MENINGOCOCCAL DISEASE IN NSW 1991–1999

Jeremy McAnulty, Mohammad Habib, David Muscatello
Communicable Diseases Surveillance and Control Unit

Meningococcal disease is characterised by a rapid onset and, on rare occasions, death. Because these deaths are often sudden and usually affect young people they are often publicised and cause alarm within the community. Here we review the epidemiology of meningococcal disease cases notified in NSW since 1991.

BACKGROUND

Meningococcal disease is caused by infection with *Neisseria meningitidis* bacteria. The bacteria has several different serogroups. The identification of serogroups can help distinguish related cases and describe the epidemiology of the disease.

Around five to 10 per cent of people in some communities may carry the bacteria in their nasopharynx, but disease is rare. When it does occur the illness usually progresses rapidly. The symptoms vary according to main site of infection, and may include:

- high fever
- headache
- nausea and vomiting
- neck stiffness
- drowsiness
- coma
- a characteristic rash.

Specific treatment involves intravenous antibiotics and supportive care. Those at increased risk of disease include:

- persons in close contact with a case
- persons without a functioning spleen
- persons with rare congenital deficiencies of complement or properdin
- travellers to regions where the disease is endemic (for example, sub-Saharan Africa)
- small children
- adolescents.[1]

Cases of meningococcal disease should be notified to public health units (PHUs), whose staff investigate risk factors and provide education and chemoprophylactic therapy to close contacts.

METHODS

Under the NSW Public Health Act 1991, all laboratories and hospitals must notify suspected cases of meningococcal disease to their local PHU. PHU staff record the details on a confidential statewide database.

The characteristics of cases of meningococcal disease notified to PHUs between 1991 and 1999 were analysed. Incidence rates were calculated using the estimated 1997 mid-year population for NSW.

The NSW Department of Health's Inpatients Statistics Collection (ISC) was used to identify hospital separations of NSW residents with an ICD-9 principal diagnosis code of 036, meningococcal disease. Data were only available for complete calender years to 1997. The total number of cases for 1991, 1992 and half of 1993 were estimates based on a weighted sample as a census of all hospital separations was included in the ISC only after June 1993. To better estimate case counts of admitted patients, obvious

TABLE 5

PATIENT NOTIFICATION 1991–1999, HOSPITALISATION 1991–1997, AND DEATHS FROM MENINGOCOCCAL DISEASE, NSW

Case characteristics	*Notified cases*	*Hospital admissions*[1]	*Notified deaths (% of cases)*
Year of onset			
1991	130	118	3 (2)
1992	122	113	7 (6)
1993	153	127	11 (7)
1994	142	132	15 (11)
1995	113	104	6 (5)
1996	161	149	7 (4)
1997	219	218	7 (3)
1998	184	Not available	16 (9)
1999	220	Not available	14 (6)

1. (excludes multiple admissions)

TABLE 6

CHARACTERISTICS OF PATIENTS NOTIFIED WITH MENINGOCOCAL DISEASE, NSW, 1991–1999

Case characteristics	Cases (% total)	Average annual rate per 100,000	Deaths (% of cases)
Residence			
Sydney area	754 (52)	2.3	50 (7)
Other NSW	668 (46)	2.8	35 (5)
Overseas/unknown	22 (2)	-	1 (5)
Sex			
Male	775 (54)	2.8	53 (7)
Female	668 (46)	2.6	33 (5)
Age group			
<1	254 (18)	32.5	17 (7)
1	187 (13)	23.9	8 (4)
2	90 (6)	11.4	4 (4)
3	56 (4)	7.1	3 (5)
4	55 (4)	6.9	2 (4)
Total <5	***642 (44)***	***16.2***	***34 (5)***
5–9	103 (7)	2.6	8 (8)
10–14	87 (6)	2.2	0 (0)
15–19	224 (16)	6.0	14 (6)
20–24	106 (7)	2.5	4 (4)
25–44	136 (9)	0.8	9 (7)
45–64	79 (5)	0.7	10 (13)
65+	67 (5)	0.9	7 (10)
Syndrome			
Meningitis	769 (53)	1.4	25 (3)
Septicaemia	396 (27)	0.7	49 (12)
Unspecified	279 (19)	0.5	12 (4)
Laboratory confirmed	1011 (70)	1.8	67 (7)
Total	**1444 (100)**	**2.6**	**86 (6)**

multiple re-admissions of the same case (based on age, sex, place of residence and admission–separation dates) were removed.

RESULTS

Case reports

During the nine-year period, 1444 cases of meningococcal disease were reported in NSW, an average of 160 per year. The least number of reports of the disease were received in 1995 (*n*=113), and the most in 1999 (*n*=220) (see Table 5). The average annual incidence for this period was 2.6 per 100,000 persons. The incidence of meningococcal disease was clearly seasonal, with prominent peaks occurring in late winter and early spring (see Figure 6).

