

Mosquito-Borne Diseases



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KEYWORDS

- Mosquitoes • Chikungunya • Dengue • Japanese encephalitis • Malaria • West Nile
- Yellow fever • Zika

KEY POINTS

- Mosquito-borne diseases have become more common in the United States as globalization and urbanization have allowed previously geographically isolated diseases to spread globally.
- Patient history should include local residence, global travel, and relevant exposures, including local outbreaks.
- Diagnostic testing can vary based on symptom duration and testing availability, and should be coordinated with local public health departments or the Centers for Disease Control and Prevention.
- Treatment for most mosquito-borne diseases is supportive, and the emphasis is on reducing risk and local spread.
- Some mosquito-borne diseases require mandatory reporting in the United States.

INTRODUCTION AND BACKGROUND

The purpose of this article was to review the epidemiology, presentation, and treatment of several common and emerging mosquito-borne diseases, specifically chikungunya, dengue, Japanese encephalitis, malaria, West Nile, yellow fever, and Zika. Although the clinical presentation overlaps for several of these diseases, it is important to make an accurate diagnosis for treatment, prognosis, and prevention. Globalization, urbanization, and changes to climate and agriculture have allowed geographically isolated mosquito-borne diseases to spread globally (Fig. 1).¹ Patient history should include local residence, global travel, and relevant exposures, including local outbreaks.

Mosquitoes are flying, blood-sucking insects that are a common vector, taking in virulent microorganisms and passing them along to subsequent bite targets. The morbidity and mortality from mosquito-borne diseases are very high: more than 2.5 billion people are at risk to contract dengue, and more than 400,000 people die from malaria annually.¹

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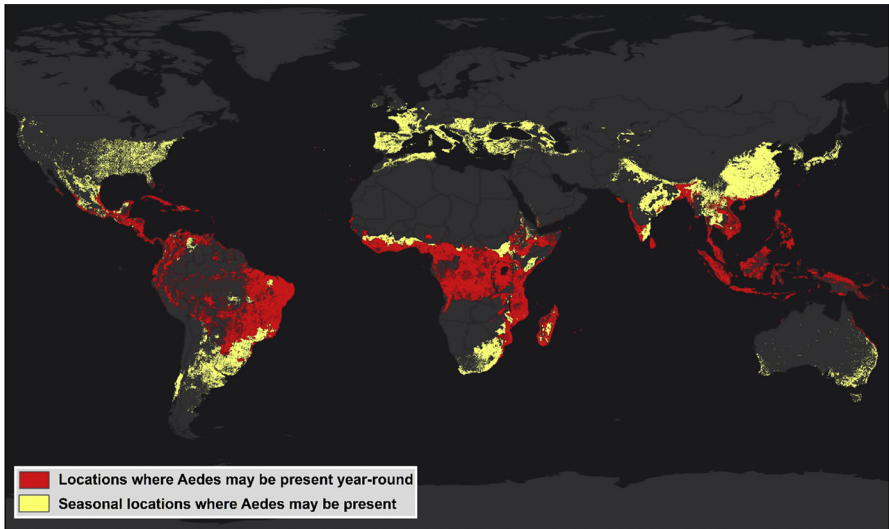


Fig. 1. Global map of the locations suitable for seasonal presence (*yellow*) and year-around presence (*red*) of hematophagous *Aedes* mosquitoes. (From Attaway DF, Waters NM, Geraghty EM, et al. Zika virus: endemic and epidemic ranges of *Aedes* mosquito transmission. *J Infect Public Health* 2017;10(1):122; with permission. CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Because treatment of many mosquito-borne diseases is mainly supportive, the emphasis is on reducing risk and infection. Individuals should be encouraged to use insect repellent and mosquito netting, and to wear long-sleeved shirts and pants when local outbreaks occur or when traveling to endemic areas. Detailed, country-specific information on prevention and prophylaxis can be found on the Centers for Disease Control and Prevention (CDC) Web site. Many mosquito-borne diseases require mandatory reporting in the United States, including in 2018 chikungunya, dengue, malaria, West Nile virus, yellow fever, and Zika.²

Chikungunya

Epidemiology

Chikungunya affects people in more than 60 countries.³ It is rarely fatal, but 87% to 95% of individuals suffer debilitating arthralgia, which can persist for years. Because of this chronic arthralgia, Chikungunya is called “to be contorted” in Tanzanian Kimakonde language, where the disease was first described in 1952.⁴

Chikungunya is a Togaviridae alphavirus and has a largely sylvatic life cycle, periodically causing urban human outbreaks in Africa and Asia. Its primary vectors are *Aedes aegypti* (Fig. 2) and *Aedes albopictus*, a more temperate-climate mosquito species, increasingly its global spread.⁵ In 2004, an initial outbreak in Kenya spread to millions of people in India, with subsequent local transmission in Southeast Asia, France, and Italy.⁶ The first outbreak in the Americas started on St. Martin Island in October 2013 and spread to Florida.⁷ It is estimated more than 40 million people have been infected in the Americas, resulting in 23.8 million disability-adjusted life-years lost, costing more than \$185 billion.⁸

Signs and symptoms

The primary clinical findings are acute-onset fever and severe arthralgia, usually within 24 to 48 hours of a mosquito bite. Headache, myalgia, conjunctivitis, nausea/vomiting,

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