Mumps

Disease Plan

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Last updated: July 1, 2016, by Jeffrey Eason, MPH.

Questions about this disease plan?

Contact the Utah Department of Health Bureau of Epidemiology: 801-538-6191.

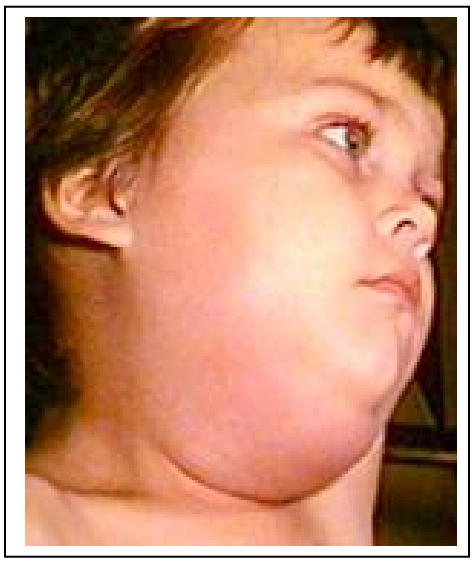
✓ WHY IS MUMPS IMPORTANT TO PUBLIC HEALTH?

Mumps is characterized by swelling of either one, or both, of the parotid glands lasting two or more days in duration. It may be accompanied by fever and swelling of the submandibular and sublingual glands. While typically self-limited and mild, complications of mumps may include aseptic meningitis, encephalitis, acute hearing loss, orchitis, oophoritis, mastitis and pancreatitis. Prior to the widespread use of an effective vaccine, mumps primarily occurred in young children attending primary grade school; mumps was also a leading cause of viral meningitis and the most common cause of unilateral acquired sensorineural deafness in children. Despite high immunization levels, the U.S. has experienced three large outbreaks between 2006 and 2010 in populations highly vaccinated with two doses of measles-mumps-rubella (MMR) vaccine. In 2011-2013, there were several smaller mumps outbreaks reported on college campuses outside of Utah. However, these all had limited spread. Cases of mumps will continue to be imported into the U.S. as long as mumps continues to be endemic globally, making it an important disease for public health surveillance.

✓ DISEASE AND EPIDEMIOLOGY

Clinical Description

Mumps is a moderately contagious viral illness. Mumps usually begins with prodromal symptoms that include myalgia, anorexia, malaise, headache, and a low-grade fever. The most common manifestation of mumps is parotitis. Parotitis consists of swelling and tenderness in the salivary glands (parotid, sublingual, or submaxillary glands), and may be unilateral or bilateral. Parotitis usually develops two days after prodromal symptoms, and usually resolves within 10 days of onset. Parotitis manifests in 30-40% of mumps cases and typically appears as swelling under the ears on one or both sides of the face. Forty to 50% of persons infected with mumps will never develop parotitis, and an additional 20% will remain asymptomatic.



In contrast to these classic manifestations, asymptomatic infection occurs in 20% of cases, and only non-specific or predominantly respiratory symptoms are seen in up to 50% of cases in whom the diagnosis of mumps is not usually made. Subclinical infections are more frequent in adults, while parotitis is most common in children between the ages of two and nine years.

The onset of aseptic meningitis is variable and can occur before, during, or after an episode of mumps parotitis; aseptic meningitis has been reported in 1-10% of patients with mumps parotitis, and occurs more frequently in adults rather than children, and boys rather than girls. In

some studies, up to 50% of patients present with mumps meningitis in the absence of parotitis. The most frequent manifestations are headache, low grade fever, and mild nuchal rigidity. Oophoritis, which mimics appendicitis, and mastitis occur in 5% and 31% of infected females who have reach puberty, respectively. As many as 50% of infected males who have reached puberty will develop orchitis. While testicular atrophy has been documented in as many as 30-50% of patients following mumps orchitis, and impaired fertility in approximately 13%, sterility is estimated to be rare. Mumps orchitis has been reported to be a risk factor for testicular cancer. Permanent deafness can occur, and hearing loss is unilateral in 80% of cases. Mumps encephalitis is rare (1-2/100,000 cases/year) but can result in permanent sequalae, such as paralysis, seizures, cranial nerve palsies, hydrocephalus, and death.

