Measles Scenario-Based Human Health Risk Assessment

Updated as of March 10, 2025

Currently, the Center for Outbreak Response Innovation (CORI) judges the measles outbreak in the United States to be in Scenario 3:

	Risk to unvaccinated people	Risk to children	Risk to healthcare workers	Risk to the US general public
Scenario 3 – Development of 1-2 large outbreaks	Moderate- High	Moderate-High	Low	Low

Our confidence in these risk scores is **moderate** given the currently available information.

Outbreak Summary

- As of March 10, 2025, approximately 251 measles cases have been reported this year across 13 jurisdictions in the United States*.
- Of the reported cases:
  - Most cases are among children, primarily aged 5 to 19 years.
  - At least 17% were hospitalized, the majority (28%) of whom are under 5 years.
    - Over half of hospitalizations are linked to the ongoing Texas outbreak.
  - Majority of reported cases are among individuals unvaccinated or with unknown vaccination status, underscoring the critical importance of measles-mumps-rubella (MMR) vaccination in preventing spread.
- Two measles-associated deaths were reported, marking the first U.S. measles-related fatalities since 2015 and the first pediatric measles fatality since 2003.
  - The first death occurred in an unvaccinated school-aged child in Texas with no known underlying conditions.
  - The second death was reported in an unvaccinated adult in New Mexico who did not seek medical care. The official cause of death is still under investigation.
- Four measles outbreaks have been reported: Western Texas, Lea County, New Mexico, Bergen County, New Jersey, and metro Atlanta, Georgia.
  - **Texas (Large Outbreak, 198 cases):** An additional 39 cases were reported with the majority in children aged five to 17. The outbreak remains concentrated in Gaines County (69%), the epicenter of transmission with links to a close-knit, undervaccinated Mennonite community, with spread to 9 counties. Additional cases are likely to occur. The Texas Department of State Health Services is now recommending an accelerated vaccination schedule for those in affected counties. Infants aged 6 through 11 months should receive an early dose of the MMR vaccine, followed by a second dose at 12–15 months, with at least 28 days between doses. Children older than 12 months who have not been vaccinated should receive one dose immediately and a second dose at least 28 days later, and those who have

*Texas, Maryland, Florida, Pennsylvania, Washington, Kentucky, New Mexico, California, New Jersey, New York City, Georgia, Rhode Island, and Alaska

already received one prior dose should receive an early second dose, also separated by at least 28 days. Teenagers and adults previously vaccinated with only one dose should receive a second dose to ensure protection. Additionally, individuals with no evidence of immunity should receive one dose immediately, followed by a second dose at least 28 days later. The Centers for Disease Control and Prevention (CDC) and Administration for Strategic Preparedness and Response (ASPR) are collaborating with Texas to support outbreak response efforts.

  - **New Mexico (Medium Outbreak, 30 cases):** An additional 21 cases have been reported, all in Lea County. Most cases are among adults, including one unvaccinated adult who tested positive for measles post-mortem. The individual did not seek medical care, and the official cause of death remains under investigation. Additional cases are likely to occur.
  - **New Jersey (Small Outbreak, 3 cases)**: The outbreak was linked to international travel, with all cases occurring in unvaccinated individuals. No additional cases have been reported.
  - **Georgia (Small Outbreak, 3 cases)**: The initial exposure occurred in the US, though the specific location has not been disclosed. No additional cases have been reported.
- The majority (93%) of cases occurring nationally are related to outbreaks but sporadic cases related to international travel have also been reported.
  - **Maryland:** A new case was reported in an individual with recent international travel.
  - **New York:** Additional details are available on two previously reported sporadic cases—one February involved an infant too young for vaccination, and the other in January was an unvaccinated child. The cases were not related.
- **NEW:** CORI has created a measles dashboard displaying measles cases and available immunization coverage for counties with available data

Measles FAQs: Common Concerns Explained

Can Vitamin A or cod liver oil prevent or cure measles?

No, vitamin A and cod liver oil (which is rich in vitamin A) do not prevent or cure measles. The measles vaccine is the only way to prevent measles. There is no specific treatment for measles, only supportive care.

However, vitamin A supplementation may reduce measles severity and risk of complications, including death. The CDC and American Academy of Pediatrics recommends vitamin A for children with measles, especially if hospitalized. There is no CDC recommendation for the use of cod liver oil as part of measles supportive care.

Since excessive vitamin A intake can be harmful, supplementation should only be given when medically necessary and under the supervision of a healthcare provider. Most children in the US receive sufficient vitamin A through their diet.

Can measles vaccine cause autism?

No. Studies have repeatedly shown no link between the measles vaccine and autism.

Does a positive IgG test mean someone has a measles infection?

No, a positive IgG test indicates immunity to measles from past infection or vaccination, not an active infection. The Oklahoma State Health Department confirmed there are no confirmed cases of measles in the state. A staff member at an elementary school tested positive for IgG immunity, meaning they are protected against measles, not that they have the disease.

