



# Epidemiological Alert: Equine Encephalitis transmitted by Arthropods

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Currently the Republic of Panama is investigating the occurrence of human cases of Eastern equine encephalitis (EEE) in the Darien Province and east of the province of Panama.

In Colombia, three outbreaks of Venezuelan equine encephalitis (VEE) have been confirmed in horses, located in the departments of Magdalena (two) and Córdoba (one) which are related to the epidemiological situation in the area where the disease is endemic and has characteristics of the epizootic cycle. Up to date, there have been 44 deaths reported.

Due to this situation, the Pan American Health Organization (PAHO) is issuing a warning about of the importance of strengthening epidemiological surveillance, coordination, monitoring and control of vectors in the Region.

## Introduction

Equine encephalitides are a group of viral diseases transmitted to humans by arthropods. Eastern equine encephalitis (EEE), Western equine encephalitis (WEE) and Venezuelan equine encephalitis (VEE) are considered the most important for their distribution and impact on public health in the Americas.

The etiologic agent of these viral diseases belongs to the genus *Alphavirus*, family *Togaviridae*.

The disease can be transmitted by the bite of infected mosquitoes. The most important vectors for the EEE are *Culiseta melanura* and one or more species of *Aedes* and *Coquillettidia*. The VEE virus has been isolated in different species of *Culex* mosquitoes (*Melanoconion*), *Aedes*,

### Eastern Equine Encephalitis (EEE) and Western Equine Encephalitis (WEE) (ICD-10 A83.1, A83.2)

They are acute inflammatory disease of short duration affecting parts of the brain, spinal cord and meninges. Signs and symptoms are similar, but vary in severity and progression. Most infections are asymptomatic; mild cases occur as febrile headache or aseptic meningitis. The incubation period for EEE is from 4-15 days, while for WEE it is 5-10 days.

Severe infections are characterized by sudden onset, headache, high fever, meningeal signs, stupor, disorientation, coma, tremors, occasional convulsions and spastic paralysis. The fatality rate ranges from 0.3% to 33%. EEE has the highest fatality rate and is the type that is most often associated with neurological sequelae in survivors.

### Venezuelan Equine Encephalitis (VEE) (ICD-10 A92.2)

Most of the infections are mild, with symptoms lasting three to five days. The clinical manifestations are similar to those of dengue or influenza, with sudden onset of severe headache, chills, fever, myalgia, retro-orbital pain, nausea and vomiting. The incubation period is 2-6 days.

Some cases may have a biphasic febrile course. In most cases children may have signs of central nervous system disease ranging from drowsiness to frank encephalitis with disorientation, convulsions, paralysis, coma and death. The fatality rate can reach 10%. In many cases they may present sequelae – in pregnant women VEE has been associated with an increase in abortions and births of children with congenital malformations.

*Mansonia, Psorophora, Haemagogus, Sabethes, Deinocerites and Anopheles.*

EEE has been documented in eastern and north-central regions of the United States, as well as in the area of the Gulf of Mexico and neighboring regions of Canada. There have also been reports of the disease in scattered areas of Central America, South America and the Caribbean Islands.

WEE virus circulation was registered in the western and central regions of the United States, Canada, Central America, and in some areas of South America.

VEE is enzootic in tropical rain forests and marshy areas of South America, Central America, and Trinidad and Tobago. It appears in the form of epidemics mainly in northern and western South America; in 1971 it temporarily extended to the southern part of the United States. In 1995, an outbreak of VEE was registered in humans affecting 7 states in Venezuela and the department of La Guajira in Colombia with more than 400,000 cases reported and 46 deaths between those countries.

EEE epizootics start and end in an abrupt way, lasting just a few months, while the VEE outbreaks begin in a sudden and abrupt manner but can spread for several years, affecting a large number of animals. Enzootic virus circulation is maintained by mosquitoes, rodents and possibly birds; incidental transmission to horses, to humans and other vertebrates may occur when they penetrate in areas of endemic viral circulation.

## Laboratory Diagnosis of Human Cases

The virological diagnosis of VEE, EEE and WEE are made by isolation and identification of the virus, or detection of specific nucleic acid by RT-PCR (Reverse Transcriptase Polymerase Chain Reaction) in serum or cerebrospinal fluid during the acute phase of the disease.

The diagnosis is made by detecting specific IgM antibodies in serum and/or cerebrospinal fluid using the ELISA technique. The serum sample should be taken five days after the development of symptoms. The diagnosis can also be done by demonstration of elevated serum antibody titers in paired samples using the techniques such as neutralization, complement fixation, hemagglutination inhibition, fluorescent antibody and ELISA IgG. Cross-reactions can occur within the same group of viruses, therefore the most specific diagnostic is the plaque reduction neutralization test.

The samples to confirm the diagnosis can be whole blood, serum, cerebrospinal fluid or tissue. These samples must be sent to the laboratory in refrigerated containers. If samples can not be processed immediately, should be kept in dry ice or frozen at -70 °C.

It is recommended to obtain serum samples and cerebrospinal fluid during the acute phase (up to 5 days after signs onset) and a serum sample in the convalescent phase (after 14 days.)

## Preventive measures of infections in health facilities

There is no specific antiviral treatment for equine encephalitis. Most infections are characterized by a mild clinical presentation in which the treatment is symptomatic. Patients with neurological symptoms should be evaluated by a specialist and require close monitoring.

Regarding infection prevention in health facilities, it is encouraged to comply strictly with the standard precautions including hand washing with soap and water or alcohol, using glycerine and gloves for contact with mucous membranes or skin contact, and full excretions or secretions. Cleaning the environment with soap and water is also recommended.

Isolation of patient for at least five days after the onset of the disease helps to prevent the spread of equine encephalitis.

## Factors which influence the incidence and could determine an increase in cases

- The local peculiarities of topography, climate, vegetation and soil which influence the distribution and vector population, the variety of vertebrate hosts and immune status of human and equine population.
- The existence of natural foci where the infection persists in rodents, wild birds and bats.
- The increase in vector populations, which can lead to an increased exposure of domestic animals and susceptible people.
- The existence of susceptible horse population.
- The movement of people and their residence in high-risk areas, possibly surrounded by domestic animal amplifiers of the infections, favoring the occurrence of an outbreak of any of these diseases.

## Recommendations

- Strengthen the epidemiological surveillance system integrating the different sectors (human health, animal health and others) for relevant and effective prevention and control activities.
- Increase surveillance in both human primary care sites and at the hospital level in areas where suspected or confirmed cases of equine encephalitis exist.
- Strengthen entomological surveillance to detect changes in the geographical distribution of vector, identify the species and density.

### Recommendations for the prevention:

- Disseminate the information and recommendations to alert the population at risk.
- The use of mosquitoes repellent is recommended for people at risk of infection.

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