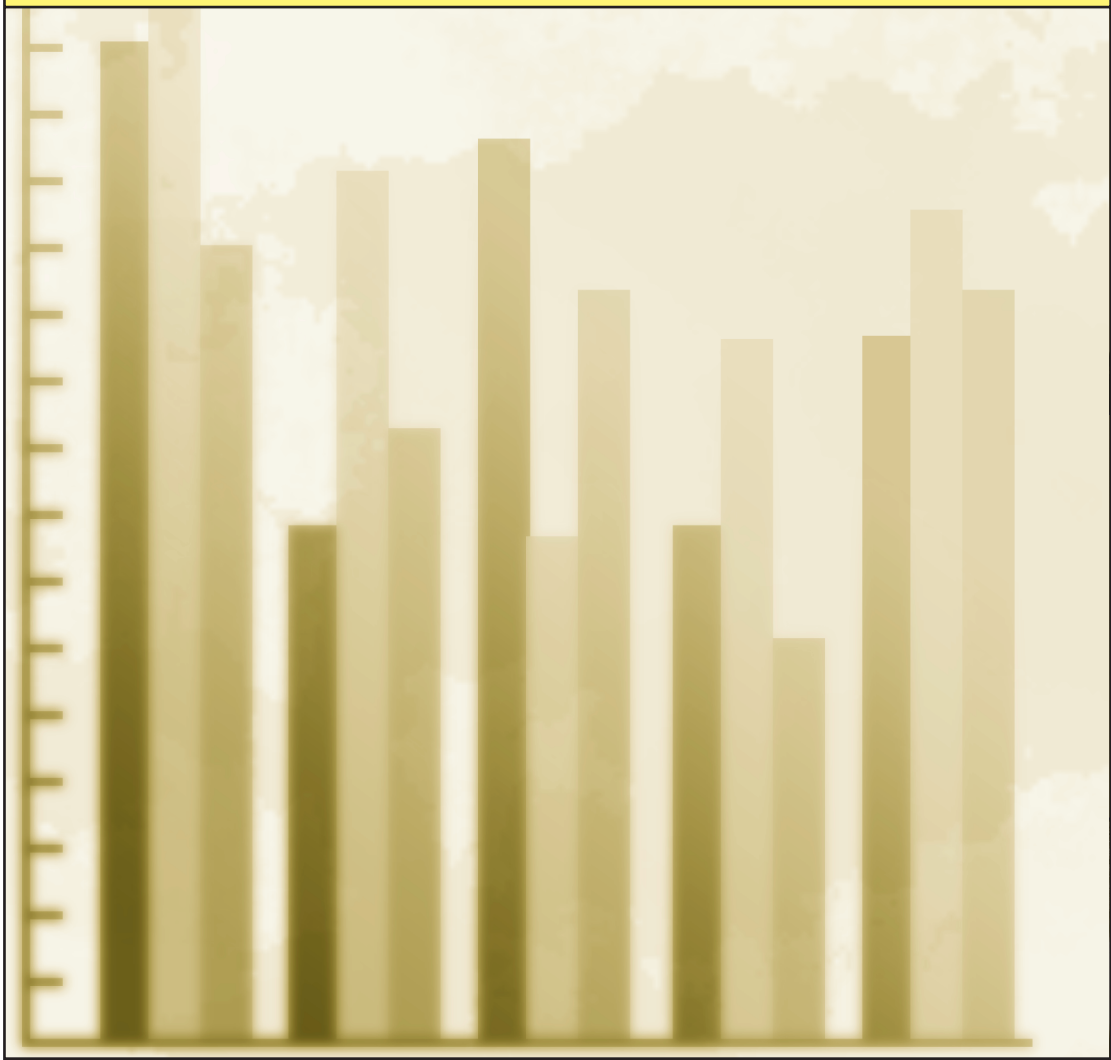
Communicable Disease Report

1994-2003 London & Middlesex County



MIDDLESEX-LONDON HEALTH UNIT
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Communicable Disease Report 1994-2003

London and Middlesex County

MIDDLESEX-LONDON HEALTH UNIT

October, 2005

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Cite reference as: Middlesex-London Health Unit (2005).Communicable Disease Report 1993-2003 London and Middlesex County, London, Ontario: Author.

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Acknowledgements

This report is made possible by the diligent efforts of those responsible for the reporting of diseases designated as reportable under the *Health Protection and Promotion Act* (HPPA). These individuals include physicians, nurses, laboratory personnel, infection control practitioners, and school principals in Middlesex-London, as well as Health Unit staff who follow up these reports. The consistent and ongoing efforts of all individuals involved are crucial to the success of our local surveillance system.

This report was compiled with the support of the members of Communicable Disease and Sexual Health Services at the Middlesex-London Health Unit. They lent their expertise, knowledge, and editing skills to make this report as complete and comprehensive as possible. A sincere thank-you to:

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Amy Pavletic		Melissa Thompson
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Sincere thanks are also due to Laurie Young (Administrative Assistant, Communicable Disease and Sexual Health Services) for sharing her expertise with data entry and analysis in the Reportable Disease Information System (RDIS) used by the Middlesex-London Health Unit. Both Laurie Young and Nancy Forbes (Administrative Assistant, Research, Education, Evaluation and Development Services) are thanked for their support with the formatting and layout of the report. Ruta Pocius (Manager, Communications) and Jane Antoniak (Acting Manager, Communications) are also thanked for coordinating the report cover development and the report printing with Sharpfusion Communication.

Finally, Angie Fazzone from the Public Health Division of the Ontario Ministry of Health and Long-Term Care is thanked for providing provincial and regional data from RDIS for the years 1994 through 2002, and for sharing her expertise in the interpretation of the information.

Executive Summary

This report provides information about the communicable diseases reported to the Middlesex-London Health Unit for the years 1994 through 2003. The report is divided into the following five categories: infections transmitted by food or water, sexually transmitted infections, tuberculosis, diseases prevented by vaccination, and other emerging and reportable diseases.

INFECTIONS TRANSMITTED BY FOOD OR WATER

Amebiasis, campylobacter, cryptosporidium, cyclospora, giardia, hepatitis A, salmonella, shigella, verotoxin-producing *Escherichia coli* (VTEC) and yersinia are the reportable diseases included in this category. In Middlesex-London between 1994 and 2003, campylobacter infections were the most common in this category, accounting for between 30% and 45% of all reports in the category, depending on the year. Giardia and salmonella infections were the next most common infections in this category. Overall, the number of food- and water-borne illnesses reported has decreased in the ten-year time frame.

SEXUALLY TRANSMITTED INFECTIONS

The following reportable diseases are included in this category: acquired immune deficiency syndrome (AIDS) and human immunodeficiency virus (HIV), chlamydia, gonorrhea, and syphilis. Between 1994 and 2003, the most commonly reported sexually transmitted infection (STI) in Middlesex-London was chlamydia, accounting for 79% to 89% of all STIs reported. Although gonorrhea infections were the second most commonly reported STI, the total number of chlamydia cases reported exceeded the number of gonorrhea infections by a ratio of six to one.

Until the late 1990s, the number of STIs reported followed a pattern of consistent decline. However, the total number of STIs reported nearly doubled between 1997 and 2003, from approximately 500 reported cases in 1997 to almost 1,000 in 2003. Much of this increase was due to a dramatic rise in the number of reported chlamydia and gonorrhea cases. By comparison, the number of syphilis cases reported over the ten-year period declined, as did newly diagnosed cases of AIDS and HIV.

TUBERCULOSIS

The number of tuberculosis cases reported in Middlesex-London varied between 1994 and 2003, from a minimum of five cases reported in 2001 to a maximum of 14 cases reported in 2002. On average, nine tuberculosis cases were reported in Middlesex-London each year between 1994 and 2003.

DISEASES PREVENTED BY VACCINATION

The following reportable diseases are included in this category: chickenpox (varicella), diphtheria, *Haemophilus influenzae* type b (hib), hepatitis B, influenza, measles, meningococcal disease, mumps, pertussis, invasive pneumococcal disease, poliomyelitis,

rubella, and tetanus. The most commonly reported vaccine preventable disease was pertussis (whooping cough). Cases of pertussis continue to occur, however, rates are decreasing because of the availability of a publicly-funded vaccine that is approximately 80% effective.

No cases of measles have been reported in Middlesex-London since 1997, and the most recent cases of rubella (German measles) were reported in 1999. Similarly, over the ten-year reporting period there were no cases of diphtheria, polio, or tetanus reported in Middlesex-London and only one reported case of *Haemophilus influenzae* type b. Comparing 1994 to 2003, there was a decrease in the number of reported infections for the following: hepatitis B cases, hepatitis B carriers, measles, meningococcal disease, mumps, and pertussis. Invasive *Streptococcus pneumoniae* infections were made reportable in 2003,when there were 22 cases reported in Middlesex-London.

OTHER EMERGING AND REPORTABLE DISEASES

Viral encephalitis and meningitis, invasive Group A *Streptococcus*, neonatal Group B *Streptococcus*, hepatitis C, Legionnaire's disease, Lyme disease, Q fever, rabies and animal exposures, Severe Acute Respiratory Syndrome (SARS) and West Nile virus (WNv) are the reportable diseases included in this category. With more than 200 cases reported annually, hepatitis C was the most common disease in this category between 1994 and 2003. Viral encephalitis and meningitis was also an important disease reported in this category, with an average of 32 cases reported in each year between 1994 and 2003.

In the ten-year period covered in this report, two notable communicable diseases emerged and were classified as reportable. Human cases of West Nile virus (WNv) infection were first reported in Ontario and Middlesex-London in 2002. At that time there were 18 residents of Middlesex-London who had laboratory evidence of infection with the virus, nine of whom met the strict reporting criteria used by the Ministry of Health and Long-Term Care. From March through to June 2003 an outbreak of Severe Acute Respiratory Illness (SARS) occurred in the Greater Toronto Area. While no Middlesex-London residents contracted the disease, several were placed in quarantine due to exposures in the Toronto area.

IMPLICATION

The identification and reporting of communicable diseases is an important aspect of public health practice. Hundreds of cases of food- and water-borne illnesses and vaccine preventable diseases are reported each year in Middlesex-London. Diseases requiring detailed patient follow-up, such as tuberculosis, continue to be reported as well. For other reportable diseases, particularly sexually transmitted infections, the number of cases reported has dramatically increased. At the same time, new communicable diseases continue to emerge. All these factors highlight the important and ever evolving role of public health in communicable disease control.

Methodological Notes

PURPOSE OF THIS REPORT

The purpose of this report is to provide information about the communicable diseases reported to the Middlesex-London Health Unit for the years 1994 through 2003. It provides an update to reports released in April 1998 and April 2000 that summarized data from 1990 through 1998.

REPORTABLE COMMUNICABLE DISEASES

The information included in this report reflects those diseases that are designated reportable in Ontario, through the *Health Protection and Promotion Act* (HPPA). Under this legislation, physicians, nurses, other regulated health professionals, laboratories, hospitals, school principals, and superintendents of institutions must report these diseases to the local health unit. Section 25 (1) of the HPPA states that physicians and other regulated health care practitioners are required to report when they "form the opinion that the person has or may have a reportable disease". Section 26 of the HPPA also requires these health care providers to report potential carriers of communicable disease once the opinion "that the person is or may be infected with an agent of a communicable disease" has been formed. Information reported to the local health unit may include clinical presentation, the results of diagnostic testing, and treatment. A list of reportable diseases is provided in Appendix A of this report.

Reporting of diseases to the local health unit serves two functions:

1. The follow-up of communicable diseases to prevent spread to others; and
2. The maintenance of surveillance data for epidemiologic and program planning purposes, such as this report.

FOLLOW-UP OF INDIVIDUALS WITH COMMUNICABLE DISEASES

When a communicable disease is reported to the Middlesex-London Health Unit, the treating physician is contacted to obtain further information. The Health Unit then contacts the affected person and the following activities are undertaken with him/her, or the parent/guardian when the case is a child:

1. The person is counseled about the disease and any questions are answered;
2. The person's treatment and follow-up are reviewed (if indicated, depending on the disease);
3. The source of the infection is reviewed with the person to determine if further public health intervention is required;
4. Methods to prevent the transmission to others are discussed with the person; and
5. Contacts are followed up, if needed, and advised of measures that can be taken to prevent the infection. The Health Unit facilitates the provision of vaccines and/or antibiotics to contacts as appropriate.

For sexually transmitted infections, significant effort is made to ensure that contacts of the affected person are notified of the need for testing and treatment. Contact notification by the Health Unit is done in a confidential manner such that the name of the source person is never revealed to the contacts.

LEGISLATION RELATED TO THE SYSTEMATIC COLLECTION AND REPORTING OF COMMUNICABLE DISEASE SURVEILLANCE INFORMATION

The *Health Protection and Promotion Act* not only specifies the diseases that are reportable to health units, it also allows for the collection of information about reported cases of communicable disease. Section 91.1 subsections (1) and (2) of the HPPA state that personal information may be collected, used, and retained for the purposes of the Act and for purposes related to the administration of public health programs.

The standards for collection, retention, use and release of personal health information collected by the Middlesex-London Health Unit are outlined in two pieces of legislation: the *Municipal Freedom of Information and Protection of Privacy Act*, R.S.O. 1990 (MFIPPA) and the *Personal Health Information Protection Act*, 2004 (PHIPA). These Acts outline the measures that must be taken to ensure the accuracy, security and confidentiality of the information collected and, when necessary, released.

CONFIDENTIALITY AND SECURITY OF PERSONAL INFORMATION COLLECTED

All case information reported to the Middlesex-London Health Unit is held in the strictest of confidence. Access to all records (paper and electronic) containing personal information is restricted to those individuals who require access to carry out their public health responsibilities. Paper files containing case information are locked in cabinets when not in use and discarded documents containing any personal information are shredded. Electronic files are accessible only through a strictly controlled password protected system.

REPORTABLE DISEASE INFORMATION SYSTEM (RDIS)

At a local level, details about reportable communicable diseases have been entered into a computer-based information system called the Reportable Disease Information System (RDIS) since 1990. RDIS is used for case follow-up, surveillance, and data analysis. Each Ontario health unit transmits non-identifying aggregate information from RDIS to the Ontario Ministry of Health and Long-Term Care on a weekly basis.

Specific criteria, or case definitions, must be met for a report to be included in RDIS. Case definitions can be based on laboratory test results, clinical diagnostic criteria, or both. Consistent application of the case definitions ensures that disease information collected is comparable across all regions of Ontario.

The means by which reportable communicable disease information is electronically collected, managed and reported changed in 2005. A new computer-based information system called the Integrated Public Health Information System (iPHIS) is replacing RDIS. Although the nature of information collected in iPHIS is similar to that collected in RDIS, iPHIS expands and improves upon RDIS, enhancing the management of communicable diseases by public health workers across Ontario.

LOCAL, PROVINCIAL, NATIONAL, AND INTERNATIONAL COMMUNICABLE DISEASE SURVEILLANCE DATA

In order to carry out its public health mandate, it is necessary for the Middlesex-London Health Unit to report on the personal health information that is collected in RDIS. When local RDIS information is used for reporting purposes, individual case reports are grouped, or aggregated, so that individuals cannot be identified. Aggregate analysis of local surveillance data, such as this report, will assist the Health Unit, other health professionals, and health planners to examine groups at risk for disease, and to target, plan, and monitor services in Middlesex-London.

Ontario health units regularly transmit surveillance data that do *not* contain person-identifying information to the Ontario Ministry of Health and Long-Term Care, where provincial data are compiled. The Ontario Ministry of Health and Long-Term Care publishes results from Ontario in the report *Summary of Reportable Diseases*.

Data from all provinces and territories are aggregated by the Centre for Infectious Disease Prevention and Control (CIDPC) at the Public Health Agency of Canada to generate national-level information about reportable diseases. National data are published in the *Notifiable Diseases Annual Summary*. Many of these statistics are also available through the Notifiable Diseases On-Line product[1]. Both provincial and federal reports of communicable diseases assist public health officials to plan disease prevention strategies that are appropriate for the populations they serve.

National data compiled by the CIDPC are forwarded to the Pan American Health Organization (PAHO) and then to the World Health Organization (WHO). At PAHO and the WHO, information from Canada is aggregated with the information from other countries around the world. It is through this chain of referrals that surveillance data from Middlesex-London are incorporated into world statistics.

SOURCES OF DATA USED IN THIS REPORT

For the years 1994 through 2003, the number of cases reported in Middlesex-London and other local information was obtained from the RDIS database maintained by the Middlesex-London Health Unit. The date of onset of symptoms, if available, or the date laboratory tests were submitted were used to determine the year and month of occurrence for these cases.

The number of cases reported for each disease for the other health units in the

[1] http://dsol-smed.phac-aspc.gc.ca/dsol-smed/ndis/index_e.html

Southwest region of Ontario (as defined by the Ontario Ministry of Health and Long-Term Care)[2] and Ontario as a whole were obtained from the provincial RDIS dataset maintained by the Ontario Ministry of Health and Long-Term Care. Data from 1994 through 2002 were available from the Ministry of Health and Long-Term Care. As with Middlesex-London data, the date of onset of symptoms or the date laboratory tests were submitted were used to determine the year and month of occurrence for cases, with the exception of AIDS. Date of diagnosis was used to determine the year in which AIDS cases occurred.

The number of reported AIDS cases in Ontario, the number of reported West Nile virus cases in the Southwest region of Ontario and Ontario as a whole, and the number of confirmed-rabid animals reported in Middlesex-London were acquired from public sources. The annual number of AIDS cases reported in Ontario between 1994 and 2002 was obtained from *Report on HIV/AIDS in Ontario*[3], published by the Ontario HIV Epidemiology Monitoring Unit. The number of reported West Nile virus cases in Southwestern Ontario and Ontario was based on annual human West Nile virus surveillance summaries available from the Ontario Ministry of Health and Long-Term Care[4]. The number of animals confirmed to be rabid in Middlesex-London was based on the Ontario Ministry of Natural Resources *Rabies Reporter*[5].

The population estimates used to generate incidence rates in this report were based on the 2001 census, as reported in the Statistics Canada product *Annual Demographic Statistics 2003*. In 2003, population estimates were approximately 428,600 for Middlesex-London, 1,133,100 for Southwestern Ontario (less Middlesex-London), and 12,238,300 for Ontario as a whole.

METHODS USED IN THIS REPORT

When sufficiently available, the following information is provided for most diseases described in this report:

1. Background about the disease;
2. Number of cases reported in Middlesex-London each year;
3. Comparison by age group and sex;
4. Comparison of incidence rates among Middlesex-London, the remainder of the Southwest region, and Ontario; and
5. Other information, such as seasonal trends or risk factors, when available.

Only limited information is available for some diseases, especially those where few cases are reported.

Some diseases and conditions are recorded in the Middlesex-London RDIS system but not transmitted to the Ontario Ministry of Health and Long-Term Care. These include HIV cases, hepatitis B carriers, and animal exposures. Therefore, information

[2] The other public health units comprising the Southwest region are: Chatham-Kent, Elgin-St.Thomas, Grey Bruce, Huron County, Perth District, and Windsor-Essex County, as well as the County of Lambton Community Health Services Department and the Oxford County Board of Health.

[3] Remis RS, Swantee C, Rottensten K, et al. (2003). *Report on HIV/AIDS in Ontario*. Toronto: Ontario HIV Epidemiology Monitoring Unit.

[4] http://www.health.gov.on.ca/english/providers/program/pubhealth/westnile/wnv_05/wnv_surveillance.html. Last accessed January 12, 2005.

[5] http://www.gis.queensu.ca/rreporter/. Last accessed July 14, 2005.

about these diseases or conditions is available only for Middlesex-London and cannot be compared to other regions.

Reported incidence rates for the Southwest region of Ontario *exclude* Middlesex-London cases to eliminate the influence of Middlesex-London on Southwestern Ontario rates. Reported incidence rates for Ontario *include* cases from both Middlesex-London and the Southwest Ontario region.

Incidence rates presented in this report are not age-standardized. That is, incidence rates have not been adjusted to remove the possible effect of different age distributions on the incidence of communicable diseases when comparing Middlesex-London to the Southwest region and Ontario as a whole. This type of adjustment was not considered necessary because comparisons of the age structures in the populations of Middlesex-London, Southwest Ontario (less Middlesex-London), and Ontario found no significant differences in the age structures of the three jurisdictions[6].

POSSIBLE SOURCES OF BIAS IN THIS REPORT

The information presented in this report represents the best available estimate of the occurrence of communicable diseases in Middlesex-London. In general, though, the case counts included do not represent all cases of disease occurring in our community. This is because several events generally have to occur for reportable communicable diseases to be included in local surveillance data, as follows:

1. The disease or infection must cause the person to feel ill;
2. The symptoms must be severe enough for the person to visit his/her physician for treatment;
3. The symptoms must be specific enough to cause the physician to consider the diagnosis and report the findings to the Health Unit;
4. If laboratory confirmation is required, the test must be ordered by the physician and provide accurate results; and
5. The laboratory results must be reported to the Health Unit.

Many communicable diseases have a range of clinical presentations. Some infected individuals may be symptom-free, while others will experience mild symptoms, and a few will have severe symptoms that require hospitalization or result in death. The more severe the disease process, the more likely it is to be reported to the Health Unit and be incorporated into the local surveillance system. Infections such as meningococcal disease and invasive group A *Streptococcus*, which tend to have more severe clinical presentations, are more accurately reflected in surveillance data. Other diseases, such as chlamydia and hepatitis B, are under-reported because many infected individuals have no symptoms, referred to as asymptomatic. Reported incidence rates for diseases that have a large proportion of asymptomatic individuals are influenced a great deal by how aggressively physicians screen for those diseases.

Diagnoses based on laboratory reports tend to be more accurately reported than those relying on clinical diagnostic criteria. This occurs because of

[6] Archer J, Alder R, and Mai V (1993). *The Prevalence of Health Enhancing and Health Risk Behaviours in Middlesex-London and Southwestern Ontario.* London: Middlesex-London Health Unit.

differences in how clinical factors are interpreted and reported by health care professionals. Consistent application of case definitions limits some variability in conditions that rely on clinical criteria.

Although RDIS was first introduced as the provincial reporting system in 1990, the individuals entering information into the system have changed over time. While efforts are made at the Middlesex-London Health Unit to ensure that data are captured consistently, there may be differences in how case information is interpreted and entered. The accuracy of the number of cases included in RDIS may be influenced by this minor variability. Similarly, it is known that the interpretation of case information and its entry into RDIS also varies across Ontario health units. This may be an important factor when considering comparisons across jurisdictions.

Overall, the data presented in this report provide a reasonable estimate of the burden of disease in Middlesex-London and how local rates compare to the remainder of the Southwest region of Ontario and the province as a whole. In reviewing this report, it must be remembered that the data may be subject to these and other biases. Within each section, obvious sources of bias are identified.

INFECTIONS TRANSMITTED BY FOOD OR WATER

AMEBIASIS

BACKGROUND

Amebiasis is caused by a parasite, *Entamoeba histolytica,* that can produce a wide range of symptoms. Amebiasis may cause no symptoms at all, mild abdominal discomfort, bloody diarrhea, distention of the colon, or infection outside of the gastrointestinal tract. Disease is more severe in the very young, the very old and pregnant women. This infection is endemic in many developing countries where infection rates are estimated to be as high as 50%, and is a concern for travelers to areas with poor hygiene. It is transmitted from person to person through contact with fecal matter, and through fecally contaminated water or food.

TRENDS IN LONDON AND MIDDLESEX COUNTY

***Historical*:** Figure 1.1 shows that the annual number of reported amebiasis cases in Middlesex-London varied between 1994 and 2003. On average, there were 11 amebiasis infections reported each year between 1994 and 2003.

***By age group and sex*:** Figure 1.2 shows that the average annual reported incidence rate of amebiasis infections was highest among those between the ages of 30 and 39 years (5.9/100,000). For adults 20 years of age and over, the reported rate of infections among males was nearly double the rate for females. This difference is likely related to the increased risk of sexual transmission among men who have sex with men.

***By month*:** There was no obvious seasonal variation in the number of reported amebiasis infections between 1994 and 2003. Over the ten-year period, the average number of cases reported per month was approximately one.

***Regional*:** Between 1994 and 2003, the average annual reported incidence rate of amebiasis infections in Middlesex-London was 2.7/100,000 population compared to 1.9/100,000 in the rest of Southwestern Ontario and 7.6/100,000 in Ontario. Figure 1.3 shows that while the reported incidence rate in Middlesex-London was consistently higher than the reported rate in the rest of the Southwest region, it was lower than the rate in the province as a whole.

Figure 1.1
Annual Number of Reported Amebiasis Infections,
Middlesex-London, 1994-2003

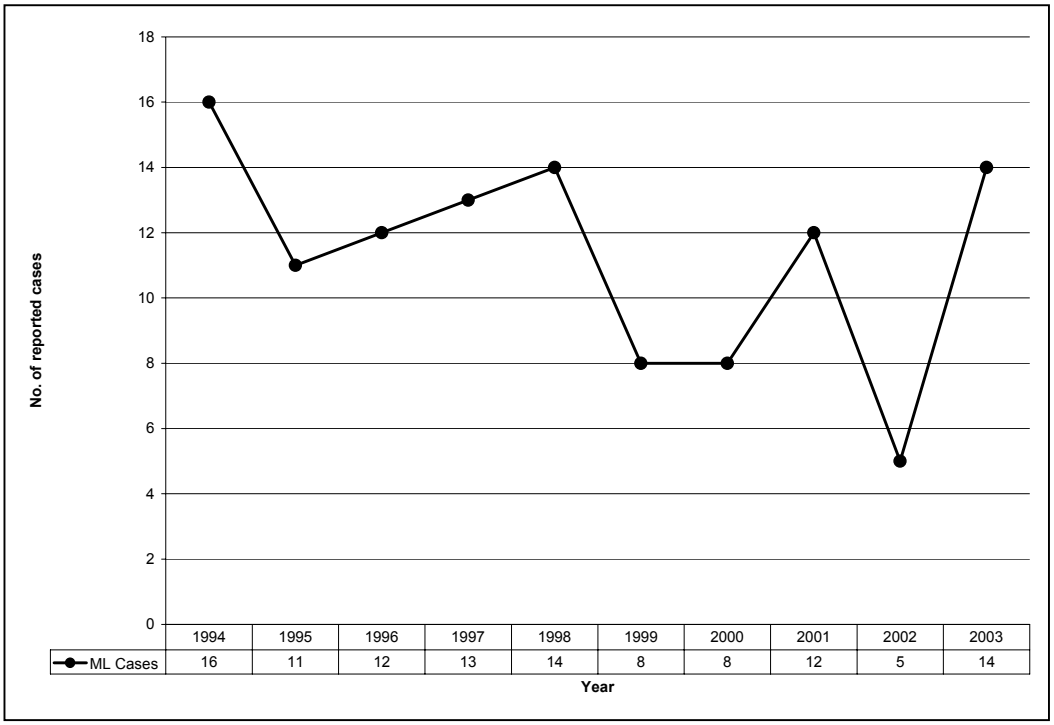


Figure 1.2
Average Annual Reported Incidence Rate of Amebiasis Infections by Age Group And Sex,
Middlesex-London, 1994-2003

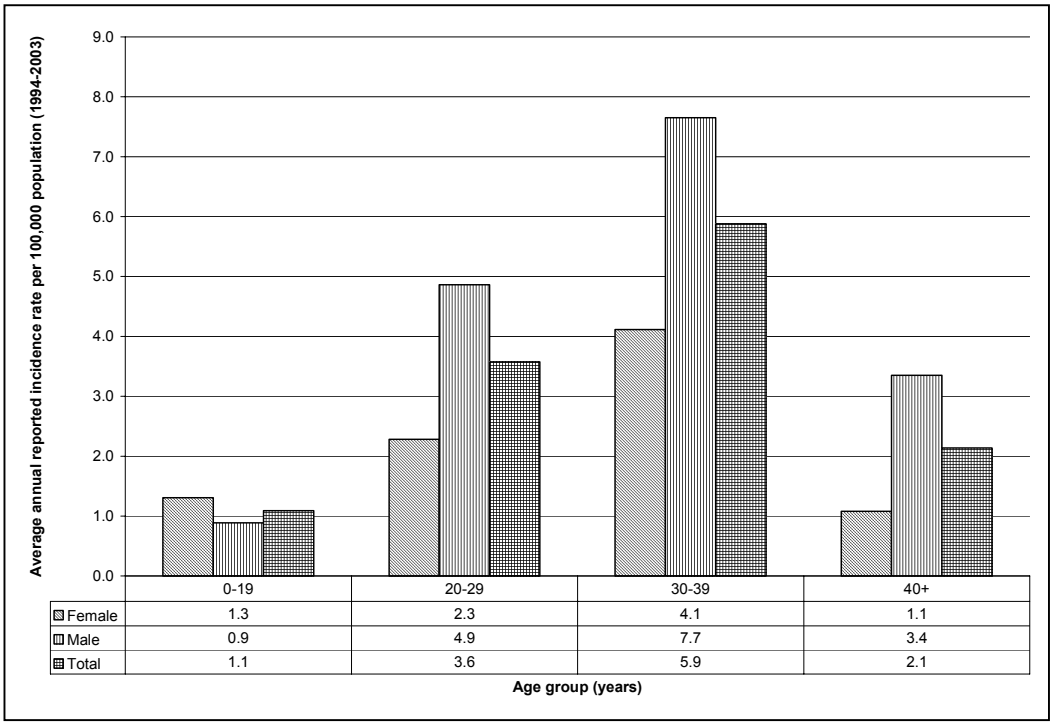
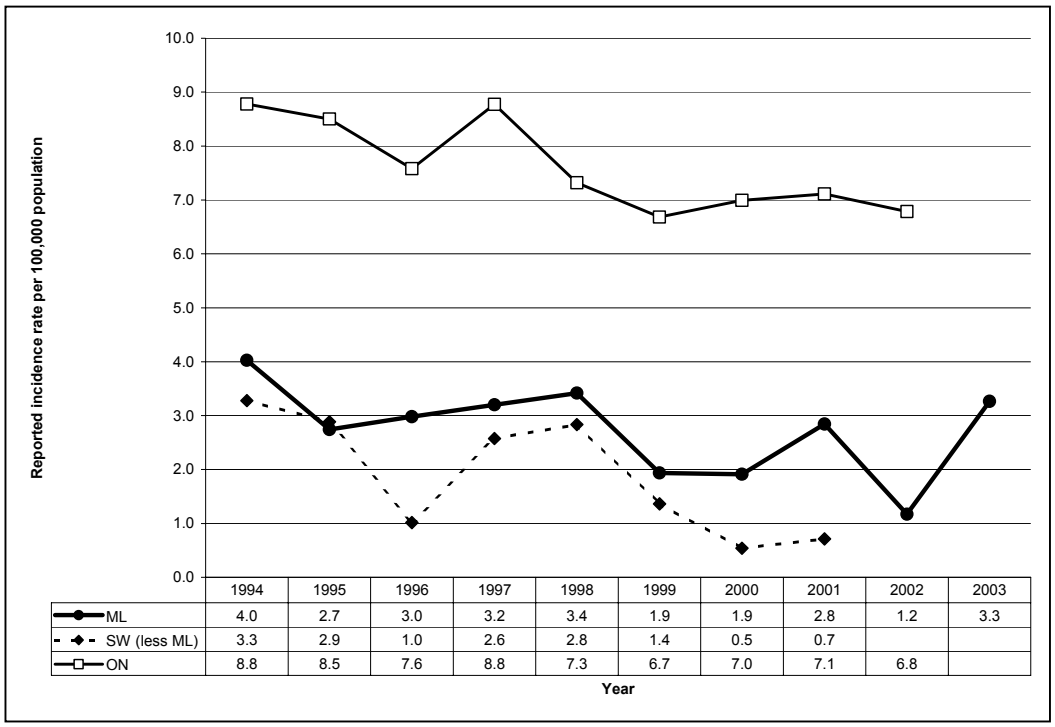


Figure 1.3
Annual Reported Incidence Rate of Amebiasis Infections,
Middlesex-London, Remainder of Southwestern Ontario, and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ML	4.0	2.7	3.0	3.2	3.4	1.9	1.9	2.8	1.2	3.3
SW (less ML)	3.3	2.9	1.0	2.6	2.8	1.4	0.5	0.7		
ON	8.8	8.5	7.6	8.8	7.3	6.7	7.0	7.1	6.8	

CAMPYLOBACTER

BACKGROUND

Campylobacter is the most commonly reported cause of bacterial diarrhea in Canada. It takes only a small amount of campylobacter bacteria to cause symptoms, which include watery and often bloody diarrhea, abdominal pain, fever, headache, nausea and vomiting. The illness is usually self-limited and lasts seven to ten days, but it can last two to three weeks, and relapses can occur. Complications such as reactive arthritis and rarely, Guillain-Barré syndrome, meningitis or neonatal sepsis may occur.

Campylobacter are part of the normal flora of birds and animals. Transmission of this infection is by the fecal-oral route, meaning that stool from an infected animal or person is transferred to another person's mouth. Undercooked contaminated meats, unwashed fruits and vegetables contaminated by feces, and fecally contaminated water can also transmit this infection. Contact with household pets such as birds, puppies and kittens, and contact with farm animals are also documented sources of infection. Workers on poultry farms and processing plants are at risk for this infection. Person-to-person transmission occurs, but less often than with other infections.

TRENDS IN LONDON AND MIDDLESEX COUNTY

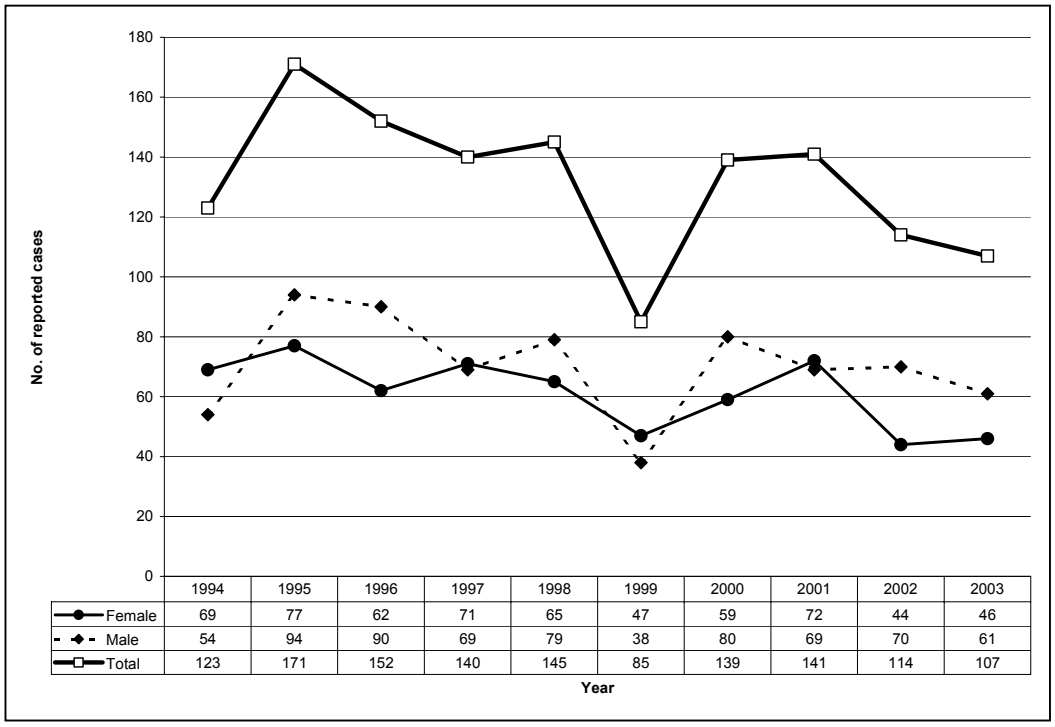
Historical: Campylobacter was the most common disease transmitted by food or water reported in Middlesex-London between 1994 and 2003. Figure 1.4 shows that the total number of reported cases varied by year. Over the ten-year period, the average number of campylobacter cases reported each year was 132.

By age group and sex: Figure 1.5 shows that with the exception of cases under the age of one year, the average annual reported incidence rate of campylobacter infections in Middlesex-London was higher among males. Regardless of gender, the average annual reported incidence rate was highest among children under the age of five years. It is possible that children in this age group are exposed more often or are more susceptible, and truly experience campylobacter infections more frequently than other age groups. However, it is also possible that relative to other age groups, more cases under the age of five years are reported because parents and caregivers are more likely to seek medical care for young children than for older individuals experiencing the same symptoms.

***By month*:** Figure 1.6 shows that between 1994 and 2003 the average number of reported campylobacter cases was highest in the summer months, peaking in July. This may be related to improper food handling practices and poor food temperature control at a time when people are more likely to have outdoor meals and barbeques.

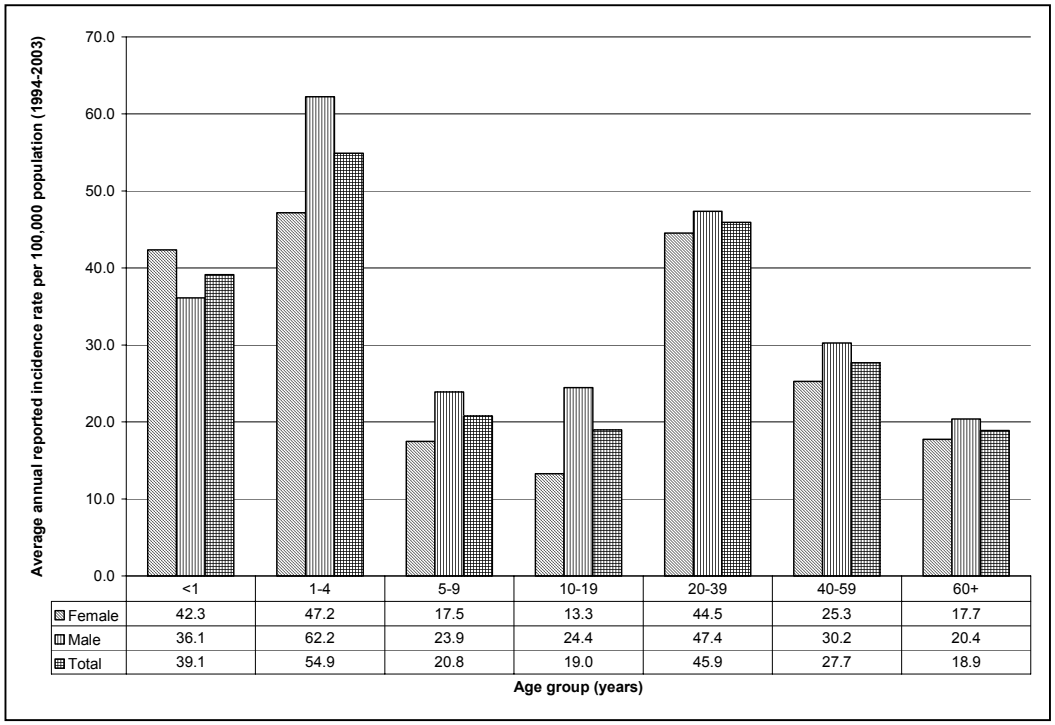
***Regional*:** Figure 1.7 compares the annual reported incidence rate of campylobacter in Middlesex-London, the remainder of the Southwest region, and Ontario between 1994 and 2003. The average annual reported incidence rate for these years was 31.9/100,000 in Middlesex-London, compared to 45.8/100,000 in the rest of Southwestern Ontario and 47.2/100,000 in Ontario. In 2000 there was a marked increase in the reported incidence rate of campylobacter infections in the rest of Southwestern Ontario. This peak is associated with the Walkerton outbreak of *E. coli* O157:H7 and campylobacter.

Figure 1.4
Annual Number of Reported Campylobacter Infections by Sex, Middlesex-London, 1994-2003



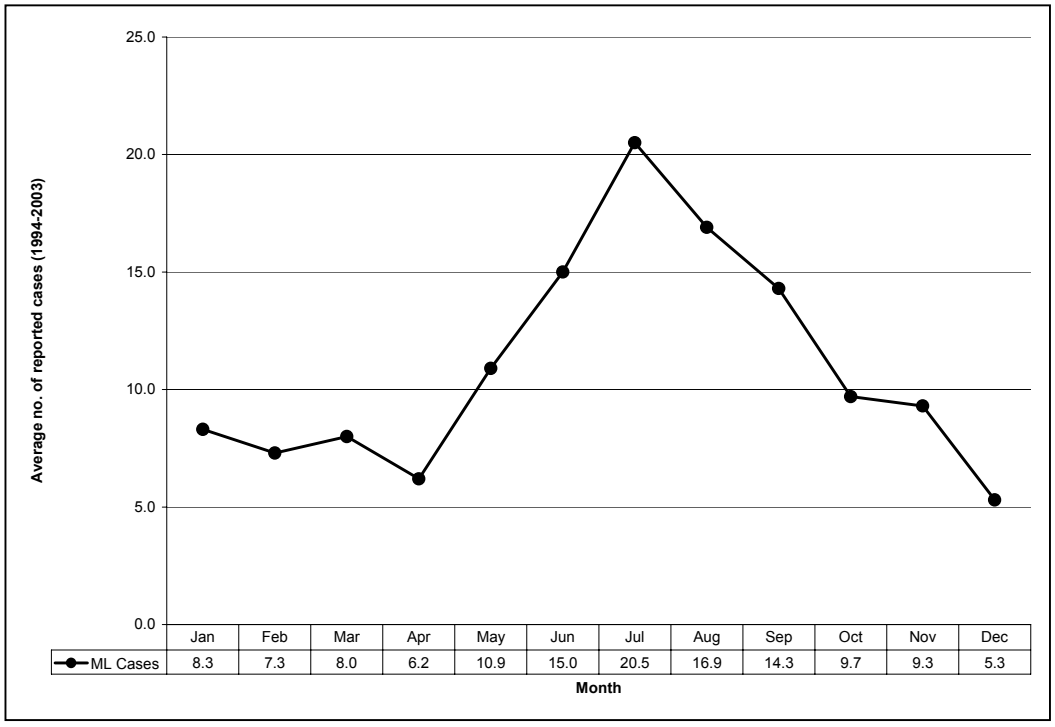
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Female	69	77	62	71	65	47	59	72	44	46
Male	54	94	90	69	79	38	80	69	70	61
Total	123	171	152	140	145	85	139	141	114	107

Figure 1.5
Average Annual Reported Incidence Rate of Campylobacter Infections by Age Group and Sex, Middlesex-London, 1994-2003



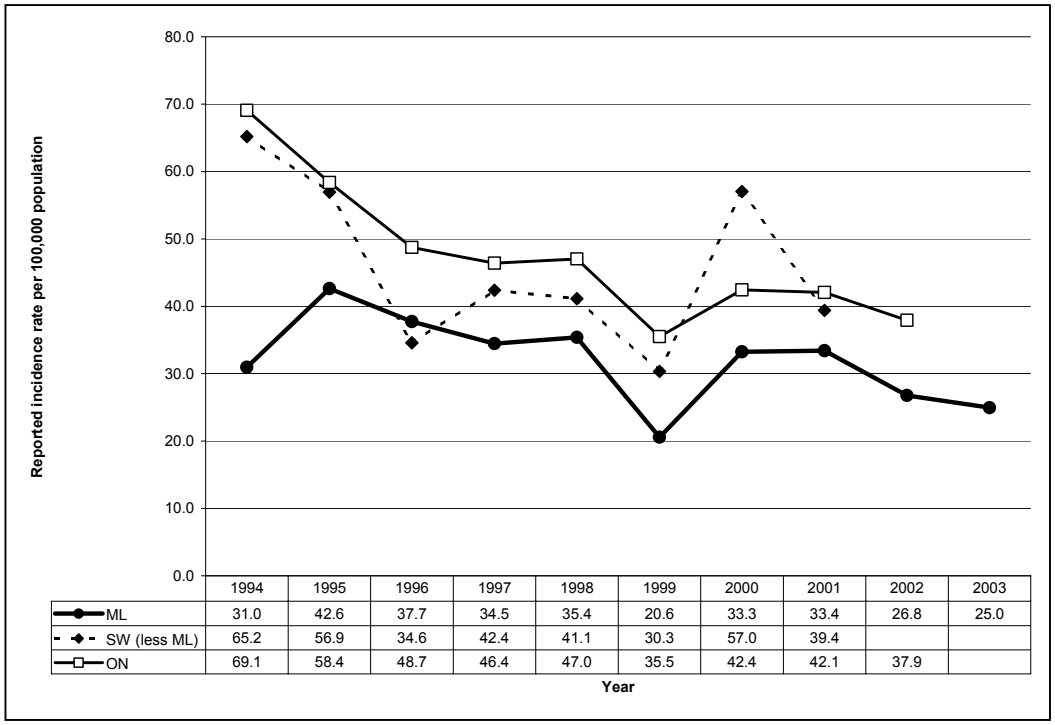
	<1	1-4	5-9	10-19	20-39	40-59	60+
Female	42.3	47.2	17.5	13.3	44.5	25.3	17.7
Male	36.1	62.2	23.9	24.4	47.4	30.2	20.4
Total	39.1	54.9	20.8	19.0	45.9	27.7	18.9

Figure 1.6
Average Number of Reported Campylobacter Infections by Month, Middlesex-London, 1994-2003



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ML Cases	8.3	7.3	8.0	6.2	10.9	15.0	20.5	16.9	14.3	9.7	9.3	5.3

Figure 1.7
Annual Reported Incidence Rate of Campylobacter Infections, Middlesex-London, Remainder of Southwestern Ontario, and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ML	31.0	42.6	37.7	34.5	35.4	20.6	33.3	33.4	26.8	25.0
SW (less ML)	65.2	56.9	34.6	42.4	41.1	30.3	57.0	39.4		
ON	69.1	58.4	48.7	46.4	47.0	35.5	42.4	42.1	37.9	

CRYPTOSPORIDIUM

BACKGROUND

Cryptosporidium parvum is a parasite that causes a wide range of symptoms. Some people have no symptoms, others have mild diarrhea for a few days, while some people with suppressed immune systems can develop chronic diarrhea, weight loss, and rarely, can die from this infection.

