

Mumps

1. DISEASE REPORTING

A. Purpose of Reporting and Surveillance

1. To assess the burden of mumps in Washington.
2. To identify cases and prevent further spread from cases by recommending appropriate preventive measures, including exclusion.
3. To educate potentially exposed individuals about signs and symptoms of disease, thereby facilitating early diagnosis and reducing the risk of further transmission.
4. To identify and vaccinate susceptible individuals.

B. Legal Reporting Requirements

1. Health care providers: notifiable to local health jurisdiction within 24 hours.
2. Health care facilities: notifiable to local health jurisdiction within 24 hours.
3. Laboratories: Mumps virus, acute, by IgM positivity or PCR positivity notifiable to local health jurisdiction within 24 hours; specimen submission is required - isolate or clinical specimen associated with positive result (2 business days).
4. Local health jurisdictions: notifiable to the Washington State Department of Health (DOH) Communicable Disease Epidemiology Section (CDES) within 7 days of case investigation completion or summary information required within 21 days.

C. Local Health Jurisdiction Investigation Responsibilities

1. Begin routine case investigation within one working day.
2. Facilitate the transport of specimens to assist with the diagnosis of cases.
3. Recommend measures to prevent further spread from the case.
4. Identify and evaluate contacts; educate and recommend measures to prevent further spread from susceptible contacts.
5. Report all confirmed and probable cases as well as suspected cases with previous exposure to mumps virus (either through vaccination or having had mumps) to Communicable Disease Epidemiology Section (see Section 3). Complete the mumps case report form (<http://www.doh.wa.gov/notify/forms/mumps.pdf>) and enter the data into the Public Health Issues and Management System (PHIMS).

2. THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Mumps is caused by a single-stranded RNA paramyxovirus.

B. Description of Illness

Prodromal symptoms are nonspecific; they include myalgias, 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, but may be apparent in only 30–40% of infected persons. Parotitis can be unilateral or bilateral; 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.

Diagnosis of mumps can easily be missed, as up to 20% of infections are asymptomatic, and an additional 40–50% may have only nonspecific or primarily respiratory symptoms, particularly among children less than 5 years old.

The most common complication is orchitis, affecting up to 50% of infected males who have reached puberty. While painful, orchitis rarely leads to infertility. Other complications are also rare, but may include encephalitis, meningitis, oophoritis, mastitis, pancreatitis, myocarditis, arthritis, and nephritis. Spontaneous abortion (miscarriage) can result if an infection occurs during pregnancy, particularly in the first trimester. However, mumps virus is not known to be teratogenic. Rarely (~1 in 20,000), mumps infection can cause deafness, which is usually sudden and permanent. Death due to mumps is rare, as are serious permanent sequelae.

Although mumps virus is the only agent known to cause epidemic parotitis, not all cases of parotitis are caused by mumps virus. Sporadic parotitis can also occur as a result of infection with other viral pathogens such as enteroviruses (including coxsackievirus), parvovirus B-19, adenoviruses, parainfluenza virus types 1 – 3 (PIV 1 – 3), influenza A and B, human herpesviruses 6 (HHV-6), Epstein-Barr virus (EBV), and bocavirus (HBoV) as well as infection with *Staphylococcus aureus* and other bacteria. Additionally, non-infectious causes of parotitis include drugs, tumors, immunologic diseases, and obstruction of the salivary duct. Current mumps diagnostics do not satisfactorily identify cases in previously vaccinated people; thus, a negative laboratory test result for mumps cannot rule out the disease. Also, testing for alternative causes of parotitis is not routinely done. Because of this, most mumps–negative cases of parotitis lasting two days or more must still be considered suspected mumps.

