

EASTERN EQUINE ENCEPHALITIS

Bioterrorism Agent Profiles for Health Care Workers

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

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

Infective Dose & Infectivity: The infective dose is unknown. All people are considered susceptible though children are more likely to be severely affected.

Incubation Period: The incubation period is varies from 5-15 days.

Clinical Effects: The illness is characterized by rapid onset of high fever, vomiting, stiff neck, and drowsiness. Children frequently manifest generalized, facial, or periorbital edema. Motor involvement with paresis is common during the acute phase of the illness. Major disturbances of autonomic function, such as impaired respiratory regulation or excess salivation may dominate the clinical picture. Adults typically exhibit a febrile prodrome for up to 11 days before the onset of neurological disease; however, illness in children exhibits a more sudden onset. Up to 30% of survivors are left with neurological sequelae such as seizures, spastic paralysis, and cranial neuropathies. Cognitive impairment ranges from minimal brain dysfunction to severe dementia.

Lethality: Fatality rates for EEE are estimated to be from 50% to 75%. Mortality rates are highest among young children and the elderly.

Transmissibility: EEE infection occurs when a person is bitten by an infected mosquito. The virus is not directly transmitted from person-to-person.

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

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

Decontamination & Isolation:

Patients – Standard precautions should be practiced and enteric precautions are appropriate until enterovirus meningoencephalitis is ruled out. 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) is effective for environmental decontamination.

Laboratory testing: Clinical laboratory findings in patients with EEE often demonstrate an early leukopenia followed by a leukocytosis. Elevated opening pressure is commonly noted on lumbar puncture, and in children, especially, the CSF lymphocytic pleocytosis may reach a cell count of thousands of mononuclear cells per microliter. Specific diagnosis of EEE depends on virus isolation or serologic testing in which rising titers of HI, CF, or neutralizing antibodies are observed. IgM antibodies are usually detectable in acute-phase sera.

Therapeutic Treatment: There is no specific therapy. Patients who develop severe illness may require anticonvulsant and intensive supportive care to maintain fluid and electrolyte balance, adequate ventilation, and to avoid complicating secondary bacterial infections.

Prophylactic Treatment: An investigational formalin-inactivated vaccine is available, but it is poorly immunogenic.

Differential Diagnosis: The differential diagnosis includes a number of infections including cytomegalovirus, herpes simplex encephalitis, St. Louis encephalitis, West Nile encephalitis, Western equine encephalitis, Venezuelan encephalitis, malaria, *Naegleria* infection, leptospirosis, lyme disease, cat scratch disease, bacterial meningitis, tuberculosis, and fungal meningitis.

References:

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

Smith JF, Davis K, Hart MK, et al. Viral Encephalitides. In: Zajtchuk R, Bellamy RF, eds. Medical Aspects of Chemical and Biological Warfare. Washington, DC: Office of the Surgeon General, U.S. Department of the Army; 1997:561-589.

Available at <http://www.nbc-med.org/SiteContent/HomePage/WhatsNew/MedAspects/contents.html>

For more information call (602) 364-3289

Frequently Asked Questions About Eastern Equine Encephalitis

What is Eastern Equine Encephalitis?

Eastern Equine Encephalitis (EEE) is a mosquito-borne viral disease. As the name suggests, EEE occurs in the eastern half of the US. Because of the high case fatality rate, it is regarded as one of the more serious mosquito-borne diseases in the United States.

How do people become infected with EEE virus?

EEE virus is transmitted to humans through the bite of an infected mosquito. Several species of mosquitoes can become infected with EEE virus. The main EEE transmission cycle is between birds and mosquitoes. Horses can also become infected with, and die from, EEE virus infection.

What causes EEE?

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

What type of illness can occur?

Symptoms can range from mild flu-like illness to encephalitis (inflammation of the brain), coma, and death. Among those who are recognized to have infection the death rate is 50-75%, making it one of the most deadly mosquito-borne diseases in the US. It is estimated that 30% of people who survive EEE will have neurologic deficits.

How common is EEE?

Human cases occur relatively infrequently, largely because the cycle of infection between mosquito and birds takes place in swamp areas that humans tend to avoid. There are an average of 4 EEE cases in the US each year. The states with most cases are Florida, Georgia, Massachusetts, and New Jersey.

Who is at risk for developing EEE?

Persons over age 50 and younger than age 15 seem to be at greatest risk for developing severe disease. Residents of and visitors to areas with an established presence of the virus are at increased risk, as are people who engage in outdoor work and recreational activities.

How can people avoid infection with EEE virus?

Though a vaccine is available to protect horses, there is no licensed vaccine for human use.

To avoid infection people should avoid mosquito bites by employing personal and household protection measures, such as using insect repellent containing DEET, wearing protective clothing, taking precautions from dusk to dawn when mosquitoes are most likely to bite, and controlling standing water that can provide mosquito breeding sites.

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