

Mumps

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Mumps is caused by an RNA virus in the genus *Rubulavirus* of the Paramyxoviridae family. This virus family also includes parainfluenza and Newcastle disease virus. Infection with parainfluenza and Newcastle disease viruses produces antibodies that cross react with mumps virus.

B. Clinical Description

Mumps is characterized by swelling and tenderness of one or more of the salivary glands, usually the parotid gland(s). The parotid gland is located in the cheek area, at the back angle of the jaw, in front of the ear. Parotitis occurs in 30-40% of infected persons. Parotitis may be unilateral or bilateral. Symptoms tend to decrease after 1 week and usually resolve after 10 days. Nonspecific prodrome symptoms, including myalgia, anorexia, malaise, headache, and low-grade fever, may occur several days prior to salivary gland swelling. As many as 20% of mumps infections are asymptomatic and nearly 50% may only have nonspecific or primarily respiratory symptoms. Thus, it is difficult to diagnosis mumps.

Not all cases of parotitis – especially sporadic ones – are due to mumps infection. Parotitis can also be caused by parainfluenza virus types 1 and 3, Epstein Barr virus, influenza A virus, Coxsackie A virus, echovirus, lymphocytic choriomeningitis virus, human immunodeficiency virus, and other noninfectious causes, such as drugs, tumors, immunologic diseases, and obstruction of salivary duct. However, these agents do not cause epidemic parotitis; only mumps causes epidemic parotitis.

Some complications of mumps occur more frequently among adults than among children. Orchitis (testicular inflammation causing pain, swelling, and tenderness) is the most common complication in post-pubertal males and occurs in as many as 50% of post-pubertal males. Rarely, it causes sterility. Adults have a higher risk for mumps meningoencephalitis and aseptic meningitis than children. However, hearing loss due to mumps is more common in children.

Central nervous system involvement in the form of aseptic meningitis is common with mumps infections. Up to 15% of cases have symptomatic meningitis (headache and stiff neck) and 50 – 60% have asymptomatic aseptic meningitis (inflammatory cells in cerebrospinal fluid). As many as half of the cases with aseptic meningitis due to mumps do not have parotitis.

Severe complications of mumps are rare. Rare complications of mumps include arthritis, encephalitis, thyroiditis, mastitis, glomerulonephritis, myocarditis, endocardial fibroelastosis, thrombocytopenia, cerebellar ataxia, transverse myelitis, ascending polyradiculitis, pancreatitis, oophoritis, sterility, and hearing impairment. Permanent sequelae and death are rare.

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Some data suggest that mumps infection during the first trimester of pregnancy is associated with an increased rate of spontaneous abortion. Although mumps can cross the placenta, no evidence exists that this results in congenital malformation.

C. Reservoirs

Humans are the only known natural hosts. Persons with asymptomatic disease can transmit the virus, but no carrier state is known to exist.

D. Modes of Transmission

Mumps is transmitted by direct contact with respiratory droplets or saliva from an infected person. Mumps may be spread by freshly contaminated fomites.

E. Incubation Period

The average incubation period is 16-18 days, with a range of 12-25 days.

F. Period of Communicability or Infectious Period

The period of maximum communicability is from 1 to 2 days before onset of salivary gland swelling to 5 days after onset of salivary gland swelling. However, mumps virus has been isolated from saliva from 7 days before through 9 days after onset of parotitis. For disease investigation purposes, consider mumps cases infectious 2 days prior to salivary gland swelling through 6 days of swelling (5 days after swelling onset with the day of onset counted as day 0).

G. Epidemiology

Mumps occurs worldwide. The incidence of mumps remains high in countries where mumps vaccine has not been introduced. In the United States, the reported incidence of mumps declined after the introduction of mumps vaccine in 1967 and the recommendation for its routine use in 1977. Several mumps outbreaks among highly vaccinated school populations have been reported, indicating that high coverage with a single dose of mumps vaccine does not always prevent disease transmission. After expanded recommendations for a 2-dose MMR vaccine schedule for measles control in 1989, mumps cases declined further. During 2001 – 2003, fewer than 300 mumps cases were reported annually, a 99% decline from the 185,691 cases reported in 1968.

