



Measles Scenario-Based Human Health Risk Assessment for the United States

Updated as of September 19, 2024

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 high given the amount of information available both nationally and globally.

Epidemiological updates of note as of September 19, 2024:

- In 2024, a total of [262 measles cases](#) have been reported to the Centers for Disease Control and Prevention (CDC). The majority of cases ([70%](#)) have been outbreak-associated, occurred in children under 5 years ([42%](#)), and involved individuals who were either unvaccinated or had an unknown vaccination status ([88%](#)). The total also includes numerous sporadic cases, such as internationally imported, US-acquired, or unknown source cases. Out of all cases, [41%](#) of U.S. measles cases required hospitalization, with the highest rate ([52%](#)) among children under 5 years old.
- Measles cases have been reported across 32 jurisdictions in the US.* The East North Central region of the US has reported the highest number of measles cases in 2024, with 83 cases, largely due to a now-complete outbreak in Illinois (67 cases). The West North Central Region follows with 60 cases, most of which occurred in Minnesota (57 cases).
- This year, there have been [13 outbreaks](#) (defined as 3 or more related cases) reported in the US. Currently, a large outbreak is ongoing, with sporadic cases and small-to-medium outbreaks continuing to occur across the country. In the last 30 days, 29 cases have been reported, with the majority coming from Minnesota (83%). Reports suggest that these cases are appearing in pockets of unvaccinated individuals.
- Due to the size and growing concern of the Minnesota outbreak, we have included additional updates below

*AZ, CA, DC, FL, GA, ID, IL, IN, LA, MD, MA, MI, MN, MO, NC, NH, NJ, NM, NYC, NY, OH, OK, OR, PA, SC, SD, TN, VT, VA, WA, WI, WV



Minnesota Outbreak Update:

- In Minnesota, a large-sized measles outbreak has emerged, with [51 cases](#) reported since May 2024, primarily affecting unvaccinated children in the Twin Cities metro area. The outbreak saw a sharp rise in late July, with peaks in late August and early September. Of the 51 confirmed cases, the majority (46%) are among children aged 1 to 19 years, with majority (88%) occurring in Hennepin County and additional cases reported in surrounding counties. To date, 12 individuals have been hospitalized.
- The [outbreak](#) has notably impacted unvaccinated children in the Somali community, prompting health officials to promote vaccination and increase awareness. A Somali religious school [temporarily closed](#) to help contain the spread, highlighting the community's proactive response.
- Recently, at least one [Minneapolis school](#) has reported a measles case, prompting district officials to work with the Minnesota Department of Health to contact those most impacted. Parents are urged to ensure their children are up-to-date on vaccinations and to monitor for symptoms such as rash, fever, and cough. As the school year begins, Minnesota health officials continue to emphasize the importance of MMR vaccinations to protect the community. CORI will closely monitor the outbreak to assess if it escalates further.

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 measles virus is introduced to an undervaccinated community (90% coverage or less), which leads to a small-to-medium outbreak, ranging from [3–49 related cases](#).
- **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, 3 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 one 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

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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 high 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.



Recommendations

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

- [All children](#) receive a routine 2-dose the 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.

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

- Implementing all recommendations from prior scenarios.

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- 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 (eg, schools, shelters, etc.).
- Promoting targeted 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 (eg, health alerts, clinician letters, and press releases).
- Building strong relationships with providers and schools (including school leadership and school nurses) to increase awareness of measles symptoms, testing, and isolation protocols.
- Enhancing communication between public health and medical leaders to share outbreak response experiences and lessons learned.



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