

## Introduction

The following preliminary mumps surveillance report covers the year 2009 and aims to provide an overview of surveillance systems and selected epidemiological characteristics of mumps at European level.

## Methods

We requested mumps data in aggregated format, consisting of the number of cases in specified age-groups. Standardized forms were used to collect information on vaccination status, laboratory confirmation, hospitalisation and deaths. Data were collected retrospectively in 2010. The following report provides an overview for the countries with epidemiological data obtained through mandatory notification systems covering total national populations. Cases meeting the requirements for national surveillance, including clinical, laboratory-confirmed, and epidemiologically linked cases, were analyzed. Country and age-specific incidence were calculated using the population estimates from Eurostat.<sup>1</sup> Population estimates from 2008 were used for the UK because the 2009 population was not available.

## Surveillance systems

Twenty-six EUVAC.NET-participating countries conducted surveillance for mumps based on a mandatory notification system covering the total population.<sup>2</sup> In December 2008, the Netherlands introduced a mandatory reporting of laboratory-confirmed and epidemiologically linked cases.<sup>3</sup> In Germany mumps is a notifiable disease in five of the 16 federal states. Switzerland, France and Belgium conduct sentinel surveillance systems for mumps. In Austria and Turkey mumps is not a notifiable disease.

## Results

### Incidence

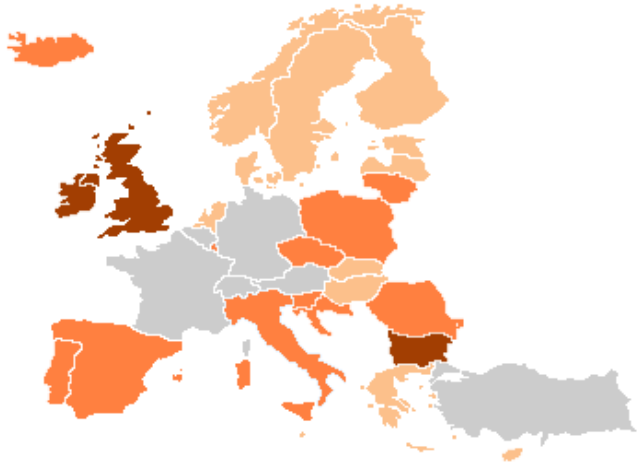
A total of 21,300 mumps cases was reported from 26 countries that provided epidemiological data based on mandatory notification systems covering the total country population for 2009 (table 1). The incidence category of reported mumps cases per 100,000 inhabitants is shown in figure 1. The overall incidence was 6.1 per 100,000.

The highest incidences were reported from Ireland, Bulgaria and UK, with 81.6, 14.6 and 14.2 cases per 100,000 inhabitants, respectively. Most cases (58%; n=12,294) were reported from the UK (n=8,663) and

Ireland (n=3,629), contributing to 41% and 17% respectively of all cases reported for 2009.

Figure 1. Incidence category of reported mumps cases per 100,000 inhabitants, 2009

■ <1   ■ 1-<10   ■ 10-100   ■ No data / Non-mandatory notification

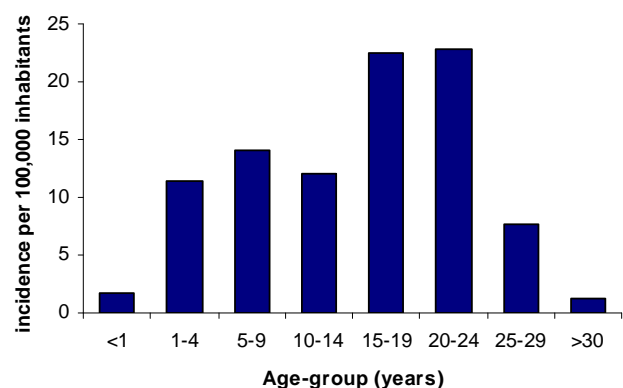


### Age distribution

Data on the specified age-groups was known in 21,011 cases (99%). These were distributed between age-groups with 67 (0.3%) aged <1 year, 1,713 (8%) aged 1-4 years, 2,523 (12%) aged 5-9 years, 2,211 (11%) aged 10-14 years, 4,619 (22%) aged 15-19 years, 5,120 (25%) aged 20-24 years, 1,843 (9%) aged 25-29 years, and 2,800 (13%) older than 30 years. The incidence was highest among adolescents aged 20-24 years, (22.8 per 100,000) and among those aged 15-19 years (22.5 per 100,000 inhabitants).

Romania reported 57 cases in age categories 25-34 and 58 cases with more than 35 years.

