

Mumps

Summary

Mumps is an acute viral disease that typically presents with swelling of the parotid (parotitis) or other salivary glands. Infection among adults is more likely to be severe. Diagnosis during outbreaks is often made clinically, but isolated cases should be confirmed using PCR or culture; serology is often unreliable. Treatment is supportive. Mumps can occur in vaccinated persons, but infection and complications are much more likely to occur in unvaccinated persons.

See here for [Surveillance Worksheet](#).

Agent

Mumps virus is an RNA virus of the genus Rubulavirus in the Paramyxovirus family.

Transmission

Reservoir:

Humans.

Mode of transmission:

Airborne transmission or droplet spread and by direct contact with the saliva of an infected person.

Period of communicability:

For purposes of contact tracing, consider cases infectious from 2 days before onset of parotitis through 5 days after onset of parotitis. Virus has been detected several days before and several days after the onset of swelling, but patients are most infectious and most likely to transmit virus from 1-2 days before to 5 days after onset of swelling.

Clinical Disease

Incubation period:

The incubation period of mumps is 16 to 18 days (range is 12 to 25 days).

Illness:

Acute onset of mild to moderate tender swelling of one or more salivary glands, usually the parotid, but can be sublingual or submandibular. Approximately 20% of mumps infections among unvaccinated persons are asymptomatic. Mumps reinfection in patients who were previously infected, or recurrent mumps (when the parotid swelling resolves and then recurs on the same or other side weeks to months later) can also occur.

Complications may occur in cases with or without parotitis. Orchitis, or testicular inflammation, is the most common complication, occurring in as many as 30% of post-pubertal males (6% among vaccinated males). About half of patients with mumps orchitis develop testicular atrophy of the affected testicle(s).

Mastitis, or breast inflammation, occurs in approximately 30% of post-pubertal females (<1% among vaccinated females), while oophoritis, or ovarian inflammation, occurs in approximately 7% of post-pubertal unvaccinated females (<1% among vaccinated females). There is no association between mumps-associated orchitis, mastitis, or oophoritis with permanently impaired fertility, although there is a theoretical risk of temporary sterility or subfertility among males with mumps orchitis.

More than half of people with mumps have cerebrospinal fluid pleocytosis, but <1% have symptoms of viral meningitis.

Pancreatitis or hearing loss both have an estimated frequency of approximately 4% among unvaccinated cases (<1% vaccinated). Meningitis occurs in approximately <1-10% of unvaccinated cases (<1% vaccinated) and encephalitis in <1% of cases (vaccinated or unvaccinated).

Nephritis and myocarditis have been reported from mumps patients but are uncommon, while death from mumps is extremely rare. There is no evidence that mumps infection during pregnancy results in congenital malformation.

Laboratory Diagnosis

- A buccal swab from the parotid duct or other affected salivary gland ducts for viral isolation and/or reverse transcriptase-polymerase chain reaction (RT-PCR) testing is the preferred sampling method for mumps, and should be collected as soon as possible after symptom onset, ideally within 3-5 days (but some specimens have been positive up to 9 days after onset). For best results, the parotid should be massaged for 30 seconds before swabbing.
 - See here for a CDC video demonstrating proper buccal swab collection: <https://www.youtube.com/watch?v=ThvoJBjsUvQ>
 - Urine samples are no longer recommended, but may be useful in situations where the case does not have parotitis or salivary gland swelling, but does have orchitis/oophoritis, mastitis, pancreatitis, hearing loss, meningitis, or encephalitis.
 - Genotyping is available to distinguish between wild-type and vaccine-type mumps virus if necessary.
- If indicated for epidemiologic purposes, the New Mexico Department of Health Scientific Laboratory Division offers testing for the mumps virus by culture, in addition to PCR.
- If it has been >3 days since symptom onset, collect serum for IgM in addition to a buccal swab for PCR.
- Serology is unreliable in vaccinated persons, who may have a false negative or false positive IgM result. A negative IgM result in vaccinated persons should not be used to rule out a mumps diagnosis. In the absence of another diagnosis, cases meeting the clinical case definition should be reported.

