Introduction

The following preliminary measles surveillance report aims to describe basic epidemiological features of measles in EUVAC.NET-participating countries for 2008.

Methods

Measles surveillance data were submitted by all 32 EUVAC.NET-participating countries for the whole year. Thirty-one countries provided case-based data obtained through national mandatory notification systems. Belgium provided case-based data gathered through both a national voluntary notification system and a mandatory system applied to schools. Turkey provided aggregated data. Cases meeting the requirements for national surveillance, including clinical, laboratory-confirmed, and epidemiologically linked cases, were analysed.

Data analysis was based on cases with disease onset in 2008. Case-based reports provided data for disease onset dates, age, diagnosis confirmation, vaccination, importation, hospitalisation, the presence of acute encephalitis as a complication of measles, and death. Variables for which no data were available in the case-based reports were converted to unknown status. Aggregated data consisted of the number of cases in specified age-groups categorised by diagnosis confirmation, vaccination, importation, and hospitalisation variables. The number of cases with complications including death was also supplied.

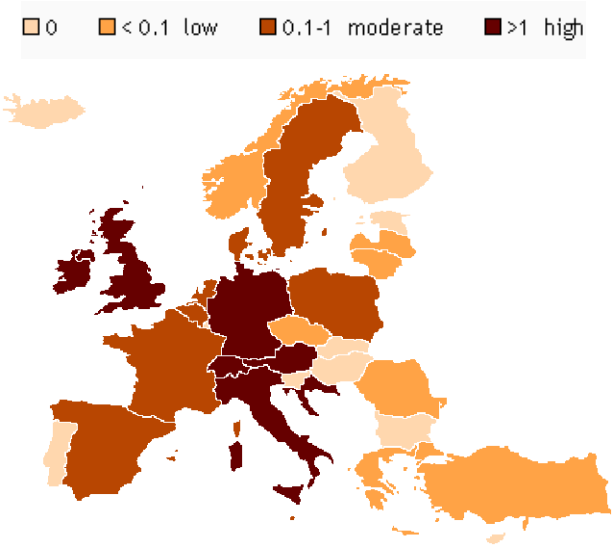
We defined indigenous cases as those that were not recorded as imported from another country. Those with unknown importation status were also regarded as indigenous cases. Data for imported cases indicated the most probable country to have been the source of infection. Countries were grouped into categories of zero, low, moderate, and high incidence for the corresponding indigenous measles incidence per 100,000 inhabitants per year of 0, less than 0·1, 0·1–1, and more than 1, respectively.

Case-based reports with absent or unknown disease onset dates were included in the analyses because the date of notification or the date of collection of the laboratory sample was during the corresponding years. Incidence was calculated with the number of cases of reported measles as the numerator and the country population obtained from the WHO Computerized Information System for Infectious Diseases (CISID)[1] as the denominator. We expressed incidence of disease as measles cases per 100,000 inhabitants per year, and that of death as the total per 1000 measles cases per year. We included all reported cases (i.e., including indigenous cases, imported cases, and those with unknown importation status) when calculating crude incidences.

Incidence – notifications and laboratory data

During 2008, a total of 7,817 measles cases was reported and included 314 (4%) case-based reports with absent or unknown disease onset dates. Most cases (n=7,033; 90%) were from six countries: Switzerland, Italy, the UK, Germany, France and Austria (table 1).

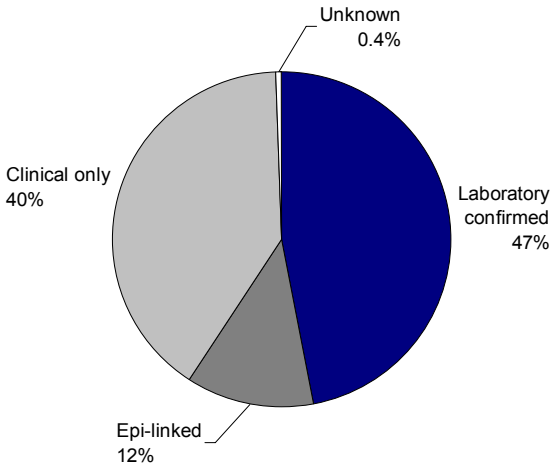
Figure 1. Geographical indigenous incidence of measles, 2008



In some countries minor discrepancies with nationally reported data may arise if these include cases reported in 2008 but with disease onset in 2007.

The distribution of reported measles cases varied considerably among the participating countries (table 1). The largest numbers of cases in 2008 were reported from Switzerland (26% of the total) and Italy (21%), and the highest crude incidences were in Switzerland and Austria with 27.45 and 5.09 per 100,000 inhabitants, respectively (figure 1). Figure 2 below shows the proportions of cases by diagnosis classification.

