

MEASLES FACT SHEET (RUBEOLA)

Agent: Measles virus.

Brief Description: An acute, highly communicable, systemic, viral infection characterized by a prodromal period of 2 to 4 days, in which fever and malaise, cough, coryza (profuse amount of clear nasal discharge), and conjunctivitis are observed. Approximately 3 to 4 days later, a characteristic maculopapular (dusky-red blotchy) rash appears on the face and neck. The rash usually starts at the hairline, then spreads downward and outward to the trunk, hands and feet. The rash generally lasts 5 to 6 days. Koplik's spots, characteristic blue-white spots against the bright red background of the buccal (cheek) mucosa, can be observed 1 to 2 days before or 1 to 2 days after the appearance of the maculopapular rash. Complications include diarrhea, otitis media, pneumonia and encephalitis. One or more complications occur in approximately 30% of reported measles cases. In recent years, mortality from measles occurred in roughly 1 to 2 per 1000 reported cases in the United States.

Reservoir: Humans.

Mode of Transmission: Airborne by small droplet spread, direct contact with nasal or throat secretions of an infected person, and less commonly by articles freshly soiled with secretions of nose and throat. Measles can be transmitted from 4 days before to 4 days after the onset of rash.

Incubation Period: Usually 10 to 12 days from exposure to prodrome (range, 7 to 18 days). The rash usually appears about 14 days after exposure.

Clinical Case Definition:

An illness characterized by all of the following:

- A generalized maculopapular rash lasting 3 or more days.
- A temperature of at least 101.0° F (38.3° C).
- Cough, coryza, and/or conjunctivitis.

Laboratory Criteria for Diagnosis:

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

Diagnostic Testing:

A. Serology

1. Specimen Needed: Blood - 5cc. collected during acute phase of illness and 5 cc. collected 14-30 days later, or two capillary tubes collected during acute phase and convalescent phase.
2. Outfit: Other serology outfit, order #500.
3. Form: 3432.
4. Lab Test Performed: Measles IgG (acute and convalescent) **and** IgM titers (**note:** be sure to request the IgM titer with the acute phase draw so that case confirmation can be accomplished in a timely manner).
5. Lab Performing Test: Immunology Laboratory, Georgia Public Health Laboratory (GPHL) in Decatur.
6. Transport requirements: blood must be non-hemolyzed.

B. Culture or Polymerase Chain Reaction (PCR)

1. Specimen Needed: Urine, heparinized blood, nasopharyngeal aspirates, or throat swabs – collect at same time as samples for serology (best within 3 days after rash onset).
2. Outfit: Viral transport media – culture: order #0575
PCR: order #0565
3. Form: 3595R.
4. Lab Test Performed: Culture, PCR.



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5. Lab Performing Test: Virology Laboratory, GPHL in Decatur -culture, specimen forwarded to CDC for PCR.
6. Transport: Transport at 4° C if tests are to be performed within 72 hours,
Otherwise freeze at -70° C.

Case Classification:

- **Suspected:** Febrile illness accompanied by generalized maculopapular rash.
- **Probable:** a case that meets the clinical case definition, has noncontributory or no serologic or virology testing, and is not epidemiologically linked to a confirmed case.
- **Confirmed:** a case that is laboratory confirmed or that meets the clinical case definition and is epidemiologically linked to a confirmed case. A laboratory-confirmed case does not need to meet the clinical case definition.

Comment: Two probable cases that are epidemiologically linked would be considered confirmed cases, even in the absence of laboratory confirmation.

Confirmed cases should be classified as:

- **International importation:** An international imported case has its source outside the country, rash onset occurs within 21 days after entering the country, and illness cannot be linked to a local transmission.
- **Indigenous case:** Any case for which importation cannot be proven.
- **Out-of-state importation:** A case imported from another state in the United States. The patient must have either been out of state continuously for the entire period of possible exposure (at least 7-18 days before onset of rash) or have one of the following types of exposure while out of state: a) face-to-face contact with a person who had either a probable or confirmed case, or b) attendance in the same institution as a person who had a case of measles (e.g., in a school, classroom or day care center).

