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A report on the epidemiology of selected vaccine-preventable diseases in the European Region

No. 2/2018

This issue of WHO EpiBrief provides an overview of selected epidemiological characteristics of measles and rubella in the WHO European Region based on monthly surveillance data for January-June 2018. It also includes short reports on events of these diseases in France, Serbia and Ukraine. These short reports are based on additional information supplied by these countries.

The surveillance data presented in this issue were reported by countries and are incorporated in the Centralized Information System for Infectious Diseases.[1] Tabulated surveillance data by country for the first half of 2018 (as of 5 September 2018) are annexed to this issue. The analyses of these data are performed on cases with disease onset dates during the first half of 2018. Where these dates were unavailable, cases with the date of notification reported during this period were included. The numbers of cases in a specified time period may differ from reports produced by national or partner agencies if different dates are used. Percentages in this report were rounded to the nearest whole number.

Measles in the WHO European Region January–June 2018

Incidence – notifications and laboratory data

For the first half of 2018, 42 170 measles cases were reported by 44 of the 53 countries of the WHO European Region (Table 1 in annex).

Of the total, 73% of cases (n=30 617) were reported by 3 countries: Ukraine (23 070; 55%), Serbia (4954; 12%) and France (2593; 6%). The highest crude incidence per million population for this period was in Serbia (283) followed by Ukraine (261). Fig.1 shows the number of cases reported by month from July 2017 through June 2018 by these and the other countries of the WHO European Region.

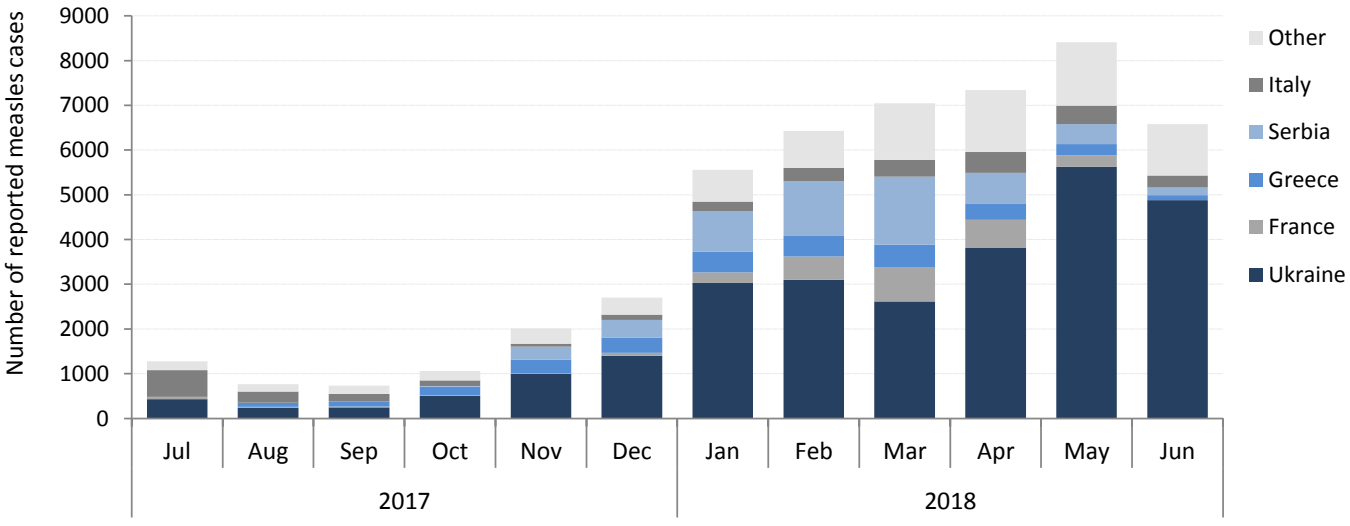
Of the total, 17 088 (41%) cases were laboratory confirmed and 1516 (4%) were epidemiologically linked cases. The remaining 23 566 cases (56%) were classified as clinically compatible.

For the first half of 2018, 38 (86%) of countries in the Region notifying measles cases submitted genomic sequence information for 2345 cases to the Measles Nucleotide Surveillance database (MeaNS)[2] through WHO-accredited reference laboratories (as of 24 September 2018). The genotypes identified in the Region comprised D8 (n=1196), B3 (1144) and D4 (5). The dominant measles virus genotype D8 variant was the named strain Herborn.DEU/05.17/ (54% of all D8 variants); dominant B3 named strains were Dublin.IRL/8.16/ (37% of all B3 variants) and MVs/Saint Denis.FRA/36.17 (33%). Genotype D4, which was not reported in 2017, was reported by one country in the Region.

Age distribution

The age group was known in 42 134 cases (99.9%): 3165 (8%) were <1 year old, 7375 (18%) were 1–4 years old, 13 847 (33%) were 5–19 years old and 17 747 (42%) were ≥20 years old. (Fig. 2). Fig. 3 shows

Fig. 1. Measles cases by month in the WHO European Region, 1 July 2017– 30 June 2018 (n=51 636)



the age distribution of reported measles cases in the top three countries reporting most cases: France, Serbia and Ukraine, by proportion and age-specific incidence.

Vaccination status

Vaccination status and age was known in 31 339 cases (74%). Of the 20 372 (65%) who were unvaccinated, 2919 cases (14%) were <1 year old, 5331 cases (26%) were 1–4 years old, 3657 cases (18%) were 5–9 years old, 3183 cases (16%) were 10–19 years old and 5282 cases (26%) were ≥20 years old. In addition, 10 961 cases (35%) were reportedly vaccinated with at least one measles-containing vaccine dose.

Measles-related deaths

There were 57 measles-related deaths in 8 countries among cases with disease onset in the first half of 2018: Romania (22 deaths), Serbia (14), Ukraine (8), Italy (4), France (3), Georgia (2), Greece (2), and Russian Federation (2).

Most deaths (60%, n=34) occurred in children under 10 years of age: 24 cases were <1 year old and 10 cases were 1–9 years old. Of the remaining deaths 3 cases were 10–19 years old and 20 cases were ≥25 years old.

All 57 deaths were laboratory-confirmed cases of measles. 52 fatal cases were unvaccinated, 2 cases had received one measles-containing vaccine dose, 1 case had received two measles-containing vaccine doses and in 2 cases the vaccination status was unknown.

Hospitalization

Data on hospitalization status was available for 70% (n=29 671) of all reported measles cases. Of these, 24 027 were hospitalized, amounting to 81% of all cases with known hospitalization status. Of all the hospitalized cases, most were reported by Ukraine (n=16 507; 69%).

Imported cases

Importation status was known for 24% (n=11 171) of cases. Of these, 543 were reported as imported cases, amounting to 5.3% of cases with a known importation status. Of all the imported cases, most (392; 72%) were reported by United Kingdom (n=149), France (67), Turkey (54), Russian Federation (47), Italy (38) and Germany (37).