In 2006, the largest mumps outbreak since 1987 occurred, with more than 6,000 cases reported in the United States. During the 2006 outbreak, 6 midwestern states reported the majority (84%) of the cases, and young adults aged 18 – 24 years were the most highly affected age group with many of the cases occurring among college students. Many of the cases had received one or two doses of MMR vaccine, and 63% of the reported cases were females; previously, no gender difference in case rates had been reported.

Historically, the peak incidence of mumps was between January and May; however, seasonality is no longer evident in the United States. Over time, the age group with the most reported cases has shifted from children 5 to 9 years of age to older individuals.

Colorado mumps statistics are available on the CDPHE website:

www.cdphe.state.co.us/dc/CODiseaseStatistics/index.html or under the Vaccine Preventable Diseases section at www.cdphe.state.co.us/dc/surveillancereports.html.

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2) CASE DEFINITION

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 2 days, and without other apparent cause.

Clinically Compatible Illness

Infection with mumps virus may present as aseptic meningitis, encephalitis, hearing loss, orchitis (testicular inflammation), oophoritis (ovarian inflammation), parotitis or other salivary gland swelling, mastitis (breast inflammation) or pancreatitis.

Laboratory Criteria for Diagnosis

- 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.

Case Classification

Suspected: A case with clinically compatible illness or that 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 without laboratory confirmation and is epidemiologically linked to a clinically compatible case.

Confirmed: A case that:

- 1) meets the clinical case definition or has clinically compatible illness, and
- 2) is either laboratory confirmed or is epidemiologically linked to a confirmed case.

Note: A detailed travel history, including dates of travel and locations, is needed to classify mumps cases as internationally imported cases or US-acquired cases. .

3) REPORTING CRITERIA

What to Report to the Colorado Department of Public Health and Environment (CDPHE) or local health agency

- Suspect, confirmed, and probable cases of mumps.
- Cases should be reported using telephone, fax or the Colorado Electronic Disease Reporting System (CEDRS) to CDPHE or the local health department. See below for phone and fax numbers.
- All mumps cases should be reported within 7 days of clinical or laboratory diagnosis.
- Only confirmed and probable cases are reported to CDC.

Purpose of Surveillance and Reporting

- To identify cases for investigation and ensure laboratory testing if necessary.
- To promptly identify clusters and potential outbreaks of disease.
- To recommend vaccination in certain situations.
- To monitor trends in disease incidence.

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Important CDPHE Web Resources, Telephone and Fax Numbers

- CDPHE Communicable Disease Epidemiology Program
 - Phone: 303-692-2700 or 800-886-7689 x2700 or 800-866-2759 (voicemail)
 - Fax: 303-782-0338 or 800-811-7263
 - After hours: 303-370-9395
- CDPHE Molecular Sciences Laboratory: 303-692-3286
- Communicable Disease Manual (CD Manual) website:
www.cdphe.state.co.us/dc/epidemiology/dc_manual.html

4) LABORATORY TESTING

A clinical diagnosis of mumps may not be reliable, so all suspect and probable mumps cases should be tested for mumps. In some situations, additional testing of probable mumps cases with negative mumps laboratory results may be recommended. Confirmatory laboratory tests for acute mumps infection are mumps IgM antibody, viral culture, mumps PCR or a significant rise in mumps IgG antibody titer between acute and convalescent serology specimens.

The interpretation of laboratory test results for persons suspected of having mumps may not be clear-cut, especially in previously vaccinated persons. Mumps IgM test results may be negative; IgG test results may be positive at initial blood draw and viral detection in RP-PCR or culture may have low yield in persons having previous contact with mumps virus either through vaccination (particularly with 2 doses) or natural infection. Therefore, clinically compatible mumps cases may not be ruled out by negative laboratory results. Persons with negative laboratory results, who are highly suspected of having mumps, should have another specimen collected for testing. The decision to collect an additional specimen depends on the person's vaccination status, exposure history, and the timing of his/her initial specimen collection. Serologic tests should be interpreted with caution, as false positive and false negative results are possible with IgM tests.

A. Serology Testing

Mumps IgM antibody testing is the recommended diagnostic test for mumps. In unvaccinated persons, IgM antibody is detectable within 5 days after onset of symptoms and peaks about a week after onset, and remains elevated for several weeks or months. The IgM response to mumps infection in vaccinated persons is highly variable and may be transient, absent or delayed (see paragraph above).

