



News Articles, Infectious Diseases, ID Snapshot

What you need to know about mumps

by H. Cody Meissner M.D., FAAP



Dr. Meissner Maurice Hilleman, M.D., developed the mumps vaccine after isolating the virus from the throat of his first-born daughter, Jeryl Lynn. The mumps vaccine (Jeryl-Lynn strain) was licensed in 1967 and recommended for routine use in 1977.

The mumps vaccine strain produces a mild, non-communicable infection. Post-licensure studies determined that one dose of measles-mumps-rubella (MMR) vaccine is about 78% effective in disease prevention, while two doses are about 88% effective.

The prodromal symptoms of mumps are nonspecific and include myalgia, anorexia, malaise, headache and low-grade fever. The classic symptom of mumps is acute onset of unilateral or bilateral swelling of the parotid, submandibular or sublingual salivary glands. Before vaccine availability, orchitis developed in as many as 50% of infected post-pubertal males. In recent years, the rates of orchitis have ranged from 3% to 10%. In the post-vaccine era, reported rates of other complications, including meningitis, encephalitis, pancreatitis, oophoritis and deafness, have been less than 1%.

Which of the following statements regarding mumps are true?

- a) During World War I, only influenza and gonorrhea were more common infectious causes of hospitalization among soldiers than mumps.
- b) In 1967, mumps accounted for about 35% of all reported cases of encephalitis in the United States.
- c) Infectious causes of parotitis include parainfluenza viruses, Epstein-Barr virus, influenza A virus, enteroviruses, lymphocytic choriomeningitis virus and HIV.
- d) In a vaccinated adolescent, diagnosis of a breakthrough mumps infection can be ruled out with a negative serum IgM result.
- e) Mumps is as contagious as varicella or measles.

Answer: a, b and c are true

The contagiousness of mumps is similar to that of influenza and rubella but less than that for measles or varicella. Mumps virus is spread in respiratory secretions, and droplet precautions are recommended from two days before until five days after onset of parotitis. Transmission likely occurs from people with asymptomatic infection, which may be as high as 15% to 27% of those infected.

The diagnosis of mumps is suspected based on clinical manifestations. Laboratory testing should be performed to determine the cause. Acute infection can be detected by the presence of serum mumps IgM in an unvaccinated person, a significant rise in IgG antibody titer between acute and convalescent-phase serum



News Articles, Infectious Diseases, ID Snapshot

specimens (although a four-fold or greater rise in IgG is rarely demonstrated among vaccinated people), a positive mumps virus culture or detection of virus by real-time reverse transcriptase polymerase chain reaction (rRT-PCR).

Among those with a history of one or two doses of MMR, the acute-phase serum specimen may contain significant levels of mumps IgG as measured by immunofluorescent (IFA) or enzyme immunoassay (EIA). Therefore, a single serum sample tested for mumps-specific IgG is not useful for diagnosing acute mumps infections in a vaccinated person. The presence of IgG (as measured commercially by IFA or EIA) may not correlate with the presence of neutralizing antibody or protection from mumps disease. There is no known protective level of neutralizing antibody (antibody titer) for mumps, and there are no other immune parameters that correlate with protection from mumps disease.

As with measles and rubella, mumps IgM may be transient or missing in a vaccinated person who has contracted mumps. Thus, absence of mumps IgM in a vaccinated person presenting with a clinically compatible syndrome does not rule out mumps as a diagnosis.

Viral detection by rRT-PCR or culture may have low yield if the buccal swab is collected more than three days after parotitis onset. Therefore, mumps may be difficult to rule out by a negative laboratory result.

In the pre-vaccine years, about 186,000 mumps cases were reported annually in the United States. Since the vaccine was licensed, the number of reported cases has decreased by more than 99%. In 2015, approximately 1,050 cases of mumps were reported. Outbreaks of mumps still occur in highly vaccinated communities, especially those with close-contact settings. However, high vaccination rates help to limit the size, duration and spread of an outbreak.

People born between 1970 and the early 1990s may have less than optimal vaccine-induced protection against mumps because they received a single MMR vaccine (which was recommended at the time) but no booster dose.

Although MMR vaccine is not recommended for mumps post-exposure prophylaxis, limited data suggest that a third dose of MMR may have some benefit during a sustained mumps outbreak despite high two-dose MMR coverage (*MMWR*. 2016;65(29):731). Antibody boosting following a third dose may provide protection for those with two-dose vaccine failure or waning of vaccine-induced immunity when the virus continues to circulate in a closed setting.

Generally, a person may be considered immune to mumps if he or she was born before 1957, has serologic evidence of mumps immunity, confirmation of physician diagnosed mumps, laboratory confirmation of disease or written documentation of adequate vaccination for mumps at age 12 months or older. Demonstration of mumps IgG antibody by any commonly used serologic assay is acceptable evidence of mumps immunity.

Dr. Meissner is professor of pediatrics at Floating Hospital for Children, Tufts Medical Center. He also is an ex officio member of the AAP Committee on Infectious Diseases and associate editor of the AAP Visual Red Book.