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Measles: Why it's still a threat

A recent outbreak in Minnesota underscores the need to maintain vigilance and adhere to best practices in immunization and containment of known cases.

In April of this year, 3 counties in Minnesota reported a measles outbreak, illustrating the danger of vaccine hesitancy that exists in some communities, resulting in low rates of childhood immunization. Fifty people—mostly children under the age of 5 and almost all unimmunized—have been diagnosed with measles since this outbreak began. As of early May, 11 had been hospitalized. Most of those infected have been American-born children of Somali immigrants.^{1,2}

At the time of the outbreak, only 42% of the Somali children had been immunized against measles, compared with 88.5% of non-Somalis in Minnesota.² Because of concern about the number of Somali children being diagnosed with autism, a condition apparently not recognized in Somalia, Somali parents living in Minnesota began questioning why this was occurring.

High profile anti-vaccine advocates reportedly visited the community and advised these parents that the measles-mumps-rubella (MMR) vaccine was the cause of this rise in autism incidence and encouraged them to avoid the vaccine.² This series of events led to low vaccination rates in what was once a well-vaccinated community. The outbreak appears to have started with a Somali child who visited Africa and then returned to his community while incubating measles.

■ **The clinical course of measles.** Measles is an acute viral respiratory illness, which, after an incubation period of 10 to 12 days, starts with a fever (as high as 105° F), malaise, and at least one of the 3 “C”s—cough, coryza, and conjunctivitis.^{3,4} A maculopapular rash

then starts on the face and spreads to the trunk and the extremities (FIGURE 1). Koplik spots (FIGURE 2) can be seen on the oral mucosa. Children with measles look very ill. Patients are contagious for approximately 8 days, starting 4 days before the rash appears. Complications can include otitis media, bronchopneumonia, encephalitis, and diarrhea.

■ **Measles is not a benign childhood illness.** Before the licensure of live measles vaccine in 1963, an average of 549,000 measles cases were reported in the United States each year.³ That number is likely an underestimate due to inconsistent reporting, with a more plausible number of infections annually being 3 to 4 million.³ These regular epidemics led each year to about 48,000 people being hospitalized from complications, 1000 developing chronic disability from acute measles encephalitis, and about 500 dying from measles-related complications. Today, worldwide, an estimated 134,200 individuals die from measles each year.³

■ **Where the risk is greatest.** In the year 2000, measles was declared eliminated from the United States, meaning that endemic transmission was no longer occurring. Since then, the annual number of cases has ranged from a low of 37 in 2004 to a high of 667 in 2014.³ Most measles cases have occurred in unvaccinated individuals and primarily through importation by people infected in other countries who then transmit the infection upon entry or reentry to this country. In the United States, measles is more likely to spread and cause outbreaks in communities where large groups of people are unvaccinated.

FIGURE 1

Maculopapular rash of measles



The measles rash typically starts on the face and spreads to the trunk and the extremities.

Source: Centers for Disease Control and Prevention. Public health image library (PHIL). Available at: <https://phil.cdc.gov/phil/quicksearch.asp>. Accessed June 15, 2017.

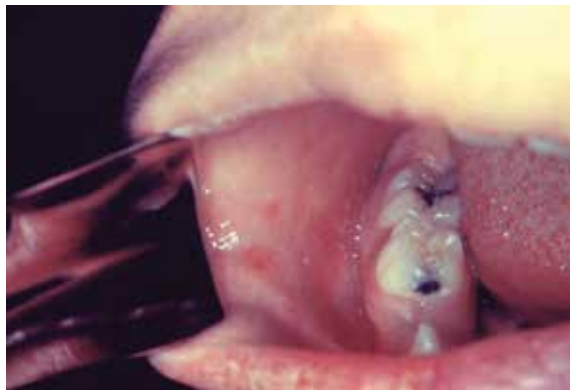
■ **Laboratory confirmation of measles is important** to establish a correct clinical diagnosis, as well as to verify the infection for public health purposes. Confirmation is achieved by detecting in a patient's blood sample the measles-specific IgM antibody or measles RNA by real-time polymerase chain reaction (RT-PCR). Obtain both a serum sample and a throat swab (or nasopharyngeal swab) from patients you suspect may have measles. Urine samples may also contain virus, and can be useful. The local health department can offer advice on how to collect and process these laboratory specimens.

