Communicable Disease 1994–2003

Focus on Influenza

A Peel Health Status Report

Region of Peel
Working for you
Peel Health

INTRODUCTION

The *Communicable Disease Report 1994-2003* focuses on influenza. As in past years the report also contains data on communicable diseases organized by mode of transmission and an appendix containing all communicable diseases reported in Peel and Ontario for which data were available.

Data for this report are mainly from the Reportable Diseases Information System (RDIS) with some influenza data originating from other sources. For more details please refer to the Data Sources and Methods section.

Communicable diseases are illnesses caused by living organisms or the toxins they produce. They are spread directly from an infected person, animal or environmental source. Spread can also occur indirectly by contaminated animals and objects.

The information contained in this report is presented as follows:

- A focus chapter on influenza
- An overview of the following groups of communicable diseases:
  - sexually transmitted and bloodborne diseases
  - vaccine preventable diseases
  - diseases spread by food and water
  - diseases spread by close personal contact
  - diseases spread by insects
- An Appendix containing tables with case counts and incidence rates for a more extensive list of communicable diseases reported in Peel and Ontario, listed in alphabetical order. Diseases not reported in Peel during the time period of this report were not included in the tables.

The *Communicable Disease Report 1994-2003* will highlight data on selected communicable diseases of public health importance because of their potential for spread to a large number of people and their ability to cause serious illness. Diseases meeting these criteria but which are rare in Peel are included in the appendix.

The *Communicable Disease Report 1994-2003* is intended to be a resource for Peel Health Department and staff, health and social service agencies, physicians and other health care providers, elected officials and those that provide programs and services to groups at risk for communicable diseases.

CHAPTER 1: INFLUENZA

Highlights

- In Peel and Ontario, the incidence of influenza in the 2003/2004 season was the highest it has been in the last nine seasons. This is most likely due to increased use of newly available and convenient rapid tests for influenza and increased monitoring of respiratory infections in response to Severe Acute Respiratory Syndrome (SARS).
- In Peel, the reported incidence of influenza is highest in those aged less than five years and those 60 years and older. This may reflect the fact that these age groups are more likely to have a serious illness from influenza and be tested.
- The predominant strain of influenza that circulated in Ontario and Canada during the 2003/2004 influenza season was A/Fujian/411/02-like.
- During the 2003/2004 influenza season there were 21 outbreaks of influenza A in institutions reported by the Region of Peel Health Department to the Ontario Ministry of Health and Long-Term Care. The number of outbreaks for 2003/2004 was the highest since these data started to be collected in 1997/1998.

Introduction

Influenza (commonly known as the flu) is a serious respiratory infection that is caused by the influenza virus. Various strains of the virus circulate throughout the world year-round, causing local outbreaks. In Canada, influenza season usually runs any time from October to April. Most influenza activity occurs within a one or two month period during this time. It is estimated that between 10-25% of Canadians may become infected with influenza each year.[1] Although most of these people recover completely, many Canadians, mostly seniors, die every year from pneumonia and from other serious complications related to influenza. Health Canada estimates the number of deaths in Canada from influenza to be 700 to 2,500 per year.[2]

Vaccination, which is available before and during each influenza season, decreases the incidence and severity of disease.

History of Influenza

Historians can trace the past epidemics of influenza by examining reports for the signs, symptoms, extensiveness and explosive nature of previous outbreaks - widespread outbreaks of a rapidly spreading respiratory disease with fever that is accompanied by high rates of complications such as pneumonia and an excess of deaths is likely to have been influenza. Reports of influenza have changed

from the early Greek writings of 412 BC describing diseases which may have been influenza to the laboratory confirmed reporting done today. The term "influenza" resulted from an epidemic in 1357, to which Buonissequi referred as the "grande influenza." This Italian word for "influence" was used as a collective term for various causes of widespread epidemics.[3] After 1650, the term influenza is found regularly in scientific and lay publications. By 1700 onwards, the amount of information on influenza outbreaks increased and improved in quality so that people today can have an idea of the numbers of people infected, the severity of illness, the countries involved and the possible origins of some outbreaks.[3]

In Canada, influenza appeared in epidemic proportions on at least seven occasions during the 19th century. The effects of the epidemic of 1832 were masked by cholera and those of the epidemic of 1847/1848 by typhus, but the eradication of other diseases was not the only reason influenza grew in importance by the end of the 1800s. The epidemic of 1889/1890 was particularly widespread, affecting 40% of the world's population.[4]

Local historian William Perkins Bull noted the impact of influenza on communities here in Peel.[5] In 1874, there was a widespread outbreak of bronchitis which caused many deaths. Although the cause was unknown, in hindsight it may well have been influenza. Unfortunately, even after the Pandemic of 1918/1919, the cause of influenza was unknown. There were no laboratory tests to help physicians distinguish the flu from other less serious respiratory conditions. And it was unknown when a person with the flu ceased to be a danger to other people.[4]

Because of these uncertainties, during the Pandemic of 1918/1919 most schools in Peel were closed by local authorities and public gatherings were stopped.[5] The health care system at the time was stretched to its limit. Many people in Peel relied on hospitals in other cities such as Toronto and Hamilton. But these were so full that people from outside the city of a particular hospital could not be admitted. This made the situation very difficult in Peel (for example, in Brampton there were as many as 150 cases of influenza at one time). The founding of Peel Memorial Hospital and a local chapter of the Victorian Order of Nurses was in no small part a response to the events of the influenza pandemic.[5]

The pandemic of 1918/1919 (also known as the "Spanish Flu") demonstrated the devastation caused by influenza. Worldwide, an estimated 500 million persons were infected and over 20 million persons died.[3]

Since then, a number of scientific developments have improved our ability to track, prevent and treat influenza. In 1932, the influenza virus was first isolated allowing for the confirmation of a diagnosis as well as detailed information on strains causing illness in people. In the 1940s, influenza vaccines were developed providing a means to prevent influenza infection and its complications.[6] More recently, a number of drugs have been developed

providing not only a means to treat influenza infections, but also to enhance the preventive abilities of vaccines.

Biology of Influenza

Three types of influenza virus are known: A, B and C. Influenza A and B are the two types of influenza viruses that cause widespread human disease. Influenza A viruses are found in many different animals, including ducks, chickens, pigs, whales, horses, and seals. Influenza A viruses are divided into subtypes based on two proteins on the surface of the virus. These proteins are called hemagglutinin (H) and neuraminidase (N).[7] Influenza B viruses are found to circulate only among humans and are not categorized into subtypes. Influenza C is a minor cause of mild illness in people and not associated with epidemics like Influenza A or B. Receiving an influenza shot can prevent illness from Influenza types A and B.

The World Health Organization (WHO) system of naming A, B and C influenza viruses consists of a strain designation which includes the virus type, geographic origin, laboratory reference number, and year of occurrence.[3] For example "A/Fujian/411/02-like" would be type A, first found in the Fujian region of China, with laboratory number 411, first occurring in 2002. In addition, for influenza A viruses only, a description of the hemagglutinin ("H") and neuraminidase ("N") antigens is used.[3] So our previous example is more fully described as "A/Fujian/411/02(H3N2)-like".

The influenza virus is constantly changing. One type of change is called "antigenic drift."[7] These are small changes in the virus that happen continually over time. Antigenic drift produces new virus strains that may not be completely recognized by the body's immune system. Frequent development of new strains through antigenic drift is the reason why influenza comes back every year. The need for annual vaccination is to incorporate more of these new strains in each year's influenza vaccine.[7]

The other type of change is called "antigenic shift." Antigenic shift is an abrupt, major change in the influenza A virus, resulting in new hemagglutinin and/or new neuraminidase proteins in influenza viruses that infect humans. Shift results in a new influenza A subtype. When shift happens, most people have little or no protection against the new virus. While influenza viruses are changing by antigenic drift all the time, antigenic shift happens only occasionally. Type A viruses undergo both kinds of changes; influenza type B viruses change only by the more gradual process of antigenic drift and does so less rapidly than influenza A viruses.[7]

The main currently circulating subtypes of human influenza A viruses are A(H1N1) and A(H3N2). Influenza A(H1N1), A(H3N2), and influenza B strains are

included in the 2003/2004 influenza vaccine.[7] More on influenza vaccination will be discussed in the Influenza Vaccination and Treatment section of this report on page 22.

Mode of Transmission

The influenza virus spreads easily from person to person through droplets that have been coughed or sneezed into the air by someone who has influenza. A person can become infected with influenza by breathing in these droplets through their nose or mouth, or by the droplets landing directly on their eyes. The influenza virus is also found on the hands of people with influenza and on surfaces they have touched. A person can become infected if they touch contaminated surfaces and transfer the virus to their own eyes, nose or mouth. Influenza can be prevented by practising good hand-washing and getting the influenza vaccine every year.

The incubation period for influenza is an average of two days (range between one and four days). The period of communicability for influenza is probably three to five days from clinical onset in adults and up to seven days in young children.[8,9]

Signs and Symptoms of Influenza

Influenza typically starts abruptly with a headache, chills and cough, followed rapidly by fever, loss of appetite, muscle aches and fatigue, runny nose, sneezing, watery eyes and throat irritation. It can often come on so suddenly that people remember the exact time they first felt ill. Children may have nausea, vomiting and diarrhea, which are uncommon symptoms in adults. Many people use the terms "flu" or "stomach flu" to describe other illnesses such as a cold or a mild case of food poisoning. These illnesses are not caused by the influenza virus.

Complications and Health Outcomes

Although most people recover within a week or ten days, the risks of complications, hospitalizations and deaths from influenza are higher among persons aged 65 years and older, young children, and persons of any age with certain underlying conditions. These include chronic respiratory disease, heart or kidney disease, diabetes or a depressed immune system because of cancer, Human Immunodeficiency Virus (HIV) infection, or some other cause.[6] Influenza-related deaths can result from pneumonia as well as from exacerbations of cardiopulmonary conditions and other chronic conditions.[6]

Reye's syndrome can develop in children and teenagers who are given salicylates (aspirin) when they have high fever associated with illnesses such as influenza.[6] Reye's syndrome affects the central nervous system and the liver, and can be fatal. Aspirin should not be given to ill children or teenagers unless specifically directed by a doctor.[6]

Respiratory illness caused by influenza is difficult to distinguish from illness caused by other respiratory pathogens (such as colds) based on symptoms alone. Laboratory tests for influenza are crucial to making the diagnosis.

Laboratory Diagnosis of Influenza

The accuracy of clinical diagnosis of influenza on the basis of symptoms alone is limited because symptoms caused by other illnesses can overlap considerably with influenza. Fortunately, a large number of different diagnostic tests are available for detection of influenza. Rapid antigen testing and viral culture are the two main types of tests in use today.[10, 11]

Commercial rapid diagnostic tests are available that can detect influenza viruses within 30 minutes versus the three to ten days that viral culture can take. However, these tests are less accurate and provide less information than viral culture. [10, 11]

Despite the availability of rapid diagnostic tests, collecting clinical specimens for viral culture is critical, because only culture isolates can provide specific information regarding circulating influenza subtypes and strains. This information is needed to compare current circulating influenza strains with vaccine strains, to formulate vaccine for the coming year and to monitor the emergence of antiviral drug resistance and the emergence of new influenza A subtypes that might pose a pandemic threat. [10, 11]

Use of these tests on a population basis is helpful to determine the type and level of influenza activity in the community. Testing for influenza is also very helpful during a respiratory illness outbreak in an institution such as in a hospital or long-term care facility. This allows a number of specific control measures to be brought into place if influenza is found to be the cause. Use of rapid tests allows this to happen much more quickly (in addition to samples taken for viral culture). However, these tests do not need to be done on all patients. For most individual patients the knowledge that influenza is circulating widely in the community combined with their symptoms is enough to properly guide a doctor's care. [10, 11]

Influenza Surveillance

Influenza surveillance (monitoring) is a collaborative effort between local health departments, provincial and territorial ministries of health, participating laboratories, The College of Family Physicians of Canada, sentinel physicians, and Viral Respiratory Diseases Section, Division of Immunization and Respiratory Diseases, Centre for Infectious Disease Prevention and Control (CIDPC) at Health Canada.[12]

Influenza surveillance data collected by local health departments are part of an international system for monitoring this disease. Confirmed influenza cases reported to local health departments are transmitted to the Ontario Ministry of Health and Long-Term Care for provincial monitoring, which in turn is transmitted to Health Canada for national monitoring, and finally shared with the World Health Organization (WHO) to monitor global influenza trends. These data provide information regarding the presence of influenza viruses in the community, and identify the predominant circulating types, subtypes and strains of influenza.

The Viral Respiratory Diseases Section, Division of Immunization and Respiratory Diseases, Centre for Infectious Disease Prevention and Control (CIDPC) at Health Canada, produces *FluWatch* reports, summarizing influenza surveillance activities in Canada. Weekly reports are produced during the influenza season (October - May) and biweekly reports are produced during the off season (June - September).

The main components of the influenza surveillance system include:

1) Laboratory reports of positive influenza tests.

2) Influenza-like illness (ILI) reporting by sentinel physicians within Ontario and the country. ILI is a non-specific respiratory illness characterized by fever, fatigue, cough, and other symptoms. Although a large number of ILI cases are not caused by influenza but by other viruses (e.g. rhinovirus, respiratory syncytial virus (RSV), adenoviruses, and parainfluenza viruses) ILI monitoring does detect influenza activity when it is intense.[13]

3) Reporting of influenza activity by provincial and territorial epidemiologists. This assessment of influenza activity is based on various indicators, including laboratory surveillance, ILI, reporting school and work absenteeism, and outbreaks in long-term care facilities (LTCF) or other institutions.

4) World Health Organization and other international reports of influenza activity.[12]

This wide variety of information is collected to provide a timely and broad picture of influenza activity. Each type of information has its advantages and disadvantages. Laboratory tests for influenza, while accurate, tend to be done only on hospitalized patients and may not reflect what is happening in the community. Until the development of rapid tests, this system also was not timely. Physician reporting of influenza-like illness, while rapid and more reflective of transmission in the community, cannot distinguish between influenza and other respiratory viruses.

For further details on any of these components please consult Health Canada's FluWatch website at http://www.hc-sc.gc.ca/pphb-dgspsp/fluwatch/index.html.

Influenza in Canada and Ontario, 2003/2004

The Canadian 2003/2004 influenza season began earlier than usual and involved a new variant of the A(H3N2) strain (A/Fujian/411/2002) that was not included in the 2003/2004 year vaccine.[1] The vaccine was still felt by WHO to provide some reduced protection against this strain since it contained a closely related A(H3N2) strain (A/Panama/2007/99).[13] As with other H3N2 predominant seasons, the 2003/2004 influenza season was more severe than average, although surveillance indicators to date were still within the range of past seasons.[14]

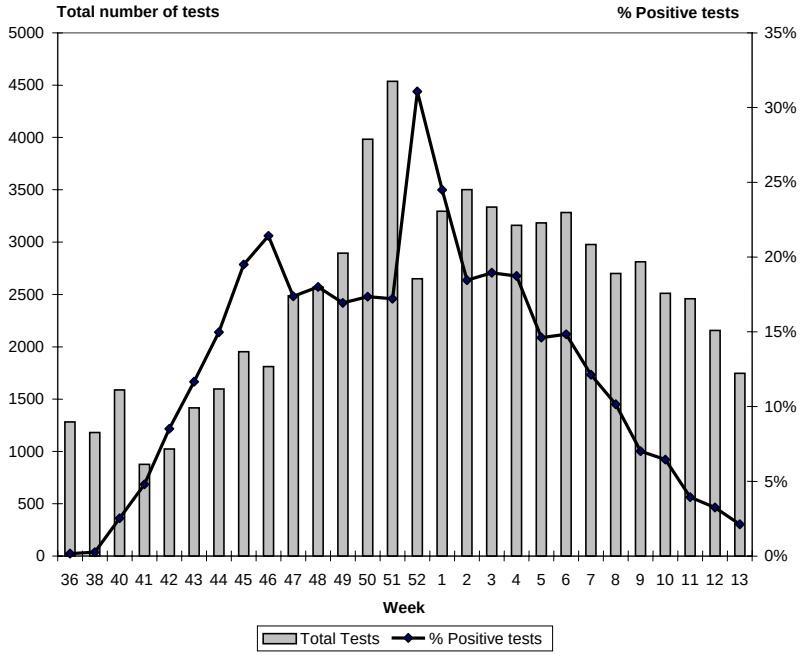
Positive Influenza Tests

Figures 1.1 and 1.2 show the percentage of positive tests in Canada and Ontario from August 24, 2003 (Week 36) to March 27, 2004 (Week 13). Up to March 27, 2004 Health Canada received 75,223 reports of laboratory tests for influenza, including 11,199 (14.9%) influenza A detections and 100 (0.1%) influenza B detections. In Ontario, there were 29,105 laboratory tests for influenza, of which 4,465 (15.3%) were positive for Influenza A and 31 (0.1%) were positive for Influenza B.

The highest percentage of positive influenza tests in both Canada and Ontario occurred during the week ending December 27, 2003 (Week 52), when nearly half (48.5%) of all influenza tests in Ontario were positive. The percentage of positive tests during week 52 was higher in Ontario (48.5%) than Canada (31.1%).

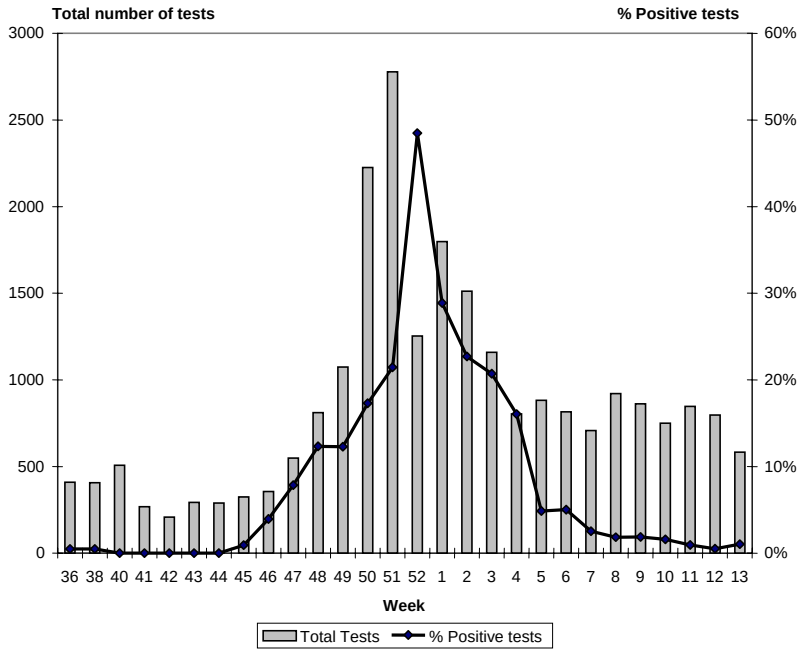
Compared to Ontario, (Figures 1.1 &1.2) influenza activity across Canada as a whole occurred over a wider time period but did not reach as high a peak. This reflects the fact that Canada-wide data are summed from differently timed regional influenza outbreaks across the country which tend to be more intense but of shorter duration. The peak of influenza activity in Ontario during week 52 can be seen in the national data but is not as intense. The earlier peak in the Canadian influenza graph (week 46) is due to the peak of influenza activity in the Prairie provinces (data not shown).[15]

Figure 1.1: Number and Percent of Positive Influenza Tests in Canada by Week of Report, August 24, 2003 (Week 36) to March 27, 2004 (Week 13)



Source: Health Canada, Population and Public Health Branch. *FluWatch Report: March 21 to 27, 2004.* 2004 April [cited 2004 May 12]: [7 screens].
Available from: URL: http://www.hc-sc.gc.ca/pphb-dgspsp/fluwatch/03-04/w13_04/index.html

Figure 1.2: Number and Percent of Positive Influenza Tests in Ontario by Week of Report, August 24, 2003 (Week 36) to March 27, 2004 (Week 13)

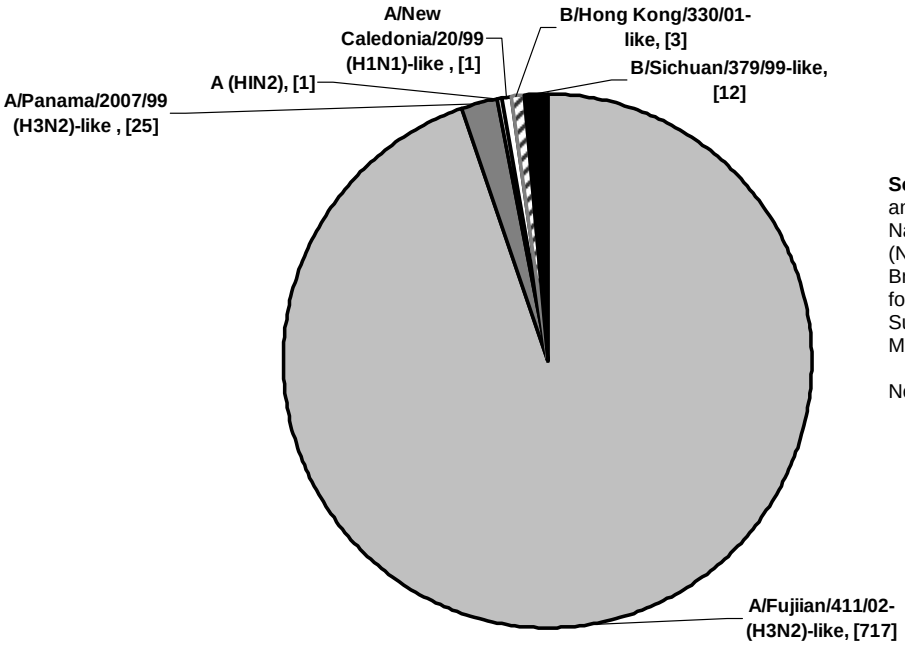


Source: Health Canada, Population and Public Health Branch. *FluWatch Report: March 21 to 27, 2004.* 2004 April [cited 2004 May 12]: [7 screens].
Available from: URL: http://www.hc-sc.gc.ca/pphb-dgspsp/fluwatch/03-04/w13_04/index.html

Strain Characterization

The predominant strain of influenza that circulated in Canada during the 2003/2004 influenza season was A/Fujian/411/02-like (717 out of 759 positive isolates or 94.5% - Figure 1.3).[12] A/Fujian is an H3N2 strain first isolated in 2002 and which appeared in Canada for the first time in 2003. It is closely related to A/Panama which has been circulating in Canada since the 2000/2001 influenza season. A/Panama was the predominant strain in 2001/2002.

Figure 1.3: Distribution of Influenza Strain Characterization, Canada, Cumulative Number, 2003/2004 influenza season [N=759]



Source: Health Canada. Influenza and Respiratory Viruses Section. National Microbiology Laboratory (NML), Population and Public Health Branch. Canadian Sciences Centre for Human and Animal Health. Submitted from October 1, 2003 to March 27, 2004.

Note: Pie chart is not to scale.

