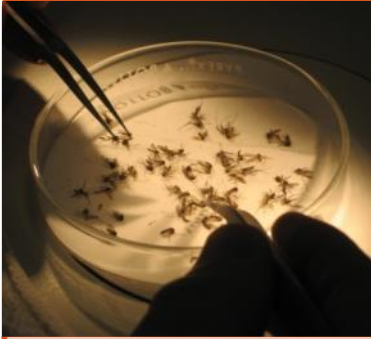


# CDC's Division of Vector-Borne Diseases



## DVBD Priority Diseases

- Dengue hemorrhagic fever
- Ehrlichiosis & Anaplasmosis
- Lyme disease
- Plague
- Q fever
- Rocky Mountain spotted fever
- Tularemia
- West Nile virus and other mosquito-borne viruses

[www.cdc.gov/ncezid/dvbd](http://www.cdc.gov/ncezid/dvbd)

## Key DVBD Functions

- Lead agency for prevention and response to viral and bacterial vector-borne disease.
- Coordinates nationwide disease surveillance. Identifies and responds to changes in disease patterns.
- Serves as national diagnostic reference laboratory, supporting state laboratory networks to quickly identify the cause of epidemics.
- Responds to vector-borne disease epidemics with science-based guidance and leadership.

**B**illions of people around the world, including Americans, are at risk from viruses and bacteria transmitted by mosquitoes, ticks, fleas and other vectors. The most widely known vector-borne diseases in the U. S. are West Nile virus, Lyme disease and Rocky Mountain spotted fever. Dengue virus, a major health problem in Puerto Rico, infects as many as 400 million worldwide each year, some fatally. As rapid global travel and changing land use increase, the risk of rare or new vector-borne pathogens to emerge and cross borders also increases. For example, West Nile virus, which was unknown in the U. S. before 1999, infected 5,674 Americans in 2012.

**V**ector-borne diseases are especially difficult to predict, prevent or control. Only a few have vaccines. Mosquitoes and ticks are notoriously difficult to reach and often develop resistance to insecticides. Adding to the complexity, almost all vector-borne pathogens are zoonoses, meaning they can live in animals as well as in humans.

## Our Role in Preventing Vector-Borne Diseases

*The Division of Vector-Borne Diseases (DVBD) is a national and international leader in the prevention and control of infections from vector-borne viruses and bacteria. Our strength is a uniquely skilled staff that includes physicians, veterinarians, entomologists, zoologists, epidemiologists, molecular biologists, and laboratory diagnosticians. DVBD's core vector-borne disease activities include:*

- ◇ Develop cutting-edge laboratory technology for the rapid identification and diagnosis of emerging pathogens.
- ◇ Develop innovative vaccines and vaccine implementation strategies.
- ◇ Train and assist front-line disease surveillance and response staff.
- ◇ Develop clinician education programs, such as a dengue case management course now required for medical licensure in Puerto Rico.
- ◇ Detect mosquito-borne diseases through the ArboNET surveillance system and tick-borne diseases through the TickNET system. Both systems further DVBD's surveillance, research, and prevention efforts in collaboration with state and local health departments.
- ◇ Closely collaborate with state, local, and tribal health departments, industry, and international partners, such as the World Health Organization, to rapidly detect and implement timely, effective responses to known and newly identified pathogens.

## Responding to Epidemics and Assessing Human Risk

*DVBD both responds to epidemics and constantly strives to develop better tools to predict, prevent and control risk. We have the unique capability, expertise, and mandate to fill this role at a time when vector-borne disease are emerging and spreading. A few recent emergency responses are:*

- Q fever infections associated with a goat farm in Washington State
- Dengue in the Marshall Islands, Kenya, and Tanzania
- Yellow fever epidemic in Uganda
- Bacterial infections among inmates at a Louisiana prison
- Assessment of dengue among American missionaries returning from Haiti
- Rocky Mountain spotted fever, a tick-borne disease, in the Navajo Nation
- Evaluation of adult mosquito control during a West Nile virus epidemic in Texas

As a division of CDC,  
DVBD reduces the  
threat and burden  
from vector-borne  
diseases everywhere.

