

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.

The surveillance data presented in this issue were reported by Member States and are incorporated in the centralized information system for infectious diseases.¹ Tabulated surveillance data by country for 2018 (as of 28 March 2019) are annexed to this issue. Preliminary data for the first two months of 2019 (as of 28 March 2019) are also presented. Tabulated surveillance data by country for these two months are also published separately in WHO EpiData no. 3/2019.²

The analyses of these data are performed on cases with disease onset dates during 2018 and during the first two months of 2019. Where these dates were unavailable, cases with the date of notification reported during this period were included. If different dates are used the numbers of cases in a specified time period may differ from reports produced by national or partner agencies. Percentages in this report were rounded to the nearest whole number.

Measles in the WHO European Region in 2018

Incidence – notifications and laboratory data

For 2018, 83 540 measles cases were reported in 47 countries of the WHO European Region among all 53 Member States that submitted measles data (including zero reporting) (Table 1 in annex).

Of the total, 88% of cases (n=73 685) were reported by eight countries: Ukraine (n=53 218; 64%), Serbia (5076; 6%), Israel (3140; 4%), France (2913; 3%), Italy (2686; 3%), Russian Federation (2256; 3%), Georgia (2203; 3%) and Greece (2193; 3%). The highest incidence per million population for 2018 was in Ukraine (1209) followed by Serbia (579) and Georgia (564).

Of the total, 28 391 cases (34%) were laboratory confirmed and 4189 cases (5%) were epidemiologically linked. The remaining 50 960 cases (61%) were classified as clinically compatible. For 2018, 42 (89%) of the 47 countries in the Region notifying measles cases submitted 4200 genomic sequence information to the Measles Nucleotide Surveillance database (MeaNS)³ through WHO-accredited reference laboratories. The genotypes identified in the Region comprised B3

(n=2203), D8 (1981) and D4 (16). The dominant measles virus genotype B3 variants were the named strains Dublin.IRL/8.16/ (50% of all B3 variants) and MVs/Saint Denis.FRA/36.17 (21%), whereas the dominant D8 variants were the named strains Herborn.DEU/05.17/ (39% of all D8 variants) and Gir Somnath.IND/42.16/ (26%). Genotype D4, which was not reported in 2017, was reported by one country in the Region following an importation from another WHO Region. For the first time in several years, H1 was not reported in the Region in 2018. The number of sequences of measles virus in the WHO European Region reported to MeaNS by genotype from 2016 up to week 8 of 2019 is shown in Fig. 1 (page 2).

Age distribution

Of the total cases in the Region, the age group was known in all but 8 cases: 6639 (8%) were <1 year old, 14 602 (17%) were 1–4 years old, 31 625 (38%) were 5–19 years old and 30 666 (37%) were ≥20 years old (Fig. 2). The age distribution varied between countries. Fig. 3 shows the age distribution of reported measles cases by proportion and age-specific incidence in the top three countries reporting 75% (n=61 434) of cases in the Region: Israel, Serbia and Ukraine. Among these 3 countries, the largest proportion of cases in adults aged 20 years and older was reported from Serbia (67%; n=3404). By contrast, the largest proportion of cases in children 1–4 years old was reported in Israel (29%; 916).

Vaccination status

Vaccination status was known in 62 524 cases (76%). Of the 39 486 (62%) who were unvaccinated: 6089 cases (15%) were <1 year old, 10 528 cases (27%) were 1–4 years old, 7886 cases (20%) were 5–9 years old, 6479 cases (16%) were 10–19 years old and 8499 cases (22%) were ≥20 years old. In 5 unvaccinated cases (0.01%) the age was unknown. The remaining 23 768 cases (38%) were reportedly vaccinated with at least one dose of measles-containing vaccine (MCV).

Hospitalization

Data on hospitalization status was available for 71% (n=59 011) of all reported measles cases. Of these, 49 454 were hospitalized, amounting to 84% of all cases with known hospitalization status. Of all the hospitalized cases, most were reported from Ukraine (n=36 140; 73%).

Fig. 1. The number of sequences of measles virus in the WHO European Region reported to MeaNS by genotype, 2016 up to week 8, 2019

