

# PUBLIC HEALTH REFERENCE SHEET

## Dengue



<b>Name</b>	<i>Dengue Virus, serotypes 1, 2, 3, and 4</i>
<b>Reservoir &amp; Transmission</b>	Human- <i>Aedes</i> mosquito cycle; <i>Aedes aegypti</i> and to a lesser extent <i>Aedes albopictus</i> ; Sylvatic monkey-mosquito cycle, which may spill into human populations of southeastern Asia and western Africa
<b>Incubation Period</b>	3–14 days, commonly 4–7 days
<b>Common Symptoms</b>	Ranges from critical to asymptomatic; sudden onset of fever, which lasts 2–7 days and may be biphasic; also, may include headache, myalgia, arthralgia, bone pain, retro-orbital pain, anorexia, vomiting, macular or maculopapular rash, and minor hemorrhagic manifestations including petechiae, ecchymosis, purpura, epistaxis, bleeding gums, hematuria, or a positive tourniquet test
<b>Gold Standard Diagnostic Test</b>	Rapid Immunochromatographic test (ICT) detecting NS1, IgM, and IgG Rapid tests should be confirmed by enzyme-linked immunosorbent assay (ELISA); virus isolation or molecular methods (PCR)
<b>Risk Groups</b>	People who live in endemic areas. Infants infected with dengue viruses (DENV) at 6–12 months of age, and born to mothers previously infected with DENV, are at increased risk for severe infection. Travelers from non-endemic regions that travel to endemic regions are at risk for febrile illness.
<b>Geographic Significance</b>	Endemic in at least 100 countries in Asia, the Pacific, the Americas, and the Caribbean (see map below)

### What is dengue?

Dengue, an acute febrile illness, is caused by infection with any of four related positive-sense, single-stranded RNA viruses of the genus *Flavivirus*, dengue viruses (DENV) 1, 2, 3, or 4. Approximately 1 in 20 patients with dengue virus disease progress to develop life-threatening severe dengue. The second infection by a different serotype to the first dengue infection is epidemiologically associated with the highest risk of severe dengue.

### What is the occurrence of dengue?

Sporadic outbreaks with local transmission have occurred in Florida, Hawaii, and Texas (along the border with Mexico). Dengue is endemic throughout the tropics and subtropics and is a leading cause of febrile illness among travelers returning from Latin America, the Caribbean, and Southeast Asia. Dengue occurs in more than 100 countries in the Americas, the Caribbean, Africa, Europe, the Middle East, Asia, and Oceania.

### How is dengue transmitted?

Dengue viruses are spread to people through the bite of an infected *Aedes* mosquito (species *Ae. aegypti* or *Ae. albopictus*); dengue is not contagious and there is no direct person-to-person spread of dengue. In the Western Hemisphere, the *Aedes aegypti* mosquito is the most important transmitter or vector of dengue viruses. The mosquito becomes infected with dengue virus when it bites a person who has dengue virus in their blood. After about 1 week, the mosquito can then transmit the virus while biting a healthy person. Because of the approximately 7-day viremia in humans, bloodborne transmission is possible through exposure to infected blood, organs, or other tissues (such as bone marrow). Perinatal dengue transmission occurs when the mother is infected near the time of birth, in which infection occurs via micro-transfusions (i.e., when the placenta is detached or through mucosal contact with mother's blood during birth). Dengue viruses may also be transmitted through breast milk. There is no evidence of sexual transmission.

The mention of any non-federal entity and/or its products is for informational purposes only, and is not to be construed or interpreted, in any manner, as federal endorsement of that non-federal entity or its products.

# PUBLIC HEALTH REFERENCE SHEET

## Dengue



### What are the signs and symptoms of dengue?

An estimated 1 in 4 dengue virus infections are symptomatic. Symptomatic dengue virus infection most commonly presents as a mild to moderate, nonspecific, acute febrile illness. The World Health Organization (WHO) classifies dengue illness as 1) dengue with or without warning signs for progression toward severe dengue, and 2) severe dengue. Warning signs of dengue: lives in or has traveled to a dengue-endemic area; has a fever; and has two of the following: nausea and vomiting, rash, aches and pains, tourniquet test positive, or leukopenia.

Warning signs of progression to severe dengue occur in the late febrile phase around the time of defervescence (abatement of fever) and include severe abdominal pain or tenderness, persistent vomiting, clinical fluid accumulation, mucosal bleeding, lethargy or restlessness, difficulty breathing, postural hypotension, liver enlargement, or an increase in hematocrit concurrent with a rapid decrease in platelet count.

