

# Annual Epidemiological Report

September 2024

## Invasive Meningococcal Disease in Ireland, 2022

### Key Facts

There has been a marked reduction in the number of notified invasive meningococcal disease (IMD) cases since 2018. This may be attributable to the impact of measures introduced during the COVID-19 pandemic, which began in early 2020.

Year	No. Cases	Incidence rate per 100,000 population
2018	89	1.9
2019	71	1.5
2020	22	0.5
2021	10	0.2
2022	31	0.7

Of the 223 cases notified between 2018 and 2022, 214 cases (96.0%) were classified as confirmed and nine (4.0%) as possible.

A similar number of cases were male (n=110, 49.9%) and female (n=113, 50.7%) between 2018 and 2022. This gives a male to female ratio of 1:0.97.

The median age of IMD cases between 2018 and 2022 was 18.2 years (range two weeks to 89 years).

The age specific incidence rate (ASIR) was highest among the <1 year age group for each of the five-years between 2018-2022.

Serogroup B (SgB) was the most frequent serogroup for IMD cases between 2018 and 2022, accounting for over half (n=122, 54.7%) of cases.

There were 26 IMD related notified deaths between 2018 and 2022. Half (n=13, case fatality ratio [CFR]=14.6%) were in 2018, seven (CFR=9.9%) were in 2019, one in 2020 (CFR=4.5%) and five (CFR=16.1%) in 2022.

Over the five-year period, 17 vaccine meningococcal B vaccine failures were reported, five were complete, five were incomplete and seven were age appropriately vaccinated; in 2022 there were two complete vaccine failures and one incomplete vaccine failure.

## Epidemiology

### *Annual trends*

There was a steady decline in the incidence rate<sup>1</sup> for invasive meningococcal disease (IMD) from 14.8 per 100,000 (n=536) in 1999 to 1.4 per 100,000 (n=66) in 2012. Between 2012 to 2018, the incidence rate remained somewhat stable though had increased to 1.9 per 100,000 by 2018 (n=89). Since 2018, the incidence rate for IMD has decreased and was 0.7 per 100,000 (n=31) in 2022.

### *Diagnostics/Testing*

Between 2018 and 2022, most cases 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, invasive cases is considered a possible case. Between 2018 and 2022, 223 cases were notified on CIDR. Of cases between 2018 and 2022, 214 (96.0%) were classified as confirmed and nine (4.0%) were possible.

### *Gender*

Between 2018 and 2022, a similar number of cases were male (n=110, 49.9%) and female (n=113, 50.7%). This gives a five-year male to female ratio of 1:0.97. In each year 2018-2021, less male than female cases were notified. However, more male than female cases were notified in 2022, a similar pattern to annual trends between 2001 and 2016.

### *Age*

The median age of IMD cases between 2018 and 2022 was 18.2 years (range two weeks to 89 years). The age specific incidence rate (ASIR) was highest among the <1 year age group for each of the five-years, with the ASIR for the <1 year age group ranging from 17.7 per 100,000 in 2018 to 1.6 per 100,000 in 2021 (Table 1, Figure 1).

Figures 2a and 2b presents the number of IMD cases by gender and age group between 1999 and 2022. Since 1999, the general pattern is a decline in numbers across age groups, though the downward pattern is less apparent in more recent years in the 10-24 years age group and in the 25+ age group.

### *Geographical Area*

At regional level, there was no observed pattern for incidence rate by Health Region area over the five years. In 2022, incidence was highest in both HSE Dublin & South East and Mid West (1.0/100,000) and lowest in HSE South West 0.1/100,000). The national incidence rate in 2022 was 0.7 per 100,000 (Table 2, Figure 3).

### *Imported Cases*

Two imported cases, one from another European country (serogroup=SgB, notified in 2018) and the other from USA (serogroup=SgB, notified in 2019) from were identified over the five-year

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<sup>1</sup> Census 2016 data were used to calculate incidence rates

period. One of these cases was aged <1 year. This case died. A coroner's report is still awaited at the time of writing.

### *Seasonality*

In 2018, 2019 and 2020, the peak incidence of IMD was in the first quarter of the year. This is a phenomenon observed in most previous years (Figure 4). However, the peak incidence of IMD in 2021 and 2022 was not in the first quarter of the year.

### *Ethnicity*

Ethnicity details were poorly collected with 'not known' or 'not specified' reported for a large proportion (n= 134, 60.1%) of cases between 2018 and 2022. Where ethnic background was specified, 'White' (n=43, 19.3%), 'White – Irish' (n=25, 11.2%) and 'White - Irish Traveller' (n=10, 4.5%) were most frequently recorded.

### *Serogrouping*

Between 1999 and 2012, there was a marked decline in both SgC and SgB. IMD due to SgC remained at low levels between 2003 and 2013 respectively with an average of 3.4 cases occurring annually. However, 30 cases of SgC were notified in 2017, 20 in 2018 and 13 in 2019. More recently, case numbers have declined and no case of SgC was reported in 2022. In 2017, the annual number of SgC cases surpassed that of SgB cases for the first time but this trend did not persist in recent years. For SgB, 46 cases were notified in 2018, 33 in 2019, 15 in 2021 and seven in 2022. Twenty-three cases of SgB were reported in 2022. This accounted for 74.2% of IMD notifications in 2022. There were 23 cases of SgW notified over the five-years, 2018-2022. Half (n=12) were reported in 2018. There were 22 cases of SgY notified between 2018-2022. Nine (40.9%) were reported in 2019 (Table 3).

Figure 5 presents the number of IMD notifications by serogroup and proportion of cases attributable to serogroup B with 95% confidence intervals from 1999-2022.