- Blood should be collected from persons suspected of having mumps for mumps IgM antibody testing at the initial visit to a health care provider.
- Unvaccinated cases should be tested for mumps IgM and IgG antibodies.
- Persons suspected of having mumps with negative mumps IgM results from an acute specimen may need to have a convalescent serum specimen collected for testing. The recommendation to collect a second specimen is based on the case's mumps vaccination status and when the acute specimen was collected.
- If an **unvaccinated** person is mumps IgM negative from a specimen collected < 4 days after onset of symptoms, a second serology specimen should be collected. The second specimen should be collected 5 days to 3 weeks after the person's onset of swelling. CDPHE's experience has been that many people are unlikely to return for a second blood draw 2 to 3 weeks after onset of symptoms, especially if they have fully recovered from their illness. Thus, CDPHE recommends collecting the second specimen as soon as feasible after

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obtaining the negative IgM results and at least 5 days after the person's onset of swelling. This differs from CDC's guidance, which recommends collection of the second specimen 2-3 weeks after swelling onset. If the person was also mumps IgG negative, the second specimen may be tested for mumps IgM and IgG antibody, even though it may be too soon to see a rise in the IgG antibody.

- If a **vaccinated** person is mumps IgM negative from an acute specimen and is highly suspected of having mumps, a second specimen should be collected because the person may have a delayed or transient mumps IgM response. The second specimen should be collected 5 days to 3 weeks after the person's onset of swelling. CDPHE's experience has been that many people are unlikely to return for a second blood draw 2 to 3 weeks after onset of symptoms, especially if they have fully recovered from their illness. Thus, CDPHE recommends collecting the second specimen as soon as feasible after obtaining the negative IgM results and at least 5 days after the person's onset of swelling. This differs from CDC's guidance, which recommends collection of the second specimen 2-3 weeks after swelling onset.
- Mumps may also be confirmed by demonstrating a 4-fold increase in mumps IgG titer or seroconversion from negative mumps IgG antibody to positive mumps IgG antibody using a standard serologic assay of paired acute and convalescent serum specimens. However, mumps IgM testing is the preferred test since the convalescent specimen for IgG testing should be collected 2-3 weeks after the person's swelling onset. Testing for IgG seroconversion or 4-fold rise may be considered if the person's acute serology specimen is mumps IgG negative.

B. Viral Detection (PCR and culture)

In addition to collecting a serology specimen, the health care provider may want to collect a buccal swab for mumps PCR testing. Instructions for collecting a buccal swab are located on CDC's website at:

http://www.cdc.gov/vaccines/vpd-vac/mumps/downloads/detection_IL.pdf. A swab of the buccal mucosa/parotid duct or the duct of another affected salivary gland yields the best viral sample. Mumps virus may also be isolated from throat, urine and cerebrospinal fluid (CSF) specimens. Viral specimens should be collected as soon as possible after onset of salivary gland swelling, ideally within 3 days of salivary gland swelling. Viral specimens should not be collected more than 10 days after onset of salivary gland swelling.

C. Other tests

If the health care provider is uncertain about the diagnosis of mumps, the provider may elect to test for other infections, such as mononucleosis or streptococcal pharyngitis. throat if the patient's symptoms are compatible with one of these illnesses.

D. State Laboratory Testing Services

- Commercial laboratories typically perform diagnostic testing for sporadic suspect mumps cases.
- Mumps PCR testing is available at the CDPHE Lab on a fee-for-service basis.
- With approval from CDPHE Communicable Disease staff, specimens may be submitted to the CDPHE Lab to be sent to the CDC Lab for mumps testing. The CDC Lab offers mumps IgM antibody testing and mumps PCR testing. A viral culture may be done at the CDC Lab if the PCR result is positive.

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5) CASE INVESTIGATION

Investigate all mumps reports, including suspect cases.

