



Introduction

The following preliminary measles surveillance report aims to describe basic epidemiological features of measles in EUVAC.NET-participating countries for 2010.

Methods

Measles surveillance data were submitted by all 32 EUVAC.NET-participating countries for the whole year. All countries provided data obtained through national mandatory notification systems. Thirty-one countries supplied case-based data while one country, namely Bulgaria, provided data in aggregated format. Cases meeting the reporting requirements for national surveillance, including clinical, laboratory-confirmed, and epidemiologically linked cases, were analysed.

Data analysis was based on cases with disease onset in 2010. Case-based reports provided data for disease onset dates, age, diagnosis confirmation, vaccination, importation, hospitalisation, and measles-related death. Variables for which no data were available in the case-based reports were converted to unknown status. The data from Bulgaria consisted of the number of measles cases aggregated in specified age-groups, and the number of laboratory-confirmed and hospitalised cases. The number cases resulting in 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 >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.

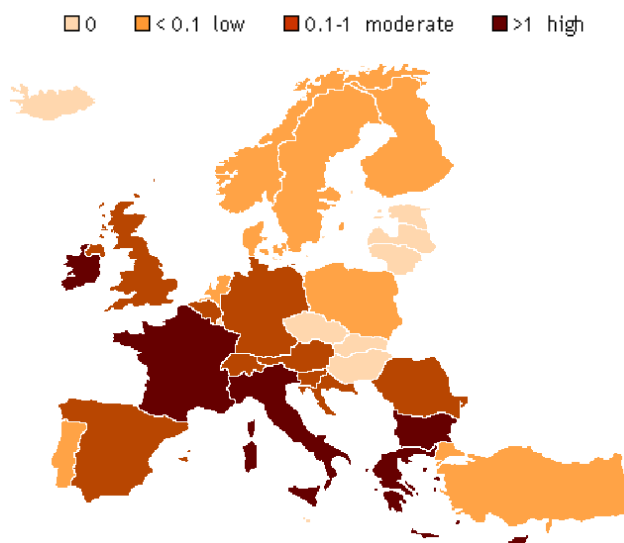
Incidence – notifications and laboratory data

During 2010, a total of 30,367 measles cases was reported. Of these 8,362 were reported in case-based format and included 104 (1%) case-based reports with absent or unknown disease onset dates. The remaining 22,005 were reported from Bulgaria in aggregated format.

The majority of cases (n=28,672; 94%) were from five countries: Bulgaria, France, Germany and Italy. The distribution of reported measles cases varied considerably among the participating countries (table 1). The largest numbers of cases were reported from Bulgaria (72%) and France (17%), and the highest crude incidence rates were in Bulgaria and Ireland with 294.5 and 8.9 per 100,000 inhabitants, respectively.

Figure 1 shows the geographical incidence by country based on reported indigenous measles cases for 2010. No indigenous cases were reported from nine countries: Czech Republic, Estonia, Hungary, Iceland, Latvia, Lithuania, Luxembourg, Malta and Slovakia. In panel 1 overleaf, countries are grouped into categories of low, moderate and high incidence of indigenous measles cases.

Figure 1. Geographical indigenous incidence of measles, 2010



In some countries minor discrepancies with nationally reported data may arise if these include cases reported in 2010 but with disease onset in 2009.

Panel 1: Reported incidence of indigenous measles per 100,000 inhabitants by country, 2010

High incidence (>1)

Bulgaria (294.5), Ireland (8.9), France (8.0), Cyprus (1.8), Italy (1.5) and Greece (1.2)

Moderate incidence (0.1-1)

Germany (0.9), Austria (0.5), Belgium (0.3), Romania (0.9), Switzerland (0.9), Spain (0.6), UK (0.6), Croatia (0.1) and Slovenia (0.1)

Low incidence (<0.1)