Figure 2. Diagnosis classification of measles cases, 2008 (n=7,817)



In panel 1, countries have been grouped into low, moderate and high incidence categories based on reported indigenous measles cases. No indigenous cases were reported from 10 countries: Bulgaria, Cyprus, Estonia, Finland, Hungary, Iceland, Luxembourg, Portugal, Slovakia and Slovenia.

Panel 1: Reported incidence of indigenous measles per 100,000 inhabitants by country, 2008

High incidence (>1) Switzerland (27.2), Italy (2.7), United Kingdom (2.3), Germany (1.0), Austria (4.9), Ireland (1.2) and Croatia (1.1).

Moderate incidence (0.1-1) France (0.9), Belgium (0.9), The Netherlands (0.6), Spain (0.6), Denmark (0.1), Sweden (0.2), Poland (0.2) and Malta (0.2)

Low incidence (<0.1) Romania (0.05), Latvia (0.09), Norway (0.04), Lithuania (0.03), Czech Republic (0.01), Greece (0.01) and Turkey (0.004).

Outbreak-related and imported cases

Information on outbreak status was provided in 51% of case-based reports. Of these, there were 2,747 outbreak-related cases (table 2) making up to 69% of those with a known outbreak status. Most outbreak cases were reported from the United Kingdom (31%) followed by Germany (24%). Measles outbreaks in 2008 were reported from Austria,[2,3] Belgium,[4] Denmark,[5] France,[6,7] Germany,[2,8,9] Italy,[10-13] the Netherlands,[14] Norway,[2,15] Spain,[16,17] Switzerland,[18-21] and the UK.[22-26] They involved the general population as well as particular groups such as travellers communities and ultra-orthodox Jewish communities.

Importation status was known in 4,249 (54%) of cases (table 2). Of these, there were 218 imported cases amounting to 5% of cases with known importation status. 165 (76%) were imported from another European country. The rest were reported as imported from other continents including, 30 from Asia, six from the Middle East, 13 from Africa, three from North America and one from South America. The number of reported measles cases by country identified as sources of importation is seen in panel 2.

Panel 2: Top 10 countries identified as sources of importation, 2008

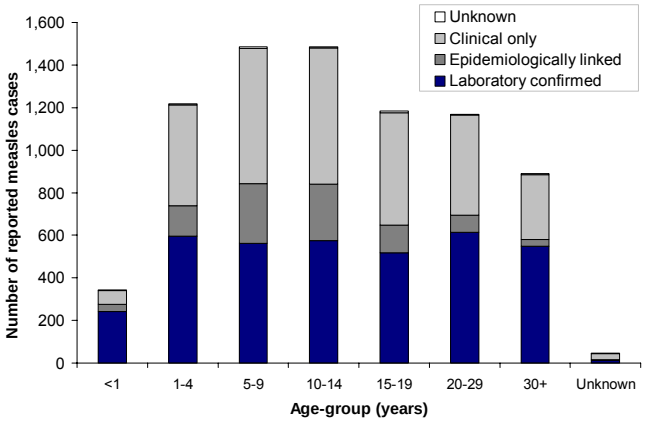
Switzerland (68), United Kingdom (30), Italy (15), India (12), Thailand (12), Germany (11), Austria (10), France (6), Spain (6), Egypt (4)

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

Age distribution

Measles was reported in both children and adults. Overall, 4% of cases were infants, 16% 1-4 years, 53% 5-19 years and 26% were ≥ 20 years. Figure 3 shows the number of reported measles cases by age-group and diagnosis confirmation status.

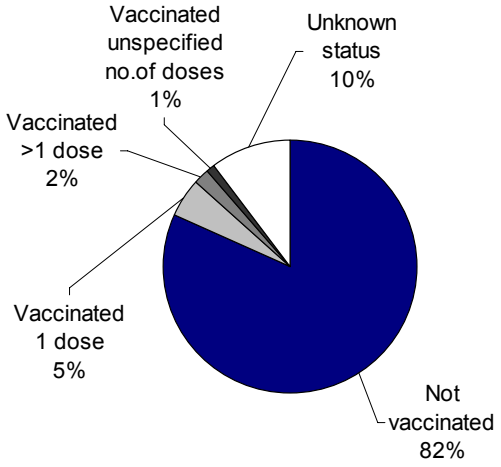
Figure 3. Reported measles cases by age-group and diagnosis confirmation status, 2008 (n=7,817)



Vaccination status

Information on known vaccination status was provided in 7,063 (90%) of all reported measles cases (table 3). Overall, 91% of those with a known vaccination status were unvaccinated. Figure 4 overleaf shows the proportions of cases by vaccination status.