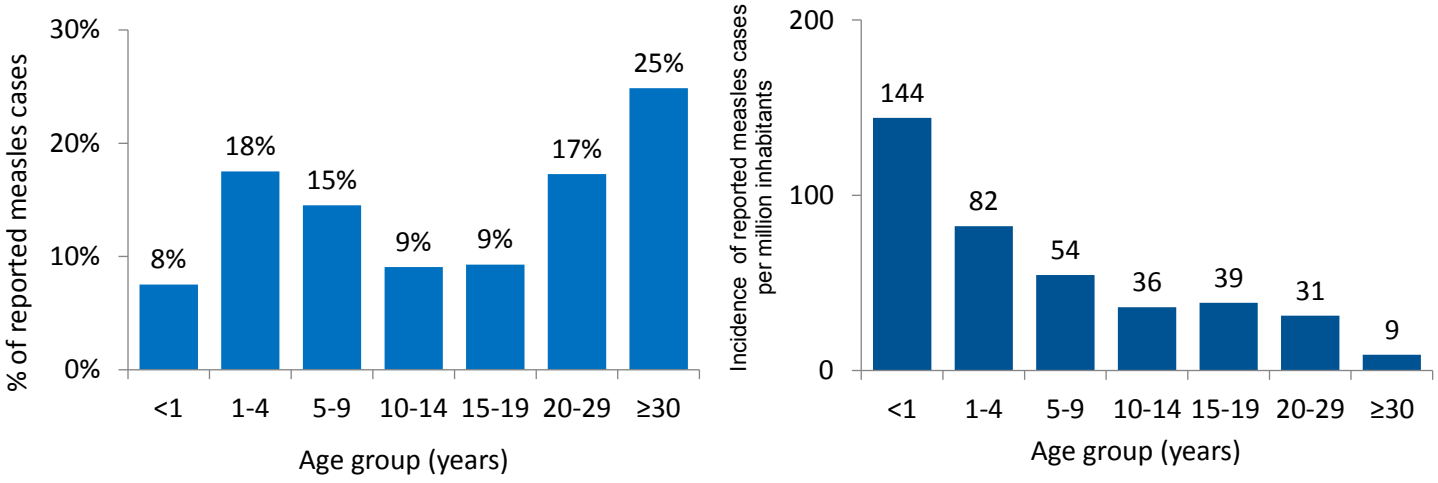
Rubella in the WHO European Region January–June 2018

Incidence – notifications and laboratory data

For the first half of 2018, 526 rubella cases were reported in 21 countries of the WHO European Region among 48 (91%) countries submitting rubella data (including zero reporting) (Table 2 in annex). Most cases were reported by Poland (n=283; 54%), followed by Ukraine (147; 28%) and Germany (31; 6%). Poland also had the highest crude incidence per million population (7.3).

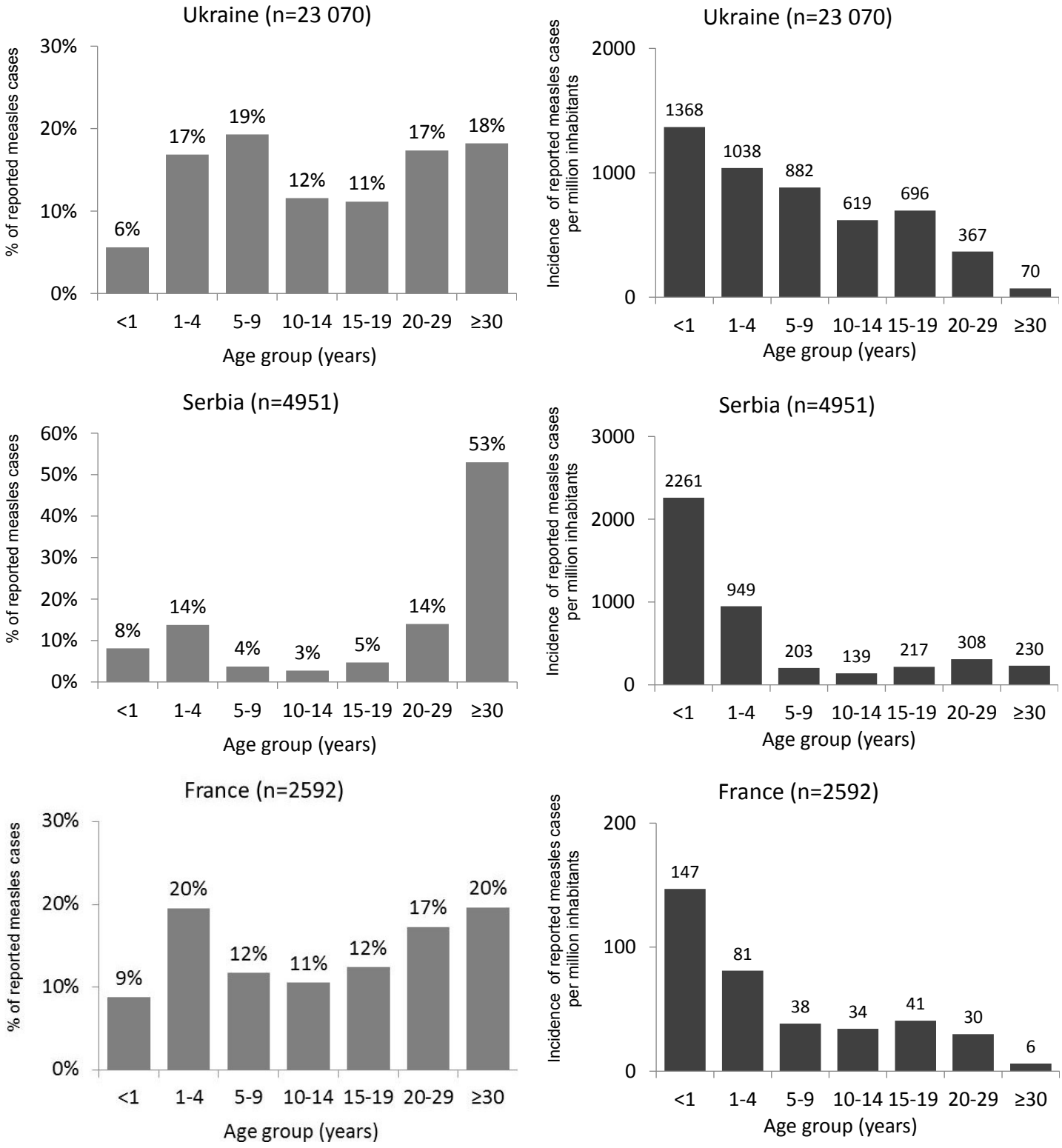
Of the total, 65 (16%) cases were laboratory confirmed, reported by 17 countries. Most (n=54; 83%) were reported by 6 countries: Turkey (10 cases), Ukraine (10), Italy (7), Kyrgyzstan (7), Germany (6) and Austria (5). Most cases reported by Poland and Ukraine were clinically compatible cases: 98% (87) and 88% (137), respectively.