Causative Agent

Mumps is caused by a paramyxovirus (an RNA virus). Other paramyxoviruses include parainfluenza, measles, respiratory syncytial virus (RSV), metapneumovirus, Hendra and Nipah viruses. There is only one known serotype of mumps. This virus has a lipid envelope and is subject to disruption by typical cleaning agents (this means that it is easily inactivated, and easy to disinfect).

Differential Diagnosis

Not all cases of parotitis (swollen lymph nodes) are mumps, but mumps is the only known cause of outbreaks of parotitis. Parotid swelling can last up to 10 days. Other causes of parotitis include cytomegalovirus (CMV), parainfluenza, influenza A, coxsackievirus, lymphocytic choriomeningitis virus (LCM), enterovirus, HIV, *Staphylococcus aureus*, MOTT (mycobacteria other than TB), drug reactions, and certain metabolic disorders (e.g., diabetes mellitus, cirrhosis, and malnutrition). Because clinical diagnosis of this disease may be unreliable, physicians should confirm all cases through serology, PCR, or viral culture. Increased serum amylase supports the clinical diagnosis.

Laboratory Identification

Because clinical diagnosis of mumps may be unreliable, cases of mumps should be laboratory confirmed. Laboratory testing, in conjunction with case investigations, can result in many suspected mumps cases being ruled out. CDC strongly recommends that clinicians collect serum and buccal/throat swab specimens from *all* suspect mumps cases.

Laboratory confirming the diagnosis of mumps in highly vaccinated populations may be challenging; serologic tests should be interpreted with caution because false negative results in vaccinated persons are common.

IgM Serology

IgM is the simplest and quickest method for confirming mumps diagnosis. Therefore, IgM serology should be ordered on all acute cases. Serum IgM antibody to mumps typically remains positive for up to four weeks, but may be negative in up to 50-60% of specimens from individuals with acute disease who were previously immunized. While a positive IgM confirms the illness, a negative IgM does not rule out the disease, and culture or PCR testing should be considered.

Among **unvaccinated** persons, serum samples drawn too early in the course of illness may produce false negative results. If the IgM is negative from serum samples collected within the first three days of onset of parotitis, a second serum sample (collected 5-7 days after onset) is recommended.

Among **vaccinated** persons, IgM positive serology may be missing, delayed, or transient (meaning it could be falsely negative), regardless of the timing of collection.

IgG Serology

Mumps needs to be diagnosed in a timely manner; for this reason, IgG serology testing for acutely ill patients is not recommended for diagnosing persons who have not been previously vaccinated. A single IgG serology from an acutely ill patient is not diagnostic, and must be followed up with a second serology 2-4 weeks later; a 4-fold rise in titer is diagnostic. In previously vaccinated persons, the IgG titer will rise rapidly so it is important to obtain specimens as soon as mumps is suspected to make the diagnosis serologically. A positive mumps IgG serology is expected among previously immunized persons. However, the level of neutralizing antibody that is needed for protection against mumps is not known. Serologic tests cannot differentiate between prior exposure to mumps virus, or mumps vaccine.

Viral Culture

In patients with aseptic meningitis due to mumps, the virus can frequently be isolated from the cerebrospinal fluid (CSF) during the first three days of clinical symptoms. Virus is present in saliva for approximately one week, starting 2-3 days before the onset of parotitis. Virus is also excreted in urine for the first two weeks of illness. However, selective viral isolation culture techniques are time consuming and may require days to yield a positive identification of mumps virus, thus delaying diagnosis. Viral culture is most sensitive between 1-4 days (but may be positive for up to nine days) after the onset of parotitis. If the patient has previously received MMR vaccine, viral isolation is a good laboratory test to order. Buccal/throat swabs or urine are the preferred specimens.

