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SURVEILLANCE OF INVASIVE MENINGOCOCCAL DISEASE IN CANADA, 1995-1996

Introduction

Invasive meningococcal disease (IMD) is a nationally reportable disease in Canada. Since 1985, the Laboratory Centre for Disease Control (LCDC) has enhanced IMD surveillance to correlate case-by-case information provided by the provinces and territories with detailed laboratory studies done at the National Laboratory for Bacteriology at LCDC. This report provides information on IMD from 1 January 1995 to 31 December 1996.

Methodology

Provincial and territorial ministries of health, and provincial and federal laboratories provide data for meningococcal surveillance. Both laboratory-confirmed cases and cases meeting the clinical case definition are reported to LCDC. Meningococcal serotyping and subtyping is routinely completed at LCDC by the National Laboratory for Bacteriology. Multilocus enzyme electrophoresis is completed as part of the routine surveillance of serogroup C meningococcal isolates. Data have been recorded and analyzed using Epi-Info version 6.04. All incidence rates are per 100,000 population per year.

Incidence

There were 304 cases of IMD reported across Canada during 1995, for an incidence of 1.0 per 100,000 population. During 1996, there was a 13% decrease with 265 cases reported for an incidence of 0.9. Figures 1 and 2 show the number of cases and the incidence of IMD reported across the country during these 2 years. During the past decade, there have been fluctuations in the Canadian incidence of IMD (Figure 3). The incidence reached a peak of 1.6 per 100,000 population during 1989 and 1990, and gradually decreased to 0.9 in 1996, the lowest rate in 11 years.

Seasonal Distribution

IMD showed a clear seasonal distribution with approximately one-third of cases occurring during one quarter of the year. Thirty-one percent of cases occurred from January to March in

Figure 1
Distribution of invasive meningococcal disease, Canada 1995 and 1996

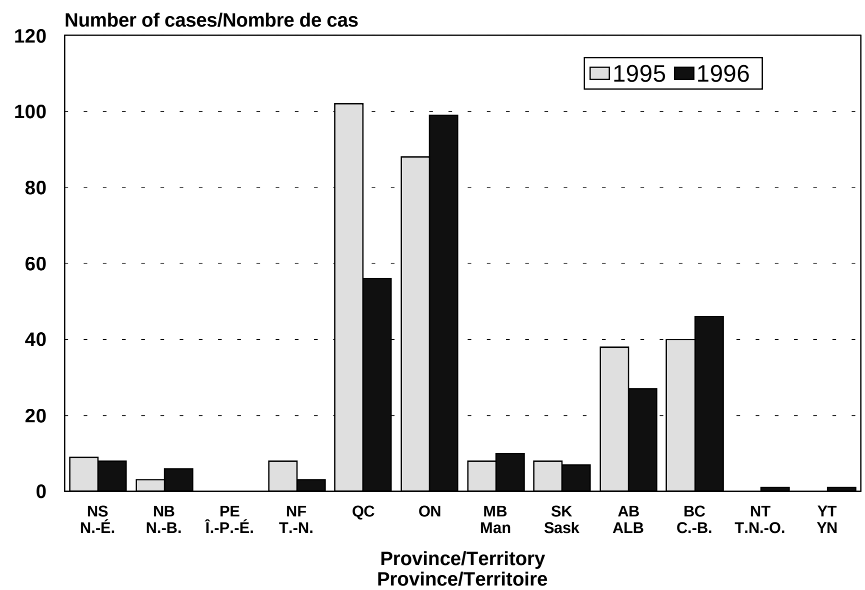
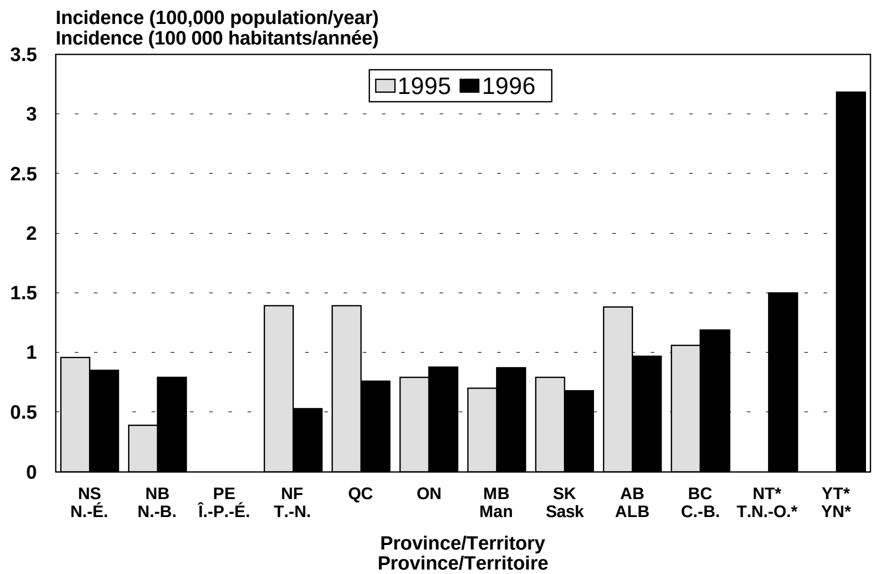
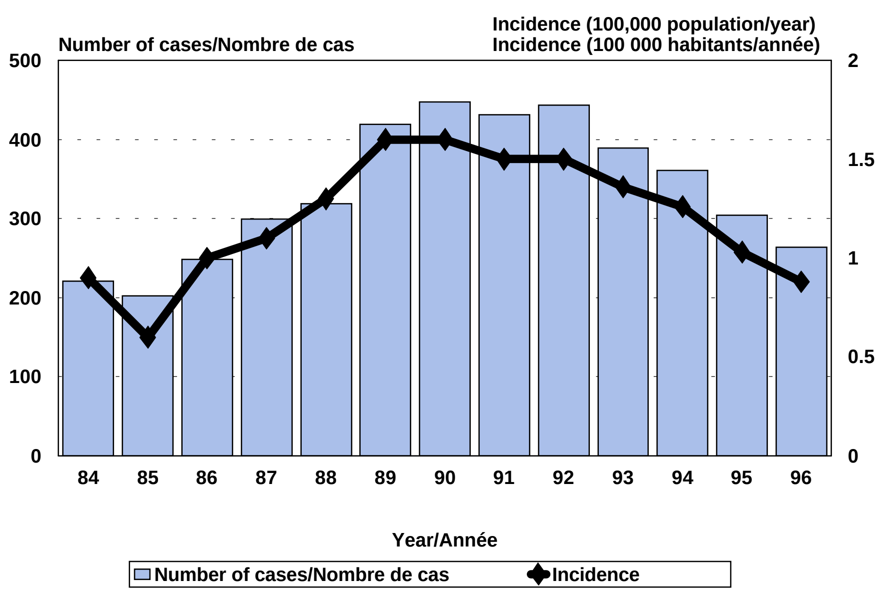


