1.3 Meningococcal Disease

Summary

Number of cases, 2013: 81
Number of cases, 2012: 66
Number of cases, 2011: 94
Crude incidence rate, 2013:1.8/100,000

In 2013, 81 cases (1.8/100,000) cases of invasive meningococcal disease (IMD) were notified in Ireland. This represents a 22.7% increase on the previous year when 66 cases (1.4/100,000) were reported. However, over the past decade the trend has been downward: in 1999 there were 536 cases (14.8/100,000). The number of cases reported in 2013 compared to 1999 reflects a decline in incidence of almost 85%.

Of the 81 cases notified in 2013, 74 (91.3%) were case classified as confirmed, one (1.2%) as probable and six (7.4%) as possible. Confirmation of diagnosis by laboratory testing of cases has improved with time. In 2013, 93.8% (n=76/81) of cases were confirmed by laboratory testing in comparison to 83.0% (n=445/536) in 1999.

Typically, most cases in 2013 were diagnosed by blood/CSF culture testing, blood/CSF PCR testing or by detection of Gram negative diplococci in skin lesions/culture or in CSF specimens. Isolation of the organism from non-sterile sites (such as the eye, nose or throat) in clinically compatible cases is considered a possible case.

In 2013, 39 of the 74 confirmed cases (52.7%) were laboratory tested by PCR testing alone and another 11 confirmed cases (14.9%) were diagnosed by culture of sterile specimens alone. Among the remaining 24 (32.4%) confirmed cases, all were diagnosed by both culture and PCR testing of sterile specimens.

Of all the 81 cases in 2013, none had a positive skin lesion, throat or nose culture test result or a positive serology or skin lesion microscopy test result. There were however, two positive eye culture test results and four CSF positive microscopy test results.

In 2013, male cases (n=44) exceeded female cases (n=37), resulting in a male to female ratio of 1.2:1.0, following a consistent pattern observed since 2005. IMD cases in 2013 ranged in age from one month to 84 years (median age of 4 years). The incidence of IMD was highest in infants and young children. Age specific incidence rate (ASIR) was highest among infants <1 year of age (35.9/100,000; n=26), followed by children in the 1 to 4 year (7.4/100,000; n=21), and 15 to 19 year age groups (3.2/100,000; n=9) (table 1, figure 1).

Figure 2 presents the number of IMD cases by gender and age group between 1999 and 2013 and shows the decline in numbers across all of the age groups, with the steepest declines observed in the <1, 5 to 9 and 10 to 24 year age groups following the introduction of the meningococcal C conjugate (MCC) vaccine in late 2000.

The overall incidence of IMD in Ireland in 2013 was highest in the HSE SE area (2.4/100,000) with the lowest in the HSE S area (1.4/100,000) (table 2). No

Table 1. Number of cases, deaths, age-group specific incidence rates per 1000,000 population (calculated using Census 2011 denominator data) and case fatality ratios of IMD, Ireland, 2013

Age Group	No. Cases	ASIR	No. Deaths	%CFR
<1	26	35.9	1	3.8%
1-4	21	7.4	0	0.0%
5-9	8	2.5	0	0.0%
10-14	2	0.7	0	0.0%
15-19	9	3.2	0	0.0%
20-24	3	1.0	0	0.0%
25+	12	0.4	3	25.0%
All ages	81	1.8	4	4.9%

ASIR, age specific incidence rate per 100,000 population
%CFR, case fatality ratio

HSE area had an incidence rate that was significantly different from the national rate (figure 3). There was one imported case in 2013 from the United States.

Neisseria meningitidis serogroup B was the pathogen most commonly associated with IMD in 2013 and accounted for 68 of the 81 (84.0%) notifications (figure 4). Since 2003 serogroup B has consistently accounted for more than 80% of annual IMD notifications (figure 4).

Apart from the year 2003, IMD cases have tended to occur most frequently in the first quarter of each calendar year (figure 5).

When serogroup B cases since 2009 by clinical diagnosis are viewed, the proportion of cases with septicaemia only decreases between the 1 to 4 and 25+ year age groups, but the opposite trend occurs with meningitis only cases (figure 6).

