

# MEASLES OUTBREAK IN STYRIA, AUSTRIA, MARCH-MAY 2009

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In the last week of March 2009, five measles cases among students of an anthroposophic school were reported to the public health authorities in the Austrian province of Styria where only five cases had been reported in the whole of 2008. A descriptive epidemiological investigation of the measles outbreak was performed. Between 2 March and 10 May 2009, 37 cases of measles were identified in Styria: 33 confirmed outbreak cases and four probable outbreak cases. The measles outbreak spread from the general population (12 cases) to an anthroposophic community (25 cases). Cases outside of the anthroposophic community were mostly over 10 years of age (10/12). Thirty-five cases were unvaccinated, and two of the 37 had received one dose of measles, mumps, rubella vaccine. Following a measles outbreak in Salzburg in 2008 with 394 cases, this outbreak reemphasises the continued need for additional vaccination campaigns in population groups over the age of 10 years.

### Introduction

In the last week of March 2009, five measles cases were reported to public health authorities in the Austrian province of Styria (total population: 1,2 million). All cases were pupils of an anthroposophic school (total school population: 305). No measles cases had been reported in the two previous months in Austria. In 2008, five cases had been reported in Styria during the whole year.

A bivalent measles, mumps (MM) vaccine was introduced in Austria in 1974 as part of the national childhood immunisation programme. This was replaced in 1994 by a trivalent measles, mumps, rubella (MMR) vaccine (two-dose regimen with the first dose at 15 months and the second dose at six years of age) [1]. The Ministry of Health estimates the average measles vaccine coverage with at least one dose for the birth cohorts 1997–2007 to be 84% [2]. Measles vaccination is not mandatory in Austria for enrolling a child in school.

The World Health Organization (WHO) set the year 2010 as the target for elimination of measles in the European Region [3]. Between 2004 and 2007, Austria was considered a low to moderate incidence country, according to the criteria of EUVAC.NET (< 1/100,000 population/year) [4]. In 2008, a measles outbreak with at least 394 cases in the Austrian province of Salzburg, linked to the anthroposophic community, changed Austria's status to a high incidence country [5].

The aim of the outbreak investigation was to describe the outbreak by person, place and time and to identify the proportion of cases who were vaccinated.

### Methods

A descriptive epidemiological outbreak investigation was performed. Case data on demographics, date of rash onset, clinical symptoms, past history of contact with a known measles case, vaccination status, and disease outcome were assessed by telephone interviews.

A confirmed outbreak case was defined as a patient with a generalised macular-papular rash with fever accompanied by at least one of the following clinical signs: cough, coryza, or conjunctivitis, who fulfilled one of the criteria of a laboratory-confirmed measles infection as described elsewhere [6] or who was epidemiologically linked to a laboratory-confirmed measles infection within 7–21 days prior to rash onset, who fell sick after 1 March 2009, and was resident in the Austrian province of Styria. A probable outbreak case was defined as a patient who fulfilled the clinical criteria of measles, who fell sick after 1 March 2009, and was resident in the Austrian province of Styria.

Active case finding was conducted among contact persons of the measles cases who were notified to the district public health authorities. Infection with measles virus was defined as laboratory-confirmed if at least one of the following three laboratory criteria was fulfilled: detection of measles virus-specific IgM, detection of measles virus RNA, or isolation of measles virus from a clinical specimen [6]. The detection of measles virus RNA in clinical specimens as described by El Mubarak *et al.* [7] and genotyping as described by Santibanez *et al.* [8] were performed by the Austrian National Reference Centre for Measles.

### Results

Thirty-seven cases fulfilled the outbreak case definition. Of these, 33 were confirmed and four were probable cases. Nine of the 11 laboratory-tested cases were confirmed for measles virus infection. The measles virus RNA from two outbreak case specimens was partially sequenced and was genotype H1. The outbreak affected four of the 17 public health districts of Styria between 2 March (week 10) and 10 May 2009 (week 19), and peaked with eight cases with onset of symptoms in week 17 (20-

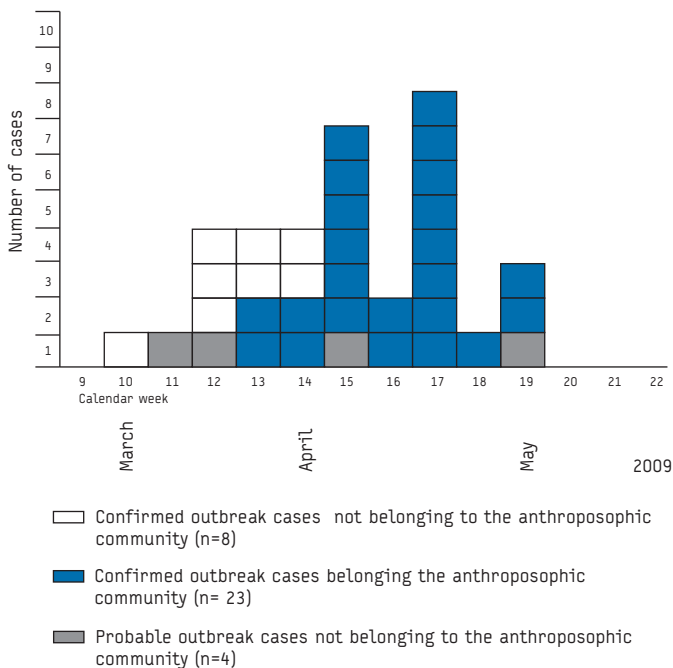
26 April). Between March and May 2009, 11 unrelated measles cases were reported in the other eight Austrian provinces. The figure shows the outbreak cases by week of rash onset according to the outbreak case classification.