Figure 2
Incidence of invasive meningococcal disease, Canada, 1995 and 1996



* Incidence may be unstable due to small numbers.

Figure 3
Invasive meningococcal disease, Canada, 1984-1995



1995, and 34% occurred during these months in 1996. In contrast, only 17% of IMD cases in 1995 and 16% in 1996 occurred during the warmer months of July to September.

Age Distribution

As in previous years, the incidence rates of IMD varied inversely with age (Figure 4). Infants < 1 year of age had the greatest age-specific incidence (13.6 in 1995 and 11.1 in 1996). The incidence declined with age until the 15- to 19-year-age group, where there was a second smaller peak of 2.6 in 1995 and 2.0 in 1996. This can be compared to the much lower incidence in adults (0.5 in 1995 and 0.4 in 1996).

Case-Fatality Rates

During 1995 there were 21 deaths from IMD for a case-fatality rate (CFR) of 6.9%. During 1996, the CFR decreased slightly to 6.5% (17 deaths), the lowest rate in 11 years (Figure 5). The CFR varied by serogroup. The CFR among persons with serogroup B disease was 5% (seven deaths) in 1995 and 4% (four deaths) in 1996; whereas the CFR among persons with serogroup C disease was 12% (11 deaths) and 9% (eight deaths) in 1995 and 1996, respectively.

Serogroups

Figure 6 shows the distribution of meningococcal serogroups. Of the 304 reported cases of IMD in 1995, 11% (34 cases) were diagnosed based on the clinical case definition. Serogroup results were available for 266 isolates. Serogroups B and C were the two most commonly isolated, accounting for 48% and 38% of confirmed cases, respectively. During 1996, 17% of the 264 cases were diagnosed clinically. Serogroup results were available for 218 cases. Serogroup B accounted for 46% of isolates and serogroup C for 42%.

The age distribution of serogroup B and serogroup C diseases varied greatly. Infants with meningococcal disease were significantly more likely to be infected with serogroup B disease than serogroup C disease in both 1995 (RR = 1.9; $p < 0.05$) and 1996 (RR = 2.0; $p < 0.05$). There was no difference in gender distribution among persons with serogroup B or C disease.