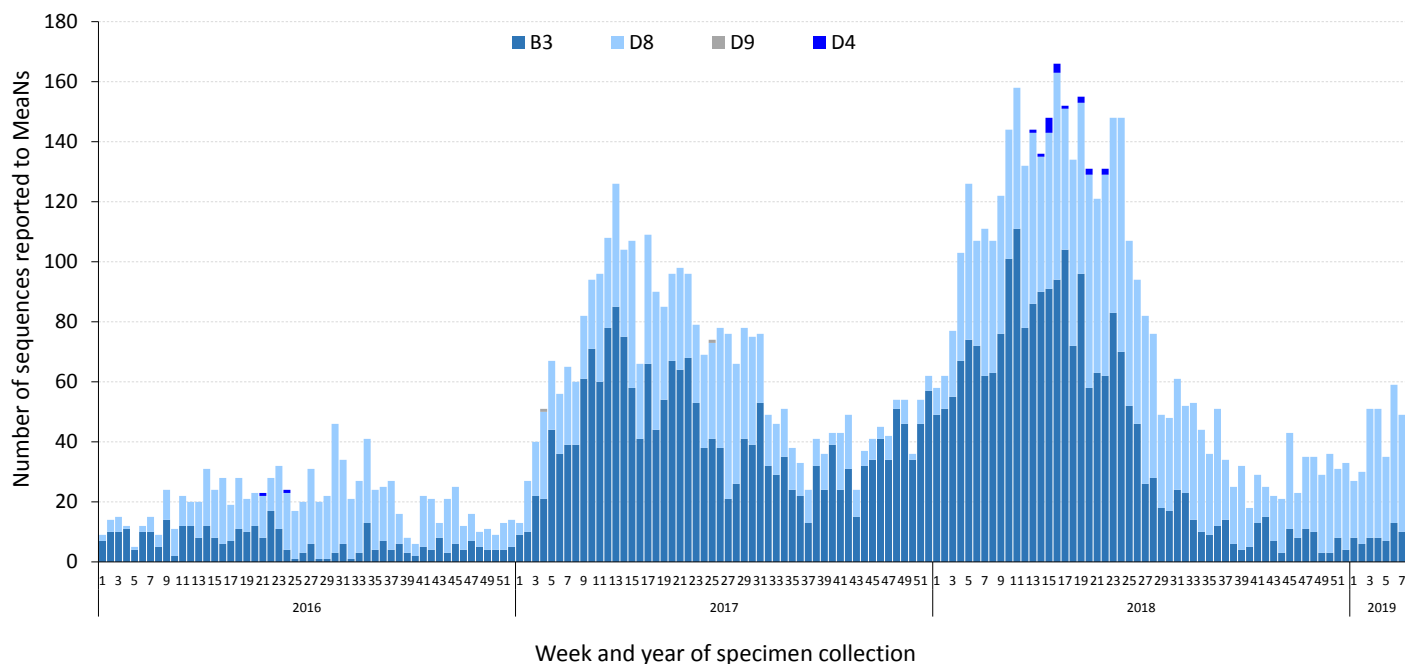
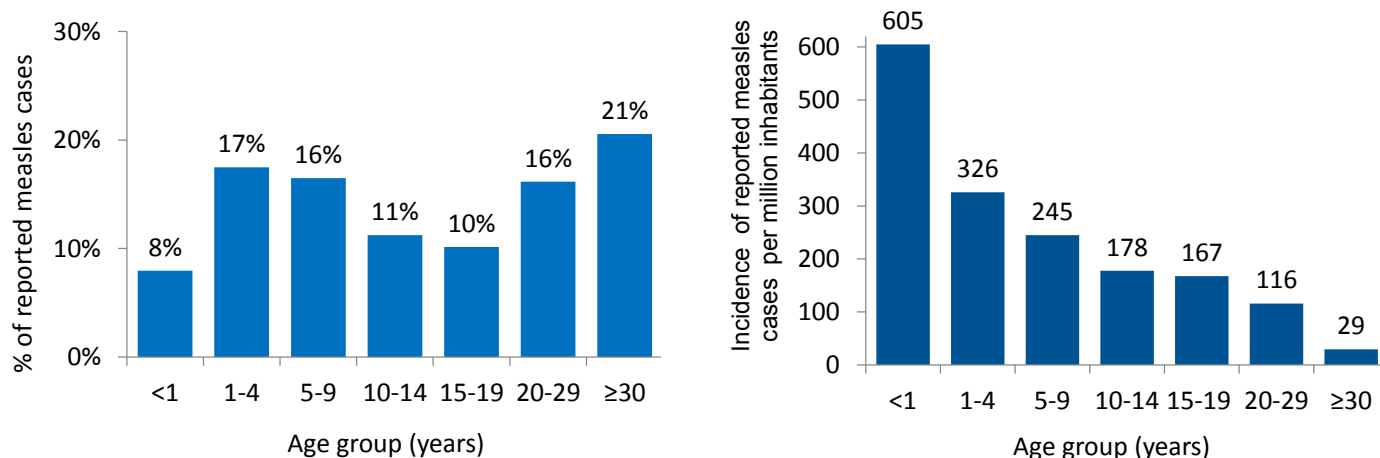


Fig. 2. Age distribution of measles cases by proportion (left) and incidence per million inhabitants (right) in the WHO European Region, 2018 (n=83 532)*



N.B. Discarded cases are not included.

*For 8 cases the age group was not reported.

