Introduction

The following measles surveillance report covers the year 2005 and aims to describe basic epidemiological features of measles in 32 EUVAC.NET participating countries. Up to 2004, annual measles surveillance reports were based on data submitted by 19 EUVAC.NET participating countries. In May 2005, Croatia joined the network on a voluntary basis. In October 2005 a new grant agreement between EUVAC.NET and the EU Commission was signed and an additional 12 countries officially became part of the EUVAC.NET network: nine of the newer EU Member States together with Bulgaria, Romania and Turkey. In this report incidence rates are based on reported measles cases per 10^5 inhabitants per year.

Methods

Measles surveillance data were available for the whole year from all countries with the exception of France that started reporting case-based data from June 2005 onwards. Twenty-nine countries provided case-based data that were obtained through national mandatory notification systems. Belgium provided case-based data collected through a non-mandatory notification system. Romania and Turkey provided aggregated data (Table 1). For the purpose of this report, all clinical, laboratory-confirmed or epidemiologically linked cases meeting the requirements for national surveillance were included in the analysis.

Table 1. *Measles surveillance data source by country, 2005*

Countries reporting case-based data			
Austria	Finland	Latvia	Slovakia
Belgium	France[1]	Lithuania	Slovenia
Bulgaria	Germany	Luxembourg	Spain
Croatia	Greece	Malta	Sweden
Cyprus	Hungary	The Netherlands	Switzerland
Czech Republic	Iceland	Norway	United Kingdom
Denmark	Ireland	Poland	
Estonia	Italy	Portugal	
Countries reporting aggregated data			
Romania			
Turkey			

[1] France introduced case-based reporting based on mandatory notification in June 2005

Data analysis was based on cases with disease onset in 2005. In 45 case-based reports (3%) the disease onset dates were not available. However, these cases were also included in the analyses on the basis of their date of notification or date of collection of laboratory sample being in 2005. In some countries minor discrepancies with nationally reported data may arise if these include cases notified in 2005 but with disease onset in 2004.

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Incidence rates were based on population statistics for 2005 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/. Variables that had no data in the case-based reports were converted to an unknown status.

In addition to case-based data collected through national mandatory notification systems, France, Italy and Switzerland also provided sentinel surveillance data.

Incidence – notifications and laboratory data

A total of 13,325 measles cases were reported from EUVAC.NET countries giving a crude incidence of 2.33 per 100,000 inhabitants. Data on 1,472 (11%) of these were case-based and classified as seen in figure 1a. Data on the rest of the cases (89%) were aggregated data from Romania and Turkey (Figure 1b).

Figure 1a. *Diagnosis classification of measles cases from case-based reports (n=1,472)*

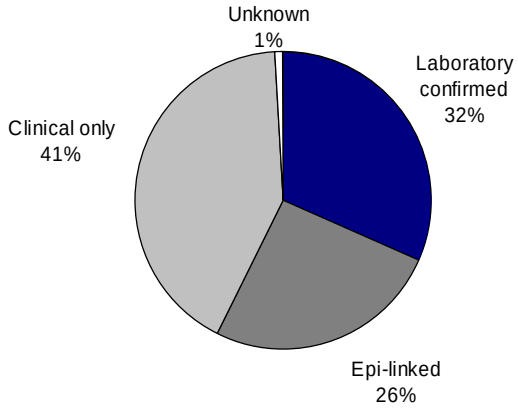
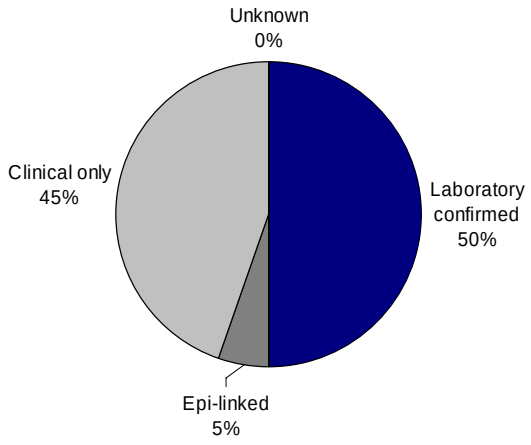


Figure 1b. *Diagnosis classification of measles cases from aggregate reports (n=11,853)*



The distribution of notified measles cases varied considerably among the participating countries (Table 2). The highest incidence of measles notifications was reported from Romania followed by Turkey with a crude incidence of 25.49 and 8.48 per 100,000 inhabitants respectively.

