



Udai Pratap (Autonomous) College, Varanasi

E-learning Material

Module/Lecture	02
Subject	Zoology
Year/Semester	M.Sc. II Semester (Minor)
Unit	I
Topic	Applied Zoology
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Dengue fever :

- First reported epidemics in 1779 –1780 in Asia, Africa and North America. It is considered as mild non fatal disease.
- Epidemics every 10-40 years due to introduction of new serotype
- After World War II, pandemic of dengue which began in Southeast Asia, expanded geographical distribution, epidemics with multiple serotypes and emergence of DHF.

Dengue in India :

- In India first outbreak of dengue was recorded in 1812

- **First isolated in Calcutta in 1945. A double peak hemorrhagic fever epidemic occurred for the first time in Calcutta between July 1963 & March 1964.**
- **1980 a second re-expansion of DHF in Asia with epidemics in India, Sri Lanka and Maldives, Taiwan, PRC; Africa and America.**
- **Severe epidemic in New Delhi in 1967,1970,1982 1996, 2006; Lucknow 1998, 2003, 2006.** In India, there has been a decline in dengue cases and deaths (2017 to 2018) from 188401 to 89974 & 325 to 144., respectively.
- **All 4 serotypes (DEN-1, 2, 3, 4) are prevalent**
- **Viruses prevalent all over except Himalayan region & Kashmir**
- **Progressively larger epidemics**
- **Primarily urban**

National Dengue Day is observed in India on May 16 with the recommendation of Ministry of Health and Family Welfare, Government of India to create awareness about dengue.



Dengue fever is a mosquito-borne tropical disease caused by the **dengue virus**. Symptoms typically begin 3 or 4 days (three to fourteen days) after infection. These may include a high **fever**, headache, vomiting, muscle and joint pains, and a characteristic skin rash.

- ❖ Infection caused by a virus and spread by an insect vector – the mosquito the virus are -
 - **Flavi viruses: RNA**
 - **Arbovirus group**
 - **4 serotypes – Den 1,2,3 and 4**
 - **Cycle involves humans and mosquitos**
 - **Infection with one virus gives immunity to that serotype only.**

Symptoms of Dengue Fever :

Symptoms of dengue fever is usually begin four to six days after infection and last for up to 14 days. Dengue fever causes a high fever **104 F (40 C)** and any of the following signs and symptoms:

- Sudden, high fever
- Severe headaches
- Pain behind the eyes
- Severe joint and muscle pain
- Fatigue

- Nausea
- Vomiting
- Skin rash, which appears two to five days after the onset of fever.
- Mild bleeding (such a nose bleed, bleeding gums, or easy bruising enlargement of the liver, and failure of the circulatory system.)

Younger children and people who have never had the infection before tend to have milder cases than older children and adults. These include dengue hemorrhagic fever, a rare complication characterized by high fever, damage to lymph and blood vessels, bleeding from the nose and gums, The symptoms may progress to massive bleeding, shock, and death. **This is called dengue shock syndrome (DSS).**

People with weakened immune systems as well as those with a second or subsequent dengue infection are believed to be at greater risk for developing dengue hemorrhagic fever. Most people recover within a week or so.

In some cases, symptoms worsen and can become life-threatening. This is called severe dengue, dengue hemorrhagic fever or dengue shock syndrome.

Severe dengue happens when your blood vessels become damaged and leaky, a number of clot-forming cells (platelets) in your bloodstream drops. This can lead to shock, internal bleeding, organ failure and even death. Warning signs of severe dengue fever which

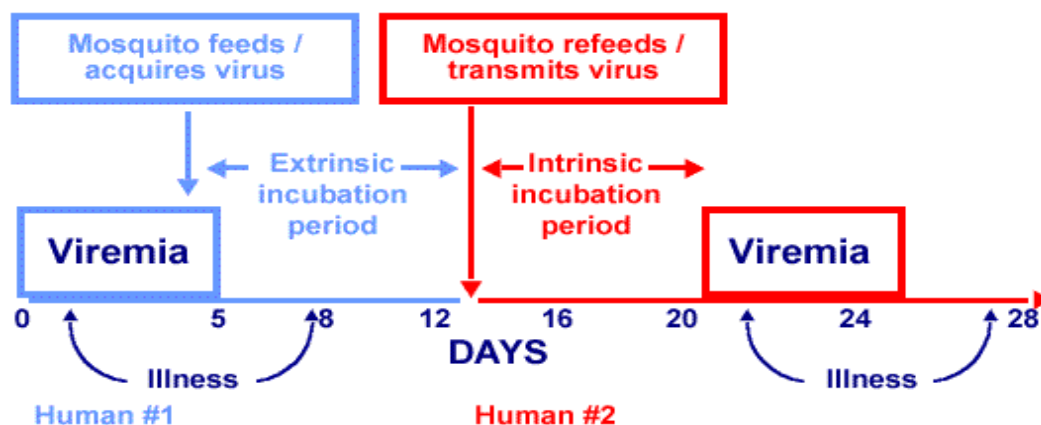
is a life-threatening emergency can develop quickly. The warning signs usually begin the first day or two after fever goes away, and may include:


