Introduction

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

Methods

We requested data for varicella, consisting in number of cases aggregated by age-groups, for the years 2000-07. Standardized forms were used to collect information on vaccination status, laboratory confirmation, hospitalisation and complications. Data was collected retrospectively in 2008, as part of a more extensive survey on surveillance systems, case definitions used, and vaccination strategies. Our assessment included countries' epidemiological data obtained through mandatory notifications systems covering national populations for the 8-year period 2000-07. Countries which operated solely sentinel surveillance systems were not included.

Cases meeting requirements for national surveillance (clinical, laboratory-confirmed and/or epidemiologically linked) were included in the analysis. United Kingdom is divided into England & Wales, Scotland and Northern Ireland for the purposes of varicella surveillance: therefore it was treated as three separate countries in the present report.

Country and age-specific incidence was calculated using the mid-year population estimates from Eurostat[1] and the General Register Office for Scotland.[2]

Surveillance systems

Fifteen countries (Table 1) conducted surveillance for varicella based on a mandatory notification system covering the total population and had data available and comparable for the entire study period. Three additional countries (Cyprus, Greece, and Finland) conducted mandatory surveillance during the 8-year period; however for Cyprus data was available only for 2000-03; in Greece in 2004 the mandatory surveillance converted to include varicella cases with complications only; Finland reported only on laboratory confirmed cases.

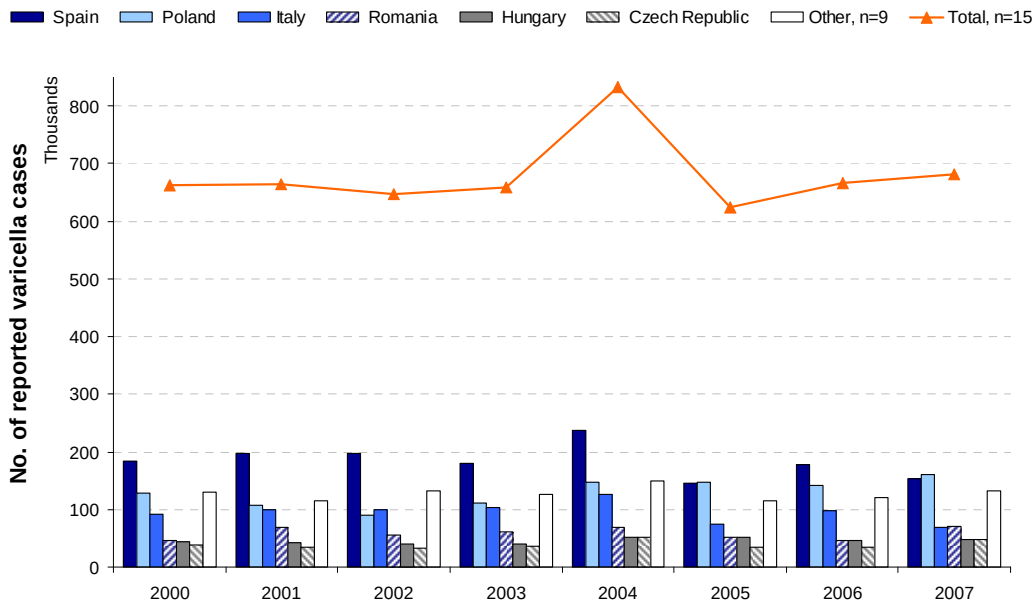
Eight countries (Austria, Belgium, France, Germany, Ireland, the Netherlands, Portugal, England and Wales) operated sentinel systems. One country (Greece) conducted sentinel surveillance from 2004 in addition to the mandatory system for varicella with complications. Eight countries had no surveillance system in place for varicella (Denmark, Iceland, Norway, Luxemburg, Switzerland, Sweden, Turkey, and Northern Ireland).

Results

Number of cases

During 2000-07, there were 5,435,223 cases of varicella reported from the 15 countries with mandatory notification that could provide data for the whole period (Figure 1). Most cases were reported from Spain (27%) and then Poland (19%). There was a peak in the total number of cases for all countries in 2004.

Figure 1. Total number of cases of varicella, 15 countries, 2000-07 (n=5,435,223)



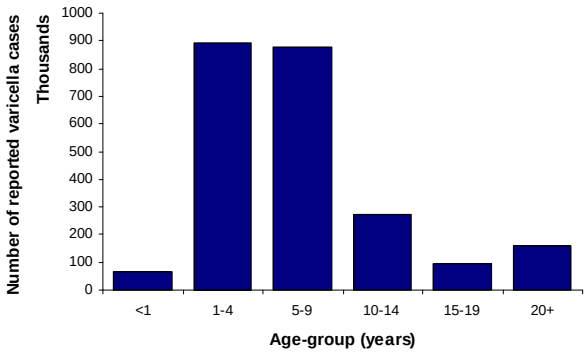
Incidence

The incidence for 18 countries for 2000-07 is shown in table 2. There was a peak in the incidence for most countries in 2003 or 2004. Some countries reported their highest annual incidence rates per 100,000 inhabitants in other years: in 2000 Lithuania (500) and Scotland (490); in 2005, Hungary (541); in 2007, Estonia (590) and Romania (327). The highest incidence rates were reported in 2003 in Slovenia (772 per 100,000) and the lowest in 2001 (45 per 100,000) from Malta.