Figure 6 presents the distribution of serogroups by age group over the period 1999 to 2022. The figure highlights that the highest frequency of SgB and SgC cases in this time period are in age groups <1 year, 1-4 years and 15-19 years age groups. For SgW, the frequency distribution is similar though a higher proportion of cases is seen in older age groups also. For SgY, the frequency is highest in the 65+ years age group.

The crude incidence rates for each of the serogroups SgB, SgC, SgW and SgY between 1999 and 2022 are shown in Figure 7.

Figure 8 presents the proportion of IMD cases between 1999 and 2022 by final clinical diagnosis.

### *Mortality*

There were 26 IMD related notified deaths between 2018 and 2022. Half (n=13, case fatality ratio [CFR]=14.6%) were in 2018, seven (CFR=9.9%) were in 2019, one in 2020 (CFR=4.5%) and five (CFR=16.1%) in 2022. There were no deaths reported in 2021. The age range in the deaths was 3 months to 89 years. Eleven deaths over this five-year period were associated with SgB, five with SgC, six with SgW, and three with SgY (Table 3). The serogroup was not known in one death.

In spite of the marked reduction in the overall incidence of IMD since 1999, it is clear that due to its associated virulence, high mortality rate and serious adverse sequelae, IMD remains a serious public health challenge. The best prevention for IMD is effective vaccination.

There was reported family cluster of Serogroup B cases reported between 2018 and 2022 (in 2018), involving two children in Regional Health Area A, the younger of whom died.

### **Meningococcal B vaccination**

In Ireland, the primary childhood immunisation (PCI) schedule was updated in July 2016. All infants born on or after 1st October 2016 are recommended to receive three doses of MenB, one dose given at two, four and 12 months of age.

Between 2018 and 2022, 17 meningococcal B vaccine failures were reported. Five complete vaccine failures occurred in children aged 6 between months and five years, each receiving three doses, one of whom died; five were incompletely vaccinated, aged 10 months to two years, three of whom received two doses each and two others had received one; and seven were aged appropriate vaccinated, aged two to 11 months, four of whom had received two doses each and three others had received one dose only. In 2022 there were two complete vaccine failures and one incomplete vaccine failure.

### **Meningococcal C and ACWY vaccinations**

The meningococcal C conjugate (MCC) vaccination was introduced in Ireland in 2000 for all children and a catch up to the age of < 23 years. In October 2016, the PCI schedule changed with one dose of MenC at six months of age and a further dose (Hib/MenC) at 13 months. In September 2019, the MenACWY was introduced into the school immunisation programme for children aged 12-13 years of age. This vaccine provides additional protection against the serogroups W and Y which have emerged in recent years.

For information on uptake of meningococcal vaccines please refer to the National Immunisation Advisory Committee guidelines on meningococcal disease available at <https://www.hse.ie/eng/health/immunisation/hcpinfo/guidelines/chapter13.pdf>

The figures presented in this summary are based on data extracted from the Computerised Infectious Disease Reporting (CIDR) system on 23 October 2023 with further serogrouping validation with the Irish Meningitis & Sepsis Reference Laboratory (IMSRL) during 2024. These figures may differ from those published previously due to on-going updating of notification data on CIDR.