Vaccination: The current recommendation is a two-dose schedule. The first dose should be given at 12 to 15 months of age, the second at school entry (4 to 6 years of age.) Both doses can be given as MMR vaccine. For any child older than six who has not received one or both doses, any opportunity to immunize should be utilized.

Period of Communicability: Measles is highly communicable, with greater than 90% secondary attack rates among susceptible persons. The virus may be transmitted from 4 days prior to 4 days after rash onset. Maximum communicability occurs from the onset of the prodromal period through the first 3-4 days of rash.

Treatment: Supportive care only.

Protection of Contacts: Transmission is likely in households, schools, and other institutions. All contacts of a case-patient during the infectious period (4 days before appearance of rash to 4 days after appearance) should be identified. If they have not received two doses of vaccine on or after their first birthday, they should be considered susceptible and vaccinated.

Investigation:

Measles and rubella must be ruled out whenever illness involving fever and rash are reported. The investigation must be started **immediately** when a potential case is identified.

Essential components of the case investigation include the following:

- a) Establish a diagnosis, obtain laboratory specimens for serology if not already done.
- b) Obtain accurate and complete immunization histories.
- c) Identify the source of infection.

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- d) Assess potential transmission and identify contacts.
- e) Obtain specimens for virus isolation.

Initial response to the report of suspected measles:

1. Call the Notifiable Disease Epidemiology Section (404) 657-2588 for a line listing number.
2. Contact the parent(s) or guardian and reporting physician **immediately** to obtain a detailed clinical **and** exposure history of the patient.
 - Ask parent(s) about any out-of-town travel or visitations during the 7-21 days period prior to rash onset.
 - Identify any person(s) or group(s) exposed by the patient during the period 4 days before to 4 days after rash onset.
3. Complete the Measles Surveillance Worksheet (from the Centers for Disease Control and Prevention's Manual for the Surveillance of Vaccine Preventable Diseases, Appendix 11). Read the instructions carefully and complete as much of the form as possible. Do not leave any item blank. If information is not available, enter "none" or "NA". The following should be collected during case investigations:
 - Demographic data
 - Clinical details, including
 - a) date of onset of all symptoms,
 - b) date of rash onset,
 - c) rash duration and presentation,
 - d) complications and/or hospitalization
 - Laboratory information, including
 - a) serologic test results,
 - b) date of collection of specimen for virus isolation
 - Case classification
 - Vaccination status, including
 - a) number of doses of measles vaccine,
 - b) date(s) of measles vaccine
 - Risk factors for disease, including
 - a) Travel history to determine

import status (indigenous, international import, or out-of-state import),

- b) contact with a probable or confirmed case,
 - c) contact with immigrants or travelers,
 - d) setting (i.e., is case part of an outbreak or is it a sporadic case).
- Dates, including
 - a) date reported to health department,
 - b) date of case investigation

Fax the completed worksheet and any pertinent lab results to the Notifiable Disease Epidemiology Section (404) 657-7517. Do not wait for laboratory confirmation to fax the report.

Outbreak Control Strategy: All reports of suspected measles cases should be **investigated rapidly**. Control activities should not be delayed until laboratory results on suspected cases are received. A measles outbreak exists in a community whenever there is **one confirmed** case of measles. Once this occurs, preventing dissemination of measles depends on promptly vaccinating susceptible persons and limiting the number of exposures to infectious cases. All persons who cannot readily provide documentation of measles immunity (see ACIP Statement on Measles Prevention, dated 12/29/89) should be vaccinated or excluded from the setting (e.g. school). Documentation of vaccination is adequate only if the date of vaccination is provided. Persons who have been exempted from measles vaccination for medical or religious reasons should be excluded from the outbreak area for at least 2 weeks after the onset of rash in the last case of measles.