Measles-related deaths

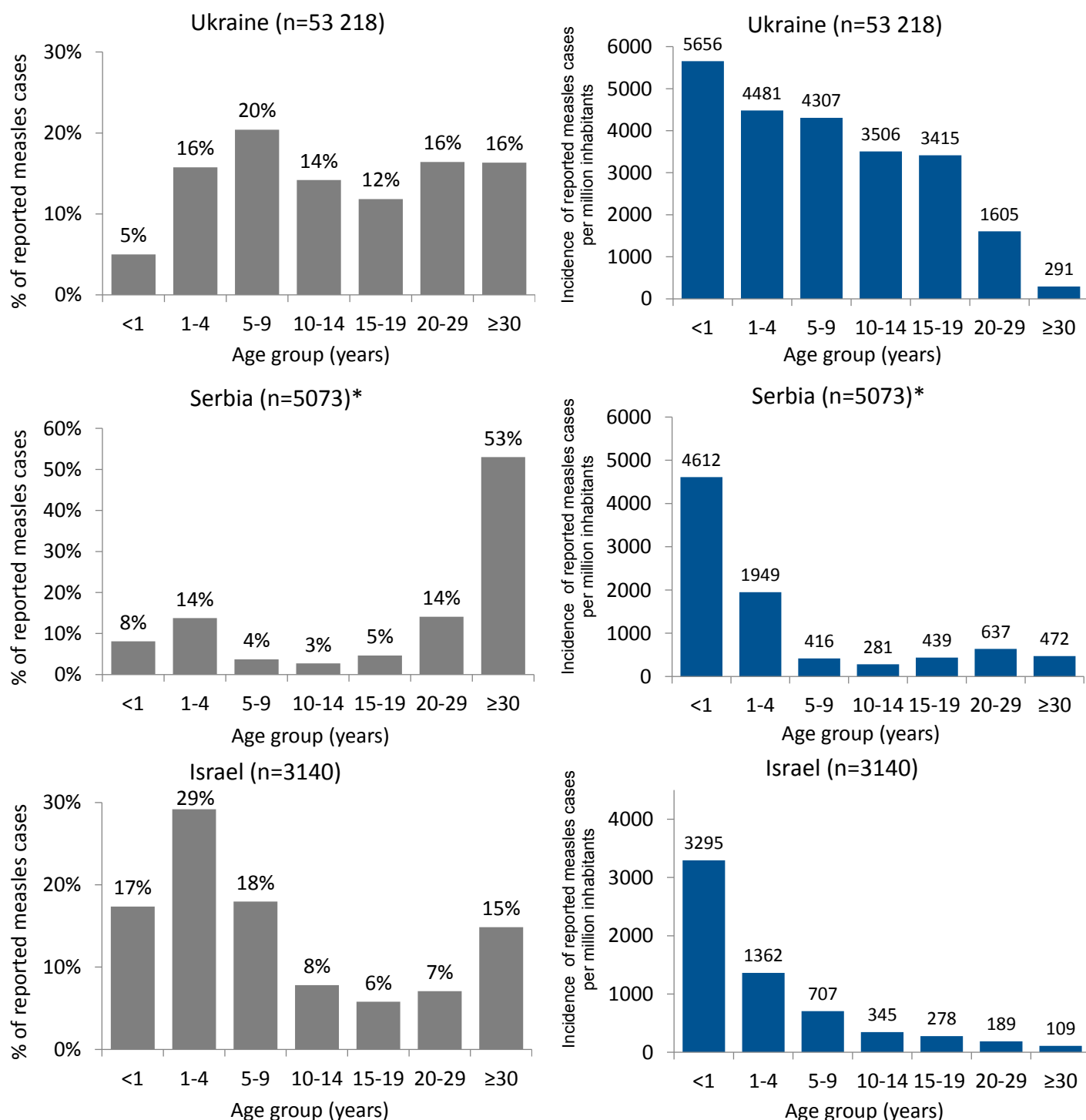
There were 74 measles-related deaths in 10 countries in cases with disease onset or date of notification in 2018: Albania (3 deaths), France (3), Georgia (3), Greece (2), Italy (9), Kyrgyzstan (2), Romania (22), Russian Federation (1), Serbia (14) and Ukraine (15). This corresponded to a death rate per 1000 measles cases of 0.89. Most deaths (60%, n=44) occurred in children under 10 years of age: 29 cases were <1 year old and 15 cases were 1–9 years old. Of the remaining deaths, 4 cases were 10–19 years old and 26 cases were ≥23 years old with the oldest being 74 years of age. All 74 deaths were laboratory-confirmed cases of measles

with one exception that occurred in an epidemiologically linked case. 70 fatal cases were unvaccinated, 3 cases had received one MCV dose and 1 case had received two MCV doses.

Imported cases

Importation status was known for 20% (n=17 028) of cases. Of these, 938 were reported as imported cases, amounting to 5.5% of cases with a known importation status. Of all the imported cases, most (579; 62%) were reported by United Kingdom (n=109), France (102), Russian Federation (101), Poland (89), Italy (61), Germany (61) and Turkey (56) (Table 1).

Fig. 3. Age distribution of measles cases by proportion (left) and incidence per million inhabitants (right) in the three countries that together reported 75% of cases with data on age in the WHO European Region, 2018 (n=61 434)



*For 3 cases the age group was not reported.

**Measles in the WHO European Region
January—February 2019**

Incidence – notifications and laboratory data

By 28 March 2019, 34 300 measles cases were reported in 42 countries of the WHO European Region for the first two months of 2019.

Of the total, 91% of cases (n=31 361) were reported by

5 countries: Ukraine (n=25 319), Kazakhstan (3414), Georgia (1098), Kyrgyzstan (985) and Russian Federation (545).

Measles-related deaths

There were 13 measles-related deaths in 3 countries in cases with disease onset or date of notification in January-February 2019: Albania (2 deaths), Romania

(1), and Ukraine (10). This corresponded to a death rate per 1000 measles cases of 0.38.

Rubella in the WHO European Region in 2018

Incidence – notifications and laboratory data

For 2018, 850 rubella cases were reported in 22 countries of the WHO European Region among 49 countries (92% of the 53 Member States) submitting rubella data (including zero reporting) (Table 2 in annex). Most cases were reported by Poland (n=450; 53%), followed by Ukraine (235; 28%), Germany (58; 7%), Italy (21; 2%) Turkey (16; 2%) and Spain (13; 2%). Poland also had the highest crude incidence per million population (12).

