

# 1.3 Meningococcal Disease

## (*Neisseria meningitidis*) (invasive)

### Summary

Number of cases, 2016: 87  
 Number of cases, 2015: 74  
 Number of cases, 2014: 82  
 Crude incidence rate, 2016: 1.8/100,000

Between 1999 and 2012, a marked downward trend in invasive meningococcal disease (IMD) incidence was observed: in 1999 there were 536 cases (14.8/100,000) and in 2012 there were 66 cases (1.4/100,000), a decline of almost 88%. In 2016, however, 87 cases (1.8/100,000) of IMD were notified, 13 more reported than in the previous year (n=74).

Typically, most cases in 2016 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.

Of the 87 cases notified in 2016, 85 (97.7%) were case classified as confirmed and two (2.3%) as possible. Of the 85 confirmed cases, 37 (43.5%) were confirmed by PCR testing alone and another 17 confirmed cases (20.0%) were diagnosed by culture of sterile specimens alone. Of the remaining 31 (36.4%) confirmed cases, all were diagnosed by both culture and PCR testing of sterile specimens. Additional laboratory testing was done on the 85 confirmed cases: six had positive CSF microscopy test results and one had a positive skin lesion culture. Of the two possible cases

reported in 2016, one had a positive a bronchial lavage test result.

In 2016, male cases (n=49) exceeded female cases (n=38), resulting in a male to female ratio of 1.28:1, following a consistent pattern observed since 2001. IMD cases in 2016 ranged in age from one week to 93 years (median age of 14.2 years).

Overall incidence in Ireland was 1.8/100,000 population in 2016. Age specific incidence rate (ASIR) was highest among infants <1 year of age (28.9/100,000; n=18), followed by children in the 1 to 4 years (5.9/100,000; n=16), and 15 to 19 year age groups (4.6/100,000; n=14) (Table 1, Figure 1).

Figure 2 presents the number of IMD cases by gender and age group between 1999 and 2016 and shows the decline in numbers across all of the age groups, with the steepest declines observed in the <1, 5-9 and 10-24 year age groups following the introduction of the meningococcal C conjugate (MCC) vaccine in late 2000.

At regional level, incidence was highest in the HSE NW area (4.7/100,000) and lowest in the HSE MW area (1.3/100,000) (Table 2). No area had an incidence rate that was significantly different from the national rate (Figure 3). There was one imported case identified in 2016, (from the United Kingdom with a menB infection (aged 20-24 years)). In December 2016, a cluster of two cases was reported in HSE NW in Donegal, both aged 10-14 with a serogroup B infection; both cases recovered.

Table 1. Number of cases, deaths, age-group specific incidence rates per 100,000 population and case fatality ratios of IMD, Ireland, 2016

Age Group	No. Cases	ASIR	No. Deaths	%CFR
<1	18	28.9	0	0.0%
1-4	16	5.9	0	0.0%
5-9	4	1.1	0	0.0%
10-14	8	2.5	0	0.0%
15-19	14	4.6	1	7.1%
20-24	6	2.2	0	0.0%
25+	21	0.7	4	19.0%
All ages	87	1.8	5	5.7%

ASIR, age specific incidence rate per 100,000 population calculated using Census 2016 data; %CFR, case fatality ratio,

Apart from the years 2003, 2013, 2014 and 2016, IMD cases have tended to occur most frequently in the first quarter of each calendar year (Figure 4).

Most cases of IMD occurred in cases whose ethnic background was described as 'White' (51.7%; n=45/87) followed by 'Irish Traveller' (12.6%; n=11), 'Indian Subcontinent' (3.4%; n=3) 'Other' (2.3%; n=2) and 'not known'/not specified (29.9%; n=26).

*Neisseria meningitidis* serogroup B was the pathogen most commonly associated with IMD in 2016 and accounted for 48 of the 87 (55.2%) notifications. However, this is a marked decline on what was previously reported between 2002 and 2015 when serogroup B accounted for more than 80% (n=1746/2105) of all IMD notifications (Figure 5).

There were five IMD related notified deaths in 2016 (case fatality ratio of 5.8%) (age range 17 months to 81 years)