PCR

The use of polymerase chain reaction (PCR) assay enables more rapid confirmation of mumps. PCR detects viral RNA and provides epidemiologically important information. Overall, PCR confirms mumps virus RNA in the CSF of 96% of patients, compared to 39% for CSF culture alone. It is strongly recommended that viral culture always be performed with PCR. The interpretation of a positive PCR result without demonstration of mumps growth in tissue culture must be interpreted carefully, particularly among persons whose symptoms do not meet the clinical definition of mumps. Buccal/throat swabs or urine are the preferred specimens.

Utah Public Health Laboratory (UPHL): UPHL accepts specimens for mumps testing. Samples should be collected per instructions found here: http://health.utah.gov/epi/diseases/mumps/VPD_lab_submission_form.pdf.

The requisition form should accompany the sample to UPHL. Samples are submitted to the California Department of Health, and PCR results are estimated to be back within two business

days. All specimens must be approved by the Utah Department of Health (UDOH), Bureau of Epidemiology (BOE) prior to submission to UPHL.

Treatment

There is no specific treatment for mumps. Therapy for mumps parotitis is supportive care which may include analgesics or antipyretics, such as aspirin or acetaminophen. Topical application of warm or cold packs to the parotid may also be soothing. Patients who have meningitis or pancreatitis with nausea and vomiting may require hospitalization for intravenous fluids. Patients with orchitis are also treated symptomatically with bed rest, nonsteroidal anti-inflammatory agents, support of the inflamed testis, and ice packs

Case Fatality

Death from mumps infection is very rare. Case fatality rates are estimated at 1.6-3.8 deaths per 10,000 infections per year. More than 50% of fatalities occur in those over the age of 19 years.

Reservoir

Humans are the only known hosts of mumps virus.

Transmission

Mumps is highly infectious and spreads rapidly among susceptible people living in close quarters. Mumps is transmitted through droplet nuclei or direct contact with oral secretions.

Susceptibility

Anyone can get mumps, however it is typically seen in children 5-14 years of age. Recently several cases of mumps have been seen in college students, particularly in the Midwest. Mumps is uncommon in infants under the age of one, due to passively acquired maternal antibodies. Mumps cases are reported throughout the year, but tend to peak in late winter and spring. Lifelong immunity develops after clinical (symptomatic or asymptomatic) infections.

Incubation Period

The incubation period is 16-18 days (range is 12-25 days).

Period of Communicability

Viral shedding in respiratory secretions precedes the onset of symptomatic illness, and the period of peak contagion is just before the onset of parotitis (approximately three days). The infectious period is generally defined as ranging from two days prior until five days after the onset of parotitis.

Epidemiology

Mumps is endemic throughout the world. Before the advent of the vaccine in 1967, the peak incidence was annually between January and May. Since then, there is no observed seasonality in case occurrence. Epidemics tend to occur in closed communities such as boarding schools, ships, and prisons. After implementation of the one-dose mumps vaccine recommendation, the incidence of mumps in the U.S. declined from an incidence of 50 -251 per 100,000 persons/year

in the pre-vaccine era, to 2 per 100,000 persons/year in 1988. After implementation of the 2-dose measles-mumps-rubella (MMR) vaccine recommendation in 1989 for measles control, mumps further declined to extremely low levels, with an incidence of 0.1 per 100,000 persons/year by 1999. In early 2006, a large-scale mumps outbreak occurred in the Midwestern U.S., with 6,584 reported cases. Many of the cases occurred among people 18-24 years of age, many of whom were college students who had received two doses of the mumps vaccine. In June 2009, the largest U.S. mumps outbreak since 2006 occurred. The index case was an 11 year old male infected in the United Kingdom (U.K.), where approximately 7,400 reports of mumps were reported in 2009. A total of 3,502 outbreak related cases were reported, primarily from New York. The outbreak was confined to the Orthodox Jewish communities, with the majority of cases attending summer camp for boys where they were in congregate settings, where close contact among persons facilitated transmission. The U.S. mumps epidemics in the Midwest and the Northeast were preceded by several years of widespread disease in Europe, particularly the U.K., where immunization rates are low. Surveillance of mumps is needed to detect and control outbreaks, and to evaluate current prevention strategies.

