

Chapter 9: Mumps

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I. Disease Description

Mumps is an acute viral illness caused by a paramyxovirus that typically presents as swelling of the parotid (parotitis) or other salivary gland[s]. Parotitis may be unilateral or bilateral and usually lasts about 3 to 7 days (average 5 days); most cases resolve within 10 days. Nonspecific prodromal symptoms may precede parotitis by several days, including low-grade fever, which may last 3–4 days, myalgia, anorexia, malaise, and headache. The incubation period ranges from 12–25 days, but parotitis typically develops 16 to 18 days after exposure to mumps virus.¹

Mumps can occur in a person who is fully vaccinated, but vaccinated persons are at much lower risk for mumps and mumps complications. Mumps reinfection in patients who previously had natural infection or recurrent mumps (parotid swelling resolves and then weeks to months later occurs on the same or other side) can also occur.^{2–4}

Mumps infection may present only with nonspecific or primarily respiratory symptoms or may be asymptomatic.⁵ Among unvaccinated people, approximately 20% of infections can be asymptomatic; frequency of asymptomatic infection among vaccinated people is unknown.^{6–8}

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.^{9,10} The frequency of complications is lower in vaccinated patients compared with unvaccinated patients (Table 1).^{11–14} 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.⁸ About half of patients with mumps orchitis develop testicular atrophy of the affected testicles.^{15,16} While there is a theoretical risk for temporary sterility or subfertility from oligospermia, azoospermia, or asthenospermia among men with mumps orchitis,¹⁵ 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.

Table 1. Frequency of complications among unvaccinated and vaccinated patients with mumps

| Complication | Estimated frequency among unvaccinated mumps patients (%) | Estimated frequency among vaccinated mumps patients (%) |
|--------------|---|---|
| Orchitis | 30 [17,18] | 6 [12–14] |
| Oophoritis | 7 [7] | ≤1 [12,13] |
| Mastitis | 30 [6] | ≤1 [12] |
| Pancreatitis | 4 [8] | <1 [12,13] |
| Hearing loss | 4 [19,20] | <1 [12,13] |
| Meningitis | <1–10 [18,21] | ≤1 [12,13] |
| Encephalitis | ≤1 [18] | ≤1 [12] |



Transmission and infectious period

Mumps virus is transmitted person to person through direct contact with saliva or respiratory droplets of a person infected with mumps (i.e., droplet transmission). Mumps is not as easily transmitted as measles or varicella (i.e., airborne transmission). Mumps typically requires close contact to spread, especially among vaccinated populations.

Close contact* is defined for mumps as:

- (a) having direct contact with a mumps patient's infectious respiratory secretions by droplet transmission (e.g., kissing, sharing saliva-contaminated objects like water bottles, or being coughed or sneezed on). Droplets generally travel ≤ 3 feet when an infected person talks, coughs, or sneezes; or
- (b) being in close proximity for a prolonged period of time with a person infected with mumps during their infectious period (2 days prior, to 5 days after, onset of parotitis or other salivary gland swelling)

A person with mumps is considered infectious from 2 days before through 5 days after parotitis onset.²² Although mumps virus has been isolated from 7 days before through 11–14 days after parotitis onset,^{22–24} the highest percentage of RT-PCR positive results and the highest virus loads occur closest to parotitis onset and decrease rapidly thereafter.^{22,25,26} Transmission may also occur from persons with asymptomatic infections or only prodromal symptoms.²⁷ No studies have assessed peak infectiousness in mumps patients who do not have parotitis (e.g., patients who only have nonspecific respiratory symptoms or only have complications like orchitis). In lab-confirmed patients without parotitis, onset of first symptom can be used in place of onset of parotitis to estimate a patient's infectious period. Mumps virus has been isolated up to 14 days in urine²⁸ and semen.²⁹ However, no studies have assessed if mumps virus can be transmitted through either of these fluids.

