MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH GUIDE TO SURVEILLANCE, REPORTING AND CONTROL

**Mumps**

**Section 1 \*\*February 2024: See specimen shipping and storage update page 13**

# ABOUT THE DISEASE

**A. Etiologic Agent**

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

**B. Clinical Description**

Mumps is an acute viral illness characterized by swelling of one or more salivary glands, usually the parotid glands. Parotitis tends to occur early and may first be noted as an earache or pain on palpitation at the angle of the jaw. Symptoms tend to decrease after 3 to 7 days (average 5 days) and usually resolve after 10 days. Prodromal symptoms are non-specific and may include myalgia, anorexia, malaise, headache, and low-grade fever. Approximately one-third of infections do not cause clinically apparent salivary gland swelling and may be asymptomatic (subclinical) or may manifest primarily as respiratory tract infection.

Swelling of the salivary glands (parotitis) can also be caused by infection due to parainfluenza virus types 1 and 3, influenza A, Coxsackie A, echovirus, *Staphylococcus aureus*, lymphocytic choriomeningitis virus, HIV, and noninfectious causes such as drugs (e.g., phenylbutazone, thiouracil, iodides), tumors, starch ingestion, metabolic disorders (diabetes, cirrhosis, and malnutrition), immunologic diseases, and obstruction of the salivary duct. However, other infectious causes of parotitis do not cause epidemic parotitis.

Complications

The most common complications of mumps include orchitis, oophoritis, mastitis, pancreatitis, hearing loss, meningitis, and encephalitis. Complications may occur in the absence of parotitis. The frequency of complications is lower in vaccinated patients compared with unvaccinated patients. Among vaccinated patients, complications of mumps are uncommon but occur more frequently among adults than children, mainly due to higher rates of orchitis among post-pubertal males. About half of patients with mumps orchitis develop testicular atrophy of the affected testicles. While there is a theoretical risk for temporary sterility or subfertility from oligospermia, azoospermia, or asthenospermia among men with mumps orchitis, no studies have assessed risk for permanent infertility. Nephritis, myocarditis, and other sequelae, including paralysis, seizures, cranial nerve palsies, and hydrocephalus have also been reported in mumps patients but are uncommon. Death due to mumps is exceedingly rare.

In the pre-vaccine era, mumps accounted for approximately 10% of cases of symptomatic aseptic meningitis. In the post-vaccine era, among all persons infected with mumps, reported rates of meningitis, encephalitis, pancreatitis, and deafness have all been less than one percent. Encephalitis occurs rarely, and persistent sequelae, such as paralysis, seizures, cranial nerve palsies, and hydrocephalus occur very rarely.

Mumps infection during the first trimester of pregnancy can increase the risk of spontaneous abortion, although no evidence exists that mumps infection in pregnancy causes congenital malformations.

**C. Vectors and Reservoirs**

Humans are the only known host for mumps virus infection. While persons with asymptomatic or nonclassical infection can transmit the virus, no true carrier state is known to exist.

**D. Modes of Transmission**

Mumps is transmitted by respiratory droplets and by direct contact with nasopharyngeal secretions. The risk of spreading the virus increases with repeated and prolonged close contact. In recent years, mumps outbreaks have occurred in settings where close contact is repeated and prolonged, such as in colleges and university dormitories, at bars and parties, and other such crowded settings. Asymptomatic and mildly ill persons may spread mumps.

**E. Incubation Period**

The incubation period is usually 16–18 days, with a range of 12–25 days.

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

Persons with mumps are usually considered infectious from 2 days before through 5 days after onset of parotid swelling. The initial day of swelling should be counted as day zero. In the example below, onset of swelling is shown by the red box on December 7th. December 7th is considered “day zero.” The infectious period begins two days before, on December 5, and continues through five days after onset of swelling, through December 12.



Mumps is similar to influenza and rubella in infectiousness and is not as contagious as measles or chickenpox. Asymptomatic infections can be communicable.

**G. Epidemiology**

Mumps occurs worldwide. In the U.S., it is endemic year-round, peaking in winter and spring. Mumps is no longer very common in the United States. From year to year, mumps cases can range from roughly a couple of hundred to several thousand. For example, in 2010, there were 2,612 cases reported to the U.S. Centers for Disease Control and Prevention (CDC) from all over the U.S., and in 2012 there were 229. In 2016, the number of mumps cases reported in the U.S. exceeded 5000, and there were over 250 cases in Massachusetts. Before the U.S. mumps vaccination program started in 1967, about 186,000 cases were reported each year, but the actual number of cases was likely much higher due to underreporting. Since the pre-vaccine era, there has been a more than 99% decrease in mumps cases in the United States.