Cryptosporidium is transmitted directly from person to person through unwashed hands, and indirectly through fecally contaminated drinking water or food, and swimming in fecally contaminated recreational water such as lakes or swimming pools. Animal-to-human transmission can occur through contact with the feces of infected animals, particularly calves, and through the consumption of unpasteurized milk and dairy products. The feces of infected animals may also contaminate human water sources, which is another route for animal-to-human transmission. *Cryptosporidium parvum* is also one of the parasites that can cause traveler's diarrhea.

In Ontario, outbreaks have been associated with contaminated municipal drinking water systems (as in the 1993 outbreak in Kitchener) and with swimming in contaminated recreational water sites, such as swimming pools. In 1996, cryptosporidiosis became a reportable disease in Ontario.

TRENDS IN LONDON AND MIDDLESEX COUNTY

***Historical*:** Figure 1.8 shows that the annual number of reported cryptosporidium infections in Middlesex-London varied between 1996 and 2003, corresponding to an annual average of five reported cases.

***By age group*:** As shown in Figure 1.9, the average annual reported incidence rate of cryptosporidium infections was highest among those under the age of five years (3.4/100,000) and declined with increasing age.

***Regional*:** Between 1996 and 2003, the average annual reported incidence rate of cryptosporidium infections in Middlesex-London was 1.2/100,000 population. This compares to 4.2/100,000 in the rest of Southwestern Ontario and 2.0/100,000 in Ontario. Figure 1.10 illustrates that the annual reported incidence rate of cryptosporidium infections in Middlesex-London was far lower than the rates in Southwestern Ontario in each year, as well as being lower than the rates in Ontario as a whole in all years except 1997.

Figure 1.8
Annual Number of Reported Cryptosporidium Infections,
Middlesex-London, 1996-2003

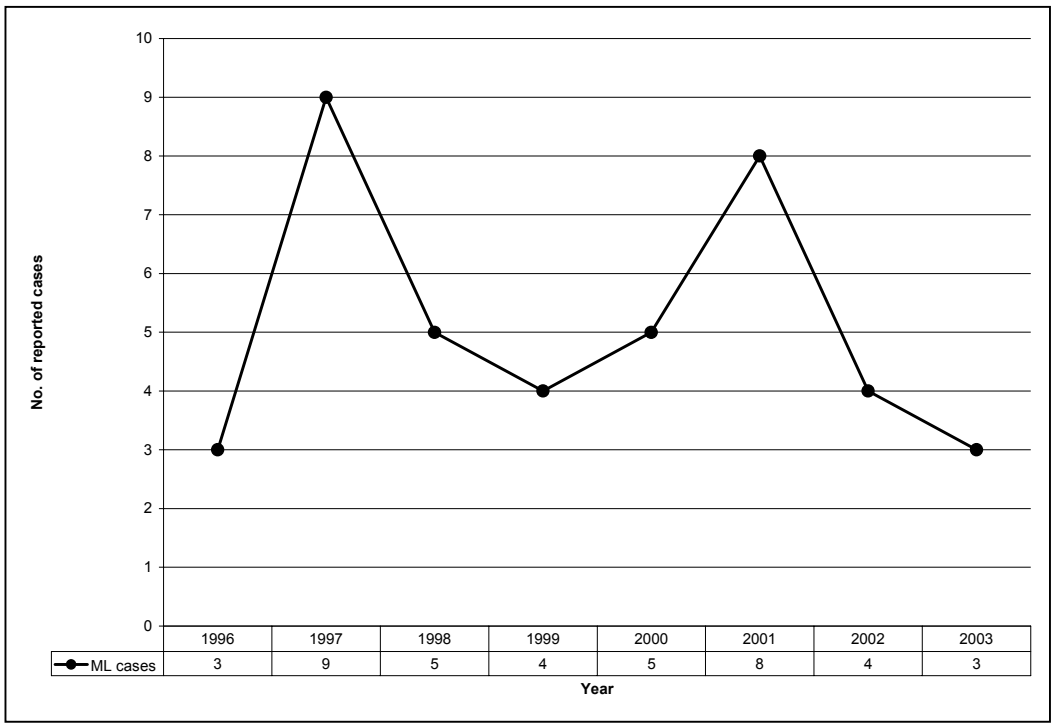


Figure 1.9
Average Annual Reported Incidence Rate of Cryptosporidium Infections by Age Group,
Middlesex-London, 1996-2003

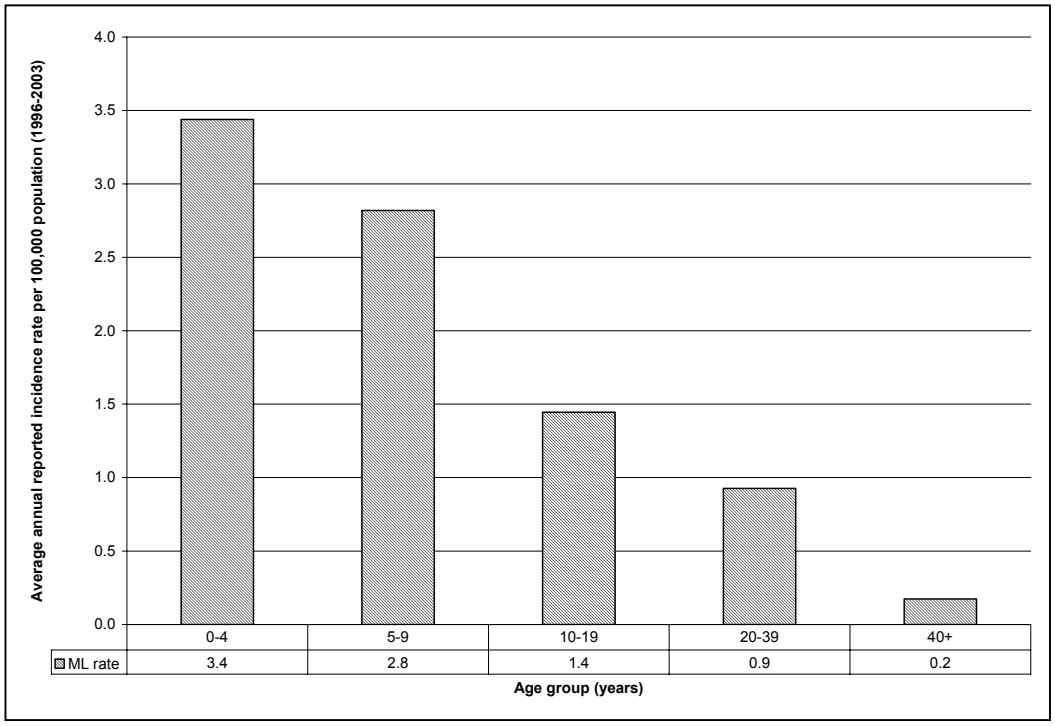
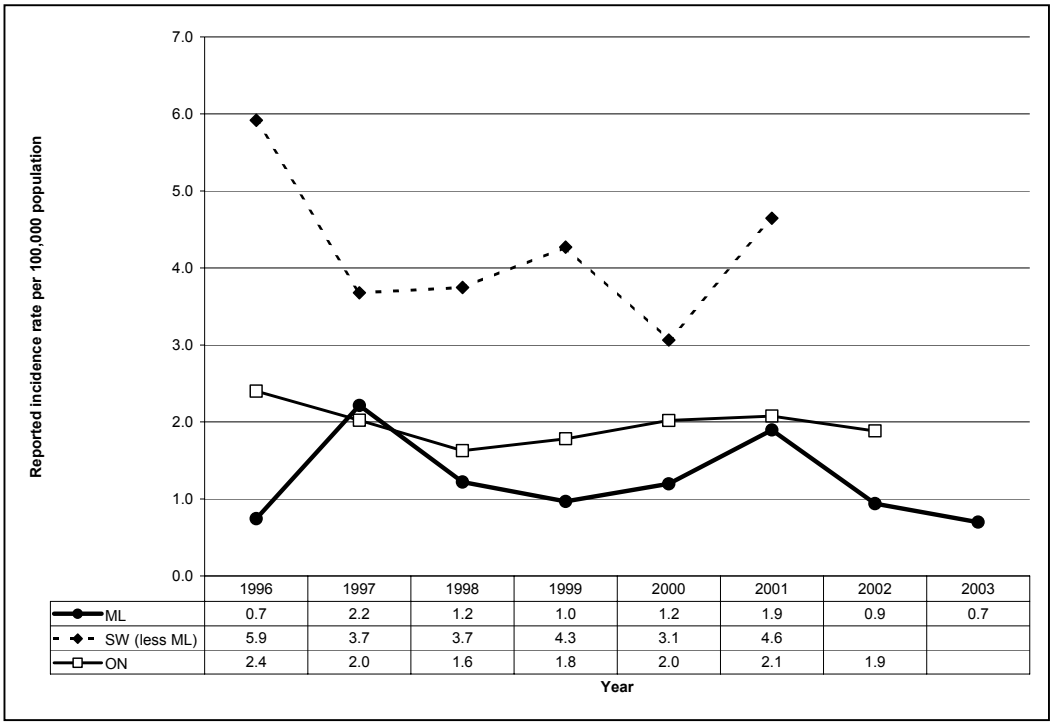


Figure 1.10
Annual Reported Incidence Rate of Cryptosporidium Infections, Middlesex-London, Remainder of Southwestern Ontario, and Ontario, 1996-2003



	1996	1997	1998	1999	2000	2001	2002	2003
ML	0.7	2.2	1.2	1.0	1.2	1.9	0.9	0.7
SW (less ML)	5.9	3.7	3.7	4.3	3.1	4.6		
ON	2.4	2.0	1.6	1.8	2.0	2.1	1.9	

CYCLOSPORA

BACKGROUND

Cyclospora is transmitted by ingestion of water or food contaminated with oocysts that are excreted into the environment in the feces of infected persons. When initially excreted, oocysts are not infectious and may require days to weeks to become infectious as they sporulate. Therefore, transmission of cyclospora directly from one infected person to another person is unlikely. The incubation period between acquisition of infection and onset of symptoms averages about one week. Cyclospora infects the small intestine and typically causes watery diarrhea with frequent, sometimes explosive, stools. Other symptoms can include loss of appetite, substantial loss of weight, bloating, stomach cramps, nausea, vomiting, muscle aches, low-grade fever, and persistent fatigue. If untreated, illness may last for a few days to a month or longer, and may follow a remitting-relapsing course. Some infected persons are asymptomatic.

Outbreaks linked to contaminated water and various types of fresh produce have been reported in recent years. Fresh raspberries or blackberries imported from Guatemala were related to outbreaks of cyclospora in Ontario from 1996 to 1999. In May 1998, 305 people in Ontario were stricken with cyclospora as a result of consuming contaminated raspberries. It has been mandatory to report any human cases of cyclospora in Ontario to local public health units since October 2001. However, it is not yet known how frequently the various modes of transmission occur. Information about the spectrum of sources for this infection is also lacking, and is it unknown whether animals can be infected and serve as sources of infections for humans.

TRENDS IN LONDON AND MIDDLESEX COUNTY

***Historical*:** The first local cases of cyclospora infection were reported in 2003, when there were three cases.

***Regional*:** In Ontario, there were 21 cases of cyclospora infection reported in 2001. None of these reported cases was from Middlesex-London, although one case was from another part of the Southwest region. In 2002 there were 52 reported cases in Ontario, none of which were from the Middlesex-London area.

GIARDIA

BACKGROUND

Giardia infection is caused by a parasite, *Giardia lamblia*, that results in a wide range of symptoms. Giardia may present with no symptoms, abdominal pain, loss of appetite, acute watery diarrhea, chronic diarrhea, malabsorption, or weight loss.

Giardia is transmitted from person to person and by ingesting contaminated water, or occasionally, contaminated food. Infection due to giardia is also referred to as "beaver fever" since the feces of beavers and other animals, including pets, can be the source of water contamination, particularly in open lakes and streams. Chlorination is not sufficient to eliminate *Giardia* from water and effective filtration of the water system is required.

TRENDS IN LONDON AND MIDDLESEX COUNTY

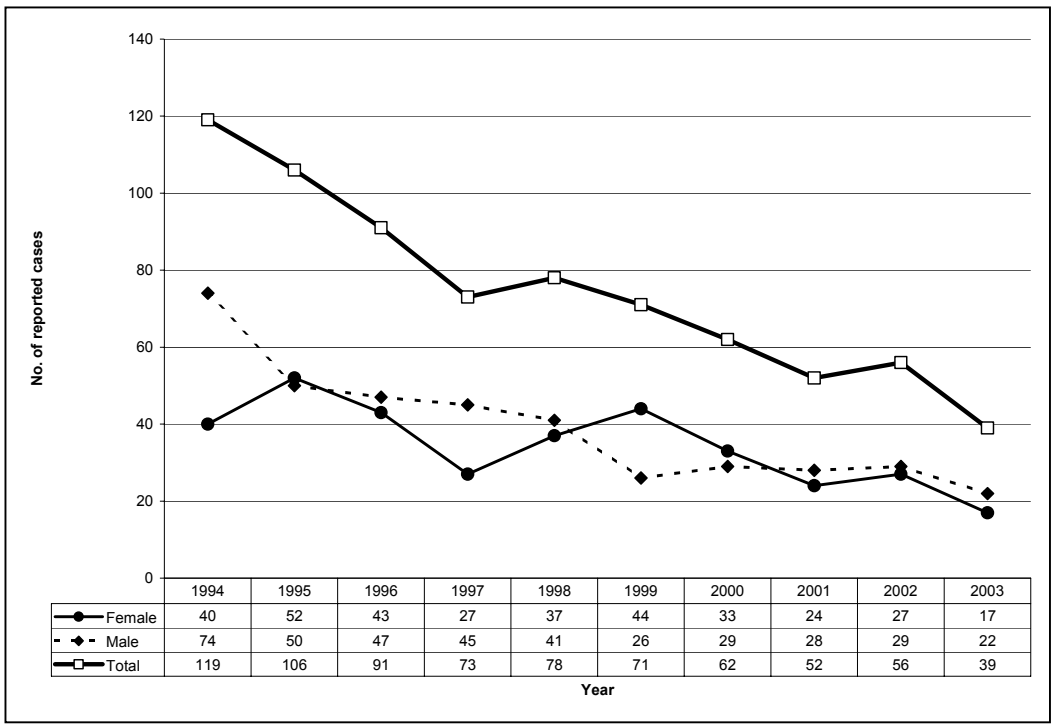
***Historical*:** Figure 1.11 illustrates that since 1994, there has been a gradual decline in the number of reported giardia infections in Middlesex-London. On average, there were 75 reported cases of giardia infection each year between 1994 and 2003.

***By age group*:** Figure 1.12 shows that between 1994 and 2003, the average annual reported incidence rate of giardia infections was highest among children between the ages of one and four years of age (78.3/100,000). Similar to some other enteric infections, the reported incidence rate in this age group may be truly higher, or it might be influenced by other factors. That is, more cases under the age of five might be reported because caregivers are more likely to seek medical attention for children experiencing symptoms of infection. The higher incidence among younger children may also be related to children who attend child-care centres, who may be more likely to acquire and be diagnosed with this infection.

***By month*:** Between 1994 and 2003, the average number of reported cases per month peaked at 11 in September (Figure 1.13). This seasonal peak is consistent with other jurisdictions and may reflect increased transmission of the infection in the late summer months when children and families are more likely to be in and around potentially contaminated water for recreational purposes. Consumption of contaminated well-water may also contribute to this peak.

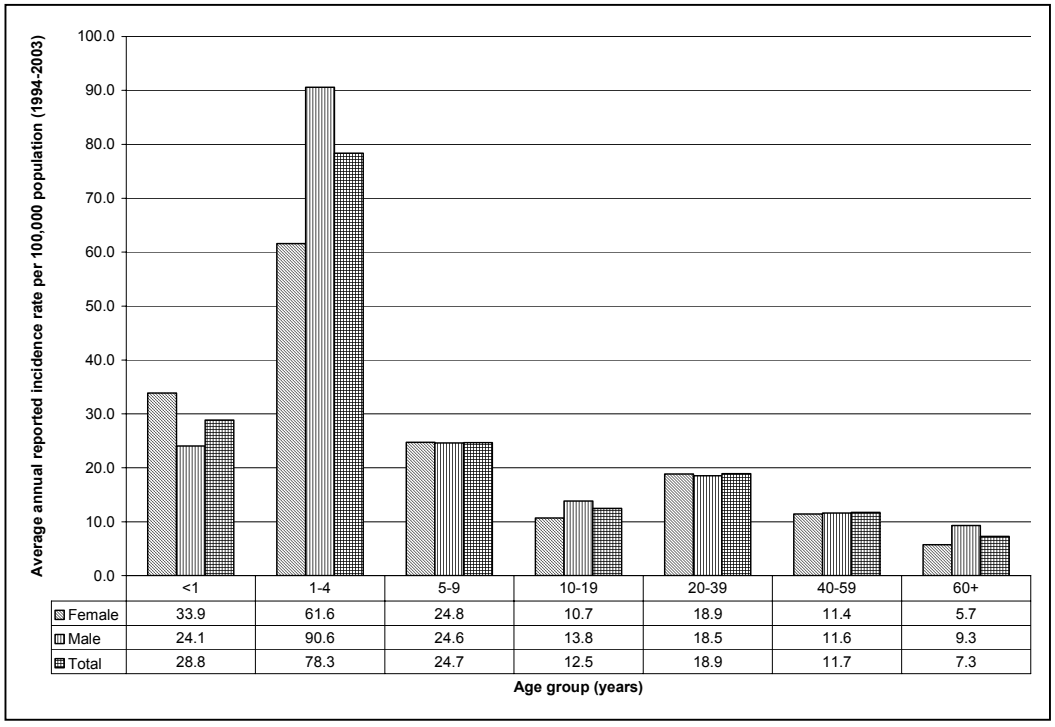
***Regional*:** Since 1994 the number of reported giardia infections has declined in Middlesex-London, the remainder of the Southwest region and Ontario as a whole (Figure 1.14). In general, the annual reported incidence rate in Middlesex-London was slightly greater than the reported incidence rate in the rest of Southwestern Ontario. Over the ten-year period the average annual reported incidence rate in Middlesex-London was 18.1/100,000, compared to 16.8/100,000 in the rest of the Southwest region and 19.9/100,000 in Ontario.

Figure 1.11
Annual Number of Reported Giardia Infections by Sex, Middlesex-London, 1994-2003



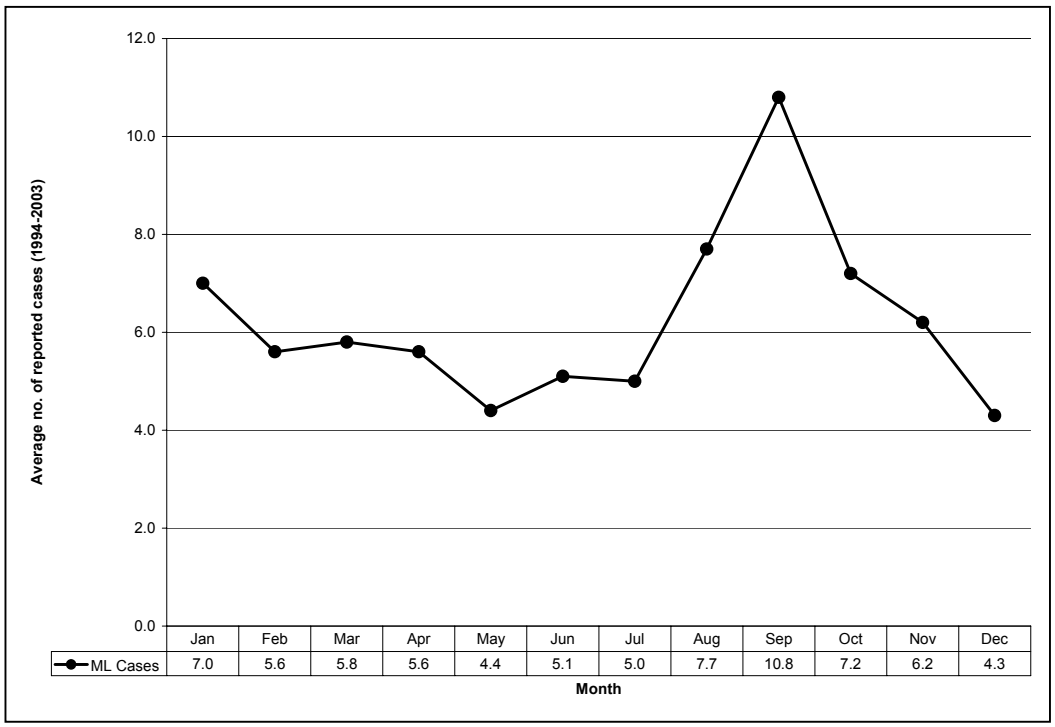
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Female	40	52	43	27	37	44	33	24	27	17
Male	74	50	47	45	41	26	29	28	29	22
Total	119	106	91	73	78	71	62	52	56	39

Figure 1.12
Average Annual Reported Incidence Rate of Giardia Infections by Age Group and Sex, Middlesex-London, 1994-2003



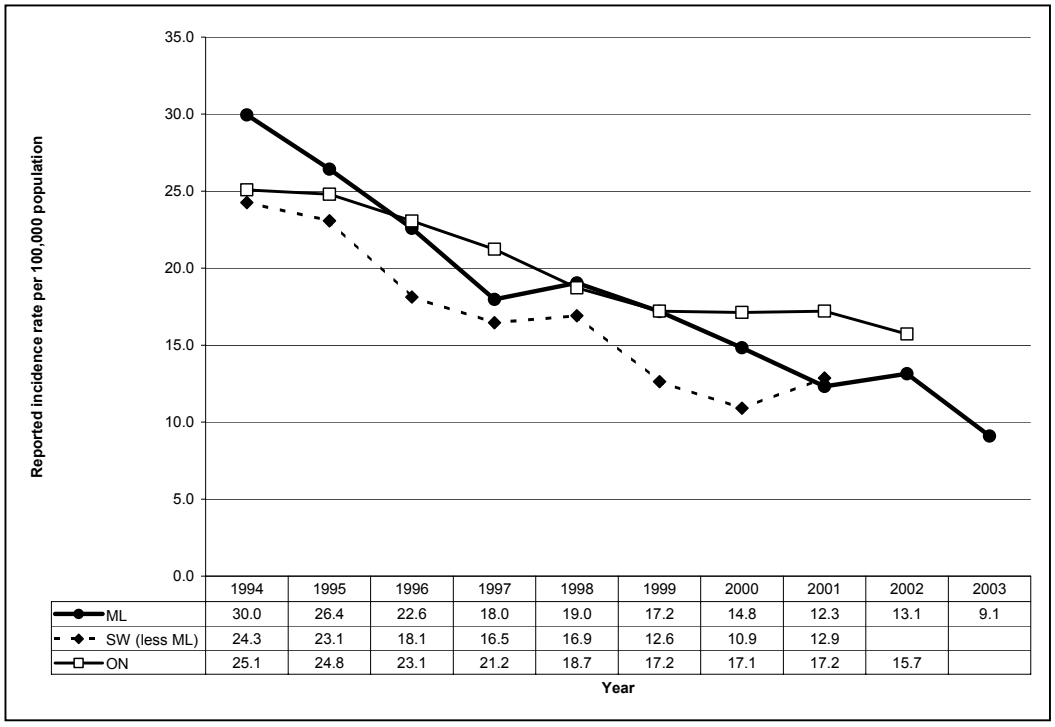
	<1	1-4	5-9	10-19	20-39	40-59	60+
Female	33.9	61.6	24.8	10.7	18.9	11.4	5.7
Male	24.1	90.6	24.6	13.8	18.5	11.6	9.3
Total	28.8	78.3	24.7	12.5	18.9	11.7	7.3

Figure 1.13
Average Number of Reported Giardia Infections by Month, Middlesex-London, 1994-2003



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ML Cases	7.0	5.6	5.8	5.6	4.4	5.1	5.0	7.7	10.8	7.2	6.2	4.3

Figure 1.14
Annual Reported Incidence Rate of Giardia Infections, Middlesex-London, Remainder of Southwestern Ontario, and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ML	30.0	26.4	22.6	18.0	19.0	17.2	14.8	12.3	13.1	9.1
SW (less ML)	24.3	23.1	18.1	16.5	16.9	12.6	10.9	12.9		
ON	25.1	24.8	23.1	21.2	18.7	17.2	17.1	17.2	15.7	

HEPATITIS A

BACKGROUND

Hepatitis A is a virus that infects the liver, resulting in fever, abdominal pain, and yellowing of the skin. Although the infection is most common in childhood, many children are asymptomatic. Hepatitis A is more likely to cause symptomatic illness in adults. Hepatitis A can be fatal in a minority of cases, especially in older adults.

Hepatitis A is spread from person to person by the fecal-oral route. Outbreaks have been traced to contaminated water supplies or, less frequently, through infected food handlers or from person to person in child-care centres. Hepatitis A is endemic in developing nations due to a lack of adequate sanitation. Unlike Hepatitis B or C, those infected with Hepatitis A do not become carriers of the virus.

A vaccine to prevent hepatitis A has been available in Canada since 1994. It is strongly recommended for those at high risk for this infection, including travelers to areas with high rates of hepatitis A, men who have sex with men, and injection drug users. The vaccine has been publicly funded in Ontario for men who have sex with men, injection drug users and people with chronic liver disease since 2003.

TRENDS IN LONDON AND MIDDLESEX COUNTY

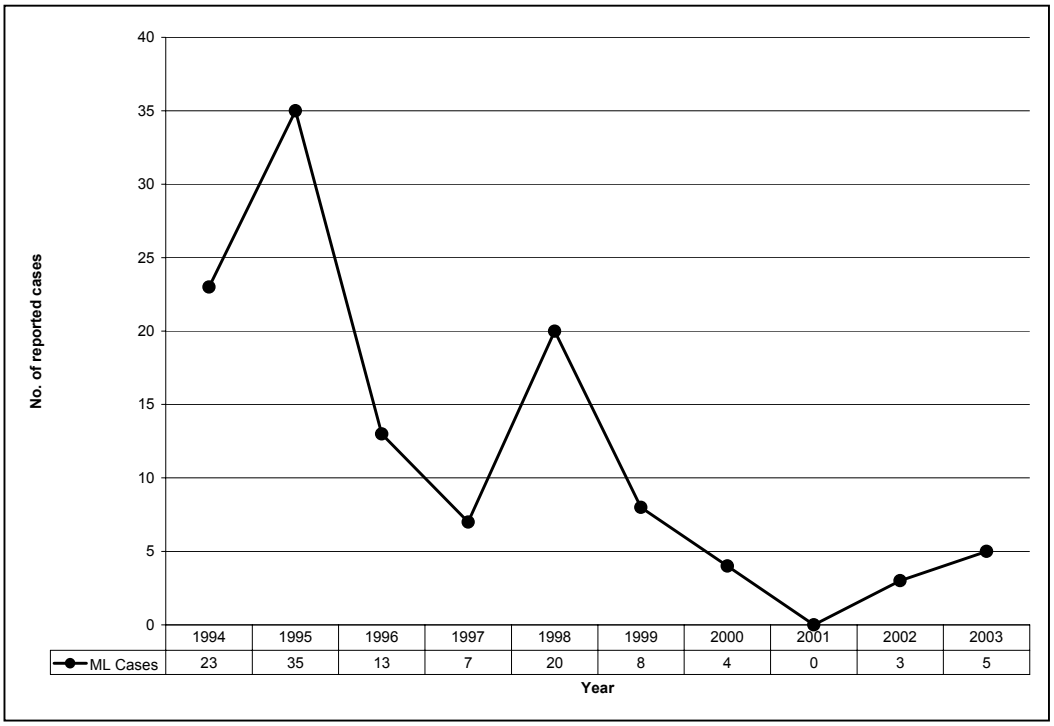
***Historical*:** Figure 1.15 shows that the number of reported hepatitis A infections in Middlesex-London varied between 1994 and 2003. In general, the number of cases reported over the ten-year time period has decreased.

***By age group and sex*:** As shown in Figure 1.16, between 1994 and 2003 the average annual reported incidence rate of hepatitis A infections was greatest among adults between the ages of 20 and 39 years (9.2/100,000), followed closely by children under the age of ten years (8.8/100,000). The reported incidence rate among males was greater than the rate for females. This difference was greatest in the 20 to 39 year old age group and those 40 years of age and over, where the rate for males was nearly twice the rate among females. This difference may be related to transmission among men who have sex with men and injection drug users.

***By month*:** Between 1994 and 2003, reported hepatitis A infections appeared to occur in clusters unrelated to season. Over the ten-year period, the average number of cases reported per month in Middlesex-London was less than two.

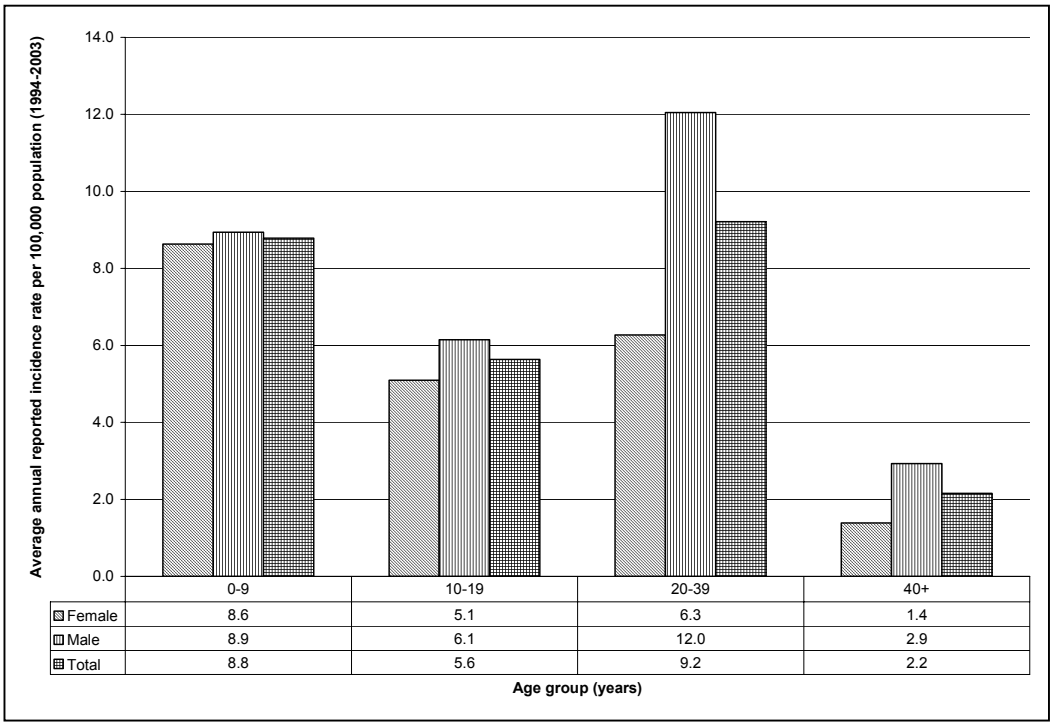
***Regional*:** Figure 1.17 shows that the annual reported incidence rate of hepatitis A infections in Middlesex-London was greater than the rate in the remainder of the Southwest region, with the exceptions of 1996, 1997, and 2001. Across all ten years, the average annual reported incidence rate of hepatitis A infections in Middlesex-London was 2.9/100,000, compared to 1.9/100,000 in the rest of the Southwest region and 3.0/100,000 in Ontario as a whole.

Figure 1.15
Annual Number of Reported Hepatitis A Infections,
Middlesex-London, 1994-2003



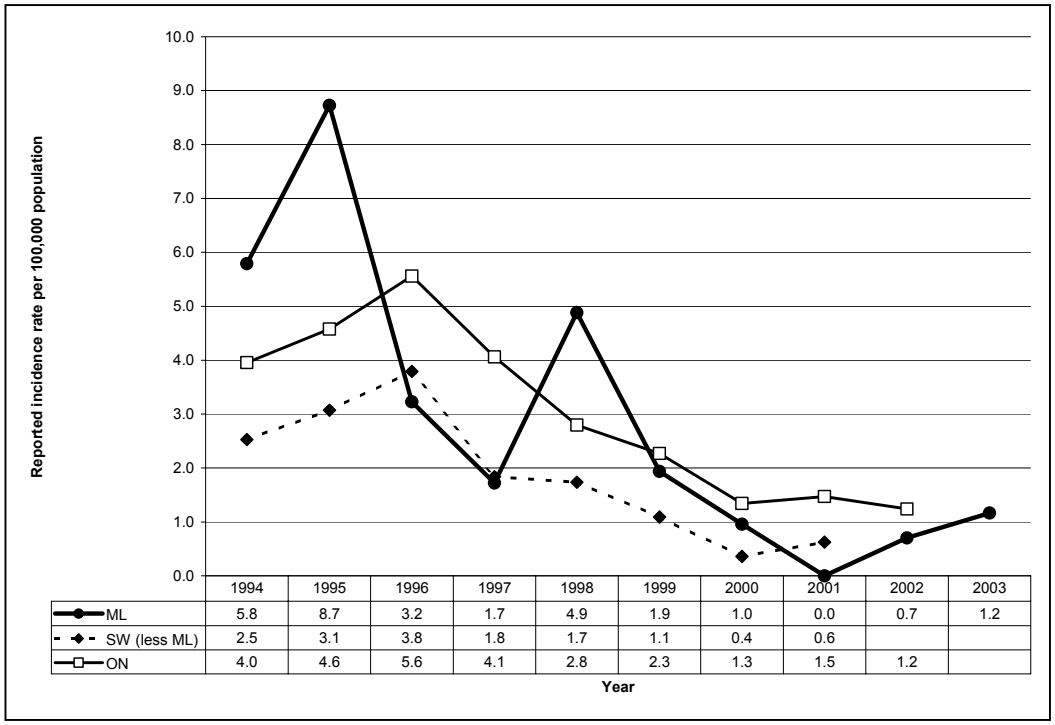
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ML Cases	23	35	13	7	20	8	4	0	3	5

Figure 1.16
Average Annual Reported Incidence Rate of Hepatitis A Infections by Age Group and Sex,
Middlesex-London, 1994-2003



	0-9	10-19	20-39	40+
Female	8.6	5.1	6.3	1.4
Male	8.9	6.1	12.0	2.9
Total	8.8	5.6	9.2	2.2

Figure 1.17
Annual Reported Incidence Rate of Hepatitis A Infections,
Middlesex-London, Remainder of Southwestern Ontario, and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ML	5.8	8.7	3.2	1.7	4.9	1.9	1.0	0.0	0.7	1.2
SW (less ML)	2.5	3.1	3.8	1.8	1.7	1.1	0.4	0.6		
ON	4.0	4.6	5.6	4.1	2.8	2.3	1.3	1.5	1.2	

SALMONELLA

BACKGROUND

Salmonella is a bacterial infection that causes gastrointestinal illness characterized by diarrhea, fever, headache, and abdominal pain that may persist for several days to weeks. Dehydration, infection of the bloodstream, or infections outside the gastrointestinal tract are potential complications that occur infrequently. Salmonella is caused by eating fecally contaminated foods, such as raw or undercooked eggs, meat, shellfish or poultry. The organism can also be acquired from contaminated water, milk, fruits or vegetables, including sprouts. The bacteria can also be passed from one person to another if the hands of an infected person are not properly washed after having a bowel movement. Salmonella bacteria may also be carried by turtles, iguanas, snakes or chickens, and can spread to people who handle infected animals or their feces.

TRENDS IN LONDON AND MIDDLESEX COUNTY

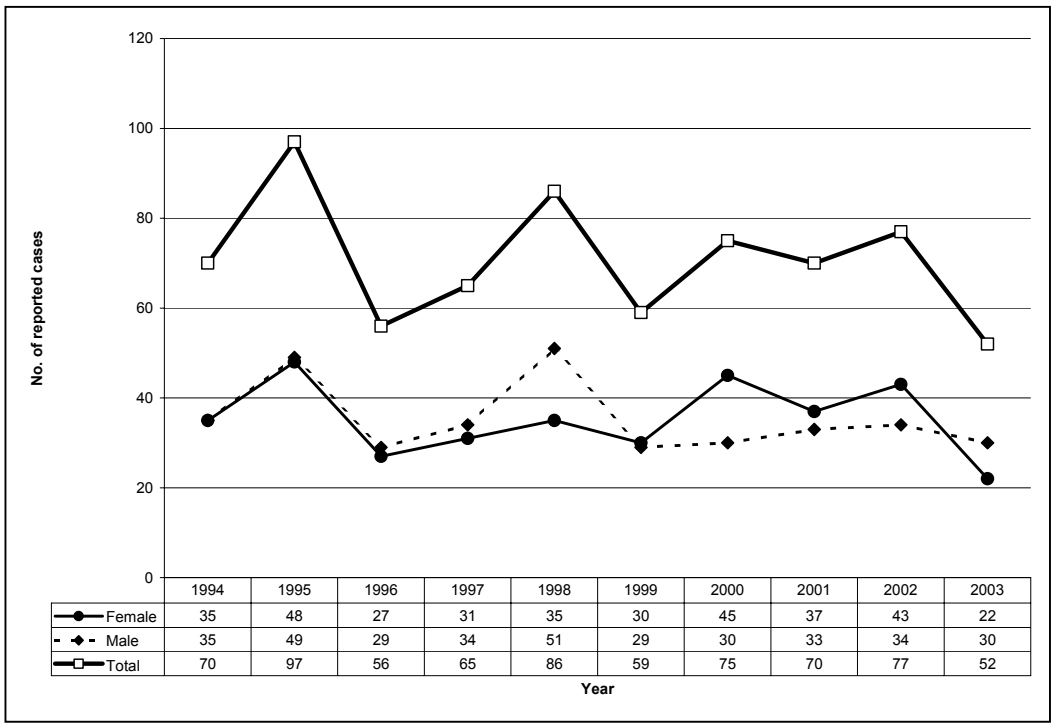
***Historical*:** Figure 1.18 shows that the annual number of reported salmonella infections in Middlesex-London varied between 1994 and 2003. On average, 71 cases were reported each year.

***By age group*:** Figure 1.19 shows that, in general, the average annual reported incidence rate of salmonella infections in Middlesex-London between 1994 and 2003 decreased with increasing age group. The average annual reported incidence rate was highest among children under the age of one year (86.5/100,000). This may reflect a truly higher incidence of infection among this age group, or it might be related to the fact that older individuals who become ill may be less likely to seek medical care and therefore are under-reported.

***By month*:** Figure 1.20 shows that peaks in the average number of reported salmonella infections occurred in March and August. The early spring peak might be related to consumption of contaminated food and water associated with travel during Reading Week and March Break. The peak observed in late summer may be associated with poor food handling practices and insufficient food temperature control that occur during picnics and barbeques.

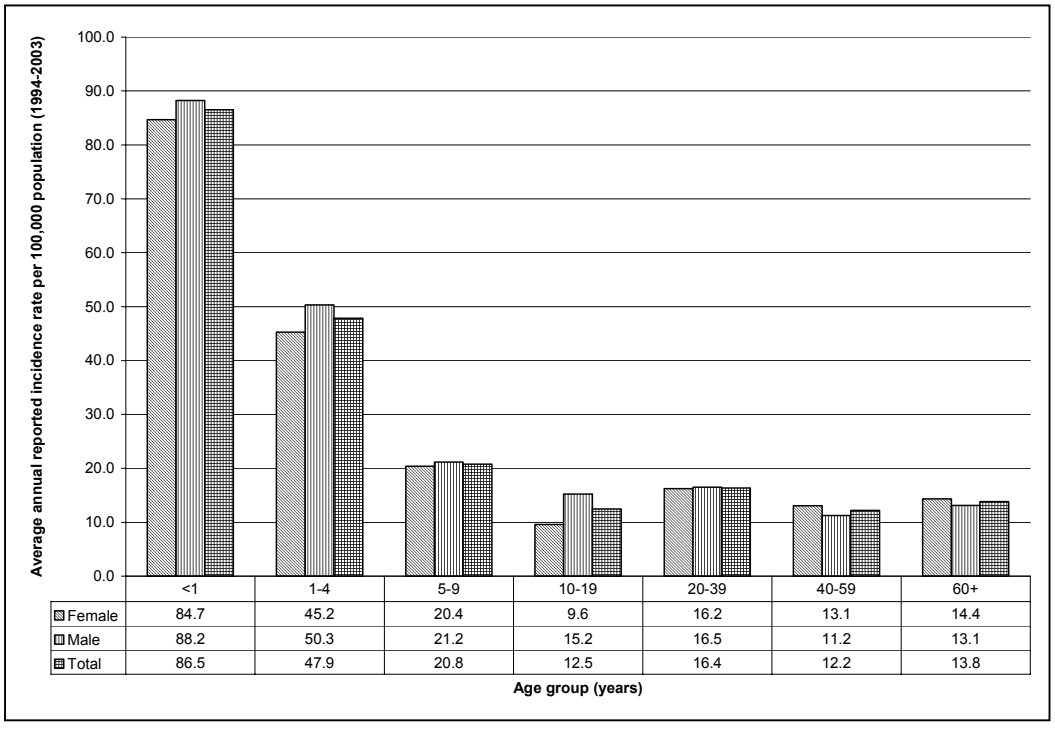
***Regional*:** Between 1994 and 2003, the average annual reported incidence rate of salmonella infections in Middlesex-London was 17.1/100,000 compared to 21.1/100,000 in the rest of Southwestern Ontario and 23.4/100,000 in Ontario. Figure 1.21 shows that the annual reported incidence rate for Middlesex-London was consistently lower than that for the entire province, and was also lower than the reported incidence rate in the remainder of Southwestern Ontario except in 1995 and 1996.

