



**New Jersey Department of Health
Vaccine Preventable Disease Program**

MUMPS CLINICAL FAQS

Date: May 21, 2014

RECENT MUMPS CASES IN NEW JERSEY

Is there a mumps outbreak in NJ?

The New Jersey Department of Health (NJDOH), in conjunction with the Hoboken Health Department, Stevens Institute of Technology, and additional local, county, and state health departments, is investigating an outbreak of confirmed mumps associated with Stevens Institute of Technology (SIT) in Hoboken, NJ. NJDOH is working with the involved local health departments within NJ to manage the exposures.

As of 05/21/2014, 15 cases of mumps have been identified among students attending Stevens Institute of Technology. Cases range in age from 18 to 22 years and all have received two documented doses of mumps-containing vaccine. Parotitis onset spanned from 04/06/2014 through 05/18/2014. Classes have finished for the semester and letters were sent to students with information on signs/symptoms, infection prevention, and what students should do if they become symptomatic. NJDOH continues to work with the Hoboken Health Department and SIT to monitor the situation over the summer.

Outbreaks can still occur in highly vaccinated U.S. communities, particularly in close-contact settings. In recent years, outbreaks have occurred in schools, colleges, and camps. However, high vaccination coverage helps limit the size, duration, and spread of mumps outbreaks. For more information on outbreaks, please visit:

<http://www.cdc.gov/mumps/outbreaks.html>

My patient got the vaccine but still got mumps. Does this mean the vaccine doesn't work?

No. The MMR vaccine is very effective against measles, mumps, and rubella, but it is not perfect. MMR vaccine reduces the risk of getting mumps, especially if you get two doses. People who have received two doses of the MMR vaccine are about 9 times less likely to get mumps than unvaccinated people who have the same exposure to mumps virus. However, some people who received two doses of MMR can still get mumps, especially if they have an intense exposure to the mumps virus. If they do get mumps, people who have been vaccinated are likely to have less severe illness than unvaccinated people with mumps.

Some people who have had both doses of the recommended MMR vaccine (to protect against measles, mumps, and rubella disease) are still getting mumps. Why is this happening if the mumps vaccine is effective?

During mumps outbreaks in highly vaccinated communities, the proportion of cases that occur among people who have been vaccinated may be high (see example below). This should not be interpreted as meaning that the vaccine is ineffective. The way to assess the effectiveness of the vaccine is by comparing the attack rate in people who are vaccinated with the attack rate in those who have not been vaccinated. In outbreaks in highly vaccinated populations, the relatively few people who have not been vaccinated against mumps usually have a much greater mumps attack rate than those who have been fully vaccinated. During the outbreak in 2006, most of the mumps cases occurred in those who had received 2 doses of the MMR vaccine because most of the affected population had received 2 vaccine doses. However, the attack rate was much higher in the unvaccinated people, and 2 doses of the vaccine were estimated to be 88% (range: 66-95%) effective in preventing mumps.

Example:

Let's say that an outbreak occurs among 1,000 people and that 950 of these 1,000 people have received 2 doses of the vaccine and 50 are unvaccinated (i.e., vaccine coverage = 95%). If there is a 30% attack rate among people who haven't been vaccinated, 15 unvaccinated people would get the disease. Among the 950 vaccinated people, the attack rate would be 3%, so 29 vaccinated people would get the disease. Therefore, of the 44 people who got sick during the outbreak, the majority (29, or 66%) would have been vaccinated. This doesn't imply that the vaccine didn't work—in fact, the

people who hadn't been vaccinated were 10 times more likely to get sick as those who had been vaccinated, it's just that there were a lot fewer unvaccinated people at risk. Furthermore, if none of the 1,000 people had been vaccinated, the outbreak would have resulted in 300 cases rather than only 44. In this scenario, we would say that the vaccine is 90% effective in preventing the disease after 2 doses, which is the same as saying that the attack rate in the unvaccinated group is 10 times higher than the attack rate among people who have received 2 doses of vaccine. The formula to calculate vaccine effectiveness is (attack rate in unvaccinated group minus attack rate in vaccinated group) divided by attack rate in unvaccinated group, or $(ARU-ARV)/ARU$.

