



# Mumps: Case and Outbreak Investigation



## Pathogen

Mumps is an acute viral illness caused by an RNA virus in the Paramyxoviridae family.

## Clinical symptoms

Prodromal symptoms are nonspecific and may include myalgia, anorexia, malaise, headache and low-grade fever. The most common manifestation is unilateral or bilateral swelling of one or more of the salivary glands, usually the parotid glands (parotitis), which occurs in 30%-40% of infected persons. Parotitis tends to occur within the first 2 days and may be first noted as earache and tenderness on palpation of the angle of the jaw. Symptoms tend to decrease after 1 week and usually resolve after 10 days. Approximately 40-50% of infections may only have nonspecific or respiratory symptoms only. As many as 20% of mumps infections are asymptomatic.

## Differential diagnosis

Mumps virus is the only cause of epidemic parotitis. Parotitis – especially sporadic cases – may be due to viruses other than mumps. Parotitis can also be caused by Epstein-Barr virus, human herpesvirus B6 (the cause of roseola) cytomegalovirus, parainfluenza virus types 1 and 3, influenza A virus, coxsackieviruses and other enteroviruses, lymphocytic choriomeningitis virus, human immunodeficiency virus, *Staphylococcus aureus*, and nontuberculous *Mycobacterium*.

## Complications

Orchitis (testicular swelling) is a common complication and may occur in as many as 50% of postpubertal males. Central nervous system (CNS) involvement is common but fewer than 10% have symptoms of CNS infection. Other rare complications include arthritis, mastitis, glomerulonephritis, myocarditis, endocardial fibroelastosis, thrombocytopenia, cerebellar ataxia, transverse myelitis, ascending polyradiculitis, pancreatitis, oophoritis, and hearing impairment.

Mumps during the first trimester is associated with an increased rate of spontaneous abortion, but although mumps virus can cross the placenta, there is no evidence that this results in congenital malformation.

## Modes of transmission

Transmitted by contact with respiratory secretions or droplets from the respiratory tracts of infected persons.

## Mumps exposure

Unprotected face-to-face (<3 feet) contact with an infectious person for at least 5 minutes.

## Incubation period

Usually 16 to 18 days, but cases may occur 12 to 25 days after exposure.

## Period of communicability

Communicability is probably highest from 2 days before to 5 days after onset of parotitis; mumps virus has been isolated in saliva from 7 days before through 9 days after onset of swelling.

## Laboratory testing

The preferred method for confirming acute mumps infection is detection of virus from a buccal specimen by PCR. Collection of a buccal specimen within 1 to 3 days of parotitis onset is optimal, however virus may be detected for up to 9 days after parotitis onset.

Acute mumps infection may also be laboratory confirmed by the presence of serum mumps IgM, a significant rise in IgG antibody titer in acute- and convalescent-phase serum specimens, or positive mumps virus culture. However, mumps IgM response may be attenuated or absent in vaccinated persons making serologic confirmation difficult. In addition, studies have shown that individuals with detectable mumps IgG titers have still developed mumps infection.

[Detailed specimen collection instructions](https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/Mumps_Testing_VRDL.pdf) are available at: [https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/Mumps\\_Testing\\_VRDL.pdf](https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/Mumps_Testing_VRDL.pdf)

## Case definition

**Suspect:** Parotitis, 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).

**Probable:** Acute parotitis or other salivary gland swelling lasting at least 2 days, or orchitis or oophoritis unexplained by another more likely diagnosis, in: A person with a positive test for serum anti-mumps immunoglobulin M (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.

### **Confirmed**

A positive mumps laboratory confirmation for mumps virus with reverse transcription polymerase chain reaction (RT-PCR) or culture in a patient with an acute illness characterized by any of the following:

- Acute parotitis or other salivary gland swelling, lasting at least 2 days
- Aseptic meningitis
- Encephalitis
- Hearing loss
- Orchitis
- Oophoritis
- Mastitis
- Pancreatitis

Report suspected, probable, and confirmed cases to CDPH via CalREDIE or the [CDPH case report form](https://www.cdph.ca.gov/CDPH%20Document%20Library/ControlledForms/cdph8690.pdf) available at: <https://www.cdph.ca.gov/CDPH%20Document%20Library/ControlledForms/cdph8690.pdf>

### **Immunization**

Live-attenuated mumps vaccine is given as part of measles, mumps and rubella (MMR) vaccine in the U.S. Post-licensure data estimate the effectiveness of 1 dose of mumps vaccine at approximately 80% (64%-95%) and two doses at 90% (88%-90%). However, in recent large outbreaks, mumps infections have occurred in many persons with a history of 2 doses of mumps vaccine and some studies indicate that vaccine-induced immunity may wane.

### **Postexposure prophylaxis (PEP)**

None. Neither mumps vaccine nor immune globulin (IG) is effective for mumps postexposure prophylaxis.

### **Case investigation**

1. Confirm clinical signs and symptoms of mumps.
2. Arrange for laboratory testing. Submit specimens to CDPH VRDL for testing, if feasible.
3. Ensure case isolation for 5 days after parotitis onset.
4. Interview the suspected case to determine the possible source of exposure, i.e., contact with a person with mumps and/or recent travel to an area of the world where mumps is endemic/epidemic.
5. Identify all household and other close contacts and assess their mumps immunity status.

6. Assess occupational status of household contacts; if any household member is a healthcare worker, see section on “Mumps in Healthcare Settings”.
7. Refer known susceptible contacts and contacts who’ve had only one dose of MMR vaccine or who have unknown MMR immunization status. Postexposure vaccination will not prevent or alter the clinical severity of mumps. However, if the current exposure to mumps does not cause infection, vaccination should induce protection against subsequent infection.
8. If one confirmed case occurs in a childcare center or school, exposed persons who have had only one dose of MMR should be recommended to receive a second dose ( $\geq 28$  days after the first dose). In outbreaks among older children and adolescents, offering a third MMR dose to contacts with 2 documented MMR doses may be considered.

### **Mumps on College Campuses and Other Congregate Living Settings**

Notify CDPH of any suspected mumps cases in college students. Mumps can spread quickly on college campuses even among persons with two doses of MMR vaccine. Action steps should include immediate testing and isolation of the suspected case, and consideration of vaccination of contacts.

Contacts who have only received 0 or 1 dose of MMR vaccine should be brought up to date. While MMR vaccination will not serve as postexposure prophylaxis, it may protect against future exposures if transmission continues in the same setting.

In addition, there is some evidence that a third dose of MMR vaccine may limit the duration and size of mumps outbreaks. Even for single cases, a third dose intervention may be considered for a limited number of special types of contacts (sports teammates, roommates).

The same approaches used on college campuses may be applied to other settings as well, e.g., jails, prisons, military barracks or other congregate living settings.

### **Mumps in Healthcare Settings**

If a confirmed or probable case has visited a healthcare setting, healthcare workers in that setting with unprotected exposure who do not have documented immunity to mumps (two documented doses of MMR or serologic evidence of immunity) should be excluded from work from the 12th day after the first exposure through the 25th day after the last exposure. See [more mumps information from the CDC](http://www.cdc.gov/vaccines/pubs/surv-manual/chpt09-mumps.html) at: <http://www.cdc.gov/vaccines/pubs/surv-manual/chpt09-mumps.html>