

Section 7: Mumps

BASIC EPIDEMIOLOGY

Infectious Agent

Mumps virus, a single-stranded RNA paramyxovirus.

Transmission

Transmission occurs through respiratory droplets or through direct contact with nasopharyngeal secretions.

Incubation Period

Average of 16-18 days (range 12-25 days)

Communicability

Mumps virus has been found in respiratory secretions as early as 3 days before the start of symptoms and up to 9 days after onset. However, the patient is most infectious within the first 5 days after symptom onset.

Clinical Illness

Prodromal symptoms are nonspecific; they include myalgia (muscle pain), anorexia, malaise, headache, and low-grade fever, and may last 3–4 days. [Parotitis \(inflammation and swelling of the parotid glands\)](#) is the most common manifestation of clinical mumps, affecting 30–40% of infected persons. Parotitis can be unilateral (one side of cheek) or bilateral (both sides of cheek); other combinations of single or multiple salivary glands may be affected. Parotitis usually occurs within the first 2 days of symptom onset and may present as an earache or tenderness on palpation of the angle of the jaw. Symptoms usually decrease within 1 week and generally resolve within 10 days.

Up to 20% of infections are asymptomatic; an additional 40–50% may have only nonspecific or primarily respiratory symptoms.

The most common complication is orchitis, affecting up to 50% of infected males who have reached puberty. While painful, only rarely does this lead to infertility. Other complications are rare, but may include encephalitis (inflammation of the brain), meningitis, oophoritis (inflammation of an ovary), mastitis (inflammation of the breast), pancreatitis (inflammation of the pancreas), myocarditis (inflammation of heart muscle), arthritis (inflammation of joints), and nephritis (inflammation of the kidneys). Spontaneous abortion (miscarriage) can result if an infection occurs during pregnancy, particularly in the first trimester. Rarely (~1 in 20,000), mumps infection can cause deafness, which is usually permanent.

Not all cases of parotitis are caused by mumps virus. Parotitis can also occur as a result of infection with other viruses such as cytomegalovirus, parainfluenza virus, influenza A, Coxsackie A, echovirus, lymphocytic choriomeningitis virus, and HIV as well as *Staphylococcus aureus*, and other bacteria. Non-infectious causes of parotitis include drugs, tumors, immunologic diseases, and obstruction of the salivary duct. Mumps, however, is the only agent that can cause outbreaks (i.e. multiple cases at once) of parotitis.

DEFINITIONS

Clinical Case Definition

An acute parotitis or other salivary gland swelling lasting at least 2 days, or orchitis or oophoritis unexplained by another more likely diagnosis.

Note: Influenza, parainfluenza type 3, and cytomegaloviruses (CMV) can also cause parotitis. In addition, there are numerous other non-infectious causes of parotid swelling. Approximately 30% of sporadic parotitis cases are NOT caused by the mumps virus, and 20% to 40% of mumps cases may not have parotid swelling. Mumps can only be confirmed through mumps-specific laboratory testing.

Laboratory Confirmation

- Isolation of mumps virus from a clinical specimen, or
- Detection of mumps-virus-specific nucleic acid by PCR.

Note: An elevated serum amylase is **not** confirmatory for mumps

Case Classifications

- **Confirmed:**
 - A case that has a positive mumps PCR result OR has a positive mumps culture AND either meets clinical case definition or has aseptic meningitis, encephalitis, hearing loss, mastitis, or pancreatitis.
- **Probable:** A case that meets the clinical case definition AND
 - Has a positive test for serum anti-mumps immunoglobulin M (IgM) antibody, OR
 - Has an epidemiologic link to another probable or confirmed case or linkage to a group/community defined by public health during an outbreak of mumps.

CASE INVESTIGATION & TREATMENT

Case Investigation

- All suspect mumps reports should be promptly investigated.
- Alert appropriate local and regional health departments as well as DSHS IDCU in Austin.
- Identify all susceptible contacts and initiate control measures.
- Collect serology and virology specimens as soon as possible.

Control Measures

- Although vaccination after exposure to mumps may not prevent disease, the vaccine will protect persons from subsequent exposures. If ongoing exposure is expected, quarantine and/or vaccinating contacts may be of use.
- Persons who are unsure of their mumps disease history or mumps vaccination history should be vaccinated.
- IG is not effective and not recommended.

Exclusion

CDC now recommends isolating mumps patients for 5 days following onset of symptoms.

REPORTING AND DATA ENTRY REQUIREMENTS

Provider, School & Child-Care Facilities, and General Public Reporting Requirements

Mumps cases are required to be reported within 1 week to the local or regional health department or the Texas Department of State Health Services (DSHS), Infectious Disease Control Unit (IDCU) at **(800) 252-8239** or **(512) 776-7676**.

Local and Regional Reporting and Follow-up Responsibilities

Promptly investigate any reported cases of mumps. Identify and evaluate close contacts. Implement control measures and provide education to prevent further spread of disease. Completed mumps investigation forms for confirmed and probable cases must be submitted to DSHS IDCU. In the event of a death, copies of the hospital discharge summary, death certificate, and autopsy report should also be sent to DSHS IDCU. Records must be faxed within 30 days of initial report to **(512) 776-7616** or mailed to the following address:

Infectious Disease Control Unit,
Texas Department of State Health Services
Mail Code: 1960
PO Box 149347
Austin, TX 78714-9347

Data Entry

The principle investigator (Local or Regional health department) is required to enter all mumps investigations with a confirmed or probable case status and submit notification in the NEDSS Base System (NBS) within 30 days of initial report. Please refer to the *NBS Data Entry Guidelines* for disease specific entry rules.