Figure 1.18
Annual Number of Reported Salmonella Infections by Sex, Middlesex-London, 1994-2003



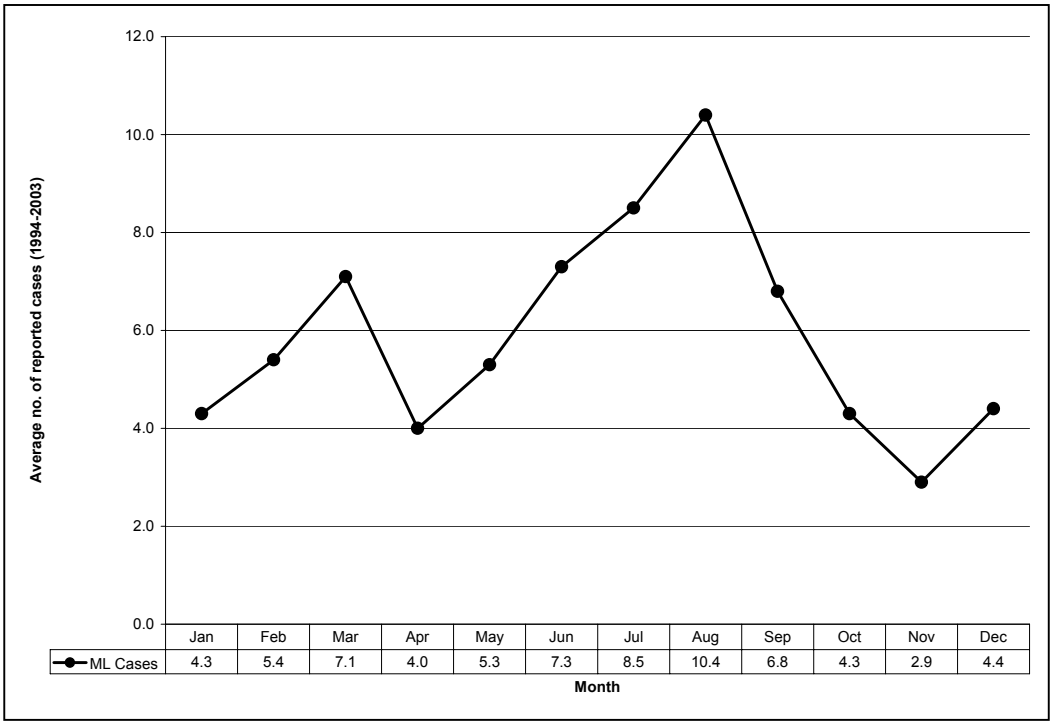
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Female	35	48	27	31	35	30	45	37	43	22
Male	35	49	29	34	51	29	30	33	34	30
Total	70	97	56	65	86	59	75	70	77	52

Figure 1.19
Average Annual Reported Incidence Rate of Salmonella Infections by Age Group and Sex, Middlesex-London, 1994-2003



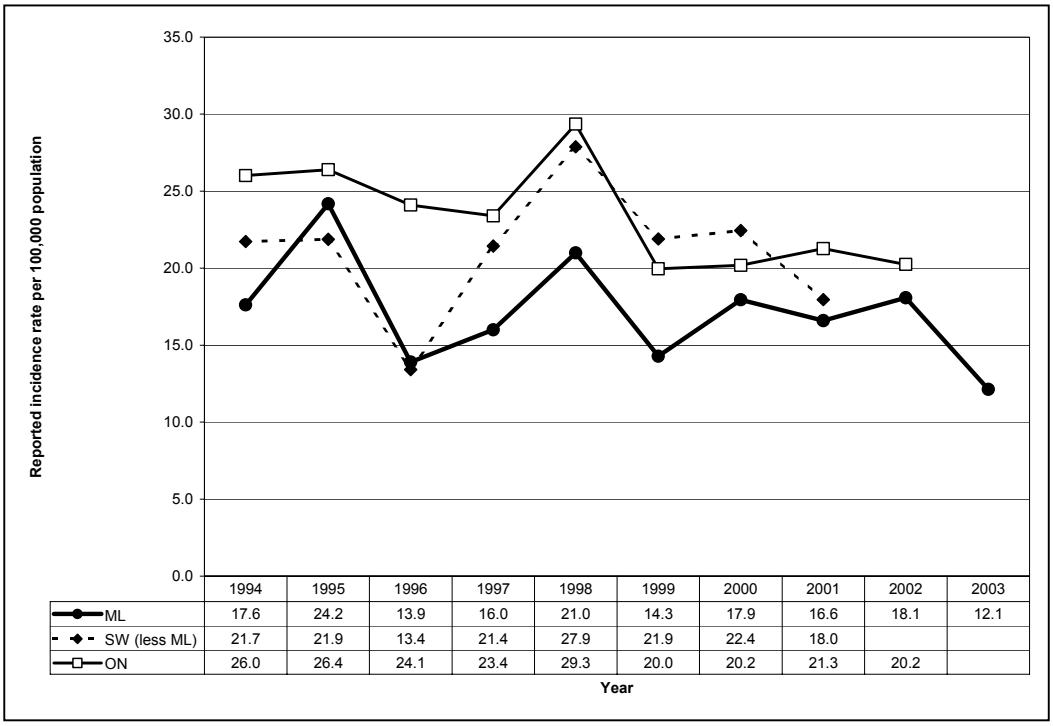
	<1	1-4	5-9	10-19	20-39	40-59	60+
Female	84.7	45.2	20.4	9.6	16.2	13.1	14.4
Male	88.2	50.3	21.2	15.2	16.5	11.2	13.1
Total	86.5	47.9	20.8	12.5	16.4	12.2	13.8

Figure 1.20
Average Number of Reported Salmonella Infections by Month, Middlesex-London, 1994-2003



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ML Cases	4.3	5.4	7.1	4.0	5.3	7.3	8.5	10.4	6.8	4.3	2.9	4.4

Figure 1.21
Annual Reported Incidence Rate of Salmonella Infections, Middlesex-London, Remainder of Southwestern Ontario, and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ML	17.6	24.2	13.9	16.0	21.0	14.3	17.9	16.6	18.1	12.1
SW (less ML)	21.7	21.9	13.4	21.4	27.9	21.9	22.4	18.0		
ON	26.0	26.4	24.1	23.4	29.3	20.0	20.2	21.3	20.2	

SHIGELLA

BACKGROUND

Shigella infection causes symptoms ranging from mild watery diarrhea to severe, bloody diarrhea with serious complications. Shigella is endemic to many developing countries and results in thousands of deaths every year. In North America, the death rate is very low because of effective sanitation practices that prevent infections, and the availability of effective antibiotics to treat infections.

Shigella is transmitted primarily by the fecal-oral route. Transmission can occur directly from person to person or indirectly through eating contaminated food, drinking contaminated water or milk, or by touching contaminated objects. Only a few shigella bacteria need to be ingested in order to acquire this infection. Proper hand washing after handling potentially contaminated objects is essential to ensuring that shigella infections do not spread.

Outbreaks occur more commonly among men who have sex with men, as well as under conditions where close contact occurs and personal hygiene may not be optimal, such as in child-care centres.

TRENDS IN LONDON AND MIDDLESEX COUNTY

***Historical*:** Figure 1.22 shows that the annual number of reported shigella infections in Middlesex-London varied between 1994 and 2003. The average across all ten years was 11 reported cases per year.

***By age group*:** Figure 1.23 shows that between 1994 and 2003, the average annual reported incidence rate of shigella infections was highest among children under the age of ten years (one to four year olds: 4.2/100,000; five to nine year olds: 3.9/100,000) and adults between the ages of 20 and 39 years (4.0/100,000).

***By month*:** Over the ten-year period between 1994 and 2003, the average number of reported shigella infections per month was one case. There was no obvious seasonal variability.

***Regional*:** Between 1994 and 2003, the average annual reported incidence rate of shigella infections in Middlesex-London was 2.6/100,000, which was higher than the rate of 1.8/100,000 in the rest of Southwestern Ontario but lower than the rate of 3.5/100,000 for Ontario as a whole. Figure 1.24 shows that the annual reported incidence rate in Middlesex-London was greater than the rate in Southwestern Ontario in all years except 1995. The peak observed in the annual reported incidence rate in Ontario in 2002 is largely due to an outbreak associated with a commercially prepared, broadly distributed Greek pasta salad that was contaminated with shigella bacteria.

Figure 1.22
Annual Number of Reported Shigella Infections,
Middlesex-London, 1994-2003

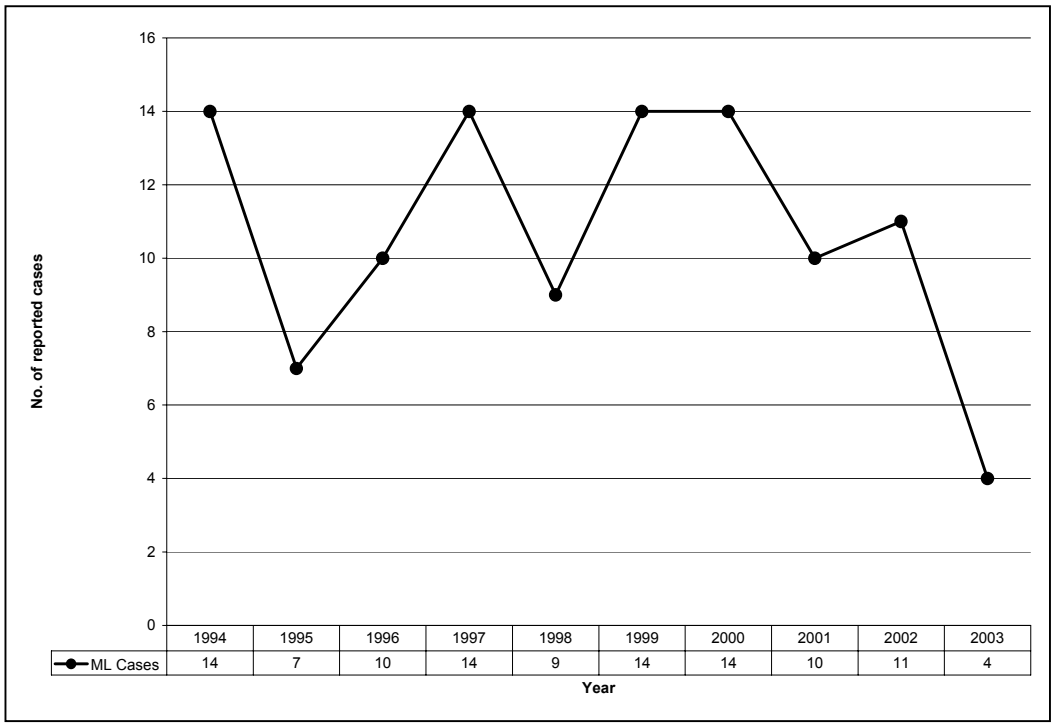


Figure 1.23
Average Annual Reported Incidence Rate of Shigella Infections by Age Group,
Middlesex-London, 1994-2003

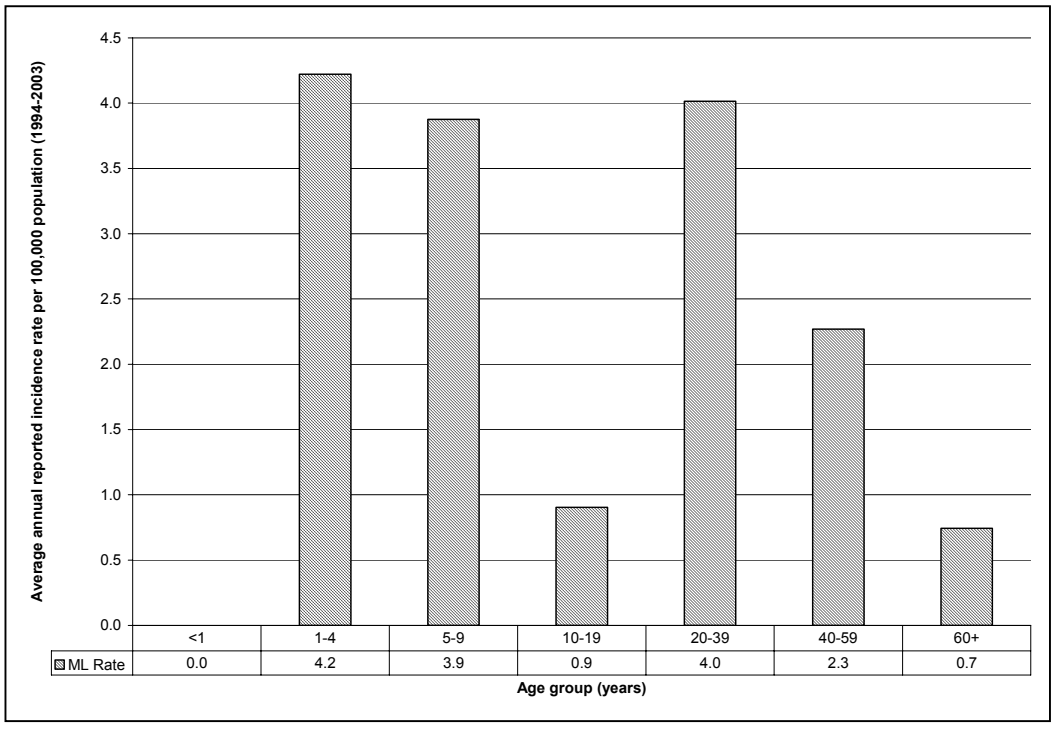
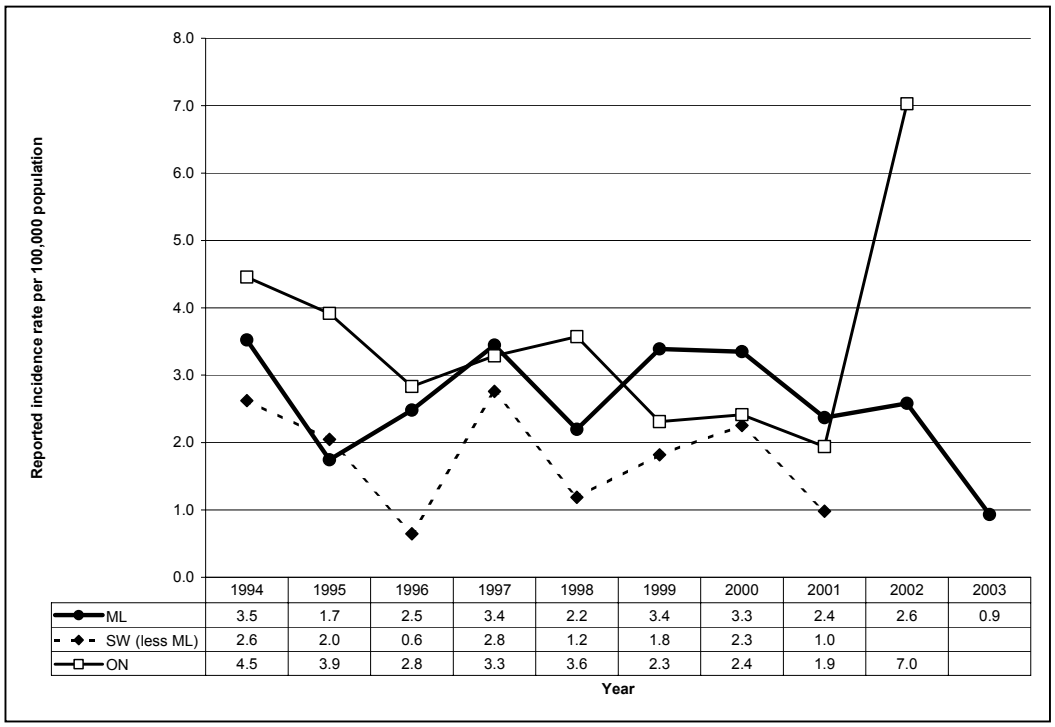


Figure 1.24
Annual Reported Incidence Rate of Shigella Infections,
Middlesex-London, Remainder of Southwestern Ontario, and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ML	3.5	1.7	2.5	3.4	2.2	3.4	3.3	2.4	2.6	0.9
SW (less ML)	2.6	2.0	0.6	2.8	1.2	1.8	2.3	1.0		
ON	4.5	3.9	2.8	3.3	3.6	2.3	2.4	1.9	7.0	

VEROTOXIN-PRODUCING *ESCHERICHIA COLI* (VTEC)

BACKGROUND

Infection with verotoxin-producing *Escherichia coli* (VTEC) is most commonly caused by the *E. coli* O157:H7 bacterium. VTEC can cause mild diarrhea or severe, bloody diarrhea. Complications of VTEC include a syndrome called hemolytic-uremic syndrome (HUS) that can result in damage to the red blood cells and platelets, as well as kidney and neurological dysfunction. This severe complication occurs in about 2% to 7% of people who develop a VTEC infection with bloody diarrhea. HUS can be fatal in 3% to 5% of people who develop this complication. Young children and the elderly are particularly at risk for developing HUS if infected with VTEC.

E. coli O157:H7 is found in the intestines and feces of infected cattle, sheep, goats, horses, dogs, deer and seagulls. Transmission occurs by the fecal-oral route. Illness occurs by ingesting the bacteria directly or through some intermediate source such as undercooked contaminated meat, unpasteurized contaminated milk, or products contaminated with feces such as sprouts or apples picked from the ground. Swimming in contaminated water and drinking water from a contaminated well can also result in infection.

Ground beef is a commonly reported source of VTEC because when meat is ground, bacteria on the outside of meat cuts can be spread throughout the ground beef. If the hamburger is not thoroughly cooked, the VTEC may survive and cause infection. Only a small amount of the bacteria is required to make a person sick. Since the bacteria can also be spread from person to person, it is a concern in institutional settings like child-care centres and long-term care facilities.

TRENDS IN LONDON AND MIDDLESEX COUNTY

***Historical*:** Figure 1.25 shows that the number of reported VTEC infections varied between 1994 and 2003, with an average of 14 VTEC cases reported each year. In 1999 there was an outbreak of *E. coli* O157:H7 associated with an agricultural pavilion at a local fair. There were 20 cases that met the strict case definition, and in total, 159 individuals in Middlesex-London and the surrounding area reported becoming ill.

***By age group and sex*:** Between 1994 and 2003, the average annual reported incidence rate of VTEC infections was greatest among children aged one to four years (10.3/100,000). Figure 1.26 shows that in general, the average annual reported incidence rate decreased as age group increased, although a slightly elevated incidence rate occurred among those 60 years of age and over. The reported incidence rate among females was higher than in males in all age groups except those between the ages of five and nine years.

***By month*:** As shown in Figure 1.27, the average number of reported VTEC infections tended to be greatest over the summer months, peaking in July. Similar to other food- or water-borne illnesses, this peak may be related to poor food handling and inadequate food temperature control in the summer. Regardless of season, though, the monthly average between 1994 and 2003 was three or fewer cases.

***Regional*:** Figure 1.28a compares the annual reported incidence rate of VTEC infections in Middlesex-London to that in the remainder of the Southwest region and Ontario as a whole. The sharp increase observed in the Southwest region in 2000 corresponds to a water-borne outbreak of *E. coli* O157:H7 and campylobacter in Walkerton, Ontario. The reported incidence rate for 2000 has been removed from Figure 1.28b to better illustrate comparisons in other years. Figure 1.28b shows that with the exception of 1999, the reported incidence rate of VTEC infections in Middlesex-London was lower than the reported incidence rate in the rest of Southwestern Ontario, which has a more rural geographic profile. Between 1994 and 2003, the average annual reported incidence rate of VTEC infections in Middlesex-London was 3.4/100,000, compared to 5.0/100,000 in Ontario.

Figure 1.25
Annual Number of Reported VTEC Infections,
Middlesex-London, 1994-2003

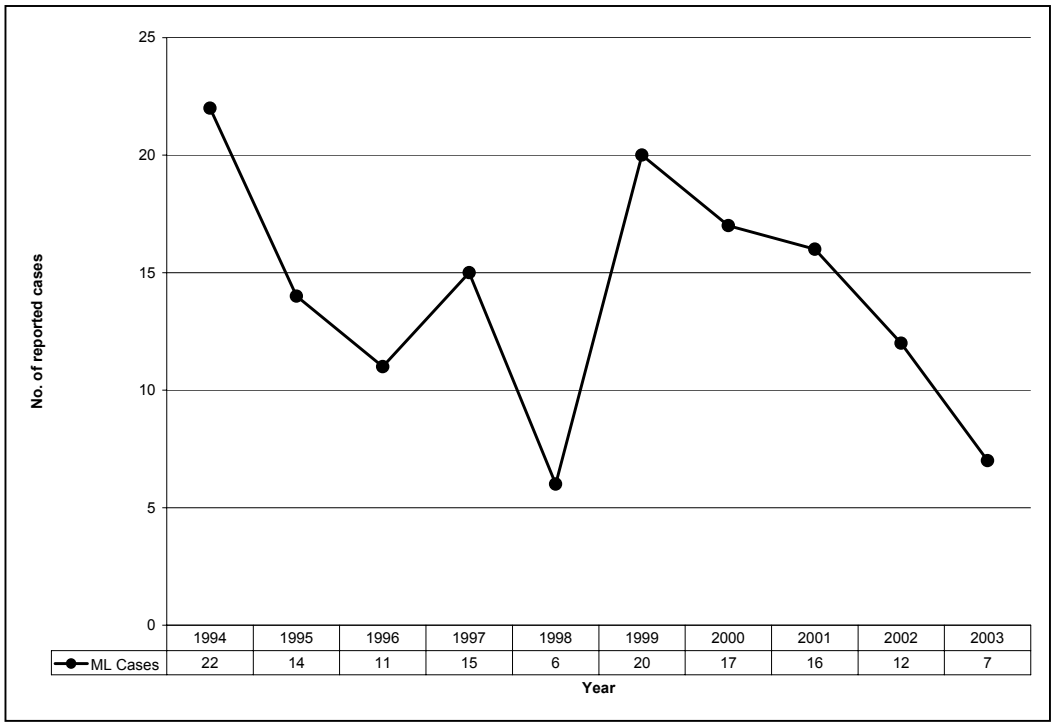
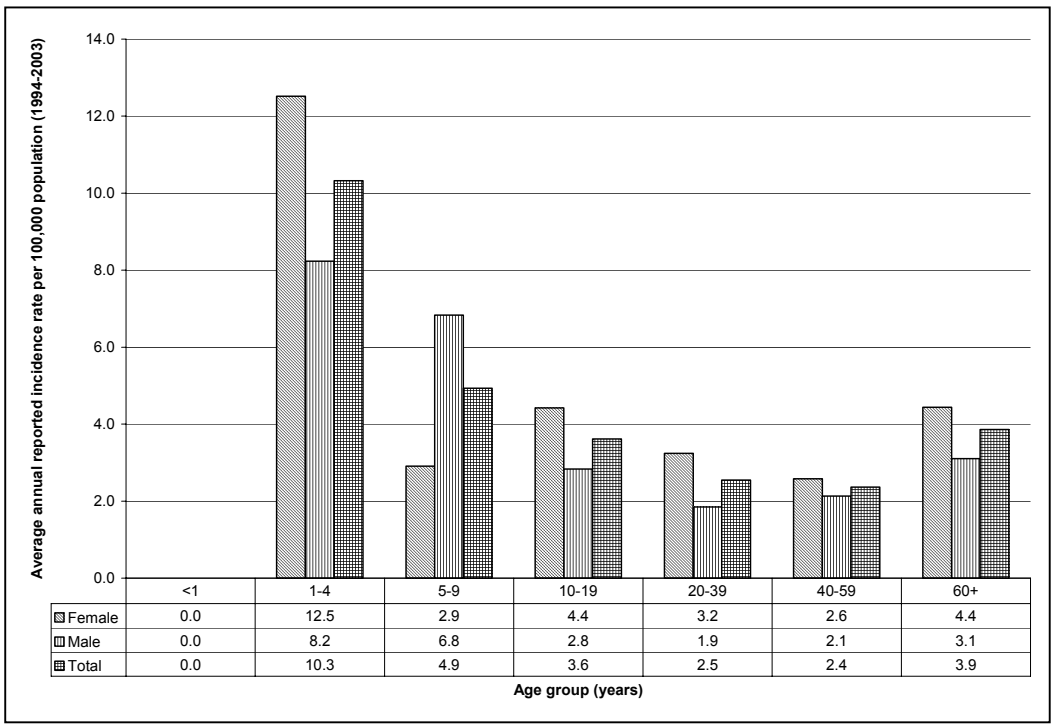
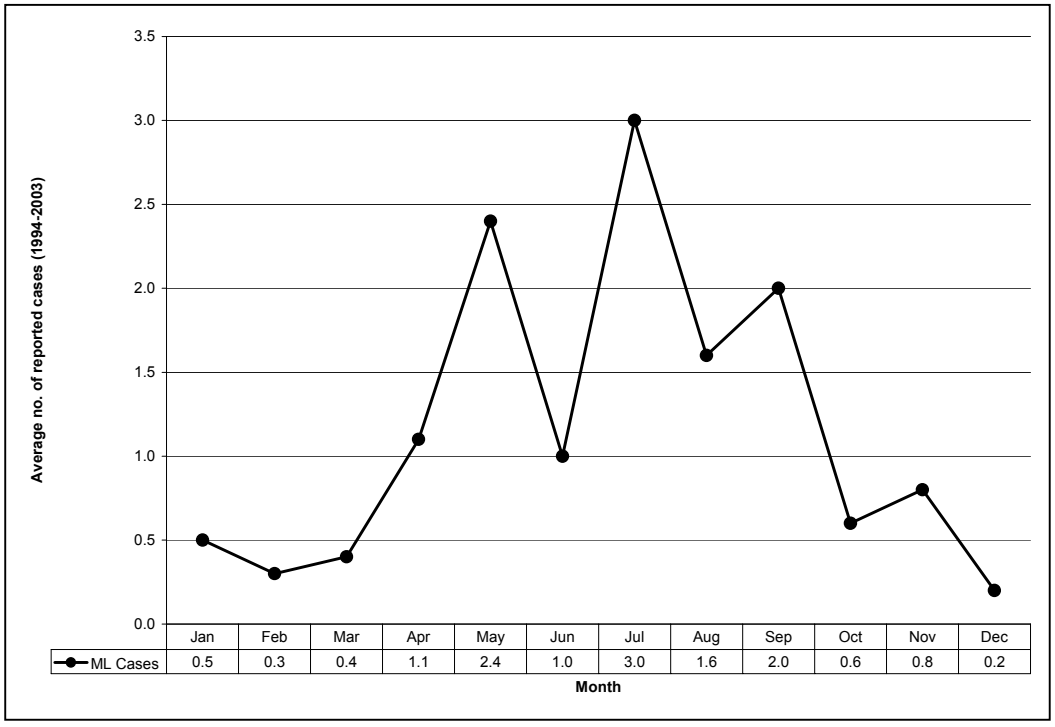


Figure 1.26
Average Annual Reported Incidence Rate of VTEC Infections by Age Group and Sex, Middlesex-London, 1994-2003



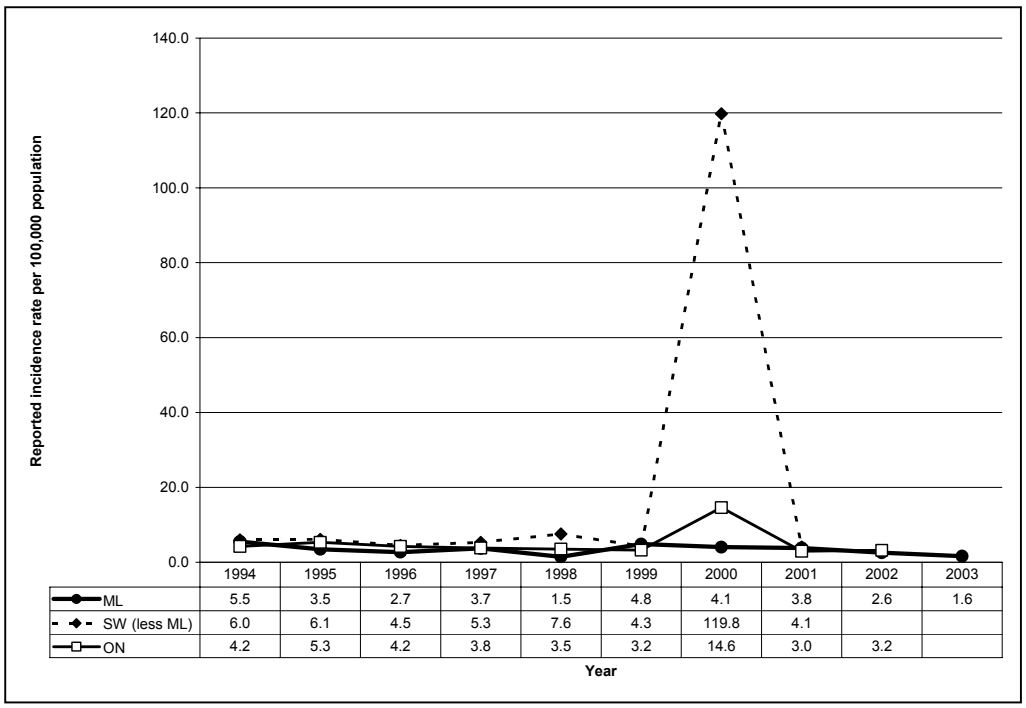
	<1	1-4	5-9	10-19	20-39	40-59	60+
Female	0.0	12.5	2.9	4.4	3.2	2.6	4.4
Male	0.0	8.2	6.8	2.8	1.9	2.1	3.1
Total	0.0	10.3	4.9	3.6	2.5	2.4	3.9

Figure 1.27
Average Number of Reported VTEC Infections by Month, Middlesex-London, 1994-2003



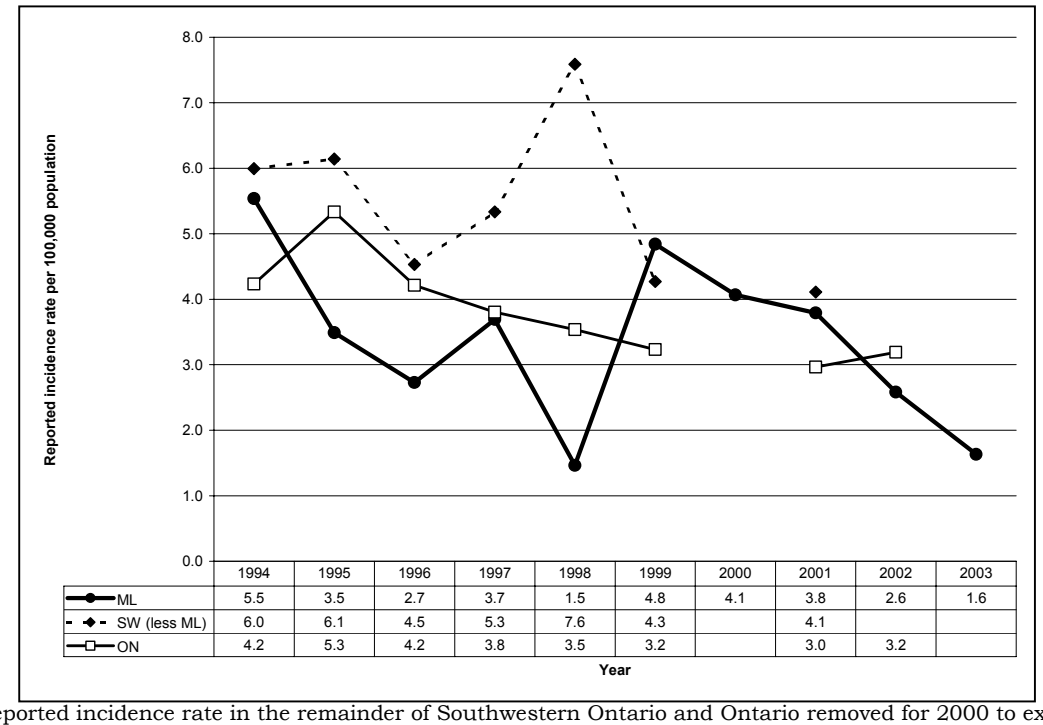
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ML Cases	0.5	0.3	0.4	1.1	2.4	1.0	3.0	1.6	2.0	0.6	0.8	0.2

Figure 1.28a
Annual Reported Incidence Rate of VTEC Infections,
Middlesex-London, Remainder of Southwestern Ontario, and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ML	5.5	3.5	2.7	3.7	1.5	4.8	4.1	3.8	2.6	1.6
SW (less ML)	6.0	6.1	4.5	5.3	7.6	4.3	119.8	4.1		
ON	4.2	5.3	4.2	3.8	3.5	3.2	14.6	3.0	3.2	

Figure 1.28b
Annual Reported Incidence Rate of VTEC Infections, Middlesex-London,
1994-2003; Remainder of Southwestern Ontario and Ontario, 1994-1999 and 2001-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ML	5.5	3.5	2.7	3.7	1.5	4.8	4.1	3.8	2.6	1.6
SW (less ML)	6.0	6.1	4.5	5.3	7.6	4.3		4.1		
ON	4.2	5.3	4.2	3.8	3.5	3.2		3.0	3.2	

Note: Reported incidence rate in the remainder of Southwestern Ontario and Ontario removed for 2000 to exclude the increased reported incidence rate resulting from the Walkerton outbreak, better illustrating the trend over the other remaining years.

YERSINIA

BACKGROUND

Yersinia infection is caused by two different strains of bacteria. Infection with *Yersinia enterocolitica* usually leads to fever and bloody diarrhea in young children and can cause pseudoappendicitis syndrome in older children and young adults. Infection with *Yersinia pseudotuberculosis* leads to fever, rash and abdominal symptoms. Ingesting contaminated meat (particularly pork), contaminated water, or contaminated unpasteurized milk can result in yersinia infection. Infected dogs and cats can also spread this bacterium. Rarely, person-to-person contact can spread yersinia.

TRENDS IN LONDON AND MIDDLESEX COUNTY

***Historical*:** Figure 1.29 shows that while the annual number of reported yersinia cases in Middlesex-London varied between 1994 and 2003, there has been a general decline in the total number reported since 1996. On average, eight yersinia infections were reported each year between 1994 and 2003.

***By age group*:** Figure 1.30 shows that the average annual reported incidence rate of yersinia infections was highest among those under the age of one year (12.4/100,000) and those between the ages of one and four years (9.4/100,000). It is possible that children under the age of five years are exposed more often or are more susceptible, and truly experience infection more frequently than other age groups. However, it is also possible that yersinia symptoms in this age group may be more likely to be medically treated, and therefore reported, relative to older age groups.

***By month*:** There was no obvious seasonal variation in the average number of reported yersinia cases per month between 1994 and 2003. Regardless of the month, the average number of reported yersinia infections per month was one or less.

***Regional*:** Between 1994 and 2003, the average annual reported incidence rate of yersinia infections in Middlesex-London was 1.8/100,000, which was comparable to the rate in the rest of Southwestern Ontario (2.0/100,000) and slightly lower than the rate of 3.6/100,000 in Ontario as a whole. Figure 1.31 shows that regardless of the year, the annual reported incidence rate in Middlesex-London was lower than the reported incidence rate in Ontario as a whole.

Figure 1.29
Annual Number of Reported Yersinia Infections,
Middlesex-London, 1994-2003

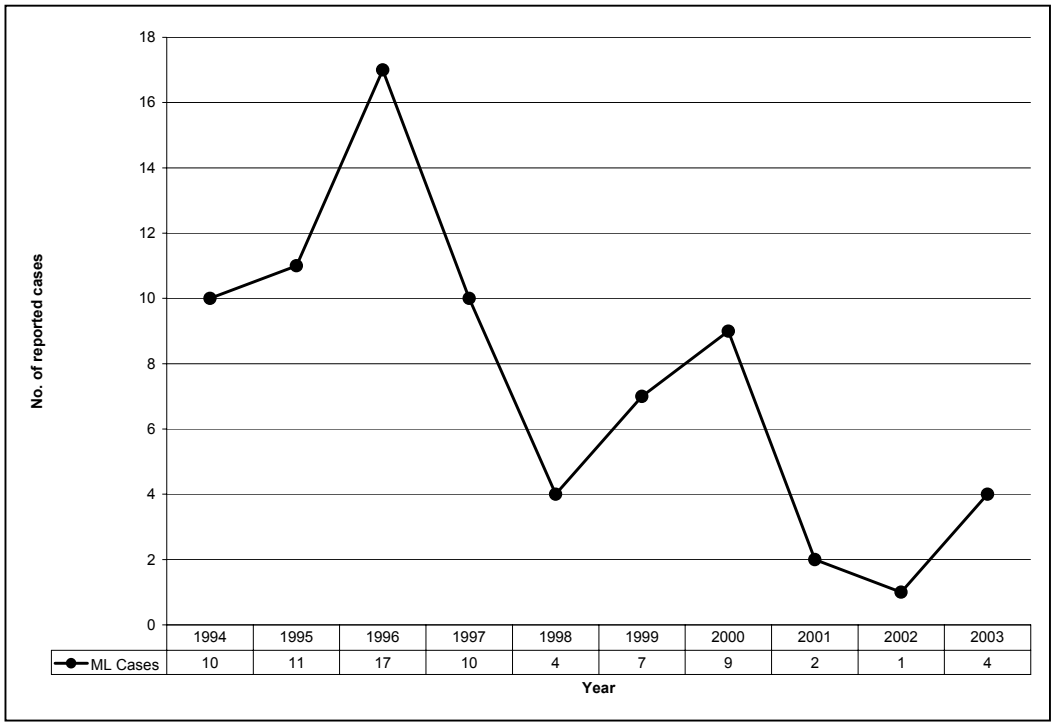


Figure 1.30
Average Annual Reported Incidence Rate of Yersinia Infections by Age Group,
Middlesex-London, 1994-2003

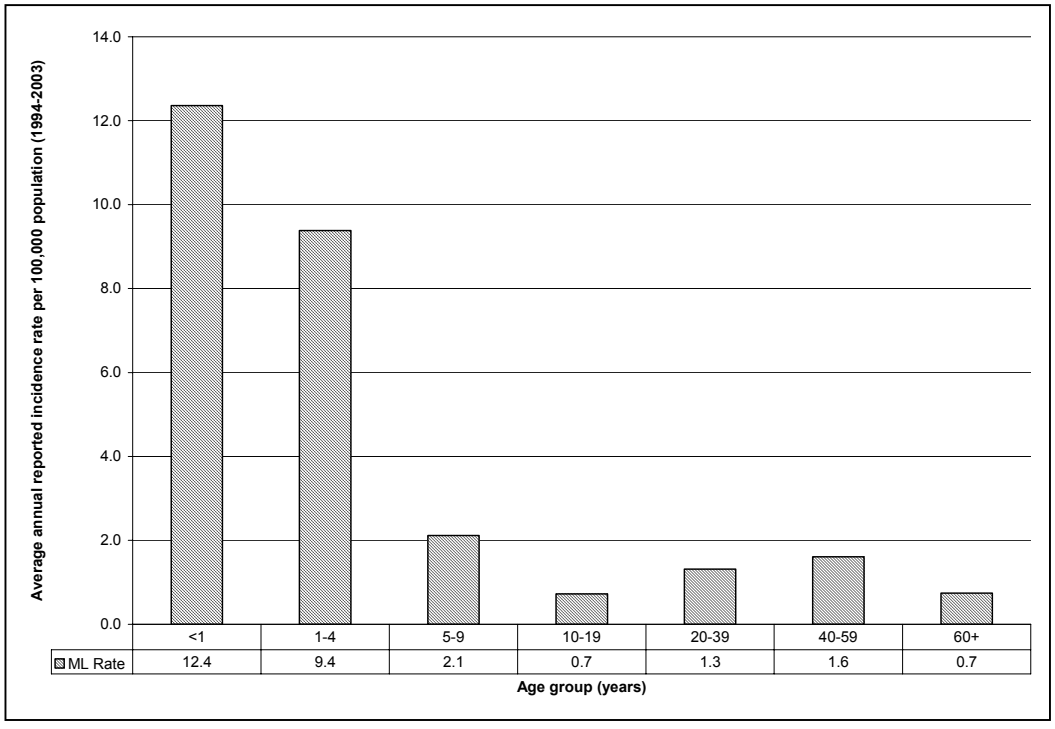
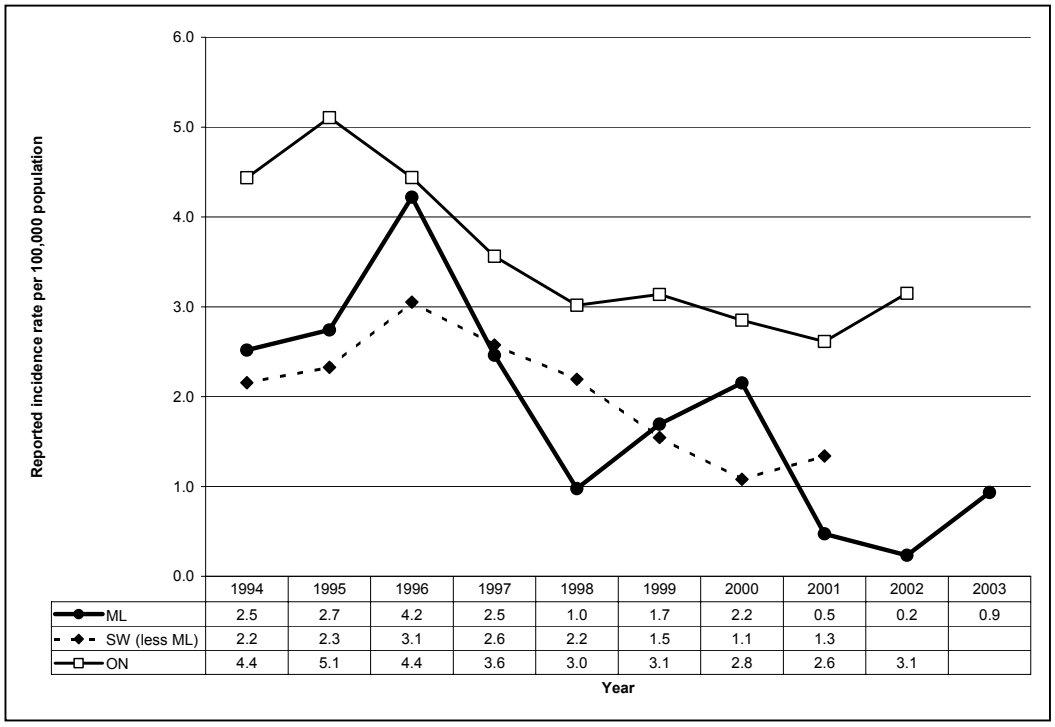


Figure 1.31
Annual Reported Incidence Rate of Yersinia Infections,
Middlesex-London, Remainder of Southwestern Ontario, and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ML	2.5	2.7	4.2	2.5	1.0	1.7	2.2	0.5	0.2	0.9
SW (less ML)	2.2	2.3	3.1	2.6	2.2	1.5	1.1	1.3		
ON	4.4	5.1	4.4	3.6	3.0	3.1	2.8	2.6	3.1	

SEXUALLY TRANSMITTED INFECTIONS (STIs)

ACQUIRED IMMUNE DEFICIENCY SYNDROME (AIDS) & HUMAN IMMUNODEFICIENCY VIRUS (HIV)

BACKGROUND

Acquired Immune Deficiency Syndrome (AIDS) is a severe, life-threatening illness that results from infection with Human Immunodeficiency Virus (HIV). A person positive for HIV does not necessarily have AIDS, however, HIV is a necessary factor for the development of AIDS. HIV impairs the body's ability to fight off infection, resulting in unusual infections and cancers. When these diseases occur in a person with HIV, that person is said to have AIDS. AIDS is a fatal disease. While there is no cure, newer medications are slowing the progression of HIV to AIDS.

HIV is spread from an infected individual to another person through blood, semen, vaginal fluid, and breast milk. Spread of the virus can occur through unprotected sexual contact, including vaginal, anal, and oral intercourse, and by sharing sex toys. Sharing contaminated needles or other drug-related equipment, and contaminated needles used for tattooing, piercing and acupuncture can also spread HIV. An infected mother can also pass HIV to her baby through pregnancy, birth and breast milk.

The time between HIV infection and a diagnosis of AIDS varies, from less than a year to 15 years or more. Many factors, including the person's health status and behaviours, can influence the time to development of AIDS. Effective anti-HIV treatments slow the rate at which the immune system is weakened. Without anti-HIV treatment it takes, on average, ten years for HIV-infected adults to develop AIDS. As with other diseases, early detection with an HIV blood test offers more options for treatment and preventive health care. Even with anti-HIV and other treatments, quality of life for those infected with HIV/AIDS may be affected. Drug therapies may have undesired side effects, and their long-term use may cause heart disease, organ damage, diabetes and other health problems.

In spite of efforts to prevent the spread of the disease, the number of people in Canada living with HIV/AIDS is increasing. It was estimated that at the end of 2002 there were approximately 56,000 Canadians with HIV or AIDS, and that up to one-third of these people were unaware that they were infected. In the 1980s when HIV and AIDS were first recognized, men who have sex with men were the primary risk group for infection. While this group continues to account for the greatest proportion of new infections, up to one-third of new cases are attributable to injection drug use and nearly one-quarter are associated with high-risk heterosexual exposures.

TRENDS IN LONDON AND MIDDLESEX COUNTY

***Historical*:** As shown in Figures 2.1 and 2.2, the number of reported AIDS and HIV infections has decreased since the mid-1990s. Between 1994 and 1997, when case counts were highest, an average of 15 new AIDS cases and 31 new HIV infections were reported in Middlesex-London each year. From 1998 onward the pattern of reported cases of AIDS and HIV changed somewhat, and between 1998 and 2003 there was an annual average of two reported AIDS cases and 17 reported HIV infections in Middlesex-London.

***By age group and sex*:** Figure 2.2 illustrates that regardless of year, the reported number of males with new HIV infections consistently outnumbered the number of females. On average, between 1994 and 2003 there were four new HIV infections reported among males for every one female HIV infection reported.

Figure 2.3 shows that between 1994 and 2003, the average annual reported incidence rate of HIV infections was highest among those in their early thirties (17.6/100,000), followed by those aged 35 to 39 years (14.0/100,000) and those 25 to 29 years of age (12.1/100,000). It is important to note that this represents the age at which cases first tested positive for HIV. There is usually a lag time between when an individual becomes infected with HIV and when he/she is tested and determined to be positive. Cases may have been infected when they were several years younger.

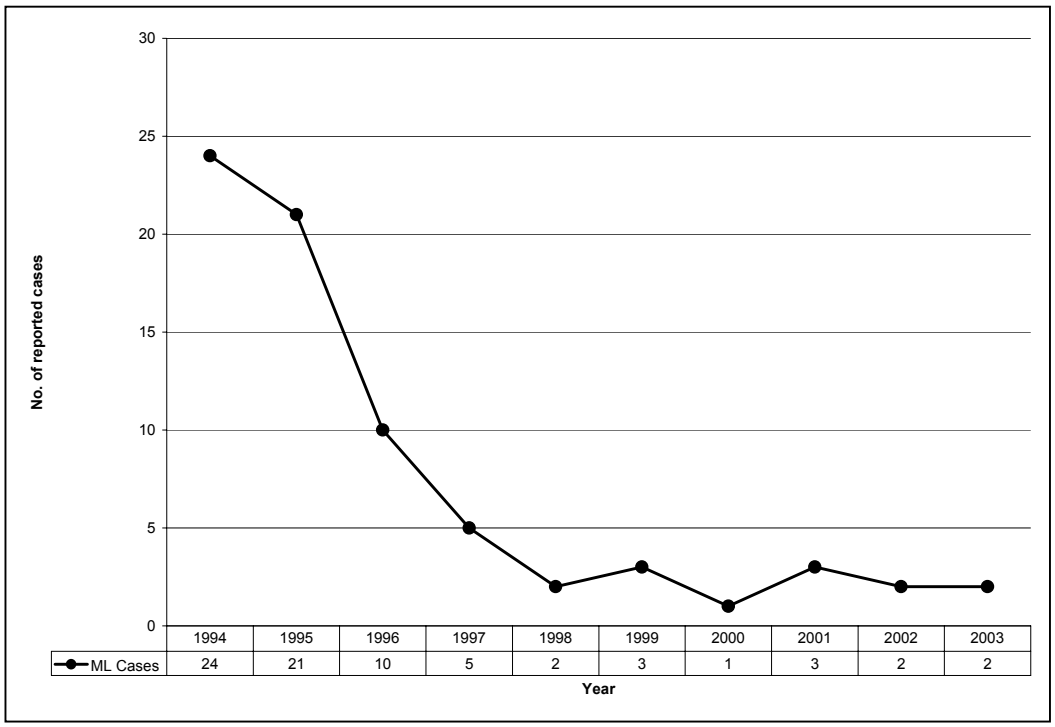
Due to the low number of cases, comparisons of AIDS cases by age group and sex were not possible.

