

# MUMPS

**Also known as: Infectious Parotitis**

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## **Responsibilities:**

**Hospital:** Report by facsimile, phone or mail

**Lab:** Report by facsimile, phone or mail

**Physician:** Report by facsimile, phone or mail

**Local Public Health Agency: Report by facsimile, phone or mail.**

**Iowa Department of Public Health**

**Disease Reporting Hotline: (800) 362-2736**

**Secure Fax: (515) 281-5698**

## **1) THE DISEASE AND ITS EPIDEMIOLOGY**

### **A. Etiologic Agent**

Mumps is caused by the mumps virus (genus *Paramyxovirus*, family *Paramyxoviridae*).

### **B. Clinical Description**

Mumps is a systemic disease characterized by swelling of the salivary glands, which usually lasts several days. However, about one-third of infections do not cause clinically apparent salivary gland swelling. Respiratory symptoms are common. Encephalitis occurs rarely, and permanent sequelae or death is uncommon. Infection in adulthood is likely to produce a more severe disease, including mastitis, which occurs in up to 31% of females aged > 15 years, and orchitis, which occurs in 20% – 30% of post-pubertal males. Other rare complications include arthritis, renal involvement, myocarditis, cerebellar ataxia, pancreatitis, and hearing impairment. Mumps infection during the first trimester of pregnancy can increase the risk of spontaneous abortion, although no evidence exists that it causes congenital malformations. While death due to mumps is rare, more than half the fatalities occur in those  $\geq$  19 years of age.

Mumps should not be ruled out in someone who is vaccinated if he or she has clinically consistent symptoms.

*Note:* Swelling of the salivary glands can also be caused by infection with cytomegalovirus, parainfluenza virus types 1 and 3, influenza A, Coxsackie A, echovirus, lymphocytic choriomeningitis virus, HIV, and non-infectious causes such as drugs, tumors, immunologic diseases, and obstruction of the salivary duct.

### **C. Reservoirs**

Humans are the only known reservoirs.

### **D. Modes of Transmission**

Mumps is transmitted by droplet or direct contact with nasopharyngeal secretions of an infected person, and by the airborne route.

### **E. Incubation Period**

The incubation period is usually 16 – 18 days, with a range of 14 – 25 days.

### **F. Period of Communicability or Infectious Period**

From 3 days prior to onset of symptoms to 4 days after (This includes the first day of symptoms as day zero; totaling 5 days after the onset of symptoms as the period of communicability.)

**Note:** The 3 days prior to onset of symptoms and 4 days after (counting the day of onset as day zero) will be utilized for public health follow-up when dealing with a highly vaccinated population.

The previous recommendation of 9 days of potential transmission after the onset of symptoms, has been revised in accordance with the new *Epidemiology and Prevention of Vaccine-Preventable Diseases* ("Pink Book" 9<sup>th</sup> Edition, January 2006) from the Centers for Disease Control and Prevention, and has been endorsed by the Infectious Disease Advisory Committee<sup>†</sup>.

To determine the appropriate period of communicability, we evaluated several sources and assessed the recommendations used in other states that have experienced recent mumps activity. Research shows that the virus may be isolated up to 9 days after the onset of symptoms, which is the foundation for several current national guidelines on period of potential communicability. However, studies looking at actual period of communicability suggest that the virus only transmits to others 3 days prior to and 4 days after the day of onset of symptoms. We acknowledge that this new recommendation differs from what is stated in the *Control of Communicable Diseases Manual* (18<sup>th</sup> Edition, by the American Public Health Association) and the *Red Book Report of the Committee on Infectious Diseases* (2003, by the American Academy of Pediatrics).