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Table 2. *Reported measles cases and laboratory confirmed cases by country, 2005 (n=13,325)*

	No. of reported cases	*Crude incidence per 100,000 inhabitants*	*Confirmed cases* as a % of no. reported*	*Laboratory confirmed as a % of total confirmed cases*
Austria	9	0.11	33%	100%
Belgium	25	0.24	44%	91%
Bulgaria	3	0.04	100%	100%
Croatia	2	0.04	0%	-
Cyprus	1	0.12	100%	100%
Czech Republic	0	0.00	-	-
Denmark	2	0.04	100%	100%
Estonia	2	0.15	100%	100%
Finland	1	0.02	100%	100%
France [1]	22	0.04	41%	100%
Germany	778	0.95	77%	41%
Greece	116	1.09	22%	100%
Hungary	2	0.02	100%	100%
Iceland	0	0.00	-	-
Ireland	92	2.31	12%	100%
Italy	218	0.38	0%	-
Latvia	2	0.08	100%	100%
Lithuania	1	0.03	0%	-
Luxembourg	0	0.00	-	-
Malta	4	1.01	75%	33%
The Netherlands	3	0.02	100%	100%
Norway	0	0	-	-
Poland	14	0.04	7%	100%
Portugal	7	0.07	86%	100%
Romania	5,647	25.49	96%	88%
Slovakia	0	0.00	-	-
Slovenia	0	0.00	-	-
Spain	17	0.04	88%	67%
Sweden	12	0.14	83%	90%
Switzerland	61	0.85	92%	73%
Turkey	6,206	8.48	18%	100%
United Kingdom	78	0.13	100%	97%
Total	**13,325**	**2.33**	**55%**	**86%**

* Confirmed cases include both laboratory confirmed cases and epidemiologically-linked cases.
[1] France introduced case-based reporting based on mandatory notification in June 2005.

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In table 3, countries have been grouped into low, moderate and high incidences based on notified indigenous (non-imported) measles cases. No indigenous cases were reported from 11 countries: Bulgaria, Cyprus, Czech Republic, Hungary, Iceland, Latvia, Luxembourg, the Netherlands, Norway, Slovakia and Slovenia.

Table 3. *Reported incidence of indigenous measles cases per 100,000 inhabitants by country, 2005*

High incidence (>1.0)		
Ireland (2.28)	*Romania (25.49)**	
Malta (1.01)	*Turkey (8.48)**	
Greece (1.09)		
Moderate incidence (0.1-1.0)		
Belgium (0.22)	Italy (0.38)	United Kingdom (0.12)
Cyprus (0.12)	Sweden (0.10)	
Germany (0.93)	Switzerland (0.84)	
Low incidence (< 0.1)		
Austria (0.09)	France (0.03)	The Netherlands (0)
Bulgaria (0)	Hungary (0)	Poland (0.04)
Croatia (0.04)	Iceland (0)	Portugal (0.06)
Czech Republic (0)	Latvia (0)	Slovakia (0)
Denmark (0.04)	Lithuania (0.03)	Slovenia (0)
Estonia (0.08)	Luxembourg (0)	Spain (0.04)
Finland (0.02)	Norway (0)	

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

Outbreak-related and imported cases

Information on outbreak status was provided in 73% of case-based reports. Of these, there were 572 outbreak-related cases (Table 4) making up to 53% of those with a known outbreak status. Most outbreak cases were reported from Germany (84%). Although there were no case-based reports on outbreak cases from Romania and Turkey both countries reported very high measles activity. Reports on measles outbreaks occurring in 2005 came from Germany,[1,2] Greece,[3,4] Romania[5] and Sweden.[6]

Importation status was known in 72% of case-based reports (Table 4). Of these, there were 52 imported cases amounting to 5% of case-based reports with known importation status. Eighteen cases (35%) were imported from another European country. There were 34 imported cases (65%) from other continents including, 19 from Asia, five from the Middle East, four from Africa, six from North America.

