

Rapid communications

ONGOING MEASLES OUTBREAK IN SOUTHERN BAVARIA, GERMANY

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Since early October 2007, the Bavarian Health Authority (BHA) has noticed an increased number of measles cases in Bavaria, Germany. A total of 95 cases occurred between week 41 and 51 in 2007, whereas only three cases had been notified to the District Health Authorities (DHA) during the same period in 2006.

In the outbreak investigation, we defined a case as a resident of Bavaria or a person diagnosed with measles in Bavaria with onset of symptoms (generalised maculopapular rash lasting three or more days, fever $\geq 38.5^{\circ}\text{C}$, and at least one of the following symptoms: cough, coryza, Koplik spots, or conjunctivitis) after 28 September 2007 (week 39). A case was laboratory-confirmed by one of the following results: detection of measles-specific IgM antibodies, a significant increase in measles-specific IgG or neutralising antibody titres between two successive samples, isolation of measles virus (MeV), or detection of MeV nucleic acid.

After receiving a case notification by physicians, heads of schools, child day-care facilities, or laboratories, the DHA contacted cases for exploratory interviews and identification of their contacts, and communicated the information to the BHA. Laboratory diagnosis was performed by private laboratories and by the National Reference Centre (NRC) for Measles, Mumps, and Rubella at the Robert Koch Institute, Berlin.

Outbreak description

To date, a total of 95 cases of measles have been notified in Bavaria since week 41. Most cases were notified between weeks 46 and 48, with a maximum of 21 cases in week 48. Since week 49, the weekly case notification numbers has been declining (Figure 1).

The cases were between five months and 39 years of age, and 29 (31%) were ≥ 20 years old. Fifty-nine (62%) were female (Figure 2).

Measles specific complications were notified for eight cases (8%). Two suffered from otitis media, and six from pneumonia. Three of the pneumonia patients (aged 10, 27 and 31 years) required hospitalisation. The total number of notified hospitalised cases was 24 (25%). Twelve of them were ≥ 20 years-old (Table).

Laboratory results

51% (48 cases) had laboratory-confirmed measles infection. In 12 of those cases MeV nucleic acid was detected at the NRC. All genotyped samples ($n=8$) were a variant of genotype D4, which had previously been responsible for clusters of measles cases in Jewish orthodox communities in Antwerp, the United Kingdom, and Jerusalem [1-3].

FIGURE 1

Measles cases in Bavaria, week 40-51, 2007, by week of notification ($n=95$)

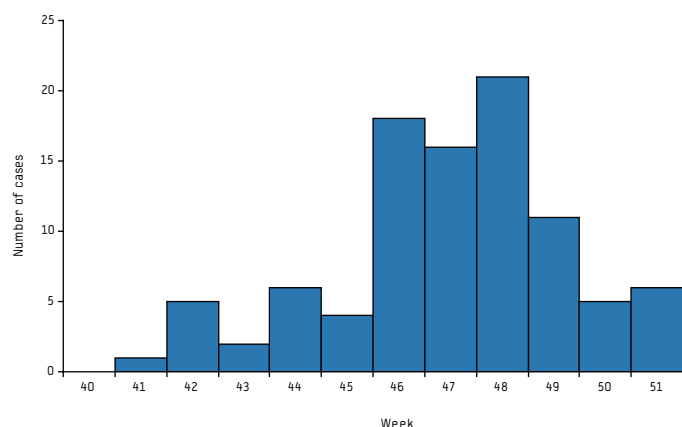
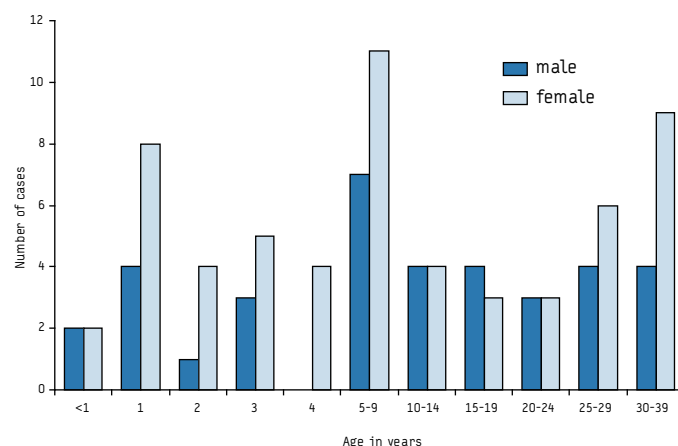