Figure 4. Vaccination status of measles cases, 2008 (n=7,817)



Morbidity and mortality

Data on known hospitalisation status was available in 96% of all reported measles cases. There were 1,142 reported hospitalised cases in connection with measles (table 2) amounting to 15% of all cases with known hospitalisation status.

One patient acquiring measles in 2008 died (0.13 per 1000 measles cases) due to pneumonia.[23] The death was reported from the UK and occurred in a 17-year-old with a congenital immunodeficiency disorder. The case was laboratory-confirmed.

Eight cases were complicated with encephalitis corresponding to an overall incidence of 200 per 100,000 measles cases. The cases were reported from Germany (four cases), Switzerland (two cases), Italy (one case) and the UK (one case). They were distributed between age-groups with one aged 5–9 years, one aged 15–19 years and six aged 20–29 years. None had been vaccinated against measles.

Comments

The number of reported measles cases in EUVAC.NET-participating doubled in 2008 compared with the previous year. The increase has been mostly attributed to the increased number of reported cases from Italy, Switzerland and France, Austria and the UK. Conversely, Romania reported the largest decrease in measles cases.

Comparisons between countries should, however, be made with caution because while some countries reported both clinical cases and laboratory-confirmed cases others only reported the latter. Fewer countries reported zero indigenous cases with 10 countries in 2008 compared with 13 in 2007. As expected, the majority of measles cases occurred in unvaccinated cases.

Most imported cases were reported to occur following travel to countries with documented outbreaks or where endemic measles transmission still occurs. It is to be noted that the list of countries reported as sources of importation of measles (panel 2) has to be interpreted with caution since different countries may use different definitions of imported cases.

The sharp increase in number of measles cases in EUVAC.NET-participating countries is of great concern 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 and in travellers returning from endemic countries 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.

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Table 1. Reported measles cases and laboratory-confirmed cases by country, 2008 (n=7,817)

Country	Number of cases *(Crude incidence per 100,000 inhabitants)*		*Laboratory-confirmed cases*	*Epidemiologically linked cases*
	2007	2008	2008	2008
Austria	20 *(0.24)*	427 *(5.09)*	154 36%	3 1%
Belgium	58 *(0.55)*	98 *(0.94)*	36 37%	56 57%
Bulgaria	1 *(0.01)*	1 *(0.01)*	1 100%	0 0%
Croatia	0 *(0)*	50 *(1.10)*	40 80%	4 8%
Cyprus	0 *(0)*	1 *(0.12)*	1 100%	0 0%
Czech Republic	2 *(0.02)*	2 *(0.02)*	2 100%	0 0%
Denmark	2 *(0.04)*	12 *(0.22)*	12 100%	0 0%
Estonia	1 *(0.08)*	0 *(0)*	0 ..	0 ..
Finland	0 *(0)*	5 *(0.09)*	5 100%	0 0%
France	40 *(0.07)*	604 *(0.98)*	305 50%	58 10%
Germany	571 *(0.69)*	915 *(1.11)*	374 41%	405 44%
Greece	2 *(0.02)*	1 *(0.01)*	1 100%	0 0%
Hungary	0 *(0)*	0 *(0)*	0 ..	0 ..
Iceland	0 *(0)*	0 *(0)*	0 ..	0 ..
Ireland	52 *(1.22)*	56 *(1.28)*	10 18%	3 5%
Italy	420 *(0.72)*	1,619 *(2.75)*	261 16%	145 9%
Latvia	0 *(0)*	3 *(0.13)*	3 100%	0 0%
Lithuania	0 *(0)*	1 *(0.03)*	1 100%	0 0%
Luxembourg	0 *(0)*	0 *(0)*	0 ..	0 ..
Malta	2 *(0.49)*	1 *(0.24)*	1 100%	0 0%
Netherlands	10 *(0.06)*	109 *(0.66)*	50 46%	59 54%
Norway	20 *(0.43)*	4 *(0.08)*	3 75%	1 25%
Poland	43 *(0.11)*	100 *(0.26)*	76 76%	8 8%
Portugal	0 *(0)*	1 *(0.01)*	1 100%	0 0%
Romania	352 *(1.63)*	14 *(0.07)*	11 79%	0 0%
Slovakia	0 *(0)*	0 *(0)*	0 ..	0 ..
Slovenia	0 *(0)*	0 *(0)*	0 ..	0 ..
Spain	265 *(0.61)*	296 *(0.66)*	196 66%	31 10%
Sweden	1 *(0.01)*	25 *(0.27)*	19 76%	5 20%
Switzerland	1,040 *(14.30)*	2,062 *(27.45)*	738 36%	161 8%
Turkey	3 *(0.004)*	4 *(0.01)*	4 100%	0 0%
United Kingdom	1,004 *(1.67)*	1,406 *(2.30)*	1,379 98%	27 2%
Total	3,909 *(0.67)*	7,817 *(1.33)*	3,684 47%	966 12%