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Table 4. *Reported measles cases: hospitalised, outbreak related and imported, by country, 2005*

	Hospitalised cases[1]			Outbreak-related cases[2]			Imported cases[2]		
	No. (% of known hospitalisation status)		*% unknown /no data*	*No. (% of known outbreak status)*		*% unknown /no data*	*No. (% of known importation status)*		*% unknown /no data*
Austria	3	60%	44%	3	100%	67%	2	50%	56%
Belgium	4	18%	12%	0	0%	12%	2	9%	12%
Bulgaria	2	67%	0%	3	100%	0%	3	100%	0%
Croatia	0	0%	0%	0	0%	0%	0	0%	50%
Cyprus	1	100%	0%	0	0%	0%	1	100%	0%
Czech Republic	0	-	-	0	-	-	0	-	-
Denmark	1	50%	0%	2	100%	0%	0	0%	50%
Estonia	1	50%	0%	0	0%	0%	1	50%	0%
Finland	0	0%	0%	0	0%	0%	0	-	100%
France [3]	4	18%	0%	1	6%	18%	2	100%	91%
Germany	98	13%	1%	481	62%	0%	18	2%	1%
Greece	66	88%	35%	12	10%	0%	0	0%	1%
Hungary	2	100%	0%	0	0%	0%	2	100%	0%
Iceland	0	-	-	0	-	-	0	-	-
Ireland	5	13%	59%	0	0%	84%	1	8%	87%
Italy	36	22%	25%	0	-	100%	0	-	100%
Latvia	2	100%	0%	0	0%	0%	2	100%	0%
Lithuania	0	0%	0%	0	0%	0%	0	0%	0%
Luxembourg	0	-	-	0	-	-	0	-	-
Malta	0	0%	0%	3	75%	0%	0	0%	0%
The Netherlands	2	67%	0%	2	100%	33%	3	100%	0%
Norway	0	-	-	0	-	-	0	-	-
Poland	0	0%	0%	0	0%	0%	0	0%	0%
Portugal	4	57%	0%	6	86%	0%	1	14%	0%
Romania [4]	4,601	81%	0%	n.r.	-	-	n.r.	-	-
Slovakia	0	-	-	0	-	-	0	-	-
Slovenia	0	-	-	0	-	-	0	-	-
Spain	3	18%	0%	12	71%	0%	1	6%	0%
Sweden	0	-	100%	0	-	100%	3	25%	0%
Switzerland	7	12%	7%	47	81%	5%	1	2%	21%
Turkey [4]	0	-	100%	n.r.	-	-	n.r.	-	-
United Kingdom	20	45%	44%	0	-	100%	9	100%	88%
Total	**4,862**	**70%**	**48%**	**572**	**53%**	**27%**	**52**	**5%**	**28%**

[1] Denominator n= 13,325. [2] Denominator n=1,472. [3] France introduced case-based reporting based on mandatory notification in June 2005. [4] Aggregated data does not include information on outbreaks and importation status. n.r.= not reported

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Age distribution and seasonality

Measles was reported in both children and adults. In countries reporting case-based data 77% of cases were less than 15 years old. While in countries reporting aggregated data 91% of cases belonged to this age group (Figure 2). The age group with the highest proportion of laboratory confirmed cases was that >20 years (69%), followed by those <1 year of age (65%) and least in the 5-19 year-age group (34%) (Figure 3). Most case-based reports (71%) occurred in the first half of the year. Figure 4 shows the occurrence of measles by month of onset derived from case-based reports. Aggregated data did not include such information.

