

Collection and Submission of Suspected Measles Specimens

The Ohio Department of Health (ODH) will accept specimens from suspected measles cases who meet the CDC clinical case definition and have a recent travel history and/or are unvaccinated.* Providers who suspect measles and the patient does not meet the criteria for ODH lab testing, should be instructed to send specimens to the laboratory they normally use.

CDC measles clinical case definition:

An illness characterized by **all** of the following

1. A generalized rash lasting ≥ 3 days; **and**
2. A temperature $\geq 101^{\circ}\text{F}$ ($\geq 38.3^{\circ}\text{C}$); **and**
3. Cough, coryza, or conjunctivitis

*Under certain circumstances exceptions may be made, for example if an IgM test comes back positive from a commercial or hospital lab and measles is strongly suspected and confirmatory testing is needed.

When to collect measles specimens:

- Detection of measles RNA and measles virus isolation are most successful when samples are collected on the first day of rash through the 3 days following onset of rash. Detection of measles RNA by RT-PCR may be successful as late as 10–14 days post rash onset.
- IgM tests are often positive on the day of rash onset. However, up to 20% of tests for IgM may give false negative results in the first 72 hours after rash onset. Therefore, IgM tests that are negative in the first 72 hours after rash onset should be repeated. IgM obtained four days after the onset of rash is the preferred laboratory diagnostic procedure. IgM is detectable for at least 28 days after rash onset.

How to collect measles specimens (collect both respiratory swabs and serum samples):

Respiratory Swabs - Throat (oropharyngeal), nasal, or NP (nasopharyngeal) swabs are the preferred samples for virus isolation or detection of measles RNA by RT-PCR. Synthetic swabs are recommended. Throat, NP, or nasal swabs should be transferred to 1-3ml of **viral transport medium (do not allow to dry out).

- Insert a dry swab and allow swab to remain there for 15 seconds to absorb secretions.
- Rotate the swab gently 2-3 times and withdraw slowly.
- Place the swab in container with transport media, break off end of swab so that it fits in container.
- Label the container with patient name, date of collection, and type of specimen.

**Cell culture medium (minimal essential medium or Hanks' balanced salt solution) or other sterile isotonic solution (e.g. phosphate buffered saline) can be used. The presence of protein, for example 1% bovine albumin, 0.5% gelatin, or 2% serum, stabilizes the virus. Samples without a source of protein in the medium will lose 90%–99% infectivity within 2 hours at 4°C.

Serology (serum) samples - Blood for serologic testing is collected by venipuncture or by finger/heel stick. Use tubes without additives--a plain, red-top tube or serum-separator tube (SST). The preferred volume for IgM and IgG testing at CDC is .5-1 ml of serum; however, testing can be done with as little as .1 ml (100 μl). Generally, 5 ml of blood will yield about 1.5 ml of serum.

- Do not freeze the tube before serum has been removed. Centrifuge the tube to separate serum from clot. Gel separation tubes should be centrifuged no later than 2 hours after collection. Aseptically transfer serum to a sterile tube that has an externally threaded cap with an o-ring seal.
- Capillary tubes can be utilized for infants. Capillary tubes require the submitter to have access to the appropriate centrifuge for these capillary tubes. Clinical laboratories should have 50 or 100 μl capillary

tubes that are typically used for a variety of tests such as hematocrits or total lipids on newborns. At least 3 of the 50 µl hematocrit capillary tubes should be collected and spun in a hematocrit centrifuge.

Storage and shipment:

- Measles virus is sensitive to heat and viability decreases markedly when samples are not kept cold.
- It is important to transport samples with cold packs as soon as possible following sample collection. Avoid repeat freeze-thaw cycles or freezing at -20°C (standard freezer temperature) because formation of ice crystals decreases infectivity. If -40°C or -70°C freezers are not available, it is recommended to keep the sample in the refrigerator (4°C).
- Processing the swabs within 24 hours will enhance the sensitivity of both the RT-PCR and virus isolation techniques

How to submit specimens to the Ohio Department of Health Laboratory:

- Local Health Departments should call ODH Vaccine Preventable Disease Epidemiology at (614) 995-5599 as soon as possible the next business day regarding specimen submission to ODH Lab.
- For each specimen fill out the following forms as completely as possible (fill out separate forms for each specimen). Forms can be found in the [Infectious Disease Control Manual \(IDCM\)](#).
 - For serum specimens (serology testing) complete each of the following:
 - Ohio Department of Health Laboratory Microbiology Specimen Submission Form - Indicate “Measles” in the Comments section
 - CDC Specimen Submission Form 50.34 –
Test order name: Measles Serology
Test order code: CDC-10244
Suspected agent: Measles Virus
 - For swab specimens (PCR and/or measles genotyping) complete each of the following:
 - Ohio Department of Health Laboratory Microbiology Specimen Submission Form - Indicate “Measles” in the Comments section
 - Wisconsin (WI) VPD Submission Form
Test order: Measles virus PCR and Measles virus Genotyping
- Place collected specimen and frozen cold packs in a sealed plastic bag (or other watertight secondary packaging).
- Place sealed plastic bag and submission forms in a rigid third container, such as a fiberboard box.
- Overnight shipment is preferred for receipt within 24 hours. Store specimens that can be received within 24 hours at 4°C until they are shipped. Specimens that cannot be processed within 24 hours should be frozen at -40°C or lower (preferably -70°C) and shipped on dry ice. Specimens collected on a Friday or Saturday should be frozen at -40°C or lower (preferably -70°C) and shipped on dry ice the following Monday. Follow protocols for standard interstate shipment of etiologic agents. All shipments must comply with current DOT/IATA regulations for Category B Biological Substances.
- Ship the specimen to the following address:
Ohio Department of Health Laboratory
Attn: Virology - Measles
8995 Main St., Building # 22
Reynoldsburg, OH 43068