Table 2. Reported measles cases: hospitalised, outbreak related and imported, by country, 2008

Country	Hospitalised cases[1]		Outbreak-related cases[1]		Imported cases[1]	
	No. of cases (% of known hospitalisation status)	***% Unknown status or no data***	***No. of cases (% of known outbreak status)***	***% Unknown status or no data***	***No. of cases (% of known importation status)***	***% Unknown of total or no data***
Austria	74 17%	0%	348 81%	0%	14 3%	0%
Belgium	11 13%	13%	83 88%	4%	2 2%	4%
Bulgaria	1 100%	0%	0 0%	0%	1 100%	0%
Croatia	11 24%	10%	47 98%	4%	2 4%	4%
Cyprus	1 100%	0%	0 0%	0%	1 100%	0%
Czech Republic	2 100%	0%	0 0%	0%	1 50%	0%
Denmark	7 58%	0%	6 75%	33%	5 42%	0%
Estonia	0 ..	..	0 ..	..	0 ..	..
Finland	0 ..	100%	0 ..	100%	5 100%	0%
France	112 19%	2%	310 66%	22%	22 4%	16%
Germany	97 11%	0%	664 73%	0%	74 9%	7%
Greece	1 100%	0%	0 0%	0%	0 0%	0%
Hungary	0 ..	..	0 ..	..	0 ..	..
Iceland	0 ..	..	0 ..	..	0 ..	..
Ireland	7 15%	23%	6 19%	49%	4 17%	59%
Italy	328 23%	13%	1 1%	96%	0 0%	96%
Latvia	3 100%	0%	0 0%	0%	1 33%	0%
Lithuania	0 0%	0%	0 0%	0%	0 0%	0%
Luxembourg	0 ..	..	0 ..	..	0 ..	..
Malta	0 0%	0%	0 0%	0%	0 0%	0%
Netherlands	8 7%	1%	73 95%	29%	12 11%	0%
Norway	0 0%	0%	3 75%	0%	2 100%	50%
Poland	80 80%	0%	68 68%	0%	14 14%	0%
Portugal	0 0%	0%	0 0%	0%	1 100%	0%
Romania	12 86%	0%	0 0%	50%	3 27%	21%
Slovakia	0 ..	..	0 ..	..	0 ..	..
Slovenia	0 ..	..	0 ..	..	0 ..	..
Spain	24 8%	0%	278 95%	1%	7 2%	0%
Sweden	0 ..	100%	15 60%	0%	11 44%	0%
Switzerland	165 8%	3%	0 ..	100%	16 1%	24%
Turkey	2 50%	0%	3 75%	0%	1 25%	0%
United Kingdom	196 14%	0%	842 60%	0%	19 22%	94%
Total	1,142 15%	4%	2,747 69%	49%	218 5%	46%

[1]Denominator n=7,817

Table 3. Vaccination status of reported measles cases by country, 2008 (n=7,817)

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	363 87%	53 13%	11 3%
Belgium	63 77%	19 23%	16 16%
Bulgaria	0 0%	1 100%	0 0%
Croatia	32 82%	7 18%	11 22%
Cyprus	1 100%	0 0%	0 0%
Czech Republic	0 0%	2 100%	0 0%
Denmark	11 92%	1 8%	0 0%
Estonia	0 ..	0 ..	0 ..
Finland	5 100%	0 0%	0 0%
France	504 89%	65 11%	35 6%
Germany	801 96%	35 4%	79 9%
Greece	1 100%	0 0%	0 0%
Hungary	0 ..	0 ..	0 ..
Iceland	0 ..	0 ..	0 ..
Ireland	31 66%	16 34%	9 16%
Italy	1,262 88%	175 12%	182 11%
Latvia	1 50%	1 50%	1 33%
Lithuania	0 0%	1 100%	0 0%
Luxembourg	0 ..	0 ..	0 ..
Malta	0 0%	1 100%	0 0%
Netherlands	100 93%	8 7%	1 1%
Norway	4 100%	0 0%	0 0%
Poland	90 90%	10 10%	0 0%
Portugal	1 100%	0 0%	0 0%
Romania	9 64%	5 36%	0 0%
Slovakia	0 ..	0 ..	0 ..
Slovenia	0 ..	0 ..	0 ..
Spain	118 80%	30 20%	148 50%
Sweden	23 92%	2 8%	0 0%
Switzerland	1,697 93%	118 7%	247 12%
Turkey	0 0%	1 100%	3 75%
United Kingdom	1,314 94%	81 6%	11 1%
Total	6,431 91%	632 9%	754 10%

Contributors

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