

Measles (Rubeola)

Surveillance Protocol



Measles is a highly communicable paramyxovirus that has only one antigenic type. Measles is an acute, viral, systemic infection, primarily of the respiratory epithelium of the nasopharynx. The virus invades and replicates in the respiratory epithelium and regional lymph nodes. A prodrome of fever that increases in stepwise fashion, followed by cough, coryza, or conjunctivitis occurs 10 to 12 days after exposure. A maculopapular rash occurs 2 to 4 days after the prodrome and about 14 days after exposure. The measles rash starts on the face and upper neck and persists for 5 to 6 days, gradually proceeding downward and outward. Transmission of measles occurs person to person by contact with respiratory droplets or through airborne spread. Vaccination for measles is available and routinely recommended in the United States. The measles virus vaccine is available combined with mumps and rubella vaccines as MMR, or combined with mumps, rubella, and varicella vaccine as MMRV.

Healthcare Provider Responsibilities

1. Consider measles as a diagnosis in anyone with a febrile rash illness and clinically compatible symptoms (cough, coryza, and/or conjunctivitis) who has recently traveled abroad or who has had contact with someone with a febrile rash illness.
Immunocompromised patients may not exhibit rash or may exhibit an atypical rash. The incubation period for measles from exposure to fever is usually about 10 days (range, 7 to 12 days) and from exposure to rash onset is usually 14 days (range, 7 to 21 days).
2. Suspect measles patients should be immediately placed in isolation with airborne transmission precautions for 4 days after the onset of rash in otherwise healthy children and for the duration of illness in immunocompromised patients.
3. Assure that healthcare personnel (HCP) who care for patients are immune to the disease by any of the following criteria (CDC):
 - a. Documented administration of 2 doses of live-virus measles vaccine at least 28 days apart on or after their first birthday;
 - b. Laboratory evidence of immunity;
 - c. Laboratory confirmation of disease; or
 - d. Birth before 1957. Although birth before 1957 is considered presumptive immunity for the general population, unvaccinated HCP born before 1957 should have additional evidence of immunity (e.g. laboratory evidence of immunity or confirmation of disease). Healthcare facilities should consider providing two doses of MMR vaccine at the appropriate intervals to unvaccinated HCP born before 1957 who do not have additional evidence of immunity, particularly during a measles outbreak.

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4. Notify the infection preventionist of the receiving healthcare facility BEFORE referring a suspect or confirmed measles case to the facility.
5. Collect throat and/or nasopharyngeal secretions and urine for measles testing. The West Virginia Department of Health and Human Resources' Office of Laboratory Services (OLS) and the Division of Infectious Disease Epidemiology (DIDE) will assist with measles laboratory testing. If you have a suspect case of measles, notify your local health department or DIDE immediately at 304-558-5358, extension 1. Because of the high false positive measles IgM results done by commercial laboratories, DIDE and OLS recommend calling 304-558-5358, extension 1 to obtain measles testing free-of-charge.
6. Laboratory diagnosis of measles is done by any of the following:
 - a. Isolation of measles virus from a clinical specimen – Specimens should be collected as soon as possible after rash onset (ideally within three days of rash onset, but up to ten days post rash onset). Specimens for virus isolation should be taken at the same time that serum is obtained, since a delay in collection will reduce the chance of isolating the virus. Throat (oropharyngeal) swabs (and/or nasopharyngeal [NP] swabs) collected in viral transport media are the preferred clinical samples for measles virus. Urine samples can also be collected in a sterile urine cup. While throat swabs are generally more easily collected, processed and transported, urine samples provide an additional opportunity for successful isolation of virus. For more information about specimen collection and shipping, contact the WV Office of Laboratory Services at 304-558-3530.
 - b. Serology:
 - i. Measles IgM – obtain specimen for single serum testing at first encounter with suspect case of measles. Sensitivity of test is affected by timing of specimen collection and immunization status and may diminish during the first 72 hours following rash onset. (Note: If IgM negative but patient has generalized rash lasting >72 hours, repeat measles IgM testing.)
 - ii. Measles IgG – paired acute and convalescent measles serology specimens; the acute specimen should be collected 72 hours after rash onset and convalescent specimen should be collected 14 to 30 days after the acute sample.
7. Assist the local health department with the investigation by providing information about the suspect case of measles and contacts in a timely manner. Initial notification should be done by telephone as soon as possible. Anticipate the need to provide information on clinical history, clinical findings, laboratory findings, vaccination history and history of travel or other exposures to support the investigation.

