Measles Scenario-Based Human Health Risk Assessment

Updated as of February 14, 2025

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

	Risk to unvaccinated people	Risk to children	Risk to healthcare workers	Risk to the US general public
Scenario 2 – Development of small-to-medium outbreaks	Moderate	Moderate	Low	Low

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

Overview: As of February 14, 2025, approximately 57 measles cases and at least two outbreaks (≥3 related cases) have been reported in the United States (US) this year.

Measles Cases in the US

State		Location	% MMR Coverage*	# of Cases
Texas	Western Texas Outbreak	Gaines County	82%	42 *(update from 24)*
		Terry	96%	3 *(new)*
		Yoakum	93%	2 *(new)*
		Lynn County	92%	1
		Harris County	94%	2
New Mexico		Lea County	95%**	1
New York		New York City	97%	1
Georgia		Metro Atlanta	85-91%	3
Rhode Island		Not Specified	97%**	1
Alaska		Southern Kenai Peninsula	84%**	1

**MMR= measles-mumps-rubella vaccination; MMR coverage data sources linked, **State MMR coverage*

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).

- **Western Texas Outbreak:** A medium outbreak (48 cases) emerged in Gaines County and spread to bordering counties. The outbreak is expected to grow to a large size (≥50 cases) due to connections to close-knit communities and pockets of low MMR coverage.
- **Lea County, New Mexico:** The case had no known exposure, suggesting potential undetected spread in Southeast New Mexico, which borders Gaines County, Texas.
- **Metro Atlanta, Georgia:** A small outbreak (3 cases) emerged among family members. The exposure occurred in the US. Local MMR coverage may help limit the extent of the outbreak.
- **MMR vaccination is highly effective, providing 93% - 97% protection from one to two doses.**

Additional information and mitigation recommendations are presented on subsequent pages.

Risk Assessment

Measles Scenario-Based Human Health

Outbreak Summary

- As of February 14, 2025, approximately 57 measles cases have been reported this year across six states (TX, NM, GA, NYC, RI, AK). These cases include at least:
  - 44 children, eight adults, and five cases whose ages have not been specified.
  - 14 hospitalizations (at least nine among children).
  - All reported cases are among unvaccinated individuals or unknown vaccination status, underscoring the critical importance of measles-mumps-rubella (MMR) vaccination in preventing spread.
- Two measles outbreaks have emerged: one in Western Texas (48 cases) and one in metro Atlanta, Georgia (3 cases). The majority of cases are related to outbreaks, but sporadic cases have also been reported. Detailed information is available in Outbreak Overview.

Impact of MMR Vaccination Coverage

- The MMR vaccine is highly effective, providing approximately 93% protection against measles after one dose and 97% after 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 of the cases this year are among children, the majority of whom are school aged. Schools can be high-risk settings for outbreaks—falls below 85% in a school, the likelihood of an outbreak and outbreak size increases significantly once MMR coverage (see School Outbreak Risk table).

Outbreak Risk Scale

Higher Risk	Moderate- High Risk	Lower Risk

Measles Cases in the US

State		Location	MMR Coverage*	Cases
Texas	Western Texas Outbreak	Gaines County	82%	42
		Terry	96%	3
		Yoakum	93%	2
		Lynn County	92%	1
		Harris County	94%	2
New Mexico		Lea County	95%**	1
New York		New York City	97%	1
Georgia		Metro Atlanta	85-91%	3
Rhode Island		Not Specified	97%**	1
Alaska		Southern Kenai Peninsula	84%**	1

School Outbreak Risk***

MMR Coverage	Chance of an Outbreak	Size of an Outbreak
97%	16%	Smaller
95%	29%	
93%	36%	
90%	51%	
85%	61%	
80%	64%	
70%	78%	Larger

*MMR coverage data sources linked, **State MMR coverage, ***Adapted from CDC model

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Outbreak Overview

Western Texas Outbreak (medium outbreak, 10-49 related cases)

- A measles outbreak in Western Texas has resulted in approximately 48 reported cases.
- The outbreak, which began in Gaines County (42 cases), has spread to neighboring counties—Terry (3), Yoakum (2), and Lynn (1). Among those affected, 42 are children and 13 individuals required hospitalization.
- The source of the outbreak has not been confirmed, and it remains unclear whether the initial case was linked to international travel or acquired domestically.
- The outbreak remains under investigation, but exposures have been associated with private religious schools and a healthcare waiting room. Exposures were also reported in nearby regions, such as Lubbock and New Mexico, putting those areas at risk.
- The cases in Houston, Texas and Lea County, New Mexico are not currently believed to be related to this outbreak.
- In response, local health officials in Gaines County have established drive-through vaccination clinics and are offering screening services to residents. The South Plains District will offer MMR vaccines at their clinic in Seminole, which serves a diverse population, including many Mennonite families, in Gaines County.

Western Texas Outbreak Counties MMR Vaccination Coverage

Texas permits personal belief exemptions for school vaccination requirements, contributing to one of the highest exemption rates in the US. Schools in Gaines County have particularly low MMR vaccination coverage, creating even larger pockets of undervaccination which increases the risk of continued transmission and the size of the outbreak (see Texas Counties MMR Coverage by School District table).