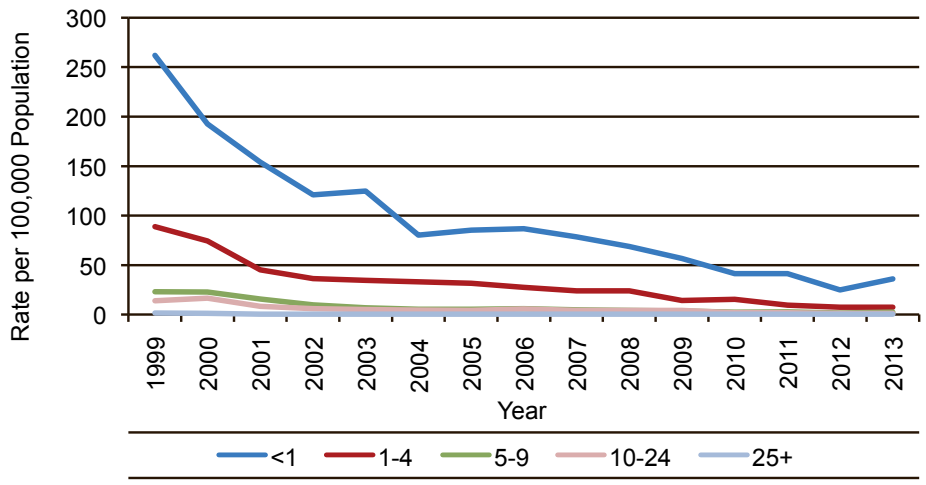

Figure 1. Age-specific rates per 100,000 population for invasive meningococcal disease (IMD), Ireland, 1999-2013

Table 2. Age specific incidence rates per 100,000 population (calculated using Census 2011 denominator data) of IMD by HSE area and age group, Ireland, 2013

HSE Area	<1	1-4	5-9	10-14	15-19	20-24	25+	Total
HSE E	26.9	10.2	0.9	1.0	2.1	0.8	0.6	1.7
HSE M	20.7	5.2	18.2	0.0	0.0	0.0	0.0	2.1
HSE MW	35.1	4.4	0.0	0.0	12.2	0.0	0.4	1.8
HSE NE	26.0	6.4	0.0	0.0	0.0	7.9	0.4	1.6
HSE NW	77.1	6.3	5.3	0.0	0.0	0.0	0.0	1.9
HSE SE	65.4	9.7	0.0	0.0	6.4	0.0	0.6	2.4
HSE S	29.9	2.5	2.2	0.0	4.9	0.0	0.5	1.4
HSE W	45.3	7.6	3.2	3.4	0.0	0.0	0.0	1.6
Ireland	35.9	7.4	2.5	0.7	3.2	1.0	0.4	1.8

Table 3. Number of cases, deaths and case fatality ratios (%CFR) by year for meningococcal B and C disease, Ireland, 1999-2013

	Meningococcal B			Meningococcal C		
Year	No. Cases	No. Deaths	%CFR	No. Cases	No. Deaths	%CFR
1999	292	12	4.1%	135	5	3.7%
2000	258	13	5.0%	139	11	7.9%
2001	245	8	3.3%	35	3	8.6%
2002	199	8	4.0%	14	0	0.0%
2003	206	11	5.3%	5	1	20.0%
2004	163	7	4.3%	5	1	20.0%
2005	169	5	3.0%	5	0	0.0%
2006	168	5	3.0%	4	0	0.0%
2007	157	6	3.8%	2	0	0.0%
2008	149	6	4.0%	4	1	25.0%
2009	119	6	5.0%	5	0	0.0%
2010	93	4	4.3%	4	0	0.0%
2011	84	2	2.4%	2	0	0.0%
2012	58	1	1.7%	0	0	0.0%
2013	68	4	5.9%	1	0	0.0%

%CFR, case fatality ratio

IMD due to serogroup C (MenC) has remained at very low levels over the last decade with five cases or less occurring annually. In 2013, only one meningococcal C case was notified (table 3); it occurred in an eight year old child with no risk factors reported and who had received three primary childhood doses of the MCC vaccine by the time she was eight months of age and was therefore considered a true vaccine failure for her age cohort. Before 2013, there had been no true vaccine failures since 2009 when three failures were reported. Between 2005 and 2008, one true vaccine failure was reported in each year.