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8. Susceptible HCP who have been exposed should be offered the first dose of MMR vaccine and should be relieved of direct patient contact from day 5 to day 21 following exposure, regardless of whether they received vaccine or IG after exposure.
 - a. HCP without evidence of immunity who are not vaccinated after exposure should be removed from all patient contact and excluded from the facility from day 5 after their first exposure to day 21 after their last exposure.
 - b. HCP with documentation of 1 vaccine dose may remain at work and should receive the second dose.
9. Measles is highly contagious and can be transmitted from 4 days before through 4 days after the rash onset. Healthcare personnel who become ill should not have direct patient contact for 4 days after rash develops.
10. Inadvertent measles exposures in a healthcare setting require *urgent action* to prevent spread to susceptible persons (patients, family members, visitors and staff). List all persons who were in the same clinical area (emergency room, clinic, ward) with an infectious measles patient for up to two hours after the patient left or was isolated. Review their records for immunization status and underlying disease. Susceptible persons who can receive vaccine should receive a dose of MMR vaccine within 72 hours of exposure. Susceptible persons who cannot receive vaccine, especially infants less than one year of age, pregnant women and immunocompromised persons can receive a dose of immune globulin within 6 days of exposure. For immunization recommendation and postexposure prophylaxis recommendation with immune globulin, see immunization recommendations under Local Health Responsibilities (p. 4 & 5).

Laboratory Responsibilities

1. Immediately notify the healthcare provider and the infection preventionist of a positive laboratory result for measles.
2. Immediately report a positive laboratory result of measles by phone to your local health department or to DIDE (304-558-5358, extension 1).
3. In addition to a telephone call, send the positive laboratory report via electronic laboratory report (ELR) or fax a copy to the local health department.

Local Health Responsibilities

1. Educate providers about measles reporting, testing, and prevention and control measures.
2. Employees who will investigate a case or a suspected case of measles via face-to-face

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contact should have:

- a. Documented administration of 2 doses of live-virus measles vaccine at least one month apart on or after the first birthday; or
 - b. Laboratory evidence of immunity; or
 - c. Laboratory confirmation of disease.
3. Educate laboratories and providers to immediately report a suspected case of measles to public health. This should be done by telephone to ensure the report is received.
 4. When a case of measles (suspect or confirmed) is reported:
 - a. Immediately assure the case is isolated using airborne precautions.
 - b. Investigate any reported suspected case of measles **immediately** by using the measles WVEDSS form:
<https://dhhr.wv.gov/oeps/disease/WVEDSS/Documents/Measles.pdf>
 5. Immediately notify DIDE about a suspected case of measles.
 6. Ascertain the case and immediately initiate control measures. Obtain accurate and complete immunization histories, documenting any doses of measles-containing vaccine. Vaccination histories may be obtained from WVSIS, schools, medical providers or on immunization records provided by the case-patient. Verbal history of receipt of measles vaccine is not considered adequate proof of vaccination.
 7. Assure that measles polymerase chain reaction (PCR) testing (blood, throat and/or nasopharyngeal secretions, and urine) is performed for all suspected measles cases. See Laboratory Testing section (p. 14) for detailed laboratory testing information.
 8. For confirmed or highly suspected cases, consider notifying local providers through a health alert or other activities to enhance reporting of other cases of measles.
 9. Identify the source of infection for every case of measles. Case-patients should be asked about contact with other known cases. When no history of contact with a known case can be elicited, opportunities for exposure to unknown cases should be sought through a thorough interview covering travel history and activities and events to include dates attended. For cases involving multi-state or international travel, consult with the regional epidemiologist and the DIDE. After determining when and where transmission likely occurred, investigative efforts should be directed to locations visited.
 10. Assess potential transmission and identify contacts of the case-patient during the infectious period (4 days before and 4 days after the onset of rash).
 11. Implement control measures as soon as a case is suspected:
 - a. One case of measles constitutes an outbreak.
 - b. Exclude people who have not been vaccinated with measles-containing vaccine within 72 hours of exposure and people who have medical exemption against receiving measles vaccine from school, childcare, and healthcare settings until 21 days after the onset of rash in the last case of measles. Measles vaccine given

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within 72 hours of exposure may provide some protection against the disease. People receiving their second dose as well as unimmunized people receiving their first dose as part of the outbreak-control program may be readmitted immediately to the school, childcare facility, or non-healthcare related workplace.