Figure 2. Incidence of reported mumps cases by age-group, 2009

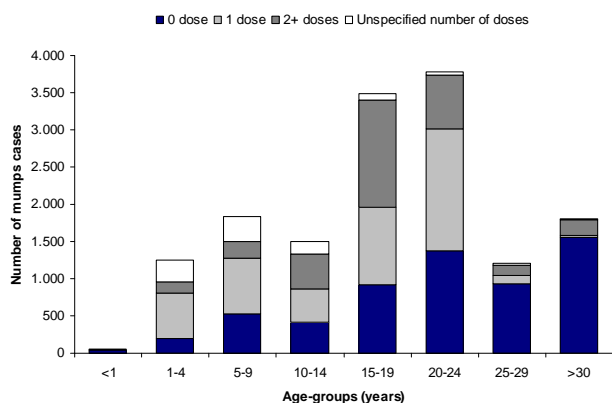


## Vaccination status

The vaccination status was known in 14,976 (70%) of all reported mumps cases (Table 2). Of these, 5,991 (40%) were unvaccinated, 4,654 (31%) were vaccinated with one dose, 3,367 (22%) were vaccinated with at least two doses, and 964 (5%) were vaccinated with an unspecified number of doses. Table 2 shows the number and proportion of mumps cases by vaccination status for each country. Figure 2 shows the age distribution of mumps cases with a known vaccination status.

Of those with a known vaccination status the majority of cases younger than 25 years of age were vaccinated with one or two doses (63%, 7,509/11,901), while the majority of those aged over 25 years (82%, 2,494/3,012) had never been vaccinated.

Figure 2. Number of mumps cases with a known vaccination status by age-group, 2009 (n=14,913)



63 cases with unknown age-group not shown

## Hospitalisations and complications

Data on hospitalisation status was provided from 20 countries (table 3). There were 693 reported hospitalised mumps cases in connection with mumps (4%). Most were aged 20-24 years (23%, n=159), followed by those aged 15-19 years (19%, n=135), and those aged less than 10 years (15%, n=109).

Information on the number of cases with complications related to mumps was provided from 17 countries (table 3) where a total of 458 cases with complications were reported. Most cases with complications were aged 20-24 years (26%, n=121), followed by those aged 15-19 years (21%, n=98,) and those aged and over 30 years (16%, n=71).

## Comments

The number of reported mumps cases is comparable to the previous year. Such figures must also take into consideration that in December 2008 mumps became a notifiable disease in the Netherlands and therefore this country is only

included for the first time in 2009 in our European assessment.

Since 2000, we have observed a declining trend in the number of reported mumps cases<sup>3</sup>; nevertheless, outbreaks of mumps occurring in 2009 were documented in the Netherlands<sup>3</sup>, in England and Wales,<sup>5, 6</sup> and in the former Yugoslav Republic of Macedonia<sup>7</sup>. Except for the latter outbreak, the majority of cases had been previously vaccinated. Our European assessment from 26 countries is showing a similar picture: 60% of the cases with a known vaccination status were vaccinated with at least one dose, of whom 23% with two doses.

We observed a high degree of variation in the epidemiological picture among reporting countries. Comparisons between countries have to be made with caution because of different reporting procedures: nine countries reported only laboratory-confirmed cases whereas others reported clinical cases without laboratory confirmation. The majority of cases were reported by the UK, Ireland, Bulgaria, Spain and Poland. In most of these countries a resurgence of mumps have been described not only in 2009 but over the last years.<sup>8-11</sup>

A number of factors have been suggested to explain the resurgence of mumps in populations where a high proportion of people have received two doses of MMR vaccine. These include waning immunity, lack of boosting due to diminished circulation of the virus, possible mismatch between with vaccine strain component and the circulating wild strain, and the high threshold necessary for herd immunity.<sup>8</sup> Moreover, it is well established that in contrast to the measles and rubella vaccine component, the mumps component of the MMR vaccine does not provide the same high levels of protection, and at least two doses are necessary.<sup>12</sup>

The analysis of age-specific incidences showed that adolescents and young adults were the most affected. These are also the age-groups at increased risk of some of the complications: orchitis or oophoritis are virtually limited to post-puberty. An increased risk of mumps infection has been reported among males in Ireland and in Israel.<sup>14,15</sup> The factors implicated need to be further studied. The format of the data available meant we could not analyse the cases by gender thereby limiting our analysis.

To improve the quality of our epidemiological assessment there is a need to collect information in a case-based format, including laboratory confirmation. Moreover, genotyping could be

useful to the ultimate aim of an accurate European picture which can inform vaccination policies.

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Table 1. Number, incidence, and proportion of laboratory-confirmed mumps cases, 2009

