

## SURVEILLANCE REPORT

# Measles and rubella monitoring

January 2013

### Main developments

Measles and rubella are targeted for elimination in Europe by 2015. ECDC closely monitors progress towards interruption of endemic transmission of both diseases through enhanced surveillance and epidemic intelligence. Measles and rubella vaccinations are routinely delivered in the form of the measles-mumps-rubella (MMR) vaccine in Europe, and the first of the two recommended doses is normally given during the second year of life.

### Measles

- The 29 participating EU and EEA countries reported 8 326 cases during the last 12-month period from December 2011 to November 2012.
- Reporting was complete for the 12-month period, with the exception of Luxembourg and Malta, which both did not report for November 2012.
- France, Italy, Romania, Spain and the United Kingdom accounted for 87% of all reported cases.
- The number of reported cases was substantially lower in 2012 compared with the same period in 2011, but the notification rate for the last 12-month period continues to exceed the elimination target (Figure 1). During the last 12 months, twelve countries reported less than one case of measles per one million population, and the overall notification rate for the EU/EEA countries was 16.4 cases per million. Of the cases reported in the last 12-month period for which vaccination status was available, 82% were unvaccinated.
- Among 2 209 cases aged 1–4 years, targeted by vaccination programmes in all European countries, 75% were reported as being unvaccinated.
- There have been no measles-related deaths during the last 12 months, but seven cases were complicated by acute measles encephalitis.
- Measles transmission continued at European level but no new large outbreaks have been reported since the previous report.

### Rubella

- 26 438 cases of rubella were reported from January to November 2012 by the 26 EU and EEA countries which contribute to the enhanced surveillance for rubella.
- 28 536 cases were reported during the period December 2011 to November 2012.
- Poland and Romania accounted for 99% of all reported rubella cases in the 12-month period. Italy did not report data from January; Luxembourg, Malta and the Netherlands did not report for November.

# Measles

## Surveillance data

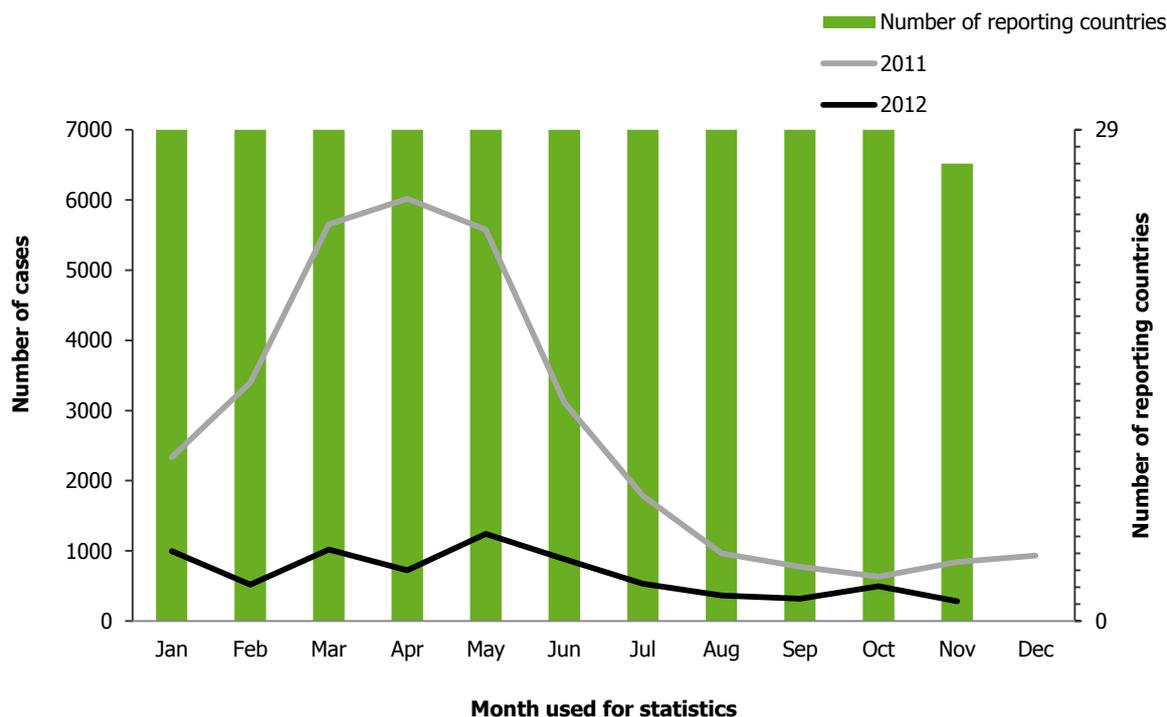
Data for enhanced measles surveillance were retrieved from the European Surveillance System (TESSy) on 21 December 2012, and the analysis covers the 12-month period from December 2011 to November 2012. Twenty-nine countries reported case-based data for the entire period, with the exception of Luxembourg and Malta, which did not submit data for November 2012.

The number of cases and notification rates for the past 12 months are shown in Table 1. Reported cases in 2012 are much lower than for the same period in 2011, and there was no increase in cases at the European level during the peak transmission season from February to June (Figure 1). The highest notification rate was among infants under one year of age (230.3 cases per 1 000 000 population), followed by children aged between one and four years (102.5 cases per 1 000 000 population) (Figure 2).