## G. Epidemiology

Mumps occurs worldwide. In the United States, it is endemic year-round, historically peaking in winter and spring; however seasonality no longer is evident, due to widespread immunization. Eighty-five percent of adults have serologic evidence of immunity. About one-third of the infections do not cause apparent parotitis but those infected can still transmit disease; most infections in children < 2 years of age are subclinical. The incidence of mumps in the U.S. has declined since the vaccine came into use in 1967. In 1986 and 1987, there was a relative resurgence of mumps, apparently due to the absence of comprehensive state immunization requirements as well as, in some instances, vaccine failure. The number of mumps cases reported in the U.S. has declined steadily since 1989, thanks in large part to the two-dose MMR vaccination policy. However, outbreaks in highly vaccinated populations still occur, probably due to vaccine mismanagement or vaccine failure. Iowa has had an average of 7 cases reported per year over the past 10 years.

## H. Bioterrorism Potential

None

## 2) REPORTING CRITERIA AND LABORATORY TESTING SERVICES

Iowa Administrative Code 641-1.3(139) stipulates that the laboratory and the healthcare provider report. The reporting number for IDPH Center for Acute Disease Epidemiology (CADE) is (800) 362-2736; fax number (515) 281-5698, mailing address:

IDPH, CADE  
Lucas State Office Building, 5<sup>th</sup> Floor  
321 E. 12<sup>th</sup> St.  
Des Moines, IA 50319-0075

Postage-paid disease-reporting forms are available free of charge from the clearinghouse. Call (888) 398-9696 to request a supply.

## A. What to Report to the Iowa Department of Public Health

- A suspect or confirmed case of mumps, as diagnosed by a healthcare professional, or
- Isolation of mumps virus from clinical specimen, or
- Significant rise between acute and convalescent phase titers in serum mumps IgG antibody level by any standard serologic assay, or
- Positive serologic test for mumps IgM antibody.

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<sup>†</sup> IDAC is the infectious disease advisory committee to CADE at the Iowa Department of Public Health

## B. Laboratory Testing Services Available

- Laboratory tests should be conducted on anyone with symptoms compatible with mumps without other apparent cause, regardless of vaccination history.
- All specimens described below should be obtained for all patients with suspected mumps.

**1) Isolation of the Mumps Virus:** Specimens should be submitted with a completed UHL "Non-Respiratory Disease" Test Request Form. Test request forms and specimen collection and shipment instructions can be found at UHL web site at <http://www.uhl.uiowa.edu/kitsquotesforms/>.

- a) *Parotid gland duct swab for viral culture (in M4 viral transport medium) may be collected from date of onset of symptoms to 9 days after onset of symptoms.* Massage the parotid (salivary) glands for 30 seconds prior to swabbing the buccal cavity (the space near the upper rear molars between the cheek and the teeth). **Place swab into M4 Viral Transport Medium and do not remove swab. Specimen must be stored and shipped cold (on ice packs).** Laboratories have M4 transport tubes available in the UHL Biodefense kits (blue box), herpes kits, and virus isolation kits.

**AND**

- b) *Urine clean catch* collected up to 9 days post symptom onset, in a screw-cap, sterile container. Store and ship cold.

**2) Serologic Testing:** collect 7-10 ml blood in a red top or serum separator tube (SST) with a completed UHL Serology Test Request form and ship either **a)** with culture specimens cold (on ice packs) or, **b)** at ambient temperature. Test request forms and instructions for collection and shipment of specimens can be found at the UHL web site at <http://www.uhl.uiowa.edu/kitsquotesforms>.

- a) *Acute serum-* should be collected within 5 days after symptom onset  
b) *Convalescent serum-* should be collected within 2-5 weeks after the symptom onset

Both the acute and convalescent sera are needed to diagnose a case of mumps.

**NOTE:** Though the parotid gland swab is preferred, serology may still be used to diagnose mumps as long as the acute serum is drawn within the first 4-5 days after the onset of symptoms. Both the acute and convalescent sera are needed to confirm the diagnosis of mumps.

**Contact UHL at (319) 335-4500 to request test kits,** specimen collection instructions, test request forms, and shipping instructions or visit [www.uhl.uiowa.edu](http://www.uhl.uiowa.edu).