	Number of cases (incidence per 100,000)				Laboratory confirmed cases (%)	
	2008		2009		2009	
<b>Bulgaria</b>	5,582	73.1	1,111	14.6	185	17%
<b>Croatia</b>	93	2.1	57	1.3	0	0%
<b>Cyprus</b>	3	0.4	5	0.6	4	80%
<b>Czech Re- public</b>	399	3.8	357	3.4	284	80%
<b>Denmark</b>	24	0.4	17	0.3	17	100%
<b>Estonia</b>	14	1	11	0.8	0	0%
<b>Finland</b>	5	0.1	2	0	2	100%
<b>Greece</b>	5	0.04	21	0.2	3	14%
<b>Hungary</b>	14	0.1	5	0	5	100%
<b>Iceland</b>	0	0	4	1.3	4	100%
<b>Ireland</b>	1,385	31.5	3,629	81.6	1,375	38%
<b>Italy</b>	997	1.7	1103	1.8	0	0%
<b>Latvia</b>	6	0.3	1	0	1	100%
<b>Lithuania</b>	82	2.4	74	2.2	0	0%
<b>Luxemburg</b>	23	4.8	25	5.1	25	100%
<b>Malta</b>	7	1.7	0	0	0	100%
<b>Netherlands</b>	-	-	73	0.4	52	71%
<b>Norway</b>	16	0.3	12	0.3	12	100%
<b>Poland</b>	3,271	8.6	2,954	7.7	1	0%
<b>Portugal</b>	140	1.3	154	1.4	9	6%
<b>Romania</b>	2,302	10.7	784	3.6	0	0%
<b>Slovakia</b>	5	0.1	5	0.1	5	100%
<b>Slovenia</b>	32	1.6	27	1.3	3	11%
<b>Spain</b>	3,734	8.2	2,174	4.7	184	8%
<b>Sweden</b>	52	0.6	32	0.3	21	66%
<b>UK</b>	2,443	4	8,663	14.2	8,663	100%
<b>Total</b>	<b>20,634</b>	<b>6.3</b>	<b>21,048</b>	<b>6.1</b>	<b>10,855</b>	<b>0.51</b>

Table 2. Mumps cases by country and by vaccination status, 200

	0 doses		1 dose		≥ 2 doses		Unspecified number of doses		Unknown vaccination status	
	n	%	n	%	n	%	n	%	n	%
Bulgaria	30	3%	481	43%	150	14%	0	0%	450	41%
Croatia	9	16%	3	5%	21	37%	0	0%	24	42%
Cyprus	0	0%	2	40%	2	40%	0	0%	1	20%
Czech Republic	94	26%	7	2%	253	71%	3	1%	0	0%
Denmark	6	35%	6	35%	2	12%	0	0%	3	18%
Estonia	2	18%	6	55%	1	9%	0	0%	2	18%
Finland	2	100%	0	0%	0	0%	0	0%	0	0%
Greece	2	10%	1	5%	1	5%	16	76%	1	5%
Hungary	3	60%	1	20%	1	20%	0	0%	0	0%
Iceland	0	0%	0	0%	0	0%	0	0%	4	100%
Ireland	257	7%	381	10%	562	15%	0	0%	2429	67%
Italy	328	30%	0	0%	0	0%	510	46%	265	24%
Latvia	0	0%	0	0%	0	0%	0	0%	1	100%
Lithuania	22	30%	0	0%	0	0%	52	70%	0	0%
Luxemburg	0	0%	0	0%	1	4%	1	4%	23	92%
Malta	0	-	0	-	0	-	0	-	0	-
the Netherlands	42	58%	12	16%	14	19%	1	1%	4	5%
Norway	1	8%	1	8%	0	0%	1	8%	9	75%
Poland	1190	40%	1023	35%	105	4%	0	0%	636	22%
Portugal	20	13%	46	30%	46	30%	11	7%	31	20%
Romania	0	0%	0	0%	0	0%	0	0%	784	100%
Slovakia	0	0%	0	0%	4	80%	0	0%	1	20%
Slovenia	9	33%	0	0%	3	11%	3	11%	12	44%
Spain	218	10%	165	8%	393	18%	363	17%	1035	48%
Sweden	11	34%	5	16%	2	6%	3	9%	11	34%
UK	3745	43%	2514	29%	1806	21%	0	0%	598	7%
<b>Total</b>	<b>5.991</b>	<b>28%</b>	<b>4.654</b>	<b>22%</b>	<b>3.367</b>	<b>16%</b>	<b>964</b>	<b>5%</b>	<b>6.324</b>	<b>30%</b>

Table 3. Number and percentage of hospitalised cases and cases with mumps-related complications, 2009

	Hospitalised		Cases with complications	
	Number	%	Number	%
Bulgaria	274	25%	176	16%
Croatia	n/a	-	n/a	-
Cyprus	0	0%	0	0%
Czech Republic	71	20%	53	15%
Denmark	6	35%	2	12%
Estonia	0	0%	0	0%
Finland	0	0%	0	0%
Greece	20	95%	0	0%
Hungary	0	0%	0	0%
Iceland	0	0%	0	0%
Ireland*	75	10%	120	17%
Italy	47	4%	n/a	-
Latvia	1	100%	1	100%
Lithuania	n/a	-	n/a	-
Luxemburg	n/a	-	n/a	-
Malta	0	0%	0	-
the Netherlands	7	10%	13	18%
Norway	1	8%	0	0%
Poland	35	1%	n/a	-
Portugal	3	2%	n/a	-
Romania	n/a	-	n/a	-
Slovakia	0	0%	0	0%
Slovenia	1	4%	0	0%
Spain	n/a	-	n/a	-
Sweden	n/a	-	n/a	-
UK	152	2%	93	1%
<b>Total †</b>	<b>693</b>	<b>4%</b>	<b>458</b>	<b>4%</b>

n/a = not available

\*Ireland, Hospitalisation status was reported for 770 cases; complication status was reported for 700 cases

† The denominator is from the countries reporting on hospitalised cases, 20 countries (n=17,224) and from the countries reporting on cases with complications, 17 countries, 17 countries (n=11,003)

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