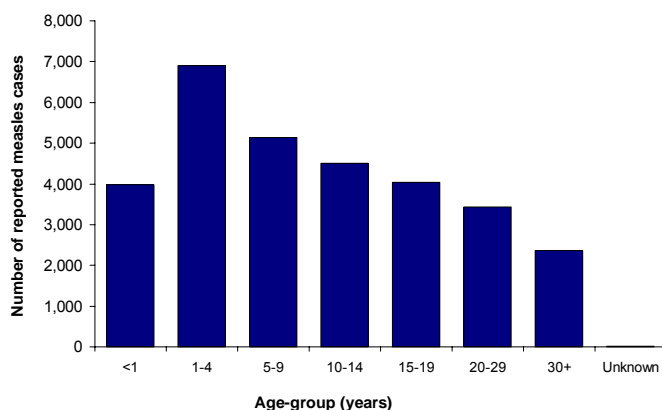
Finland (0.06), Denmark (0.04), the Netherlands (0.03), Poland (0.03), Portugal (0.03), Norway (0.02), Sweden (0.01) and Turkey (0.001).

A total of 5,885 cases (19% of the total) were laboratory-confirmed and included 1,499 cases from Bulgaria. Table 1 shows the number and percentage of laboratory-confirmed cases by country.

Age distribution

The age-group was known in 99.95% of cases. Measles was reported in both children and adults. Overall, 13% (n=3,976) of cases were infants, 23% (n=6,900) 1-4 years, 45% (n=13,682) 5-19 years and 19% (n=5,794) were ≥20 years. The age was unknown in 15 cases. Figure 2 shows the number of reported measles cases by age-group and diagnosis confirmation status.

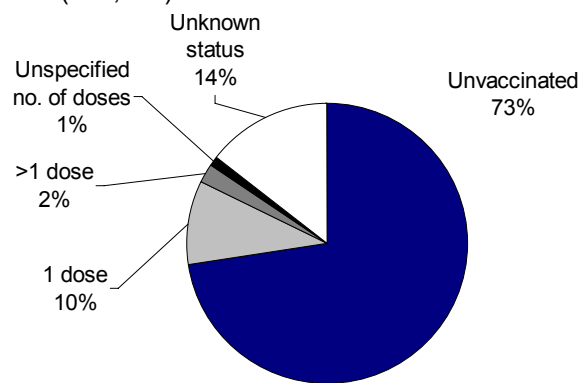
Figure 2. Reported measles cases by age-group, 2010 (n=30,367)



Vaccination status

Information on vaccination status was known for 7,157 (86%) of measles cases reported in case-based format. Overall, 85% of those with a known vaccination status were unvaccinated. Table 2 shows the vaccination status of reported measles cases by country.

Figure 3. Vaccination status of measles cases, 2010 (n=8,362)



Imported cases

The importation status was known in 6,701 (80%) of measles cases reported in case-based format (table 2). Of these, there were 217 imported cases amounting to 3.2% of cases with known importation status. 154 (71%) were imported from another European country. The rest were reported as imported from other continents including, 32 (15%) from Africa, 26 (12%) from Asia, two from the Middle East, two from North America region and one from Australia. The number of reported measles cases by country identified as sources of importation is seen in panel 2.

Panel 2: Countries identified as sources of importation, 2010

France (44), Bulgaria (27), UK (15), Ireland (7), Italy (20), Spain (16) India (13) South Africa (12), and Morocco (7), China (4), Germany (4), the Netherlands (4), Switzerland (4) and Macedonia -FYRM (3).

This panel needs to be interpreted with caution as the definition of an imported case may differ from country to country. Only countries that were reported as the source of at least three are listed.

Hospitalisation and mortality

Data on known hospitalisation status was available in 90% of all reported measles cases. There were 21,877 reported hospitalised cases in connection with measles (table 3) amounting to 80% of all cases with known hospitalisation status.

A total of 21 measles-related deaths were reported. These were reported from Bulgaria (n=18), France (n=2) and Romania (n=1). This corresponds to an overall case fatality rate of 0.69 per 1000 measles cases.