C. Mumps in Washington State

During 1998–2005, DOH received between 0 and 11 reports of mumps infections per year. A large outbreak of mumps originating in the Midwest in December 2005 spread to nine other states during 2006. Because of increased awareness of mumps during 2006, DOH received over 150 reports of possible mumps, and laboratory testing for mumps – polymerase chain reaction (PCR) and serologic assay – was initiated at Washington State Public Health Laboratories (PHL). In October 2006, CDC requested that a strict interpretation of the case definition be used (MMWR 2006;55(42):1152–53) which included reporting any previously immunized person with 2 or more days of parotitis as a probable case. Using these guidelines, 42 reports of confirmed and probable mumps were identified in 2006, though none were linked to the outbreak in the Midwest; 53 cases were reported

in 2007. A change in national reporting criteria was made in 2008; persons who meet the clinical case definition or have clinically compatible disease, but who lack either laboratory confirmation or epidemiologic link to a case, are now considered suspect rather than probable cases and therefore are not included in the annual case counts. In 2008 and 2009, 14 and 6 cases were reported, respectively.

D. Reservoir

Humans are the only known reservoir.

E. Modes of Transmission

Transmission occurs through respiratory droplets or through direct contact with nasopharyngeal secretions.

F. Incubation Period

The incubation period is usually 16–18 days, but can range from 12–25 days after exposure.

G. Period of 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. Therefore, CDC now recommends isolating mumps patients for 5 days following onset of symptoms (parotitis) (MMWR 2008;57 [No.40]:1103–4).

H. Treatment

Treatment is supportive.

I. Immunity

In general, immunity is considered lifelong and develops after either clinical or inapparent infections. Most adults, particularly those born before 1957, are likely to have been infected naturally and may be considered to be immune, even if they did not have recognized disease. Recent evidence suggests that persons previously exposed to the virus through either vaccination or disease may still become infected. In response to the multistate mumps outbreak in 2006, ACIP recommendations for prevention and control of mumps were updated. Evidence of immunity through documentation of vaccination is now defined as:

- 1 dose of live mumps vaccine for preschool-aged children and for adults not at high risk for exposure and infection, and
- 2 doses of live mumps vaccine for school-aged children (i.e., grades K–12) and for adults at high risk for exposure and infection (i.e., health-care workers, international travelers, and students at post-high-school education institutions)

See MMWR 2006;55(22):629–30.

3. CASE AND CONTACT DEFINITIONS**A. Case Definition (2010)**

Suspected: Clinically compatible illness characterized by: aseptic meningitis, encephalitis, hearing loss, orchitis, oophoritis, parotitis or other salivary gland swelling, mastitis or pancreatitis without laboratory testing.

OR

Acute onset of unilateral or bilateral tender, self-limited swelling of the parotid and or other salivary gland(s), lasting at least 2 days without laboratory testing,

OR

A person without clinical information but with any of the following laboratory tests suggestive of mumps:

- 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.

Probable: Acute onset of unilateral or bilateral tender, self-limited swelling of the parotid and or other salivary gland(s), lasting at least 2 days without laboratory confirmation

AND

Epidemiologically linked to a clinically compatible case.

Confirmed:

1. Acute onset of unilateral or bilateral tender, self-limited swelling of the parotid and or other salivary gland(s), lasting at least 2 days **OR**
2. Clinically compatible illness characterized by: aseptic meningitis, encephalitis, hearing loss, orchitis, oophoritis, parotitis or other salivary gland swelling, mastitis or pancreatitis **AND**

Epidemiologically linked to a confirmed case, **OR**

Has laboratory confirmation by any of the following:

- 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.

Comment

As a result of previous contact with mumps virus either through vaccination (particularly with 2 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 cannot 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.

B. Close Contacts (of a person with mumps)

Mumps spreads by direct contact with infectious respiratory secretions by droplet transmission. Such droplets generally travel 3 feet or less when an infected person talks, coughs, or sneezes. The risk of transmission of mumps is a function of multiple factors including clinical features of the source case as they relate to communicability (e.g., stage of illness, character of cough), proximity and duration of contact, ventilation, and use of appropriate infection control measures (mask, eye protection).