### **Further information available on HPSC website:**

<https://www.hpsc.ie/a-z/vaccinepreventable/invasivemeningococcaldisease/>

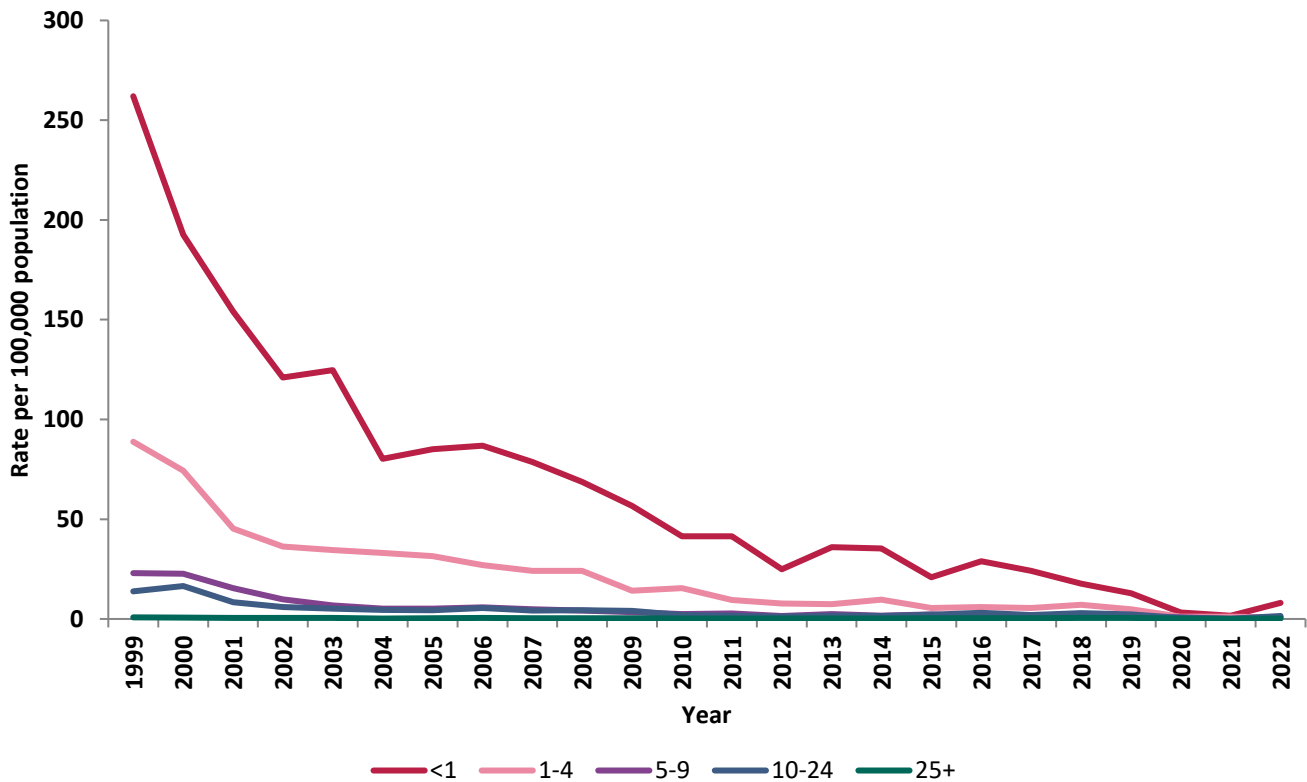
## **Acknowledgements:**

HPSC wishes to thank all who provided data for this report: Departments of Public Health, Irish Meningitis & Sepsis Reference Laboratory, and other Microbiology Laboratories.