✓ PUBLIC HEALTH CONTROL MEASURES

Public Health Responsibility

- Promote vaccination to reduce disease burden in the community.
- Investigate all new cases of disease, complete and submit appropriate disease investigations forms.
- Educate patients on how to limit transmission.
- Provide education to the general public (regarding disease transmission) and to clinicians (regarding disease diagnosis, reporting, and prevention).
- Monitor disease trends.

Prevention

The primary method of prevention of mumps is through vaccination.

Chemoprophylaxis

Persons exposed to mumps that are not immune should be vaccinated as soon as possible. Although mumps vaccination has not been shown to be effective in preventing mumps in persons already infected, it will prevent infection in those persons who are not infected.

Vaccine

Two doses of mumps-containing vaccine (MMR) separated by at least 28 days are routinely recommended for all children. The first dose is given at 12-15 months of age; the second is given at 4-6 years of age. If a child receives a dose of mumps vaccine before 12 months of age, this dose is not counted toward the required number of doses, and two additional doses are required beginning at 12-15 months of age, separated by at least 28 days. The vaccine appears to reduce the risk of infection in 80-90% of vaccinated individuals. Two doses of the vaccine appear to provide better protection against the disease than one dose. The expected duration of immunity is thought to be more than 25 years. MMR is a live, attenuated vaccine, and,

therefore, pregnant women and persons with an impaired immune system should not receive the vaccine. Non-pregnant women should avoid becoming pregnant within 28 days after the last dose of vaccination. Breastfeeding is not a contraindication for MMR vaccination.

Mumps vaccine is available as a combined measles, mumps, rubella and varicella (MMRV) vaccine. MMRV can be used for children aged 12 months through 12 years of age. For the first dose of measles, mumps, rubella and varicella vaccines at ages 12 through 47 months, either MMR and varicella vaccines, or MMRV vaccine can be used. MMRV can also be used for the second dose at any age.

MMRV vaccine should be stored frozen between -58° F and 5°F (-50°C to -15°C). MMR vaccine can be stored either in a freezer (at the same temperature requirement of the MMRV) or in the refrigerator, and should be protected from light at all times. Storing MMR in the freezer with the MMRV may help prevent inadvertent storage of MMRV in the refrigerator.

- For more information on best practice and recommendations, refer to the CDC's Vaccine Storage and Handling Toolkit, http://www.cdc.gov/vaccines/recs/storage/toolkit/storage-handling-toolkit.pdf.

Isolation and Quarantine Requirements

Isolation: Persons diagnosed with mumps should voluntarily isolate themselves at home until five days after the onset of parotitis.

Hospital: Hospitals should follow droplet precautions for five days following the onset of parotitis. (2007 Guideline for Isolation Precautions)

Quarantine: Close contacts should have their immunization records audited for appropriate immunity. A person is considered susceptible unless they have documentation of two doses of mumps vaccine, administered at least one month apart, or if they were born prior to 1957. A verbal report of immunization is not considered adequate documentation. If adequate documentation cannot be provided, the person should be considered susceptible. Susceptible persons should be vaccinated immediately. Although there is no evidence that vaccination after exposure to mumps prevents disease, the Local Health Officer may choose to allow a person to come out of quarantine after vaccination. Susceptible persons should be quarantined in their home until 26 days after the onset of parotitis in the last mumps case. If immunization status is unknown, vaccination in an already immune person is not harmful. Utah Administrative Code R396-100-8 addresses school exclusions as follows:

R396-100-8. Exclusions of Students Who Are Under Exemption and Conditionally Enrolled Status.

