



Introduction

The following measles surveillance report covers the year 2007 and aims to describe basic epidemiological features of measles in EUVAC.NET-participating countries.

Methods

Measles surveillance data were available for all 32 EUVAC.NET-participating countries reporting for the whole year. Thirty countries provided case-based data obtained through national mandatory notification systems. Belgium provided data collected through a non-mandatory notification system. Romania and Turkey provided aggregated data. All clinical, laboratory-confirmed or epidemiologically linked cases meeting the requirements for national surveillance were included in the analysis.

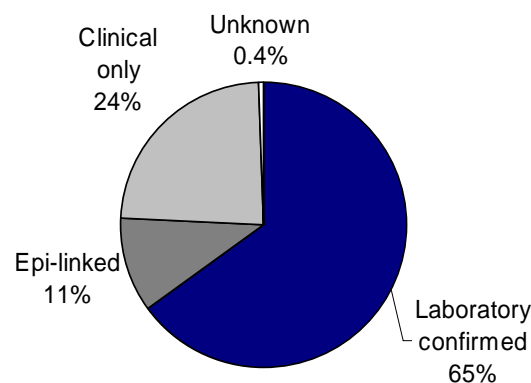
Data analysis was based on cases with disease onset in 2007. In 636 (18%) case-based reports the disease onset dates were not available. However, these cases were included in the analyses on the basis of their date of notification or date of collection of laboratory sample being in 2007. In some countries minor discrepancies with nationally reported data may arise if these include cases reported in 2007 but with disease onset in 2006.

In this report incidence rates were based on population statistics for 2007 obtained from the Population Information page on the WHO website for the Computerized Information System for Infectious Diseases (CISID), <http://data.euro.who.int/cisid/>. Incidence rates are based on reported measles cases per 10⁵ inhabitants per year. Variables that had no data in the case-based reports were converted to an unknown status.

Incidence – notifications and laboratory data

A total of 3,909 measles cases was reported from EUVAC.NET-participating countries giving a crude incidence of 0.67 per 100,000 inhabitants. Data on 3,554 (91%) cases were case-based and aggregated data on the remaining 355 (9%) from Romania and Turkey.

Figure 1. *Diagnosis classification of measles cases, 2007 (n=3,909)*



The distribution of reported measles cases varied considerably among the participating countries (Table 1). The highest incidence of measles was reported from Switzerland followed by the United Kingdom with a crude incidence of 14.30 and 1.67 per 100,000 inhabitants, respectively.

Table 1. *Reported measles cases and laboratory-confirmed cases by country, 2007 (n=3,909)*

Country	No. of cases	Crude incidence per 100,000 inhabitants	Laboratory confirmed cases	Epidemiologically linked cases
Austria	20	0.24	15 75%	0
Belgium	58	0.55	14 24%	36 62%
Bulgaria	1	0.01	1 100%	0
Croatia	0	0	.. ..	.. ..
Cyprus	0	0	.. ..	.. ..
Czech Republic	2	0.02	2 100%	0
Denmark	2	0.04	2 100%	0
Estonia	1	0.08	1 100%	0
Finland	0	0.00	.. ..	.. ..
France	40	0.07	24 60%	0
Germany	571	0.69	280 49%	207 36%
Greece	2	0.02	0 0%	0
Hungary	0	0	.. ..	.. ..
Iceland	0	0	.. ..	.. ..
Ireland	52	1.22	14 27%	6 12%
Italy	420	0.72	154 37%	0 ..
Latvia	0	0	.. ..	.. ..
Lithuania	0	0	.. ..	.. ..
Luxembourg	0	0	.. ..	.. ..
Malta	2	0.49	0 0%	0
The Netherlands	10	0.06	10 100%	0
Norway	20	0.43	17 85%	3 15%
Poland	43	0.11	29 67%	1 2%
Portugal	0	0.00	.. ..	.. ..
Romania	352	1.63	344 98%	0 ..
Slovakia	0	0	.. ..	.. ..
Slovenia	0	0	.. ..	.. ..
Spain	265	0.61	235 89%	20 8%
Sweden	1	0.01	0 0%	0
Switzerland	1,040	14.30	421 40%	125 12%
Turkey	3	0.00	3 100%	0 ..
United Kingdom	1,004	1.67	972 97%	32 3%
Total	3,909	0.67	2538 65%	430 11%