How effective is the MMR vaccine in general?

The MMR vaccine is very effective against measles, mumps, and rubella and has made these three once-common childhood diseases very rare in the United States.

Before there was a vaccine against mumps, mumps was a common disease in the United States and caused complications such as permanent deafness in children, and it occasionally caused encephalitis, which can result in death, although very rarely. Before vaccine was used, over 150,000 mumps cases were reported every year, although many more unreported cases occurred. Now, a few hundred cases of mumps are reported every year on average. However, outbreaks still occasionally occur. In 2006, there was an outbreak affecting more than 6,584 people in the United States, with many cases occurring on college campuses. In 2009, an outbreak started in close-knit religious communities and schools in the Northeast, resulting in more than 3,000 cases. These outbreaks have shown that when people who are sick with mumps have close contact with a lot of other people (such as among students living in dormitories and students and families in close-knit communities) mumps can spread even among vaccinated people. However, outbreaks are much larger in areas where vaccine coverage rates are lower.

Is there any recommendation to give a third dose of MMR to control outbreaks?

Data on use and effectiveness of a third dose of MMR vaccine for mumps outbreak control are limited. Data are insufficient to recommend for or against the use of a third dose of MMR vaccine for mumps outbreak control. CDC has issued guidance for consideration for use of a third dose in specifically identified target populations along with criteria for public health departments to consider for decision making. This information is available

through the CDC website at <http://www.cdc.gov/vaccines/pubs/surv-manual/chpt09-mumps.html>

Should I administer mumps vaccine to a patient less than 12 months of age if he/she were exposed to mumps during an outbreak?

Although mumps-containing vaccine has not been shown to be effective in preventing mumps in persons already infected, it will prevent infection in those persons who are not yet exposed or infected. If persons without evidence of immunity can be vaccinated early in the course of an outbreak, they can be protected prior to exposure. However, because of the long incubation period for mumps, cases are expected to continue to occur for at least 25 days among newly vaccinated persons who may have been infected before vaccination.

Measles, mumps, and rubella vaccine is safe to administer to children < 12 months of age. In fact, it is recommended that travelers aged ≥ 6 months of age who do not have acceptable evidence of measles, mumps, and rubella immunity should be vaccinated with MMR vaccine. Children who receive MMR vaccine before 12 months of age should be considered potentially susceptible to all three diseases and should be revaccinated with 2 doses of MMR vaccine, the first dose administered when the child is aged 12 through 15 months (12 months if the child remains in an area where the disease risk is high) and the second dose at least 28 days later. A MMR vaccine administered prior to 12 months of age will not be accepted for attendance in NJ schools. The child's healthcare provider, in conjunction with the parents/guardians should decide whether vaccination prior to 12 months of age is appropriate based on ongoing risk of exposure to mumps.

EVIDENCE OF IMMUNITY

What is considered acceptable presumptive evidence of immunity to mumps for the general public?

- 1) Documentation of age-appropriate vaccination with a live mumps virus-containing vaccine. The first dose of MMR vaccine should be administered at age ≥ 12 months; the second dose of measles- or mumps-containing vaccine should be administered no earlier than 28 days after the first dose.
 - a. Preschool-age children: one dose
 - b. School-aged children (grade K – 12): 2 doses

- c. Adults not at high risk: one dose, or
- 2) Laboratory evidence of immunity--Measles, rubella, or mumps immunoglobulin G (IgG) in serum; equivocal results should be considered negative, or
- 3) Laboratory confirmation of disease, or
- 4) Born before 1957

NOTE: Adults at high risk include students in post-high school educational institutions, health-care personnel, and international travelers. Acceptable presumptive evidence of immunity is different for healthcare personnel, students in post-high school educational institutions, and international travelers. For more information see MMWR, June 14, 2013, Vol. 62, No. 4.

<http://www.cdc.gov/mmwr/pdf/rr/rr6204.pdf>

I am a healthcare facility whose employees are caring for patients during a mumps outbreak. How should I manage employees who might be exposed?

