



### Introduction

The following rubella surveillance report aims to provide an overview of surveillance systems and selected epidemiological characteristics of rubella at European level for the 8-year period 2000-07.

### Methods

A questionnaire on rubella and congenital rubella syndrome (CRS) surveillance systems for the period 2000-07 was sent to all 32 EUVAC.NET-participating countries in April 2008. We also requested rubella epidemiological aggregated data for the years 2000-07 consisting of the number of cases in specified age-groups. These were categorised by number of vaccines received and diagnosis classification status i.e. clinical, laboratory-confirmed, and epidemiologically linked. Our assessment included countries' epidemiological data obtained through mandatory notification systems covering total national populations for the 8-year period 2000-07. All reported rubella cases meeting the requirements for national surveillance were analysed. In addition we report on the number CRS cases and rubella cases among pregnant women by country from nationwide surveillance systems.

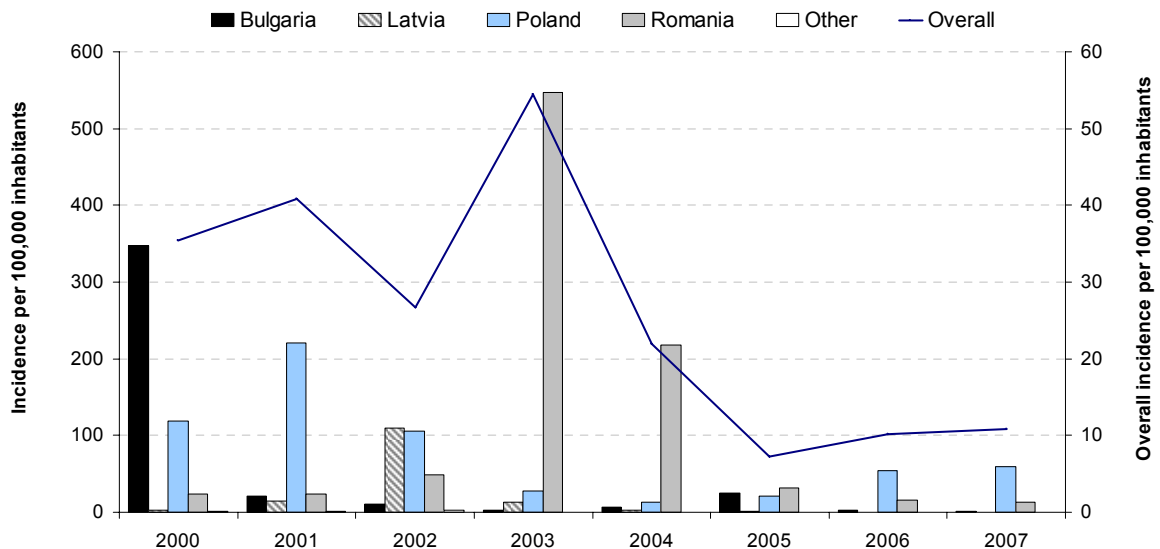
Incidence was calculated with the number of reported rubella cases as the numerator and the country population obtained from Eurostat<sup>1</sup> as the denominator. Incidence by age-group was also calculated. We expressed incidence of disease as rubella cases per 100,000 inhabitants per year.

### Rubella and CRS surveillance systems

All 32 EUVAC.NET-participating countries responded to the questionnaire. Twenty-five countries conducted surveillance for rubella based on a mandatory notification system covering the total population and had data available at national level for the entire study period. Austria established such a reporting system in 2007 and Luxembourg in 2004. Germany conducted surveillance for rubella at regional level. There was no operating rubella surveillance in Belgium while Denmark conducted rubella surveillance based on a mandatory notification system only in the case of pregnancy. In Italy, cases of rubella among pregnant women became statutory notifiable in 2005 to distinguish them from other notified rubella cases. France conducted a well-developed and comprehensive voluntary laboratory-based reporting system for rubella among pregnant women and newborns. In Switzerland, only laboratory-confirmed cases among pregnant women and newborns were included in the mandatory notification system during the study period. Supplementary surveillance systems were conducted in six countries: Ireland, Italy, Greece, Malta and Switzerland had sentinel systems and the UK has a voluntary laboratory-based reporting system that has been established for over 30 years.

For 2000-07, CRS was a nationwide statutory notifiable disease in 26 countries. In Italy, CRS became statutory notifiable on 1<sup>st</sup> January 2005.

