

## VENEZUELAN EQUINE ENCEPHALITIS

### Bioterrorism Agent Profiles for Health Care Workers

**Causative Agent:** Venezuelan Equine Encephalitis (VEE) is a mosquito-borne illness caused by an alphavirus of the *Togaviridae* family.

**Routes of Exposure:** Humans are primarily exposed to VEE through the bite of an infected mosquito.

**Infective Dose & Infectivity:** The infective dose is considered to be 10-100 organisms. All people are considered susceptible though children are more likely to be severely affected.

**Incubation Period:** The incubation period is usually 2-6 days; though it can be as short as 1 day.

**Clinical Effects:** VEE is characterized by inflammation of the meninges of the brain and of the brain itself, thus accounting for the predominance of CNS symptoms in the small percentage of infections that develop encephalitis. The disease is usually acute, prostrating and of short duration. Illness begins suddenly with generalized malaise, spiking fevers, rigors, severe headache, photophobia, and myalgias. Nausea, vomiting, cough, sore throat, and diarrhea may follow. Full recovery takes 1-2 weeks.

**Lethality:** The overall mortality rate for VEE is less than 1%, but is somewhat higher among children and older adults.

**Transmissibility:** VEE infection generally occurs when a person is bitten by an infected mosquito. VEE is highly infectious when aerosolized. There is no evidence of human-to-human transmission, even though VEE virus can be found in human throat swabs.

**Primary contaminations & Methods of Dissemination:** As a bioterrorism weapon, VEE would most likely be delivered via aerosolization.

**Secondary Contamination & Persistence of organism:** Secondary transmission does not occur and VEE particles are not considered to be stable in the environment.

**Decontamination & Isolation:**

*Patients* – Standard precautions should be practiced. Specific isolation procedures are not indicated.

*Equipment, clothing & other objects* – 0.5% hypochlorite solution (one part household bleach and 9 parts water = 0.5% solution), other EPA approved disinfectants, and heat are effective for environmental decontamination.

**Laboratory testing:** Virus can be isolated from serum, and in some cases throat swab specimens. An increase in VEE IgG antibody in paired sera, or VEE specific IgM present in a single serum sample indicate recent infection.

**Therapeutic Treatment:** There is no specific therapy. Patients with uncomplicated VEE infection may be treated with analgesics to relieve headache and myalgia. Patients who develop encephalitis may require anticonvulsant and intensive supportive care to maintain fluid and electrolyte balance, adequate ventilation, and to avoid complicating secondary bacterial infections.

**Prophylactic Treatment:** A live, attenuated vaccine is available as an investigational new drug. A second, formalin-inactivated, killed vaccine is available for boosting antibody titers in those initially receiving the live vaccine.

**Differential Diagnosis:** The differential diagnosis includes a number of viral and bacterial infections including arenaviruses, cytomegalovirus, dengue fever, viral hepatitis, herpes simplex encephalitis, influenza, leptospirosis, malaria, bacterial meningitis, Q fever, St. Louis encephalitis, West Nile encephalitis, yellow fever, Colorado tick fever, and the early prodrome of measles.

**References:**

Chin J. Control of Communicable Diseases Manual, Seventeenth Edition, American Public Health Association; 2000.

Kortepeter M, Christopher G, Cieslak T, et al. Medical Management of Biological Casualties Handbook, U.S. Army Medical Research Institute of Infectious Diseases, U.S. Department of Defense; 2001: 37-42

Available at <http://www.usamriid.army.mil/education/bluebook.htm>

For more information call (602) 364-3289

## Frequently Asked Questions About Venezuelan Equine Encephalitis

### **What is Venezuelan Equine Encephalitis?**

Venezuelan Equine Encephalitis (VEE) is a mosquito-borne viral disease. It is common in South America, Trinidad, Central America, Mexico, and Florida.

### **How do people become infected with VEE virus?**

VEE virus is transmitted to humans through the bite of an infected mosquito. Horses can also become infected with, and die from, VEE virus infection. There is no evidence that VEE has been directly transmitted from person-to-person.

### **What causes VEE?**

VEE is caused by a virus that is a member of the family *Togaviridae*, genus *Alphavirus*. It is closely related to Eastern and Western equine encephalitis viruses.

### **Where is VEE found?**

VEE is found in northern South America (Colombia, Peru, Brazil, Venezuela, French Guiana, Guyana, and Suriname) and Trinidad. It also causes rare cases of human encephalitis in Central America, Mexico, and Florida.

### **Why are we concerned about VEE as a biological weapon?**

VEE could possibly be used as a biological weapon. The virus is stable in the environment and can survive the storage and manipulation procedures necessary for making it into a weapon. Since it may take no more than 10-100 organisms to cause disease, it is considered to be a potentially effective bioterrorism weapon.

### **Who is at risk for developing VEE?**

Anyone can get VEE, but those at increased risk of developing severe disease include young children and older adults. Pregnant women may also develop complications.

### **What are the signs and symptoms of VEE?**

Most VEE infections are mild with only a small percentage of the infected population developing encephalitis. Persons with the mild form of illness may describe only minimal flu-like symptoms of low-grade fever, muscular pain, or headache. Patients with moderate disease may experience fever, chills, muscle pain, back pain, headache, sensitivity to light, vomiting, and sore throat. Among severe cases symptoms include a sudden high fever, severe muscle and back pain, headache, sensitivity to light, vomiting, weakness, exhaustion, and confusion. Though rare, seizures, paralysis, tremors, coma, and severe encephalitis can also occur.

### **How soon after exposure do symptoms appear?**

Symptoms usually appear in 2 to 6 days after the bite of an infected mosquito.

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**How is VEE diagnosed?**

VEE is often diagnosed based on symptoms and travel history. Blood samples to test for the virus are used to confirm the diagnosis.

**Is there treatment for VEE?**

No specific treatment other than supportive care is available.

**Is there a vaccine for VEE?**

Although two vaccines are being developed and tested, there is currently no licensed vaccine for human use.

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