A/Fujian was also the predominant strain circulating in Ontario during the 2003/2004 influenza season (337 out of 349 positive isolates or 96.6%), followed by two influenza B strains - B/Sichuan (nine out of 349 positive isolates) and B/Hong Kong (three out of 349 positive isolates).[16]

The distribution of influenza strains in Canada for the five most recent influenza seasons is shown in Table 1. A particular strain may circulate for a number of years and is often only predominant during one influenza season. In any one year more than one strain can be circulating. The predominant strain in circulation for each of the past five influenza seasons has been type A, with the exception of 2000/2001 when type B was predominant.

Table 1: Distribution of Influenza Strains Characterized by the Respiratory Viruses Section of the National Microbiology Laboratory for the influenza Seasons 1999/2000 to 2003/2004, Canada

Influenza Season	1999/2000a	2000/2001b	2001/2002c	2002/2003d	2003/2004e
Strain					
A/New Caledonia/20/99-like	99	236	1	81	1
A/Fujian/411/02-like					717
A/Johannesburg/82/96-like		5			
A/H1N2			75	265	1
A/Panama/2007/99-like		2	347	78	25
A/Sydney/5/97-like	480				
B/Sichuan/379/99-like			5	2	12
B/Hong Kong/330/01-like			147	126	3
B/Yamanashi/166/98-like		253			
B/Beijing/243/97	43	1			
Total	**622**	**497**	**575**	**552**	**759**

predominant strain in a given year.

Sources:

a. Health Canada. *Influenza in Canada - 1999-2000 Season*. CCDR. 2001 January 1; 27(01): 1-12.

b. Health Canada. *Influenza in Canada - 2000-2001 Season*. CCDR. 2002 February 1; 28(03): 17-28.

c. Health Canada. *Influenza in Canada - 2001-2002 Season*. CCDR. 2003 March 15; 29(06): 45-60.

d. Health Canada, Population and Public Health Branch. *FluWatch Report: August 10 to August 23, 2003.* 2003 August [cited 2004 May 12]: [7 screens].
Available from: URL: http://www.hc-sc.gc.ca/pphb-dgspsp/fluwatch/02-03/w34_03/index.html

e. Health Canada, Population and Public Health Branch. *FluWatch Report: March 21 to 27, 2004.* 2004 April [cited 2004 May 12]: [7 screens].
Available from: URL: http://www.hc-sc.gc.ca/pphb-dgspsp/fluwatch/03-04/w13_04/index.html

Influenza Outbreaks in Canada

During the 2003/2004 influenza season in Canada (up to March 27, 2004), there were a total of 730 outbreaks reported, including 447 influenza confirmed outbreaks in long-term care facilities/retirement lodges (360) and hospitals (87), and 283 influenza-like illness outbreaks in schools (188) and other types of facilities (95).[12]

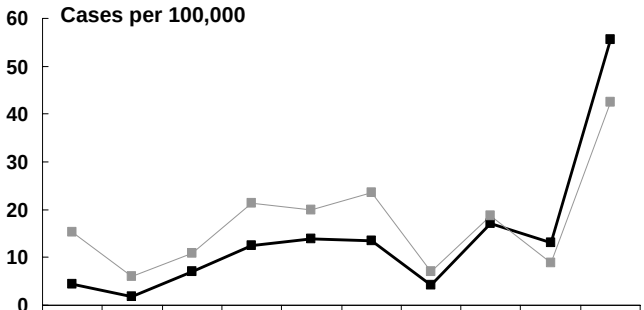
Influenza in the Region of Peel

The role of Peel Health in the prevention and control of influenza is to:

- Monitor influenza in the community and provide reports to stakeholders and the public
- Investigate cases and outbreaks of influenza
- Provide assistance to institutions experiencing outbreaks of influenza
- Promote the influenza vaccine
    - Distribute influenza vaccine to all sites where immunization will occur
    - Coordinate and offer influenza immunization clinics at community locations
    - Coordinate regional efforts to immunize in workplaces, hospitals, long-term care facilities, physician offices and schools.

The last influenza season in the Region of Peel (2003/2004) had the most cases (554) and highest incidence rate (55.5 per 100,000) compared to the previous 10 influenza seasons (Figure 1.4). This trend was similar for Ontario. In the Region of Peel, there were 550 cases of Influenza A and four cases of Influenza B for the 2003/2004 influenza season (up to March 20, 2004). Nine of the type A strains were characterized, and all were A/Fujian (H3N2). The increase in 2003/2004 compared to previous influenza seasons may be due to increased use of newly-developed rapid tests for influenza. In addition there was heightened awareness and testing of respiratory illnesses as a result of the outbreak of Severe Acute Respiratory Syndrome (SARS) which occurred in southern Ontario in the spring of 2003.

Figure 1.4: Incidence of Influenza by Seasonal* Year, Region of Peel and Ontario, 1994/1995-2003/2004



	94/95	95/96	96/97	97/98	98/99	99/00	00/01	01/02	02/03	03/04
Peel	4.4	1.9	7.0	12.5	13.8	13.5	4.2	17.1	13.0	55.5
Ontario	15.3	6.1	10.9	21.3	19.9	23.5	7.1	18.8	8.9	42.5
Peel Cases	34	18	61	101	111	113	41	166	133	554

Year

*Seasonal year from July to June (e.g. 94/95 includes all cases from July 1, 1994 to June 30, 1995). 2003/2004 data up to March 20, 2004.

Note: Rates age-standardized using 1991 (adjusted) Canadian population.

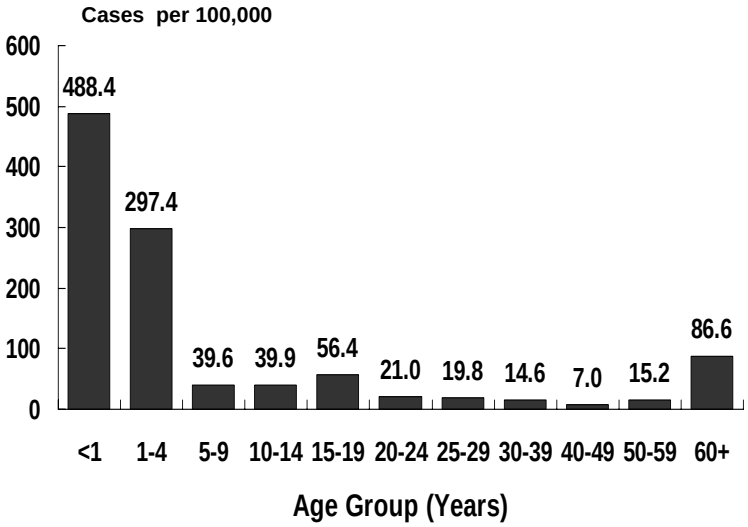
Sources: Ontario Data from RDIS, Ontario Ministry of Health and Long-Term Care, as of 05/18/2004.

Peel Data from RDIS, Region of Peel Health Department, as of 05/06/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

In Peel, the reported incidence of influenza is highest in those aged less than five years and those 60 years and older. This may reflect the fact that these age groups are more likely to have a serious illness from influenza and be tested. (Figure 1.5)

Figure 1.5: Incidence of Influenza by Age Group, Region of Peel, 2003/2004*



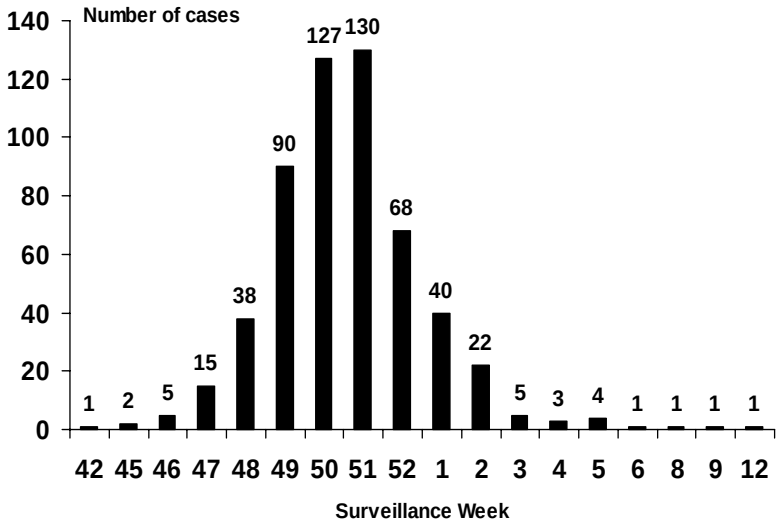
*Seasonal year 2003/2004 from October 12, 2003 to March 20, 2004.

Sources: Peel Data from RDIS, Region of Peel Health Department, as of 05/06/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

Influenza cases by week for the 2003/2004 influenza season show high activity for seven to eight weeks, with a peak of 130 cases during week 51 (week ending December 20, 2003) (Figure 1.6). This is similar to the pattern for Ontario (Figure 1.2). The small number of cases during week 52 compared to weeks 50 and 51 may be the result of the holiday season.

Figure 1.6: Influenza Cases By Week of Onset of Symptoms, Region of Peel, October 12, 2003 - March 20, 2004**



*Seasonal year 2003/2004 from October 12, 2003 to March 20, 2004.

**Note: Episode date was used when onset date was not available.

Source: Peel data from RDIS, Region of Peel Health Department, as of 05/06/2004.

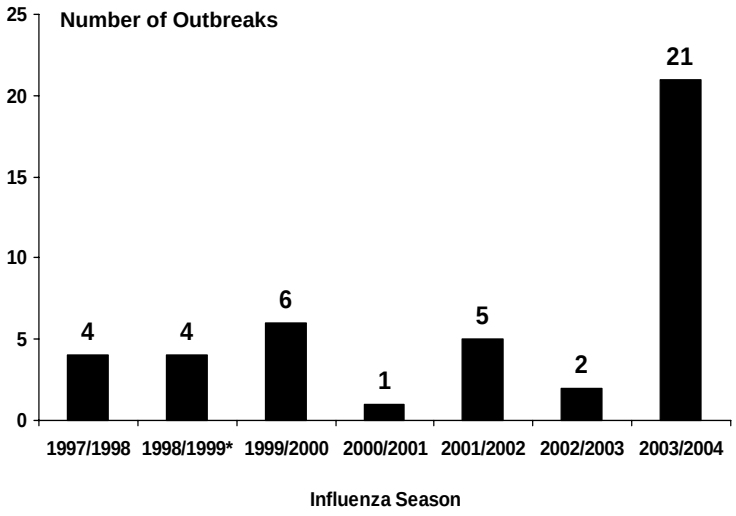
Influenza Outbreaks in the Region of Peel

During the 2003/2004 influenza season there were 21 outbreaks of influenza A in institutions reported by the Region of Peel Health Department to the Ontario Ministry of Health and Long-Term Care. The number of outbreaks for 2003/2004 was the highest since these data were collected, beginning in 1997/1998 (Figure 1.7).

There were four outbreaks of influenza in Peel Region hospitals during the 2003/2004 influenza season. There were two outbreaks in Peel Region hospitals in 2001/2002 and before this the last outbreak in a Peel Region hospital was during the 1999/2000 influenza season.

The above information needs to be interpreted with caution as the system of reporting outbreaks has improved and the number of institutions in Peel has increased substantially.

Figure 1.7: Influenza Outbreaks, by Influenza Season, Region of Peel, 1997/1998 - 2003/2004

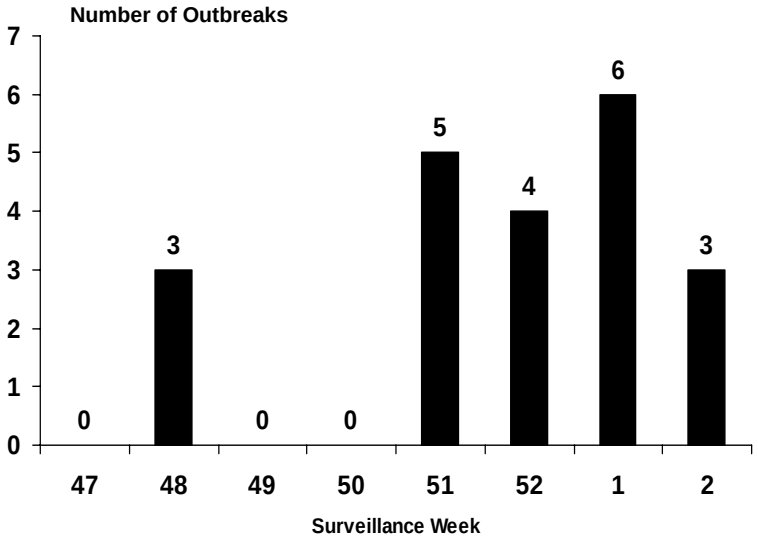


Source: Communicable Disease Division, Region of Peel Health Department, as of 05/06/2004.

Note: * outbreaks for 1998/1999 influenza season include one for Influenza B.

Influenza outbreaks during the 2003/2004 influenza season were clustered around week 51 to week 2, with a peak of six outbreaks during week 1 (Figure 1.8). This is similar to the time frame from other types of influenza reporting contained in this report.

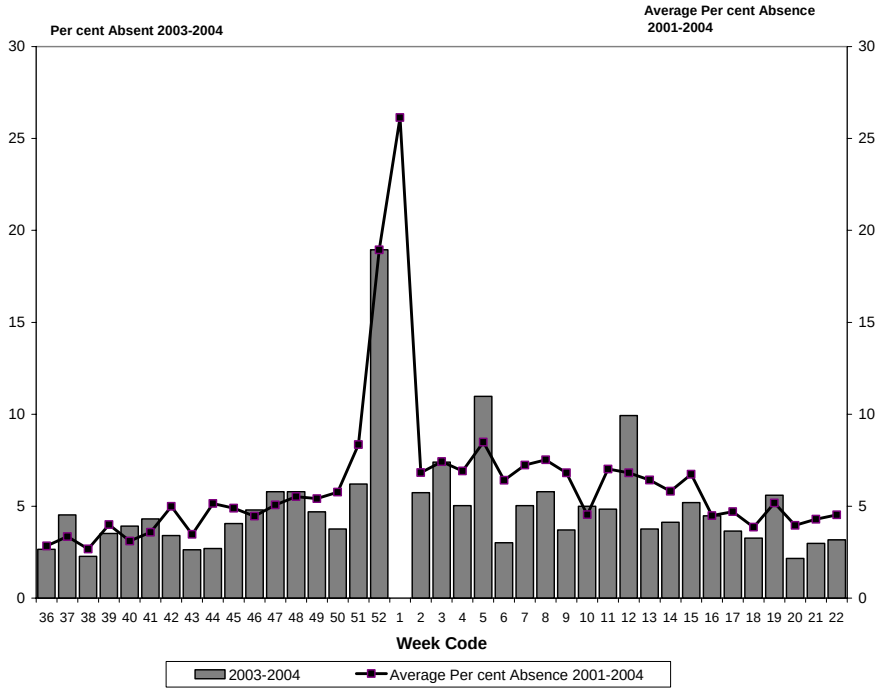
Figure 1.8: Influenza Outbreaks by Week, Region of Peel, 2003/2004 Influenza Season



Source: Communicable Disease Division, Region of Peel Health Department, as of 05/06/ 2004.

Another way that Peel Health monitors influenza in the community is by tracking absenteeism at local daycares and workplaces. This is one way to see if influenza is having an impact on the community. Results from the daycare surveillance data for the 2003/2004 influenza season are shown in Figure 1.9. The peak absences during week 52 and week 1 are most likely due to the holiday season and corresponding vacations occurring during this time of year. This is a well known problem with absenteeism monitoring – many people are away for reasons other than illness often as a function of holiday schedules.

Figure 1.9: Per Cent Absenteeism in Daycares: Pandemic Influenza Watch, Region of Peel, 2003-2004



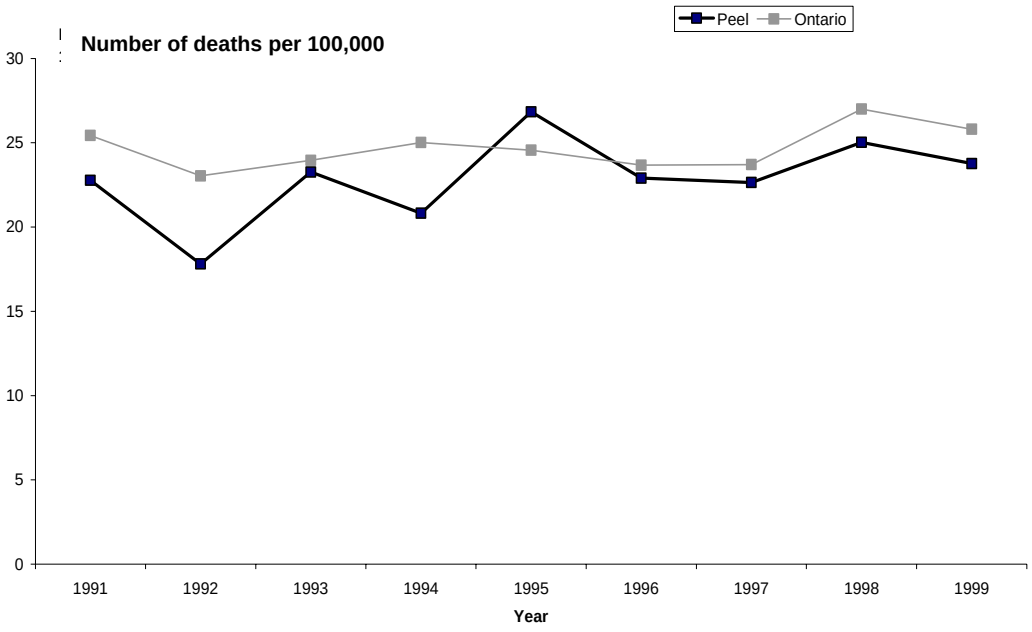
Source: Communicable Disease Division, Region of Peel Health Department, as of 06/07/2004.

Pneumonia and Influenza Mortality and Morbidity

Approximately 700 to 2,500 deaths per year are reported in Canada due to influenza or pneumonia as a complication of influenza. However, this number may be an underestimate since there are many more deaths where the immediate cause of death is another underlying medical condition but where influenza may have started the chain of events leading to death.

Information on deaths from influenza in Peel is available for the years 1991-1999. From 1991 to 1998 in the Region of Peel there were less than five deaths per year where the cause of death was reported as influenza. In 1999 this increased to seven deaths. Most of these deaths occurred in adults aged 65 and older. When influenza deaths were combined with pneumonia (one of the complications of influenza which can also be due to other causes), the death rate in the Region of Peel fluctuated between 17 and 27 deaths per 100,000 from 1991 to 1999 (Figure 1.10). The death rates in Peel were similar to the rates in Ontario.

Figure 1.10: Influenza and Pneumonia-Related Deaths, Region of Peel and Ontario, 1991-1999

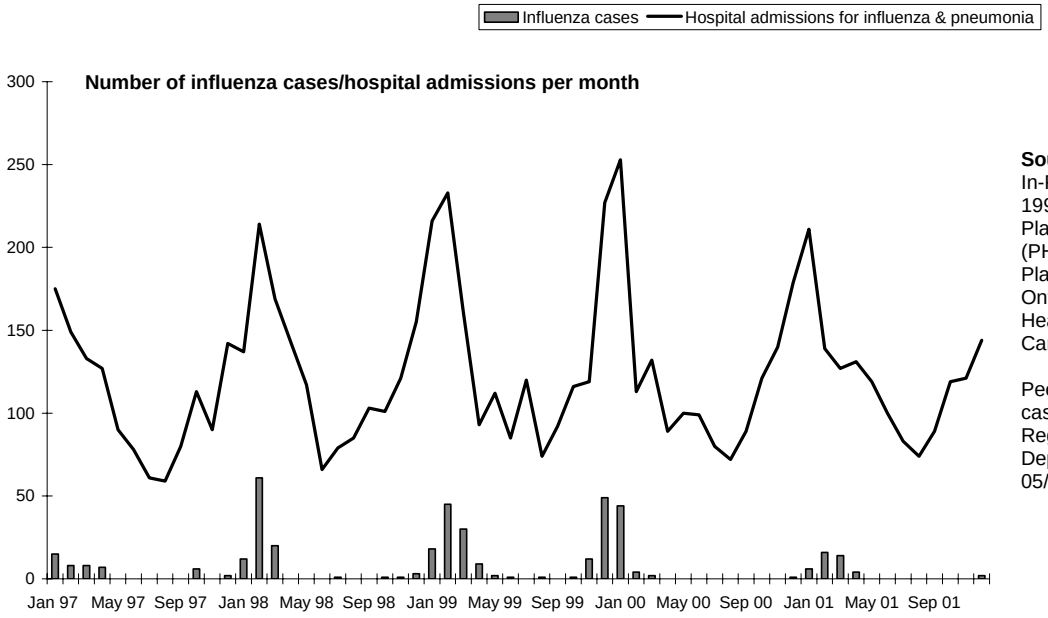


Sources: Ontario Mortality Database 1991-1999, HELPS (Health Planning System), Public Health Branch, Ontario Ministry of Health and Long-Term Care.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

Hospitalizations due to pneumonia and influenza in the Region of Peel typically peak in January and February each year (Figure 1.11). This coincides with peak activity of influenza and other respiratory viruses. The majority of these hospitalizations occur in those aged 65 years or more followed by those aged four years of age and less.

Figure 1.11: Influenza Cases and Hospital Admissions due to Influenza/Pneumonia, by Month, Region of Peel, January 1997 - December 2001



Sources: Hospital In-Patient Data 1997-2001, Provincial Planning Database (PHPDB), Health Planning Branch, Ontario Ministry of Health and Long-Term Care.

Peel data on Influenza cases from RDIS, Region of Peel Health Department, as of 05/06/2004.

Influenza Vaccination and Treatment

Vaccination is recognized as the single most effective way of preventing or lessening the impact of influenza for those at high risk of serious illness or death from influenza infection and related complications. With a good match between the vaccine and the circulating virus, influenza vaccination has been shown to prevent laboratory-confirmed influenza illness in approximately 70% to 90% of healthy children and adults. Under these circumstances, studies have also shown influenza vaccination to be approximately 70% effective in preventing hospitalization for pneumonia and influenza among elderly people living in the community. Studies of elderly people residing in nursing homes have shown influenza vaccination to be 50% to 60% effective in preventing hospitalization and pneumonia and up to 85% effective in preventing death, even though the efficacy in preventing influenza illness may often be in the range of 30% to 40% among the frail elderly.[17]

The effectiveness of influenza vaccine in any particular person varies depending on the immune system of the vaccine recipient and the degree of similarity between the virus strain included in the vaccine to the strain of circulating virus during the influenza season.[18] Because circulating influenza strains change from year to year, a new vaccine, updated yearly with the most current circulating strains, is needed to protect against new infections every year. Which influenza strains go into a particular year's vaccine are determined by the World Health Organization (WHO) Global Influenza Surveillance Network. The WHO recommends the content of the influenza vaccine for the subsequent influenza season based on currently circulating strains, February for the northern hemisphere and September for the southern hemisphere.[18] This allows people in the northern hemisphere to be vaccinated from October to mid-November just before influenza season usually starts.[18]

Universal voluntary influenza immunization began in Ontario in 2000 with free influenza vaccine being made available to all Ontario residents aged six months and older. Currently, Ontario is the only province in Canada to provide a universal influenza "flu shot" campaign.

