

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

- Dengue viruses include the flaviviruses DENV1, DENV2, DENV3 and DENV4.

B. Description of Illness

- **General facts:** Dengue fever (DF) is a disease caused by any one of four closely related dengue viruses (DENV 1, DENV 2, DENV 3, or DENV 4). The viruses are transmitted to humans by the bite of an infected mosquito. In the Western Hemisphere, the *Aedes aegypti* mosquito is the most important transmitter or vector of dengue viruses.
- **Occurrence:** Dengue virus is a leading cause of illness and death in the tropics and subtropics. As many as 400 million people are infected yearly. Although dengue rarely occurs in the continental United States, it is endemic in Puerto Rico and in many destinations in Latin America, Southeast Asia and the Pacific islands. Nearly all cases reported in the continental U.S. were acquired elsewhere by travelers or immigrants. Because contact between *Aedes* and people is infrequent in the continental U.S., these imported cases rarely result in secondary transmission. The last reported continental dengue outbreak was in south Texas in 2005. Most dengue cases in U.S. citizens occur in inhabitants of Puerto Rico, the U.S. Virgin Islands, Samoa and Guam, which are endemic for the virus.
- **Incubation period:** Usually 4-7 days after the mosquito bite
- **Common symptoms:** The principle symptoms of dengue are fever lasting 2-7 days and at least two of the following: severe headache, severe pain behind the eye, joint pain, muscle and/or bone pain, rash, mild bleeding manifestations (e.g. nose or gum bleed, petechiae, or easy bruising) or low white blood cell count. Generally, younger children and those with their first dengue infections have a milder illness than older children and adults, or those with repeat infections. More severe symptoms include severe abdominal pain or persistent vomiting, red spots or patches on skin, bleeding from nose or gums, vomiting blood, black tarry stools, drowsiness or irritability, pale cold or clammy skin, and difficulty breathing.

Dengue hemorrhagic fever (DHF) is characterized by a fever that lasts from 2-7 days, with the general signs and symptoms of dengue fever. When the fever declines, symptoms include persistent vomiting, severe abdominal pain, and possibly difficult breathing. This marks the beginning of the 24- to 48-hour period when the capillaries become excessively permeable, allowing the fluid component to escape from the blood vessels into the peritoneum, causing ascites, and the pleural cavity, leading to pleural effusions. This may lead to circulatory system failure and shock, followed by death if circulation is not corrected. Patients with DHF have a low platelet count and hemorrhagic manifestations, tendency to bruise easily, bleeding nose or gums, and possibly internal bleeding.

Dengue shock syndrome (DSS) has all of the criteria for DHF plus circulatory failure. Evidence of circulatory failure includes rapid, weak pulse and narrow pulse pressure, age-specific hypotension and cold, clammy skin, and restlessness.
- **Treatment:** There are currently no vaccines to prevent infection with dengue virus and the most effective protective measures are those that avoid mosquito bites. Once a person is ill, there is no specific medication to treat for either dengue or DHF. Persons who think they have dengue should use pain relievers with acetaminophen and avoid

those containing aspirin. They should also rest, drink plenty of fluids and consult a physician. If they develop vomiting and/or severe abdominal pain in the first 24 hours after fever declines, they should be evaluated immediately at a hospital.

For illness that progresses to DHF, fluid replacement therapy may be effective if early clinical diagnosis is made. DHF management frequently requires hospitalization.

C. Reservoirs

Humans are the main reservoir of dengue viruses for female mosquitoes.

D. Modes of Transmission

Dengue cannot be spread directly from person to person. Transmission usually occurs through the bite of an *Aedes* mosquito that is infected with dengue virus. The mosquito becomes infected with dengue virus when it bites a person who has dengue virus in their blood. The person can either have symptoms of dengue fever or DHF, or they may have no symptoms. About one week later, the mosquito can then transmit the virus while biting a healthy person. The mosquito remains infectious for the duration of its approximate 1-month lifespan.

In rare cases dengue can be transmitted in organ transplants or blood transfusions from infected donors, and there is evidence of transmission from an infected pregnant mother to her fetus when mothers are acutely ill around the time of delivery. It is not known if DENV is transmitted through breast milk.

E. Period of Communicability

- There is an approximate 7-day period of viremia in humans, during which time mosquito-borne, bloodborne or perinatal transmission may occur.

2) ACTIONS REQUIRED/CONTROL MEASURES

A. Reporting Requirements

Dengue is physician reportable to both the Connecticut Department of Public Health (DPH) and the local health department (LHD). The director of any clinical laboratory must also report laboratory evidence of dengue to both the DPH and the LHD. See current lists of physician Reportable Diseases (Attachment A) and Laboratory Reportable Significant Findings (Attachment C).

B. Case Definition*

- **Confirmed Case:** A clinically compatible case of DF, DHF or DSS with confirmatory lab results
- **Probable Case:** A clinically compatible case of DF, DHF, or DSS with laboratory results indicative of presumptive infection
- **Suspect Case:** A clinically compatible case of DF, DHF or DSS that is epidemiologically linked to a confirmed case

*Please see the following link to further information on laboratory and exposure criteria for case classification:

<http://wwwn.cdc.gov/nndss/script/casedef.aspx?CondYrID=655&DatePub=1/1/2010%2012:00:00%20AM>

C. Investigation

- **DPH Responsibility:** The DPH Epidemiology Program will follow-up with the ordering physician to collect basic demographic, hospitalization and risk factor information (attachment L). Risk factors of interest include recent history of travel, blood transfusion or blood donation. If the patient reports no travel or travel only within the U.S., additional clinical and laboratory information will be collected and shared with the Centers for Disease Control and Prevention (CDC).
- **LHD Responsibility:** If DPH identifies a case that may have been acquired within the U.S., the local health department may assist with collecting additional information.

D. Control Measures

- There is no vaccine to prevent dengue. Residents living in areas infested with *Aedes* mosquitos should eliminate standing water where mosquitos can breed, specifically artificial containers that hold water.
- Containers used to collect rainwater or to store water should be covered or properly discarded. Animal watering containers and flower vases should be emptied and cleaned (to remove eggs) at least once a week. This will eliminate the mosquito eggs and larvae and reduce the number of mosquitoes present in these areas.
- Reduce the risk of mosquitoes coming indoors by using air conditioning and window screens. Reduce risk of mosquito bites by applying mosquito repellent containing 20% to 30% DEET on clothing and exposed skin.

Fact Sheet

- Please see the CDC fact sheet at the following link:
<http://www.cdc.gov/dengue/faqFacts/fact.html>

References

Centers for Disease Control and Prevention online, Dengue Homepage:
<https://www.cdc.gov/dengue>

CDC Travelers' Health: <http://wwwnc.cdc.gov/travel/yellowbook/2014/chapter-3-infectious-diseases-related-to-travel/dengue>

This fact sheet is for information only and is not meant to be used for self-diagnosis or as a substitute for consultation with a health care provider. If you have any questions about the disease described above or think that you may have this infection, consult a health care provider.

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