

Mosquito-borne Infectious Disease



Mosquitoes are carriers of diseases that can affect humans around the world. Though generally less common in the US, global climate change and rising temperatures are increasing the range of some mosquito species, causing increased incidence of mosquito-borne diseases in ever-widening regions.

WHAT DISEASES CAN MOSQUITOES TRANSMIT?

MALARIA. More than 241 million cases of malaria occurred globally in 2020 with about 2,000 cases reported annually in the U.S. Most US cases occur in people returning from international travel from countries in sub-Saharan Africa and South Asia, according to CDC. Through August 2023, only 9 cases of locally acquired malaria were reported for the year in the US, meaning that the overall US risk is extremely low. But malaria is a serious disease caused by a parasite that infects *Anopheles* mosquitoes, which can be transmitted to humans via a bite. This mosquito can also transmit malaria from person to person even if the mosquito itself is not infected. Symptoms of malaria can range from fever and flu-like illnesses to serious symptoms of kidney failure, seizures, and coma. Properly administered prescription treatments can effectively treat and cure malaria, so seeking prompt medical attention is important.

DENGUE (breakbone fever) is a viral infection that is spread primarily by bites from female *Aedes aegypti* mosquitoes with about 5 million cases reported globally each year. When the mosquito bites a person with Dengue, the virus replicates in the mosquito reaching an infectious level within 12 days (when the ambient temperature is 77-82°F). Transmission to others then occurs through subsequent bites. According to the World Health Organization (WHO), about 5 million cases occurred globally in 2019; but since most cases are asymptomatic or mild, it's likely that the numbers are significantly underreported. The Americas, South-East Asia, and Western Pacific regions are the most seriously affected, with Asia representing around 70% of the global disease incidence. Dengue outbreaks occasionally occur in the continental US with about half related to travel. Per the CDC, more than 2,900 cases were reported in 2023 from an area including the 50 states, District of Columbia, 5 US territories and 3 freely associated states. When they occur, Dengue symptoms include very high fever (~104°F) and severe headache 4-10 days after a bite, that can persist for up to 7 days. After the fever goes away, severe abdominal pain, bleeding and GI impacts can occur. Treatment relies on treating the symptoms with nonspecific drugs aimed at pain reduction.

CHIKUNGUNYA is a viral disease whose symptoms resemble Dengue and is also transmitted by an infected *Aedes* species of mosquito, so it can be misdiagnosed. While most Chikungunya cases in the US are related to travel in affected areas in Africa and Asia, rare locally acquired cases have been reported.

ZIKA is a viral disease spread to people primarily through the bite of an infected *Aedes* mosquito. Infections are typically asymptomatic or very mildly symptomatic with fever, rash, headaches, and other pains. But infection during pregnancy can cause a birth defect of the brain in the fetus. In 2015-2016, cases of Zika virus spread from Brazil to the Southern US, causing tens of thousands of cases. But cases have decreased dramatically in recent years, with 2017 seeing the last case of locally acquired Zika in the US, though it persists in several countries including Africa and the Caribbean among others, per the WHO.

OROPOUCHE VIRUS is endemic in Central and South America and The Caribbean. It is likely spread via bites from midges and perhaps mosquitoes who transmit the virus to humans from animals such as sloths and primates. It causes a febrile illness with symptoms including fever, chills, headache, muscle pain, and joint stiffness; and can recur in up to 60% of patients. There are no vaccines for prevention or medicines for treatment, rather treatment is supportive. Since late 2023, 8,000 cases have been identified in Central and South America and The Caribbean, and 21 cases in Americans who recently traveled to Cuba.

EASTERN EQUINE ENCEPHALITIS VIRUS is very rare but serious and can be spread through the bite of an infected mosquito. Symptoms can include fever, headache, vomiting, diarrhea, seizures, behavioral changes, and drowsiness. About 30% of cases are fatal. Only a few cases are reported annually in the US, typically in the Gulf Region. In summer of 2024, at least three cases were reported in New England and one person died.

HOW CAN I REDUCE TRANSMISSION OF MOSQUITO-BORNE DISEASE?

1. Avoid areas where mosquitoes or other disease-transmitting insects are found, such as near standing water.
2. Use EPA-registered mosquito repellents and/or nets; ensure that window and door screens are intact.
3. Be aware of, and take precautions during infectious-mosquito active times. Night: *Anopheles* mosquitoes that carry malaria are active. Day: *Aedes* species that carry Dengue, Chikungunya and Zika.

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