Figure 2. *Reported measles cases by age group in all reporting countries, 2005 (n=13,325)*

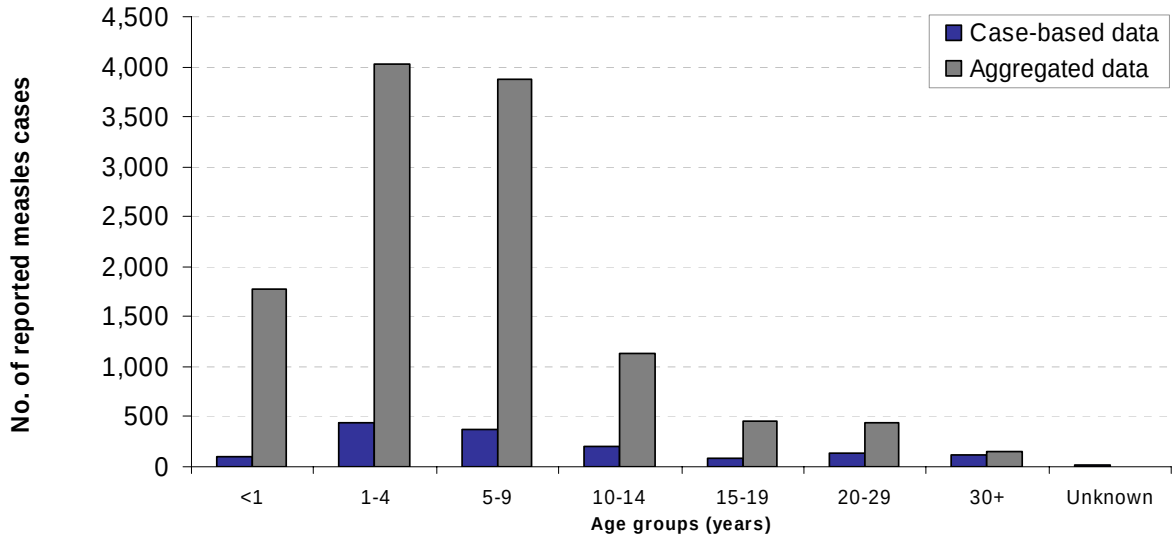

Figure 3. *Reported measles cases by age group and confirmation status in all reporting countries, 2005 (n=13,325)*

