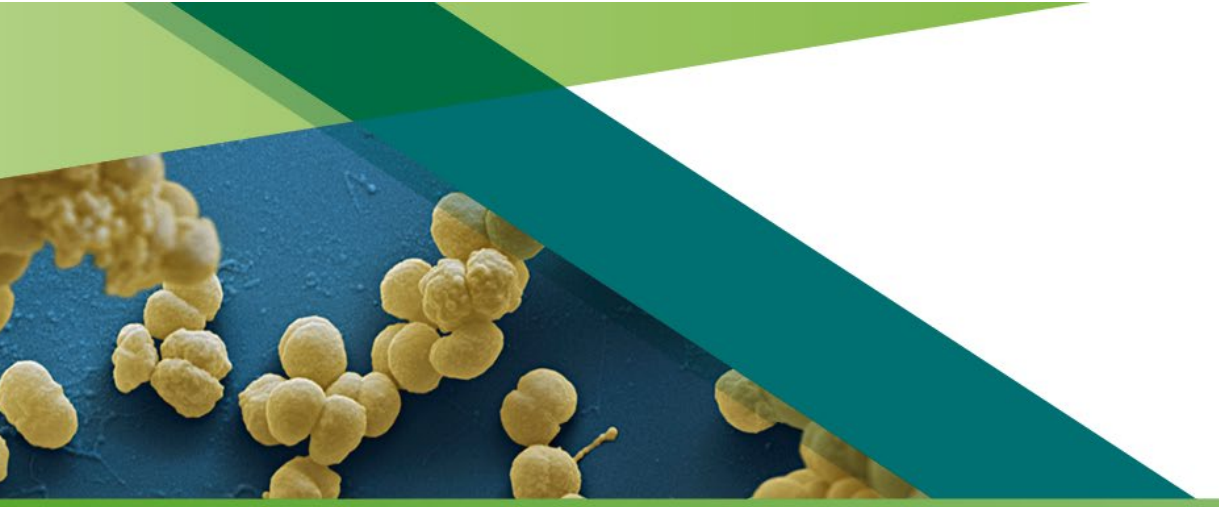


SURVEILLANCE & MONITORING

Invasive meningococcal disease

Annual Epidemiological Report for 2023

Key facts

- In 2023, 1 895 confirmed cases of invasive meningococcal disease (IMD), including 200 deaths, were reported in 30 European Union/European Economic Area (EU/EEA) countries.
- France, Germany and Spain accounted for 57% of all confirmed IMD cases in 2023.
- The notification rate of IMD rose to 0.4 cases per 100 000 population in 2023, which is the highest since 2020. Age-specific notification rates were highest in infants under one year old, followed by 1–4-year-olds and 15–24-year-olds.
- Serogroup B remains the major cause of IMD. It accounted for 57% of cases with known serogroup and was the dominant serogroup in all age groups under 65 years. Its notification rate has been increasing since 2021.
- Serogroup Y was the second most reported overall (20% of cases with known serogroup) and the most reported in those 65 years old and above.
- Serogroup W was the third most reported overall (15% of cases with known serogroup).
- It is essential to continue to strengthen surveillance of IMD and regularly evaluate the impact of immunisation programmes to support decision-makers in implementing or adapting vaccination strategies over the lifelong immunisation course.

Introduction

Invasive meningococcal disease (IMD) is a serious bacterial infection caused by the Gram-negative diplococcus *Neisseria meningitidis*. The bacterium is often detected in the nasopharynx without causing disease, described as asymptomatic carriage. It occasionally invades the body and causes meningococcal infection. IMD is a major cause of meningitis (occurring in 37–49% of cases) and septicaemia (18–33%) [1]. It is of public health concern because of its severe morbidity and relatively high case fatality rate (8–15%). In the European Union/European Economic Area (EU/EEA), vaccines are available for primary prevention of disease caused by serogroups A, B, C, W and Y. Antibiotics are administered for elimination of carriage and treatment of the disease.

Suggested citation: European Centre for Disease Prevention and Control. Invasive meningococcal disease. In: ECDC. Annual Epidemiological Report for 2023. Stockholm: ECDC; 2025.

Stockholm, December 2025

Methods

This report is based on data for 2023 retrieved from EpiPulse Cases on 12 March 2025. EpiPulse Cases is a system for the collection, analysis and dissemination of data on communicable diseases; it replaced The European Surveillance System (TESSy) in October 2024.

For a detailed description of the methods used to produce this report, please refer to the Methods chapter in the 'Introduction to the Annual Epidemiological Report' [2]. An overview of the national surveillance systems is available online [3]. Additional data on this disease are accessible from ECDC's online Surveillance Atlas of Infectious Diseases [4].

Thirty EU/EEA countries reported data on IMD to ECDC. Most countries used the EU case definition for confirmed cases [5] or a comparable case definition [3].

Most countries reported data from comprehensive, passive surveillance systems with national coverage. Belgium reported data from a sentinel surveillance system. Bulgaria reported aggregate data in 2023.

