

Measles (Rubeola) - Clinician Fact Sheet

Agent: Rubeola virus, a single-stranded RNA paramyxovirus

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.
- The *rash* is maculopapular and usually lasts 5–6 days. It 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 disappears 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), and generalized lymphadenopathy.

Complications:

- Diarrhea, otitis media, laryngotracheobronchitis (croup), and bronchopneumonia occur commonly in young children.
- Pregnant women with measles are more likely have a miscarriage, give premature birth, and/or have a low-birthweight infant.
- Acute encephalitis, which can result in permanent brain damage, occurs in approximately 1 in every 1000 cases.
- Death, predominantly from respiratory and neurological complications, occurs in 1 to 3 of every 1000 cases reported in the United States. Case fatality rates are higher in children younger than 5 years of age and immunocompromised children.
- Subacute sclerosing panencephalitis (SSPE) is a rare degenerative central nervous system disease characterized by behavioral and intellectual deterioration and seizures that occurs 7 to 10 years after wild-type measles virus infection.

Differential Diagnosis:

The differential diagnosis includes, but is not limited to:

- Rubella
- Fifth disease
- Enterovirus
- Adenovirus
- Mononucleosis
- Scarlet fever
- Roseola
- Kawasaki's disease
- Rocky Mountain spotted fever
- Drug reaction

Clinical case definition:

An illness characterized by all the following:

- A generalized rash lasting greater than or equal to 3 days,
- A temperature greater than or equal to 101.0°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

Case classification:

According to the Centers for Disease Control and Prevention, there are three case classifications:

Suspect: Any febrile illness accompanied by rash.

Probable: A case that meets the clinical case definition, has noncontributory or no serologic or virologic testing, and is not epidemiologically linked to a confirmed case.

Confirmed: A case that meets the clinical case definition and is epidemiologically linked to a confirmed case OR that is laboratory confirmed (does not need to meet the clinical case definition). Note: False positive laboratory results are common in the absence of clinical signs and symptoms; testing should only be done if there is clinical suspicion.

Epidemiology:

- Measles is primarily spread through respiratory transmission. Airborne transmission has been documented in closed areas for up to 2 hours *after* the infected person has left. Note: If you suspect a case of measles, you will need to close down the area that the suspect case was located (eg. waiting room, exam room) for two hours.
- The incubation period from exposure to prodrome averages 10-12 days. From exposure to rash onset averages 14 days (range 7-18 days).
- Measles is highly contagious. More than 90% of susceptible contacts will develop disease. A person with measles is contagious from 4 days before rash onset to 4 days after rash onset.
- Humans are the only host. A person cannot be a carrier of the disease. A person must be infected with the wild-type measles infection to spread it to another person.

Diagnostic Testing:

Laboratory testing should not be used to rule out measles. Only highly suspect cases that are clinically compatible should be recommended for testing. For highly suspect cases, ALL of the following should be performed upon first contact:

- IgM serology
- IgG serology
- Viral Culture
- RT-PCR

Serology: False positive measles IgM results can occur due to cross reactivity with rheumatoid factor, parvovirus, rubella, and roseola antibodies. The measles IgG helps to determine whether this is a false positive or not. There is a 30% chance of a false negative if the sample is collected *less than 3 days (72 hours)* after rash onset. Therefore, another IgM should be drawn *at least 3 days (72 hours)* after rash onset to rule out highly suspicious cases.

Viral Culture and RT-PCR: Specimens for viral culture and RT-PCR should be collected for every highly suspect case, but should only be tested once serology results are positive. Nasopharyngeal swab is the ideal specimen for viral culture and RT-PCR, but urine and throat cultures can also be performed. Ideally, specimens should be collected within the first 3 days (72 hours) of rash onset. If more than 7 days have passed since rash onset, specimens should not be collected.

Treatment:

There is no specific treatment for measles. In children that are immunocompromised or severely ill, the measles virus has demonstrated susceptibility to ribavirin. In communities with a known vitamin A deficiency, a child diagnosed with measles should be administered vitamin A.

Case Management:

Persons diagnosed with measles should be isolated at home until 4 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.

Management of People Exposed to Measles:

Vaccination: Vaccination within 72 hours of exposure in unimmunized persons can provide protection against measles in some cases. If immunization status is unknown, vaccination in an already immune person is not harmful.

Immunoglobulin: For persons whom vaccination is contraindicated (immunocompromised, pregnant women, and infants less than 1 year of age) IG can provide some protection either by preventing or reducing the severity of disease. IG should be administered within 6 days of exposure, preferably within 72 hours. Infants less than six months of age are considered immune if the mother can show proof of vaccination.

Quarantine: A person is considered susceptible unless they have documentation of 2 doses of measles vaccine administered at least 1 month apart or they were born prior to 1957. Susceptible persons, if not immunized their second dose of MMR within 72 hours after exposure, should be quarantined in their home until 21 days after the onset of rash in the last measles case.

Vaccine/ Immunization:

Two doses of measles-containing vaccine (MMR), separated by at least 28 days, are routinely recommended for all children. The first dose is given at 12-15 months of age; the second is given

at 4-6 years of age. During measles outbreaks, MMR vaccine can be given preemptively to children as young as 6 months of age. If the child is less than one year old, this dose is treated as dose zero and two more are required in the future. However, if the child is over one year old and receives a second dose prior to age 4-6 years because of an outbreak, that dose will fulfill the two dose mandatory school requirement. The immunity level among recipients of 2 doses of vaccine is 99.7%. MMR is a live, attenuated vaccine, and therefore pregnant women and persons with an impaired immune system should not receive the vaccine. Non-pregnant women should avoid becoming pregnant within 28 days after the last dose of vaccination. Breastfeeding is not a contraindication for MMR vaccination. Additional information can be found at www.immunize-utah.org or www.cdc.gov/vaccines.

References:

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