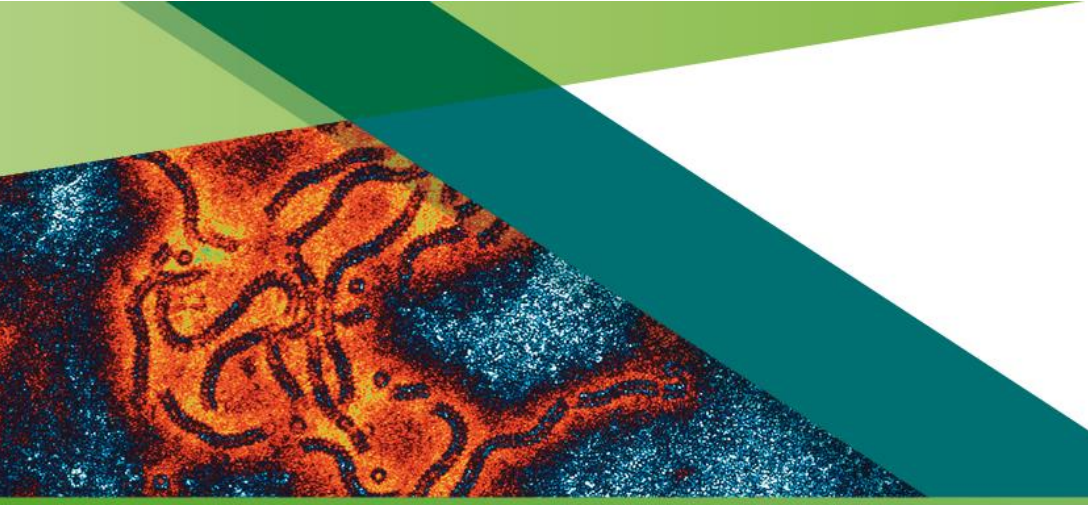


SURVEILLANCE REPORT

Mumps

Annual Epidemiological Report for 2023

Key facts

- For 2023, 2 963 cases of mumps were reported to ECDC by 27 EU/EEA Member States with an overall notification rate of 0.7 cases per 100 000 population. This was similar to 2022, but slightly higher than the notification rate reported in 2021 (0.4) and significantly lower than the notification rates reported during the preceding two years (2020=1.7, 2019=3.4) in the EU/EEA.
- In 2023, those aged 1–4 and 5–9 years experienced the highest age-specific notification rates (4.4, 4.05 retrospectively).
- In 2023, there has been a shift towards those in older age groups being diagnosed with mumps, with individuals over 30 years of age the most affected in terms of absolute numbers (26.4%). The median age of cases was 21 years which is higher than 2022 when the median was 10 years.
- Mumps was slightly more common among males (53.7%) than females with an overall male to female ratio of 1.16:1. Notification rates for males were higher in the younger age groups (<1, 1–4, 5-9, 10–14, and 15–19 years) and slightly lower than females among adults (20–29 and 30 years and older groups).
- Children aged 5–9 years accounted for 25.1% of cases in 2023, with 34% of them being fully vaccinated (with at least two doses).
- High MMR vaccination coverage is essential to prevent mumps outbreaks and progress towards measles and rubella elimination; being vaccinated is also associated with decreased disease severity.

Introduction

Mumps is a contagious viral infection caused by an RNA virus belonging to the *Rubulavirus* genus within the *Paramyxoviridae* family. It primarily manifests as acute parotitis - inflammation of the parotid salivary glands - but can also lead to complications such as orchitis, meningitis, pneumonia, sensorineural hearing loss, and in rare cases, encephalitis, which may result in death. Subfertility and oligospermia are possible long-term consequences, particularly in males who experience orchitis [1].

Transmission occurs via respiratory droplets or direct contact with saliva, with individuals considered infectious from 12 to 25 days post-exposure. The average incubation period is approximately 19 days, ranging from 14 to 25 days. Immunisation remains the only effective preventive measure [1]. All EU/EEA countries include the mumps vaccine in their routine childhood immunisation schedules, administered as part of the combined measles-mumps-rubella (MMR) vaccine. The first dose is typically given in the second year of life, while the timing of the second dose varies by country [2, 3].

Suggested citation: European Centre for Disease Prevention and Control. Annual Epidemiological Report for 2023 - mumps. Stockholm: ECDC; 2025.

Stockholm, July 2025

Before the introduction of the vaccine, mumps was largely a childhood illness. However, in the post-vaccine era, outbreaks are more commonly reported among adolescents and young adults, particularly in congregated settings such as universities and military barracks, where close contact facilitates transmission.

Methods

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

For a detailed description of methods used to produce this report, please refer to the 'Methods' chapter [4]. An overview of the national surveillance systems is available online [5].

A subset of the data used for this report is available and downloadable through ECDC's online 'Surveillance atlas of infectious diseases [6].