The low numbers of MenC cases and the rarity of MCC vaccine failures over the past decade is a measure of the positive impact of the vaccination programme since first introduced in October 2000. Prior to the introduction of the MCC vaccine, serogroup C incidence rate in 1999 was 3.7/100,000 population.

There were four IMD related notified deaths in 2013 (case fatality ratio of 4.9%), double the number in the previous year (table 1). This compares to an annual average of 5.6 deaths between 2005 and 2011. In 2013, the %CFR was highest amongst cases 65+ years of age (40.0%) as a result of two deaths among five cases. The next highest %CFR was 33.1% (n=1/3) due to a death in an adult aged 40-44 years.

All of the IMD deaths in 2013 were due to serogroup B disease (age range 7 months to 81 years). This is in marked contrast to the 13 deaths due to serogroup B out of all 25 deaths reported in 2000. In the same year, 11 deaths were due to serogroup C disease. The decline in deaths associated with meningococcal disease since 2000 has been significant, partly due to the decrease in MenC cases as a result of the vaccination programme and also partly due to the decline in meningococcal B disease (table 3).

Despite a marked decline in the overall incidence over the past decade, IMD is still an important public health concern due to its associated severity, high mortality rate and serious adverse sequelae. Effective vaccination

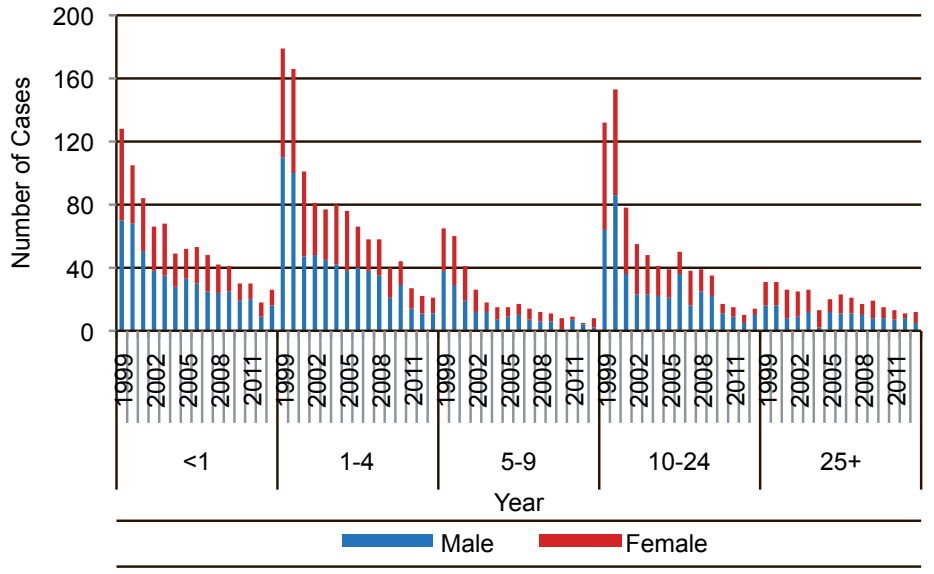

Figure 2. Number of IMD cases by gender and age group in Ireland, 1999-2013 (excludes one case with unknown gender details)

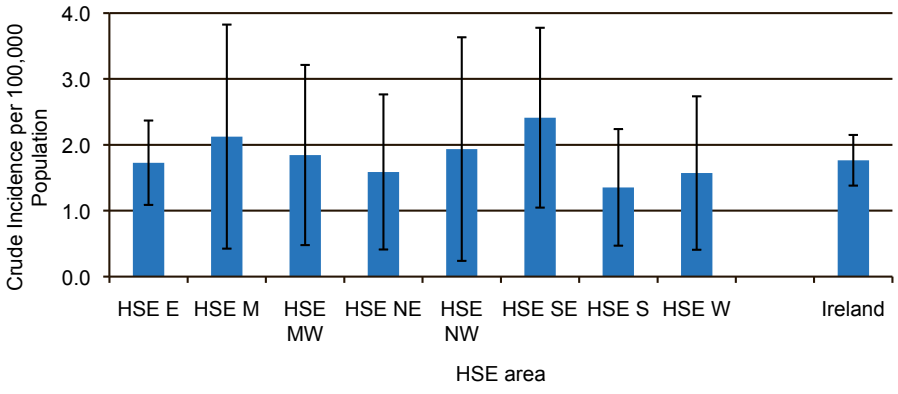

Figure 3. Crude incidence rates per 100,000 population with 95% confidence intervals for IMD notifications by HSE area, Ireland, 2013