Fig. 2. Age distribution of measles cases by proportion (left) and incidence per million inhabitants* (right) in the WHO European Region, first half of 2018 (n=42 134)**



*Annualized crude incidence. **The age was not known in 36 cases.

Fig. 3. Age distribution of measles cases by proportion (left) and incidence per million inhabitants* (right) in top three countries of the WHO European Region reporting cases, first half of 2018 (n=30 617)**



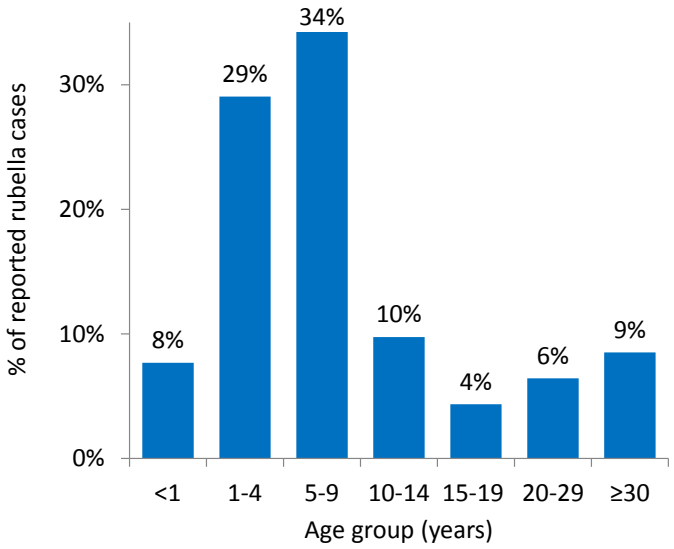
*Annualized crude incidence. **The age was not known in 1 case in France and 3 cases in Serbia.

During the first half of 2018, 1 rubella virus sequence was entered in the Rubella Nucleotide Surveillance database (RubeNS).[3] The identified genotype was 2B.

Age distribution

The age group was known in 482 cases: 37 cases (8%) were <1 year old, 140 cases (29%) were 1–4 years old,

Fig. 4. Age distribution of rubella cases in the WHO European Region, January-June 2018 (n=482)



*Annualized crude incidence. **The age was not known in 44 cases.

212 cases (44%) were 5–14 years old, 21 cases (4%) were 15–19 years old and 72 cases (15%) were ≥20 years old (Fig. 4).

Vaccination status

Vaccination status was known in 86% of cases (n=624). Of the 314 (50%) unvaccinated cases, 87 cases (28%) were <1 year old, 71 cases (23%) were 1–4 years old, 36 cases (11%) were 5–9 years old, 21 cases (7%) were 10–14 years old and 99 cases (32%) were ≥15 years old. The remaining 310 cases (50%) were reportedly vaccinated with at least one rubella-containing vaccine dose.

Imported cases

Importation status was known in 23% (n=169) of rubella cases. Of these, 11 were reported as imported cases, amounting to 6.5% of cases with a known importation status. The imported cases were reported by Austria (n=3), United Kingdom (3), Czech Republic (1), Germany (1), Italy (1), Russian Federation (1) and Spain (1).

Measles in France

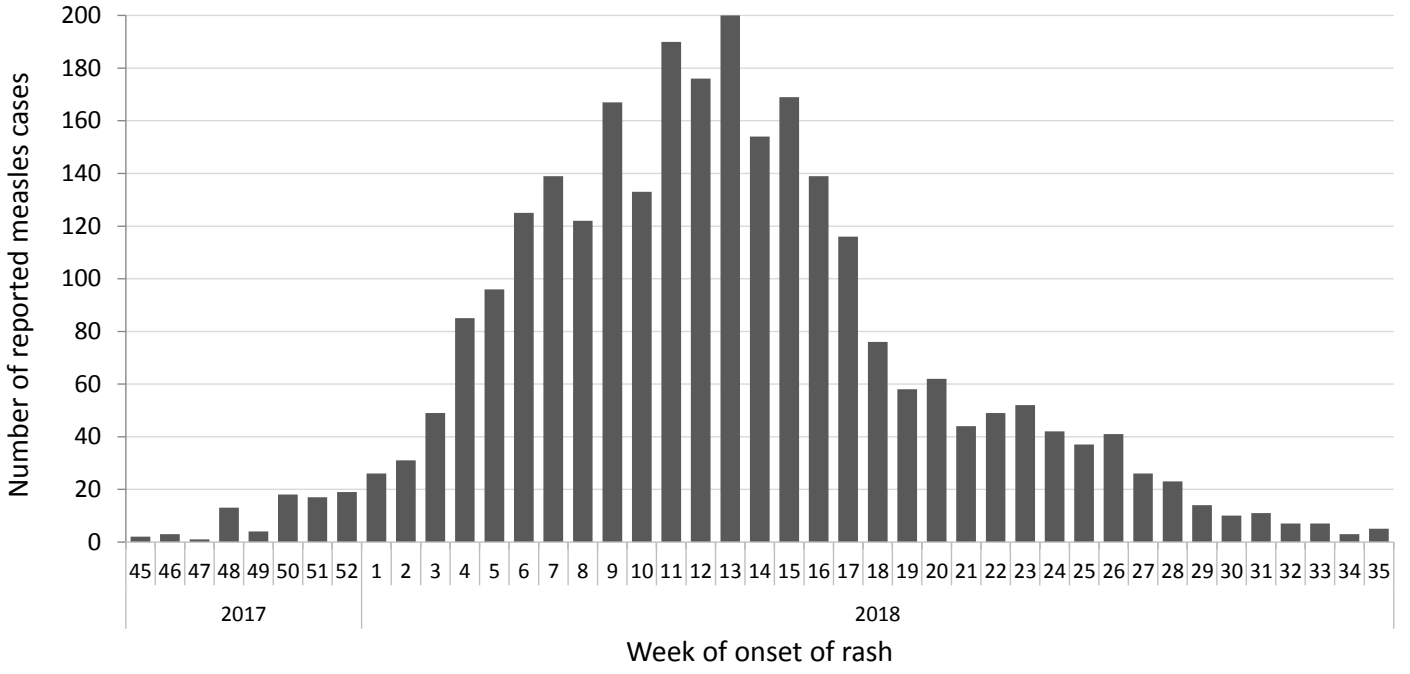
A measles outbreak started in November 2017 in the Nouvelle-Aquitaine region of France located in the southwest of the country. The first cases were reported among students attending the University of Bordeaux. The outbreak quickly spread into other regions of France and by 31 August 2018, a total of 2761 measles cases were reported (November 2017–August 2018). Three measles-related deaths were reported (as of 31 August 2018).