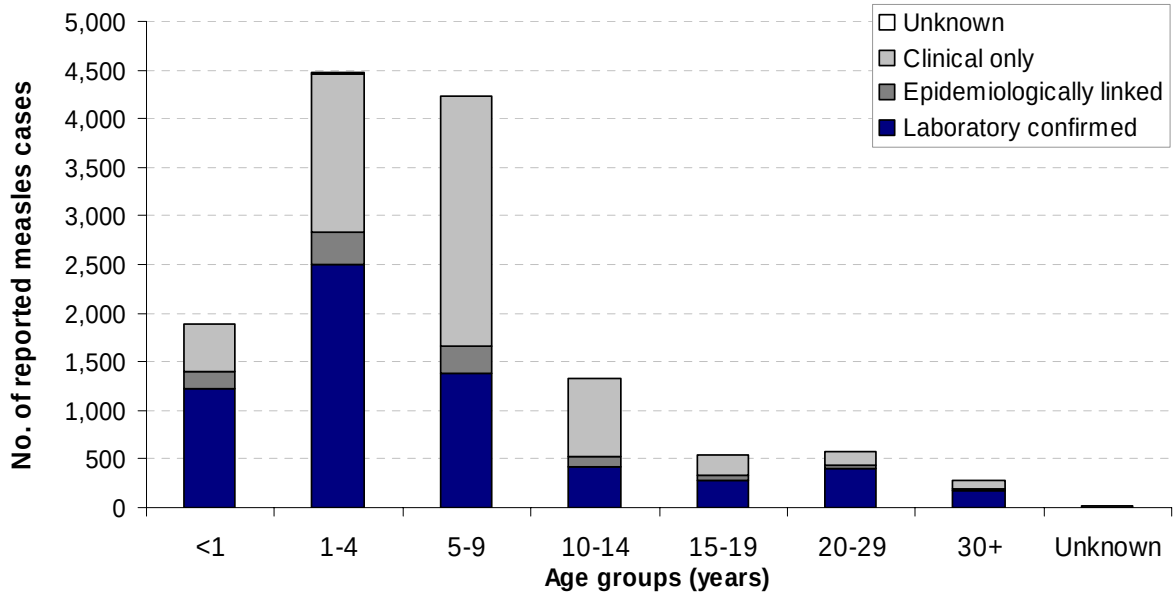

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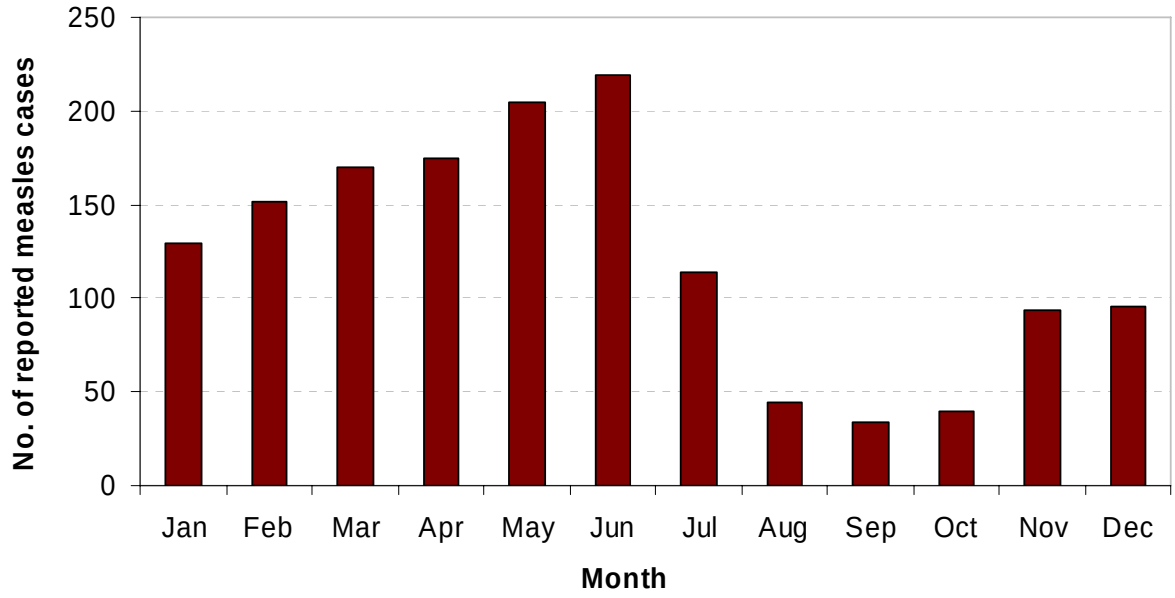
Figure 4. *Number of reported measles cases by month of disease onset from case-based reporting countries, 2005 (n=1,472)*



Vaccination status

Information on vaccination status was provided in 77% of all reported measles cases. Overall, 52% of those with a known vaccination status were unvaccinated: 83% of measles cases from case-based reports (Figure 5a) and 47% of cases from aggregated data (Figure 5b).

Figure 5a. *Vaccination status of measles cases from case-based reports (n=1,472)*

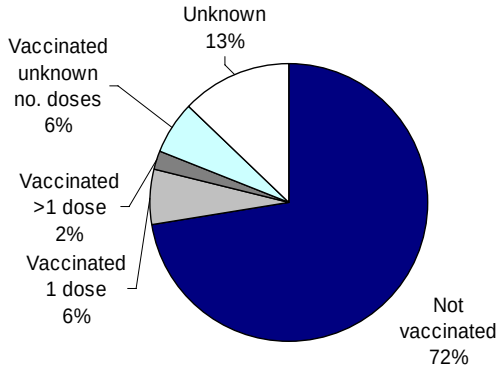


Figure 5b. *Vaccination status of measles cases from aggregate reports (n=11,853)*

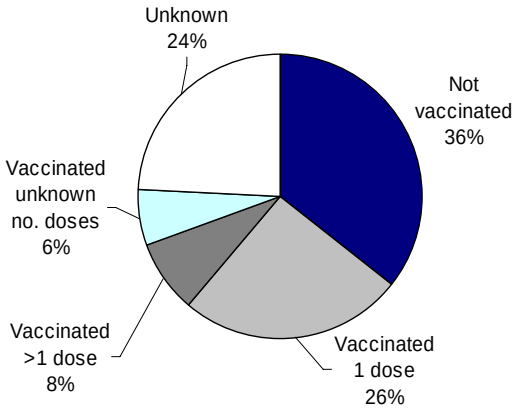


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Table 5. *Vaccination status of reported measles cases by country, 2005 (n=13,325)*