Age distribution

Nine countries (Czech Republic, Estonia. Hungary, Italy, Malta, Slovakia, Slovenia, Croatia, Romania) reported cases by age-group. These reported 2,364,116 varicella cases amounting to (43%) of the total cases reported. The cases were distributed between age-groups with 66,589 (3%) aged <1 year, 889,863 (38%) aged 1-4 years, 876,260 (37%) aged 5-9 years, 271,916 (12%) aged 10-14 years, 93,268 (4%) aged 15-19 years and 159,759 (7%) older than 20 years. For 6,461 (0.3%) cases the age was unknown.

Figure 2. Number of varicella cases by age-group, 2000-07 (n=2,364,116), for the nine countries reporting on age.



Vaccination status

Two countries reported cases with a known vaccination status. Only one country (Italy) provided data on vaccination status for the entire 8-year period. Cyprus provided data for 2004-2007. The proportion of unvaccinated cases was high for both countries, and across age-groups, ranging between 76% (age-groups 15-19 and over 20) and 82% (age-group 1-4years) for the Italian cases, and between 80% (age-group 5-9) and 96% (age-group <1year) for Cyprus.

Hospitalisations and complications

Data on hospitalisation status was provided by five countries (Hungary, Italy, Poland, Slovakia, Slovenia) for the 8-year period. A total of 23,485 (1%) cases were hospitalised (table 3). Four countries (Hungary, Italy, Slovakia, Slovenia) were able to report hospitalisation by age-groups, and for these 15,961 cases, for 99% (n=15,833) the age was known. Of these, 34% (n=5364) were aged 1-4 years, followed by those aged 20 years and older (n=3,943, 25%).

Data on complications was only available for three countries (Hungary, Slovakia and Slovenia).These reported 381 (0.1%) varicella cases with complications during 2000-07.

Vaccination programmes

During 8-year timeframe of the study, Germany, which is not described in the present report as operates a sentinel system, implemented universal vaccination[3], recommended in July 2004. In January 2003, Italy implemented universal vaccination only in one region, Sicily. [4] In 2006, the vaccine became part of the Greek National Immunisation programme. [5]Ten further countries (Austria, Belgium, Cyprus, Finland, Ireland, Italy, Slovenia, Spain, Switzerland and the United Kingdom) recommended the vaccine for susceptible adolescence and adults and/or high risk groups through the public sector.

In January 2008, universal vaccination was implemented in Latvia for children of 15 months of age.[6]

Comments

Our findings show that the number of reported varicella cases has been relatively stable throughout 2000-07, except for a peak in 2004, which was reflected in a peak of the incidence for most countries. Overall, the incidence can be considered high, but heterogeneous among countries. Comparisons have to be made with caution since there is no case definition of varicella at European level and the definitions fulfilling the requirements for national surveillance vary widely.

The differences observed cannot be ascribed to different vaccination programs. During the 8-year period examined none of the countries described had implemented a national vaccination programme for more than two years.

Our analysis was restricted to the 18 countries which perform national mandatory surveillance. A number of countries in Europe operate sentinel systems. The two systems, although complementary, do not allow pooling of

information. Following the availability of the combined vaccine MMRV, countries may consider introducing universal varicella vaccination: the collection and analysis of comparable European data is an essential step and a unique opportunity to inform policy decisions on vaccination programmes.

The data was collected in an aggregated format for all countries. Nevertheless, many countries were not able to provide a full set of data for all variables requested for the 8-year period: less than half (43%) of the cases had a known age-group, only three countries reported on hospitalisation, and only one on vaccination status. The collection of data on vaccination status is crucial when a vaccination is introduced a part of an immunisation program. Hospitalisation and data on complications are important to assess severity and burden of disease for varicella in a population. Complications of varicella include superinfection of the skin, respiratory complications, cerebellitis and encephalitis. In addition, long term sequelae as severe scarring, ataxia/coordination disorder, epilepsy and cerebral nerve paralysis may occur. There is need for more accurate description at national and European level: most of the data on complications and hospitalisation available at present comes from ad-hoc studies implemented at hospital or general practice level. [7]
With the information available in an aggregated format a general picture of varicella occurrence in Europe for 2000-07 could be made. However a more precise epidemiological assessment of varicella at European level depends on a complete set of surveillance data in case-based format from all participating countries. Case-based data allows for a much more complete analysis and identification of parameters responsible for changes in the epidemiological picture. For example, with case-based data it is possible to describe accurately shifting of age of onset of disease, or to perform a birth cohort analysis.

Varicella poses a challenge: it is a perceived as a relatively mild disease, but severe complications and sequelae occur, and they need to be better described. The situation in Europe - concerning surveillance and epidemiology - is very heterogeneous. Developments in the availability of newer vaccines, including combined forms such as measles-mumps-rubella-varicella (MMRV) but also the vaccine for Herpes Zoster, may be followed by additional changes in the health status of the populations which must be monitored with the highest possible standards.

