Frequently Asked Questions on Measles Testing Practices

Measles Testing Practices • October 2026

Overview

To address measles testing questions from public health professionals, epidemiologists and clinicians, APHL has developed a frequently asked questions (FAQ) document. Measles testing is a collaborative process; when considering measles testing, the relevant facility, state and federal guidelines should be referenced, and often, public health officials should be contacted in advance.

Specimen Collection

What specimens should be collected for measles testing?

CDC recommends that either a nasopharyngeal (NP) swab, throat swab or paired respiratory swab and urine specimen be collected from all patients with clinical features compatible with measles.[1] If the patient presents >10 days post rash onset, a blood specimen should be collected for serologic testing.

NP or throat swabs are preferred over urine specimens.[1] Laboratories may accept different specimen types; please review your laboratory's test directory prior to collecting and submitting specimens.

Is urine an acceptable specimen type for measles RT-PCR testing? Are there data on specimen type performance?

Urine is an acceptable specimen type for measles reverse transcription polymerase chain reaction (RT-PCR) testing; RT-PCR testing can be performed on respiratory (nasopharyngeal or throat) swabs and on urine.[2] Several small-scale studies have demonstrated that NP swabs, throat swabs, or other respiratory specimens are preferred because measles virus is typically present at higher concentrations in the respiratory tract, particularly early in the illness.[3]

For optimal diagnosis, urine is best used as a supplemental specimen, ideally collected alongside a respiratory specimen when measles is suspected. Clinicians should reference the CDC Laboratory Testing and Clinical Guidance for Measles webpage for further information on collection timeframe but also be aware that different laboratories may have different acceptance criteria.[1] Please review your laboratory's specimen submission requirements prior to collecting specimens.

Can self-testing/self-swabbing be utilized for measles testing?

The authors are not aware of any US laboratories offering testing on self-collected specimens.

While this approach has been utilized in the UK and piloted in Canada, there are no FDA cleared tests available for this purpose in the US.[4,5] Laboratories must follow regulatory requirements for validating self-collection outside of a clinical setting to utilize test results diagnostically. The authors are not aware of any laboratories that have completed this validation at the time of writing.

Diagnostics

What tests are available for measles diagnosis?

Measles RT-PCR is the preferred test for diagnosis of measles infection. Measles RT-PCR detects measles RNA in respiratory or urine specimens, offering the highest diagnostic sensitivity when collected promptly. It is most sensitive when collected on the first day of rash through 3 days post rash onset but can detect measles RNA up to 14 days post rash onset. There are no FDA cleared tests for measles RT-PCR. All tests offered in the US are laboratory developed tests (LDTs).

Measles IgM antibody testing detects measles-specific IgM antibodies in serum, providing presumptive evidence of recent infection. It can be useful to diagnose cases where suspicion of measles infection is high, but the patient is past the viremic period (>10 days post rash onset). False positives can occur due to cross-reactivity or rheumatoid factor and false negatives may occur if serum is collected too early.

The measles vaccine (MeVa) assay is an RT-PCR that detects RNA from the strain of measles virus used in vaccines. It should be performed on specimens from recently vaccinated individuals to distinguish vaccine reaction from wild-type measles infection.

Should you perform RT-PCR tests on specimens from suspect measles cases before the appearance of a rash?

No. Measles RT-PCR assays are validated with specimens from cases that meet the clinical case definition (CCD)[6]:

- Generalized, maculopapular rash lasting ≥ 3 days; AND
- Temperature ≥ 101°F or 38.3°C; AND
- Cough, coryza or conjunctivitis.

There are not published data on the performance of RT-PCR tests on specimens that do not meet the CCD. While it is possible to use an RT-PCR test to provide early confirmation of infection, a negative RT-PCR test run on a specimen that does not meet the CCD is not definitive and should not be used to test out of quarantine, for example.

What is the difference between the Pan Measles and Measles Vaccine (MeVA) assays?

Measles RT-PCR tests are designed to detect RNA from all measles strains, including the strain used in measles vaccines. The MeVA assay detects RNA from the measles strain specifically used in measles vaccines. The MeVA assay was created to help differentiate vaccine reactions from wild-type measles infection.

The measles, mumps and rubella (MMR) and measles, mumps, rubella and varicella (MMRV) vaccines contain live-attenuated viruses, and roughly 5% of recipients may develop measles-like symptoms within approximately 8-12 days after vaccination.[7] Therefore, a recent measles vaccination can complicate a measles diagnosis because the RT-PCR may detect RNA of the vaccine-strain. Measles vaccine-specific assays (MeVA) distinguish wild-type measles infection from vaccine-associated rashes.

There are no FDA cleared diagnostic tests available for the molecular detection of measles virus. Currently used RT-PCR assays are laboratory developed tests (LDTs) that detect measles virus (MeV) RNA in clinical specimens, such as nasopharyngeal swabs, throat swabs, or urine. They target conserved regions of the measles virus genome, allowing detection of all genotypes, including wild-type measles and measles vaccine strains.

MeVA was created to differentiate vaccine reactions from wild-type measles infection faster than genotyping, the previously relied-on method. The MeVA test detects only RNA from measles vaccine-strains and is informative in situations when vaccination history is available and there is a known epidemiologic risk for wild-type measles.[8]

Should a laboratory perform MeVA as a stand-alone test?