The measles, mumps, rubella (MMR) vaccine prevents most, but not all, cases of mumps and the complications caused by the disease. Two doses of the vaccine are 88% (range: 66 to 95%) effective at protecting against mumps; one dose is 78% (range: 49% to 92%) effective.

In the pre-vaccine era, the majority of cases occurred among unvaccinated children. The epidemiology of outbreaks has shifted with the advent of widespread MMR vaccination. Cases now occur predominantly in fully vaccinated adolescents and young adults, mainly driven by outbreaks on college campuses, schools and camps, other congregate settings and close-knit communities. Mumps outbreaks can occur any time of year but often occur in winter and spring. Spread in highly vaccinated populations is likely due to waning immunity in adult individuals. High vaccination coverage, however, helps limit the size, duration, and spread of mumps outbreaks.

**H. Bioterrorist Potential**

This pathogen is not considered to be of risk for use in bioterrorism.

**I. Diagnostic Challenges in Vaccinated Individuals**

Laboratory confirmation of mumps in previously vaccinated or previously infected individuals is challenging, and failure to detect mumps IgM in previously vaccinated, but infected, persons has been well-documented.

* Persons with a history of mumps vaccination may not have detectable mumps IgM antibody in response to infection regardless of time of specimen collection. The ability to detect IgM varies by vaccination status and is highest in unvaccinated persons (80-100%), intermediate in one-dose vaccine recipients (60-80%) and lowest in two-dose vaccine recipients (13-14%).
* Absence of a mumps IgM response in a vaccinated or previously infected individual presenting with clinically compatible illness does not rule out mumps as a diagnosis.
* In both unvaccinated and vaccinated persons, false positive laboratory test results can occur because serologic assays may be affected by presence of other viral infections, including due to parainfluenza viruses 1, 2, and 3, Epstein-Barr virus, adenovirus, and human herpesvirus 6.
* The presence of mumps-specific IgG indicates a prior exposure to mumps virus or mumps vaccine. **However, a positive mumps IgG does not necessarily predict immunity to mumps disease.** IgG tests are not performed at MA SPHL. There have been many outbreaks of mumps among populations with positive mumps IgG titers. Recognition of mumps outbreaks has been delayed when providers assumed that positive IgG titers meant that symptomatic patients could not be infected with mumps.
* Buccal swab samples for mumps PCR testing enhance the ability to laboratory-confirm a mumps infection and can provide additional information (genotyping and sequencing) to aid epidemiologic investigations. **However, failure to detect mumps virus RNA by RT-PCR in samples from a person with clinically compatible mumps symptoms does not rule out mumps as a diagnosis.** Successful detection of mumps virus depends primarily on the timing of collection and quality of the clinical sample. Vaccinated individuals may shed virus for a shorter period and might shed smaller amounts of virus. In outbreaks among two-dose vaccination recipients, mumps virus RNA was detected in samples from 30-35% of cases if the samples were collected within the first 3 days following onset of parotitis.

**Section 2**

# REPORTING CRITERIA AND LABORATORY TESTING

**A. What to Report to the Massachusetts Department of Public Health (MDPH)**

Report any of the following:

* A suspect or confirmed case of mumps, as diagnosed by a healthcare provider
* Isolation of mumps virus from a clinical specimen
* Detection of mumps-virus specific nucleic acid from a clinical specimen using polymerase chain reaction (PCR)
* Significant rise (four-fold or greater) in serum mumps immunoglobulin G (IgG) antibody titer between acute and convalescent sera by any standard serologic assay; or
* Positive serologic test for mumps immunoglobulin M (IgM) antibody.

*Note: See Section 3C for information on how to report a case.*

**B. Laboratory Testing Services Available**

Before sending sera and clinical specimens to the Massachusetts State Public Health Laboratory (MA SPHL) for virus isolation, **please call an MDPH epidemiologist (24 hours a day/7 days a week) at (617) 983-6800**. See *Attachment One: Mumps Testing* (at the end of this chapter) for instructions on collecting and submitting specimens to MA SPHL.