Comments

The number of reported measles cases in EUVAC.NET-participating increased fourfold compared with the previous year. This was primarily due to the ten-fold increase in the number of cases reported from Bulgaria which suffered a major outbreak across the country. However, other

countries have reported a considerable increase in the number of cases particularly France, Germany, Italy, Ireland, Romania and Spain. Other countries such as Cyprus and Slovenia reported measles following zero cases in recent years. Consequently, fewer countries reported zero indigenous cases with nine countries in 2010 compared with 13 in 2009. By contrast, Poland, Switzerland and the UK reported considerably less cases in 2010 compared with 2009.

Most imported cases were reported to occur following travel to countries with documented outbreaks or where endemic measles transmission still occurs. Vaccination against measles should be strongly recommended to persons intending to travel to such countries. Several countries have well-established recommendations on pre-travel measles vaccination.^{2,3,4} Such recommendations should also be made before events involving mass gatherings (e.g. international sporting events) if hosted in countries with ongoing outbreaks.

Although there is a statutory obligation to report measles in all countries, passive routine surveillance systems are notorious for under-reporting and incompleteness of data reporting. Another limitation of the data relates to the different reporting procedures – some countries reported only laboratory-confirmed cases while others reported mainly clinical cases. Nevertheless, from a European perspective, our findings indicate a significant setback toward the goal of eliminating measles from Europe.

The sharp increase in number of measles cases in some EUVAC.NET-participating countries remains of great concern in relation to the measles elimination goal by 2015. 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.

Reference

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Table 1. Reported measles cases and laboratory-confirmed cases by country, 2010 (n=30,367)

Country	Number of cases <i>(Crude incidence per 100,000 inhabitants)</i>		Laboratory-confirmed cases	Epidemiologically linked cases
	2009	2010	2010	2010
Austria	47 (0.56)	48 (0.57)	13 27%	0 0%
Belgium	33 (0.31)	40 (0.38)	29 73%	3 8%
Bulgaria	2249 (29.88)	22005 (294.53)	1449 7%	0 0%
Croatia	2 (0.04)	7 (0.15)	6 86%	1 14%
Cyprus	0 (0)	18 (2.04)	16 89%	0 0%
Czech Republic	5 (0.05)	0 (0)	0 ..	0 ..
Denmark	8 (0.15)	5 (0.09)	4 80%	1 20%
Estonia	0 (0)	0 (0)	0 ..	0 ..
Finland	2 (0.04)	5 (0.09)	5 100%	0 0%
France	1544 (2.48)	5019 (8.03)	2677 53%	578 12%
Germany	572 (0.69)	787 (0.96)	467 59%	252 32%
Greece	2 (0.02)	149 (1.33)	91 61%	37 25%
Hungary	1 (0.01)	0 (0)	0 ..	0 ..
Iceland	0 (0)	0 (0)	0 ..	0 ..
Ireland	193 (4.33)	406 (8.97)	196 48%	62 15%
Italy	173 (0.29)	861 (1.46)	19 2%	0 0%
Latvia	0 (0)	0 (0)	0 ..	0 ..
Lithuania	0 (0)	2 (0.06)	2 100%	0 0%
Luxembourg	0 (0)	0 (0)	0 ..	0 ..
Malta	1 (0.24)	0 (0)	0 ..	0 ..
Netherlands	15 (0.09)	15 (0.09)	13 87%	2 13%
Norway	2 (0.04)	3 (0.06)	3 100%	0 0%
Poland	109 (0.29)	10 (0.03)	5 50%	4 40%
Portugal	3 (0.03)	5 (0.05)	5 100%	0 0%
Romania	8 (0.04)	187 (0.88)	179 96%	6 3%
Slovakia	0 (0)	0 (0)	0 ..	0 ..
Slovenia	0 (0)	3 (0.15)	3 100%	0 0%
Spain	41 (0.09)	302 (0.67)	246 81%	35 12%
Sweden	3 (0.03)	6 (0.06)	6 100%	0 0%
Switzerland	992 (13.16)	80 (1.06)	49 61%	5 6%
Turkey	4 (0.01)	7 (0.01)	7 100%	0 0%
United Kingdom	1166 (1.90)	397 (0.65)	395 99%	1 0%
Total	7175 (1.22)	30367 (5.15)	5885 19%	987 3%

