

## CHAPTER 2: VACCINE PREVENTABLE DISEASES

### Highlights

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- The incidence of measles declined dramatically since the introduction of the two-dose schedule of measles vaccine in 1996.
- In Peel, there had been no cases of measles since 1998 until 2004 where four cases occurred, all of which were imported.
- The incidence of mumps and rubella has also decreased since 1996, when a second dose of Measles/Mumps/Rubella conjugate vaccine (MMR) was added to the routine childhood immunization schedule.
- The incidence of pertussis has been low and stable since 1996 (approximately less than five cases per 100,000). Children under one year of age have the highest rate of pertussis.
- The incidence of influenza in the 2003/2004 season was the highest among the past ten seasons, due mainly to the involvement of a new variant of the A(H3N2) strain (A/Fujian/411/2002) that was not included in the flu vaccine for the season. However, the severity of the season was still within the range compared to the past H3N2 predominant seasons.<sup>16</sup>
- The reported incidence of influenza is the highest in those aged less than one year, followed by those aged 1 to 4 years and those greater than 60 years old. This may reflect the fact that these groups are more likely to have a serious illness from influenza and seek medical attention.

### 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 a 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-aged children in Ontario. Prior to universal vaccination, tetanus and polio infected a large proportion of the population and caused considerable illness and death, especially in children.<sup>17</sup>

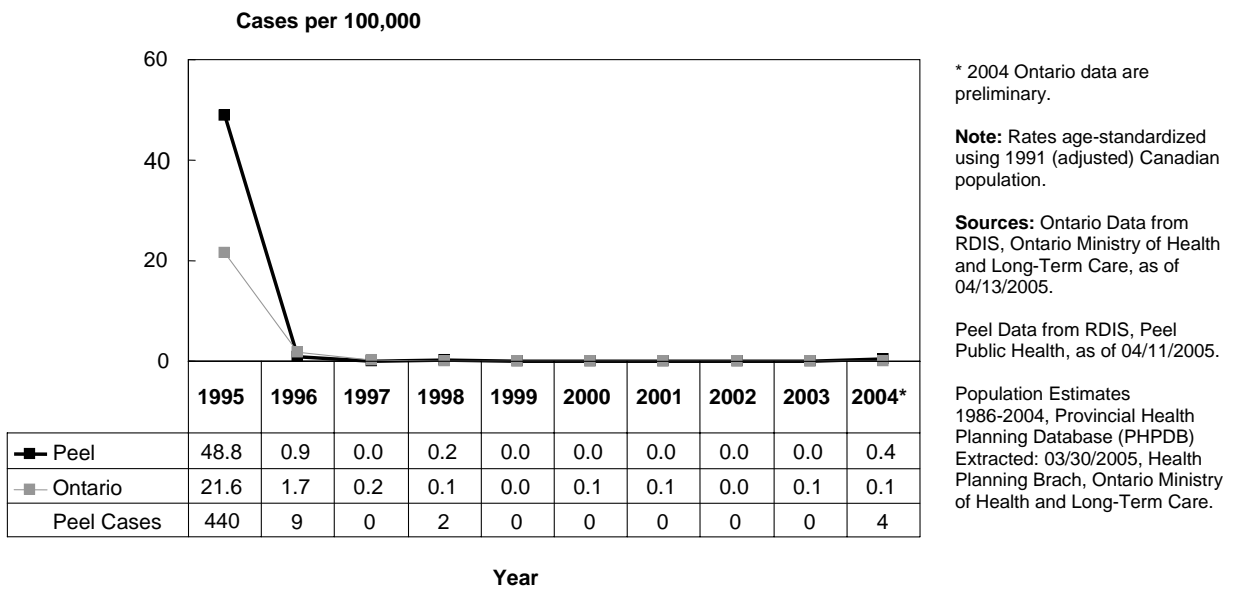
Outbreaks of vaccine preventable diseases have occurred in developed countries when immunization rates have declined (eg. Diphtheria outbreak in the Soviet Union in 1994).<sup>17</sup> Because of high immunization rates, some diseases (diphtheria, tetanus and polio) are currently so rare in Peel that 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.

**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 was infected with measles virus by the time they reached adulthood.<sup>6,18</sup>

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.