Twenty-seven EU/EEA Member States routinely report mumps data to ECDC. The majority use the 2008, 2012 or 2018 EU case definitions [5] and report data from comprehensive, passive surveillance systems with national coverage. Belgium and Poland reported aggregated data in 2023. Poland provided aggregated annual data disaggregated by vaccination status, sex, and age, but without case classification, and therefore their cases do not appear as confirmed in this report. Austria has reported no data since 2013; France and Liechtenstein reported no data.

Vaccination coverage estimates for mumps vaccine presented in this report, are using the measles-containing-vaccine (MCV) as a proxy indicator, since all EU/EEA countries are using measles-mumps-rubella-containing-vaccines (MMR) [2]. The data were obtained from the websites of the WHO Global Health Observatory, and WHO and UNICEF estimates of national immunization coverage (WUENIC) [7]. The method of calculating measles-containing-vaccine first-dose (MCV1) and measles-containing-vaccine second-dose (MCV2) coverage are outlined in the metadata available for each indicator online [8, 9].

Epidemiology

For 2023, 27 EU/EEA countries reported 2 963 cases of mumps of which 1 260 (43%) were laboratory confirmed, the remaining 347 (12%) cases were reported as possible, 390 cases (13%) were probable, 966 cases (33%) had unknown status. No data was available from Austria, France, and Liechtenstein.

Three countries (Poland, Spain, Germany) reported the majority of cases (966, 553, 330 respectively) accounting for 62% of the notified cases reported in 2023. Of these countries Poland did not use the EU case definition for reporting purposes, as all their reported cases met the national case definition used for possible cases, which includes anyone meeting the clinical criteria of fever and sudden swelling of the parotid or other salivary glands [10]. (Table 1).

The EU/EEA overall notification rate in 2023 was 0.7 cases per 100 000 population which is similar to the rate of 2022, slightly higher compared with 2021 (0.4) but significantly lower than the notification rate observed in the preceding two years (2020:1.7, 2019:4.2) (Table 1). Notification rates ranged from 0.0 (Greece, Hungary, Iceland, Slovenia) to 2.46 (Poland) cases per 100 000 population in EU/EEA countries in 2023 (Table 1 and Figure 1).

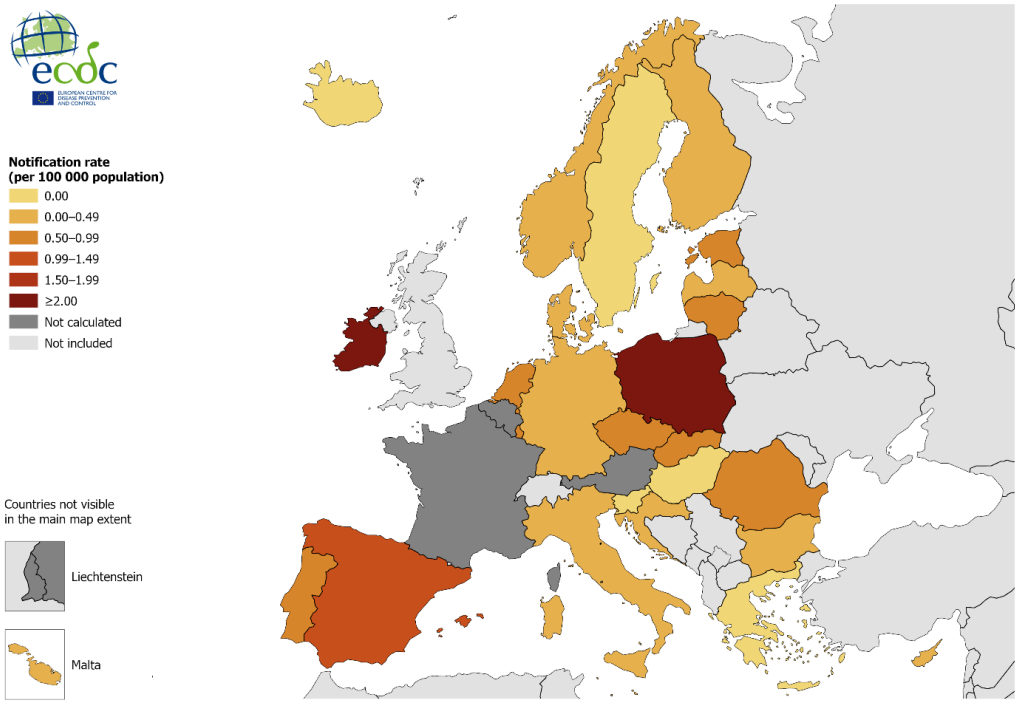
Table 1. Mumps cases and rates per 100 000 population by country and year, EU/EEA, 2019–2023

