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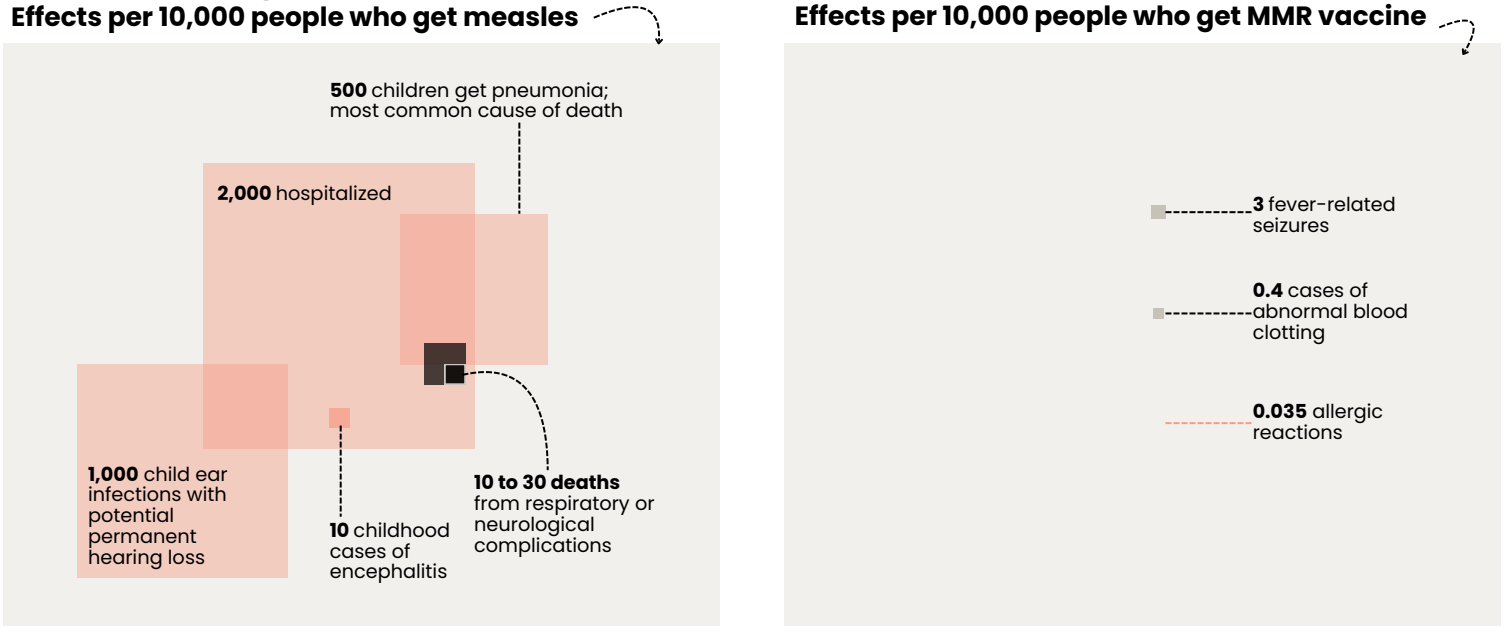
MMR (Measles-Mumps-Rubella) Vaccine & Measles: What Healthcare Providers Need to Know

Comparing the risk: Measles vs. MMR Vaccine



Potentially serious complications shown in pink

NYT, 2020

MEASLES

Measles is highly contagious; if 1 person has measles, 9 out of 10 people who are exposed and not immune will ALSO become infected. Measles can cause severe complications, including pneumonia, encephalitis, and death. Measles can also impact the body beyond the initial infection.

Immune amnesia: The measles virus can erase hard-earned immune memory, leaving individuals vulnerable to other infections, including pneumonia and the flu, for months or even years. Among unimmunized children, measles infection has been shown to eliminate 11% to 73% of their antibody repertoire, significantly weakening their immune defenses. This immune amnesia affects everyone to varying degrees, making measles more than just a transient illness —it reshapes long-term immunity. (ASM, 2024; The Journal of Pediatrics, 2020).

Subacute sclerosing panencephalitis (SSPE): Generally, 4 to 11 per 100,000 cases of measles result in SSPE, a rare central nervous system disease that emerges 7-10 years after recovery from measles. This number increases to 18 per 100,000 cases if the child was less than five years old when primarily infected. SSPE is always fatal, with death typically occurring 1-3 years after diagnosis (StatPearls, 2023).

MMR VACCINE

Safety: The risks associated with MMR vaccination are vanishingly small, especially compared to the devastating effects of measles. Like any medication, the vaccine can have some temporary side effects, such as fever, a mild rash, and joint pain.

Decades of research confirm no link to autism or other serious conditions. Rare adverse events (e.g., febrile seizures) occur in fewer than 1 in 3,000–4,000 cases (CHOP, 2024; Vaccine X, 2023).