Influenza vaccine programs should aim to vaccinate at least 90% of eligible recipients. Nevertheless, only 70% to 91% of long-term care facility (LTCF) residents and 20% to 40% of adults and children with medical conditions listed previously receive vaccine annually. Studies of health care workers (HCW) in hospitals and LTCFs have shown vaccination rates of 26% to 61%.[17]

The National Advisory Committee on Immunization recommended that the trivalent influenza vaccine for the 2004/2005 influenza season contain A/New Caledonia/20/99 (N1H1)-like, A/Fujian411/2002 (H3N2)-like, and B/Shanghai/361/2002-like virus antigens.[19]

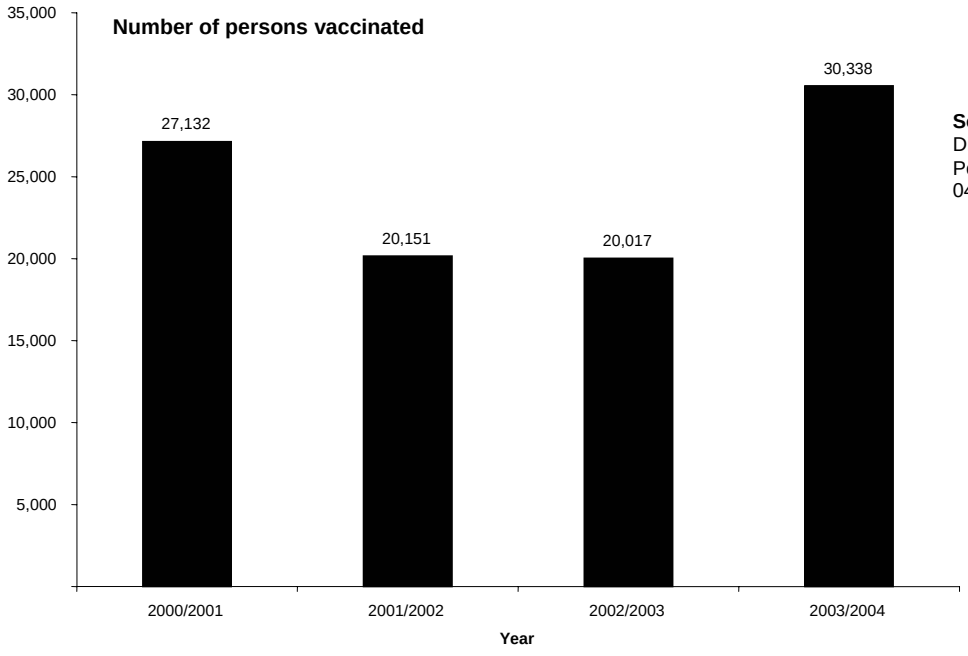
Vaccination in the Region of Peel

The Peel Health Department distributes vaccine to local physicians, hospitals, long-term care facilities, nursing agencies and workplaces, and also holds various community clinics for local residents before and during each influenza season.

According to Rapid Risk Factor Surveillance System (RRFSS) data for the Region of Peel, about 39% of Region of Peel residents aged 18 and older reported having an influenza shot during the 2003/2004 influenza season. This figure was slightly higher than the 32% of residents who reported having an influenza shot during the 2002/2003 influenza season.

There were 162 influenza clinics held at various community sites and secondary schools in the Region of Peel from October 15, 2003 through to January 19, 2004. The number of influenza vaccinations given by Peel Health Department staff during the 2003/2004 influenza season was the highest it had been since the influenza immunization campaign became universal in 2000 (Figure 1.12).

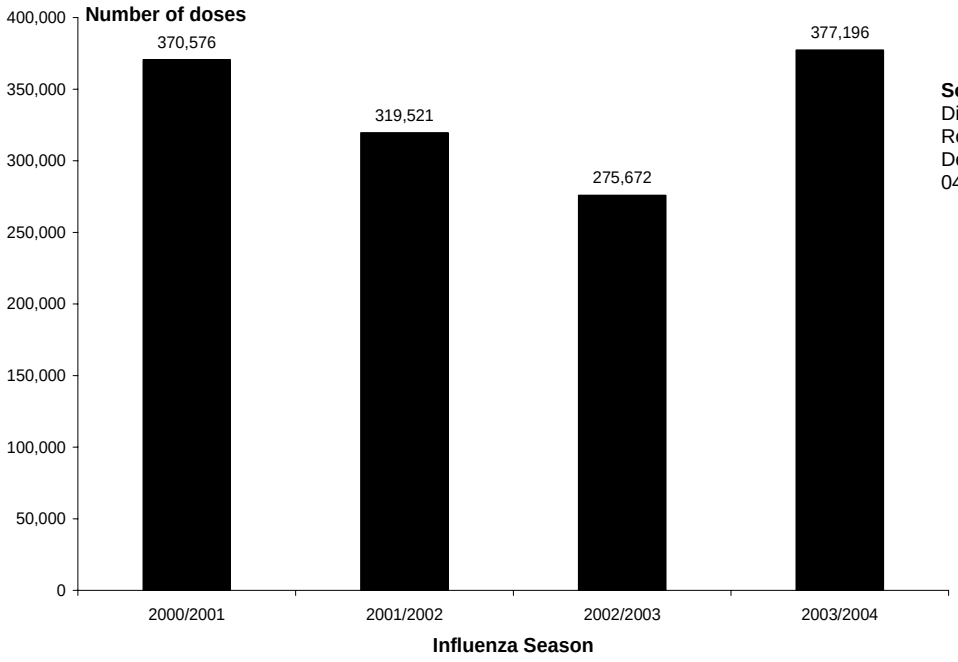
Figure 1.12: Influenza Vaccinations Given by Peel Health Staff, by Influenza Season, 2000/2001 to 2003/2004



Source: Communicable Disease Division, Region of Peel Health Department, as of 04/26/2004.

During the 2003/2004 influenza season, approximately 377,196 doses of the influenza vaccine were distributed by the Region of Peel Health Department, which represents a 37% increase over those distributed during the 2002/2003 influenza season (Figure 1.13). It is apparent that most people in Peel receive their influenza vaccine outside of a Peel Health clinic.

Figure 1.13: Influenza Vaccine Doses Distributed by Peel Health, by Influenza Season, 2000/2001 to 2003/2004



Source: Communicable Disease Division, Region of Peel Health Department, as of 04/26/2004.

People who are residents of long-term care facilities (LTCF) are among the most vulnerable to influenza. The Region of Peel data in Table 2 indicate that at least 94% of LTCF residents have been vaccinated for influenza each year since the 1998/1999 influenza season. The immunization rates among LTCF staff are lower than among residents, yet higher than what is shown among different studies of the general population. Immunization rates in LTCF staff jumped from 34% in 1998/1999 to 81% in 1999/2000 largely as a result of a province-wide effort to increase influenza vaccination in this group of health care workers. This was in response to a January 1999 outbreak of influenza in a Kitchener LCTF that killed 17 of 238 residents.[20] These rates of coverage are all the more remarkable given that only about 5% of LTCF staff in Ontario were immunized in 1993/1994.[21]

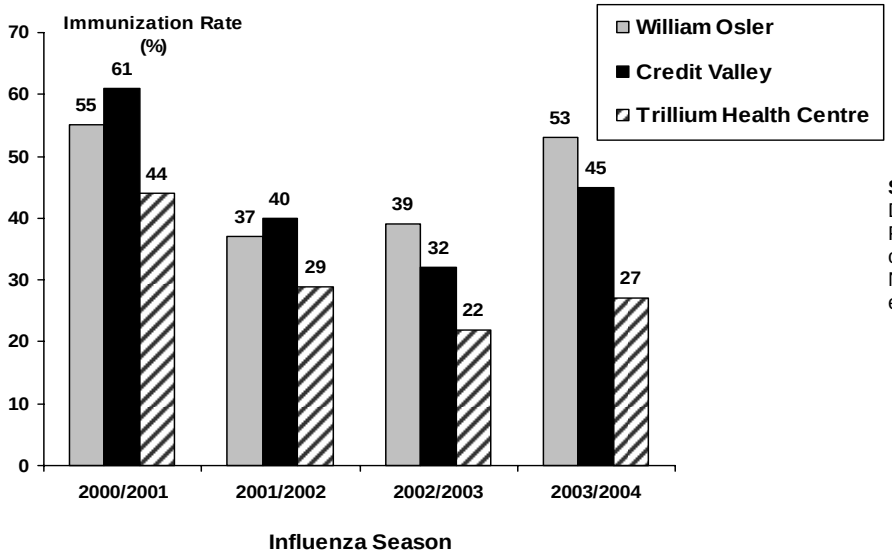
Table 2: Immunization Rates in Long-Term Care Facilities, Region of Peel, 1998/1999 to 2003/2004

Year	Residents	Staff
1998/1999	96%	34%
1999/2000	96%	81%
2000/2001	95%	81%
2001/2002	96%	82%
2002/2003	95%	79%
2003/2004	93%	73%

Note: Rates are for nursing homes and retirement homes combined in the Region of Peel.
Source: Communicable Disease Division, Region of Peel Health Department, as of 03/31/2004.

Hospital workers in the Region of Peel have shown a much lower rate of influenza vaccination compared to long term care facility staff, as shown in Figure 1.14. In general, the immunization rates for staff from each hospital in the Region of Peel declined from 2000/2001 to 2002/2003, only to increase in 2003/2004. Unfortunately, immunization rates of hospital staff are not much above those of the general population despite the fact that immunization in this group is strongly recommended and encouraged due to their contact with highly vulnerable individuals. During the 2003/2004 influenza season, only one Peel hospital out of three reported that more staff were immunized than not. This is an improvement over the previous two seasons when none of the three hospitals reached this target.

Figure 1.14: Influenza Immunization Rates among Hospital Staff, Region of Peel, 2000/2001 - 2003/2004



Source: Communicable Disease Division, Region of Peel Health Department, as of 03/31/2004.
Note: Data as of December 1 each year.

Adverse Vaccine Reactions

Adverse reactions may follow the use of vaccines, with most occurring shortly after immunization and others appearing only later. Mild vaccine-associated adverse events such as fever or swelling at the injection site are common, predictable and disappear quickly, while more serious and unexpected adverse reactions such as seizures or anaphylaxis (a severe allergic reaction) rarely develop.[22] Influenza vaccination cannot cause influenza because the vaccine does not contain live virus.

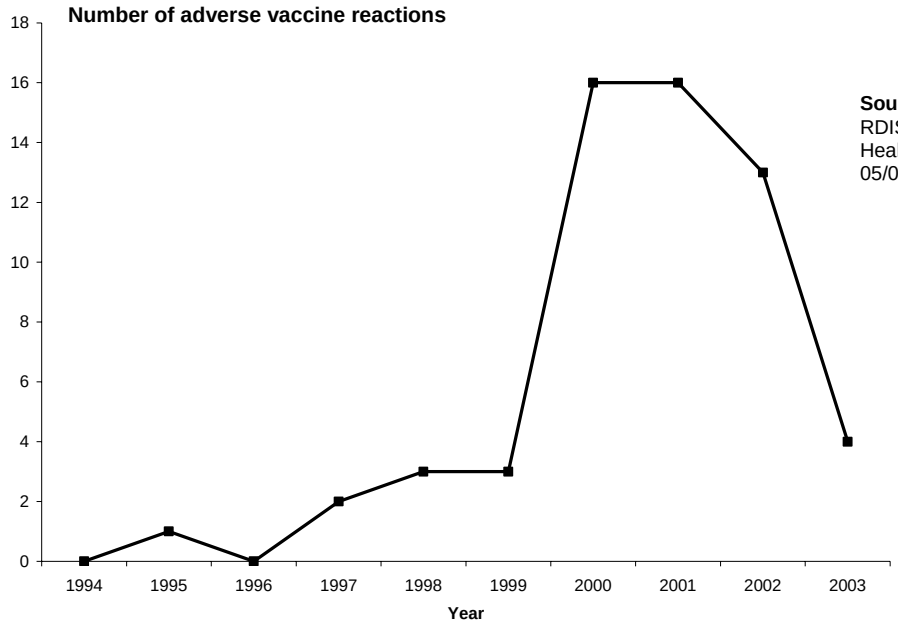
The benefits of influenza shots far outweigh the risks. Soreness at the injection site lasting up to two days is common but rarely interferes with normal activities. Fever, fatigue, and muscle soreness may occur within six to 12 hours after vaccination and last one to two days. Occasionally people develop a condition called "oculo-respiratory syndrome" (ORS) after an influenza shot. The symptoms include red eyes and respiratory effects such as cough, wheezing, chest tightness, difficulty breathing, or sore throat. In most cases, the symptoms are mild and disappear within 48 hours. During the 2000-2001 season, Health Canada received a large number of reports of red eyes, respiratory symptoms (cough, sore throat, difficulty breathing, chest tightness, and wheezing), and facial edema following influenza immunization.[23] Since then, reports of oculo-respiratory syndrome have been fewer.

Allergic responses to influenza vaccine are rare and are probably a consequence of hypersensitivity to some vaccine component, most likely residual egg protein, which is present in very small quantities. Severe allergic reactions to influenza shots are rare.

A rare possible side effect of influenza vaccination is Guillain-Barré syndrome (GBS). This is an autoimmune disease that attacks the nervous system and results in weakness and abnormal sensations. Most patients recover fully. The chance of developing GBS as a result of an influenza shot is literally one in a million.[6]

Numbers of adverse reactions attributable to influenza vaccine in the Region of Peel are shown in Figure 1.15. The increase in the number of adverse reactions from 2000 to 2002 is most likely the result of an increase in the number of vaccinations given due to the universal influenza immunization campaign which was initiated in Ontario in 2000.

Figure 1.15: Adverse Influenza Vaccine Reactions, Region of Peel, 1997-2003



Source: Peel data from RDIS, Region of Peel Health Department, as of 05/06/2004.

As a precaution, influenza vaccine should not be given to people who have had an allergic reaction to a previous dose or who have known allergy to eggs manifested as hives, swelling of the mouth and throat, difficulty in breathing, low blood pressure and shock.

In comparison to these adverse reactions, the prospect of disease and death caused by influenza are much more serious.

Drug Treatment for Influenza

While the main strategy to limit influenza's impact is vaccination, there are three drugs available in Canada that can be used to treat and prevent influenza: amantadine, oseltamivir and zanamivir. These drugs are often referred to as antivirals. Amantadine works by interfering with the ability of the virus to reproduce once it has infected a cell. Oseltamivir and zanamivir are chemically related drugs called neuraminidase inhibitors (NAIs). They both work by interfering with the ability of new virus particles to be properly released from an infected cell. Amantadine has been in use since the 1960's. It is relatively inexpensive but has more side effects and the influenza virus can rapidly develop resistance, rendering the drug ineffective.[24]

When used to treat a person ill with influenza, all three drugs have been shown to shorten the length of illness by about one to two days. There is some limited information that shows neuraminidase inhibitors can reduce complications such as pneumonia and hospitalizations. However, in order to be effective, these drugs need to be given within two days of the start of symptoms. The sooner they are given, the better their effectiveness. People who are at high risk of complications from influenza infection are most likely to benefit from antiviral treatment (i.e. those over 65 years and those with chronic diseases of the lungs, heart, kidneys, liver or immune system). The need to start treatment so soon after the start of symptoms and the lack of a readily available diagnostic test has limited the use of antiviral drugs for treatment of influenza.[24]

These same drugs can also be used to prevent people from acquiring an influenza infection (this prevention is called "chemoprophylaxis"). The drugs are commonly used in situations when there is an influenza outbreak within institutions or other semi-enclosed settings that house many high-risk individuals. Examples of such settings include long-term care facilities, residential communities of high-risk persons and hospitals. In these situations, and along with other outbreak control measures (such as cohorting of patients or residents, institution of droplet precautions, limiting of visitors), the antiviral drugs are given to all uninfected patients or residents for the duration of the institutional outbreak regardless of their vaccination status. Many vaccinated elderly still become infected with influenza despite vaccination and can transmit the virus; however, the vaccine is highly effective in preventing complications in this group. In addition, chemoprophylaxis is used for unvaccinated employees who have contact with patients or residents for the duration of the institutional outbreak. It is common to see an outbreak of influenza quickly stop within a day or two of starting chemoprophylaxis and other control measures.[24]

Pandemic Influenza

Influenza A and B usually occur in epidemic outbreaks every winter. Pandemic influenza occurs when a new, highly infectious and dangerous strain of the influenza virus appears that results in worldwide outbreaks. The pandemic influenza virus causes severe complications, such as pneumonia and death in previously healthy individuals, much more often than a non-pandemic strain. The last three pandemics occurred in 1918/1919, 1957/1958 and 1968/1969. Pandemics are unpredictable, but most experts agree that another is likely to occur in the next five to 10 years.[25]

Scientists from the World Health Organization (WHO) are continually monitoring the influenza situation. When the next pandemic happens, it will likely begin outside of North America, but with today's growing volume of international travel, the virus can spread rapidly throughout the world.

Even with the best science available, it would take at least four to six months for manufacturers to produce the first batch of vaccine once the new virus is obtained. Health Canada has taken steps to be able to ramp up production once the virus is available. In this event, production of influenza vaccine by a domestic manufacturer, Shire Biologics of Saint-Foy, Quebec, can start immediately and production capacity can be increased. The goal is to produce enough vaccine to protect all Canadians as quickly as possible. Canada is the first country worldwide to plan for a secure vaccine supply through the contracting of a domestic supplier. The contract ensures that everything required for vaccine production, including the eggs required to grow the vaccine virus and storage facilities, is in place.[25]

The WHO is urgently working together with laboratories in the WHO Global Influenza Surveillance Network to develop a prototype pandemic vaccine for use by leading vaccine manufacturers based on the H5N1 virus that has caused the recent Avian Flu outbreaks in Asia.[26]

Contingency plans for Pandemic Influenza have been developed by Health Canada,[27] the Ontario Ministry of Health and Long-Term Care[28] and the Region of Peel outlining how each level of government will respond to a pandemic. Peel Health has developed a community plan to deal with pandemic influenza at the local level and has been educating and assisting municipalities, health organizations including hospitals, police, emergency workers and local industry to do their own planning. The local plan will be regularly reviewed and updated as needed.

Implications of a Pandemic in the Region of Peel

The following implications of a pandemic in the Region of Peel are based on data from the Ontario Ministry of Health and Long-Term Care:

- as many as 750,000 people in the Region of Peel will be affected with pandemic influenza
- almost 380,000 people will become sick enough to stay in bed for several days
- up to 170,000 people would need medical treatment
- 1,100 residents could die
- hospitals, doctors and emergency rooms will be severely overburdened.

Emergency workers including police, fire, ambulance and nursing staff will be in high demand, but many of them will also be sick. One of the biggest challenges will be to provide medical attention to all the people who need it.

Once the pandemic influenza virus is identified, a special vaccine will have to be made. It can take several months to make a new vaccine and then a longer period to distribute it. Because of worldwide demand, the pandemic influenza vaccine may be in short supply at first.

Avian Influenza

Avian influenza, or "bird flu", is a contagious disease of animals caused by viruses that normally infect only birds and, less commonly, pigs. It is of concern because of its potential to develop into the source of the next pandemic. The large numbers of birds in close-quarters helps the disease to spread quickly.[26, 29]

Avian influenza viruses do not normally infect species other than birds and pigs. The first documented infection of humans with an avian influenza virus occurred in Hong Kong in 1997, when a highly pathogenic strain, known as “H5N1”, caused severe respiratory disease in 18 humans, of whom six died. The infection of humans coincided with an epidemic of avian influenza, caused by the same strain, in Hong Kong’s poultry population.[26] In 2003 this same strain made two members of the same Hong Kong family ill after they traveled to China, one of whom died. In this last year H5N1 jumped the species barrier again, causing disease in 34 individuals in Viet Nam and Thailand, 23 of whom died.[30] Recent outbreaks of avian influenza A (H5N1) in poultry throughout Asia have had major economic and health repercussions.

An outbreak of another highly pathogenic avian influenza A subtype H7N7 started at the end of February 2003 in commercial poultry farms in the Netherlands.[31] Although the risk of transmission of these viruses to humans was initially thought to be low, an outbreak investigation noted an unexpectedly high number of transmissions of avian influenza A virus subtype H7N7 from chickens to humans directly involved in handling infected poultry. There was also evidence for person-to-person transmission.[31] In all, 89 people were confirmed to have been infected.

In the spring of 2004, Avian Influenza infected two poultry workers in the Fraser Valley area of southern British Columbia[32] who had mild illness. More significant was the impact on agriculture in the area. All poultry in the area (estimated to be 17 million birds) was depopulated starting in March. It was not until July 9th that farms there were allowed to restock. It is important to note that the H7 strain found in British Columbia is not the same strain that has caused serious illness and some deaths in Asia.[33]

The greatest concern is the possibility that an outbreak of avian influenza could give rise to another influenza pandemic in humans. Scientists know that avian and human influenza viruses can exchange genes when a person or animal is simultaneously infected with viruses from both species. This process of gene swapping could give rise to a completely new subtype of the influenza virus. It would have the ability to cause high rates of death and severe illness like the recent avian flu in Vietnam and Thailand, and the ability to spread easily from person to person like current human influenza viruses. Because it would be a previously unknown type of virus, people would have little if any immunity to it.

Moreover, existing vaccines, which are developed each year to match presently circulating strains and protect humans during seasonal epidemics, would not be effective against a completely new influenza virus.[26]

This was the situation during the great influenza pandemic of 1918/1919, when a completely new influenza virus subtype emerged and spread around the globe in around four to six months. Several waves of infection occurred over two years, killing over an estimated 20 million persons.[26] The present day global system of influenza monitoring, testing and rapid vaccine development is designed to prevent this from happening again. By quickly detecting new influenza viruses and implementing control measures, it may be possible to prevent these viruses from developing into the next pandemic strain. If despite these efforts a new deadly and highly transmissible strain of influenza arises, the rapid development of a new vaccine and implementation of pandemic plans could minimize its impact on human health.

CHAPTER 2: SEXUALLY TRANSMITTED AND BLOODBORNE DISEASES

Highlights

- In Peel, the incidence of Acquired Immunodeficiency Syndrome (AIDS) has remained low and stable since 1997 (1.4 cases per 100,000 or less). Any variability from year to year may be due to the small number of cases.
- Chlamydia is not only the most common sexually transmitted disease in Peel, but also the most commonly reported communicable disease.
- In Peel, the incidence of chlamydia increased by approximately 71% between 1996 and 2003. This increase may be due to improved screening and case finding by physicians.[34]
- The incidence of gonorrhea in Peel has remained stable from 2000 to 2003 (approximately 30 to 34 cases per 100,000).
- Persons aged 15 to 24 years have the highest incidence of chlamydia and gonorrhea.
- There were one or two new cases of infectious syphilis in Peel per year since 1999; however in 2003, the number of cases increased to nine. Toronto experienced a similar increase.[35]
- In Peel, the incidence of hepatitis B has been low since 1997 (approximately one case per 100,000 or less). Incidence of hepatitis B was highest among people aged 25 to 29.
- Hepatitis C incidence has steadily decreased since 1995. Incidence of hepatitis C was highest in those aged 30 years and older.
- The incidences of both Hepatitis B and C were generally higher in males compared to females, especially in the high incidence age groups identified above.

