



**New Jersey Department of Health
Vaccine Preventable Disease Program**

MUMPS LABORATORY TESTING FAQs

Date: February 2023

SPECIMEN COLLECTION AND MANAGEMENT

1. Who should be tested for suspected mumps infection?

Any person with clinical features compatible with mumps should be tested. Clinical diagnosis of mumps may be unreliable, so suspected cases of mumps should be laboratory confirmed. As with any disease, lab work should be used in conjunction with clinical presentation (signs and symptoms).

2. What specimens should be collected from patients meeting the clinical case definition?

The Centers for Disease Control and Prevention (CDC) recommends that a buccal/oral swab and blood specimen be collected from all patients with clinical features compatible with mumps. Additional specimens may be requested in some scenarios. For example, urine, in addition to an oral specimen, may be requested for patients presenting with mumps complications (orchitis, oophoritis, nephritis, encephalitis, meningitis) without parotitis.

3. What is the preferred method for laboratory confirmation of mumps?

Reverse transcriptase polymerase chain reaction (RT-PCR) testing performed on buccal or oral swabs, collected within 3 days of parotitis onset, is preferred. RT-PCR testing is widely available, and results are generally available within 3 days. Culture results have limited clinical usefulness since results may take up to 4 weeks.

4. When is the best time to collect clinical specimens?

In patients with clinical features compatible with mumps symptoms presenting:

- ≤ 3 days from parotitis onset: [collect](#) a buccal swab specimen for RT-PCR.
- > 3 days from parotitis onset: collect a buccal swab specimen for RT-PCR and a serum specimen for IgM detection. Please see Q11 for additional information regarding timing for serologic (IgM) testing.

If the patient has orchitis/oophoritis, mastitis, pancreatitis, hearing loss, meningitis or encephalitis and does not have parotitis, collect a buccal swab specimen for RT-PCR, a urine specimen for RT-PCR, and a serum specimen for IgM detection regardless of the days since symptom onset.

Note: please refer to Laboratory Results section for additional information on how vaccination status and timing of collection can affect results.

5. How long would you be able to detect mumps in specimens?

This depends on the type of specimen and vaccination status of the person. It is recommended that specimens be collected as close to parotitis onset as possible (but preferably within 3 days).

- Swabs may be positive in unvaccinated persons up to 14 days post onset, however among suspected cases that have received 1 or more doses of a mumps-containing vaccine, virus may be cleared much earlier.
- IgM can be positive for up to 1 month in unvaccinated persons. However, vaccinated persons, regardless of timing of collection, may not have detectable IgM.

6. How should specimens be collected and managed?

Buccal/Oral Swab: Swabs should be synthetic (non-cotton). Brands of synthetic swabs include Dacron® and Copan (those products without charcoal). This is the same type of swab and media used for influenza RT-PCR testing. Massage the parotid gland area (the space between the cheek and teeth just below the ear) for about 30 seconds prior to collection of the buccal secretions. The parotid duct (Stensen's duct) drains in this space near the upper rear molars. Place swabs in 2-3 ml of standard, commercially available viral transport medium (VTM). Transport media with charcoal should *not* be used. Keep specimens cold (4°C) and ship using cold packs (4°C).

Serologic testing: Collect 7-10 ml of blood in a red top or serum separator tube (red-speckled or gold). Keep specimens cold (4°C) and ship using cold packs.

Urine: Collect a minimum volume of 50 ml of urine in a sterile container. Keep specimens cold (4°C) and ship using cold packs.

Please note: If there is a delay in shipment for any specimens, freezing (-20°C or lower) and shipping with dry ice may be recommended.

Resources:

- [Illustration of parotid gland and instructions for collection of buccal fluid](#)
- [Materials and Methods of Specimen Collection, Storage, and Shipment](#)

7. Where can specimens be sent for testing?

Each specimen must be clearly labelled with the patient's name, date of birth, and date of collection. Mumps testing can be performed by commercial laboratories. Commercial laboratories have different testing capabilities based on specimen type; carefully check both the specimen type and the specific test to be requested. For example, if collecting oral swab, ensure test selected is for RT-PCR (vs culture).

In certain circumstances, testing may be available at CDC or Wadsworth (CDC viral reference laboratory):

- Approval is **required** by NJDOH prior to submission and should be coordinated through the LHD. Once submission is approved, the LHD can also assist with coordination of transport to Public Health and Environmental Laboratory (PHEL).
- In [PHEL's Online Ordering Portal](#), search for "Reference Laboratory Test Request", select "Other" under test type and enter "Mumps PCR testing"; select appropriate specimen type; and select appropriate reference laboratory location. Print requisition form and include with sample in shipment to PHEL. Incorrectly labeled specimens submitted to PHEL will be rejected.
- If online ordering is not available, a completed [SRD-1](#) form must accompany the specimens sent to PHEL. In "Tests Requested" section of the form, indicate "Reference Laboratory" and write in "CDC/Wadsworth".

- Turnaround time for specimens sent to CDC/Wadsworth is approximately 2 weeks depending on collection timing and transportation. NJDOH will provide results to the LHD when they are available.