Country	2019		2020		2021		2022		2023		
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	ASR
Austria	NDR	NRC	NDR	NRC	NDR	NRC	NDR	NRC	NDR	NRC	NRC
Belgium	234	NRC	207	NRC	105	NRC	186	NRC	298	NRC	NRC
Bulgaria	50	0.8	13	0.2	0	0.0	12	0.2	11	0.2	0.2
Croatia	15	0.4	13	0.3	5	0.1	18	0.5	13	0.3	0.4
Cyprus	0	0.0	1	0.1	0	0.0	2	0.2	1	0.1	0.1
Czechia	191	1.8	93	0.9	38	0.4	68	0.6	86	0.8	0.9
Denmark	NDR	NRC	NDR	NRC	1	0.0	1	0.0	7	0.1	0.1
Estonia	4	0.3	3	0.2	0	0.0	4	0.3	7	0.5	0.5
Finland	4	0.1	4	0.1	1	0.0	2	0.0	4	0.1	0.1
France	NDR	NRC	NDR	NRC	NDR	NRC	NDR	NRC	NDR	NRC	NRC
Germany	593	0.7	338	0.4	114	0.1	260	0.3	330	0.4	0.4
Greece	2	0.0	2	0.0	0	0.0	0	0.0	0	0.0	0.0
Hungary	1	0.0	0	0.0	0	0.0	2	0.0	0	0.0	0.0
Iceland	4	1.1	1	0.3	0	0.0	0	0.0	0	0.0	0.0
Ireland	2 780	56.7	2 899	58.4	111	2.2	94	1.9	133	2.5	2.4
Italy	657	1.1	241	0.4	222	0.4	308	0.5	193	0.3	0.4
Latvia	6	0.3	10	0.5	2	0.1	2	0.1	3	0.2	0.2
Liechtenstein	NDR	NRC	NDR	NRC	NDR	NRC	NDR	NRC	NDR	NRC	NRC

Country	2019		2020		2021		2022		2023		
	Number	Rate	Number	Rate	Number	Rate	Number	Rate	Number	Rate	ASR
Lithuania	32	1.1	10	0.4	3	0.1	11	0.4	22	0.8	0.9
Luxembourg	4	0.7	13	2.1	0	0.0	5	0.8	4	0.6	0.6
Malta	8	1.6	3	0.6	3	0.6	3	0.6	1	0.2	0.2
Netherlands	128	0.7	64	0.4	1	0.0	7	0.0	93	0.5	0.6
Norway	20	0.4	9	0.2	4	0.1	8	0.1	3	0.1	0.1
Poland	1 338	3.5	582	1.5	484	1.3	922	2.5	966	2.6	2.8
Portugal	152	1.5	57	0.6	50	0.5	81	0.8	91	0.9	1.0
Romania	105	0.5	28	0.1	16	0.1	54	0.3	114	0.6	0.6
Slovakia	16	0.3	0	0.0	3	0.1	13	0.2	26	0.5	0.5
Slovenia	0	0.0	0	0.0	1	0.0	1	0.0	0	0.0	0.0
Spain	6 039	12.9	1 766	3.7	399	0.8	524	1.1	553	1.2	1.3
Sweden	33	0.3	23	0.2	6	0.1	6	0.1	4	0.0	0.0
EU/EEA (30 countries)	**12 416**	**3.4**	**6 380**	**1.7**	**1 569**	**0.4**	**2 594**	**0.7**	**2 963**	**0.7**	**0.8**
United Kingdom	5 061	7.6	NDR	NRC	NA	NA	NA	NA	NA	NA	NA
EU/EEA (31 countries)	**17 477**	**4.1**	**6 380**	**1.7**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**

Source: Country reports.
ASR: Age-standardised rate.
NDR: No data reported.
NRC: No rate calculated.
NA: Not applicable.
No data from 2020 onwards were not reported by the United Kingdom, due to its withdrawal from the EU on 31 January 2020.