Can measles vaccine cause measles illness?

No, the measles vaccine cannot cause measles illness. The MMR vaccine contains a weakened, non-infectious strain (MeVA, genotype A), which does not cause or spread measles but helps the body develop immunity. No human-to-human transmission of the measles vaccine virus has ever been reported.

The current Texas outbreak is linked to a naturally circulating, disease-causing strain (wild-type, genotype D8), which has been circulating since 1990 in regions including Europe, North Africa, the Middle East, and Southwest Asia.

Are measles boosters recommended? ***Updated March 12, 2025***

There are currently no recommendations to receive a third dose of MMR vaccine during measles outbreaks.

During measles outbreaks, state and local health departments may adjust or implement temporary accelerated vaccination schedules, in addition to routine recommendations, for populations at-risk who are residing in or visiting the affected areas. This may include recommending:

- Infants (6–11 months old): Early dose, followed by routine two-dose series at 12–15 months and 4–6 years, per CDC guidelines.
- Children (1–4 years old): Early second dose, at least 28 days after the first.
- Adults: Second dose if only one dose was received, given at least 28 days after the first.
- Healthcare personnel in a healthcare facility or facilities serving outbreak areas are recommended to receive two MMR doses regardless of birth year if they lack laboratory-confirmed immunity.

The following populations, aged 12 months of age or older, are recommended to receive at least *two doses of MMR vaccine, at least 28 days apart*, if they lack measles immunity:

- Students at post-high school educational institutions
- International travelers
    - Infants (6 through 11 months) traveling internationally should receive an early dose of MMR if they lack immunity against measles. These infants will still need the routine two-dose series.

- Household and close contacts of immunocompromised persons
- People with Human Immunodeficiency Virus (HIV) infection (without severe immunosuppression)

Certain populations may benefit from an additional MMR dose or revaccination:

- *Adults vaccinated before 1968 with an inactivated vaccine or unknown vaccine type*
  - The CDC recommends getting at least one dose of the current, more effective live attenuated MMR vaccine for better protection.
- *Individuals without evidence of measles immunity or unsure of their vaccination status*
  - If vaccination status is not known, getting the MMR vaccine is safe and effective. Check with a healthcare provider for guidance.

Impact of MMR Vaccination Coverage

- The MMR vaccine is highly effective, providing 93% - 97% protection from one to two doses.
- Maintaining ≥95% vaccination coverage is critical for herd immunity, yet US MMR coverage stands at 92.7% for the 2023-2024 kindergarten school year. Pockets of high-density settings or close-knit communities increase the risk of sustained transmission and large outbreaks (≥50 cases).
- Most cases this year are among children, the majority of whom are school aged. Schools can be high-risk settings for outbreaks— once MMR coverage falls below 85% in a school, the likelihood of an outbreak and outbreak size increases significantly.

Notable Limitations

- Limited information and ongoing outbreak investigations may impact reported numbers, which are subject to change as more data becomes available.
- As of February 21, 2025, CDC transitioned to weekly reporting of measles cases.
- National Notifiable Diseases Surveillance System (NNDSS) data is often delayed, leading to potential underreporting in real time.
- Data is being supplemented by other sources, resulting in moderate confidence in current estimates.

Mitigation Recommendations

To minimize the spread of measles and the potential for large outbreaks, CORI recommends:

- Implementing all recommendations from prior scenarios.
- Monitoring vaccination coverage rates within local and state jurisdictions, at the provider or clinic level, and within sub-communities that may be at increased risk of transmission due to mass gatherings (e.g., schools, shelters, etc.).
- Promoting targeted and culturally informed vaccine messaging and mobile clinics for populations with low vaccine coverage.

- Promoting community and provider awareness of measles cases early on and through diverse media (e.g., health alerts, clinician letters, and press releases).
- Building strong relationships with providers, community leaders, and schools (including school leadership and school nurses) to increase awareness of importance and efficacy of MMR vaccination, measles symptoms, testing, and isolation protocols.
- Enhancing communication between public health and medical leaders to share outbreak response experiences and lessons learned.

To minimize the spread of measles and the potential for small to medium-sized outbreaks, CDC recommends:

- Provision of post-exposure prophylaxis (PEP) as needed to possibly provide protection or alter the progression of illness.
- Implementation of temporary, accelerated vaccination schedules at the discretion of the state and local health departments.
- Routine documentation of measles immunity status among healthcare professionals to facilitate appropriate PEP or quarantine of individuals in the event of an occupational exposure.
- During a measles outbreak in a healthcare facility or facilities serving outbreak areas, healthcare personnel are recommended to receive two doses of MMR vaccine, regardless of birth year, if they lack laboratory evidence of immunity or laboratory confirmation of measles disease.