In table 2, countries have been grouped into low, moderate and high incidence categories based on reported indigenous (non-imported) measles cases. No indigenous cases were reported from 13 countries: Bulgaria, Croatia, Cyprus, Denmark, Finland, Hungary, Iceland, Latvia, Lithuania, Luxembourg, Portugal, Slovakia and Slovenia.

Table 2. *Reported incidence of indigenous measles per 100,000 inhabitants by country, 2007*

High incidence (>1.0)		
Ireland (1.22)	Switzerland (14.10)	
Romania (1.63)*	United Kingdom (1.64)	
Moderate incidence (0.1-1.0)		
Austria (0.15)	Italy (0.72)	Poland (0.11)
Belgium (0.5)	Malta (0.49)	Spain (0.61)
Germany (0.67)		
Low incidence (< 0.1)		
Czech Republic (0.01)	Greece (0.02)	Sweden (0.01)
Estonia (0.08)	The Netherlands (0.04)	Turkey (0.004)*
France (0.05)	Norway (0.02)	
Zero incidence		
Bulgaria (0)	Hungary (0)	Portugal (0)
Croatia (0)	Iceland (0)	Slovakia (0)
Cyprus (0)	Latvia (0)	Slovenia (0)
Denmark (0)	Lithuania (0)	
Finland (0)	Luxembourg (0)	

* For Romania and Turkey the crude incidence is quoted in this table as data on importation status of cases were not included in the aggregated dataset provided.

Outbreak-related and imported cases

Information on outbreak status was provided in 59% of case-based reports. Of these, there were 1,465 outbreak-related cases (Table 4) making up to 70% of those with a known outbreak status. Most outbreak cases were reported from the United Kingdom (51%) followed by Germany (24%). Measles outbreaks in 2007 were reported from Belgium,¹ Italy,²⁻³ Germany,⁴ Norway,⁵ Spain,⁶ Switzerland,⁷⁻⁸ and the UK.⁹⁻¹¹ They involved the general population as well as particular groups such as Travellers communities and ultra-orthodox Jewish communities.

Importation status was known in 1,912 (56%) of case-based reports (Table 4). Of these, there were 84 imported cases amounting to 4% of case-based reports with known importation status. Fifty-three cases (63%) were imported from another European country. There were 31 imported cases (37%) from other continents including, 13 from Asia, seven from the Middle East, seven from Africa, three from North America and one from Australia. The number of reported measles cases by country identified as a source of importation is seen in table 5.

Table 4. Reported measles cases: hospitalised, outbreak related and imported, by country, 2007