## 3) DISEASE REPORTING AND CASE INVESTIGATION

### Clinical case definition

An illness with acute onset of unilateral or bilateral tender, self-limited swelling of the parotid or other salivary gland, lasting  $\geq 2$  days, and without other apparent cause.

### Laboratory criteria for diagnosis

- Isolation of mumps virus from clinical specimen, or
- Significant rise between acute and convalescent phase titers in serum mumps immunoglobulin G (IgG) antibody level by any standard serologic assay, or
- Positive serologic test for mumps immunoglobulin M (IgM) antibody.

### Case classification for public health follow-up\*

*Probable:* A case that meets the clinical case definition, has noncontributory or no serologic or virologic testing, and is not epidemiologically linked to a confirmed or probable case.

*Confirmed:* A case that meets the clinical case definition and that is laboratory-confirmed or epidemiologically linked. A confirmed case may also be asymptomatic with a positive laboratory mumps viral culture.

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\*Public health control measures should be performed for all confirmed cases. Public health follow-up may be needed to determine the clinical symptoms. This case classification is for the purposes of public health investigation only. This may not be the classification used to determine whether or not a case will be reported to CDC.

### A. Purpose of Surveillance and Reporting

- To identify cases and susceptible exposed people rapidly and to prevent further spread of the disease.
- To confirm mumps infection as the cause of glandular swelling/pain.
- To distinguish between failure to vaccinate and vaccine failure and development of a plan to address the problems.

### B. Initial Questions to Ask Healthcare Provider and Patient

To assess the likelihood that a suspect case is a true case prior to laboratory testing, LPHA and/or other public health staff helping in the investigation should ask about: 1) symptoms, 2) mumps immunization history, 3) recent history of dental work, 4) recent history of travel (to where and dates), 5) whether there were any recent out-of-town visitors (from where and dates), and 6) whether there was any recent contact with anyone with similar symptoms.

## 4) CONTROLLING FURTHER SPREAD

This section provides detailed control guidelines that are an integral part of case investigation.

### A. Isolation

#### Minimum Period of Isolation of Patient

From day of onset of symptoms to 4 days after (This includes the first day of symptoms as day zero; totaling 5 days after the onset of symptoms as the period of communicability.)

### B. Protection of Contacts of a Case (includes outbreak situations)

Identify and immunize susceptible people within the same community. Susceptible persons are defined as those who have not had two MMRs. **Note:** *mumps (MMR) vaccination will not prevent infection in a person who has been recently exposed, but vaccinating may prevent future outbreaks.*

- **Case:** Exclude through 5 days after onset of symptoms (counting the day of symptom onset as day zero). The suspect case may return to normal activities on the 6th day or once symptoms have resolved, whichever is later.
  - **Contacts:** All contacts should be evaluated for vaccination status. If a person does not have 2 doses, refer for vaccination. If person has a contraindication or refuses vaccination, educate on personal protective measures and symptoms of mumps. Contacts may continue normal activities in the absence of symptoms. **Note:** *mumps (MMR) vaccination will not prevent infection in a person who has been recently exposed, but vaccinating may prevent future outbreaks.*
1. Conduct active surveillance for mumps for **2 incubation periods (50 days)** after onset of the last case.
  2. Mumps vaccine, preferably the MMR should be administered to all susceptible persons. As with any vaccine, there will be some individuals who will not gain immunity after the receipt of the mumps vaccine. Because effectiveness is not 100%, a second dose of mumps-containing vaccine is recommended for individuals who have previously received only one dose. Furthermore, birth before 1957 does not guarantee mumps immunity, thus mumps vaccine should be considered for those born before 1957, especially in outbreak situations.