Figure 1. Mumps cases per 100 000 population by country, EU/EEA, 2023

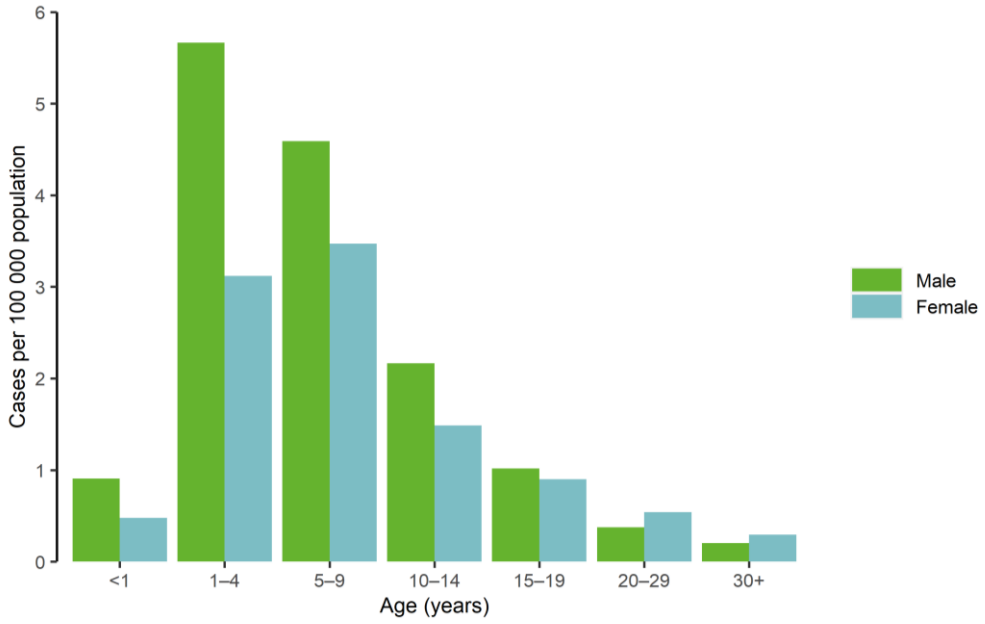


Age and gender

In 2023, the most affected age group was 1–4 years with a notification rate of 4.4 cases per 100 000 population followed by the 5–9 years group (notification rate 4.05). In terms of absolute case numbers, the most affected group was the 30 years and older group (26.4%) followed by the 5–9 years group (25.1%) and the 1–4 years (21%). The median age of cases across all EU/EEA countries submitting case-based data in 2023 (i.e. excluding Belgium and Poland) was 21 years (interquartile range, IQR: 5–27.5 years) which is higher than 2022, where the median age was 10 years.

Mumps was slightly more common among males (53.7%) than females with an overall male to female ratio of 1.16:1. Notification rates for males were higher in the younger age groups (<1, 1–4, 5–9, 10–14, and 15–19 years) and slightly lower than females among adults (20–29 and 30 years and older groups) (Figure 2).

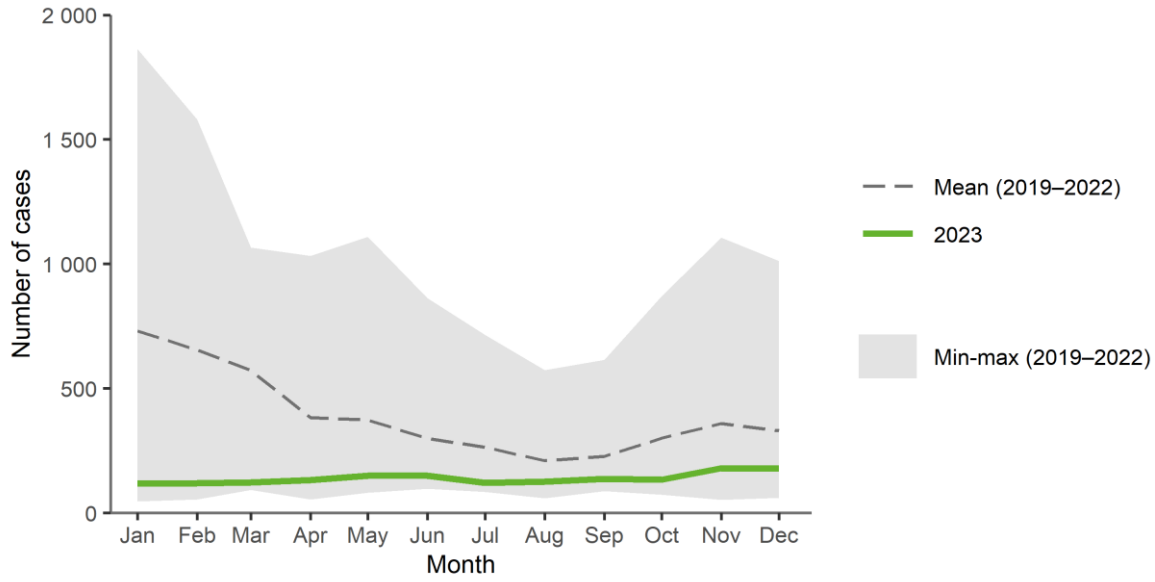
Figure 2. Mumps cases per 100 000 population, by age and gender, EU/EEA, 2023



Seasonality and trend

Between 2019 and 2022, the seasonal trends of reported mumps cases were characterised by a peak in winter (January) and the lowest number of cases reported in the late summer (August). The number of cases recorded in 2023 remained well below the mean number of cases between 2019–2022 throughout the year, presenting with no significant seasonal variation.