*Culture and PCR Testing*

Virus culture from clinical specimens, and detection by real time polymerase chain reaction (RT-PCR) are very useful for disease control purposes, as well as for confirming mumps. PCR can be particularly useful in the confirmation of mumps in vaccinated individuals. **The preferred specimen for PCR and virus isolation is a swab of the buccal region (“buccal swab”), obtained as soon as possible (within 3 days) after onset of parotid swelling.** If more than 3 days, collect buccal swab for PCR and serum for IgM tests. The specimen should be sent to the MA SPHL for testing.

Mumps virus can be cultured from buccal, oropharyngeal or nasopharyngeal swab specimens, and urine. In cases of mumps meningitis, the virus is readily cultured from cerebrospinal fluid (CSF). Virus culture is the gold standard for mumps confirmation. Virus culture can require several days to several weeks to complete, while detection of IgM by EIA or viral RNA by RT-PCR can usually be performed in less than one day. Genotyping and/or genome sequencing of isolated mumps virus, performed at CDC or an Association of Public Health Laboratory (APHL)/CDC reference laboratory, or another laboratory, may be helpful in epidemiologic investigation to determine the source of infection and which cases and outbreaks are linked.

*Serologic Testing*

**Mumps IgM Antibody Test**

It is important to obtain laboratory confirmation for suspect cases of mumps. Due to cross-reacting antibodies and other issues, sensitivity and specificity of commercially available IgM tests are not reliable. The Centers for Disease Control and Prevention (CDC) and the MDPH do not recommend mumps IgM testing by commercial laboratories for confirmation or elimination of a diagnosis of mumps. **Sera should be collected for suspected mumps cases, as soon as possible after onset, and submitted to the MA SPHL for testing.** Confirmatory testing may be necessary at CDC. The ability to detect IgM varies by vaccination status and is highest in unvaccinated persons (80-100%), intermediate in one-dose vaccine recipients (60-80%) and lowest in two-dose vaccine recipients (13-14%).

If the acute-phase serum sample collected ≤3 days after parotitis onset is negative for specific IgM antibody, and the case has a negative (or not done) result for RT-PCR, a second serum sample collected 10 or more days after symptom onset is recommended because, in some cases, the IgM response is not detectable until 10 days after symptom onset. However, people with a history of mumps vaccination may not have detectable mumps IgM antibody regardless of timing of specimen collection.

**Mumps IgG Paired-Titer Testing – No Longer Recommended**

In the past, a demonstrated four-fold increase in IgG titer or a seroconversion from negative to positive from acute to convalescent specimens was used to provide laboratory confirmation for suspect cases of mumps. However, according to CDC, collection of acute and convalescent phase serum samples to demonstrate a four-fold increase in IgG titer is no longer recommended. A four-fold rise in IgG titer is rarely demonstrated between paired serum samples from persons who have received one or two doses of MMR vaccine, and was only seen in persons who were also IgM positive.

**Shipment of specimens:**

Specimens should be sent on a cold pack with a completed MA SPHL *Specimen Submission Form* found on the [MDPH website](https://massgov-my.sharepoint.com/personal/stephen_fleming_mass_gov/Documents/David%20W.%20Kimberlin%20MD%2C%20FAAP%2C%20ed.%202021.%20Red%20Book%3A%202021-2024%20Report%20of%20the%20Committee%20on%20Infectious%20Diseases%20-%2032nd%20Ed.%20Printed%20in%20the%20United%20States%20of%20America.%20American%20Academy%20of%20Pediatrics.%20ISBN-10%3A%201-%2061002-521-0%2C%20ISBN-13%3A%20978-1-61002-521-8.%20eISBN-10%3A%201-61002-522-9%2C%20eISBN-13%3A%20978-1-61002-522-5.). Use one form for each specimen. **MA SPHL, 305 South Street, Jamaica Plain, MA 02130.**

**Section 3**

# REPORTING RESPONSIBILITIES AND CASE INVESTIGATION

**A. Purpose of Surveillance and Reporting**

* To identify all cases and susceptible exposed people rapidly in order to prevent further spread of the disease.

**B. Laboratory and Healthcare Provider Reporting Requirements**

Mumps is reportable to the local board of health (LBOH). The MDPH requests that healthcare providers report as soon as possible to the LBOH in the community where the case is diagnosed, all confirmed or suspect cases of mumps, as defined by the reporting criteria in Section 2A.

