

Dengue

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- **Dengue is a mosquito-borne viral infection, found in tropical and sub-tropical climates worldwide, mostly in urban and semi-urban areas.**
- **The virus responsible for causing dengue, is called dengue virus (DENV). There are four DENV serotypes, meaning that it is possible to be infected four times.**
- **While many DENV infections produce only mild illness, DENV can cause an acute flu-like illness. Occasionally this develops into a potentially lethal complication, called severe dengue.**
- **Severe dengue is a leading cause of serious illness and death in some Asian and Latin American countries. It requires management by medical professionals.**
- **There is no specific treatment for dengue/severe dengue. Early detection of disease progression associated with severe dengue, and access to proper medical care lowers fatality rates of severe dengue to below 1%.**
- **The global incidence of dengue has grown dramatically in recent decades. About half of the world's population is now at risk. There are an estimated 100-400 million infections each year.**
- **Dengue prevention and control depends on effective vector control measures. Sustained community involvement can improve vector control efforts substantially.**

What kind of diseases?

Dengue causes a wide spectrum of diseases. This can range from subclinical disease (people may not know they are even infected) to severe flu-like symptoms in those infected. Although less common, some people develop severe dengue, which can be any number of complications associated with **severe bleeding, organ impairment, and/or plasma leakage**. Severe dengue has a higher risk of death when not managed appropriately. Severe dengue was first recognized in the 1950s during dengue epidemics in the Philippines and Thailand. Today, severe dengue affects most Asian and Latin American countries and has become a leading cause of hospitalization and death among children and adults in these regions.

what cause dengue?

Dengue is caused by a virus of the **Flaviviridae family** and there are four distinct, but closely related, serotypes of the virus that cause dengue (DENV-1, DENV-2, DENV-3, and DENV-4). Recovery from infection is believed to provide lifelong immunity against that serotype. However, cross-immunity to the other serotypes after recovery is only partial and temporary. Subsequent infections (secondary infection) by other serotypes increase the risk of developing severe dengue.

Transmission

Mosquito-to-human transmission

The virus is transmitted to humans through the bites of infected female mosquitoes, primarily the *Aedes aegypti* mosquito. Other species within the *Aedes* genus can also act as vectors, but their contribution is secondary to *Aedes aegypti*.

After feeding on a DENV-infected person, the virus replicates in the mosquito midgut, before it disseminates to secondary tissues, including the salivary glands. The time it takes from ingesting the virus to actual transmission to a new host is termed the extrinsic incubation period (EIP). The EIP takes about 8-12 days when the ambient temperature is between 25-28°C. Variations in the extrinsic incubation period are not only influenced by ambient temperature; a number of factors such as the magnitude of daily temperature fluctuations, virus genotype, and initial viral concentration can also alter the time it takes for a mosquito to transmit virus. Once infectious, the mosquito is capable of transmitting the virus for the rest of its life.

Human-to-mosquito transmission

Mosquitoes can become infected from people who are viremic with DENV. This can be someone who has a symptomatic dengue infection, someone who is yet to have a symptomatic infection (they are pre-symptomatic), but also people who show no signs of illness as well (they are asymptomatic).

Human-to-mosquito transmission can occur up to 2 days before someone shows symptoms of the illness, up to 2 days after the fever has resolved.

Other modes of transmission

The primary mode of transmission of DENV between humans involves mosquito vectors. There is evidence, however, of the possibility of maternal transmission (from a pregnant mother to her baby). While vertical transmission rates appear low, the risk of vertical transmission is seemingly linked to the timing of the dengue infection during the pregnancy. When a mother does have a DENV infection when she is pregnant, babies may suffer from pre-term birth, low birth weight, and fetal distress.

Symptom

Disease characteristics (signs and symptoms)

Dengue is a severe, flu-like illness that affects infants, young children and adults, but seldom causes death. Symptoms usually last for 2–7 days, after an incubation period of 4–10 days after the bite from an infected mosquito. The World Health Organization classifies dengue into 2 major categories: dengue (with / without warning signs) and severe dengue. The sub-classification of dengue with or without warning signs is designed to help health practitioners triage patients for hospital admission, ensuring close observation, and to minimise the risk of developing the more severe dengue (see below).

Dengue

Dengue should be suspected when a high fever (40°C/104°F) is accompanied by 2 of the following symptoms during the febrile phase:

- severe headache
- pain behind the eyes
- muscle and joint pains
- nausea
- vomiting
- swollen glands
- rash.

Symptom

Severe dengue

A patient enters what is called the critical phase normally about 3-7 days after illness onset. It is at this time when the fever is dropping (below 38°C/100°F) in the patient, that warning signs associated with severe dengue can manifest. Severe dengue is a potentially fatal complication, due to plasma leaking, fluid accumulation, respiratory distress, severe bleeding, or organ impairment.

Warning signs are:

- severe abdominal pain
- persistent vomiting
- rapid breathing
- bleeding gums
- fatigue
- restlessness
- blood in vomit.

Treatment

There is no specific treatment for dengue fever.

Fever reducers and pain killers can be taken to control the symptoms of muscle aches and pains, and fever.

- The best options to treat these symptoms are acetaminophen or paracetamol.
- NSAIDs (non-steroidal anti-inflammatory drugs), such as ibuprofen and aspirin should be avoided. These anti-inflammatory drugs act by thinning the blood, and in a disease with risk of hemorrhage, blood thinners may exacerbate the prognosis.

For severe dengue, medical care by physicians and nurses experienced with the effects and progression of the disease can save lives – decreasing mortality rates from more than 20% to less than 1%. Maintenance of the patient's body fluid volume is critical to severe dengue care. Patients with dengue should seek medical advice upon the appearance of warning signs.

Prevention and control

- Prevention of mosquito breeding:
 - Preventing mosquitoes from accessing egg-laying habitats by environmental management and modification;
 - Disposing of solid waste properly and removing artificial man-made habitats that can hold water;
 - Covering, emptying and cleaning of domestic water storage containers on a weekly basis;
 - Applying appropriate insecticides to water storage outdoor containers;
- Personal protection from mosquito bites:
 - Using personal household protection measures, such as window screens, repellents, insecticide treated materials, coils and vaporizers. These measures must be observed during the day both inside and outside of the home (e.g.: at work/school) because the primary mosquito vectors bites throughout the day;
 - Wearing clothing that minimises skin exposure to mosquitoes is advised;
- Community engagement:
 - Educating the community on the risks of mosquito-borne diseases;
 - Engaging with the community to improve participation and mobilization for sustained vector control;
- Reactive vector control:
 - Emergency vector control measures such as applying insecticides as space spraying during outbreaks may be used by health authorities;