A. Case Investigation / Forms

- Organized health departments have primary responsibility for investigating cases in their jurisdiction.
- Public health nursing services should consult their CDPHE Field Epidemiologist to establish primary responsibility for investigating cases in their jurisdiction.
- Use the CDC **Mumps Surveillance Worksheet** during the investigation to ensure collection of pertinent information. The worksheet and instructions for completing the worksheet are available on the CD Manual website.
- In addition to the questions on the worksheet, ask whether the case's swelling was unilateral or bilateral, and if the case had fever or malaise.
- Attempt to obtain a mumps immunization record for all cases, especially cases < 25 years of age. If possible, the vaccination history should include vaccination date, type of vaccine, vaccine manufacturer, and lot number.
- Interview the case's health care provider. Determine whether the case had swollen salivary glands and which glands were swollen. Ask about demographic information, other symptoms, vaccine history, travel history, occupation, and whether specimens were collected for mumps testing.
- If specimens were not collected for mumps testing, recommend specimen collection for mumps testing, unless the case is a direct contact to a confirmed case. See Section 4) for details regarding laboratory testing.
- Interview the case or case's guardian to collect all the pertinent information. See section B. Identify and Evaluate Contacts for additional questions to ask during the interview regarding contacts.
- If multiple attempts to obtain case information are unsuccessful (e.g., the case, case's guardian, or health care provider does not return your calls, or the person refuses to divulge information), contact your CDPHE Field Epidemiologist to discuss the situation.
- Determine whether the case's symptoms are compatible with mumps.
- If the case's symptoms are compatible with mumps, enter all information from the worksheet into CEDRS or mail or fax the completed worksheet to CDPHE.
- If the case's symptoms are compatible with mumps, recommend exclusion from school, child care, and/or work for 5 days beyond the day of swelling onset (day of onset is counted as day 0).
- In some low-risk employment situations, the case may be allowed to work if he/she can be functionally isolated at work (adequately separated from other individuals by at least 3 feet).

B. Identify and Evaluate Contacts

The main purpose of identifying contacts is to determine their mumps immunity status and educate them about mumps symptoms.

- Identify household and other close contacts.
- Obtain information about the case's close contacts (household, relatives, significant other, friends, etc.) and the case's activities (school, child care, work, church, social gatherings, travel) during the case's infectious period.
- Ask if the case knows anyone else with mumps symptoms. If other contacts have mumps symptoms they should be investigated as suspect mumps cases.

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- Record names, ages, county (city or address) and phone numbers of all close contacts.
- For each activity, record the facility's name, phone number and a contact person.
- Information about contacts and activities occurring outside the investigator's county/area should be given to the appropriate county health department or nursing service or CDPHE.
- CDPHE should be notified of all out-of-state close contacts.
- Close contacts or their guardian should be interviewed to determine if the contact is immune to mumps using the criteria listed below.

Presumptive evidence of mumps immunity includes one of the following:

- a. documentation of adequate vaccination (described below),
- b. laboratory evidence of immunity,
- c. birth before 1957, or
- d. documentation of physician-diagnosed mumps.

Adequate vaccination for preschool-aged children and adults not at high risk is one dose of live mumps virus vaccine administered on or after the first birthday. Adequate vaccination for school-aged children (i.e., grades K-12) and for adults at high risk (i.e., persons who work in health care facilities, international travelers, and students at post-high school educational institutions) is 2 doses of live mumps vaccine with a minimum interval of 28 days between the 2 doses.

Health care facilities should consider routinely recommending 1 dose of mumps vaccine for unvaccinated workers born prior to 1957, since birth before 1957 is only presumptive evidence of immunity.

During a mumps outbreak, consider recommending a second dose of mumps virus vaccine for children 1-4 years of age and adults at low risk if they are affected by the outbreak. In addition, during a mumps outbreak strongly consider recommending 2 doses of mumps vaccine for health care workers born before 1957 without other evidence of mumps immunity.

C. Reported Incidence is Higher than Usual / Outbreak Suspected

Call the CDPHE Communicable Disease Program if there are a higher number of cases in your area than usual or an outbreak is suspected. A mumps outbreak is defined as 3 or more epidemiologically linked cases. For additional vaccination recommendations during a mumps outbreak see the presumptive evidence of mumps immunity information in Section 5) B. Identify and Evaluate Contacts.

6) DISEASE CONTROL MEASURES

A. Treatment

There is no specific treatment for mumps, only supportive treatment.

B. Prophylaxis

There is no prophylaxis for mumps infection. Receiving mumps vaccine after exposure will not prevent infection. Mumps vaccine may be recommended to prevent infection from future exposures. Recommend mumps vaccine for susceptible contacts, as they may not have been exposed yet, and may be exposed to a secondary mumps case.