Of the total, 104 cases (12%) were laboratory confirmed, most of which were reported by Germany (16 cases), Turkey (16 cases), Ukraine (12) and Spain (10). 7 cases were classified as epidemiologically linked and 739 were clinically compatible cases. Of the latter, most (90%) were reported by Poland (445 cases) and Ukraine (223).

During 2018, 15 rubella virus sequences were entered in the Rubella Nucleotide Surveillance database (RubeNS).⁴ The identified genotypes comprised 2B (n=11) and 1E (3).

Age distribution

The age group was known in 761 cases (90%): 79 cases (10%) were <1 year old, 220 cases (29%) were 1–4 years old, 323 cases (42%) were 5–19 years old, 139 cases (18%) were ≥20 years old (Fig. 4).

Vaccination status

Vaccination status was known in 62% of cases (n=530). Of the 239 (45%) unvaccinated cases, 62 cases (26%)

were <1 year old, 61 cases (26%) were 1–4 years old, 26 cases (11%) were 5–9 years old, 12 cases (5%) were 10–19 years old and 78 cases (33%) were ≥20 years old. The remaining 291 cases (55%) were reportedly vaccinated with at least one rubella-containing vaccine dose.

Imported cases

Importation status was known in 11% (n=96) of rubella cases. Of these, 9 were reported as imported cases, amounting to 9% of cases with a known importation status. The imported cases were reported by Belarus (n=1), Germany (3), Italy (1), Latvia (1), Portugal (2), and the United Kingdom (1).

Rubella in the WHO European Region January–February 2019

Incidence – notifications and laboratory data

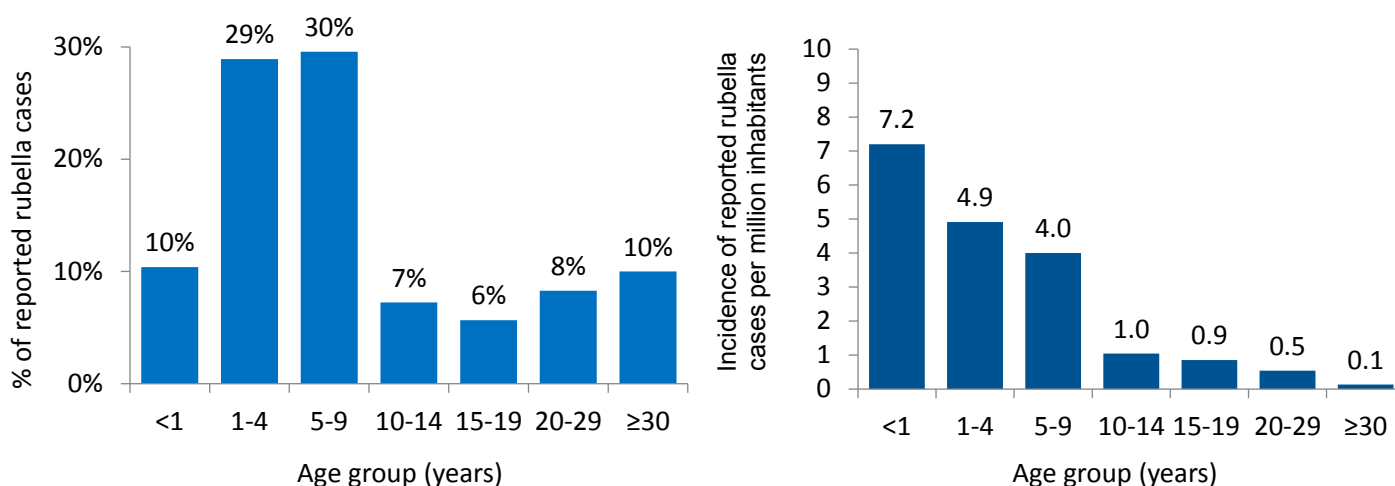
By 28 March 2019, 144 rubella cases were reported in 10 countries of the WHO European Region among 49 (92%) countries submitting rubella data (including zero reporting). Most cases were reported by Poland (n=69; 48%) followed by Ukraine (49; 34%). Of the total cases reported in the Region, 24 were laboratory confirmed.

Comments

Measles and rubella in the WHO European Region

The number of reported measles cases in the Region in 2018 (n=83 540) increased significantly compared to 2017 (25 870). Several countries have experienced a range of challenges in recent years, such as sub-optimal national routine immunization coverage,⁵ or consistently low coverage among some groups in

Fig. 4. Age distribution of rubella cases by proportion (left) and incidence per million inhabitants (right) in the WHO European Region, 2018 (n=761)*



N.B. Discarded cases are not included.

*For 89 cases the age group was not reported.

countries with generally high coverage,^{6,7} and interruptions in vaccine supply.⁸ The resulting accumulation of persons susceptible to measles forms the basis of widespread outbreaks and persisting measles transmission in the Region through 2018.

Continued transmission of measles, for periods longer than a year, in some cases, is also the result of delayed or inadequate outbreak response. An adequate outbreak response requires initiation of a large-scale immunization campaign to reduce the pool of susceptible individuals, active case finding, contact tracing for targeted vaccination, if required, and enhanced laboratory surveillance.