Severe dengue: severe plasma leakage leading to shock or fluid accumulation with respiratory distress, severe bleeding, or severe organ impairment. Symptoms include hemorrhagic manifestations (bruise easily, bleeding nose or gums, frank hemorrhage, hematemesis, hemochezia, melena, menorrhagia); pleural effusion or ascites; hypoproteinemia; hemoconcentration; fulminant hepatitis; myocarditis; pancreatitis; and encephalitis.

There may be three phases of dengue:

- **Febrile phase:** high fever, severe headache, severe pain behind the eyes; muscle, bone, and joint pain; macular or maculopapular rash; and minor hemorrhagic manifestations including petechia, ecchymosis, purpura, epistaxis, bleeding gums, hematuria, or a positive tourniquet test result. Some patients have injected oropharynx and facial erythema in the first 24–48 hours after onset. Fever typically lasts 2–7 days and can be biphasic. Dengue fever is also called “breakbone fever” because of the very severe and debilitating muscle, bone, and joint pain. Symptoms can take up to 2 weeks to develop but usually end in a week. Generally, younger children and those with their first dengue infection have milder illness than older children and adults.
- **Critical phase:** begins at abatement of fever and typically lasts 24–48 hours. Patients with severe plasma leakage may have pleural effusions, ascites, hypoproteinemia, or hemoconcentration. Most patients clinically improve during this phase with maintenance of fluid volume and hemodynamic status, but those with significant plasma leakage can progress to severe dengue.
- **Convalescent phase:** begins when plasma leakage subsides, and intravenous, pleural, and abdominal fluids reabsorb, hemodynamic status stabilizes, and diuresis ensues. Generalized erythematous rash with circular areas of nonerythematous skin may desquamate and be pruritic.

### How is dengue diagnosed?

Patients with symptoms consistent with dengue can be tested with both molecular and serologic diagnostic tests during the first 7 days of illness. After the first 7 days of illness, test only with serologic diagnostic tests. Testing cerebrospinal fluid is recommended in suspect patients with central nervous system clinical manifestations such as encephalopathy and aseptic meningitis. <https://www.cdc.gov/dengue/healthcare-providers/testing/testing-guidance.html>

The mention of any non-federal entity and/or its products is for informational purposes only, and is not to be construed or interpreted, in any manner, as federal endorsement of that non-federal entity or its products.

# PUBLIC HEALTH REFERENCE SHEET

## Dengue



Areas with co-circulating flaviviruses: For people living in or traveling to an area with endemic or concurrently circulating dengue, Zika, and other flaviviruses (such as, Japanese encephalitis, West Nile, yellow fever, clinicians) will need to order appropriate tests to best differentiate dengue virus from other flaviviruses and consult with state or local public health laboratories or CDC.

### **How is dengue treated?**

There is no specific antiviral therapy for dengue. During the febrile phase, use acetaminophen; do not use aspirin-containing drugs or nonsteroidal anti-inflammatory drugs, as these drugs may increase the risk of bleeding due to dengue. Clinical management depends on early recognition of the development of capillary leakage and prompt intravenous fluid replacement with isotonic crystalloids.

### **How can dengue be prevented?**

A dengue vaccine is approved for use in children aged 9 to 16 years with laboratory-confirmed previous dengue virus infection and living in areas where dengue is endemic (common). Endemic areas include some U.S. Territories and freely associated States. The vaccine is not approved for use in U.S. travelers who are visiting but not living in an area where dengue is common.

Eliminate the places where the mosquito lays eggs, primarily artificial containers that hold water. Employment of a combination of effective mosquito (vector) control programs. (See Vector Control section of the Control of Communicable Diseases Manual.)

Using air conditioning or window and door screens reduces the risk of mosquitoes coming indoors. Using bed nets if sleeping outdoors also reduces the risk of mosquito bites. Avoid outdoor activity around dusk and dawn.

Application of mosquito repellents containing 20–30% DEET as the active ingredient on exposed skin and clothing, such as long-sleeved shirts, long pants, and hats, decreases the risk of being bitten by mosquitoes. Consider wearing clothing impregnated with permethrin or functional equivalent.

### **What are some public health considerations?**

- Specify serotype if known (DENV-1, -2, -3, or -4).
- Document relevant travel and deployment history occurring within the incubation period of 3 to 14 days.

Although the geographic distribution of dengue is similar to malaria, dengue is more of a risk in urban and residential areas than is malaria. The dengue map ([www.healthmap.org/dengue/index.php](http://www.healthmap.org/dengue/index.php)) shows up-to-date information on areas of ongoing transmission.

The mention of any non-federal entity and/or its products is for informational purposes only, and is not to be construed or interpreted, in any manner, as federal endorsement of that non-federal entity or its products.

# PUBLIC HEALTH REFERENCE SHEET

## Dengue

### Map of Dengue risk in the Americas and the Caribbean



Source: <https://wwwnc.cdc.gov/travel/yellowbook/2020/travel-related-infectious-diseases/dengue>

The mention of any non-federal entity and/or its products is for informational purposes only, and is not to be construed or interpreted, in any manner, as federal endorsement of that non-federal entity or its products.