All healthcare facilities should have a record of healthcare personnel vaccination or immune status. The following criteria should be followed to assess presumptive evidence of immunity among healthcare personnel:

- Written documentation of vaccination with two doses of live mumps or MMR vaccine administered at least 28 days apart with the first dose administered on or after the first birthday, or
- Laboratory evidence of immunity - Measles, rubella, or mumps immunoglobulin G (IgG) in serum; equivocal results should be considered negative, or
- Laboratory confirmation of disease, or
- Birth before 1957 - For unvaccinated personnel born before 1957 who lack laboratory evidence of measles, rubella, or mumps immunity or laboratory confirmation of disease, healthcare facilities should consider vaccinating personnel with 2 doses of MMR vaccine at the appropriate interval (for measles and mumps) and 1 dose of MMR vaccine (for rubella), respectively.

For more information regarding documentation of immunity for measles, rubella, and mumps for health care personnel, visit <http://www.cdc.gov/mmwr/pdf/rr/rr6204.pdf>.

The criteria for acceptable evidence of measles, rubella, and mumps immunity were developed to guide vaccination assessment and administration in clinical and public health settings and to provide presumptive rather than absolute evidence of immunity. Persons who meet the criteria for acceptable evidence of immunity have a very high likelihood of immunity. Occasionally, a person who meets the criteria for presumptive immunity can acquire and transmit disease.

Vaccine doses with written documentation of the date of administration at age ≥ 12 months are the only doses considered to be valid. Self-reported doses and history of vaccination provided by a parent or other caregiver are not considered adequate evidence of immunity. Because of the extremely low incidence of these diseases in the United States, the validity of clinical diagnosis of measles, rubella, and mumps is questionable and should not be considered in assessing evidence. Persons who do not have documentation of adequate vaccination or other acceptable evidence of immunity should be vaccinated.

Serologic screening for measles, rubella, or mumps immunity before vaccination is not necessary and not recommended if a person has other acceptable evidence of immunity to these diseases. Similarly, postvaccination serologic testing to verify an immune response is not recommended.

Documented age-appropriate vaccination supersedes the results of subsequent serologic testing. If a person who has 2 documented doses of measles- or mumps-containing vaccines is tested serologically and is determined to have negative or equivocal measles or mumps titer results, it is not recommended that the person receive an additional dose of MMR vaccine. Such persons should be considered to have presumptive evidence of immunity. In the event that a person who has 1 dose of rubella-containing vaccine is tested serologically and is determined to have negative or equivocal rubella titer results, it is not recommended that the person receive an additional dose of MMR vaccine, except for women of childbearing age. Women of childbearing age who have 1 or 2 documented doses of rubella-containing vaccine and have rubella-specific IgG levels that are not clearly positive should be administered 1 additional dose of MMR vaccine (maximum of 3 doses) and do not need to be retested for serologic evidence of rubella immunity.

I am a healthcare facility whose employees are caring for patients during a mumps outbreak. My employees have documentation of 2 doses of MMR administered in accordance with ACIP guidelines. Should I check serology to be sure they are immune?

No. Checking serology in this situation is not recommended. These employees have adequate presumptive evidence of immunity.

I am a healthcare facility whose employees are caring for patients during a mumps outbreak. I have an employee who has 2 doses of MMR administered in accordance with ACIP guidelines and now has a negative serologic assay for mumps. Should I give a 3rd dose of MMR?

No. A 3rd dose of MMR is not currently recommended. The person has adequate presumptive evidence of immunity by having 2 doses of MMR administered in accordance with ACIP recommendations.

EXCLUSION OF HEALTHCARE PERSONNEL

What are the guidelines for excluding healthcare personnel during a mumps outbreak?

Healthcare personnel with active mumps illness and those who lack evidence of immunity and have had unprotected exposures to mumps should be excluded from work. Employees who have unprotected exposure to mumps should be excluded from work from the 12th day after the first unprotected exposure to mumps through the 25th day after the last exposure. Unprotected exposures are defined as being within three feet of a patient with a diagnosis of mumps without the use of proper personal protective equipment. Irrespective of their immune status, all exposed healthcare personnel should report any signs or symptoms of illness during the incubation period, from 12 through 25 days after exposure. People with an illness consistent with mumps should be excluded for 5 days after the onset of parotitis.

