Measles Scenario-Based Human Health Risk Assessment

Updated as of March 26, 2025

Currently, the Center for Outbreak Response Innovation (CORI) judges the measles outbreak in the United States to be in Scenario 4:

	Risk to unvaccinated people	Risk to children	Risk to healthcare workers	Risk to the US general public
Scenario 4 – Development of 3+ large outbreaks or at least one extra-large outbreak	High	High	Low-Moderate	Moderate

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

As of March 26, 2025, approximately 456 measles cases (including probable cases) and at least 5 outbreaks have been reported this year across 20 jurisdictions in the United States. *

The CORI measles dashboard provides real-time data on reported cases and immunization coverage for counties with available information, sometimes before risk assessments.

New Updates

- **Texas Outbreak Updates (379 cases):** Additional cases are likely.
  - **Texas (**327 outbreak-related cases**):** An additional 18 cases were reported, with new spread to Lamb County in western Texas, near outbreak-affected areas.
  - **New Mexico (**43 cases**):** One additional case was reported in Lea County.
  - **Oklahoma (**7 confirmed cases, 2 probable cases**):** Five additional cases reported. Of all reported cases, at least two are in Tulsa County; counties of other cases are unknown.
- **Medium Outbreaks**
  - **Kansas (**23 cases**):** An additional 13 cases have been reported, with new spread to Gray, Haskell, and Kiowa counties. Stevens and Kiowa counties have 6 cases each, while all other counties have fewer than 6. Most cases are in unvaccinated children aged 5–17. Kansas is now recommending adjusted vaccination schedules for outbreak-affected or adjacent areas. A Kansas health official reported that genetic sequencing suggests a link to the Texas outbreak, but the exposure source remains unknown. Cases may be reclassified as part of another outbreak if epidemiological links are identified.

*Texas, Minnesota, Tennessee, Michigan, Kansas, New York State, Vermont, Oklahoma, Maryland, Florida, Pennsylvania, Washington, Kentucky, New Mexico, California, New Jersey, New York City, Georgia, Rhode Island, and Alaska

- **Ohio (**10 cases**):** A new outbreak has emerged, with nine additional cases among unvaccinated individuals reported in Ashtabula County, all linked to the state's first reported case in an unvaccinated adult who had contact with a recent international traveler. New exposures reported in Knox County.

- **New Sporadic Cases**
  - **Pennsylvania (**4 cases**):** Two cases reported in Eerie County, both related to international travel. Ashtabula County, Ohio— which borders Erie— recently reported a case in an unvaccinated adult exposed to an international traveler. Given the proximity and exposure, these cases may be connected. CORI will continue to monitor the situation.
  - **Minnesota (**1 case**)**: First case reported in Hennepin County with recent international and domestic travel. The source of infection is still under investigation. There were no exposures reported in Minnesota, but exposures were reported in Washington, DC.
- **Other Reports**
  - The DC Department of Health reported exposures linked to a Minnesota resident who traveled through the district while infectious.
  - **Transmission Risk:** Increased domestic and international travel during spring break heightens the risk of measles spreading. Travelers to and from U.S. outbreak areas raise concerns for interstate transmission, while mass gatherings in undervaccinated, high-density settings or close-knit communities increase the risk of sustained transmission and large outbreaks (≥50 cases) if measles is introduced.

Outbreak Summary

- Of the reported cases:
  - Most cases are among children, primarily aged 5 to 19 years.
  - At least 64 individuals were hospitalized, the majority of whom are under 5 years.
    - The majority of hospitalizations are linked to the Texas outbreak.
  - At least 95% 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.
- Five measles outbreaks have been reported: Texas, Ohio, Kansas, New Jersey, and Georgia.
  - **Texas Outbreak (Extra-Large 379 cases):**

        - **Texas (**327 cases**)**: The outbreak remains concentrated in Gaines County, the epicenter of transmission with links to a close-knit, undervaccinated Mennonite community. The outbreak has spread across a total of 15 counties in the state, including Gaines.
        - **New Mexico (**43 cases**):** All cases are located in Lea County, except two.
        - **Oklahoma (**7 confirmed cases, 2 probable cases**):** At least two cases in Tulsa County.
        - There are now reports this outbreak has spread internationally with 39 cases in Chihuahua, Mexico related to the Texas outbreak *(note these cases are not included in the current Texas outbreak numbers reported by CORI)*.
    - **Kansas (Medium Outbreak,** 23 cases**):** See above.
    - **Ohio (Medium Outbreak,** 10 cases**):** See above.
    - **New Jersey (Small Outbreak,** 3 cases**)**: The outbreak was linked to international travel, with all cases occurring in unvaccinated individuals. No additional cases reported.
    - **Georgia (Small Outbreak,** 3 cases**)**: The initial exposure occurred in the US, though the specific location has not been disclosed. Since it has been at least 42 days (two incubation cycles) since the last reported case, this outbreak is considered complete.
- The majority (at least 90%) of cases occurring nationally are related to outbreaks but sporadic cases, mostly related to international travel, have also been reported.

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 undervaccination in 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 and extra-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.
- In high-risk areas experiencing outbreaks, strengthening vaccination policies is critical to prevent further transmission. Measures may include mandating vaccination for school attendance and high-risk settings and implementing exclusion policies for unvaccinated individuals in schools and childcare settings. Additional public health measures, such as masking requirements in healthcare settings and targeted immunization campaigns, can further reduce transmission and increase community protection.

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, adjusted vaccination schedules at the discretion of the state and local health departments.
    - NOTE: The Texas Department of State Health Services is now recommending an adjusted vaccination schedule for those in affected counties.
- 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.
- ***UPDATED:*** **Scenario 4 – Development of 3+ large outbreaks or at least one extra-large outbreak:** In this situation, three or more large outbreaks (50+ cases) occur across different communities or there is report of an extra-large outbreak (300+ cases). These outbreaks may or may not be accompanied by reports of small-to-medium outbreaks and/or sporadic cases and do not result in sustained transmission beyond 12 months. Large outbreaks may emerge independently, driven by localized drops in vaccination coverage, mass gatherings, or travel-related introductions, while an extra-large outbreak results from continued transmission within a single expanding outbreak. 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 or at least one extra-large outbreak	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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