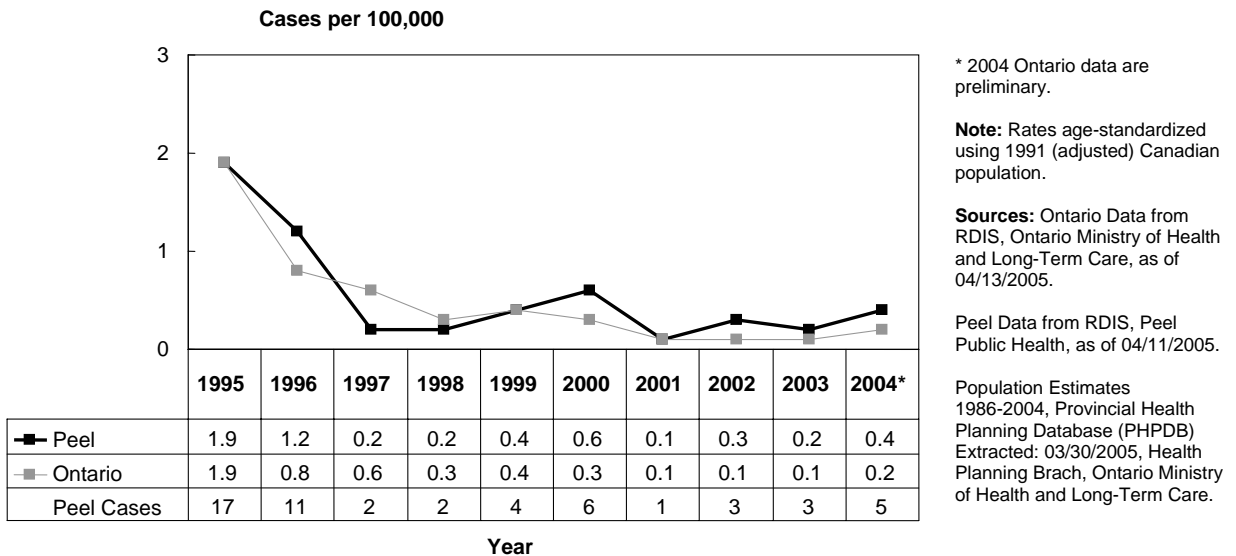
**Figure 2.1: Incidence of Measles, Region of Peel and Ontario, 1995-2004**



**MUMPS**

Mumps is an acute infectious disease caused by the mumps virus. Prior to the licensure of mumps vaccine in 1969, it was a common childhood illness. It can infect and inflame a number of different organs including the salivary glands, brain, testicles and ovaries. Serious complications of the disease include meningitis, deafness and, in rare cases, male sterility.<sup>6,18</sup>

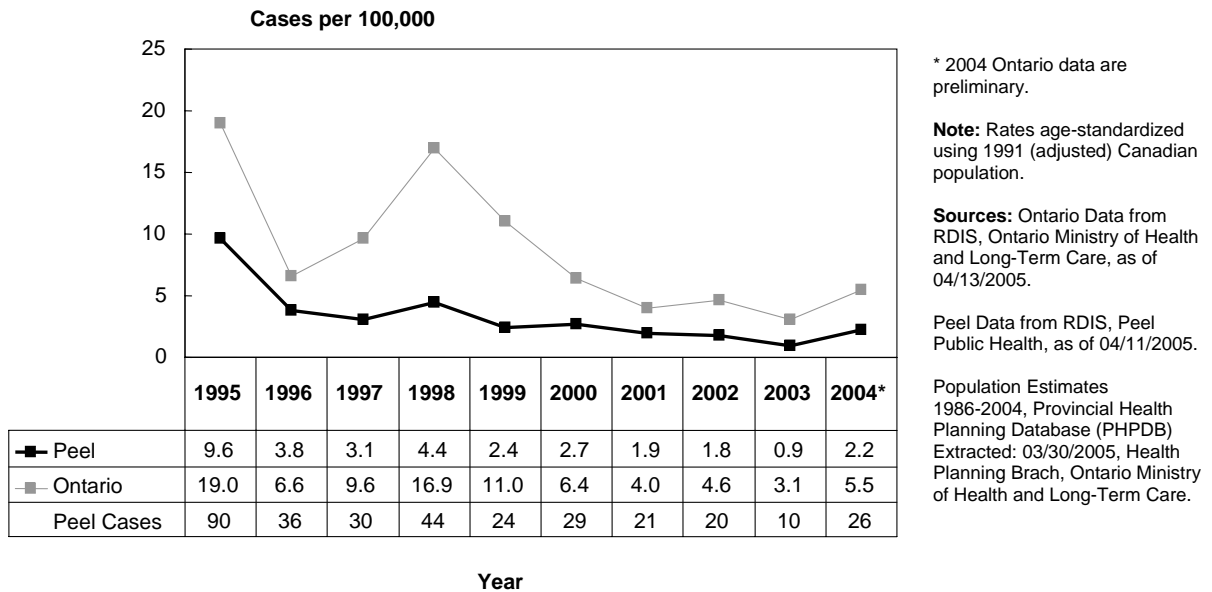
**Figure 2.2: Incidence of Mumps, Region of Peel and Ontario, 1995-2004**