Mumps during pregnancy

Mumps infection that occurs in pregnant women is generally benign and not more severe than in women who are not pregnant. Few studies have been conducted to determine if there is a risk that mumps infection in pregnant women may cause complications during pregnancy. One study from 1966 reported an association between maternal mumps infection during the first trimester of pregnancy and an increase in the rate of spontaneous abortion or intrauterine fetal death,³⁰ but this association was not found in another study.³¹ Another study did not find a significant association between low birth weight and mumps infection during pregnancy.³² While there are case reports of congenital malformations in infants born to mothers who had mumps during pregnancy,³³ the only prospective, controlled study found rates of malformations were similar between mothers who had mumps and those who did not have mumps during pregnancy.³⁴

Other parotitis etiologies

Not all cases of parotitis—especially sporadic ones—are due to mumps infection. Parotitis can be caused by parainfluenza virus types 1–3, Epstein Barr virus, influenza A virus (H3N2), human herpes virus 6A and 6B, herpes simplex viruses 1 and 2, Coxsackie A virus, echovirus, adenoviruses, lymphocytic choriomeningitis virus, and human immunodeficiency virus.³⁵ Parotitis can also result from noninfectious causes such as drugs, tumors, immunologic diseases, and obstruction of the salivary duct. However, other causes do not produce parotitis on an epidemic scale.^{36,37}

** In the health care setting, unprotected exposures are defined as being within 3 feet of a patient with a diagnosis of mumps without the use of proper personal protective equipment*

II. Background

Pre-vaccine era (before 1967)

In the prevaccine era, mumps was a notable cause of morbidity in the United States, with well over 100,000 cases reported each year. Mumps was a universal childhood disease, with highest incidence among children 5–9 years of age.^{38,39} Permanent unilateral deafness caused by mumps occurred in 1 of 20,000 infected persons; however, bilateral, severe hearing loss was very rare.¹⁹ Before 1967, mumps accounted for approximately 10% of all cases of aseptic meningitis.⁴⁰ In 1967, mumps encephalitis accounted for 36% of all reported encephalitis cases.³⁸ During 1962–1967, there were 3 deaths per 10,000 reported mumps

cases.³⁸ Mumps also substantially affected US armies during mobilization.⁴¹ The average annual rate of hospitalization resulting from mumps during World War I was 55.8 per 1,000, which was exceeded only by the rates for influenza and gonorrhea.⁴¹

Vaccine era – disease reduction (1967-2005)

Mumps vaccine was licensed in the United States in 1967.³⁸ In 1977, the Advisory Committee on Immunization Practices (ACIP) made a recommendation for 1 dose of mumps vaccine for all children at any age after 12 months.⁴² In 1989, children began receiving 2 doses of mumps vaccine because of implementation of a 2-dose measles vaccination policy using the combined measles, mumps, and rubella vaccine (MMR).⁴³ In 2006, a 2-dose mumps vaccine policy was recommended routinely for school-aged children, students at post high school educational institutions, healthcare personnel, and international travelers, and also considered in outbreak settings for children 1–4 years of age and for adults previously vaccinated with 1 dose.⁴⁴

Following mumps vaccine licensure and ACIP recommendations for its use, reported cases of mumps steadily decreased from more than 152,000 cases in 1968 to 2,982 in 1985.⁴⁵ During 1986–1987, a resurgence occurred with more than 20,000 reported mumps cases. The primary cause of this resurgence was low vaccination levels among adolescents and young adults.⁴⁵ In the late 1980s and early 1990s, outbreaks were reported among primary and secondary school children who had previously received 1 dose of mumps-containing vaccine.^{46,47} The second dose of MMR vaccine recommended in 1989 subsequently improved mumps control as well. By the early 2000s, reported mumps cases declined to an average of less than 300 cases annually.⁴⁸

Resurgence in cases and outbreaks (2006– present)

Starting in 2006, there has been an increase in the number of mumps cases and outbreaks reported in the United States, with several peak years. The epidemiology has shifted from the majority of cases occurring among unvaccinated children during the pre-vaccine era to cases occurring in fully vaccinated adolescents and young adults, mainly driven by outbreaks on college campuses, close-knit communities, and other congregate settings. Although this resurgence began with geographically localized large outbreaks, it has since transitioned to outbreaks of varying sizes and different settings across most US states.