Vaccination status was known for 7 754 (93%) of the 8 326 reported cases. Of the cases with known vaccination status, 82% (6 391 cases) were unvaccinated, 13% (970) had received one dose of measles vaccine, 5% (375) had received two or more doses, and 0.2% (18) had received an unknown number of doses. The proportion of unvaccinated cases was high across all age groups, including those between one and four years old, the age group targeted by routine vaccination programmes (Figure 3).

Seven cases were complicated by acute measles encephalitis over the last 12 months, but there were no measles-related deaths reported.

**Figure 1. Number of measles cases in 2011 and 2012 and number of EU/EEA countries reporting by month in 2012**



**Table 1. Number of measles cases by month and notifications rates (cases per million), December 2011– November 2012, EU/EEA countries**

Country	2011	2012											Total cases	Cases per million
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov		
Austria	6	3	1	0	2	2	4	1	3	1	2	0	25	3.0
Belgium	2	6	6	3	9	4	9	5	0	1	0	0	45	4.1
Bulgaria	0	0	0	0	0	0	0	0	1	0	0	0	1	0.1
Cyprus	0	0	1	0	0	0	0	0	0	0	0	0	1	1.2
Czech Republic	1	3	2	0	2	7	4	1	2	1	0	0	23	2.2
Denmark	0	1	0	0	0	1	0	0	0	0	0	0	2	0.4
Estonia	0	0	0	0	2	1	0	0	0	0	0	0	3	2.2
Finland	0	0	1	0	3	0	0	0	0	1	0	0	5	0.9
France	126	106	123	140	110	103	92	75	31	10	25	26	967	14.9
Germany	7	4	18	7	18	56	17	19	11	3	3	5	168	2.1
Greece	0	0	0	0	0	1	1	1	0	0	0	0	3	0.3
Hungary	5	0	1	0	1	0	0	0	0	0	0	0	7	0.7
Iceland	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Ireland	3	3	4	5	3	53	19	3	3	9	11	3	119	26.6
Italy	54	62	122	89	100	105	58	28	6	13	73	4	714	11.8
Latvia	0	0	2	1	0	0	0	0	0	0	0	0	3	1.3
Lithuania	0	0	0	0	2	0	0	0	0	0	0	0	2	0.6
Luxembourg	0	0	0	1	0	0	1	0	0	0	0	NR	2	3.9
Malta	0	0	0	0	0	0	0	0	0	0	0	NR	0	0.0
Netherlands	0	0	0	1	4	0	1	2	2	0	0	0	10	0.6
Norway	0	0	0	0	1	0	0	0	2	1	0	0	4	0.8
Poland	0	1	1	1	13	11	9	4	6	1	2	1	50	1.3
Portugal	1	1	0	0	1	4	0	0	1	0	0	0	8	0.8
Romania	592	729	110	647	317	620	338	157	77	55	155	94	3891	181.7
Slovakia	0	0	0	0	0	0	0	0	1	0	0	0	1	0.2
Slovenia	0	1	0	1	0	0	0	0	0	0	0	0	2	1.0
Spain	108	60	69	89	65	59	55	30	7	4	8	0	554	12.0
Sweden	0	2	14	4	4	1	0	1	1	1	0	0	28	3.0
United Kingdom	29	17	47	31	66	216	278	206	211	220	218	149	1688	27.0
<b>Total</b>	<b>934</b>	<b>999</b>	<b>522</b>	<b>1020</b>	<b>723</b>	<b>1244</b>	<b>886</b>	<b>533</b>	<b>365</b>	<b>321</b>	<b>497</b>	<b>282</b>	<b>8326</b>	<b>16.4</b>

NR: data not reported.

Notification rates were calculated using the most recent population estimates available from Eurostat (2011).

Countries with a notification rate  $\geq 1$  per million population are highlighted in green. The target to monitor progress toward elimination is achievement of an incidence of less than one confirmed case per million population per year, excluding cases confirmed as imported.

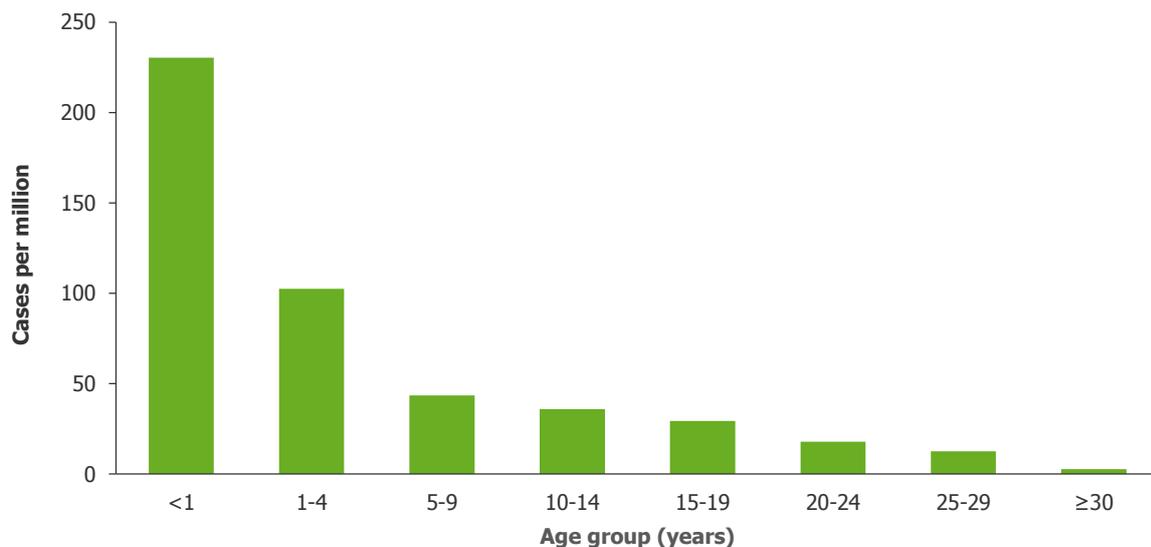
For countries that did not report data for all 12 months, notification rates might be underestimated.