**Report as soon as possible: Due to the potential significance of a mumps case, the MDPH requests that information about any case also be reported as soon as possible to an MDPH epidemiologist at the MDPH Division of Epidemiology and Immunization by calling (617) 983-6800 (available 24/7).**

Laboratories performing examinations on any specimens derived from Massachusetts residents that yield evidence of mumps infection, including mumps virus IgM+, mumps IgG seroconversion or a significant

rise in IgG, detection of mumps virus using PCR, or isolation of mumps virus shall report such evidence of infection directly to the MDPH within 24 hours. Additionally, all laboratories performing examinations on any specimens derived from Massachusetts residents are required to submit all specimens with indication or suspicion of mumps virus presence directly to the MA SPHL for further examination.

**C. Local Board of Health (LBOH) Reporting and Follow-Up Responsibilities**

*Reporting Requirements*

MDPH regulations *(105 CMR 300.000)* stipulate that mumps is reportable to the LBOH and that each LBOH must report any case of mumps or suspect case of mumps, as defined by the reporting criteria in Section 2A. Cases should be reported to the MDPH Bureau of Infectious Disease, Division of Surveillance, Analytics and Informatics (DSAI) via MAVEN. Cases reported directly to MDPH by providers, laboratories, or ELR will populate the MAVEN “Online LBOH Notification for Immediate Disease” workflow for acknowledgement by the appropriate LBOH. Cases not already in MAVEN should be reported to DSAI using MAVEN. LBOH not on MAVEN should report by phone and additional information collected using the Mumps Case Report Form. Mumps Case Report Forms can be faxed to DSAI at (617) 983-6813.

Refer to the List of Diseases Reportable to Local Boards of Health for information on prioritization and timeliness requirements of reporting and case investigation

[Infectious Disease Reporting and Regulations for Health Care Providers and Laboratories | Mass.gov](https://www.mass.gov/lists/infectious-disease-reporting-and-regulations-for-health-care-providers-and-laboratories)

*Case Investigation*

Depending on local public health capacity, the MDPH may take the lead on mumps case investigation and

control recommendations in partnership with the LBOH, particularly in outbreak situations. When this is necessary, the MDPH will keep the LBOH informed of all significant developments through MAVEN and will request the assistance of the LBOH as needed. Rapid implementation of disease control measures is an integral part of case investigation. It is the responsibility of the LBOH to understand, and if necessary, institute the control guidelines listed in Section 4.

Essential components of case investigation include establishing a diagnosis of mumps, obtaining

immunization history for confirmed cases, identifying sources of infection, assessing potential for

transmission, identifying susceptible contacts and obtaining specimens for viral isolation. To assess the likelihood that a suspect case is a true case prior to laboratory testing, the MDPH and/or other public health staff helping in the investigation should ask about:

* Clinical presentation, including date of onset of symptoms--particularly presence and duration of parotitis, and mumps complications (e.g., meningitis, deafness, encephalitis, mastitis, or orchitis)
* Mumps immunization history
* Country of origin and length of residence in U.S.
* Recent history of travel (to where and dates)
* Whether there were any recent out-of-town visitors (from where and dates)
* Whether there was any recent contact with anyone with similar symptoms
* Risk factors for disease
* Recent dental work and/or trauma to the head
* Possible transmission setting (e.g., childcare, school, healthcare setting) and
* Laboratory information, including viral isolation and serologic test results.

*Using MAVEN*

Administrative Question Package

Monitor your “Online LBOH Notification for Immediate Disease” workflow in MAVEN for any new cases of mumps. An MDPH Epi-of-the-Day (EOD) will review all new cases and initiate immediate follow-up for mumps events. Depending on local capacity, EODs may take the lead for case investigation and will coordinate follow-up with the LBOH as needed. Once a new event appears in this workflow, open the Administrative Question Package (QP) and under the “Local Health and Investigation” section, answer the first question “**Step 1** – LBOH acknowledged” by selecting “Yes.” The “LBOH acknowledged date” will auto populate to the current day. Completing this first step will move the event out of this workflow and into your “Online LBOH notified but Case Report Forms (CRF) are pending” workflow. Note the date you started your investigation by answering “**Step 2** – Investigation started” as “Yes” and then note the date where shown. Record your name, agency, and phone numbers as shown in “**Step 3** - LBOH/Agency

Investigator.”

Demographic Question Package

Please note that complete case follow-up includes collection and reporting of ALL demographic data elements found in MAVEN Demographic Question Package including age, gender, sexual orientation, race, ethnicity, disability, occupation, and preferred language.

Clinical Question Package

Complete the “Diagnosis/Clinical Information” section, providing symptom and other medical information.

For case classification purposes, it is particularly important that Parotitis, Parotitis Onset Date, and Duration of Parotitis symptom questions are answered.