Treatment

Supportive.

Other Causes of Parotitis

Influenza (especially influenza A) has been noted to cause parotitis (sometimes called “flumps”) and suspected mumps cases should concurrently be tested for influenza.

Other common infectious causes of parotitis include Epstein-Barr Virus, cytomegalovirus, parainfluenza types 1 and 3, enteroviruses, lymphocytic choriomeningitis virus, HIV, nontuberculous mycobacterium, and gram-positive and gram-negative bacteria.

Non-infectious causes include (but are not limited to) dental abscesses, allergic reactions, salivary duct blockages, and Sjögren’s syndrome.

Mumps is the only known cause of epidemic parotitis.

Surveillance

Case Definition (2024):

Clinical Criteria:

In the absence of a more likely alternative diagnosis, an acute illness characterized by:

- Parotitis or swelling of other (non-parotid) salivary gland(s) of any duration, **or**
- At least one of the following mumps-associated complication(s):
 - Orchitis
 - Oophoritis
 - Aseptic meningitis
 - Encephalitis
 - Hearing loss
 - Mastitis
 - Pancreatitis

Laboratory Criteria:

Confirmatory Laboratory Evidence:

- Positive reverse transcriptase polymerase chain reaction (RT-PCR) for mumps-specific nucleic acid^a, **or**
- Isolation of mumps virus, **or**
- Significant rise (i.e., at least a 4-fold rise in a quantitative titer or seroconversion) in paired acute and convalescent serum mumps immunoglobulin G (IgG) antibody^a

Supportive Laboratory Evidence:

- Positive test for serum mumps immunoglobulin M (IgM) antibody^{a,b}

^a Not explained by MMR vaccination during the previous 6-45 days.

^b May be ruled out by a negative convalescent mumps IgG antibody using any validated method.

Epidemiologic Linkage Criteria:

- Exposure to or contact with a confirmed mumps case, **or**
- Member of a group or population identified by public health authorities as being at increased risk for acquiring mumps because of an outbreak

Confirmed –

- Meets confirmatory laboratory evidence

Probable –

- Meets clinical criteria **and** epidemiologic linkage criteria

or

- Has an IgM+ result **but** does not meet epidemiologic linkage criteria **and** has:
 - ≥ 2 day duration of parotitis or other salivary gland swelling or a mumps-related complication

Suspect –

- Meets clinical criteria **but** does not meet laboratory or epidemiologic linkage criteria

or

- Has an IgM+ result **and** documentation that mumps was suspected, **but** does not meet clinical criteria

Epidemiologic Classification for Internationally Imported and US-acquired Cases

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 (US) 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 US and the onset of parotitis or other mumps-associated complications within 25 days of entering the US and no known exposure to mumps in the US during that time. All other cases are considered US-acquired cases.

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

US-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 US in a pattern indicative of endemic transmission. An endemic genotype is the genotype of any mumps virus that occurs in an endemic chain of transmission (i.e., lasting ≥ 12 months). Any genotype that is found repeatedly in US-acquired cases should be thoroughly investigated as a potential endemic genotype, especially if the cases are closely related in time or location.
- *Endemic case:* A case for which epidemiological or virological evidence indicates an endemic chain of transmission. Endemic transmission is defined as a chain of mumps virus transmission continuous for ≥ 12 months within the United States.
- *Unknown source case:* A case for which an epidemiological or virological link to importation or to endemic transmission within the US cannot be established after a thorough investigation. These cases must be carefully assessed epidemiologically to assure that they do not represent a sustained US-acquired chain of transmission or an endemic chain of transmission within the US

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

Comments: With 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 if the buccal

swab is collected too long after parotitis onset. Therefore, mumps cases should not be ruled out by negative laboratory results. Serologic tests should be interpreted with caution, as both false positive and false negative results are possible with IgM tests.

Reporting:

Report all suspected or confirmed cases of mumps to the Epidemiology and Response Division (ERD) at 505-827-0006. Information needed includes: patient's name, age, sex, race, ethnicity, home address, home phone number, occupation, and health care provider.