Management of healthcare personnel with illness due to mumps

A diagnosis of mumps should be considered in exposed healthcare personnel who develop non-specific respiratory infection symptoms during the incubation period after unprotected exposures to mumps, even in the absence of parotitis.

Healthcare personnel with mumps illness should be excluded for five days after the onset of parotitis.

Management of healthcare personnel who are exposed to persons with mumps

Healthcare personnel without evidence of immunity should be excluded from the 12th day after the first unprotected exposure to mumps through the 25th day after the last exposure.

Previously unvaccinated healthcare personnel who receive a first dose of vaccine after an exposure are considered non-immune and should be excluded from the 12th day after the first exposure to mumps through the 25th day after the last exposure. The mumps vaccine cannot be used to prevent the development of mumps after exposure.

For healthcare personnel with partial vaccination

Healthcare personnel who had been previously vaccinated for mumps, but received only one dose of mumps vaccine may continue working following an unprotected exposure to mumps. Such personnel should receive a second dose as soon as possible, but no sooner than 28 days after the first dose. They should be educated about symptoms of mumps, including nonspecific presentations, and should notify occupational health if they develop these symptoms.

For healthcare personnel who have presumptive evidence of immunity

Healthcare personnel with evidence of immunity do not need to be excluded from work following an unprotected exposure. However, two doses of MMR vaccine do not provide 100% protection from mumps. Some vaccinated personnel may remain at risk for mumps. Therefore, healthcare personnel should be educated about symptoms of mumps, including nonspecific presentations, and should notify occupational health if they develop these symptoms.

DISEASE DESCRIPTION

What causes mumps?

Mumps is a viral illness caused by a paramyxovirus of the genus *Rubulavirus*.

What are the laboratory criteria for diagnosis?

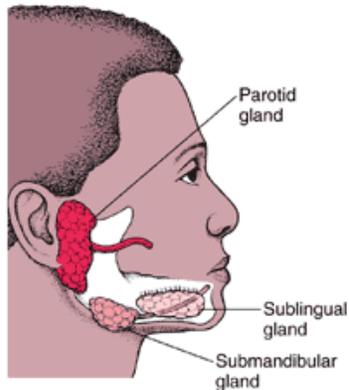
- Isolation of mumps virus from clinical specimen, or
- Detection of mumps nucleic acid (e.g., standard or real time RT-PCR assays), or
- Detection of mumps IgM antibody, or
- Demonstration of specific mumps antibody response in absence of recent vaccination, either a four-fold increase in IgG titer as measured by quantitative assays, or a seroconversion from negative to positive using a standard serologic assay of paired acute and convalescent serum specimens.

My patient has a clinically compatible illness but the lab tests are negative. Can I rule out mumps infection?

No. With previous contact with mumps virus either through vaccination (particularly with 2 doses) or natural infection, serum IgM test results may be negative; immunoglobulin G (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 false positive and false negative results are possible with IgM tests.

What are the clinical manifestations of mumps?

The classic symptoms of mumps include parotitis in about 50% either unilateral bilateral, which develops an average of 16 to 18 days after exposure. Swelling can also be seen in the submandibular and sublingual gland in a small percentage. Nonspecific symptoms including myalgia, anorexia, malaise, headache, and low-grade fever may precede parotitis by several days. As many as 40%–50% of mumps infections are associated with nonspecific or primarily respiratory symptoms, particularly among children less than 5 years of age. Only 30-40% of mumps infections produce typical acute parotitis. In 15-20% of infections, cases are asymptomatic.



From [The Merck Manual of Medical Information – Second Home Edition](#), p. 667, edited by Mark H. Beers.
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Are there other causes of parotitis?

Yes, but only mumps causes epidemic parotitis. Parotitis can also be caused by bacteria and by parainfluenza virus types 1 and 3, influenza A virus, Coxsackie A virus, echovirus, lymphocytic choriomeningitis virus, and human immunodeficiency virus. Non-infectious causes include drugs, tumors, immunologic diseases, and obstruction of the salivary duct.

How can mumps present?