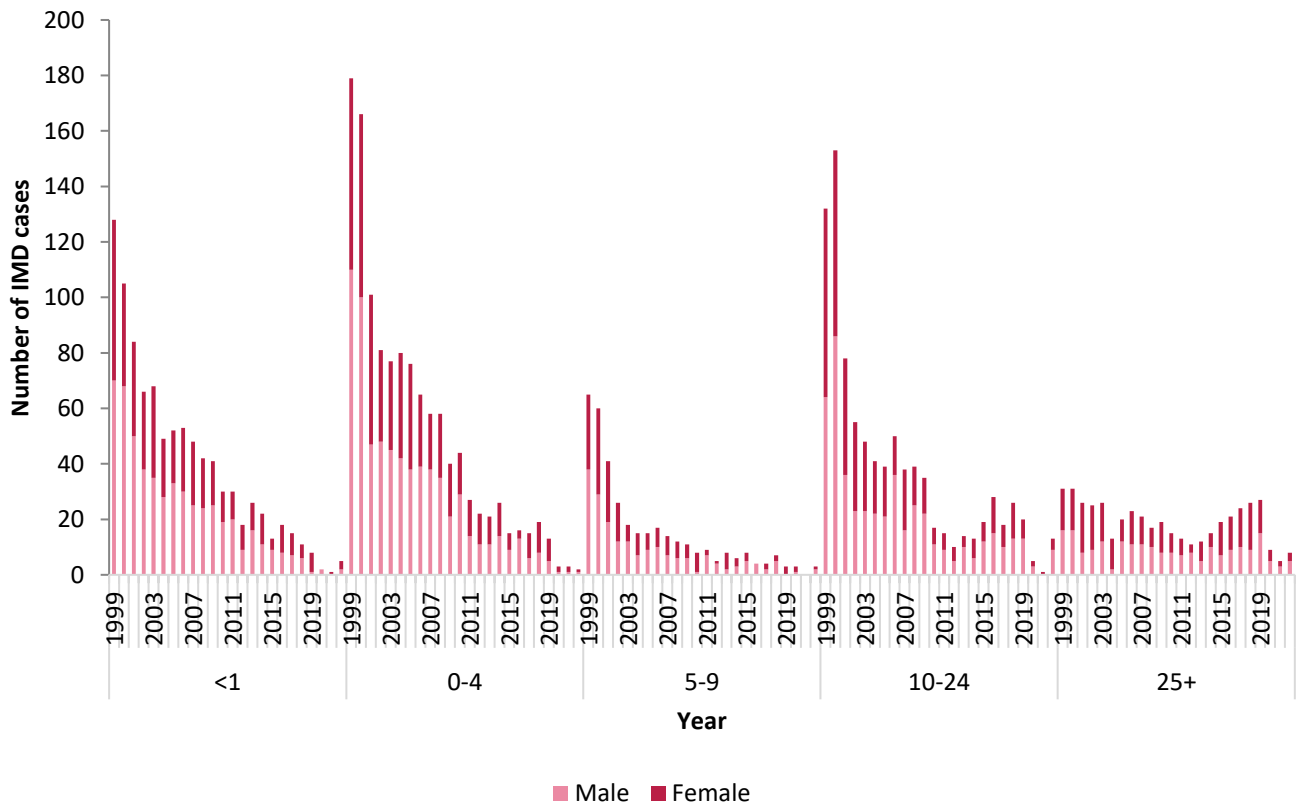
## **Report prepared by:**

**Eimear Keane, Piaras O’Lorcain, Geraldine Casey, Vaccine Preventable Disease (VPD) team**

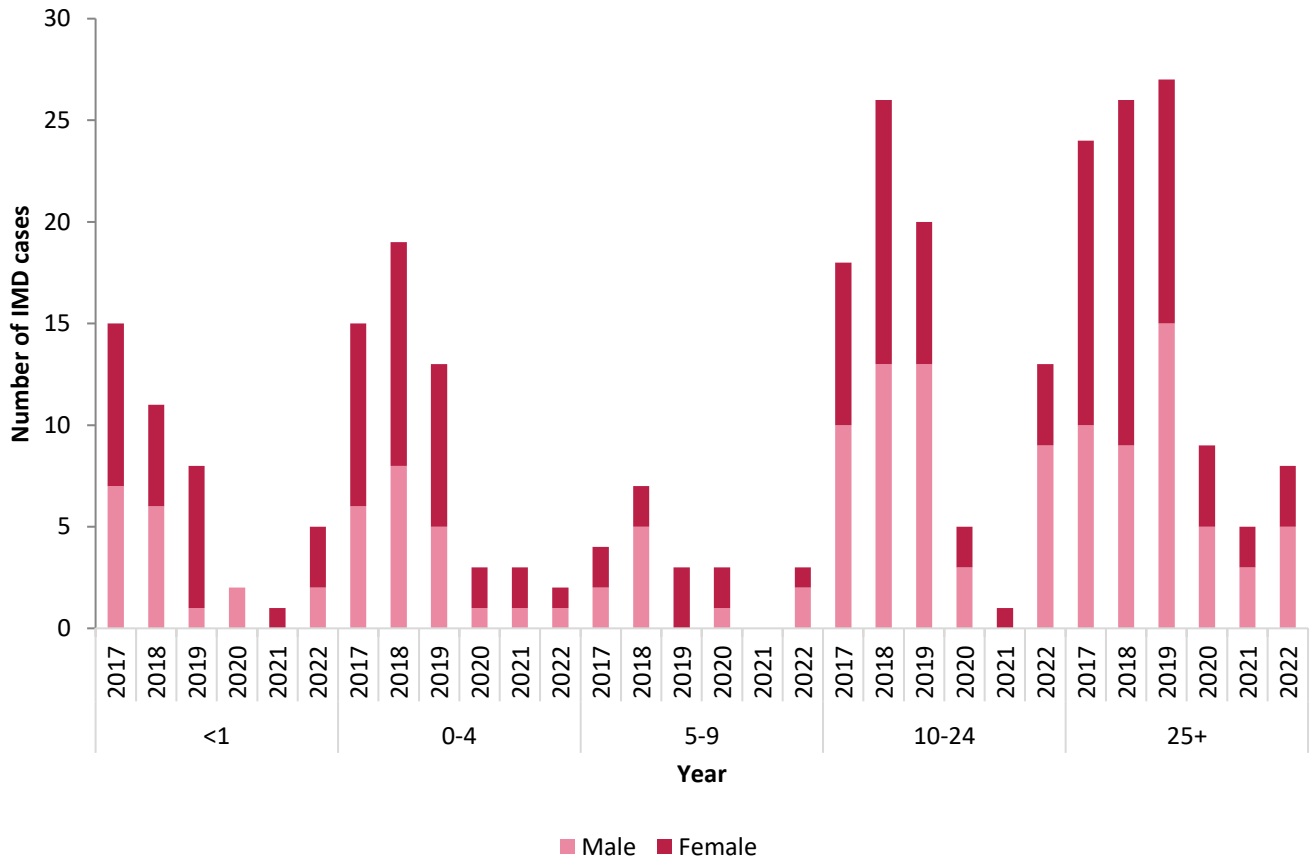
**Figure 1. Age-specific rates per 100,000 population for invasive meningococcal disease (IMD), Ireland, 1999-2022**



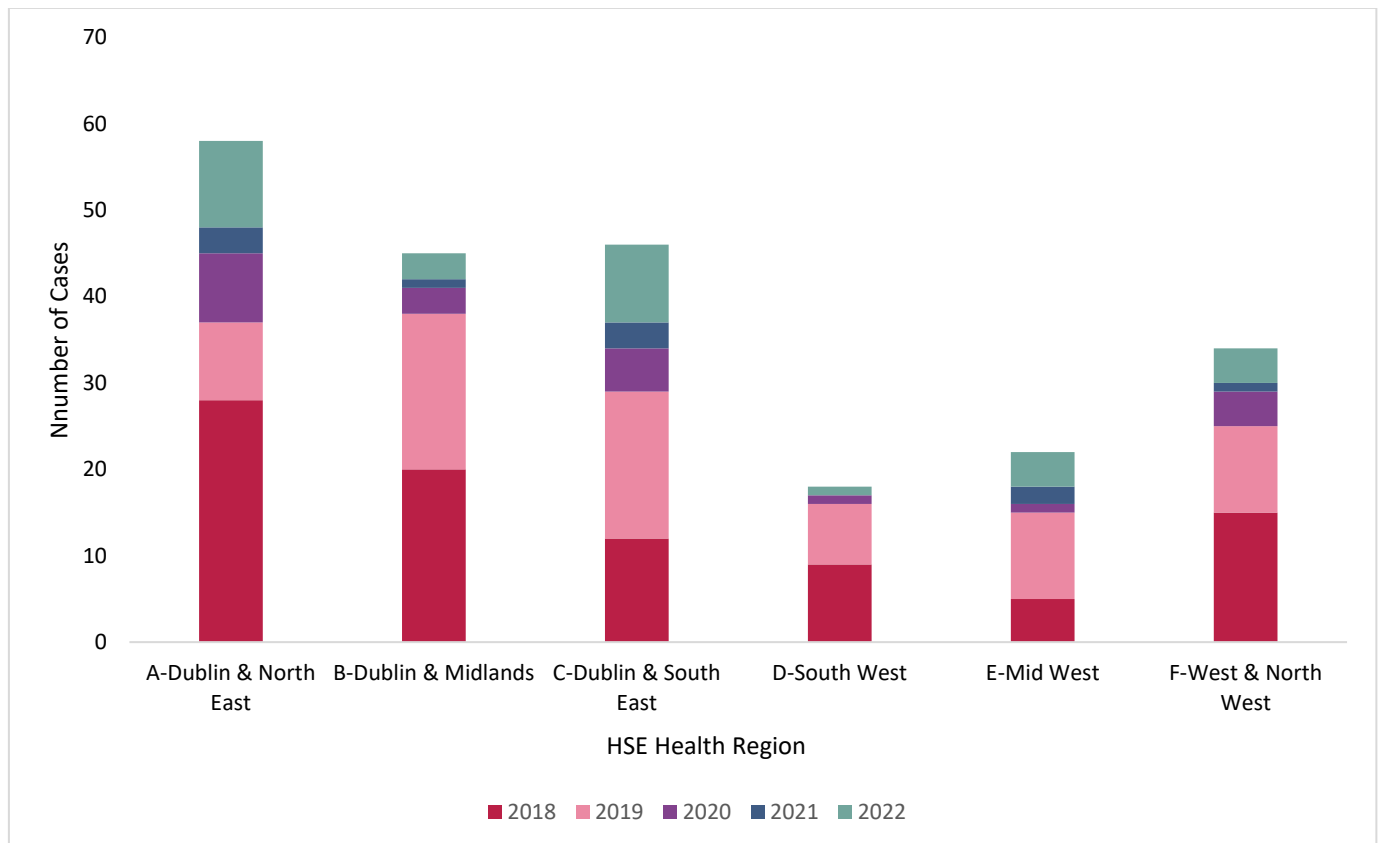
**Figure 2a. Number of IMD cases by gender and age group in Ireland, 1999-2022 (excludes one IMD case with unknown gender in 2009)**