Case Investigation: Complete the CDC Mumps Surveillance Worksheet and mail to the Epidemiology and Response Division, P.O. Box 26110, Santa Fe, New Mexico 87502-6110, or (preferably) faxed to 505-827-0013. Investigation information should also be entered in NM-EDSS per established procedures.

Control Measures

1. Case management
 - 1.1. Isolation: Droplet precautions for five days after onset of gland swelling. Exclusion from school, childcare, and workplace for five days after onset of gland swelling.
2. Contact management
 - 2.1. See below for presumptive evidence of immunity to mumps:

Acceptable Presumptive Immunity to Mumps

1. Laboratory evidence of immunity by serum IgG
 - a. Note: IgG antibody does not necessarily predict protection; during an outbreak, close contacts of mumps patient(s) should not be tested for serologic evidence of immunity (because a positive IgG titer may indicate acute or recent infection)
2. Laboratory confirmation of disease
3. Birth before 1957
4. Documentation of adequate vaccination:
 - At least 1 dose of MMR for preschool-age children and adults not at high risk
 - 2 doses of MMR for school-aged children, adolescents, and adults at high risk, including college students, healthcare personnel, and international travelers
 - Adequate vaccination for outbreak settings
 - Children aged 1-4 years and adults at low risk: if affected by the outbreak, consider a second* dose live mumps virus vaccine.
 - Health care workers born before 1957 without other evidence of immunity: strongly consider recommending two* doses of live mumps virus vaccine.
 - People previously vaccinated with 2 doses who are identified as being part of a group or population at increased risk for acquiring mumps because of an outbreak: recommended to receive a third dose of MMR.

* Minimum interval between doses is 28 days.

- 2.2. Quarantine: Exclusion of exposed people without presumptive evidence of immunity (as listed above) from school or daycare from day 12 through day 25 after exposure, if other people without evidence of presumptive immunity are present.

2.3. Post-Exposure Prophylaxis:

2.3.a See evidence of immunity table, above. Vaccination as post-exposure prophylaxis is not effective for mumps, but can protect people from future exposures in outbreak settings. Students in grades K-12 and post-high-school educational settings who have a history of 1 dose of MMR vaccine should be allowed to remain in the outbreak setting, and are recommended to receive their second vaccine dose. In an outbreak setting, excluded people can be readmitted immediately after they are vaccinated. Students who are exempted from mumps immunization should be excluded until at least 26 days after the onset of parotitis in the last person with mumps in the affected school.

2.3.b In some circumstances, a third dose of MMR may be recommended for fully vaccinated people at increased risk of infection during an outbreak. People who have a history of 2 doses of MMR and are recommended to receive a third dose may remain in the outbreak setting even if they do not accept the third MMR dose. However, whether to recommend a third MMR dose in an outbreak, and to whom, is situation-dependent and at the discretion of the public health department; consult with the VPD Epidemiologist and/or medical epidemiologist before making such a recommendation.

2.3.c Immune globulin (IG) is not recommended or effective as prophylaxis.

3. Prevention

3.1. Immunization: Routine immunization with the modified live virus vaccine at 12-15 months of age with a booster before school entry (e.g., 4-6 years of age), in the form of measles/mumps/rubella (MMR) vaccine or measles/mumps/rubella/varicella (MMRV) vaccine. Immunization or documentation of immunity is recommended for health care providers and for school personnel. See table above for vaccination recommendations.

3.1.a The first dose should preferably be MMR rather than MMRV, to lessen the risk for fever and side effects.

Managing Mumps in Child Care Centers

- Exclude symptomatic child from childcare for five days from onset of gland swelling.
- Review the immunization status of all children in the facility to assure they have received their first mumps vaccination. Those not adequately immunized should be referred to their clinician.

References

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Centers for Disease Control and Prevention. *Strategies for the Control & Investigation of Mumps Outbreaks*. 30 June 2021. <https://www.cdc.gov/mumps/health-departments/strategies.html>

See Mumps Fact Sheets ([English](#)) ([Spanish](#)).