

An ongoing measles outbreak in the Federation of Bosnia and Herzegovina, 2014 to 2015

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Between January 2014 and the beginning of February 2015, the Federal Institute of Public Health in the Federation of Bosnia and Herzegovina has reported 3,804 measles cases. Notable transmission has been observed in three Central Bosnia Canton municipalities: Bugojno, Fojnica and Travnik. Most cases were unvaccinated 2,680 (70%) or of unknown vaccination status 755 (20%). Health authorities have been checking vaccination records and performing necessary prevention measures. The epidemic is still ongoing.

Since the beginning of 2014, a measles outbreak is taking place in the Federation of Bosnia and Herzegovina (FB&H), including a total of 3,804 measles cases up to the start of February 2015.

The first two cases were reported in Bugojno, Central Bosnia Canton, in siblings who were teenagers, both of whom had respectively visited the local health care centre in early February 2014, with a rash that had started three days earlier. They had recently travelled to Germany.

Description of the outbreak

For the investigation of the outbreak, the general principles of the case definition of the European Union (EU) Commission Decision of 2012 were used [1]. Laboratory investigations of initial patients were conducted at the Department of Microbiology, University Clinical Centre-Sarajevo, Bosnia and Herzegovina, and were based on serological findings of the measles virus specific antibody response in serum samples.

From the first municipality affected by the outbreak, Bugojno in Central Bosnia Canton, where school-aged children and adolescents (6 to 19 years-old) with measles were reported from February 2014, the outbreak subsequently spread, in two distinct epidemic waves,

to other cantons, including, consecutively, Sarajevo, Zenica-Doboj, Tuzla, Una-Sana, and Herzegovina-Neretva (Figure 1).

FIGURE 1

Cumulative number and geographical distribution of notified cases of the measles outbreak, Federation of Bosnia and Herzegovina, January 2014–February 2015 (n=3,804 cases)

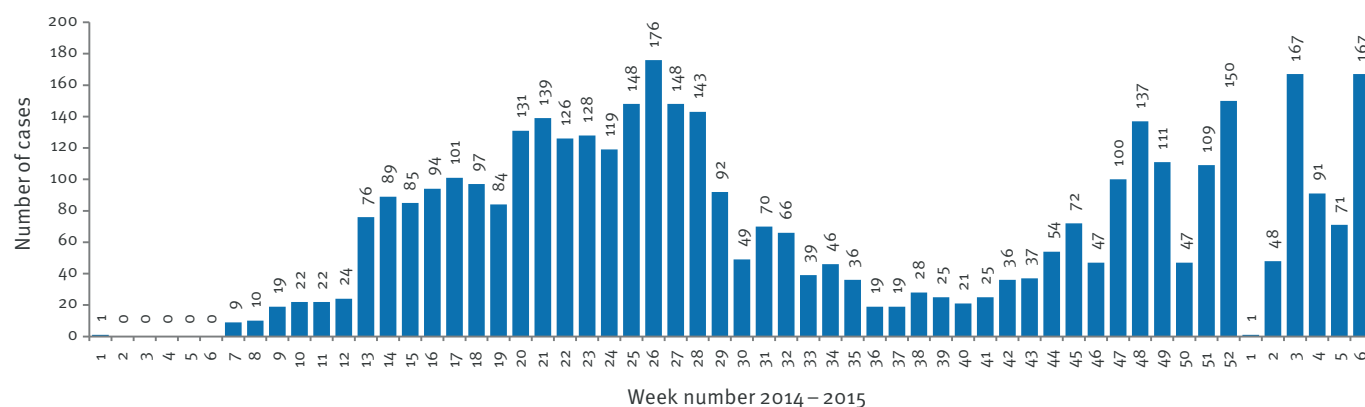


The name of the cantons of the Federation of Bosnia and Herzegovina are in white font, with the number of cases below.

In the legend, the first and second waves, refer to the two waves of the measles outbreak.

FIGURE 2

Reported measles cases by week of rash onset, Federation of Bosnia and Herzegovina, January 2014–February 2015 (n=3,804)



The first epidemic wave of the outbreak had a peak in week 26 of 2014 (23–29 June, n=175 cases) and the second, a peak in week 4 of 2015 (29–25 January, n=167 cases) (Figure 2). During the first wave which occurred from the beginning of 2014 until July of that year, 2,201 measles cases were reported, mainly in the cantons of Central Bosnia, Zenica-Doboj and Sarajevo. The second wave, from August 2014 to February 2015, accounted for an additional 1,603 cases, mainly in the Tuzla and Una-Sana Cantons. During the second wave, cases continued to occur in the three cantons that were previously most affected (Figure 2).

Age and sex distribution of cases

Overall, most cases 3,300 (87%) were under the age of 30 years. The highest number of cases (n=713) were in children aged between 15 and 19 years, followed by one to four year-olds (n=637 cases) and five to nine year-olds (n=578 cases) (Figure 3).

With the exception of those aged 30 years and older, for which of a total of 503 affected, 266 were female, more male individuals were reported in each age group (Figure 3).

Vaccination status of cases

The majority of the outbreak cases had not been vaccinated against measles. Only 2% (58/3,804) had received a full course of vaccination (two doses of the measles, mumps, and rubella (MMR) vaccine), 8% (311/3,804) received one dose, while 70% (2,680/3,804) were unvaccinated. For 755 (20%) cases vaccination status was unknown.

Laboratory findings

Nasopharyngeal swabs were sent to the European Regional Reference Laboratory for Measles and Rubella in Luxembourg for genotyping. Investigations of three initial cases revealed the presence of the D8 measles virus genotype, and more samples are currently being analysed.