### C. Managing Mumps in Healthcare Settings

1. Proof of immunity: Birth in the U.S. before 1957 does not guarantee mumps immunity. Therefore, all healthcare workers should have documentation of at least one dose, preferably two doses, of mumps-containing vaccine on or after the first birthday or serologic proof of immunity. An effective routine MMR vaccination program for healthcare workers (in addition to standard precautions) is the best approach to prevent nosocomial transmission.
2. Isolation of **patients:**
  - Patients should be placed on droplet precautions for the duration of their hospitalization. Unusual circumstances may need consultation with the Iowa Department of Public Health.

## Guide to Surveillance and Reporting

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- Exposed susceptible patients should be placed on droplet precautions from the 12<sup>th</sup> day after the earliest exposure through the 26<sup>th</sup> day after the last exposure. They may be taken off precautions on the 27<sup>th</sup> day.
3. Exclusion of **staff**:
- Personnel who become sick should be excluded from work at least 5 days after the onset of symptoms (counting the day of symptom onset as day zero) or until symptoms resolve, whichever is later. These staff should be excluded from high-risk (i.e. patient's requiring a protective environment such as cancer unit, burn unit, bone marrow recipients, special-care nursery) patient contact at least 9 days after the onset of symptoms (counting the day of symptom onset as day zero) or until symptoms resolve, whichever is later.
  - Personnel who have been exposed to a mumps case and are susceptible (have no serological evidence of immunity) should be vaccinated and should remain home from the 12<sup>th</sup> day after the 1<sup>st</sup> exposure through the 26<sup>th</sup> day after their last exposure. Consult with IDPH for special situations.
- Note:** All new staff should be assessed for mumps immunity.
4. Surveillance: Conduct active surveillance for mumps for 2 incubation periods (50 days) after onset of the last case.

### E. Preventive Measures

#### Personal Preventive Measures/Education

Vaccination with MMR of all susceptibles is the best preventive measure against mumps.

Susceptibles are defined as anyone who has not had 2 doses of MMR. Good personal hygiene (which consists of proper hand hygiene, disposal of used tissues, not sharing eating utensils, etc.) is also important. For more information on the measles, mumps and rubella vaccine, see the ACIP vaccine information statement.

## References

- American Academy of Pediatrics. *Red Book 2003: Report of the Committee on Infectious Diseases, 26<sup>th</sup> Edition*. Illinois, American Academy of Pediatrics, 2003.
- CDC. Case Definitions for Infectious Conditions Under Public Health Surveillance. *MMWR*. 1997, 46:RR-10.
- CDC. Immunization of Healthcare Workers. Recommendations of the Advisory Committee on Immunization Practices (ACIP) and the Hospital Infection Control Practices Advisory Committee (HICPAC). *MMWR*. 1997, 46:RR-18.
- CDC. *Manual for the Surveillance of Vaccine-Preventable Diseases*, CDC, 2002.
- CDC. Measles, Mumps, and Rubella—Vaccine Use and Strategies for Elimination of Measles, Rubella, and Congenital Rubella Syndrome and Control of Mumps. Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR*. 1998, 47:RR-8.
- Chin, J., ed. *Control of Communicable Diseases Manual, 18<sup>th</sup> Edition*. Washington, DC, American Public Health Association, 2004.
- CSTE 1999 Annual Meeting. Position Statement #ID-9.
- CDC. *Epidemiology and Prevention of Vaccine-Preventable Diseases*. Ninth Edition. January 2006.

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**FACT SHEET**

**MUMPS**  
**(Infectious parotitis)**

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**What is mumps?**

It is an infection caused by the mumps virus.

**How is mumps spread?**

Mumps is spread by airborne transmission with mucus or droplets from the nose or throat of an infected person, usually when a person coughs or sneezes.

**Who gets mumps?**

Anyone, but it is more common in infants, children and young adults. Of people who are not immunized, >85% will have mumps by adulthood, but symptoms may have been mild and therefore not recognized.

**What are the symptoms of mumps?**

The most common symptoms are fever, headache, and swollen salivary glands under the jaw. The disease can lead to hearing loss, aseptic meningitis (infection of the covering of the brain and spinal cord) and, in 20% to 30% of males who have reached puberty, the disease can cause painful, swollen testicles.

