

## 9.0 PREVENTION AND CONTROL OF INFECTIOUS DISEASES

Infectious diseases are illnesses caused by living organisms or the toxins they produce. They are spread directly from an infectious person, animal or environmental source. Sometimes spread occurs indirectly by contaminated animals or objects.

Infectious diseases are an important cause of both illness and death in the community. Infectious diseases represent ongoing challenges to public health's role as new organisms emerge as causes of disease. Public health professionals must remain vigilant to ensure that systems are in place that are capable of controlling all infectious diseases.

In Ontario, the Health Protection and Promotion Act (HPPA) provides legal framework that requires the reporting of infectious diseases. Regulations list specific diseases and conditions that are to be reported and the current list includes 69 communicable diseases that must be reported.

The Mandatory Health Programs and Services Guidelines (MHPSG) for the Control of Infectious Diseases includes programs for safe food and water, sexually transmitted disease (STD) including AIDS, tuberculosis, rabies and vaccine preventable diseases for which there are Ministry of Health immunization programs. In addition this section includes requirements for assuring that effective infection control programs are in place in institutions, day care centers and personal service settings.

The primary goal for the prevention and control of infectious diseases is to reduce or eliminate infectious diseases. This includes the following goals as per the MHPSG:

- To reduce the incidence of infectious diseases of public health importance
- To improve the health of the population by reducing the incidence of food-borne illness
- To reduce transmission of infectious diseases
- To prevent the occurrence of rabies in humans
- To reduce the incidence of water borne illness in the population
- To reduce the incidence of and complications from all sexually transmitted diseases (STD) including HIV/AIDS
- To reduce the incidence of tuberculosis
- To reduce the incidence of vaccine preventable diseases

In order to meet the above program goals, staff in the Health Protection Branch of the Public Health and Community Services Department are involved in the following activities and services:

- Investigations and case management of all reported cases and their contacts
- Immunization clinics in schools and in the community
- Collect immunization information for children enrolled in schools or daycares and enforce the legislated vaccination requirements
- Distribute and ensure the safe handling of vaccines
- Provision of sexual health counselling, low cost birth control, PAP tests, anonymous HIV tests, and treatments for STD
- Provision of treatment and case management of individuals with active and inactive tuberculosis
- Community and institutional outbreak response and management
- West Nile Virus surveillance and control
- Safe food and water inspections
- Response to animal bite complaints and ensuring that pet dogs and cats are vaccinated against rabies
- Participate in the development of the provincial and local plan for pandemic influenza
- Provide 24/7 service for the response to reports of reportable infectious diseases



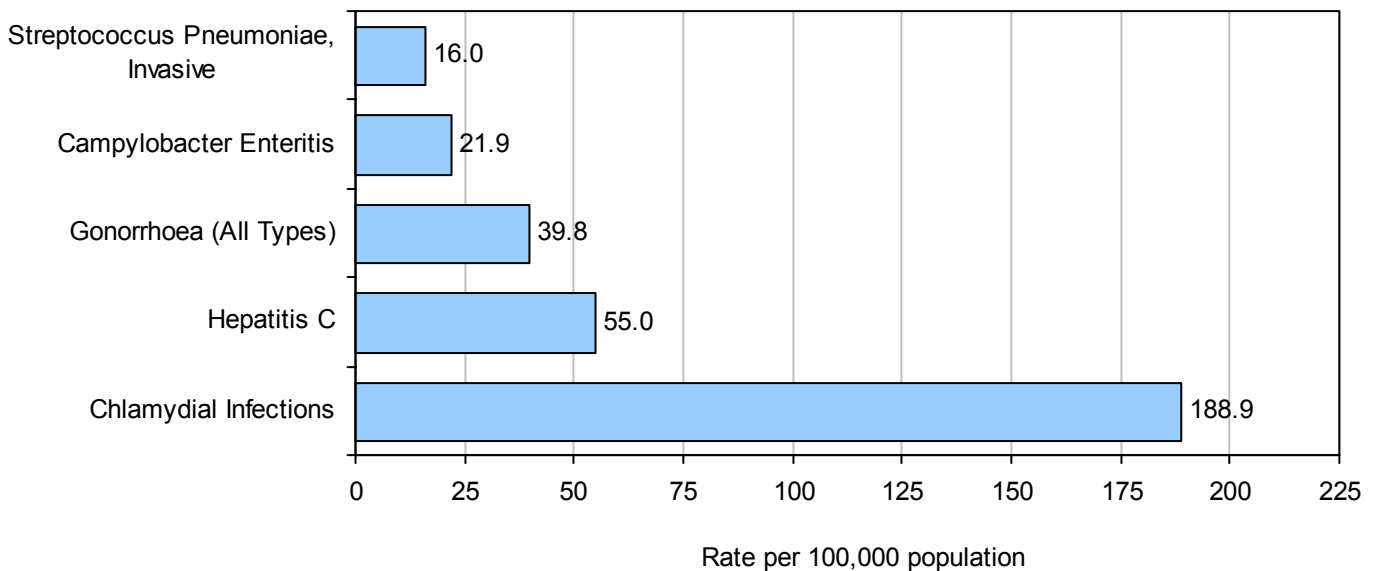
## INFECTIOUS DISEASES

- Description:**
- There are a number of infectious diseases that must be reported to public health units by healthcare professionals and laboratories, as outlined in the Health Protection and Promotion Act.
  - These diseases are reported on a case by case basis and, here, are displayed as a rate per 100,000 population per year in the City of Hamilton.

- Key Message:**
- In 2004, of the five diseases with the highest number of new cases in the City of Hamilton, Chlamydia was the disease with the highest incidence rate, with approximately 189 cases per 100,000 population.
  - Campylobacter and Invasive Pneumococcal Disease (IPD) infections showed the lowest incidence rates of the top five diseases, with approximately 22 and 16 cases per 100,000 population

### *Top five incident infectious diseases, City of Hamilton, 2004*

Infectious disease



*Source: Reportable Diseases Information System (RDIS), City of Hamilton, 2005*

- Limitations:**
- These data are based on confirmed laboratory tests and do not represent all cases. Underreporting by cases, inadequate test samples, and limitations in the sensitivity of the diagnostic laboratory test are three key factors which affect the representativeness of the laboratory data.