The highest number of cases occurred in the Nouvelle-Aquitaine region (1065 cases) particularly in the district of Gironde (619 cases). The peak of the outbreak was in week 13 (26 March to 1 April 2018). The weekly distribution of measles cases is shown in Fig. 5.

Of the total cases, 247 (9%) were <1 year old, 536 (19.5%) were 1–4 years old and 604 (22%) were 5–14 years old. Adults aged 20 years and older constituted 37% (n=1024) of the total reported cases (Fig. 6).

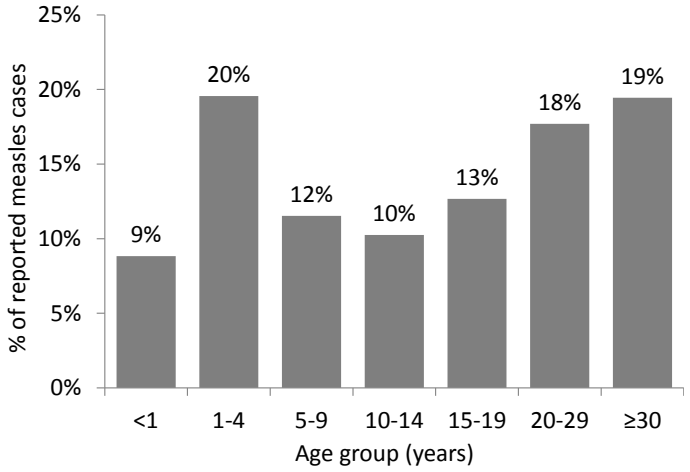
Of the total cases, 1297 (47%) were laboratory confirmed, 573 (21%) were epidemiologically linked to

Fig. 5. Distribution of measles cases by week of onset of rash in France, 6 November 2017—31 August 2018 (n=2761)*



Data source: Santé publique France, mandatory reporting of measles cases. * provisional data as of 31 August 2018

Fig. 6. Age distribution of reported measles cases in France, 1 November 2017—31 August 2018 (n=2760)



*The age was not known in 1 case.

laboratory-confirmed cases and 891 were classified as clinically compatible. Molecular characterization conducted on clinical specimens from 484 measles cases between November 2017 and end of July 2018 identified D8 genotype (424 cases) and B3 genotype (60 cases).

Of the total cases, 624 (23%) were hospitalized. Pneumonia as a complication of measles was reported in 161 cases and 4 cases had acute encephalitis. Three of these cases with complications resulted in death – all 3 were laboratory-confirmed cases.

Information on vaccination status was available for 2233 cases, all born after 1980 when the vaccination programme against measles started: 1666 were unvaccinated (75%), 310 had received one vaccine dose (14%) and 226 had received two doses (10%). For 31 cases the number of vaccine doses was unknown.

Measles-related deaths in France

The first measles-related death related to this outbreak was reported in February 2018 in an adult around 30 years old. This was followed by a second death in June in an adult around 25 years old. Both died as a result of respiratory complications. A third death occurred in July, in a teenager presenting with measles inclusion-body encephalitis. The latter two cases had a pre-existing high-risk condition (post-transplantation immunodeficiency).

Outbreak response and control measures in France

In response to the measles outbreak, a nationwide campaign of enhanced routine immunization activities was undertaken to identify unvaccinated or incompletely vaccinated people and vaccinate them with the combined measles, mumps and rubella vaccine according to the national recommendations. Locally, specific catch-up campaigns were also undertaken to target particular susceptible and affected population groups, such as university students, health professionals, nomadic minorities and inmates at a correctional facility. The outbreak control team established mobile vaccination teams to increase vaccination uptake among these groups.

To increase awareness of the outbreak and the importance of vaccination against measles, the health authorities provided information to the public mostly in newspapers and social media. Information was also specially provided to health professionals and nomadic minorities.

As of 1 January 2018, France has mandatory vaccination in place for a number of routine vaccines including the measles-mumps-rubella (MMR) vaccine for children born since that date.

Other actions implemented by the Ministry of Health include the opening in 2017 of a national website (www.vaccination-info-service.fr), together with the national public health agency *Santé publique France,* targeting both the public and health professionals; and the provision of new recommendations to strengthen immunization of health professionals by 2019 (focused especially on vaccination against measles, pertussis and influenza).

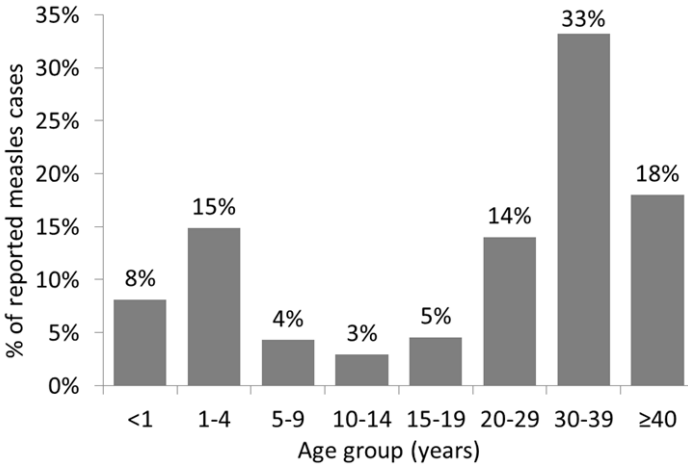
Measles in Serbia

A measles outbreak started in 2017 in Serbia. A total of 5741 measles cases were reported across the country for the period October 2017 – 30 September 2018. Measles cases were reported in all 25 districts, but predominantly (84%) in five districts: Belgrade, Nisava, Raska, Pcinja and Jablanica. The highest number of cases occurred in the capital Belgrade (1742), the city of Nis (1235) and city of Leskovac (343). The peak of the outbreak was in March 2018.

Of the total cases, 465 (8.1%) were <1 year old, 852 (14.8%) were 1–4 years old and 246 (4.3%) were 5–9 years old. Adults older than 20 years constituted 65.3% (n=3749) of the total reported cases. Most of the adults were 30–39 years old (n=1903) (Fig.7).

Of the total cases, 2893 (50.4%) were laboratory confirmed, 1472 cases (25.6%) were epidemiologically linked to laboratory-confirmed cases and 1376 cases

Fig. 7. Age distribution of reported measles cases, Serbia, 1 October 2017—30 September 2018 (n=5729)*



* For 12 cases the age was unknown and they are therefore not represented in the graph.

(24%) were classified as clinically compatible. Molecular characterization of the circulating measles virus in Serbia between October 2017 and September 2018 identified B3 genotype.