Country	Hospitalised cases ¹			Outbreak-related cases ²			Imported cases ²		
	No. of cases (% of known hospitalisation status)	% Unknown of total /no data		No. of cases (% of known outbreak status)	% Unknown of total /no data		No. of cases (% of known importation status)	% Unknown of total /no data	
Austria	7	35%	0%	3	15%	0%	8	40%	0%
Belgium	2	4%	12%	47	84%	3%	6	11%	3%
Bulgaria	1	100%	0%	0	0%	0%	1	100%	0%
Croatia	0	..	..	0	..	..	0	..	..
Cyprus	0	..	..	0	..	..	0	..	..
Czech Republic	0	0%	0%	0	0%	50%	1	50%	0%
Denmark	2	100%	0%	0	..	100%	2	100%	0%
Estonia	0	0%	0%	0	0%	0%	0	0%	0%
Finland	0	..	..	0	..	..	0	..	..
France	15	38%	0%	3	8%	0%	8	22%	10%
Germany	74	13%	1%	358	63%	0%	16	3%	3%
Greece	1	100%	50%	0	0%	0%	0	0%	50%
Hungary	0	..	..	0	..	..	0	..	..
Iceland	0	..	..	0	..	..	0	..	..
Ireland	2	6%	35%	13	50%	50%	0	0%	59%
Italy	50	15%	21%	0	0%	93%	3	9%	92%
Latvia	0	..	..	0	..	..	0	..	..
Lithuania	0	..	..	0	..	..	0	..	..
Luxembourg	0	..	..	0	..	..	0	..	..
Malta	0	0%	0%	0	0%	0%	0	0%	0%
The Netherlands	2	20%	0%	9	90%	0%	4	44%	10%
Norway	7	35%	0%	18	95%	5%	2	10%	0%
Poland	23	53%	0%	10	23%	0%	0	0%	0%
Portugal	0	..	..	0	..	..	0	..	..
Romania ³	318	100%	10%	0	0%	0%	0	0%	0%
Slovakia	0	..	..	0	..	..	0	..	..
Slovenia	0	..	..	0	..	..	0	..	..
Spain	43	16%	0%	257	97%	0%	0	0%	0%
Sweden	0	0%	0%	0	0%	0%	0	0%	0%
Switzerland	82	8%	3%	0	..	100%	14	2%	20%
Turkey	1	33%	0%	0	0%	0%	0	0%	0%
United Kingdom	176	18%	0%	747	74%	0%	19	100%	98%
Total	805	22%	5%	1465	70%	41%	84	4%	46%

¹Denominator n=3,909. ²Denominator n=3,554. ³Aggregated data does not include information on outbreaks and importation status.

Table 5. Reported number of measles cases by country identified as source of importation, 2007 (n=84)

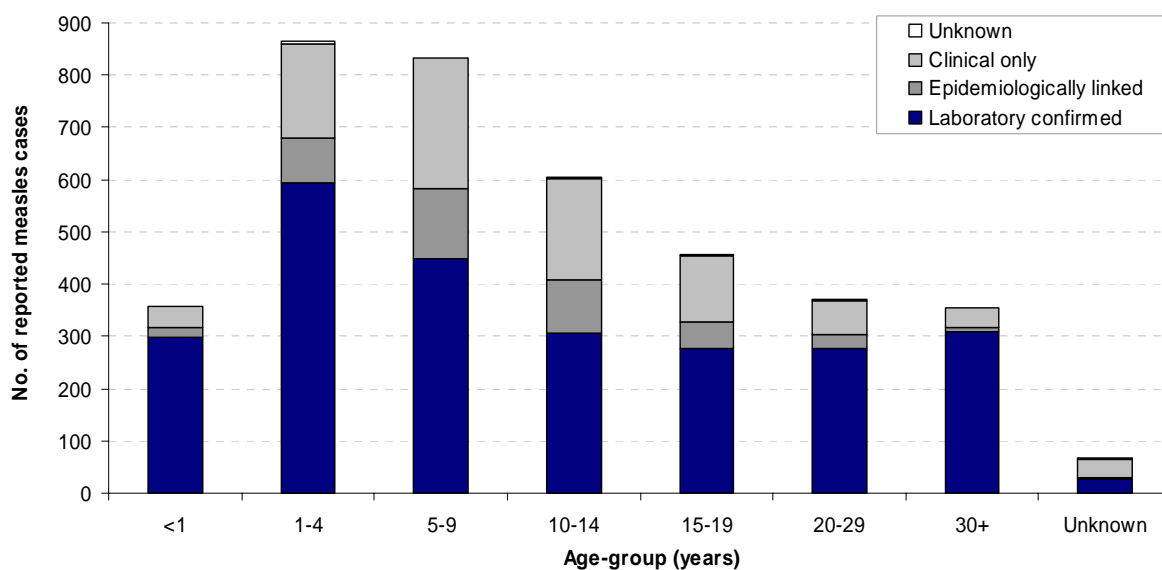
Switzerland	13	Thailand	4	Tanzania	2	Poland	1
United Kingdom	10	China	3	Australia	1	Portugal	1
Germany	9	Ethiopia	3	Austria	1	Qatar	1
Spain	7	Greece	2	Barbados	1	Russia	1
Italy	6	Israel	2	Belgium	1		
India	5	Morocco	2	Canada	1		
Pakistan	4	The Netherlands	2	Dominican Republic	1		