Epidemiology

In 2023, 30 EU/EEA countries reported 1 895 confirmed cases of IMD (Table 1). This is the highest since 2020 and has tripled compared with 2021. Three countries (France, Germany and Spain) accounted for 57% of all confirmed cases. Liechtenstein reported zero cases.

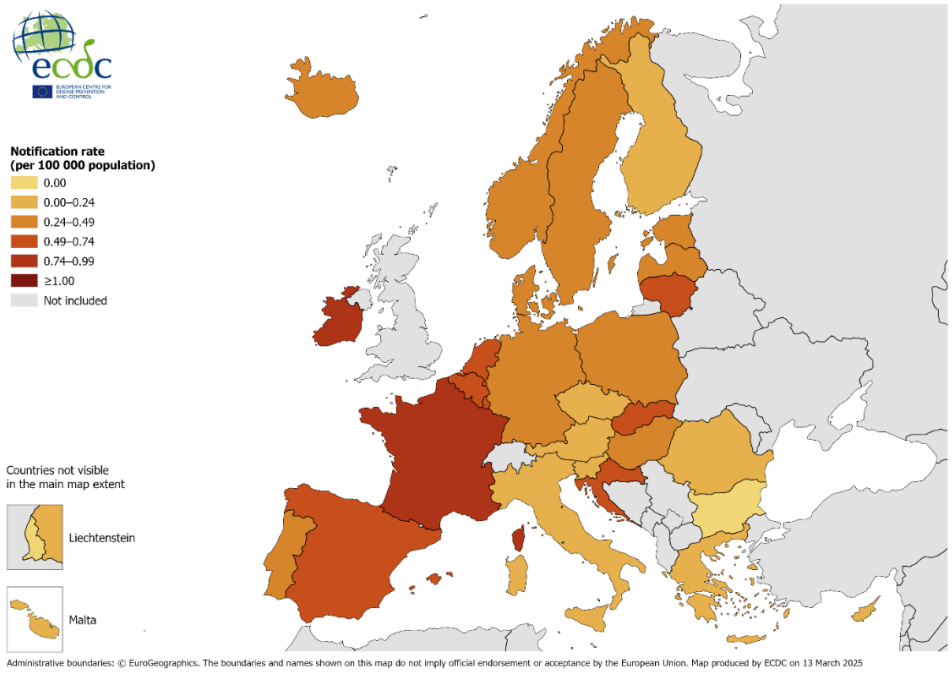
The overall notification rate was 0.4 cases per 100 000 population, which was slightly lower than in 2019 (0.5 cases per 100 000 population). By country, the notification rate ranged from less than 0.1 cases (Bulgaria) to 0.8 cases per 100 000 population (France and Ireland) (Table 1, Figure 1). Belgium, Lithuania and the Netherlands each reported the second highest notification rate, 0.7 cases per 100 000 population. Nearly all reporting countries experienced an increased notification rate in 2023 compared with 2021 and 2022, and are close to their pre-pandemic rate. Czechia, Iceland, Latvia, Luxembourg and Malta did not experience an increased notification rate.

Table 1. Confirmed invasive meningococcal disease cases and rates per 100 000 population by country and year, EU/EEA, 2019–2023

Country	2019		2020		2021		2022		2023		
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	ASR
Austria	24	0.3	8	0.1	2	0.0	7	0.1	16	0.2	0.2
Belgium	107	0.9	55	0.5	24	0.2	43	0.4	83	0.7	0.7
Bulgaria	9	0.1	3	0.0	1	0.0	3	0.0	2	0.0	0.0
Croatia	34	0.9	14	0.4	6	0.2	17	0.4	19	0.5	0.6
Cyprus	2	0.2	0	0.0	0	0.0	0	0.0	2	0.2	0.2
Czechia	49	0.5	25	0.2	11	0.1	24	0.2	16	0.1	0.2
Denmark	50	0.9	16	0.3	9	0.2	15	0.3	25	0.4	0.4
Estonia	4	0.3	3	0.2	1	0.1	1	0.1	4	0.3	0.3
Finland	16	0.3	5	0.1	2	0.0	7	0.1	10	0.2	0.2
France	456	0.7	214	0.3	117	0.2	319	0.5	558	0.8	0.8
Germany	255	0.3	138	0.2	74	0.1	138	0.2	251	0.3	0.3
Greece	32	0.3	21	0.2	4	0.0	5	0.0	21	0.2	0.2
Hungary	46	0.5	32	0.3	30	0.3	24	0.2	33	0.3	0.4
Iceland	0	0.0	0	0.0	0	0.0	1	0.3	1	0.3	0.2
Ireland	67	1.4	20	0.4	10	0.2	29	0.6	41	0.8	0.8
Italy	189	0.3	73	0.1	25	0.0	57	0.1	85	0.1	0.2
Latvia	8	0.4	6	0.3	5	0.3	8	0.4	8	0.4	NRC
Liechtenstein	NDR	NRC	NDR	NRC	0	0.0	0	0.0	0	0.0	0.0
Lithuania	32	1.1	7	0.2	11	0.4	13	0.5	21	0.7	0.8
Luxembourg	1	0.2	4	0.6	1	0.2	4	0.6	4	0.6	0.7
Malta	33	6.7	17	3.3	8	1.6	2	0.4	1	0.2	0.2
Netherlands	159	0.9	68	0.4	37	0.2	79	0.4	127	0.7	0.7
Norway	16	0.3	5	0.1	5	0.1	10	0.2	16	0.3	0.3
Poland	193	0.5	106	0.3	107	0.3	117	0.3	154	0.4	0.4
Portugal	56	0.5	34	0.3	10	0.1	15	0.1	34	0.3	0.3
Romania	50	0.3	24	0.1	12	0.1	25	0.1	30	0.2	0.2
Slovakia	29	0.5	23	0.4	20	0.4	28	0.5	31	0.6	0.6
Slovenia	9	0.4	5	0.2	3	0.1	7	0.3	5	0.2	0.3
Spain	395	0.8	213	0.5	68	0.1	131	0.3	265	0.6	0.6
Sweden	65	0.6	28	0.3	9	0.1	21	0.2	32	0.3	0.3
EU/EEA (30 countries)	**2 386**	**0.5**	**1 167**	**0.3**	**612**	**0.1**	**1 150**	**0.3**	**1 895**	**0.4**	**0.4**
United Kingdom	551	0.8	NDR	NRC	NA	NA	NA	NA	NA	NA	NA
EU/EEA (31 countries)	**2 937**	**0.6**	**1 167**	**0.3**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