	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	4	57%	3	43%	2	22%
Belgium	13	65%	7	35%	5	20%
Bulgaria	3	100%	0	0%	0	0%
Croatia	0	0%	1	100%	1	50%
Cyprus	0	-	0	-	1	100%
Czech Republic	0	-	0	-	0	-
Denmark	2	100%	0	0%	0	0%
Estonia	1	50%	1	50%	0	0%
Finland	1	100%	0	0%	0	0%
France [1]	14	70%	6	30%	2	9%
Germany	662	89%	80	11%	36	5%
Greece	53	88%	7	12%	56	48%
Hungary	1	100%	0	0%	1	50%
Iceland	0	-	0	-	0	-
Ireland	36	61%	23	39%	33	36%
Italy	140	71%	56	29%	22	10%
Latvia	0	0%	1	100%	1	50%
Lithuania	1	100%	0	0%	0	0%
Luxembourg	0	-	0	-	0	-
Malta	0	0%	4	100%	0	0%
The Netherlands	2	67%	1	33%	0	0%
Norway	0	-	0	-	0	-
Poland	3	21%	11	79%	0	0%
Portugal	5	83%	1	17%	1	14%
Romania	3,215	74%	1,145	26%	1,287	23%
Slovakia	0	-	0	-	0	-
Slovenia	0	-	0	-	0	-
Spain	15	88%	2	12%	0	0%
Sweden	1	100%	0	0%	11	92%
Switzerland	40	85%	7	15%	14	23%
Turkey	1,001	22%	3,614	78%	1,591	26%
United Kingdom	70	95%	4	5%	4	5%
Total	**5,283**	**52%**	**4,974**	**48%**	**3,068**	**23%**

[1] France introduced case-based reporting based on mandatory notification in June 2005.

Morbidity and mortality

Data on known hospitalisation status was available in 52% of reported measles cases. There were 4,862 reported hospitalised cases in connection with measles (Table 4) amounting to 70% of all cases with known hospitalisation status. Of these, 95% were reported from Romania.

In 2005, there were 13 reported deaths attributed to measles: 11 from Romania, one from Germany and one from Turkey. This corresponds to an overall incidence of 98 per 100,000

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measles cases. Of the cases from Romania seven cases were aged <1 year. The case from Germany was a 14 year old female who was not vaccinated against measles.

Encephalitis was reported in four cases, three from Romania and one from Germany, giving an overall incidence of 30 per 100,000 measles cases. The cases from Romania were aged <14 years. The case from Germany occurred in a 35 year-old male who was not vaccinated against measles.

Data from Sentinel Surveillance Systems

In France the sentinel surveillance system continued to report measles cases. In 2005 it involved 265 general practitioners who reported eight clinical cases giving an extrapolated 4100 cases nationwide and an incidence of 7 per 100,000 inhabitants.

Besides case-based reporting Switzerland also provided sentinel surveillance data. The Swiss sentinel system involved the participation of about 3% of all primary care physicians who reported six cases giving an extrapolated 130 cases and a crude incidence rate of 2 per 100,000 inhabitants.

In Italy a paediatric sentinel surveillance system for childhood vaccine-preventable diseases (Sorveglianza Padiatri Sentinella - SPES) involved 324 paediatricians caring for 2.5% of the paediatric population up to 14 years of age. The Italian paediatric sentinel surveillance system reported a record low of only nine cases giving a crude incidence rate of 4 per 100,000 children aged up to 14 years. Five (56%) of the cases were in the 1-4 year-age group.

Comments

Comparisons with the previous year are not made in this report as data for 2004 was not requested from the 12 new participating countries. The highest incidence of measles in 2005 occurred in Romania and Turkey. Germany also reported an increase in incidence compared with the previous year from 0.15 to 0.95 per 100,000 inhabitants. In contrast, 11 countries reported indigenous measles incidence rates of zero possibly indicating an elimination or near-elimination situation. More information on outbreaks in Germany, Greece, Romania and Sweden are found in the references below.

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Reporters

Mark Muscat and Henrik Bang

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