

## MUMPS

### REPORTING INFORMATION

- **Class B:** Report by the end of the next business day after the case or suspected case presents and/or a positive laboratory result to the local public health department where the patient resides. If patient residence is unknown, report to the local public health department in which the reporting health care provider or laboratory is located.
- Reporting Form(s) and/or Mechanism: [Ohio Confidential Reportable Disease form](#) (HEA 3334), [Positive Laboratory Findings for Reportable Disease form](#) (HEA 3333, rev. 8/05), the local health department via the Ohio Disease Reporting System (ODRS), or telephone.
- [CDC Mumps Surveillance Worksheet](#) is available for use to assist in local health department disease investigation and contact tracing activities. Information collected from the form should be entered into the Ohio Disease Reporting System (ODRS) and not sent to the Ohio Department of Health (ODH), unless otherwise requested.

### AGENT

Mumps virus, a member of the genus paramyxovirus.

### CASE DEFINITION

#### Clinical Case Definition

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

#### Clinically Compatible Illness

Infection with mumps virus may present as aseptic meningitis, encephalitis, hearing loss, orchitis, oophoritis, acute parotitis or other salivary gland swelling lasting  $\geq 2$  days, mastitis or pancreatitis.

#### Laboratory Criteria for Diagnosis

- Isolation of mumps virus from clinical specimen *or*
- Detection of mumps virus with reverse transcription polymerase chain reaction (RT-PCR) *or*
- Positive serologic test for mumps immunoglobulin M (IgM) antibody.

#### Case Classification

Suspect: A case with parotitis, acute salivary gland swelling, orchitis, or oophoritis without other apparent cause *or* a case with laboratory tests suggestive of mumps without clinical information (with or without epidemiological linkage to a confirmed or probable case).

Probable: A case that meets the clinical case definition and is laboratory confirmed by a positive M (IgM) antibody test or epidemiologically linked to a confirmed or probable case or group/community defined by public health during an outbreak of mumps.

Confirmed: A case with clinically compatible illness and is either laboratory confirmed by RT-PCR or culture.

Not a Case: This status will not generally be used when reporting a case, but may be used to reclassify a report if investigation revealed that it was not a case.

#### Comments

A case is outbreak related if 3 or more cases of mumps are clustered in time and place. Active surveillance should be maintained for at least two incubation periods (50 days) following parotitis onset in the last case. Two incubation periods allow for the identification of transmission from subclinical infections or unrecognized cases.

### **Case Classification for Mumps Import Status**

*Internationally imported case:* an internationally imported case is defined as a case in which mumps results from exposure to mumps virus outside the United States as evidenced by at least some of the exposure period (12–25 days before onset of parotitis or other mumps-associated complications) occurring outside the United States and the onset of parotitis or other mumps-associated complications within 25 days of entering the United States and no known exposure to mumps in the U.S. during that time. All other cases are considered U.S.-acquired cases.

*U.S.-acquired case:* a U.S.-acquired case is defined as a case in which the patient had not been outside the United States during the 25 days before onset of parotitis or other mumps-associated complications or was known to have been exposed to mumps within the United States.

U.S.-acquired cases are sub-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 United States 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  $\geq 12$  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  $\geq 12$  months within the United States.

**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 1:**

Internationally imported, import-linked, and imported-virus cases are considered collectively to be import-associated cases.

#### **Note 2:**

States may also choose to classify cases as “out-of-state imported” when imported from another state in the United States. For national reporting, however, cases will be classified as either internationally imported or U.S.-acquired.

## **SIGNS AND SYMPTOMS**

Approximately 20% - 40% of mumps infections are either subclinical or unrecognized due to the lack of salivary gland swelling. Mumps typically starts with a few days of fever, headache, muscle aches, tiredness, and loss of appetite, and is followed by swelling of the salivary glands. The most recognizable symptoms of mumps are the unilateral or bilateral swelling of the parotid glands and a moderately elevated temperature. Parotitis tends to occur within the first two days and may first be noted as earache and tenderness on palpation of the angle of the jaw. Other symptoms include anorexia, abdominal pain and headache. Orchitis is a complication that occurs in up to 20% of postpubertal males, but sterility rarely occurs. The onset of orchitis may occur prior to or in the absence of parotitis. Females may experience oophoritis and/or mastitis with mumps infection. Other complications include pancreatitis, arthritis, deafness, meningitis and encephalitis. The possible relationship between mumps and diabetes is not well understood.

## **DIAGNOSIS**

CDC recommends that a buccal or oral swab specimen and a blood specimen be collected from all patients with clinical features compatible with mumps.