Figure 1. Trends in crude incidence of rubella, 2000-07



Ireland conducted CRS surveillance based on voluntary reporting systems until CRS became statutory notifiable on 1<sup>st</sup> January 2004. In the UK an active surveillance system to monitor congenital rubella births was established in 1971<sup>2,3</sup> and France relied on well-established voluntary laboratory-based reporting of congenital infections in newborns. Belgium established CRS surveillance based on a sentinel system from 2007. Austria did not operate CRS surveillance but plans to establish it in the future.

### Rubella incidence

A total of 504,990 rubella cases was reported from 23 countries that provided epidemiological data based on mandatory notification systems for covering total population for the 8-year period 2000-07 (table 1). During this period, most cases were reported from Poland and Romania contributing to 47% and 40%, respectively. The highest annual incidence rates were reported from Romania in 2003 and Bulgaria in 2000 with 548 and 347 per 100,000 inhabitants, respectively (figure 1). Other countries reporting high annual incidence rates included Poland in 2001 and Latvia in 2002, with 221 and 110 per 100,000 inhabitants, respectively.

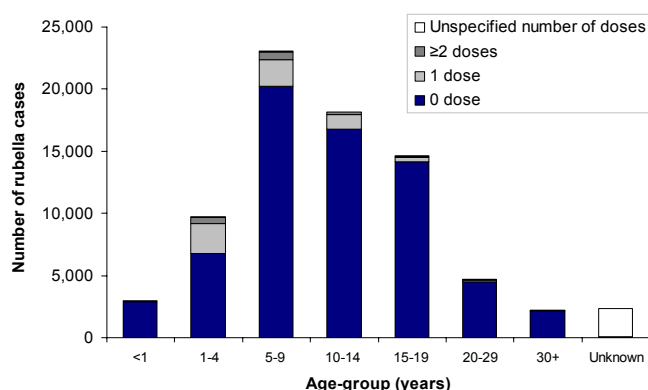
### Age distribution

Data on the specified age-groups was known in 502,016 cases (99%). These were distributed between age-groups with 21,374 (4%) aged <1 year, 68,360 (14%) aged 1-4 years, 171,048 (34%) aged 5-9 years, 148,234 (30%) aged 10-14 years, 64,819 (13%) aged 15-19 years and 28,181 (6%) older than 20 years.

### Vaccination status

Information on known vaccination status was provided in 77,795 (15%) of all reported rubella cases (table 2). Of these, 67,566 (87%) were unvaccinated, 6,338 (8%) were vaccinated with one dose, 1,367 (2%) were vaccinated with at least two doses, and 2,524 (3%) were vaccinated with an unspecified number of doses.

Figure 2. Rubella cases with a known vaccination status by age-group, 2000-07 (n=75,459)



### Rubella in pregnancy and CRS

A total of 111 CRS cases were reported for 2000-07 (table 3), 13 of which were identified as imported cases, eight by the UK, three by Germany, one by Spain and one by Hungary.

A total of 211 cases of rubella among pregnant women were reported for 2000-07. These were reported from six countries France (169 including 135 confirmed cases), UK (25), Italy (10), Switzerland (4), Norway (1), Spain (1 imported case) and Sweden (1).

### Comments

The overall decline in the incidence of rubella reported at European level during 2000-07 could be attributed to a marked decrease in incidence rates reported from only a few countries. The largest drop in incidence was reported from Romania.

Comparisons of number of rubella cases between countries should be made with caution because of dissimilar surveillance sensitivities, completeness of reporting and different reporting procedures—some countries reported only laboratory-confirmed cases whereas others reported clinical cases without laboratory confirmation.

A more accurate epidemiological assessment of rubella, CRS, and rubella in pregnancy depends on a complete set of surveillance data in case-based format from all participating countries. Although most countries have nationwide surveillance systems in place for CRS, the challenges of clinically identifying CRS cases and actively surveying them can result in underestimating the burden of rubella. Moreover, the diagnosis of CRS can be delayed by several years and so, if a surveillance system classifies cases by the year of birth, as is epidemiologically appropriate, the figures for more recent years should always be considered as provisional.

The plan to eliminate rubella and prevent congenital rubella infection Europe<sup>4</sup> depends on high rubella vaccine coverage in all European countries. Moreover, enhanced surveillance with timely reporting and laboratory confirmation is necessary not only to detect any outbreaks but also to provide the required documentation and verification of rubella elimination from Europe.