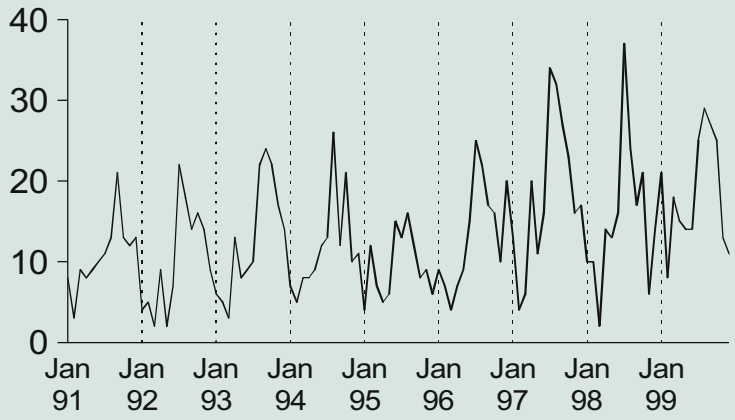
Incidence varied widely with age: it was highest among children less than one year old (32.5/100,000), and gradually declined with increasing age in early childhood. Children under five years of age had an incidence of 16.2/100,000, and accounted for 44 per cent of all notified cases. The next highest incidence was among adolescents aged 15–19 years (6.0/100,000). Incidence was broadly similar among other demographic variables, including sex and place of residence. Approximately half the cases presented with meningitis, a quarter with septicaemia and the mode of presentation of the remainder was not reported (see Table 6).

Seventy percent of cases (*n*=1011) were reported to be confirmed by a laboratory. In 1991 this proportion was only 40 per cent, but in all subsequent years was around 70 per cent. In 1999, 72 per cent (*n*=159) were laboratory confirmed.

For the nine-year period, information about the meningococcus serogroup was available for only 47 per cent (*n*=476) of laboratory-confirmed cases. Of these, 51 per cent were serogroup B, 45 per cent were serogroup C, two per cent were serogroup W135, and two per cent were serogroup Y. The proportion of laboratory-confirmed cases on whom serogrouping was reported has steadily increased from zero per cent in 1991. In 1999, this information was available on 80 per cent (*n*=128) of laboratory-confirmed cases, of which 58 per cent were serogroup B, 40 per cent were

FIGURE 6

NOTIFICATIONS OF MENINGOCOCCAL DISEASE BY MONTH OF ONSET, NSW, 1991 TO 1999



serogroup C, three per cent were serogroup W135, and less than one per cent were serogroup Y.

Hospitalisations

During the period 1991–1997 there were 961 admissions recorded with a primary diagnosis of meningococcal disease in Australia among NSW residents. For the same period 1,040 cases of meningococcal disease were notified in NSW. The extent of overlap between notified and hospitalised cases was not able to be assessed, however, the total hospitalised cases represented 92 per cent of notified cases for this period (see Table 5). The distributions of hospitalised cases and notified cases were broadly similar by sex and age group.

Deaths

During the period 1991–1999, there were 86 deaths from meningococcal disease notified to public health units (six per cent of all cases). By year, the deaths varied from two per cent (*n*=3) in 1991 to 15 per cent (*n*=11) in 1994, and in 1999, six per cent (*n*=14) of cases were reported to have died. Case fatality rates were similar by place of residence, sex, or serogroup, however, it was higher in people aged 45 years and older (12 per cent) than in younger people (five per cent) (relative risk [RR]=2.2, 95 per cent confidence intervals [CI] = 1.3 to 3.6). The case fatality rate was almost four times higher among those presenting with septicaemia (12 per cent) than with meningitis (three per cent), RR=3.8, 95 per cent CI= 2.4 to 6.1) (see Table 6).

DISCUSSION

These data indicate that in NSW, meningococcal disease is rare, but fatal in about one in 17 cases. The disease is more common in small children and adolescents, and the case-fatality rate tends to be high in older adults, and in people presenting with septicaemia.

Surveillance of meningococcal disease can provide basic information on the burden, case fatality rates, and demographic risk factors for disease. Effective surveillance of infectious diseases is often hampered by under-reporting. However, since we can expect that almost all diagnosed cases of meningococcal disease require hospital monitoring and treatment, the comparison of cases identified by the hospital ISC suggests that under-reporting is minimal in NSW. This comparison is limited in that it was not possible to link individuals in the ISC data with those notified, and by the possibility of misclassification errors in the ISC. A substantial number of case reports lack specific information on the meningococcus serogroup that caused the disease, limiting our ability to assess shifts in the distribution of serotypes over time. Available data, however, suggest fairly stable serogroup patterns during the study period.

Rapid identification and reporting of cases allows public health workers to assess whether other people are at increased risk for disease, and thereby help control the further spread. NSW Health will continue efforts to improve the surveillance of meningococcal disease through more complete reporting of serogroup data.

ACKNOWLEDGEMENT

Thanks are due to public health unit staff, doctors, and hospital and laboratory staff for providing their data.

REFERENCE

1. Chin J (editor). *Control of Communicable Diseases Manual*, 17th edition. Washington, DC: American Public Health Association, 2000.