**CLINICAL SPECIMENS PROTOCOL:** Swab and serum should be collected as soon as possible upon suspicion of mumps according to the following information:

- **Serum specimens**
  - An acute serum sample should be drawn at the time of clinical diagnosis.
  - IgM assays are most sensitive >3 days after onset of parotitis.
- **Oral or Buccal swab specimens:**
  - Specimens should be collected for RT-PCR detection or isolation (i.e. viral culture) of mumps virus.
  - Viral mumps specimens should be collected as soon as mumps disease is suspected, preferably  $\leq 2$  days after onset of parotitis.
  - The preferred viral specimen is a parotid (or other salivary gland) duct swab, following massage of the salivary glands for 30 seconds.
  - Synthetic swabs are preferred over cotton. Commercial flocked swabs are best. Swabs should be placed in viral transport media (VTM) at 4 degrees Celsius immediately.
  - In the past, urine and buccal swabs were acceptable, but we are now **discouraging urine samples** due to low yield in favor of only buccal swabs.

### **Note 1:**

Early collection of buccal or oral swab provides the best means of lab confirmation, particularly among suspected patients with a history of vaccination. Most IgM assays work well in unvaccinated persons if the specimen was collected >3 days of parotitis onset. Previously vaccinated or previously infected patients may not have an IgM response or it may be transient and not detected depending on timing of specimen collection.

### **Note 2:**

In the absence of a positive RT-PCR result, if the acute-phase serum sample collected  $\leq 3$  days after parotitis onset is negative, a second serum sample collected  $\geq 5$  days after symptom onset is suggested since IgM may not be detectable until 5 days after parotitis onset.

### **Comment**

Absence of a mumps IgM response or a negative RT-PCR result in a vaccinated or previously infected individual presenting with clinically compatible mumps does not rule out mumps as a diagnosis. Viral detection in RT-PCR or culture may have low yield if the buccal swab is collected too long after parotitis onset. Serologic tests should be interpreted with caution, as false positive and false negative results are possible with IgM tests.

Specimens may be sent to a public health laboratory for testing for surveillance purposes. For serum specimens, complete the Ohio Department of Health Laboratory Microbiology Specimen Submission Form found at: <http://www.odh.ohio.gov/pdf/IDCM/frm2530.pdf> and the CDC Specimen Submission Form at: <http://www.odh.ohio.gov/pdf/IDCM/frm5034.pdf>. For swab specimens, complete the Ohio Department of Health Laboratory Microbiology Specimen Submission Form found at: <http://www.odh.ohio.gov/pdf/IDCM/frm2530.pdf> and the Wisconsin (WI) VPD Submission Form found at: <http://www.odh.ohio.gov/pdf/idcm/frmwivpd.pdf>.

Please notify the ODH VPD Epidemiology Program at (614) 995-5599 before shipping a specimen to the Ohio Department of Health Laboratory.

## **EPIDEMIOLOGY**

### **Source**

Humans are the only known host.

### **Occurrence**

Mumps infections occur with greater frequency during late fall, winter, and early spring months. However, mumps outbreaks can occur any time of year and in highly vaccinated communities. Recently, a number of cases and outbreaks have been reported, primarily associated with college settings. A major factor contributing to the outbreaks is being in a crowded environment. Additional factors include: the known effectiveness of the vaccine, lack of previous and exposure to wild-type virus.

### **Mode of Transmission**

By direct contact with the saliva of an infected person and by droplet spread.

### **Period of Communicability**

Mumps is most infectious in the several days before and after parotitis onset. Most transmission likely occurs two days before to five days after overt parotitis. No carrier state is thought to exist although individuals experiencing asymptomatic infection are capable of spreading the virus.

### **Incubation Period**

Usually 16-18 days, but may range from 12-25 days.

## **PUBLIC HEALTH MANAGEMENT**

### **Case**

#### Investigation

The Mumps Surveillance Worksheet should be completed on all cases. Cases should be monitored to determine whether an outbreak is occurring.

#### Isolation

The Ohio Administrative Code (OAC 3701-3-13, (P)) states that "a person with mumps shall be isolated, including exclusion from school or child care center, for five days after the onset of parotid swelling."

### **Contacts**

Contacts born prior to 1957 are considered immune. Unvaccinated healthcare workers born prior to 1957 are not considered immune unless they have evidence of mumps immunity. Those born in 1957 or later should have proof of mumps immunization or have a history of physician-diagnosed disease. All other contacts should be immunized for mumps. Mumps vaccine administered after exposure will not prevent or modify the

disease, but may possibly avert later disease if the exposure did not result in infection.

