

Recognizing and Preventing Arbovirus Infections



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Several arboviruses, including dengue, chikungunya, Zika, and West Nile viruses, are associated with notable dermatologic manifestations ranging from asymptomatic rashes to life-threatening skin and mucosal hemorrhage. Consider these infections in a patient with recent travel to or residence in an endemic area who presents with any combination of fever, rash, headache, myalgia, and conjunctivitis.

What do patients need to know about arboviruses?

Dengue is the most common arbovirus worldwide, with more than 300 million individuals infected each year, most of them asymptomatic carriers. It is the most common febrile illness in travelers returning from Southeast Asia, South America, and the Caribbean. Dengue symptoms typically begin 3 to 12 days after exposure and may include fever; headache; conjunctivitis; and a biphasic rash that begins with blanching macular erythema, which patients may mistake for sunburn, followed by a morbilliform to petechial rash with islands of sparing (white islands in a sea of red). Severe dengue (formerly known as dengue hemorrhagic fever) may present with dramatic skin and mucosal hemorrhage including purpura, hemorrhagic bullae, and bleeding from orifices and injection sites, with associated thrombocytopenia and hypotension (dengue shock syndrome). Patients with onset of such symptoms need to go to the emergency department for inpatient management.

Individuals living in the United States should be particularly aware of West Nile virus, with infections reported in all US states in 2017, except Alaska and Hawaii thus far. Transmitted by the bite of the *Culex* mosquito, most infections are symptomatic; however, up to 20% of patients may present with nonspecific symptoms such as mild febrile or flulike symptoms, nonspecific morbilliform rash, and headaches, and up to 1% of patients may develop encephalitis or meningitis, with approximately 10% mortality rates.

What are your go-to treatments?

Arboviral infections generally are self-limited and there are no specific treatments available. Supportive care, including fluid resuscitation, and analgesia (if needed for joint, muscle, or bone pain) are the mainstays of management. Diagnoses generally are confirmed via viral polymerase chain reaction from serum (<7 days), IgM enzyme-linked immunosorbent assay (>4 days), or IgG serologies for later presentations.

Resources for Patients

Centers for Disease Control and Prevention Zika virus prevention
<https://www.cdc.gov/zika/prevention/index.html>

Centers for Disease Control and Prevention Zika virus sexual transmission & prevention
<https://www.cdc.gov/zika/prevention/sexual-transmission-prevention.html>

Environmental Protection Agency insect repellent search tool
<https://www.epa.gov/insect-repellents/find-repellent-right-you>

National Center for Emerging and Zoonotic Infectious Diseases
<https://www.cdc.gov/nceid/dvbd/index.html>

World Health Organization: Tools for the diagnosis and care of patients with suspected arboviral diseases
<http://iris.paho.org/xmlui/handle/123456789/33895>

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Patients should avoid the use of nonsteroidal anti-inflammatory drugs if there is a possibility of dengue virus infection, as they may potentiate the risk for hemorrhagic complications in patients with severe dengue. Instead, acetaminophen is recommended for analgesia and anti-pyretic purposes, if needed.

How do you recommend patients prevent infection while traveling?

Primary prevention of infection and secondary prevention of transmission are important. Although mosquito bed netting is helpful in preventing some mosquito-borne viruses, many arboviruses (ie, dengue, Zika, chikungunya) are transmitted by primarily daytime-biting *Aedes* mosquitoes. In an endemic area, travelers should try to stay within air-conditioned buildings with intact window and door screens. When outdoors, wear long sleeves and pants and use Environmental Protection Agency-registered mosquito repellents. Conventional repellents include the following:

- DEET: concentrations 10% to 30% are safe for children 2 months and older and pregnant women; concentrations around 10% are effective for periods of approximately 2 hours; as the concentration of DEET increases, the duration of protection increases.
- Picaridin: concentrations of 5% to 20%; effective for 4 to 8 hours depending on the concentration; most effective concentration is 20%; is not effective against ticks.

Biopesticide repellents include the following:

- IR3535 (ethyl butylacetylaminopropionate): concentration 10% to 30% has been used as an insect

repellent in Europe for 20 years with no substantial adverse effects.

- 2-undecanone: a natural compound from leaves and stems of the wild tomato plant; is a biopesticide product less toxic than conventional pesticides.
- Oil of lemon eucalyptus (OLE) or PMD (the synthesized version of OLE): concentration 30%; “pure” oil of lemon eucalyptus (essential oil not formulated as a repellent) is not recommended.
- Natural oils (eg, soybean, lemongrass, citronella, cedar, peppermint, lavender, geranium) are exempted from Environmental Protection Agency registration; duration of effectiveness is estimated between 30 minutes and 2 hours.

Products that combine sunscreen and repellent are not recommended because sunscreen may need to be reapplied, increasing the toxicity of the repellent. Use separate products, applying sunscreen first and then applying the repellent.

Permethrin-treated clothing may provide an additional measure of protection, though in some endemic areas, resistance has been reported.

Because sexual transmission has been reported for Zika virus (between both male and female partners), any known or possibly infected persons should use condoms. Durations of abstinence or protected sex recommendations vary by situation and more detailed recommendations can be found from the Centers for Disease Control and Prevention. Pregnant women and women trying to get pregnant should take preventive measures with respect to Zika due to the possibility of the virus causing severe birth defects (congenital Zika syndrome) including microcephaly, joint deformities, ocular damage, and hypertonia.