

# MEASLES CLINICAL INFORMATION

FOR HEALTH CARE PROVIDERS

## EPIDEMIOLOGY OF MEASLES

Measles, also called rubeola, is no longer considered endemic in the United States. However, continued success depends upon maintaining high vaccination rates, because 80% of the cases of measles continue to be imported into the United States. Measles disease can occur anytime of the year, but is most frequently seen during late winter and spring.

Measles is an acute viral illness characterized by:

- Prodrome of fever and malaise **and**
- Cough, coryza, or conjunctivitis **and**
- Maculopapular rash (starts 2-4 days after prodrome and begins at the hairline and moves downward and outward)

- Koplik's spots (exanthem present on mucous membranes) are considered to be indicative of measles and occur 1–2 days before the rash and persist for to 1–2 days after the rash. Other rash-causing diseases often confused with measles include roseola and rubella, among others.

Atypical measles occurs only in persons who received inactivated ("killed") measles vaccine (KMV) and are subsequently exposed to wild type measles virus. Modified measles occurs primarily in patients who received immune globulin (IG) as post-exposure prophylaxis and in young infants who have some residual maternal antibody.

## VACCINATION RECOMMENDATIONS

Two doses of MMR (measles, mumps, rubella) vaccine—the first dose at 12-15 months and the second dose at 4-6 years—are routinely recommended. All persons born in or after 1957 should have documentation of at least 1 MMR or other evidence of immunity.

Certain groups of adults may be at increased risk for exposure to measles. Adults attending colleges or other post high school educational institutions, working in medical facilities, or traveling internationally should be assessed to ensure they are properly immunized.

## DIAGNOSING MEASLES

Rash illnesses are difficult to distinguish without laboratory testing.

In diagnosing measles, clinicians should consider:

- Including both rubella and measles in the differential diagnosis of patients presenting with an acute generalized rash and fever.
- Ordering serology tests only if the clinical case definition is met; otherwise, false positive results may be detected.

Collecting specimens for both culture and serology. Acute measles infection is lab confirmed by the presence of one or more of the following:

- Positive measles-specific IgM antibody,
- Significant rise in IgG antibody from paired acute and convalescent sera,
- Positive viral culture for measles, or
- Detection of the virus by reverse transcription-polymerase chain reaction (RT-PCR).

Measles is reportable disease. Report suspect cases of measles immediately to the Kansas Department of Health and Environment (KDHE). KDHE can facilitate testing and exposure follow-up.

Call the KDHE Epidemiology Hotline at 1-877-427-7317

## Specimens to Collect

Collection of a serum specimen for serologic detection of measles antibody in conjunction with a respiratory sample (nasopharyngeal swab or aspirate), and a urine specimen for molecular determination or virus isolation is helpful in the laboratory confirmation of a measles case. Timing of specimen collection in relation to clinical presentation is important to yield reliable results.

Prioritize testing to those patients most likely to have measles, i.e., those with fever and generalized maculopapular rash. Testing for measles in patients with no rash, no fever, a vesicular rash, or a rash limited to the diaper area leads to **false seropositive** results.

### Viral Culture and PCR Specimens

Measles virus can best be isolated from (in order of preference): throat, urine, and nasal specimens.

- Throat / Nasopharyngeal swabs
  - ◊ Preferred collection is within 3 days of rash onset.
  - ◊ *Ideally collect <7 days and no more than 10 days after rash onset.*
  - ◊ Use Dacron or synthetic swab placed in Viral Transport Media (VTM).
  - ◊ Keep all specimens on wet ice or at 4°C until shipment.
  - ◊ Ship as soon as possible on cold packs (within 48 hours).
  - ◊ Culture is necessary if case was vaccinated 6-45 days before testing to distinguish wild-type virus from the vaccine virus.
- Urine
  - ◊ Collect 2 to 15ml midstream, clean-catch (first morning void preferred) urine into sterile container. Do not add VTM. Transport to arrive at laboratory within 24 hours.

### Serology Specimens

- Blood, 3-5 ml collected in clot separator tubes
  - ◊ IgM serology: Collect ASAP and, if negative, repeat at >72 hours after rash onset [*IgM is detected for at least 28 days after rash onset*].
  - ◊ IgG serology: Collect paired sera.
    - **Acute:** ASAP after rash onset (7 days at the latest);
    - **Convalescent:** 10–30 days after first specimen.
- False-positive measles IgM tests are more likely to occur when:
  - ◊ IgM test was not EIA,
  - ◊ Case did not meet clinical criteria,
  - ◊ Case is an isolated indigenous case, or
  - ◊ Measles IgG was detected within 7 days of rash onset.

## Communicability of measles

Measles is highly communicable. Secondary attack rates exceed 90% among susceptible persons.

Measles is infectious from 4 days prior to 4 days after rash onset. Maximum infectiousness occurs between onset of prodrome through the first 3-4 days of rash.

Immunocompromised persons may shed virus for several weeks after the acute illness. There are no asymptomatic infectious carriers.

The incubation period for measles averages 10-12 days from exposure to prodrome and 14 days (range 7-18) from exposure to rash onset.

The measles virus is found in respiratory secretions. Measles transmission can be person-to-person via contact with secretions or by contact with large respiratory droplets that are aerosolized during coughing and sneezing. Airborne transmission via aerosolized droplet nuclei is the primary route of transmission and has been documented in closed areas (e.g., office examination room) for up to 2 hours after a person with measles occupied the area.

## Preventing transmission of measles

Vaccination is the primary means to prevent disease.

### Healthcare settings

- Patients suspected to have measles should be placed in a negative pressure room in Airborne Infection Isolation (All) Precautions. Susceptible persons should not enter the isolation room.
- Susceptible patients who have been exposed to an individual with measles (contagious) should be placed in Airborne Infection Isolation (All) Precautions from the 5th to the 21st day after exposure (regardless of whether they received measles vaccine or immunoglobulin for this specific exposure) or from the onset of symptoms until 4 days after the onset of the rash if the patient becomes ill.
- 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 at least 4 days after they develop the rash.

### School, daycare and work settings:

- Persons with suspect measles illness will be excluded from child care, school or work until 4 days after onset of the rash, or until measles has been ruled out (KAR 28-1-6).
- Persons exposed to measles who cannot readily provide documentation of measles immunity shall be vaccinated within 24 hours or excluded from child care or school settings for 21 days after onset of last reported illness (KAR 28-1-6).
- Persons revaccinated, as well as previously unvaccinated persons receiving their first dose as part of the outbreak control program, may be immediately readmitted to child care or school.
- Persons who continue to be exempted from or who refuse measles vaccination shall be excluded from the child care or school until 21 days after the onset of illness in the last case of measles (KAR 28-1-6).

## Handling exposures to measles

- Live measles vaccine may prevent disease if given within 72 hours of exposure.
- Immune globulin (IG) may prevent or modify disease and provide temporary protection if given within 6 days of exposure. IG may be especially indicated for susceptible household contacts of measles patients, particularly contacts <1 year of age (for whom the risk of complications is highest), susceptible pregnant women and susceptible immunosuppressed persons who are

exposed to measles. Some diseases that cause immunosuppression may suppress measles immunity in those with a history of measles immunity. Testing for immunity is recommended for immunosuppressed individuals.

- IG is not indicated for household contacts who have received one dose of vaccine at 12 months of age or older unless they are immunocompromised.

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