Serotype and Subtype

Meningococcal strains are designated by serogroup:serotype: subtype. Serotyping and subtyping were available for 120 of the 129 serogroup B isolates from 1995 and 90 of the 100 isolates from 1996. The two most common serogroup B strains isolated during

Figure 4
Incidence of invasive meningococcal disease, by age, Canada, 1995 and 1996

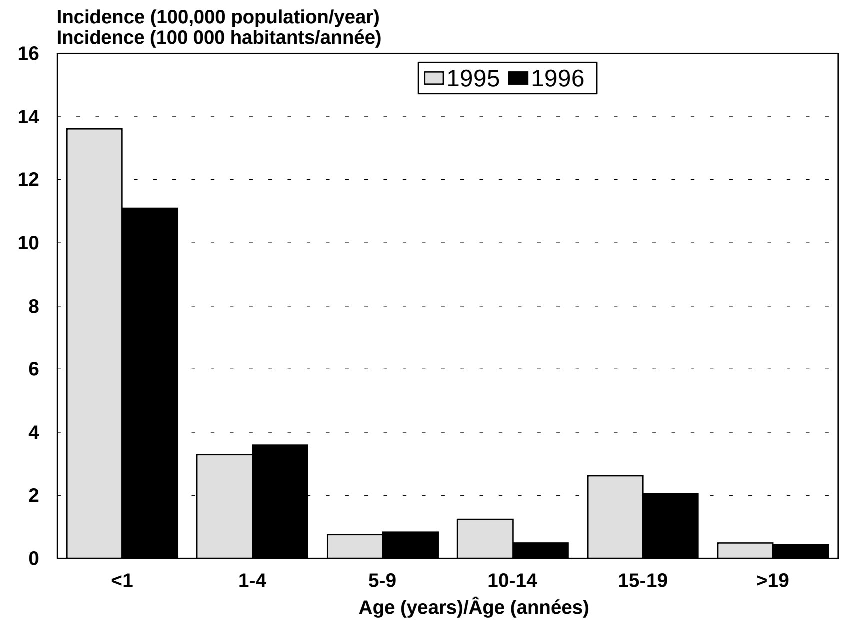
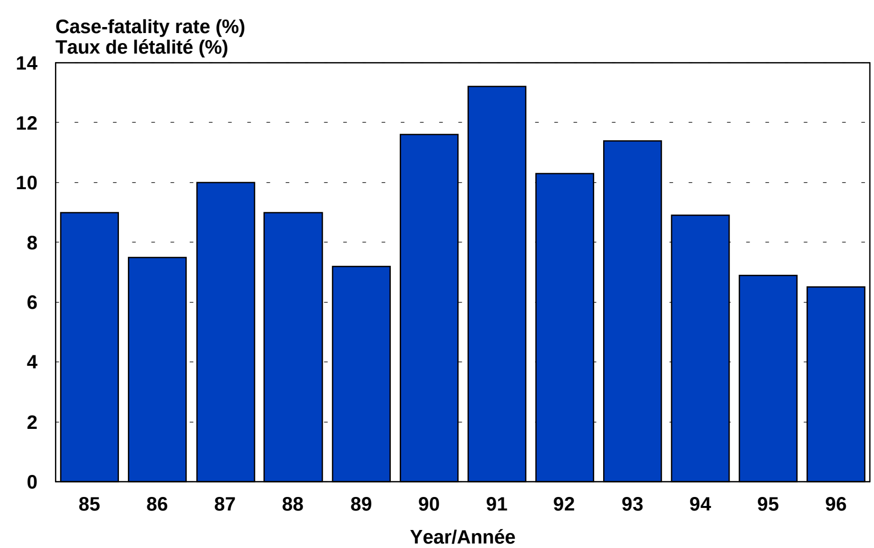


Figure 5
Case-fatality rate from invasive meningococcal disease, Canada, 1985-1996



both 1995 and 1996 were B:NT:P1. – (non-serotypable, non-subtypable; 23 isolates in 1995 and 20 in 1996) and B:4:P1. – (20 isolates in 1995 and 11 in 1996).

Serotyping and subtyping were available for 96 of the 101 serogroup C isolates from 1995 and 84 of the 92 isolates from 1996. Serogroup C serotypes and subtypes were more homogeneous than serogroup B. The three most common serogroup C strains isolated during both 1995 and 1996 were C:2a:P1.2.5 (41 isolates in 1995 and 36 in 1996), C:2a:P1.2 (25 isolates in 1995 and 10 in 1996), and C:2a:P1. – (20 isolates in 1995 and 22 in 1996).