Measles is a preventable infection

The Centers for Disease Control and Prevention (CDC) recommends routine childhood immunization with MMR vaccine, with the first dose given at age 12 through 15 months,

FIGURE 2

Koplik spots



Koplik spots on the oral mucosa often appear days before the onset of the skin rash.

Source: Centers for Disease Control and Prevention. Public health image library (PHIL). Available at: <https://phil.cdc.gov/phil/details.asp?pid=6111>. Accessed June 15, 2017.

and the second dose at 4 through 6 years of age (or at least 28 days following the first dose).^{3,5} Others for whom the vaccine is recommended are included in the **TABLE**.³

Because the MMR vaccine is a modified live-virus vaccine, it is contraindicated for pregnant women and those with severe immune deficiencies. It is also contraindicated for individuals who have ever had a life-threatening allergic reaction to the antibiotic neomycin or to any other MMR vaccine component.⁴ That these high-risk groups cannot receive protection from the vaccine underscores the importance of maintaining community herd immunity at a high level to prevent the spread of infection.

■ **In response to this latest outbreak,** the Minnesota Department of Health (MDH) has augmented its routine recommendations regarding measles vaccine,¹ including advising that:

- All children 12 months and older who have not received the MMR vaccine and all adults born in 1957 (or later) who have not received the vaccine or ever had the measles should get the first dose as soon as possible.
- Children who live in counties where measles cases have occurred and who have received their first dose of the MMR vaccine at least 28 days ago



If measles is suspected, care for patients in an isolation room or one that can be kept unused afterwards.

TABLE

Individuals who should receive the measles vaccine³

Children

Every child ages 12 through 15 months should receive the first dose of measles-mumps-rubella (MMR) vaccine, with the second dose at age 4 through 6 years (or at least 28 days following the first dose).

Students at post-high school educational institutions

Students at post-high school educational institutions without evidence of measles immunity need 2 doses of MMR vaccine, with the second dose given no sooner than 28 days after the first dose.

Adults

Individuals born during or after 1957 who do not have evidence of immunity against measles should receive at least one dose of MMR vaccine.

International travelers

Individuals 6 months of age or older who will be traveling internationally should be protected against measles. Before traveling internationally,

- infants 6 through 11 months of age should receive one dose of MMR vaccine;
- children 12 months of age or older should have documentation of 2 doses of MMR vaccine (the first dose given at age 12 months or older, the second dose no sooner than 28 days after the first dose); and
- teenagers and adults born during or after 1957 without evidence of immunity against measles should have documentation of 2 doses of MMR vaccine, with the second dose given no sooner than 28 days after the first dose.

Health care personnel

Health care personnel should have documented evidence of immunity against measles.

should get their second dose as soon as possible.

- All Somali Minnesotan children statewide who received their first dose of the vaccine at least 28 days ago should get their second as soon as possible.
- Health care providers statewide may recommend an early (before age 4 years) second dose of the vaccine during routine appointments for children.

Preventing measles outbreaks and minimizing community impact

Measures family physicians can take to protect their staff, patients, and community from measles (and other infectious diseases) include ensuring that all staff are fully immunized as recommended by the CDC,⁶ vaccinating all patients according to the recommended immunization schedules, implementing and enforcing good infection control practices in the clinical setting, and taking appropriate measures to diagnose and manage individuals with suspected measles. These measures are described on the CDC Web site.⁷

Measles virus, commonly believed to be the most infectious agent known, is often transmitted in medical facilities. An individual can become infected simply by entering a closed space that had been occupied by someone with measles several hours earlier. In your facility, physically separate those with fever and rash from other patients as soon as possible and, if measles is suspected, care for them in an isolation room or one that can be kept unused afterwards.

Any time you suspect that a patient has measles, immediately inform the local public health department. The health department should conduct an investigation to find susceptible individuals, provide immunizations for case contacts (and immune globulin for unvaccinated pregnant women and those who are severely immunosuppressed), and implement isolation and quarantine measures as indicated by the situation.

There is no antiviral medication for measles. Aim treatment at controlling symptoms and addressing any complicating bacterial infections. Children who have severe illness should receive vitamin A at recommended doses.³

Outbreaks such as the one in Minnesota demonstrate the importance of family physicians working in collaboration with public health officials to minimize the effect of infectious illnesses on the community. **JFP**

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