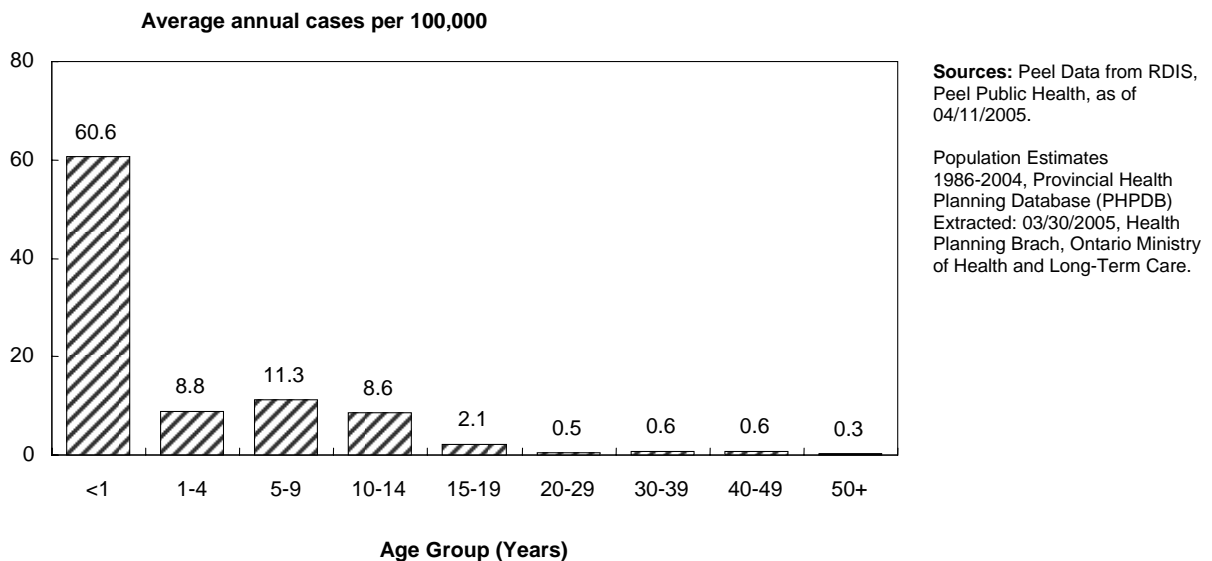
**PERTUSSIS**

Pertussis or whooping cough is caused by the bacteria *Bordetella pertussis*. The main symptom is a very severe coughing spell often described as a “seal bark”. Complications are much more severe in the very young and include pneumonia, brain damage and, in rare cases, death.<sup>6,18</sup>