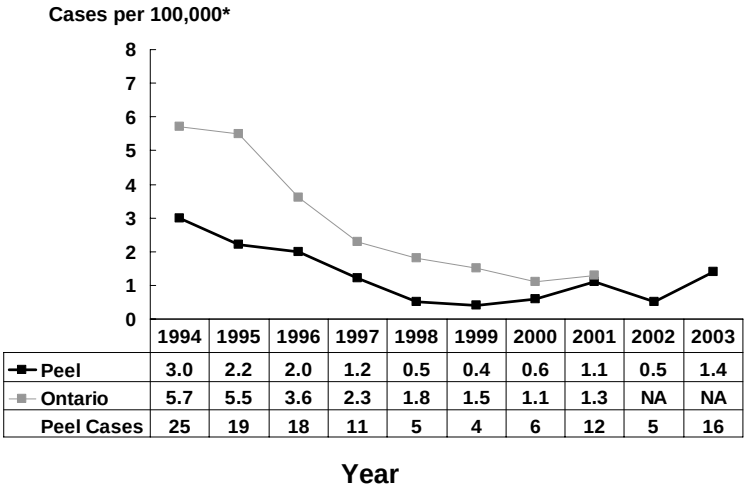
INTRODUCTION

Sexually transmitted diseases (STDs) and bloodborne diseases are caused by a variety of bacteria and viruses found in blood and body fluids (semen, vaginal fluids and sometimes breast milk and saliva). In addition to being spread by sexual contact, STDs can also be spread when blood or body fluids containing the organism find their way into the body by another route such as injection or a cut in the skin.[36] STDs are rarely spread through such activities as touching, hugging, shaking hands or non-sexual kissing. Gonorrhea and chlamydia are almost exclusively sexually transmitted. Other diseases can also be spread from contaminated blood. For hepatitis C, blood is the main route of infection; for syphilis, sexual transmission is most frequent; while for human immunodeficiency virus (HIV) and hepatitis B, both blood and sexual transmission are important. All these diseases may be passed from mother to child during birth or pregnancy, often with severe consequences to the fetus or newborn.

HIV/AIDS

HIV (Human Immunodeficiency Virus) attacks the immune system. Acquired Immunodeficiency Syndrome (AIDS) is the advanced disease form of HIV infection. Most of the serious effects of HIV/AIDS result when the immune system is so weak that the body cannot defend itself against other infections.[36]

Figure 2.1: Incidence of AIDS, Region of Peel and Ontario, 1994-2003



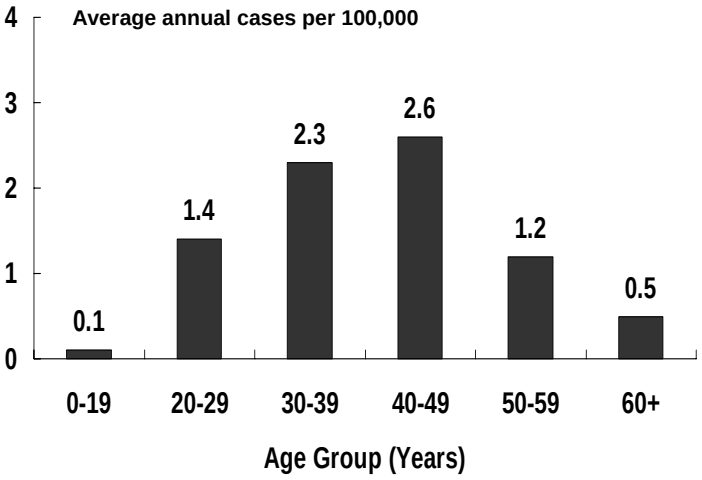
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Peel	3.0	2.2	2.0	1.2	0.5	0.4	0.6	1.1	0.5	1.4
Ontario	5.7	5.5	3.6	2.3	1.8	1.5	1.1	1.3	NA	NA
Peel Cases	25	19	18	11	5	4	6	12	5	16

* Crude rate per 100,000
NA: 2002 and 2003 Ontario AIDS data not available.

Sources: Ontario Data from RDIS, Ontario Ministry of Health and Long-Term Care, as of 05/13/2003.
Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

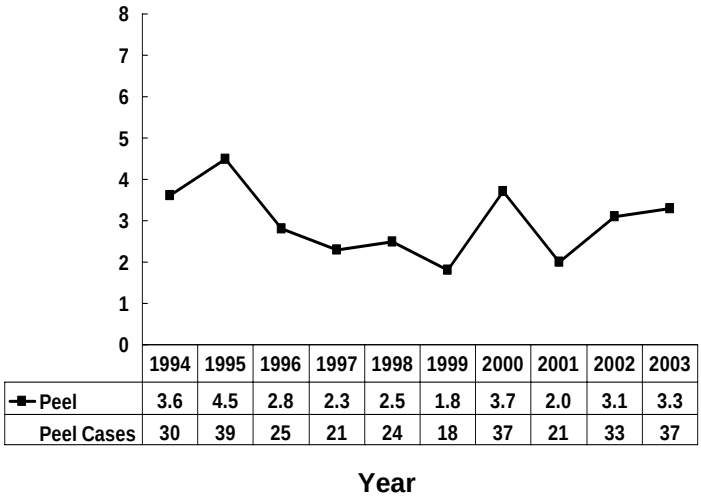
Figure 2.2: Incidence of AIDS by Age Group Region of Peel, 1994-2003 Combined



Sources: Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

Figure 2.3: Incidence of HIV Infection, Region of Peel, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Peel	3.6	4.5	2.8	2.3	2.5	1.8	3.7	2.0	3.1	3.3
Peel Cases	30	39	25	21	24	18	37	21	33	37

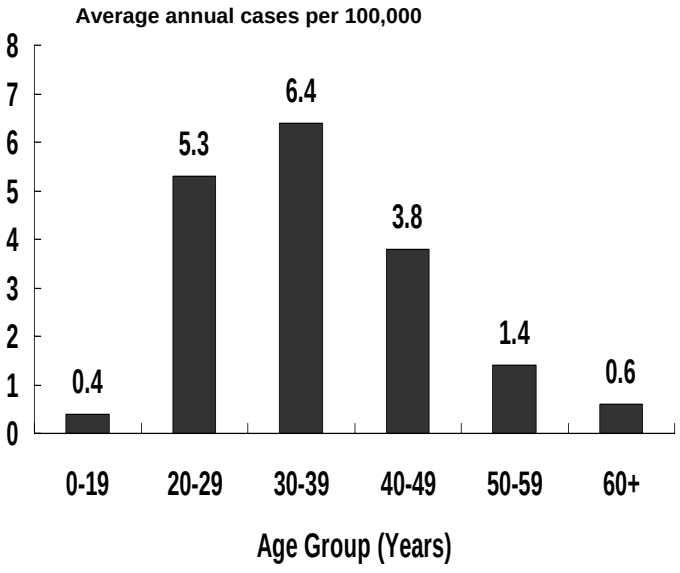
Year

* Crude rate per 100,000
Note: Ontario HIV data not available.

Sources: Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

Figure 2.4: Incidence of HIV Infection by Age Group, Region of Peel, 1994-2003 Combined



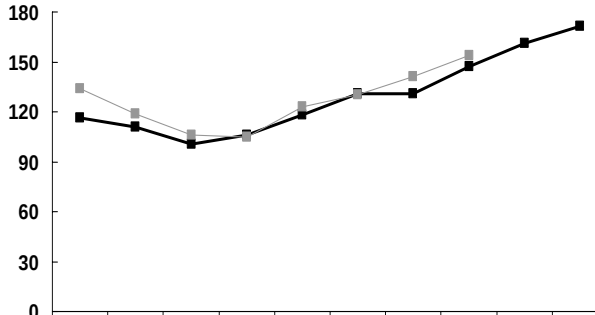
Sources: Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

CHLAMYDIA

Chlamydia is a bacterial infection caused by *Chlamydia trachomatis*. The most common symptoms are urinary pain and genital discharge. If left untreated, chlamydia can cause a chronic infection (pelvic inflammatory disease), infertility and tubal pregnancy. It can often be asymptomatic, making diagnosis and treatment difficult.[37]

Figure 2.5: Incidence of Chlamydia, Region of Peel and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Peel	116.6	111.1	100.6	105.9	118.3	130.8	131.1	147.0	161.5	171.6
Ontario	133.7	118.9	106.1	105.0	122.9	130.5	141.5	153.8	NA	NA
Peel Cases	998	962	877	947	1087	1230	1270	1477	1628	1764

NA: 2002 and 2003 Ontario data not available.

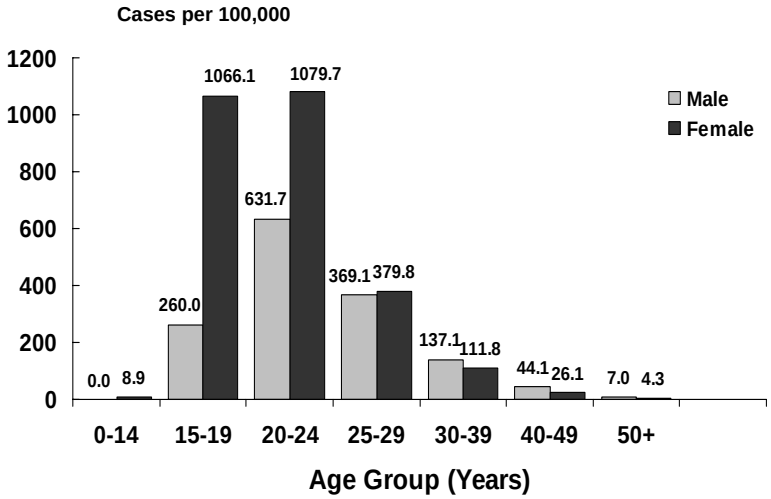
Note: Rates age-standardized using 1991 (adjusted) Canadian population.

Sources: Ontario Data from RDIS, Ontario Ministry of Health and Long-Term Care, as of 05/18/2004.

Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

Figure 2.6: Incidence of Chlamydia by Age Group and Sex, Region of Peel, 2003



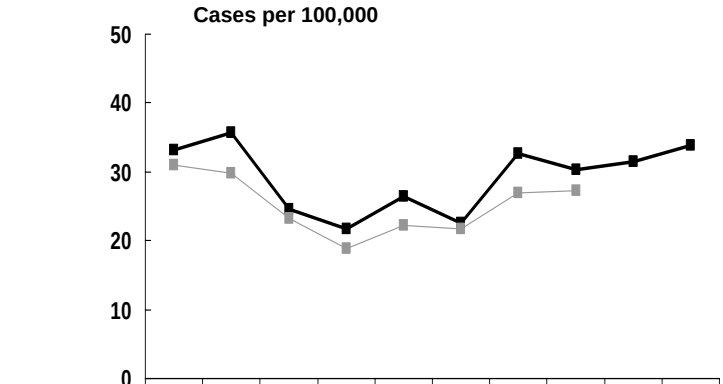
Sources: Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

GONORRHEA

Gonorrhea is a bacterial infection caused by *Neisseria gonorrhea*. Gonorrhea is very similar to chlamydia in its symptoms of urinary pain, genital discharge and complications such as chronic infection, infertility and tubal pregnancy. Like chlamydia, gonorrhea can be asymptomatic and go undiagnosed.[38]

Figure 2.7: Incidence of Gonorrhea, Region of Peel and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Peel	33.1	35.7	24.6	21.7	26.4	22.5	32.6	30.3	31.5	33.8
Ontario	31.0	29.8	23.2	18.8	22.2	21.8	26.9	27.3	NA	NA
Peel Cases	284	309	215	194	244	214	318	308	319	353

NA: 2002 and 2003 Ontario data not available.

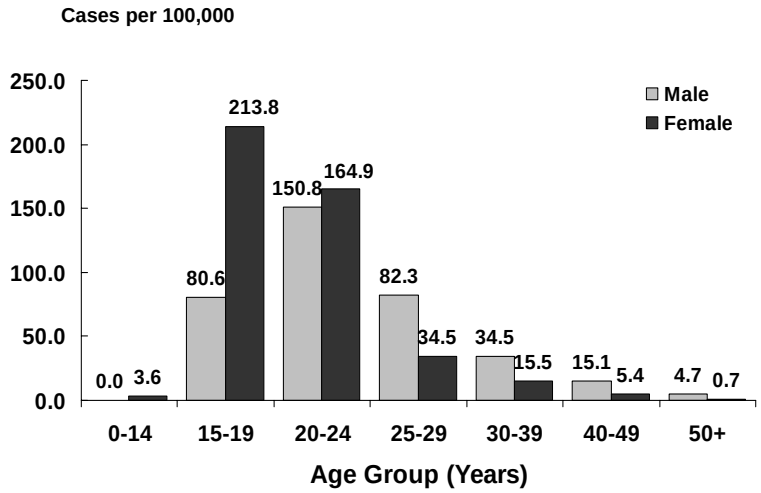
Note: Rates age-standardized using 1991 (adjusted) Canadian population.

Sources: Ontario Data from RDIS, Ontario Ministry of Health and Long-Term Care, as of 05/18/2004.

Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

Figure 2.8: Incidence of Gonorrhea by Age Group and Sex, Region of Peel, 2003



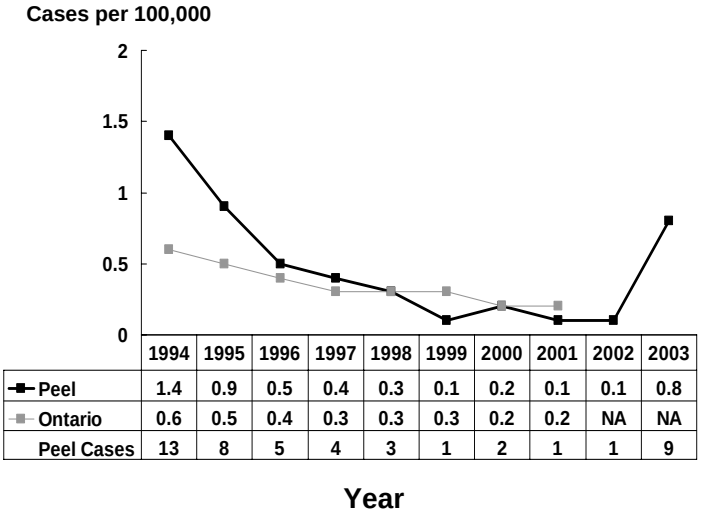
Sources: Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

SYPHILIS

Syphilis is a complex sexually transmitted disease caused by the bacteria *Treponema pallidum*. Syphilis has a number of stages related to the progression of disease. Infectious syphilis is the earliest stage of the disease. End stage syphilis can cause severe damage to the heart, blood vessels, nervous system, liver and eyes, sometimes leading to death.[39]

Figure 2.9: Incidence of Syphilis (Infectious), Region of Peel and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Peel	1.4	0.9	0.5	0.4	0.3	0.1	0.2	0.1	0.1	0.8
Ontario	0.6	0.5	0.4	0.3	0.3	0.3	0.2	0.2	NA	NA
Peel Cases	13	8	5	4	3	1	2	1	1	9

NA: 2002 and 2003 Ontario data not available.

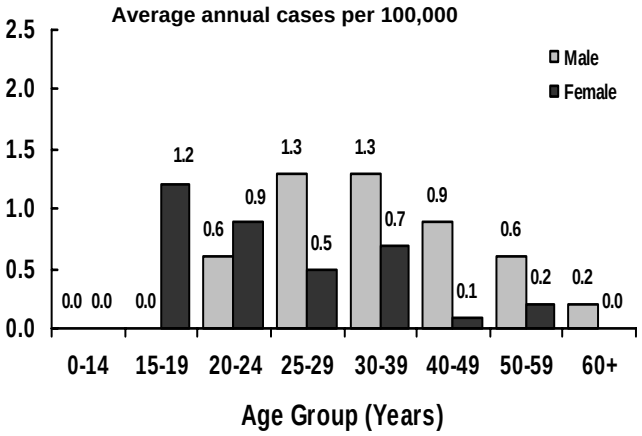
Note: Rates age-standardized using 1991 (adjusted) Canadian population.

Sources: Ontario Data from RDIS, Ontario Ministry of Health and Long-Term Care, as of 05/18/2004.

Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

Figure 2.10: Incidence of Syphilis (Infectious) by Age Group and Sex, Region of Peel, 1994-2003 Combined



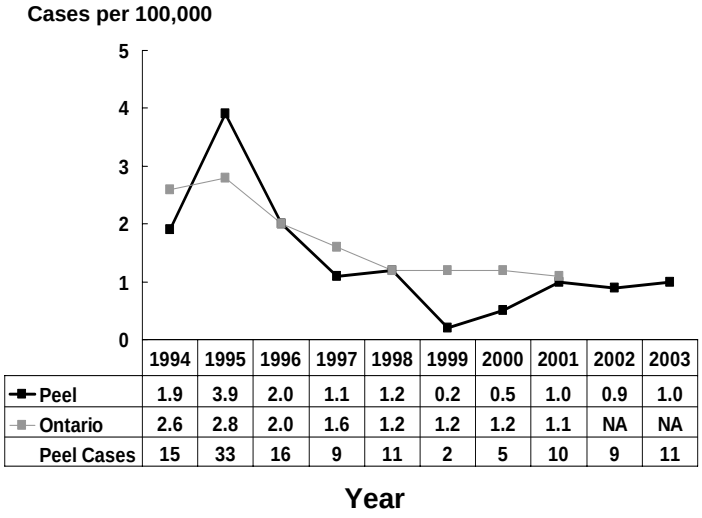
Sources: Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

HEPATITIS B

Hepatitis B is a viral infection which attacks the liver. There is a wide spectrum of illness caused by hepatitis B, which includes no symptoms, mild non-specific illness (loss of appetite, nausea, tiredness), and signs of severe liver involvement (jaundice – yellow skin and eyes, liver failure). People can be chronically infected with hepatitis B, especially if the disease is acquired early in life. Long-term complications of hepatitis B infection include cirrhosis (liver scarring), liver cancer and liver failure.[40]

Figure 2.11: Incidence of Acute Hepatitis B, Region of Peel and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Peel	1.9	3.9	2.0	1.1	1.2	0.2	0.5	1.0	0.9	1.0
Ontario	2.6	2.8	2.0	1.6	1.2	1.2	1.2	1.1	NA	NA
Peel Cases	15	33	16	9	11	2	5	10	9	11

NA: 2002 and 2003 Ontario data not available.

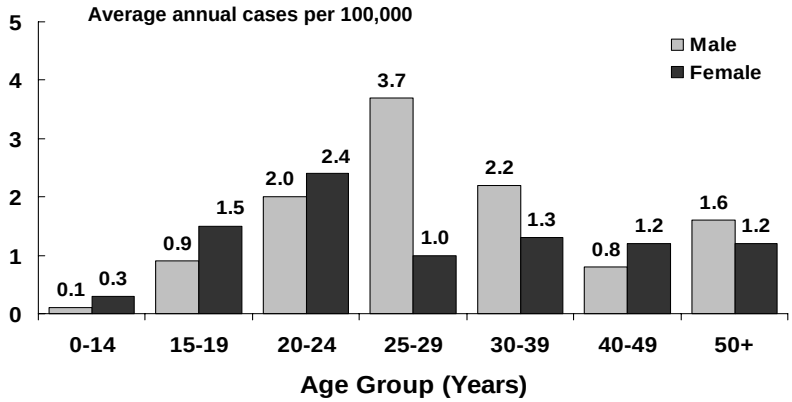
Note: Rates age-standardized using 1991 (adjusted) Canadian population.

Sources: Ontario Data from RDIS, Ontario Ministry of Health and Long-Term Care, as of 05/18/2004.

Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

Figure 2.12: Incidence of Acute Hepatitis B by Age Group and Sex, Region of Peel, 1994-2003 Combined



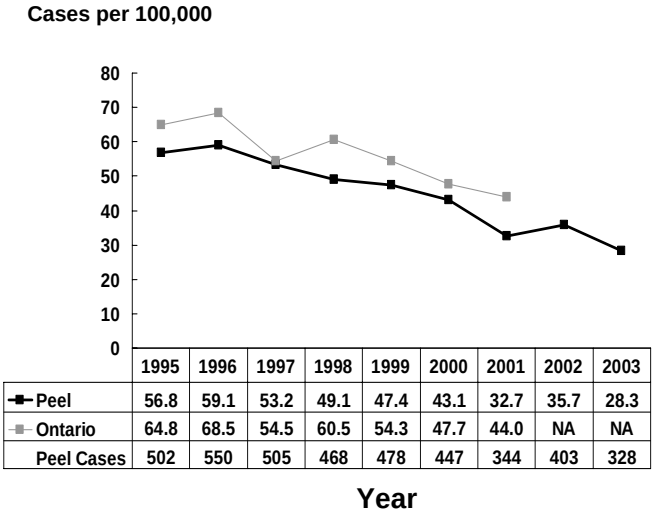
Sources: Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

HEPATITIS C

Hepatitis C is a viral infection of the liver. The symptoms of hepatitis C are similar to hepatitis B (loss of appetite, nausea, tiredness, jaundice) but tend to be more mild and subtle. Most people diagnosed with hepatitis C are chronically infected. Complications of hepatitis C include cirrhosis (liver scarring), liver cancer and liver failure.[41] Reporting of hepatitis C became mandatory in 1995. In Canada, injection drug use is the primary risk factor and has been documented as the factor in 60% of the newly infected cases reported between 1999 and 2001.[42]

Figure 2.13: Incidence of Hepatitis C, Region of Peel and Ontario, 1995-2003



	1995	1996	1997	1998	1999	2000	2001	2002	2003
Peel	56.8	59.1	53.2	49.1	47.4	43.1	32.7	35.7	28.3
Ontario	64.8	68.5	54.5	60.5	54.3	47.7	44.0	NA	NA
Peel Cases	502	550	505	468	478	447	344	403	328

NA: 2002 and 2003 Ontario data not available.

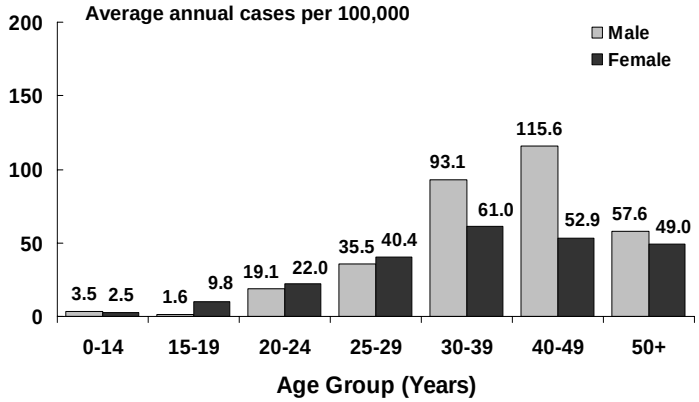
Note: Rates age-standardized using 1991 (adjusted) Canadian population.