Source: Country reports
ASR: age-standardised rate; NA: not applicable; NDR: no data reported; NRC: no rate calculated.
The United Kingdom did not report any data between 2020 and 2023, due to its withdrawal from the EU on 31 January 2020.

Figure 1. Confirmed invasive meningococcal disease cases per 100 000 population by country, EU/EEA, 2023

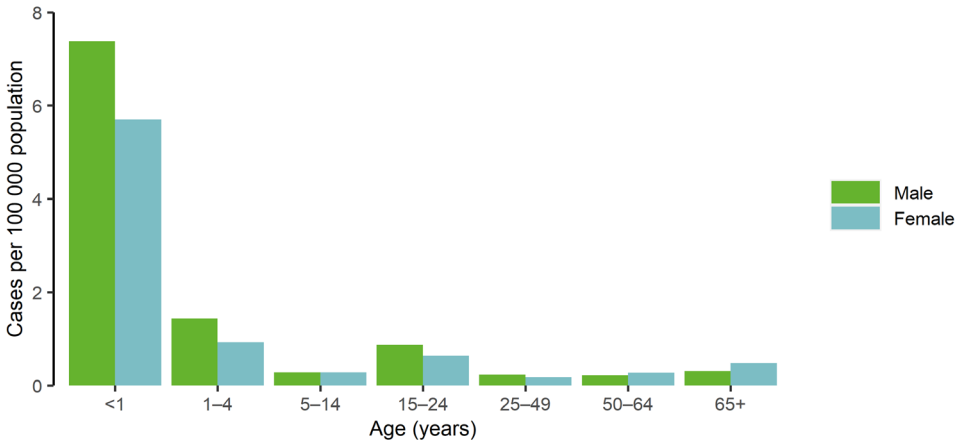


Age and gender

In 2023, the notification rate for IMD was highest among young children, with 6.5 confirmed cases per 100 000 population in infants under one year old and 1.2 confirmed cases per 100 000 population in 1–4-year-olds (Figure 2), as observed in previous years. The notification rate in 15–24-year-olds (0.8 per 100 000 population) was the third highest, followed by adults aged 65 years and above (0.4 per 100 000 population) and 5–14-year-olds (0.3 per 100 000 population).

Notification rates in men were higher than or equivalent to those in women in all age groups except older adults (50–64 years and 65 years and above age groups), where notification rates in women were slightly higher than in men. Compared with other age groups, the notification rate was particularly higher in male infants (under one year old) than female infants (male: 7.4 confirmed cases per 100 000 population; female: 5.7 per 100 000 population). The overall male-to-female ratio was 1.08:1.

Figure 2. Confirmed invasive meningococcal disease cases per 100 000 population, by age and gender, EU/EEA, 2023