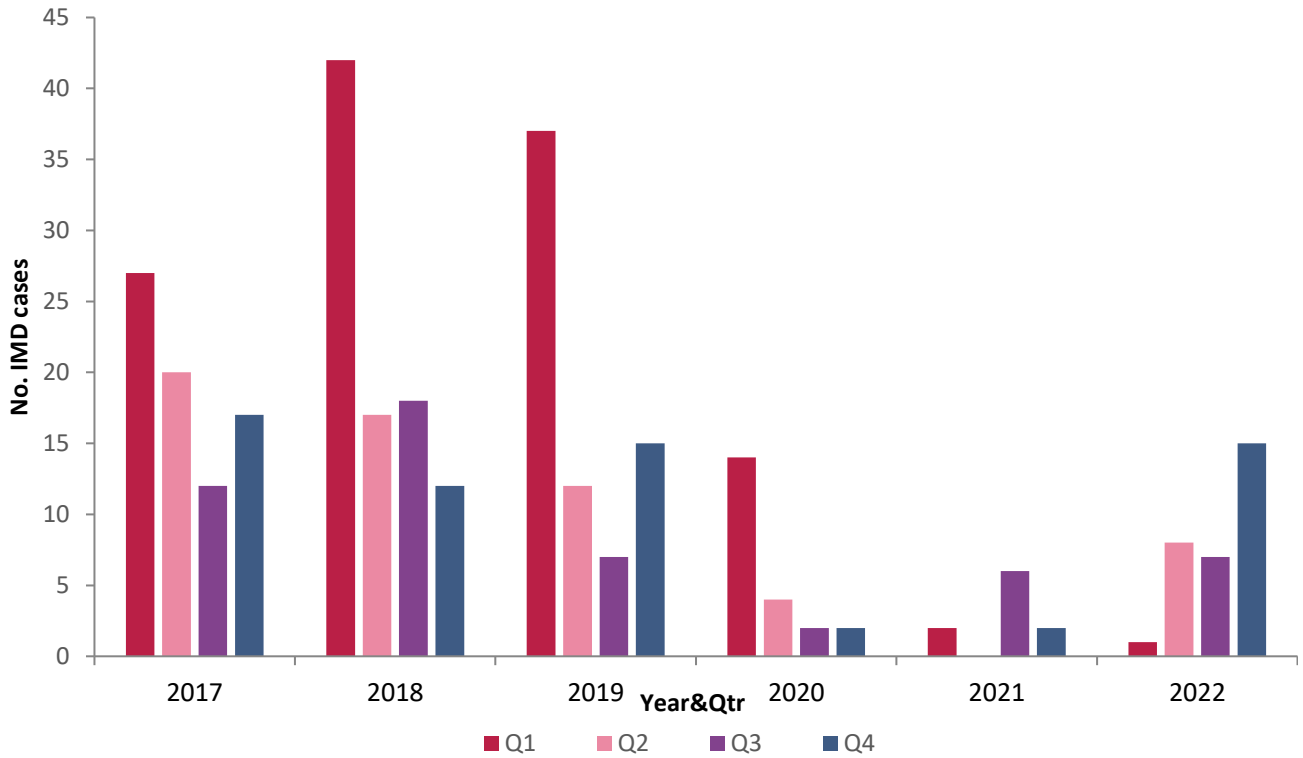
**Figure 2b. Number of IMD cases by gender and age group in Ireland, 2017-2022**