**Figure 2.3: Incidence of Pertussis, Region of Peel and Ontario, 1995-2004**



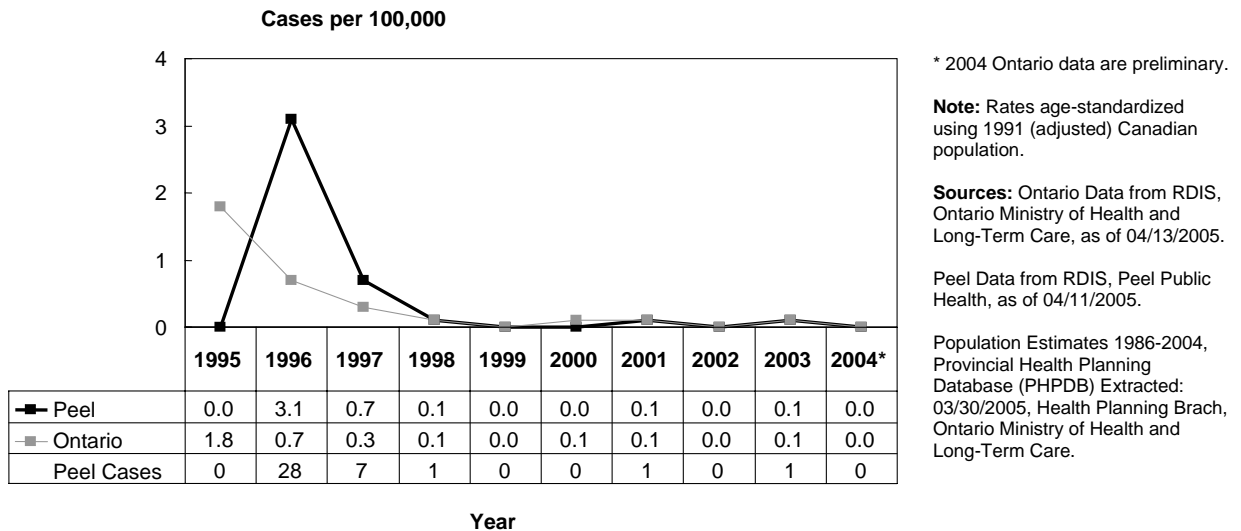
**Figure 2.4: Incidence of Pertussis by Age Group, Region of Peel, 1995-2005 Combined**



**RUBELLA**

Rubella (sometimes called German Measles) is a mild viral illness that is characterized by a rash, swollen lymph nodes and fever. It was a significant source of childhood illness and congenital birth defects until 1969, when Rubella vaccines were first licensed for use in the US. Rubella can cause intrauterine death, spontaneous abortion and 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. The incidence of rubella has dropped since the introduction of the second-dose measles-mumps-rubella (MMR) vaccine in 1996.<sup>6,18</sup>

**Figure 2.5: Incidence of Rubella, Region of Peel and Ontario, 1995-2004**



### **HAEMOPHILUS INFLUENZA TYPE B (HIB)**

Haemophilus influenzae 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 the first Hib vaccine in 1988. The incidence of Hib disease has decreased even further since the introduction of the newer conjugate vaccines in 1992 for use in infants (starting from two months of age). There were only five cases of Hib in Peel between 1995 and 2004.<sup>6, 18</sup> (Please see the Appendix for more specific information).

### **CHICKENPOX (VARICELLA)**

Chickenpox (varicella) is caused by a virus called Varicella zoster. This highly contagious illness usually starts off with a fever, fatigue, headache and runny nose which is followed within a day or two by a red blister-like rash. Complications of chickenpox include scarring of the skin, pneumonia and inflammation of the brain (encephalitis). There is an increased risk of birth defects for babies who get chickenpox from their mothers before birth. Children who are ill with chickenpox are also at increased risk of getting necrotizing fasciitis (flesh-eating disease).<sup>6,18</sup>

The virus spreads easily through coughing, sneezing or being in contact with the saliva or respiratory secretions of someone who has chickenpox. It can also be spread by direct contact with the fluid from a chickenpox blister. A pregnant woman can pass the chickenpox virus on to her baby before it is born. Although rare, it is possible for the virus to remain in the body and become active again later on. When this happens, the virus causes a painful rash of blisters called shingles.<sup>6,18</sup>