### INFLUENZA CASES BY STRAIN

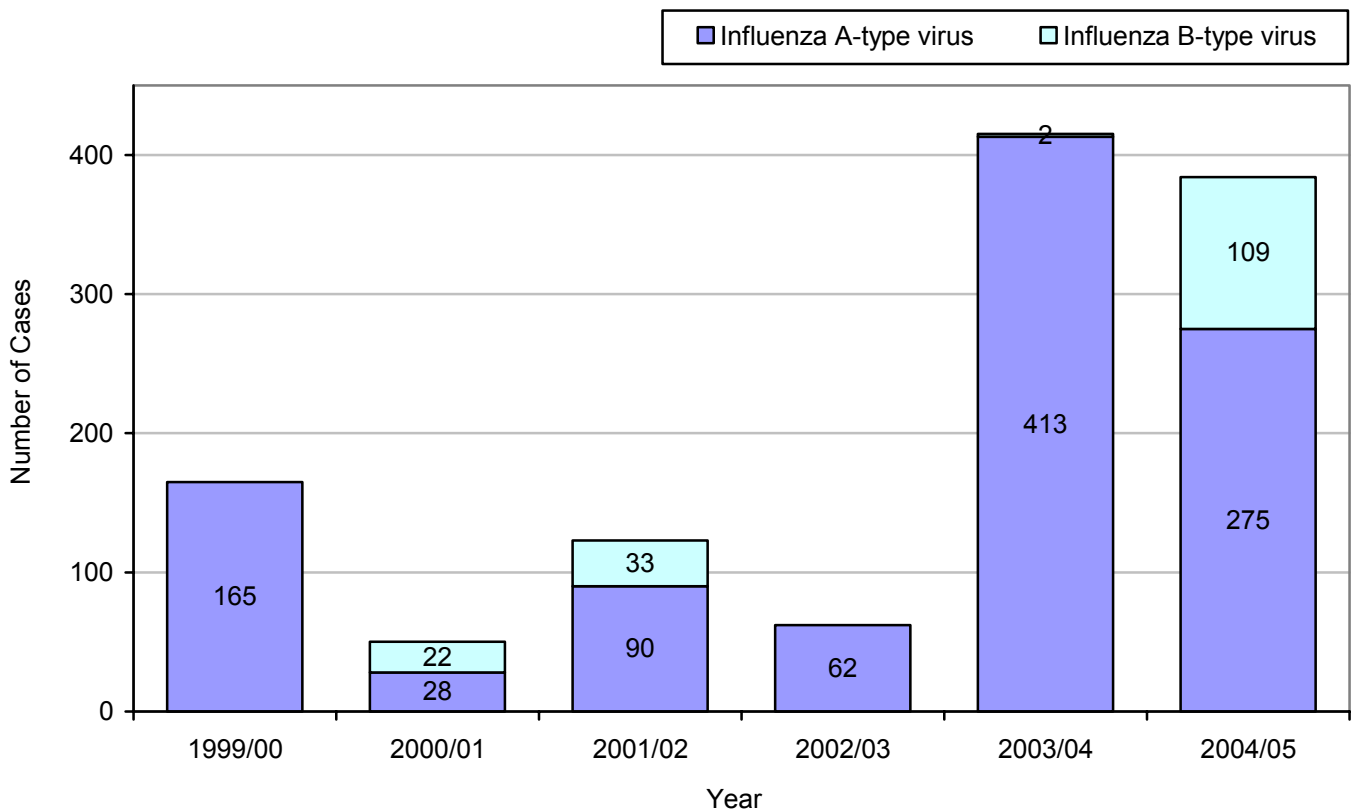
**Description:**

- The number of cases of Influenza A and B reported in the City of Hamilton during the given flu season from September to April.
- Influenza is a common viral infection, which tends to cause illness between September and April. There are two types of influenza; A and B. Both types are covered in the vaccine but may not have an exact strain match. Influenza A can be treated with anti-viral medication.
- It is important to monitor influenza cases and rates to assist with disease prevention and control.

**Key Message:**

- In recent years, influenza A has been the more common of the two major types of influenza.
- In the 2003/2004 season the incidence of influenza was significantly higher than in the previous four years. However, the incidence of influenza in the 2004/2005 season was slightly lower than in the 2003/2004 season.
- The emergence of Severe Acute Respiratory Syndrome (SARS) in 2003 led to an increase in the number of laboratory tests requested by physicians for cases of influenza-like illness. This is likely to have contributed to the increase in the number of influenza cases detected during the last two influenza seasons.

**Number of influenza cases by strain, City of Hamilton, 1999/00-2003/04**



Source: Reportable Diseases Information System (RDIS), City of Hamilton, 2005

**Limitations:**

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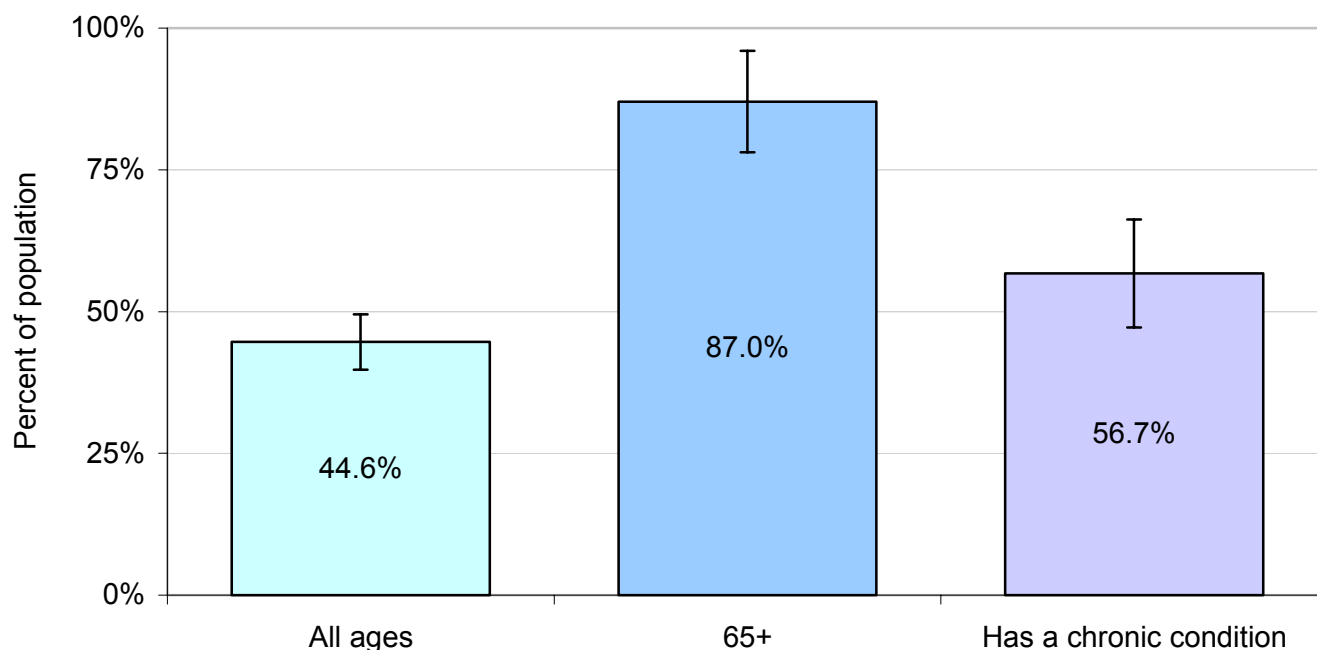


## IMMUNIZATION FOR INFLUENZA

- Description:**
- Population immunized for influenza in the 2004/05 influenza season (i.e. those surveyed January to April 2005 who had a flu shot since September 2004).
  - Immunization, including its promotion, provision of vaccine (either directly through clinics or indirectly through other health care providers), and monitoring of immunization rates are key public health functions.
  - High risk groups and thus those most recommended for vaccination, include children aged 6-23 months, those over age 65, and those who are immuno-compromised (this is measured by examining those with chronic conditions). In addition, health care workers and other workers who come into contact with an individual in a high risk group should be vaccinated.

