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Measles Outbreak - Anchorage, 1998

The largest outbreak of measles in the United States since 1996 occurred in Anchorage during August 10 through November 22, 1998. Of 33 confirmed* cases, 26 were confirmed by positive rubeola IgM antibody test, and seven met the clinical case definition. The majority of cases (70%) occurred among school-aged children.

On August 10, a 4-year-old child visiting from Japan had rash onset while in Anchorage (Figure 1). Measles was diagnosed by IgM testing. No measles virus cultures were obtained. No cases were reported during the following 3 weeks, when secondary cases would have been expected. On September 5, a 16-year-old high school student in Anchorage developed measles, confirmed by IgM testing. Subsequently, 15 other students and 1 teacher at the same high school developed measles during September 14 – October 4. In addition, six confirmed cases occurred at six other Anchorage schools; one case-patient attended two schools while infectious (from 7 days before to 4 days after rash onset). Nine confirmed cases occurred in persons not associated with schools. The last case of measles developed rash on November 17. As of January 26, no additional cases have been reported.

The 33 cases ranged in age from 2 to 38 years (median: 16 years). Of the 33, three (9%) were ≤ 10 years old, 22 (67%) were 14-17 years old, and 8 (24%) were ≥ 25 years old. Sixteen (48%) of the cases were female. There were no serious complications or deaths. Twenty-nine (88%) patients had received at least one dose of measles-containing vaccine (MCV) at or after 12 months of age; one person with laboratory confirmed measles had received two appropriately-spaced doses of measles-mumps-rubella (MMR) vaccine. Vaccination history was unavailable for two patients, and two patients had not received MCV.

At the high school where the 17 cases occurred, prior to the outbreak only one of 2186 students had not received at least one dose of MCV; 1073 (49%) had received one dose of MCV, and 1112 (51%) had received two or more doses. Estimated vaccine efficacy for two or more doses of MCV was 100%.

Viral isolates from the outbreak were genotyped. All three isolates examined were the same strain and were nearly identical to wild measles virus strains circulating in Japan in 1998. The isolates were not related to the strain isolated from the measles outbreak in Juneau in 1996.

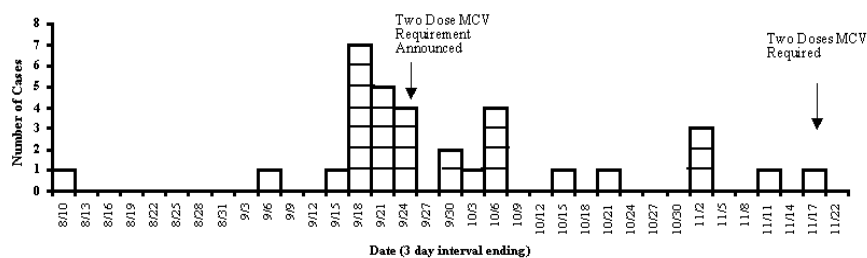
Outbreak control measures included requiring all Anchorage schoolchildren have two doses of MCV by November 16, 1998 (Figure 1). Subsequently the requirement was expanded to ensure all students in the state received two doses of MCV by January 4, 1999. Students were vaccinated by their usual health care providers and at special clinics conducted in Anchorage schools. A tremendous amount of work was required to vaccinate and review documentation for all Alaska students, and the effort was extremely successful. By November 17, 98.6% of 49,346 Anchorage School District students had provided documentation of two doses of MCV. Of the 79,109 public school students outside of Anchorage, only 142 were not in compliance with the two dose requirement as of January 7, 1999.

Discussion: The occurrence of this outbreak primarily in one school, despite extremely high one dose MCV coverage, demonstrates the importance of second dose school requirements. MCV is highly effective; $<5\%$ of children who receive one dose fail to respond to it. However, most children respond to a second dose, and $>99\%$ of persons aged ≥ 12 months receiving two doses at least 28 days apart develop immunity. Requiring schoolchildren to have two doses of MCV limited the extent of this outbreak and will help prevent future outbreaks in Alaska schools.

Monitoring of viral genotypes is an important component of measles surveillance. Although no specimens were obtained from the index case, genotyping provided evidence that the Anchorage outbreak was due to importation from Japan. This underscores the importance of obtaining throat and urine specimens from suspected measles cases as soon as possible after rash onset. Although no endemic measles virus is circulating in the United States, outbreaks may continue to occur when imported measles virus is introduced into a high risk setting such as a school with incomplete second dose MCV coverage.

*A confirmed case was laboratory confirmed or met the clinical case definition and was epidemiologically linked to a confirmed case. A clinical case was defined as an illness characterized by generalized rash lasting ≥ 3 days; temperature $\geq 101^\circ\text{F}$ (38.3°C); and either cough, coryza, or conjunctivitis.

Figure 1. Number of confirmed measles cases, by date of rash onset; Anchorage, Alaska, August 10 - November 22, 1998.



(Submitted by Tracey Lynn, DVM, MS Section of Epidemiology. Thanks to Don Ritter and staff, State Virology Laboratory, Fairbanks, Bruce Chandler, MD and staff, Anchorage Department of Health and Human Services, and to all the physicians, nurses, and volunteers who responded to the outbreak.)