Vaccination status was known in 2454 cases: 1713 were unvaccinated (69.8%), 420 (17.1%) had received one dose and 321 (13.1%) had received two doses. Of the total cases, 33.2% (n=1905) were hospitalized. Pneumonia as a complication of measles was reported in 580 cases and 2 cases had acute encephalitis.

Measles-related deaths in Serbia

The first measles-related death in 20 years was reported in December 2017 and since then 14 additional deaths have been reported (as of 30 September 2018) as a result of complications from measles. The deaths were reported in all age groups: 1 infant, 3 children 2–4 years old and 11 adults (2 aged 20–29 years, 5 aged 30–39 years, 4 aged 40 –45 years). Pneumonia and respiratory insufficiency were reported in 12 of these cases.

The diagnosis of measles in the fatal cases was confirmed with positive IgM test results in 9 cases. Three cases were reported unvaccinated and in one case the infant was not eligible for vaccination as it had not reached 12 months of age – the recommended age to receive the first dose of a measles-containing vaccine according to the Serbian childhood vaccination schedule. Vaccination status of the remaining 11 fatal cases was unknown.

Outbreak response and control measures in Serbia

In response to the outbreak, a nationwide campaign of enhanced routine immunization activities was undertaken to identify unvaccinated and incompletely vaccinated children aged between 12 months and 14 years and to vaccinate them according to the national childhood immunization schedule.

To increase awareness of the outbreak and the importance of vaccination against measles the National Institute of Public Health in Serbia has also been regularly updating its website with situation reports and has undertaken activities for outbreak control since October 2017.

Measles in Ukraine – an update[1]

The outbreak of measles has intensified in Ukraine (Fig.1). For the period 1 January to 31 August 2018, the country reported 29 465 measles cases and 13 measles-related deaths. All of Ukraine's 24 regions were affected especially L'viv (n=5949), Zakarpattya (3018), Ivano-Frankivsk (2816), Odesa (2187), Kyiv City (1994), Ternopil (1634), Mykolaiv (1357) and Chernivtsi (1287). In Kyiv city, 1994 cases were reported.

Of the total cases, 4633 cases (16%) were laboratory confirmed, 3986 cases (14%) were epidemiologically linked to laboratory-confirmed cases and 20 846 cases (70%) were classified as clinically compatible.

The largest proportion of cases (n=12 065, 41%) were below 10 years of age: 1639 cases were <1 year old, 4912 were 1–4 years old and 5514 were 5–9 years old. Adults (18 years and older) accounted for 11 816 cases (40%). Of the 23 654 cases with a known vaccination status, the majority of cases were unvaccinated (n=13 411; 57%) while 4086 (17%) had received one measles-containing vaccine dose. Of the total, 21 482 cases (73%) were hospitalized.

The 13 measles-related deaths included 9 children (5 in Odessa, 1 in Kyiv region, 1 in L'viv, 1 in Mykolaiv, 1 in Zakarpattya) and 4 adults (1 in Ivano-Frankivsk, 1 in Kirovohrad, 1 in Odessa and 1 in Ternopil).

Outbreak control measures

The first significant increase in the incidence of measles was noticed in May 2017. Since that time the Ministry of Health of Ukraine has been monitoring the measles outbreak response by holding regular conference calls with the regions of Ukraine. Eight meetings of the national Measles Task Force involving key stakeholders and partners, such as WHO and United Nations Children's Fund (UNICEF) were conducted In the period

[1] First report of this outbreak was published in WHO EpiBrief, 2018, 1:1–16. www.euro.who.int/__data/assets/pdf_file/0009/370656/epibrief-1-2018-eng.pdf?ua=1

July 2017—August 2018, with the participation of the Minister of Health, deputy Minister of Health and the Ministry's Public Health Center.

In May 2018 supplementary immunization activities among 1–9 year-old children were further extended to all children under 17 years of age. In June 2018, the Measles Task Force extended the provision of free-of-charge measles-mumps-rubella (MMR) vaccination to adults in high-risk groups, including health care workers, military personnel, staff of educational institutions and adult students.

WHO, UNICEF and other partners, namely the nongovernmental organizations Parents for Vaccination and Rotary International and national Rotary clubs continued actively supporting measles outbreak response activities. During the period November 2017—July 2018, integrated surveillance workshops on measles, rubella and congenital rubella syndrome were conducted in 23 oblasts of Ukraine by WHO in cooperation with the National Verification Committee for Measles and Rubella Elimination and the Public Health Center. WHO and partners plan to provide further support focused on strengthening country capacities and on microplanning of supplementary immunization activities, including forecasting of target group and vaccine needs.

According to data reported by Ukraine for the first half of 2018, routine vaccination coverage with the first and second MMR doses for the full year 2018 is expected to reach over 90% for each dose.

Comments

Measles and rubella in the WHO European Region

The number of reported measles cases for the first half of 2018 (n=42 170) was almost triple that reported for the first half of 2017 (14 674). This increase was mostly due to large numbers of cases reported from France, Greece, Italy, Serbia and Ukraine indicating large pools of persons susceptible to measles in these countries.

Several countries in the Region have experienced a range of challenges in their efforts to eliminate measles and rubella in recent years, such as declines in overall routine immunization coverage, consistently low coverage among some marginalized groups and adults, and interruptions in vaccine supply.

Rubella continues to be reported in fewer countries than measles. The number of reported cases in the Region (n=526) for the first half of 2018 was 26% higher than that reported for the same period in 2017 (n=418). This is attributed to the reported rubella cases in Ukraine, from 0 cases for 2017 to 147 cases for the first half of 2018. Only 3 of the 283 and 10 of the 147 reported cases in Poland and Ukraine, respectively, were laboratory-confirmed. Laboratory testing would be needed to confirm cases as rubella.

Measles and Rubella Laboratory Network

All 73 laboratories of the European Measles and Rubella Laboratory Network were accredited for 2018. In their annual reports to the Regional Verification Commission for Measles and Rubella Elimination (RVC), national verification committees (NVCs) continue to include laboratory data not only from WHO-accredited laboratories but also from other sources. The RVC therefore recommended in June 2018 that WHO-accredited national laboratories coordinate or facilitate access of these other laboratories to national measles and rubella external quality assessments to ensure their proficiency.

During the first half of 2018, 84% of countries in the Region notifying measles cases submitted genomic sequence information to the Measles Nucleotide Surveillance database (MeaNS) (although only 78% of countries met the 80% target for viral detection). As in previous years, few countries submitted genomic sequence information on rubella cases to the Rubella Nucleotide Surveillance database (RubeNS).

It is important to note that these genotype reports are not fully representative of the regional distribution of measles and rubella viruses. This is primarily because Member States differ in the rate of collecting specimens for viral sequencing but also due to differences in the reporting of sequence data to MeaNS/RubeNS.