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Table 1. Number of reported varicella cases by year for the 18 countries with mandatory notification.

	2000	2001	2002	2003	2004	2005	2006	2007	2000-07
Bulgaria	23,348	23,252	22,854	25,130	35,915	24,695	30,315	33,275	218,784
Croatia	20,081	14,483	21,821	21,222	23,063	17,087	19,549	21,815	159,121
Cyprus *	-	-	-	-	699	457	178	159	-
Czech republic	38,665	35,343	33,474	35,719	52,487	35,217	35,197	48,575	314,677
Estonia	7,893	6,199	6,250	5,053	6,873	6,428	6,679	7,795	53,170
Finland **	-	-	-	-	49	52	38	51	-
Greece †	3,122	3,878	3,651	4,734	27	37	42	33	-
Hungary	43,728	42,179	40,288	39,486	52,123	52,608	46,372	48,313	365,097
Italy	91,098	99,081	100,062	103,470	126,051	74,525	97,639	69,328	761,254
Latvia	5,773	6,336	5,940	6,953	9,355	6,266	6,887	6,340	53,850
Lithuania	18,470	13,029	15,184	16,202	17,984	16,555	15,941	13,539	126,904
Malta	301	177	180	696	565	482	290	228	2,919
Poland	128,016	106,342	89,817	111,527	147,977	147,995	141,349	160,174	1,033,197
Romania	46,321	69,647	55,050	60,972	68,563	51,438	45,917	70,410	468,318
Slovakia	16,743	18,757	19,003	16,066	21,058	18,967	14,391	16,882	141,867
Slovenia	12,877	11,065	12,137	15,294	12,928	9,178	10,853	13,361	97,693
Spain	183,639	196,631	196,257	180,873	237,071	146,113	177,728	153,099	1,471,411
Scotland	24,787	21,894	28,407	19,875	21,333	15,896	16,619	18,150	166,961
Total † †	**661,740**	**664,415**	**646,724**	**658,538**	**833,346**	**623,450**	**665,726**	**681,284**	**5,435,223**

* Cyprus, not mandatory data available for 2004-07
** Finland, only laboratory confirmed cases are notified
† Greece,from 2004 mandatory notification system includes only varicella with complications
†† Total is calculated only on the 15 countries reporting data for the whole 8-year period

Table 2: Incidence rate of varicella per 100,000 population for each country with mandatory notification, 2000-2007 (n=18)

	2000	2001	2002	2003	2004	2005	2006	2007	2000-07††
Bulgaria	294	296	293	326	470	326	395	437	347
Croatia	432	311	469	456	495	367	429	479	447
Cyprus *	-	-	-	-	86	56	21	19	-
Czech Republic	376	344	327	349	513	345	345	476	384
Estonia	566	450	459	376	517	488	504	590	490
Finland **	-	-	-	-	1	1	1	1	-
Greece †	29	37	34	45	-	-	-	-	-
Hungary	439	425	408	402	534	541	460	481	450
Italy	158	172	174	180	220	130	168	119	165
Latvia	238	263	248	292	395	266	300	278	289
Lithuania	500	353	412	441	491	453	466	398	460
Malta	77	45	46	176	143	121	72	56	92
Poland	332	276	233	290	385	385	367	416	338
Romania	206	311	247	274	309	232	212	327	268
Slovakia	310	347	351	297	389	350	266	313	329
Slovenia	648	557	612	772	653	464	552	680	612
Spain	460	493	492	453	594	366	410	351	437
Scotland	490	432	562	393	420	312	325	353	410

* Cyprus, not mandatory data available for 2004-07
** Finland, only laboratory confirmed cases are notified
† Greece, from 2004 mandatory notification system includes only varicella with complications
†† Incidence for 2000-07 is calculated only on the 15 countries reporting data for the whole 8-year period

Table 3.Number of varicella hospitalised cases by year, for the five countries reporting on hospitalisation, 2000-07

	2000	2001	2002	2003	2004	2005	2006	2007	2000-07
	(n=292,462)	*(n=277,424)*	*(n=261,397)*	*(n=285,843)*	*(n=360,137)*	*(n=303,273)*	*(n=310,604)*	*(n=308,058)*	*(n=2,399,108)*
Hungary	428	401	309	318	451	410	444	394	3,155
Italy	1,609	1,503	1,603	1,391	1,535	1,062	1,157	789	10,649
Poland	1,008	872	761	781	1,056	986	948	1,112	7,524
Slovakia	180	170	181	160	177	179	123	367	1,537
Slovenia	62	73	81	112	61	76	75	80	620
Total	**3,287**	**3,019**	**2,935**	**2,762**	**3,280**	**2,713**	**2,747**	**2,742**	**23,485**
(% hospitalised)	**1%**	**1%**	**1%**	**1%**	**1%**	**1%**	**1%**	**1%**	**1%**