



## Summary: Dengue Scenario-Based Human Health Risk Assessment for the United States as of January 9, 2024

*Currently, the Center for Outbreak Response Innovation (CORI) judges that the ongoing dengue situation in the US is now within Scenario 2, meaning there is an increase of locally acquired cases in areas with known endemic spread, like Puerto Rico and Florida, as well as an increase in imported cases across the US and the globe.*

This judgement is based on the continued increase in local transmission of dengue in Puerto Rico, US Virgin Islands, and Florida, as well as travel-associated cases in 53 states or territories in 2024. As of [December 31 2024](#), the US Centers for Disease Control and Prevention (US CDC) reports 9,255 dengue cases, 6,076 of which are locally acquired. In comparison, there were a total of 3,352 cases in all of 2023. In [September 2024](#), California detected their first case of locally acquired dengue, By the end of 2024, there were [18 cases](#) of locally acquired dengue in the state, with separate outbreaks occurring in different counties throughout the year. In November of 2024, Texas reported their first and only case of locally acquired dengue in the state. All other reports of local transmission have been in the states and territories that have historically reported endemic transmission, though the increase of travel-associated cases does increase the risk of local transmission beyond the historical levels from endemic states.

See the detailed risk assessment analysis beginning on the next page.

	Risk to travelers	Risk to children	Risk to people who spend significant time outdoors	Risk to vulnerable populations	Risk to the US general public
Scenario 2 – Increase in locally acquired cases in endemic areas of the US	Moderate	Low	Low	Low	Low

Our **confidence** in these risk scores remains high, as the modes of transmission, main drivers of increased rates of infection, and case diagnosis and reporting are well documented and understood. To decrease the risk to human health in the current situation, we [recommend](#):

- Preventing mosquito bites by using insect repellent, wearing full-coverage loose clothing when in outside environments, and controlling mosquito populations around the home, like clearing standing water.
- Prepare for travel to dengue-endemic areas by visiting a travel clinic, being aware of any country-specific travel recommendations, and packing insect repellent and acetaminophen.
- Individuals aged 9-16 who live in areas of endemic spread should get a dengue vaccine with laboratory-confirmed previous dengue virus infection.



## Dengue Scenario-Based Human Health Risk Assessment for the United States Center for Outbreak Response Innovation (CORI) Updated as of January 9, 2025

Dengue virus is the most common and widely transmitted arboviral disease globally, with at least [half of the world's population at risk](#) of infection. Global and US-national [burden has been growing](#) over the recent years, with 500,000 cases reported globally in 2000 and 5.2 million cases reported in 2019. As of November 30, 2024, the [WHO reports](#) 13.9 million cases globally (7.3 million cases laboratory confirmed) and just under 10,000 deaths. [The increase in dengue cases globally](#) is due to a myriad of factors including a shift in the distribution of dengue-carrying mosquitoes, climate-change-associated weather patterns and increases in heat and humidity, increased levels of movement of people across borders, and political instability, and humanitarian crises. The vast majority of cases in 2024 have been in Central and South America, though [the US has seen a significant increase in caseload](#) in 2024 when comparing it to historical averages. On June 25, 2024, the CDC released a [Health Advisory](#) to the Health Alert Network that outlined the recent surge in dengue cases, highlighting the seriousness of the virus and its impacts on human health.

The CDC has reported [3,352 cases for 2023](#) and over [9,255 cases in 2024 so far](#). To date, there have been [6,076 locally acquired cases](#) of dengue, the vast majority of which have been in Puerto Rico (5,793), and the remaining in the US Virgin Islands (185) and Florida (79). The [remaining 3,179 cases](#) are all associated with travel and span the entirety of the continental US, Alaska, Hawaii, and the Northern Mariana Islands.

[Historical data suggests](#) that new infections peak in late-August and early-September, and data for 2024 shows similar trends, though with much higher numbers of reported infections. Both [historical](#) and [2024 data](#) show that the virus infects males and females approximately equally and individuals aged 11-19 make up 23-30% of confirmed or probable cases. 58% of all 2024 cases with [known serotype](#) were identified as DENV-3, 25% as DENV-1, 13% as DENV-2, and just 4% as DENV-4. [44% of the total 2024 cases](#) resulted in hospitalization

Currently, the risk to human health from this surge in dengue cases is low-moderate, data collection and dissemination is rapid and consistent, natural history of disease and transmission dynamics are well understood, but case number is continuing to expand beyond historical values, vaccines are complex to administer and are only recommended for certain at-risk groups, and there is no effective treatment for severe dengue, increasing the risk for certain populations. Risk assessment can be very helpful in times of significant uncertainty because it enables structured consideration of complex scenarios, likelihoods, and consequences to inform decisions around



policy and operational action, as well as implementation of protective measures and future planning for worst-case scenarios. It is important not to wait for perfect information to estimate potential risk, because decisions must be made even in the absence of plentiful data.