Figure 3. Mumps cases by month, EU/EEA, 2023 and 2019–2022



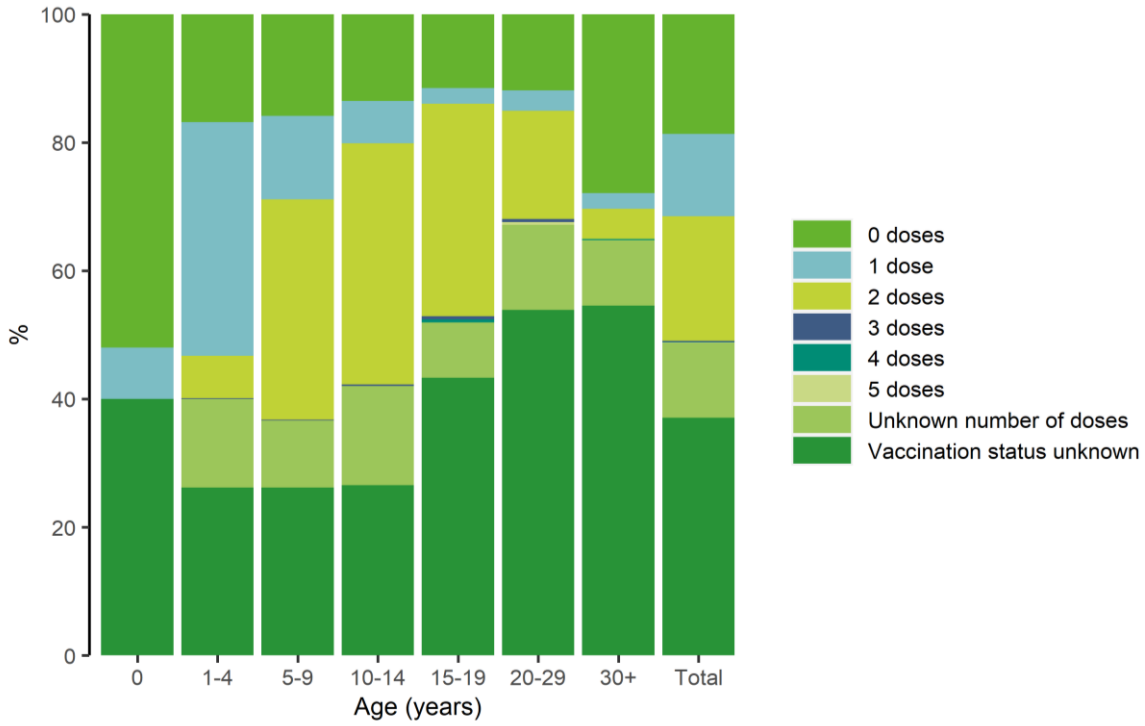
Source: Country reports from Bulgaria, Croatia, Cyprus, Czechia, Estonia, Finland, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Malta, the Netherlands, Norway, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden.

Vaccination status

Data on vaccination status were available for 1 938 cases (65%). Of these cases, 564 (29%) were unvaccinated, 390 (20%) were vaccinated with one dose of the MMR vaccine, 624 (32%) with two doses, and 12 (0.6%) with three or more doses. For 348 cases (18%), the number of vaccination doses was unknown. For 1 025 (35%) cases, the vaccination status was not reported.

The highest proportion of unvaccinated cases were among those aged under one year (52%) (below the age of routine vaccination against mumps) and among the 30 years and older group (27%). The number of unvaccinated cases 30 years and older accounted for 65% (n=218) of the total number of unvaccinated cases (n=553). The majority of fully vaccinated cases (with at least two doses) were aged 5–14 years, with the 5–9 and 10–14-years age groups representing 41% (n=267) and 23% (n=145) of the total cases with known vaccination status and fully vaccinated (n=636), respectively. Vaccination status was more likely to be unknown among cases aged 15–19 (43%), age group 20-29 (52%), and among 30 years and older(54%) (Figure 4).

Figure 4. Distribution (%) of mumps cases by age group and vaccination status, EU/EEA, 2023



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

Vaccination coverage

In 2023, the overall population-weighted average vaccination coverage for mumps-containing vaccine for EU/EEA countries was 93% for the first dose and 89% for the second dose (Table 2). Nineteen countries reported a decrease in the vaccination coverage for the first dose of mumps-containing vaccine (range -1 to -13%) compared to the coverage reported in 2019, and eighteen countries reported a decrease in coverage for the second dose (range -1 to -18%).

Moreover, four countries reported an increase in vaccination coverage for the first dose (range 1–3%) and four countries for the second dose (3–9%). In 2023, fifteen countries (50%) reported a coverage of ≥95% for the first dose. Only four countries (14%) (Hungary, Malta, Portugal, and Slovakia) had a coverage of ≥95% for the second dose (Table 2, Figure 6, Figure 7). Only three countries had an estimated coverage of ≥95% for both first and second dose of mumps-containing vaccine in 2023 (Hungary, Malta, and Portugal).

Table 2. Vaccination coverage for first and second dose of measles-containing-vaccine*, EU/EEA, 2019–2023