***Reported risk factors*:** Figure 2.4 shows that in Middlesex-London, over three-quarters (76.9%) of females with HIV or AIDS reported having sex with an opposite-sex partner as a risk factor for their infection. One-quarter (26.9%) of female cases reported having a partner with HIV or AIDS. By comparison, Figure 2.5 shows that the most commonly reported risk factor among males with HIV or AIDS was sex with a same-sex partner (72.0%), followed by having an opposite-sex partner (26.8%).

***Regional*:** Due to the low number of AIDS cases reported in Middlesex-London since 1997, annual reported incidence rates cannot be generated for comparison to the rest of the Southwest region and Ontario. However, Figure 2.6 shows that since 1994, the reported incidence rate of AIDS infections has decreased in both Southwestern Ontario (including Middlesex-London) and the province as a whole.

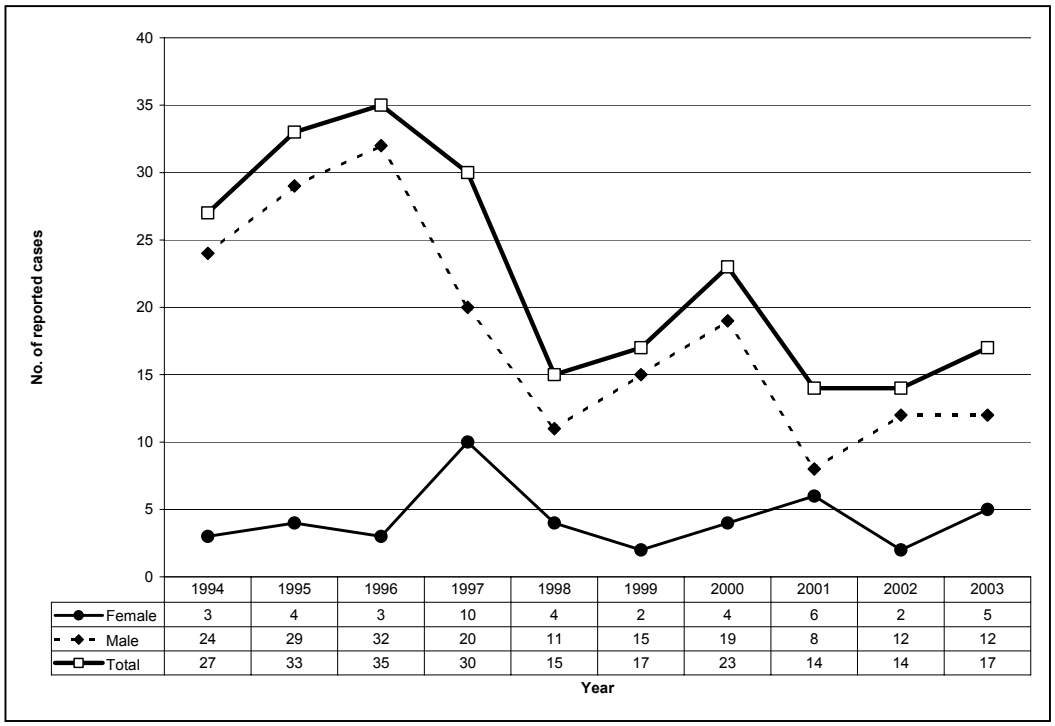
HIV infection information is not available for Southwestern Ontario. However, annual incidence rates of reported HIV infections for Middlesex-London and Ontario are shown in Figure 2.7. In general, the reported HIV incidence rate in Middlesex-London has declined since 1996.

Figure 2.1
Annual Number of Reported AIDS Infections,
Middlesex-London, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ML Cases	24	21	10	5	2	3	1	3	2	2

Figure 2.2
Annual Number of Reported HIV Infections by Sex,
Middlesex-London, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Female	3	4	3	10	4	2	4	6	2	5
Male	24	29	32	20	11	15	19	8	12	12
Total	27	33	35	30	15	17	23	14	14	17

Figure 2.3
Average Annual Reported Incidence Rate of HIV Infections by Age Group, Middlesex-London, 1994-2003

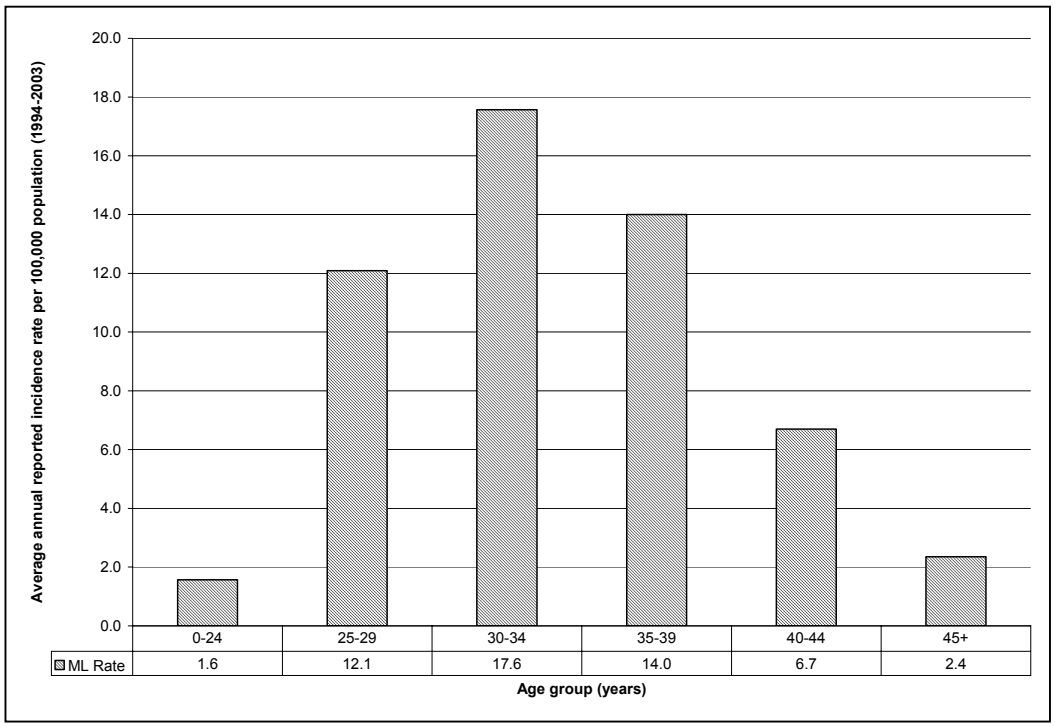
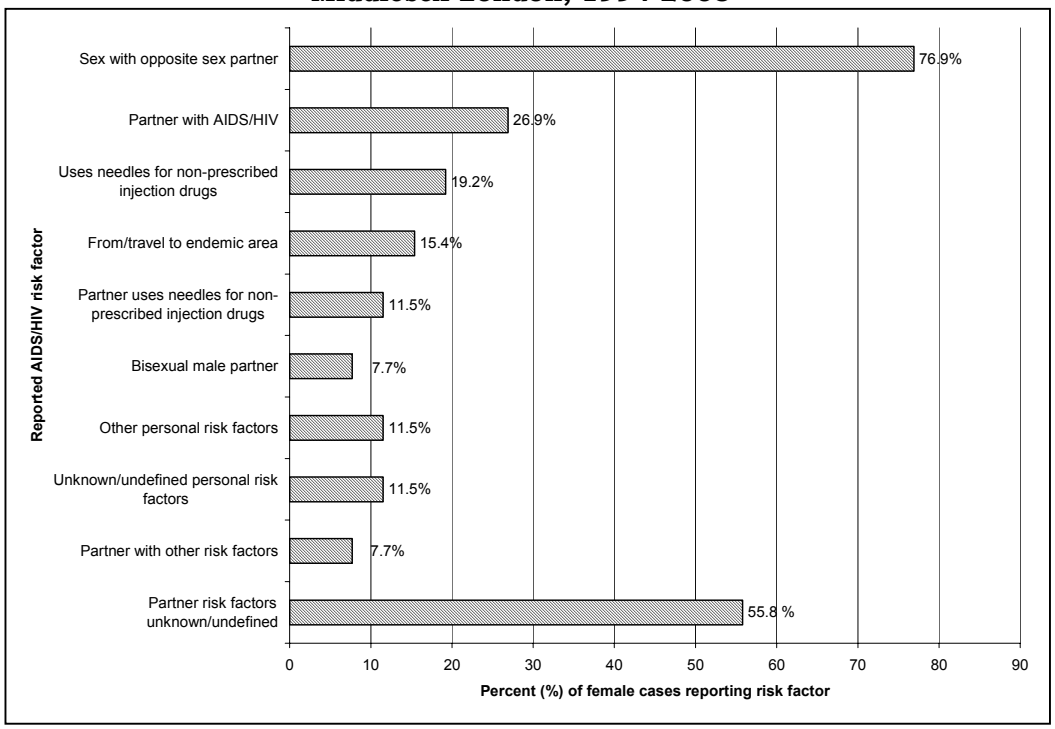
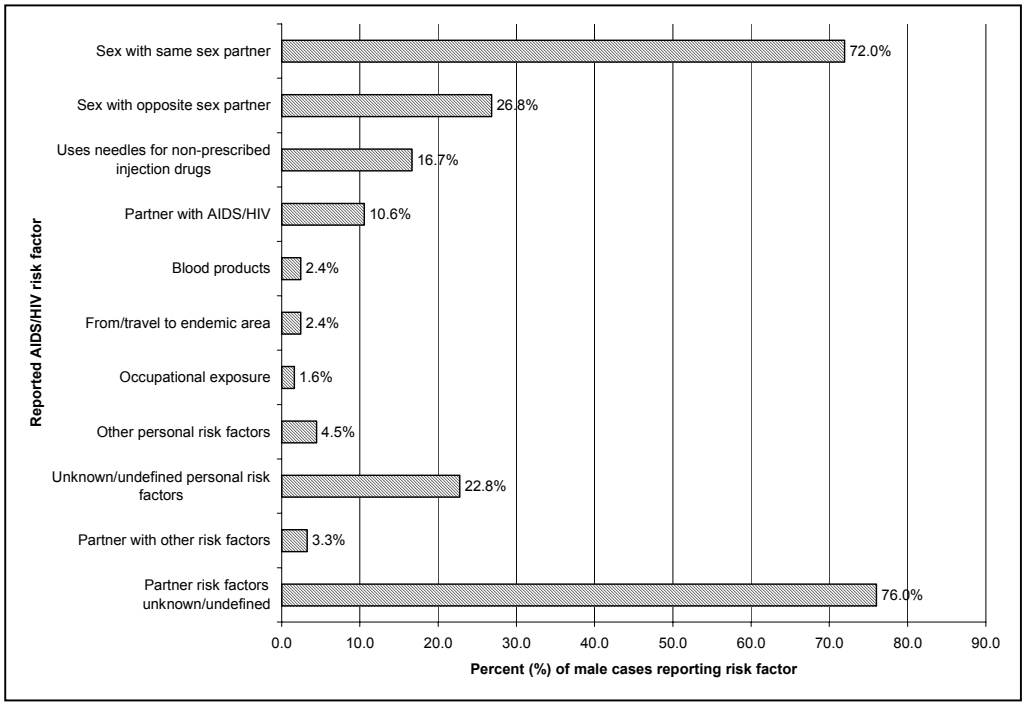


Figure 2.4
Reported Risk Factors for HIV and AIDS Infections Among Females, Middlesex-London, 1994-2003



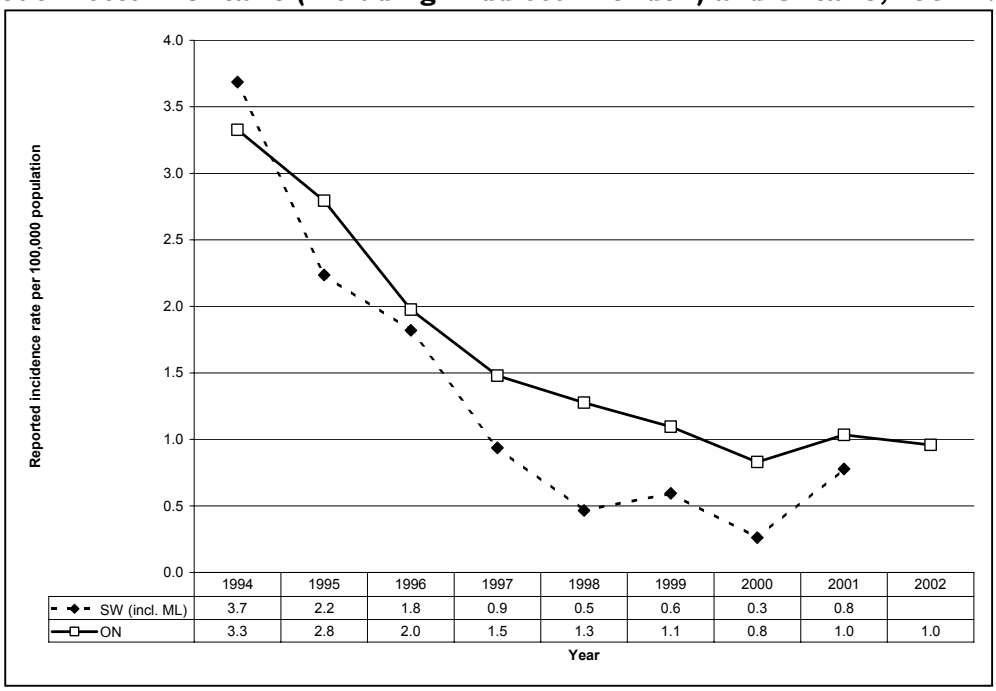
Note: More than one risk factor may be reported by each case. The denominator used to calculate percentage is the number of female HIV and AIDS cases. Accordingly, the proportions shown do not sum to 100%.

Figure 2.5
Reported Risk Factors for HIV and AIDS Infections Among Males, Middlesex-London, 1994-2003



Note: More than one risk factor may be reported by each case. The denominator used to calculate percentage is the number of male HIV and AIDS cases. Accordingly, the proportions shown do not sum to 100%.

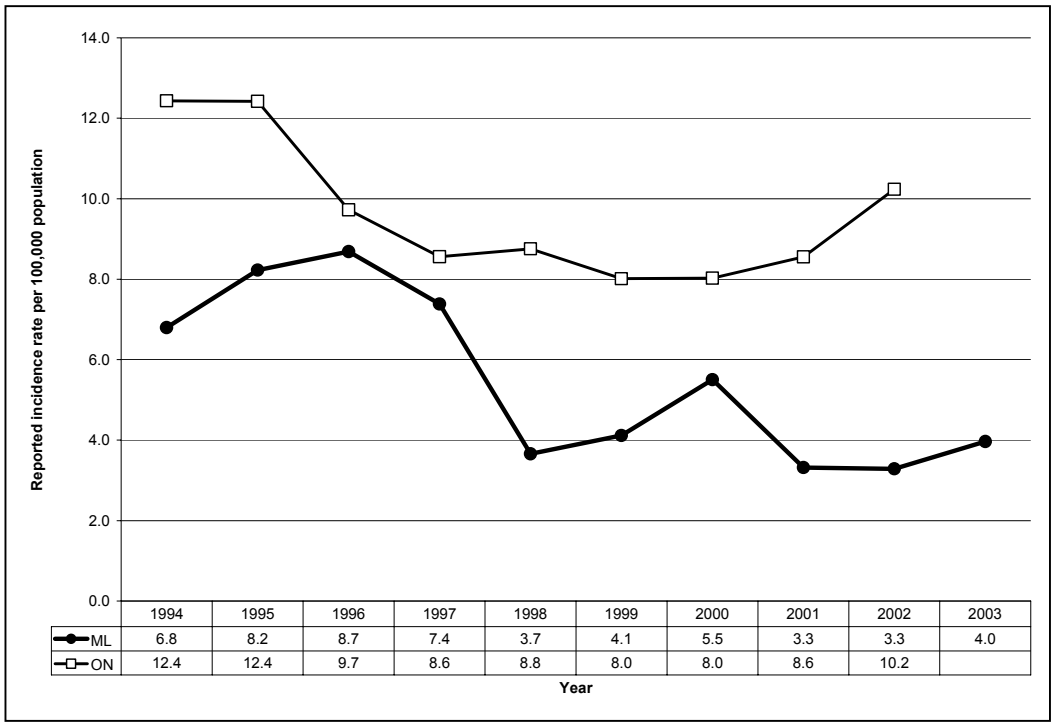
Figure 2.6
Annual Reported Incidence Rate of AIDS Infections, Southwestern Ontario (including Middlesex-London) and Ontario, 1994-2002



	1994	1995	1996	1997	1998	1999	2000	2001	2002
SW (incl. ML)	3.7	2.2	1.8	0.9	0.5	0.6	0.3	0.8	
ON	3.3	2.8	2.0	1.5	1.3	1.1	0.8	1.0	1.0

Note: Due to the low number of cases, the annual reported incidence rate of AIDS infections in Middlesex-London could not be calculated.

Figure 2.7
Annual Reported Incidence Rate of HIV Infections,
Middlesex-London and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ML	6.8	8.2	8.7	7.4	3.7	4.1	5.5	3.3	3.3	4.0
ON	12.4	12.4	9.7	8.6	8.8	8.0	8.0	8.6	10.2	

Note: Ontario numerator data from Remis RS, Swantee C, Rottensten K, et al. (2003). *Report on HIV/AIDS in Ontario.* Toronto: Ontario HIV Epidemiology Monitoring Unit.

CHLAMYDIA

BACKGROUND

Chlamydia trachomatis is the most frequently reported bacterial sexually transmitted infection in Ontario. Chlamydia can produce an infection of the urethra in males and the cervix in females, but is often asymptomatic. Both males and females may experience complications of chlamydia infection if not treated properly. Complications in women include inflammation of the pelvis, leading to infertility and ectopic pregnancy. Complications in men include inflammation of the epididymitis and scarring of the urethra, making it difficult to urinate and occasionally causing infertility. Rarely, untreated males or females may develop a form of arthritis called Reiter's syndrome. Infants born to infected mothers can develop eye infections or pneumonia.

Sexually active people under the age of 25 are at the highest risk for infection with *Chlamydia trachomatis*. Risk factors for infection, regardless of age, include a) multiple sexual partners, b) sexual contact with a person with a known sexually transmitted infection (STI), c) a new sexual partner within the last two months, d) not using condoms on a regular basis, e) commercial sex work, f) homelessness, and g) injection drug use.

Many people infected with chlamydia do not have symptoms and therefore are not aware that they are at risk for complications or that they may spread the infection to their sexual partner(s). It is important that people with known risk factors be screened for infection. The introduction of urine testing in the late 1990's improved chlamydia detection rates, particularly among males. Prior to the introduction of urine testing, a urethral swab was used to test for chlamydia among males. Since this type of swab was rather uncomfortable, it may have been underutilized, resulting in underreporting of male chlamydia cases.

TRENDS IN LONDON AND MIDDLESEX COUNTY

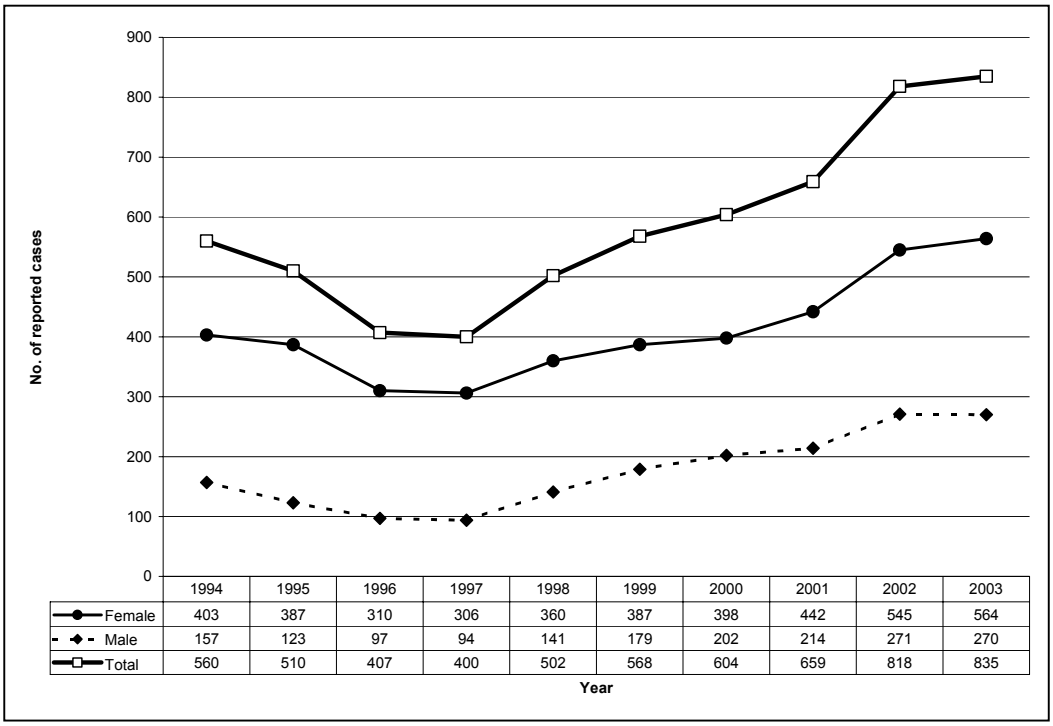
Historical: Each year between 1994 and 2003, an average of 586 chlamydia cases was reported in Middlesex-London. Figure 2.8 shows that after several years of consistent decline, the number of reported chlamydia infections in Middlesex-London has steadily increased since 1998. Between 1998 and 2003 the number of reported cases increased by 66%. A portion of this increase may be attributed to the introduction of non-invasive urine testing techniques, particularly for males, and to improved sensitivity of the tests used to detect chlamydia. However, only part of the increase since 1998 is due to improved detection; the remainder is likely a true increase in the incidence of chlamydia infections.

By age group and sex: Figure 2.8 shows that regardless of the year, the number of reported chlamydia infections was greater among females than males. This difference may be due to increased testing of females as part of annual Pap screening for cervical cancer and, as a result, chlamydia infections being detected.

As shown in Figure 2.9, the average annual reported incidence rate of chlamydia infections between 1994 and 2003 was highest among those aged 20 to 24 years (820.4/100,000), followed by those 15 to 19 years of age (636.5/100,000). Among those under the age of 30 years, the average annual reported incidence was higher among females than males. However, beyond the age of 30 years, the average annual reported incidence rate was greater among males.

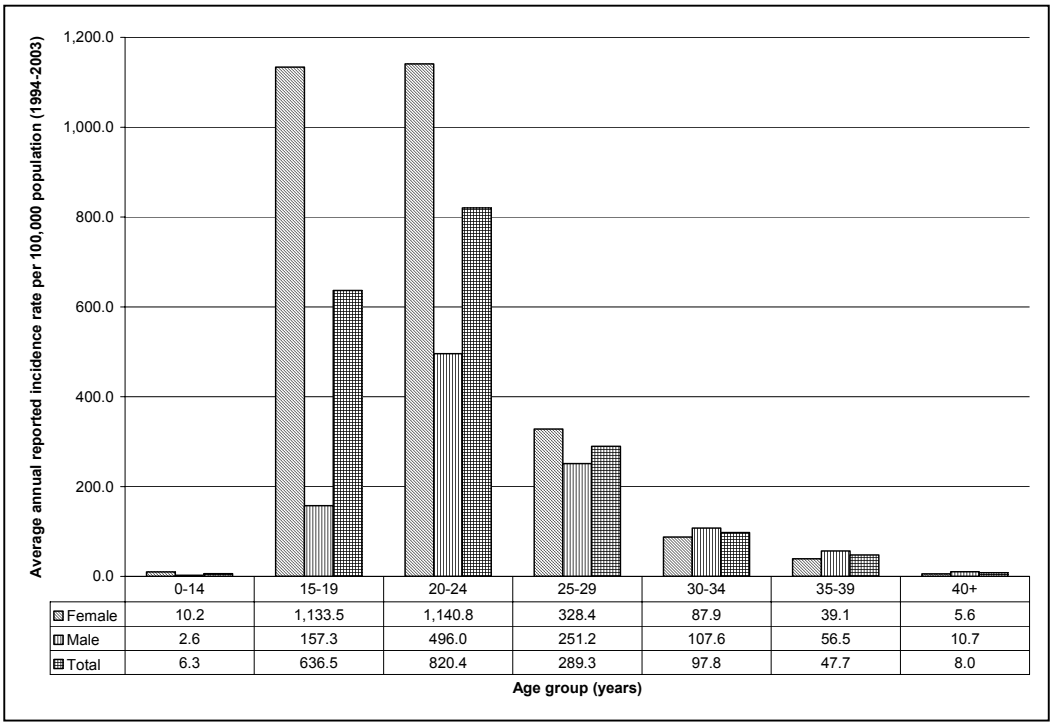
***Regional*:** Figure 2.10 illustrates that the annual reported incidence rate of chlamydia infections in Middlesex-London consistently exceeded the incidence rates reported in the remainder of Southwestern Ontario and Ontario as a whole. Between 1994 and 2003, the average annual reported incidence rate for Middlesex-London was 142.1/100,000 compared to 64.3/100,000 in the remainder of the Southwest region and 119.6/100,000 provincially.

Figure 2.8
Annual Number of Reported Chlamydia Infections by Sex, Middlesex-London, 1994-2003



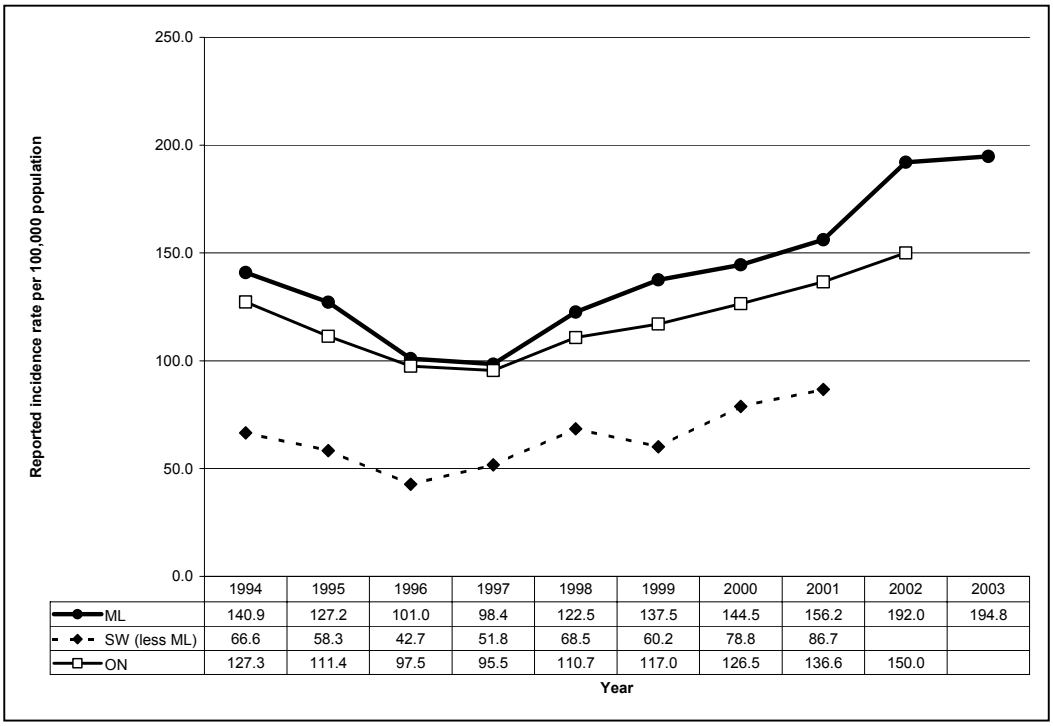
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Female	403	387	310	306	360	387	398	442	545	564
Male	157	123	97	94	141	179	202	214	271	270
Total	560	510	407	400	502	568	604	659	818	835

Figure 2.9
Average Annual Reported Incidence Rate of Chlamydia Infections by Age Group and Sex, Middlesex-London, 1994-2003



	0-14	15-19	20-24	25-29	30-34	35-39	40+
Female	10.2	1,133.5	1,140.8	328.4	87.9	39.1	5.6
Male	2.6	157.3	496.0	251.2	107.6	56.5	10.7
Total	6.3	636.5	820.4	289.3	97.8	47.7	8.0

Figure 2.10
Annual Reported Incidence Rate of Chlamydia Infections, Middlesex-London, Remainder of Southwestern Ontario, and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ML	140.9	127.2	101.0	98.4	122.5	137.5	144.5	156.2	192.0	194.8
SW (less ML)	66.6	58.3	42.7	51.8	68.5	60.2	78.8	86.7		
ON	127.3	111.4	97.5	95.5	110.7	117.0	126.5	136.6	150.0	

GONORRHEA

BACKGROUND

Infection with *Neisseria gonorrhea* typically causes an inflammation of the urethra in males and cervix in females. It can also cause an inflammation of the throat (pharyngitis) when contracted through oral sex, or an inflammation of the rectum when contracted through anal sex. Up to 15% of females infected with gonorrhea may develop pelvic inflammatory disease, which can result in ectopic pregnancies or infertility. Many individuals infected with gonorrhea are also infected with chlamydia. It is therefore recommended that individuals infected with gonorrhea be treated for chlamydia as well.

As with *Chlamydia trachomatis* infections, many people infected with gonorrhea have no symptoms. Thus, regular testing of high-risk individuals is recommended. Sexually active people under the age of 25 with multiple sexual partners are at highest risk for gonorrhea infection. Other risk factors, regardless of age, include a) multiple sexual partners, b) unprotected sex with an infected partner or with a partner from an area with high rates of gonorrhea, c) men who have unprotected sex with men, d) commercial sex trade work, and e) homelessness among youth.

After numerous years of constant decline, reported gonorrhea infection rates in Canada increased approximately 45% between 1997 and 2001. In addition to the increased reported incidence of the disease, the occurrence of antibiotic resistant strains of gonorrhea is an ongoing concern with regard to appropriate treatments.

TRENDS IN LONDON AND MIDDLESEX COUNTY

***Historical*:** Between 1994 and 2003, an annual average of 74 gonorrhea cases was reported in Middlesex-London. Figure 2.11 shows that the number of reported gonorrhea infections in Middlesex-London increased 224% between 1998 and 2003. As with chlamydia, a portion of the overall increase may be attributed to the introduction of non-invasive urine testing techniques and increased sensitivity of the diagnostic tests. However, the remainder is likely a true increase in the occurrence of gonorrhea infections.

***By age group and sex*:** Figure 2.12 shows that in Middlesex-London, the average annual reported incidence rate of gonorrhea infections between 1994 and 2003 was highest among those aged 20 to 24 years (68.2/100,000). Among cases aged 24 years and under, the reported incidence rate of gonorrhea infections was slightly higher among females compared to males. However, among cases 25 years of age and over, the reported incidence rate was consistently greater among males than females.

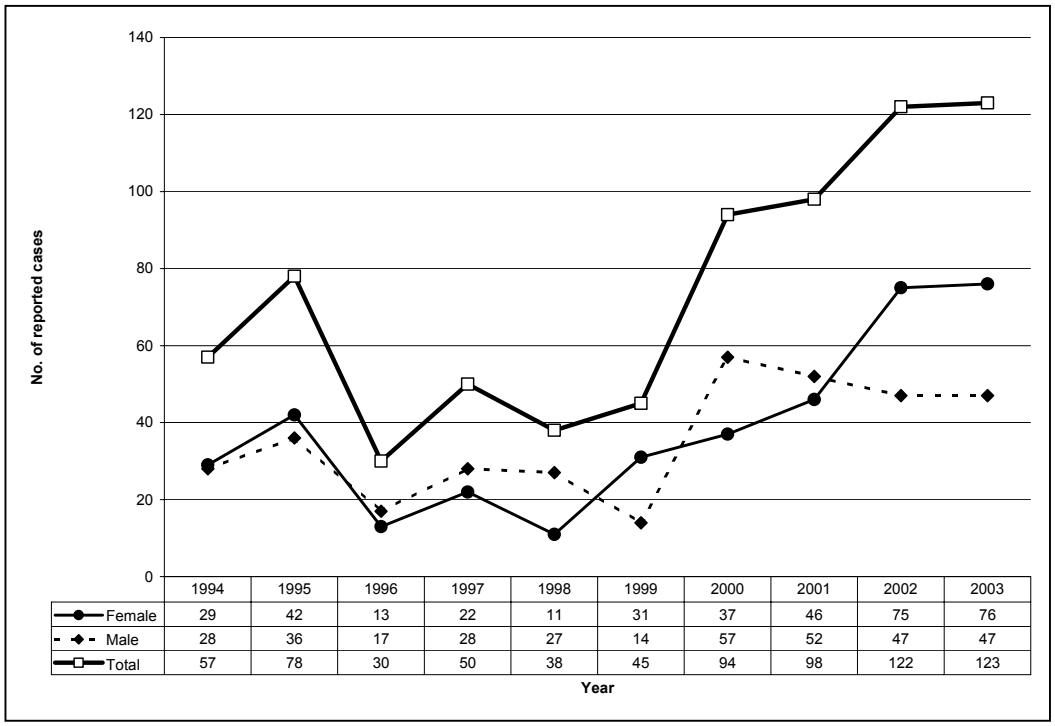
***Antibiotic resistance*:** Figure 2.13a shows that between 1994 and 2003, the number of gonorrhea cases reported to be resistant to one or more antibiotics fluctuated. On

average, 29 antibiotic resistant gonorrhea cases were reported in Middlesex-London each year between 1994 and 2003.

Figure 2.13b shows that among antibiotic resistant gonorrhea cases reported, the number resistant to two or more antibiotics outnumbered those resistant to only one in most years. Over one-half (54.1%) of antibiotic resistant cases were resistant to tetracycline or tetracycline in combination with other antibiotics[7] (excluding penicillin), and nearly one in five (19.4%) antibiotic resistant cases were resistant to both penicillin and tetracycline, or penicillin and tetracycline in combination with other antibiotics[8].

***Regional*:** Figure 2.14 illustrates that the annual reported incidence rate of gonorrhea infections in Middlesex-London consistently exceeded the incidence rates reported in the remainder of Southwestern Ontario. However, the reported incidence rate in Middlesex-London was lower than that in Ontario as a whole, with the exception of 2002. Between 1994 and 2003, the average annual reported incidence rate for Middlesex-London was 17.8/100,000 compared to 5.1/100,000 in the rest of the Southwest region and 23.5/100,000 provincially.

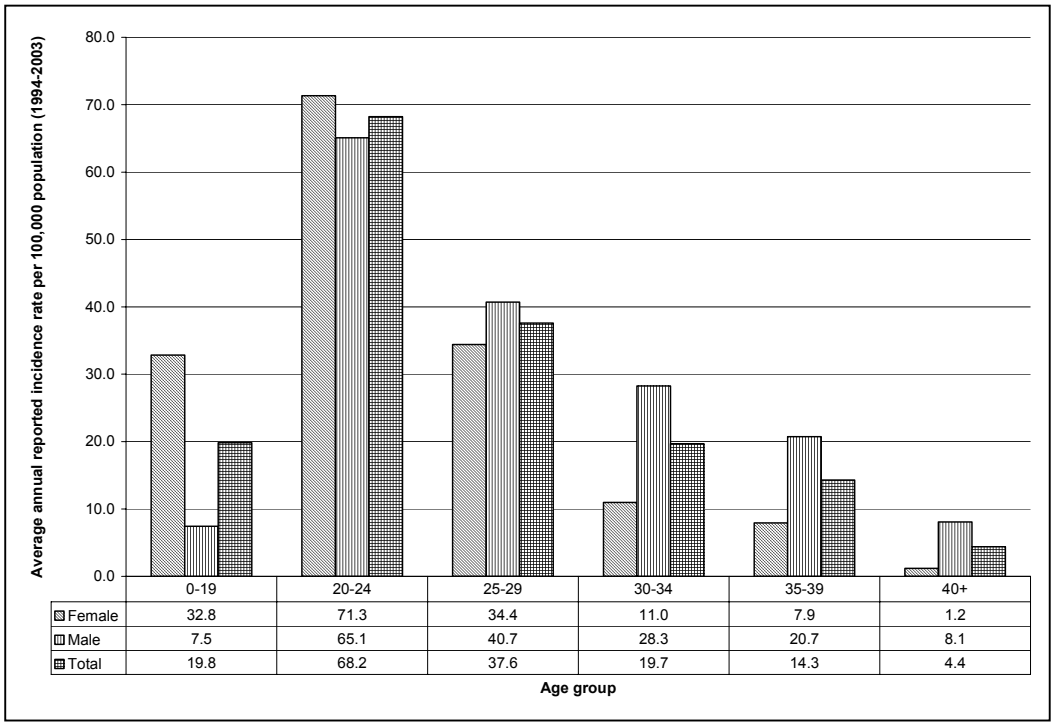
Figure 2.11
Annual Number of Reported Gonorrhea Infections by Sex, Middlesex-London, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Female	29	42	13	22	11	31	37	46	75	76
Male	28	36	17	28	27	14	57	52	47	47
Total	57	78	30	50	38	45	94	98	122	123

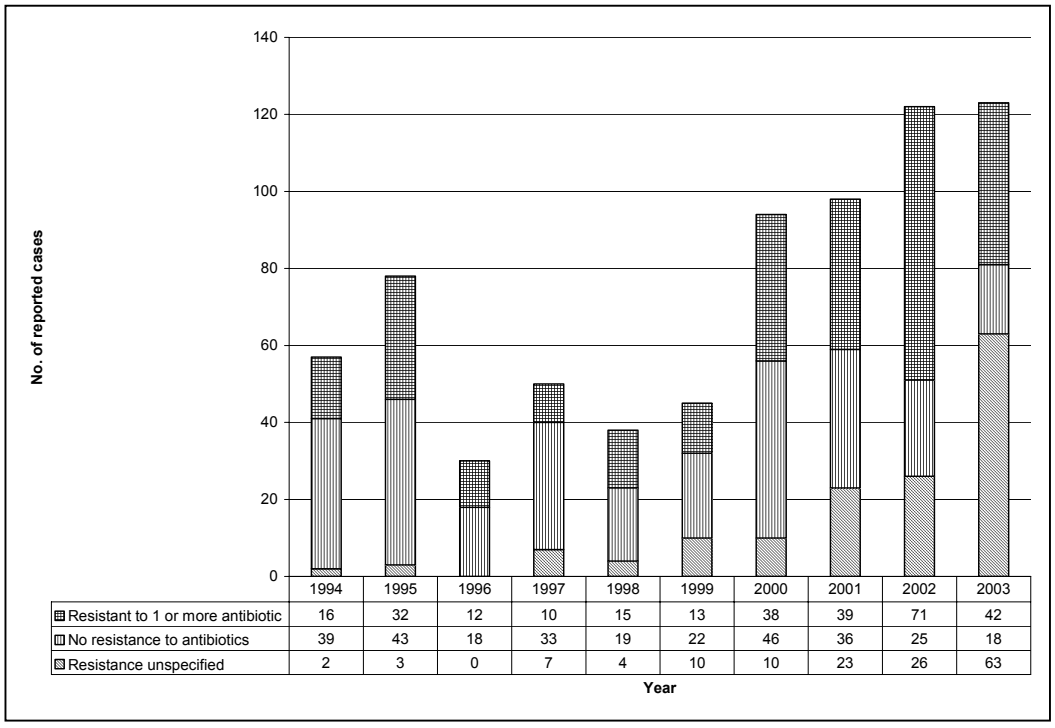
[7] Tetracycline and erythromycin; tetracycline and ciprofloxacin; tetracycline and spectinomycin; tetracycline, cefuroxime and erythromycin; tetracycline and other antibiotics; tetracycline, erythromycin and other antibiotics.
[8] Penicillin, tetracycline and erythromycin; penicillin, tetracycline and ciprofloxacin.

Figure 2.12
Average Annual Reported Incidence Rate of Gonorrhea Infections by Age Group and Sex, Middlesex-London, 1994-2003



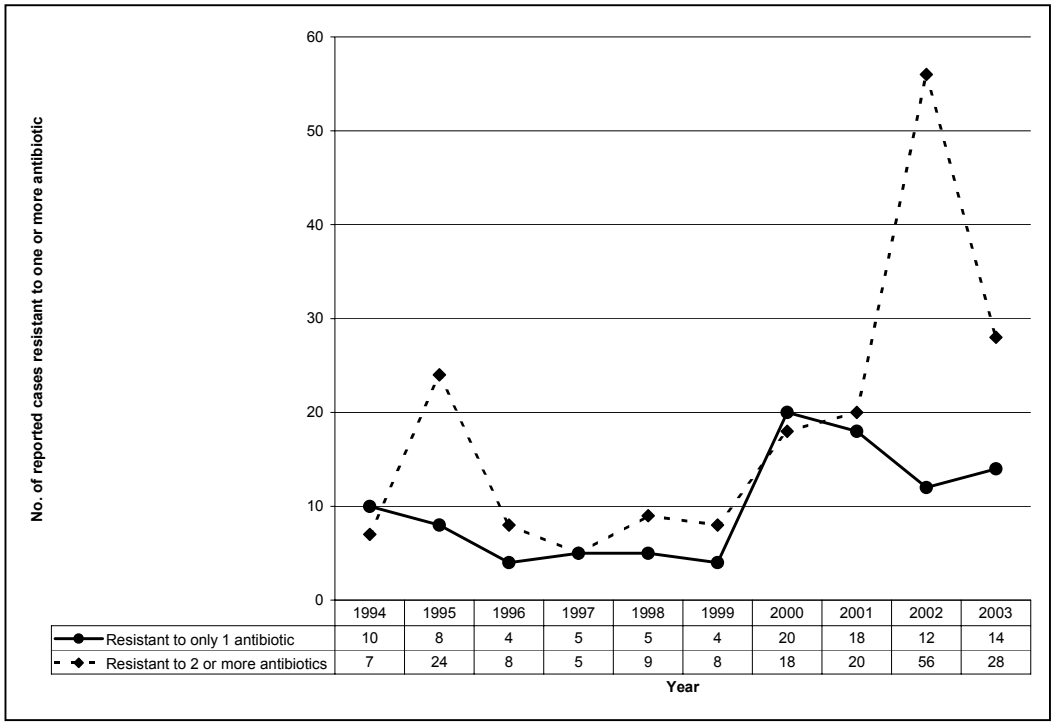
	0-19	20-24	25-29	30-34	35-39	40+
Female	32.8	71.3	34.4	11.0	7.9	1.2
Male	7.5	65.1	40.7	28.3	20.7	8.1
Total	19.8	68.2	37.6	19.7	14.3	4.4

Figure 2.13a
Annual Number of Reported Gonorrhea Infections by Antibiotic Resistance Status, Middlesex-London, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Resistant to 1 or more antibiotic	16	32	12	10	15	13	38	39	71	42
No resistance to antibiotics	39	43	18	33	19	22	46	36	25	18
Resistance unspecified	2	3	0	7	4	10	10	23	26	63

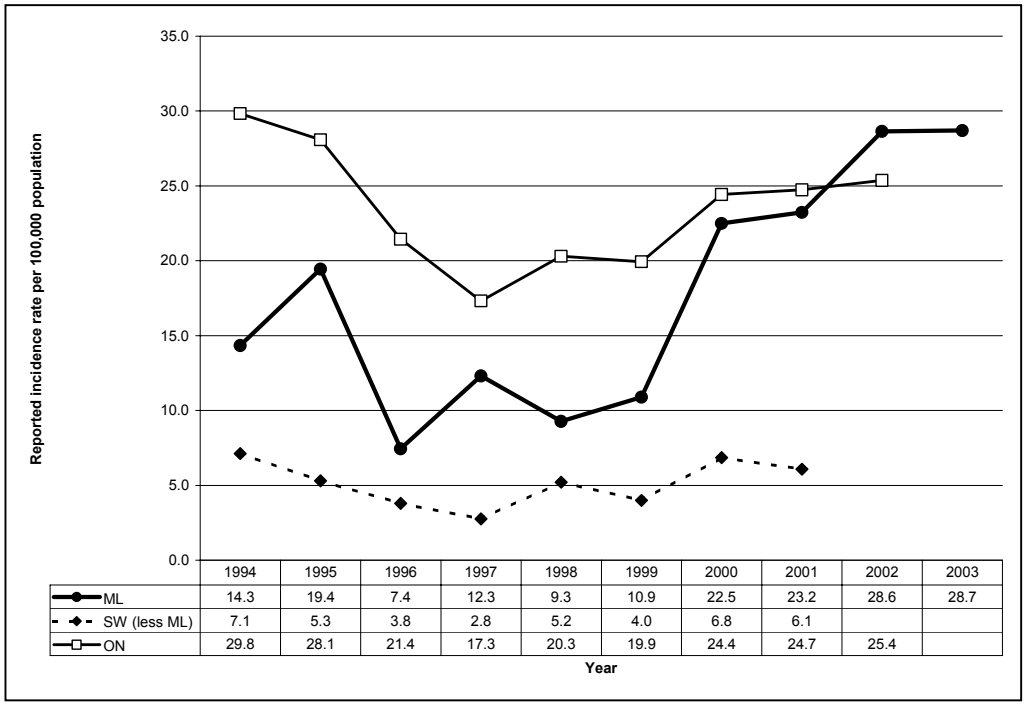
Figure 2.13b
Annual Number of Antibiotic Resistant Strains of Gonorrhea Reported by Number of Resistances, Middlesex-London, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Resistant to only 1 antibiotic	10	8	4	5	5	4	20	18	12	14
Resistant to 2 or more antibiotics	7	24	8	5	9	8	18	20	56	28

Note: The total reported in this figure may not equal the total number of antibiotic resistant cases reported in Figure 2.13a due to differences between reporting antibiotic resistance and type of antibiotic resistance.

