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ONE MINUTE CONSULT
BRIEF ANSWERS TO SPECIFIC CLINICAL QUESTIONS

Q: Does my adult patient need a measles vaccine?

A: Possibly. Two doses of the measles-mumps-rubella (MMR) vaccine are recommended for children.[1] Many adults (≥ 19 years) have preexisting immunity to measles from prior infection or vaccination. Adults without acceptable presumptive evidence of immunity to measles are recommended to receive 1 dose of MMR. Two doses of MMR are recommended for adults in special situations.[1]

Measles was eliminated from the United States in 2000.[2] However, communities with reduced vaccination rates remain vulnerable to measles infection or outbreaks. As of April 18, a total of 800 confirmed measles cases have been reported in the United States this year,[3] exceeding the 285 cases reported in all of 2024. The rising number of measles cases has garnered public attention and highlights the importance of vaccination in children and adults.

MEASLES ELIMINATION IN THE UNITED STATES

Before a vaccine became available, measles was considered a routine childhood illness and nearly everyone was infected by adulthood.[2] About 500,000 measles infections were reported annually, although the US Centers for Disease Control and Prevention (CDC) estimates that the actual number of cases was much higher at 3 to 4 million per year.[2,4] Annually, there were an estimated 48,000 hospitalizations, 1,000 cases of encephalitis, and 400 to 500 deaths attributed to measles. With the development and approval of a measles vaccine in 1963, a national vaccine campaign was launched, leading to the elimination of measles in the United States several decades later.[2,4]

A steep decline in measles cases was observed after a single-dose measles vaccine for infants was introduced. By the 1980s, annual reported cases of measles dropped below 4,000, but outbreaks continued to occur in vaccinated school-age children.[2,3] To address the potential for primary vaccine failure (ie, failure to produce protective antibodies after vaccination), the CDC recommended a second dose of measles vaccine before school entry starting in 1989.[2] After high measles vaccination rates were achieved and maintained in preschool- and school-age children, measles was declared to be eliminated from the United States in 2000.[2]

MEASLES EPIDEMIOLOGY IN THE POSTELIMINATION ERA

Since measles elimination, isolated cases and small outbreaks have occurred, but these have been traced to sources originating outside the United States. These outbreaks have historically been contained because vaccination rates among school-age children met or exceeded the threshold for herd immunity (95%), halting the chain of transmission.[5] Because measles is one of the most contagious diseases in the world—1 person with measles will infect 90% of susceptible contacts—outbreaks are hard to contain in predominantly unvaccinated communities.[4]

Disruptions in routine healthcare during the COVID-19 pandemic paired with an increasing prevalence of vaccine hesitancy have negatively impacted measles vaccination rates. In 2024, the national 2-dose MMR vaccination rate in school-age children was 92.7%, and state vaccination rates varied widely, ranging from 79.6% in Idaho to 98.3% in West Virginia.[6] The United States is increasingly vulnerable to larger-scale measles outbreaks as vaccination rates decline.

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CURRENT RECOMMENDATIONS FOR MEASLES VACCINATION IN THE UNITED STATES

The live attenuated measles vaccine is highly effective in preventing measles infection by inducing both cell-mediated and humoral immunity.[7,8] Because cell-mediated immunity is challenging to measure and interpret, humoral immunity (measles-specific immunoglobulin [Ig] G) is used to assess response in the clinical setting. With 1 dose of live attenuated measles vaccine, 96% of recipients will seroconvert to measles IgG positive, and nearly 100% will seroconvert with 2 doses.[7]

The live attenuated measles vaccine is considered to provide lifelong immunity when administered to children at age 12 months or older.[7] Long-term studies demonstrate persistence of measles IgG for at least 11 years following 1 dose, and at least 15 years following 2 doses.[7,8] In people with waning or low-level measles IgG in the years following vaccination, protection is maintained due to cell-mediated immunity and an anamnestic immune response following subsequent measles exposure.[7–9] While secondary vaccine failure (ie, measles infection in a vaccine responder) is possible, it is exceedingly rare (< 0.2%) regardless of whether 1 or 2 doses are administered.[9] Given the overall low incidence of measles infection in the United States, serologic screening to identify the 4% of adults who do not seroconvert after 1 dose of a live attenutated measles vaccine is unlikely to provide an incremental benefit.

The combination live attenuated MMR vaccine is used in place of single-antigen component vaccines in the United States. MMR vaccine may be given on the same day with other injectable or intranasal live virus vaccines (eg, varicella). If administered on separate days, a minimum 28-day interval is required to prevent interference with the immune response.[10] When MMR vaccination is administered as a 2-dose series, the minimum interval between doses is also 28 days.

Children

The MMR vaccine is recommended as a routine childhood vaccination.[1,7] All children should receive 2 doses prior to school entry—the first dose at 12 months and the second dose between 4 and 6 years. The second dose may be given at an earlier age, spaced at least 28 days from the first dose.

Adults

Many adults have preexisting immunity to measles from previous infection or vaccination. Adults who meet at least 1 of the following 4 criteria are considered to have acceptable presumptive evidence of measles immunity[7]:

Born before 1957. Because of the high prevalence of measles in the prevaccine era, up to 98% of adults born before 1957 are immune to measles. However, healthcare personnel born before 1957 are excluded from this criterion and should have documentation of adequate measles vaccination or laboratory evidence of immunity to prevent disease transmission in healthcare settings.