Consult with a Communicable Disease Epidemiology Section epidemiologist as needed on a case-by-case basis regarding determinations of close-contacts.

Examples of close contact with mumps patients include:

1. Direct face-to-face contact with a symptomatic case-patient during the contagious period. This includes household and immediate family members, boyfriends/girlfriends, and child care contacts (those who spend many hours together or sleep under the same roof).
2. An obvious exposure that involves direct contact with respiratory, oral, or nasal secretions from a case-patient during the contagious period (e.g., a cough or sneeze in the face, sharing eating utensils, sharing water bottles, kissing, mouth-to-mouth resuscitation, or performing intubation or nasotracheal suctioning without a mask).
3. Close proximity for a prolonged period of time with a case-patient during the contagious period. Risk of droplet exposure increases with longer duration and closer proximity of contact.

Examples of persons who may be at increased risk include:

- a. non-household close friends or other social contacts
- b. some passengers during shared transportation

- c. some contacts at community activities or at the place of employment
- d. some healthcare workers caring for a case without wearing a mask
- e. children attending an after-school care group or play group on the same days

Note: Close contact does not include activities such as walking by a person or briefly sitting across a waiting room or office.

4. DIAGNOSIS AND LABORATORY SERVICES

A. Diagnosis

Mumps is most commonly diagnosed by detection of mumps specific IgM antibody in serum, or by isolation of mumps virus or detection of mumps nucleic acid by PCR assay on secretions collected from the buccal mucosa.

1. Viral culture and detection of mumps nucleic acid by PCR assay: Virus is likely to be present in the saliva from 2 or 3 days before onset of parotitis until 4-5 days afterward. The yield is highest from buccal specimens collected within 3 days of onset and specimens should be collected within 3 days if possible, and not more than 5 days after onset (Mandell, Bennett, & Dolin. Principles and Practice of Infectious Diseases, Sixth Edition, Volume 2; Chapter 154 Mumps Virus, pp 2003-2008.)

Note: During the 2006 mumps outbreak at a U.S. college where most patients had been vaccinated with 2 doses of measles, mumps, and rubella (MMR) vaccine, a study aimed at viral identification using reverse transcription--polymerase chain reaction from buccal specimens from patients with parotitis found that, among 20 patients tested ≤ 3 days after onset of parotitis, mumps viral RNA was detected in seven (35%) whereas in a total of 26 specimens from 14 patients tested from 4--22 days after onset of parotitis all were negative for mumps viral RNA. (MMWR 2008;57 [No.40]:1103-4)

Although very specific, viral culture and detection of mumps nucleic acid by PCR are not highly sensitive tests. Therefore a negative culture and/or PCR assay cannot rule out the diagnosis of mumps.

2. Serologic testing: A serum sample for both IgM and IgG should be collected at the first clinical encounter, if possible. In unvaccinated cases, IgM is present by day 5 post onset of symptoms. Therefore, among **unvaccinated** persons, if an acute IgM is collected less than 5 days after onset of parotitis and the IgM is negative, mumps cannot be ruled out and a second serum sample collected at least 5 days after onset is recommended. IgM peaks at about 1 week and can be present for at least 6 weeks.

Recent evidence suggests that persons previously exposed to the virus through either vaccination or disease may still become infected. Elevation of mumps IgM may be transient or absent in these individuals. Experience suggests that IgM assays from persons with acute infection may be negative in up to 50% of previously immunized individuals (i.e., a negative IgM does not rule out infection in a vaccinated person) (MMWR 2006;55(42):1152-3). In contrast, IgG levels in

previously vaccinated individuals may rise rapidly after exposure or infection. By the time an “acute” sample is collected, IgG levels may already be quite high, precluding the possibility of detecting a 4-fold rise in a convalescent specimen.