Some countries are unwilling or unable to undertake large-scale vaccination campaigns due to:

- poor acceptance of large-scale immunization campaigns by health authorities and the general public;
- lack of infrastructure to vaccinate specific susceptible population groups;
- lack of dedicated financial resources;
- insufficient political commitment; or
- vaccine supply challenges.

Rubella continues to be reported in fewer countries than measles, however the number of reported cases in the Region for 2018 (n=850) was higher than that reported for 2017 (n=702). Only a small percentage of rubella cases were laboratory confirmed. Laboratory testing would be needed to confirm cases as rubella.

Measles mortality

Measles mortality is likely to be underestimated since many surveillance systems collect case numbers but do not systematically obtain data on the complications of the disease per case. Moreover, the cause of death on death certificates may be noted as a complication of measles, such as pneumonia or encephalitis, rather than as measles itself. This means that the death rate per 1000 cases for 2018 is likely to be even higher than 0.89. Our description of reported measles-related deaths is also limited because data on complications that led to death are often not reported. In addition, the rare but invariably fatal complication of subacute sclerosing panencephalitis (SSPE) can develop years after acute measles infection. Therefore the full extent of mortality from measles can only be assessed in the long term.

Vaccination

Continued high vaccination coverage ($\geq 95\%$) with two doses of MCV in every district is crucial to achieve and sustain elimination in the Region. At the same time those

who have missed vaccinations in the past need to be identified and reached with vaccination services to close immunity gaps. Every opportunity should be used to reach children with routine vaccination and to present adolescents and adults with the option of checking their vaccination status and receiving vaccinations that they may have missed. A MCV should also be recommended for susceptible persons (or anyone not sure of their immunization status) intending to travel to countries where measles is endemic and/or outbreaks are ongoing.

Based on population mixing patterns and the risk of measles transmission, the WHO Strategic Advisory Group of Experts on Immunization (SAGE) noted that because of high contact rates after school entry, immunity gaps in school-age children are an important factor in disease transmission.⁹ SAGE therefore recommended that countries put in place school entry checks for measles vaccination and consider optimal approaches for filling the immunity gaps. These include follow-up MCV vaccination campaigns that also target school-age children, either at the national or at a more targeted subnational level. Countries where the scheduled age for the routine second MCV dose is after school entry should consider lowering the age of administering the second dose, provided that this does not have a negative impact on coverage levels.

Surveillance

In 2018, the extent of laboratory confirmation of suspected measles and rubella cases varied between countries depending on the absence or presence of outbreaks and on the quality of surveillance. Compared to previous years, in 2018, a larger number of countries submitted genomic sequence information on rubella cases to RubeNS. Most countries in the Region notifying measles cases submitted genomic sequence information to the MeaNS (although not always meeting the 80% target for viral detection required for elimination-standard surveillance). The genotype information on the circulating measles virus in MeaNS provides a good indication of the dynamics of measles virus molecular epidemiology in the Region although not fully representative of the regional distribution of measles viruses. This is primarily because countries differ in the rate of collecting specimens for viral sequencing, but also due to differences in the reporting of sequence data to MeaNS.

Measles and rubella surveillance systems need to be sensitive and specific enough to detect, confirm and

classify all suspected cases.¹⁰ Suspected cases of measles and rubella should be notified promptly to public health authorities to allow timely case-based investigation and tracing of contacts for vaccination, if necessary. Specimens adequate for detecting acute infection should be collected from $\geq 80\%$ of suspected measles and rubella cases and tested in a proficient laboratory.¹⁰ Both epidemiological data and molecular characterization of the viruses are critical to identify imported viruses, define import-related outbreaks and understand transmission patterns, thereby contributing to the assessment of interruption of endemic transmission of these diseases.

During the process of verifying the elimination of measles in the Region, each country needs to evaluate its own sensitivity of measles surveillance and identify areas where the quality of surveillance can be improved.¹¹ As the Region progresses towards measles elimination, all countries are urged to ensure that their surveillance systems are of elimination-standard quality.¹²

Elimination status

According to the assessment conducted in 2018 by the European Regional Verification Commission for Measles

and Rubella Elimination, 43 of the 53 Member States of the Region had interrupted endemic measles transmission for ≥ 12 months by the end of 2017.¹³ 37 of these had sustained interruption for ≥ 36 months and were therefore considered to have eliminated endemic disease. For rubella, 42 countries had interrupted endemic measles transmission for ≥ 12 months by the end of 2017. 37 eliminated the disease. 35 countries provided evidence for the elimination of both measles and rubella transmission. Yet, 10 and 11 countries were still considered endemic for measles and rubella, respectively.

Elimination of both measles and rubella is a priority goal that all European countries have firmly committed to. To attain this goal in the Region, immunization coverage of at least 95% needs to be reached and maintained at national level and in all districts through routine immunization. In addition high-quality surveillance is necessary to monitor disease occurrence for public health action but also to adequately ascertain its absence. The latter is key to enable verification of elimination.