Therefore, the Center for Outbreak Response Innovation (CORI) conducted a scenario-based risk assessment to consider human health risks both now and in potential future scenarios. We will update this assessment as additional data becomes available.

**\*Please note:** We are evaluating the risks to human health should each scenario occur, **not** the relative risk of any one scenario occurring.

Features that would characterize each scenario include:

**Scenario 1 – Baseline:** The virus is infecting individuals in known endemic regions of the US (Puerto Rico, USVI, and Florida) at rates consistent with historical values. There are a few travel-related cases across the country but no local transmission beyond endemic areas. Global caseload and infection outcome (including severe dengue, case fatality, and hospitalization rates) mirrors historical data.

**Scenario 2 – Increase in local transmission in endemic areas:** The virus is spreading via local transmission within endemic areas at increased rates beyond historical values and there may be sporadic cases of local transmission. There is no increase in travel-related cases throughout the rest of the US. Global caseload, especially local transmission in endemic areas, increases. The likelihood of widespread human infection is low. Population health consequences are low-moderate and the risk for those who spend significant time outdoors and vulnerable populations is low-moderate. Case outcome, including hospitalization rates, increases in areas with endemic transmission but not elsewhere in the US.

**Scenario 3 – Sustained transmission in locally acquired cases in new regions of the US:** The virus is spreading via local transmission in new regions of the US. Travel-related cases are also increasing. The likelihood of widespread human infection is moderate. Population health consequences are moderate and the risk to those who spend time outdoors and vulnerable populations is moderate. Case outcome, including hospitalization and fatality rates increase.

**Scenario 4 – Year-round endemicity and expanded local transmission:** Viral transmission now occurs year-round and local transmission continues to expand outside of states and territories that have seen local transmission historically. Global transmission continues to expand and endemicity period extends in multiple regions. Case outcomes, including severe dengue from second-time infections, hospitalization and fatality rates increases. The likelihood of widespread human infection is moderate-high. Population health consequences are



moderate-high and the risk to those who spend time outdoors and vulnerable populations is high.

**Due to recent events, CORI judges that the ongoing dengue outbreak is now within Scenario 2, meaning the virus is infecting individuals via local transmission in known endemic areas, but at higher rates than historical averages, increasing risk to those who spend significant time outdoors and vulnerable populations.**

This judgement is based on the sharp increase in dengue virus cases in endemic regions of the US when compared to historical data. There are currently no new regions of local transmission beyond what has been seen historically in the US, though the overall increase in travel-acquired cases and the wider spread of states that are detecting cases increases the risk of local transmission in the future.

CORI are continuing to monitor and adapt this risk assessment to the evolving changes of the dengue outbreak in the US. Factors that may contribute to a change in this assessment include increased reports of dengue infections among in endemic or travel-related cases, reports of local transmission in non-endemic areas, and reports of steady case load into the autumn months.

**Dengue Human Health Risk Assessment Scenario Table**

	Risk to travelers to endemic areas	Risk to children	Risk to people who spend significant time outdoors	Risk to vulnerable populations	Risk to the US general public
<b>Scenario 1</b> – Baseline: Historical trends of imported cases onto mainland US	Low	Low	Low	Low	Very Low
<b>Scenario 2</b> – Increase in locally acquired cases in endemic areas of the US	Moderate	Low	Low	Low	Very Low
<b>Scenario 3</b> – Increase in locally acquired cases in new regions of the US	Moderate	Moderate	Low	Low	Low
<b>Scenario 4</b> – Dengue endemicity expands to year-round, local transmission continues to expand to new states/territories in the US	High	Moderate-high	Moderate-high	Moderate-high	Moderate

**Methods:** The purpose of this document is to consider possible future developments in this outbreak and describe corresponding risks to human populations should a given scenario occur.



A risk score is determined for each key population across multiple possible scenarios. Risk scores are evaluated on a five-point scale, with scores including low, low-moderate, moderate, moderate-high, and high. The confidence in each of these risk level assignments is based on the breadth, depth, and the quality of information available. The overall confidence of each risk score determination is based on a three-point scale, which includes low, moderate, and high. Each risk score and the confidence in the score is discussed in the Appendix.

In each scenario regarding dengue, we consider the risk to four distinct populations: travelers, children, people who spend significant time outdoors, vulnerable populations (eg, those with previous DENV infection, [the elderly](#), [children under 9](#), [pregnant people](#), and [people with certain medical conditions](#)) and the US general public.

In determining these risks, we consider several factors, including mosquito-human transmission pathways, human-human transmission pathways (eg, maternal transmission), symptoms and length of viremia, and the 4 co-circulating serotypes of DENV. We also consider disease morbidity and mortality, instances of transmission, the level of testing and reporting to the CDC, and existing processes to reduce mosquito breeding. Other factors include events that could increase transmission (eg, climate change, seasonal trends, increased mosquito lifespan and breeding, etc.), treatments available to humans (none currently available), preventative nonpharmaceutical measures (eg, use of insect repellent, wearing full-coverage clothing, and using window screens), preventative medical countermeasures (eg, vaccines), and ongoing response operations to address the outbreak.