Figure 2.14
Annual Reported Incidence Rate of Gonorrhea Infections, Middlesex-London, Remainder of Southwestern Ontario, and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ML	14.3	19.4	7.4	12.3	9.3	10.9	22.5	23.2	28.6	28.7
SW (less ML)	7.1	5.3	3.8	2.8	5.2	4.0	6.8	6.1		
ON	29.8	28.1	21.4	17.3	20.3	19.9	24.4	24.7	25.4	

SYPHILIS

BACKGROUND

Syphilis is caused by the bacterium *Treponema pallidum*, and is most often transmitted through oral, anal or vaginal sexual contact with an infected individual. Transmission occurs through contact with infectious discharge from moist lesions, which may be obvious or concealed on the skin or mucous membranes. Transmission occurs in the primary or secondary phases of the infection. An infected mother can also pass the infection to her unborn infant during pregnancy, resulting in stillbirth, prematurity, or long-term consequences for the baby involving the brain, bones, joints, teeth, eyes, and skin.

Syphilis is categorized as primary, secondary, latent, or tertiary depending on the time since initial infection and the presenting symptoms. The primary stage of syphilis, like other sexually transmitted infections, is most often diagnosed in young, sexually active people, and males are diagnosed more frequently than females.

Primary syphilis consists of a painless sore called a chancre, which occurs in the genital area, cervix, rectum, tongue, lips or other parts of the body. The chancre goes away in four to six weeks. Secondary syphilis symptoms then appear, consisting of a rash involving the body, palms of the hands and soles of the feet. Other symptoms include mild fever, fatigue, headache, sore throat, patchy hair loss and swollen glands.

Long-term consequences of untreated syphilis infection include the development of lesions of the skin, bones, aorta, brain, nervous system and other organs. If left untreated, a small proportion of affected individuals will die or develop serious disabilities. Unfortunately, a diagnosis of syphilis is sometimes overlooked because of the wide range of symptoms the infection produces and because these symptoms are similar to other diseases.

TRENDS IN LONDON AND MIDDLESEX COUNTY

***Historical*:** Figure 2.15 illustrates that in general, the number of reported syphilis infections in Middlesex-London has declined since the mid-1990s. On average, seven syphilis cases were reported each year between 1994 and 2003.

***By age group*:** As shown in figure 2.16, the average annual reported incidence rate of syphilis infections was highest among those 30 to 39 years of age (2.8/100,000 population). This rate is similar to the rates observed for those in their forties (2.4/100,000) and fifties (2.3/100,000). People in older age ranges may be diagnosed with latent or tertiary syphilis that was acquired many years earlier.

***Regional*:** Figure 2.17 shows that the reported incidence rate of syphilis infections in Middlesex-London was consistently lower than the rate across Ontario. The average annual reported incidence rate between 1994 and 2003 for Middlesex-London was 1.6/100,000 population, which is comparable to the average annual incidence rate of 1.2/100,000 reported in the remainder of the Southwest region. The rate for Middlesex-London is approximately one-half the provincial average annual reported incidence rate of 3.0/100,000. Recent outbreaks of syphilis have been reported in several larger urban centres across Canada, including Toronto, which may affect the occurrence of future cases in Middlesex-London.

Figure 2.15
Annual Number of Reported Syphilis Infections,
Middlesex-London, 1994-2003

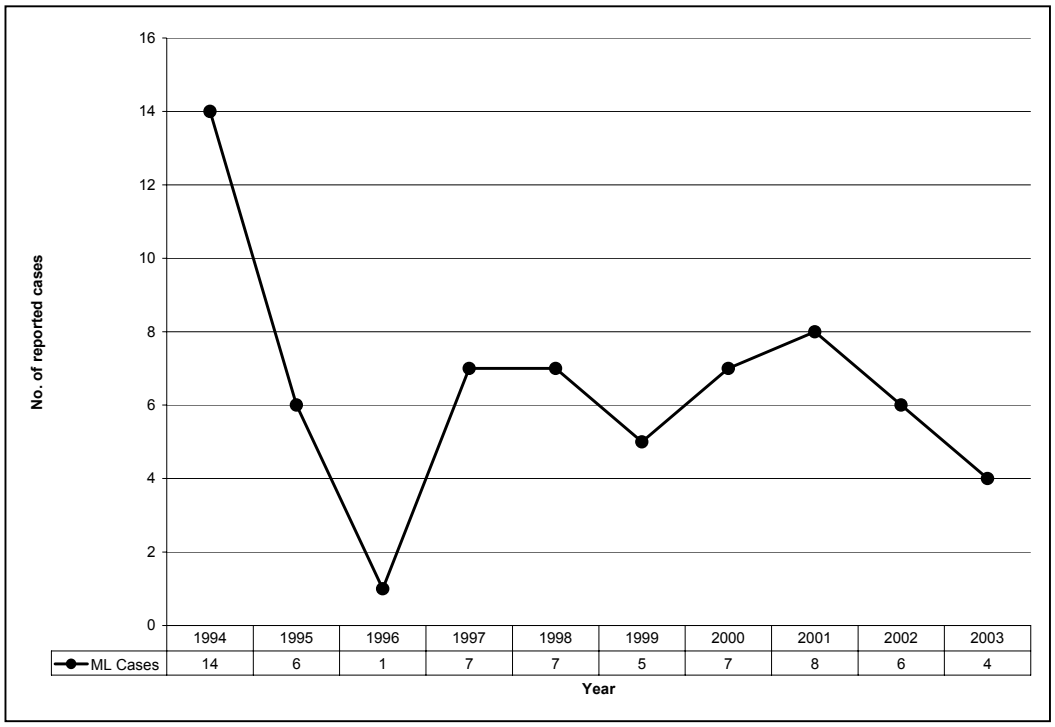


Figure 2.16
Average Annual Reported Incidence Rate of Syphilis Infections by Age Group, Middlesex-London, 1994-2003

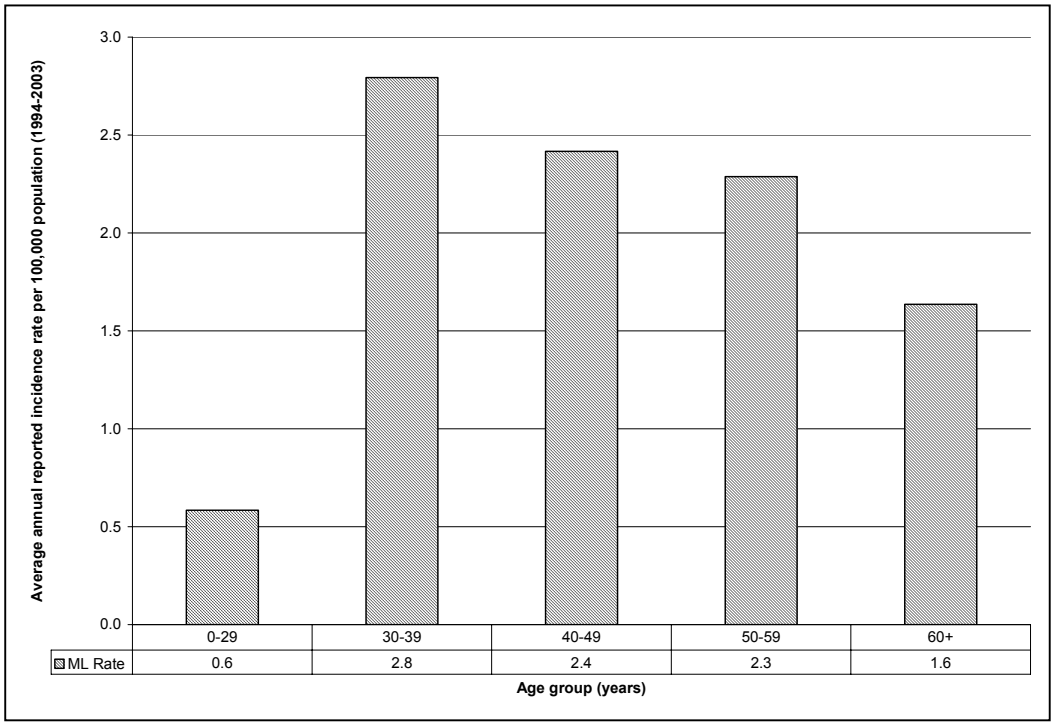
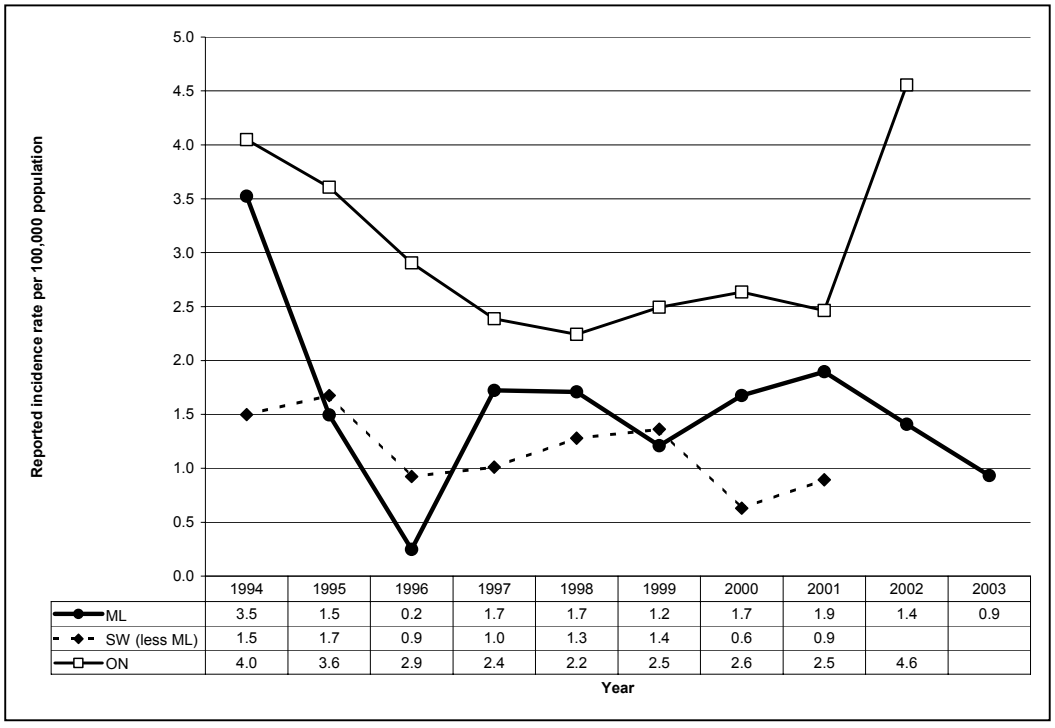


Figure 2.17
Annual Reported Incidence Rate of Syphilis Infections, Middlesex-London, Remainder of Southwestern Ontario, and Ontario, 1994-2003



TUBERCULOSIS

TUBERCULOSIS

BACKGROUND

Tuberculosis (TB) is usually caused by the bacterium *Mycobacterium tuberculosis*, although *M. africanum, M. bovis* and *M. canettii* are responsible for a small number of cases in Africa. Most people infected with the TB bacterium will carry it in their lungs for many years without developing any health problems. These people are said to have a latent TB infection but do not have *active* TB disease. Individuals with latent TB infection are not ill and are not able to pass the bacteria to anyone else.

Over their lifetime, approximately 10% of people infected with TB will develop active TB disease. Active TB disease means that the bacteria are growing in number, causing illness that can be spread to others. Although active TB disease most commonly affects the lungs, it can also involve other parts of the body, such as the larynx (throat), lymph nodes, kidneys, bones, abdomen, or lining of the brain and spinal cord. Active TB disease is treated with a combination of antibiotics, all of which are provided at no cost to the patient.

TB bacteria are transmitted when someone with active TB disease in their lungs expels bacteria into the air, such as by coughing, talking or breathing, and the bacteria are subsequently inhaled by someone else. TB is spread by someone who has active TB disease in his/her lungs or larynx, although very rarely transmission has occurred from a person with active TB disease in other sites. TB cannot be spread by someone who has only latent TB infectionTB is *not* a highly contagious disease and requires prolonged exposure to someone with active TB disease for spread to occur.

About 5% of people with TB infection will develop active TB disease in the first two to three years after they are infected with TB, while a further 5% will develop active TB disease many years after they are first infected. People with latent TB infection may develop active TB disease if their immune systems are weakened, such as if they become ill with other medical conditions like AIDS, cancer, and diabetes, or through the normal process of aging. Medications can be used to prevent people with TB infection from developing active TB disease. Public health provides these medications to the patient at no cost.

Statistics pertaining to TB refer to the number of people who have *active* TB disease. In general, the number of cases of active TB disease in Canada has declined since the 1970s.

TRENDS IN LONDON AND MIDDLESEX COUNTY

***Historical*:** Figure 3.1 illustrates that the reported number of active tuberculosis (TB) cases in Middlesex-London fluctuated between 1994 and 2003. On average, there were nine cases of active TB disease reported annually in the ten-year time period.

***By age group*:** Figure 3.2 shows that the highest average annual reported incidence rate of active TB disease was among those 80 years of age and over (5.7/100,000). Age-related declines in immunity and the progression of underlying medical conditions may contribute to the development of active TB disease in this group, who may have been infected earlier in their lives when exposure to active TB disease was more common.

***Regional*:** Between 1994 and 2003, the average annual reported incidence rate of active TB disease in Middlesex-London was 2.1/100,000 compared to 1.7/100,000 in the remainder of Southwestern Ontario and 6.6/100,000 in Ontario. Figure 3.3 shows that the reported incidence rate in Middlesex-London was consistently lower than the rate in Ontario as a whole and that in general, the reported incidence rate in the rest of the Southwest region was slightly lower than that in Middlesex-London.

Figure 3.1
Annual Number of Reported Active Tuberculosis Disease,
Middlesex-London, 1994-2003

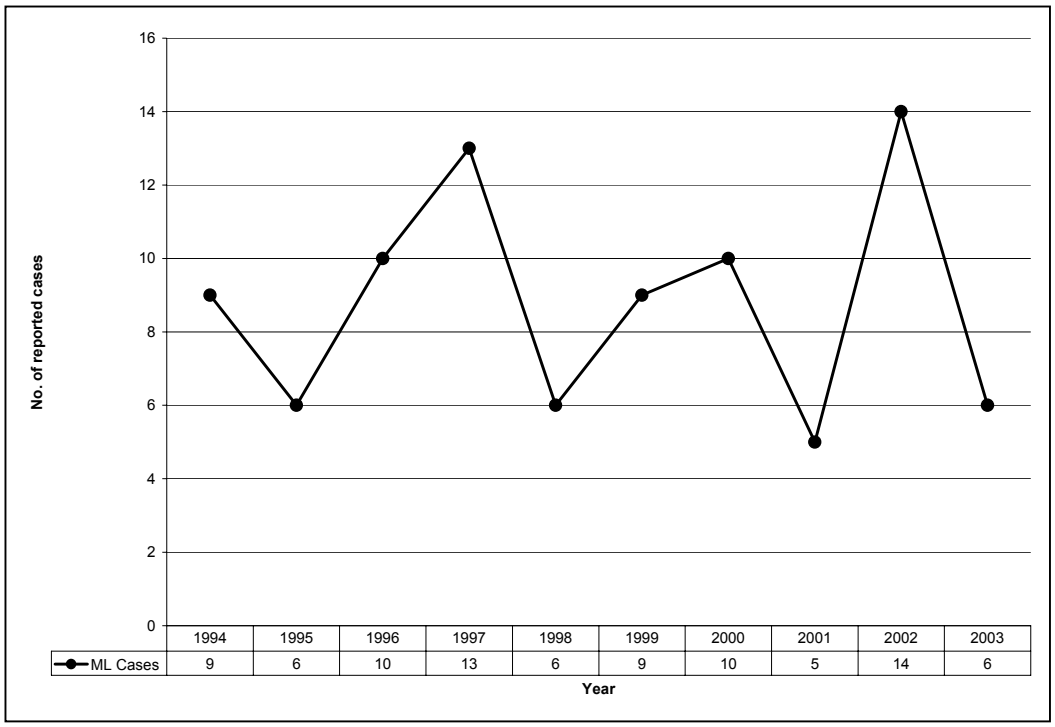
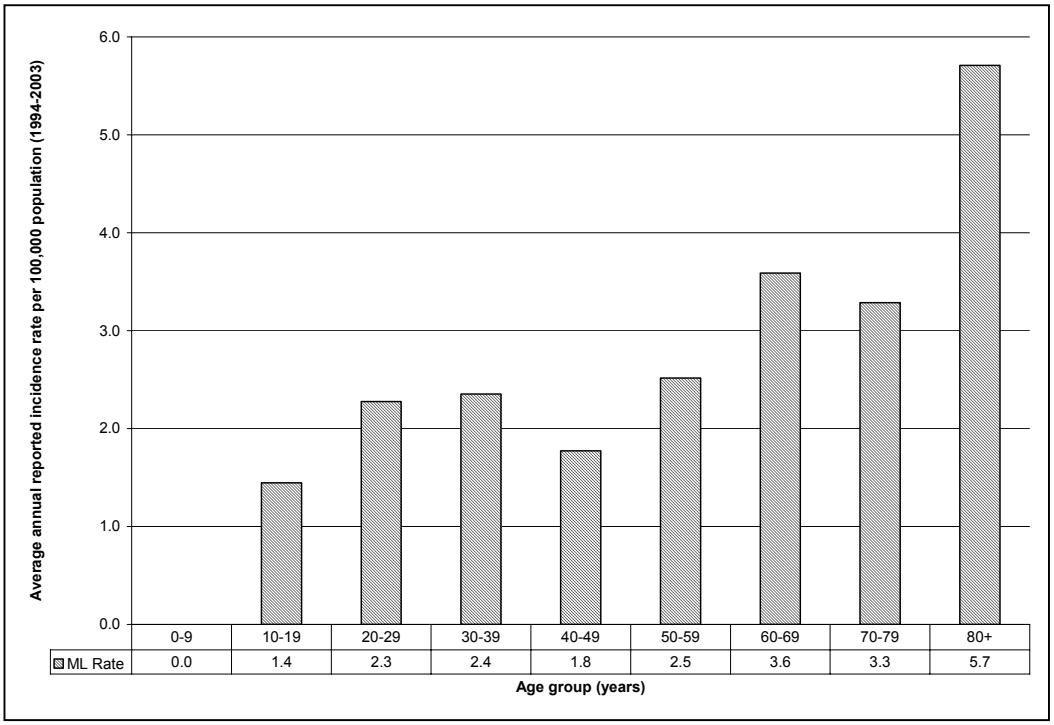
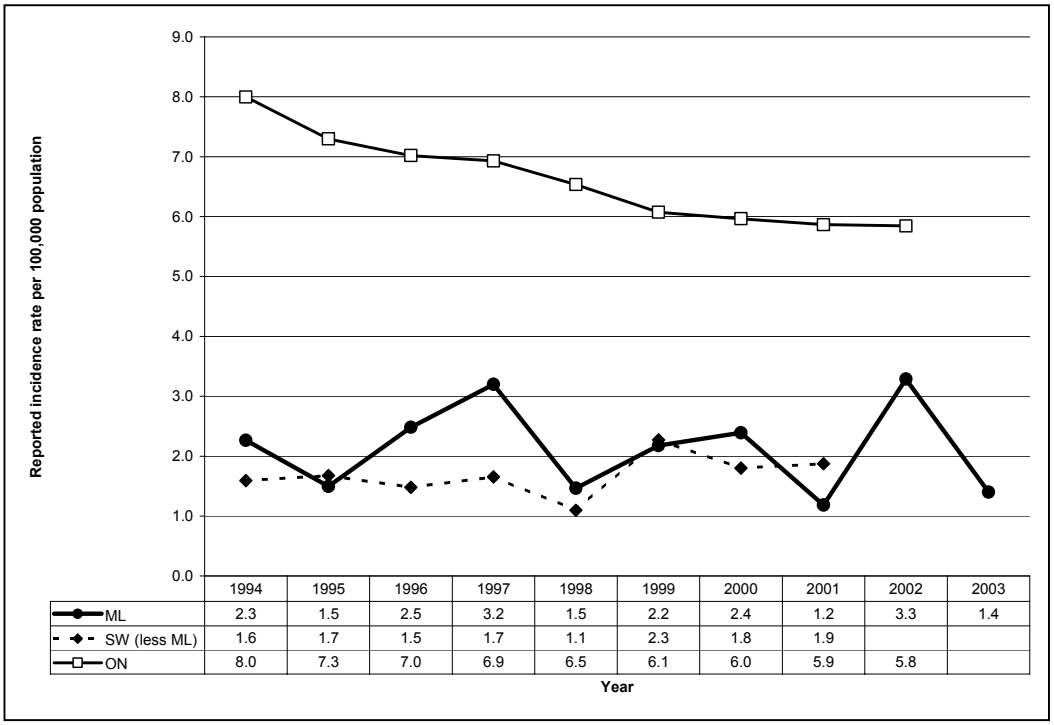


Figure 3.2
Average Annual Reported Incidence Rate of Active Tuberculosis Disease by Age Group, Middlesex-London, 1994-2003



	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80+
ML Rate	0.0	1.4	2.3	2.4	1.8	2.5	3.6	3.3	5.7

Figure 3.3
Annual Reported Incidence Rate of Active Tuberculosis Disease, Middlesex-London, Remainder of Southwestern Ontario, and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ML	2.3	1.5	2.5	3.2	1.5	2.2	2.4	1.2	3.3	1.4
SW (less ML)	1.6	1.7	1.5	1.7	1.1	2.3	1.8	1.9		
ON	8.0	7.3	7.0	6.9	6.5	6.1	6.0	5.9	5.8	

DISEASES PREVENTED BY VACCINATION

CHICKENPOX (VARICELLA)

BACKGROUND

Chickenpox (varicella) is caused by the varicella-zoster virus (VZV), a member of the *herpesvirus* group. Chickenpox is highly contagious and is spread by direct contact with the open rash of an infected person, or droplet or airborne contact with his/her respiratory secretions. Once the rash has completely scabbed over, the person is no longer considered contagious. This usually takes about five days from when the rash first appeared.

Chickenpox is considered a common childhood disease, but people can be infected at any age. For most, chickenpox causes a mild illness with a slight fever and an itchy rash. The rash may be relatively minor with only a few spots, or it may appear all over the body, including in the mouth and around the eyes. Those who have had chickenpox carry the virus in their bodies for life and it can reappear later in life as a painful rash called shingles. Contact with the shingles rash can cause chickenpox in a person who is not immune to chickenpox.

On occasion, chickenpox can be a serious infection leading to pneumonia, inflammation of the brain (encephalitis), and other complications. Bacterial infection of the rash sites is another potential complication that can lead to serious disease, such as flesh-eating disease (necrotizing fasciitis) or a blood infection (septicaemia).

Infected adults are more likely to experience severe disease, resulting in a greater occurrence of pneumonia and other complications. People of all ages who are immunocompromised, such as those undergoing cancer treatments, are also at risk of severe complications if they contract chickenpox. Chickenpox infection early in pregnancy can result in deformities of the infant in about 0.7% of cases, and up to 2% of cases if the infection occurs between 13 and 20 weeks gestation. Finally, newborns and their mothers may experience severe chickenpox if the mother develops the disease between five days before and two days after delivery.

A vaccine to prevent chickenpox was approved for use in Canada in December 1998. Since September 2004, Ontario children born on or after September 1, 2003 are eligible to receive publicly funded chickenpox vaccine on or shortly after their first birthday. As of January 1, 2005 the vaccine is also be available at no charge to five year old children who have not yet had chickenpox, and anyone else who has not had the disease and is at greater risk for complications if chickenpox is contracted, such as immunocompromised individuals.

TRENDS IN LONDON AND MIDDLESEX COUNTY

Although chickenpox is a reportable disease, each individual case of chickenpox is not followed up and information about the person with chickenpox is not collected. As a result, the number of chickenpox cases in Middlesex-London each year is not available. Information for the remainder of Southwestern Ontario and the province as a whole is also lacking.

DIPHTHERIA

BACKGROUND

Diphtheria is a bacterial infection usually affecting the nose, throat and skin that can cause breathing problems, heart problems, and nerve damage. It can be fatal in 5% to 10% of cases. Transmission occurs from person to person through contact with the lesions of an infected person. Carriers who have no symptoms of infection can also spread diphtheria.

There are very few reported cases of diphtheria in Canada; two or fewer cases were reported each year between 1994 and 2000. However, this is not the case in other areas of the world where immunization levels are lower. The existence of cases outside North America raises the possibility of the disease being imported into Canada.

To protect against diphtheria, the Ontario Ministry of Health and Long-Term Care recommends a series of vaccinations that begins in infancy and continues into the teen years. Diphtheria vaccination is required for attendance at schools in Ontario. For adults, a booster dose of diphtheria vaccine is recommended every ten years.

TRENDS IN LONDON AND MIDDLESEX COUNTY

***Historical*:** There were no reported cases of diphtheria in Middlesex-London from 1994 through 2003.

***Regional*:** Between 1994 and 2002, there were no reported diphtheria cases in the remainder of Southwestern Ontario. However, there were two cases reported elsewhere in Ontario.

HAEMOPHILUS INFLUENZAE TYPE B (HIB)

BACKGROUND

Haemophilus influenzae type b (Hib) is a bacterium that causes serious infections in young children, including an infection of the lining of the brain and spinal cord (meningitis), an infection of the throat (epiglottitis), and infections of the blood, lungs, joints, bones, and skin. Even with modern treatment, one in 20 affected individuals die of Hib and one in every three survivors is left with neurologic difficulties. Prior to the development of a vaccine that was provided through the publicly funded program for infants in 1992, Hib was the most common cause of bacterial meningitis in Canada. Since that time there has been a substantial decrease in the number of cases reported.

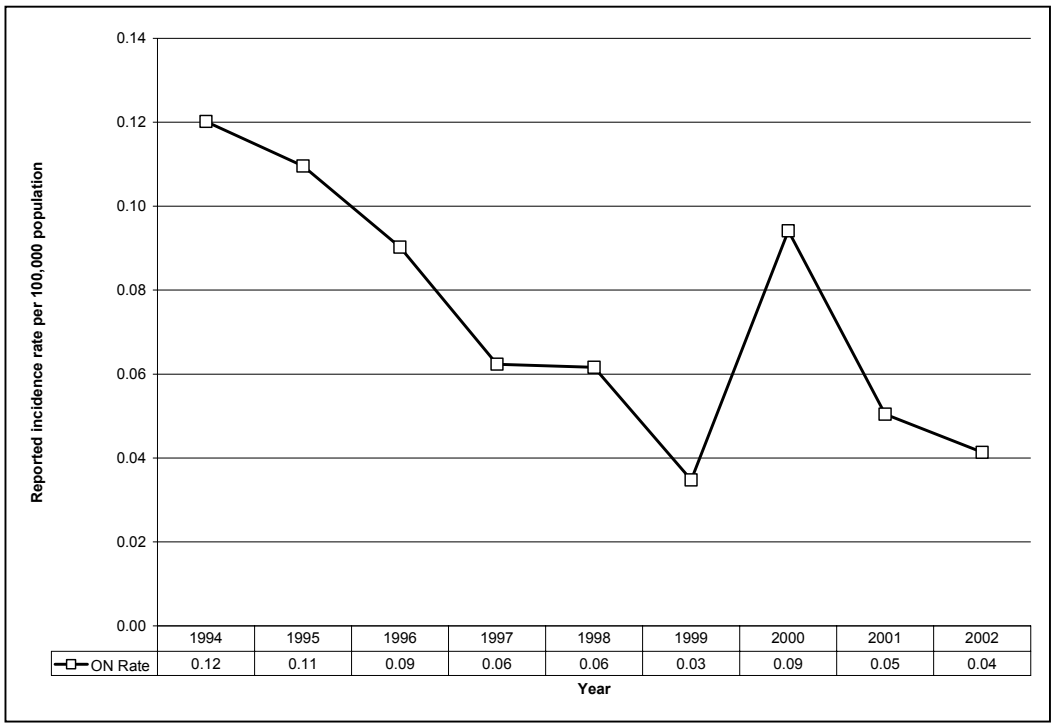
Since Hib is most prevalent in young children between three months and three years of age, the Ontario Ministry of Health and Long-Term care recommends a series of vaccinations against Hib at two, four, and six months of age with a final dose at 18 months of age.

TRENDS IN LONDON AND MIDDLESEX COUNTY

***Historical*:** There was one reported case of *H. influenzae* type b (Hib) in Middlesex-London between 1994 and 2003.

***Regional*:** In the rest of Southwestern Ontario, the number of reported cases of Hib was low, with four or fewer cases reported each year. Figure 4.1 shows that across the province, the annual reported incidence rate of Hib infections was consistently below 0.2/100,000 between 1994 and 2003.

Figure 4.1
Annual Reported Incidence Rate of *Haemophilus influenzae* type b (Hib) Infections, Ontario, 1994-2002



Note: Due to the low number of cases, the annual reported incidence rate of *Haemophilus influenzae* type b infections in Middlesex-London and the remainder of Southwestern Ontario could not be calculated.

HEPATITIS B

BACKGROUND

Hepatitis B is a potentially life-threatening virus that causes an infection of the liver (hepatitis). Hepatitis B infection can result in death for about 1% of people who are acutely ill and hospitalized due to their symptoms. It is spread by sexual contact, as well as exposure to contaminated personal instruments that pierce the skin, such as shared injection drug equipment, contaminated piercing and tattooing instruments, and contaminated razors and personal grooming scissors. The hepatitis B virus can be spread to recipients of contaminated blood or blood products, although screening of blood and blood products for hepatitis B makes this very unlikely. Newborns of infected mothers are also at risk of acquiring the virus during pregnancy or delivery. Although the risk is very low, hepatitis B virus can be spread by being bitten by an infected person. In general, health care workers are considered to be at increased risk for hepatitis B due to occupational exposures to blood and other body fluids.

Only 50% or fewer of the people with recent infections with hepatitis B develop symptoms. Those with recent infection are said to have *acute* hepatitis B. After an acute hepatitis B infection, there is a risk of carrying the virus for life; these people are said to be *carriers* of the virus. Carriers are at risk of developing long-term scarring of the liver and liver cancer, and are able to spread the infection to others as long as they carry the virus. Approximately 10% of those infected as adults become carriers. Infants who acquire the infection from their mothers at birth have a 90% chance of becoming a carrier if they do not receive the proper post-exposure immunization at birth. Therefore, it is very important that all pregnant women be screened for the hepatitis B virus, in order to identify babies needing post-exposure medications at birth.

Ontario instituted a publicly funded, school-based immunization program against hepatitis B in 1994. Each year, all grade 7 students are offered hepatitis B vaccine to prevent this infection. In 1996, a one-time catch-up program offered vaccine to those in grades 9 to 13. The vaccine is also available at no cost to those with high-risk conditions, such as injection drug users and people with multiple sexual partners.

TRENDS IN LONDON AND MIDDLESEX COUNTY

***Historical*:** Figure 4.2 shows that in Middlesex-London, the number of reported hepatitis B acute cases and carriers decreased in the ten years between 1994 and 2003. On average, two hepatitis B acute cases and 80 carriers were reported in Middlesex-London each year between 1994 and 2003.

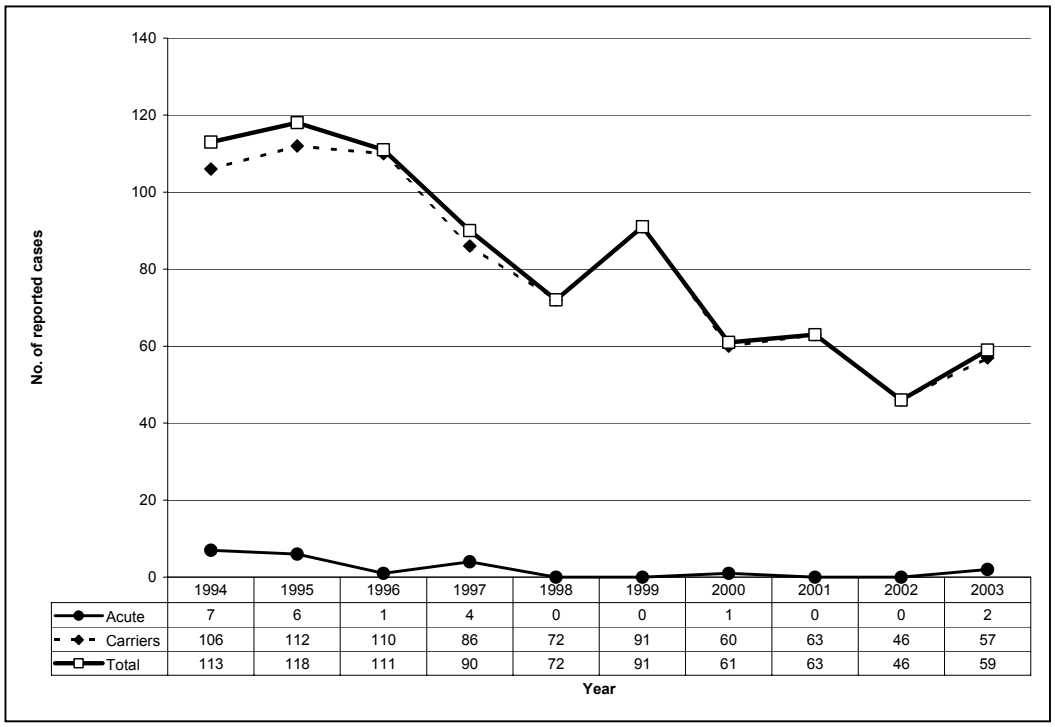
***By age group*:** For *acute* cases of hepatitis B, the average annual reported incidence rate was highest among those between the ages of 30 and 39 years (1.5/100,000) (Figure 4.3). Figure 4.4 illustrates that a similar pattern existed for hepatitis B *carriers*. The average annual reported incidence rate for carriers was highest among

30 to 39 year olds (37.8/100,000) followed by those in their twenties (25.5/100,000). For carriers, the average annual reported incidence rate was higher for males than females among those 30 years of age and over.

***Risk factors*:** Figure 4.5 shows that between 1994 and 2003, nearly one-half (47.6%) of *acute* hepatitis B cases in Middlesex-London reported sexual contact without protection of a condom as a risk factor for acute hepatitis B infection. Over one-quarter (26.7%) of acute hepatitis B male cases reported being homosexual or bisexual as a risk factor for acute hepatitis B infection. The majority of hepatitis B *carriers*, 83.1%, did not know the source of their infection or were unable to provide the information. Some of these people were likely infected at birth.

Regional: Although annual reported incidence rates could not be generated for Middlesex-London due to an insufficient number of *acute* hepatitis B cases, Figure 4.6 illustrates the decreasing rates for acute hepatitis B cases reported in Southwestern Ontario (including Middlesex-London) and the province as a whole. The average annual reported incidence rate of acute cases of hepatitis B in Middlesex-London between 1994 and 2003 was 0.5/100,000, compared to 1.5/100,000 in the remainder of the Southwest region and 1.6/100,000 in Ontario. Annual reported incidence rates for hepatitis B *carriers* were not available for the remainder of the Southwest region or for Ontario as a whole.

Figure 4.2
Annual Number of Reported Hepatitis B Cases and Carriers, Middlesex-London, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Acute	7	6	1	4	0	0	1	0	0	2
Carriers	106	112	110	86	72	91	60	63	46	57
Total	113	118	111	90	72	91	61	63	46	59

Figure 4.3
Average Annual Reported Incidence Rate of Hepatitis B *Cases* by Age Group, Middlesex-London, 1994-2003

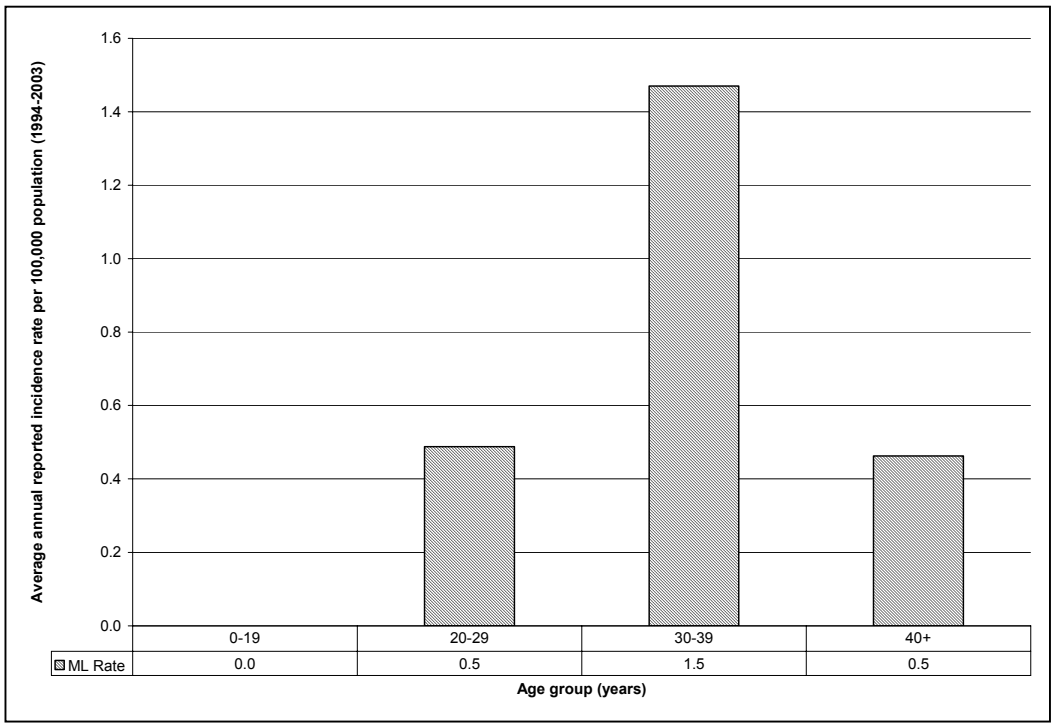


Figure 4.4
Average Annual Reported Incidence Rate of Hepatitis B *Carriers* by Age Group and Sex, Middlesex-London, 1994-2003

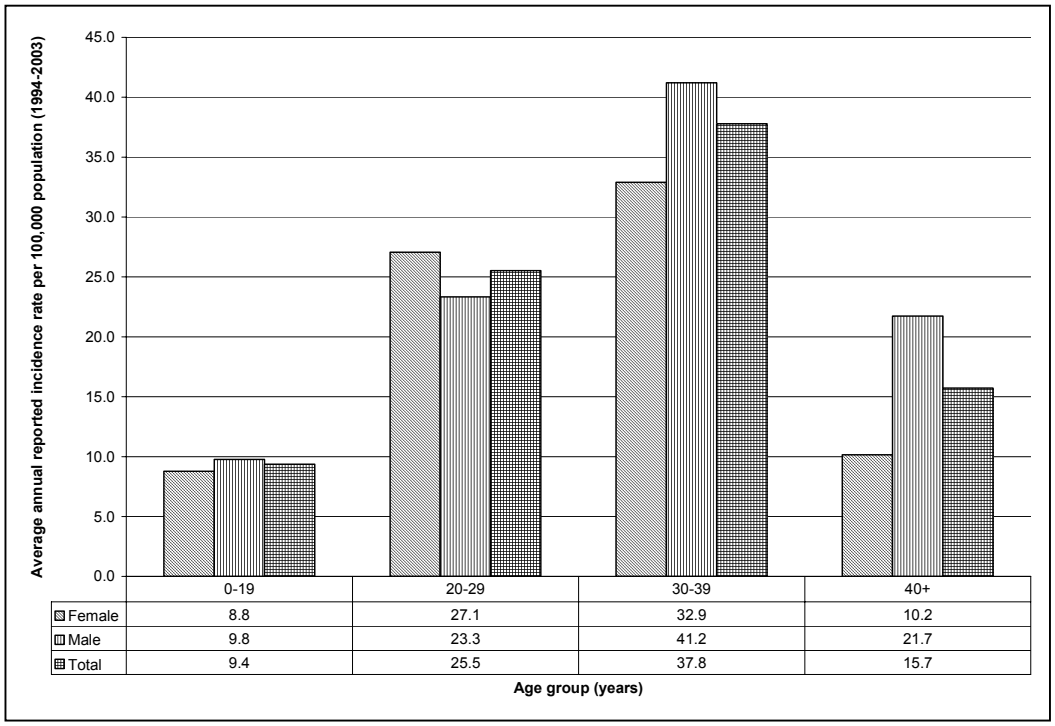
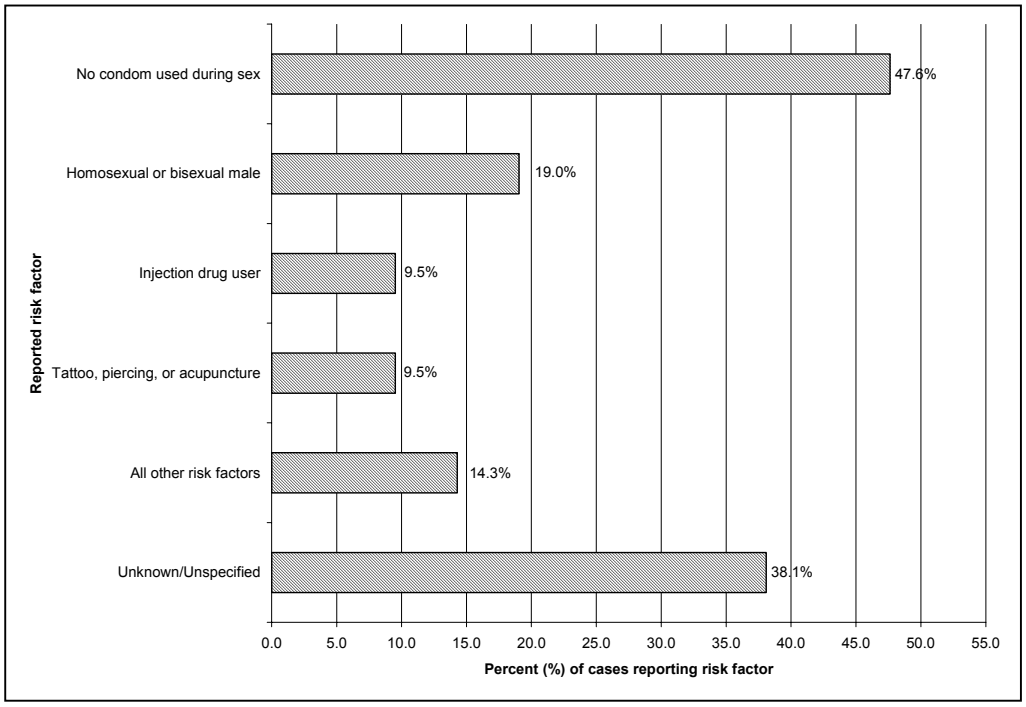
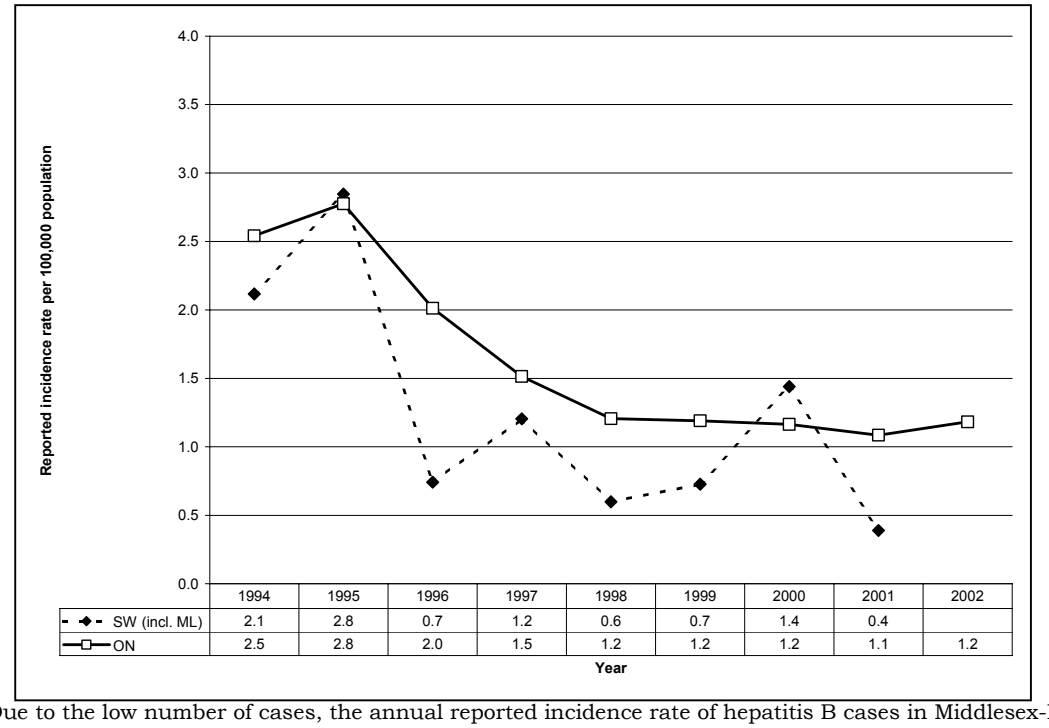


Figure 4.5
Reported Risk Factors for Acute Hepatitis B *Cases*, Middlesex-London, 1994-2003



Note: More than one risk factor may be reported by each case. The denominator used to calculate percentage is the number of cases. Accordingly, the proportions shown do not sum to 100%.