(1) A local or state health department representative may exclude a student who has claimed an exemption or who is conditionally enrolled from school attendance if there is good cause to believe that the student has a vaccine preventable disease AND:

(a) has been exposed to a vaccine-preventable disease; OR

(b) will be exposed to a vaccine-preventable disease as a result of school attendance.

(2) An excluded student may not attend school until the local health officer is satisfied that a student is no longer at risk of contracting or transmitting a vaccine-preventable disease.

✓ CASE INVESTIGATION

Reporting

If mumps is suspected, it should be reported to public health within three working days. Report any illness to public health authorities that meets any of the following criteria:

1. Acute illness characterized by parotitis (i.e., acute onset of unilateral or bilateral tender, self-limited swelling of the parotid) or other salivary gland(s), lasting at least two days.
2. Acute illness characterized by a mumps-associated complication (i.e., aseptic meningitis, encephalitis, hearing loss, orchitis, oophoritis, mastitis, or pancreatitis) in a person with any of the following epidemiologic risk factors for mumps:
    - Contact with a confirmed mumps case
    - Member of a risk group defined by public health authorities during an outbreak

3. Laboratory tests for acute mumps infection without clinical information.
    - Isolation of mumps virus in cell culture
    - Reverse Transcriptase Polymerase Chain Reaction (RT-PCR) test positive for mumps-specific nucleic acid
    - Mumps IgM antibody
    - Acute and convalescent anti-mumps IgG by quantitative assay
    - Standardized mumps serologic assay to determine seroconversion

Table 1. Reporting criteria for mumps

Criterion	**Reporting**		
Clinical Evidence			
Parotitis lasting at least 2 days	S		
Swelling of other salivary gland(s) lasting at least 2 days	S		
Aseptic meningitis		O	
Encephalitis		O	
Hearing loss		O	
Orchitis		O	
Ooophoritis		O	
Mastitis		O	
Pancreatitis		O	
Laboratory Evidence			
Isolation of Mumps virus in cell culture			O
Reverse Transcriptase Polymerase Chain Reaction (RT-PCR) test positive for mumps-specific nucleic acid			O
Mumps IgM antibody			O
Acute and convalescent anti-mumps IgG by quantitative assay			O

Standardized mumps serologic assay to determine seroconversion			O
Epidemiologic Risk Evidence			
Contact of a confirmed mumps case		O	
Member of a risk group defined by public health authorities during an outbreak		O	

Notes:
S = This criterion alone is sufficient to report a case
O = At least one of these "O" criteria in each category in the same column (e.g., clinical presentation evidence and laboratory evidence) is required to report a case.

CSTE Case Definition
Mumps (2011)

Clinical Case Definition
An illness with acute onset of unilateral or bilateral tender, self-limited swelling of the parotid and or other salivary gland(s), lasting at least two days, without other apparent cause.

Clinically Compatible Illness
Infection with mumps virus may present as aseptic meningitis, encephalitis, hearing loss, orchitis, oophoritis, parotitis or other salivary gland swelling, mastitis or pancreatitis.

Laboratory Criteria
- Isolation of mumps virus from clinical specimen, OR
- Detection of mumps nucleic acid (e.g., standard or real time RT-PCR assays), OR
- Detection of mumps IgM antibody, OR
- Demonstration of specific mumps antibody response in absence of recent vaccination, either a four-fold increase in IgG titer as measured by quantitative assays, or a seroconversion from negative to positive using a standard serologic assay of paired acute and convalescent serum specimens.

