

Measles Clinician Guidance

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Diagnosis

- Consider measles in patients of any age who have ***a fever (101°F or greater) AND a rash***. Fever can spike as high as 105°F. Measles rashes are red, blotchy and maculopapular and typically start on the hairline and face and then spread downwards to the rest of the body.
- With suspected measles patients:
 - Determine patient's immunization status for measles.
 - Although documentation of receipt of any MMR vaccine or a positive measles IgG test result makes the diagnosis of measles much less likely, measles can still occur in such persons.
 - Airborne/droplet precautions should be implemented with suspect measles cases.

Differential Diagnosis Clarification

Other diseases can mimic or produce disease with symptoms very similar to symptoms of measles, such as scarlet fever, fifth disease, rubella, Kawasaki disease, enterovirus or adenovirus infections, mononucleosis, roseola, Rocky Mountain spotted fever and drug reaction. Please report any patient to public health who is experiencing symptoms consistent with measles and who has had any possible exposure to measles.

Immunity

A person is considered susceptible to measles unless s/he can meet one of the following criteria:

- Born before 1957
- Acceptable documentation of receipt of two doses of measles vaccine, administered at least one month apart. (Examples of acceptable documentation: medical record, school entry immunization records, yellow card completed by a health care provider.)
- Documentation of immunity to measles through serology.
- Clinical documentation of having had measles.

Immunity Testing

Any individual can seek a test for evidence of immunity to measles to get out of quarantine. However, testing can be expensive (up to \$250) and may take several days to receive results. Various laboratories (i.e., ARUP, LabCorp, Quest Diagnostics) in Utah can provide testing; turnaround times and costs may vary. Exposed individuals seeking laboratory evidence of immunity should contact their healthcare provider for immunity testing or check with their local health department. Some local health departments *may* offer immunity testing for residents in their jurisdiction. Individuals may choose different options based on their insurance status and ability to pay.

Symptoms

- The *prodrome* lasts 2-4 days (range 1-7 days). It is characterized by fever, often peaking as high as 103°- 105°F, with malaise, cough, coryza, or conjunctivitis.
- Measles is contagious four days before rash onset to four days after rash onset. More than 90% of susceptible contacts will develop disease.
- The *rash* is maculopapular and usually lasts 5-6 days. It typically begins on the face, and over the next few days extends to the body and extremities. The lesions increase in size and may coalesce. Initially, lesions blanch with fingertip pressure. By day 3-4 of the rash, however, most do not blanch with pressure. The skin over the more severely affected areas may slough off. The rash fades first on the face and head, and then disappearing from the body and extremities.
- *Koplik spots*, blue-white spots that generally develop on the mucosa of the mouth, are a characteristic sign of measles disease. Koplik spots appear 1-2 days before the rash to 1-2 days after the rash.
- Other symptoms associated with measles include anorexia, diarrhea (especially in infants), photophobia, and generalized lymphadenopathy.

Classical Measles, Atypical Measles and Modified Measles

Persons with measles usually present with characteristic disease (classical measles). However, two forms of measles infections that have abnormal presentations can occur, which are known as atypical measles and modified measles.

Atypical measles

Atypical measles occurs only in persons who were vaccinated with inactivated measles vaccine and are subsequently exposed to wild-type measles virus. The inactivated measles vaccine sensitizes recipients to measles virus antigens without providing protection.

Atypical measles is characterized by fever, pneumonia, pleural effusions, and edema. The rash appears first on the wrists or ankles and is usually maculopapular or petechial, but may have urticarial, purpuric, or vesicular components. Atypical measles may be prevented by revaccinating with live measles vaccine. Moderate to severe local reactions with or without fever may follow vaccination. These reactions are less severe than with infection with wild measles virus.

Modified measles

Modified measles occurs primarily in persons who have received immune globulin (IG) as post-exposure prophylaxis and in young infants who have some residual maternal antibody. It is characterized by a prolonged incubation period, mild prodrome, and sparse, discrete rash of short duration. Similar mild illness has been reported among previously vaccinated persons.

Clinical Case Definition

An illness characterized by all the following:

- A generalized rash lasting greater than or equal to three days,
- A temperature greater than or equal to 101°F (greater than or equal to 38.3°C), *and*
- Cough, coryza, or conjunctivitis

Laboratory Criteria for Diagnosis

- Positive serologic test for measles immunoglobulin M antibody, or
- Significant rise in measles antibody level by any standard serologic assay, or
- Isolation of measles virus from a clinical specimen (NP swab/PCR)

Laboratory Criteria for Sample Recollection

If serum was collected between the rash onset date and three days after the date of rash onset, **AND** the IgM test came back negative, then, to rule out measles, another serum sample should be collected between day 7 and day 28 for follow-up testing. Alternatively, a nasopharyngeal swab or throat swab may be tested by PCR. Urine samples are appropriate samples for PCR testing if collected 3-10 days after rash onset. Currently, the CDC reference lab for the Utah Public Health Laboratory does not conduct PCR testing on urine samples.