In 2006, the first peak year, 6,584 cases were reported, predominantly among midwestern college students.¹² In the six states where most cases were reported, approximately 63% of all patients with known vaccination status had received 2 doses of MMR vaccine.¹² In 2007 and 2008, the number of annual cases declined to 800 and 454 cases, respectively.^{49,50} Then from 2009 to 2010, two large outbreaks occurred among Orthodox Jewish communities in the Northeast (3,502 cases)¹³ and the U.S. Territory of Guam (505 cases).¹⁴ Cases in these outbreaks were mainly among fully vaccinated children and adolescents.^{13,14} Between July 2010 and December 2015, at least 23 large outbreaks (20–485 cases per outbreak) were reported in 18 states. Most outbreaks during this time occurred among fully vaccinated young adults of college age.⁵¹

Following a relative decline in cases from 2011–2013 (~200–500 cases reported annually), cases began to increase again, peaking with >6,000 cases reported in both 2016 and 2017.^{52,53} From January 2016 through June 2017, 39 health departments (37 states, New York City, Washington DC) reported 150 outbreaks, accounting for >9,000 cases.^{54,55} Median outbreak size was 10 cases (range: 3–2,954 cases). Outbreaks occurred in many different settings, including universities, schools, athletics teams and facilities, church groups, workplaces, large parties or events, and households. Of 7,187 (78%) patients with known vaccination status, 75% had ≥ 2 doses of MMR vaccine. Though young adults made up the majority of cases, in 2015–2018, at least 1 in every 5 mumps cases was in a fully vaccinated child or adolescent.⁵⁶

Across 13 studies with varying methods, settings, age groups, and sample sizes, the median estimate for the vaccine effectiveness of two doses of MMR vaccine against clinical mumps disease was 88% (range: 32–95%),^{27, 57–68} lower than for the other two components of the MMR vaccine (97% for measles after two doses and 97% for rubella after one dose). While evidence is limited, experts believe that several factors contribute to some vaccinated people being at risk for mumps infection, including:

- Development of a low immune response (insufficient for protection), or decreased immunity (waning) overtime after initially developing an immune response following vaccination (secondary vaccine failure), or lack of development of an immune response after receiving the vaccine (primary vaccine failure),

- Lower levels of vaccine-induced antibodies against the circulating wild-type virus strains (mainly genotype G in the U.S.) compared with the vaccine virus strain (genotype A),
- During the current period of low disease incidence, lower frequency of subclinical immunologic boosting (re-infection that boosts antibody titers without causing illness) due to lack of exposure to wild-type virus.

Introduction of mumps virus into settings with intense or frequent close contact exposures† that facilitate transmission can lead to outbreaks among highly vaccinated people.

Use of the third MMR dose during outbreaks

In 2012, CDC issued interim guidance on consideration of the use of a third dose of MMR vaccine during mumps outbreaks for specific target populations. One study conducted during a large university outbreak in 2015–2016 found that students who received a third MMR vaccine dose had a 78% lower risk of mumps than those with two doses.⁶² The increased burden of mumps and results from this study, led the Advisory Committee on Immunization Practices (ACIP) to examine the evidence on use of a third dose of a mumps-containing vaccine during mumps outbreaks.⁶⁹ In October 2017, ACIP recommended a third dose of MMR vaccine[§] for people who are identified by public health authorities as being part of a group or population at increased risk for mumps because of an outbreak. Subsequently, CDC developed [guidance for health departments](#) on implementation of the recommendation.

The duration of protection from a third dose of MMR vaccine is unknown. Immunological studies suggest the added protection from a third MMR dose may be short term, as people who received a third dose were observed to have a boost in neutralizing antibodies one month after vaccination that then declined to near-baseline levels after one year.⁷⁰ More studies are needed to assess vaccine effectiveness over time and if other mechanisms of the immune response may provide longer term protection. Therefore, a third dose of MMR vaccine is recommended only for additional individual protection against mumps during outbreaks, as demonstrated by vaccine effectiveness studies conducted during outbreaks. ACIP currently recommends two doses of MMR vaccine for routine vaccination; there is no recommendation for routine vaccination with a third dose.