8. What is the turnaround time for lab results?

Many factors can affect turnaround time. These factors include a) differing turnaround times for tests at laboratories; b) differing test methodologies used; c) timing of specimen collection and transportation of specimens to laboratories. For example, some labs have a 3-5 day RT-PCR turnaround. Turnaround from CDC/Wadsworth also depends on collection timing and transportation, but generally takes around 1-2 weeks.

Note: results from CDC/Wadsworth are not intended to guide the patient's clinical management, but are for public health surveillance purposes.

LABORATORY RESULTS

9. A specimen tests negative for mumps virus by RT-PCR. Does this result rule out mumps infection?

No. Failure to detect mumps virus RNA by RT-PCR in specimen from a person with clinically compatible mumps symptoms might not rule out mumps as a diagnosis. The result could be negative because the amount of virus shed at the time of specimen collection was very low. Other factors can also significantly reduce the likelihood of detecting mumps virus such as inadequate specimen collection, processing, shipping or storage. An example of this is symptomatic persons who have received 1 or more doses of mumps-containing vaccine, as they may clear the virus more rapidly. In outbreaks among two-dose vaccine recipients, mumps virus RNA was detected in specimen from 30%–71% of case-patients if the specimen were collected within 3 days following onset of parotitis. IgM was detected in 13 to 50% of these cases (Bitsko et al, 2008, Rota et al. 2009, Rota et al, 2013).

10. How do I interpret serology results?

Note: Serologic tests should be interpreted with caution, as false-positive and false-negative results are possible with IgM tests.

Unvaccinated Persons

- A positive IgM test result indicates current/very recent infection or reinfection. As with any lab test, there can be false-positive test results (refer to question 13).
- If an acute IgM is collected within 3 days of parotitis onset and the IgM is negative, a second serum specimen (collected 5-7 days after onset) is recommended as a delayed IgM response has been reported.
- IgG: IgG alone is not diagnostic unless you obtain both an acute (can be done as soon after onset as the patient is seen, but ideally 4-5 days after onset of symptoms) and convalescent (from 2-3 weeks after onset) blood specimen for serologic tests to determine if a four-fold rise in IgG antibody titer has occurred (e.g., from 1:40 to 1:320). Although acute and convalescent titers might be useful for clinicians, this test will not help classify cases for public health purposes.

Vaccinated Persons

- Mumps should not be ruled out in someone with negative IgM who is vaccinated if they have symptoms consistent with mumps. IgM may be transient or absent and therefore not detected.

- A detailed investigation should be conducted for each case with emphasis on accurate and complete immunization history. Recent outbreaks have included many cases who had already received at least one dose of mumps-containing vaccine.

11. If the IgM result is negative and IgG is positive, can mumps be ruled out?

Absence of a mumps IgM response in a vaccinated or previously infected individual presenting with clinically compatible mumps *does not rule out mumps* as a diagnosis. A positive IgG result is expected among previously vaccinated persons. Older persons or foreign nationals with no history of mumps illness or vaccination may have detectable mumps IgG due to a previous subclinical infection.

12. Are there any etiologic agents that can interfere with serologic assays for mumps (i.e. produce false-positive results)?

Parainfluenza viruses (HPIV) 1, 2, and 3, Epstein-Barr virus (EBV), adenovirus, and human herpesvirus 6 have all been noted to interfere with mumps serologic assays.

13. What additional testing should be considered for sporadic cases that have negative laboratory results for mumps?

Consider testing for other etiologies such as influenza virus, EBV, adenovirus, HPIV types 1,2 and 3, or bacteria including staphylococcus aureus and alpha hemolytic streptococcus. During 2009-2011, 8 jurisdictions throughout the United States investigated sporadic cases of parotitis. Labs tested 101 specimens for alternate etiologies, and 23% were positive for EBV, 10% for HHV-6, 3% for HPIV2, 1% for HPIV3 and 1% for human bocavirus. Parotitis has also been reported in persons with laboratory-confirmed influenza infections.

14. Is it possible to demonstrate a 4-fold rise in titer (seroconversion) from persons with a history of vaccination?

It may not be possible. In vaccinated persons, the existing IgG will begin to rise soon after exposure and infection. At the time of onset of symptoms and collection of the acute serum, the IgG may already be quite elevated, and obviate the 4-fold rise observed in convalescent serum specimen. Collection of acute and convalescent phase serum specimen to demonstrate a 4-fold increase in IgG titer is not recommended. In addition, this test will not help classify cases for public health purposes.

FOR MORE INFORMATION

Where can I get more information on mumps?

- Your local health department
 - [Directory of Local Health Departments in New Jersey](#)
- NJDOH [Communicable Disease Service](#)
 - 609-826-5964
 - NJDOH [Mumps Page](#)
- Centers for Disease Control & Prevention [Mumps Page](#)

For additional information and materials on proper handwashing techniques, please visit the NJDOH Communicable Disease Service's [Handwashing Materials Page](#).

This information is intended for educational purposes only and is not intended to replace consultation with a health care professional.