Texas Counties MMR Coverage by School District

County	# of Cases	School District (ISD)	# of Students	MMR Coverage	Chance of an Outbreak	Size of an Outbreak
Gaines	42	Seagraves	519	94%	~29- 36%	Smaller ↓ Larger
		Seminole	2961	82%	~61-64%	
		Loop	151	46%	>78%	
Lynn	1	O'Donnel	296	95%	29%	Smaller ↓ Larger
		Tahoka	598	91%	36-51%	
		New Home	588	91%	36-51%	
Terry	3	Brownfield	1641	97%	16%	Smaller ↓ Larger
		Meadow	270	93%	36%	
		Wellman-Union	284	88%	~51-61%	
Yoakum	2	Denver City	1601	96%	~16-29%	Smaller ↓ Larger
		Plains	412	83%	~61-64%	

- County-wide MMR coverage among kindergarteners (2023-2024 year) in Gaines County is 82% (74% excluding schools with fewer than five students), but school district (ISD) data highlights significant disparities. Seminole ISD, the largest district, reports 82% coverage, while Loop ISD has the lowest coverage at 46%— making an outbreak in these settings likely and large without prompt public health intervention.
- While some districts in counties near Gaines that have reported cases have MMR coverage above 90%, reducing the risk of an outbreak to below 50%, others have school districts with lower vaccination rates, increasing the risk of transmission. Schools with lower coverage—such as Plains (83%) ISDs— face a higher outbreak risk due to insufficient population immunity.
- Private religious schools linked to this outbreak adds further risk, as private schools may have higher exemption rates, and some religious beliefs may influence vaccine uptake.
- Coverage data is not available for all Texas schools, making it difficult to assess risks in these settings.
- Measles case numbers are expected to rise where vaccination rates remain low. Post-exposure prophylaxis (PEP), accelerated vaccination schedules, and culturally informed outreach campaigns may aid in preventing a large outbreak.

Metro Atlanta, Georgia (small outbreak, 3-9 related cases)

- An unvaccinated individual acquired measles while traveling domestically. The state of exposure is unknown but may be linked to a case in another state where there was an exposure. Two additional cases—unvaccinated family members—were exposed while the individual was infectious. Case age ranges are unknown.
- As of February 14, 2025, no additional cases have been reported yet.
- Georgia epidemiologists identified at least 300 exposed individuals across 20+ counties, including 114 in Gwinnett County**.** Exposures were reported among three healthcare facilities.
- Public health measures, including but not limited to contact tracing and provision of post-exposure prophylaxis, are ongoing.

Metro Atlanta MMR Vaccination Coverage

Georgia does not allow personal belief exemptions for school vaccination requirements, which may contribute to higher overall vaccination rates and less significant pockets of undervaccination.

MMR vaccination coverage among children aged 19–35 months (January–March 2023) in metro Atlanta ranges from 85% to 91%, depending on the county (see Metro Atlanta MMR Coverage by County table).

Metro Atlanta MMR Coverage by County

County	MMR Coverage	Chance of an Outbreak	Size of an Outbreak
Bartow (Highest coverage)	91%	~36-51%	Smaller
Newton	90%	51%	↓
Rockdale	89%	~51-61%	
Gwinnett (Most exposures)	88%	~51-61%	
Fulton	86%	~51-61%	
Coweta (Lowest Coverage)	85%	61%	Larger

- Metro Atlanta comprises 29 counties, with over half reporting MMR coverage between 89% and 90%. Fulton County (where Atlanta is) reports 86% coverage, while Gwinnett County (where over one-third of contacts were reported) is slightly higher at 88%.
- Despite the large number of identified contacts (300+), moderate vaccination rates in Gwinnett and nearby counties (Newton, Rockdale), along with most of metro Atlanta, may help contain the outbreak. Given current vaccination coverage, the outbreak is likely to remain small to medium in size.
- However, additional cases remain possible due to the large number of exposed individuals, potential for pockets of undervaccination, and the high transmissibility of measles
- School district data was unavailable, making it difficult to assess school-specific risks. However, county-level data and the absence of personal belief exemptions suggest a lower likelihood of large pockets of undervaccination in schools.

Other Locations

Public health authorities in most affected states have issued press releases and/or health alerts to notify community members and healthcare providers about cases, potential exposures, isolation/quarantine instructions, and the importance of vaccination.

- **Lea County, New Mexico:** The case is a school-aged child. While the county borders Gaines County, Texas, where a medium-sized outbreak is ongoing, no travel to Texas or direct linkages have been identified, suggesting possible undetected transmission. Exposures were reported in a hospital and sixth-grade gymnastics class, posing a risk of school-based spread without prompt public health intervention. The county has a 1% school vaccination exemption rate. The county is hosting vaccination clinics.
- **New York City, New York:** No information is available on the case or exposure setting(s), but overall city MMR coverage is high (95%). However, pockets of undervaccination in the city can contribute to an outbreak. New York has yet to issue a public advisory.

- **Houston, Texas:** Two adult cases have been identified among household members, both linked to international travel. Vaccination coverage (94%) in the area may help limit spread, and high-risk exposure settings have not been reported.
- **Rhode Island:** The child case is linked to international travel, with no additional cases identified in the state so far. The child was hospitalized. Overall vaccination coverage in the state is high (97%). Potential exposures were reported in a healthcare setting.
- **Southern Kenai Peninsula, Alaska:** The adult case is linked to international travel. Statewide vaccination rates are low (84%); however, the case was in an adult with seemingly limited exposures (in an airplane and 2 hours at the airport).

CORI will continue monitoring the situation and provide updates as new information becomes available.

NOTE: High overall MMR coverage at the state, city, or county level does not eliminate the risk of outbreaks, as pockets of undervaccination may persist and facilitate disease spread.

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 January 2, 2025, CDC transitioned to monthly 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.

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.

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.

Measles Scenario-Based Human Health

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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