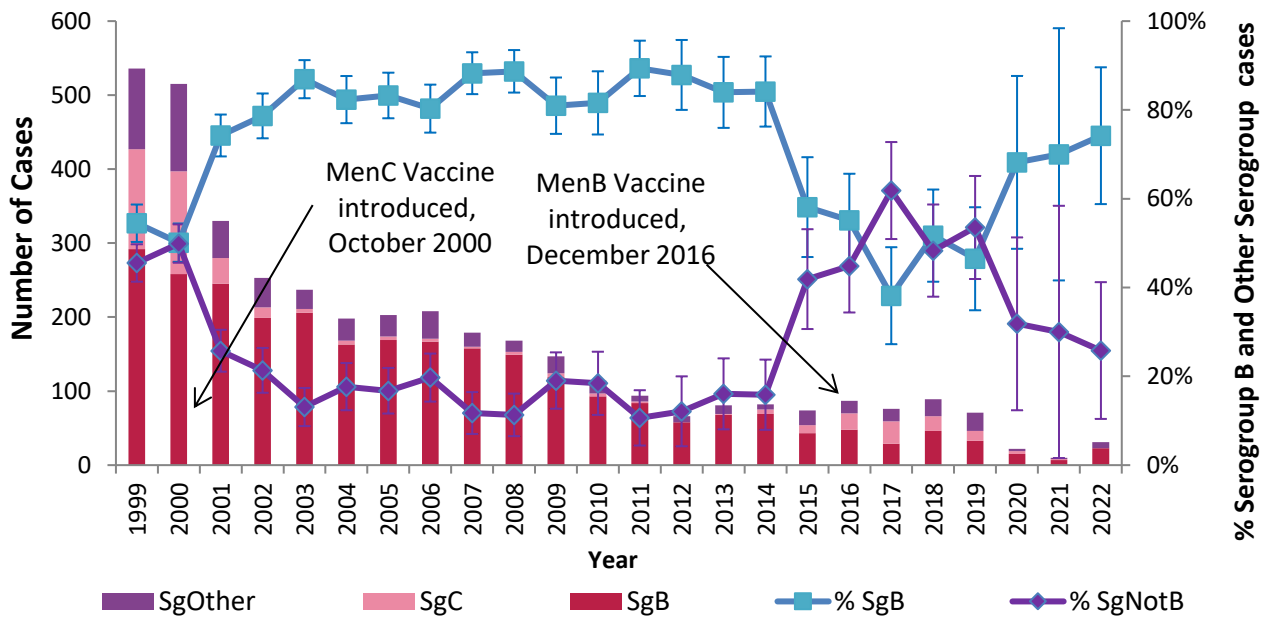
**Figure 3. Number of IMD cases by HSE Health Region, Ireland, 2018-2022**



**Figure 4. Number of IMD cases by quarter, Ireland, 2017-2022**

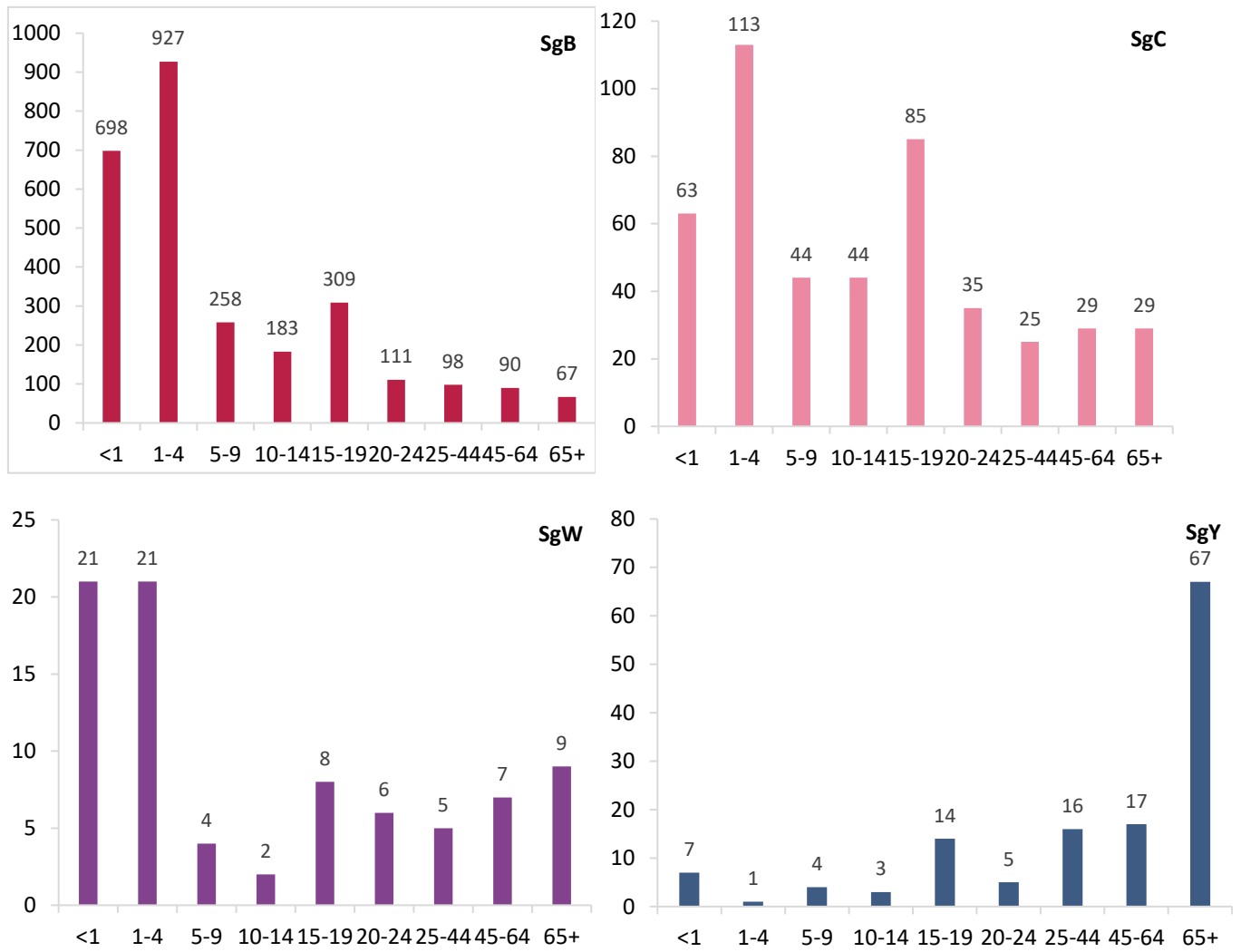


**Figure 5. Number of IMD notifications by serogroup and proportion of cases attributable to serogroup B with 95% confidence intervals, Ireland, 1999-2022**