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C. Education

- Advise contacts of signs and symptoms of mumps and to contact a health care provider if they develop symptoms.
- Recommend contacts review their MMR vaccination status and receive MMR vaccine if susceptible.
- The CDPHE sample letter, **Mumps Alert, Important Notice to Parents**, located on the CD Manual website includes information about mumps symptoms, contacting a health care provider if symptoms develop, and vaccine recommendations.
- A mumps fact sheet, **Facts about Mumps**, is located on the CD Manual website.
- Additional educational materials are available on the CDC Mumps Vaccination website at <http://www.cdc.gov/vaccines/vpd-vac/mumps/default.htm>.
- A Health Alert Network (HAN) Advisory about mumps may be sent to health care providers during a mumps outbreak. Sending a mumps HAN should be discussed with your CDPHE Field Epidemiologist, who may assist you in developing the notice.

D. Managing Special Situations

1. Child care / Preschool

Refer child care providers to the Colorado Department of Public Health and Environment guidelines for child care providers **Infectious Disease in Child Care Settings: Guidelines for Child Care Providers** (<http://www.cdphe.state.co.us/dc/Epidemiology/Childcareflipchart02a.pdf>) or the mumps fact sheet, **Facts about Mumps**, for additional mumps information. Each situation should be evaluated individually. Determine the dates the mumps case attended child care while infectious and who may have been exposed to mumps at the facility.

- Exclude the case from child care/preschool for 5 days beyond the day of swelling onset (day of onset is counted as day 0).
- Advise parents of the signs and symptoms of mumps, to contact a health care provider if their child develops symptoms, and to review their child's immunization record.
- Inform staff about the signs and symptoms of mumps, contacting their health care provider if they develop symptoms and reviewing their immunization records.
- The CDPHE sample letter, **Mumps Alert, Important Notice to Parents**, may be used to notify staff and parents of students. This sample letter is located on the CD Manual website.
- Child care staff and/or the health department personnel should review the MMR immunization records of all children and staff at the facility. If unable to review records for the whole facility, review the immunization records of the children and staff in the exposed classroom.
- Child care staff and/or health department personnel should contact the parents of children not up to date on their MMR vaccinations and refer them to their health care provider or the local public health agency for immunization.
- Child care personnel should monitor children and staff at the facility for mumps symptoms.
- Exposed contacts with symptoms of mumps should be seen by a health care provider and tested for mumps as appropriate. Testing of all cases is not necessary during an outbreak.
- During a mumps outbreak, consider recommending a second dose of mumps vaccine for children 1-4 years of age and staff members with only one dose of mumps vaccine.

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2. School

Refer school personnel to the CDPHE **Infectious Disease Guidelines for School Personnel** (http://www.cdphe.state.co.us/dc/epidemiology/dc_guide.asp) or the mumps fact sheet, **Facts about Mumps**, for additional information. Each school situation should be evaluated individually. Determine the dates the mumps case attended school while infectious and who may have been exposed to mumps at the school.

- Exclude the case from school for 5 days beyond the day of swelling onset (day of onset is counted as day 0).
- Notify the school nurse, health aide or person responsible for health issues at the school (secretary, principal, etc.) about the case and discuss possible school exposures and disease control strategies.
- Determine whether the case is with one group of classmates all day or attends multiple classes with different students.
- Determine whether the case is involved in extra-curricular school activities, such as sports teams, clubs, etc.
- Advise parents, students, and staff of the signs and symptoms of mumps, to contact their health care provider if symptoms develop, and to review their immunization records.
- The CDPHE sample letter, **Mumps Alert, Important Notice to Parents**, may be used to notify staff and parents of students. This sample letter is located on the CD Manual website.
- School staff and/or health department personnel should review the MMR immunization records of all children and staff at the facility. If unable to review records for the whole facility, review the immunization records of the students and staff in the exposed classroom(s).
- School and/or health department personnel should contact staff members and the parents of children not up to date on their MMR vaccinations and refer them to their health care provider or the local public health agency for immunization.
- School personnel should monitor students and staff at the facility for mumps symptoms.
- Exposed contacts with symptoms of mumps should be seen by a health care provider and tested for mumps as appropriate. Testing of all cases is not necessary during an outbreak.
- During a mumps outbreak consider recommending a second dose of mumps vaccine for staff members who have previously received one dose of mumps vaccine.