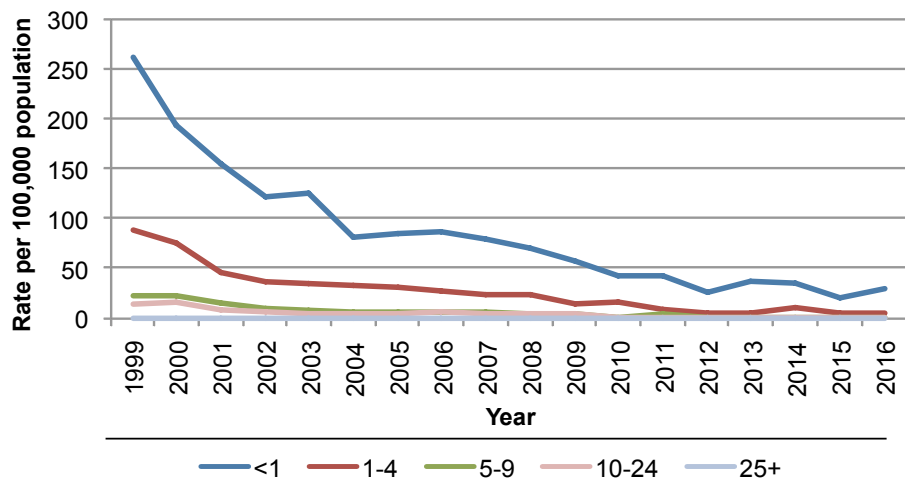


Figure 1. Age-specific rates per 100,000 population for invasive meningococcal disease (IMD), Ireland, 1999-2016

Table 2. Age specific incidence rates per 100,000 population of IMD by HSE area and age group, Ireland, 2016

HSE Area	<1	1-4	5-9	10-14	15-19	20-24	25+	Total
HSE E	26.4	4.2	0.8	0.0	3.9	1.8	0.6	1.4
HSE M	0.0	5.6	0.0	0.0	15.5	0.0	1.1	2.1
HSE MW	20.3	0.0	0.0	3.8	3.9	4.6	0.4	1.3
HSE NE	15.4	0.0	2.5	0.0	9.7	4.4	0.7	1.7
HSE NW	94.6	14.2	5.1	21.7	5.8	0.0	0.6	4.7
HSE SE	15.4	17.5	2.6	0.0	3.0	0.0	0.0	1.6
HSE S	34.0	7.9	0.0	4.4	2.3	5.1	1.5	2.6
HSE W	52.3	4.0	0.0	3.3	0.0	0.0	0.3	1.3
Ireland	28.9	5.9	1.1	2.5	4.6	2.2	0.7	1.8

ASIR, age specific incidence rate per 100,000 population calculated using Census 2016 data

Table 3. Number of cases, deaths and case fatality ratios (%CFR) by year for meningococcal B and C disease, Ireland, 1999-2016

Year	Meningococcal B			Meningococcal C		
	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	158	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
2014	69	3	4.3	6	1	16.7
2015	43	2	4.7	11	0	0.0
2016	48	2	4.2	22	1	4.5

%CFR, case fatality ratio

(Table 1). Two of the deaths were attributable to a serogroup B infection, one to a serogroup W135 infection, one case had a serogroup C infection at the time of death, but the cause of death was not known and another, with no serogroup reported, is awaiting a coroner's report at the time of writing.

IMD due to serogroup C (MenC) had remained at low levels between 2003 and 2014 with an average of 3.4 cases occurring annually. However, since then, numbers have risen with 11 cases in 2015 and 22 in 2016 (Table 3). Of the cases in 2016, 11 were unvaccinated (aged between 1 month and 69 years), six were complete vaccine failure failures (aged 8 to 17 years), two were incomplete vaccine failures (aged 12-14 years) and the vaccination status of the remaining three

cases were either unknown or not specified (aged 30-81 years) (Table 4).

The recent increase in MenC cases, which began in 2014, may be attributable to waning population herd immunity. Recent studies undertaken in the United Kingdom have reported waning immunity to serogroup C disease following infant vaccination in early childhood. Furthermore, 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.<sup>1-4</sup> Evidence shows that MCC vaccination significantly reduces nasopharyngeal carriage of the serogroup C meningococcus, providing indirect protection through herd immunity.<sup>5-6</sup> The

Table 4. Details of the MenC cases notified in 2016 including age group, outcome and age at vaccination

Case No.	Age Grp	Outcome	Vaccination Status	No. MenC doses given	Age at (Last) Vaccination
1	<1	Not known	Unvaccinated	0	.
2	<1	Not known	Unvaccinated	0	.
3	<1	Recovering	Unvaccinated	0	.
4	<1	Recovering	Unvaccinated	0	.
5	5-9	Recovering	Complete	3	6 months
6	10-14	Recovering	Complete	3	6 months
7	10-14	Recovered	Incomplete	1	6 months
8	10-14	Recovering	Incomplete	3	5 months
9	15-19	Recovering	Complete	1	3.5 years
10	15-19	Recovered	Complete	1	3.3 years
11	15-19	Recovered	Complete	1	3.3 years
12	15-19	Recovering	Complete	1	2.5 years
13	15-19	Recovered	Unvaccinated	0	.
14	20-24	Recovering	Unvaccinated	0	.
15	30-34	Recovering	Unknown	.	.
16	45-49	Recovering	Unknown	.	.
17	50-54	Recovering	Unvaccinated	0	.
18	55-59	Recovering	Unvaccinated	0	.
19	60-64	Not known	Unvaccinated	0	.
20	65-69	Recovered	Unvaccinated	0	.
21	65-69	Recovering	Unvaccinated	0	.
22	80-84	Died	Not specified	.	.