LABORATORY PROCEDURES

Diagnosing Mumps

Serologic tests should be interpreted with caution, as false-positive and false-negative results are possible with IgM tests. Therefore, mumps cases should not be ruled out by negative laboratory results. With previous contact with mumps virus either through vaccination (particularly with 2 doses) or natural infection, serum mumps IgM test results

may be negative; IgG test results may be positive at initial blood draw and viral detection in RT-PCR or culture may have low yield.

Serology

The first (acute-phase) serum sample should be collected as soon as possible upon suspicion of mumps disease. Convalescent-phase serum samples should be collected about 2-3 weeks after the acute-phase sample.

Persons with a history of mumps vaccination may not have detectable mumps IgM antibody regardless of timing of specimen collection.

Specimen Collection

Option 1:

- Collect at least 5 mL blood in red top tube.
- Label blood tubes with patient's first and last name, and we recommend a second identifier such as date of birth or medical record number or social security number. If the first and last name is not provided, the specimen will be rejected.
 - Centrifuge the **red top blood** collection tube within 2 hours from the time of collection to separate the serum from the red blood cells (clot).
 - Transfer the serum from the red top tube into a serum transport tube properly labeled with the patient's name and date of birth or social security number and ship cold with cool packs and must be received within 48 hours.
 - If the serum samples will not be delivered to the laboratory within 48 hours of collection, then the samples must be frozen at -20°C (frozen) or lower and shipped frozen with dry ice.
 - Do not freeze whole blood in red top tube for shipping.

Option 2:

- Collect at least 5 mL blood in **gold top** or **tiger top** blood collection tube containing a gel serum separator (Gold top or tiger top tubes are types of Serum Separator Tubes with the gel that keeps the serum separated from the clot after the centrifugation).
- Label blood tubes with patient's first and last name, and we recommend a second identifier such as date of birth or medical record number or social security number. If the first and last name is not provided, the specimen will be rejected.
 - Centrifuge the gold top blood collection tube within 2 hours from the time of collection to separate the serum from the red blood cells (clot) and ship cold with cool packs and must be received within 48 hours.
 - If more than 48 hours, transfer the serum into a serum transport tube properly labeled with the patient's name and date of birth or social security number and ship frozen with dry ice.
 - Do not freeze serum in SST for shipping. Freezing will cause hemolysis and hemolyzed specimens will be unsatisfactory for testing.

Submission Form

- Use the DSHS Laboratory current version of G-2A form (Dec 2011, Rev 4) for specimen submission.
- Make sure the patient's first and last name and date of birth / social security number match exactly what is written on the tube.

- Mark the laboratory test requested, date of onset, and date of collection. Be certain that the names on acute and convalescent sera match exactly.
- Call DSHS Laboratory at 512-776-7138 if needing information for specimen submission.

Specimen Shipping

- To avoid specimen rejection, ship separated serum or centrifuged SST Mon-Thur to the DSHS laboratory via overnight delivery following the above guidelines.
- DO NOT mail on a Friday unless special arrangements have been pre-arranged with DSHS Laboratory.
 - If the serum samples will not be delivered to the DSHS laboratory within 48 hours of collection, transfer into a serum transport tube and freeze on Fridays. Ship frozen specimens with dry ice on Monday. Lone Star service will not deliver specimen to the DSHS lab on Saturday.
- Ship specimens to:

Laboratory Services Section, MC-1947
 Texas Department of State Health Services
 Attn. Walter Douglass (512) 776-7569
 1100 West 49th Street
 Austin, TX 78756-3199

Causes for Rejection:

- Discrepancy between name on tube and name on form.
- Insufficient quantity of serum for testing.
- Specimens received with extended transit time or received at incorrect temperature or no date of collection.

Virus Isolation and PCR

Specimens should be obtained early in the course of illness when the quantity of virus shed is highest. Collect buccal or oral swab samples as soon as mumps disease is suspected. Samples collected when the patient first presents with symptoms have the best chance of having a positive result by RT-PCR.

Specimen Collection

Processing the swabs within 24 hours of collection will enhance the sensitivity of both the RT-PCR and virus isolation techniques.

- Using a buccal or oral swab, massage the parotid gland area for 30 seconds prior to swabbing the area around Stensen's duct.
 - A commercial product designed for the collection of throat specimens or a flocked polyester fiber swab can be used. Synthetic swabs are preferred. Do not use cotton swabs, which may contain substances that are inhibitory to enzymes used in RT-PCR. Flocked synthetic swabs appear to be more absorbent and elute samples more efficiently.
- Swabs should be placed in 2 ml of standard viral transport medium.

Submission Form

- Use specimen submission for G-2A.
- If more than 1 swab is submitted, a G-2A must be provided for each swab.

Specimen Shipping

- All clinical specimens for virus isolation should be kept at 2-8°C during storage and shipment. Ship specimens on ice via overnight delivery.
- If there is a delay in shipment or the specimen will not be received at the laboratory within 48 hours of collection, the sample should be frozen at -70°C. Frozen samples should be shipped on dry ice.
- DO NOT mail on a Friday unless special arrangements have been pre-arranged with DSHS Laboratory.
- Ship specimens to:

Laboratory Services Section, MC-1947
Texas Department of State Health Services
Attn. Walter Douglass (512) 776-7569
1100 West 49th Street
Austin, TX 78756-3199

Causes for Rejection:

- Specimens submitted on a preservative, such as formalin.
- Insufficient quantity of urine for testing.
- Specimens received at room temperature or cold greater than 48 hours of collection.