Measles Scenario-Based Human Health Risk Assessment

Updated as of February 21, 2025

Currently, the Center for Outbreak Response Innovation (CORI) judges the measles outbreak in the United States to be in Scenario 3 (update from Scenario 2):

	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.

Overview: As of February 21, 2025, at least 113 measles cases and three outbreaks (≥3 related cases) have been reported across eight jurisdictions in the United States (US) this year.

Measles Cases in the US

State	Outbreak	Location	% MMR Coverage*	# of Cases
Texas	Large	Gaines County	82%	57 *(update from 42)*
		Lubbock County	92%	1 *(new)*
		Terry County	96%	20 *(update from 2)*
		Yoakum County	93%	4 *(update from 2)*
		Lynn County	92%	1
		Dawson County	88%	6 *(new)*
		Ector County	91%	1 *(new)*
		Harris County	94%	2
New Mexico	Small	Lea County	96%	9 *(update from 1)*
California		Not Specified	96%**	1 *(new)*
New Jersey		Bergen County	93%***	1 *(new)*
		Not Specified	93%***	2 *(new)*
New York		New York City	97%	2 *(update from 1)*
Georgia	Small	Metro Atlanta	85-91%	3
Rhode Island		Not Specified	97%**	1
Alaska		Southern Kenai Peninsula	84%**	2 *(update from 1)*

**MMR= measles-mumps-rubella vaccination; data sources linked, **State coverage, ***coverage for all school vaccines in state*

Notable Highlights: Majority of the cases occurred in unvaccinated individuals. Pockets of undervaccination (≤90% MMR coverage) are contributing to sustained transmission. Targeted vaccine campaigns are critical for containment & achieving herd immunity (≥95% MMR coverage).

- **Texas:** A large outbreak (90 cases) has spread across at least 7 counties.
- **New Mexico:** A new, small outbreak (9 cases) has been reported.
- **New Jersey:** Three cases have been reported, with linkage status not reported.

MMR vaccination is highly effective, providing 93% - 97% protection from one to two doses.

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Measles Scenario-Based Human Health

Outbreak Summary

- As of February 21, 2025, approximately 113 measles cases have been reported this year across eight jurisdictions: Texas (TX), New Mexico (NM), California (CA), New Jersey (NJ), New York City (NYC), Georgia (GA), Rhode Island (RI), and Alaska (AK). Of these cases:
    - Majority of cases are among children, primarily aged 5 to 19 years.
    - 23 hospitalizations have been reported, most involving children.
    - 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.
- At least three measles outbreaks have emerged: Western Texas (90 cases), Lea County, New Mexico (9 cases), and metro Atlanta, Georgia (3 cases).
    - **Texas**: The large outbreak (90 cases) in Western Texas has spread to 7 counties. Reports suggest there may be an additional 200–300 untested cases, though this remains unverified. The Texas State Department of Health has secured 2,000 MMR vaccine doses from the federal stockpile, with higher uptake observed among those previously vaccinated. The outbreak is linked to private religious schools, some of which have temporarily closed to limit transmission.
    - **New Mexico**: A small outbreak (9 cases) has been reported, with five cases occurring among family members. No linkages have been reported to the current Texas outbreak. An exposure has been reported in an elementary school.
    - **Georgia**: A small outbreak emerged among family members. The initial exposure occurred in the US. No additional cases have been reported since.
    - **New Jersey**: Three cases have been identified, though it is currently unclear if they are epidemiologically linked. If connected, this could represent a fourth outbreak.
- Most cases occurring nationally are related to outbreaks, but sporadic cases have also been reported.
- CORI will continue monitoring the situation and provide updates as new information becomes available.

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.

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Notable Limitations

- State, local, and school-level MMR coverage rates are often underreported, inconsistently available, and not standardized across different jurisdictions.
- 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.
- CDC reporting delays due to administrative changes require supplemental data, 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.

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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 are 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 or quarantine.

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.

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- **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.

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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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