Global mumps epidemiology

Worldwide, mumps is not as well controlled as measles and rubella. From 1999–2019, on average, about 500,000 mumps cases were reported to the World Health Organization annually;⁷¹ however, global mumps incidence is challenging to estimate as mumps is not a notifiable disease in many countries. As of 2019, mumps vaccine is routinely used in 122 of 194 (63%) countries.⁷² Since the mid-2000s, mumps outbreaks have also been reported among populations with high 2-dose MMR coverage in other countries, including United Kingdom,⁷³ Ireland,⁷⁴ New Zealand,⁷⁵ Canada,⁷⁶ Netherlands,⁷⁷ Spain,⁷⁸ and Norway.⁷⁹ Despite these outbreaks, mumps incidence is still much higher in countries that do not have routine mumps vaccination.

III. Vaccination

For specific information about mumps vaccination, refer to the [Pink Book](#), which provides general recommendations, including vaccine use and scheduling, immunization strategies for providers, vaccine content, adverse events and reactions, vaccine storage and handling, and contraindications and precautions.

† Examples of intense close contact exposures include physical contact, such as attendance at a crowded party, or during dancing, contact sports, kissing or sexual activity; and sharing of gym equipment or drinks. Examples of frequent close contact exposures include prolonged contact such as living in confined or shared spaces; repeated contact such as meeting regularly or sharing daily habits.

§ Measles, mumps, rubella, and varicella (MMRV) vaccine may be used for children ≤12 years of age

IV. Case Definition

The following case definition for mumps was updated and approved by the Council of State and Territorial Epidemiologists in 2011.⁸⁰

Case definition for case classification

Suspect:

Parotitis, acute salivary gland swelling, orchitis, or oophoritis unexplained by another more likely diagnosis,

or

A positive lab result with no mumps clinical symptoms (with or without epidemiological linkage to a confirmed or probable case).

Probable:

Acute parotitis or other salivary gland swelling lasting at least 2 days, or orchitis or oophoritis unexplained by another more likely diagnosis, in:

- a person with a positive test for serum anti-mumps IgM antibody, or
- a person with epidemiologic linkage to another probable or confirmed case or linkage to a group/community defined by public health during an outbreak of mumps.

Confirmed:

A positive mumps laboratory confirmation for mumps virus with RT-PCR or culture in a patient with an acute illness characterized by any of the following:

- acute parotitis or other salivary gland swelling, lasting at least 2 days
- aseptic meningitis
- encephalitis
- hearing loss
- orchitis
- oophoritis
- mastitis
- pancreatitis

Case classification for 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 US-acquired cases.

US-acquired case: A US-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.

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 US-acquired.

V. Laboratory Testing

If mumps is suspected, laboratory testing should be performed. Refer to Chapter 22, “[Laboratory Support for Surveillance of Vaccine-Preventable Diseases](#)” for detailed information on laboratory testing for mumps and specific information on specimen collection and shipment. All specimens sent to CDC or Association of Public Health Laboratories (APHL)—[Vaccine Preventable Diseases \(VPD\) Reference Centers](#) should be accompanied by complete information on the case’s parotitis onset date and vaccination status.

To help local and state health departments conserve public health resources during mumps outbreaks, CDC, in collaboration with CSTE and APHL, developed guidance to optimize mumps testing practices. This guidance is intended to reduce the number of specimens unnecessarily or improperly collected and tested. [CDC Guidance for Optimizing Mumps Testing](#) can be found on the CDC website.

Health departments can also distribute the CDC Mumps Testing [Job-Aid Template](#) for Providers to educate providers on appropriate specimen collection.

Public health laboratories are encouraged to send select specimens (see [Guidance for Optimizing Mumps Testing](#) for more information on which specimens) to CDC or the [APHL VPD Reference Center](#) laboratories for routine molecular surveillance (e.g., sequencing the small hydrophobic (SH) gene to determine the mumps virus genotype). Molecular surveillance is important to monitor any changes in the genotype or strain prevalence over time and to trace pathways of transmission. Since 2006, over 98% of sequenced mumps isolates in the United States are from the same genotype (genotype G), and the majority of genotype G specimens share the SH gene of the same strain (Sheffield), or are only 1 or 2 single nucleotide polymorphisms (SNPs) different from the Sheffield reference strain.⁸¹ The high level of similarity among US sequences limits the usefulness of routine genotyping to inform the epidemiologic investigation during outbreak(s). However, if the epidemiology suggests a case(s) may not be related to an outbreak, a notable difference (i.e., different genotype or strain) can help identify sporadic cases and inform outbreak response efforts. More research is needed to evaluate the minimum difference needed between sequences to determine if cases are epidemiologically related. With wide global distribution of genotype G viruses, sequencing larger segments of the mumps genome may be useful to identify sources and epidemiologic linkages.⁸² However, information on the distribution of mumps lineages around the world is currently limited and not sufficient to identify country of origin for imported cases.