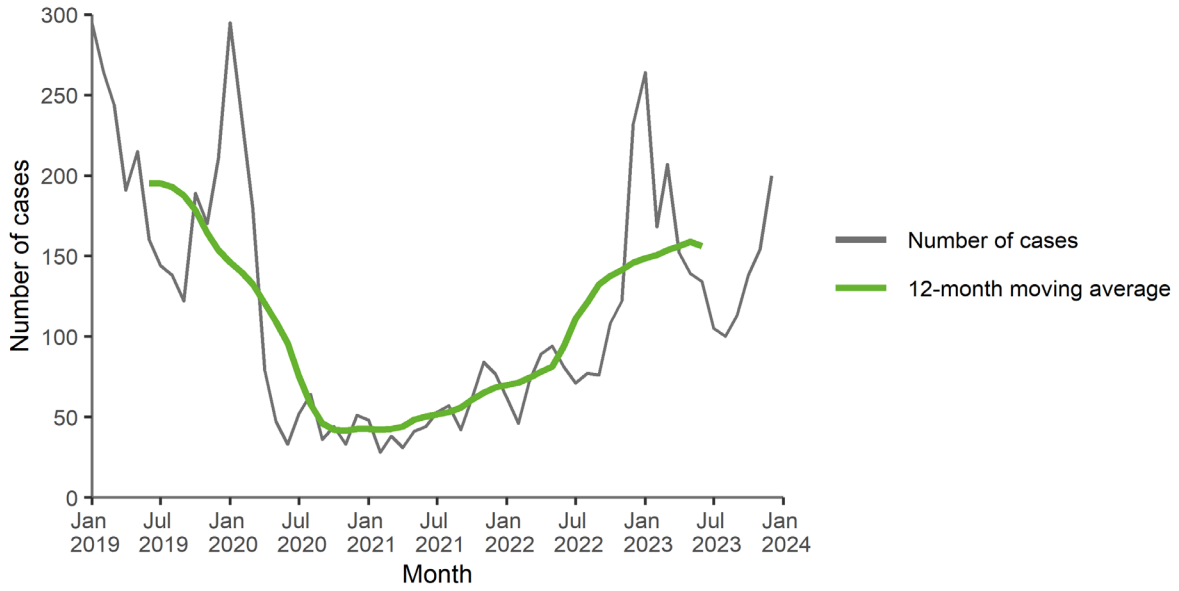


Source: Country reports from Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden.

Seasonality and trends

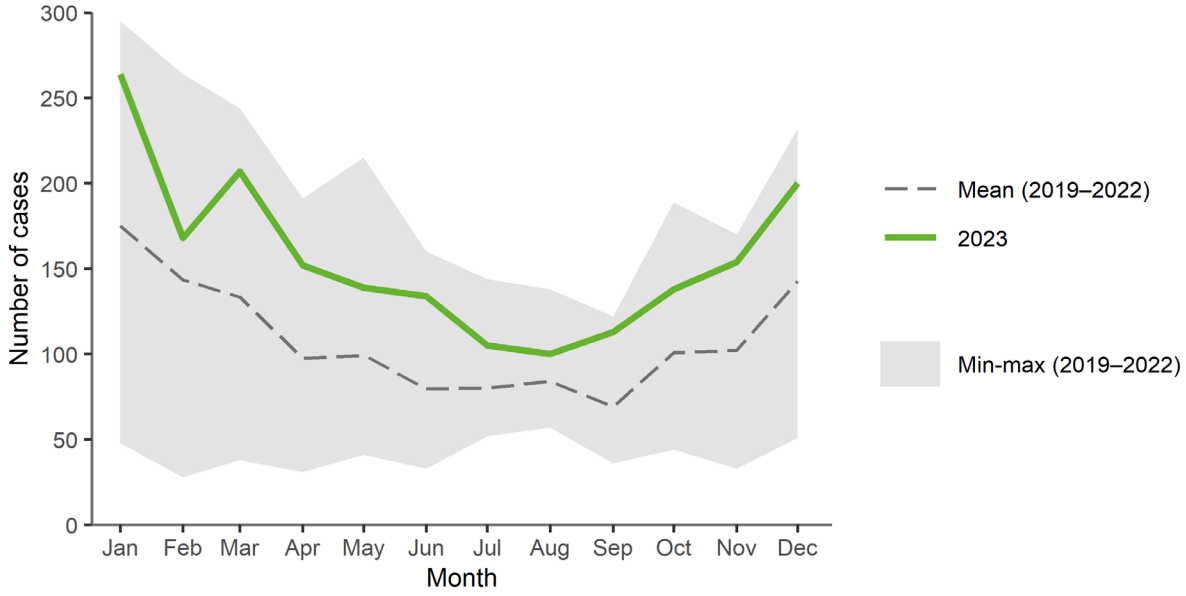
IMD usually occurs primarily in the winter months and the number of cases is lowest in the summer. In 2023, the number of confirmed cases peaked in January, followed by March and December (Figure 4). Compared with the previous three years (2020–2022), the number of confirmed cases in 2023 significantly increased (Figure 3).

Figure 3. Number of confirmed invasive meningococcal disease cases by month, EU/EEA, 2019–2023



Source: Country reports from Austria, Belgium, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden.

Figure 4. Number of confirmed invasive meningococcal disease cases by month, EU/EEA, 2023 and 2019–2022



Source: Country reports from Austria, Belgium, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden.

Serogroup

Out of 1 895 confirmed IMD cases reported in 2023, 1 806 (95%) had a documented serogroup. Most of these belonged to serogroup B (57%), followed by serogroups Y (20%) and W (15%) (Table 2). The proportion of unknown serogroup (5%) had decreased in 2023 compared to 2022 (14%) and 2021 (16%).