For additional information regarding laboratory testing for mumps infection, see: <http://www.cdc.gov/mumps/lab/index.html>.

B. Tests Available at the Washington State Department of Health Public Health Laboratories (PHL)

PHL will perform viral cultures and real time PCR for mumps virus on buccal swabs from persons suspected to have mumps (urine testing is no longer recommended). Ideally, buccal swabs should be collected within 3 days of onset of parotitis, and are not useful if collected 5 or more days after parotitis begins.

Healthcare providers can be encouraged to send serum to commercial laboratories for both mumps specific IgM and IgG testing. There is a problem with false positive IgM results with any of the commercially available tests for mumps specific IgM. If a positive IgM is reported by a commercial laboratory, the local jurisdiction should make arrangements for the specimen to be sent to PHL for additional testing. PHL currently has a mumps EIA serology test and is also working closely with CDC to assure accurate results for each suspect mumps case.

All requests for mumps testing sent to PHL must have approval from the local health jurisdiction, which will get approval from an epidemiologist in Communicable Disease Epidemiology Section (CDES) at 877-539-4344 or 206-418-5500.

Note that PHL requires all clinical specimens have two patient identifiers, a name **and** a second identifier (e.g., date of birth) both on the specimen label and on the submission form. Due to laboratory accreditation standards, specimens will be rejected for testing if not properly identified. Also include specimen source and collection date.

C. Specimen Collection (including Enhanced Testing for Alternative Etiologies)[§]

Following receipt of approval from CDES and the local health jurisdiction, healthcare providers should be encouraged to collect the following four specimens within 3 days of parotitis onset and send to PHL:

1. Buccal swab specimens (2) for culture and PCR: Massage the parotid gland for about 30 seconds prior to collecting specimen. Simultaneously place two Dacron® swabs* between rear molars and cheek (both on the affected side if parotitis is unilateral) and leave in place 10–15 seconds. Place both swabs in a tube containing 2-3 ml of cold viral transport medium (VTM.)**
2. Oropharyngeal (OP) swab specimen for PCR: Use a single Dacron® swab* to collect secretions from the posterior pharynx and tonsillar areas, avoiding the tongue. Place swab in a tube containing 2-3 ml of cold viral transport medium (VTM.)**

3. Serum specimen: Collect blood in a red-gray top (SST) or red top tube, at least 4 ml blood, or send at least 2 ml serum. The serum should be kept cold after collection and during shipment. The test request form should include the date of symptom onset, since this information is essential for interpretation of serologic results.

*For swab specimen collection, synthetic swabs are preferred over cotton swabs as the latter may contain substances that are inhibitory to enzymes used in RT-PCR.

** Cell culture medium (MEM or Hanks Balanced Salt Solution) or other sterile isotonic solution (phosphate buffered saline) may also be used to stabilize the virus. Ensure that the cap is securely tight and will not leak. Keep cold after collection and during shipment.

§Enhanced Testing for Alternative Etiologies:

DOH will send one buccal swab and the oropharyngeal swab from cases of parotitis not confirmed as being due to mumps infection (which currently remain classified as suspected mumps cases) to CDC for additional testing to determine if the parotitis was due to one of the following viral pathogens: enteroviruses, parvovirus B-19, adenoviruses, parainfluenza 1-3, influenza A & B, human herpesviruses 6, Epstein-Barr virus, or bocavirus.

D. Specimen Shipping

All specimens must be accompanied by a PHL “Virus Examination” lab form, with patient name, additional identifier such as date of birth (which must also be on specimen), submitter name, date of collection, date of onset of symptoms, and symptoms. The PHL lab form may be obtained online at <http://www.doh.wa.gov/EHSPHL/PHL/Forms/SerVirHIV.pdf>.

Ship the specimen(s) so that they are kept appropriately cool (not frozen) for the type of delivery (regular or overnight) selected.

5. ROUTINE CASE INVESTIGATION

Interview the case and others who might be able to provide pertinent information.