- Key Message:**
- Nearly half (44.6%) of the population in the City of Hamilton reported that they had received a flu shot for the 2004/2005 influenza season.
  - Fifty seven percent of those who have a chronic condition and 87% of those who are age 65 years of or older were immunized against influenza in the 2004/2005 season.

**Population who have received a flu shot since September 2003 by group, based on vulnerability, City of Hamilton, 2004**



I - represents the 95% confidence intervals. If the survey was expanded from this sample to a larger sample, the result would be expected to fall between the lower and upper limits 95% of the time.

Source: Rapid Risk Factor Surveillance System (RRFSS), City of Hamilton, 2004

- Limitations:**
- These data are based on questions only asked of Hamilton population age 18 years and over. The results provided are based on self-reporting elicited through a telephone survey which was administered only in the English language.

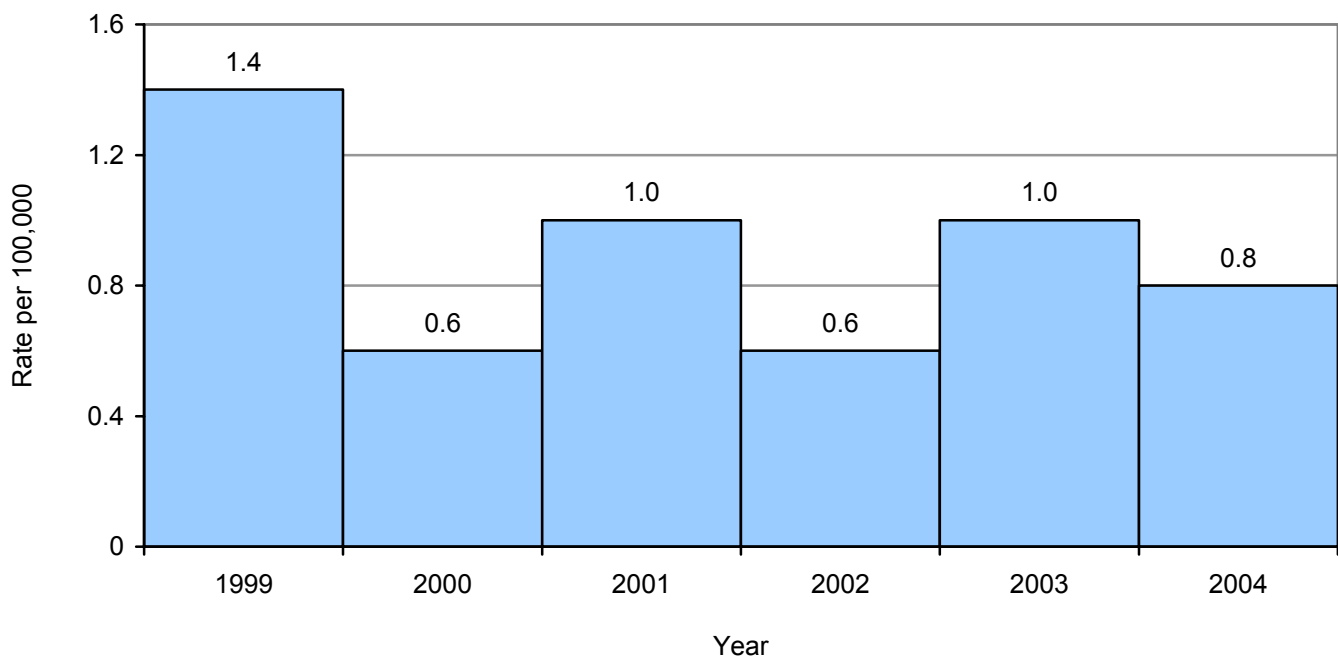


## HEPATITIS B

- Description:**
- The number of cases of acute Hepatitis B per 100,000 population, age-standardized, per 100,000 population reported per year to the public health department.
  - An age-standardized rate is a summary measure of a rate that a population would have if it had a standard age structure. Age-standardization is necessary for two reasons. Firstly, it minimizes the effects of varying age composition among different populations on the calculated rate. Secondly, age-standardization minimizes the effects of age as a risk factor for disease on the calculated rate.
  - Hepatitis B is a blood-borne viral infection primarily affecting the liver. The majority of acute cases do not lead to chronic infection, however, some do.
  - Because of the severity and potential longevity of this disease, one of the goals of public health is to follow up all laboratory diagnosed cases to ensure they are aware of their disease status, are receiving available treatment and are taking steps to prevent further spread of the disease to other persons.

- Key Message:**
- The incidence rate of hepatitis B declined from 1.0 case per 100,000 population in 2003 to 0.8 case per 100,000 population in 2004.

### *Age-standardized rate of acute-hepatitis B, City of Hamilton, 1999-2004*



*Source: Reportable Diseases Information System (RDIS), City of Hamilton, 2005*

- Limitations:**
- These data are based on confirmed laboratory tests and do not represent all cases. Underreporting by cases, inadequate test samples, and limitations in the sensitivity of the diagnostic laboratory test are three key factors which affect the representativeness of the lab data.