Note: This table needs to be interpreted with caution as the definition of an imported case may differ from country to country.

Age distribution and seasonality

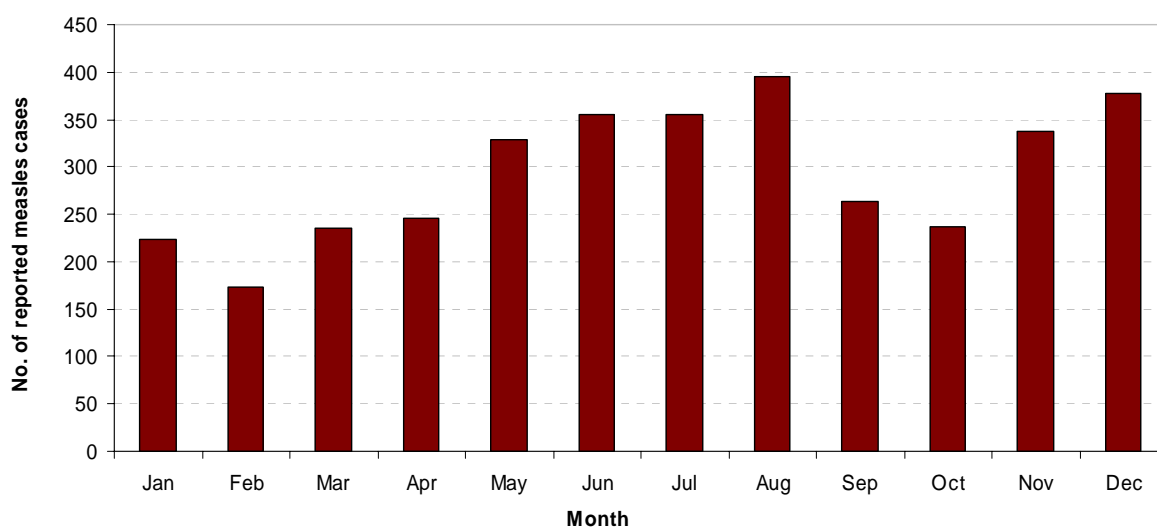
Measles was reported in both children and adults. Overall, 9% of cases were infants, 23% 1-19 years, 49% 5-19 years and 19% were ≥ 20 years. Figure 2 shows the number of reported measles cases by age-group and confirmation status.

Figure 2. Reported measles cases by age-group and confirmation status in all reporting countries, 2007 (n=3,909)



Of the case-based reports, 44% occurred in the first half of the year. Figure 3 shows the occurrence of measles by month of onset derived from case-based reports.

Figure 3. Number of reported measles cases by month of disease onset from case-based reporting countries, 2007 (n=3,554)



Vaccination status

Information on known vaccination status was provided in 3,582 (92%) of all reported measles cases (Table 6). Overall, 87% of those with a known vaccination status were unvaccinated.