Table 2. Vaccination status of reported measles cases by country, 2010 (n=30,367)

Country	No. of unvaccinated cases <i>(% of unvaccinated of known vaccination status)</i>	No. of vaccinated cases <i>(% vaccinated of known vaccination status)</i>	No. with unknown vaccination status/no data <i>(% unknown status /no data)</i>
Austria	24 92%	2 8%	22 46%
Belgium	18 62%	11 38%	11 28%
Bulgaria	n.r. ..	n.r. ..	22005 100%
Croatia	5 83%	1 17%	1 14%
Cyprus	15 88%	2 12%	1 6%
Czech Republic	0 ..	0 ..	0 ..
Denmark	3 100%	0 0%	2 40%
Estonia	0 ..	0 ..	0 ..
Finland	5 100%	0 0%	0 0%
France	3403 82%	729 18%	887 18%
Germany	715 97%	23 3%	49 6%
Greece	112 90%	13 10%	24 16%
Hungary	0 ..	0 ..	0 ..
Iceland	0 ..	0 ..	0 ..
Ireland	241 75%	79 25%	86 21%
Italy	742 90%	79 10%	40 5%
Latvia	0 ..	0 ..	0 ..
Lithuania	1 50%	1 50%	0 0%
Luxembourg	0 ..	0 ..	0 ..
Malta	0 ..	0 ..	0 ..
Netherlands	13 87%	2 13%	0 0%
Norway	1 50%	1 50%	1 33%
Poland	9 90%	1 10%	0 0%
Portugal	4 100%	0 0%	1 20%
Romania	122 66%	63 34%	2 1%
Slovakia	0 ..	0 ..	0 ..
Slovenia	1 50%	1 50%	1 33%
Spain	208 85%	38 15%	56 19%
Sweden	5 83%	1 17%	0 0%
Switzerland	52 84%	10 16%	18 23%
Turkey	2 29%	5 71%	0 0%
United Kingdom	360 91%	34 9%	3 1%
Total	6061 85%	1096 15%	23210 76%

n.r. = not reported

Table 3. Reported measles cases: hospitalised and imported, by country, 2010

Country	Hospitalised cases ¹		Imported cases ²	
	No. of cases (% of known hospitalisation status)	% unknown /no data	No. of cases (% of known importation status)	% unknown /no data
Austria	31 69%	6%	9 19%	2%
Belgium	14 41%	15%	11 28%	3%
Bulgaria	19223 100%	13%	n.r ..	n.r
Croatia	1 14%	0%	1 17%	14%
Cyprus	13 72%	0%	2 11%	0%
Czech Republic	0 ..	..	0 ..	..
Denmark	4 80%	0%	3 60%	0%
Estonia	0 ..	..	0 ..	..
Finland	2 100%	60%	2 40%	0%
France	1479 30%	2%	19 0%	21%
Germany	224 29%	1%	71 9%	2%
Greece	105 71%	1%	10 7%	7%
Hungary	0 ..	..	0 ..	..
Iceland	0 ..	..	0 ..	..
Ireland	93 28%	17%	2 1%	47%
Italy	282 33%	0%	0 0%	0%
Latvia	0 ..	..	0 ..	..
Lithuania	2 100%	0%	2 100%	0%
Luxembourg	0 ..	..	0 ..	..
Malta	0 ..	..	0 ..	..
Netherlands	5 33%	0%	10 67%	0%
Norway	1 33%	0%	2 67%	0%
Poland	8 80%	0%	0 0%	0%
Portugal	4 80%	0%	2 40%	0%
Romania	180 96%	0%	2 1%	5%
Slovakia	0 ..	..	0 ..	..
Slovenia	1 33%	0%	1 33%	0%
Spain	64 21%	0%	24 8%	0%
Sweden	0 0%	67%	5 100%	17%
Switzerland	13 18%	8%	13 26%	38%
Turkey	4 57%	0%	6 100%	14%
United Kingdom	124 31%	0%	20 87%	94%
Total	21877 80%	10%	217 3.2%	20%

¹ Denominator n=30,367

² Denominator n=8,362

n.r. = not reported