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- **Institution-based outbreaks**

During outbreaks in day care centers, elementary, middle, junior and senior high schools, and colleges and other institutions of higher education, a program of mandatory revaccination with MMR vaccine should be conducted in the affected schools. Revaccination should include all students and their siblings and all school personnel born in or after 1957 who cannot provide documentation of receipt of two doses of measles-containing vaccine on or after their first birthdays or other evidence of measles immunity. Students and personnel receiving their first dose as part of an outbreak control program may be immediately readmitted to school. A second dose should be given in 28 days. If there is an **unconfirmed** but clinically compatible case in a school, the response should be phased in. Reimmunization should be recommended but not mandatory until the case is confirmed. Proceed with the epidemiologic work on the case. Search for a source, immunize siblings and close contacts when appropriate, ensure an adequate supply of vaccine and begin to prepare for a school-based clinic. At this point it is very important to implement **daily active surveillance** of absenteeism of two or more days and any rashes should be followed up immediately. New cases signal the immediate need for school-based clinics and the exclusion of children and staff who do not have two documented doses of measles vaccine.

- **Outbreaks among preschool-age children**

The risk of complications from measles is high among infants less than one (1) year of age. Therefore, considering the benefits and risks, vaccination with monovalent measles vaccine is recommended for infants as young as six (6) months of age when exposure to measles is considered likely. Children less than six months of age do not require measles vaccination because they still have passive antibody passed to them from their mother during gestation. MMR may be used in children before the first birthday if monovalent measles vaccine is not readily available. Infants vaccinated before the first birthday should be revaccinated when they are 12 months old and at school entry to ensure adequate protection.

- **Medical Settings**

If an outbreak occurs in the areas served by a hospital or within a hospital, all employees with direct patient contact who were born in or after 1957 who cannot provide documentation of receipt of two doses of measles vaccine on or after their first birthday or other evidence of immunity to measles (see ACIP Statement on Measles Prevention dated 12/29/89) should receive a dose of measles vaccine. Since some medical personnel who have acquired measles in medical facilities were born before 1957, vaccination of older employees who may have occupational exposure to measles should also be considered during outbreaks. Susceptible personnel who have been exposed should be relieved from direct patient contact from the 5th to the 21st day after the exposure, regardless of whether they received vaccine or immunoglobulin after the exposure. Those who become ill should be relieved from patient contact for seven days after they develop a rash.

Reporting: Report all suspected, probable, or confirmed cases **IMMEDIATELY** by phone to the local health department, District Health Office, or the Epidemiology Branch at 404-657-2588. If calling after regular business hours, it is very important to report cases to the Epidemiology Branch answering service. After verbal report has been made, please transmit the case information electronically through the State Electronic Notifiable Disease Surveillance System (SENDSS) at <http://sendss.state.ga.us>, or complete and mail a GA Notifiable Disease Report Form (#3095).

References:

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3. CDC. Case Definitions for Infectious Conditions Under Public Health Surveillance. *MMWR* Vol. 46(RR10), 1997: 1-55.
4. CDC. Epidemiology of measles – United States, 1998. *MMWR* Vol. 48, 1999: 749-53.
5. CDC. Epidemiology and Prevention of Vaccine-Preventable Diseases, 6th Edition, January 2000: 117-140.
6. Centers for Disease Control and Prevention. Measles Outbreak — Netherlands, April 1999—January 2000. *MMWR* Vol. 49(14), 2000: 299-303.
7. Centers for Disease Control and Prevention. Manual for the surveillance of vaccine-preventable disease. Centers for Disease Control and Prevention: Atlanta, GA, 1999.
8. Chin J, ed. Measles. In: Control of Communicable Diseases Manual. 17th ed. Washington, DC: American Public Health Association, 2000: 330-335.