- c. In a congregate setting such as a school or workplace: Exclude persons without evidence of immunity* to measles until they have received one dose of measles-containing vaccine.

*Evidence of immunity for students and adults is defined as:

- i. Documentation of age-appropriate vaccination with a live measles virus-containing vaccine:
 - Preschool-aged children: 1 dose administered after the first birthday;
 - School-aged children (grades K-12): 2 doses; the first dose administered after the first birthday and the second dose administered at least 28 days after the first dose;
 - ii. Laboratory confirmation of disease;
 - iii. Laboratory evidence of immunity; or
 - iv. Person born before 1957.
- d. Vaccination is the intervention of choice for measles outbreak control. Absent contraindications, all susceptible persons should be immunized with the first dose of measles-containing vaccine within 72 hours of exposure to a patient with measles. A second dose of measles-containing vaccine may be given at any time at least 28 days after the first dose of measles-containing vaccine. Infants 6-12 months of age should have the first dose repeated at age 12-15 months, and the second dose given at 4-6 years of age.
- e. In schools, colleges, and other educational institutions (i.e. daycare) where close contact may exist, and where there may be high rates of vaccine exemptions, exclude and isolate cases until 5 days after rash onset, unless they are immunocompromised. Offer age-appropriate vaccination (first dose to the unvaccinated, second dose to those with one documented dose can be given at least 28 days after the first dose). Persons who refuse vaccination should be excluded until 21 days after rash onset in the last case of measles.
- f. In healthcare settings, all susceptible persons (patients, family, visitors, staff) who were in the same clinical care area (emergency room, clinic, ward, etc.) should be evaluated for immunity. A first or second dose of measles-containing vaccine should be given to:
- i. Infants as young as 6 months of age (repeat the first dose of measles-

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containing vaccine at 12 to 15 months of age and second dose of measles-containing vaccine at 4-6 years of age)

- ii. Children
- iii. Adults should have one dose (birth before 1957 is NOT considered evidence of immunity during an outbreak).
- iv. Healthcare personnel without evidence of immunity (birth before 1957 is NOT considered evidence of immunity during an outbreak). Healthcare personnel without evidence of immunity should receive the first dose of vaccine and be excluded from work from day 5 after the first exposure to day 21 following the last exposure. **All healthcare personnel caring for a suspect or confirmed measles case should use respiratory protection consistent with airborne infection control precautions, regardless of immune status.**

- g. Individuals who are at risk for severe disease and complications from measles, particularly contacts younger than 1 year of age, pregnant women, and immunocompromised people for whom the risk of complications is highest, should receive immune globulin (IG). IG can be given within 6 days of exposure.
- h. Children who received IG for post-exposure prophylaxis should be given the first dose of measles-containing vaccine at age 12-15 months, and the second dose at age 4-6 years, assuming there is no contraindication.

HIV-infected children who have serologic evidence of immunity or who received 2 doses of measles vaccine after initiation of combination antiretroviral therapy (cART) with no or moderate immunosuppression should be considered immune and will not require additional measures to prevent measles. Asymptomatic mildly or moderately immunocompromised HIV-infected patients without evidence of immunity should receive IG (0.5 mL/kg, maximum of 15 mL) regardless of immunization status. Severely immunocompromised patients should receive IG intravenous (IGIV) prophylaxis, 400 mg/kg, after exposure, regardless of vaccination status, because they may not be protected by the vaccine. HIV-infected children who have received IGIV within 3 weeks of exposure do not require additional passive immunization. People with perinatally-acquired HIV who were vaccinated before initiation of cART should be considered unvaccinated and should receive 2 doses of MMR vaccine once effective cART has been administered.

- 12. Conduct active (enhanced) surveillance for measles for at least two incubation periods (24 days or two times the maximum incubation period) following onset of rash in the last case, in all affected areas for persons with measles.