Figure 4.6
Annual Reported Incidence Rate of Acute Hepatitis B *Cases*, Southwestern Ontario (including Middlesex-London), and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002
SW (incl. ML)	2.1	2.8	0.7	1.2	0.6	0.7	1.4	0.4	
ON	2.5	2.8	2.0	1.5	1.2	1.2	1.2	1.1	1.2

Note: Due to the low number of cases, the annual reported incidence rate of hepatitis B cases in Middlesex-London could not be calculated.

INFLUENZA

BACKGROUND

Influenza is a virus that is spread through the air by droplets and by direct contact with the secretions from an infected person's respiratory tract. Influenza is characterized by sudden onset of fever, sore muscles, fatigue, headache, runny nose, and cough. In any individual, the symptoms of influenza may resemble a cold but may be more severe and last longer. Unlike the common cold, influenza has the propensity to spread rapidly through a community and in some cases, can spread worldwide. As well, unlike the common cold, influenza can cause high rates of pneumonia and death, particularly among the elderly and those with heart, lung, or other chronic medical conditions.

Influenza tends to occur in North America between November and April of each year. When influenza arrives in a community, 10% to 20% of the general population can be affected. If influenza occurs in closed populations, such as nursing homes, upwards of 50% of people may become ill.

The strain of influenza that circulates in the population may change each year. A new vaccine containing two influenza A strains and one influenza B strain is developed each year to protect against the strains that are predicted to circulate that year. Prior to 2000, influenza vaccine was publicly funded for people in Ontario 65 years of age and over and those with chronic medical conditions. Since 2000 influenza vaccination has been provided at no direct cost to all Ontario residents who are six months of age or older.

TRENDS IN LONDON AND MIDDLESEX COUNTY

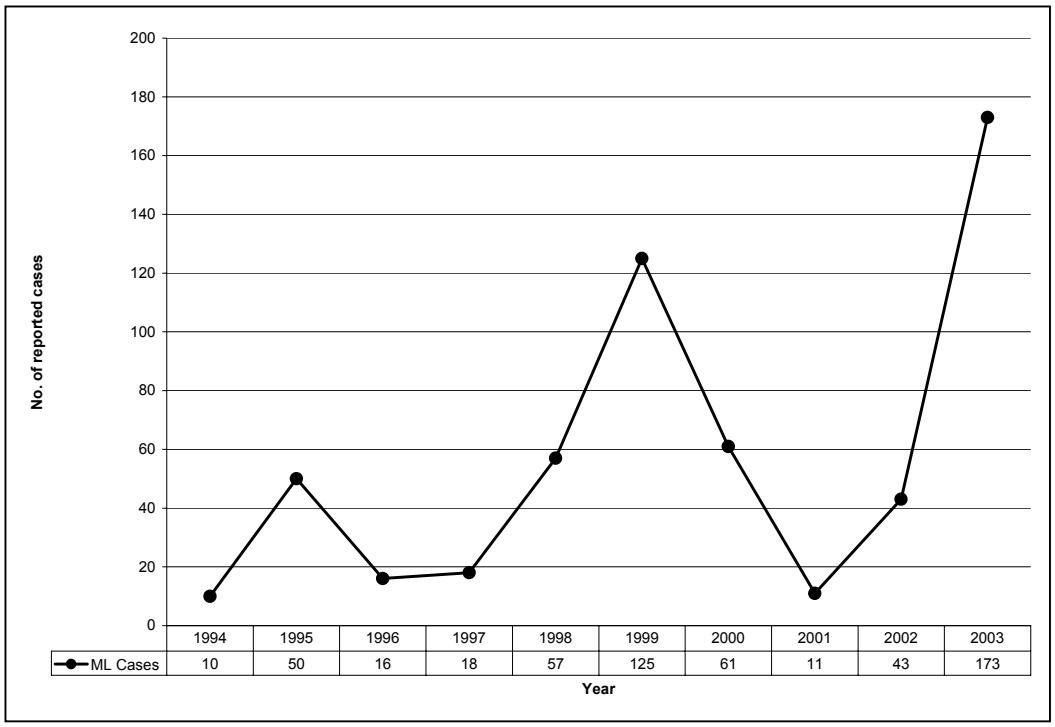
***Historical*:** Figure 4.7 shows that the number of reported influenza cases has fluctuated between 1994 and 2003. The number of influenza cases reported in any single year depends largely on the number of specimens collected to confirm the diagnosis. The number of reported cases is driven predominantly by the number of outbreaks in long-term care facilities, since specimens are consistently obtained when these facilities have an influenza outbreak. Most people in the community who contract influenza do not seek physician care; among those who do, a specimen is not regularly collected. As a result, the number of influenza cases reported here greatly underestimates the true level of influenza in the community.

It is important to note that the means of collecting information about influenza has changed between 1994 and 2003. Prior to the 1996-1997 influenza season, all patients in long-term care facilities experiencing influenza-like symptoms were reported as having influenza if laboratory testing had confirmed influenza in some of the patients. From the 1996-1997 influenza season through the end of the 2002-2003 season, only patients with a laboratory-confirmed positive specimen were reported as having influenza. Positive specimen results from community members were

consistently captured when available, but starting with the 2003-2004 season, Middlesex-London physicians were encouraged to collect and submit specimens from community cases more frequently. All these changes to influenza information collection may have influenced the observed fluctuation in the number of reported influenza cases between 1994 and 2003.

Regional: Comparable information about the reported number of influenza cases was not available for the remainder of the Southwest region or Ontario.

Figure 4.7
Annual Number of Reported Influenza Infections,
Middlesex-London, 1994-2003



MEASLES

BACKGROUND

Measles virus is one of the most highly contagious of all infectious diseases, and is spread through the air or by direct contact with infected respiratory secretions. Measles is characterized by a red rash that starts on the face, as well as fever and runny eyes and nose. Individuals who develop measles can become very ill and may develop significant complications that include pneumonia and infections of the brain. It is estimated that of those who develop the disease, one in 3,000 will die as a result of the infection. In 1991, five children died of measles during a large outbreak in Quebec.

Because measles is so highly contagious, it is essential that very high rates of immunization against measles be maintained. In 1996, a two-dose measles vaccination strategy was introduced in Ontario to prevent future outbreaks. Although a single dose of vaccine is 90% to 95% effective, the two-dose strategy raises community levels of protection against measles to 99%. The Ontario Ministry of Health and Long-Term Care recommends that children receive vaccination to protect against measles shortly after their first birthday. The second immunization was given between the ages of four and six years, but as of January 2005, it is given at the age of 18 months.

TRENDS IN LONDON AND MIDDLESEX COUNTY

***Historical*:** Figure 4.8 shows that there has been a dramatic reduction in the number of reported cases of measles in Middlesex-London since the introduction of the two-dose vaccination strategy. In 1994 and 1995 an average of 32 cases was reported each year. Since 1996 there has been only one confirmed case of measles reported in Middlesex-London. This case acquired measles in 1997 while in another country.

***By age group*:** Measles cases were last reported in Middlesex-London in 1997. Figure 4.9 shows that between 1994 and 1997 the average annual reported incidence rate of measles was highest among those between the ages of 15 and 19 years (42.6/100,000). All reported cases were under the age of 20 years.

***Regional*:** As shown in Figure 4.10, there has also been a dramatic reduction in the reported incidence rate of measles in Southwestern Ontario (including Middlesex-London) and Ontario as a whole since the two-dose strategy was introduced. Since 1998 the reported incidence rate has been less than 0.1/100,000 in both the Southwest region and Ontario.

Figure 4.8
Annual Number of Reported Measles Infections,
Middlesex-London, 1994-2003

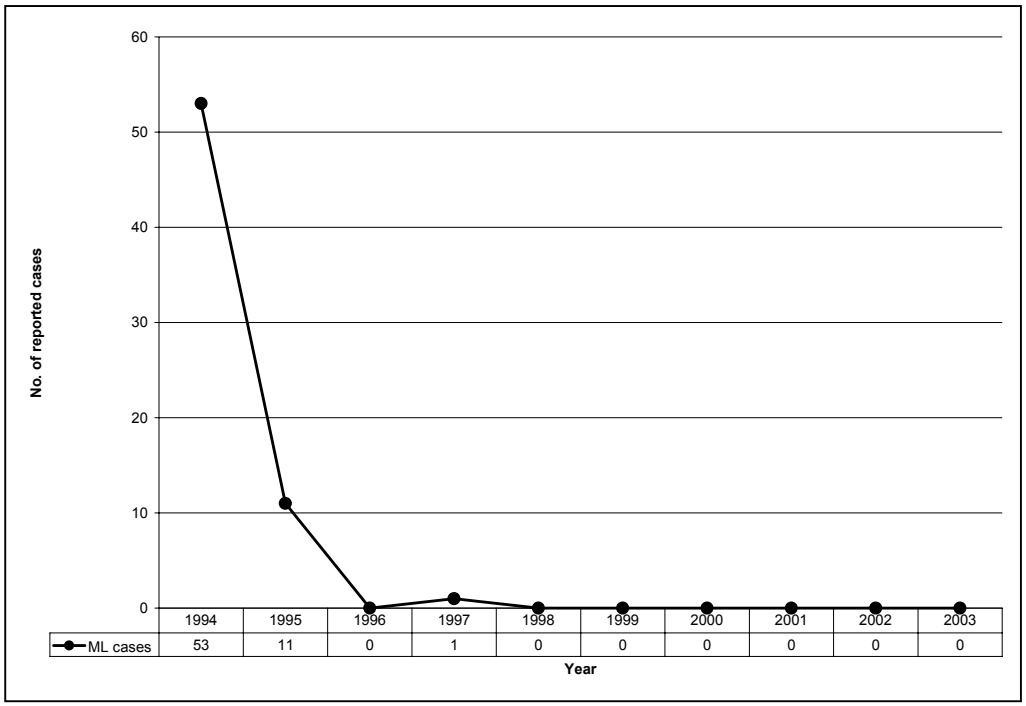


Figure 4.9
Average Annual Reported Incidence Rate of Measles Infections by Age Group,
Middlesex-London, 1994-1997

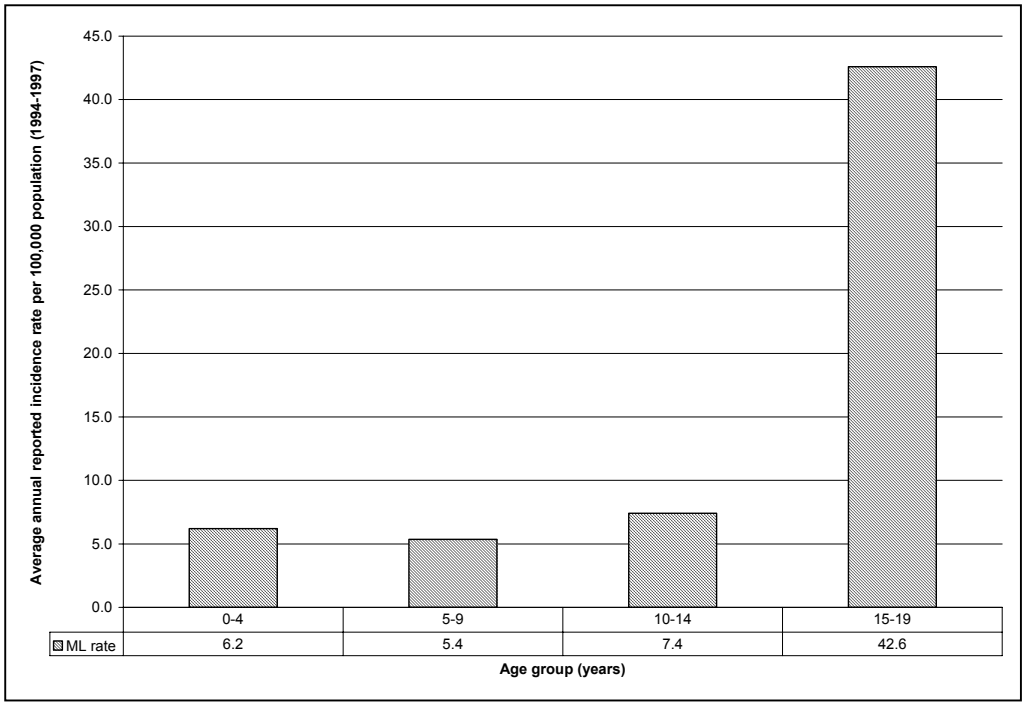
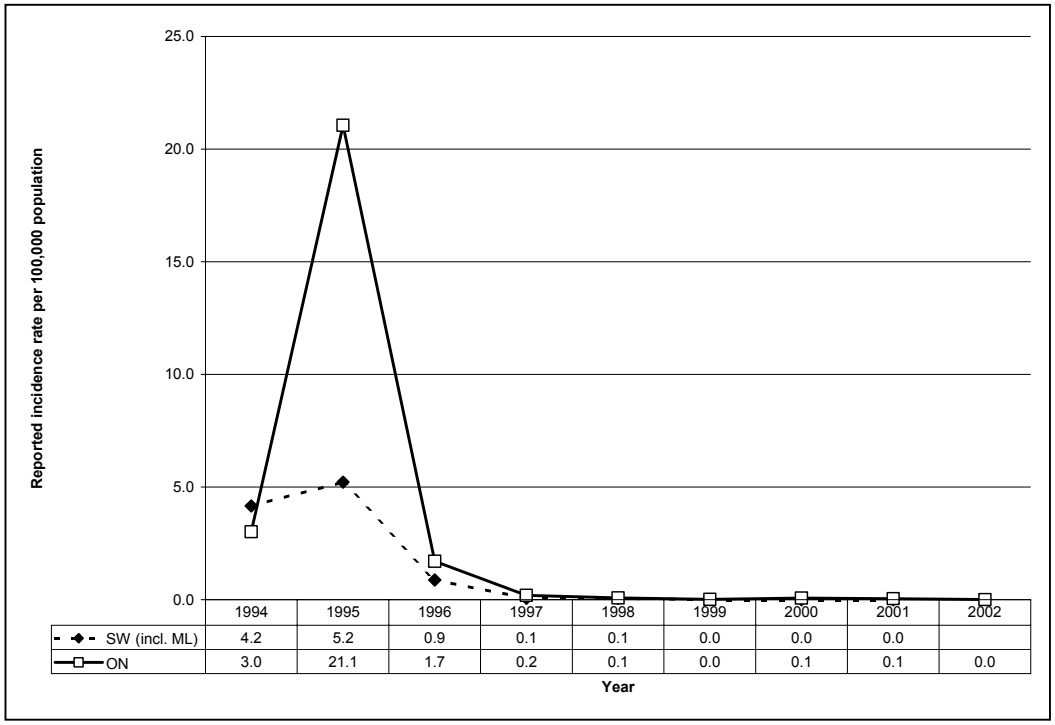


Figure 4.10
Annual Reported Incidence Rate of Measles Infections,
Southwestern Ontario (including Middlesex-London), and Ontario, 1994-2002



	1994	1995	1996	1997	1998	1999	2000	2001	2002
SW (incl. ML)	4.2	5.2	0.9	0.1	0.1	0.0	0.0	0.0	
ON	3.0	21.1	1.7	0.2	0.1	0.0	0.1	0.1	0.0

Note: Due to the low number of cases, the annual reported incidence rate of measles infections in Middlesex-London could not be calculated.

MENINGOCOCCAL DISEASE

BACKGROUND

Meningococcal disease is caused by the bacterium *Neisseria meningitidis.* The bacterium causes two forms of illness: meningitis, a swelling of the lining of the brain and spinal cord (the meninges); or meningococcemia, an infection of the blood stream. Meningococcal disease is fatal in about 10% of cases. Children under the age of five have the highest rates of infection with this bacterium, although high rates are also observed for adolescents and young adults.

There are 13 types, or serogroups, of meningococcal disease. Serogroup C is the most common, accounting for about one-third of meningococcal cases in Canada. Regardless of the serogroup, meningococcal disease is spread when the nose or throat secretions of an infected person come in contact with the mouth or nose of another person. This can occur through kissing and sharing drinks or cigarettes. Coughing or sneezing directly at another person can also result in the spread of this infection.

In September 2004 a vaccine against serogroup C meningococcal disease became publicly funded for one year olds in Ontario. Effective January 1, 2005, the vaccine was also publicly funded for grade 7 students, other 12 year olds, 15 to 19 year olds, and those with high-risk medical conditions.

TRENDS IN LONDON AND MIDDLESEX COUNTY

***Historical*:** Figure 4.11 shows that the number of reported meningococcal cases in Middlesex-London varied between 1994 through 2003. On average, five meningococcal cases were reported each year in the ten-year time period. In 2001 there was a community outbreak of meningococcal disease in London. Six laboratory-confirmed cases of serogroup C were identified during the outbreak period of February to June 2001. A two-phase mass immunization campaign was launched and approximately 106,000 people were vaccinated.

***By age group*:** Between 1994 and 2003, the average annual reported incidence rate of meningococcal disease was greatest among children under the age of one year, at 18.5/100,000 (Figure 4.12). Another smaller peak was also observed among those 15 to 19 years of age (2.6/100,000).

***Regional*:** Annual reported incidence rates could not be generated for Middlesex-London due to an insufficient number of cases in several years. However, between 1994 and 2003, the average annual reported incidence rate of meningococcal disease in Middlesex-London was 1.2/100,000 compared to 0.9/100,000 in the rest of Southwestern Ontario and 0.7/100,000 in Ontario. Figure 4.13 illustrates that in general, the annual reported incidence rate of meningococcal disease has decreased in Southwestern Ontario (including Middlesex-London) and the province as a whole.

Figure 4.11
Annual Number of Reported Meningococcal Infections,
Middlesex-London, 1994-2003

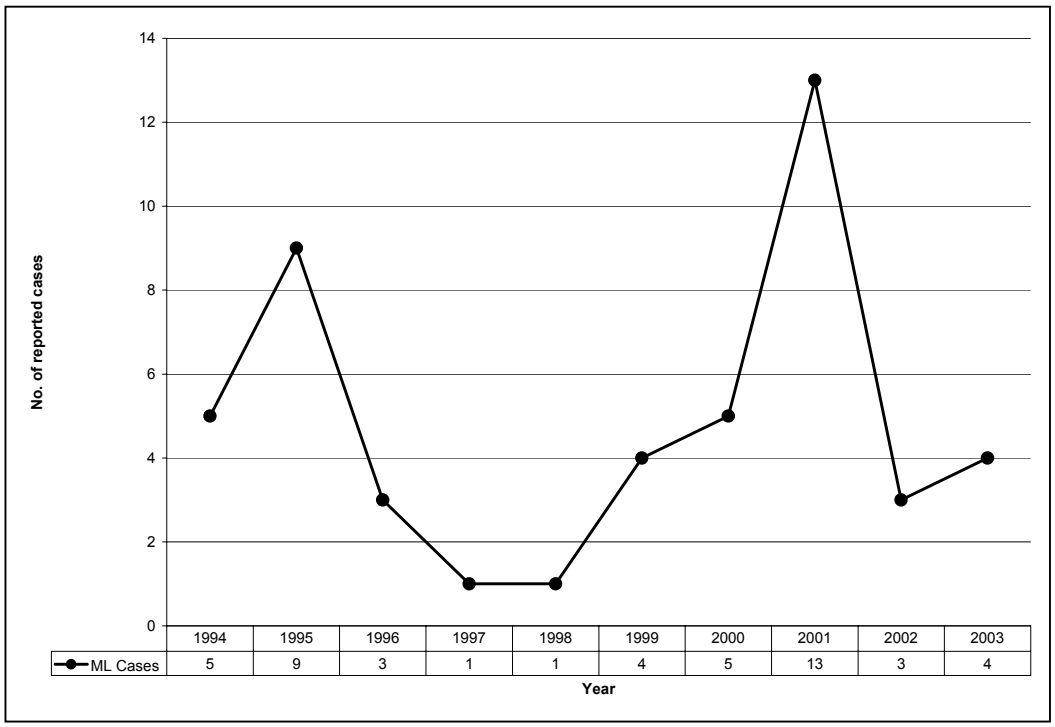


Figure 4.12
Average Annual Reported Incidence Rate of Meningococcal Infections by Age Group,
Middlesex-London, 1994-2003

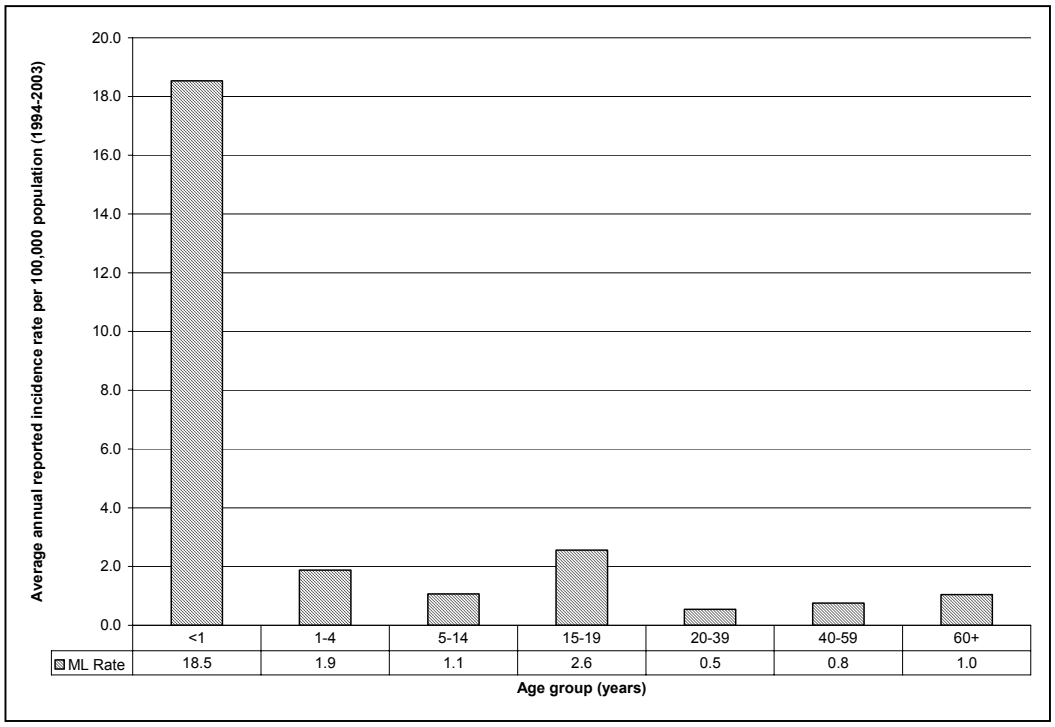
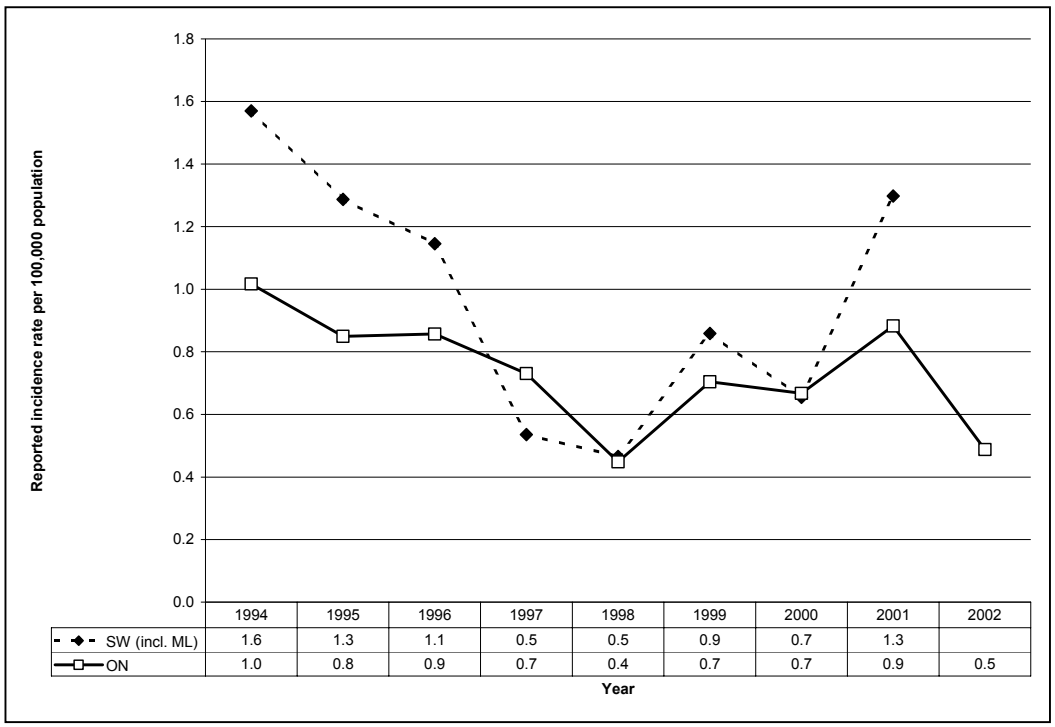


Figure 4.13
Annual Reported Incidence Rate of Meningococcal Infections,
Southwestern Ontario (including Middlesex-London) and Ontario, 1994-2002



	1994	1995	1996	1997	1998	1999	2000	2001	2002
SW (incl. ML)	1.6	1.3	1.1	0.5	0.5	0.9	0.7	1.3	
ON	1.0	0.8	0.9	0.7	0.4	0.7	0.7	0.9	0.5

Note: Due to the low number of cases, the annual reported incidence rate of meningococcal infections in Middlesex-London could not be calculated.

MUMPS

BACKGROUND

Mumps is an acute viral illness that causes fever and swelling of the salivary glands under the jaw and in the cheeks. It is spread by direct contact with or inhalation of the nose and throat secretions of an infected person. Serious complications of mumps include a mild form of meningitis, deafness and, among affected males, inflammation of the testicles (orchitis). On rare occasions, permanent sterility may result from orchitis. Spontaneous abortion may occur as a result of mumps infection during the first three months of pregnancy.

The Ontario Ministry of Health and Long-Term Care recommends that children receive a vaccination to protect against mumps shortly after their first birthday. A second immunization was formerly given between the ages of four and six years but, as of January 2005, is now provided at 18 months of age.

TRENDS IN LONDON AND MIDDLESEX COUNTY

***Historical*:** Since1995 the number of mumps cases reported in Middlesex-London has been in decline, to the point that no cases were reported in either of 2002 or 2003 (Figure 4.14). Between 1994 and 2001 there was an annual average of eight reported mumps cases.

***By age group*:** Figure 4.15 shows that between 1994 and 2003, the average annual reported incidence rate of mumps in Middlesex-London was highest among children five to nine years of age (7.8/100,000), followed by those four years of age and under (5.7/100,000). From 1994 through 2003 there were four reported cases of mumps among males 15 years of age and over, who are at increased risk for orchitis.

***Regional*:** Annual reported incidence rates could not be generated for Middlesex-London or the remainder of Southwestern Ontario due to the insufficient number of cases since 1998 onward. Between 1994 and 2003, the average annual reported incidence rate of mumps cases in Middlesex-London was 1.5/100,000 compared to 0.7/100,000 in the rest of Southwestern Ontario and 0.6/100,000 in Ontario. The reason for slightly higher rates in Middlesex-London is not clear. Figure 4.16 shows that in Ontario, the annual reported incidence rate of mumps decreased nearly ten-fold between 1994 and 2002.

Figure 4.14
Annual Number of Reported Mumps Infections,
Middlesex-London, 1994-2003

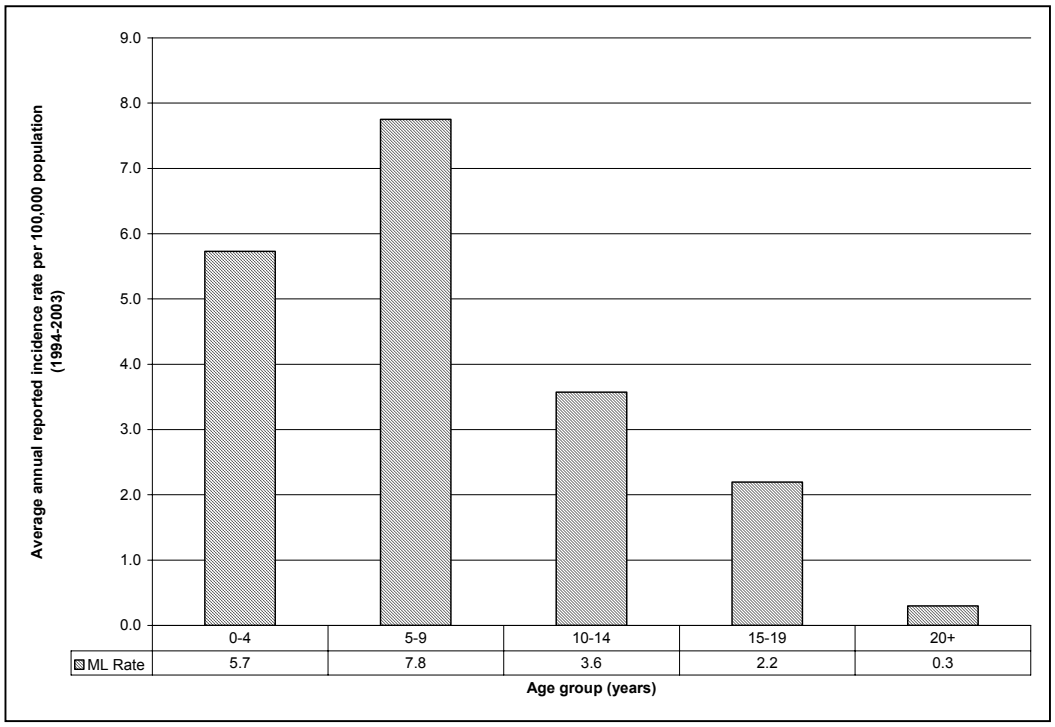


Figure 4.15
Average Annual Reported Incidence Rate of Mumps Infections by Age Group,
Middlesex-London, 1994-2003

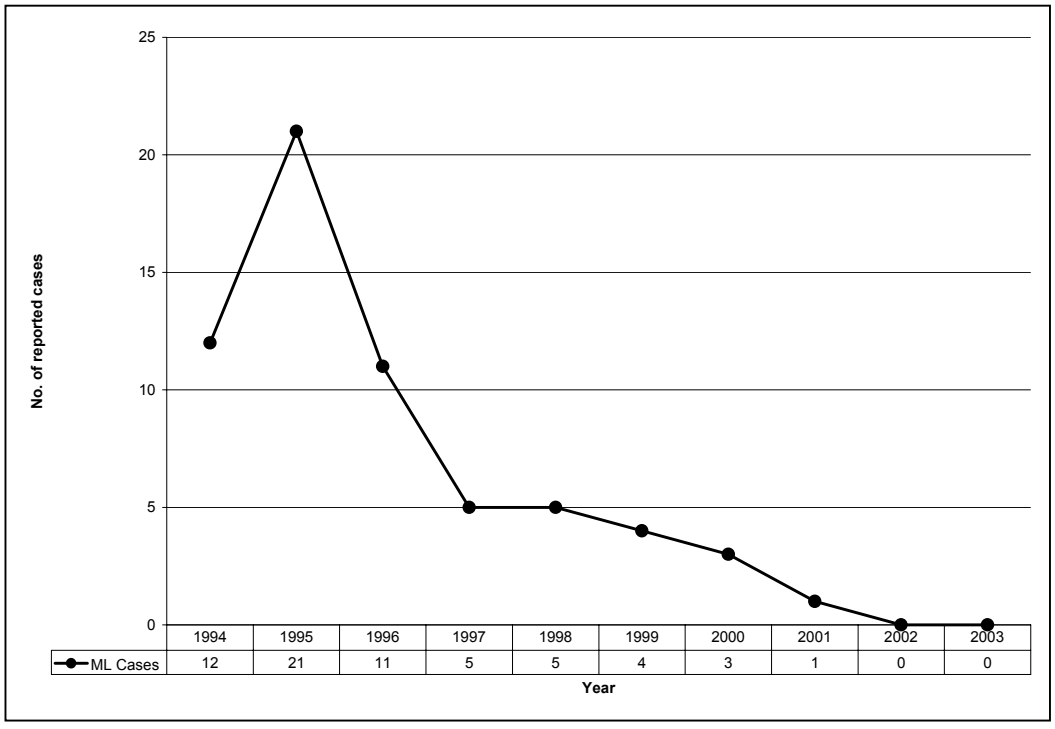
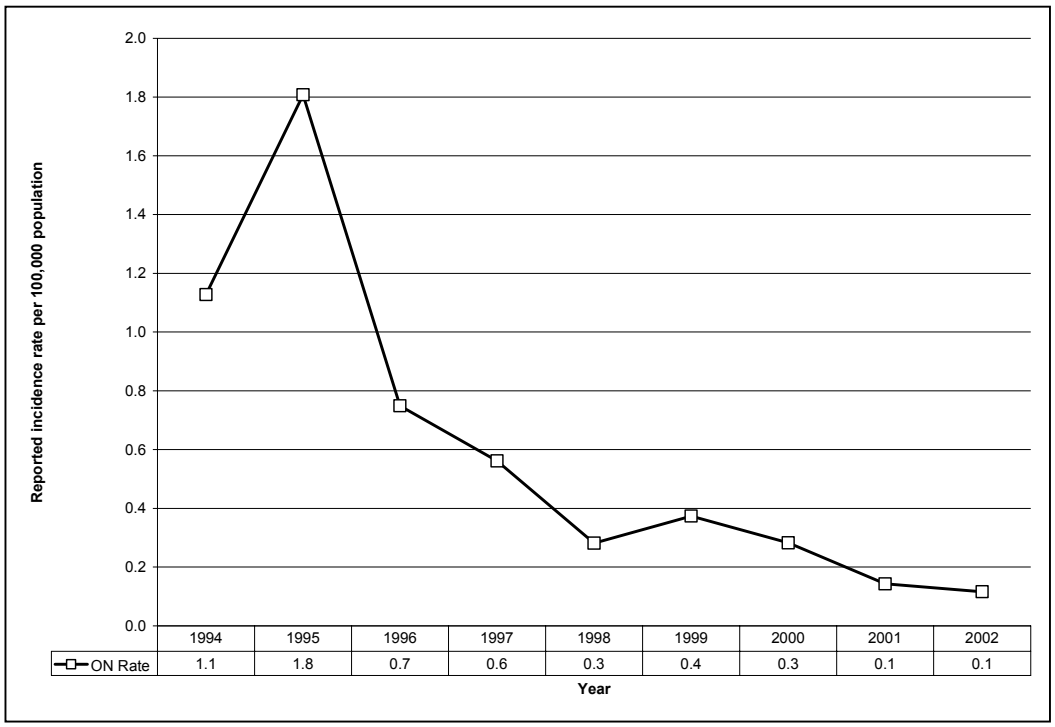


Figure 4.16
Annual Reported Incidence Rate of Mumps Infections,
Ontario, 1994-2002



Note: Due to the low number of cases, the annual reported incidence rate of mumps infections in Middlesex-London and the remainder of Southwestern Ontario could not be calculated.

PERTUSSIS

BACKGROUND

Pertussis, or whooping cough, is caused by the bacterium *Bordetella pertussi*s. It causes a cough, lasting six to ten weeks, that is characterized by prolonged spasms that often end in a whooping noise. Affected individuals may also have difficulty breathing, a fever, and may vomit. Pertussis is highly contagious and spreads when an infected person coughs or sneezes near other people. Complications of pertussis, which can affect all ages but are most likely to develop in young babies, include pneumonia, weight loss, seizures, brain damage and rarely, death. Vaccinated children who develop pertussis tend to have milder disease and may not have the classic whoop after they cough. Adolescents and adults who develop the disease may also have milder forms of pertussis, but they can transmit the infection to others, including infants.

The introduction of the pertussis vaccine in 1943 resulted in a decrease of over 90% in the rate of pertussis in Canada. However, cases of pertussis continued to occur in Canada. This is because the whole cell vaccine that was in use until mid-1997 was only 50% to 80% effective in protecting against pertussis, and because protection provided by vaccination decreases over time. A new form of the vaccine, called acellular pertussis vaccine, was introduced in the summer of 1997. This new vaccine is estimated to be at least 80% effective, and its use appears to have resulted in a further decrease in the number of reported pertussis cases.

The Ontario Ministry of Health and Long-Term Care recommends a series of vaccinations against pertussis at two, four, six and 18 months of age, as well as booster immunizations between four and six years of age and again between 14 and 16 years of age. Pertussis protection for adolescents has been available since September 2003, when a vaccine protecting against tetanus, diphtheria and pertussis became publicly funded. Adults receiving their ten-year tetanus booster who want additional protection against pertussis can also consider receiving this vaccine, but it is not publicly funded for this purpose.

TRENDS IN LONDON AND MIDDLESEX COUNTY

***Historical*:** On average, 47 cases of pertussis were reported annually between 1994 and 2003. Figure 4.17 demonstrates that in general, the number of pertussis cases reported in Middlesex-London has decreased since a large outbreak in 1994-1995. However, it is important to note that the number of cases presented in Figure 4.17 is an underestimate of the true number of cases in the community because pertussis is under-detected and under-reported.

***By age group*:** Between 1994 and 2003, the average annual reported incidence rate of pertussis was highest among children under the age of one year (98.9/100,000) (Figure 4.18). The rates for one to four year olds (65.2/100,000) and five to nine year olds (61.0/100,000) were similar. Overall, the reported incidence rate decreased with increasing age.

***By month*:** While pertussis cases are reported throughout the year, Figure 4.19 shows that the average number of cases reported each month tended to be higher in the fall and winter months. The timing of a local outbreak that occurred in 1994-1995 partially influences this observation.

***Regional*:** Between 1994 and 2003, the average annual reported incidence rate of pertussis infections in Middlesex-London was 11.5/100,000 compared to 13.0/100,000 in the rest of Southwestern Ontario and 10.6/100,000 in Ontario. Figure 4.20 shows that the reported incidence rate in Middlesex-London is consistent with the patterns observed in the rest of the Southwest region and the province as a whole.

Figure 4.17
Annual Number of Reported Pertussis Infections,
Middlesex-London, 1994-2003

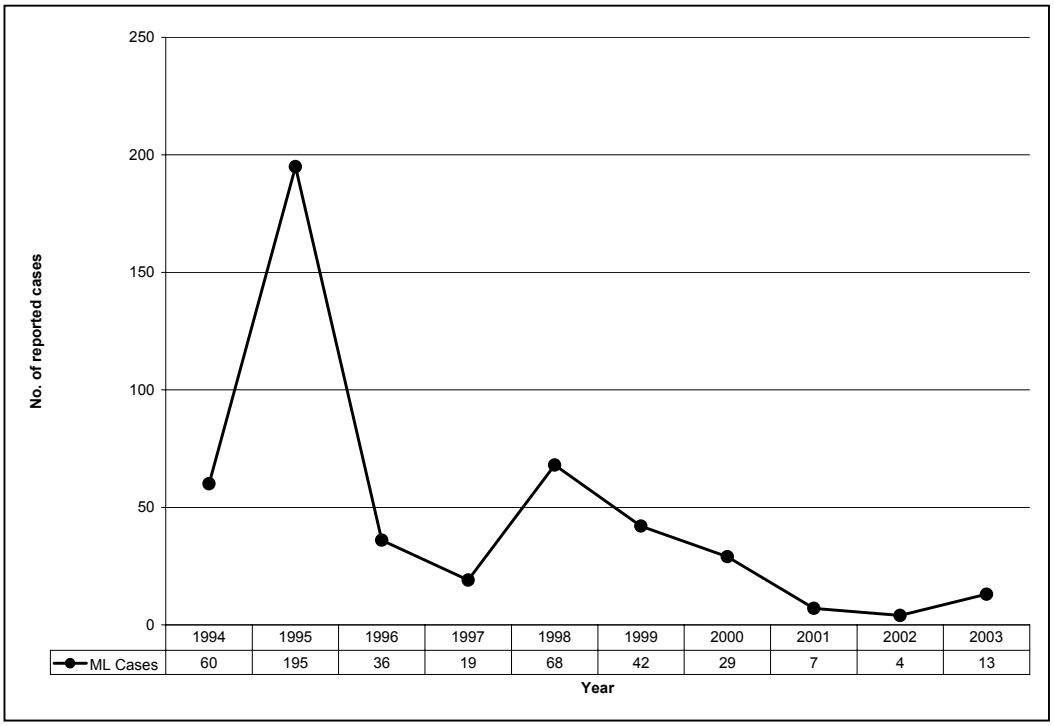


Figure 4.18
Average Annual Reported Incidence Rate of Pertussis Infections by Age Group,
Middlesex-London, 1994-2003

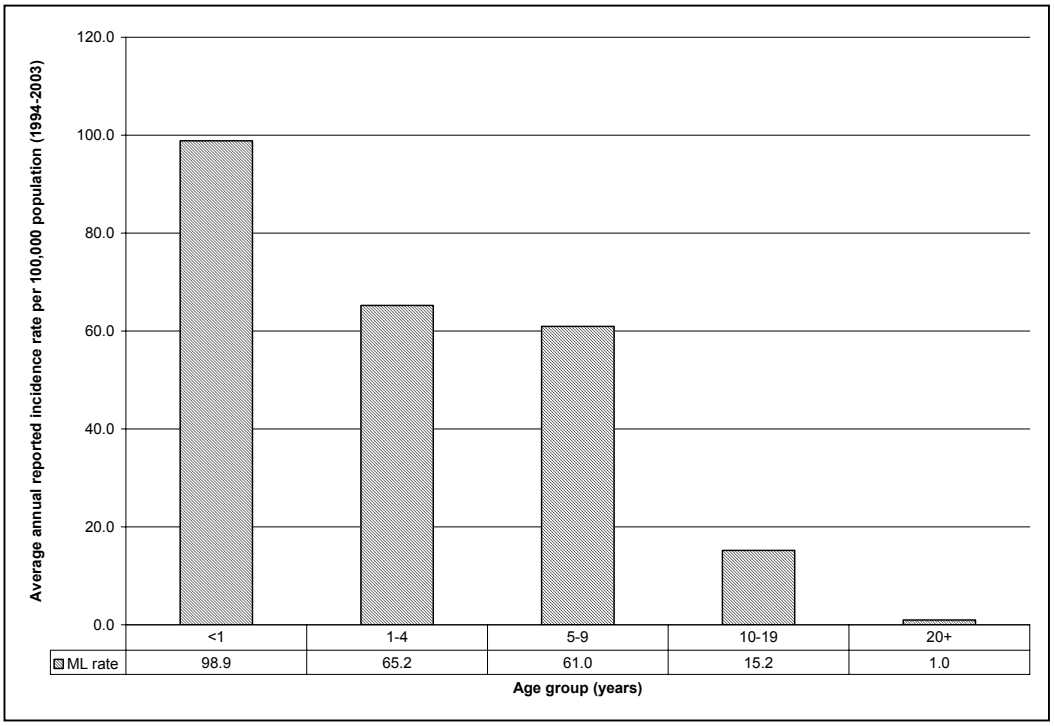
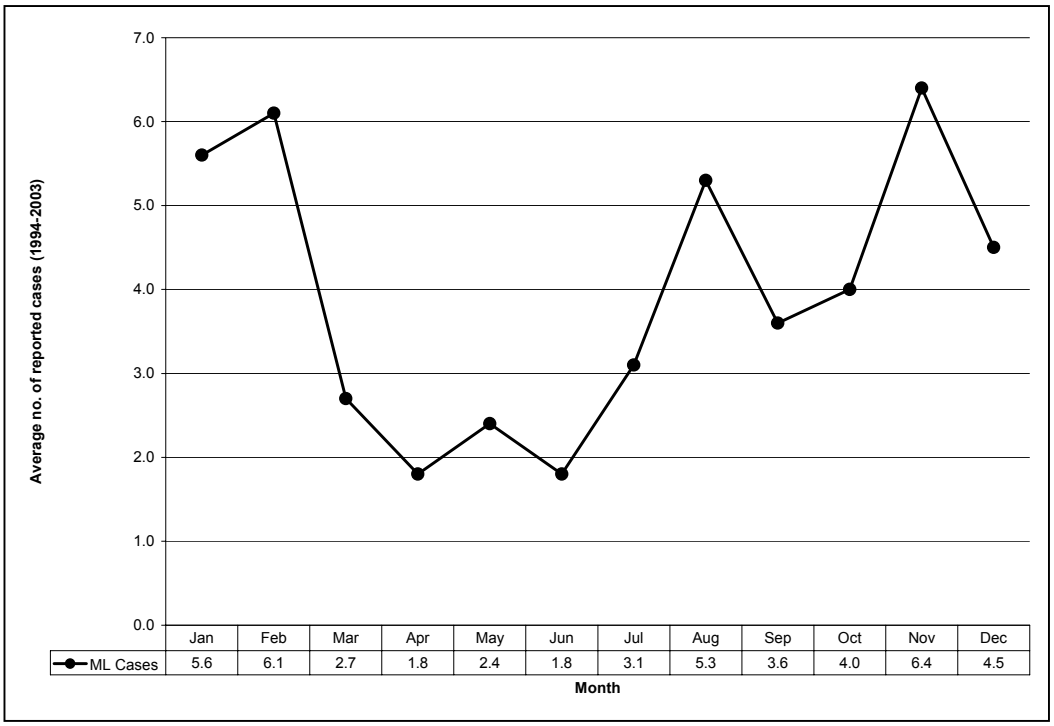
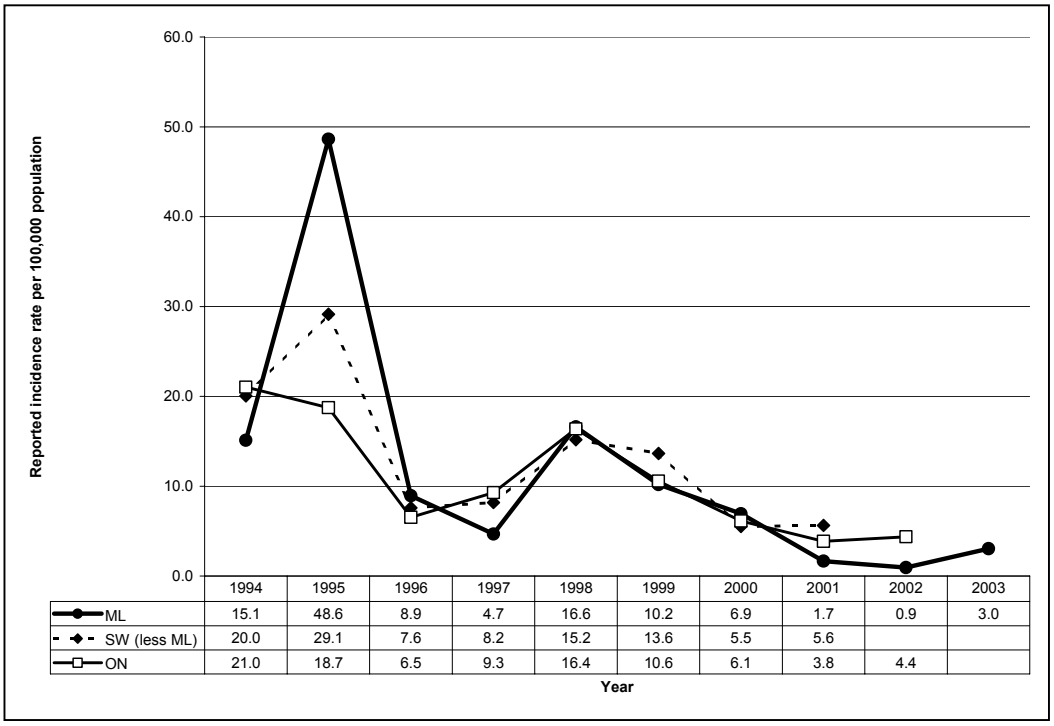


Figure 4.19
Average Number of Reported Pertussis Infections by Month, Middlesex-London, 1994-2003



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
ML Cases	5.6	6.1	2.7	1.8	2.4	1.8	3.1	5.3	3.6	4.0	6.4	4.5

Figure 4.20
Annual Reported Incidence Rate of Pertussis Infections, Middlesex-London, Remainder of Southwestern Ontario, and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ML	15.1	48.6	8.9	4.7	16.6	10.2	6.9	1.7	0.9	3.0
SW (less ML)	20.0	29.1	7.6	8.2	15.2	13.6	5.5	5.6		
ON	21.0	18.7	6.5	9.3	16.4	10.6	6.1	3.8	4.4	

POLIOMYELITIS

BACKGROUND

Poliomyelitis (polio) is a viral infection that can lead to paralysis in about one in every 100 people who contract the virus. The poliovirus is spread from person to person by contact with an infected person's fecal matter or throat secretions. Between 90% and 95% of polio infections produce no or only mild symptoms, such as fever. However, severe illness can result and is characterized by muscle pain and stiffness of the back and neck, and may result in paralysis.