Patient Management

Isolation

Persons diagnosed with measles should be isolated at home until four days after rash onset. Hospitalized cases should be put into airborne isolation for the duration of the illness.

Transportation of the patient should be limited. Isolation precautions should be taken for patients presenting with rash illness in physician offices/clinics/medical facilities to reduce possibility of exposure to others.

Management of People Exposed to Measles

Vaccination

Vaccination within 72 hours of exposure in unimmunized persons can provide some protection against measles. If immunization status is unknown, re-vaccination of an immune person is not harmful. During an outbreak, children between 6-12 months of age who have been exposed to measles may be vaccinated with MMR vaccine within 72 hours of the exposure in lieu of immune globulin. This dose will not be counted as a valid first dose of MMR, which is typically given at 12-15 months of age. Vaccination should be offered at any interval following exposure in order to offer protection from future exposures.

Prophylaxis with Immune Globulin (IG)

For persons for whom vaccination is contraindicated (i.e., immunocompromised patients, pregnant women, and infants <12 months of age), IG may provide some protection – either by preventing or reducing the severity of disease. To be effective, IG should be administered within six days of exposure to measles. IG can be given to other persons who do not have evidence of measles immunity, but priority should be given to persons exposed in settings with intense, prolonged, close contact (i.e., household, childcare, classroom). During an outbreak, receipt of IG does not allow a person to get out of quarantine.

The recommended dose of IG given intramuscularly (IGIM) is 0.5 mL/kg of body weight (maximum dose = 15 mL) and the recommended dose of IG given intravenously (IGIV) is 400 mg/kg. **IGIM should be given to all infants aged <12 months who have been exposed to measles. For infants aged 6 through 11 months, MMR vaccine can be given in place of IG, if administered within 72 hours of exposure.**

Healthcare Workers

Persons who work in healthcare facilities (including volunteers, trainees, nurses, physicians, technicians, receptionists, and other clerical and support staff) are at increased risk of exposure to measles, and all persons who work in such facilities in any capacity should be immune to measles to prevent any potential outbreak.

- If an outbreak occurs within or in the areas served by a hospital, clinic, or other medical or nursing facility, all personnel born during or after 1957 who do not have documentation of two doses of MMR vaccine, or documentation of disease, should receive one dose of MMR vaccine.
- Personnel born before 1957 without documentation of measles immunity should receive one dose of MMR.
- Serologic screening of healthcare workers during an outbreak to determine measles immunity is not generally recommended.

- Stopping measles transmission requires the rapid vaccination of susceptible healthcare workers.
- Susceptible personnel who have been exposed to measles should be relieved from patient contact and excluded from the facility from the 5th to the 21st day after exposure, regardless of whether they received vaccine or immune globulin after the exposure.
- Personnel who become ill should be relieved from all patient contact and excluded from the facility for seven days after they develop rash.

Quarantine

- During an outbreak, persons exposed to measles must have documented evidence of immunity (see Immunity) or be quarantined for a period of 21 days after the date of their exposure.
- A person with one dose of the MMR vaccine who receives a second dose within 72 hours may be released from quarantine.
- For most persons, quarantine is voluntary and consists of remaining at home and avoiding contact with the public or anyone who does not have documented evidence of immunity. Local health departments in consultation with their legal counsel have the authority to enforce quarantine for uncooperative persons.

Reentry of Excluded Students during a Measles Outbreak

In the event of a measles outbreak, students who claimed immunization exemptions and have not received the two doses of MMR vaccine will be excluded from school or childcare until they have either received the appropriate vaccination(s) or are no longer considered at risk for contracting or spreading disease. For measles, the exclusion period is 21 days after the date of measles rash onset, not the date they were exposed. Students who were excluded from school or childcare due to inadequate MMR vaccination (i.e., received only one dose) may be re-admitted after receiving the 2nd dose of MMR vaccine. Students who receive one dose of MMR vaccine after being exposed or who refuse the 2nd dose will be excluded for the full 21 days.

For more information, contact the Utah Department of Health, Bureau of Epidemiology, 801-538-6191.

Utah Department of Health
Bureau of Epidemiology
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