Table 2. Case classification criteria for mumps

Criterion	Confirmed		Probable		Suspect	
Clinical Evidence						
Acute parotitis or other salivary gland swelling lasting at least 2 days	O	O	O	O	O	
Orchitis	O	O	O	O	O	
Oophoritis	O	O	O	O	O	
Aseptic meningitis	O	O				
Encephalitis	O	O				
Hearing loss	O	O				
Mastitis	O	O				
Pancreatitis	O	O				
Laboratory Evidence						
Positive test for serum anti-mumps IgM antibody			N			O
Detection of mumps virus with RT-PCR	N					O
Isolation of mumps virus in cell culture from a clinical specimen		N				O
Epidemiologic Evidence						
Epidemiologic linkage to another probable or confirmed case				O		
Epidemiological linkage to a group/community defined by public health during an outbreak of mumps				O		

Notes:
S = This criterion alone is Sufficient to classify a case.
N = This criterion in conjunction with all other “N” and any “O” criteria in the same column is required to classify a case.
O = At least one of these “O” criteria in each category in the same column (e.g., clinical evidence and laboratory evidence)—in conjunction with all other “N” criteria in the same column—is required to classify a case.

Case Classification

Suspect: A case with clinically compatible illness, or one who meets the clinical case definition without laboratory testing or a case with laboratory tests suggestive of mumps without clinical information.

Probable: A case that meets the clinical case definition with a positive mumps IgM antibody, or is epidemiologically linked to another probable or confirmed case, or has linkage to a group/community defined by public health during a mumps outbreak.

Confirmed: A case that meets the clinical case definition, or has clinically compatible illness with any of the symptoms as defined above, and is laboratory confirmed by RT-PCR or culture.

Note: 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.

Therefore, mumps cases should not be ruled out by negative laboratory results. Serologic tests should be interpreted with caution, as false positive and false negative results are possible with IgM tests.

Epidemiologic classification

An epidemiologically linked case is one in which the patient has had contact with one or more persons who have or had the disease, and transmission of the agent by the usual modes of transmission is plausible. A case may be considered epidemiologically linked to a laboratory-confirmed case if at least one case in the chain of transmission is laboratory confirmed.

Internationally imported case

A case in which mumps results from exposure to mumps virus outside the U.S. as evidenced by:

- At least some of the exposure period (12–25 days before onset of parotitis or other mumps-associated complications) occurred outside the U.S.,
- The onset of parotitis or other mumps associated complications occurs within 25 days of entering the U.S., AND
- No known exposure to mumps occurred in the U.S. during that time.

U.S.-acquired case

A case in which the patient:

- Had not been outside the U.S. during the 25 days before onset of parotitis or other mumps-associated complications, OR
- Was known to have been exposed to mumps within the U.S.

U.S.-acquired cases are further classified into four mutually exclusive groups:

- *Import-linked case:* any case in a chain of transmission that is epidemiologically linked to an internationally imported case.
- *Imported-virus case:* a case for which an epidemiologic link to an internationally imported case was not identified, but for which viral genetic evidence indicates an imported mumps genotype, i.e., a genotype that is not occurring within the U.S. in a pattern indicative of endemic transmission. An endemic genotype is the genotype of any mumps virus that occurs in an endemic chain of transmission (i.e., lasting ≥12 months). Any genotype that is found repeatedly in U.S.-acquired cases should be thoroughly investigated as a potential endemic genotype, especially if the cases are closely related in time or location.
- *Endemic case:* a case for which epidemiological or virological evidence indicates an endemic chain of transmission. Endemic transmission is defined as a chain of mumps virus transmission, continuous for ≥12 months within the U.S.

- *Unknown source case:* a case for which an epidemiological or virological link to importation or to endemic transmission within the U.S. cannot be established after a thorough investigation. These cases must be carefully assessed epidemiologically to assure that they do not represent a sustained U.S.-acquired chain of transmission or an endemic chain of transmission within the U.S.

Note: Currently, there is insufficient information to determine whether any mumps strains are endemic to the U.S., or to distinguish endemic from non-endemic strains.

Case Investigation Process

All highly suspect cases of mumps warrant urgent action. Cases of mumps should be managed as follows:

- Local and state health departments should be notified of any cases.
- Appropriate laboratory samples and preliminary clinical and epidemiologic information (including vaccine history) should be obtained.
- Strict isolation should be imposed until five days after the onset of parotitis.
- All case contacts should be identified and appropriately managed (explained in detail below).

