MUMPS

1. **Agent**: Mumps virus.

2. **Identification**:

   a. **Symptoms**: An acute viral disease characterized by fever and by swelling and tenderness of one or more salivary glands (usually the parotid, occasionally the sublingual or submaxillary glands). The most common complication in post-pubertal males is orchitis (testicular inflammation) in 30% of unvaccinated and 6% of vaccinated pos-pubertal males. Some degree of testicular atrophy may result; however, sterility is rare. Other complications include meningitis, encephalitis, pancreatitis, and deafness, and tend to occur more frequently in unvaccinated individuals and among adults. As many as 30% of cases are subclinical.

   b. **Differential Diagnosis**: Mumps is the only cause of epidemic parotitis. However, many other viruses including EBV, parainfluenza, influenza A, and coxsackie, HIV etc can cause sporatic parotitis. Other causes of facial swelling include anterior cervical or preauricular lymphadenitis, suppurative parotitis, parotid duct stone, mixed tumors of the parotid gland, Mikulicz's syndrome and uveoparotid fever.

   c. **Diagnosis**: Clinical syndrome, serological, or virological evidence of infection. Note: In previously vaccinated persons, the IgM response can be non- existent or delayed and the IgG response can become quite elevated.

3. **Incubation**: Usually 16-18 days, but may range from 12 to 25 days after exposure.

4. **Reservoir**: Human.

5. **Source**: Saliva or respiratory droplets of infected persons.

6. **Transmission**: Through direct contact with saliva or respiratory droplets of a person infected with mumps (i.e., droplet transmission)

7. **Communicability**: Person considered infectious from 2 days before through 5 days after parotid gland swelling (parotitis) onset. Can likely also occur from persons with asymptomatic infections and from persons with prodromal symptoms.

8. **Specific Treatment**: None.

9. **Immunity**: After infection, lifelong.

REPORTING PROCEDURES

1. **Reportable**. *California Code of Regulations*, Section 2500. Individual cases are reportable, but not routinely investigated by district staff. Submit CMR and any available laboratory results. Investigate outbreaks. Report case or suspect case within 7 calendar days from the time of identification by mail, telephone, fax, or electronic report.

2. **Report Form:**

   MUMPS CASE REPORT (CDPH-8690).

   For Outbreaks: OTHER OUTBREAK / OTHER REPORTABLE DISEASE OR DISEASE OF UNUSUAL OCCURRENCE (CDPH 8554).

3. **Notify Vaccine Preventable Disease Control Program immediately of**:

   a. Outbreaks of 2 or more cases occurring within 4 week period at day-care, school, college, university, or correctional facility; or

   b. Sustained transmission (2 or more transmission cycles) occurring at a day- care, school, college, university, or correctional facility.

4. **Epidemiologic Data to Collect**:

   a. Demographic information:
      - Name
      - Address
      - Date of Birth
      - Age
      - Sex
      - Ethnicity
      - Race
      - Country of birth
      - Country of usual residence (e.g., United States resident or foreign visitor)
      - Occupation

   b. Clinical information:

- Date of illness onset (note: this may be earlier than parotitis onset due to prodromal symptoms)
- Parotitis or other salivary gland involvement (pain, tenderness, swelling)
- Date of parotitis (or other salivary gland swelling) onset
- Duration of parotitis (or other salivary gland swelling)
- Prodromal symptoms (e.g., headache, anorexia, fatigue, fever, body aches, stiff neck, difficulty in swallowing, nasal congestion, cough, earache, sore throat, nausea, abdominal pain)
- Complications:
  - orchitis/oophoritis
  - mastitis
  - pancreatitis
  - deafness (transient or permanent; unilateral or bilateral)
  - meningitis
  - encephalitis

c. Outcome:
- Hospitalization for mumps
- Duration of hospitalization
- Patient survived or died
  - Date of death
  - Postmortem examination results
  - Death certificate diagnoses

d. Laboratory:
- Specimen type (buccal, oral, urine, CSF for viral detection/isolation, sera for serology)
- Type of test (RT-PCR, viral culture, IgM, IgG)
- Date of collection of specimens

e. Vaccine information:
- Vaccination status
- Number of doses of vaccine given
- Type of vaccine administered
- Date of mumps vaccination for each dose