Polio represents another important success in the history of vaccines. It was a common childhood illness until the introduction of a vaccine in 1953. Polio was officially declared eliminated from the Americas in 1994. Maintaining high vaccination levels will help ensure that no further polio cases occur in Canada.

The Ontario Ministry of Health and Long-Term Care recommends a series of vaccinations against polio at the ages of two, four, six, and 18 months, followed by a final vaccination between the ages of four and six years of age.

TRENDS IN LONDON AND MIDDLESEX COUNTY

***Historical*:** No cases of acute polio have been reported in Middlesex-London since 1978.

***Regional*:** Between 1994 and 2002, there were no cases of acute polio reported in North America.

RUBELLA

BACKGROUND

Rubella, also known as German measles, is a viral illness that causes fever, a rash that starts on the face and progresses from head to feet, and swollen lymph nodes. In older adolescents and adults, it may also result in transient joint pain, especially in women. Rubella is spread by direct contact with the nose and throat secretions of an infected person.

Although rubella usually causes relatively mild illness, it is a major concern when a woman contracts the disease while pregnant, as this can lead to the development of congenital rubella syndrome (CRS). CRS can cause spontaneous abortion of the fetus or congenital defects including deafness, cataracts, heart defects, and neurologic disorders. CRS occurs in approximately 90% of infants born to women with confirmed rubella infection during the first trimester of their pregnancy.

The Ontario Ministry of Health and Long-Term Care recommends vaccination to protect against rubella shortly following a child's first birthday, followed by a second vaccination that was given at four to six years of age but as of January 2005 is given at 18 months of age. As well, it is recommended that all women of reproductive age with no documentation of rubella vaccination or no laboratory evidence of rubella immunity be vaccinated against rubella before becoming pregnant.

TRENDS IN LONDON AND MIDDLESEX COUNTY

***Historical*:** Figure 4.21 shows that the number of reported rubella infections in Middlesex-London has decreased since 1995. No new cases have been reported in Middlesex-London since 1999; between 1994 and 1999 there was an annual average of three reported rubella cases.

***By age group*:** Figure 4.22 illustrates that between 1994 and 2003, the average annual reported incidence rate of rubella infections was highest among children four years of age and under (4.2/100,000). In general, the average annual reported incidence rate decreased with increasing age.

***Regional*:** Meaningful incidence rates cannot be calculated for either Middlesex-London or the remainder of Southwestern Ontario due to the low number of cases reported since 1995. There were 146 reported cases in the Southwest region in 1995, but from 1996 to 2001 only 11 additional cases were reported. Between 1994 and 2003, the average annual reported incidence rate of rubella infections in Middlesex-London was 0.5/100,000. This rate was comparable to the average annual reported rate for Ontario (0.4/100,000); the rate for the remainder of Southwestern Ontario (2.3/100,000) exceeded both the local and provincial rates. Figure 4.23 shows that in Ontario, the annual reported incidence rate of rubella infections has remained low at less than 2.0/100,000 population.

Figure 4.21
Annual Number of Reported Rubella Infections,
Middlesex-London, 1994-2003

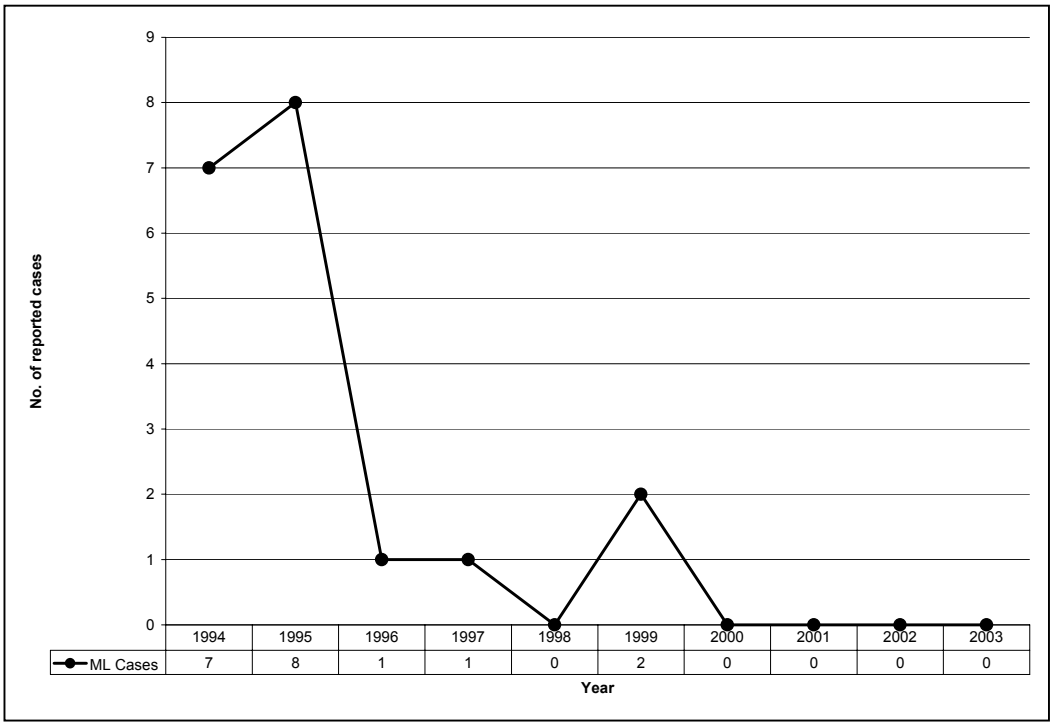


Figure 4.22
Average Annual Reported Incidence Rate of Rubella Infections by Age Group,
Middlesex-London, 1994-2003

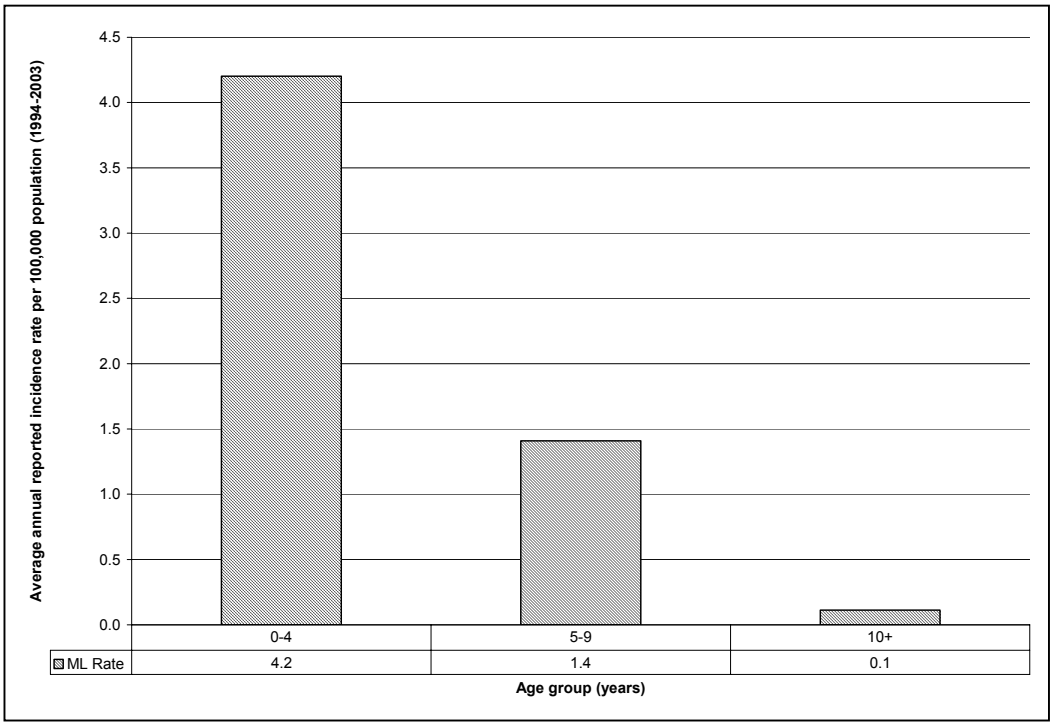
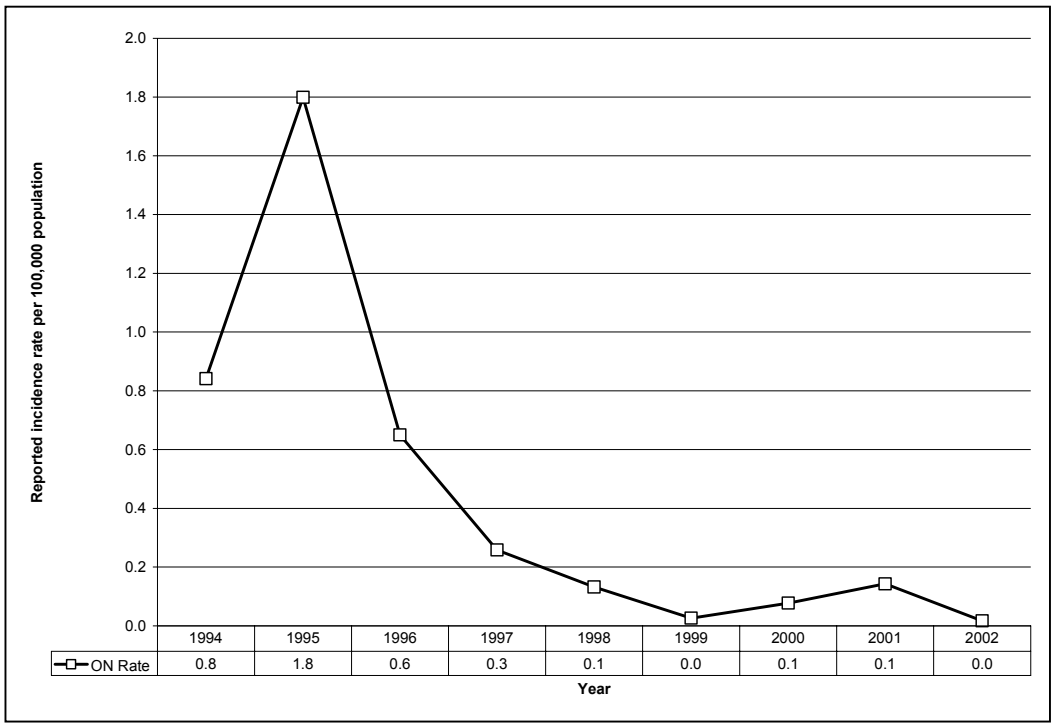


Figure 4.23
Annual Reported Incidence Rate of Rubella Infections,
Ontario, 1994-2003



Note: Due to the low number of cases, the annual reported incidence rate of rubella infections in Middlesex-London and the remainder of Southwestern Ontario could not be calculated.

STREPTOCOCCUS PNEUMONIAE – INVASIVE

BACKGROUND

Invasive pneumococcal disease is caused by the bacterium *Streptococcus pneumoniae* and includes inflammation of the brain and spinal cord lining (meningitis) and infection of the blood (septicemia). *S. pneumoniae* can also cause pneumonia, but this is not generally considered an invasive infection with the bacterium.

A sugar-type (polysaccharide) vaccine has been publicly funded in Ontario since 1996. This vaccine protects against the most common serotypes known to cause pneumonia, and is recommended for people 65 years of age and over and those with chronic medical conditions. A more sophisticated vaccine called a conjugate vaccine, which is effective in young children, has been publicly funded since September 2003 for children less than two years of age with high-risk medical conditions. Since July 2004, the vaccine has been publicly funded for high-risk children under the age of five years. Effective January 1, 2005, the vaccine has been publicly funded for all infants and children less than two years of age, regardless of their medical status. Infants receive this vaccine at two, four, six and 15 months of age.

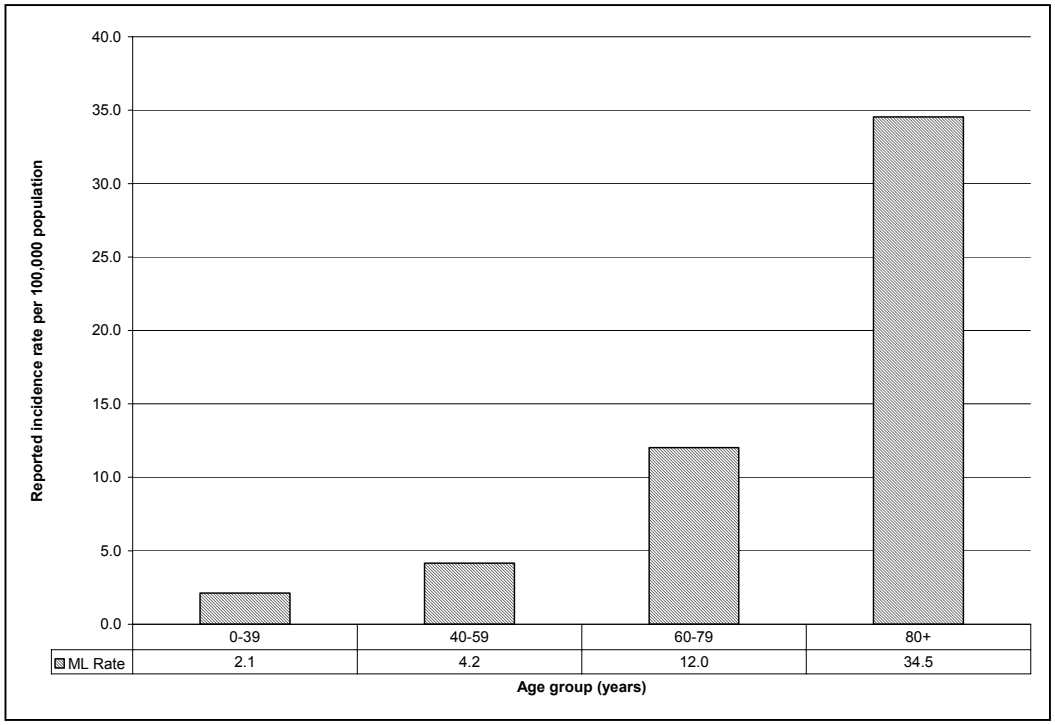
TRENDS IN LONDON AND MIDDLESEX COUNTY

***Historical*:** There were 22 cases of invasive *S. pneumoniae* pneumococcal disease reported in Middlesex-London in 2003, the first year that it was reportable.

***By age group*:** Figure 4.24 shows that in 2003, the reported incidence rate of invasive pneumococcal disease was concentrated among older age groups. The reported rate among those 80 years of age and over (34.5/100,000) was nearly three times greater than the rate among cases in their sixties and seventies.

***Regional*:** Comparative information from the rest of Southwestern Ontario and Ontario was not available.

Figure 4.24
Reported Incidence Rate of Invasive *S. pneumoniae* Infections by Age Group, Middlesex-London, 2003



TETANUS

BACKGROUND

Tetanus is a potentially fatal disease caused by the *Clostridium tetani* bacterium. The spores of the bacteria are found everywhere in our environment including soil and household dust. They can be introduced into the body through cuts, puncture wounds, or burns. Even a minor injury, such as a prick from rose bush, can result in tetanus. Affected individuals experience painful muscle contractions that begin in the neck and may spread to include to the trunk muscles. Infection with tetanus can be fatal in 10% of cases.

Immunization for tetanus was introduced in Canada in 1940, resulting in a substantial reduction in the number of reported tetanus cases and deaths, such that only five deaths from tetanus have been reported in Canada since 1980. The number of cases treated between 1994 and 2000 is similarly low, ranging between three and seven cases reported in Canada each year.

The Ontario Ministry of Health and Long-Term Care recommends a series of vaccinations to protect against tetanus at two, four, six, and 18 months of age, as well as between the ages of four and six years and between 14 and 16 years of age. Booster vaccinations are recommended every ten years for adults, to provide long-term protection against tetanus.

TRENDS IN LONDON AND MIDDLESEX COUNTY

***Historical*:** No cases of tetanus have been reported in Middlesex-London for many years. There are no cases recorded in the Health Unit's electronic data collection system, which contains information dating back to 1990.

***Regional*:** Between 1994 and 2001 there were three tetanus cases reported in the remainder of Southwestern Ontario. In the same time period, between one and three cases were reported each year in the province as a whole. Although the number is small, it reinforces the need for continued promotion of tetanus vaccination.

OTHER EMERGING AND REPORTABLE DISEASES

ENCEPHALITIS AND MENINGITIS – PRIMARY VIRAL

BACKGROUND

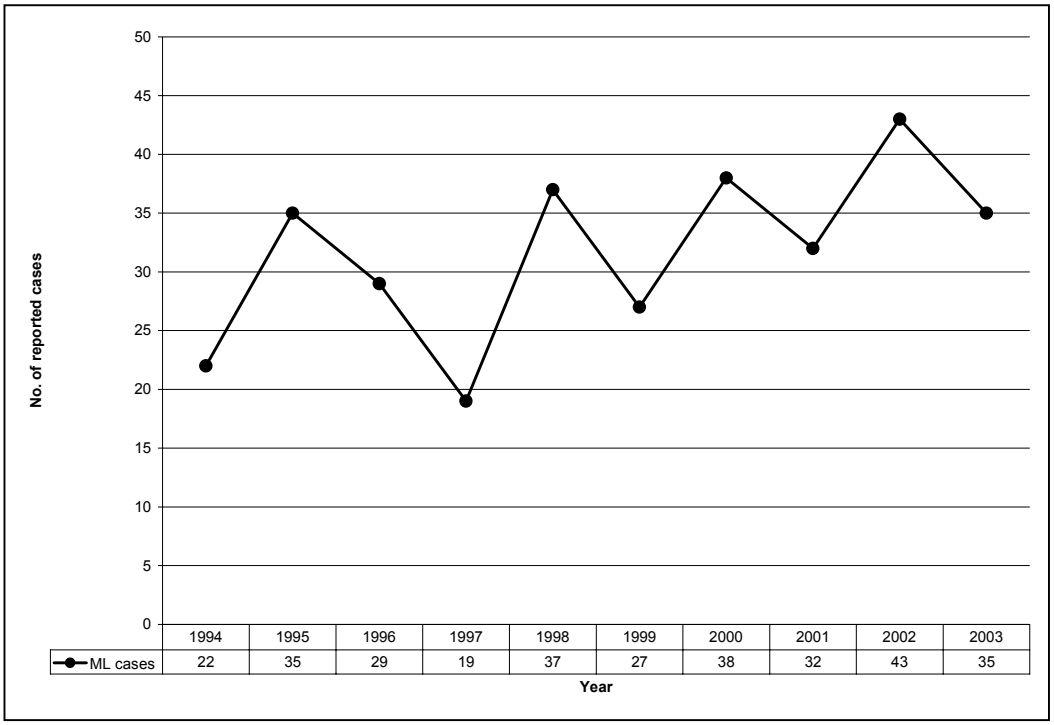
Primary viral encephalitis and meningitis are caused by a variety of viruses. Accordingly, clinical presentation of disease varies depending on the virus causing the encephalitis or meningitis, but generally includes fever, headache, and stiff neck. A rash, respiratory symptoms or gastrointestinal symptoms may also occur depending on the virus. In general, people with viral encephalitis/meningitis tend to be less ill than those with bacterial meningitis. As well, contacts of viral encephalitis/meningitis are not at increased risk of acquiring viral encephalitis/meningitis and so do not require public health follow up.

TRENDS IN LONDON AND MIDDLESEX COUNTY

***Historical*:** Figure 5.1 shows that the number of reported encephalitis/meningitis cases in Middlesex-London varied between 1994 and 2003. Over the ten-year period, an average of 32 cases was reported each year.

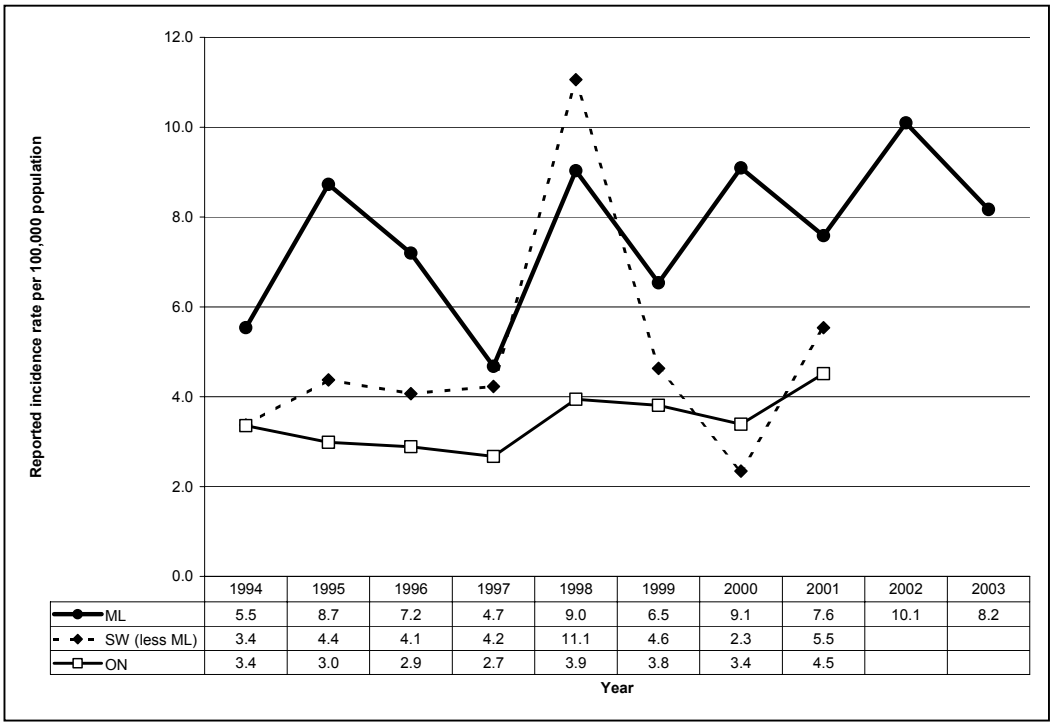
***Regional*:** Figure 5.2 illustrates that the annual reported incidence rate of primary viral encephalitis/meningitis in Middlesex-London was consistently higher than the reported incidence rate in the remainder of Southwestern Ontario, except in 1998. Similarly, the annual reported incidence rate in Middlesex-London exceeded the rate in Ontario across all years. Between 1994 and 2003 the average annual reported incidence rate in Middlesex-London was 7.7/100,000. This compares to 5.0/100,000 in the rest of the Southwest region and 3.5/100,000 in Ontario between 1994 and 2001. The higher rates compared to the region and province may reflect more comprehensive reporting by physicians in Middlesex-London rather than a truly elevated rate.

Figure 5.1
Annual Number of Reported Primary Viral Encephalitis/Meningitis Infections, Middlesex-London, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ML cases	22	35	29	19	37	27	38	32	43	35

Figure 5.2
Annual Reported Incidence Rate of Primary Viral Encephalitis/Meningitis Infections, Middlesex-London, Remainder of Southwestern Ontario, and Ontario, 1994-2003



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
ML	5.5	8.7	7.2	4.7	9.0	6.5	9.1	7.6	10.1	8.2
SW (less ML)	3.4	4.4	4.1	4.2	11.1	4.6	2.3	5.5		
ON	3.4	3.0	2.9	2.7	3.9	3.8	3.4	4.5		

GROUP A *STREPTOCOCCUS* – INVASIVE

BACKGROUND

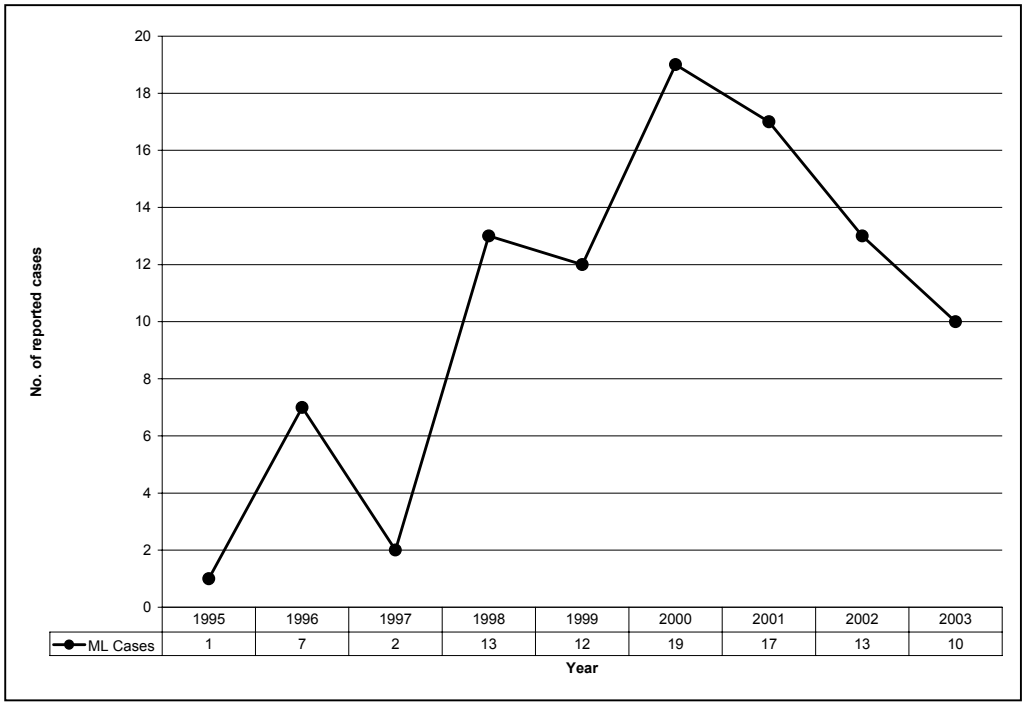
Group A *streptococcus* (GAS) is a bacterium that causes a range of infections, including the common "Strep throat", cellulitis, and scarlet fever. GAS infections can result in complications such as rheumatic fever and kidney disease. As well, GAS can cause serious infections that are referred to as invasive. Invasive infections are defined as infections in parts of the body where these bacteria are not normally found, and include severe infections such as necrotizing fasciitis (flesh-eating disease) or streptococcal toxic shock syndrome. GAS is transmitted from person to person by direct contact or by inhaling droplets expelled by infected persons while coughing or sneezing. All forms of invasive GAS have been reportable to public health since April 1995.

TRENDS IN LONDON AND MIDDLESEX COUNTY

***Historical**:* Figure 5.3 shows that the number of reported group A *streptococcus* (GAS) infections in Middlesex-London has decreased since 2000. On average, there were ten cases reported each year between 1995 and 2003.

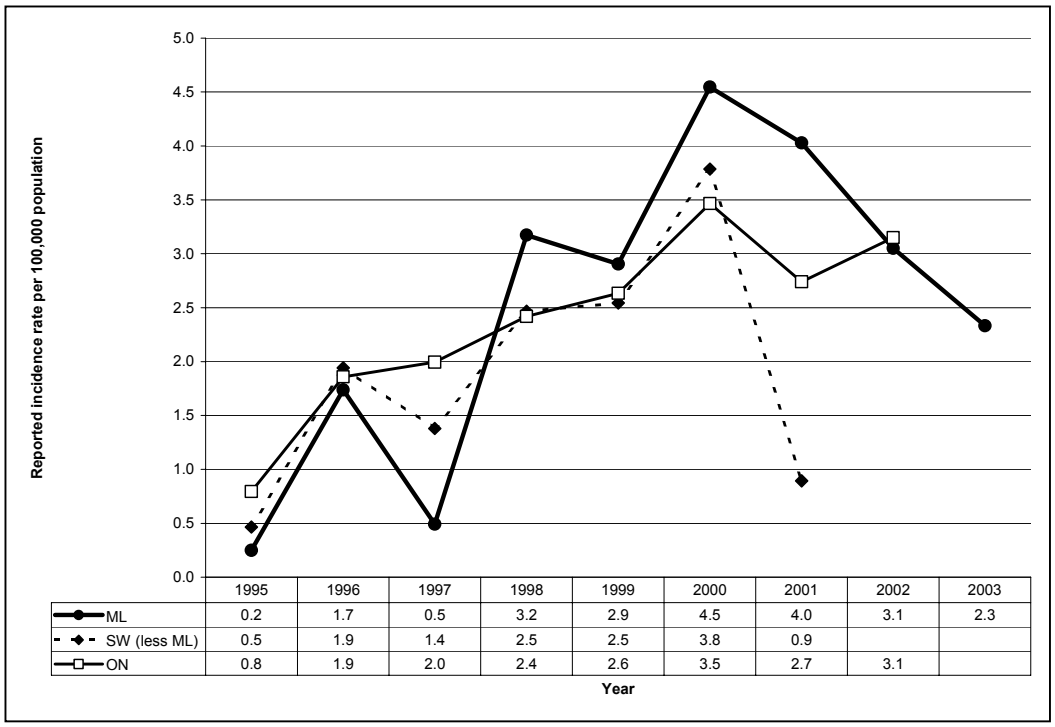
Regional: Between 1995 and 2003, the average annual reported incidence rate of GAS infections in Middlesex-London was 2.5/100,000 compared to 1.9/100,000 in the rest of Southwestern Ontario and 2.4/100,000 in Ontario as a whole. Figure 5.4 shows that the variation of the annual reported incidence rate in Middlesex-London was similar to the variation in the remainder of the Southwest region and Ontario, but exceeded the rates in both areas between 1998 and 2001.

Figure 5.3
Annual Number of Reported Group A *Streptococcus* Infections, Middlesex-London, 1995-2003



	1995	1996	1997	1998	1999	2000	2001	2002	2003
ML Cases	1	7	2	13	12	19	17	13	10

Figure 5.4
Annual Reported Incidence Rate of Group A *Streptococcus* Infections, Middlesex-London, Remainder of Southwestern Ontario, and Ontario, 1995-2003



	1995	1996	1997	1998	1999	2000	2001	2002	2003
ML	0.2	1.7	0.5	3.2	2.9	4.5	4.0	3.1	2.3
SW (less ML)	0.5	1.9	1.4	2.5	2.5	3.8	0.9		
ON	0.8	1.9	2.0	2.4	2.6	3.5	2.7	3.1	

GROUP B *STREPTOCOCCUS* – NEONATAL

BACKGROUND

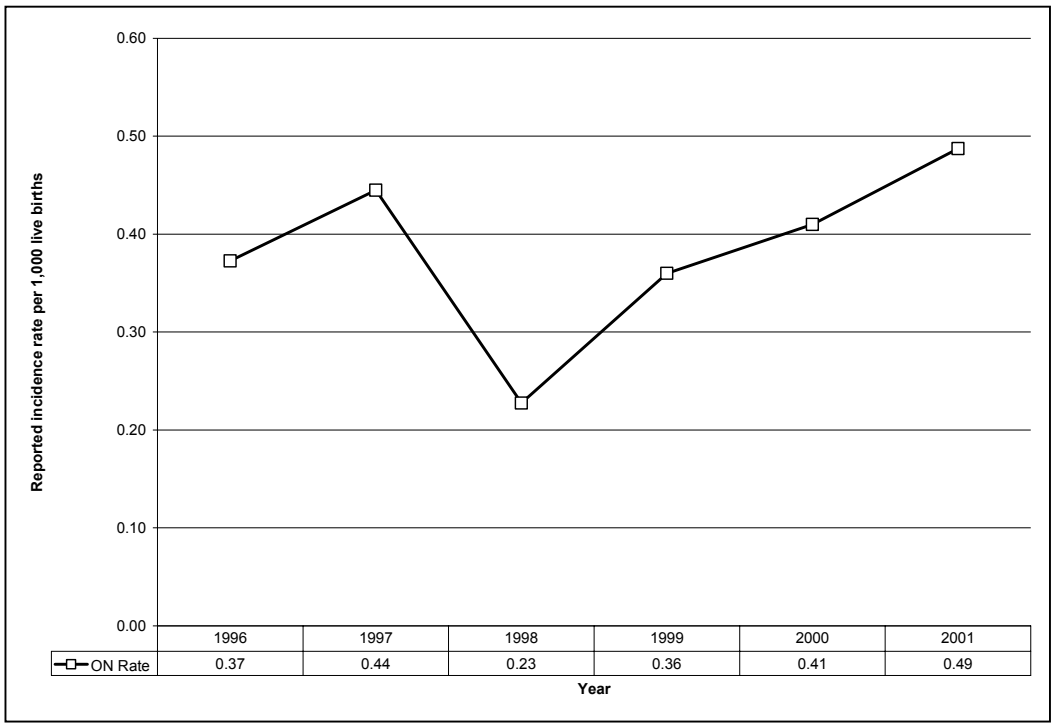
Invasive group B *streptococcus* (GBS) infections have been reportable in Ontario since 1996. Invasive infections of newborns (neonates) caused by GBS *(Streptococcus agalactiae)* manifest in two forms: early onset and late onset disease. Infection leading to *early*-onset disease occurs shortly before or during delivery. Early-onset disease occurs within one to seven days of delivery, and is characterized by onset of respiratory distress, shock, pneumonia, and less frequently, meningitis. *Late*-onset disease occurs anywhere from seven days to several months post-delivery and usually presents as an infection of the blood or as meningitis. Infection leading to late-onset disease is through person-to-person contact in 50% of all cases. Between 10% and 30% of all pregnant women carry GBS, but only approximately 1% of infants born to these women will develop disease. Women are regularly screened for GBS infection late in pregnancy so that antibiotics can be given to the mother during delivery if GBS is identified.

TRENDS IN LONDON AND MIDDLESEX COUNTY

***Historical*:** Between 1996 and 2003 there was an average of three group B *streptococcus* (GBS) cases reported in Middlesex-London per year. Across the ten-year period, four or fewer cases were reported each year.

***Regional*:** Between 1996 and 2001 there was a total of 27 reported GBS cases in the remainder of the Southwest region of Ontario, corresponding to an average of five cases reported each year. Figure 5.5 shows that in Ontario, the average annual reported incidence rate between 1996 and 2001 was 0.4/1,000 live births.

Figure 5.5
Annual Reported Incidence Rate of Group B *Streptococcus* Infections, Ontario, 1996-2001



Note: The denominator used to calculate rates is the total number of live births in Ontario each year. These data were derived from information released by the Health Planning System (HELPS), which is managed by the Ontario Ministry of Health and Long-Term Care.

Note: Due to the low number of cases, annual reported incidence rate of Group B *Streptococcus* infections in Middlesex-London and the remainder of Southwestern Ontario could not be calculated.

HEPATITIS C

BACKGROUND

Hepatitis C is caused by a virus that infects the liver. It is carried in the blood of infected individuals and is spread when contaminated blood is introduced into the bloodstream of an uninfected individual. Hepatitis C is mainly spread through sharing contaminated injection drug equipment, and contaminated tattooing and piercing equipment are also possible routes of infection. Hepatitis C is also infrequently spread through sexual contact and, rarely, from a mother to her newborn baby. Sexual and mother-to-newborn transmissions occur much less frequently than with other blood-borne infections such as HIV or hepatitis B.

Prior to the introduction of hepatitis C screening for blood donations, this infection was also commonly spread through receipt of contaminated blood and blood products. Donated blood has been routinely screened for hepatitis C since 1990; the likelihood of transmission via this route is now very low.

Only 25% of people who acquire hepatitis C will develop acute symptoms that occur within six months of infection. Even without developing symptoms, as many as 90% of these individuals will carry the virus for extended periods. These people, many of whom will not know that they are infected, are able to transmit the infection to others. Long-term infection with this virus can result in scarring of the liver or liver cancer.

Accurate reporting of hepatitis C cases did not begin until January 1995. In mid-1998, a program to follow up patients with hepatitis C was initiated by the Middlesex-London Health Unit. Accurate information about risk factors for hepatitis C is therefore only available from mid-1998 onward.

TRENDS IN LONDON AND MIDDLESEX COUNTY

***Historical*:** Figure 5.6 shows that in Middlesex-London, the number of reported hepatitis C cases has declined since 1998. On average, 275 cases were reported each year between 1995 and 2003.

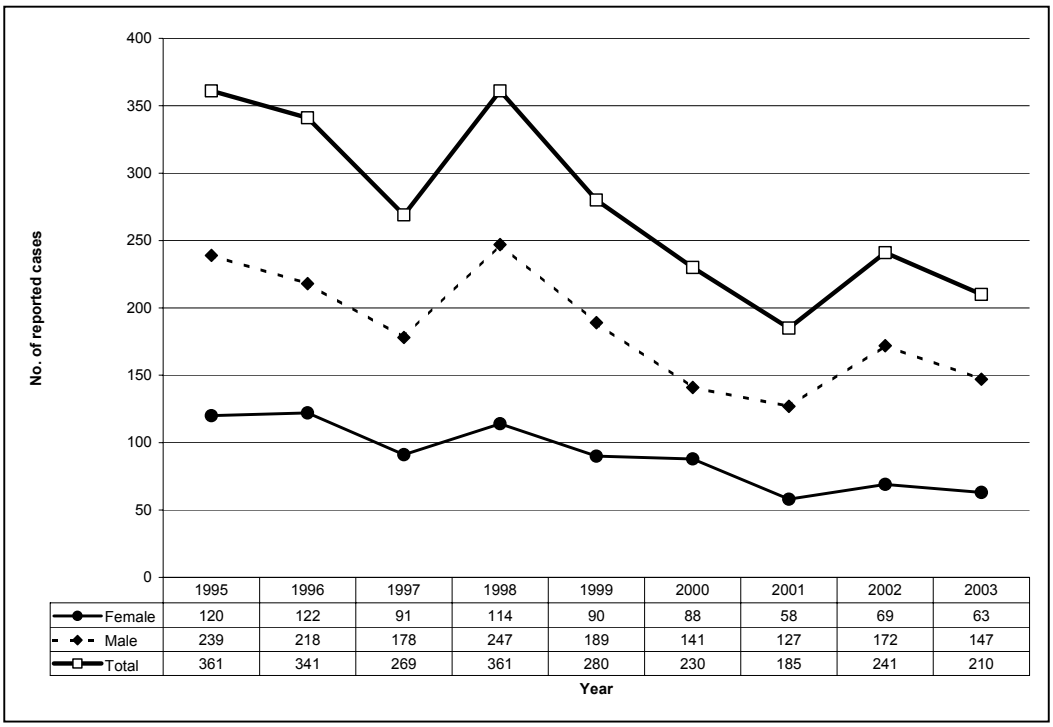
***By age group and sex*:** Figure 5.7 illustrates that between 1995 and 2003, the average annual reported incidence rate of hepatitis C cases was highest among those in their forties (160.7/100,000), followed by those in their late thirties (154.5/100,000). Regardless of age group, the number of reported cases and the average annual reported incidence rate for males were consistently higher than for female cases (Figures 5.6 and 5.7).

***Risk factors*:** Figure 5.8 shows that between mid-1998 and 2003, nearly one-quarter (23.0%) of reported hepatitis C cases in Middlesex-London indicated injection drug use as a risk factor for infection. More than one in ten hepatitis C cases (11.1%) reported

having tattoos, piercings or acupuncture as a risk factor. Approximately two-thirds of hepatitis C cases (65.7%) did not know or did not report risk factors for their infection.

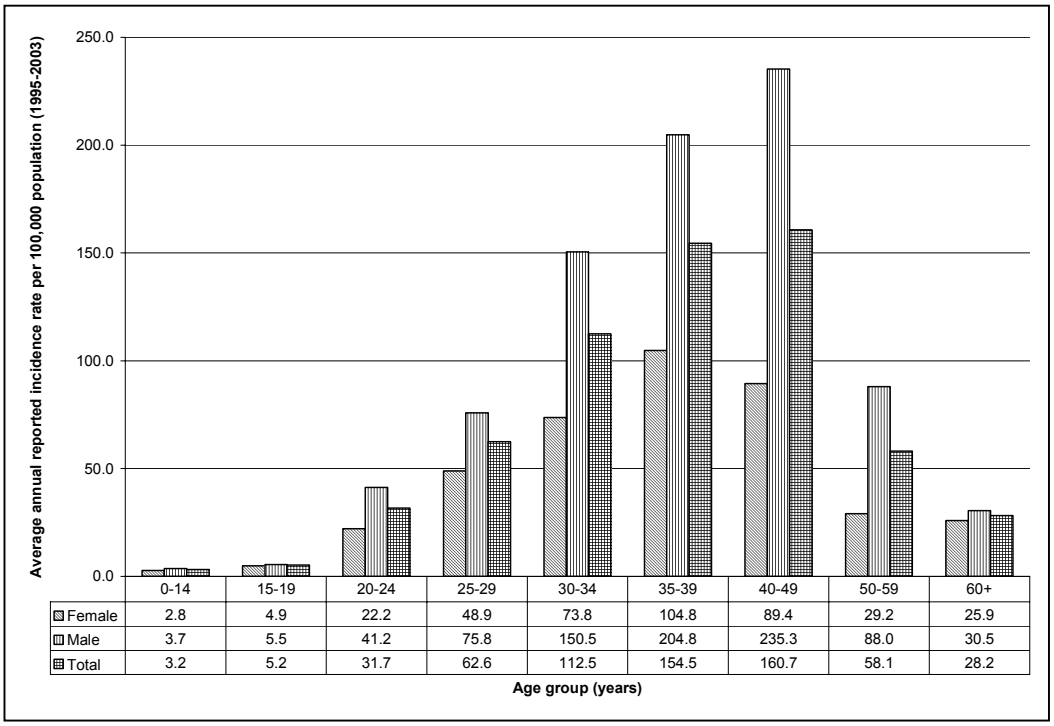
***Regional*:** Between 1995 and 2003, the average annual reported incidence rate of hepatitis C infections in Middlesex-London was 66.5/100,000, compared to 35.5/100,000 in the rest of Southwestern Ontario and 56.5/100,000 in Ontario. Figure 5.9 illustrates that regardless of year, the incidence rate in Middlesex-London was substantially higher than the rate in the remainder of the Southwest region, and exceeded the provincial rate in all years except 2001. The reasons for this pattern are unclear. Part of the disparity between Middlesex-London and the other municipalities comprising Southwestern Ontario may be related to the fact that the rest of the Southwest region is more rural than Middlesex-London, and people with risk factors for hepatitis C, particularly injection drug use, tend to migrate to larger urban centres. Higher rates compared to Ontario as a whole might be related to better access to screening in Middlesex-London to detect asymptomatic people.