Serogroup B was predominant in all age groups except the 65 years old and above age group, where it was the second most common serogroup after serogroup Y. Serogroup B accounted for 77% of cases in infants under one year old, 78% of cases in children one to four years old and 74% of cases in children 5–14 years old (Figure 5).

Serogroup Y was predominant in people 65 years old and above, accounting for 34% of cases in this age group. Its proportions were also high in 50–64-year-olds (23%) and 15–24-year-olds (22%), making it the second most common serogroup identified in these age groups after serogroup B.

Serogroup W was predominant in people 65 years old and above, accounting for 27% of cases in this age group. It was the third most common serogroup identified in this age group.

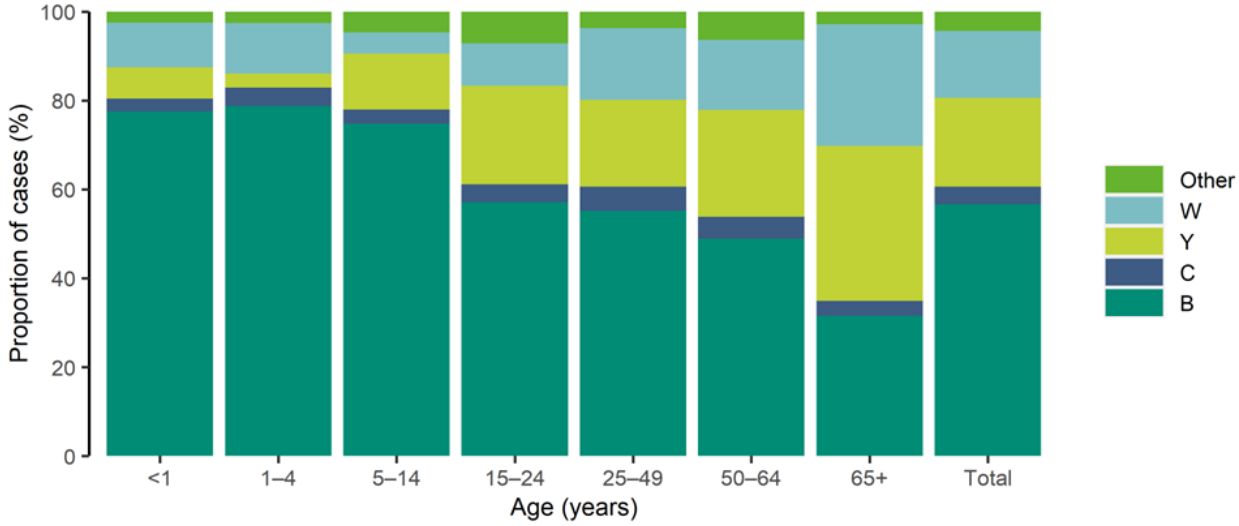
Serogroup C continued to represent a low proportion of cases in all age groups compared with other serogroups. It accounted for 5% of cases in 25–49-year-olds and 4% of cases in each of the following age groups: 1–4-year-olds, 15–24-year-olds, and 50–64-years-olds. It was the least documented serogroup in 2023 overall, accounting for 4% of all identified cases.

Table 2. Serogroup distribution of confirmed cases of invasive meningococcal disease, EU/EEA, 2023

Serogroup	Cases	
	Number	%
B	1 023	57
C	73	4
Y	359	20
W	273	15
Other	78	4
Total	**1 806**	**100**

'Other' refers to all cases reported as serogroups A, X, Z or 29E; non-groupable; or 'other'.

Figure 5. Serogroup distribution of confirmed cases of invasive meningococcal disease by age group, EU/EEA, 2023



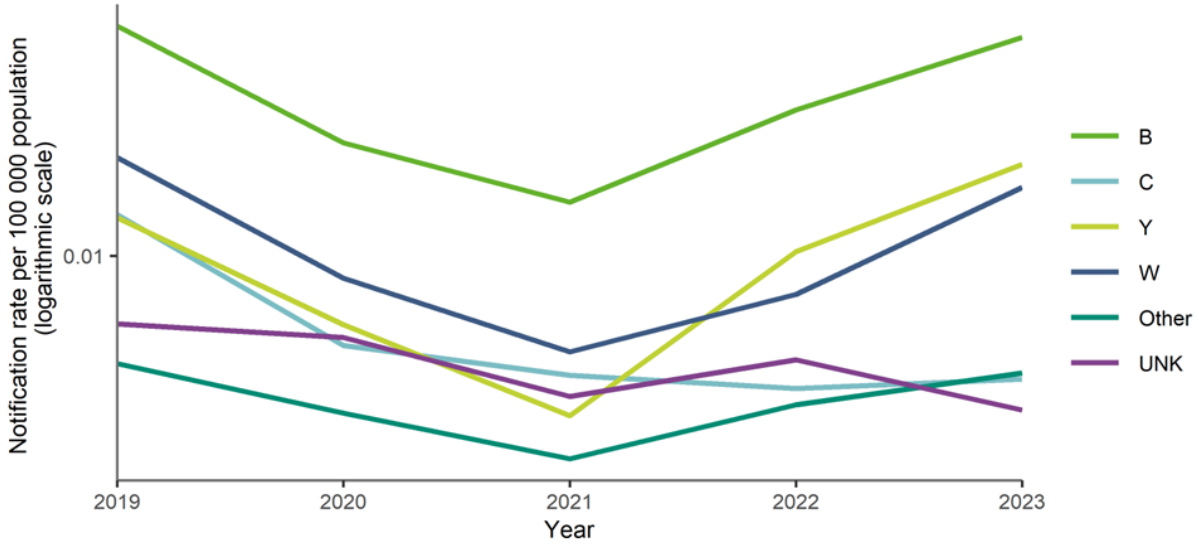
'Other' refers to all cases reported as serogroups A, X, Z or 29E; non-groupable; or 'other'.