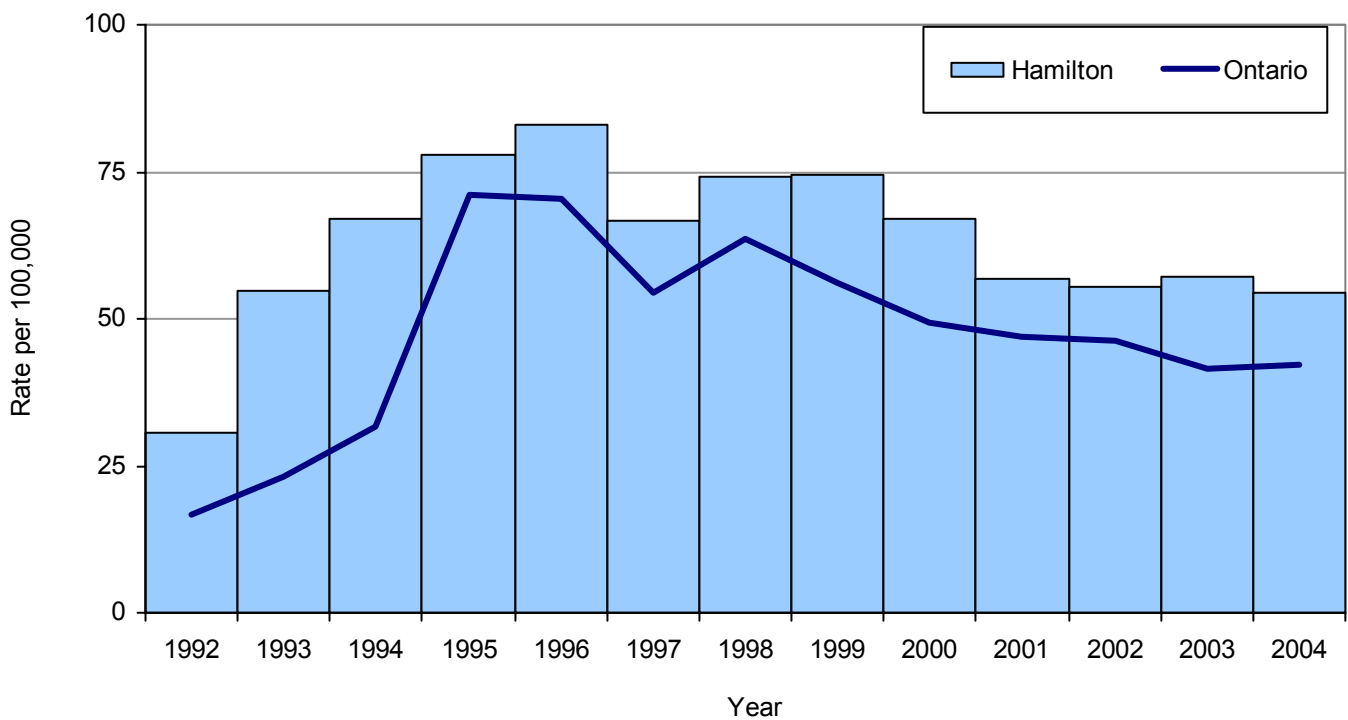


## HEPATITIS C

- Description:**
- The number of cases of Hepatitis C per 100,000 population, age-standardized, per 100,000 population reported per year to the public health department.
  - An age-standardized rate is a summary measure of a rate that a population would have if it had a standard age structure. Age-standardization is necessary for two reasons. Firstly, it minimizes the effects of varying age composition among different populations on the calculated rate. Secondly, age-standardization minimizes the effects of age as a risk factor for disease on the calculated rate.
  - Hepatitis C is a blood-borne viral infection primarily affecting the liver. Approximately three quarters of persons infected with the Hepatitis C virus (HCV) will develop chronic infection.

- Key Message:**
- Since 1999, when the incidence rate of hepatitis C in Hamilton peaked at 74.3 cases per 100,000 population, there has been a gradual decline in the incidence of the disease in the City of Hamilton.
  - The incidence of hepatitis decreased slightly from 56 cases per 100,000 population in 2003 to 55 cases per 100,000 population in 2004.
  - The rate of Hepatitis C has been higher in the City of Hamilton than Ontario.

**Age-standardized rate of Hepatitis C, City of Hamilton and Ontario, 1992-2004**



Source: Reportable Diseases Information System (RDIS), City of Hamilton, 2005

- Limitations:**
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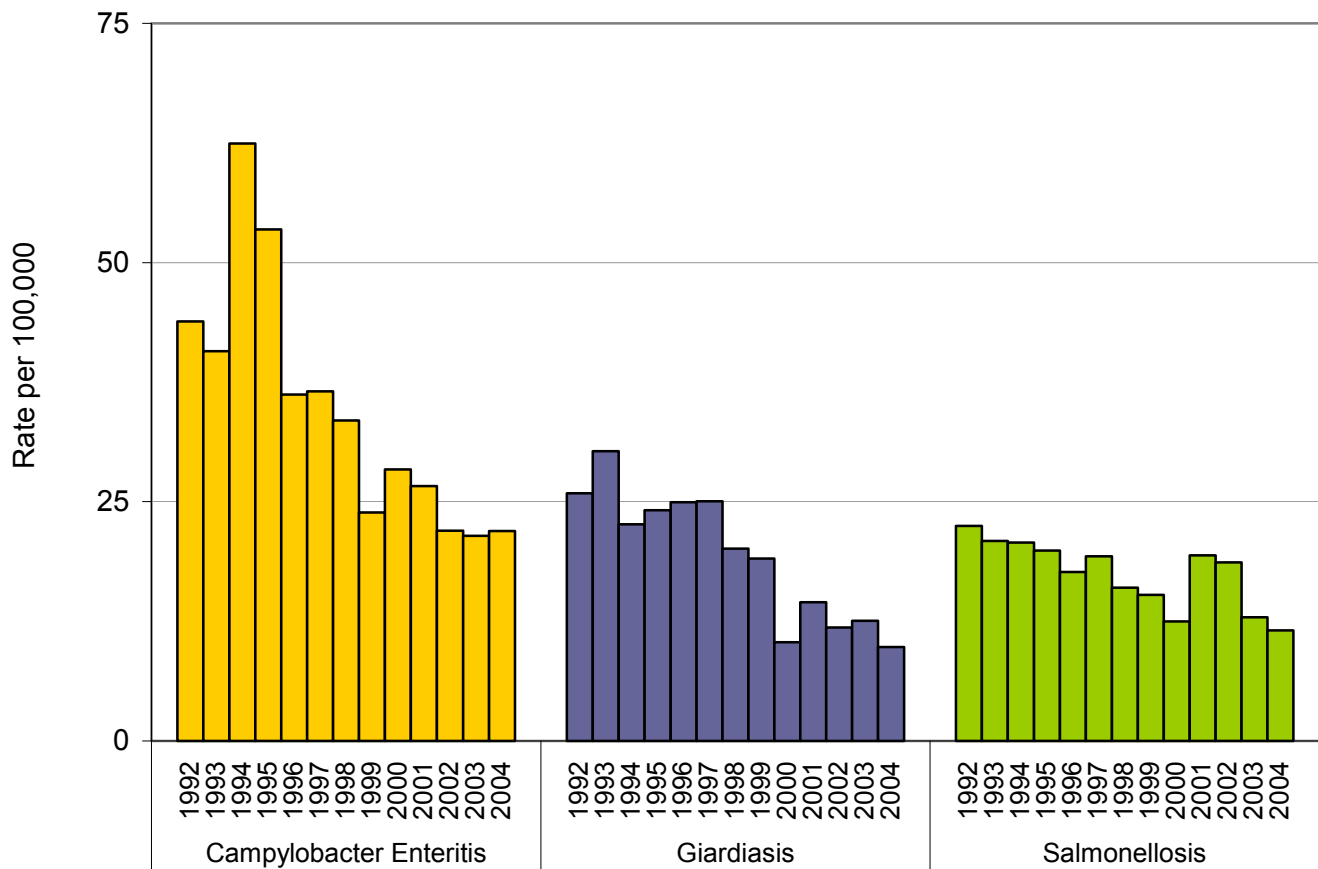


