Ask a Public Health Expert: The Resurgence of Measles

Stronger Counties. Stronger America.



Measles & MMR

Jessica Malaty Rivera, MS Infectious Disease Epidemiologist & Science Communicator May 2025



The Most Contagious Infectious Disease

The R0 for measles is between 12-18. That means **one person** with measles can infect **12-18 people.**

For comparison, the R0 for seasonal influenza is between 0.9 to 2.1, and for COVID-19, it's between 1.5-3.5.



The Most Contagious Infectious Disease

If one person has measles, 90% of people close to them, with no previous immunity, will become infected. Depending on the vaccination rate, one person with measles can infect...



The Most Contagious Infectious Disease

Measles is a highly contagious, airborne virus that lasts on surfaces and in the air for up to 2 hours.





MEASLES It isn't just a little rash



Measles can be dangerous, especially for babies and young children.

Measles symptoms typically include:



High fever (may spike to more than 104°F) *m*



Runny nose



Red and/or watery eyes



Rash (breaks out 3-5 days after symptoms begin)

Measles can be serious.

Measles can cause severe health complications, including pneumonia, swelling of the brain (encephalitis) and death.



1 out of 5 people who get measles will be hospitalized.



1 out of every 20 children with measles will get pneumonia, the most common cause of death from measles in young children.



1 out of every 1,000 people with measles will develop brain swelling, which may lead to brain damage.



1 to 3 out of 1,000 people with measles will die.

Long-Term Complications

A very rare, but deadly disease called **subacute sclerosing panencephalitis (SSPE)** can develop 7 to 10 years after a person has recovered from measles.

The measles can also destroy memory cells in the immune system leading to temporary or long-term **immune amnesia**—where the body "forgets" previous encounters with other pathogens.

History of Measles



* In the first 10 years of reporting, ~6,000 measles-related deaths were reported annually

** Prior to the vaccine, all children got measles by the time they were 15 years old

"Measles is probably the best argument for why there needs to be global health, and why we have to think about it as a global public good. Because in a sense, measles is the canary in the coal mine for immunization."

- Seth Berkley

Annual US Measles Burden (pre-vaccines)

3-4 million cases 500 deaths 48,000 hospitalizations **1,000** cases of encephalitis

Global Measles Burden

3 million <u>deaths</u> every year (pre-vaccine)

In 2023

- 10.3 million cases were reported (20% increase from 2022)
- 107,500 measles-related deaths occurred among children under 5 years old
- Measles was the single leading killer of children worldwide before GAVI

Measles Elimination

Measles–United States, 1950-2001



2000

Thanks to a highly successful vaccination program, measles was declared eliminated from the United States in 2000. This meant the absence of the continuous spread of disease was greater than 12 months.

Measles Vaccine Development



1954

Scientists collected samples from sick students during a measles outbreak in Boston. The virus was successfully isolated from a 13-year-old boy's blood. His name was David Edmonston.



Scientists transformed the Edmonston-B strain into a vaccine, and licensed it in the US. 1968

The Edmonston-Enders strain has been the only measles vaccine used in the US since 1968.

Available Vaccines

There are two options for protecting children who are 12 months-12 years old against measles, mumps, rubella, and varicella: using the varicella vaccine and the trivalent **measles, mumps, and rubella (MMR)** vaccine or using the quadrivalent **measles, mumps, rubella, and varicella (MMRV)** vaccine.

MMR & MMRV

	MMR and Varicella Vaccines (Administered at the same doctor visit)	MMRV Vaccine
Protection against measles, mumps, rubella and varicella	Provides the same protection against the four diseases as the MMRV vaccine	Provides the same protection against the four diseases as the MMR and varicella vaccines
Number of shots	Two shots needed at the same doctor visit to provide protection against measles, mumps, rubella, and varicella	One shot needed to provide protection against measles, mumps, rubella, and varicella
Fever	Fewer children have fevers of 102°F or higher within 42 days of being vaccinated (about 15 out of every 100 children vaccinated; the highest risk for fever occurs during 5-12 days after vaccination)	More children have fevers of 102°F or higher within 42 days of being vaccinated (about 22 out of every 100 children vaccinated; the highest risk for fever occurs during 5-12 days after vaccination)
Febrile seizures (Seizures caused by fever)	Fewer children have febrile seizures during the 5-12 days after vaccination (about 4 out of every 10,000 children vaccinated)	More children have febrile seizures during the 5-12 days after vaccination (about 8 out of every 10,000 children vaccinated)

Extra Vaccine Recommendations

Older children, **adolescents**, & **adults**—Also need 1 or 2 doses of MMR vaccine if they don't have evidence of immunity. Doses should be separated at least 28 days apart.

Anyone traveling internationally (or to an area with an active outbreak)— Should be fully vaccinated <u>before traveling</u>. Infants 6–11 months old should get **1 bonus dose** of the MMR vaccine before travel. Then they should get 2 more doses after their first birthday to complete the series.

Vaccine Effectiveness



Schedule is determined to ensure protection upon entering Kindergarten

Herd Immunity Threshold: 95%





of U.S. kindergartners have received their measles vaccine, falling short of thresholds to prevent transmission.

> Declining uptake in measles vaccinations puts more children at risk of severe illness.

Source: Centers for Disease Control and Prevention

Vaccine Misinformation

- Decline in MMR vaccination rates is attributed to widespread misinformation about MMR and vaccine ingredients.
- In a since retracted Lancet paper, Andrew Wakefield published a study falsely linking the MMR vaccine to the onset of autism in children.
- Two decades later, measles has regained a foothold in communities with low trust in public health and allopathic medicine.

2025 Measles Outbreak

Katherine Wells, DrPH, MPH Director, Lubbock Public Health May 15, 2025



First Case

Jan 29, 2025: 2 children hospitalized in Lubbock (Garza County residents)

No recent travel history

Reports of widespread illness in a close-knit religious community

Source case: unknown



Early Response

Lubbock Public Health established ICS on February 3rd

- State regional office, South Plains Public Health District and Lubbock Public Health
- Expanded to include additional regions and local health departments

Provider/Hospital Support

- Access to immunoglobulin
- Infection Control Provider Calls hosted by Lubbock Public Health
- Hospital leadership meetings
- Standardized Post-Exposure Prophylaxis guidance



Expanded Response

Increase contact tracing and epidemiology capacity

Outreach to schools & daycares

- Developed school guidance documents
- Letter to unvaccinated parents
- Education to superintendents, school nurses, and daycare owners

Community Education

- PSAs with Community Leaders/Influencers
- State advertising campaign
- Support from CDC Coms team



Hospital Response

64 hospitalizations – mostly children, a few pregnant women (as of April 25, 2025)

Primary indications for admission

- Dehydration
- Hypoxia
- Respiratory distress

Most patients presented after rash developed

Two deaths – school-aged children





Operational Challenges



External Challenges

Stakeholder Management

Medical Care Exposures

Quarantine and Isolation

Media – Local, National, and International

Tackling Disinformation

Political Environment