Of the thirty-five cases, 25 belonged to the anthroposophic community, including 12 pupils of the anthroposophic school - giving a school attack rate of 12/305 (3.9%) - four household members, and nine acquaintances. A likely source was identified as one of the first four anthroposophic community cases (including two cases in pupils), who fell sick at the same time. This anthroposophic case was a pupil who had visited a billiard pub within the three weeks prior to his rash onset. An earlier case from the general population had also reported having visited the same pub. This is one probable route which enabled the measles virus to spread from the general population to the susceptible anthroposophic community.

Among the cases belonging to the anthroposophic community, the age group of 5-9 year-olds was most affected with 14 of 25 cases. Among the cases in the general population, the age group of 10-14 year-olds was most affected, with five of 12 cases (Table). Most of the cases from the general population were over 10 years old (10/12).

The symptoms most commonly reported by all 35 cases were fever (n=35), cough (n=34), conjunctivitis (n=34) and cold-like symptoms (n=28). Two measles cases reported having otitis media.

**FIGURE**  
Measles cases by week of rash onset, Styria, Austria, March-May 2009 (n=35\*)



\*Thirty-five of the 37 outbreak cases were accessible for telephone interviews.

Two cases were hospitalised during the course of the infection for five and eight days, respectively. All cases recovered.

None of the 37 outbreak cases had received both doses of MMR vaccine. Two cases had received one vaccine dose of MMR. Both belonged to the 12 cases in the general population. All cases in the anthroposophic community and ten cases in the general population were completely unvaccinated (Table).

The anthroposophic school was closed for two weeks and cases were asked to stay at home for the period of communicability (at least four days after the onset of the rash). An MMR post-exposure prophylaxis was offered free of charge to susceptible contacts of outbreak cases.

### Discussion

We report a measles outbreak, which began in the general population in week 10 of 2009 and spread to an anthroposophic school in week 13. In a measles outbreak in 2008 involving 397 cases, the attack rate in the affected anthroposophic school was 44% (150/340 pupils), significantly higher than the 3.9%

**TABLE**  
Outbreak measles cases by sex, age-group, clinical symptoms, laboratory testing and anthroposophic affiliation, Styria, Austria, March-May 2009 (n=37)

Case characteristics	N <sub>total</sub> = 37	
Sex ratio (m:f)	2.1:1	
Male	25	
Female	12	
Groups	Group A N= 12	Group B N= 25
Age distribution	Number of cases	Number of cases
0-4	0	1
5-9	2	14
10-14	5	8
15-19	1	1
20-24	0	0
25-29	4	0
30-34	0	0
35-39	0	1
Clinical symptoms		
Fever	35	
Cough	34	
Conjunctivitis	34	
Cold	28	
Otitis media	2	
Hospitalisation	2	
Laboratory-confirmed cases/tested	9/11	
Measles virus RNA positive/tested	2/9	
Measles virus-specific IgM positive/tested	9/9	

Group A: not belonging to the anthroposophic community  
Group B: belonging to the anthroposophic community

observed here. Assuming similar low vaccination coverage in the anthroposophic community as observed in the 2008 measles outbreak, the low attack rate in this outbreak was likely due to the prompt two-week closure of the anthroposophic school and the prompt isolation of cases at home for the period of communicability. The supplementary province-wide MMR vaccination campaign addressing the 15-25 years age group in the general population was implemented as a consequence of an outbreak affecting Austrian provinces other than Styria in 2008. In the first six months of 2008, 5,335 first doses (5.1% of those administered within the age group of 7–25 years) were administered, which is more than the number of first doses administered during the first half of 2009 (i.e. the period of the described measles outbreak) [unpublished data]. A concurrent rubella outbreak (ongoing since October 2008) may have also contributed to raise awareness for contagious rash diseases, which probably led to an early case presentation and case isolation [9].

Combating measles is still a high public health priority in Europe [10]. In Austria, a mumps outbreak in 2006, a measles outbreak in 2008, and a rubella outbreak in 2008-2009 have shown a clear shift of the age distribution of the cases to those older than ten years [1,5,10]. The age groups most affected were: 16-30 year-olds (mumps), 10-19 year-olds (measles), and 15-24 year-olds (rubella) [1,5,10]. The current outbreak of measles, in which the over 10 year-olds accounted for 10 of the 12 cases in the general population, justifies the introduction of supplementary MMR vaccination campaigns targeting the over 10 year-olds in Styria. Based on the vaccination register in Styria [unpublished data], an average vaccination coverage of 90% was reported for the birth cohorts 1999-2008.

Age group specific seroprevalence surveys could provide the required comprehensive information for designing supplementary age group-targeted vaccination campaigns Austria-wide. In neighbouring Germany, adolescents are often not fully vaccinated or unvaccinated [11]. Coverage is still insufficient to achieve wide enough herd immunity for measles elimination in central Europe. Continuing with suboptimal vaccination coverage in certain population groups such as the adolescents endangers the possibility of achieving the 2010 target for measles and rubella elimination in the WHO European Region.

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