## CAMPYLOBACTER, GIARDIASIS AND SALMONELLOSIS

- Description:**
- The number of Campylobacter, Giardiasis, and Salmonellosis per 100,000 population, reported per year to the public health department.
  - Enteric diseases affect the gastrointestinal system, and transmission usually occurs through the consumption of food or water.
  - Measuring the incidence of enteric disease is one indicator of the integrity of our food and water systems, and of the food handling practices of private citizens and restaurant workers.

- Key Message:**
- There has been a general decline in campylobacteriosis, giardiasis and salmonellosis in the City of Hamilton over the past 13 years (1992-2004).
  - The incidence rate of cases of salmonellosis diagnosed per year remained approximately the same from 2002 to 2004.

**Rate of Campylobacter, Giardiasis and Salmonellosis, City of Hamilton, 1992-2004**



Source: Reportable Diseases Information System (RDIS), City of Hamilton, 2005

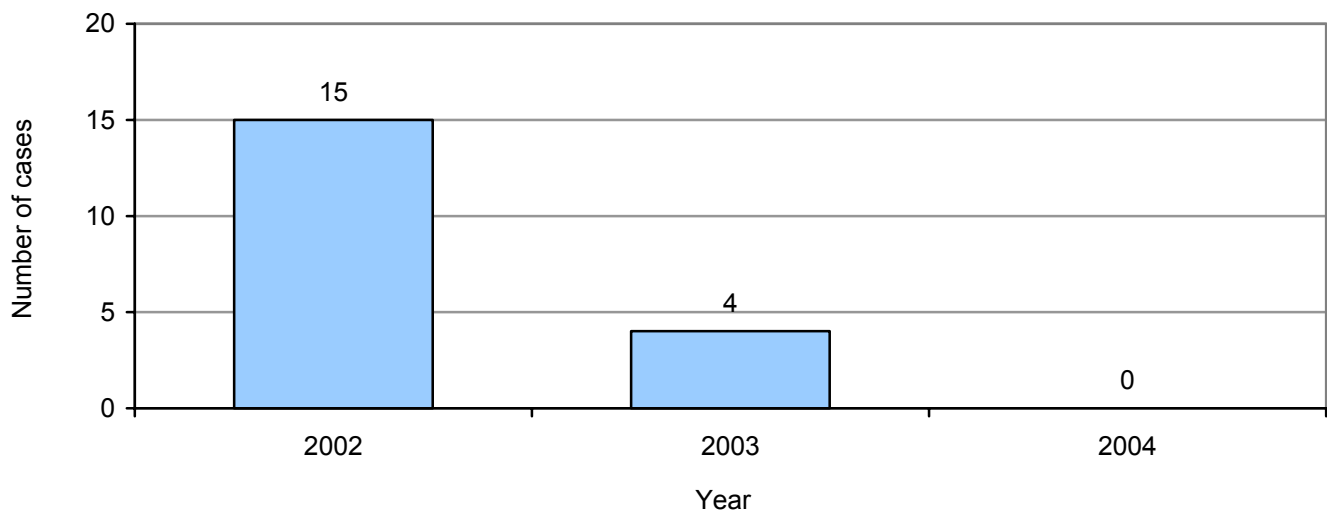
- Limitations:**
- Enteric illnesses are significantly underreported because many cases do not experience severe symptoms.



## HUMAN CASES OF WEST NILE VIRUS

- Description:**
- Passive West Nile Virus surveillance began in 2000 in the City of Hamilton. Starting in 2002, the City of Hamilton implemented an active West Nile virus surveillance program in acute care hospitals and in the community through active communication with family physicians and infectious disease practitioners.
  - The statistics below represent laboratory-confirmed cases of West Nile virus per year.
- Key Message:**
- In 2002, the City of Hamilton had 15 laboratory confirmed cases of WNV. This number dropped to 4 in 2003 and to zero cases in 2004.
  - While WNV has been present in Hamilton in birds and mosquitoes since 2001, the number of human cases has been very small.

### *Human cases of West Nile virus Infection, City of Hamilton, 2002-2004*



Source: Reportable Diseases Information System (RDIS), City of Hamilton, 2004.

- Limitations:**
- These data are based on confirmed laboratory tests and do not represent all cases. Underreporting by cases, inadequate test samples, and limitations in the sensitivity of the diagnostic laboratory test are three key factors which affect the representativeness of the lab data.
  - It should be noted that these results only represent those cases severe enough to seek medical attention. The actual portion of the City of Hamilton population who have ever had WNV, but were either asymptomatic, or had mild symptoms, could be much higher.