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Annex

Table 1. Measles cases: classification, reporting and surveillance performance 2018 (as of 28 March 2019)

Country	Total Population in 2018 ¹	2018														
		Incidence Rate (per 1 million population)	Total measles cases ²	Classification			Discarded Measles	Imported cases	Measles Death	Report			Surveillance Indicators ⁶			
				Lab confirmed	Epi-Link	Clinically compatible ³				Completeness ⁴	Timeliness ⁴	Month & year of last report	Laboratory investigation rate ⁴	Rate of discarded cases ⁵	Origin of infection ⁴	Timeliness of investigation ⁴
Albania ⁷	2 934 363	499.60	1466	1367	0	99	1268	13	3	100%	50%	Dec-18	97%	43.2	100%	79%
Andorra	76 953	0.00	0	0	0	0	0	-	-	100%	100%	Dec-18	-	0.0	-	-
Armenia	2 934 152	6.48	19	19	0	0	239	2	0	100%	83%	Dec-18	100%	8.1	84%	100%
Austria	8 751 820	8.80	77	70	6	1	25	22	0	100%	100%	Dec-18	79%	0.3	100%	15%
Azerbaijan	9 923 914	7.15	71	55	0	16	132	0	0	100%	100%	Dec-18	94%	1.3	77%	100%
Belarus ⁷	9 452 113	25.07	237	236	0	1	432	1	0	100%	58%	Dec-18	100%	4.6	0%	0%
Belgium	11 498 519	10.44	120	94	21	5	-	0	0	100%	92%	Dec-18	-	-	-	-
Bosnia and Herzegovina	3 503 554	25.40	89	45	0	44	-	0	0	100%	58%	Dec-18	-	-	-	-
Bulgaria	7 036 848	1.85	13	13	0	0	-	6	0	100%	100%	Dec-18	100%	-	77%	100%
Croatia	4 164 783	5.52	23	23	0	0	4	9	0	100%	92%	Dec-18	100%	0.1	100%	0%
Cyprus	1 189 085	11.77	14	14	0	0	-	5	0	100%	100%	Dec-18	100%	-	100%	0%
Czech Republic	10 625 250	20.42	217	215	1	1	-	48	0	100%	83%	Dec-18	99%	-	24%	0%
Denmark	5 754 356	1.39	8	8	0	0	-	4	0	100%	100%	Dec-18	100%	-	100%	0%
Estonia	1 306 788	7.65	10	10	0	0	57	3	0	100%	100%	Dec-18	100%	4.4	100%	100%
Finland	5 542 517	2.71	15	15	0	0	-	4	0	100%	100%	Dec-18	100%	-	33%	0%
France	65 233 271	44.66	2913	1449	580	884	-	102	3	100%	100%	Dec-18	81%	-	83%	0%
Georgia	3 907 131	563.84	2203	1660	100	443	508	0	3	100%	58%	Dec-18	83%	13.0	99%	96%
Germany	82 293 457	6.59	542	457	52	33	-	61	0	100%	100%	Dec-18	91%	-	80%	0%
Greece	11 142 161	196.82	2193	1234	492	467	70	3	2	100%	100%	Dec-18	74%	0.6	10%	0%
Hungary	9 688 847	1.44	14	14	0	0	22	7	0	100%	100%	Dec-18	100%	0.2	93%	92%
Iceland	337 780	0.00	0	0	0	0	-	-	-	100%	100%	Dec-18	-	-	-	-
Ireland	4 803 748	16.24	78	73	2	3	-	4	0	100%	100%	Dec-18	97%	-	21%	88%
Israel	8 452 841	371.47	3140	1318	1544	278	-	3	0	100%	75%	Dec-18	83%	-	0%	86%
Italy	59 290 969	45.30	2686	2081	177	428	234	61	9	100%	100%	Dec-18	85%	0.4	88%	0%
Kazakhstan	18 403 860	31.30	576	503	25	48	-	0	0	83%	83%	Dec-18	-	-	-	-
Kyrgyzstan ⁷	6 132 932	179.85	1103	524	483	96	816	6	2	100%	75%	Dec-18	65%	13.3	100%	88%
Latvia	1 929 938	10.36	20	20	0	0	-	8	0	92%	92%	Dec-18	100%	-	40%	100%
Lithuania	2 876 475	11.47	33	33	0	0	-	30	0	100%	92%	Dec-18	100%	-	100%	76%
Luxembourg	590 321	6.78	4	4	0	0	-	4	0	100%	100%	Dec-18	100%	-	100%	100%
Malta	432 089	11.57	5	5	0	0	-	4	0	100%	100%	Dec-18	100%	-	100%	0%
Monaco	38 897	0.00	0	0	0	0	0	-	-	92%	75%	Dec-18	-	0.0	-	-
Montenegro	629 219	322.62	203	176	4	23	69	15	0	100%	33%	Dec-18	93%	11.0	52%	95%
Netherlands	17 084 459	1.40	24	23	1	0	-	9	0	100%	100%	Dec-18	91%	-	38%	0%
North Macedonia	2 085 051	30.69	64	53	10	1	-	0	0	100%	67%	Dec-18	-	-	-	-
Norway	5 353 363	2.24	12	10	2	0	-	6	0	100%	100%	Dec-18	100%	-	83%	100%
Poland	38 104 832	9.89	377	242	18	117	-	89	0	100%	100%	Dec-18	69%	-	94%	100%
Portugal	10 291 196	16.62	171	160	2	9	408	12	0	100%	92%	Dec-18	97%	4.0	88%	82%
Republic of Moldova	4 041 065	84.14	340	194	146	0	58	15	0	100%	92%	Dec-18	100%	1.4	100%	100%
Romania	19 580 634	75.13	1471	1195	246	30	-	20	22	100%	100%	Dec-18	98%	-	100%	100%
Russian Federation	143 964 709	15.67	2256	2125	96	35	4845	101	1	100%	100%	Dec-18	99%	3.4	100%	31%
San Marino	33 557	0.00	0	0	0	0	0	-	-	100%	75%	Dec-18	-	0.0	-	-
Serbia	8 762 027	579.32	5076	2657	0	2419	-	0	14	100%	100%	Dec-18	-	-	-	-
Slovakia	5 449 816	104.96	572	405	166	1	26	17	0	100%	100%	Dec-18	100%	0.5	99%	100%
Slovenia	2 081 260	4.32	9	9	0	0	-	3	0	100%	100%	Dec-18	89%	-	44%	100%
Spain	46 397 452	4.85	225	220	4	1	134	35	0	100%	100%	Dec-18	97%	0.3	20%	96%
Sweden	9 982 709	3.81	38	36	2	0	-	18	0	100%	100%	Dec-18	97%	-	97%	0%
Switzerland	8 544 034	5.97	51	43	8	0	143	22	0	100%	100%	Dec-18	100%	1.7	96%	27%
Tajikistan	9 107 211	0.00	0	0	0	0	59	-	-	100%	83%	Dec-18	100%	0.6	-	88%
Turkey ⁷	81 916 871	6.93	568	566	1	1	3240	56	0	100%	67%	Dec-18	100%	4.0	18%	97%
Turkmenistan	5 851 466	0.00	0	0	0	0	61	-	-	100%	17%	Dec-18	100%	1.0	-	100%
Ukraine	44 009 214	1209.25	53218	7742	0	45476	-	0	15	100%	83%	Dec-18	-	-	-	-
United Kingdom	66 573 504	14.32	953	953	0	0	-	109	0	100%	92%	Dec-18	100%	-	98%	0%
Uzbekistan	32 364 996	0.71	23	23	0	0	135	1	0	100%	92%	Dec-18	100%	0.4	100%	98%
Region	922 458 377	90.56	83540	28391	4189	50960	12985	938	74	99%	88%	Dec-18	92%	2.7	70%	54%