Country	2019		2020		2021		2022		2023		Percentage of change** (2019-2023)	
	Dose 1	Dose 2	Dose 1	Dose 2	Dose 1	Dose 2	Dose 1	Dose 2	Dose 1	Dose 2	Dose 1	Dose 2
Austria	95	86	95	88	99	97	95	94	95	94	0%	9%
Belgium	96	82	96	83	96	83	96	83	96	82	0%	0%
Bulgaria	95	95	88	84	89	86	91	87	92	87	-3%	-8%
Croatia	93	95	91	91	89	90	90	90	90	90	-3%	-5%
Cyprus	86	88	86	88	86	88	84	88	82	80	-5%	-9%
Czechia	92	87	94	90	97	90	97	90	87	90	-5%	3%
Denmark	96	90	94	90	95	94	95	94	95	93	-1%	3%
Estonia	88	90	91	87	89	84	89	84	89	84	1%	-7%
Finland	96	93	95	93	93	93	94	92	94	92	-2%	-1%
France	92	86	94	90	94	91	95	92	95	93	3%	8%
Germany	97	93	97	93	97	93	97	93	97	93	0%	0%
Greece	97	83	97	83	97	83	97	83	97	83	0%	0%
Hungary	99	99	99	99	99	99	99	99	99	99	0%	0%
Iceland	93	94	93	93	92	10	91	80	91	89	-2%	-5%
Ireland	91		92		90		90		89		-2%	NR
Italy	94	88	92	86	94	86	94	85	95	85	1%	-3%
Latvia	99	96	99	94	97	85	96	86	96	92	-3%	-4%
Liechtenstein	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR
Lithuania	93	93	90	91	88	88	87	87	87	86	-6%	-8%
Luxembourg	99	90	99	90	99	90	99	90	99	90	0%	0%
Malta	96	95	95	99	90	93	96	95	95	95	-1%	0%
Netherlands	94	90	94	89	93	90	89	85	89	81	-5%	-10%
Norway	97	95	97	95	97	95	96	94	96	94	-1%	-1%
Poland	93	91	92	86	91	86	91	86	91	86	-2%	-5%
Portugal	99	96	99	95	98	95	98	96	98	95	-1%	-1%
Romania	90	76	87	75	86	75	83	71	78	62	-13%	-18%
Slovakia	96	98	96	98	95	96	95	96	94	95	-2%	-3%
Slovenia	94	94	94	91	95	91	96	92	95	89	1%	-5%
Spain	98	94	96	94	95	91	96	92	96	92	-2%	-2%
Sweden	97	93	97	92	97	91	92	91	93	92	-4%	-1%
EU/EEA* **	95	91	94	90	94	87	93	89	93	89		

Source: WHO Immunization Data Portal, WHO and UNICEF estimates of national immunization coverage (WUENIC), from Austria, Belgium, Bulgaria, Croatia, Cyprus, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden.

ND: no data reported

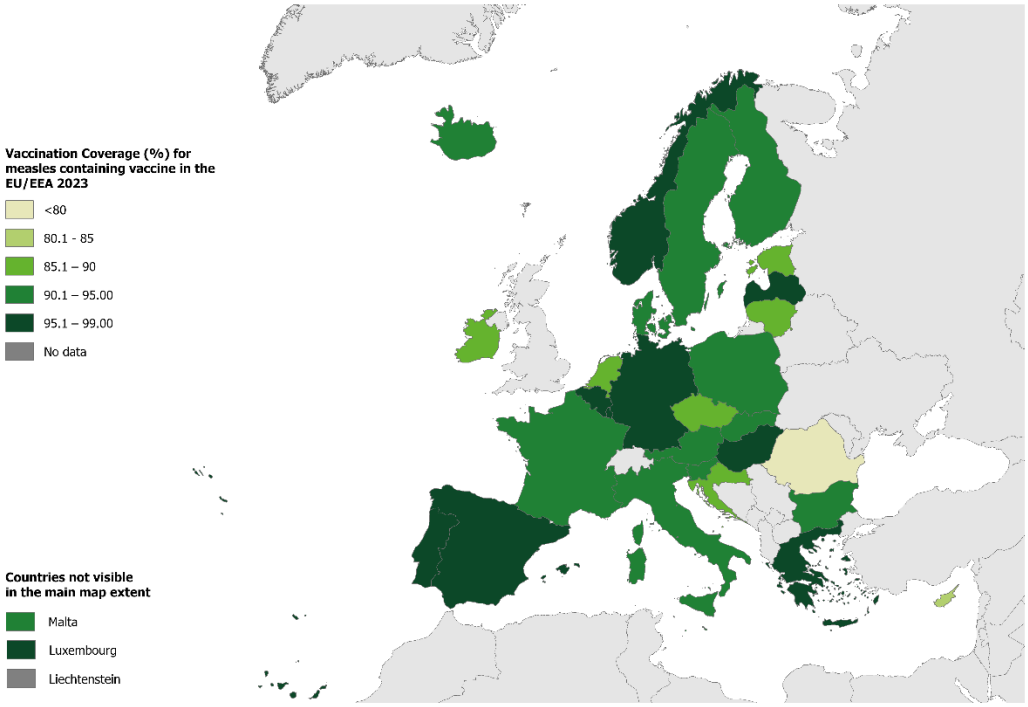
NR: no rate calculated.