All confirmed, probable, possible or unknown cases as defined by the EU 2008 case definitions are included.

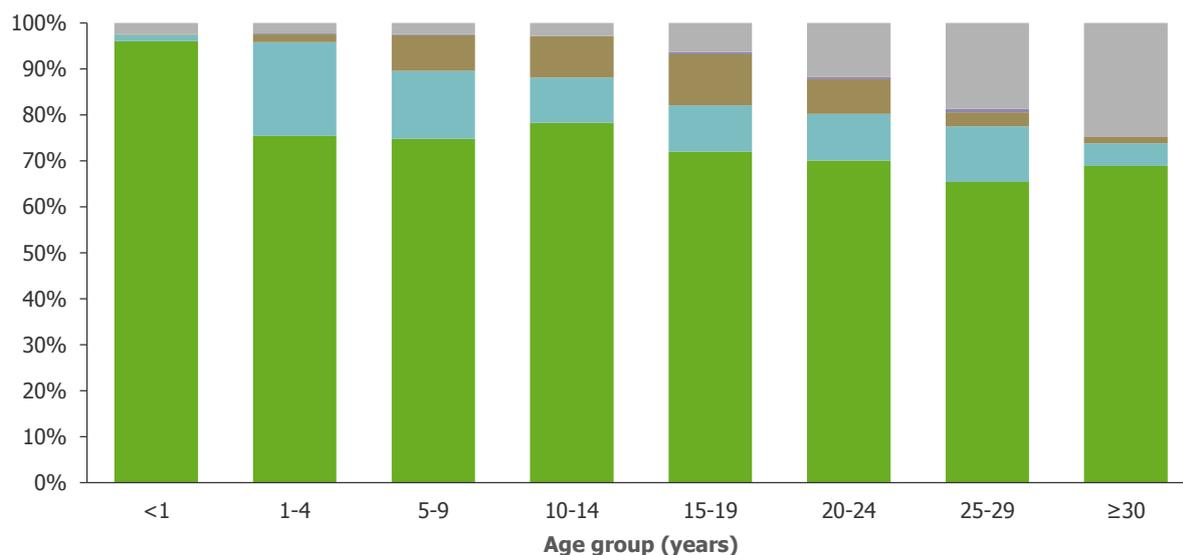
For tables relating to number of measles cases in previous years, see:

[http://ecdc.europa.eu/EN/HEALTHTOPICS/MEASLES/EPIDEMIOLOGICAL\\_DATA/Pages/annual\\_epidemiological\\_reports.aspx](http://ecdc.europa.eu/EN/HEALTHTOPICS/MEASLES/EPIDEMIOLOGICAL_DATA/Pages/annual_epidemiological_reports.aspx)

**Figure 2. Measles notification rates (cases per million) by age group, December 2011–November 2012, EU/EEA countries (n=8 286 cases with known age)**