### References

- <sup>1</sup> Eurostat. Statistical Office of the European Communities. <http://epp.eurostat.ec.europa.eu> (accessed May 19, 2008).
- <sup>2</sup> Tookey PA, Peckham CS. Surveillance of congenital rubella in Great Britain, 1971-96. *BMJ* 1999; 318:769-70
- <sup>3</sup> British Paediatric Surveillance Unit, Royal College of Paediatrics and Child Health. British Paediatric Surveillance Unit Annual Report 2007-2008 [http://bpsu.inopsu.com/publications/annual\\_reports/BPSU%202008%20Annual%20Report.pdf](http://bpsu.inopsu.com/publications/annual_reports/BPSU%202008%20Annual%20Report.pdf) (accessed May 20, 2009).

<sup>4</sup> WHO. Eliminating measles and rubella and prevention congenital rubella infection. WHO European region strategic plan 2005–2010. World Health Organization 2005. <http://www.euro.who.int/document/E87772.pdf> (accessed May 14, 2009).

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Table 1. Number of reported rubella by year and percentage laboratory-confirmed of the sum of reported cases, 2000-07

	2000	2001	2002	2003	2004	2005	2006	2007	2000-07	Laboratory-confirmed
Bulgaria	28,448	1,655	806	254	474	1,968	247	88	33,940	1%
Croatia	0	3	11	2	2	2	2	33	55	64%
Cyprus	0	1	0	0	6	0	0	0	7	0%
Czech Republic	743	894	3,156	28	31	8	8	4	4,872	64%
Estonia	370	274	96	48	22	6	5	10	831	6%
Finland	0	0	3	0	0	0	1	0	4	100%
Greece	12	14	14	5	2	16	1	0	64	0%
Hungary	107	65	42	47	36	32	22	0	351	3%
Iceland	0	0	0	0	0	0	0	0	0	..
Ireland	97	57	33	59	49	17	14	19	345	3%
Italy	2,605	5,151	6,224	1,615	461	297	257	758	17,360	0%
Latvia	62	358	2578	310	52	35	12	7	3,414	14%
Lithuania	1302	458	277	170	93	118	110	13	2,541	0%
Malta	6	0	2	4	0	6	1	2	21	19%
Norway	4	0	1	1	2	1	2	0	11	100%
Poland	46,181	84,419	40,518	10,588	4,857	7,946	20,668	22,891	238,068	0.1%
Portugal	58	40	29	14	8	3	9	6	167	5%
Romania	5,125	5,076	10,790	119,259	47,364	6,801	3,553	2,958	200,926	0%
Slovakia	11	2	7	1	3	1	2	2	29	24%
Slovenia	9	8	3	9	1	0	1	1	32	6%
Spain	345	179	138	113	87	593	89	60	1,604	39%
Sweden	1	3	1	0	0	0	2	2	9	89%
UK	72	49	78	18	16	39	34	33	339	99%
<b>Total</b>	<b>85,550</b>	<b>98,706</b>	<b>64,807</b>	<b>132,545</b>	<b>53,566</b>	<b>17,889</b>	<b>25,040</b>	<b>26,887</b>	<b>504,990</b>	<b>1%</b>