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State Health Responsibilities

1. Prompt and complete reporting of measles cases to the CDC through WVEDSS.
2. Report cases of measles to the CDC within 24 hours of notification (“Immediate, Urgent”).
3. Provide technical expertise and consultation regarding surveillance, investigation, laboratory confirmation, case ascertainment, control measures and prevention of measles.
4. Notify the CDC of suspected outbreaks identified in West Virginia and assist local health jurisdictions during investigation of a measles outbreak.
5. Maintain measles awareness among public health partners and the public.

Disease Control Objectives

1. When a case is identified, prevent additional cases by:
 - a. Assuring the case is placed in airborne isolation until 4 days after the rash onset.
 - b. Early identification and vaccination of close contacts.

Disease Prevention Objectives

Prevent cases of measles by encouraging measles vaccination of all susceptible individuals per the CDC Advisory Council on Immunization Practices (ACIP) recommendations.

Disease Surveillance Objectives

1. To rapidly detect and confirm a case of measles, if it occurs in West Virginia.
2. If measles occurs in West Virginia:
 - a. Characterize the complications of measles.
 - b. Determine whether cases are due to failure to vaccinate or vaccine failure.
 - c. Identify sources and sites of transmission.
 - d. Monitor the effectiveness of outbreak control strategies.
 - e. Identify risk factors for infection.

Occupational Health

Assure that healthcare personnel (HCP) who care for patients are immune to the disease by any of the following CDC criteria:

1. Documented administration of 2 doses of live-virus measles vaccine at least

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- 28 days apart on or after their first birthday;
2. Laboratory evidence of immunity;
3. Laboratory confirmation of disease; or
4. Birth before 1957. Although birth before 1957 is considered presumptive immunity for the general population, unvaccinated HCP born before 1957 should have additional evidence of immunity (e.g. laboratory evidence of immunity or confirmation of disease). Healthcare facilities should consider providing two doses of MMR vaccine at the appropriate intervals to unvaccinated HCP born before 1957 who do not have additional evidence of immunity, particularly during a measles outbreak.

Suspect measles patients should be immediately placed in isolation with airborne transmission precautions for 4 days after the onset of rash in otherwise healthy children and for the duration of illness in immunocompromised patients.

Susceptible HCP who have been exposed should be offered the first dose of MMR vaccine and should be relieved of direct patient contact from day 5 to day 21 following exposure, regardless of whether they received vaccine or IG after exposure.

1. HCP without evidence of immunity who are not vaccinated after exposure should be removed from all patient contact and excluded from the facility from day 5 after their first exposure to day 21 after their last exposure.
2. HCP with documentation of 1 vaccine dose may remain at work and should receive the second dose.

Public Health Significance

Measles is a highly infectious, acute viral illness that can be complicated by severe pneumonia, diarrhea, and encephalitis and can result in death. The secondary attack rate of measles among susceptible individuals is greater than 90%. In the pre-vaccine era, approximately 500,000 cases of measles occurred annually in the United States.

From 1989 to 1991, the incidence of measles in the United States increased because of low immunization rates ('failure to vaccinate') in preschool-aged children, especially in urban areas. During this time outbreaks were also reported in school-age children who had received the recommended one-dose measles-containing vaccine ('failure of vaccine'). In 1989, a 2-dose vaccination schedule was recommended by the CDC Advisory Council on Immunization Practices (ACIP) and in 1998 they recommended that all school-age children in all grades receive both doses by 2001. Implementation of the 2-dose schedule in school-age children and

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improved timely administration of the first dose of MMR vaccine resulted in a dramatic decline in measles cases.

In 2000, endemic measles was declared eliminated in the United States. However, measles remains endemic in many parts of the world and international travelers infected with measles have been a source of outbreaks in the U.S. Since 2000, the annual number of cases of measles in the U.S. has ranged from a low of 37 in 2004 to a high of 667 in 2014. The rise in the number of cases in recent years is due to greater spread from imported cases to unvaccinated individuals. Beginning in late 2014, a nationwide outbreak of measles was linked to a California amusement park. Over half the cases were unvaccinated.

The need to maintain the highest possible measles vaccination coverage in West Virginia and the United States and to adhere to recommendations regarding measles vaccination plays a major role in the prevention of measles.