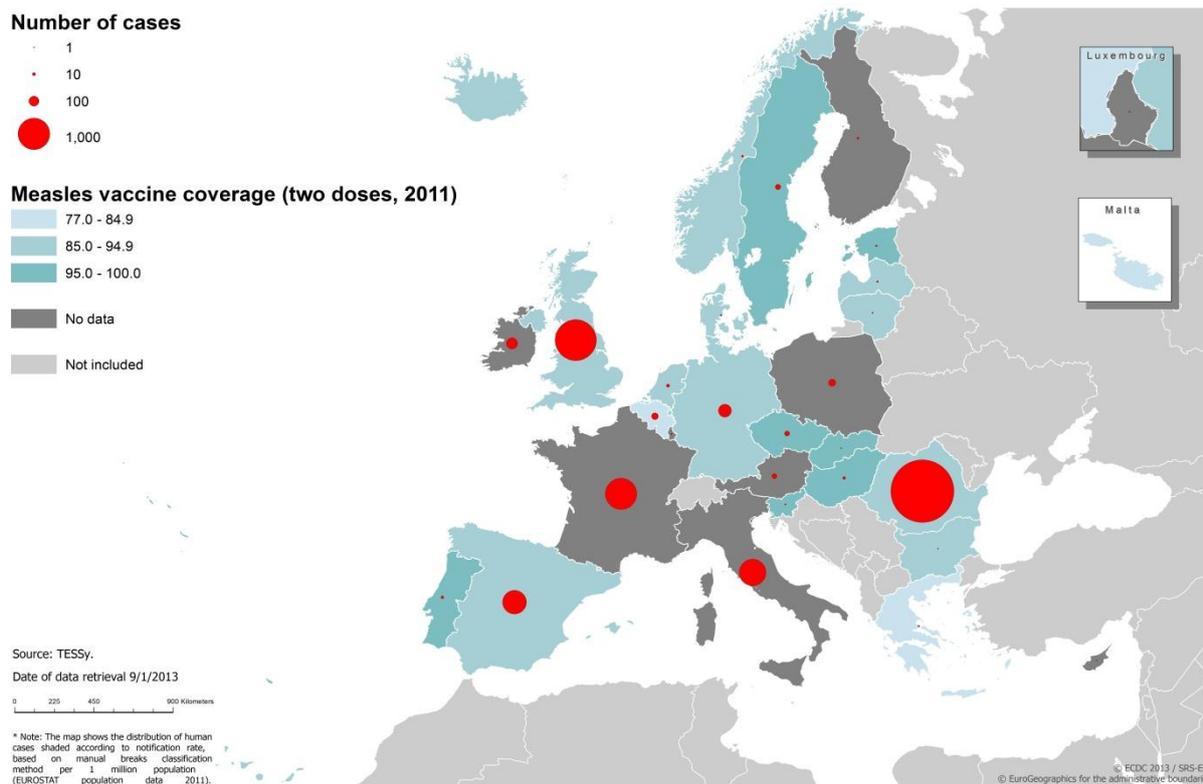


**Figure 3. Proportion of vaccination status among measles cases by age group, December 2011–November 2012, EU/EEA countries (n=8 286 cases with known age)**



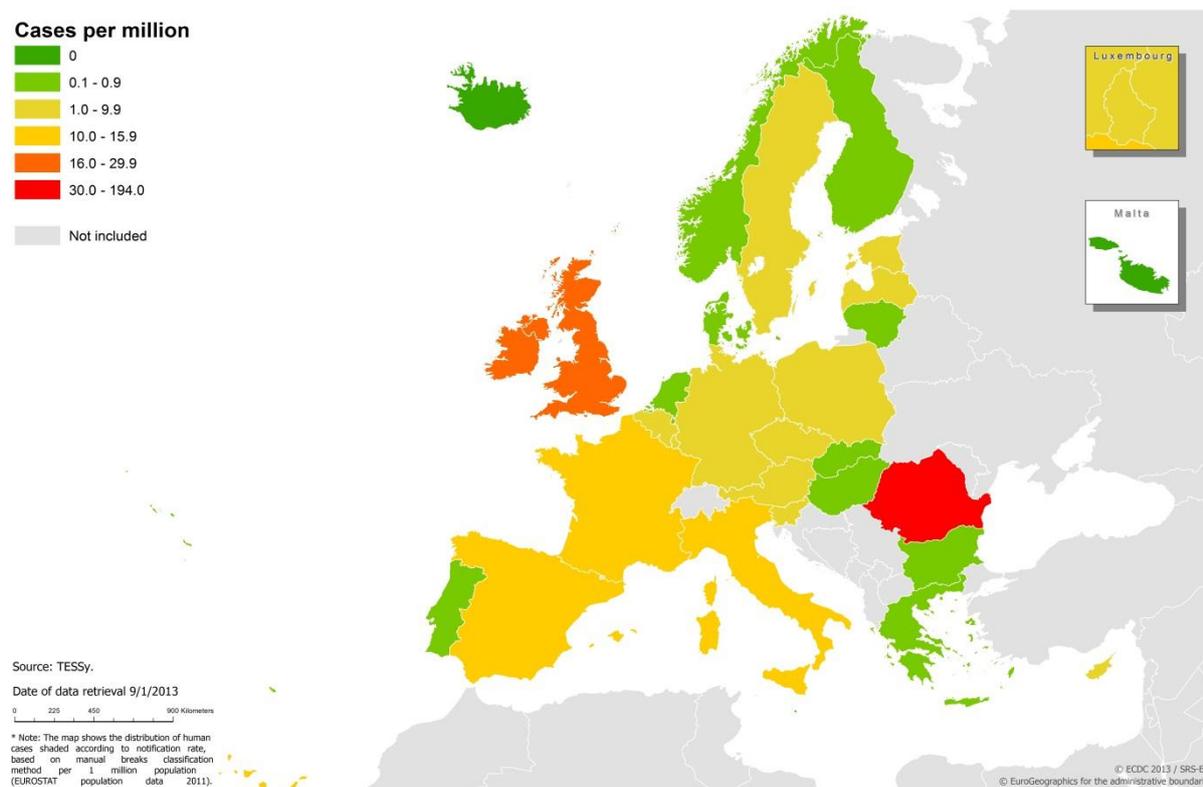
- Unvaccinated
- Vacc. 1 dose
- Vacc. ≥2 doses
- Vacc. with unknown no. of doses
- Unknown vacc. status

**Figure 4. Number of measles cases by country, December 2011– November 2012, EU/EEA countries (n=8 326), and two-dose measles vaccine coverage\* (2011 CISID), EU/EEA countries**



\* Coverage figures (%) are official national figures reported via the annual WHO/UNICEF Joint Reporting Form and WHO Regional Office for Europe reports.