Among countries that reported serogroup data from 2019 to 2023, there was an overall increase in the notification rates for serogroups B, W and Y in 2023 compared with 2022. The notification rate for serogroup C remained at the same low level as 2021 and 2022 (Figure 6).

The notification rates by serogroup and age group for 2023 showed an increase compared with 2022 in all age groups for serogroups B, W and Y (Figures 7, 9 and 10).

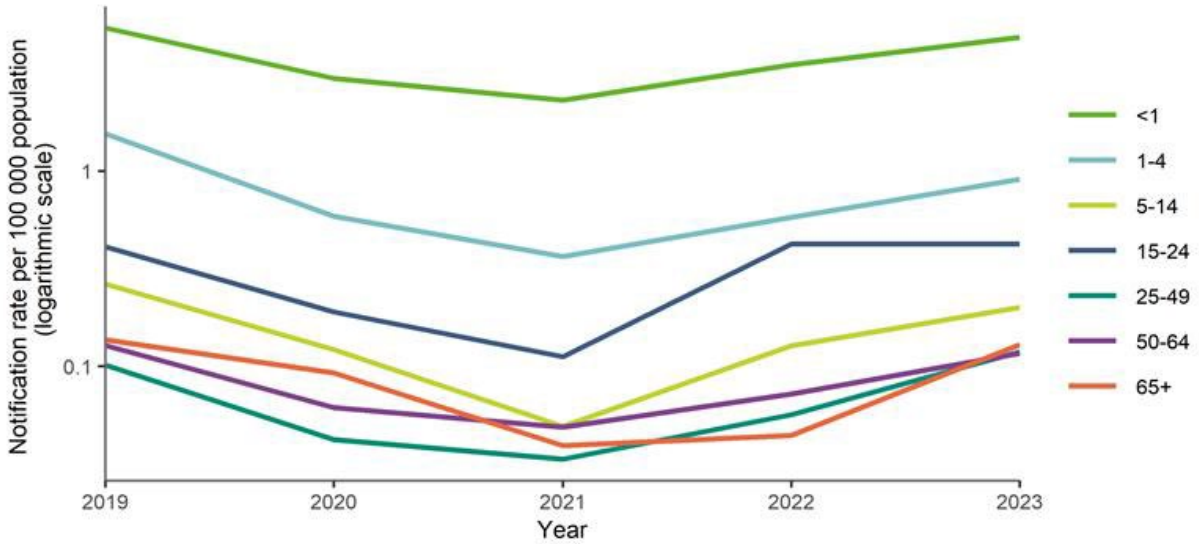
There was a sharp increase in the notification rates for serogroup C in the age groups 5–14 years old and 65 years old and above; for the remaining age groups, levels were similar to 2022 (Figure 8).

Figure 6. Notification rates of confirmed cases of invasive meningococcal disease by serogroup and year, EU/EEA, 2019–2023



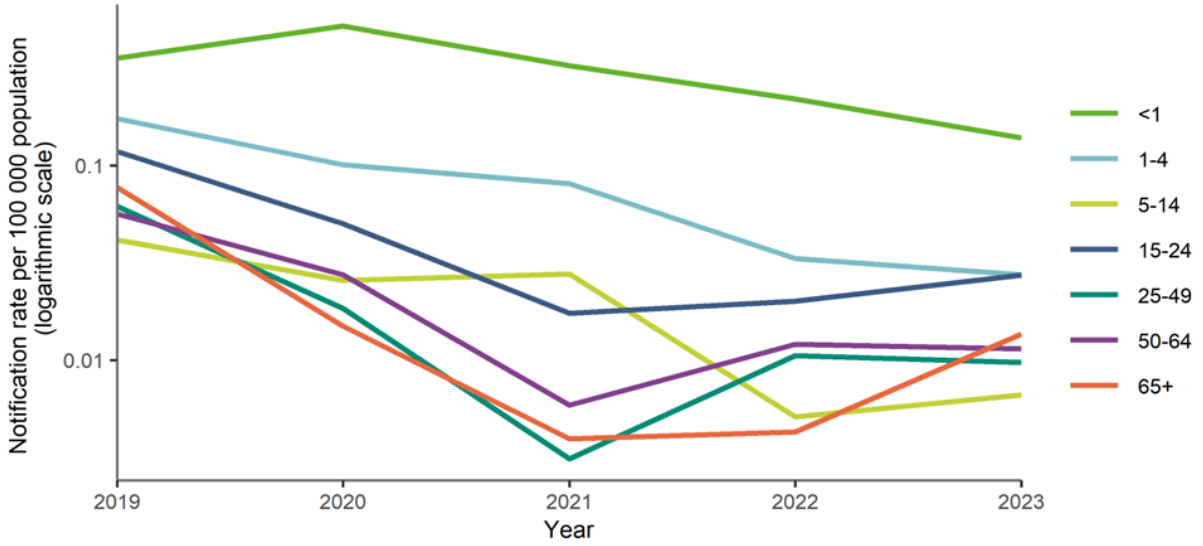
Source: Country reports from Austria, Belgium, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain and Sweden.