### DVBD Leadership

Director

Lyle R. Petersen, MD, MPH  
LRPetersen@cdc.gov

Associate Director for Science  
Ronald Rosenberg, ScD  
RRosenberg@cdc.gov

Deputy Director (Administration)  
Mary E. (Mel) Fernandez, MS  
MFernandez@cdc.gov

Assistant Director for Policy  
and Communications  
Sue Partridge, MPH  
SPartridge@cdc.gov

### DVBD Locations

#### Fort Collins, Colorado

- Office of the Director  
www.cdc.gov/ncezid/dvbd
- Arboviral Diseases Branch  
www.cdc.gov/westnile
- Bacterial Diseases Branch  
www.cdc.gov/lyme

3156 Rampart Road  
Foothills Campus  
Fort Collins, CO 80521

#### San Juan, Puerto Rico

- Dengue Branch  
www.cdc.gov/dengue

2 Calle Cañada  
San Juan, Puerto Rico 00920-3860

#### Atlanta, Georgia

- Rickettsial Zoonoses Branch  
www.cdc.gov/RMSF

1600 Clifton Road  
Mail Stop G13  
Atlanta, GA 30333

### General Inquiries

dvbd@cdc.gov  
(970) 221-6400



## Leading the Way with Innovative Research

DVBD research focuses on prevention and control strategies that can reach the targeted disease or vector at multiple levels while being mindful of cost-effective delivery that is acceptable to the public and cognizant of the world's ecology. Current research includes vaccine development, vector control, and public and healthcare provider education.

### A Gene that Stops Lyme Disease Infection

DVBD discovered a gene that, when inactivated, prevents the bacteria that causes Lyme disease from producing an infection in the host animal following a tick bite. The finding was the first demonstration of a gene from the Lyme disease bacteria that is essential to the transmission from ticks to rodents. Understanding how the organism functions in ticks and mammals may help identify new targets for vaccines and other therapeutics.

### Plague Bedside Test Saves Lives

In October 2012, a Ugandan farmer experienced the sudden onset of a very high fever and a painful swelling in his left groin. A traditional healer immediately referred the man to a local clinic where a sample was taken and tested with a diagnostic “dipstick” test for plague developed by CDC’s laboratory in Colorado. Within 15 minutes the test yielded a positive result. The patient was promptly enrolled in a CDC-sponsored trial evaluating the effectiveness of ciprofloxacin for treatment of plague. The patient received the study drug, and within a day his fever had resolved. Within three days he was back working in his field, growing food to support his wife and young children. This life-saving test is inexpensive to produce and yields results in hours, not days.

### Promising Dengue Vaccine

Dengue is the most common arthropod-borne virus in the world. DVBD has partnered with Inviragen, Inc., a Colorado-based company, to manufacture a dengue vaccine candidate named DENVax. The vaccine is showing promising results in Phase II human clinical trials taking place in Puerto Rico, Colombia, Singapore, and Thailand. If the Phase II trial continues to proceed well, they will begin studies to test the ability of the dengue vaccine to prevent illness in late 2013/early 2014.

### Lyme Disease Bait Boxes Commercially Available

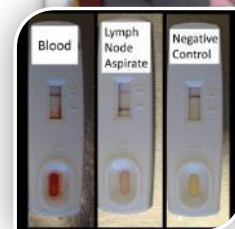
DVBD scientists pioneered the development of eco-friendly “bait boxes” to control the spread of Lyme disease from rodents to ticks by applying a tiny amount of pesticide to the rodent. These bait boxes are placed in residential yards and other populated areas and can decrease the number of Lyme-disease carrying ticks that threaten humans.

### CDC Patents Plant-Based Repellent and Insecticide

DVBD and academic partners are inventors on patents for nootkatone – a natural compound found in the essential oil of Alaska yellow cedar trees, citrus fruits and herbs. Studies show nootkatone to be an effective repellent and insecticide. CDC has licensing agreements with commercial partners to investigate development of nootkatone products as insecticides and repellents.



Clinicians caring for a plague patient



Dipstick test used to rapidly test patient lymph node samples for plague



Antibiotic bait boxes became available to the public in 2011 and are registered by EPA in 22 states