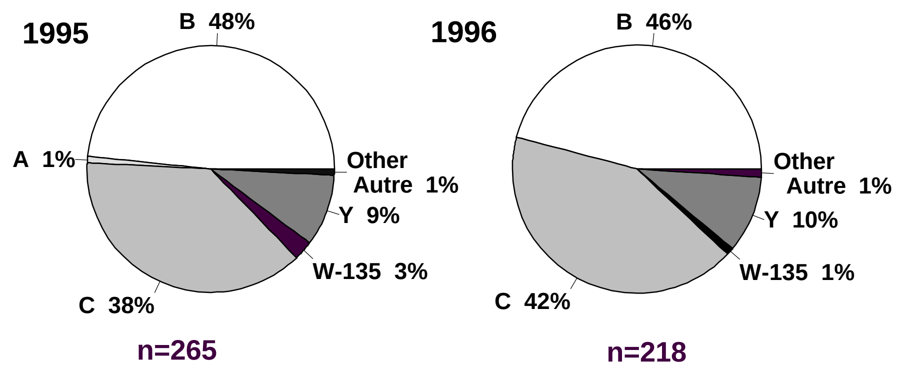
Electrophoretic Typing

Electrophoretic typing was available for all of the serogroup C meningococcal isolates that had been serotyped (96 isolates in 1995 and 84 in 1996). It is noteworthy that in both years 92% of the isolates belonged to a single electrophoretic type, ET15, or its variants.

Acknowledgements

We would like to thank our colleagues from the provincial and territorial ministries of health and from the National Laboratory for Bacteriology for providing epidemiologic and laboratory data for this report.

Figure 6
Distribution of meningococcal serogroups, Canada, 1995 and 1996



Source: *S Deeks, MD, MHSc, D Kertesz, MD, Division of Respiratory Diseases, Bureau of Infectious Disease; A Ryan, W Johnson, PhD, F Ashton, PhD, National Laboratory for Bacteriology, Bureau of Microbiology, LCDC, Ottawa, ON.*

International Notes

LYME DISEASE — UNITED STATES, 1996

Lyme disease (LD) is caused by the tickborne spirochete *Borrelia burgdorferi* sensu lato and is the most common vector-borne disease in the United States. Surveillance for LD was initiated by United States Centers for Disease Control and Prevention (CDC) in 1982, and the Council of State and Territorial Epidemiologists designated it a nationally notifiable disease in January 1991. For surveillance purposes, LD is defined as the presence of an erythema migrans rash ≥ 5 cm in diameter or laboratory confirmation of infection with evidence of at least one manifestation of musculoskeletal, neurologic, or cardiovascular disease[1]. This report summarizes the provisional number of cases of LD reported to CDC during 1996 and indicates that the number of cases reported was a record high.

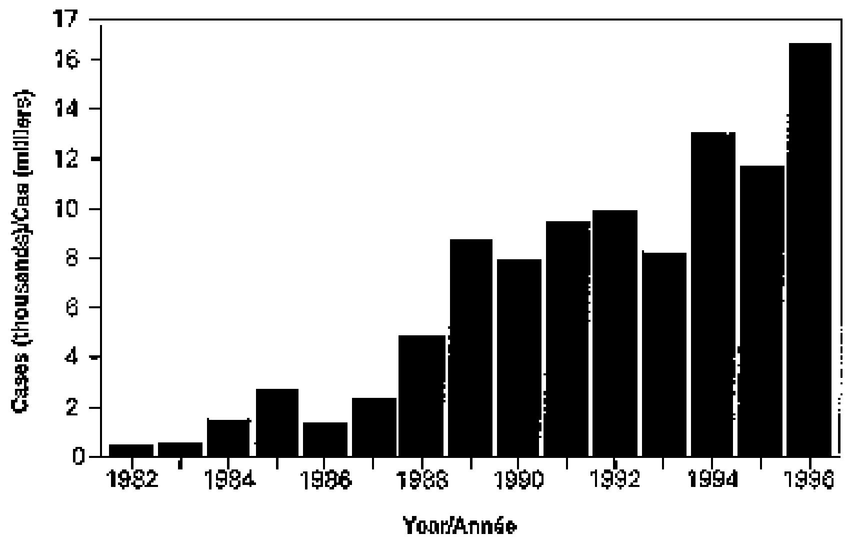
In 1996, a total of 16,461 cases of LD were reported to CDC by 45 states and the District of Columbia (overall incidence: 6.2 per 100,000 population[†]), representing a 41% increase from the 11,700 cases reported in 1995 and a 26% increase from the 13,043 cases reported in 1994 (Figure 1). As in previous years, most cases were reported from the Mid-Atlantic, Northeast, and North Central regions. Eight states reported LD incidences that were higher than the overall national rate (Connecticut, 94.8; Rhode Island, 53.9; New York, 29.2; New Jersey, 27.4; Delaware, 23.9; Pennsylvania, 23.3; Maryland, 8.8; and Wisconsin, 7.7); these states accounted for 14,959 (91%) of the nationally reported cases. In 1996, zero cases were reported from five states (Alaska, Arizona, Colorado, Montana, and South Dakota).