Figure 7. Notification rates of confirmed invasive meningococcal disease cases caused by serogroup B, by age group, EU/EEA, 2023



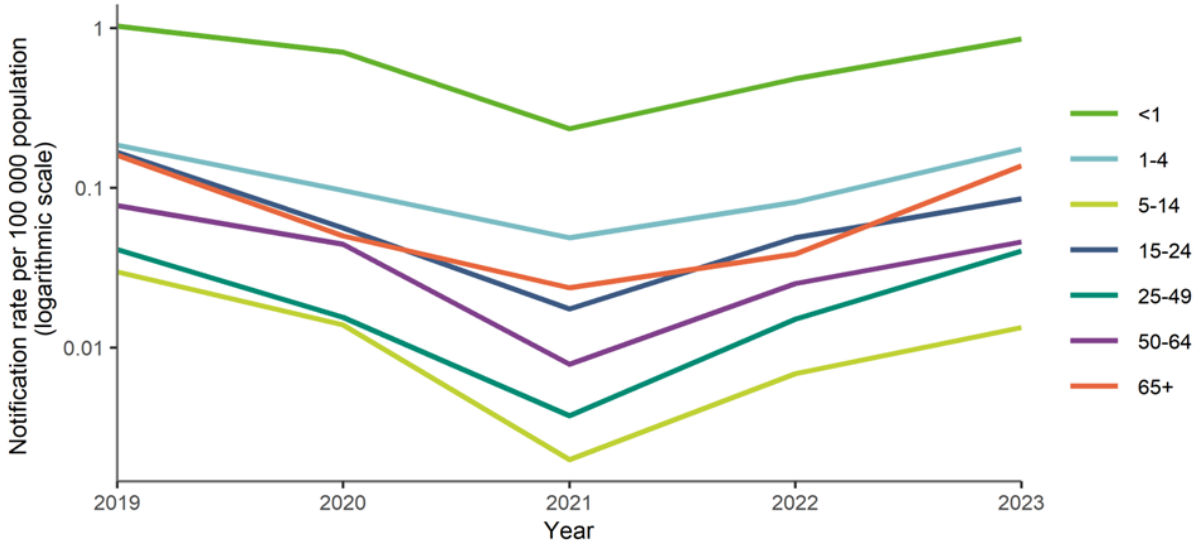
Source: Country reports from Austria, Belgium, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain and Sweden.

Figure 8. Notification rates of confirmed invasive meningococcal disease cases caused by serogroup C, by age group, EU/EEA, 2023



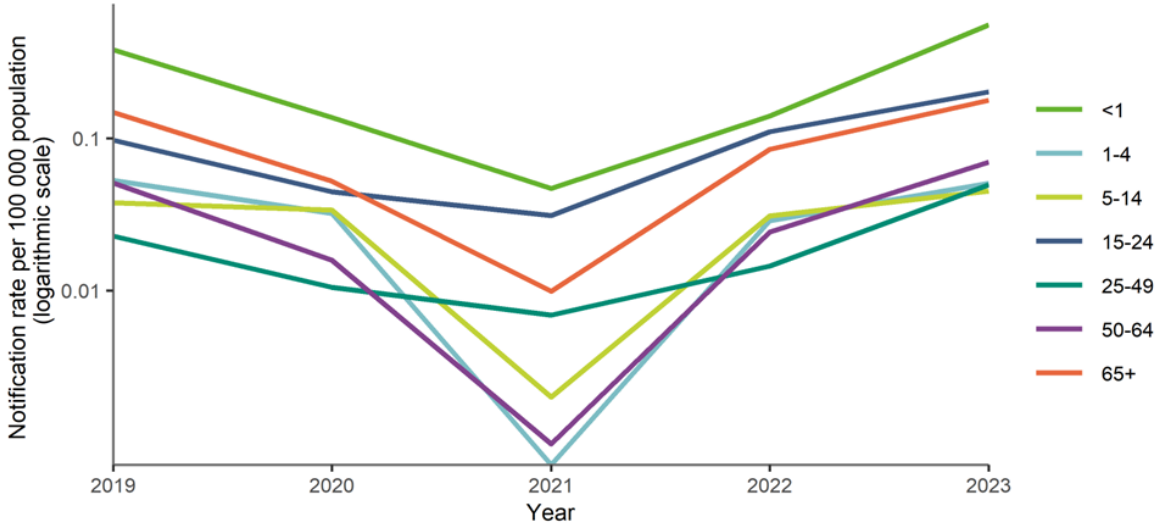
Source: Country reports from Austria, Belgium, Croatia, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain and Sweden.