Specimen collection and management

Specimen collection and shipping are important steps in obtaining laboratory diagnosis or disease confirmation. Guidelines have been published for specimen collection and handling for viral and microbiologic agents. Information is also available on using CDC laboratories as support for reference and disease surveillance; this includes

- a [central website](#) for requesting lab testing;
- the [form](#) required for submitting specimens to CDC (See Appendix 23, CDC Form 0.5034);
- information on general requirements for shipment of etiologic agents ([Appendix 24](#)—although written to guide specimen submission to CDC, this information may be applicable to submission of specimens to other laboratories; and
- the [CDC Infectious Diseases Laboratories Test Directory](#), which contains not only a list of available tests, but also detailed information on appropriate specimen types, collection methods, specimen volume, and points of contact.

Specific instructions for specimen collection and shipment may be obtained from the [CDC mumps website](#) or by contacting the CDC Viral Vaccine Preventable Diseases Branch at 404-639-3339. Specimens for RT-PCR, virus isolation, and genotyping should be sent to CDC as directed by the State Health Department.

VI. Reporting and Case Notification

Case reporting within a jurisdiction

Each state and U.S. territory has regulations or laws governing the reporting of diseases and conditions of public health importance.⁸³ These regulations and laws list the diseases that are to be reported and describe those persons or groups responsible for reporting, such as healthcare providers, hospitals, schools, laboratories, daycare and childcare facilities, and other institutions. Persons reporting these conditions should contact their Local or State Health Department for state-specific reporting requirements. Mumps is currently a reportable condition in all US states.

Case notification to CDC

Provisional notifications of all probable and confirmed mumps cases should be sent by the State Health Department to CDC using event code 10180 via the National Notifiable Diseases Surveillance System (NNDSS) within 7 days (i.e., the next reporting cycle). Electronic reporting of case records should not be delayed because of incomplete information or lack of confirmation. Following completion of case investigations, case records should be updated with any new information and resubmitted to CDC. Final laboratory results may not be available for the initial report but should be submitted via NNDSS when available.

The state in which the patient resides at the time of diagnosis should submit the case notification to CDC. For people who may be under the custody of a law enforcement agency, the state/jurisdiction of the facility in which the patient was housed at onset of parotitis, or onset of first symptom in the absence of parotitis, should submit the case notification to CDC. For further inquiries, please email: ncirddvdmrhp@cdc.gov

Information to collect

The following data should be collected during mumps case investigation. Additional information may be collected at the direction of the Local or State Health Department.

- **Demographic information**

- Name
- Address
- Date of birth
- Age
- Sex
- Ethnicity
- Race
- Country of birth
- Country of usual residence (e.g., United States resident or foreign visitor)
- Occupation

- **Reporting source**

- State
- County
- Date first reported to a health department

- **Clinical information**

- Date of illness onset (note: this may be earlier than parotitis onset due to prodromal symptoms)
- Parotitis or other salivary gland involvement (pain, tenderness, swelling)
- Date of parotitis (or other salivary gland swelling) onset
- Duration of parotitis (or other salivary gland swelling)
- Prodromal symptoms (e.g., headache, anorexia, fatigue, fever, body aches, stiff neck, difficulty in swallowing, nasal congestion, cough, earache, sore throat, nausea, abdominal pain)