Figure 4. Vaccination status of measles cases, 2007 (n=3,909)

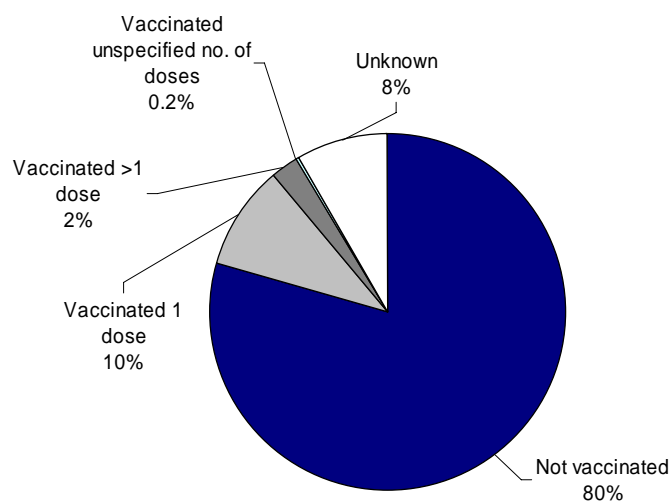


Table 6. Vaccination status of reported measles cases by country, 2007 (n=3,909)

Country	No. of unvaccinated cases (% of unvaccinated of known vaccination status)		No. of vaccinated cases (% vaccinated of known vaccination status)		No. with unknown vaccination status/no data (% unknown status /no data of total)	
Austria	7	54%	6	46%	7	35%
Belgium	37	70%	16	30%	5	9%
Bulgaria	0	..	0	..	1	100%
Croatia	0	..	0	..	0	..
Cyprus	0	..	0	..	0	..
Czech Republic	0	0%	1	100%	1	50%
Denmark	2	100%	0	0%	0	0%
Estonia	0	0%	1	100%	0	0%
Finland	0	..	0	..	0	..
France	22	65%	12	35%	6	15%
Germany	476	91%	47	9%	48	8%
Greece	0	0%	1	100%	1	50%
Hungary	0	..	0	..	0	..
Iceland	0	..	0	..	0	..
Ireland	18	47%	20	53%	14	27%
Italy	274	79%	71	21%	44	11%
Latvia	0	..	0	..	0	..
Lithuania	0	..	0	..	0	..
Luxembourg	0	..	0	..	5	100%
Malta	1	50%	1	50%	0	0%
The Netherlands	8	89%	1	11%	1	10%
Norway	11	79%	3	21%	6	30%
Poland	14	42%	19	58%	10	23%
Portugal	0	..	0	..	0	..
Romania	164	56%	131	44%	55	16%
Slovakia	0	..	0	..	0	..
Slovenia	0	..	0	..	0	..
Spain	223	86%	36	14%	6	2%
Sweden	1	100%	0	0%	0	0%
Switzerland	888	94%	57	6%	95	9%
Turkey	1	33%	2	67%	0	0%
United Kingdom	953	95%	51	5%	0	0%
Total	3100	87%	474	13%	305	8%

Morbidity and mortality

Data on known hospitalisation status was available in 95% of all reported measles cases. There were 805 reported hospitalised cases in connection with measles (Table 4) amounting to 22% of all cases with known hospitalisation status.

One patient acquiring measles in 2007 died (0.26 per 1000 measles cases) due to pneumonia. The death was reported from Italy and occurred in a 10-year-old girl with a congenital immunodeficiency disorder. The case was laboratory-confirmed.

Seven cases were complicated with encephalitis corresponding to an overall incidence of 200 per 100,000 measles cases. The cases were reported from Switzerland (five cases), Germany (one case) and the UK (one case). They were distributed between age-groups with two aged 5–9 years, one aged 10–14 years, two aged 15–19 years, and two older than 20 years. None had been vaccinated against measles.

Comments

There has been an overall decrease of 52% in reported measles cases in EUVAC.NET-participating countries in 2007 compared with the previous year. The decline has been mostly attributed to the decreased number of reported cases from Romania and Germany. However, some other countries reported an increase in indigenous incidence compared with 2007 notably Belgium, Switzerland and the UK. As expected, the majority of measles cases occurred in unvaccinated cases.

Most imported cases were reported to occur in countries where outbreaks of measles have been documented or where endemic measles transmission still occurs. It is to be noted that the list of countries reported as sources of importation of measles (Table 5) has to be interpreted with caution since different countries may use different definitions of imported cases.