A. Evaluate the Diagnosis

Review the clinical presentation and laboratory test results. Since parotitis can be caused by many other conditions, facilitate the transport of specimens to Public Health Laboratories to confirm the diagnosis as needed. Proceed with a public health investigation for all *probable* and *confirmed* cases as well as for *suspected* cases with previous exposure to mumps virus – either through vaccination or having had mumps. (see Section 3).

B. Identify Source of Infection

Attempt to determine if a suspected case was in contact with a known case or had recently traveled to an area where mumps transmission is being reported.

C. Identify Exposed, Susceptible Close Contacts

Identify persons who had close contact (see Section 3C) with the case during the communicable period (3 days prior to and 5 days after the onset of parotitis).

Determine whether contacts can be considered immune or should be considered susceptible to mumps infection. Acceptable presumptive evidence of immunity to mumps includes one of the following:

- Documentation of adequate vaccination*,
- Laboratory evidence of immunity,
- Birth before 1957, or
- Documentation of physician-diagnosed mumps.

*Evidence of immunity through documentation of adequate vaccination is now defined as 1 dose of a live mumps virus vaccine for preschool-aged children and adults not at high risk and 2 doses 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) (MMWR 2006;55(22):629–30).

Documentation of immunization is preferable, but serologic testing for IgG can be performed in exposed contacts who do not have proof of immunity.

The following are considered evidence of immunity for healthcare workers:

In non-outbreak settings:

- Documented physician-diagnosed mumps,
- Serologic evidence of immunity, or
- Documented receipt of 1 dose of mumps if born before 1957, or 2 doses of mumps vaccine if born during or after 1957.

During an outbreak, more stringent requirements for evidence of immunity should be used:

- Documented physician-diagnosed mumps,
- Serologic evidence of immunity, or
- Documented receipt of 2 doses of mumps vaccine regardless of birth year.

D. Environmental Evaluation

None

6. CONTROLLING FURTHER SPREAD

A. Infection Control Recommendations

1. Hospitalized patients should be cared for using droplet precautions for 5 days after the onset of parotitis. (MMWR 2008;57 [No.40]:1103–4).

Note: Available data published in this MMWR has shown that the proportion of samples from persons positive for mumps virus decreased from 81% 1 day after parotitis onset to 49% 2-3 days after onset, 40% 4-5 days after onset, and 17% 6-7 days after onset of parotitis.

2. Cases should stay home and not go to school, work, public places or social activities for 5 days after the onset of parotitis. Family members who are not immune should avoid contact during the time the case is infectious. Healthcare workers with mumps illness should be excluded from work until 5 days after the onset of parotitis.
3. Cases should be taught “respiratory etiquette” (see section 8B).

B. Case Management

No further public health actions are required after the above infection control measures have been implemented.

C. Contact Management

1. Symptomatic Contacts

All close contacts with symptoms compatible with mumps should be referred to a healthcare provider for assessment and laboratory testing; the healthcare provider should be made aware of the specific reason for referral.

2. Exclusion

All symptomatic close contacts should be excluded from school, workplace and child care until they have been evaluated for possible mumps. Susceptible asymptomatic contacts other than health care workers should be excluded from school, workplace, and child care from the 12th day after the first exposure through 25 days after the last exposure.

Note: The following information may be of use when considering exclusion of exposed susceptible persons:

Although mumps virus was isolated successfully from 7 days before to 8 days after onset of parotitis, isolation rates were much greater closer to parotitis onset. For seven of the eight studies with available data on isolation of mumps virus by day relative to onset of parotitis, combined data showed that the proportion of samples positive for mumps virus increased from 17% 6-7 days before onset of parotitis to 40% 2-3 days before onset, 86% 1 day before onset, and 78% on the day of parotitis onset. (MMWR 2008;57 [No.40]:1103–4)

Schools:

In the setting of a mumps outbreak in a school, pupils who are exempted from immunization for any reason should be excluded through 25 days after the last known exposure. Excluded students who choose to be vaccinated can be readmitted immediately after immunization.