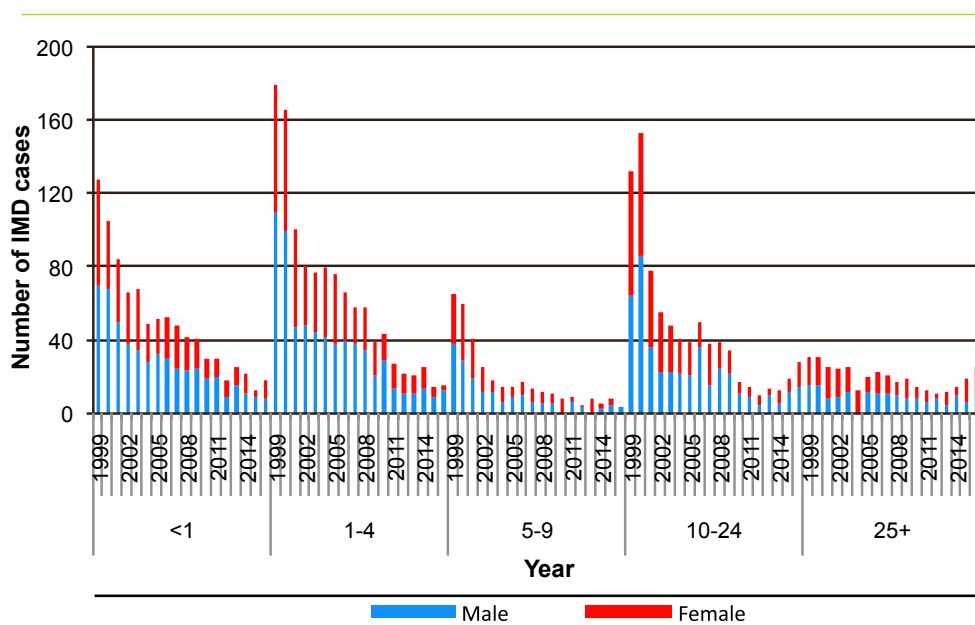


Figure 2. Number of IMD cases by gender and age group in Ireland, 1999-2016 (excludes one case with unknown gender details in 2009)

continuing increase in MenC cases in Ireland in 2016 may reflect a decline in this herd immunity.

The routine meningococcal C conjugate (MCC) vaccination programme in Ireland has recently changed in response to the recent increase in MenC cases and the emerging evidence of waning immunity. Instead of three doses of the MCC vaccine being administered to children at 4, 6 and 13 months of age, from July 2015 a single dose is given at 4 months, 13 months and at 12-13 years (if not previously vaccinated at >10 years of age) (<http://www.hse.ie/eng/health/immunisation/hcinfo/guidelines/chapter13.pdf>).

The National Immunisation Advisory Committee (NIAC) also recommended a booster dose of the MCC vaccine for those considered at increased risk of MenC disease, and since 2011, the MCC vaccine booster has been recommended for close contacts of cases if their last dose was more than one year before. In August 2014, NIAC recommended an adolescent booster at 12-13 years to be offered in the first year of secondary level school. The adolescent booster MenC programme commenced in January 2015.

Despite the marked reduction in the overall incidence in the past decade, IMD is still an important public health concern due to its associated severity, high mortality rate and serious adverse sequelae. Complete IMD prevention and control requires effective vaccination. Effective vaccines are now available against serogroups A, B, C, W135 and Y forms of the disease. In 2012, Bexsero<sup>®</sup>, a recombinant multicomponent vaccine (4CMenB) against serogroup B disease was approved by the European Medicines Agency. In March 2014, the United Kingdom's Joint Committee on Vaccination and Immunisation (JCVI) recommended the vaccination of infants against serogroup B<sup>7</sup>. In Ireland, the primary childhood immunisation (PCI) schedule were updated in July 2016 so that all babies born on or after 1<sup>st</sup> October 2016 are now offered the MenB vaccine at 2, 4 and 12 months of age (<https://www.hse.ie/eng/health/immunisation/infomaterials/newsletter/newsletter23.pdf>). The MenB vaccine cannot be given at same time as MenC vaccine, which is given at 6 and 13 months of age.