## Appendix: Additional Details on Process and Recommendations

### Scenario 1: Historical Baseline

In the first scenario we considered the risk to human health if dengue virus transmission remained at historical levels for both local and travel-related transmission. We determined the health risk to **travelers** to be **low**, the health risk to **children** to be **low**, the health risk to **those who spend significant time outdoors** to be **low**, the risk to **vulnerable populations** to be **low**, and the risk to the **general US public** to be **very low**.

Our **confidence** in these risk scores is **high** given the current level of information known for each of these factors and the fact that disease reporting standards and transmission dynamics are well adhered to and articulated.



To minimize the spread of dengue, [CDC](#) recommends:

- Preventing mosquito bites by using insect repellent, wearing full-coverage loose clothing, and controlling mosquito populations around the home.
- Prepare for travel to dengue-endemic areas by visiting a travel clinic, being aware of any country-specific travel recommendations, and packing insect repellent and acetaminophen.
- Individuals aged 9-16 who live in areas of endemic spread should get a dengue vaccine with laboratory-confirmed previous dengue virus infection.

## Scenario 2: Increase in locally acquired cases in endemic areas

In the second scenario we considered the risk to human health if dengue virus transmission increased beyond historical levels for both local and travel-related transmission. We determined the health risk to **travelers** to be **moderate**, the health risk to **children** to be **low**, the health risk to **those who spend significant time outdoors** to be **low**, the risk to **vulnerable populations** to be **low**, and the risk to the **general US public** to be **very low**.

Our **confidence** in these risk scores is **high** given the current level of information known for each of these factors and the fact that disease reporting standards and transmission dynamics are well adhered to and articulated. CORI determines this to be the current scenario and notes that increased transmission via both endemic spread and travel-related exposure increases the risk more broadly for a larger-scale outbreak or introduction of the virus to naïve populations.

To minimize the spread of dengue, [CDC](#) recommends:

- Preventing mosquito bites by using insect repellent, wearing full-coverage loose clothing, and controlling mosquito populations around the home.
- Prepare for travel to dengue-endemic areas by visiting a travel clinic, being aware of any country-specific travel recommendations, and packing insect repellent and acetaminophen.
- Individuals aged 9-16 who live in areas of endemic spread should get a dengue vaccine with laboratory-confirmed previous dengue virus infection.

## Scenario 3: Expansion of areas with local transmission in the US

In the third scenario we considered the risk to human health if dengue virus local transmission expanded to new regions in the US beyond states and territories that have historically seen local transmission. We determined the health risk to **travelers** to be **moderate**, the health risk to



**children** to be **moderate**, the health risk to **those who spend significant time outdoors** to be **low**, the risk to **vulnerable populations** to be **low**, and the risk to the **general US public** to be **low**.

Our **confidence** in these risk scores is **moderate** given the current level of information known for each of these factors and the fact that disease reporting standards and transmission dynamics are well adhered to and articulated. The confidence in the risk score is reduced because there is little evidence of how CDC, state, and local leadership will respond to new areas of endemicity, including vaccine distribution, increased public education, and mosquito control programs.

To minimize the spread of dengue, [CDC](#) recommends:

- Preventing mosquito bites by using insect repellent, wearing full-coverage loose clothing, and controlling mosquito populations around the home.
- Prepare for travel to dengue-endemic areas by visiting a travel clinic, being aware of any country-specific travel recommendations, and packing insect repellent and acetaminophen.
- Individuals aged 9-16 who live in areas of endemic spread should get a dengue vaccine with laboratory-confirmed previous dengue virus infection.

## Scenario 4: Year-long dengue endemicity, expansion of areas of local transmission

In the fourth scenario we considered the risk to human health if dengue transmission became year-long and there was an expansion of regions with local transmission. We determined the health risk to **travelers** to be **high**, the health risk to **children** to be **moderate-high**, the health risk to **those who spend significant time outdoors** to be **moderate-high**, the risk to **vulnerable populations** to be **moderate-high**, and the risk to the **general US public** to be **moderate**.

Our **confidence** in these risk scores is **moderate** given the current level of information known for each of these factors and the fact that disease reporting standards and transmission dynamics are well adhered to and articulated, though year-long endemicity would be a new development in life cycle of the virus and mosquito host. The confidence in the risk score is reduced because there is little evidence of how CDC, state, and local leadership will respond to new areas of endemicity, including vaccine distribution, increased public education, and mosquito control programs.

To minimize the spread of dengue, [CDC](#) recommends:

- Preventing mosquito bites by using insect repellent, wearing full-coverage loose clothing, and controlling mosquito populations around the home.



- Prepare for travel to dengue-endemic areas by visiting a travel clinic, being aware of any country-specific travel recommendations, and packing insect repellent and acetaminophen.
- Individuals aged 9-16 who live in areas of endemic spread should get a dengue vaccine with laboratory-confirmed previous dengue virus infection.

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