Sources: Ontario Data from RDIS, Ontario Ministry of Health and Long-Term Care, as of 05/18/2004.

Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

Figure 2.14: Incidence of Hepatitis C by Age Group and Sex, Region of Peel, 1995-2003 Combined



Sources: Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

CHAPTER 3: VACCINE PREVENTABLE DISEASES

Highlights

- Since 1999, there have been no cases of measles in the Region of Peel. The declining incidence of measles is attributable to the implementation of the two-dose measles vaccine schedule in 1996.
- The incidence of mumps and rubella have also decreased since 1996 because mumps and rubella vaccines are routinely given a second time along with the measles vaccine (MMR – Measles/Mumps/Rubella conjugate vaccine).
- In Peel, the incidence of pertussis has been low and stable since 1996 (approximately less than four cases per 100,000). Children under one year of age have the highest rate of pertussis.

INTRODUCTION

Vaccine preventable diseases are caused by viruses and bacteria. Nearly all of the organisms in this group are highly contagious and can be spread through the cough or sneeze of an infected person. Tetanus and Polio are spread by different means. Tetanus is caused by a wound contaminated with bacteria commonly found in soil. Polio is a highly contagious virus spread by infected feces. Immunization for measles, mumps, rubella, diphtheria, polio and tetanus is mandatory for school children in Ontario. Prior to universal vaccination, diphtheria and polio infected a large proportion of the population and caused considerable illness and death, especially in children.[43]

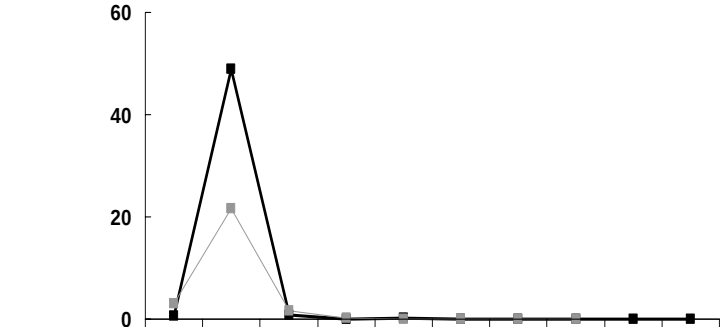
Outbreaks of vaccine preventable diseases have occurred in developed countries when immunization rates have declined. Some examples of outbreaks include 50,000 cases of diphtheria, including 1,700 deaths, in the former Soviet Union in 1994 and 100,000 cases of pertussis, including 36 deaths, in Great Britain in 1978.[43] Because of high immunization rates, some diseases (diphtheria, tetanus, polio) are currently so rare in Peel that they are not included in this report. Influenza immunization is universally available in Ontario, but is voluntary. Most people are not immunized for influenza and therefore incidence remains high. For more information on influenza please see Chapter 1 of this report.

MEASLES

Measles (also called red measles), is a viral infection causing symptoms such as fever, cough, runny nose, red eyes, followed by a rash. Severe complications can include pneumonia, ear infections, nervous system damage and death. Prior to universal vaccination for measles, nearly every Canadian had been infected with the virus by the time they reached adulthood.[44]

In the past, a cyclical trend could be identified, with outbreaks occurring every two or three years. In 1995, Peel and Ontario experienced an outbreak of measles. After this, two doses of measles vaccine were required instead of one. The incidence of measles has decreased dramatically as a result.

Figure 3.1: Incidence of Measles, Region of Peel and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Peel	0.7	48.8	0.9	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Ontario	3.1	21.6	1.7	0.2	0.1	0.0	0.1	0.1	NA	NA
Peel Cases	6	440	9	0	2	0	0	0	0	0

NA: 2002 and 2003 Ontario data not available.

Note: Rates age-standardized using 1991 (adjusted) Canadian population.

Sources: Ontario Data from RDIS, Ontario Ministry of Health and Long-Term Care, as of 05/18/2004.

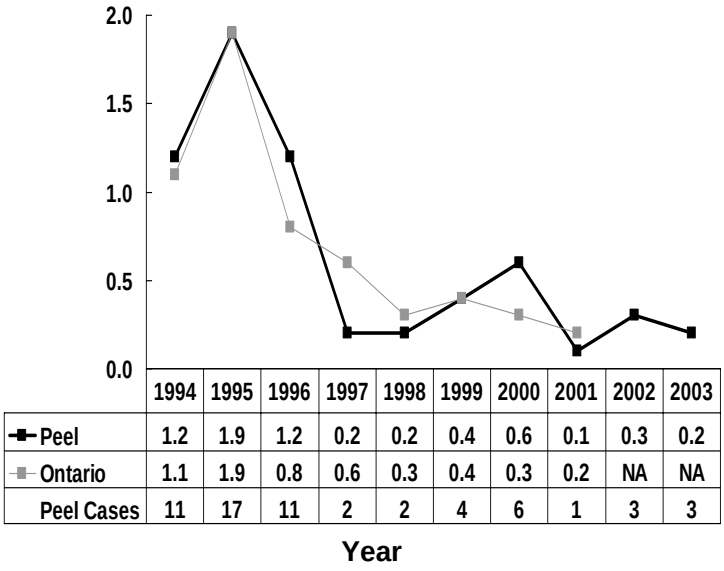
Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

MUMPS

Mumps is a viral infection previously common in childhood.[44] It can infect and inflame a number of different organs causing symptoms and even damage to the salivary glands, brain, testicles, and ovaries. Complications of mumps infection include deafness and male sterility.[44]

Figure 3.2: Incidence of Mumps, Region of Peel and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Peel	1.2	1.9	1.2	0.2	0.2	0.4	0.6	0.1	0.3	0.2
Ontario	1.1	1.9	0.8	0.6	0.3	0.4	0.3	0.2	NA	NA
Peel Cases	11	17	11	2	2	4	6	1	3	3

NA: 2002 and 2003 Ontario data not available.

Note: Rates age-standardized using 1991 (adjusted) Canadian population.

Sources: Ontario Data from RDIS, Ontario Ministry of Health and Long-Term Care, as of 05/18/2004.

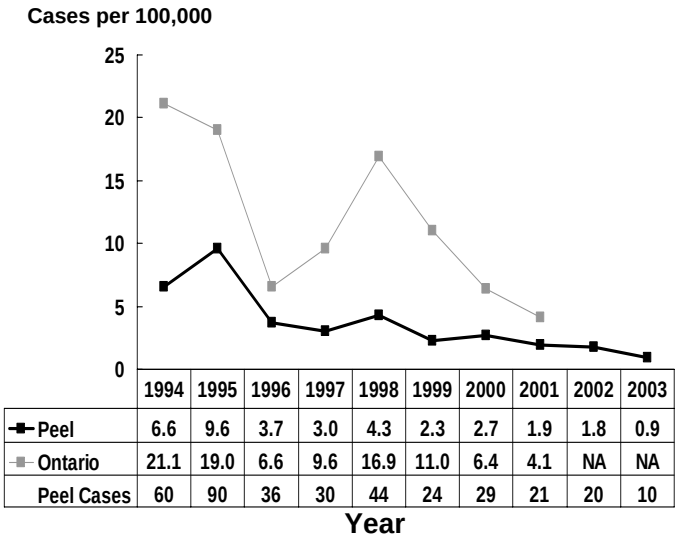
Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

PERTUSSIS

Pertussis or whooping cough, is caused by the bacteria *Bordatella pertussis*. The main symptom is a very severe cough often described as a “seal bark”. Complications are much more severe in the very young and include pneumonia, brain damage and death.[44]

Figure 3.3: Incidence of Pertussis, Region of Peel and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Peel	6.6	9.6	3.7	3.0	4.3	2.3	2.7	1.9	1.8	0.9
Ontario	21.1	19.0	6.6	9.6	16.9	11.0	6.4	4.1	NA	NA
Peel Cases	60	90	36	30	44	24	29	21	20	10

NA: 2002 and 2003 Ontario data not available.

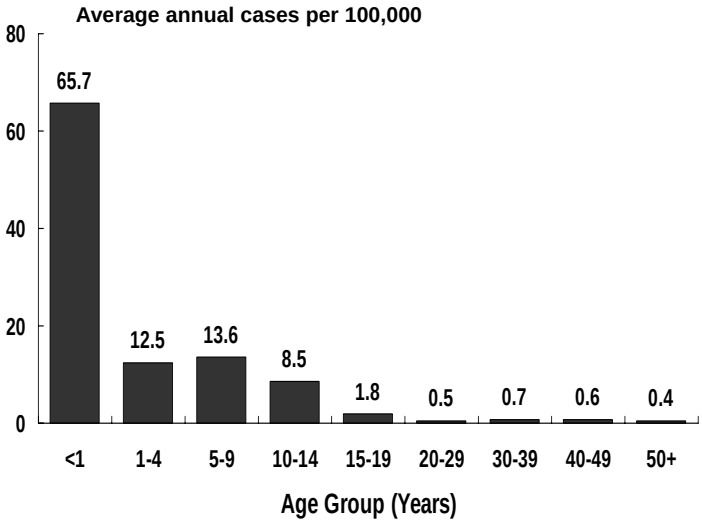
Note: Rates age-standardized using 1991 (adjusted) Canadian population.

Sources: Ontario Data from RDIS, Ontario Ministry of Health and Long-Term Care, as of 05/18/2004.

Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

Figure 3.4: Incidence of Pertussis by Age Group, Region of Peel, 1994-2003 Combined



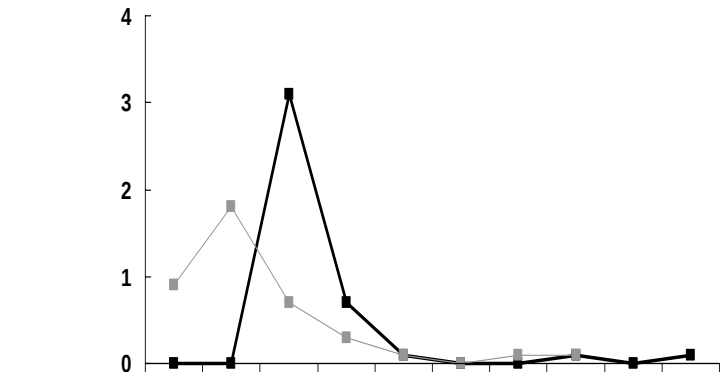
Sources: Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

RUBELLA

Rubella (sometimes called German Measles) is a mild viral illness in adults that is characterized by a rash, swollen lymph nodes and fever. Rubella can cause severe birth defects such as blindness, deafness and mental retardation in babies whose mothers become infected with rubella during the first three months of pregnancy.[44] The incidence of this disease has also dropped since the introduction of the second-dose MMR vaccine in 1996.

Figure 3.5: Incidence of Rubella, Region of Peel and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Peel	0.0	0.0	3.1	0.7	0.1	0.0	0.0	0.1	0.0	0.1
Ontario	0.9	1.8	0.7	0.3	0.1	0.0	0.1	0.1	NA	NA
Peel Cases	0	0	28	7	1	0	0	1	0	1

NA: 2002 and 2003 Ontario data not available.

Note: Rates age-standardized using 1991 (adjusted) Canadian population.

Sources: Ontario Data from RDIS, Ontario Ministry of Health and Long-Term Care, as of 05/18/2004.

Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

HAEMOPHILUS INFLUENZA TYPE B (HIB)

Haemophilus influenza type b (Hib) is a bacterium that causes serious disease including meningitis, pneumonia and death in young children. Hib was the most common cause of meningitis in young children prior to the availability of conjugate vaccine for this organism in 1988.[44] There were six cases of Hib in Peel between 1994 and 2003. (Please see the Appendix for more specific information).

CHAPTER 4: DISEASES SPREAD BY FOOD AND WATER

Highlights

- The incidence of diseases spread by food and water was generally higher in Peel than Ontario with the exceptions of hepatitis A and verotoxin-producing *Escherichia coli* (VTEC).
- There has been a decreasing trend in campylobacteriosis, giardiasis, hepatitis A and yersiniosis in Peel and Ontario.
- In Peel, the incidence of diseases spread by food and water was generally higher in the younger age groups.
- The increase in salmonellosis cases in Ontario and in Peel during 1998 was due to the second largest salmonellosis outbreak in Canadian history; an outbreak caused by a particularly virulent strain of *Salmonella enteritidis* that contaminated cheese used in the production of a pre-packaged lunch product marketed for school-age children.
- The increase in the incidence of shigellosis in 2002 was due to an outbreak associated with the consumption of a contaminated processed pasta salad that involved several public health units in Ontario. The outbreak remains the largest one reported for shigellosis in Canada.

The diseases covered in this chapter were examined in more detail in the *State of the Region's Health 2003 – Focus on Foodborne Disease* report, published by the Region of Peel Health Department in 2003.

INTRODUCTION

Diseases spread by food and water are caused by bacteria, parasites and viruses that have found their way into our food or water from the feces of an infected person or animal.[45] Many of these diseases can also be spread from one person to another if hands are not thoroughly washed with soap and water after going to the bathroom (this is the main method of transmission for hepatitis A).[45] All these diseases may cause diarrhoea that can be quite severe. In some illnesses (campylobacteriosis, hepatitis A, some types of salmonellosis, shigellosis, verotoxin producing *Escherichia coli* (VTEC)) people will recover without antibiotics. Unfortunately, some of these infections have a risk of complications such as kidney failure (VTEC), systemic infections (amebiasis, salmonellosis, yersiniosis) and immune system problems (campylobacteriosis, salmonellosis, yersiniosis).

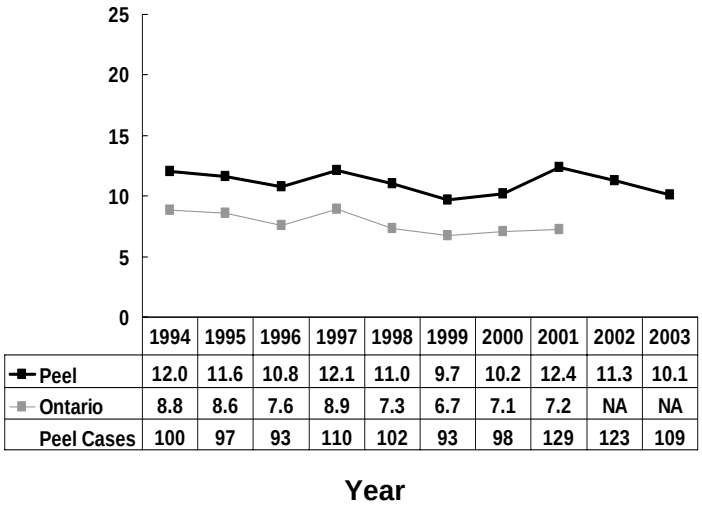
The highest incidence for many of these diseases (campylobacteriosis, giardiasis, salmonellosis, shigellosis, Verotoxin producing *Escherichia coli* and yersiniosis) occurs in those under five years of age. This finding may be due to:

- poor personal hygiene,
- increased likelihood of severe illness due to susceptibility of dehydration in infants and young children,
- increased likelihood of severe illness due to less developed immune system, and
- increased likelihood of being seen by a physician and diagnosed if sick.

AMEBIASIS

Amebiasis is caused by the parasite *Entamoeba histolytica*. It is most common in immigrants from and travellers to developing countries with poor sanitation. The disease can become widespread and infect the liver, lungs or brain.[46]

Figure 4.1: Incidence of Amebiasis, Region of Peel and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Peel	12.0	11.6	10.8	12.1	11.0	9.7	10.2	12.4	11.3	10.1
Ontario	8.8	8.6	7.6	8.9	7.3	6.7	7.1	7.2	NA	NA
Peel Cases	100	97	93	110	102	93	98	129	123	109

NA: 2002 and 2003 Ontario data not available.

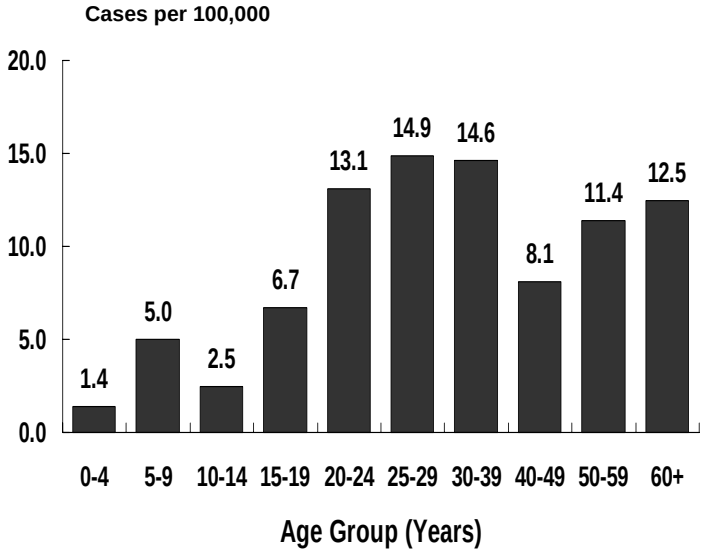
Note: Rates age-standardized using 1991 (adjusted) Canadian population.

Sources: Ontario Data from RDIS, Ontario Ministry of Health and Long-Term Care, as of 05/18/2004.

Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

Figure 4.2: Incidence of Amebiasis by Age Group, Region of Peel, 2003



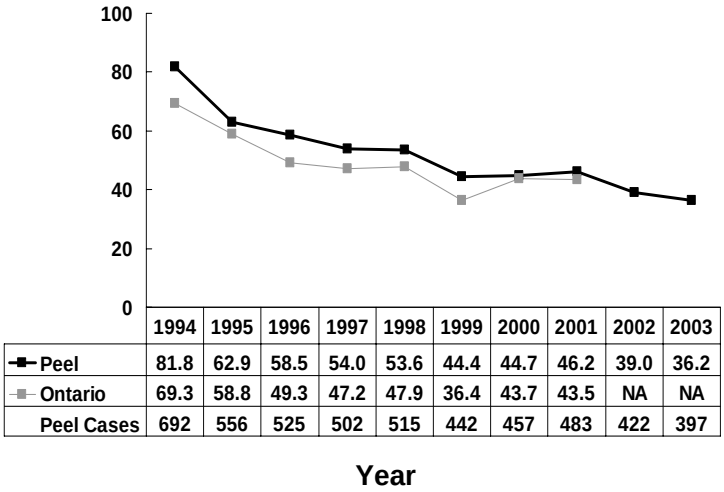
Sources: Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

CAMPYLOBACTERIOSIS

Campylobacteriosis is the most common bacterial cause of diarrhoeal illness in Ontario. Most cases are associated with handling or eating raw or undercooked poultry.[47] Other sources of infection include unpasteurized milk and the stool of an ill dog or cat.[47]

Figure 4.3: Incidence of Campylobacteriosis, Region of Peel and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Peel	81.8	62.9	58.5	54.0	53.6	44.4	44.7	46.2	39.0	36.2
Ontario	69.3	58.8	49.3	47.2	47.9	36.4	43.7	43.5	NA	NA
Peel Cases	692	556	525	502	515	442	457	483	422	397

NA: 2002 and 2003 Ontario data not available.

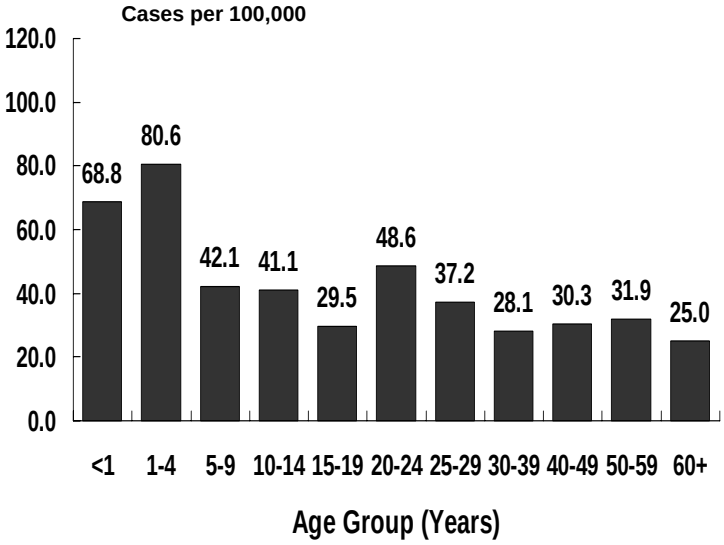
Note: Rates age-standardized using 1991 (adjusted) Canadian population.

Sources: Ontario Data from RDIS, Ontario Ministry of Health and Long-Term Care, as of 05/18/2004.

Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

Figure 4.4: Incidence of Campylobacteriosis by Age Group, Region of Peel, 2003



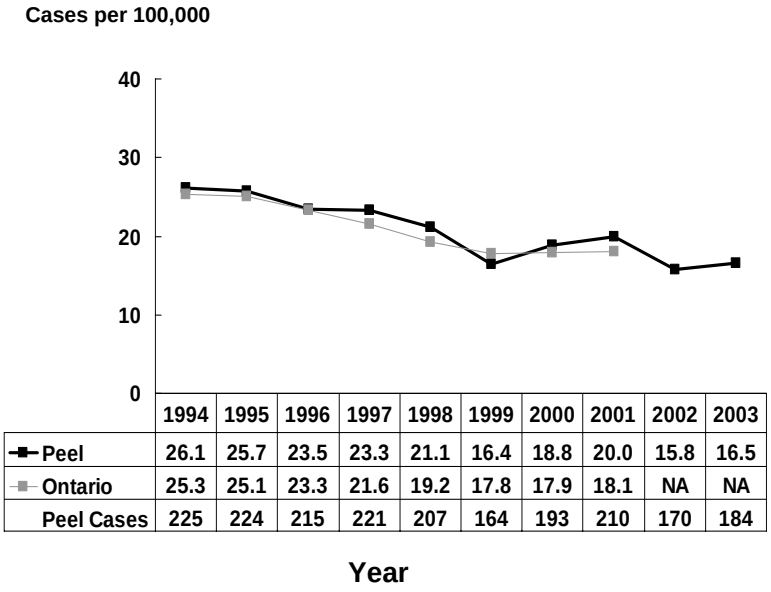
Sources: Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

GIARDIASIS

Giardiasis is caused by *Giardia lamblia*, a one-celled, microscopic parasite that lives in the intestines of people and animals. It is one of the most common causes of waterborne disease (drinking and recreational). Person-to-person spread has occurred in day care centres and other institutional settings.[48]

Figure 4.5: Incidence of Giardiasis, Region of Peel and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Peel	26.1	25.7	23.5	23.3	21.1	16.4	18.8	20.0	15.8	16.5
Ontario	25.3	25.1	23.3	21.6	19.2	17.8	17.9	18.1	NA	NA
Peel Cases	225	224	215	221	207	164	193	210	170	184

NA: 2002 and 2003 Ontario data not available.

