

CDC's Division of Vector-Borne Diseases



DVBD Priority Diseases

- Chikungunya virus
- Dengue virus
- Ehrlichiosis & anaplasmosis
- Lyme disease
- Plague
- Rocky Mountain spotted fever
- Tularemia
- West Nile virus
- Zika virus

DVBD Leadership

Lyle R. Petersen, MD, MPH
DVBD Director

General Inquiries

800-CDC-INFO
TTY 888-232-6348
dvbd@cdc.gov

www.cdc.gov/nceid/dvbd



Virtually everyone on earth is vulnerable to diseases from viruses and bacteria transmitted to people through bites of mosquitoes, ticks, fleas, and other insects, known as vectors. West Nile virus, Lyme disease, and Rocky Mountain spotted fever are some of the more well-known vector-borne diseases in the United States. Dengue virus infections, a major health problem in Puerto Rico, infect as many as 400 million worldwide each year and can be deadly.

Increasing global travel, urbanization, and climate change are contributing to vector-borne disease outbreaks in new regions and countries. These diseases can be difficult to prevent and control, particularly since vaccines are available for only a few vector-borne diseases.

Detecting and Preventing Vector-Borne Diseases

The Division of Vector-Borne Diseases (DVBD) is a national and international leader in researching, preventing, and controlling viruses and bacteria spread by vectors like mosquitoes, ticks, and fleas. Our staff includes entomologists, epidemiologists, molecular biologists, laboratorians, microbiologists, physicians, veterinarians, virologists, and zoologists. DVBD's key activities include:

- Developing cutting-edge laboratory tests for rapid identification and diagnosis of new and known vector-borne diseases.
- Developing guidelines and educating clinicians.
- Working with health departments to monitor vector-borne diseases through surveillance systems. ArboNET, a national surveillance system, tracks vector-borne viruses in people, animals, mosquitoes, and blood donors. TickNET leads collaborative research on tickborne diseases.
- Researching vaccines.
- Partnering with state, local, territorial, and tribal health departments, industry, and international partners, such as the World Health Organization, to quickly detect and respond to outbreaks.
- Educating the public, Congress, and other key audiences.

Responding to Outbreaks

Upon invitation, DVBD provides subject matter expertise and technical support to state, local, territorial, and tribal health departments that are responding to outbreaks. DVBD has recently worked with partners on the following outbreaks:

- Zika and chikungunya viruses in Latin America and the Caribbean
- Dengue in Hawaii
- Sudden cardiac death due to Lyme carditis
- Plague in Yosemite National Park
- Rocky Mountain spotted fever in Arizona and Mexico
- Tularemia in Devils Tower National Monument





Developing New Tests for Zika, Chikungunya, and Dengue



Zika can cause severe birth defects. Chikungunya causes debilitating joint pain. Dengue can be deadly. All are spread by *Aedes aegypti* and *Aedes albopictus* mosquitoes. When a person gets sick, these diseases can be difficult to diagnose. Healthcare providers may order tests to help confirm a diagnosis. DVBD researchers developed the international “gold standard” tests for Zika virus infection—one detects Zika virus RNA, the other detects antibodies to Zika virus. These tests provided the foundation for a third DVBD-developed test, the Trioplex, which detects Zika, chikungunya, and dengue virus RNA in one test.

Discovering and Tracking Tickborne Diseases



Tick bites can cause serious infections, such as ehrlichiosis, Lyme disease, and Rocky Mountain spotted fever—some are deadly if not treated promptly with antibiotics. Since 2004, seven new tickborne pathogens have been discovered in people in the United States. More advanced testing methods are needed to help properly diagnose tickborne infections and to discover new pathogens that cause infections.

Over a three-year period, CDC is partnering with the Minnesota Department of Health, Mayo Clinic, the Tennessee Department of Health, and Vanderbilt University to obtain up to 30,000 clinical samples from people who have a suspected tickborne illness. CDC will use Advanced Molecular Detection methods to identify tickborne bacteria that may have caused these patients’ illnesses.

Finding Effective Natural Insect Repellents and Insecticides



Nootkatone, a natural ingredient found in Alaska yellow cedar trees, some herbs, and citrus fruits, is responsible for the distinctive smell of grapefruits. Nootkatone has long been used in many products with a citrus flavor or smell, including the soft drink Fresca. DVBD scientists have found nootkatone to be an effective repellent and insecticide for use against mosquitoes, ticks, and other pests.

Nootkatone appears to work differently compared to available insecticides and may be a valuable option when fighting insecticide resistance in mosquitoes. To expand available insect repellent options, nootkatone could be used in soaps, sprays, and lotions. CDC is working with a commercial partner, Evolva, to evaluate possible formulations. Currently, Evolva is working with the US Environmental Protection Agency to get nootkatone registered as a biochemical insecticide active ingredient. Watch an Evolva video: <http://bit.ly/2bzo4Zv>.