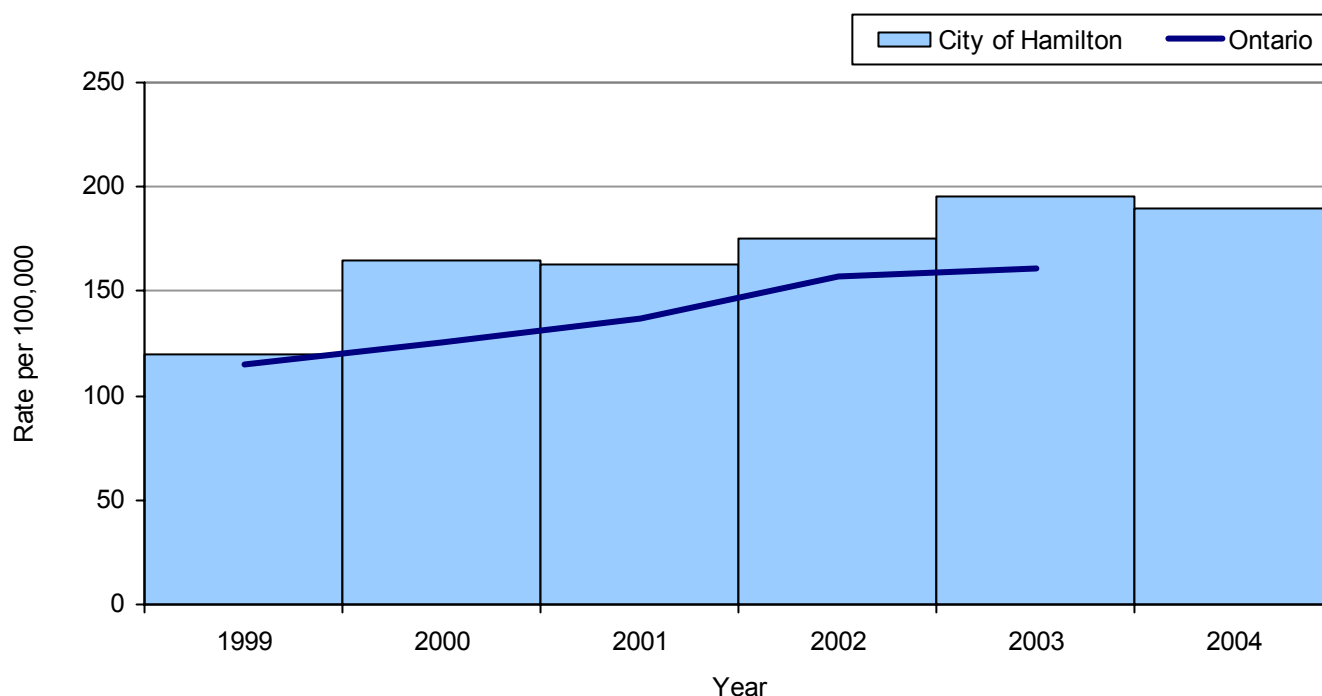


## CHLAMYDIA

- Description:**
- The number of laboratory confirmed cases of Chlamydia, age-standardized, per 100,000 population reported per year to the public health department.
  - An age-standardized rate is a summary measure of a rate that a population would have if it had a standard age structure. Age-standardization is necessary for two reasons. Firstly, it minimizes the effects of varying age composition among different populations on the calculated rate. Secondly, age-standardization minimizes the effects of age as a risk factor for disease on the calculated rate.
  - Monitoring rates of sexually transmitted diseases (STD), such as Chlamydia, are indicators of unprotected sexual activity.
  - Changes in diagnostic procedures over the past decade may have lead to artifactual changes in disease occurrence.

- Key Message:**
- The rate of Chlamydia among the population in the City of Hamilton increased between 1999 and 2003.
  - The incidence of Chlamydia was consistently higher in the City of Hamilton than in Ontario between 1999 and 2003.

**Age-standardized rate of Chlamydia, City of Hamilton and Ontario, 1999-2003**



Source: Reportable Diseases Information System (RDIS), City of Hamilton, 2004.

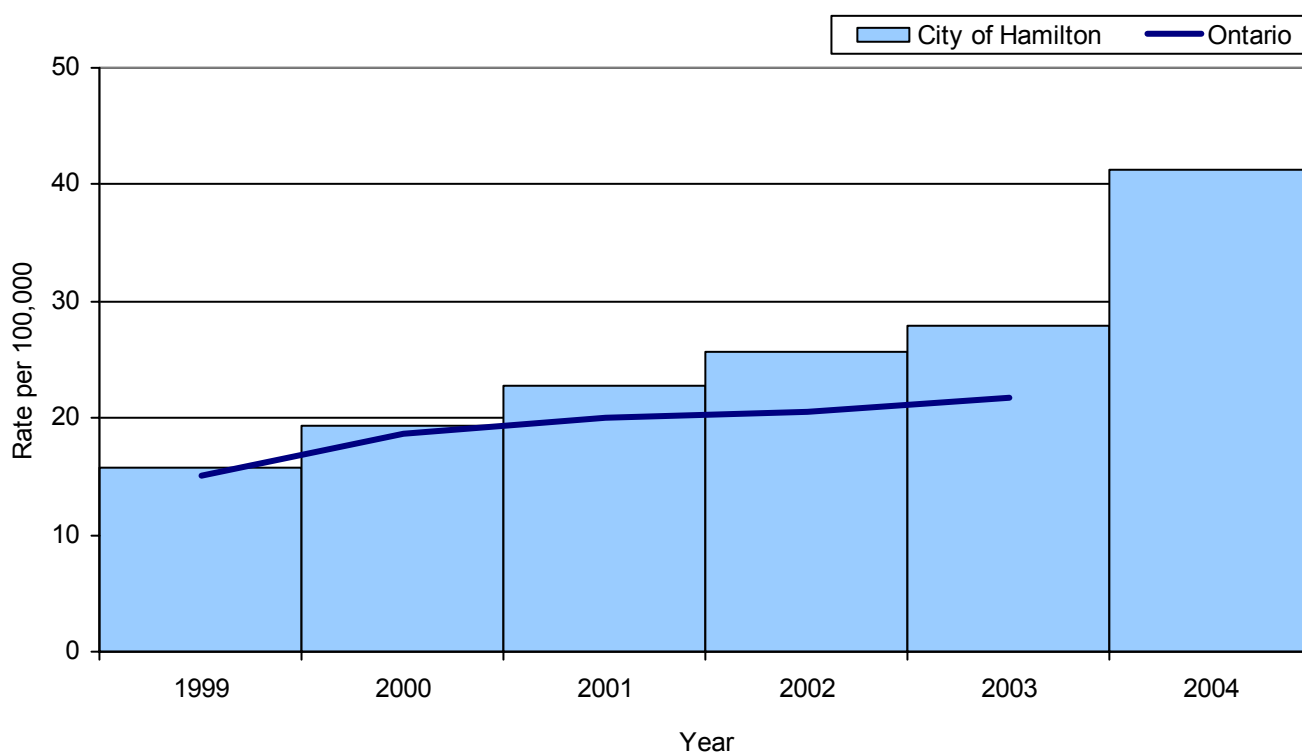
- Limitations:**
- The above infectious disease data is primarily based on confirmed laboratory tests, and does not represent all cases. Underreporting by the cases, an inadequate sample for testing, and limitations in the sensitivity of the diagnostic laboratory test are three key factors which affect the representativeness of the lab data compared to the actual cases.



## GONORRHOEA

- Description:**
- The number of laboratory confirmed cases of Gonorrhoea, age-standardized, per 100,000 population reported per year to the public health unit.
  - An age-standardized rate is a summary measure of a rate that a population would have if it had a standard age structure. Age-standardization is necessary for two reasons. Firstly, it minimizes the effects of varying age composition among different populations on the calculated rate. Secondly, age-standardization minimizes the effects of age as a risk factor for disease on the calculated rate.
  - Monitoring rates of sexually transmitted diseases, such as Gonorrhoea, are indicators of unprotected sexual activity.
  - Changes in diagnostic procedures over the past decade may have lead to artifactual changes in disease occurrence.
- Key Message:**
- Since 1999, there has been a consistent increase in the incidence of gonorrhoea among the population in the City of Hamilton and in Ontario.
  - Although both incidence rates are increasing, the incidence of Gonorrhoea has been consistently higher in the City of Hamilton than in Ontario

**Age-standardized rate of Gonorrhoea, City of Hamilton and Ontario, 1999-2003**



Source: Reportable Diseases Information System (RDIS), City of Hamilton, 2004.