Eighty-seven counties each reporting ≥ 20 cases accounted for 89% of all reported cases. Reported incidences were > 100 per 100,000[††] in 18 counties in Connecticut, Maryland, Massachusetts, North Carolina, New Jersey, New York, Pennsylvania, Rhode Island, and Wisconsin; the highest reported county-specific incidence (1,247.5 per 100,000) was in Nantucket County, Massachusetts. From 1995 to 1996, a total of 28 states reported increases in the number of cases, 16 states reported decreases, and seven states reported no change. Approximately 90% of the total increase in reported cases in 1996 occurred in five states (Connecticut, New Jersey, New York, Pennsylvania, and Rhode Island) where average annual LD incidence rates had exceeded the national average for the previous 5 years combined.

† State rates are based on 1996 population estimates.
†† County rates are based on 1990 population estimates.

Of 5,298 cases for which information was available, 217 (4%) were reported as having been acquired outside of the United States, and 156 (3%) cases were reported as having been acquired in the United States but outside of the reporting state. The highest proportions of cases occurred among persons aged 0 to 14 years (3,784 [23%]) and adults aged 40 to 79 years (7,694 [47%]). Of 16,422 cases for which sex was reported, 8,634 (53%) were male.

Figure 1
Number of reported cases of Lyme disease, by year — United States, 1982-1996*



MMWR Editorial Note

Increases in reported LD cases in 1996 were limited to certain counties in some states, consistent with focal differences in the distribution and density of the tick vector. In both Connecticut and Rhode Island, the numbers of reported cases of LD increased statewide, although increases were greatest in coastal counties. In both states, this increase was associated with increased population densities of *I. scapularis* (K. Stafford, Connecticut Agricultural Experiment Station, and T. Mather, University of Rhode Island: personal communications, 1997). In New York, the greatest increases occurred in Dutchess County, where reported cases of LD nearly doubled from 1995 (918) to 1996 (1,832). Because an LD vaccine trial was being conducted in the area, some of this increase may have resulted from heightened awareness and reporting of LD. The number of reported cases was stable in other counties of New York with endemic disease, including Putnam, Suffolk, and Westchester counties. In New Jersey, eight counties with active surveillance reported higher rates than the remaining counties with passive surveillance systems.

The increase in reported LD cases in 1996 probably represents a combination of increased tick density, enhanced health-care provider awareness and reporting, and improved laboratory surveillance. In addition, case reporting has been enhanced through the availability of CDC resources for LD surveillance in eight states (Connecticut, Michigan, Minnesota, New Jersey, New York, Oregon, Rhode Island, and West Virginia).

Most LD cases respond well to appropriate antibiotic therapy; drugs of choice include amoxicillin, doxycycline, and ceftriaxone(2). Vaccines to prevent LD are under evaluation but are not yet available. Personal protection methods recommended for preventing cases of LD and other tickborne diseases (e.g. babesiosis, ehrlichiosis, and Rocky Mountain spotted fever) include wearing light-colored clothing (to more readily detect ticks), tucking long pants into socks, using insect repellents and acaricides according to label directions, and performing tick checks at least daily. The use of environmental modifications to residential properties (e.g. application of insecticides, use of deer fencing, and removal of leaf litter) also may help prevent LD.

References

1. CDC. *Case definitions for infectious conditions under public health surveillance.* MMWR 1997;46(no. RR-10):20-1.
2. Steere AC. ***Borrelia burgdorferi*** (*Lyme disease, Lyme borreliosis*). In: Mandell GL, Bennett JE, Dolin R, eds. *Principles and practices of infectious diseases.* New York: Churchill Livingstone, 1995:2143-55.

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