- Severe stomach pain.
- Persistent vomiting.
- Bleeding from your gums or nose.
- Blood in your urine, stools or vomiting.
- Bleeding under the skin, which might look like bruising.
- Difficult or rapid breathing.
- Fatigue.
- Irritability or restlessness.





The most common epidemic vector of dengue in the world is the *Aedes aegypti* mosquito. It can be identified by the white bands or scale patterns on its legs and thorax.



They are approximately 5 mm in size: 



Dengue mosquitos bite in the early morning and the late afternoon.

Causes :

Dengue fever is caused by any one of four types of dengue viruses. The two types of mosquitoes that most often spread the dengue viruses are common both in and around human lodgings. When a mosquito bites a person infected with a dengue virus, the virus enters the mosquito. Then, when the infected mosquito bites another person, the virus enters that person's bloodstream and causes an infection.

After recovered from dengue fever, we have long-term immunity to the type of virus that infected you but not to the other three dengue fever virus types. This means we can be infected again in the future by one of the other three virus types. The risk of developing severe dengue fever increases if you get dengue fever a second, third or fourth time.

Complications :

Severe dengue fever can cause internal bleeding and organ damage. Blood pressure can drop to dangerous levels, causing shock. In some cases, severe dengue fever can lead to death.

Women who get dengue fever during pregnancy may be able to spread the virus to the baby during childbirth. Additionally, babies of women who get dengue fever during pregnancy have a higher risk of pre-term birth, low birth weight or fetal distress.

Prevention and Control :

In areas of the world where dengue fever is common, one dengue fever vaccine (**Dengvaxia**) is approved for people ages 9 to 45 who have already had dengue fever at least once. The vaccine is given in three doses over the course of 12 months.

The vaccine is approved only for people who have a documented history of dengue fever or who have had a blood test that shows previous infection with one of the dengue viruses — called seropositivity.

In people who have not had dengue fever in the past (seronegative), receiving the vaccine appears to increase the risk of severe dengue fever and hospitalization due to dengue fever in the future.

Dengvaxia vaccine is not available for travelers or for people who live in the continental United States. But in 2019, the U.S. Food and Drug Administration approved the vaccine for people ages 9 to 16 who have had dengue fever in the past and who live in the U.S. territories of American Samoa, Guam, Puerto Rico and the U.S. Virgin Islands where dengue fever is common.

Prevention from mosquito bites :

The World Health Organization stresses that the vaccine is not an effective tool on its own to reduce dengue fever in areas where the illness is common. Preventing mosquito bites and controlling the mosquito population are still the main methods for preventing the spread of dengue fever.

If we live in or travel to an area where dengue fever is common, these tips may help reduce your risk of mosquito bites:

- **Stay in air-conditioned or well-screened housing.** The mosquitoes that carry the dengue viruses are most active from dawn to dusk, but they can also bite at night.
- **Wear protective clothing.** When you go into mosquito-infested areas, wear a long-sleeved shirt, long pants, socks and shoes.
- **Use mosquito repellent.**

Permethrin ($C_{21}H_{20}Cl_2O_3$) 3-Phenoxybenzyl (1RS)-cis,trans-3-

(2,2-dichlorovinyl) -2,2-dimethylcyclopropanecarboxylate can be applied to your clothing, shoes, camping gear and bed netting.

You can also buy clothing made with permethrin already in it. For your skin, use a repellent containing at least a 10% concentration of DEET (Diethyltoluamide).

- **Reduce mosquito habitat.**

The mosquitoes that carry the dengue virus typically live in and around houses, breeding in standing water that can collect in such things as used automobile tires. We can help lower mosquito populations by eliminating habitats where they lay their eggs.

At least once a week, empty and clean containers that hold standing water, such as planting containers, animal dishes and flower vases. Keep standing water containers covered between cleanings.

When to see a doctor :

Severe dengue fever is a life-threatening medical emergency. Seek immediate medical attention if you've recently visited an area in which dengue fever is known to occur, you have had a fever and you develop any of the warning signs. Warning signs include severe stomach pain, vomiting, difficulty breathing, or blood in your nose, gums, vomit or stools.

If you've been traveling recently and develop a fever and mild symptoms of dengue fever, call your doctor.

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