Effectiveness: The vaccine is 97% effective with 2 doses. Vaccination provides lifelong immunity for most individuals. Routine boosters are not needed except in some high-risk situations(YLE, 2025).

MMR Vaccination Guidelines & Special Considerations

Vaccination Recommendations by Year (YLE, 2025):

- ***Born before 1957:*** No vaccine needed. People born before 1957 were likely infected naturally and therefore are presumed to be protected.
- ***Vaccinated between 1963-1967:*** A second dose may be needed if the patient received the inactivated vaccine. This represents a very small percentage of the U.S. population, likely <5% (JHU, 2025).
- ***Born before 1989:*** 1 dose was standard (93% effective). A 2nd dose is only needed for higher-risk groups (e.g., healthcare workers, college students, international travelers, close contacts of immunocompromised individuals).
- ***Born in 1989 and after:*** 2 doses of MMR or MMRV are recommended starting with the first dose at 12 through 15 months of age, and the second dose at 4 through 6 years of age.

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Who Should NOT Receive the MMR Vaccine (CDC, 2021)?

- Immunocompromised individuals (See the CDC website for greater detail)
- Infants under 6 months old
- Pregnant individuals or those who may be pregnant
- Those with severe allergic reactions to vaccine components

Uncertain Vaccination Status (CDC, 2024)

- If there is no written documentation of measles vaccination, patients can get vaccinated. There is no harm in getting another dose for those who may have received a previous dose of measles vaccination.
- Serologic testing is not routinely recommended for confirming immunity.

Post-Exposure Vaccination & Prophylaxis (CDC, 2021):

- MMR vaccination within 72 hours of exposure may prevent or reduce disease severity.
- Immunoglobulin (IG) is another option, if given within 6 days of exposure.

Travel Precautions (CDC, 2025):

- International travelers should ensure they are up to date on their MMR vaccine before departure - many measles cases in the U.S. are linked to unvaccinated international travelers.

Can Fully Vaccinated Individuals Get or Spread Measles?

The MMR vaccine is highly effective, making vaccinated individuals **35 times less likely to get measles**. However, breakthrough infections (when measles occurs after completion of measles vaccine series) occur in about 3 out of 100 fully vaccinated people, usually with mild symptoms (CDC, 2018; CDC, 2024; YLE, 2025).

Breakthrough infections are rare, but may happen due to (CDC, 2025):

- Waning immunity
- Vaccine non-response (~7% don't develop immunity after one dose, but 95% of people respond to the second.)

Can vaccinated individuals spread measles (CDC, 2024; JCV, 2019; CID, 2014)?

- Research suggests that vaccinated individuals who experience breakthrough measles are significantly less likely to spread the virus to others compared to unvaccinated individuals.
- Transmission is extremely rare, especially in asymptomatic cases.
- Studies show minimal viral shedding and limited spread, even with prolonged exposure.

Maternal Immunity and Timing of Infant Vaccination

Measles can be serious in all age groups, but infants are particularly vulnerable to severe disease. Nearly 1 out of every 3 children under the age of 5 who contract measles ends up in the hospital (CDC, 2024).

Are babies protected if their mothers were vaccinated?
Maternal antibodies transfer during pregnancy but wane by 6-12 months, leaving infants vulnerable (IJID, 2020). Breastfeeding provides limited protection, but it is not a substitute for vaccination due to insufficient evidence.

Anyone planning pregnancy should check measles titers and, if low, receive the vaccine at least 28 days before conception.

Why wait until 12 months to vaccinate infants (YLE, 2025; CDC, 2021)?
The first dose is timed for optimal immunity, balancing: waning immunity from mom, maturation of the infant's immune system, and most common age of infection in outbreaks.

Additional Doses During an Outbreak

Health departments may recommend a second dose for adults or an earlier second dose for children (1-4 years old) in affected areas to provide additional protection against ongoing transmission (CDC, 2024).

Early vaccination (6-11 months) may be advised during outbreaks or for international travel but does not count toward the two-dose series (Lancet, 2019).

Measles Testing Considerations for Healthcare Providers

The MMR and MMRV vaccines can cause symptoms 6-12 days post-vaccination that mimic a measles infection, including a fever in up to 15% of recipients and a self-limited rash in up to 5% of recipients. These patients are not contagious, and when evaluating patients with a rash, clinicians should assess whether symptoms are due to wild-type measles infection or a vaccine reaction.

In the absence of epidemiologic risk factors, such as recent travel or known exposure, testing for measles post-vaccination is generally not recommended, as it may lead to confusion and unnecessary use of public health resources. If testing is pursued, it's important to counsel families on the limitations of results and the low risk of contagion from vaccine-related symptoms. To see a flow chart on evaluating a patient presenting with a rash when there is no local measles transmission, please click here. To read more on this topic, click here.