Elimination status

Following review of submitted annual reports for 2017, the RVC verified in June 2018 that 37 of 53 countries interrupted endemic measles transmission for ≥36 months by the end of 2017, and are therefore considered to have eliminated measles.[7] A further 6 countries provided evidence for the interruption of measles transmission for a period of <36 months. Ten countries remain endemic and face challenges in interrupting measles transmission.

For rubella, 37 countries eliminated the disease and 5 interrupted transmission for a period of <36 months. Eleven were still considered endemic for rubella. 35 countries provided evidence for the elimination of both measles and rubella transmission while 8 countries are still endemic for both diseases.

The resurgence of measles in the European Region reflects ongoing challenges in endemic countries to eliminate the disease. It also reflects the need for sustained efforts to protect gains in countries that are considered to have interrupted or eliminated measles. Elimination of both measles and rubella is a priority goal that all European countries have firmly committed to. To attain it, they need to ensure that immunization coverage of at least 95% is reached and maintained in all districts, and immunity gaps in the population are closed. Furthermore, high-quality surveillance is necessary to monitor disease occurrence and detect outbreaks so that appropriate and timely response measures can be taken. Accurate surveillance data is also needed to adequately ascertain the status of measles and rubella transmission as part of the elimination verification process. The goal will not be met unless all countries translate their political commitment into concrete programmatic actions that address identified challenges and guarantee adequate investment.

Acknowledgements

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Annex

Table 1. Measles cases: classification, reporting and surveillance performance January–June 2018 (as of 5 September 2018)

Country	Total Population in 2018[1]	2018 (as of 05 September 2018)			2018														
							Classification						Reporting			Surveillance Indicators[7]			
		Incidence Rate (per 1 million population)[2]	Total measles cases[3]	Total measles death	Annualized Incidence Rate (per 1 million population)[2]	Total measles cases[3]	Lab confirmed	Epi-Link	Clinically compatible[4]	Discarded Measles	Imported cases	Measles Death	Completeness[5]	Timeliness[5]	Month & year of last report	Laboratory investigation rate[5]	Rate of discarded cases[6]	Origin of infection[5]	Timeliness of investigation[5]
Albania	2 919 422	0.69	12	0	0	0	0	0	0	0	0	-	100%	17%	Jun-18	-	0.00	-	-
Andorra	68 915	0	0	-	0	0	0	0	0	0	0	-	100%	100%	Jun-18	-	0.00	-	-
Armenia	3 034 998	0.33	1	0	0	17	17	0	0	155	17	0	100%	67%	Jun-18	100%	5.11	100%	99%
Austria	8 613 647	9.64	94	0	2.73	62	55	6	1	16	15	0	100%	100%	Jun-18	81%	0.19	100%	15%
Azerbaijan	10 070 075	0	0	0	0	0	0	0	0	63	0	0	100%	100%	Jun-18	100%	0.63	-	100%
Belarus	9 429 102	0	1	0	8.33	157	157	0	0	222	0	0	100%	50%	Jun-18	100%	2.35	0	0
Belgium	11 513 025	31.88	367	0	3.08	71	56	14	1	0	0	0	100%	100%	Jun-18	-	-	-	-
Bosnia and Herzegovina	3 782 297	7.14	27	0	11.37	86	42	1	43	0	0	0	100%	33%	Jun-18	-	-	-	-
Bulgaria	6 992 150	23.60	166	1	0	5	5	0	0	0	5	0	100%	100%	Jun-18	100%	0.00	100%	100%
Croatia	4 194 538	1.67	7	0	1.67	19	19	0	0	4	5	0	100%	83%	Jun-18	100%	0.10	100%	0
Cyprus	1 198 198	0.83	4	0	3.76	14	14	0	0	0	5	0	100%	100%	Jun-18	100%	0.00	100%	0
Czech Republic	10 563 111	13.73	149	0	7.05	149	146	1	2	0	0	0	100%	67%	Jun-18	0%	0.00	0	0
Denmark	5 732 713	0.35	4	0	0.26	3	3	0	0	0	0	0	100%	100%	Jun-18	100%	0.00	100%	0