FIGURE 2

Measles cases in Bavaria, week 41-51, 2007, by age and sex ($n=95$)



Vaccination status

A total of 92 cases (97%) were unvaccinated. Two cases (aged 23 months and 16 years, laboratory confirmation by MeV IgM) had received one documented dose of measles vaccine before exposure. No case had received two doses. One 29 year-old, non laboratory-confirmed case indicated to have been vaccinated against measles during childhood, but vaccination documents were not available.

In 2005, coverage of vaccination with at least two doses of measles vaccine was 68% among first graders (five to seven years-old) in Bavaria with a range from 35 to 75% in the districts that are currently affected. Coverage for at least one dose ranged between 76 and 94% in those districts [4]. The figures only represent pupils with available vaccination records and are possibly an overestimation of the true vaccination coverage. Reasons for non-vaccination were not investigated in this outbreak. However, a study conducted earlier in the region currently affected identified three main factors for non-immunisation against measles: physicians advising against vaccination, physicians abstaining from advice, and parental reservations due to alternative health beliefs [5].

Most measles cases in the current outbreak were residents of the greater Munich area in the south of Bavaria. In contrast to an outbreak of measles in Bavaria earlier this year that involved mainly pupils from a local Montessori school [6], only 58 cases (61%) were epidemiologically linked to other cases in the current outbreak. A total of 21 clusters were notified, two thirds (n=15 in households). One of the identified clusters was linked to a Montessori kindergarten in which 12 children fell ill with measles after week 45. To date, no other school or day-care centre has seen more than two cases. One cluster of five cases was linked to a restaurant in which an employee fell ill in week 44.

Despite the lack of an epidemiological link for a large number of cases, we consider all Bavarian cases notified between week 41 and 51 to be part of the same outbreak since they occurred in regional proximity and molecular analysis revealed the same genotype in all typed samples.

Public health measures

In order to control the infection, letters were sent out to general practitioners, paediatricians and hospitals in Bavaria to inform them about the outbreak and on the legislation concerning measles and attendance at schools and day-care facilities (exclusion from schools or day-care facilities during measles infection, possible exclusion for susceptibles after exposure to measles [7]), and to ask them to close immunisation gaps in the population. Information for physicians was also distributed through the homepage of the physicians' association. The DHA were advised to check vaccination histories in schools and day-care facilities and to offer measles vaccination. Press statements were released to inform the public.

International impact

It has not been possible to identify an epidemiological link between the current outbreak and clusters in Jewish orthodox communities abroad where the identical MeV strain was detected.

To our knowledge, at least one Bavarian case visited the Oktoberfest in Munich during the infectious period. The Oktoberfest is a large social event with a high number of national and international visitors. The Bavarian Health Authority was informed about a 31 year-old British patient who had visited Munich and

TABLE 1

Age distribution of hospitalised measles cases in Bavaria, week 41-51, 2007 (n=24)

Age (years)	Number of cases
<1	3
1	3
4	1
5-9	2
10-14	1
15-19	2
20-24	1
25-29	2
30-39	9
Total	24

the Oktoberfest in early October (personal communication with Dr A. Sundermann. After returning to the UK he fell ill with measles in week 40 and was hospitalised for pneumonia and encephalitis. Genotyping of the MeV nucleic acid detected in this case also showed genotype D4. Related exportation of further cases to foreign countries cannot be excluded.

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