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the second most common cause of hospitalization (malaria is the most common) among travelers returning from the tropics.

- The bite of one infected mosquito can result in infection. The risk of being bitten is highest during the early morning, several hours after daybreak, and in the late afternoon several hours before sunset, because the female mosquito typically feeds (bites) during these hours. However, mosquitoes may feed at any time during the day.

- Published data are limited on the health outcomes associated with dengue infection among pregnant women and the effects of maternal dengue infection on a developing fetus. However, if a pregnant woman has dengue at the time of delivery, the infant can be born with dengue infection or acquire dengue during labor and delivery and then develop the clinical manifestations of DF or DHF. Transplacental transfer of maternal antidengue antibodies (from a previous maternal infection) may place infants at greater risk for DHF with their first dengue infection.

**Clinical Presentation**

- Dengue should be considered in the differential diagnosis of febrile patients with a history of travel to the tropics in the 2 weeks prior to symptom onset. The incubation period is typically 4–7 days (range 3–14 days).

- Many travelers infected with DENV are asymptomatic, as are about half of people infected with DENV who live in areas where the virus is widespread.

- The clinical manifestations of symptomatic illness range from mild, undifferentiated febrile illness to classic DF or DHF. DF is defined clinically by an acute febrile illness with two or more of the following symptoms: headache, retro-orbital pain, muscle or joint pain, rash, hemorrhagic manifestation, or leucopenia. The rash usually appears as the fever subsides and lasts 2–4 days. The rash is either macular or maculopapular and generalized, often confluent with small patches of normal skin, and it may become scaly and itchy. Other signs and symptoms include flushed facies (usually during the first 24–48 hours), nausea, and vomiting. Approximately 1% of patients with DF develop DHF as the fever subsides (usually 3–7 days following the onset of fever).

- The hallmark of DHF is evidence of vascular leakage. DHF is defined by the presence of all the following symptoms:
  - fever or recent history of fever lasting 2–7 days,
  - any hemorrhagic manifestation,
  - thrombocytopenia (i.e., platelet count <100,000/mm³), and
  - evidence of increased vascular permeability (i.e., hemoconcentration, pleural or abdominal effusion, hypoalbuminemia, or hypoproteinemia).

- Thrombocytopenia can occur with classic DF and does not by itself indicate DHF.

- Dengue Shock Syndrome (DSS) is defined as a syndrome in any case patient who meets the criteria for DHF and has hypotension, narrow pulse pressure (≤20 mm Hg), or frank shock.

*This section has been updated as of August 24, 2009.*

**Map 5-1. Distribution of dengue, Western Hemisphere**
A suspected case of dengue infection can be laboratory confirmed by one of the following means:

- identification of DENV from serum or autopsy tissue samples by reverse transcriptase-polymerase chain reaction (RT-PCR),
- seroconversion from negative to positive or a four-fold or greater change in anti-dengue antibody titer in paired serum samples taken in the acute- (<6 days after illness onset) and convalescent-phase (6–30 days after onset) of the illness, or
• Dengue viral antigen identification in autopsy tissue samples by immunofluorescence or immunohistochemical analysis.

• In combination with a compatible travel history and symptom profile, anti-dengue IgM positivity in a single serum sample suggests a probable, recent dengue infection. However, antidengue IgG positivity in a single serum sample may only indicate infection at an indeterminate time in the past. Caution should be exercised when using anti-dengue IgM or IgG antibody positivity from a single sample for diagnosis because there is cross-reactivity between anti-dengue IgM and IgG antibodies with antibodies from other flaviviruses such as the West Nile, yellow fever, and Japanese encephalitis viruses. Previous infection or vaccination with another flavivirus may also result in false-positive anti-dengue antibody results.

• If testing at CDC is requested, acute- and convalescent-phase serum samples should be sent through state or territorial health department laboratories to CDC’s Dengue Branch at 1324 Calle Cañada, San Juan, Puerto Rico 00920-3860. Serum samples should be accompanied by clinical and epidemiologic information, including the date of disease onset and sample collection and the patient’s detailed recent travel history. For additional information, the Dengue Branch can be contacted by telephone 787-706-2399; fax 787-706-2496; or CDC website at www.cdc.gov/ncidod/dvbid/misc/contactus.htm.

• Prevention of DHF or DSS is key. Avoidance of mosquito bites is the best strategy. Travelers should be advised to take measures to avoid being bitten by Aedes mosquitoes. These preventive measures include the following: select accommodations with well-screened windows or air-conditioning when possible. Aedes mosquitoes typically live indoors and are often found in dark, cool places such as in closets, under beds, behind curtains, and in bathrooms. A traveler should be advised to use insecticides to get rid of mosquitoes in these areas. Wear clothing that adequately covers the arms and legs, especially during the early morning and late afternoon. Apply insect repellent to both skin and clothing (e.g., permethrin). The most effective repellents contain DEET (N,N-diethylmetatoluamide) (see the Protection Against Mosquitoes, Ticks, and Other Insects and Arthropods (travelyellowbook/2010/chapter-2/protection-against-mosquitoes-ticks-insects-arthropods.aspx) section in Chapter 2). For long-term travelers, empty and clean or cover any standing water that can be mosquito-breeding sites in your accommodation (e.g., water storage barrels).

References

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