### **Prevention and Control**

A live attenuated mumps vaccine was licensed in the United States in 1967. The mumps component of the measles, mumps, rubella (MMR) vaccine has a lower effectiveness compared to the measles and rubella components. Mumps vaccine effectiveness has been estimated at a median of 78% for one dose and a median of 88% for two doses. Susceptible children, adolescents and adults should be immunized unless the vaccination is contraindicated. Mumps vaccine may be given to individuals  $\geq 12$  months of age in combination with measles and rubella vaccines. For additional information, consult the ODH Vaccine Protocol Manual

Ohio School Requirement: All children entering school must have received two doses of MMR vaccine. All three vaccine components (i.e. measles, mumps, rubella) must have been received to meet this vaccination requirement. MMR vaccine is the only way that measles vaccine is supplied in the U.S., but other countries may still use a one component vaccine.

### **Outbreak Control**

Mumps is the only known cause of epidemic parotitis. The main strategy for controlling a mumps outbreak is to define the at-risk population and a transmission setting, and to rapidly identify and vaccinate susceptible persons or, if a contraindication exists, to exclude susceptible persons from the setting to prevent exposure and transmission. Mumps vaccine, preferably as MMR, should be administered to susceptible persons. 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. If susceptible persons can be vaccinated early in the course of an outbreak, they can be protected. However, cases are expected to continue to occur among newly vaccinated persons who are already infected for at least 3 weeks following vaccination because of the long incubation period for mumps.

As with all vaccines, there are some individuals who will not gain immunity after receipt of mumps vaccine. Because vaccine effectiveness is not 100%, a second dose of mumps containing vaccine is recommended during outbreak situations for individuals who have received only one dose previously. Studies have shown a trend toward a lower attack rate among children who have received two doses of mumps vaccine as opposed to those who have received one dose. Furthermore, birth before 1957 does not guarantee mumps immunity, and in outbreak settings vaccination with a mumps containing vaccine should be considered for those born before 1957 who may be exposed to mumps and who may be susceptible.

Exclusion of susceptible students from schools affected by a mumps outbreak (and other, unaffected schools judged by local public health authorities to be at risk for transmission of disease) should be considered among the means to control mumps outbreaks. Once vaccinated, students can be readmitted to school. Students who have been exempted from mumps vaccine for medical, religious, or other reasons should be excluded through at least 25 days after the onset of parotitis in the last person with mumps in the affected school. For more information of outbreak control and prevention and control strategies in healthcare settings, please visit:  
<http://www.cdc.gov/vaccines/pubs/surv-manual/chpt09-mumps.html>.

**What is mumps?**

Mumps is an acute viral disease characterized by fever, swelling and tenderness of one or more of the salivary glands.

**Who gets mumps?**

Anyone who is not immune from either previous mumps infection or from vaccination can get mumps. Before the routine vaccination program was introduced in the United States, mumps was a common illness in infants, children, and young adults. Because most people have now been vaccinated, mumps is now a rare disease in the United States. Mumps is more common during winter and spring.

**How is mumps spread?**

Mumps is spread when an infected person coughs or sneezes and sends the mumps virus into the air. The virus can land in other people's noses or throats when they breathe or put their fingers in their mouth or nose after handling an infected surface.

**What are the symptoms of mumps?**

Symptoms of mumps include fever, headache, and swelling and tenderness of one or more of the salivary glands located close to the jaw. The salivary gland most often affected is the parotid gland (located just below the front of the ear). Approximately one-third of infected people do not exhibit symptoms.

**How soon after infection do symptoms occur?**

The incubation period is usually 16 to 18 days, but may range from 12 to 25 days.

**What complications have been associated with mumps?**

Mumps can cause encephalitis (inflammation of the brain), meningitis (inflammation of the covering of the brain and spinal column), inflammation of the testicles or ovaries, inflammation of the pancreas, and deafness (usually permanent).

**When and for how long is a person able to spread mumps?**

Mumps is generally transmitted from about 3 days before symptoms appear to about 4 days after, although the virus has been isolated from saliva as early as 7 days before to as late as 11-14 days after onset of symptoms.

**Does past infection with mumps make a person immune?**

Yes. Immunity acquired after contracting the disease is usually permanent.

**Is there a vaccine for mumps?**

Yes. Mumps vaccine is given on or after a child's first birthday, and is administered in combination with measles and rubella vaccine. A second booster dose is recommended after four years of age. The MMR (measles mumps rubella) vaccine is highly effective and usually produces lifelong immunity against mumps.

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

The single most effective control measure is maintaining the highest possible level of immunization in the community. Children with mumps should not attend school during their infectious period.