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

¹ Population source: United Nations, Department of Economic and Social Affairs, Population Division. World Population Prospects: The 2017 Revision.

² Includes all confirmed measles cases regardless of origin.

³ Unless specified as laboratory confirmed or epi-linked, cases are classified as clinically compatible.

⁴ Target (>=80%) not achieving are highlighted in red.

⁵ Rate of discarded cases not achieving the target (>=2 discarded cases per 100 000) are highlighted in red. Rate of discarded cases is not calculated for the countries submitting only confirmed measles cases.

⁶ Surveillance indicators cannot be calculated for Member States submitting aggregate data.

⁷ Country classifies discard cases as "discarded, not measles, not rubella".

Table 2. Rubella cases: classification, reporting and surveillance performance 2018 (as of 28 March 2019)

Country	Total Population in 2018 ¹	2018													
		Incidence Rate (per 1 million population)	Total rubella cases ²	Classification			Discarded Rubella	Imported cases	Report			Surveillance Indicators ⁶			
				Lab confirmed	Epi-Link	Clinically compatible ³			Completeness ⁴	Timeliness ⁴	Month & year of last report	Laboratory investigation rate ⁴	Rate of discarded cases ⁵	Origin of infection ⁴	Timeliness of investigation ⁴
Albania ⁷	2 934 363	0.00	0	0	0	0	1268	0	100%	50%	Dec-18	100%	43.2	-	74%
Andorra	76 953	0.00	0	0	0	0	0	0	100%	100%	Dec-18	-	0.0	-	-
Armenia	2 934 152	0.00	0	0	0	0	0	0	100%	83%	Dec-18	-	0.0	-	-
Austria	8 751 820	0.69	6	6	0	0	-	0	100%	100%	Dec-18	100%	-	100%	0%
Azerbaijan	9 923 914	0.00	0	0	0	0	69	0	100%	100%	Dec-18	100%	0.7	-	100%
Belarus ⁷	9 452 113	0.21	2	2	0	0	432	1	100%	58%	Dec-18	99%	4.6	50%	0%
Belgium ⁸	11 498 519	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bosnia and Herzegovina	3 503 554	0.86	3	0	0	3	-	0	92%	50%	Dec-18	-	-	-	-
Bulgaria	7 036 848	0.14	1	0	0	1	-	0	100%	100%	Dec-18	0%	-	0%	100%
Croatia	4 164 783	0.00	0	0	0	0	-	0	100%	83%	Dec-18	-	-	-	-
Cyprus	1 189 085	0.00	0	0	0	0	-	0	100%	100%	Dec-18	-	-	-	-
Czech Republic	10 625 250	0.19	2	1	1	0	-	0	100%	58%	Dec-18	100%	-	100%	0%
Denmark ⁸	5 754 356	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Estonia	1 306 788	0.00	0	0	0	0	15	0	100%	100%	Dec-18	100%	1.1	-	100%
Finland	5 542 517	0.00	0	0	0	0	-	0	100%	100%	Dec-18	-	-	-	-
France ⁸	65 233 271	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Georgia	3 907 131	0.00	0	0	0	0	77	0	100%	33%	Dec-18	74%	2.0	-	96%
Germany	82 293 457	0.70	58	16	0	42	-	3	100%	100%	Dec-18	26%	-	59%	0%
Greece	11 142 161	0.00	0	0	0	0	-	0	100%	100%	Dec-18	-	-	-	-
Hungary	9 688 847	0.00	0	0	0	0	7	0	100%	75%	Dec-18	100%	0.1	-	100%
Iceland	337 780	0.00	0	0	0	0	-	0	100%	100%	Dec-18	-	-	-	-
Ireland	4 803 748	0.83	4	0	0	4	-	0	100%	100%	Dec-18	25%	-	50%	75%
Israel	8 452 841	0.24	2	1	0	1	-	0	100%	67%	Dec-18	100%	-	0%	100%
Italy	59 290 969	0.35	21	6	1	14	22	1	100%	100%	Dec-18	83%	0.0	62%	0%