Last Updated September 1, 2023

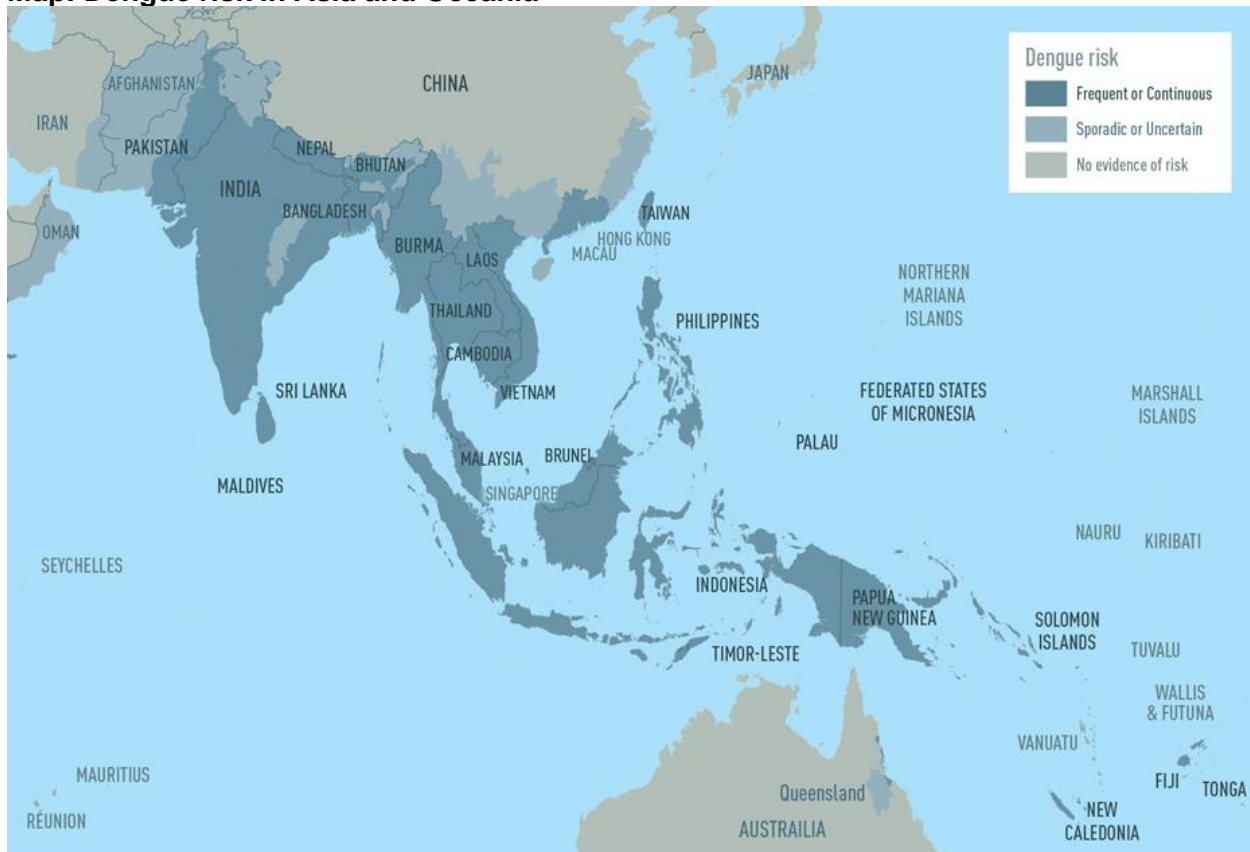




# PUBLIC HEALTH REFERENCE SHEET

## Dengue

### Map: Dengue risk in Asia and Oceania



Source: <https://wwwnc.cdc.gov/travel/yellowbook/2020/travel-related-infectious-diseases/dengue>

### References:

Defense Health Agency. 2022. *Armed Forces Reportable Medical Events Guidelines and Case Definitions*.

<https://www.health.mil/Reference-Center/Publications/2022/11/01/Armed-Forces-Reportable-Medical-Events-Guidelines>

“Dengue Fever,” Centers for Disease Control and Prevention, last reviewed July 1, 2023.

<https://wwwnc.cdc.gov/travel/yellowbook/2020/travel-related-infectious-diseases/dengue>

Heymann, David L. ed. 2022. *Control of Communicable Diseases Manual*, 21<sup>st</sup> Edition, Washington DC: APHA Press.

The mention of any non-federal entity and/or its products is for informational purposes only, and is not to be construed or interpreted, in any manner, as federal endorsement of that non-federal entity or its products.

Last Updated September 1, 2023