Control measures

Catch-up vaccinations have been conducted for school-aged children and adolescents who had not received two doses of MMR vaccine (the minimum interval between the two doses was four weeks). In addition urgent immunisation campaigns were planned/partially conducted in municipalities where members of the Roma community were affected, as for parts of this community vaccination coverage is low in FB&H (data not shown). To prevent further spread, and to control the epidemic, persons with measles were asked to stay at home and vaccinations of unvaccinated contacts were carried out in families, kindergartens, schools, etc. according to the national regulations. In total, 1,577 first doses and 3,110 second doses of MMR vaccine were administered, however an obstacle to reaching sufficient vaccination coverage stems from parents following the anti-vaccination movement.

Discussion

Part of the World Health Organization strategic plan for the control of measles has been its elimination in Europe by 2015 [2]. However, the number of notified measles outbreaks especially in central and western Europe has been increasing in the last five years, with a reported peak in 2011 (32,124 cases) [3–5]. Several countries reported a considerable number of cases, including: France, Bulgaria, Germany, Italy, Romania, Spain, Ukraine, and the United Kingdom [4–6]. According to a report from the European Centre for Disease Prevention and Control, 30 EU/European Economic Area (EEA) countries conducting measles surveillance reported a total of 3,840 cases between December 2013 and November 2014 [6]. The ongoing outbreak of measles in FB&H accounts for 3,804 cases, highlighting the region as a European hot spot for the disease.

In order to achieve 95% immunity in the population for measles, vaccination coverage with two doses needs to be higher than 95%. However, this was not achieved in the EU [5], and, similarly, FB&H has accumulated

a large unvaccinated population over a long period of time. Vaccination coverage in FB&H is measured as the percentage vaccinated of the target population (12 months and 6 years). MMR vaccine coverage between 1998 and 2015 in FB&H ranged from 80.7% (1999) to 96.2% (2007) (average value: 87.1 ± 4.12) for primary immunisation and from 53% (2006) to 91.9% (2008) (average value: 82.9 ± 8.83) for the second dose. Disruption in the immunisation programme during the war (1992–1995) and in the post-war period (1996–1998) left a considerable number of children susceptible to measles, as well as mumps and rubella [7,8].

The probable causes of the outbreak described here, as well as its expansion, are insufficient vaccination and implementation of proposed control measures. The majority of those affected had not received necessary vaccination (two doses of MMR) at the recommended time (up to 14 years of age). Our data demonstrate that most cases in the current outbreak either did not know their vaccination status (20%) or reported being either partially (8%) or not vaccinated at all (70%).

In 2007, the measles genotype circulating in FB&H was D4 [9], however in the current outbreak genotype D8 was found, a genotype reported in the western part of Europe (England, Germany, Italy) at the end of 2011 [10]. It cannot be ruled out that the genotype D8 found in this outbreak might have been imported by individuals who travelled to such countries a short time before the beginning of the epidemic [10,11]. Molecular epidemiology is an important surveillance tool for routine monitoring of movement and the spreading of different virus genotypes across Europe.

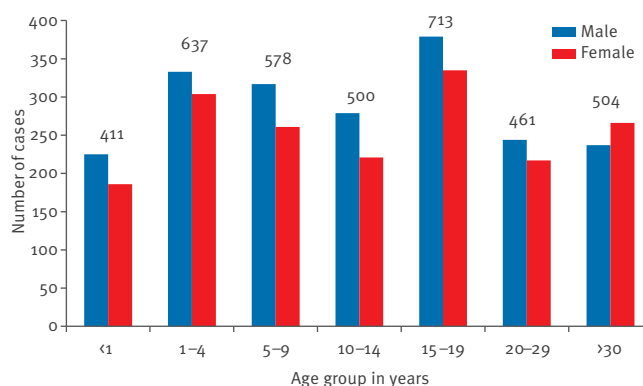
In conclusion, FB&H is currently facing a large measles outbreak with 3,804 cases by the beginning of 2015. This is probably related to disruption of routine MMR vaccination during the war and post-war periods, as well as the recent wave of vaccination controversies and the anti-vaccination movement that contribute to parental hesitance and in turn to lower immunisation coverage. Monitoring of the immunisation status and vaccine effectiveness is crucial. High vaccination coverage rates with two doses and advocacy and communication campaigns ensuring effective community involvement and public awareness are necessary to control the current epidemic and to avoid future outbreaks.

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FIGURE 3

Age and sex distribution of reported measles cases in the Federation of Bosnia and Herzegovina, January 2014–February 2015 (n=3,804)



For each age group the total number of cases is indicated above the chart bars.

Conflict of interest

None declared.

Authors' contributions

Mirsada Hukic was involved in the design of the study, drafted the article, analysed and interpreted surveillance data and revised the manuscript. Jelena Ravlija was involved in the analysis and interpretation of epidemiological data. Sead Karakas contributed to the recruitment of study participants and the analysis of surveillance data. Mirsada Mulaomerovic was involved in the analysis of epidemiological data. Amela Dedic Ljubovic was involved in laboratory investigation and data analysis. Irma Salimovic-Basic contributed to the recruitment of study participants and analysis of surveillance data. Sead Ahmetagic contributed to the recruitment of study participants and analysis of surveillance data. Mensura Seremet was involved in laboratory investigation and data analysis. Aeta Comor was involved in the data interpretation and the revision of the manuscript. Elma Feric was involved in the interpretation of the results and the writing of the manuscript.

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