- Limitations:**
- The above infectious disease data is primarily based on confirmed laboratory tests, and does not represent all cases. Underreporting by the cases, an inadequate sample for testing, and limitations in the sensitivity of the diagnostic laboratory test are three key factors which affect the representativeness of the lab data compared to the actual cases.

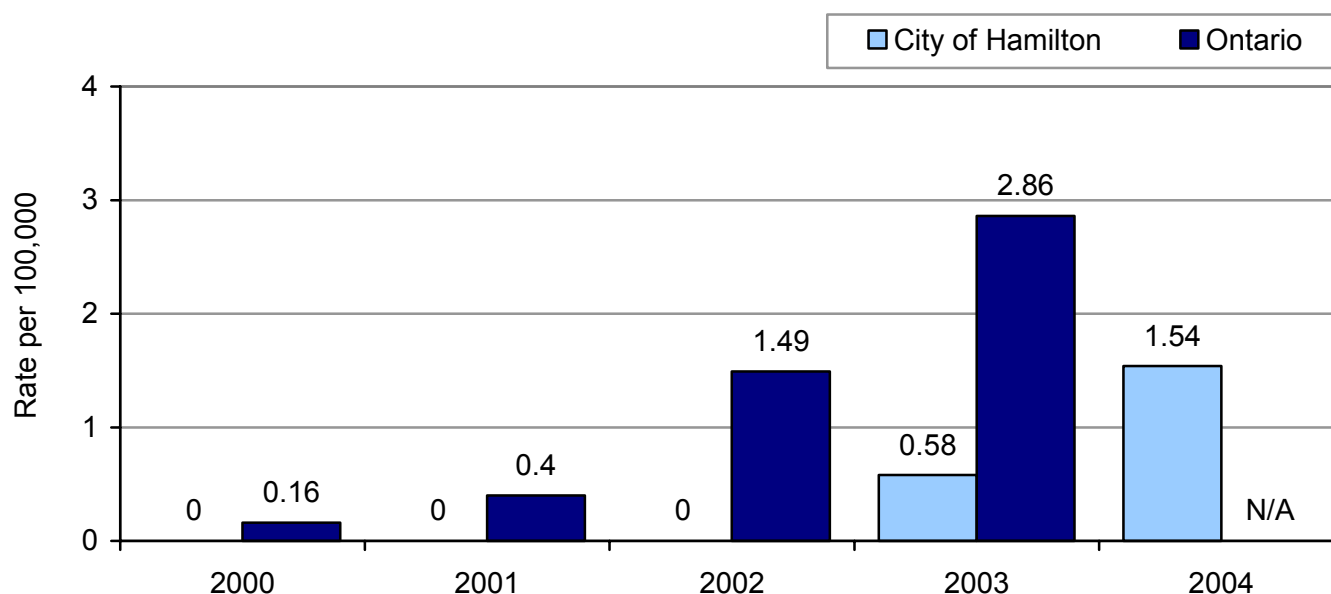


## INFECTIOUS SYPHILIS

- Description:**
- The number of laboratory confirmed cases of Infectious Syphilis, age-standardized, per 100,000 population reported per year to the public health unit.
  - An age-standardized rate is a summary measure of a rate that a population would have if it had a standard age structure. Age-standardization is necessary for two reasons. Firstly, it minimizes the effects of varying age composition among different populations on the calculated rate. Secondly, age-standardization minimizes the effects of age as a risk factor for disease on the calculated rate.
  - Monitoring rates of sexually transmitted diseases, such as Infectious Syphilis, are indicators of unprotected sexual activity.
  - Changes in diagnostic procedures over the past decade may have lead to artifactual changes in disease occurrence.
  - Syphilis is the least often reported STD, when compared to Chlamydia and Gonorrhoea.

- Key Message:**
- The age-standardized rate of infectious syphilis in the City of Hamilton has been consistently lower than the rate in Ontario between 2000 and 2003. While the provincial rates have been experiencing a rise in infection syphilis between 2001 and 2003, no comparable rise was experienced in the City of Hamilton during the same time period.

### Age-standardized rate of infectious syphilis, City of Hamilton and Ontario, 2000-2004



N/A - data not available

Source: Reportable Diseases Information System (RDIS), City of Hamilton, 2004.

- Limitations:**
- The above infectious disease data is primarily based on confirmed laboratory tests, and does not represent all cases. Underreporting by the cases, an inadequate sample for testing, and limitations in the sensitivity of the diagnostic laboratory test are three key factors which affect the representativeness of the lab data compared to the actual cases.
  - Rates are unstable due to low numbers of cases.