To minimize the risk of measles transmission due to international travel, CDC recommends:

- Individuals DO NOT travel while sick, especially with a fever and rash.
- Individuals planning to travel outside of the US to be fully vaccinated against measles at least 2 weeks prior to departure, in accordance with CDC guidelines.
- Individuals traveling internationally with infants under 12 months old should ensure that their child receives an early dose of vaccine between 6 and 11 months, a second dose at 12 to 15 months, and a final dose at 4 to 6 years, in accordance with CDC guidelines.
- Individuals returning to the US after international travel should monitor their health for 3 weeks and contact their local health department or provider if symptoms such as high fever, cough, or rash develop.

To minimize the spread of measles in general, CDC recommends:

- All children receive a routine 2-dose measles, mumps, and rubella (MMR) vaccine: the first dose at age 12 through 15 months and the second dose at age 4 through 6 years (before school entry).

- Adults and teens should also be up to date on MMR vaccinations, with either 1 or 2 doses (depending on risk factors), unless they have other presumptive evidence of immunity to measles, mumps, and rubella.
- Healthcare personnel without presumptive evidence of immunity should get 2 doses of MMR vaccine, separated by at least 28 days.
- People with confirmed or suspected measles should isolate themselves from others without immunity to measles until after the fourth day of rash onset.
- Individuals without measles immunity who are exposed to the virus should receive post-exposure prophylaxis with the measles vaccine within 72 hours or immunoglobulin within 6 days, or they may need to quarantine to prevent further spread.

Scenarios

CORI identified 5 key scenarios that may shape the risk of measles in the US for the upcoming year. These scenarios consider the health risks of measles, taking into account the differing impacts to various population groups within the US.

Currently, the Center for Outbreak Response Innovation (CORI) judges the measles outbreak in the United States to be in Scenario 3.

Features that would characterize each scenario include:

- **Scenario 1 – Sporadic cases of measles, no outbreaks (baseline):** In this scenario, the measles virus is occasionally introduced, usually by international travelers, into a community, but transmission lasts for less than 12 months. While sporadic cases can occur in any community with varying vaccination coverage, they often occur in well-vaccinated communities (over 90% coverage). There is no or limited transmission from these cases, with a total of 1–2 related cases, and they do not lead to an outbreak.
- **Scenario 2 – Development of small-to-medium outbreaks:** In this scenario, small-to-medium outbreaks occur, with or without reports of sporadic cases, and do not result in sustained transmission beyond 12 months. These outbreaks usually occur when the measles virus is introduced to an undervaccinated community (90% coverage or less), which leads to a small (3-9 related cases) to medium (10-49 related cases) outbreak.
- **Scenario 3 – Development of 1–2 large outbreaks:** In this scenario, large outbreaks occur, with or without reports of small-to-medium outbreaks and/or sporadic cases, and do not result in sustained transmission beyond 12 months. Large outbreaks typically occur in close-knit, undervaccinated settings with high population density, especially when there are pockets of unvaccinated individuals, such as migrant shelters or mass gatherings. This results in a large outbreak, ranging from 50 or more cases.

- **Scenario 4 – Development of 3+ large outbreaks:** In this situation, three or more large outbreaks (50+ cases) occur across different communities, with or without reports of small-to-medium outbreaks and/or sporadic cases and does not result in sustained transmission beyond 12 months. These outbreaks are not connected by a shared chain of transmission but emerge independently due to various factors such as localized drops in vaccination coverage, mass gatherings, or travel-related introductions. Additionally, there may be an increase of sporadic cases in highly vaccinated communities due to widespread prevalence of the virus.
- **Scenario 5 – Sustained transmission beyond 12 months leading to loss of measles elimination status:** In the fifth scenario, the virus maintains sustained transmission, regardless of vaccination coverage levels, for at least 1 year. The sustained transmission of the virus results in measles once again becoming endemic in the US. CDC defines endemic transmission as a chain of measles virus transmission that is continuous for 12 months or more within the US. Under this scenario, the US would lose its measles elimination status, which was achieved in 2000.

Scenario-Based Human Health Risk Assessment for the US

Please note: *We are evaluating the risks to human health should each scenario occur,* ***not*** *the relative risk of any one scenario occurring. This risk assessment will be updated regularly.*

	Risk to unvaccinated people	Risk to children	Risk to healthcare workers	Risk to the US general public
Scenario 1 – Sporadic cases of measles, no outbreaks (baseline)	Low-Moderate	Low-Moderate	Low	Low
Scenario 2 – Development of small-to-medium outbreaks	Moderate	Moderate	Low	Low
Scenario 3 – Development of 1-2 large outbreaks	Moderate-High	Moderate-High	Low	Low
Scenario 4 – Development of 3+ large outbreaks	High	High	Low-Moderate	Moderate

Scenario 5 – Sustained transmission beyond 12 months leading to loss of measles elimination status	High	High	Low-Moderate	Moderate

Our overall **confidence** in these risk scores is moderate given the current level and availability of information for each of these factors, historical knowledge from past outbreaks on transmission dynamics, and the availability of vaccination and treatment resources.

Human Health Risk Scale				
Low	Low-Moderate	Moderate	Moderate-High	High

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