In addition to parotitis or other salivary gland swelling, infection with mumps virus may present as aseptic meningitis, encephalitis, hearing loss, orchitis, oophoritis, mastitis or pancreatitis.

What complications can be caused by mumps?

Severe complications of mumps are rare. However, mumps can cause acquired sensorineural hearing loss in children; incidence is estimated at 1 in 20,000 cases. Mumps-associated encephalitis occurs in < 2 per 100,000 cases and approximately 1% of encephalitis cases are fatal.

Some complications of mumps are known to occur more frequently among adults than among children. Adults have a higher risk for mumps meningoencephalitis than children. In addition, orchitis occurs in up to 30-40% of cases in post pubertal males. Although it is frequently bilateral, it rarely causes sterility. Mastitis has been reported in as many as 31% of female patients older than 15 years who have mumps. Other rare complications of mumps are oophoritis and pancreatitis. Aseptic meningitis occurs in 10% of cases and is associated with a good prognosis. Although mumps infection in the first trimester of pregnancy may result in fetal loss,

there is no evidence that mumps during pregnancy causes congenital malformations. Permanent sequelae such as paralysis, seizures, cranial nerve palsies, aqueductal stenosis, and hydrocephalus are rare, as are deaths due to mumps.

What is the incubation period and period of infectiousness?

The average incubation period for mumps is 16-18 days, with a range of 12–25 days. Fever may persist for 3–4 days and parotitis, when present, usually lasts 7–10 days. Persons with mumps are usually considered most infectious from 1-2 days before until 5 days after onset of parotitis.

How is the mumps virus transmitted?

The mumps virus replicates in the upper respiratory tract and is spread through direct contact with respiratory secretions or saliva or through fomites. In health care settings, patients should be placed in droplet precautions in addition to standard precautions.

Staying home (or isolating oneself while at home) is not easy. Does this really matter?

Mumps is spread through respiratory droplets and direct contact with others who have the infection. The risk of spreading the virus increases the longer and the closer the contact is with someone who has the infection. When a person is ill with mumps, he or she should avoid contact with others from the time of diagnosis until at least 5 days after the onset of parotitis by staying home from work or school and staying in a separate room if possible. Others who are potentially exposed to those with mumps should make sure they are up to date with the vaccine against mumps.

VACCINE ISSUES

Should an IgG be drawn after two doses of MMR?

No. It is not necessary to draw an IgG after vaccines to confirm immunity.

Is there any danger to a person receiving additional vaccine (e.g., they have received MMR but can not find documentation)?

There is no danger to a person if he/she receives additional vaccine or if he/she has actually had the disease in the past and then receives vaccination. Short term safety of administration of a third dose of MMR vaccine was evaluated following vaccination clinics during two mumps outbreaks among 2,130 persons aged 9 through 21 years. Although these studies did not

include a control group, few adverse events were reported after administration of a third dose of MMR vaccine (7% in Orange County, New York and 6% in Guam). The most commonly reported adverse events were pain, redness, or swelling at the injection site (2%-4%); joint or muscle aches (2%-3%); and dizziness or lightheadness (2%). No serious adverse events were reported in either study. For more information see MMWR, June 14, 2013, Vol. 62, No. 4.

How long does it take to develop MMR immunity?

In general, it takes 10-14 days to mount a response to a vaccine if it is the body's first exposure. Then it takes approximately seven days after the second exposure.

Is there risk to a newborn of a susceptible mom?

If the mother develops disease, the newborn is susceptible and can develop disease. If the mother has had disease in the past, maternal antibody is transferred across the placenta and may protect infants from developing mumps during the first year of life. Since the vaccine is not administered before 12 months of age, symptomatic mothers should use standard and droplet precautions. The virus is not believed to be transmitted through breast milk.

If someone is exposed to mumps, would the vaccine prevent the disease?

Mumps vaccine has not been shown to be effective in preventing disease after exposure, but vaccination of exposed susceptible persons will reduce the risk of disease from possible future exposures. If symptoms develop (generally 16-18 days after exposure), the person should not go to school or work for at least 5 days and should contact their medical provider.

SPECIMEN COLLECTION AND MANAGEMENT

Who should be tested for suspected mumps infection?