Outbreaks

Because patients are infectious for up to six days prior to symptoms, and because of the likelihood of asymptomatic infections, the sole use of isolation to curb an outbreak will be ineffective. Effective outbreak management will require vaccination of the susceptible population, as well as school exclusion of susceptible individuals. The following is a suggested outbreak management protocol, which may be altered depending on the epidemiology of the outbreak:

- A second dose of vaccine should be considered for adults and for children aged 1-4 years of age who have received only one dose of MMR vaccine.
    - In an outbreak setting, 28 days is the recommended interval between MMR doses.
- Exclusion of persons without evidence of immunity to mumps from institutions such as schools and colleges that are affected by the outbreak may be necessary.
    - Once vaccinated, students and staff can be readmitted to school immediately, even if they have been exposed to a case of mumps.
    - The period of exclusion for those who remain unvaccinated for medical, religious, or other reasons is 26 days after the onset of parotitis in the last person in the affected institution.
- Students who acquire mumps illness should be excluded from school until five days after the onset of parotitis.
- After an exposure to mumps, unvaccinated healthcare workers without evidence of immunity should be vaccinated and excluded from duty from the 12th day after the first exposure through the 26th day after the last exposure.
    - Healthcare workers with mumps illness should be excluded from work until five days after the onset of parotitis.

During mumps outbreaks, public health authorities may administer a third dose of MMR or MMRV for specifically identified target populations. Catch-up vaccination efforts to ensure that populations at risk are up to date with the recommended number of vaccine doses, as well as reducing opportunities for close contact, remain the recommended strategies for mumps outbreak control.

Identifying Case Contacts

Close contact exposure is not well defined. It is known that mumps is more communicable than pertussis, but less than measles or varicella. Consider members of the following groups that were exposed to the case during the infectious period (two days prior until five days after the onset of parotitis):

- Household members
- Students in the same classroom (but not everyone in the school)
- Children in the same daycare room
- Children who ride the school bus
- Core groups of close friends, social contacts, boyfriends, girlfriends
- Co-workers who work within six feet of the case
- Those who have direct contact with respiratory secretions
- Healthcare workers with face-to-face contact with a patient
- Anyone that has had close exposure for more than 10 minutes

Healthcare personnel

Prevention and control strategies should be applied in all healthcare settings, including outpatient and long-term facilities. These measures include:

- Assessment of presumptive evidence of immunity of healthcare personnel with the following criteria:
    - Written documentation of vaccination with two doses of live mumps or MMR vaccine administered at least 28 days apart.
    - Laboratory evidence of immunity.
    - Laboratory confirmation of disease.
    - Birth before 1957.
- Vaccination of those without evidence of immunity.
- Exclusion of healthcare personnel with active mumps illness, as well as healthcare personnel who do not have presumptive evidence of immunity who are exposed to a person with mumps.
- Isolation of patients in whom mumps is suspected.
- Implementation of droplet precautions, in addition to standard precautions.

In the event that a nosocomial outbreak occurs, healthcare facilities should have a plan put into place for the implementation of the two-dose recommendation for all healthcare personnel, including those who were born after 1957 and lack of laboratory evidence of immunity or laboratory confirmation of disease.

Case Contact Management

- Assess contacts' immunity by auditing immunization records. Contacts must be able to produce documentation of vaccination; a verbal history of vaccination is not sufficient.
- Vaccinate susceptible contacts. Although there is no evidence that vaccination after exposure to mumps prevents disease, the Local Health Officer may choose to allow a person to come out of quarantine after vaccination. Susceptible contacts not immunized should be quarantined in their home until 26 days after the onset of parotitis in the last mumps case.
- Provide educational materials informing contacts of exposure and recommending vaccination.

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✓ VERSION CONTROL

Updated August 2015: General update to document formatting.

Updated February 16, 2016: Added Importance to Public Health section.

Updated March 1, 2016: Updated Laboratory Identification and Treatment, Clinical Description, Incubation Period, Period of Communicability, and Transmission. Updated the Epidemiology section and added Healthcare Personnel to Outbreak Management. Added UT-NEDSS Minimum/Required Fields by Tab.