is necessary for the complete prevention and control of IMD. Effective vaccines are available against serogroups A, C, W135 and Y forms of the disease. In 2012, a recombinant multicomponent vaccine (4CMenB) against serogroup B disease was recommended for approval by the European Medicines Agency. Marketing authorisation for the vaccine was granted in January 2013 for both child and adult administration. The decision regarding introducing this vaccine into the national immunisation programme is still under consideration at the time of writing, but in August 2014, the National Immunisation Advisory Committee (NIAC) issued recommended guidelines relating to this vaccine, details of which are available at http://www.hse.ie/eng/health/immunisation/hcpinfo/guidelines/

An outbreak of meningococcal disease in an extended Irish Traveller family across three HSE areas was reported in 2013. Eight cases of disease within this extended family group with epidemiological links were identified between March 2010 and November 2013. All eight cases survived and were aged between 5 and 46 months, and were either a cousin or sibling of another case. This outbreak was notable in that appropriate chemoprophylaxis had been given to the relevant nuclear family members and close contacts following each notification. *Neisseria meningitidis* isolates from six cases were highly related, belonging to the ST-41/44 clonal complex, and shared the porA designation 7-2,4. In November 2013, the outbreak control team (incorporating staff from public health departments, the Health Protection Surveillance Centre and the Irish Meningococcal and Meningitis Reference Laboratory) recommended that directly observed ciprofloxacin chemoprophylaxis be administered simultaneously to the extended family, and that the four component 4CMenB vaccine be administered to family members aged 2 months to 23 years inclusive in an effort to prevent further cases occurring among members of this family. At the time of writing, the combination of directly observed ciprofloxacin chemoprophylaxis and use of 4CMenB vaccine has controlled the outbreak with no further cases diagnosed.

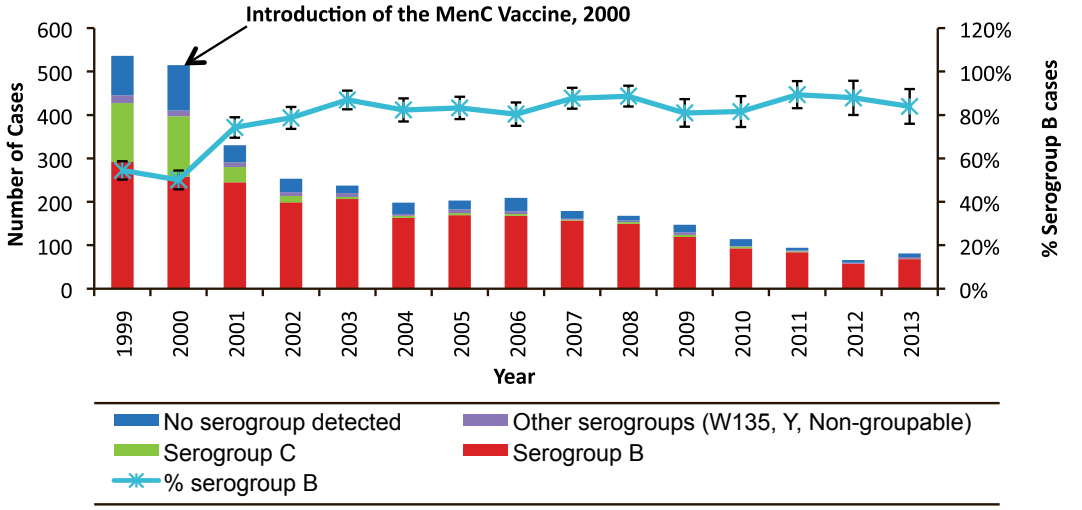

Figure 4. Number of IMD notifications in Ireland by serogroup and proportion of cases attributable to serogroup B with 95% confidence intervals, Ireland, 1999-2013