Clinical diagnosis of mumps may be unreliable, suspected cases of mumps should be laboratory confirmed. As with any disease, lab work should be used in conjunction with clinical presentation (signs and symptoms). The recommendation to laboratory confirm all cases will be re-evaluated as the outbreak progresses.

It is difficult to interpret serology in people who have been vaccinated. Mumps should not be ruled out in someone with negative laboratory tests who is vaccinated if they have symptoms consistent with mumps. A detailed investigation should be conducted for each case with emphasis on accurate and complete immunization history. Recent outbreaks have included many cases who had already received at least one dose of mumps-containing vaccine.

What specimens should be collected from patients meeting the clinical case definition?

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

What is the gold standard for laboratory confirmation of mumps?

Viral culture is the gold standard. Laboratories are strongly encouraged to perform cell culture isolation of mumps from buccal/oral swabs specimens. Detection of mumps in culture can be done using immunofluorescent antibody staining or standard RT-PCR.

When is the best time to collect clinical specimens?

Among unvaccinated persons, if an acute IgM is collected 3 or less days after onset of parotitis and the IgM is negative, a second serum sample (collected 5-7 days after onset) is recommended. Buccal/oral swabs should also be collected at first contact. Comment: unvaccinated persons include those with unknown vaccination history, and those with or without a history of mumps disease- older persons or foreign nationals may have detectable mumps IgG due to a previous subclinical infection.

Persons with a history of documented mumps vaccination, regardless of timing of collection, may not have detectable IgM. Buccal samples have the best chance of containing virus when collected on day 1-3 of onset of parotitis.

How should specimens be collected and managed?

Serologic testing:

Collect 7-10 ml of blood in a red top or serum separator tube (SST). Store and ship specimens cold (using ice packs).

Acute serum:

Collect within 5 days after symptom onset (at time of diagnosis).

Convalescent serum:

Collect within 2-3 weeks after symptom onset.

Mumps viral samples:

Collect buccal swab or throat swab as soon as mumps is suspected. Samples may be positive in unvaccinated persons out to 9 days post onset, however among suspected cases that have received 1 or more doses of MMR, virus may be cleared much earlier. A commercial product designed for collection of throat cultures or a plain Dacron swab can be used for the collection of the buccal swab or throat swab (see information below regarding addition of fluids to keep swab moist). Synthetic swabs are preferred over cotton swabs which may contain substances that are inhibitory to enzymes used in RT-PCR.

Parotid Gland/Buccal Swab: May provide the best viral sample. Massage the parotid gland area (the space between the cheek and teeth just below the ear) for about 30 seconds prior to collection of the buccal secretions. The parotid duct (Stensen's duct) drains in this space near the upper rear molars. A throat swab (oropharyngeal or nasopharyngeal swab) can also be collected and added together with the buccal swab.

Place swab in a tube containing 2-3 mls of viral transport medium or cell culture medium (MEM or Hanks Balanced Salt Solution) or other sterile isotonic solution (phosphate buffered saline). The presence of protein, for example 1% bovine albumin, 0.5% gelatin, or 2% serum, stabilizes the virus which otherwise loses 90-99% infectivity within 2 hours at 4°C in a protein-free medium.

Keep samples cold (4°C). If there is more than 1 day delay in shipping the samples to the state lab or CDC for testing, the buccal swab or throat swab is best preserved at -70°C. Ship the viral specimens using ice packs or dry ice*. Avoid freeze-thaw cycles.

*If shipment contains both serum and viral samples, ship together by overnight service on cold packs (do not freeze serum).