Clinical Description

Prodrome

Measles is characterized by prodromal symptoms of slowly increasing fever (peaking up to 105°F), followed by cough, coryza (runny nose), or conjunctivitis. The prodrome lasts for 2-4 days (range 1-7 days). Koplik spots occur 1-2 days before to 1-2 days after the skin rash. Their presence is considered to be pathognomonic for measles and appear as punctate blue-white spots on the bright red background of the oral buccal (cheek) mucosa (see Figure 1).

Rash

The measles rash is a maculopapular eruption that usually appears 14 days after exposure (range 7-21 days). The rash begins at the hairline and spreads from head to trunk to lower extremities and lasts 5-6 days (see Figure 2).

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Figure 1. Koplik spots on the buccal mucosa



Image retrieved from <http://phil.cdc.gov/phil/home.asp>

Figure 2. Distribution of measles rash

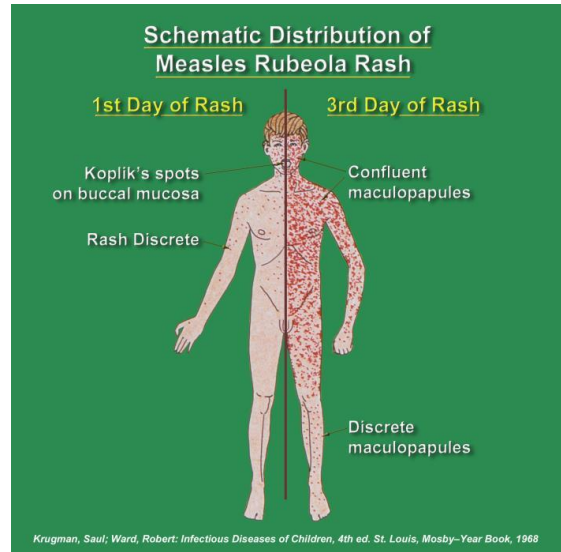


Image retrieved from
<http://phil.cdc.gov/phil/home.asp>

Complications

Complications include otitis media, bronchopneumonia, laryngotracheobronchitis (croup) and diarrhea that occur commonly in young children. Acute encephalitis, which often results in permanent brain damage, occurs in approximately 1 of every 1000 cases. Subacute sclerosing panencephalitis (SSPE) is a rare degenerative central nervous system disease believed to be due to persistent measles virus infection of the brain. Onset occurs an average of 7 years after measles (range, 1 month to 27 years) and occurs in five to ten cases per million reported measles cases. The onset is insidious, with progressive deterioration of behavior and intellect, followed by ataxia, myoclonic seizures, and eventually death. SSPE has been extremely rare since the early 1980s. Death, predominantly resulting from respiratory and neurologic complications, occurs in 1 to 3 of every 1000 cases reported in the United States. Case fatality rates are high in children under 5 years of age and immunocompromised children, including children with leukemia, HIV infection and severe malnutrition.

Etiologic Agent

Measles virus is an enveloped RNA virus with one serotype, classified as a member of the genus Morbillivirus in the Paramyxoviridae family.

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Reservoir

Humans are the only known natural reservoirs. There is no known animal reservoir, and an asymptomatic carrier state has not been documented.

Mode of Transmission

Measles is primarily transmitted from person-to-person via large respiratory droplets. Airborne transmission via aerosolized droplet nuclei has been documented in closed areas for up to 2 hours after a person with measles occupied the room. In temperate areas, the peak incidence of infection usually occurs during late winter and spring.

Incubation Period

The incubation period of measles from exposure to onset of symptoms is from 8 to 12 days. The average interval from exposure to onset of rash is 14 days (range of 7-21 days).

Period of Communicability

Measles is one of the most highly communicable of all infectious diseases; the attack rate in a susceptible individual exposed to measles is 90%. Population immunity of 95% is needed to stop ongoing transmission.

Patients are infectious from 4 days before the rash through 4 days after appearance of the rash. Maximum infectiousness occurs between 1-2 days before onset of symptoms (3-5 days before the rash) to 4 days after onset of rash.

Immunocompromised patients who may have prolonged excretion of the virus in respiratory tract secretions can be contagious for the duration of illness.

Outbreak Recognition

An outbreak is defined as one or more cases in a county or one or more cases in a congregate setting (such as school or workplace). The last measles case reported in West Virginia was in 2009.