Vaccine and IG Information Question Package

Enter at least vaccine type and date for any documented doses of mumps-containing vaccine. If the case

has no documentation of mumps-containing vaccines or does not know his or her history, “Vaccination

history unknown” should be selected. If the case is known to be unvaccinated, “No vaccine administered”

should be selected and an answer to the question “If not vaccinated, why not received?” should be entered.

Risk/Exposure/Control & Prevention Question Package

Accurately record all risk questions about travel, exposures, and where the case acquired mumps. It is important to try to identify the source of infection and whether the case can be tied to an international importation or a known outbreak.

*Completing Your Investigation*

1. If you were able to complete a case investigation and follow-up is complete, mark “**Step 4** – Case

Report Form Completed” as “Yes” and then choose “Local Board of Health (LBOH) –Ready for MDPH

review” for the “Completed by” variable.

2. If you and/or the EOD leading the case investigation have made several attempts to obtain case information but have been unsuccessful (e.g., the case or health care provider does not return your calls or respond to a letter, or the case refuses to divulge information or is too ill to be interviewed), please fill out the question packages with as much information as you have gathered, and then complete “**Step 4** - Case Report Form Completed” as “No” and choose a primary reason why the case investigation was not completed from the choices provided in the primary reason answer variable list.

3. If you are not online for MAVEN you may submit a paper case report form. After completing the form,

attach laboratory report(s) and fax or mail (in an envelope marked “Confidential”) to DSAI. The

confidential fax number is (617) 983-6813. Call DSAI at (617) 983-6801 to obtain a copy of the case

report form and to confirm receipt of your fax. The mailing address is **MDPH, Division of Surveillance, Analytics and Informatics (DSAI), 305 South Street, Jamaica Plain, MA 02130. Confidential fax: (617) 983-6813.**

**Section 4**

# CONTROLLING FURTHER SPREAD

**A. Isolation and Quarantine Requirements *(105 CMR 300.200)***

*Minimum Period of Isolation of Patient*

Through 5 days after onset of gland swelling (counting the initial day of gland swelling as day zero).

*Minimum Period of Quarantine of Contacts*

People born in or after 1957 (in the US) who are not appropriately immunized or who do not have laboratory evidence of immunity or past disease will be excluded from public activities from the 12th through the 25th day after their last exposure. When multiple cases occur, susceptibles need to be excluded through 25 days after the onset of the last case at the school or workplace.

Healthcare workers (or hospitalized patients), regardless of year of birth, who are not appropriately immunized or do not have laboratory evidence of immunity or past disease will also be excluded (or quarantined on precautions), as above. Additional control measures may be recommended by the MDPH.

**B. Protection of Contacts of a Case**

1. Isolate the suspect case before laboratory confirmation.

2. Inquire about contact with a known or suspect case or travel during the mumps exposure period (12–25 days prior to onset). Ask other questions outlined in Section 3C.

3. Identify all who have been exposed. To identify those exposed, think in terms of the “zones of exposure,” and consider members of the following groups, if they were in close contact (within six feet), with the case during his/her infectious period (or in direct contact with respiratory secretions):

a. Household members,

b. School/daycare (students and staff in close proximity),

c. Staff and patients at medical facility where patient was seen,

d. Individuals at workplace of case (especially daycare centers, schools, and medical settings),

e. Religious/social groups,

f. Sports teams and other extracurricular activity groups,

g. Bus/carpool mates,

h. Close friends, and

i. Persons at social events, travel sites, etc.

4. Identify **high-risk susceptibles** who had contact with the case during the infectious period for referral to their healthcare providers:

a. Pregnant women should be referred to their obstetricians for screening and management.

b. Immunosuppressed individuals should be referred to their healthcare providers.

c. Infants <12 months of age should be referred to their pediatricians.

5. Identify all other susceptibles. These are individuals without evidence of immunity, including those with medical or religious exemptions to immunization. Evidence of immunity is defined as:

a. Birth in the U.S. before 1957, unless a healthcare worker

b. Documentation of 2 doses of mumps-containing vaccine, appropriately timed; or

c. Serologic evidence of immunity or laboratory evidence of past disease.

Note: Persons born outside of the U.S. (without written documentation of immunity) are usually considered susceptible, regardless of year of birth. In addition, past history of disease, regardless of whether it is physician-diagnosed, is not acceptable evidence of immunity.