**Figure 5. Measles notification rates (cases per million) by country, December 2011– November 2012, EU/EEA countries (n=8 326)**



For maps relating to measles cases and notification rates in 2011, see:  
[http://ecdc.europa.eu/en/activities/surveillance/euvac/data/Pages/measles\\_maps.aspx](http://ecdc.europa.eu/en/activities/surveillance/euvac/data/Pages/measles_maps.aspx)

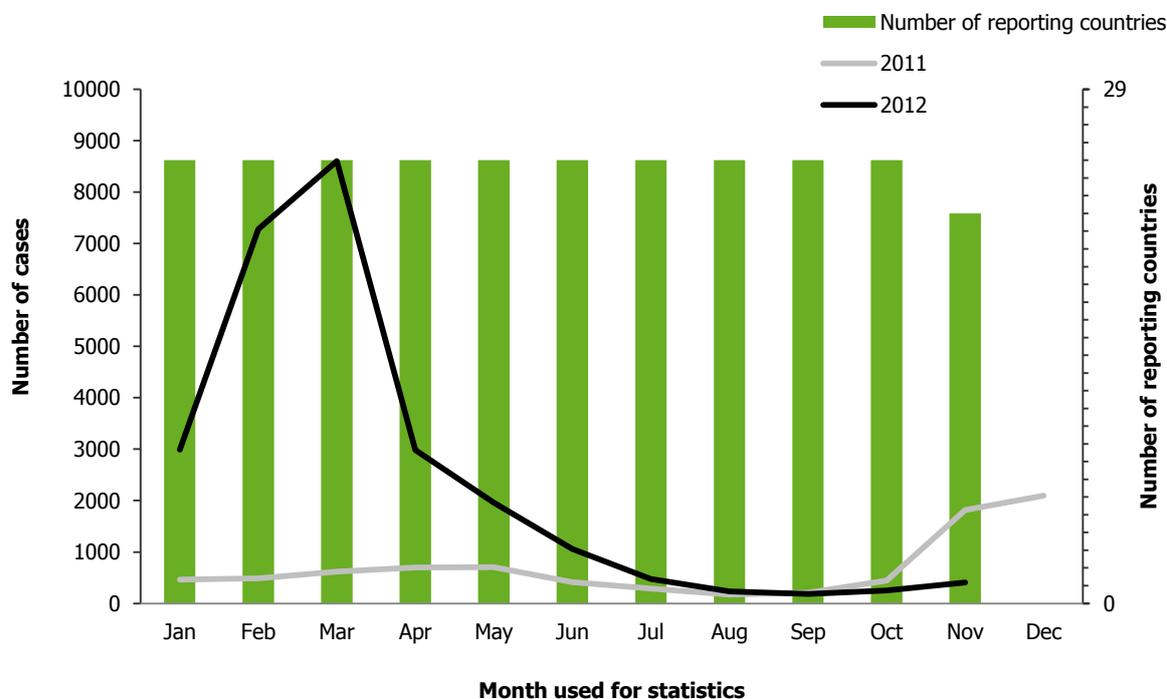
# Rubella

## Enhanced surveillance data

Data for enhanced rubella surveillance were retrieved from the European Surveillance System (TESSy) on 21 December 2012; the analysis covers the 12-month period from December 2011 to November 2012. Italy did not report data since January 2012; Luxembourg, Malta and the Netherlands did not report for November 2012. In Belgium, France and Germany there is no surveillance system in place for rubella. An overview of the number of cases and notification rates in the past 12 months is shown in Table 2. Poland and Romania accounted for 99% of the reported cases.

Reported cases in 2012 are higher than for the same period in 2011 (Figure 6). The highest notification rate was among adolescents 15–19 year of age (861.1 cases per 1 000 000 population) (Figure 7). In the age group 15–44 years, 60% of all notified cases were female.

**Figure 6. Number of rubella cases in 2011 and 2012 and number of EU/EEA countries reporting by month in 2012**



*No comprehensive surveillance system in place in Belgium, France, and Germany.*

**Table 2. Number of rubella cases by month and notifications rates (cases per million), November 2011– October 2012, EU/EEA countries**

Country	2011		2012										Total cases	Cases per million
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov		
Austria	0	2	1	0	1	2	0	0	3	0	0	0	9	1.1
Belgium	NR	NR	NR	NR	NR	NR	NR	-						
Bulgaria	1	1	2	4	1	2	2	1	0	0	1	3	18	2.4
Cyprus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Czech Republic	0	2	0	2	1	1	0	0	1	0	0	0	7	0.7
Denmark	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Estonia	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Finland	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
France	NR	NR	NR	NR	NR	NR	NR	-						
Germany	NR	NR	NR	NR	NR	NR	NR	-						
Greece	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Hungary	0	0	2	1	5	0	0	0	0	0	0	0	8	0.8
Iceland	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Ireland	0	0	0	2	0	4	2	0	1	0	0	3	12	2.7
Italy	4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	4	0.1
Latvia	0	0	0	0	0	3	2	0	2	1	0	0	8	3.6
Lithuania	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Luxembourg	0	0	0	1	0	0	0	0	0	0	0	NR	1	2.0
Malta	0	0	0	0	0	0	0	0	0	0	0	NR	0	0.0
Netherlands	0	0	0	0	1	0	0	0	0	0	0	NR	1	0.1
Norway	0	0	1	0	0	0	0	0	0	0	0	0	1	0.2
Poland	186	174	279	695	1076	1032	732	407	214	176	239	402	5612	146.9
Portugal	0	0	0	0	0	0	1	0	0	1	0	0	2	0.2
Romania	1905	2806	6965	7870	1874	899	299	34	9	4	11	1	22677	1059.0
Slovakia	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Slovenia	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Spain	2	5	12	15	13	8	2	2	2	0	0	0	61	1.3
Sweden	0	0	0	0	1	2	15	29	3	0	0	0	50	5.3
United Kingdom	0	3	19	17	9	8	5	4	0	0	0	0	65	1.0
<b>Total</b>	<b>2098</b>	<b>2993</b>	<b>7281</b>	<b>8607</b>	<b>2982</b>	<b>1961</b>	<b>1060</b>	<b>477</b>	<b>235</b>	<b>182</b>	<b>251</b>	<b>409</b>	<b>28536</b>	<b>81.5</b>

NR: data not reported.