Although there has been a marked drop in the number of measles cases in EUVAC.NET-participating countries, the large number of cases remains high in relation to the measles elimination goal by 2010. The commitment to eliminate measles in Europe needs to be strengthened by increasing vaccination coverage with two doses of measles vaccines to a WHO recommended minimum of 95%. Additionally, enhanced surveillance from clinical to laboratory level needs to be undertaken for early identification and laboratory confirmation of cases. An increased level of suspicion in cases with rash, particularly in those >15 years old is important. Laboratory investigations including molecular characterization of measles virus help to better define outbreaks and identify imported measles thereby demonstrating the absence or presence of endemic measles.

References

- 1 Lernout T, Kissling E, Hutse V, Top G. Clusters of measles cases in Jewish orthodox communities in Antwerp, epidemiologically linked to the United Kingdom: a preliminary report. *Euro Surveill* 2007;12(11):E071115.3. <http://www.eurosurveillance.org/ew/2007/071115.asp#3>
- 2 Prato R, Chironna M, Caputi G, Sallustio A, Martinelli D, Falco A, Germinario C. An outbreak of measles in Apulia, Italy, November 2006 – January 2007. *Euro Surveill* 2007;12(4):E070405.1. <http://www.eurosurveillance.org/ew/2007/070405.asp#1>
- 3 A cluster of measles cases in northern Italy: a preliminary report. A Filia, A Barale, S Malaspina, D Montu, Zito S, M Muscat, M Ciofi Degli Atti. *Eurosurveillance Weekly*: 2007; 12:11. <http://www.eurosurveillance.org/ew/2007/071129.asp#1>
- 4 Bernard H, Santibanez S, Siedler A, Ludwig M, Hautmann W. An outbreak of measles in Lower Bavaria, Germany, January-June 2007. *Euro Surveill* 2007;12(10):E071004.1. <http://www.eurosurveillance.org/ew/2007/071004.asp#1>
- 5 Løvoll Ø, Vonen L, Nordbø S, Vevatne T, Sagvik E, Vainio K, et al. Outbreak of measles among Irish Travellers in Norway: an update. *Euro Surveill* 2007;12(6):E070614.2. <http://www.eurosurveillance.org/ew/2007/070614.asp#2>
- 6 Torner N, Martinez A, Costa J, Mosquera M, Barrabeig I, Rovira A, et al. Measles outbreak in the Barcelona Region of Catalonia, Spain, October 2006 to February 2007. *Euro Surveill* 2007;12(2):E070222.2. <http://www.eurosurveillance.org/ew/2007/070222.asp#2>

- 7 Delaporte E, Wyler C, Sudre P. Outbreak of measles in Geneva, Switzerland, March-April 2007. *Euro Surveill* 2007;12(5):E070510.2. <http://www.eurosurveillance.org/ew/2007/070510.asp#2>
- 8 Richard J, Masserey Spicher V. Ongoing measles outbreak in Switzerland: results from November 2006 to July 2007. *Euro Surveill* 2007;12(7):E070726.1. <http://www.eurosurveillance.org/ew/2007/070726.asp#1>
- 9 Cohuet S, Morgan O, Bukasa A, Heathcock R, White J, Brown K, et al. Outbreak of measles among Irish Travellers in England, March to May 2007. *Euro Surveill* 2007;12(6):E070614.1. <http://www.eurosurveillance.org/ew/2007/070614.asp#1>
- 10 Ashmore J, Addiman S, Cordery R, Maguire H. Measles in North East and North Central London, England: a situation report. *Euro Surveill* 2007;12(9):E070920.2. <http://www.eurosurveillance.org/ew/2007/070920.asp#2>
- 11 Health Protection Agency. Confirmed measles, mumps and rubella cases in 2007: England and Wales. <http://www.hpa.org.uk/hpr/archives/2008/news0808.htm> (accessed Dec 29, 2008).

Reporters

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