3. College

- If the college has a student health center, contact the student health center nurse or director to notify him/her of the case and discuss disease control measures.
- If the college does not have a student health center, contact the Student Services or Administration Office to locate a contact person for campus health-related issues and the tracking of students' immunization records.
- Determine the case's living arrangements, such as whether the case lives in a dormitory, has roommates, eats in a dining hall, uses a common bathroom, etc.
- If the case lives in a residence hall, discuss with the case, student health center staff, or college administration how to isolate the case during his/her infectious period, especially if the case's roommates are susceptible to mumps. Possible options would include the case moving off campus, such as their parent's home, or moving to a single room and having meals delivered to the room by someone immune to mumps.

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- Determine whether the college requires students to have 2 MMR vaccinations or an exemption to vaccination. Students attending Colorado colleges with residence hall facilities are required to have 2 MMR vaccinations or an exemption to vaccination if they are “traditional” (traditional as defined by each institution) college students born after 1956.
 - If the college has students’ immunization records, ask about the immunization status of the student population, such as the number with 2 mumps vaccinations, 1 mumps vaccination, exemption to vaccination, and in-process of obtaining vaccination.
 - Many college student health centers routinely offer MMR vaccine to students. Colleges may conduct a MMR vaccination clinic in response to a student or staff member with mumps.
 - Notices may be distributed in the case’s classes to educate classmates and staff about mumps symptoms, the importance of seeing a health care provider if symptoms develop, the vaccine recommendations, and who to contact for vaccination. The CDPHE sample letter, **Mumps Alert, Important Notice to Parents**, or the mumps fact sheet, **Facts about Mumps**, which are available on the Communicable Disease Manual website may be modified for this purpose.
 - Campus publications, such as newspapers, or email notifications may be used to more broadly notify the campus of a case and heighten awareness of mumps.
 - Notices may be posted in the dormitory and/or cafeteria if the case lives in a dormitory.
 - Surveillance for mumps should be enhanced. The diagnosis of mumps should be considered when students with salivary gland swelling are seen at the college student health center. Students suspected of having mumps should be tested. If the college does not have a student health center, college staff and residential hall advisors could be asked to notify the person in charge of campus health-related issues if they are aware of students with facial swelling suggestive of mumps.
- 4. Patients and Staff in Health Care Facilities (Hospitals and Long Term Care Facilities)**
- Hospitals and long term care facilities generally have written infection control policies and procedures for handling cases of communicable disease among patients and staff members. If a facility does not have such policies in place, provide the following recommendations:
- Standard and droplet precautions (respiratory isolation) are recommended for 5 days beyond the day of swelling onset (day of onset is counted as day 0) for patients or residents with mumps.
 - Isolating the case in some residential facilities may require moving the case to a private room and having meals delivered to the case’s room by someone immune to mumps if possible.
 - Identify health care workers and staff having close contact with the case while the person was infectious and not in respiratory isolation (or staff not following respiratory precautions).
 - Close contact is defined as being within 3 feet of the mumps case without the use of personal protective equipment (surgical mask).
 - Determine the immunity status of the exposed close contacts. See Section 5 (B) for a description of mumps immunity.
 - Exposed non-immune health care personnel should be excluded from work from the 12th day after the first unprotected exposure to mumps through the 26th day after the last exposure. Previously unvaccinated health care personnel who receive their first dose of

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mumps vaccine after an exposure are considered non-immune and should be excluded from work.

- Exposed health care workers with history of one dose of mumps vaccine should receive a second dose as soon as possible, but no sooner than 28 days after the first dose. These employees may continue working as long as they are asymptomatic.
- All exposed health care workers, regardless of their immune status, should be educated about mumps symptoms, including non-specific presentations, and should notify Employee Health/Occupational Health if they develop any symptoms during days 12 – 26 following their exposure.
- A diagnosis of mumps should be considered in exposed health care workers who develop non-specific symptoms such as upper respiratory infection symptoms or fever during the incubation period after unprotected exposure to mumps, even in the absence of salivary gland swelling.
- Birth prior to 1957 is only presumptive evidence of immunity. Health care facilities should consider routinely recommending 1 dose of mumps vaccine for unvaccinated workers born prior to 1957 who do not have a history of physician-diagnosed mumps or laboratory evidence of mumps immunity.
- During a mumps outbreak, health care facilities should strongly consider recommending 2 doses of mumps vaccine for unvaccinated workers born prior to 1957 without evidence of mumps immunity.

E. Environmental Measures

- No specific environmental measures are recommended.

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