LINKS:

“Real-time RT-PCR protocol, targeting the nucleoprotein (N) gene”

<http://www.cdc.gov/mumps/downloads/lab-rt-pcr-assay-detect.doc>

“Standard PCR for mumps virus”

<http://www.cdc.gov/mumps/downloads/lab-rt-pcr.doc>

LABORATORY RESULTS

Serology

- **IgM:** Mumps is confirmed using mumps IgM antibody testing of serum samples collected as soon as possible after symptom onset for IgM testing. A positive IgM test result indicates current/very recent infection or reinfection. As with any lab test, there can be false positive test results. If the suspected case has received one or more doses of MMR, the IgM response may be missing, delayed, or transient. If the acute IgM is negative, a second serum specimen should be collected. This second specimen should be tested for IgM as a delayed IgM response has been reported to have occurred in mumps cases in the past.
- **IgG:** IgG alone is not diagnostic unless you obtain both an acute (can be done as soon after onset as the patient is seen, but ideally four to five days after onset of symptoms) and convalescent (from two to three weeks after onset) blood specimen for serologic tests to determine if a four-fold rise in IgG antibody titer has occurred (e.g., from 1:40 to 1:320). A four-fold increase in IgG titer as measured in plaque-reduction neutralization assays or similar quantitative assays, or a seroconversion from negative to positive in EIA assays from acute to convalescent is considered a positive diagnostic result for mumps.

In vaccinated persons, the existing IgG will begin to rise soon after exposure and infection. At the time of onset of symptoms and collection of the acute serum, the IgG may already be quite elevated, which would obviate the 4-fold rise in titer expected when comparing acute and convalescent samples.

If the suspected case has a positive IgG and negative IgM result, can mumps infection be ruled out?

No. Previously vaccinated persons who are exposed to mumps will generally have existing, detectable serum IgG.

Will persons infected with mumps who are symptomatic and have a history of one or two doses of MMR have an IgM response?

The IgM response to mumps infection in vaccinated persons is highly variable and may be absent. In unvaccinated cases, IgM is present by day 5 post onset of symptoms and peaks at about 1 week; IgM can be present for at least 6 weeks.

Is it possible to demonstrate a 4-fold rise in titer between paired serum samples (acute and convalescent) among cases of mumps with a history of 1 or 2 doses of MMR?

It may not be possible. In vaccinated persons, the existing IgG will begin to rise soon after exposure and infection. At the time of onset of symptoms and collection of the acute serum, the IgG may already be quite elevated, and obviate the 4-fold rise observed in convalescent serum specimen.

A sample tests negative for mumps RNA by RT-PCR or negative for mumps virus by isolation. Do these results rule out mumps infection?

No. These samples could be negative because the amount of virus shed at the time of sample collection was very low. Inadequate specimen collection, processing, shipping or storage can also significantly reduce the likelihood of detecting mumps virus or mumps RNA.

Among symptomatic persons who have received 1 or more doses of MMR, the virus may be cleared rapidly. The results to date do not indicate that RT-PCR for mumps among vaccinated persons has provided a diagnostic tool that is superior to IgM testing. However, samples collected when the patient first presents with symptoms have the best chance of having a positive result by RT-PCR.

EXPOSURE AND RESPONSE

How do you protect patients and staff at a healthcare facility?

Basic infection control measures apply. They include:

- Screen individuals for mumps symptoms when calling-in for an appointment. Plan to separate ill patients in the waiting room or have a separate area designated. Do not allow them to sit in the waiting area for prolonged periods of time and keep them at least three feet from other patients. Request that they wear a procedure or surgical

mask. Have disposable tissues readily available and have receptacles available for disposable.

- Follow standard precautions for all patient encounters and use droplet precautions when mumps is suspected. Use appropriate personal protective equipment (PPE) when assessing patients.
- Ensure that all staff have acceptable presumptive evidence of immunity to all vaccine-preventable diseases. For mumps, the CDC Advisory Committee on Immunization Practices (ACIP) recommends that healthcare personnel have documentation of vaccination with 2 doses of live mumps virus-containing vaccine, or laboratory evidence of immunity, or laboratory confirmation of disease, or born before 1957. For unvaccinated personnel born before 1957 who lack laboratory evidence of measles, mumps, or rubella immunity or laboratory confirmation of disease, healthcare facilities should consider vaccinating personnel with 2 doses of MMR vaccine at the appropriate interval.
- Any staff member with signs and symptoms of mumps should be sent home and be off work for five days.

Should actions be taken after a mumps case visits a healthcare facility?

If an office assessment has not already been done, determine immunity of the office and medical personnel. Susceptible personnel who have been exposed should be kept from direct patient contact from the 12th day after the first exposure through the 25th day after the last exposure.