**How soon do symptoms appear?**

They may appear 12 - 25 days after infection, but usually within 18 days.

**How long is an infected person able to spread the disease?**

From 3 days prior to the onset of symptoms to 4 days after.

**Can infection with mumps occur more than once?**

No.

**What is the treatment for mumps?**

There is no specific treatment. Supportive care should be given as indicated.

**Is there a vaccine to prevent mumps?**

Yes. Two doses of mumps-containing vaccine, given as combination MMR vaccine, separated by at least 4 weeks, are routinely recommended for all children. The first dose is given on or after the first birthday; the second is given at 4 - 6 years of age. MMR is a live, attenuated vaccine. Pregnant women and persons with immunodeficiency or immunosuppression should not receive live attenuated vaccines.

**What can be done to stop the spread of mumps?**

Anyone with mumps should not go back to child care, school or work until 5 days after symptoms began or until they are well whichever is longer. Contacts to a mumps case should have their immunization status evaluated. Anyone who has not received 2 doses of a mumps-containing vaccine (preferably MMR vaccine) should be vaccinated. Persons who may have been exposed should be educated on the signs and symptoms of mumps disease and should seek medical attention as soon as any of these symptoms begin.

**Iowa Department of Public Health**

**Confidential**

**Iowa Department of Public Health  
Center for Acute Disease Epidemiology  
Mumps Case Report**

**Agency Information**

Name of person completing report	
Phone number (    )    -	Date form completed    /    /
Agency	
Agency Address	

**Client Information**

Last name		First name	
Address		City	
County	Zip code	Phone (    )    -	
Date of Birth    /    /	Age	Occupation	
Race: (circle)    White    Black    American Indian/ Alaskan Native		Asian    Pacific Islander    Not specified	
Country of Birth			
Hispanic ethnicity: (circle)    Yes    No    Unknown		Sex: (circle)    Male    Female	
Date of Symptom Onset    /    /			
Physician name		Physician phone (    )    -	
Facility or clinic name		City	State
Outcome: (circle)    Survived    Died (date)    /    /		Unknown	
Hospitalized? (circle)    Yes    No			
Hospital name _____ City _____			

**Clinical Data**

Swelling of parotid gland		Yes	No	Unknown
Swelling of sublingual or submaxillary glands		Yes	No	Unknown
If yes, give date of onset of parotid swelling    /    /		Duration of parotitis _____ days		
Other symptoms documented – describe				

**Complications**

Aseptic meningitis	Yes	No	Deafness	Yes	No
Orchitis present	Yes	No	Encephalitis	Yes	No
Outcome (circle)	Survived	Died	Date of Death	/	/

**Laboratory**

Laboratory testing for Mumps				
Salivary gland Culture	Date collected	/	/	Results
Urine for virus isolation	Date collected	/	/	Results
Serology IgM	Date drawn	/	/	Results
Serology IgG Acute	Date drawn	/	/	Results
Serology IgG Convalescent	Date drawn	/	/	Results

Client Name \_\_\_\_\_

<b>Vaccine History</b>		
# of Doses of Mumps vaccine or Mumps containing vaccine received in lifetime _____		
<b>Vaccination Dates</b>	<b>Vaccine Lot Number</b>	<b>Vaccine Manufacturer</b>
<b>If not vaccinated reason:</b>		
<b>Epidemiological Information</b>		
Source of Exposure _____		

Notes:

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Questions about filling out this form? Contact the Center for Acute Disease Epidemiology- 515-281-6493 or 800-362-2736.

**Return completed form to: Iowa Department of Public Health, Center for Acute Disease Epidemiology,  
Surveillance Officer, Lucas State Office Building, 321 E. 12<sup>th</sup> St., Des Moines, IA 50319-0075,  
fax 515.281.5698**