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Case Definition

Measles (Rubeola) 2013 Case Definition:

Clinical case definition

An acute illness characterized by:

- Generalized, maculopapular rash lasting ≥ 3 days; **and**
- Temperature $\geq 101.0^{\circ}\text{F}$ (greater than or equal to 38.3°C); **and**
- Cough, coryza, or conjunctivitis.

Case classification

Probable:

In the absence of a more likely diagnosis, an illness that meets the clinical description with:

- No epidemiological linkage to a laboratory-confirmed measles case; **and**
- Noncontributory or no measles laboratory testing.

Confirmed:

An acute febrile rash illness[†] with:

- Isolation of measles virus[‡] from a clinical specimen; or
- Detection of measles-virus specific nucleic acid from a clinical specimen using polymerase chain reaction; or
- IgG seroconversion[‡] or a significant rise in measles immunoglobulin G antibody[‡] using any evaluated and validated method; or
- A positive serologic test for measles immunoglobulin M antibody[§]; or
- Direct epidemiological linkage to a case confirmed by one of the methods above.

[†]Temperature does not need to reach $\geq 101^{\circ}\text{F}/38.3^{\circ}\text{C}$ and rash does not need to last ≥ 3 days.

[‡]Not explained by MMR vaccination during the previous 6-45 days.

[§]Not otherwise ruled out by other confirmatory testing or more specific measles testing in a public health laboratory.

Epidemiologic classification of internationally imported and U.S.-acquired

Internationally imported case: An internationally imported case is defined as a case in which measles results from exposure to measles virus outside the U.S. as evidenced by at least some of the exposure period (7–21 days before rash onset) occurring outside the U.S. and rash onset occurring within 21 days of entering the U.S. and there is no known exposure to measles in the U.S. during that time. All other cases are considered U.S.-acquired.

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U.S.-acquired case: A U.S.-acquired case is defined as a case in which the patient had not been outside the U.S. during the 21 days before rash onset or was known to have been exposed to measles within the U.S.

U.S.-acquired cases are subclassified into four mutually exclusive groups:

- **Import-linked case:** any case in a chain of transmission that is epidemiologically linked to an internationally imported case.
- **Imported-virus case:** a case for which an epidemiologic link to an internationally imported case was not identified, but for which viral genetic evidence indicates an imported measles genotype, i.e., a genotype that is not occurring within the U.S. in a pattern indicative of endemic transmission. An endemic genotype is the genotype of any measles virus that occurs in an endemic chain of transmission (i.e., lasting ≥ 12 months). Any genotype that is found repeatedly in U.S.-acquired cases should be thoroughly investigated as a potential endemic genotype, especially if the cases are closely related in time or location.
- **Endemic case:** a case for which epidemiological or virologic evidence indicates an endemic chain of transmission. Endemic transmission is defined as a chain of measles virus transmission that is continuous for ≥ 12 months within the U.S.
- **Unknown source case:** a case for which an epidemiological or virologic link to importation or to endemic transmission within the U.S. cannot be established after a thorough investigation. These cases must be carefully assessed epidemiologically to assure that they do not represent a sustained U.S.-acquired chain of transmission or an endemic chain of transmission within the U.S.

Note: Internationally imported, import-linked, and imported-virus cases are considered collectively to be import-associated cases.

States may also choose to classify cases as “out-of-state-imported” when imported from another state in the U.S. For national reporting, however, cases will be classified as either internationally imported or U.S.-acquired.

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Laboratory Testing

The West Virginia Office of Laboratory Services (OLS) requests collection of nasopharyngeal or throat swabs and urine for the diagnosis of measles. Specimens will be submitted to the Wisconsin State Laboratory of Hygiene (WSLH) for PCR testing. Although the WSLH does not accept serum specimens, if the provider wishes to have serology testing performed, serum should be collected at the same time as specimens for viral PCR.

Measles viral RNA by PCR:

Specimens should be collected as soon as possible after rash onset and should not be delayed until any pending laboratory confirmation is obtained. While throat swabs are generally more easily collected, processed and transported, urine samples provide an additional opportunity for successful isolation of virus and may prove superior to throat swabs if collection is delayed beyond about 5 days after rash onset.