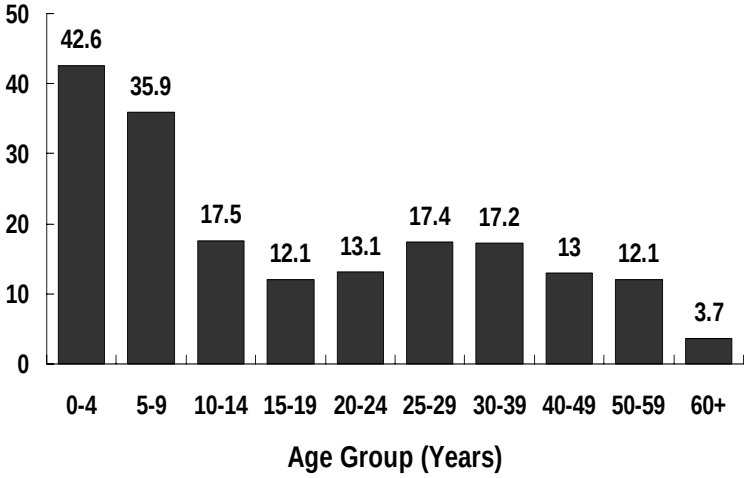
Note: Rates age-standardized using 1991 (adjusted) Canadian population.

Sources: Ontario Data from RDIS, Ontario Ministry of Health and Long-Term Care, as of 05/18/2004.

Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

Figure 4.6: Incidence of Giardiasis by Age Group, Region of Peel, 2003



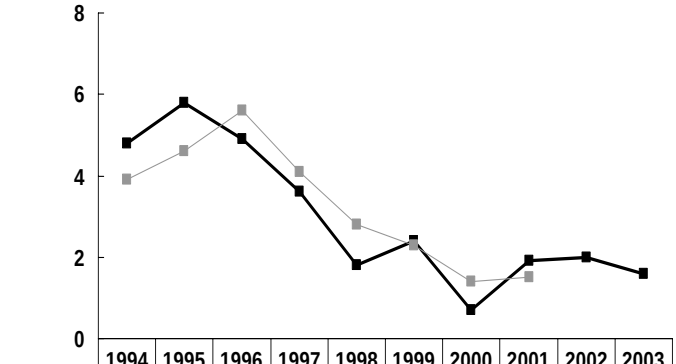
Sources: Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

HEPATITIS A

Hepatitis A is a viral infection of the liver with symptoms of fever, tiredness and jaundice. Unlike hepatitis B and C, the infection tends to have less severe consequences and chronic infection does not occur.[49]

Figure 4.7: Incidence of Hepatitis A, Region of Peel and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Peel	4.8	5.8	4.9	3.6	1.8	2.4	0.7	1.9	2.0	1.6
Ontario	3.9	4.6	5.6	4.1	2.8	2.3	1.4	1.5	NA	NA
Peel Cases	42	52	44	34	18	24	8	22	22	18

NA: 2002 and 2003 Ontario data not available.

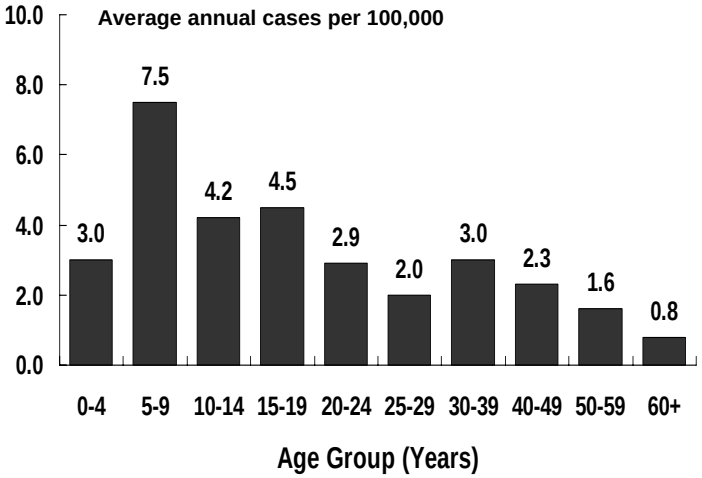
Note: Rates age-standardized using 1991 (adjusted) Canadian population.

Sources: Ontario Data from RDIS, Ontario Ministry of Health and Long-Term Care, as of 05/18/2004.

Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

Figure 4.8: Incidence of Hepatitis A by Age Group, Region of Peel, 1994-2003 Combined



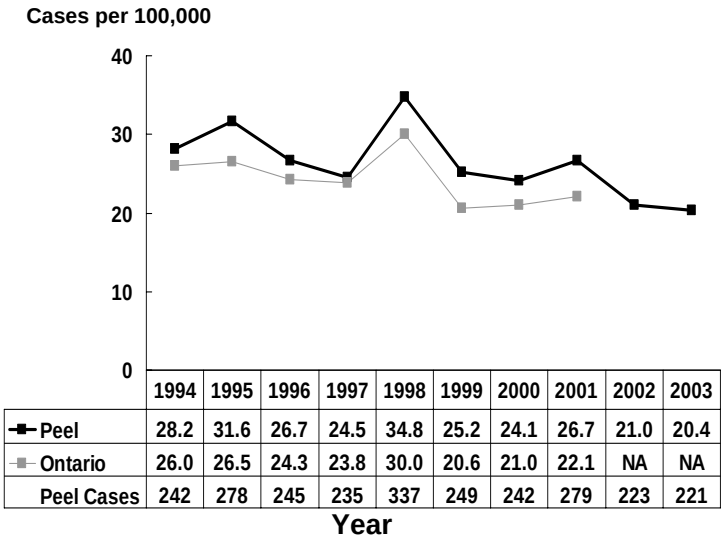
Sources: Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

SALMONELLOSIS

Salmonellosis is caused by a number of different types of *Salmonella* bacteria that live in the intestines of people and animals. Cases are usually associated with contaminated foods of animal origin such as poultry, pork, and eggs, but all foods can be contaminated.[50] *Salmonella* can also be associated with pets including dogs, cats, and turtles.[50]

Figure 4.9: Incidence of Salmonellosis, Region of Peel and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Peel	28.2	31.6	26.7	24.5	34.8	25.2	24.1	26.7	21.0	20.4
Ontario	26.0	26.5	24.3	23.8	30.0	20.6	21.0	22.1	NA	NA
Peel Cases	242	278	245	235	337	249	242	279	223	221

NA: 2002 and 2003 Ontario data not available.

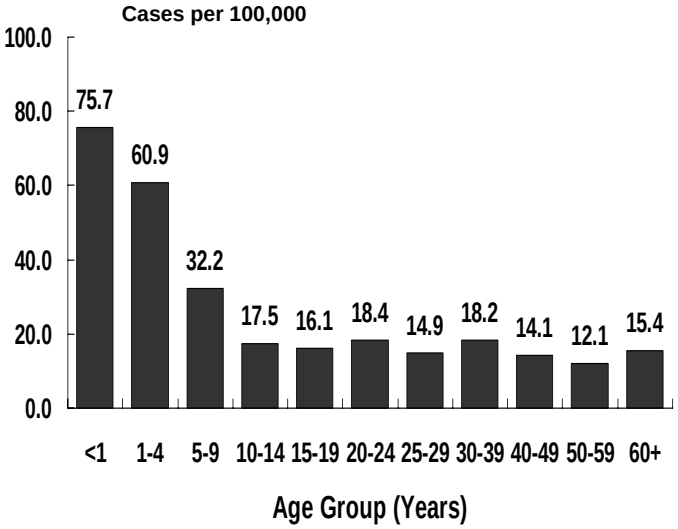
Note: Rates age-standardized using 1991 (adjusted) Canadian population.

Sources: Ontario Data from RDIS, Ontario Ministry of Health and Long-Term Care, as of 05/18/2004.

Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

Figure 4.10: Incidence of Salmonellosis by Age Group, Region of Peel, 2003



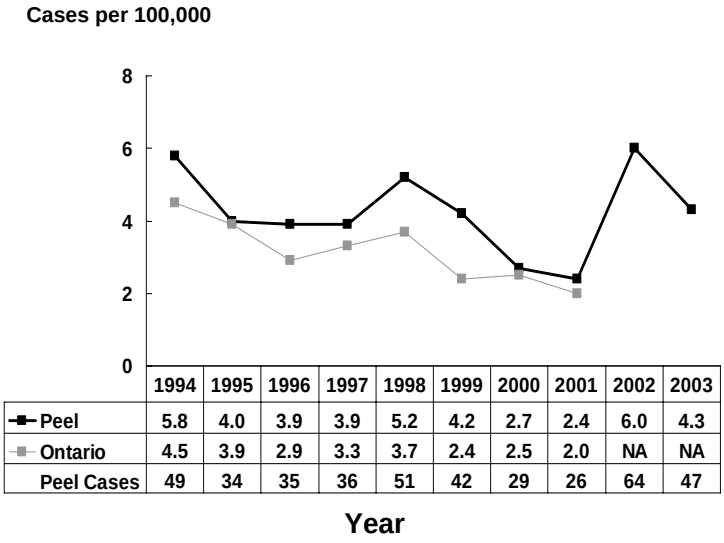
Sources: Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

SHIGELLOSIS

Shigellosis is caused by a family of bacteria called *Shigella* that are only found in the intestines of humans. Disease is spread directly from improperly washed hands. *Shigella* can also make its way into food and water from infected food handlers, infected fertilizer and contaminated flies.[51] The increase in the incidence of shigellosis in 2002 was due to an outbreak associated with a processed pasta salad, involving several public health units in Ontario.

Figure 4.11: Incidence of Shigellosis, Region of Peel and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Peel	5.8	4.0	3.9	3.9	5.2	4.2	2.7	2.4	6.0	4.3
Ontario	4.5	3.9	2.9	3.3	3.7	2.4	2.5	2.0	NA	NA
Peel Cases	49	34	35	36	51	42	29	26	64	47

NA: 2002 and 2003 Ontario data not available.

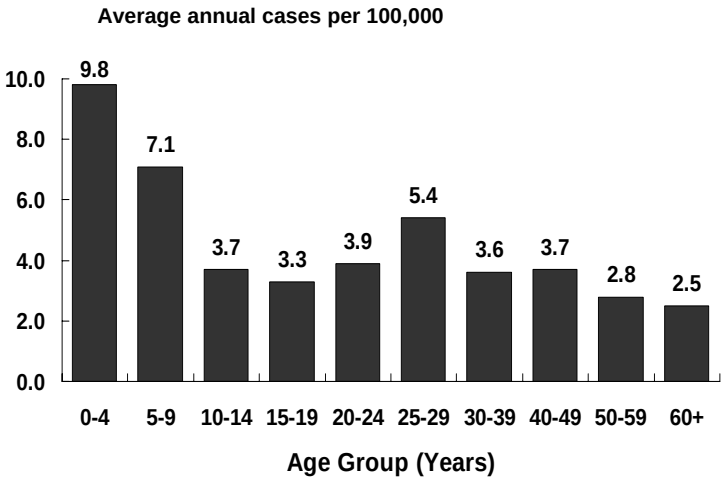
Note: Rates age-standardized using 1991 (adjusted) Canadian population.

Sources: Ontario Data from RDIS, Ontario Ministry of Health and Long-Term Care, as of 05/18/2004.

Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

Figure 4.12: Incidence of Shigellosis by Age Group, Region of Peel, 1994-2003 Combined



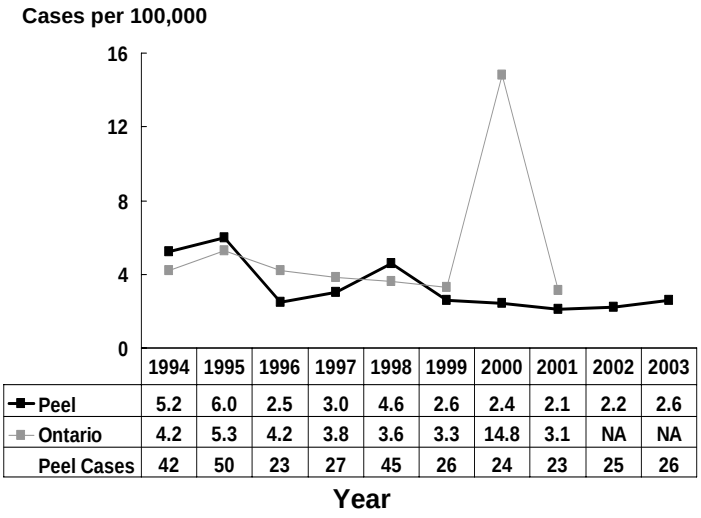
Sources: Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

VEROTOXIN-PRODUCING *ESCHERICHIA COLI* (VTEC)

Verotoxin-producing *Escherichia coli* (VTEC) has made the news in recent years due to outbreaks involving contaminated hamburgers[52] and in a contaminated municipal water supply in Walkerton, Ontario.[53] The increased VTEC incidence in Ontario in 2000 is due to the Walkerton outbreak (see Figure 4.13 below). The bacterium is found in the intestines of healthy cattle. Transmission can occur from one person to another. Most cases are the result of eating undercooked ground beef, but other foods and water can be contaminated.[52]

Figure 4.13: Incidence of Verotoxin-Producing *Escherichia coli* (VTEC), Region of Peel and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Peel	5.2	6.0	2.5	3.0	4.6	2.6	2.4	2.1	2.2	2.6
Ontario	4.2	5.3	4.2	3.8	3.6	3.3	14.8	3.1	NA	NA
Peel Cases	42	50	23	27	45	26	24	23	25	26

NA: 2002 and 2003 Ontario data not available.

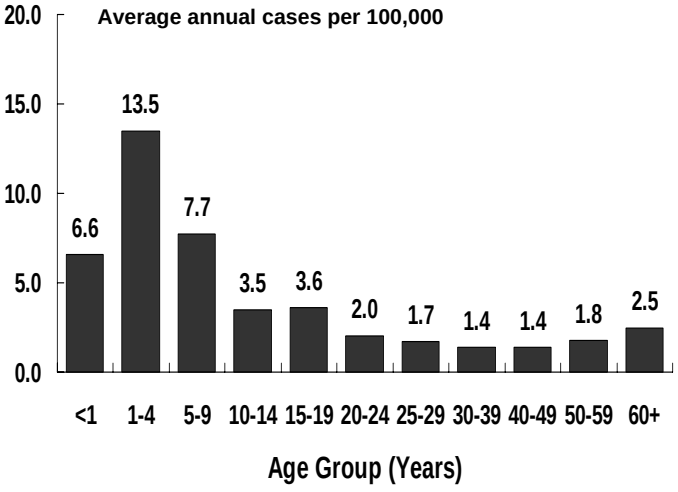
Note: Rates age-standardized using 1991 (adjusted) Canadian population.

Sources: Ontario Data from RDIS, Ontario Ministry of Health and Long-Term Care, as of 05/18/2004.

Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

Figure 4.14: Incidence of Verotoxin-Producing *Escherichia coli* (VTEC) by Age Group, Region of Peel, 1994-2003 Combined



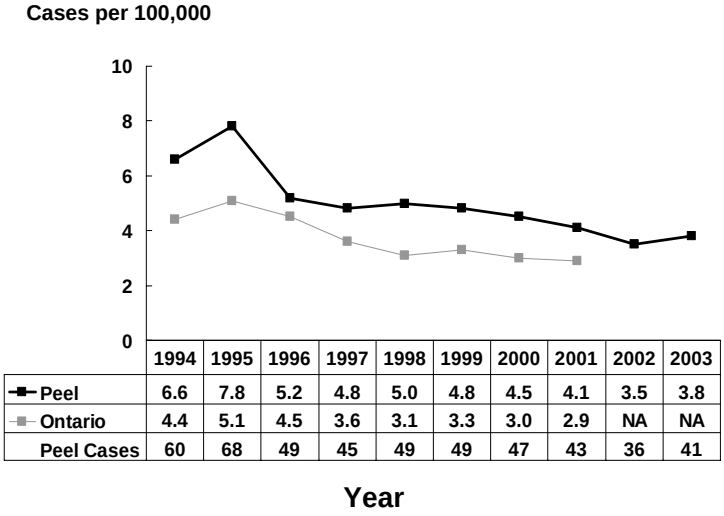
Sources: Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

YERSINIOSIS

Yersiniosis is caused by a number of types of *Yersinia* bacteria found in animals, especially pigs.[52] Most cases are caused by eating raw or undercooked pork. Children and infants are particularly susceptible to becoming sick from *Yersinia*.[54]

Figure 4.15: Incidence of Yersiniosis, Region of Peel and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Peel	6.6	7.8	5.2	4.8	5.0	4.8	4.5	4.1	3.5	3.8
Ontario	4.4	5.1	4.5	3.6	3.1	3.3	3.0	2.9	NA	NA
Peel Cases	60	68	49	45	49	49	47	43	36	41

NA: 2002 and 2003 Ontario data not available.

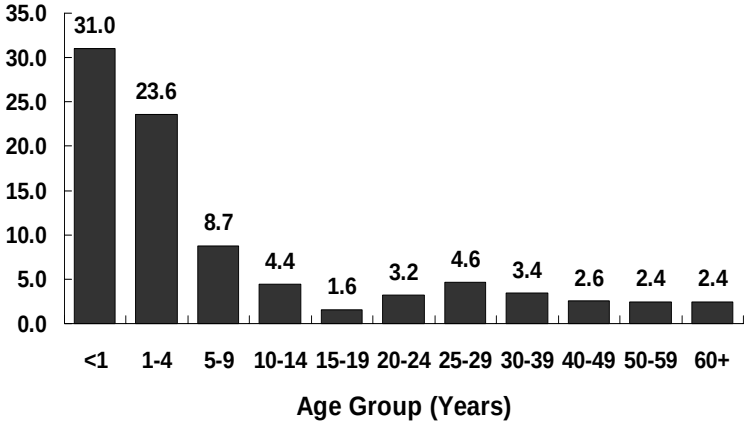
Note: Rates age-standardized using 1991 (adjusted) Canadian population.

Sources: Ontario Data from RDIS, Ontario Ministry of Health and Long-Term Care, as of 05/18/2004.

Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

Figure 4.16: Incidence of Yersiniosis by Age Group, Region of Peel, 1994-2003 Combined



Sources: Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

CHAPTER 5: DISEASES SPREAD BY CLOSE PERSONAL CONTACT

Highlights

- In Peel, meningococcal disease is most common among children aged less than one year.
- The incidence of reported invasive group A streptococcal (GAS) infection stabilized in 2002 and 2003, after steadily increasing from 1994 to 2001. Part of the increase from 1994 to 2001 is explained by a more inclusive case definition that has been used since 1995. Two outbreaks in 2001 raised rates in that year.
- Invasive group A streptococcal infection is most common in children less than one year of age and those aged 60 or more.
- The incidence of tuberculosis was generally stable in Peel from 1994 to 2003; tuberculosis was found to be more prevalent in those aged 60 years or older.

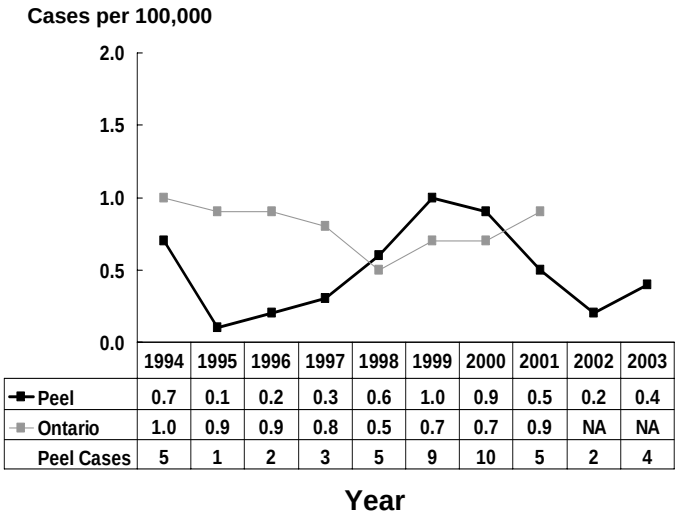
INTRODUCTION

Diseases spread by close personal contact are most often passed between family members or people who share living arrangements. Spread also occurs among casual contacts, but is much less likely since repeated, close and prolonged exposure is usually required for infection. Streptococcal and meningococcal infections are spread from the nasal and throat secretions of a person infected by or carrying the bacteria. Infections can occur directly or from large droplets produced by coughing and sneezing. Many people carry these organisms without being sick. Some types of meningococcal disease can be prevented by non-routine immunization. The Ontario Ministry of Health and Long-Term Care will be publicly funding a vaccine in 2005 against group-C meningococcal disease. Tuberculosis (TB) is spread in the air when a person coughs up TB bacteria from their lungs. For detailed information on TB in Peel please see the *Communicable Disease Report 2002 – Focus on Tuberculosis*, published by the Region of Peel Health Department.

MENINGOCOCCAL DISEASE

Invasive meningococcal disease is caused by the bacterium *Neisseria meningitidis* (also know as meningococcus) and can be life-threatening. It arises as a result of infection of the lining of the brain (meninges) or the blood stream. Canadian children under one year of age are most at risk for meningococcal infection, followed by children under five and those 15 to 19 years of age.[55]

Figure 5.1: Incidence of Meningococcal Disease, Region of Peel and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Peel	0.7	0.1	0.2	0.3	0.6	1.0	0.9	0.5	0.2	0.4
Ontario	1.0	0.9	0.9	0.8	0.5	0.7	0.7	0.9	NA	NA
Peel Cases	5	1	2	3	5	9	10	5	2	4

NA: 2002 and 2003 Ontario data not available.

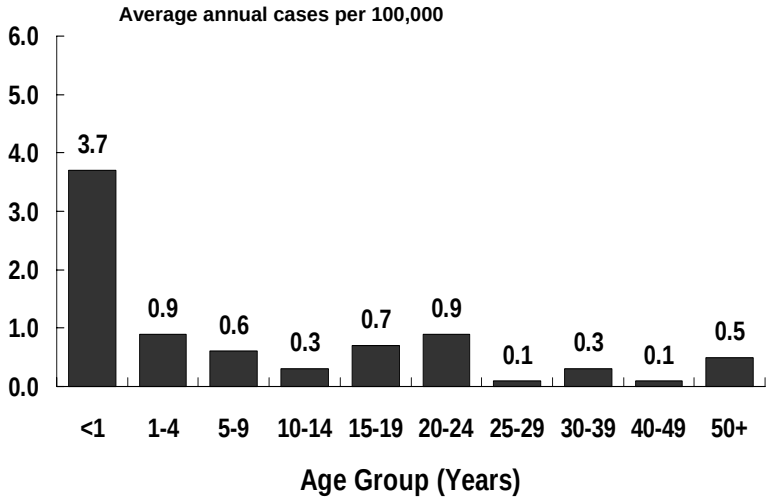
Note: Rates age-standardized using 1991 (adjusted) Canadian population.

Sources: Ontario Data from RDIS, Ontario Ministry of Health and Long-Term Care, as of 05/18/2004.

Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

Figure 5.2: Incidence of Meningococcal Disease by Age Group, Region of Peel, 1994-2003 Combined



Sources: Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

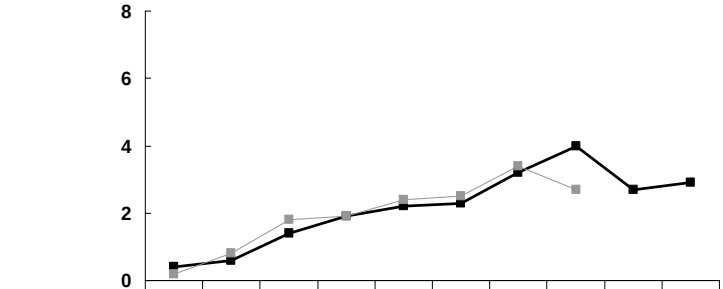
Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

INVASIVE GROUP A STREPTOCOCCAL (GAS) INFECTIONS

Invasive Group A streptococcal (GAS) infections are caused by bacteria that are responsible for a number of different infections. Common infections include pharyngitis and tonsillitis, scarlet fever and ear infections.[56] Much more rarely, invasive GAS causes severe life-threatening infections resulting in necrotizing fasciitis (flesh eating disease) and toxic shock.[56]

In 1996, the case definition of invasive GAS was made more inclusive. In Peel in 2001, there were two outbreaks of invasive GAS in long-term care facilities.

Figure 5.3: Incidence of Invasive Group A Streptococcal Infections, Region of Peel and Ontario,1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Peel	0.4	0.6	1.4	1.9	2.2	2.3	3.2	4.0	2.7	2.9
Ontario	0.2	0.8	1.8	1.9	2.4	2.5	3.4	2.7	NA	NA
Peel Cases	2	4	11	16	19	20	30	35	28	29

NA: 2002 and 2003 Ontario data not available.

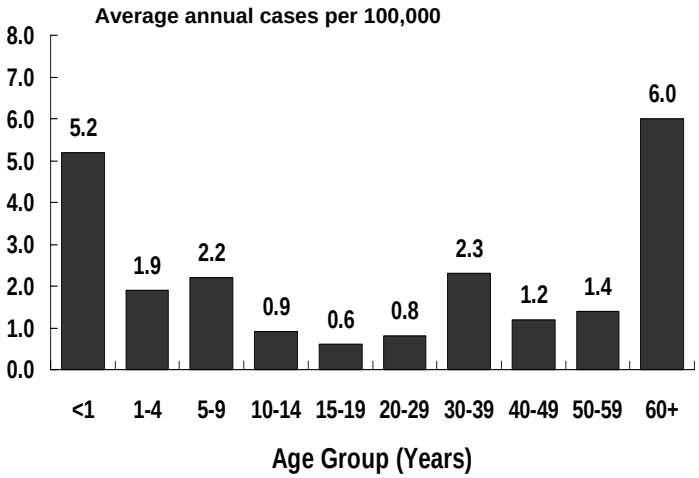
Note: Rates age-standardized using 1991 (adjusted) Canadian population.

Sources: Ontario Data from RDIS, Ontario Ministry of Health and Long-Term Care, as of 05/18/2004.

Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

Figure 5.4: Incidence of Invasive Group A Streptococcal Infections by Age Group, Region of Peel, 1994-2003 Combined



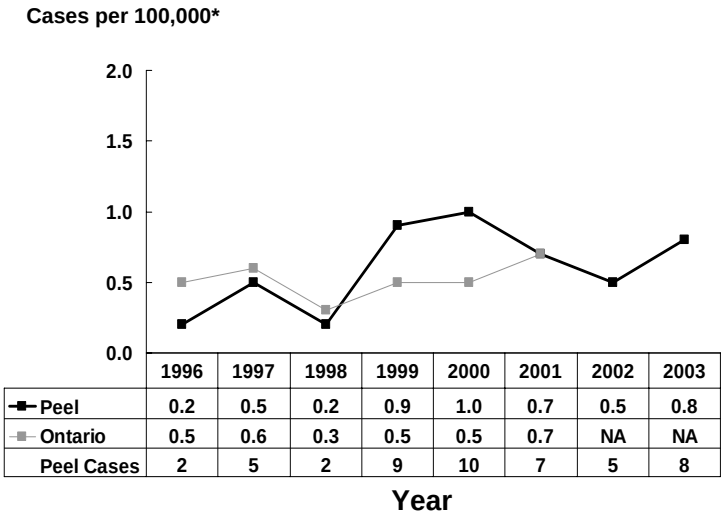
Sources: Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

GROUP B STREPTOCOCCAL (GBS) INFECTIONS

Group B streptococcal (GBS) infections are a major cause of serious infections in infants from birth to three months of age.[57] GBS infections are transmitted from mother to infant during birth.[57] GBS can cause pneumonia, meningitis or an infection throughout the entire body. GBS can be prevented by screening women at 35-37 weeks of pregnancy and offering antibiotics to those women who are positive for GBS.[57] Older children and adults can also be infected with GBS.

Figure 5.5: Incidence of Group B Streptococcal Infections, Region of Peel and Ontario, 1996-2003



	1996	1997	1998	1999	2000	2001	2002	2003
Peel	0.2	0.5	0.2	0.9	1.0	0.7	0.5	0.8
Ontario	0.5	0.6	0.3	0.5	0.5	0.7	NA	NA
Peel Cases	2	5	2	9	10	7	5	8

*All cases were among children less than one year old.

NA: 2002 and 2003 Ontario data not available.

Note: Rates age-standardized using 1991 (adjusted) Canadian population.

Sources: Ontario Data from RDIS, Ontario Ministry of Health and Long-Term Care, as of 05/18/2004.

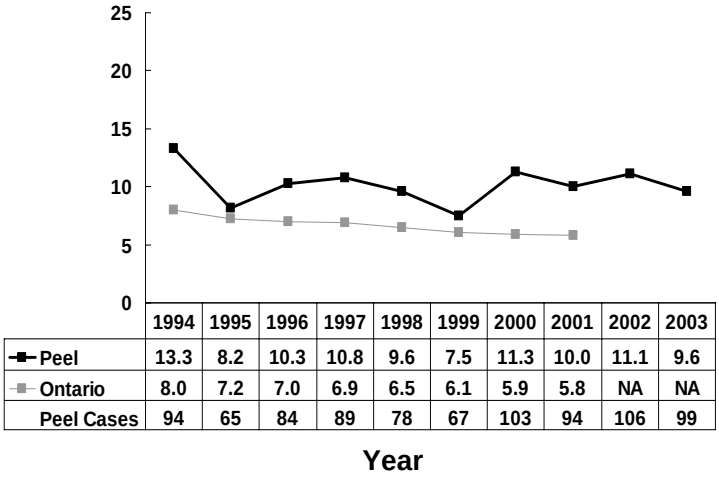
Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

TUBERCULOSIS

Tuberculosis is a disease caused by a bacterium called *Mycobacterium tuberculosis*.[58] It mainly affects the lungs but can affect other parts of the body as well. Tuberculosis organisms are released into the air when someone with infectious, active tuberculosis in their lungs or larynx coughs. The disease spreads when these organisms are inhaled. Tuberculosis found in other parts of the body cannot be spread to other people.[58]

Figure 5.6: Incidence of Active Tuberculosis, Region of Peel and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Peel	13.3	8.2	10.3	10.8	9.6	7.5	11.3	10.0	11.1	9.6
Ontario	8.0	7.2	7.0	6.9	6.5	6.1	5.9	5.8	NA	NA
Peel Cases	94	65	84	89	78	67	103	94	106	99

NA: 2002 and 2003 Ontario data not available.

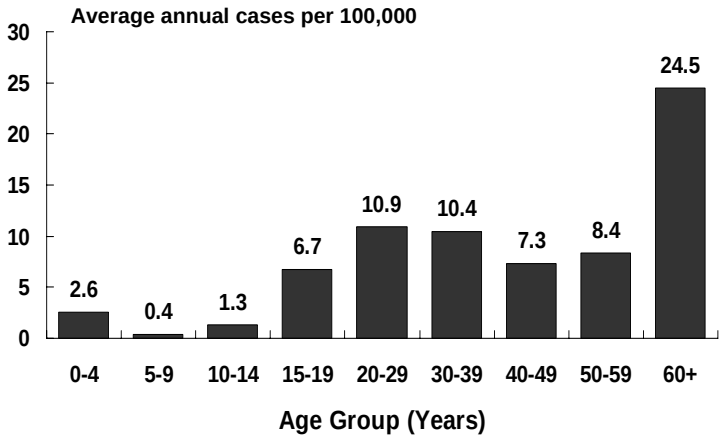
Note: Rates age-standardized using 1991 (adjusted) Canadian population.

Sources: Ontario Data from RDIS, Ontario Ministry of Health and Long-Term Care, as of 05/18/2004.

Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

Figure 5.7: Incidence of Active Tuberculosis by Age Group, Region of Peel, 1994-2003 Combined



Sources: Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

CHAPTER 6: DISEASES SPREAD BY INSECTS

Highlights

- In Peel, approximately one to six cases of malaria per 100,000 population have been reported each year, with the exception of 1996 and 1997 which had a dramatic increase in incidence (16.4 and 15.6 cases per 100,000 respectively) possibly due to travel to and immigration from the Punjab, India which was experiencing a malaria outbreak.[59] Ontario and Canada experienced a similar increase, however the increased incidence was much higher in Peel compared to either Ontario or Canada.[60]
- In 2003, there were 10 residents of Peel who had laboratory evidence of West Nile Virus (WNV) infection stemming from the 2003 mosquito season. Nine of these had confirmed diagnoses of West Nile Fever and one had a diagnosis of West Nile Neurological Manifestations. There were no deaths due to WNV in 2003. While case definitions and laboratory testing methods differed between 2002 and 2003, these results are still much lower than the 112 residents with laboratory evidence of WNV identified in 2002, 37 of whom were confirmed and 20 classified as probable WNV infections.

INTRODUCTION

Diseases spread by insects are caused by bacteria, parasites and viruses. Blood feeding insects such as fleas, mosquitoes, midges and sandflies transmit these diseases; often act as a site where the infectious organism can multiply or complete part of its lifecycle. Although some insect-borne diseases can be transmitted from person to person or through blood, this is not their main mode of transmission. Many insect-borne diseases are major health problems for developing countries. Malaria is estimated to infect over 300 million people a year, killing one million.[61, 62]

Fortunately, many insect-borne diseases are so rare in Ontario that they are not required to be reported. The reportable insect-borne diseases in Ontario are: viral hemorrhagic fevers, Lyme disease, Malaria, Plague, Q fever, West Nile Virus and Yellow Fever. In Peel only two of these insect-borne diseases averaged more than five cases per year. The first is the parasite Malaria, acquired in areas of the world where this disease occurs from the bite of an infected mosquito. The second, also spread by mosquitoes, is a new disease to Peel: West Nile Virus (WNV). WNV was acquired locally for the first time in 2002. The extent to which it will affect Peel residents in the future is unknown.

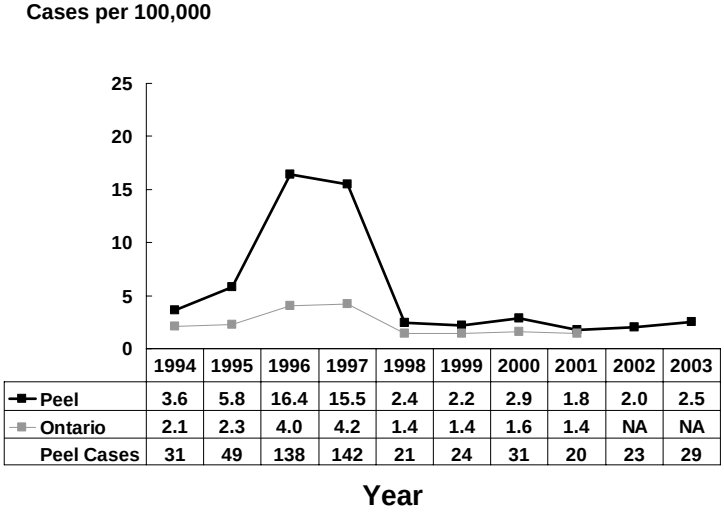
MALARIA

Malaria remains one of the world's most important and widespread fatal infectious diseases.[61] It is caused by one of four species of parasite of the genus *Plasmodium*.[61] The disease is transmitted to humans through a bite of an infected female *Anopheles* mosquito. While rare, the parasite can also be transmitted by transfusion with infected blood, shared needle use, or from a mother to her unborn child.[61]

Symptoms of malaria are non-specific and include fever, chills, headache, nausea, vomiting, muscle pain and malaise.[61]

Malaria is endemic (constantly present) in the tropical and subtropical parts of the world.[59] Nearly all cases of malaria in Canada occur in people who lived in or travelled to areas where malaria is common.

Figure 6.1: Incidence of Malaria, Region of Peel and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Peel	3.6	5.8	16.4	15.5	2.4	2.2	2.9	1.8	2.0	2.5
Ontario	2.1	2.3	4.0	4.2	1.4	1.4	1.6	1.4	NA	NA
Peel Cases	31	49	138	142	21	24	31	20	23	29

NA: 2002 and 2003 Ontario data not available.

Note: Rates age-standardized using 1991 (adjusted) Canadian population.

Sources: Ontario Data from RDIS, Ontario Ministry of Health and Long-Term Care, as of 05/18/2004.

Peel Data from RDIS, Region of Peel Health Department, as of 02/23/2004.

Statistics Canada, Population Estimates and Projections distributed by the Ontario Ministry of Health and Long-Term Care.

WEST NILE VIRUS (WNV)

West Nile Virus (WNV) is a mosquito-borne virus that was first recognized in North America in 1999 in New York City. By the end of the 2002 mosquito season, the virus had spread to five provinces in Canada (Nova Scotia, Quebec, Ontario, Manitoba and Saskatchewan) and 44 states in the United States of America. In 2003, the disease continued its spread to also include New Brunswick and Alberta, while cases reported in British Columbia and the Yukon were found to be associated with travel outside of the province/territory or country. The United States reported human cases in 46 states and bird, mosquito or other animal WNV activity in all but three states in 2003.

WNV is a human, horse and bird neuropathogen that can cause diseases of the nervous system such as encephalitis or meninigitis, and can result in death. Human cases of locally-acquired WNV occurred for the first time in 2002, with a total of 37 confirmed, 20 probable and 55 suspect cases in Peel. Case definitions and laboratory testing methods differed in 2002 and 2003, making direct comparisons between the years more difficult. Nevertheless, as of December 2, 2003, there were only 10 residents of Peel who had laboratory evidence of WNV infection stemming from the 2003 mosquito season. Nine of these had confirmed diagnoses of West Nile Fever and one had a diagnosis of West Nile Neurological Manifestations.

In 2003, half of the WNV confirmed cases in Peel were aged 40 to 59 years. This was similar to findings in 2002, when approximately half of the confirmed and probable cases were aged 50 to 69 years – as opposed to the majority of cases being among the older age groups or the infirmed as was initially expected. There were four hospitalizations and no deaths due to WNV in 2003, compared to 28 hospitalizations and two deaths due to WNV in 2002.

More detailed information on WNV can be found in the report entitled: *West Nile Virus in the Region of Peel 2003*, published by the Region of Peel Health Department.

APPENDIX

TABLE 1

Cases of Reportable Disease, Region of Peel, 1994-2003

Selected Reportable Diseases	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
AIDS	25	19	18	11	5	4	6	12	5	16
Amebiasis	100	97	93	110	102	93	98	129	123	109
Brucellosis	3	1	1	0	1	1	0	1	2	0
Campylobacteriosis	692	556	525	502	515	442	457	483	422	397
Chlamydia	998	962	877	947	1,087	1,230	1,270	1,477	1,628	1764
Cholera	0	0	0	0	0	0	0	1	0	0
Cryptosporidiosis*	NA	NA	3	3	7	8	12	14	10	13
Cyclosporiasis**	NA	NA	NA	4	12	34	2	1	3	2
Cytomegalovirus	0	0	0	1	0	0	0	1	2	0
Encephalitis/Meningitis	27	18	24	17	19	28	51	70	72	39
Giardiasis	225	224	215	221	207	164	193	210	170	184
Gonorrhea	284	309	215	194	244	214	318	308	319	353
Haemophilus influenzae type b	1	2	0	0	0	0	1	1	0	1
Hepatitis A	42	52	44	34	18	24	8	22	22	18
Hepatitis B	15	33	16	9	11	2	5	10	9	11
Hepatitis C	NA	502	550	505	468	478	447	344	403	328
Herpes, Neonatal	0	0	2	0	0	2	0	0	0	0
HIV	30	39	25	21	24	18	37	21	33	37
Influenza***	34	18	61	101	111	113	41	166	133	554
Legionella Infections	1	9	3	5	4	2	6	1	5	2
Leprosy	1	1	2	1	1	3	3	1	0	1
Listeriosis	5	5	0	4	3	4	4	4	9	3
Lyme Disease	3	0	0	1	1	0	7	1	2	3
Malaria	31	49	138	142	21	24	31	20	23	29
Measles	6	440	9	0	2	0	0	0	0	0
Meningococcal Disease	5	1	2	3	5	9	10	5	2	4
Mumps	11	17	11	2	2	4	6	1	3	3
Ophthalmia Neonatorum	0	2	1	2	1	0	0	0	0	0
Paratyphoid Fever	1	3	3	0	5	6	7	1	10	6
Pertussis	60	90	36	30	44	24	29	21	20	10
Q Fever	0	1	0	1	0	0	1	1	0	0
Rubella	0	0	28	7	1	0	0	1	0	1
Salmonellosis	242	278	245	235	337	249	242	279	223	221
Severe Acute Respiratory Syndrome (SARS)‡	NA	NA	NA	NA	NA	NA	NA	NA	NA	17
Shigellosis	49	34	35	36	51	42	29	26	64	47
Streptococcal Infections, Group A invasive	2	4	11	16	19	20	30	35	28	29
Streptococcal Infections, Group B	NA	0	2	5	2	9	10	7	5	8
Syphilis	13	8	5	4	3	1	2	1	1	9
Tuberculosis	94	65	84	89	78	67	103	94	106	99
Typhoid Fever	10	11	3	6	11	14	21	12	13	18
Verotoxin-producing Escherichia coli	42	50	23	27	45	26	24	23	25	26
West Nile Virus †	NA	NA	NA	NA	NA	1	0	0	57	10
Yersiniosis	60	68	49	45	49	49	47	43	36	41

* Cryptosporidiosis became reportable in 1996.

** The increase in cyclosporiasis cases in 1999 was due to an outbreak in the Greater Toronto Area caused by the importation of contaminated fruit. Cyclosporiasis became reportable in 2000 and entered on RDIS as of January 2003. Data prior to 2000 was collected manually by Peel Health Environmental Health Division staff.

*** Influenza data based on seasonal year (i.e. 1993 data are from July 1, 1993 to June 30, 1994). 2003/2004 data include cases up to March 20, 2004 only.

‡ Severe Acute Respiratory Syndrome (SARS) began in late March 2003. Cases reported were confirmed or probable as of June 16, 2003.

† West Nile Virus data for 2002 and 2003 includes confirmed and probable cases for Peel only. One case reported in 1999 was acquired in New York City.

NA = Data not available

Notes:

There was only one case of the following diseases in Peel in the year noted: Chancroid (1996), Hepatitis D (1998), Hepatitis Non A,B,C,D (1997), Psittacosis/Ornithosis (1995), Rubella-Congenital Syndrome (1997), Tetanus (2001) and Trichinosis (1993).

There were no cases of the following reportable diseases in Peel from 1994-2003 (or earlier): anthrax, botulism, diphtheria, hantavirus pulmonary syndrome, hemorrhagic fevers, plague, polio, rabies, streptococcus pneumoniae, smallpox, tularemia, and yellow fever.

Chickenpox (varicella) data was of poor quality and was not used in this table.

Sources: Peel data from RDIS, Region of Peel Health Department as of 02/23/2004, except West Nile Virus data, which is taken from *West Nile Virus in the Region of Peel 2003 Report* and cyclosporiasis data based on manual counts by Peel Health Environmental Health Staff. SARS data from Communicable Disease Division, Region of Peel Health Department.

TABLE 2

Cases of Reportable Disease, Ontario, 1994-2001

Selected Reportable Diseases	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
AIDS	619	604	404	256	207	172	131	157	NA	NA
Amebiasis	950	931	840	985	832	769	817	846	NA	NA
Brucellosis	4	3	2	2	4	2	2	2	NA	NA
Campylobacteriosis	7,472	6,391	5,401	5,210	5,347	4,084	4,958	5,004	NA	NA
Chlamydia	13,770	12,194	10,807	10,721	12,587	13,466	14,782	16,247	NA	NA
Cholera	1	3	1	0	1	0	0	3	NA	NA
Cryptosporidiosis*	NA	NA	266	227	185	205	236	247	NA	NA
Cytomegalovirus	3	8	5	5	4	11	8	4	NA	NA
Encephalitis/Meningitis	363	327	320	300	448	438	396	537	NA	NA
Giardiasis	2,713	2,715	2,556	2,384	2,128	1,980	2,001	2,048	NA	NA
Gonorrhea	3,227	3,075	2,377	1,944	2,307	2,293	2,854	2,943	NA	NA
Haemophilus influenzae type b	13	12	10	7	7	4	11	6	NA	NA
Hepatitis A	428	501	616	456	318	261	157	175	NA	NA
Hepatitis B	275	304	223	170	137	137	136	129	NA	NA
Hepatitis C	NA	7368	7855	6310	7090	6527	5824	5516	NA	NA
Herpes, Neonatal	6	0	5	3	3	10	1	4	NA	NA
HIV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Influenza**	1,725	696	1,244	2,499	2,334	2,824	781	2,204	958	5,031
Legionella Infections	35	33	37	45	45	44	41	21	NA	NA
Leprosy	10	5	6	4	2	6	3	3	NA	NA
Listeriosis	35	44	26	37	51	31	37	36	NA	NA
Lyme Disease	33	19	17	17	17	22	44	23	NA	NA
Malaria	223	253	443	464	159	164	183	160	NA	NA
Measles	326	2306	189	22	9	2	9	6	NA	NA
Meningococcal Disease	110	93	95	82	51	81	78	105	NA	NA
Mumps	122	198	83	63	32	43	33	17	NA	NA
Ophthalmia Neonatorum	3	9	13	9	7	7	3	2	NA	NA
Paratyphoid Fever	12	15	12	3	12	17	12	12	NA	NA
Pertussis	2,273	2,051	722	1,042	1,861	1,214	714	458	NA	NA
Q Fever	6	12	10	9	8	18	11	11	NA	NA
Rubella	91	197	72	29	15	3	9	17	NA	NA
Rubella, Congenital Syndrome	3	1	0	1	0	0	1	0	NA	NA
Salmonellosis	2,814	2,890	2,670	2,627	3,336	2,296	2,359	2,530	NA	NA
Severe Acute Respiratory Syndrome (SARS)‡	NA	NA	NA	NA	NA	NA	NA	NA	NA	376
Shigellosis	482	429	314	369	406	266	282	231	NA	NA
Streptococcal infections, Group A invasive	22	87	206	224	275	303	405	326	NA	NA
Streptococcal infections, Group B	NA	14	52	59	30	47	52	64	NA	NA
Syphilis	60	59	48	32	30	32	22	26	NA	NA
Tetanus	1	2	1	1	2	1	1	3	NA	NA
Trichinosis	0	0	0	1	0	0	0	0	NA	NA
Tuberculosis	865	799	778	778	743	699	697	698	NA	NA
Typhoid Fever	45	44	23	31	45	42	52	62	NA	NA
Verotoxin-producing Escherichia coli	458	584	467	427	402	372	1,707	353	NA	NA
West Nile Virus †	NA	NA	NA	NA	NA	NA	NA	NA	405	89
Yersiniosis	480	559	492	400	343	361	333	311	NA	NA

* Cryptosporidiosis became reportable in 1996.

