Mumps rev Jan 2018

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 (inflammation of the testicles), 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 causes outbreaks (i.e., multiple cases at once) of parotitis.

DEFINITIONS

Clinical Case Definition
Acute parotitis or other salivary gland swelling lasting at least 2 days, or orchitis or oophoritis unexplained by another more likely diagnosis

Laboratory Criteria for Diagnosis

- 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 Classification

- **Confirmed:**
  - A case that meets the laboratory criteria for diagnosis **AND**
    - 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.

SURVEILLANCE AND CASE INVESTIGATION

Case Investigation
Local and regional health departments should promptly investigate all reports of mumps. Local and regional health authorities should provide education to prevent further spread of disease, discuss exclusion criteria with reporters and encourage timely vaccinations.

Case Investigation Checklist

- ☐ Confirm that laboratory results meet the case definition.
- ☐ Request that the laboratory forward viral specimens to the DSHS laboratory. If viral specimens are not available, consider serology specimens. See laboratory procedures.
- ☐ Review medical records or speak to an infection preventionist or physician to verify case definition and vaccination status.
    - The Mumps Investigation Form should be used to record information collected during the investigation.
- ☐ Determine vaccination status of the case. Sources of vaccination status that should be checked include:
    - Case (or parent), ImmTrac, school nurse records, primary care provider, etc.
- ☐ Identify close contacts and ensure appropriate control measures are implemented (see control measures below).
- ☐ In the event of a death, copies of the hospital discharge summary, death certificate, and autopsy report should also be faxed to DSHS EAIDB.
- ☐ Send the complete Mumps Investigation Form to DSHS.
- ☐ All confirmed and probable case investigations must be entered and submitted for notification in the NEDSS Base System (NBS). Please refer to the *NBS Data Entry Guidelines* for disease specific entry rules.

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.
- A 3rd dose of MMR should be considered in ongoing outbreaks of highly vaccinated persons in certain congregate settings. See http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6204a1.htm

Exclusion
Children should be excluded from school or daycare for 5 days after onset of swelling.

MANAGING SPECIAL SITUATIONS

If there are 3 or more cases in the same institution or social group, an area or organization has met the outbreak threshold, and for guidance about other unusual situations, immediately notify EAIDB at (800) 252-8239 or (512) 776-7676.

Outbreaks
If an outbreak of mumps is suspected, notify the regional DSHS office or EAIDB at **(800) 252-8239 or (512) 776-7676**.

REPORTING AND DATA ENTRY REQUIREMENTS

Provider, School & Child-Care Facilities, and General Public Reporting Requirements
Confirmed and clinically suspected cases are required to be reported **within 1 work day** to the local or regional health department or to DSHS EAIDB at **(800) 252-8239 or (512) 776-7676.**

Local and Regional Reporting and Follow-up Responsibilities
Local and regional health departments should:

- Enter the case into NBS and submit an NBS notification on all **confirmed and probable** cases to DSHS within 30 days of receiving a report of a confirmed or probable case.
    - Please refer to the *NBS Data Entry Guidelines* for disease-specific entry rules.
    - A notification can be sent as soon as the case criteria have been met. Additional information from the investigation may be entered upon completing the investigation.
- Fax, send a secure email, or email a completed investigation form within 30 days of completing the investigation.
    - **In the event of a death, copies of the hospital discharge summary, death certificate, autopsy report and death investigation form should also be sent to DSHS EAIDB.**
    - Investigation forms may be faxed to **512-776-7616 ,** securely emailed to VPDTexas@dshs.texas.gov or mailed to:

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

When an outbreak is investigated, local and regional health departments should:

- Report outbreaks within 24 hours of identification to the regional DSHS office or to EAIDB at (800) 252-8239 or 512-776-7676.

LABORATORY PROCEDURES

Diagnosing Mumps
Serologic tests should be interpreted with caution, as false-positive and false-negative results are possible with IgM tests for mumps. Mumps cases should not be ruled out by negative serology results. With previous contact with mumps virus either through vaccination (particularly with two 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.

PCR Specimen Collection and Submission (preferred)
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 (DSHS uses Remel media)

Submission Form

- Use specimen submission form G-2V.
- If more than 1 swab is submitted, a G-2V must be provided for each swab.
- Check mumps PCR on the G2V form.

Specimen Shipping

- All clinical specimens for PCR should be kept at 2-8ºC 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.
- Notify EAID VPD staff about the specimens to ensure prompt testing and satisfactory receipt of the specimen.
- 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
- Specimens received at room temperature or cold greater than 48 hours of collection

Serology Specimen Collection and Submission (If needed)
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.

The DSHS Laboratory does not offer mumps IgM testing. Mumps PCR and IgG testing is available at the DSHS Laboratory.

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 serum separator tube (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 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

- Notify EAIDB VPD staff about the specimens to ensure prompt testing and satisfactory receipt of the specimen.
- To avoid specimen rejection, ship separated serum or centrifuged serum separator tubes Monday through Thursday 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, received at incorrect temperature, or no date of collection

UPDATES

January 2018

- Updated minimum number of cases to classify an outbreak from 2 to 3.
- Email address added as method of sending case investigation forms.

FLOW CHART rev Apr 2017