Estonia	1 302 401	0	1	0	2.69	10	10	0	0	41	3	0	100%	100%	Jun-18	100%	3.15	100%	100%
Finland	5 556 439	0.72	10	0	0.18	4	4	0	0	0	2	0	100%	100%	Jun-18	100%	0.00	50.0%	0
France	65 205 671	7.50	519	1	19.37	2593	1143	559	891	0	67	3	100%	100%	Jun-18	79%	0.00	83.0%	0.0%
Georgia	3 973 681	23.66	96	0	141.93	1128	869	65	194	321	0	2	100%	83%	Jun-18	86%	8.08	99.6%	96%
Germany	80 560 850	10.80	936	1	2.30	408	337	52	19	0	37	0	100%	100%	Jun-18	93%	0.00	81.6%	0
Greece	10 871 762	97.87	1067	2	98.51	2145	1211	490	444	67	3	2	100%	100%	Jun-18	74%	0.62	7.9%	0
Hungary	9 754 429	3.18	36	0	0.36	13	13	0	0	14	6	0	100%	100%	Jun-18	100%	0.14	92.3%	93%
Iceland	336 938	2.97	3	0	0	0	0	0	0	0	0	-	100%	100%	Jun-18	-	0.00	-	-
Ireland	4 790 845	5.22	25	0	5.64	55	48	2	5	0	1	0	100%	100%	Jun-18	98%	0.00	81.8%	85%
Israel	8 455 489	1.77	16	0	8.75	151	116	32	3	0	3	0	100%	50%	Jun-18	100%	0.00	2.0%	83%
Italy	59 788 104	89.62	5404	4	16.71	2036	1535	107	394	129	38	4	100%	100%	Jun-18	82%	0.22	89.0%	0
Kazakhstan	18 256 484	0.11	2	0	0.03	1	1	0	0	0	0	0	83%	83%	May-18	-	-	-	-
Kyrgyzstan	6 213 441	0.48	5	0	24.62	310	274	16	20	303	4	0	100%	50%	Jun-18	97%	4.88	99.0%	74%
Latvia	1 935 780	2.07	5	0	3.10	15	15	0	0	0	3	0	100%	100%	Jun-18	100%	0.00	20.0%	100%
Lithuania	2 817 402	0.00	2	0	0	1	1	0	0	0	1	0	100%	83%	Jun-18	100%	0.00	100%	0
Luxembourg	591 126	1.69	4	0	0	1	1	0	0	0	1	0	100%	100%	Jun-18	100%	0.00	100%	100%
Malta	421 387	0	0	-	0	0	0	0	0	0	0	-	100%	100%	Jun-18	-	0.00	-	-
Monaco	38 166	0	0	-	0	0	0	0	0	0	0	-	83%	67%	Jun-18	-	0.00	-	-
Montenegro	626 240	0	0	0	23.95	32	3	0	29	1	2	0	83%	50%	May-18	15%	0.16	6.3%	9%
Netherlands	17 084 531	0.59	16	0	0.35	15	14	1	0	0	3	0	100%	100%	Jun-18	0%	0.00	86.7%	0
Norway	5 387 342	0	1	0	0.28	7	7	0	0	0	4	0	100%	100%	Jun-18	100%	0.00	71.4%	100%
Poland	38 522 728	1.38	63	0	0.65	62	45	5	12	0	12	0	100%	100%	Jun-18	86%	0.00	100.0%	100%
Portugal	10 229 432	3.13	34	1	6.11	129	121	0	8	319	4	0	100%	83%	Jun-18	97%	3.12	92.2%	78%
Republic of Moldova	4 044 534	0	0	-	4.57	37	36	1	0	0	0	0	100%	83%	Jun-18	-	-	-	-
Romania	19 105 089	382.41	7330	22	16.51	635	553	64	18	0	4	22	100%	100%	Jun-18	97%	0.00	100%	100%
Russian Federation	143 261 490	6.09	898	0	5.24	1549	1486	52	11	1570	47	2	100%	100%	Jun-18	99%	1.10	100%	50%
San Marino	32 241	0	0	-	0.00	0	0	0	0	0	0	-	100%	67%	Jun-18	-	0.00	-	-
Serbia	8 742 764	80.29	702	1	283.32	4954	2577	0	2377	0	0	14	100%	100%	Jun-18	-	-	-	-
Slovakia	5 434 237	1.47	11	0	10.12	116	80	36	0	5	6	0	100%	100%	Jun-18	4%	0.09	94.8%	98%
Slovenia	2 073 018	2.89	8	0	1.45	8	8	0	0	0	2	0	100%	100%	Jun-18	88%	0.00	37.5%	100%
Spain	46 116 884	2.84	149	0	1.84	182	175	7	0	68	12	0	100%	100%	Jun-18	100%	0.15	8.8%	96%
Sweden	9 987 062	3.50	46	0	0.65	25	25	0	0	0	12	0	100%	100%	Jun-18	100%	0.00	100%	0
Switzerland	8 523 590	11.50	105	1	0.65	27	24	3	0	69	16	0	100%	100%	Jun-18	100%	0.81	92.6%	29%
Tajikistan	9 046 723	71.74	649	0	0	0	0	0	0	45	0	0	100%	83%	Jun-18	100%	0.50	-	87%
The former Yugoslav Republic of Macedonia	2 085 315	9.59	20	0	3.60	15	13	1	1	0	0	0	100%	50%	Jun-18	-	-	-	-
Turkey	81 086 257	0.81	69	0	1.89	361	360	1	0	2321	54	0	100%	50%	Jun-18	100%	2.86	15.8%	97%
Turkmenistan	5 565 070	0	0	-	0	0	0	0	0	36	0	0	100%	0%	Jun-18	100%	0.65	-	100%
Ukraine	44 170 002	108.26	4782	5	261.15	23070	3977	0	19093	0	0	8	100%	67%	Jun-18	-	-	-	-
United Kingdom	65 912 569	2.32	282	0	10.14	1486	1486	0	0	0	149	0	100%	83%	Jun-18	100%	0.00	97.6%	0
Uzbekistan	31 064 765	0	0	0	0.10	6	6	0	0	33	0	0	100%	83%	Jun-18	100%	0.11	100%	100%
Total/Averages	**917 084 469**	**25.83**	**24128**	**39**	**22.70**	**42170**	**17088**	**1516**	**23566**	**5802**	**543**	**57**	**99.1%**	**83.6%**		**89.8%**	**0.70**	**24.1%**	**41.1%**