Nasopharyngeal or throat swab: Sterile swabs (Dacron or synthetic) can be used to obtain throat and/or nasopharyngeal specimens. A throat swab is taken by rubbing the posterior nasal passages with a dry sterile Dacron swab. Place swab in a tube containing 2-3 ml of viral transport medium (VTM). The swab can be broken off into the tube. Store swab in viral transport media (Remel M4 RT or equivalent) at 4°C if shipping within 24 hours; ship on cold packs. If immediate cold shipment (within 48 hours) cannot be arranged or is not convenient, nose and throat swabs should be removed from the VTM. Gently vortex or swirl the swab in the fluid and ream the swab against the side of the tube. These samples should be frozen and shipped at -70° C on dry ice.

Urine: Collect 10-50mL of urine in sterile container. Do not add virus transport medium. If shipping within 24 hours, ship on cold packs. If shipping is delayed, freeze at -70°C and ship frozen on dry ice.

Shipping instructions:

After collection, make sure that the specimen collection vessel is labeled with the patient name and date of collection. Complete the WSLH VPD form found at http://www.dhhr.wv.gov/oeps/disease/IBD_VPD/VPD/documents/vpd-submission-form.pdf and include it in the shipment.

Ship the specimen(s) to OLS according to the recommendations in the chart. http://www.dhhr.wv.gov/oeps/disease/IBD_VPD/VPD/documents/vpd-reference-testing.pdf

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Packages must be properly labeled as UN3373 Biological Substances and shipped per current Department of Transportation regulations.

Send specimens to:
WV Office of Laboratory Services
ATTN: VPD Referral/Micro
167 11th Avenue
South Charleston, WV 25303
Telephone: 304-558-3530

NOTE: If shipping on dry ice, the package must be labeled with a UN1845 label, with the weight of the dry ice in the shipping container stated on the label. If a frozen specimen needs to be shipped directly to WSLH, OLS must be consulted before the shipment is made.

Measles serology

Acute measles serology specimens should be collected 72 hours after rash onset and convalescent measles serology should be collected 14 to 30 days after the acute sample. Since neither the OLS or WSLH performs serological testing, the serum will have to be submitted to a reference laboratory for this testing at the patient's expense. Please consult your reference laboratory for specimen shipping requirements. CDC can perform serological testing only in special circumstances with pre-approval.

Detection of specific IgM antibodies in a serum sample collected within the first few days of rash onset can provide presumptive evidence of a current or recent measles virus infection. However, because no assay is 100% specific, serologic testing of non-measles cases using any assay will occasionally produce false positive IgM results.

Blood for serologic testing is collected by venipuncture or by finger/heel stick. Use tubes without additives—either a plain, red-top tube or a serum separator tube. Collect at least 300 µl of serum.

Refrigerate at 4°C. Do not freeze. Ship the serum on cold packs.

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Preventive Interventions

1. Measles can be prevented with measles-containing vaccine. Two doses of vaccine are 97% effective at preventing measles. Vaccine recommendations (CDC):
 - a. Vaccinate children at age 12-15 months with a first dose of MMR vaccine.
 - b. Ensure that school-age children receive a second dose of MMR vaccine.
 - c. Vaccinate high risk groups, such as healthcare personnel, and international travelers including infants aged 6 to 11 months.
 - d. Students at post-high school education institutions without evidence of immunity should receive two doses of MMR vaccine 28 days apart.
 - e. People born on or after 1957 who do not have evidence of immunity (see *Evidence of immunity, p.5) should receive at least one dose of MMR vaccine.
2. Ensure that all healthcare personnel have evidence of immunity to measles.
3. Measles is transmitted by direct contact with infectious droplets or by airborne spread when an infected person breathes, coughs, or sneezes. Infected people should be isolated for 4 days after they develop a rash.
4. Post-exposure prophylaxis should be offered to anyone who cannot show proof of immunity, absent contraindications.
 - a. MMR vaccine, if administered within 72 hours of initial exposure, or immunoglobulin (IG), if administered within six days of exposure, may provide some protection or modify the clinical course of disease.

Treatment

There is no specific antiviral therapy for measles.

Surveillance Indicators

1. Proportion of cases with complete demographic data.
2. Proportion of cases with adequate laboratory testing.
3. Proportion of cases with complete vaccine information.
4. Proportion of cases with complete clinical information.
5. Proportion of cases with complete information on transmission setting.
6. Median days between rash onset date and the date reported to public health.

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Measles (Rubeola)

Surveillance Protocol



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