Table 2. Rubella cases by vaccination status, 2000-07

	0 doses		1 dose		≥2 doses		Unspecified number of doses		Unknown vaccination status	
Bulgaria *	21	0.1%	36	0.1%	0	0%	0	0%	33,883	99.8%
Croatia	37	67%	7	13%	1	2%	10	18%	0	0%
Cyprus	4	57%	3	43%	0	0%	0	0%	0	0%
Czech Republic	4,737	97%	61	1%	16	0.3%	58	1%	0	0%
Estonia	352	43%	361	44%	0	0%	68	8%	50	6%
Finland	3	75%	1	25%	0	0%	0	0%	0	0%
Greece	0	0%	0	0%	0	0%	0	0%	64	100%
Hungary	149	99%	1	1%	0	0%	0	0%	201	57%
Iceland	..	..	..	..	..	..	..	..	..	..
Ireland	15	4%	6	2%	0	0%	4	1%	320	93%
Italy	13,145	76%	0	0%	931	5%	10	0.1%	3,274	19%
Latvia	3,072	90%	259	8%	20	1%	0	0%	63	2%
Lithuania	131	5%	147	6%	0	0%	2,263	89%	0	0%
Malta	0	0%	0	0%	0	0%	0	0%	21	100%
Norway	6	55%	0	0%	0	0%	3	27%	2	18%
Poland	45,272	19%	5,245	2%	352	0.1%	0	0%	187,199	79%
Portugal	62	37%	60	36%	14	8%	31	19%	0	0%
Romania	0	0%	0	0%	0	0%	0	0%	200,926	100%
Slovakia	23	79%	1	3%	2	7%	0	0%	3	10%
Slovenia	12	38%	12	38%	6	19%	2	6%	0	0%
Spain	510	32%	135	9%	23	1%	70	4%	866	54%
Sweden	3	33%	0	0%	1	11%	5	56%	0	0%
UK	12	4%	3	1%	1	0.3%	0	0%	323	95%
<b>Total</b>	<b>67,566</b>	<b>13.7%</b>	<b>6,338</b>	<b>1.3%</b>	<b>1,367</b>	<b>0.3%</b>	<b>2,524</b>	<b>0.5%</b>	<b>427,195</b>	<b>84.6%</b>

\* Data from Bulgaria on known vaccination status (i.e. 0 doses, 1 dose, ≥2 doses and unspecified number of doses) is for 2007 only

Table 3. Number of reported congenital rubella syndrome cases, 2000-07

	2000	2001	2002	2003	2004	2005	2006	2007	Total
Austria *	-	-	-	-	-	-	-	-	-
Belgium **	-	-	-	-	-	-	-	0	0
Bulgaria	0	0	0	0	0	0	0	0	0
Croatia	0	0	0	0	0	0	0	0	0
Cyprus	0	0	0	0	0	0	0	0	0
Czech Republic	0	0	0	0	0	0	0	0	0
Denmark	0	0	0	0	0	0	0	0	0
Estonia	0	0	0	0	0	0	0	0	0
Finland	0	0	0	0	0	0	0	0	0
France <sup>v</sup>	8	6	1	2	2	2	0	0	21
Germany	7	1	1	1	3	0	1	0	14
Greece	0	0	0	0	0	0	0	0	0
Hungary	0	0	0	0	1 <sup>i</sup>	0	0	0	1
Iceland	0	0	0	0	0	0	0	0	0
Ireland <sup>vv</sup>	0	1	0	0	1	0	0	0	2
Italy <sup>†</sup>	-	-	-	-	-	2 <sup>p</sup>	1 <sup>p</sup>	1	4
Latvia	0	0	0	0	0	0	0	0	0
Lithuania	0	0	0	0	0	0	0	0	0
Luxembourg	0	0	0	0	0	0	0	0	0
Malta	0	0	0	0	0	0	0	0	0
Netherlands	0	0	0	0	0	0	0	0	0
Norway	0	0	0	0	0	0	0	0	0
Poland	1	3	2	0	0	0	0	1	7
Portugal	0	0	0	0	0	0	0	0	0
Romania	20	0	5	7	8	1	1	1	43
Slovakia	0	0	0	0	0	0	0	0	0
Slovenia	0	0	0	0	0	0	0	0	0
Spain	0	0	0	1 <sup>i</sup>	1	4	0	0	6
Sweden	0	0	0	0	0	0	0	0	0
Switzerland	0	0	0	0	0	0	0	0	0
Turkey	0	0	0	0	0	1	0	0	1
UK <sup>††</sup>	5	2	0	2	0	1	1	1	12
<b>Total</b>	<b>41</b>	<b>13</b>	<b>9</b>	<b>13</b>	<b>16</b>	<b>11</b>	<b>4</b>	<b>4</b>	<b>111</b>

Comparisons of number of rubella cases between countries should be made with caution because of dissimilar surveillance sensitivities, completeness of reporting and different reporting procedures

\* No CRS surveillance system,

\*\* CRS surveillance established from 2007 based on a sentinel system

<sup>v</sup> Laboratory-confirmed cases in newborns obtained through well-established voluntary surveillance system of rubella in pregnant women and congenital infections in newborns

<sup>vv</sup> data derived from voluntary nationwide CRS surveillance system 2000-03,

<sup>†</sup> CRS surveillance system based in mandatory notification established in 2005

<sup>p</sup> Including one case reported as probable CRS

<sup>††</sup> CRS cases reported to the active national surveillance system

<sup>i</sup> identified as imported case