f. Epidemiologic:
- Epi linkages:
  - Contact of a confirmed or probable case within incubation period.
  - Contact of a person with parotitis
  - Contact of a person with a mumps-associated complication
  - Member of a risk group defined by public health during an outbreak
- Source of exposure (e.g., age, relationship to case)
- Transmission setting (e.g., household, college, school, healthcare setting, correctional or detention facility) where the patient was likely exposed to the source
- Participation in group(s) or setting(s) or attended event(s) with intense or frequent close contact (e.g., university club, sport team, church group, congregate living, bar, concert, conference, etc.) to identify other people who may be at risk for mumps
  - Dates of participation in close contact groups, settings, or events, during infectious period
- Import status (e.g., internationally imported or U.S. acquired)
- Travel history (i.e., return from domestic or international travel within 25 days of symptom onset)
  - Destination(s) of travel
  - Date of departure and return to states or U.S.

CONTROL OF CASE, CONTACTS & CARRIERS

Clinical case definition: an illness with acute onset of unilateral or bilateral tender, self-limited swelling of the parotid or other salivary gland(s), lasting at least 2 days and without other apparent cause.

Clinically compatible illness: Infection with mumps virus may present aseptic meningitis, encephalitis, hearing loss, orchitis, oophoritis, parotitis or salivary gland swelling, mastitis or pancreatitis.

Case Classification

Confirmed: A positives mumps laboratory confirmation for mumps virus with RT-PCR or culture in a patient with an acute clinically compatible illness

Probable: Acute parotitis or other salivary gland swelling lasting at least 2 days, or orchitis or oophoritis unexplained by another more likely diagnosis, in either a person with a positive test for serum anti-mumps IgM antibody, or a person with epidemiologic linkage to another probable or confirmed case or linkage to a group/community defined by public health during an outbreak of mumps.

Suspected: Parotits, acute salivary gland swelling, orchitis, or oophoritis unexplained by another more likely diagnosis, or a positive

lab result with no mumps clinical symptoms (with or without epidemiological linkage to a confirmed or probable case).

Investigate outbreaks only. Initiate investigation within 2 days of notification.

Provisional notifications of all probable and confirmed mumps cases should be sent by the State Health Department to CDC within 7 days.

CASE:

Precautions: Exclude from school, day-care, work, and public gatherings until 5 days after the onset of parotitis.

CONTACTS:

Exposure is defined as: 1) unprotected face-to- face contact (less than 3 feet) for at least 5 minutes with an infectious case (2 days before through 5 days after onset of parotid gland swelling in the mumps case); or 2) direct contact with respiratory, oral, or nasal secretions from an infectious mumps case (e.g., kissing, sharing saliva-contaminated objects like water bottles, or being coughed or sneezed on).

Immunization: MMR is a live attenuated virus, available as a lyophilized powder that needs to be reconstituted, administered through the subcutaneous route. It is a 2 dose series given routinely at age 12-15 months and age 4-6 years of age. MMR can be given with 4 week interval between doses if needed (MMRV with 3 month interval). Measles-, mumps-, or rubella- virus-containing vaccine administered prior to age 12 months (e.g., for international travel) should not be counted as part of the 2-dose series.
Evidence of Immunity:

1) Preschool aged children: 1 dose after their first birthday
2) School aged children and adults: 2 documented doses of mumps-containing vaccine separated by 28 days.
3) Serologic evidence of immunity.
4) Laboratory confirmation of disease
5) Born before 1957. (Exception: For unvaccinated health care personnel born before 1957 who lack laboratory evidence of measles, mumps, or rubella immunity or laboratory confirmation of disease, health care facilities should have policies that offer 2 doses of MMR vaccine at the appropriate interval for measles and mumps and 1 dose of MMR vaccine for rubella, respectively. Health care facilities should also have policies for such personnel that recommend 2 doses of MMR vaccine during an outbreak of measles or mumps and 1 dose during an outbreak of rubella.)

Known close contacts (i.e. family members, partners, or roommates) should be assessed for prior evidence of immunity, and those without evidence of immunity should be brough up to date on MMR vaccination. People previously vaccinated with 2 doses of mumps-containing vaccine who are identified by public health at increased risk for mumps because of an outbreak should receive a third dose of mumps-containing vaccine to improve protection against mumps disease and related complications. However, regardless of whether a close contact has prior evidence of immunity, all contacts should be advised that they may still develop mumps and should monitor for signs and symptoms for the next 25 days and avoid large gatherings or intense close contact events. Mumps can occur in a fully vaccinated person.

Immunize all susceptible contacts immediately as it will prevent infection from subsequent exposure.