Figure 5.6
Annual Number of Reported Hepatitis C Infections by Sex, Middlesex-London, 1995-2003



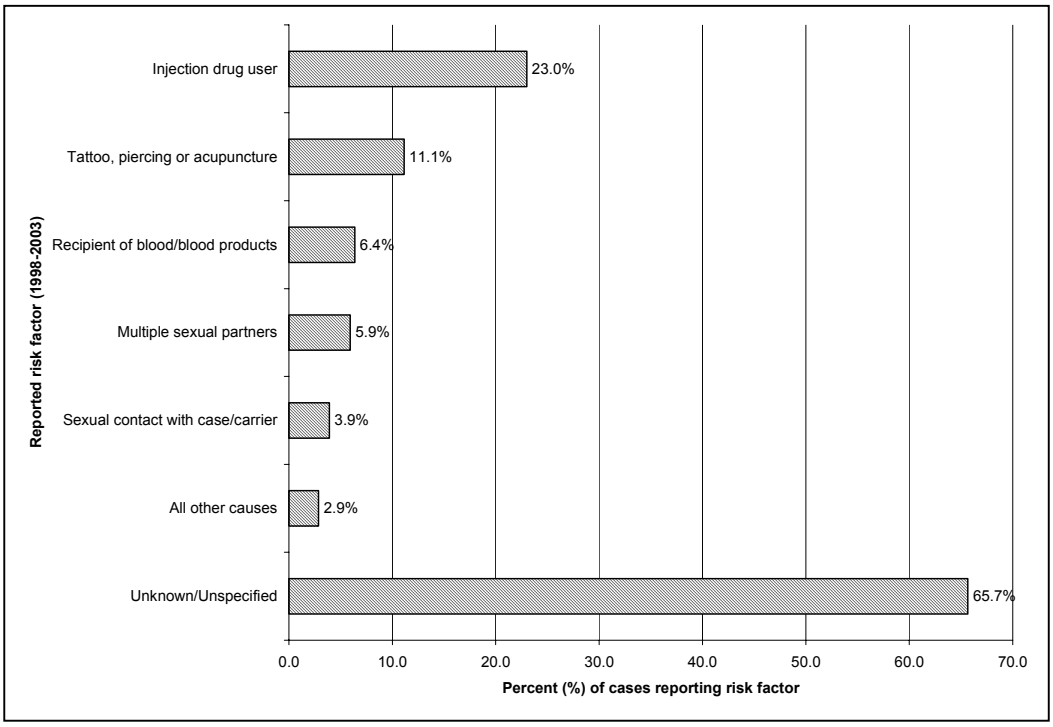
	1995	1996	1997	1998	1999	2000	2001	2002	2003
Female	120	122	91	114	90	88	58	69	63
Male	239	218	178	247	189	141	127	172	147
Total	361	341	269	361	280	230	185	241	210

Figure 5.7
Average Annual Reported Incidence Rate of Hepatitis C Infections by Age Group and Sex, Middlesex-London, 1995-2003



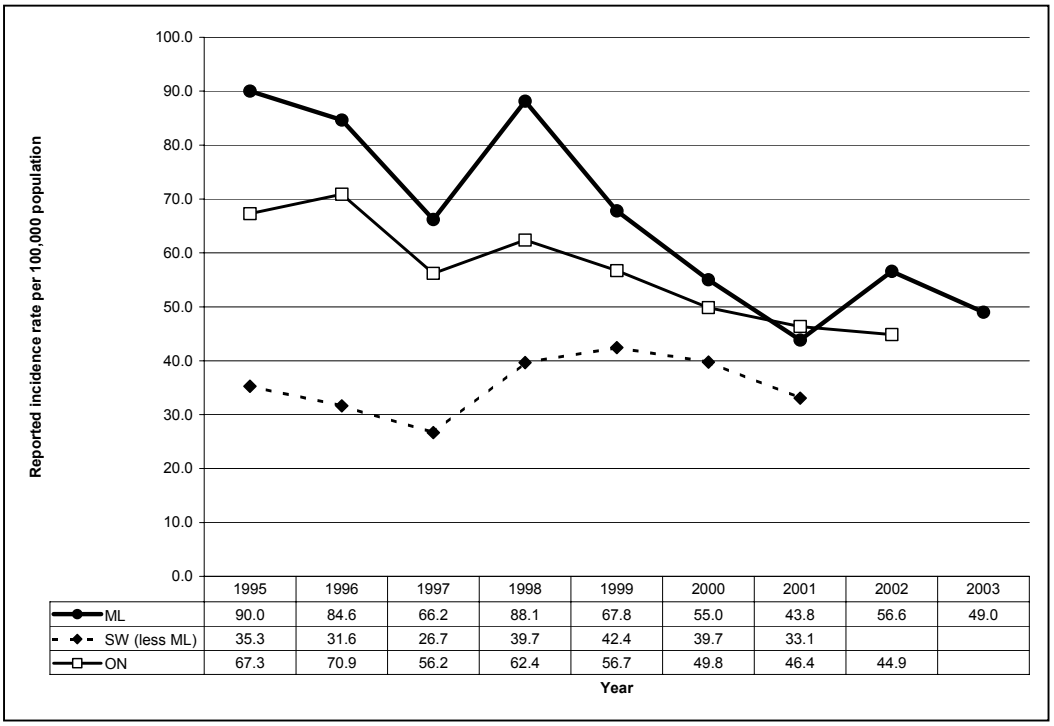
	0-14	15-19	20-24	25-29	30-34	35-39	40-49	50-59	60+
Female	2.8	4.9	22.2	48.9	73.8	104.8	89.4	29.2	25.9
Male	3.7	5.5	41.2	75.8	150.5	204.8	235.3	88.0	30.5
Total	3.2	5.2	31.7	62.6	112.5	154.5	160.7	58.1	28.2

Figure 5.8
Reported Risk Factors for Hepatitis C Infections,
Middlesex-London, 1998-2003



Note: More than one risk factor may be reported by each case. The denominator used to calculate percentage is the number of cases. Accordingly, the proportions shown do not sum to 100%.

Figure 5.9
Annual Reported Incidence Rate of Hepatitis C Infections,
Middlesex-London, Remainder of Southwestern Ontario, and Ontario, 1995-2003



	1995	1996	1997	1998	1999	2000	2001	2002	2003
ML	90.0	84.6	66.2	88.1	67.8	55.0	43.8	56.6	49.0
SW (less ML)	35.3	31.6	26.7	39.7	42.4	39.7	33.1		
ON	67.3	70.9	56.2	62.4	56.7	49.8	46.4	44.9	

LEGIONNAIRE'S DISEASE

BACKGROUND

Legionnaire's disease is a bacterial infection that results in fever, muscle pains, headache, and pneumonia. *Legionellae* bacteria are found in a variety of water environments including both natural and human-made ones, such as hot water tanks, air conditioning cooling towers, humidifiers, whirlpools, spas, hot tubs, and decorative fountains. The infection is spread to humans who breathe in aerosolized water that is contaminated with the bacteria.

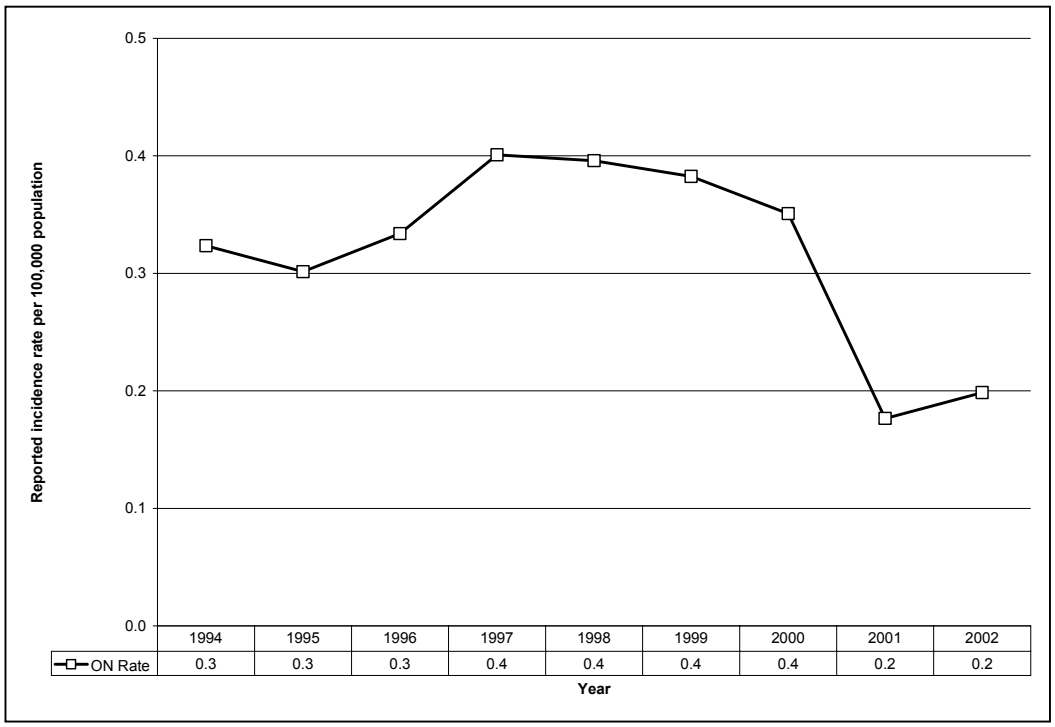
Legionnaire's disease occurs more frequently among older people, those who smoke, and those with underlying medical conditions. The disease is more frequently diagnosed in males than females.

TRENDS IN LONDON AND MIDDLESEX COUNTY

***Historical*:** There have been two or fewer reported cases of Legionnaire's disease in Middlesex-London in each year between 1994 and 2003, corresponding to an annual average of approximately one case.

***Regional*:** The number of reported cases of Legionnaire's disease in the rest of Southwestern Ontario was relatively low, with eight or fewer cases reported each year. Figure 5.10 shows that between 1994 and 2002, the annual reported incidence rate in Ontario was 0.4/100,000 or less, corresponding to an annual average of 0.3/100,00.

Figure 5.10
Annual Reported Incidence Rate of Legionnaire's Disease, Ontario, 1994-2002



Note: Due to the low number of cases, the annual reported incidence rate of Legionnaire's disease in Middlesex-London and the remainder of Southwestern Ontario could not be calculated.

LYME DISEASE

BACKGROUND

Lyme disease is transmitted to humans through the bite of a tick that is infected with the causative organism, *Borrelia burgdorferi*. In its early stages, Lyme disease may cause a distinctive red bull's eye rash, called erythema migrans, where the tick bite occurred. With or without erythema migrans, early symptoms include muscle and joint pain, headache, fatigue, and/or fever. Long-term consequences of the infection, if left untreated, can include arthritis, brain and nerve deficits, and heart problems, so the earlier treatment is received, the better.

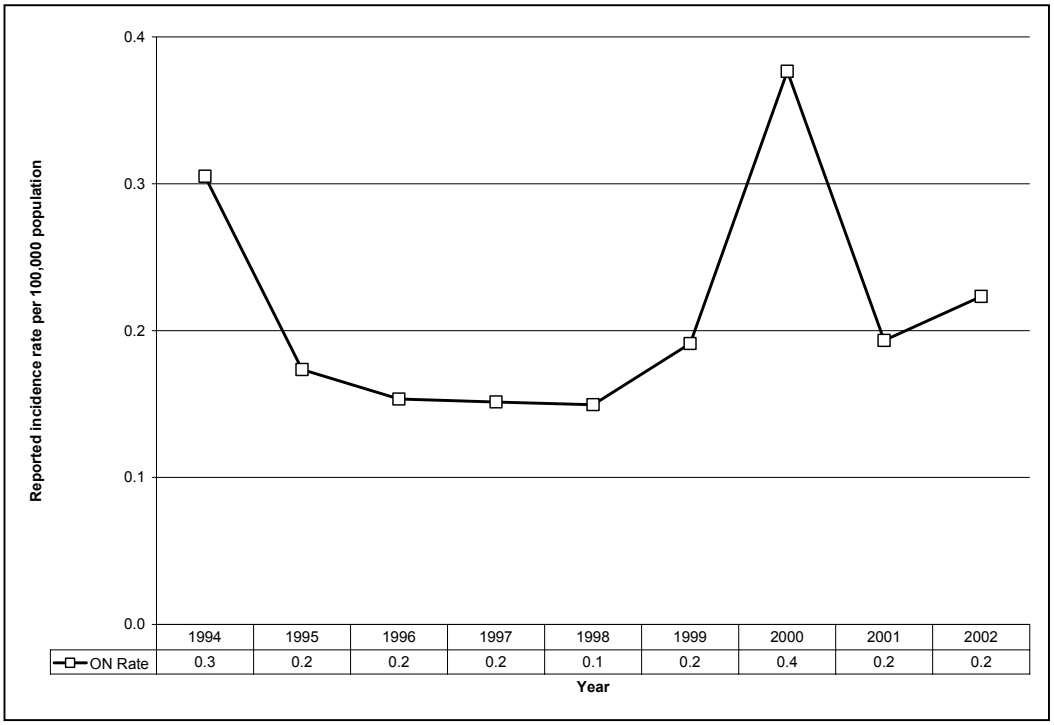
The ticks that can carry Lyme disease live mainly on deer and mice. Although found intermittently throughout Ontario, ticks carrying *B. burgdorferi* are commonly found along the north shore of Lake Erie, particularly Long Point, Point Pellee and Rondeau Provincial Park. Lyme disease is reported more frequently in the summer months, which is the feeding time for the ticks that transmit the disease.

TRENDS IN LONDON AND MIDDLESEX COUNTY

***Historical*:** Between 1994 and 2003, Lyme disease was reported sporadically in Middlesex-London, with three or fewer cases reported each year. On average, one case of Lyme disease was reported in each year of the ten-year time period.

***Regional*:** The number of reported cases of Lyme disease in the rest of the Southwest region was low, with two or fewer cases reported in each of the years between 1994 and 2001. Figure 5.11 illustrates that between 1994 and 2002, the average annual reported incidence rate in Ontario was 0.2/100,000.

Figure 5.11
Annual Reported Incidence Rate of Lyme Disease,
Ontario, 1994-2002



Note: Due to the low number of cases, the annual reported incidence rate of Lyme disease in Middlesex-London and the remainder of Southwestern Ontario could not be calculated.

Q FEVER

BACKGROUND

Q fever is caused by an organism called *Coxiella burnetii* that is found in sheep, cattle, goats, cats, dogs, birds, ticks, and some wild animals, and transmitted in the air. Since Q fever is carried by animals, people working with livestock, particularly goats and sheep, are at increased risk for exposure to this organism.

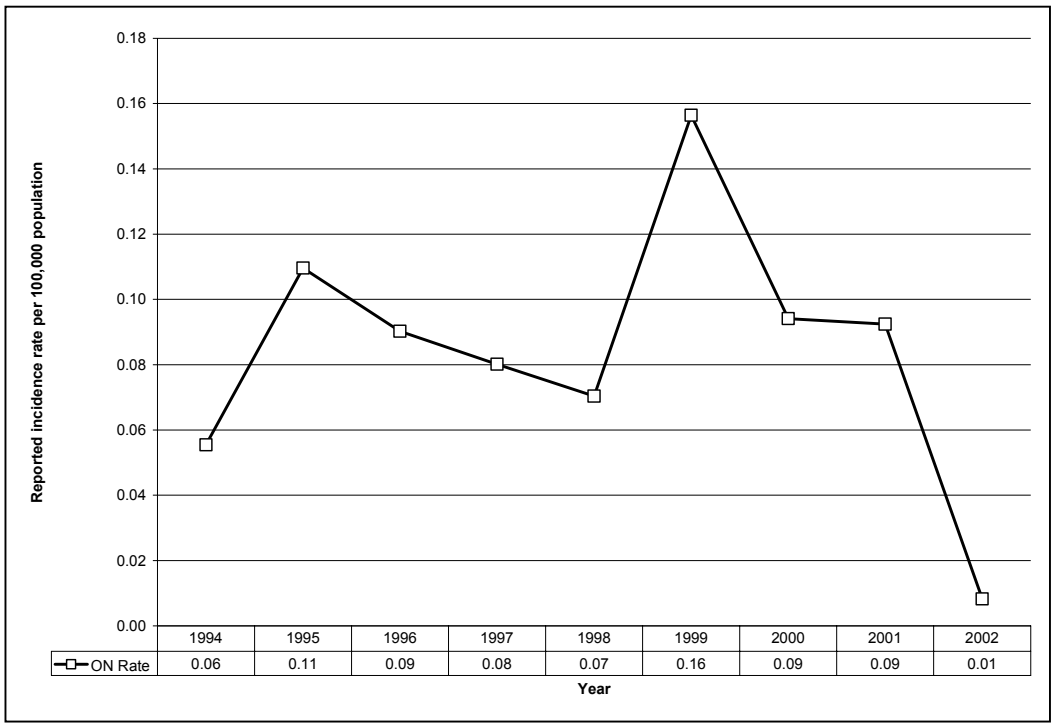
Inhalation of very small amounts of the organism can cause illness. The symptoms experienced by some people may be so mild that they go undetected. For those who do fall ill, symptoms include sudden onset of fever, chills, headache, weakness and sweating. Q fever can also affect the liver, heart, and lungs. Untreated, the fatality rate is between 1% and 2.4% but is negligible among those who receive treatment.

TRENDS IN LONDON AND MIDDLESEX COUNTY

***Historical*:** There have been no cases of Q fever reported in Middlesex-London since 2000. Between 1994 and 2000 there were 17 reported cases of Q fever, corresponding to an annual average of two reported cases. Regardless of the year, four or fewer cases were reported per year.

***Regional*:** In the remainder of Southwestern Ontario, there were fewer than five reported cases in each year between 1994 and 2001. Figure 5.12 shows that the annual reported incidence rate in Ontario was also low, corresponding to an average annual reported incidence rate of 0.08/100,000 between 1994 and 2002.

Figure 5.12
Annual Reported Incidence Rate Q Fever Infections,
Ontario, 1994-2002



Note: Due to the low number of cases, the annual reported incidence rate of Q fever infections in Middlesex-London and the remainder of Southwestern Ontario could not be calculated.

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RABIES AND ANIMAL EXPOSURES

BACKGROUND

Rabies is a viral infection that affects the brain and is nearly always fatal. All warm-blooded animals are at risk for rabies, including humans. Rabies is most commonly found in foxes, raccoons, skunks and bats, although it also affects dogs, cats, livestock, and other animals. Rabies is transmitted to humans from the bite of, or possibly a scratch from, a rabid animal. Saliva from a rabid animal that enters an open wound of a person can also transmit the virus.

Human exposures to potentially rabid animals are reported to the Health Unit so that the animal in question can be observed or tested for rabies, and appropriate measures can be taken to prevent rabies from developing in the exposed person. When such a report is received, a process is followed to determine the rabies status of the animal, as well as its rabies vaccination status if applicable. Domestic animals whose whereabouts are known are isolated and observed for a ten-day period. If the animal is well at the end of the observation period, it is considered rabies-free and there is no chance of rabies transmission. Wild animals that are suspected of being rabid are euthanized and sent for laboratory testing.

Waking to find a bat in the room or finding a bat in the room with someone who cannot report whether or not they had contact with the bat is also considered an exposure. If possible, the bat should be captured and sent for rabies testing.

People exposed to rabid animals or to animals that cannot be followed up are encouraged to receive post-exposure prophylaxis (preventive rabies injections). Post-exposure prophylaxis is provided at no cost to these individuals.

TRENDS IN LONDON AND MIDDLESEX COUNTY

***Historical*:** There have been no reported cases of human rabies in Ontario since 1967. This is due, in part, to the provision of preventive rabies injections as indicated after exposure to a potentially rabid animal. The promotion of rabies vaccination for dogs, cats, and other domestic animals has also assisted in the prevention of human rabies cases.

Figure 5.13 provides details about the number of human exposures to potentially rabid animals in Middlesex-London, as well as the number of people receiving post-exposure prophylaxis (PEP) and the number of animals confirmed to be rabid. Between 1994 and 2003 there was an average of 532 animal exposures reported annually, and the average number of people who received PEP was 63 annually. Over the ten-year period, the majority (46.2%) of those who underwent PEP did so due to exposures to bats. Exposures to stray cats and dogs accounted for an additional one-quarter (27.3%) of PEP cases.

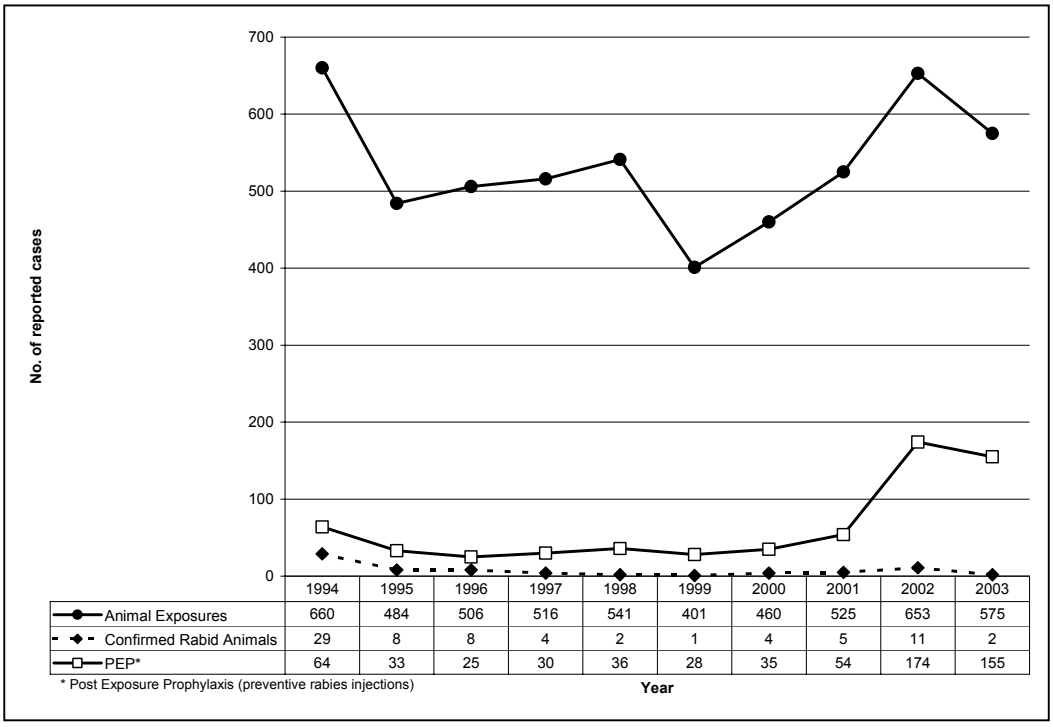
The number of reported animals in Middlesex-London confirmed to have rabies fluctuated between 1994 and 2003, however, there was an average of seven rabid animals reported annually. Over ten years, nearly one-third (35.1%) of confirmed rabid animals in Middlesex-London were bats, followed by red foxes (27.0%) and skunks (12.2%).

***By age group and sex*:** Figure 5.14 shows that the average annual reported rate of animal exposures was greatest among those five to nine years of age (239.6/100,000), followed by those ages ten to 14 years (206.5/100,000). Males exposed to potentially rabid animals outnumbered females in all age groups, with the exception of 15 to 19 year olds.

***By animal species*:** Figure 5.15 shows that between 1994 and 2003, the majority (61.4%) of reported animal exposures in Middlesex-London were related to domestic dogs. Exposures to bats were also important, accounting for one in every ten (10.0%) animal exposures reported.

***Regional*:** Comparable information about animal exposures was not available for the remainder of Southwestern Ontario or Ontario as a whole.

Figure 5.13
Annual Number of Reported Animal Exposures, Confirmed Rabid Animals Reported, and Human Post-Exposure Prophylaxis, Middlesex-London, 1994-2003

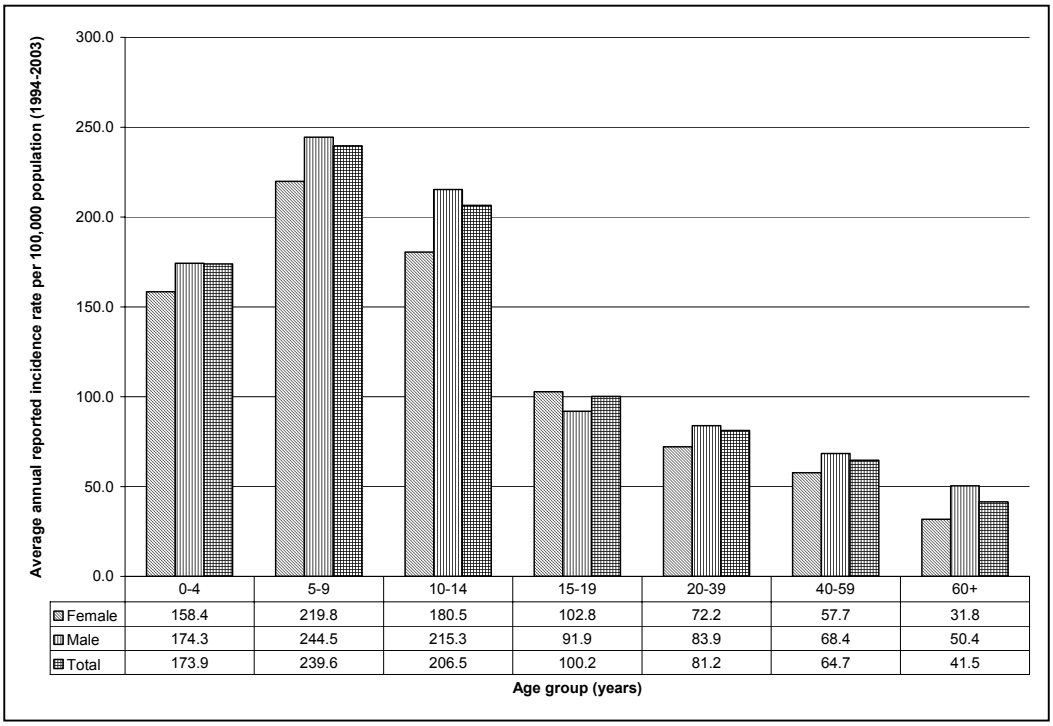


	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Animal Exposures	660	484	506	516	541	401	460	525	653	575
Confirmed Rabid Animals	29	8	8	4	2	1	4	5	11	2
PEP*	64	33	25	30	36	28	35	54	174	155

* Post Exposure Prophylaxis (preventive rabies injections)

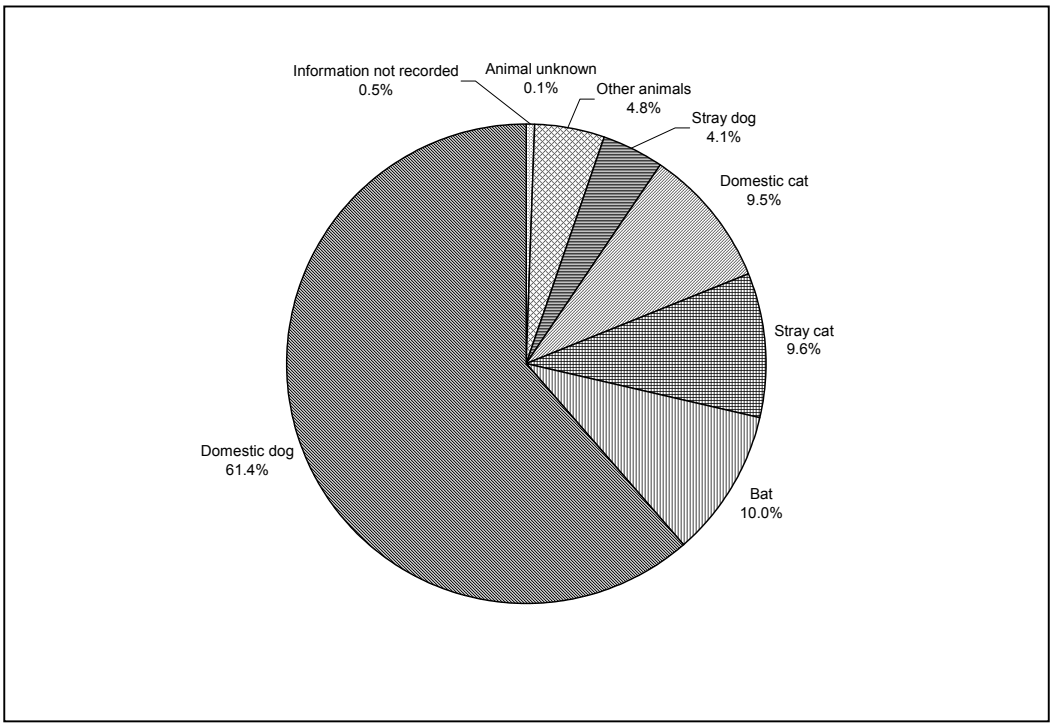
Note: Number of reported animals confirmed rabid taken from the Ontario Ministry of Natural Resources *Rabies Reporter*, available at: http://www.gis.queensu.ca/rreporter/

Figure 5.14
Average Annual Reported Incidence Rate of Animal Exposures by Age Group and Sex, Middlesex-London, 1994-2003



	0-4	5-9	10-14	15-19	20-39	40-59	60+
Female	158.4	219.8	180.5	102.8	72.2	57.7	31.8
Male	174.3	244.5	215.3	91.9	83.9	68.4	50.4
Total	173.9	239.6	206.5	100.2	81.2	64.7	41.5

Figure 5.15
Proportion of Animal Exposures by Type of Animal Reported, Middlesex-London, 1994-2003



SEVERE ACUTE RESPIRATORY SYNDROME (SARS)

BACKGROUND

Severe Acute Respiratory Syndrome (SARS) emerged in China in late 2002. It spread to several other countries, including Canada, where an outbreak in the Greater Toronto Area occurred between March and June 2003. Because SARS was a serious disease and medical understanding was limited and evolving, there was widespread public concern. SARS was designated a reportable disease in 2003.

SARS is caused by a coronavirus (SARS-CoV) that has an incubation period of two to ten days after exposure. The virus is spread from person to person when respiratory droplets from an infected individual come into contact with the eyes, nose or mouth of another person. Contact with infectious fecal matter likely also spreads the virus. Transmission usually requires close contact within a few metres, so those at risk for infection include household contacts and health care workers providing direct patient care.

TRENDS IN LONDON AND MIDDLESEX COUNTY

***Historical*:** In 2003, the year that SARS was identified, there were no SARS cases reported among Middlesex-London residents. However, several residents underwent a ten-day quarantine period due to potential exposure in the Greater Toronto Area.

***Regional*:** In 2003 there were over 400 probable and suspect SARS cases reported to public health authorities in Ontario, 44 of whom died. None of these cases was in the Middlesex-London area or the remainder of the Southwest region.

WEST NILE VIRUS

BACKGROUND

Although first isolated in Africa in 1937, West Nile virus (WNv) is a relatively new virus in North America. An outbreak in New York City in 1999 signaled the first appearance of the virus on the continent. In Ontario, WNv was made reportable in 2001 and the first human cases occurred in 2002.

WNv is spread to humans from mosquitoes that have contracted the virus. Mosquitoes usually contract the virus as a result of biting infected birds. Rarely, transmission to humans has occurred from receiving donated blood or organs, through breastfeeding, or intrauterine from a mother to her baby. The incubation period following exposure to WNv ranges from three to 14 days. The majority of people who contract WNv have no symptoms. Approximately 20% of infected individuals will experience West Nile Fever, which is characterized by fever, headache, muscle aches, rash and/or swollen glands that resolve in about one week. Less than 1% of infected people develop serious disease, such as encephalitis or meningitis. The symptoms of these disorders include fever, headache, muscle weakness, stiff neck, altered mental status ranging from disorientation to coma, and/or other neurological problems ranging from tremors to paralysis.

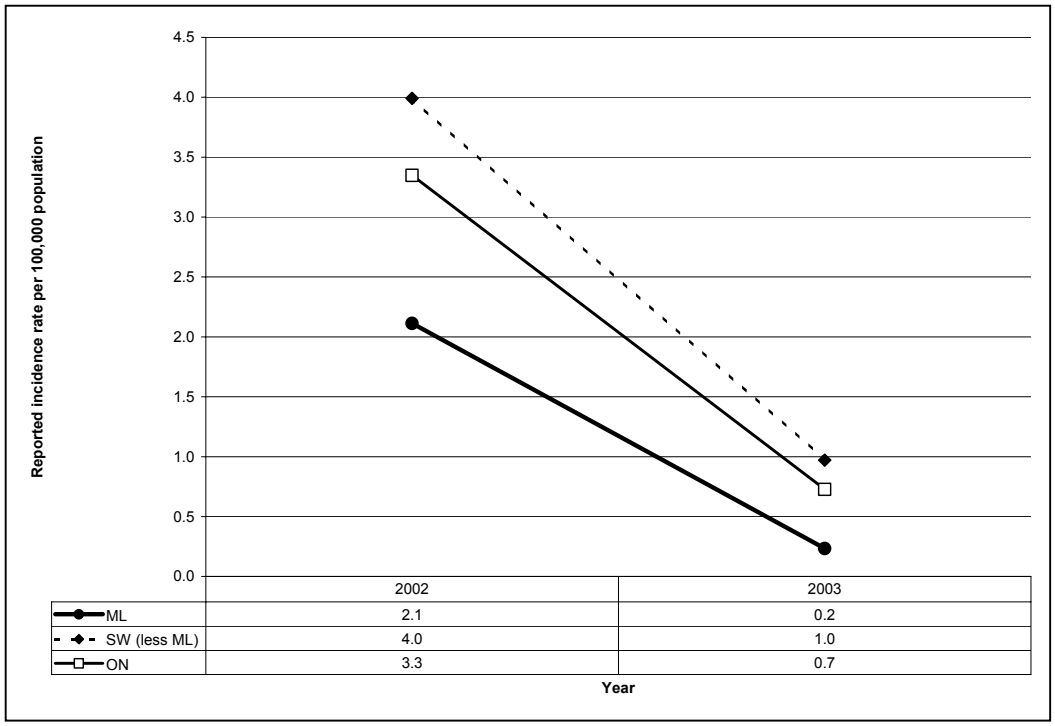
Since 2002, the MLHU has delivered a comprehensive WNv surveillance and control program comprised of the following components: mosquito larvae monitoring and identification, adult mosquito trapping and testing, bird collection and testing, human surveillance, and reduction of mosquito resting and breeding sites, as well as public education. Larviciding catch basins and standing surface water on public property was added to the program in 2003.

TRENDS IN LONDON AND MIDDLESEX COUNTY

***Historical*:** The first human cases of West Nile virus (WNv)-related illness in Middlesex-London were reported in 2002. There were 18 individuals with laboratory evidence of WNv, nine of whom met the strict reporting criteria used by the Ministry of Health and Long-Term Care. In 2003 one Middlesex-London resident was reported to have WNv infection. This individual did not acquire the infection in Middlesex-London.

Regional: Figure 5.16 shows that based on the Ministry of Health and Long-Term Care reporting criteria, the reported incidence rate of WNv infections in Middlesex-London in 2002 and 2003 was lower than the reported incidence rates in both the remainder of Southwestern Ontario and the province as a whole.

Figure 5.16
Annual Reported Incidence Rate of West Nile virus Infections, Middlesex-London, Remainder of Southwestern Ontario, and Ontario, 2002-2003



	2002	2003
ML	2.1	0.2
SW (less ML)	4.0	1.0
ON	3.3	0.7

Note: Numerator data taken from Ontario Ministry of Health and Long-Term Care West Nile virus surveillance, available at:
http://www.health.gov.on.ca/english/providers/program/pubhealth/westnile/wnv_05/wnv_surveillance.html

Appendix A
REPORTABLE DISEASES IN ONTARIO, 2003

The following specified reportable diseases (Ontario Regulations 559/91 and amendments under the Health Protection and Promotion Act) are reportable to the local Medical Officer of Health and Public Health Unit.

- Acquired Immunodeficiency Syndrome (AIDS)
- Amebiasis
- *Anthrax
- *Botulism
- *Brucellosis
- Campylobacter enteritis
- Chancroid
- Chickenpox (Varicella)
- Chlamydia trachomatis infections
- Cholera
- *Cryptosporidiosis
- *Cyclosporiasis
- Cytomegalovirus infection, congenital
- *Diphtheria
- *Encephalitis, including:
  - *1. Primary, viral
  - 2. Post-infectious
  - 3. Vaccine-related
  - 4. Subacute sclerosing panencephalitis
  - 5. Unspecified
- *Food poisoning, all causes
- *Gastroenteritis, institutional outbreaks
- *Giardiasis, except asymptomatic cases
- Gonorrhea
- *Group A Streptococcal disease, invasive
- Group B Streptococcal disease, neonatal
- **Haemophilus influenzae* b (Hib) disease, invasive
- *Hantavirus Pulmonary Syndrome
- *Hemorrhagic fevers, including:
  - *1. Ebola virus disease
  - *2. Marburg virus disease
  - *3. Other viral causes
- Hepatitis, viral
  - *1. Hepatitis A
  - 2. Hepatitis B
  - 3. Hepatitis C
  - 4. Hepatitis D (Delta hepatitis)
- Herpes, neonatal
- Influenza
- *Lassa fever
- *Legionellosis
- Leprosy
- *Listeriosis
- Lyme disease
- Malaria
- *Measles
- Meningitis, acute
  - *1. Bacterial
  - 2. Viral
  - 3. Other
- *Meningococcal disease, invasive
- Mumps
- Ophthalmia neonatorum
- Paratyphoid fever
- Pertussis (whooping cough)
- *Plague
- Pneumococcal disease *(Streptococcus pneumoniae)*, invasive
- *Poliomyelitis, acute
- Psittacosis / Ornithosis
- *Q Fever
- *Rabies
- *Respiratory infection outbreaks in institutions
- Rubella (German measles)
- Rubella, congenital syndrome
- Salmonellosis
- *Severe Acute Respiratory Syndrome (SARS)
- *Shigellosis
- *Smallpox
- Syphilis
- Tetanus
- *Transmissible Spongiform Encephalopathy, including:
  - 1. Creutzfeldt-Jakob Disease, all types
  - 2. Gerstmann-Sträussler-Scheinker Syndrome
  - 3. Fatal Familial Insomnia
  - 4. Kuru
- Trichinosis
- Tuberculosis
- *Tularemia
- Typhoid fever
- *Verotoxin-producing *E. coli* infection (VTEC), including Hemolytic Uremic Syndrome (HUS)
- *West Nile virus illness
- *Yellow fever
- Yersinosis

Disease marked * and all respiratory infection outbreaks in institutions should be reported **immediately** to the local Medical Officer of Health by telephone. Other diseases are to be reported the next working day.

Appendix B
REPORTABLE DISEASES IN MIDDLESEX-LONDON, 1994-2004

This appendix provides the annual number of reportable disease cases reported in Middlesex-London between 1994 and 2004. Only reportable diseases for which information is available in the Reportable Disease Information System (RDIS) are presented here.

Reportable Disease Name	Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Acquired Immunodeficiency Syndrome (AIDS)	24	21	10	5	2	3	1	3	2	2	0
Amebiasis	16	11	12	13	14	8	8	12	5	14	7
Anthrax	0	0	0	0	0	0	0	0	0	0	0
Botulism	0	0	0	0	0	0	0	0	0	0	0
Brucellosis	0	0	0	0	0	1	0	0	0	0	0
Campylobacter	123	171	152	140	145	85	139	141	114	107	132
Chlamydia	560	510	407	400	502	568	604	659	818	835	986
Cholera	0	0	0	0	0	0	0	0	0	0	0
Cryptosporidiosis	-	-	3	9	5	4	5	8	4	3	11
Cyclosporiasis	-	-	-	-	-	-	-	0	0	3	0
Cytomegalovirus infection, congenital	2	0	0	0	0	2	0	0	0	0	0
Diphtheria	0	0	0	0	0	0	0	0	0	0	0
Encephalitis/Meningitis	22	35	29	19	37	27	38	32	43	35	63
Giardiasis	119	106	91	73	78	71	62	52	56	39	31
Gonorrhea	57	78	30	50	38	45	94	98	122	123	204
Group A Streptococcal disease, invasive	-	1	7	2	13	12	19	17	13	10	14
Group B Streptococcal disease, neonatal	-	-	4	3	4	3	4	0	4	2	6
Haemophilus influenzae b (Hib) disease, invasive	0	0	0	1	0	0	0	0	0	0	0
Hantavirus pulmonary syndrome	0	0	0	0	0	0	0	0	0	0	0
Hemorrhagic fevers, all types*	0	0	0	0	0	0	0	0	0	0	0
Hepatitis A	23	35	13	7	20	8	4	0	3	5	17
Hepatitis B (acute)	7	6	1	4	0	0	1	0	0	2	5
Hepatitis C	-	361	341	269	361	280	230	185	241	210	170
Hepatitis D	0	0	1	0	0	0	0	0	0	0	0
Herpes, neonatal	1	0	0	0	0	1	0	0	0	0	1
Influenza	10	50	16	18	57	125	61	11	43	173	54
Legionellosis	0	1	2	2	2	0	0	0	0	1	0
Leprosy	0	0	0	0	0	0	0	0	0	0	0
Listeriosis	1	2	2	0	1	1	1	1	1	2	1

Reportable Disease Name	Year										
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Lyme disease	1	0	2	0	2	0	1	0	0	3	0
Malaria	2	3	1	2	2	2	1	7	2	2	13
Measles	53	11	0	1	0	0	0	0	0	0	0
Meningococcal disease, invasive	5	9	3	1	1	4	5	13	3	4	4
Mumps	12	21	11	5	5	4	3	1	0	0	1
Ophthalmia neonatorum	0	0	1	0	0	0	0	2	0	0	0
Paratyphoid fever	0	0	0	0	0	0	0	0	0	0	0
Pertussis (whooping cough)	60	195	36	19	68	42	29	7	4	13	11
Plague	0	0	0	0	0	0	0	0	0	0	0
Pneumococcal disease (*Streptococcus pneumoniae*), invasive	-	-	-	-	-	-	-	-	-	22	38
Poliomyelitis, acute	0	0	0	0	0	0	0	0	0	0	0
Psittacosis / Ornithosis	0	0	0	0	0	0	0	0	0	0	0
Q Fever	2	4	0	3	2	3	3	0	0	0	0
Rabies (human infections)	0	0	0	0	0	0	0	0	0	0	0
Rubella (German measles)	7	8	1	1	0	2	0	0	0	0	0
Rubella, congenital syndrome	0	0	0	0	0	0	0	0	0	0	0
Salmonellosis	70	97	56	65	86	59	75	70	77	52	64
Severe Acute Respiratory Syndrome (SARS)	-	-	-	-	-	-	-	-	-	0	0
Shigellosis	14	7	10	14	9	14	14	10	11	4	9
Smallpox	0	0	0	0	0	0	0	0	0	0	0
Syphilis	14	6	1	7	7	5	7	8	6	4	7
Tetanus	0	0	0	0	0	0	0	0	0	0	0
Transmissible Spongiform Encephalopathy, all types†	0	0	0	0	0	0	0	0	0	0	0
Tuberculosis	9	6	10	13	6	9	10	5	14	6	5
Tularemia	0	0	0	1	0	0	0	0	0	0	0
Typhoid fever	1	1	0	1	1	2	0	0	2	0	1
Verotoxin-producing *E. coli* infection (VTEC), including HUS	22	14	11	15	6	20	17	16	12	7	12
West Nile virus illness (MOHLTC case definition)	-	-	-	-	-	-	-	-	9	1	0
Yellow fever	0	0	0	0	0	0	0	0	0	0	0
Yersinosis	10	11	17	10	4	7	9	2	1	4	5

* Includes Ebola virus disease, Marburg virus disease, and other viral causes.
† Includes Creutzfeldt-Jakob Disease (CJD) (classic CJD and new variant CJD), Gerstmann-Straussler-Scheinker Syndrome (GSS), Fatal Familial Insomnia (FFI), and Kuru.