No, the MeVA test should either be 1) performed in parallel with a CLIA-validated measles RT-PCR assay or 2) as a reflex test following a positive result in a CLIA-validated measles RT-PCR assay.

The MeVA test should be performed if the following criteria are met:

- A patient has a febrile rash that is a suspected vaccine reaction due to a recently administered vaccination (i.e., rash onset within 21 days* of a measles containing vaccine), and
- A patient has been potentially exposed to wild-type measles virus (e.g. in an outbreak setting), and
- A sample was collected within 14 days of rash onset.

The same specimen should be tested using both assays, and results from the measles RT-PCR test and the MeVA test should always be reported and interpreted together for each specimen. The MeVA test should not be performed when a patient has a suspected vaccine reaction in the absence of exposure to wild-type measles virus.

*Measles vaccine rash has been observed >21 days after vaccination – see below for additional information on utilizing MeVA results if patients are greater than 21 days out from vaccination.

How should clinicians or laboratories interpret MeVA test results if a patient was vaccinated greater than 21 days prior to testing?

There are several publications that demonstrate the persistence of vaccine RNA for weeks to months post-vaccination.[9,10,11] The detection of measles vaccine strain greater than 21 days after the receipt of measles-containing vaccine could be incidental; additional characterization of the specimen and/or additional diagnostics should be considered in the context of the case.

How do you interpret a positive MeVA result on a recently vaccinated patient with a measles exposure?

In post-elimination settings, a patient experiencing a febrile rash within 21 days of MMR and a known epidemiologic risk for wild-type measles should be tested on both the measles RT-PCR assay and MeVA RT-PCR assays.[8] A positive result in both the measles RT-PCR assay and MeVA RT-PCR assays for the same specimen indicates that vaccine strain measles virus was detected, and that the patient's symptoms were likely due to a recent vaccination. The current literature does not contain any reports in which co-infection occurred with MeVA and wild-type MeV.[12]

Can you rule out a measles case based on RT-PCR?

While a positive measles RT-PCR assay result may be used as part of the diagnostic criteria for a confirmed measles case, a negative result does not necessarily rule out measles. Several analytic factors (specimen collection, storage, assay sensitivity, assay controls e.g. reference gene, reporting error) may all lead to a false negative result. A healthcare provider's clinical judgement must always be used when interpreting laboratory results.

How should measles IgG testing be used during a measles outbreak response?

Measles IgG testing is not preferred in the diagnosis of active measles infection. However, either measles IgG seroconversion or a fourfold or greater increase in IgG titer between acute and convalescent specimens is considered supportive evidence of a recent infection. Measles IgG testing may also be used to establish immune status in exposed individuals.

Clinicians should reference the CDC Laboratory Testing and Clinical Guidance for Measles webpage for further information on collection timeframe.[1]

How should IgM antibody testing be used during a measles outbreak response?

Measles IgM testing may help rule in a case that may be negative by RT-PCR when specimens are collected a week or more after rash onset, which is outside of the optimal window for RT-PCR positivity.

However, measles IgM tests have important limitations. Test performance of commercially available measles IgM kits varies widely. Data published in a 2022 Journal of Clinical Microbiology Article, found that "sensitivity and specificity for each commercial kit ranged from 50 to 83% and 86.9 to 98%, respectively.[13] Discrepant results were observed for samples tested with all five commercial kits and ranged from 13.8 to 28.8% of the specimens tested. False-positive results occurred in 2.0 to 13.1% of sera, while negative results were observed in 16.7 to 50% of sera that were positive by the CDC measles IgM capture assay."

Additionally, measles IgM antibodies can be detected up to 4 weeks after vaccination or previous infection.[14] Additionally, IgM testing requires a blood draw, which is often distressing for young children. If obtaining an IgM result is the only reason for drawing blood, the procedure may not be warranted.

How do you interpret an IgM positive, RT-PCR negative result?

Each case should be evaluated individually to determine the underlying reason for a negative RT-PCR result, including whether the specimen was collected outside of the expected window of RT-PCR positivity. If the clinical presentation is characteristic of measles AND the RT-PCR negative specimen(s) were obtained beyond the anticipated RT-PCR positivity period, the case should still be classified as measles. If the clinical presentation is characteristic of measles and the RT-PCR negative specimen(s) were NOT obtained outside of the anticipated RT-PCR positivity period, the clinician or epidemiologist must interpret the results based on clinical symptoms and epidemiological data.

How should clinicians or epidemiologists manage discordant RT-PCR results between laboratories?

Adjudication of discordant testing results should involve a close review of the results, the methods utilized in each laboratory as well as integrating clinical and epidemiological data.

False negative results may be caused by sample handling issues, nucleic acid degradation during specimen transport or storage or may be a true positive sample containing low viral copies that is near the limit of detection (LOD) in the testing laboratory. In this case, primary testing results may be positive with subsequent negative results if the sample is sent for confirmation (e.g. to a public health laboratory). Ultimately, established test performance may vary between laboratories, and unexpected results may require additional follow-up with the laboratory.

What is the role of serology in diagnosing measles complications such as subacute sclerosing panencephalitis (SSPE)?

Because of the latency period associated with SSPE, enzyme immunoassays (EIAs) to measure measles IgG in cerebrospinal fluid and serum may be used in conjunction with clinical symptoms and brain imaging to make an SSPE diagnosis.[15]

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