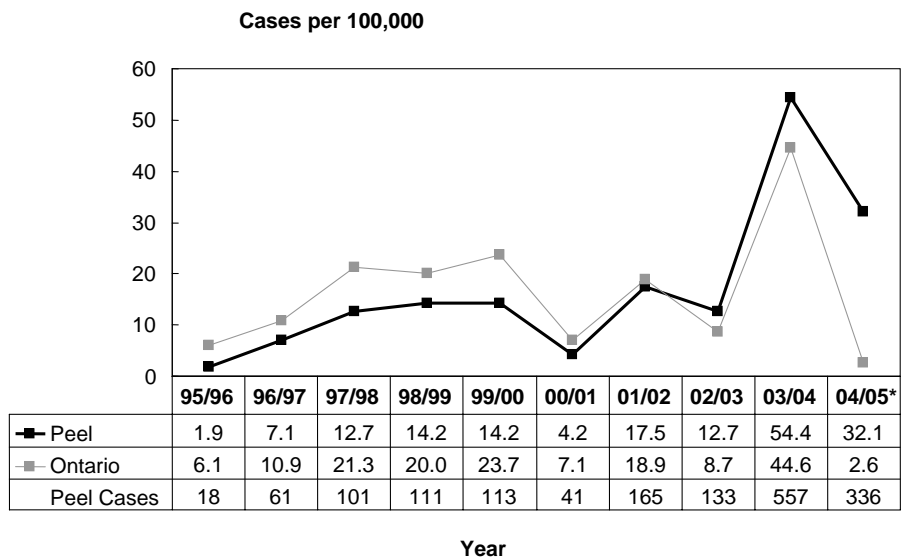
The vaccine for chickenpox was first licensed for use in Canada in 1998. As of January 2005, chickenpox vaccine was added to the publicly-funded routine infant immunization schedule for Ontario. It is estimated that the varicella vaccine offers 70 to 90 per cent protection against chicken pox of any severity and over 95 per cent protection against severe varicella for at least seven to 10 years after vaccination.<sup>19</sup>

In Peel, outbreaks of chickenpox are reported in batches by school on a monthly basis. As case information at the individual level is not available, data are not shown in this report. However, Peel Public Health will be observing trends in varicella incidence over time as more children get immunized against the disease.

## INFLUENZA

Influenza is a highly infectious respiratory illness caused by the influenza virus. Although influenza symptoms such as fever, headache, cough and muscle aches are similar to the symptoms of the common cold, they are often more sudden in onset and more severe in symptoms. Unlike the common cold, influenza is much more likely to result in serious complications such as pneumonia.<sup>6,21</sup> Voluntary influenza immunization was implemented in Ontario in 2000 with free influenza vaccine being made available to all Ontario residents aged six months and older.<sup>20</sup>

**Figure 2.6: Incidence of Influenza by Seasonal Year\*, Region of Peel and Ontario, 1995/1996–2004/2005**



\* Seasonal year from July to June (e.g. 95/96 included all cases from July 1, 1995 to June 30, 1996), except for 2004/05 season; Peel data from July 1, 2004 to February 14, 2005; Ontario data from July 1, 2004 to December 31, 2004.

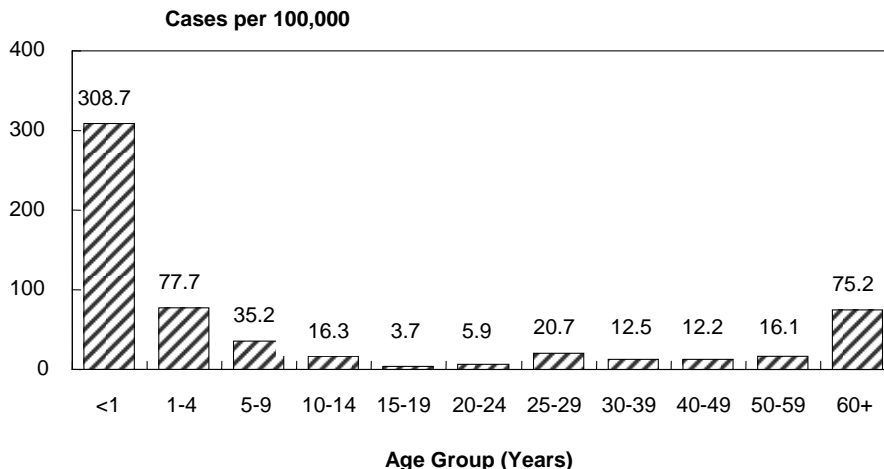
**Note:** Rates age-standardized using 1991 (adjusted) Canadian population.

**Sources:** Ontario data from RDIS, Ontario Ministry of Health and Long-Term Care, as of 04/13/2005.

Peel Data from RDIS, Peel Public Health, as of 04/11/2005.

Population Estimates 1986-2004, Provincial Health Planning Database (PHPDB) Extracted: 03/30/2005, Health Planning Branch, Ontario Ministry of Health and Long-Term Care.

**Figure 2.7: Incidence of Influenza by Age Group, Region of Peel, 2004/2005**



**Sources:** Peel Data from RDIS, Peel Public Health, as of 04/11/2005.

Population Estimates 1986-2004, Provincial Health Planning Database (PHPDB) Extracted: 03/30/2005, Health Planning Branch, Ontario Ministry of Health and Long-Term Care.