Notification rates were calculated using the most recent population estimates available from Eurostat (2011).

Countries with a notification rate  $\geq 1$  per million population are highlighted in green. The target to monitor progress toward elimination is achievement of an incidence of less than one confirmed case per million population per year, excluding cases confirmed as imported.

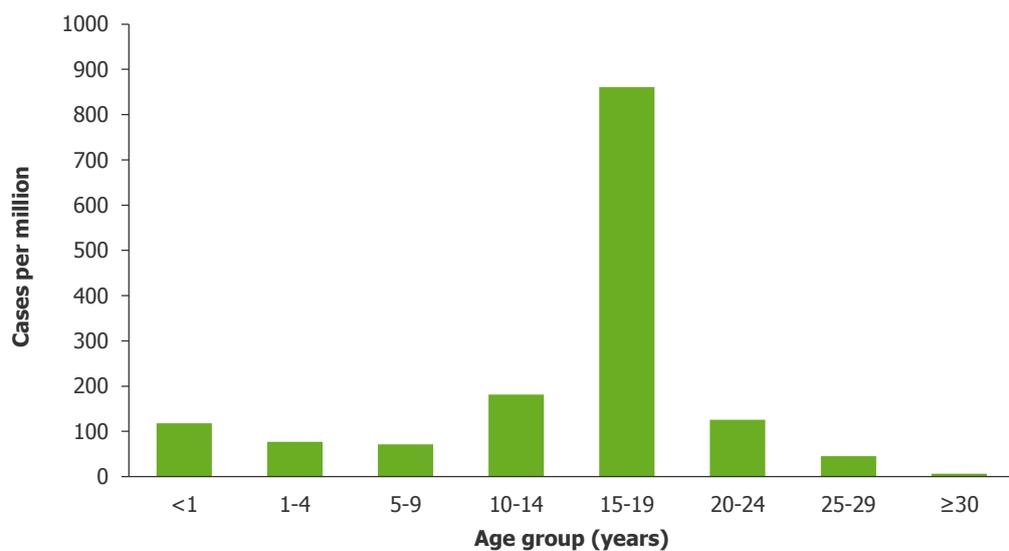
For countries that did not report data for all 12 months, notification rates might be underestimated.

All confirmed, probable, possible or unknown cases as defined by the EU 2008 case definitions are included.

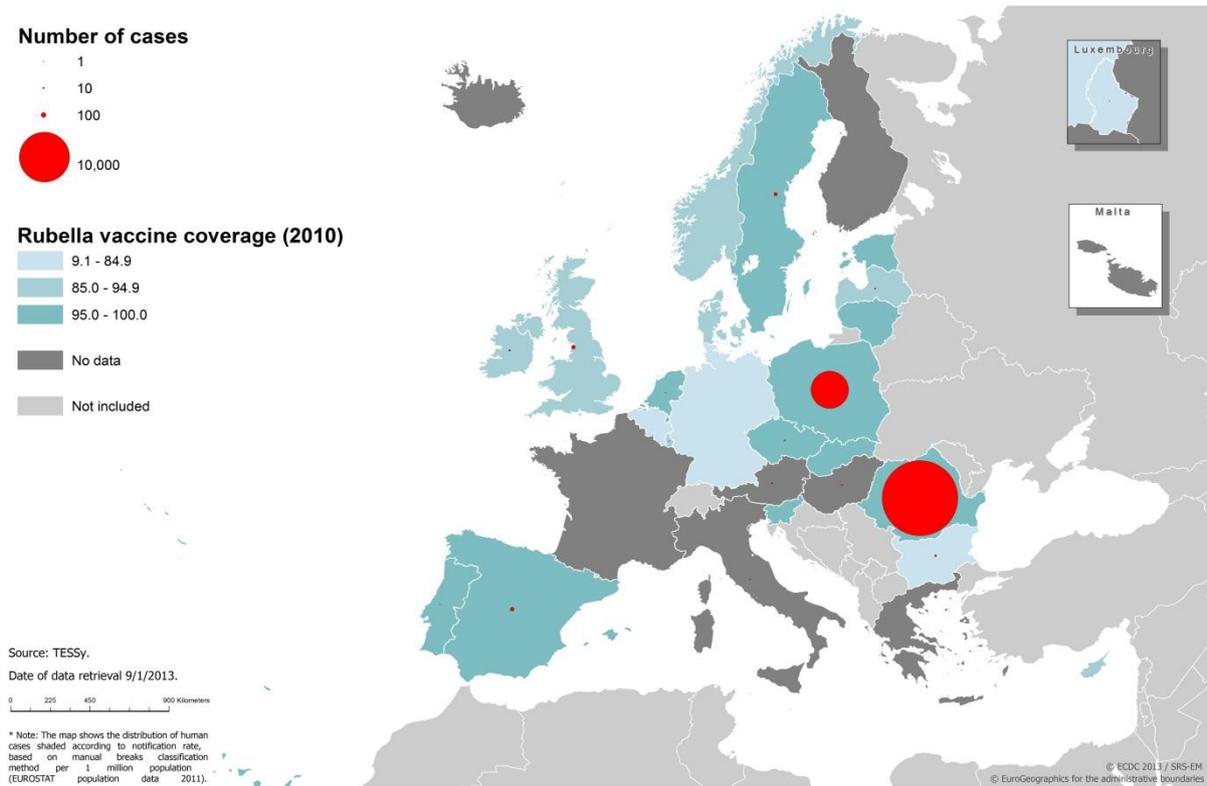
For tables relating to number of rubella cases in previous years, see:

<http://ecdc.europa.eu/en/activities/surveillance/euvac/data/Pages/status-rubella-reporting.aspx>

**Figure 7. Rubella notification rates (cases per million) by age group, December 2011–November 2012, EU/EEA countries (n=28 482 cases with known age)**

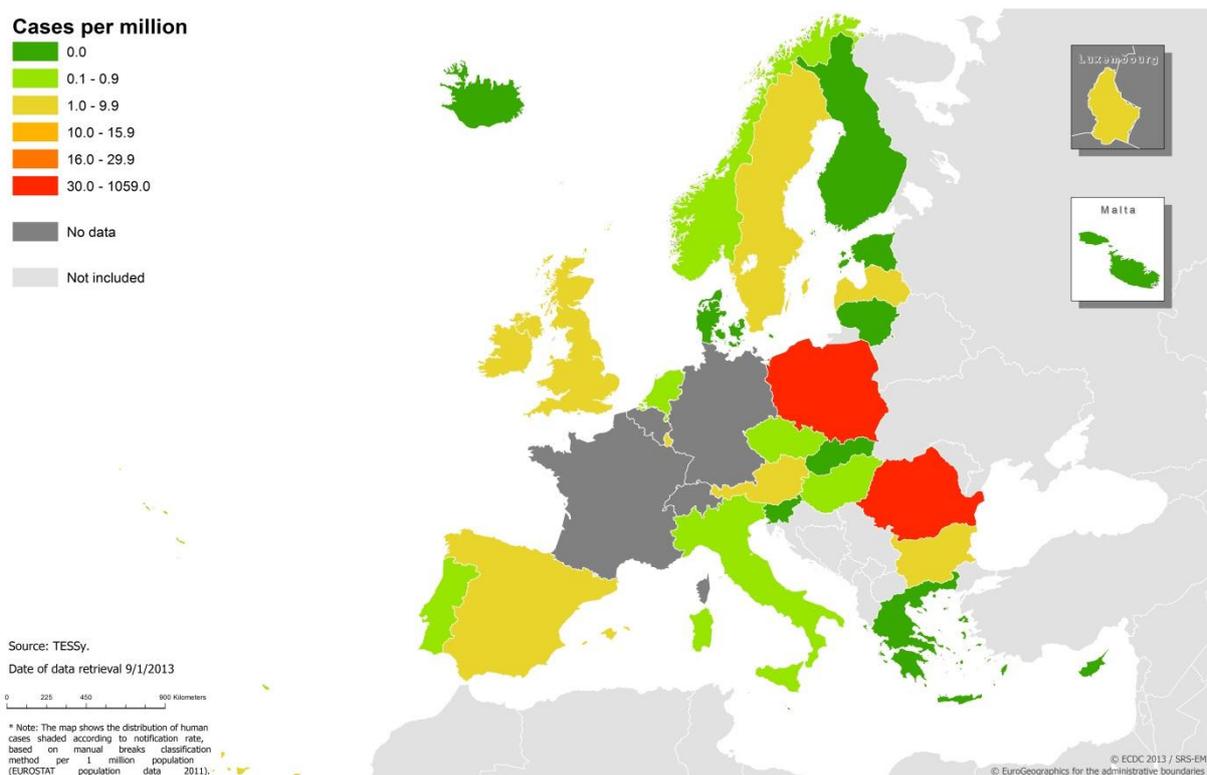


**Figure 8. Number of rubella cases by country, December 2011– November 2012, EU/EEA countries (n=28 536), and two-dose rubella vaccine coverage\* (2010 CISID), EU/EEA countries**



\* Coverage figures (%) are official national figures reported via the annual WHO/UNICEF Joint Reporting Form and WHO Regional Office for Europe reports.

**Figure 9. Rubella notification rates (cases per million) by country, December 2011– November 2012, EU/EEA countries (n=28 536)**



## Epidemic intelligence

No new outbreaks of measles or rubella were detected in the EU Member States since the previous Measles and Rubella Monitoring Report.

## Publications

De Serres G, Markowski F, Toth E, Landry M, Auger D, Mercier M, et al. Largest measles epidemic in North America in a decade – Quebec, Canada, 2011: contribution of susceptibility, serendipity, and super-spreading events. [J Infect Dis. 2013 Jan 18.](#)

The article describes measles epidemiology in Quebec in 2011, a year when Canada experienced several outbreaks as a result of 21 documented importations. Nineteen importations originated in Europe, 15 of which were from France. A single 'super-spreading event' accounted for the majority of the 725 confirmed cases reported. The index case in this outbreak worked at a high school and was in contact with a large number of students during the infectious period. This resulted in 10 secondary cases, 61 tertiary cases and altogether 678 cases over 26 weeks of transmission. Eleven of the cases were healthcare workers and in 19 instances transmission occurred in a healthcare setting. Large-scale supplementary vaccination efforts were not deployed in response to the outbreak because it was thought that the high vaccine uptake in Quebec would block sustained transmission. As is to be expected in populations with high vaccination uptake, close to half (48%) of the cases in the school were among two-dose recipients. The data underscore the importance of accounting for vaccine efficacy and residual susceptibility among twice-vaccinated as well as clustering of unvaccinated children in groups that share socio-economic conditions and religious or philosophical beliefs. In the article below, the authors used data from the same outbreak to estimate vaccine efficacy and could demonstrate that age at first vaccination can play a pivotal role for the risk of sustained transmission following importation of measles.