6. Immunize all susceptibles ≥12 months of age for which MMR is not contraindicated. Those who only have one dose of MMR should get a second dose, if the minimum interval has passed since the first dose. Postexposure vaccination is not expected to prevent illness or development of disease in someone recently exposed to mumps. Rather, exposed individuals should be vaccinated to protect against subsequent exposures. Furthermore, birth before 1957 does not guarantee mumps immunity, and in outbreaks, vaccination with MMR vaccine should be considered for those born before 1957 who may be exposed to mumps and who could be susceptible.

Keep in mind the following:

a. MMR vaccine is not recommended for infants < 12 months for mumps prevention.

b. Vaccinating an exposed individual who may be incubating mumps virus is not harmful.

c. Immune globulin (IG) is of no value as post-exposure prophylaxis for mumps and is not recommended.

7. Exclude as follows:

a. **Case:** Exclude through 5 days after onset of parotitis (counting the day of swelling onset as day zero). The suspect case may return to normal activities on the 6th day.

b. **Contacts:** Individuals with zero doses of mumps-containing vaccine should be excluded from public activities beginning on day 12 following exposure (through day 25). In most low-risk settings, these persons will usually be readmitted immediately after they are vaccinated. Individuals with one-dose of mumps-containing vaccine should receive a second dose and be allowed to remain in work/school and other public activities. Exclude all remaining susceptible persons who refuse or cannot receive vaccination (including those with medical or religious exemptions) on days 12–25 after exposure, or if there are multiple cases, for 25 days after onset of parotitis in the last reported case in the outbreak setting. They may return on the 26th day.

In some outbreak situations, MDPH may recommend additional control measures.

8. Conduct active surveillance for mumps for 2 incubation periods (50 days) following the end of the infectious period of the last case.

**C. Managing Special Situations**

*Healthcare Settings*

*Presumptive evidence of Immunity*

Healthcare workers, regardless of year of birth, should have one or more of the following, which provide presumptive evidence of immunity to mumps:

* Two doses of MMR vaccine, appropriately timed.
* Serologic evidence of immunity to mumps or laboratory evidence of past disease.

Year of birth, and history of disease, regardless of whether it is physician-diagnosed, are not acceptable evidence of immunity for healthcare workers.

*Isolation of Patients*

Patients should be placed on standard and droplet precautions through five days after onset of parotid swelling (counting the day of onset as day zero). They may be taken off precautions on the sixth day.

Exposed susceptible patients should be placed on droplet precautions from the 12th day after the earliest exposure through the 25th day after the last exposure. They may be taken off precautions on the 26th day.

*Exclusion of Staff*

* Personnel who become sick should be excluded from work through 5 days post parotid swelling onset. They may return on the 6th day.
* Exposed susceptible personnel (including those with medical or religious exemptions) should be excluded from the 12th day after their first exposure through the 25th day after their last exposure, if there are multiple exposures. They may return on the 26th day.
* In some low-risk healthcare settings, providers with one dose of MMR may receive a 2nd dose and continue to work.

**In all healthcare settings, all exposed healthcare workers should watch for signs and symptoms of mumps, even those with two doses of vaccine and/or serologic evidence of immunity, for 25 days after exposure.**

*Outbreaks*

A mumps outbreak is defined as ≥ 3 cases linked by time and place. During an outbreak, every suspected case should be investigated thoroughly, if possible. Based on these investigations, the outbreak should be characterized in terms of person, place and time, in order to determine the population at risk of infection and where transmission is occurring as clearly as possible. The main strategy for controlling outbreaks is to define the population(s) at risk and transmission setting(s); to rapidly identify suspect mumps cases and isolate them for five days following onset of parotitis; to vaccinate persons without presumptive evidence of immunity; and to exclude persons without presumptive evidence of immunity to prevent exposure and transmission. Social distancing should be encouraged within the defined outbreak population(s). Please note the caveats regarding use of negative test results to rule out mumps on page 3 of this chapter.

Although mumps vaccine is not effective in preventing mumps in persons already infected, it will prevent infection in those persons who are not yet exposed or infected. According to CDC, data are insufficient to recommend for or against the use of a 3rd dose of MMR vaccine for mumps outbreak control. Public health authorities may consider administration of a third dose of MMR vaccine for specifically identified target populations, using the following criteria:

* High two-dose vaccination coverage
* Exposure setting likely to facilitate transmission (congregate living, corrections, healthcare)
* High attack rates (i.e., >5 cases per 1000 population) and evidence of ongoing transmission for at least two weeks in the target population

Booster (third dose) vaccination should be prioritized for those individuals who have the longest interval since their previous MMR immunization.