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease

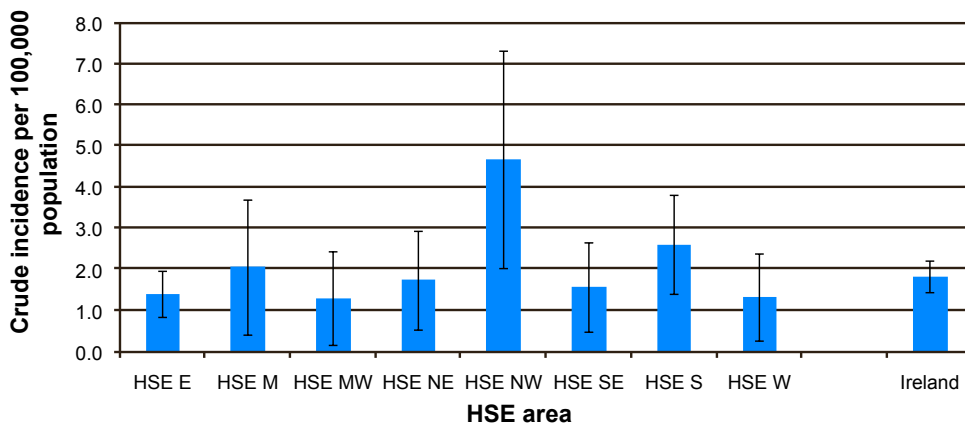


Figure 3. Crude incidence rates per 100,000 population with 95% confidence intervals for IMD notifications by HSE area, Ireland, 2016

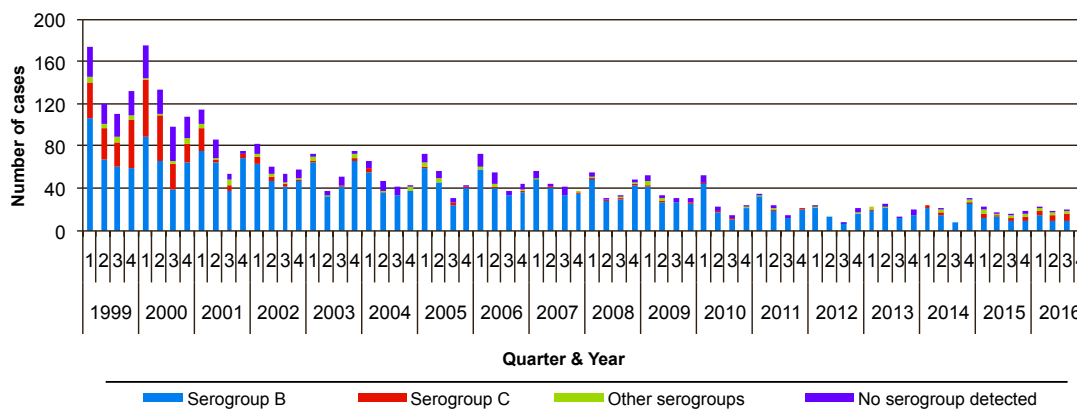


Figure 4. Number of IMD cases by quarter and serogroup, Ireland, 1999-2016

Reporting (CIDR) system on 9<sup>th</sup> November, 2017. These figures may differ from those published previously due to on-going updating of notification data on CIDR.

### References

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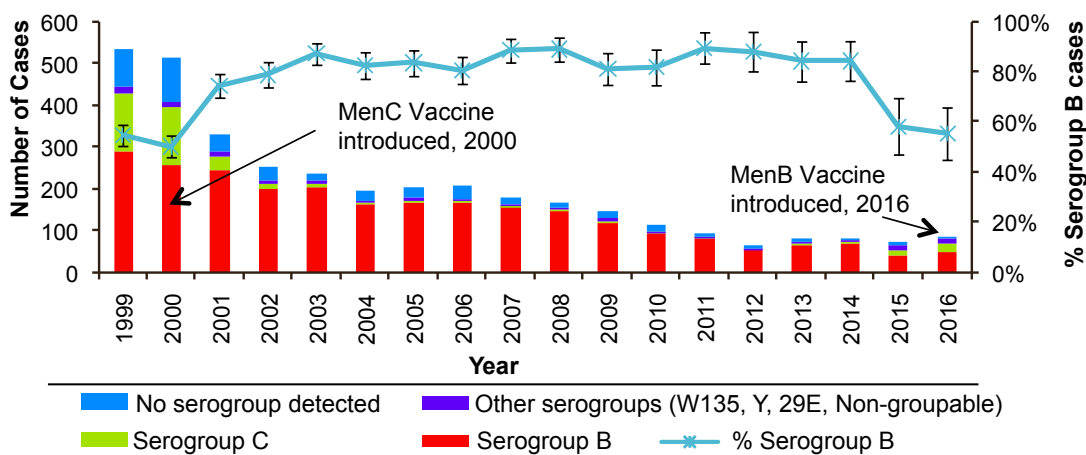


Figure 5. Number of IMD notifications in Ireland by serogroup and proportion of cases attributable to serogroup B with 95% confidence intervals, Ireland, 1999-2016