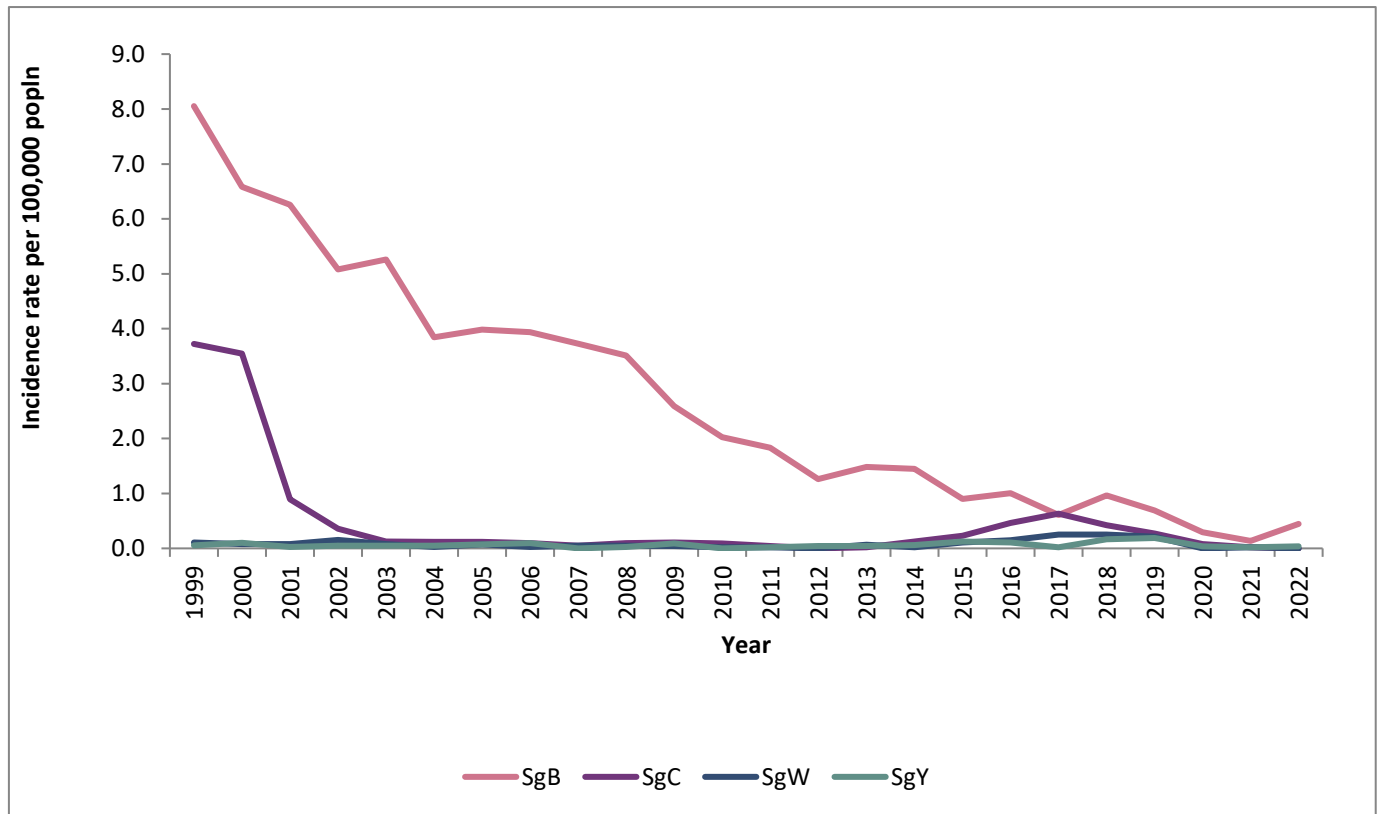




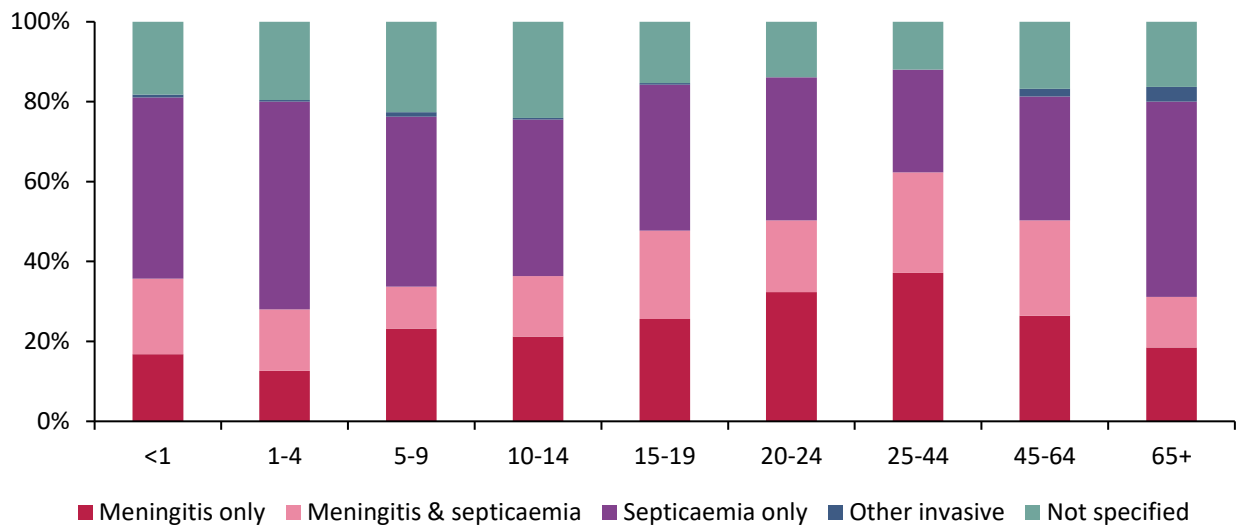
**Figure 6. Distribution of IMD notifications by serogroup and age group in Ireland, 1999-2022**