** Measles-containing-vaccine is used as a proxy indicator for mumps-containing-vaccine*

***The percentage of change was calculated for each dose as the percentage of increase or decrease between 2019 and 2023 i.e. ((coverage in 2023 - coverage in 2019)/coverage in 2019) x 100*

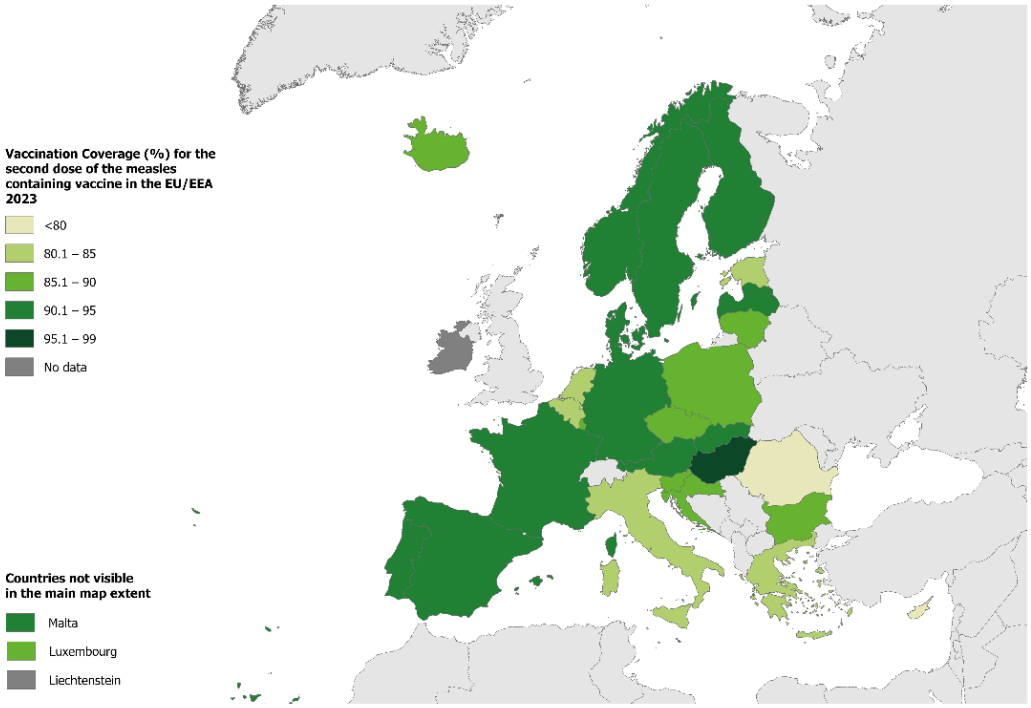
****EU/EEA: population-weighted average vaccination coverage rate*

Figure 5. Vaccination coverage for the first dose of a measles-containing-vaccine*, EU/EEA, 2023



Source: WHO Immunization Data Portal, WHO and UNICEF estimates of national immunization coverage (WUENIC) 2023, from Austria, Belgium, Bulgaria, Croatia, Cyprus, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden.
** Measles-containing-vaccine is used as a proxy indicator for mumps-containing-vaccine.*

Figure 6. Vaccination coverage for the second dose of a measles-containing-vaccine*, EU/EEA, 2023



Source: WHO Immunization Data Portal, WHO and UNICEF estimates of national immunization coverage (WUENIC) 2023, from Austria, Belgium, Bulgaria, Croatia, Cyprus, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden.

** Measles-containing-vaccine is used as a proxy indicator for mumps-containing-vaccine.*

Outcome

The outcome of disease was known for 1 168 (39%) of all cases, with no deaths reported in 2023.

Hospitalisation and complications

Of 1 129 cases with known hospitalisation status (38% of the total number of cases), 108 (9.6%) cases were hospitalised. Reported complications included 26 episodes of orchitis, eight episodes of pancreatitis, four episodes of meningitis and 8eight unspecified complications ('other'). Most of the complications were reported among the 1-4 years of age (32%) followed by the adult group of 30 years or older (30%).

Discussion

From 2019 to 2023, mumps notification rates in the EU/EEA have remained below pre-COVID-19 levels, with a continued decreasing trend from 3.1 in 2019 to 0.7 in 2023. The notification rate was 0.4 per 100 000 population in 2021, increasing slightly to 0.7 in 2022 and remaining stable at 0.7 in 2023. In 2023, three countries—Poland, Spain, and Germany—accounted for 62% of all notified cases, with Poland alone reporting nearly one-third of the total number of cases. While overall EU/EEA rates remained low, national trends varied, with some countries reporting increases and others maintaining low or zero notification rates.

The sustained low notification rates in 2021, 2022, and 2023 may still reflect the residual effects of the COVID-19 pandemic on respiratory disease transmission and surveillance capacity at that time [11]. Public health measures such as school closures and reduced mobility likely suppressed mumps transmission through 2021. The observed rise in notifications in 2022, which continues to plateau in 2023, is plausibly linked to the progressive relaxation of these measures and restoration of surveillance systems. However, the stagnation at 0.7 cases per 100 000 population in 2023 suggests that mumps transmission did not rebound fully or even more intensively, contrary to other diseases transmissible by the same respiratory route such for example measles [12]. A number of possible reasons could be ascribed to such observation, including the higher reproduction number of measles as compared to mumps (12-18 vs 4-7) [13], possibly due to residual population immunity or continued behavioural changes in post-pandemic society [14]. Moreover, the sharp decline in the number of cases reported from Spain and Ireland in 2023 compared to 2019 have had a dramatic influence in reducing the notification rate of mumps in the EU/EEA.