In outbreaks, children with immunization waivers should be excluded from school for 26 days after the onset of parotitis in the last person in the school who develops mumps. The child may return to school immediately if they receive immunization. In outbreaks, other categories of individuals (such as non-immune health care workers) who have been exposed to mumps, may need to be excluded from sensitive work settings, from the 9th day after the first exposure through the 26th day after the last exposure. Consult with the LA County DPH Vaccine Preventable Disease Control Program for guidance in such instances.

Conduct surveillance of contacts for 25 days after exposure.

PREVENTION-EDUCATION

1. Immunize all susceptible persons, especially contacts to recent case. Adolescent and adult males are of special concern.
   - **Contraindications to vaccination** (condition in a recipient that greatly increases the chance of serious adverse rection or due to the theoretical risk in the case of pregnant women):
     - Severe allergic reaction to vaccine component or following a prior dose
     - Severe immunocompromise (eg hematologic and solid tumors, receipt of

chemotherapy in the last 3 months, congenital immunodeficiency, long term immunosuppressive therapy, or people with HIV with severe immunocompromise)
- Systemic high dose corticosteroid therapy for 14 days or more
- Family history of congenital or hereditary immunodeficiency in first degree relative
- Pregnancy

2. **Precaution to the vaccination** (condition in the recipient that may increase the chance of severity of a serious adverse reaction, or that might compromise the ability of the vaccine to produce immunity)
   - Moderate or severe acute illness
   - Alpha-gal allergy (consult with physician)
   - Receipt of antibody-containing blood products (wait 3 to 11 months to vaccinate)
   - History of thrombocytopenic purpura or thrombocytopenia
   - Need for tuberculin skin testing or interferon-gamma release assay testing
   - For MMRV: Additional precautions include simultaneous use of aspirin or aspirin-containing products, personal or family history of seizures of any etiology and receipt of specific antiviral drugs 24 hours before vaccination
3. Discuss possible CNS, pancreatic, and testicular involvement early or late in the disease.
4. Disinfect utensils and fomites soiled with nose and throat secretions and urine.
5. Implement droplet precautions, in addition to standard precautions.

DIAGNOSTIC PROCEDURES

Clinical and epidemiological histories are required to aid the laboratory in test selections.

1. **Culture/PCR**: Buccal specimen for RT-PCR or viral isolation, best within 3 days to optimize opportunity for viral detection but no later than 10 days after symptoms. To collect sample, massage parotid gland area, then use Dacron swab to obtain buccal specimen by rubbing inside of each cheek with same swab. Specimen should be transported to Public Health Laboratory.
   - RT-PCR are preferred in over viral culture in an outbreak setting, as viral culture may take more than a week to produce results

   Container: Place swab in a tube containing 2-3 mls of viral transport medium (e.g., M4 media).

   Laboratory Form: Test Requisition and Report Form H-3021. In addition, work with Immunization Program to complete any forms needed by State VRDL.

   Examination Requested: Mumps Viral Culture and PCR.

   Storage: Store at 4° C and ship cold with ice packs. If more than 1 day delay in shipping, preserve at -70° C and ship on dry ice. Avoid freeze-thaw cycles.

   If shipment contains both serum and viral samples, ship together by overnight service on cold packs (do not freeze serum).

2. **Serology**:
   IgM: Acute infection can result in presence of Mumps IgM, but this may be transient, delayed or not detected. False negatives are common. Collection of serum 3 to 10 days after parotitis onset improves the ability to detect IgM.
   Paired IgG: For paired sera collect first blood specimen as early as possible. Collect the second approximately 10-14 days after the first and evaluate for a four-fold rise in IgG levels. Send each specimen as it is collected; do not store. False positive results can occur in both unvaccinated and vaccinated persons because assays may be affected by other diagnostic entities that cause parotitis. In addition, false negative results can occur in vaccinated and unvaccinated persons. By the onset of symptoms, in someone who is vaccinated or had previous infection, the acute-phase IgG may already be elevated, and therefore a 4-fold rise cannot be detected when compared to the convalescent-phase serum sample.
   Container: VR SEROLOGY gold top serum separator tube).

   Laboratory Form: Test Requisition and Report Form H-3021. In addition, work with Immunization Program to complete any forms needed by State VRDL.

   Examination Requested: Mumps Serology.

   Material: Whole clotted blood.

Amount: 8-10 ml.

Storage: Send to Public Health Laboratory as soon as possible. Store at 4° C and ship cold with ice packs.