Additional data on the effectiveness and impact of a third dose of MMR vaccine for mumps outbreak control are needed to guide control strategies in future outbreaks.

*Surveillance*

Conduct active surveillance for mumps for 2 incubation periods (50 days) following the end of the infectious period of the last case.

**D. Preventive Measures**

*Personal Preventive Measures/Education*

Vaccination, including routine childhood vaccination, catch-up vaccination of adolescents, and targeted vaccination of high-risk adult groups, is the best preventive measure against mumps. Good personal hygiene (which consists of proper hand washing, disposal of used tissues, not sharing eating utensils, etc.) is also important. A Mumps Public Health Fact Sheet for the general public can be obtained from the MDPH Division of Epidemiology or on the MDPH website at <http://www.mass.gov/eohhs/gov/departments/dph/programs/id/epidemiology/factsheets.html>.

**Section 5**

# ADDITIONAL INFORMATION

The Centers for Disease Control and Prevention (CDC) surveillance case definition for mumps is available at the link below. It is provided for your information only and should not affect the investigation and reporting of a case that fulfills the criteria in Section 2A of this chapter. (The CDC and the MDPH use the CDC case definitions to maintain uniform standards for national reporting.) **For reporting to the MDPH, always use the criteria outlined in Section 2A.** The most up-to-date CDC case definitions are available on the CDC website. MAVEN users can also find the Case Classification Manual under “MAVEN Help.”

# REFERENCES

CDC. Update: Mumps Outbreak--New York and New Jersey, June 2009--January 2010. MMWR 2010; 59:125-93. <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5905a1.htm>

CDC. *Epidemiology and Prevention of Vaccine-Preventable Diseases (The Pink Book), 14th Edition*. Marlow M. et al. Washington DC, Public Health Foundation; 2021: [Mumps chapter](https://www.cdc.gov/vaccines/pubs/pinkbook/mumps.html).

CDC. [Immunization of Healthcare Workers](http://www.cdc.gov/mmwr/pdf/rr/rr6007.pdf). Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR. 2011*; 60(7).

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). CSTE 1999 Annual Meeting. Position Statement #ID-9.

David W. Kimberlin MD, FAAP, ed. 2021. Red Book: 2021-2024 Report of the Committee on Infectious Diseases - 32nd Ed. Printed in the United States of America. American Academy of Pediatrics. ISBN-10: 1- 61002-521-0, ISBN-13: 978-1-61002-521-8. eISBN-10: 1-61002-522-9, eISBN-13: 978-1-61002-522-5.

ISSN: 1080-0131. STAT!Ref Online Electronic Medical Library. https://online.statref.com/document/- WKSYECpuGQoZRgOT--mCt. 3/2/2022 11:05:05 AM CST (UTC -06:00).

Heymann D., ed. *Control of Communicable Disease, 20th Edition*. Washington DC, American Public Health Association; 2015: 419–423.

MDPH. *Regulation 105 CMR 300.000: Reportable Diseases, Surveillance and Isolation and Quarantine Requirements.* MDPH, May 27, 2022.

# Attachment One – Mumps Testing

**\*\*February 2024: See specimen shipping and storage update page 13**

**Report suspected cases as soon as possible!**

Mumps is reportable in Massachusetts, whether suspected or confirmed. Call your local board of health and MDPH at 617/983-6800 (available 24/7). Providers in Boston should contact the Boston Public Health Commission at 617/534-5611.

**When to test for mumps:**

A clinical diagnosis of mumps must be confirmed by laboratory testing. Consider lab testing for patients with symptoms consistent with mumps:

* Low-grade fever
* Swelling of one or more salivary glands, usually the parotid gland, and/or orchitis and
* A prodrome consisting of myalgias, loss of appetite, malaise, and/or headache

Patients with fever, salivary gland swelling and contact to a known mumps case or outbreak should be given high priority for testing. Asymptomatic patients should **not** be tested for mumps.

|  |
| --- |
| **Note:**Swelling of the salivary glands (parotitis) can also be caused by infection due to parainfluenza virus types 1 and 3, influenza A, Coxsackie A, echovirus, *Staphylococcus aureus*, lymphocytic choriomeningitis virus, HIV, and noninfectious causes such as drugs (e.g., phenylbutazone, thiouracil, iodides), tumors, starch ingestion, metabolic disorders (diabetes, cirrhosis, and malnutrition), immunologic diseases, and obstruction of the salivary duct. Consider testing for these other causes of parotitis. |

**Isolate the patient:** Mask and isolate the suspect patient as much as possible and consolidate care using standard and droplet precautions. Clinicians should also be masked. Suspected cases of mumps should be asked to refrain from all public activities for five days following onset of swelling.