De Serres G, Boulianne N, Defay F, Brousseau N, Benoît M, Lacoursière S, et al. Higher risk of measles when the first dose of a 2-dose schedule of measles vaccine is given at 12–14 months versus 15 months of age. [Clin Infect Dis. 2012 Aug;55\(3\):394-402](#)

The authors estimated vaccine efficacy (VE) for measles vaccine during a large outbreak in a high school in a rural town in Quebec with high vaccination uptake among students. The results confirm the findings from many other studies and found 2-dose measles VE against classical disease to be 95.5%. There was a statistically significant difference in attack rates according to age at first dose of measles vaccine. Students who had received the first dose at 12 months had a 3–4 times higher risk contracting measles than students who had received the first dose at 15 months or later. This is a potentially important finding for measles elimination in Europe. During the 2009–11 European outbreaks, there was a large group of children too young to be vaccinated among the infected and outbreak control measures included lowering the age for the first dose of measles vaccine. As the authors point out in the discussion, routinely giving the first dose at 12 months or earlier could be counterproductive in the longer term. The reason is that measles elimination requires very high population immunity (>95%), something that can be challenging to achieve even with a 2-dose immunisation schedule and vaccine uptake >90%. Even the small difference in VE when the first dose is given at 12 months compared to  $\geq 15$  months can, over time, push population susceptibility above the epidemic threshold. Measles VE is lower at 12 months than at 15 months for two principal reasons. First, at 12 month, maternal antibodies still interfere with measles vaccination in a small proportion of children. Because vaccine-induced antibody titres are generally lower than infection-induced titres, the problem of interference from maternal antibodies should theoretically reduce as the proportion of vaccinated mothers increases. Secondly, sero-conversion rates after measles vaccination also increase with older age independently of the mother's immunity status. The data presented in this article suggest that administering the first dose of measles vaccine after 15 months of age could increase overall immunity for the same vaccination uptake. Just how important age is for VE and for population immunity needs to be substantiated by other studies. Increasing and sustaining vaccination uptake continues to have the highest priority for countries who want to eliminate measles transmission.

Centers for Disease Control and Prevention (CDC). Global control and regional elimination of measles, 2000–2011 [MMWR Morb Mortal Wkly Rep. 2013 Jan 18;62:27-31.](#)

This article offers a global perspective on progress in measles elimination since 2000. Estimated global MCV1 coverage increased from 72% in 2000 to 84% in 2011, and the number of countries routinely providing a second dose of measles-containing vaccine (MCV2) through routine services increased from 97 (50%) in 2000 to 141 (73%) in 2011. During the same period, annual reported measles incidence decreased by 65%, from 146 cases per one million in 2000 to 52 cases per one million in 2011; estimated measles deaths decreased by 71%, from 542 000 to 158 000. The article lists 17 countries which experienced large measles outbreaks in 2011 and of these, four are EU countries (France, Italy, Romania and Spain).

## Useful links

More information about measles and rubella is available on the ECDC website:

<http://ecdc.europa.eu/en/healthtopics/measles/Pages/index.aspx>

<http://ecdc.europa.eu/EN/HEALTHTOPICS/RUBELLA/Pages/index.aspx>

Information about vaccines and immunisation from the World Health Organization's Regional Office for Europe website: <http://www.euro.who.int/en/what-we-do/health-topics/communicable-diseases/measles-and-rubella>

Website for WHO CISID database: <http://data.euro.who.int/cisid/>

More information on the surveillance of vaccine-preventable diseases in the European Union is available from the [EUVAC-Net](#) website.

## Notes

1) The European Surveillance System (TESSy) reports 'date used for statistics', which is a date chosen by the country for reporting purposes. Such date may indicate onset of disease, date of diagnosis, date of notification, or date of laboratory confirmation.

2) Countries report on measles, rubella and other vaccine-preventable diseases to the European Surveillance System at their own convenience. This means that the date of retrieval can influence the data presented in this report. For this reason, the date of data retrieval is indicated for each issue. For this issue, measles data and rubella data were retrieved on 21 December 2012. Later retrievals of data may result in slightly different numbers as countries have the possibility to update data in the European Surveillance System retrospectively.

3) Starting with the September 2012 issue ECDC has been reporting measles and rubella notification rates per one million population and not as previously per thousand population. The reason is that the WHO incidence indicator to monitor progress toward elimination is number of confirmed cases per one million population year. The elimination target for both measles and rubella for Europe is less than one case per million population and year. Read more about the elimination verification process in: [Surveillance Guidelines for Measles, Rubella and Congenital Rubella Syndrome in the WHO European Region](#), and [Eliminating Measles and Rubella, Framework for the Elimination Process in the WHO European Region](#)