Figure 9. Notification rates of confirmed invasive meningococcal disease cases caused by serogroup W, by age group, EU/EEA, 2023



Source: Country reports from Austria, Belgium, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain and Sweden.

Figure 10. Notification rates of confirmed invasive meningococcal disease cases caused by serogroup Y, by age group, EU/EEA, 2023



Source: Country reports from Austria, Belgium, Croatia, Czechia, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain and Sweden.

Clinical presentation and outcome

Clinical presentation was reported for 1 605 (85%) IMD cases in 2023. Meningitis was the most commonly reported clinical presentation (40%), and was associated with septicaemia (26%). Septicaemia only was the second most common clinical pattern (29%). Pneumonia (2%) and other clinical presentations (4%) were reported in the remaining cases.

Outcome was reported for 1 749 (92%) IMD cases in 2023. There were 200 fatal cases reported, a case fatality rate (CFR) of 11% among cases with known outcome. Serogroups B (CFR: 46%) and W (27%) accounted for the highest proportions of total deaths. The case fatality rate by serogroup was as follows: W (19%), Y (11%), C (10%) and B (9%).

The highest case fatality rates were reported among individuals 65 years old and above (CFR: 15%), followed by 25–49-year-olds (14%), 50–64-year-olds (12%) and infants under one year old (11%). Individuals 65 years old and above accounted for 29% of total deaths, followed by individuals 25–49 years old (22% of total deaths).

Vaccination status

Vaccination status was reported for 808 cases (43%) and most cases were unvaccinated (91%).

Discussion

Invasive meningococcal disease (IMD) remains rare in EU/EEA countries but is a severe and life-threatening disease in all age groups. Compared with 2021 and 2022, there was an upsurge in the number of cases reported in 2023. The trend indicated a return to pre-pandemic levels, although the overall notification rate remained below those reported in 2018 and 2019.

There was an overall upsurge in the number of cases and the notification rates for all IMD serogroups except serogroup C, which may have remained low due to immunisation programmes with serogroup C-containing vaccines that provide long-lasting protection [6].

Serogroup B has been responsible for most cases in infants and young children since the outset of IMD monitoring in the EU/EEA. Notification rates for this serogroup have declined since 2014 – and even more during the COVID-19 pandemic [7] – but in 2023 an increase was observed in all age groups. This increase was less prominent in 15–24-year-olds, and the highest notification rate was observed in children under four years old, justifying immunisation programmes that primarily target infants. Immunisation programmes with 4CMenB aim to confer direct individual protection against disease caused by serogroup B [8,9], as the vaccine does not prevent individuals from carrying bacteria of this serogroup and spreading it to others [10].

Notification rates for serogroups W and Y also increased in all age groups, despite an increasing number of countries having vaccination programmes in place to protect against these serogroups using quadrivalent vaccines.

The increase in younger age groups prompted several EU/EEA countries to adjust their vaccination strategies to include quadrivalent vaccines in infants and/or adolescents.

Careful monitoring of the increasing notification rates and epidemiology of IMD in older age groups (50 years old and above) remains critical – in particular for serogroups B, W and Y – and can inform possible adjustments to vaccination strategies to include older age groups in addition to infants. There is currently no vaccination strategy to prevent IMD over the life course in any EU/EEA country. Increasing awareness of atypical IMD presentations among healthcare practitioners may also improve diagnostic delays and poor disease outcomes in older age groups [11].

The unpredictable nature of meningococcal disease epidemiology highlights the need to maintain high-quality surveillance. It is crucial to incorporate molecular technologies such as polymerase chain reaction (PCR), real-time PCR (RT-PCR) and whole genome sequencing (WGS) into surveillance systems to accurately detect and monitor epidemiological trends, identify circulating serogroups and assess the effectiveness and impact of implemented vaccination strategies. ECDC has established a pilot for integrated genomic and epidemiological surveillance of IMD that aims to improve understandings of multi-country outbreaks and provide long-term monitoring to inform vaccination strategies.

Public health implications

Several vaccines targeting different serogroups are available to prevent IMD. Whether or not to introduce a vaccine into a country's national routine immunisation programme depends on multiple factors, such as vaccine efficacy and expected coverage, disease and serogroup burden, cost effectiveness, and feasibility. In light of increasing notification rates of serogroups B, W and Y in the EU/EEA, countries may want to reassess their vaccination strategies; however, further analysis is required to better understand the impacts of the various strategies that are currently in place.

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