Documentation of adequate measles vaccination after 12 months of age. For most adults, adequate vaccination is defined as written documentation of 1 dose of a live measles virus–containing vaccine. For certain adults, 2 doses are needed (see "Special situations" below). Adults who received the inactivated measles vaccine (licensed 1963 to 1968) or measles vaccine of unknown type or who do not have written documentation of vaccination do not meet this criterion.

Laboratory evidence of immunity. Adults who test positive for measles IgG on serologic testing are considered immune to measles. Adults with a negative or equivocal serologic test should be considered nonimmune, unless they meet 1 of the other criteria for presumptive evidence of immunity to measles (eg, born before 1957, documentation of adequate measles vaccination, or laboratory confirmation of disease).

Laboratory confirmation of disease. Given the extremely low incidence of measles in the United States, the validity of a clinical measles diagnosis should be questioned. Only documentation of laboratory-confirmed disease (eg, nasopharyngeal measles polymerase chain reaction) should be accepted as presumptive evidence of immunity to measles.

Adults born in or after 1957 who do not meet at least 1 of the criteria for acceptable presumptive evidence of immunity to measles should receive 1 dose of MMR vaccine.[1,7] Adults recommended to receive 2 doses are described below. Adults born before 1957 are presumed to be immune to measles, but 1 dose of MMR vaccine can be administered if the patient requests it.

Special situations

International travel. Infants 6 to 11 months should receive 1 dose of MMR vaccine before international travel and then also receive 2 doses after age 12 months (1 dose after 12 months and a second dose at 4 to 6 years).[1,7]

For children older than 12 months and for adults who do not have acceptable presumptive evidence of

immunity to measles, completion of the 2-dose MMR series is recommended before international travel.[1,7]

Adult 2-dose MMR vaccination. Adults who do not have acceptable presumptive evidence of immunity to measles should receive 2 doses of MMR vaccine in the following scenarios[1,7]:

- Household or close contacts of immunocompromised people
- People living with human immunodeficiency virus (if CD4 count ≥ 200 lymphocytes/mm^3 and CD4 percentage ≥ 15% for > 6 months)
- Healthcare personnel born before or after 1957
- People who will be traveling internationally.

Outbreaks. During a measles outbreak, state and local health departments will identify those at risk for exposure based on the epidemiology of the outbreak (ie, if a specific age group or community is affected) and confirm adequate vaccination or other acceptable presumptive evidence of immunity to measles. Healthcare providers should continue to follow the routine recommendations for MMR vaccination, unless additional guidance is provided by public health officials. In general, "booster" doses of the MMR vaccine are not recommended for adults meeting at least 1 criterion for acceptable presumptive evidence of immunity to measles. Infants 6 to 11 months should be vaccinated only in response to a measles outbreak if recommended by public health officials.[7]

Serologic screening

Serologic screening is not recommended for people with at least 1 criterion for acceptable presumptive evidence of immunity to measles. In fact, documentation of adequate measles vaccination supersedes the results of postvaccination serologic testing,[7] because serologic testing after vaccination is more likely to reflect waning humoral immunity than primary vaccine failure in an adult with a remote history of vaccination.

Prevaccination serologic screening can be considered, but is not required, in adults who do not have presumptive evidence of immunity to measles. For example, a clinician may test for measles IgG in adults vaccinated between 1963 and 1968 who may have received the inactivated measles vaccine, and then administer the MMR vaccine to those who test negative. Or clinicians may choose to administer MMR vaccine to all patients in this scenario, without measles IgG testing.

Detailed information on indications for the MMR vaccine specific to people who are not immune to rubella or mumps can be found on the CDC's Adult Immunization schedule.[1]

Contraindications to MMR vaccine

Allergy. The MMR vaccine is contraindicated in people with a history of severe or anaphylactic allergy to the vaccine or a component, including neomycin. Patients with a history of nonsevere allergy to neomycin (eg, contact dermatitis) can receive the vaccine, and it is safe to administer the vaccine to patients with egg allergy, regardless of allergy severity.[7]

Pregnancy. MMR vaccine is contraindicated in people who are pregnant or trying to become pregnant due to the theoretical risk of vaccine-induced congenital rubella syndrome. Women should be counseled to avoid becoming pregnant for 28 days after vaccination.[7]

Immunosuppression. MMR vaccine is contraindicated for individuals with immunocompromising conditions or those who are receiving immunosuppressive medications, as there have been case reports of vaccine-induced infection.[7] For a detailed list of immunocompromising conditions and therapies, refer to the altered immunocompetence section of the CDC's General Best Practices for Immunization.[10]

MMR vaccine can be administered safely to children or close personal contacts of people who are pregnant or immunocompromised.[7]

Adverse reactions to MMR vaccine

MMR vaccine is typically well tolerated; the most common reactions reported in adults are fever (< 15%), transient rash (5%), and lymphadenopathy (20%).[7] In children, the vaccine is associated with a small risk of febrile seizures (1 case per 3,000 to 4,000 doses). In postpubertal females who are not immune to rubella, MMR vaccine is associated with a 25% incidence of mild arthritis-like symptoms, which present 1 to 3 weeks after vaccination and persist for an average of 2 days.[7]

DISCLOSURES

Dr. Rivard has disclosed serving as an advisor or review panel participant for Pfizer.

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