** Influenza data based on seasonal year (i.e. 1993 data are from July 1, 1993 to June 30, 1994). 2003/2004 data include cases up to March 20, 2004 only.

‡ Severe Acute Respiratory Syndrome (SARS) began in late March 2003. Cases reported were confirmed or probable as of June 16, 2003.

† West Nile Virus data for 2002 and 2003 includes confirmed and probable cases.

NA = Data not available

Notes:

There were 11 cases of Psittacosis/Ornithosis reported in Ontario from 1994 to 2001.

There were some reportable diseases not included in this table. Please see Table 1.

Sources: Ontario data from RDIS, Ontario Ministry of Health and Long-Term Care as of 05/18/2004.
SARS data from *SARS Bulletin for Healthcare Providers*. Ontario Ministry of Health and Long-Term Care, as of 06/16/2003.
WNV data West Nile Virus Surveillance archive, Ontario Ministry of Health and Long-Term Care, 2003.

TABLE 3

Age-Standardized Incidence of Reportable Disease, Region of Peel, 1994-2003

Selected Reportable Diseases	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
AIDS	2.8	2.2	1.9	1.1	0.5	0.4	0.6	1.0	0.4	1.3
Amebiasis	12.0	11.6	10.8	12.1	11.0	9.7	10.2	12.4	11.3	10.1
Brucellosis	0.4	0.2	0.1	0.0	<0.1	0.1	0.0	<01.	0.2	0.0
Campylobacteriosis	81.8	62.9	58.5	54.0	53.6	44.4	44.7	46.2	39.0	36.2
Chlamydia	116.6	111.1	100.6	105.9	118.3	130.8	131.1	147.0	161.5	171.6
Cholera	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Cryptosporidiosis*	NA	NA	0.3	0.3	0.7	0.8	1.2	1.3	0.9	1.2
Cyclosporiasis**	NA	NA	NA	0.4	1.3	3.5	0.2	0.1	0.3	0.2
Cytomegalovirus	0.0	0.0	0.0	<0.1	0.0	0.0	0.0	<0.1	0.2	0.0
Encephalitis/Meningitis	3.0	2.0	2.6	1.7	2.0	2.9	4.8	6.6	7.2	3.7
Giardiasis	26.1	25.7	23.5	23.3	21.1	16.4	18.8	20.0	15.8	16.5
Gonorrhea	33.1	35.7	24.6	21.7	26.4	22.5	32.6	30.3	31.5	33.8
Haemophilus influenzae type b	0.1	0.2	0.0	0.0	0.0	0.0	<0.1	0.1	0.0	<0.1
Hepatitis A	4.8	5.8	4.9	3.6	1.8	2.4	0.7	1.9	2.0	1.6
Hepatitis B	1.9	3.9	2.0	1.1	1.2	0.2	0.5	1.0	0.9	1.0
Hepatitis C	NA	56.8	59.1	53.2	49.1	47.4	43.1	32.7	35.7	28.3
Herpes, Neonatal	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.0
HIV	3.5	4.3	2.7	2.2	2.5	1.8	3.6	2.0	3.0	3.3
Influenza***	4.4	1.9	7.0	12.5	13.8	13.5	4.2	17.1	13.0	55.5
Legionella Infections	0.2	1.5	0.3	0.6	0.6	0.2	0.8	0.2	0.4	0.2
Leprosy	0.1	0.2	0.2	0.2	<0.1	0.3	0.3	<0.1	0.0	<0.1
Listeriosis	0.8	0.7	0.0	0.5	0.5	0.5	0.5	0.5	1.1	0.3
Lyme Disease	0.3	0.0	0.0	<0.1	<0.1	0.0	0.6	<0.1	0.2	0.3
Malaria	3.6	5.8	16.4	15.5	2.4	2.2	2.9	1.8	2.0	2.5
Measles	0.7	48.8	0.9	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Meningococcal Disease	0.7	0.1	0.2	0.3	0.6	1.0	0.9	0.5	0.2	0.4
Mumps	1.2	1.9	1.2	0.2	0.2	0.4	0.6	<0.1	0.3	0.2
Ophthalmia Neonatorum	0.0	0.2	<0.1	0.2	<0.1	0.0	0.0	0.0	0.0	0.0
Paratyphoid Fever	0.1	0.3	0.3	0.0	0.5	0.6	0.6	0.1	1.0	0.5
Pertussis	6.6	9.6	3.7	3.0	4.3	2.3	2.7	1.9	1.8	0.9
Q Fever	0.0	<0.1	0.0	0.1	0.0	0.0	<0.1	<0.1	0.0	0.0
Rubella	0.0	0.0	3.1	0.7	<0.1	0.0	0.0	<0.1	0.0	<0.1
Salmonellosis	28.2	31.6	26.7	24.5	34.8	25.2	24.1	26.7	21.0	20.4
Severe Acute Respiratory Syndrome (SARS)‡	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.5
Shigellosis	5.8	4.0	3.9	3.9	5.2	4.2	2.7	2.4	6.0	4.3
Streptococcal Infections, Group A Invasive	0.4	0.6	1.4	1.9	2.2	2.3	3.2	4.0	2.7	2.9
Streptococcal Infections, Group B	NA	0.0	0.2	0.5	0.2	0.9	1.0	0.7	0.5	0.8
Syphilis	1.4	0.9	0.5	0.4	0.3	0.1	0.2	0.1	<0.1	0.8
Tuberculosis	13.3	8.2	10.3	10.8	9.6	7.5	11.3	10.0	11.1	9.6
Typhoid Fever	1.1	1.2	0.3	0.7	1.1	1.5	2.0	1.1	1.1	1.7
Verotoxin-producing Escherichia coli	5.2	6.0	2.5	3.0	4.6	2.6	2.4	2.1	2.2	2.6
West Nile Virus †	NA	NA	NA	NA	NA	0.1	0.0	0.0	5.3	0.9
Yersiniosis	6.6	7.8	5.2	4.8	5.0	4.8	4.5	4.1	3.5	3.8

* Cryptosporidiosis became reportable in 1996.

** The increase in cyclosporiasis cases in 1999 was due to an outbreak in the Greater Toronto Area caused by the importation of contaminated fruit. Cyclosporiasis became reportable in 2000 and entered on RDIS as of January 2003. Data prior to 2000 was collected manually by Peel Health Environmental Health Division staff.

*** Influenza data based on seasonal year (i.e. 1993 data are from July 1, 1993 to June 30, 1994). 2003/2004 data include cases up to March 20, 2004 only.

‡ Severe Acute Respiratory Syndrome (SARS) began in late March 2003. Crude Incidence rates for 2003.

† West Nile Virus data for 2002 and 2003 includes confirmed and probable cases for Peel only. One case reported in 1999 was acquired in New York City. Incidence rates for 2002 and 2003 are crude.

NA = Data not available

Notes:

Rates are age-standardized using 1991 (adjusted) Canadian population, with the exceptions of SARS and West Nile Virus which are crude rates, expressed per 100,000 population.

There was only one case of the following diseases in Peel in the year noted: Chancroid (1996), Hepatitis D (1998), Hepatitis Non A,B,C,D (1997), Psittacosis/Ornithosis (1995), Rubella-Congenital Syndrome (1997), Tetanus (2001) and Trichinosis (1993).

There were no cases of the following reportable diseases in Peel from 1994-2003 (or earlier): anthrax, botulism, diphtheria, hantavirus pulmonary syndrome, hemorrhagic fevers, plague, polio, rabies, streptococcus pneumoniae, smallpox, tularemia, and yellow fever.

Chickenpox (varicella) data was of poor quality and was not used in this table.

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TABLE 4

Age-Standardized Incidence of Reportable Disease, Ontario, 1994-2001

Selected Reportable Diseases	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
AIDS	5.7	5.4	3.6	2.3	1.8	1.5	1.1	1.3	NA	NA
Amebiasis	8.8	8.6	7.6	8.9	7.3	6.7	7.1	7.2	NA	NA
Brucellosis	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA
Campylobacteriosis	69.3	58.8	49.3	47.2	47.9	36.4	43.7	43.5	NA	NA
Chlamydia	133.7	118.9	106.1	105.0	122.9	130.5	141.5	153.8	NA	NA
Cholera	<0.1	<0.1	<0.1	0.0	<0.1	0.0	0.0	<0.1	NA	NA
Cryptosporidiosis*	NA	NA	2.4	2.1	1.7	1.9	2.2	2.3	NA	NA
Cytomegalovirus	<0.1	<0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	NA	NA
Encephalitis/Meningitis	3.4	3.0	2.9	2.7	4.1	3.9	3.5	4.8	NA	NA
Giardiasis	25.3	25.1	23.3	21.6	19.2	17.8	17.9	18.1	NA	NA
Gonorrhea	31.0	29.8	23.2	18.8	22.2	21.8	26.9	27.3	NA	NA
Haemophilus influenzae type b	0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA
Hepatitis A	3.9	4.6	5.6	4.1	2.8	2.3	1.4	1.5	NA	NA
Hepatitis B	2.6	2.8	2.0	1.6	1.2	1.2	1.2	1.1	NA	NA
Hepatitis C	NA	64.8	68.5	54.5	60.5	54.3	47.7	44.0	NA	NA
Herpes, Neonatal	<0.1	0.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA
HIV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Influenza**	15.3	6.1	10.9	21.3	19.9	23.5	7.1	18.8	8.9	42.5
Legionella Infections	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.2	NA	NA
Leprosy	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA
Listeriosis	0.3	0.4	0.2	0.3	0.4	0.3	0.3	0.3	NA	NA
Lyme Disease	0.3	0.2	0.2	0.1	0.1	0.2	0.4	0.2	NA	NA
Malaria	2.1	2.3	4.0	4.2	1.4	1.4	1.6	1.4	NA	NA
Measles	3.1	21.6	1.7	0.2	<0.1	<0.1	<0.1	<0.1	NA	NA
Meningococcal Disease	1.0	0.9	0.9	0.8	0.5	0.7	0.7	0.9	NA	NA
Mumps	1.1	1.9	0.8	0.6	0.3	0.4	0.3	0.2	NA	NA
Ophthalmia Neonatorum	<0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA
Paratyphoid Fever	0.1	0.1	0.1	<0.1	0.1	0.2	0.1	0.1	NA	NA
Pertussis	21.1	19.0	6.6	9.6	16.9	11.0	6.4	4.1	NA	NA
Q Fever	<0.1	0.1	<0.1	<0.1	<0.1	0.1	<0.1	<0.1	NA	NA
Rubella	0.9	1.8	0.7	0.3	0.1	<0.1	<0.1	0.1	NA	NA
Rubella, Congenital Syndrome	<0.1	<0.1	0.0	<0.1	0.0	0.0	<0.1	0.0	0.0	NA
Salmonellosis	26.0	26.5	24.3	23.8	30.0	20.6	21.0	22.1	NA	NA
Severe Acute Respiratory Syndrome (SARS)‡	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.1
Shigellosis	4.5	3.9	2.9	3.3	3.7	2.4	2.5	2.0	NA	NA
Streptococcal infections, Group A invasive	0.2	0.8	1.8	1.9	2.4	2.5	3.4	2.7	NA	NA
Streptococcal infections, Group B	NA	0.1	0.5	0.6	0.3	0.5	0.5	0.7	NA	NA
Syphilis	0.6	0.5	0.4	0.3	0.3	0.3	0.2	0.2	NA	NA
Tetanus	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA
Trichinosis	0.0	0.0	0.0	<0.1	0.0	0.0	0.0	0.0	NA	NA
Tuberculosis	8.0	7.2	7.0	6.9	6.5	6.1	5.9	5.8	NA	NA
Typhoid Fever	0.4	0.4	0.2	0.3	0.4	0.4	0.5	0.6	NA	NA
Verotoxin-producing Escherichia coli	4.2	5.3	4.2	3.8	3.6	3.3	14.8	3.1	NA	NA
West Nile Virus	NA	NA	NA	NA	NA	NA	NA	NA	3.4	0.7
Yersiniosis	4.4	5.1	4.5	3.6	3.1	3.3	3.0	2.9	NA	NA

* Cryptosporidiosis became reportable in 1996.

** Influenza data based on seasonal year (i.e. 1993 data are from July 1, 1993 to June 30, 1994). 2003/2004 data includes cases up to March 20, 2004 only.

‡ Severe Acute Respiratory Syndrome (SARS) began in late March 2003. Cases reported were confirmed or probable as of June 16, 2003.

† West Nile Virus data for 2002 and 2003 includes confirmed and probable cases.

NA = Data not available

Notes:

Rates are age-standardized using 1991 (adjusted) Canadian population with the exceptions of SARS and West Nile Virus, which are crude rates, expressed per 100,000 population.

There were 11 cases of Psittacosis/Ornithosis reported in Ontario from 1994 to 2001.

There were some reportable diseases not included in this table. Please see Table 1.

Sources: Ontario data from RDIS, Ontario Ministry of Health and Long-Term Care as of 05/18/2004.
SARS data from *SARS Bulletin for Healthcare Providers* . Ontario Ministry of Health and Long-Term Care, as of 06/16/2003.
WNV data West Nile Virus Surveillance archive, Ontario Ministry of Health and Long-Term Care, 2003.

TABLE 5
Influenza Season Week Codes, 2003/2004

Week Number	Dates Included
35	Aug. 24 - Aug. 30, 2003
36	August 31 - Sept. 6, 2003
37	Sept. 7 - Sept. 13, 2003
38	Sept. 14 - Sept. 20, 2003
39	Sept. 21 - Sept. 27, 2003
40	Sept. 28 - Oct. 4, 2003
41	Oct. 5 - Oct. 11, 2003
42	Oct. 12 - Oct. 18, 2003
43	Oct. 19 - Oct. 25, 2003
44	Oct. 26 - Nov. 1, 2003
45	Nov. 2 - Nov. 8, 2003
46	Nov. 9 - Nov. 15, 2003
47	Nov. 16 - Nov. 22, 2003
48	Nov. 23 - Nov. 29, 2003
49	Nov. 30 - Dec. 6, 2003
50	Dec. 7 - Dec. 13, 2003
51	Dec. 14 - Dec. 20, 2003
52	Dec. 21 - Dec. 27, 2003
1	Dec. 28, 2003 - Jan. 3, 2004
2	Jan. 4 - Jan. 10, 2004
3	Jan. 11 - Jan. 17, 2004
4	Jan. 18 - Jan. 24. 2004
5	Jan 25 - Jan. 31, 2004
6	Feb. 1 - Feb. 7, 2004
7	Feb. 8 - Feb 14, 2004
8	Feb. 15 - Feb. 21, 2004
9	Feb. 22 - Feb. 28, 2004
10	Feb. 29 - Mar. 6, 2004
11	Mar. 7 - Mar. 13, 2004
12	Mar. 14 - Mar. 20, 2004
13	Mar. 21 - Mar. 27, 2004

GLOSSARY OF TERMS

Antibodies - Proteins produced by the body in response to exposure to a foreign substance (antigen); antibodies neutralize antigens and render them harmless.

Antigen - Any molecule that is recognized by the immune system and that triggers an immune response, such as release of antibodies.

Antigenic Drift - A gradual change of the hemagglutinin or neuraminidase proteins on the surface of a particular strain of influenza virus that occurs in response to host antibodies in humans who have been exposed to it. Antigenic drift occurs on an ongoing basis in both type A and type B influenza strains and necessitates ongoing changes in influenza vaccines.

Antigenic Shift – The “evolutionary” changes that take place in the RNA/DNA in microorganisms during their passage from one host to another. Antigenic shift leads to the alteration in the antigenic composition of the influenza virus and thus in the response of individuals and populations to exposure to the influenza virus. This type of change causes pandemics.

Antivirals - Drugs that inhibit either the life cycle or replication of viruses, resulting in decreasing the severity and duration of a viral infection.

Asian flu - Common name for the influenza A strain that killed over one million people around the world in the 1957 pandemic.

Avian flu - Avian influenza, or "bird flu", is a contagious disease of animals caused by viruses that normally infect only birds and, less commonly, pigs. It is of concern because of its potential to develop into the source of the next pandemic.

Chemoprophylaxis – prevention of disease using drugs.

Epidemic/Outbreak - A disease such as influenza occurring suddenly in a community, region or country in numbers clearly in excess of normal.

Gene - Any of the units in chromosomes by which hereditary characteristics are transmitted.

Hemagglutinin - An important surface structure protein of the influenza virus that enables the virus to attach itself to a cell in the respiratory system and penetrate it.

Hong Kong Flu - Common name for the influenza A strain that killed nearly 750,000 people around the world in the 1968 pandemic.

Incubation period – The time period between invasion by an infectious agent (e.g. influenza virus) and appearance of the first sign or symptom of the disease in question (e.g. influenza).

Isolate - In microbiology, to obtain a pure strain from a source such as a clinical specimen that may have been part of a mixture of different organisms.

Neuraminidase - An important surface structure protein of the influenza virus that enables the virus to escape the host cell and infect new cells.

Pandemic - An epidemic occurring worldwide, or over a very wide area, crossing international boundaries, and usually affecting a large number of people.

Period of communicability – The time during which an infectious agent may be transferred directly or indirectly from an infected person to another person, from an infected animal to humans, or from an infected person to an animal.

Sentinel Physicians – A network of physicians across Canada asked to complete a report form, including the total number of patients seen for any reason (denominator) and the total number of patients meeting the standard case definition for influenza-like illness (numerator). Sentinel report forms were either returned by fax, or the information was conveyed via e-mail or telephone to Health Canada's Centre for Infectious Disease Prevention and Control (CIDPC) on a weekly basis for data collation, analysis and dissemination. The results of this surveillance system are posted each week during the influenza season on the FluWatch website. The total number of patients seen each week, and the number of those patients with influenza-like illness by age group, is part of the World Health Organization global flu surveillance network.

Spanish Flu - The common name for the influenza A strain that killed over 20 million people around the world during the years 1918 to 1920, the highest death toll of any pandemic.

Strain – differences within a subtype; i.e. Fujian vs. Panama.

Subtype – Based on difference in Hemagglutinin & Neuraminidase proteins; for influenza A there are several different subtypes; for influenza B there is only one subtype.

Surveillance - the ongoing systematic collection and analysis of influenza (or other disease) data, and the dissemination of information to local health department, provincial and national public health organizations, for the purpose of an effective disease prevention and control program.

Type – A, B, or C influenza.

Vaccine - A specific substance that elicits an immune response to prevent infection by a foreign agent.

Virus - A submicroscopic infectious agent that is capable of growth and multiplication only in living cells. Viruses cause important diseases in humans, animals and plants.

DATA SOURCES AND METHODS

Only selected reportable diseases were included in the main chapters of this report. The focus topic for this report was influenza. A more complete listing of reportable diseases in Ontario can be found in Appendix tables 1 through 4.

The communicable diseases contained in this report are required to be reported to the local Medical Officer of Health under the Health Protection and Promotion Act (HPPA). Since 1990, reportable diseases have been monitored through a public health surveillance system called the Reportable Diseases Information System (RDIS). Data were obtained for Peel from the Peel Health Department for the years 1994 to 2003 and for Ontario from the Public Health Branch of the Ontario Ministry of Health and Long-Term Care for the years 1994 to 2001. Both the Peel and Ontario influenza data for Chapter 1 were from RDIS up to March 20, 2004. Although the influenza season runs from October to April each year, a broader season from July 1 to June 30 was assumed for certain figures as some cases of influenza can occur in the summer months. Other Peel specific data were obtained from databases collected by the Communicable Disease Division of the Peel Health Department. Some provincial and national data were taken from Health Canada's FluWatch website.

Comparative data for Ontario were provided in the figures and appendices when available and appropriate. Data for the year 2003 were the latest that were available for Peel. It is recognized that data for the Region of Peel (and Ontario) may change in future years when additional information becomes available, especially for some diseases such as tuberculosis which can take up to six months to be reported to the Health Department. The Peel-specific RDIS data were downloaded on February 23, 2004, with the exception of influenza data which were downloaded on May 6, 2004. Peel data for West Nile Virus were taken from the *West Nile Virus in the Region of Peel 2003* Report, published by the Region of Peel Health Department. West Nile Virus has been reported in RDIS since January 2003. The cyclosporiasis data were based on manual counts by Peel Health Environmental Health Staff. Cyclosporiasis also became reportable in RDIS in January 2003. The Ontario RDIS data provided by the Ontario Ministry of Health and Long-Term Care were downloaded on May 18, 2004. The latest year for which Ontario data were available was 2001. The Ontario data are provisional. Severe Acute Respiratory Syndrome (SARS) data for Peel and Ontario were taken from data reported to the Region and the Province during the outbreak of Spring 2003.

Age-specific rates were provided for most of the diseases contained in this report (Peel data only). Where the annual cases of the more common diseases such as chlamydia or salmonellosis were large enough, age-specific rates were

provided for 2003. In some instances, sex-specific data were provided. For diseases having low annual numbers of cases such as hepatitis B and syphilis, age and sex-specific rates were based on average annual rates for the Region of Peel for the years 1994 to 2003.

For some diseases such as pertussis, influenza, salmonellosis, meningococcal disease, and group A streptococcal infections, it is important to look at incidence in children less than one year old since this age group experiences markedly higher rates of these diseases. The Ontario Ministry of Health and Long-Term Care's data warehouse population estimates from 1994 to 2001 were used for the age group less than one year in Peel. The population estimates for age group one to four years old were then calculated by subtracting the estimates for the less than one year old age group from the age group zero to four years old. For 2002 and 2003, counts of births for Peel from the Integrated Services for Children Information System (ISCIS) were used.

Age can be a factor in whether a person acquires a disease and in the progression of that disease. When comparing two populations, it is possible to control for any differences in the age distributions by using the process of age-standardization. This minimizes the effect of differences in age distributions between populations so that observed differences can then be attributed to factors other than age. In this report, direct age-standardization was used for reporting total rates of diseases such as chlamydia, gonorrhea, influenza, salmonellosis, and others.

Age-standardization was not used for acquired immunodeficiency syndrome (AIDS) and human immunodeficiency virus (HIV) because these primarily affect more men than women.

Age-standardized rates were not used for Severe Acute Respiratory Syndrome (SARS) and West Nile Virus (WNV) because the age of cases was not known at the provincial level. In all these instances, crude incidence rates were used as indicated.

Incidence rates were age-standardized using the 1991 Canadian population provided by Statistics Canada, Population Estimates and Projections and distributed by the Ontario Ministry of Health and Long-Term Care.

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