- Complications
 - orchitis/oophoritis
 - mastitis
 - pancreatitis
 - deafness (transient or permanent; unilateral or bilateral)
 - meningitis
 - encephalitis
- **Outcome**
 - Hospitalization for mumps
 - Duration of hospitalization (i.e., number of days hospitalized)
 - Patient survived or died
 - Date of death
 - Postmortem examination results
 - Death certificate diagnoses
 - Cause of death/association with mumps (i.e., was the death related to mumps)
- **Laboratory**
 - Laboratory (i.e., where the specimen was tested, e.g., commercial lab, public health lab)
 - Specimen ID
 - Specimen type (buccal, oral, urine, CSF for viral detection/isolation; sera for serology)
 - Test type (RT-PCR, viral culture, IgM, IgG)
 - Date of collection of specimens
 - Genotype
 - Results
- **Vaccine information**
 - Vaccination status
 - Number of doses of vaccine given
 - Type of vaccine administered (i.e., MMR, MMRV)
 - Dates of mumps vaccination for each dose
 - If not vaccinated, reason
- **Epidemiologic**
 - Epidemiologic linkages
 - Contact (or in a chain of contacts) of a confirmed or probable mumps case
 - Contact of a person with parotitis
 - Contact of a person with a mumps-associated complication
 - Member of a risk group defined by public health authorities during an outbreak
 - Source of exposure (e.g., age, relationship to case)
 - Transmission setting (e.g., household, college, school, correctional or detention facility) where the patient was likely exposed to the source of exposure
 - Sporadic or outbreak-associated
 - Outbreak name and/or outbreak ID (note: it is important to consistently use the same outbreak name/ID to be able to track multiple outbreaks that may occur at the same time; include consistent outbreak name/ID when transmitting data to CDC)
 - Participation in group(s) or setting(s) or attended event(s) with intense or frequent close contact (e.g., university club, sports team, church group, congregational living, bar, concert, conference, etc.) to identify other people who may be at increased risk for mumps
 - Dates of participation in close contact groups, settings, or events, during infectious period

- Import status (e.g., internationally imported or US-acquired). See Case Classification section above.
- Travel history (i.e., return from domestic or international travel within 25 days of symptom onset)
 - Destination(s) of travel
 - Date of departure and return to state or U.S.

VII. Importance of Surveillance

Information obtained through surveillance is used to follow disease trends in the population and to characterize populations requiring additional disease control measures.

Monitoring surveillance indicators

Regular monitoring of surveillance indicators can help identify specific areas of the surveillance and reporting system that need improvement. The following indicators should be monitored by the state health department.

- The proportion of confirmed cases reported to NNDSS with complete information on
 - date of birth,
 - symptom and parotitis onset date,
 - clinical criteria for case classification (e.g., parotitis duration, complications),
 - vaccine history (vaccination status, number of doses, dates when doses received)
 - date reported to health department,
 - transmission setting,
 - outbreak-related,
 - epidemiologic linkage,
 - hospitalization,
 - laboratory testing
- The interval between date of symptom onset and date of public health notification
- The proportion of cases that are laboratory confirmed
- The proportion of outbreak-associated cases that have an outbreak name or ID

VIII. Case Investigation

All persons with suspected mumps should be investigated. Identification and investigation of mumps cases is important in the initiation of control measures to prevent the spread of the disease. In settings with high risk for transmission, such as schools, universities, close-knit communities, and correctional/detention facilities, health departments may want to be more proactive. In these settings, health departments should consider conducting case investigations and providing recommendations before laboratory results are known or before additional cases are identified. Implementation of control measures may be contingent on setting, likelihood of ongoing transmission, and available resources. The Mumps Surveillance Worksheet [Appendix 10 Cdc-pdf](#) provides key information to be collected during a case investigation.

Additional guidance on case investigation can be found in the section *Investigate and confirm suspected mumps* in the [Strategies for the Control and Investigation of Mumps Outbreaks](#) web page.

IX. Outbreak Investigation

A mumps outbreak is defined as 3 or more cases linked by time and place. Every suspect case of mumps should be investigated to determine if they are part of an outbreak. A critical part of case investigation during an outbreak is to determine if the case and their close contacts are part of a group or population at increased risk for mumps. All people in the group at increased risk should be recommended to receive an additional dose (“outbreak” or third dose) of MMR vaccine for added personal protection.

Guidance on mumps outbreak response and control, including use of a third dose of MMR vaccine, can be found on the [CDC Strategies for the Control and Investigation of Mumps Outbreaks](#) web page.

Setting specific outbreak guidance

Setting specific guidance is also provided on the [CDC Mumps Outbreaks](#) web page, including responding to mumps in healthcare settings, universities, and correctional/detention facilities.

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