**What specimens should be collected?**

In general, when mumps is suspected, MDPH recommends the collection of **serum** for mumps immunoglobulin M (IgM) testing and a swab of the buccal region (“**buccal swab”**) for mumps PCR testing. **The buccal swab is the preferred specimen for mumps PCR testing, obtained as soon as possible after onset of parotitis**. The specimens should be sent to the Massachusetts State Public Health Laboratory (MA SPHL) in Jamaica Plain for testing. A mumps IgG test (for serologic evidence of immunity to mumps) should be performed at a hospital or commercial laboratory. **Collect these specimens before the patient leaves your office.**

**Timing of specimen collection**

* Collect the buccal swab as soon after onset of swelling as possible, and within five days of onset of swelling.
* Collect an acute serum at the same time.
* A second serum may be requested ten or more days after onset of swelling for a second mumps IgM test.

|  |
| --- |
| **Note**: In vaccinated individuals, and those who have a history of mumps infection, a negative IgM result cannot be used to rule out mumps. In addition, a negative mumps PCR result cannot be used to rule out mumps. Furthermore, a positive mumps IgG result should not be interpreted as absolute evidence of immunity to mumps, because a positive mumps IgG does not necessarily predict immunity from mumps disease.  |

**Collecting a buccal swab (for mumps PCR)**

* **A swab of the buccal area (“buccal swab”) is the preferred specimen type.**
* Sterile synthetic swabs should have a polyester or Dacron tips (no cotton tips with wooden sticks, no swabs with calcium alginate tips, no charcoal swabs, no gel swabs, no dry swabs).
* Massage the parotid gland region for 30 seconds prior to swabbing.
* Firmly swab the buccal area (inside of cheek near the upper rear molars, where the Stenson’s duct drains)
* Swabs must be placed into viral transport medium (VTM) or universal transport medium (UTM) and sent wet. Agitate the swabs for at least 30 seconds in a tube containing 2 mL VTM. The swab should be left in the tube. Break/cut the end if necessary.
* **Dry swabs are not suitable for testing and will not be tested.**

In patients with fever and respiratory illness, a nasopharyngeal swab (NPS) may also be collected and placed in its own tube of viral transport medium (VTM). The NPS can be tested for influenza and other causes of respiratory illness, which may also cause parotitis. Use the “[Respiratory Surveillance](https://www.mass.gov/handbook/influenza-information-for-healthcare-and-public-health-professionals)” specimen submission form for influenza and respiratory panel testing.

**Collecting serum**

* At least 2 mL of serum should be collected in a serum-separator tube. A red-top tube is an acceptable alternative, if a serum separator tube is not available.
* The specimen must be spun before submitting it.
* If the initial specimen is negative, a second specimen may be requested, ten or more days after onset of swelling.

**Storing, labeling and shipping the specimens**

Keep specimens refrigerated at 4◦C and send on cold packs as soon as possible. Ensure that specimen containers are firmly closed, and clearly labeled with two unique identifiers, such as patient name and date of birth. After 48 hours, store and ship specimens at -20°C or lower. Avoid freeze-thaw cycles. Inappropriate or leaking specimens will be rejected. (updated 2/2024)

**Complete the Specimen Submission Form**

Use one form for each specimen submitted. Include provider contact information and other important details like patient demographics, symptoms including fever, parotitis onset date, vaccination history, recent travel history and possible exposure to mumps. Failure to fully complete this form will delay testing. The Specimen Submission Form is on the [MDPH website](https://www.mass.gov/doc/specimen-submission-form-general-form-used-for-human-tests-0/download?_ga=2.135967544.841566279.1661174344-444058863.1618585457).

.

**How do I get the specimen to the MA SPHL?**

Using your own courier is usually the best way to get a specimen to MA SPHL in a timely manner. In high-suspect situations and outbreaks, MDPH may be able to provide a courier to pick up the specimen and deliver to the MA SPHL. Call 617/983-6800.

**Where can I get more information?**

Call MDPH at 617-983-6800 or your local board of health. CDC has mumps information for healthcare professionals at <http://www.cdc.gov/mumps/hcp.html>.