Healthcare workers exposed to a person with mumps:

Exposed healthcare personnel who do not have acceptable evidence of immunity should be excluded from the 9th day after the first unprotected exposure to mumps through 25 days after the last exposure. The mumps vaccine cannot be used to prevent the development of mumps after exposure. Hence, previously unvaccinated healthcare personnel who receive a first dose of vaccine after an

exposure are considered non-immune and must be excluded as described above. *Note:* The duration of exclusion from healthcare settings is longer than that in other settings.

Exposed healthcare personnel who had been previously vaccinated for mumps, but received only one dose of mumps vaccine may continue working following an unprotected exposure to mumps. Such workers should receive a second dose as soon as possible, but no sooner than 28 days after the first. They should be educated about symptoms of mumps, including non-specific presentations, and should notify occupational health if they develop these symptoms.

Exposed healthcare personnel who are immune do not need to be excluded from work following an unprotected exposure. However, because 1 dose of MMR vaccine is about 80% effective in preventing mumps and 2 doses are about 90% effective, some vaccinated personnel may remain at risk for infection. Therefore, healthcare workers should be educated about symptoms of mumps, including non-specific presentations, and should stay away from the work environment and notify occupational health if they develop these symptoms.

3. Immunization

Mumps vaccine has not been shown to be effective in preventing disease after exposure. However, vaccination of susceptible contacts will protect against disease from future exposures. If susceptible contacts are vaccinated after exposure, the exclusions mentioned above still apply. Individuals who have had documented mumps disease do not need to receive the mumps vaccine. Immune globulin (Ig) and mumps immune globulin are not recommended after exposure.

Preschool children (ages 1–4 years) and adults not at high risk should receive 1 dose of mumps vaccine in the form of MMR (measles, mumps, rubella) vaccine; for children in grades K–12 and adults at high risk (i.e., persons who work in healthcare facilities, international travelers, and students in post-high school educational institutions), 2 doses of MMR are recommended.

In outbreak situations, a second dose of mumps vaccine should be considered for children aged 1–4 years and adults at low risk who have received 1 dose depending on the epidemiology of the outbreak (e.g., the age groups and/or institutions involved) (MMWR 2006;55(22):629–30). The second dose can be administered no sooner than 28 days after the first dose. See section 8A for contraindications to vaccination.

4. Education

All close contacts regardless of immunity status should be educated on the signs/symptoms of mumps and told to watch for these signs/symptoms from the 12th day after the first exposure through 25 days after the last exposure. If symptoms develop in these contacts, they should have an understanding that respiratory etiquette (see Section 8B) must be followed and medical care should be sought promptly; remember, providers must be made aware of the mumps exposure in order to appropriately evaluate the patient for mumps and limit risk to others in the office.

D. Environmental Measures

None

7. MANAGING SPECIAL SITUATIONS

A. Mumps in Healthcare Settings

For additional information regarding Prevention and Control of Mumps in Healthcare Settings, see: <http://www.cdc.gov/mumps/prev-control-settings/index.html>.

8. ROUTINE PREVENTION

A. Immunization Recommendations

A live attenuated mumps virus vaccine (Jeryl Lynn strain) was introduced in the United States in 1967 and is available either as a single vaccine or in combination with rubella and measles live virus vaccines (MMR). Routine immunization with MMR is recommended during childhood; the first dose of MMR is recommended at 12–15 months of age with a second dose recommended at 4–6 years. Two doses of MMR vaccine are also recommended for students attending college and other post-high school institutions. Although about 95% of susceptible persons develop antibodies after a single dose of vaccine, only about 80% can be considered protected. After two doses of vaccine, 90% of persons are considered protected.