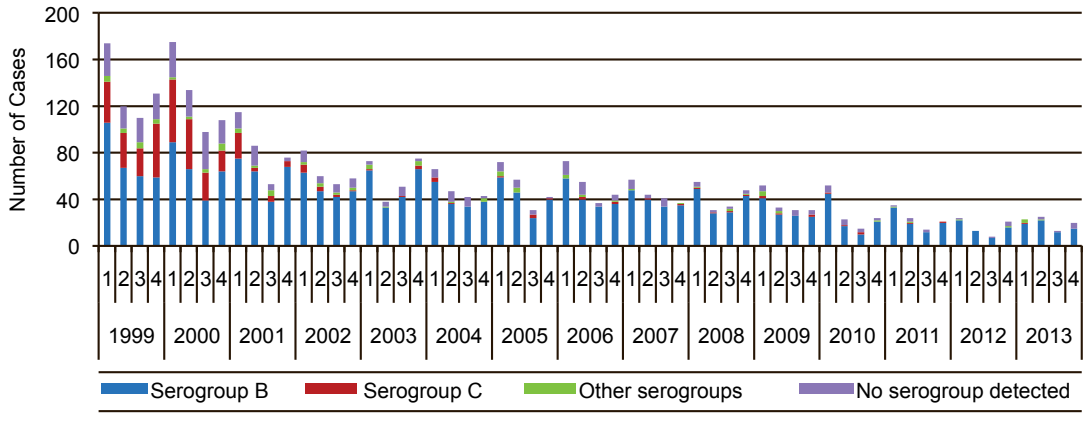

Figure 5. Number of IMD cases by quarter and serogroup, Ireland, 1999-2013

In 2014 (at the time of writing this report) new changes to the routine MenC vaccination programme are planned. Recent studies undertaken in the United Kingdom have identified waning immunity to serogroup C disease following infant vaccination in early childhood. Protection given by vaccination at 12 months also wanes by the teenage years, but vaccination later in childhood provides higher levels of antibody that persist for longer.[1-4] There is also evidence that shows that MCC vaccination significantly reduces nasopharyngeal carriage of the serogroup C meningococcus, providing indirect protection through herd immunity.[5-6] In recognition of waning immunity, NIAC has recommended a booster dose of the MCC vaccine for those considered at increased risk of MenC disease. Since 2011 the MCC vaccine booster has been recommended for close contacts of cases if their last dose was more than one year before and since August 2014, NIAC now recommends an adolescent booster at 12-13 years (http://www.hse.ie/eng/health/immunisation/hcpinfo/guidelines/). The adolescent booster will be introduced into the 2014/2015 school immunisation programme and will be provided to students in the first year of secondary level school.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 27th August, 2014. These figures may differ from those published previously due to ongoing updating of notification data on CIDR.

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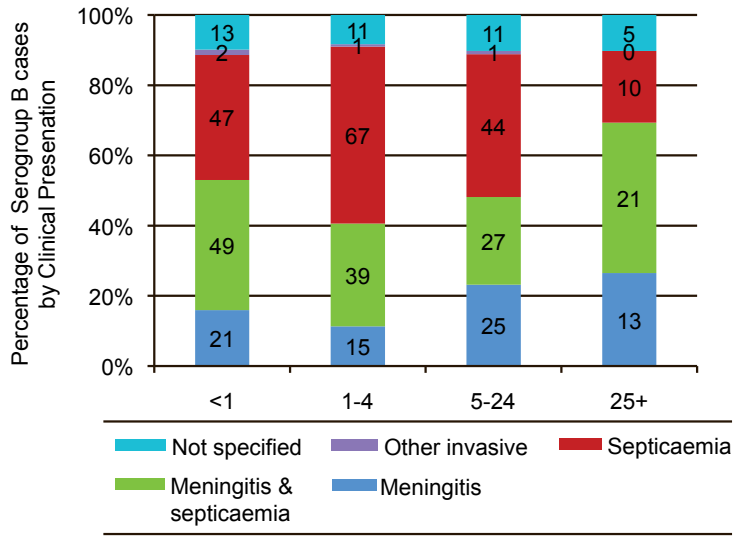

Figure 6. Percentage of serogroup B cases by age group and by clinical diagnosis, Ireland, 2009-2013