In 2023, Poland reported 966 mumps cases, a small increase compared to its numbers in 2022 (n=922), and a notable increase compared to 2021 (n=484) which represent the highest number of cases from one country in the EU/EEA for those years. While this increase is notable, it remains modest when viewed in the broader context - mumps notifications across the EU/EEA in 2023 still fell significantly below the levels observed during the pre-pandemic years, particularly the peak in 2019 [15, 16]. The peak in the notification rate in mumps cases observed in 2019 (EU/EEA overall rate 4.2), was mainly influenced by a large outbreak reported by Ireland. The outbreak, which started during the second half of 2019 and continued to produce cases until early 2020, was mainly among adolescents and young adults. The main factors that contributed to this extended outbreak were reported as crowded social environments of students, historical low uptake of MMR vaccine, insufficient effectiveness of the mumps component of the MMR vaccine and the possibility of waning immunity in those appropriately immunised [11]. This outbreak confirmed that mumps epidemics can continue to occur in the EU/EEA and that sustaining a high vaccination coverage of at least two dose MMR vaccine for all children and young adults is of the highest importance.

Several factors contribute to the understanding of mumps transmission patterns in the EU/EEA, particularly the observed shift in recent years toward older age groups. While in 2019 the majority of cases occurred among adolescents and young adults, more recent data from 2022 and 2023 indicate an increase in incidence among younger children. In 2023, individuals aged 30 years and older represented the most affected group in terms of absolute case numbers, with a resurgence in paediatric cases compared to earlier trends. This shift may reflect both epidemiological changes and the changing profile of countries contributing high case numbers, as nations such as Ireland and Spain—previously reporting elevated incidence—have recently reported fewer cases. Other key contributing factors include the incomplete and time-limited protection provided by the mumps component of the MMR vaccine, with studies indicating that immunity may wane 16 to 51 years after vaccination [17]. This waning immunity leaves adolescents and adults—particularly those vaccinated in early childhood—vulnerable to infection later in life [18]. Although 32% of cases with known vaccination status in 2023 had received at least two MMR doses, most of these were among individuals aged 5–19 years, suggesting that susceptibility persists across a broader age spectrum, which is in line with the available literature which shows that the mumps component of the MMR vaccine provides lower and more rapidly waning protection compared to the measles and rubella components [13, 17]. These findings underscore the importance of maintaining high two-dose coverage, while also reinforcing the need for continued surveillance and further evaluation of long-term vaccine effectiveness across different age cohorts.

WHO estimates of national immunisation coverage for 2023 indicate that MMR vaccine coverage in the EU/EEA remains relatively high [8, 9]. However, the post-pandemic context further complicates the picture. Although many countries managed to restore immunisation levels after the acute phase of COVID-19, the indirect effects of that disruption - such as workforce shortages, vaccine fatigue, or altered service delivery models - may have lasting impacts on coverage stability [19, 20]. In this light, the few countries that have achieved ≥95% coverage for both doses should not obscure the more widespread struggle to sustain that threshold. While discussions continue around genotypic mismatch and the potential role of a third MMR dose in outbreak settings, the priority should remain on reinforcing existing immunisation systems, closing immunity gaps, and addressing operational barriers that threaten the long-term success of the current two-dose strategy [21].

While administration of MMR in childhood may not offer complete individual protection against mumps in later life, the importance of maintaining high population MMR coverage cannot be overstated. The vaccine has been highly effective at reducing the overall morbidity and mortality of each of the three of the diseases it protects against, sustained high vaccination coverage lowers the likelihood of outbreaks occurring in a population, and being vaccinated also has a direct protective effect on mumps disease severity [21, 22]. A third dose of MMR vaccine can be effective at lowering the risk of mumps during an outbreak [21], but the relatively short duration of the antibody response following a third dose has raised questions about its general applicability beyond outbreak control [23].

Public health implications

Despite the relatively low number of mumps cases reported in recent years, including in 2023, continuous and robust epidemiological surveillance remains essential to detect early signals of resurgence. While high MMR coverage has been effective in reducing overall transmission and severity of mumps, further efforts are needed into how to improve the effectiveness and duration of protection offered by the mumps component of the MMR vaccine. Nevertheless, despite evidence of incomplete protection or waning immunity following vaccination, high MMR vaccination coverage is essential to prevent mumps outbreaks, reduce disease severity and progress towards measles and rubella elimination. Administering a third dose of MMR to adolescents and young adults can be considered as an outbreak control measure, and its potential role should continue to be evaluated, particularly in closed or high-risk settings.

Mumps control in the EU/EEA benefits from efforts towards elimination of measles and rubella. Fit for purpose and well-designed Immunisation Information Systems may allow, among others, to identify and outreach to individuals who might have missed vaccination doses.

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