✓ UT-NEDSS Minimum/Required Fields by Tab

Demographic

- ☑ First Name
- ☑ Last Name
- ☑ Street Number
- ☑ Street Name
- ☑ City
- ☑ State
- ☑ County
- ☑ Zip Code
- ☑ Date of Birth
- ☑ Area Code
- ☑ Phone Number
- ☑ Birth Gender
- ☑ Ethnicity
- ☑ Race

Clinical

- ☑ Did the patient have meningitis?
- ☑ Did the patient have encephalitis?
- ☑ Did the patient have orchitis?
- ☑ Did the patient have oophoritis?
- ☑ Did the patient have mastitis?
- ☑ Did the patient have pancreatitis?
- ☑ Date of first vaccination
- ☑ Date of second vaccination
- ☑ Is contact symptomatic?
- ☑ Has contact been vaccinated?
- ☑ Date of contact first vaccination
- ☑ Date of contact second vaccination
- ☑ Was contact vaccinated within 72 hours of exposure?
- ☑ Deafness
- ☑ Hearing impairment
- ☑ Other complications
- ☑ Specify other complications
- ☑ Parotitis
- ☑ Length of parotitis
- ☑ History of vaccination for the indicated disease?
- ☑ If vaccinated, how many doses has the patient received?
- ☑ If patient was not vaccinated, why were they not vaccinated?
- ☑ What was the IgM result?
- ☑ What is the collection date of the IgM specimen?
- ☑ What is the IgG result?
- ☑ What is the date of the acute specimen collection?
- ☑ What is the date of the convalescent specimen collection?
- ☑ Was a test done other than IgM or IgG?
- ☑ What other test method was performed?
- ☑ What was the other test method result?
- ☑ Parotitis onset date
- ☑ Was swelling unilateral/bilateral?
- ☑ Has any other possible cause of swelling been identified?
- ☑ Did the patient have swelling of the parotid or other salivary gland?
- ☑ Did swelling last at least 2 days?
- ☑ Has the patient ever received a mumps-containing vaccine?
- ☑ Number of doses:
- ☑ Reason:
- ☑ Clinician First Name
- ☑ Clinician Last Name
- ☑ Date diagnosed
- ☑ Diagnostic facility
- ☑ Died
- ☑ Disease
- ☑ Onset Date

Laboratory

- ☑ Test Type
- ☑ Test Result
- ☑ Collection Date
- ☑ Lab Test Date
- ☑ Units
- ☑ Organism
- ☑ Result value
- ☑ Has a sample been sent to CDC?
- ☑ Did CDC confirm the diagnosis?

Epidemiological

- ☑ Imported from
- ☑ Day care association
- ☑ Other data 1
- ☑ Other data 2
- ☑ Has case been excluded from childcare until 5 days after parotitis onset?
- ☑ Name and location of facility:
- ☑ Has case been excluded from the facility until 5 days after parotitis onset?
- ☑ Attends school
- ☑ Name and location of school:
- ☑ Has case been excluded from school until 5 days after parotitis onset?
- ☑ List names of contacts
- ☑ Did patient travel out of the U.S. in the 25 days before symptom onset?
- ☑ Dates and places of travel
- ☑ What is the transmission setting?
- ☑ What is the source of the infection?
- ☑ Epi-linkage to a confirmed or probable case
- ☑ Epi-linkage to a group or community as defined by public health during an outbreak

Contacts

- ☑ Date 7 days prior to onset:
- ☑ Date 5 days after onset:
- ☑ Does case have household contacts?
- ☑ Does case have workplace contacts
- ☑ Name and location of workplace
- ☑ Does case participate in any extra-curricular activities?
- ☑ Name and location of activity:

Reporting

- ☑ Date first reported to public health

Administrative

- ☑ State Case Status (Completed by UDOH)
- ☑ Outbreak Associated
- ☑ Outbreak Name
- ☑ LHD Investigation