Mumps vaccine is also available as a combined mumps, measles, rubella and varicella vaccine (MMRV) (CDC.: Use of Combination Measles, Mumps, Rubella, and Varicella Vaccine. May 7, 2010 / 59(RR03);1-12. Accessed July 30, 2010 at:

http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5903a1.htm?s_cid=rr5903a1_e

Contraindications to vaccine include a severe allergic reaction (e.g., anaphylactic allergy) to neomycin, gelatin or a previous dose of MMR vaccine; pregnancy; and immunodeficiency or immunosuppression. Persons with moderate or severe acute illness should not be vaccinated until the illness has resolved. Receipt of antibody-containing blood products (e.g., immune globulin, whole blood, or packed red blood cells) may interfere with seroconversion following mumps vaccination. Vaccine should be given 2 weeks before, or deferred for at least 3 months following, administration of an antibody-containing blood product.

For more information about MMR vaccine schedules, adverse reactions and contraindications, please see the most recent Red Book.

B. Prevention Recommendations

In addition to immunization, persons should practice “respiratory etiquette” or good health manners to stop the spread of respiratory pathogens.

Persons can keep respiratory pathogens to themselves by:

- Covering the nose and mouth with a tissue when sneezing, coughing or blowing the nose.

- Throwing out used tissues in the trash as soon as possible.
- Always washing hands after sneezing, blowing the nose, or coughing, or after touching used tissues or handkerchiefs.
- Washing hands often when sick.
- Using warm water and soap or alcohol-based hand sanitizers to wash hands.
- Staying home if coughing and febrile.
- Seeing a doctor as soon as possible if coughing and febrile, and following their instructions, including taking medicine as prescribed and getting lots of rest.
- If requested, using face masks provided in doctors' offices or clinic waiting rooms.

Persons can keep pathogens away by:

- Washing hands before eating, or touching eyes, nose or mouth.
- Washing hands after touching anyone else who is sneezing, coughing, blowing their nose, or whose nose is running.
- Not sharing things like cigarettes, towels, lipstick, toys, or anything else that might be contaminated with respiratory germs.
- Not sharing food, utensils or beverage containers with others.

ACKNOWLEDGEMENTS

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UPDATES**December 2007 Revisions**

Section 3B: Revisions were made to the examples of close contact.

March 2008 Revisions

Section 3A: The case definition was updated.

October 2008 Revisions

Section 2G: A reference was added for the period of communicability.

Section 4A: Information was added regarding laboratory testing.

Section 6A: The recommendation for the duration of isolation for persons with mumps in health care settings was updated (MMWR 2008;57 [No.40]:1103–4).

Section 6C: The recommendation for the duration of exclusion for exposed, non-immune health care providers was updated (MMWR 2008;57 [No.40]:1103–4).

July 2010 Revisions

Section 4D: Information was added to describe the state's new enhanced surveillance for alternative parotitis etiology testing in collaboration with CDC.

An oropharyngeal swab and an additional buccal swab are now requested as additional specimens to be collected and forwarded to PHL.

- Updated information in the laboratory section about optimal timing of buccal specimen collection.
- Add information related to MMRV in the immunization section.
- Update the start of the exclusion from work period for health care workers exposed to person with mumps from the 12th day after first unprotected exposure to the 9th day after first unprotected exposure. (There is no change in the exclusion through 25 days following the last exposure.)

October 2010 Revision

Information about enhanced surveillance for alternative etiology testing was temporarily removed pending a determination of exempt status by the Washington State Institutional Review Board (WSIRB.)

January 2011:

The Legal Reporting Requirements section has been revised to reflect the 2011 Notifiable Conditions Rule revision.

Section 6C2: A note added to clarify the period of communicability for the purpose of outbreak control and management of exposed susceptible persons.

Section 4D: Information about enhanced surveillance for alternative etiology of sporadic parotitis reinserted following a determination of exempt status by WSIRB.