Kazakhstan	18 403 860	0.05	1	1	0	0	-	0	83%	75%	Dec-18	-	-	-	-
Kyrgyzstan ⁷	6 132 932	1.30	8	8	0	0	816	0	100%	75%	Dec-18	50%	13.3	100%	86%
Latvia	1 929 938	1.55	3	3	0	0	-	1	92%	83%	Dec-18	100%	-	100%	33%
Lithuania	2 876 475	0.35	1	1	0	0	-	0	100%	92%	Dec-18	100%	-	100%	0%
Luxembourg	590 321	0.00	0	0	0	0	-	0	100%	100%	Dec-18	-	-	-	-
Malta	432 089	0.00	0	0	0	0	-	0	100%	100%	Dec-18	-	-	-	-
Monaco	38 897	0.00	0	0	0	0	0	0	17%	17%	Dec-18	-	0.0	-	-
Montenegro	629 219	0.00	0	0	0	0	0	0	100%	33%	Dec-18	-	0.0	-	-
Netherlands	17 084 459	0.00	0	0	0	0	-	0	100%	100%	Dec-18	-	-	-	-
North Macedonia	2 085 051	0.00	0	0	0	0	-	0	100%	67%	Dec-18	-	-	-	-
Norway	5 353 363	0.00	0	0	0	0	-	0	100%	92%	Dec-18	-	-	-	-
Poland	38 104 832	11.81	450	3	2	445	-	0	100%	100%	Dec-18	-	-	-	-
Portugal	10 291 196	0.49	5	3	0	2	11	2	100%	92%	Dec-18	81%	0.1	100%	56%
Republic of Moldova	4 041 065	0.00	0	0	0	0	17	0	100%	83%	Dec-18	100%	0.4	-	100%
Romania	19 580 634	0.46	9	6	0	3	-	0	92%	75%	Dec-18	78%	-	100%	100%
Russian Federation	143 964 709	0.04	6	5	1	0	0	0	100%	100%	Dec-18	100%	0.0	100%	67%
San Marino	33 557	0.00	0	0	0	0	0	0	100%	75%	Dec-18	-	0.0	-	-
Serbia	8 762 027	-	-	-	-	-	-	-	-	-	No report	-	-	-	-
Slovakia	5 449 816	0.00	0	0	0	0	1	0	100%	100%	Dec-18	100%	0.0	-	100%
Slovenia	2 081 260	0.00	0	0	0	0	-	0	100%	100%	Dec-18	-	-	-	-
Spain	46 397 452	0.28	13	10	2	1	9	0	100%	100%	Dec-18	100%	0.0	8%	95%
Sweden	9 982 709	0.00	0	0	0	0	1	0	100%	100%	Dec-18	100%	0.0	-	100%
Switzerland	8 544 034	0.23	2	2	0	0	32	0	100%	100%	Dec-18	91%	0.4	50%	12%
Tajikistan	9 107 211	0.00	0	0	0	0	27	0	100%	92%	Dec-18	100%	0.3	-	100%
Turkey ⁷	81 916 871	0.20	16	16	0	0	3240	0	100%	67%	Dec-18	96%	4.0	13%	97%
Turkmenistan	5 851 466	0.00	0	0	0	0	57	0	100%	17%	Dec-18	100%	1.0	-	100%
Ukraine	44 009 214	5.34	235	12	0	223	-	0	100%	75%	Dec-18	-	-	-	-
United Kingdom	66 573 504	0.03	2	2	0	0	-	1	100%	83%	Dec-18	100%	-	100%	0%
Uzbekistan	32 364 996	0.00	0	0	0	0	6	0	100%	92%	Dec-18	100%	0.0	-	100%
Region	922 458 377	0.92	850	104	7	739	6107	9	92%	78%		90%	1.3	60%	82%

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

¹ Population source: United Nations, Department of Economic and Social Affairs, Population Division. World Population Prospects: The 2017 Revision.

² All confirmed rubella cases regardless of origin.

³ Unless specified as laboratory confirmed or epi-linked, cases are classified as clinically compatible.

⁴ Target (≥80%) not achieving are highlighted in red.

⁵ Rate of discarded cases not achieving the target (≥2 discarded cases per 100 000) are highlighted in red. Rate of discarded cases is not calculated for the countries submitting only confirmed rubella cases.

⁶ Surveillance indicators can not be calculated for Member States submitting aggregate data.

⁷ Country classifies discard cases as "discarded, not measles, not rubella".

⁸ Country does not have a comprehensive rubella surveillance system.