**Figure 7. Crude incidence rates per 100,000 for serogroups B, C, W and Y in Ireland, 1999-2022**



**Figure 8. Percentage of IMD notifications by clinical diagnosis and age group in Ireland, 1999-2022**



**Table 1. Number of cases by age group and age-group specific incidence rates (ASIR) per 100,000 population for IMD, Ireland, 2017-2022**

Age Group	2017		2018		2019		2020		2021		2022	
	N	ASIR	N	ASIR	N	ASIR	N	ASIR	N	ASIR	N	ASIR
<1	15	24.1	11	17.7	8	12.8	2	3.2	1	1.6	5	8.0
1-4	15	5.6	19	7.1	13	4.8	3	1.1	3	1.1	2	0.7
5-9	4	1.1	7	2	3	0.8	3	0.8	0	0	3	0.8
10-24	18	2	26	2.9	20	2.2	5	0.6	1	0.1	13	1.5
25+	24	0.4	26	0.5	27	0.5	9	0.2	5	0.1	8	0.1

**Table 2. Incidence rates (IR) per 100,000 population of IMD by HSE region, Ireland, 2017-2022**

Year	A-Dublin & North East	B-Dublin & Midlands	C-Dublin & South East	D-South West	E-MidWest	F-West & North West	Ireland
	I.R	I.R	I.R	I.R	I.R	I.R	I.R
2017	1.4	1.1	1.1	1.7	3.6	2.0	1.6
2018	2.6	2.0	1.3	1.3	1.3	2.1	1.9
2019	0.8	1.8	1.9	1.0	2.6	1.4	1.5
2020	0.7	0.3	0.6	0.1	0.3	0.6	0.5
2021	0.3	0.1	0.3	0.0	0.5	0.1	0.2
2022	0.9	0.3	1.0	0.1	1.0	0.6	0.7

**Table 3.** Number of cases, deaths, percentage of total cases and case fatality ratios (%CFR) by year for meningococcal B, C, W and Y diseases, Ireland, 1999-2022

Year	Serogroup B				Serogroup C				Serogroup W				Serogroup Y				Total Cases	Total Deaths	Total %CFR
	Cases	Deaths	% Total Cases	%CFR	Cases	Deaths	% Total Cases	%CFR	Cases	Deaths	% Total Cases	%CFR	Cases	Deaths	% Total Cases	%CFR			
1999	292	12	54.5	4.1	135	5	25.2	3.7	4	0	0.7	0	2	0	0.4	0	536	17	3.2
2000	258	13	50.1	5	139	11	27	7.9	3	0	0.6	0	4	1	0.8	25	515	25	4.9
2001	245	8	74.2	3.3	35	3	10.6	8.6	3	1	0.9	33.3	1	0	0.3	0	330	12	3.6
2002	199	8	78.7	4	14	0	5.5	0	6	0	2.4	0	2	0	0.8	0	253	8	3.2
2003	206	11	86.9	5.3	5	1	2.1	20	3	0	1.3	0	2	0	0.8	0	237	12	5.1
2004	163	7	82.3	4.3	5	1	2.5	20	1	0	0.5	0	2	0	1	0	198	10	5.1
2005	169	5	83.3	3	5	0	2.5	0	3	0	1.5	0	3	1	1.5	33.3	203	6	3
2006	167	5	80.3	3	4	0	1.9	0	1	0	0.5	0	4	0	1.9	0	208	5	2.4
2007	158	6	88.3	3.8	2	0	1.1	0	2	0	1.1	0	0	0	0	-	179	7	3.9
2008	149	6	88.7	4	4	1	2.4	25	2	1	1.2	50	1	0	0.6	0	168	8	4.8
2009	119	6	81	5	5	0	3.4	0	2	0	1.4	0	4	0	2.7	0	147	6	4.1
2010	93	4	81.6	4.3	4	0	3.5	0	1	0	0.9	0	0	0	0	-	114	5	4.4
2011	84	2	89.4	2.4	2	0	2.1	0	1	0	1.1	0	1	0	1.1	0	94	2	2.1
2012	58	1	87.9	1.7	0	0	0	-	0	0	0	-	2	1	3	50	66	2	3
2013	68	4	84	5.9	1	0	1.2	0	3	0	3.7	0	2	0	2.5	0	81	4	4.9
2014	69	3	84.1	4.3	6	1	7.3	16.7	1	0	1.2	0	3	0	3.7	0	82	4	4.9
2015	43	2	57.3	4.7	11	0	14.7	0	5	0	6.7	0	6	0	8	0	75	4	5.3
2016	48	2	55.2	4.2	22	1	25.3	4.5	7	1	8	14.3	5	0	5.7	0	87	5	5.7
2017	29	2	38.2	6.9	30	4	39.5	13.3	12	1	15.8	8.3	1	0	1.3	0	76	7	9.2
2018	46	3	51.7	6.5	20	3	22.5	15	12	5	13.5	41.7	8	2	9	25	89	13	14.6
2019	33	3	46.5	9.1	13	2	18.3	15.4	10	1	14.1	10	9	1	12.7	11.1	71	7	9.9
2020	14	1	63.6	7.1	4	0	18.2	0	0	0	0	-	2	0	9.1	0	22	1	4.5
2021	7	0	70	0	1	0	10	0	1	0	10	0	1	0	10	0	10	0	0
2022	23	5	74.2	18.2	0	0	0	-	0	0	0	-	2	0	6.5	0	31	5	16.1