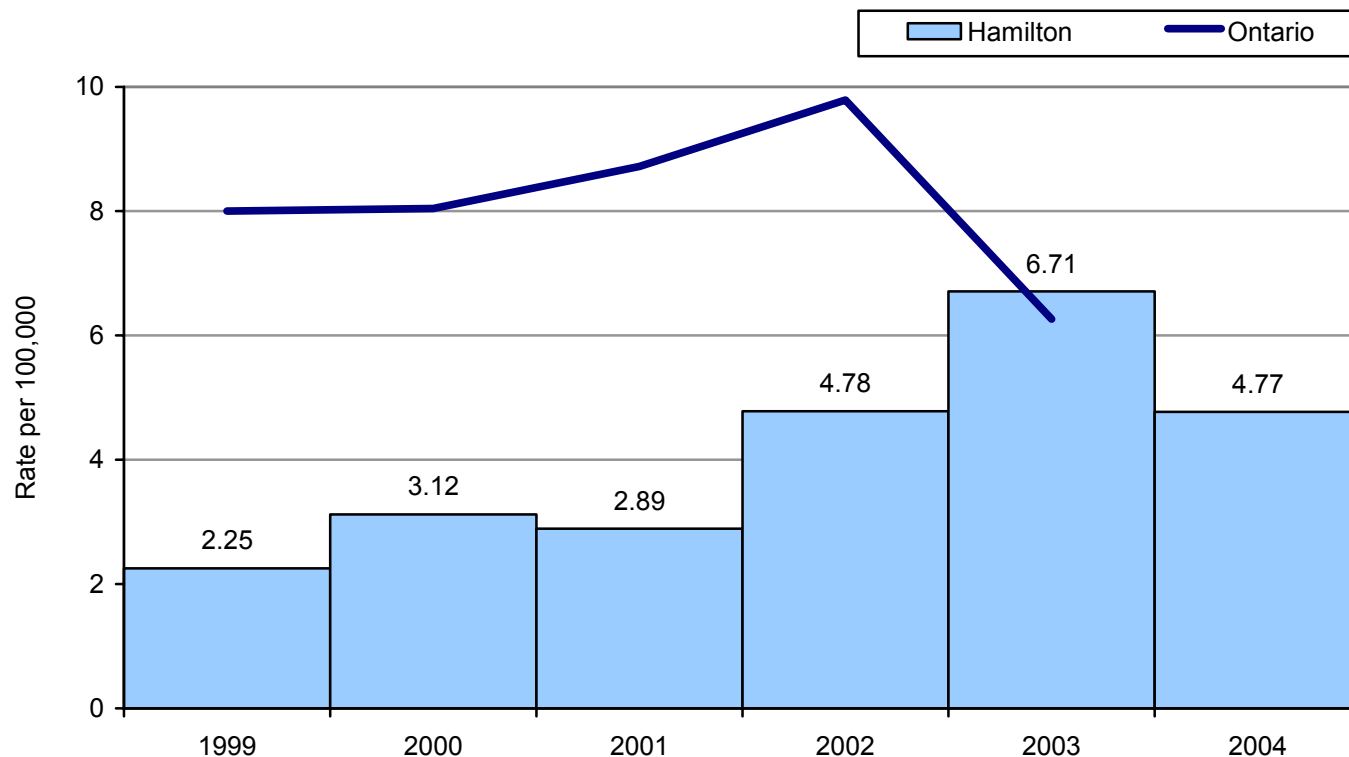


## HUMAN IMMUNODEFICIENCY VIRUS (HIV)

- Description:**
- The number of laboratory confirmed cases of Human Immunodeficiency Virus (HIV), age-standardized, per 100,000 population reported per year to the public health unit.
  - An age-standardized rate is a summary measure of a rate that a population would have if it had a standard age structure. Age-standardization is necessary for two reasons. Firstly, it minimizes the effects of varying age composition among different populations on the calculated rate. Secondly, age-standardization minimizes the effects of age as a risk factor for disease on the calculated rate.
  - Rates of sexually transmitted diseases are indicators of unprotected sexual activity.
  - Most adults and adolescents infected with HIV remain symptom free for extended periods. Eventually, HIV attacks the immune system and develops into Acquired Immunodeficiency Syndrome (AIDS), which eventually develops in almost all HIV-infected persons.

- Key Message:**
- The age-standardized rate of HIV in the City of Hamilton 4.8 cases per 100,000 population.
  - Data for Ontario in 2004 is currently unavailable.

**Age-standardized rate of HIV, City of Hamilton and Ontario, 1999-2004**



Source: Reportable Diseases Information System (RDIS), City of Hamilton, 2005.

- Limitations:**
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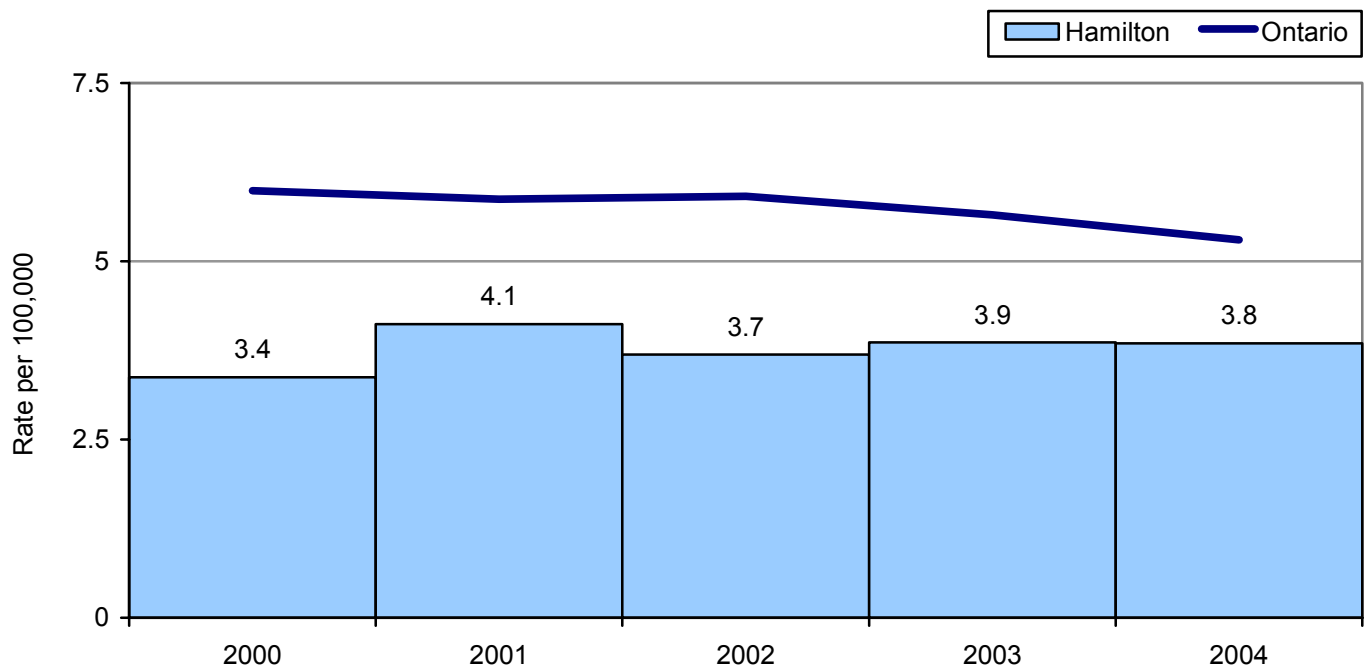
## TUBERCULOSIS (TB)

**Description:**

- Over the last few decades great strides have been made in preventing and controlling tuberculosis (TB), a serious bacterial infection which primarily infects the lung. With TB, it is important to monitor both active cases including those which are multi-drug resistant TB (i.e. a strain of TB that is resistant to the drugs isoniazid and rifampin, two drugs commonly used to treat TB). In addition, it is important to capture those individuals who have inactive TB disease. There are people who have been infected but not yet contagious.

**Key Messages:**

- Active Tuberculosis rates have remained relatively constant since 2000.
- In 2004, there were 3.8 cases of tuberculosis (TB) per 100,000 population in the City of Hamilton. This translates to approximately 20 cases of TB.

**Rate of Tuberculosis (TB) Cases, City of Hamilton and Ontario, 2000-2004**

Source: Reportable Disease Information System (RDIS), City of Hamilton, 2004

**Limitations:**

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