Data source: Monthly aggregated and case-based data reported by Member States to WHO/Europe or via ECDC/TESSy. Member States submitting aggregate data: Belgium, Bosnia and Herzegovina, Kazakhstan, Republic of Moldova, Serbia, the former Yugoslav Republic of Macedonia and Ukraine.

[1] *Data source:* "World Population Prospects: The 2015 Revision", New York, United Nations.

[2] Incidence rates not meeting the target (<1 per million population) are highlighted in red. Imported measles cases are excluded from the numerator while calculating the incidence rate.

[3] All confirmed measles cases regardless of origin.

[4] Unless specified as laboratory confirmed or epi-linked, cases are classified as clinically compatible.

[5] Laboratory investigation rates not achieving target of ≥80% are highlighted in red.

[6] Discard rates not achieving the target (≥2 discarded cases per 100 000) are highlighted in red.

[7] Surveillance indicators could not be calculated for Member States submitting aggregate data.

Table 2. Rubella cases: classification, reporting and surveillance performance January–June 2018 (as of 5 September 2018)

Country	Total Population in 2018[1]	(as of 05 September 2018)		Classification						Reporting			Surveillance Indicators[7]			
		Incidence Rate (per 1 million population)[2]	Total rubella cases[3]	Annualized Incidence Rate (per 1 million population)[2]	Total rubella cases[3]	Lab confirmed	Epi-Link	Clinically compatible[4]	Discarded Rubella	Imported cases	Completeness[5]	Timeliness[5]	Month & year of last report	Laboratory investigation rate[5]	Rate of discarded cases[6]	Origin of infection[5]	Timeliness of investigation[5]
Albania	2 919 422	0	0	0	0	0	0	0	0	0	100%	17%	Jun-18	-	0	-	-
Andorra	68 915	0	0	0	0	0	0	0	0	0	100%	100%	Jun-18	-	0	-	-
Armenia	3 034 998	0	0	0	0	0	0	0	2	0	100%	67%	Jun-18	100%	0.07	-	100%
Austria	8 613 647	4.53	42	0.29	5	5	0	0	0	0	100%	100%	Jun-18	100%	0	100%	0
Azerbaijan	10 070 075	0	0	0	0	0	0	0	35	0	100%	100%	Jun-18	100%	0.35	-	100%
Belarus	9 429 102	0.11	1	0	1	1	0	0	222	1	100%	50%	Jun-18	0%	2.35	100%	0
Belgium[8]	11 513 025	-	-	-	-	-	-	-	-	-	-	-	See footnote	-	-	-	-
Bosnia and Herzegovina	3 782 297	0.26	1	0.26	2	0	0	2	0	0	83%	17%	May-18	-	-	-	-
Bulgaria	6 992 150	0	0	0.07	1	0	0	1	0	0	100%	100%	Jun-18	0%	0	0%	100%
Croatia	4 194 538	0	0	0	0	0	0	0	0	0	100%	67%	Jun-18	-	0	-	-
Cyprus	1 198 198	0	0	0	0	0	0	0	0	0	100%	100%	Jun-18	-	0	-	-
Czech Republic	10 563 111	0.09	2	0.05	1	1	0	0	0	0	100%	17%	Jun-18	100%	0	100%	0
Denmark[8]	5 732 713	-	-	-	-	-	-	-	-	-	-	-	See footnote	-	-	-	-
Estonia	1 302 401	0	0	0	0	0	0	0	7	0	100%	100%	Jun-18	100%	0.54	-	100%
Finland	5 556 439	0.18	1	0	0	0	0	0	0	0	100%	100%	Jun-18	-	0	-	-
France[8]	65 205 671	-	-	-	-	-	-	-	-	-	-	-	See footnote	-	-	-	-
Georgia	3 973 681	1.26	5	0	0	0	0	0	52	0	100%	33%	Jun-18	67%	1.31	-	100%
Germany	80 560 850	0.91	74	0.19	31	6	0	25	0	0	100%	100%	Jun-18	19%	0	58%	0
Greece	10 871 762	0	0	0	0	0	0	0	0	0	100%	100%	Jun-18	-	0	-	-
Hungary	9 754 429	0	0	0	0	0	0	0	5	0	100%	50%	Jun-18	100%	0.05	-	100%
Iceland	336 938	0	0	0	0	0	0	0	0	0	100%	100%	Jun-18	-	0	-	-
Ireland	4 790 845	0	0	0.31	3	0	0	3	0	0	100%	100%	Jun-18	0%	0	33%	33%
Israel	8 455 489	0	0	0.06	1	0	0	1	0	0	100%	50%	Jun-18	100%	0	0%	100%
Italy	59 788 104	1.12	68	0.11	14	7	2	5	7	1	100%	100%	Jun-18	89%	0.01	64%	0
Kazakhstan	18 256 484	0.00	0	0	0	0	0	0	0	0	83%	83%	May-18	-	-	-	-
Kyrgyzstan	6 213 441	0.64	4	0.56	7	7	0	0	0	0	100%	50%	Jun-18	100%	0	100%	71%
Latvia	1 935 780	0	0	0.52	3	3	0	0	0	1	100%	83%	Jun-18	100%	0	100%	33%
Lithuania	2 817 402	0	0	0.18	1	1	0	0	0	0	100%	83%	Jun-18	100%	0	100%	0
Luxembourg	591 126	0	0	0	0	0	0	0	0	0	100%	100%	Jun-18	-	0	-	-
Malta	421 387	0	0	0	0	0	0	0	0	0	100%	100%	Jun-18	-	0	-	-
Monaco	38 166	-	-	-	-	-	-	-	-	-	-	-	No Report	-	-	-	-
Montenegro	626 240	0	0	0	0	0	0	0	0	0	83%	50%	May-18	-	0	-	-
Netherlands	17 084 531	0	0	0	0	0	0	0	0	0	100%	100%	Jun-18	-	0	-	-
Norway	5 387 342	0	0	0	0	0	0	0	0	0	100%	83%	Jun-18	-	0	-	-
Poland	38 522 728	12.36	476	3.67	283	3	1	279	0	0	100%	100%	Jun-18	-	-	-	-
Portugal	10 229 432	0.39	4	0.10	3	1	0	2	6	1	100%	83%	Jun-18	67%	0.06	100%	78%
Republic of Moldova	4 044 534	0	0	0	0	0	0	0	0	0	100%	83%	Jun-18	-	-	-	-
Romania	19 105 089	0.47	9	0.10	4	2	0	2	0	0	100%	67%	Jun-18	75%	0	100%	100%
Russian Federation	143 261 490	0.04	7	0.01	3	3	0	0	0	1	100%	100%	Jun-18	100%	0	100%	100%
San Marino	32 241	0	0	0	0	0	0	0	0	0	100%	67%	Jun-18	-	0	-	-
Serbia	8 742 764	-	-	-	-	-	-	-	-	-	-	-	No Report	-	-	-	-
Slovakia	5 434 237	0	0	0	0	0	0	0	0	0	100%	100%	Jun-18	-	0	-	-
Slovenia	2 073 018	0	0	0	0	0	0	0	0	0	100%	100%	Jun-18	-	0	-	-
Spain	46 116 884	0	1	0.03	3	2	0	1	1	0	100%	100%	Jun-18	75%	0	33%	75%
Sweden	9 987 062	0	0	0	0	0	0	0	0	0	100%	100%	Jun-18	-	0	-	-
Switzerland	8 523 590	0.12	1	0.12	2	2	0	0	15	0	100%	100%	Jun-18	94%	0.18	50%	6%
Tajikistan	9 046 723	0.11	1	0	0	0	0	0	15	0	83%	83%	Jun-18	100%	0.17	-	100%
The former Yugoslav Republic of Macedonia	2 085 315	0	0	0	0	0	0	0	0	0	100%	33%	Jun-18	-	-	-	-
Turkey	81 086 257	0.02	2	0.06	10	10	0	0	2321	0	100%	50%	Jun-18	0%	2.86	20%	0.4%
Turkmenistan	5 565 070	0	0	0	0	0	0	0	41	0	100%	0%	Jun-18	100%	0.74	-	100%
Ukraine	44 170 002	-	-	1.66	147	10	0	137	0	0	100%	50%	Jun-18	-	-	-	-
United Kingdom	65 912 569	0	3	0	1	1	0	0	0	1	100%	67%	Jun-18	100%	0	100%	0
Uzbekistan	31 064 765	0.03	1	0	0	0	0	0	5	0	100%	83%	Jun-18	100%	0.02	-	100%
Total/Averages	**917 084 469**	**0.75**	**703**	**0.28**	**526**	**65**	**3**	**458**	**2734**	**6**	**91.2%**	**71.1%**		**84.2%**	**0.38**	**11.6%**	**7.0%**

Data source: Monthly aggregated and case-based data reported by Member States to WHO/Europe or via ECDC/TESSy. Member States submitting aggregate data: Bosnia and Herzegovina, Kazakhstan, Poland, Republic of Moldova, the former Yugoslav Republic of Macedonia and Ukraine.

[1] *Data source:* World Population Prospects: The 2015 Revision", New York, United Nations.

[2] Incidence rates not meeting the target (<1 per million population) are highlighted in red. Imported rubella cases are excluded from the numerator while calculating the incidence rate.

[3] All confirmed rubella cases regardless of origin.

[4] Unless specified as laboratory confirmed or epi-linked, cases are classified as clinically compatible.

[5] Target (>=80%) not achieving are highlighted in red.

[6] Discard rates not achieving the target (>=2 discarded cases per 100 000) are highlighted in red.

[7] Surveillance indicators could not be calculated for Member States submitting aggregate data.

[8] Belgium, Denmark, and France do not have comprehensive rubella surveillance systems.