SCHOOL SETTINGS

What are the requirements for mumps vaccination in school settings?

Preschool/Childcare: Children attending preschool/childcare in NJ need at least 1 documented dose of MMR vaccine by 15 months of age.

Kindergarten-Grade 12: Children attending K-12 need two documented doses of measles, 1 dose of mumps, and 1 dose of rubella. Since single antigen (separate components of the vaccine) is not readily available in the United States, most children will have two MMR vaccines.

College: Students attending two or four-year institutions with 12 or more credits per semester are required to receive two doses of measles vaccine and 1 dose of mumps and rubella vaccine are required. Two MMR vaccines are also acceptable.

For more information about NJ's school immunization requirements, please visit <http://nj.gov/health/cd/imm.shtml>

What is the antibody titer law?

The Antibody Titer Law (Holly's Law, NJSA 26:2N-8-11), passed on January 14, 2004, requires the New Jersey Department of Health (NJDOH) to accept serologic evidence (blood tests) of protective immunity to measles, mumps and rubella in lieu of the second ACIP recommended measles, mumps and rubella vaccine.

For further information about the antibody titer law, please visit http://nj.gov/health/cd/documents/antibody_titer_law.pdf

What are the strategies for controlling mumps outbreaks in schools?

For all exposures consider the entire group that could have been exposed. That could be the whole school, whole work setting, etc. Do not forget to consider the staff as well.

Please see the question above regarding NJ's immunization requirements in school settings.

What is the guidance for staff in a school?

Teachers and all staff should have their immune status verified. All staff should be educated on hygiene, prevention and signs and symptoms of disease.

Should children without acceptable presumptive evidence of immunity be excluded from school?

The decision to exclude students should be made in consultation with public health authorities. To assist with control of mumps outbreaks in schools and colleges, students with zero doses of MMR vaccine and with no other evidence of mumps immunity might be excluded from schools/colleges affected by a mumps outbreak or other schools that are unaffected but deemed by local public health authorities to be at risk for transmission of disease. Excluded students can be readmitted immediately after they are vaccinated. Students who have been exempted from mumps vaccination for

medical, religious, or other reasons might be excluded through the 25th day after the onset of parotitis in the last person with mumps in the affected school.

If a child receives a second dose of MMR before he turns 4 as part of outbreak control, will he need a third dose to comply with NJ Immunization Requirements?

Although not recommended at this time, physicians may consider administering the second dose of MMR vaccine to children aged 13 months to 4 years who have received one dose instead of waiting to administer at 4 – 6 years of age. The second shot must be given a minimum of four weeks after the first.

Therefore, if a physician administers the second dose to exposed students prior to 4 years of age in order to control/prevent the spread of the mumps outbreak, they will be in compliance and will not need a third dose of MMR for school attendance.

For more information about NJ’s school immunization requirements, please visit <http://nj.gov/health/cd/imm.shtml>

REPORTING

Mumps is a disease reportable within 24 hours as per N.J.A.C. 8:57, which can be accessed at <http://nj.gov/health/cd/izdphome.htm> Healthcare providers should report all suspect cases to the local health department where the patient resides. If patient residence is unknown, report to your own local health department. If the individual does not live in NJ, report the case to NJDOH Vaccine Preventable Disease Program during regular business hours at (609) 826-4861 or (609) 826-5964; if after-hours or on the weekend, call NJDOH at (609) 392-2020. Local health departments should contact the NJDOH VPDP. If mumps is suspected, the VPDP can offer guidance on the appropriate clinical specimens to obtain and facilitate transport of specimens to the Public Health and Environmental Laboratories (PHEL), as appropriate.

FOR MORE INFORMATION

Where can I get more information on mumps?

- Your local health department
- NJ Department of Health Vaccine Preventable Disease Program 609-826-4861
- Centers for Disease Control & Prevention www.cdc.gov/

For additional information and materials on proper handwashing techniques, please visit the New Jersey Department of Health (NJDOH) Communicable Disease Service's Link: <http://nj.gov/health/cd/handwashing.shtml>

This information is intended for educational purposes only and is not intended to replace consultation with a health care professional.