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Epidemiological alert: Risk to human health associated with Western Equine Encephalomyelitis Virus infection in Equines

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Given the recent detection of Western Equine Encephalomyelitis (WEE) outbreaks in equines located in several provinces of Argentina and some municipalities of Uruguay, the risk to human health associated with the circulation of this virus and the high potential for spread to other countries of the Region of the Americas, the Pan American Health Organization / World Health Organization (PAHO/WHO) alerts Member States to the importance of strengthening epidemiological surveillance and diagnosis of Equine Encephalitis, intersectoral coordination, surveillance and vector control in the Region.

Summary of the situation

Western Equine Encephalomyelitis (WEE) is a disease caused by a virus of the same name, which belongs to the genus *Alphavirus* of the *Togaviridae* family, to which Eastern Equine Encephalomyelitis (EEE) and Venezuelan Equine Encephalomyelitis (VEE) also belong. In humans, the WEE virus can cause disease ranging from subclinical or moderate symptoms to severe forms of aseptic meningitis and encephalitis, with a case fatality rate of up to 30%. The main reservoir hosts of EEE and WEE are passerine birds. Equines and humans are fortuitous terminal hosts of WEE and EEE (1,2).

The WEE virus is transmitted primarily through the bite of infected mosquitoes that act as vectors. The main vector is *Culex tarsalis*, but there are multiple vectors, such as *Aedes melanimon*, *Aedes dorsalis* and *Aedes campestris*; these vectors maintain the circulation of the virus in wild enzootic cycles, where birds act as reservoir hosts. Humans and equines are final reservoirs of the virus, meaning they are not able to transmit the virus to mosquitoes (3). Although transmission can occur at any time of the year, it tends to increase during hot and humid seasons (1,3).

Symptoms in equines include: fever, lethargy, weakness, loss of appetite, difficulty walking, runny nose, and eyes, breathing problems, changes in behavior, neurological signs, prostration, seizures, and death. The incubation period from when an animal is infected until it shows the first clinical signs is 5 to 14 days (2,4,5).

Outbreaks of WEE can present isolated cases in humans with moderate symptoms, and most infections are asymptomatic. Mild cases of the disease present with fever, headache, and fatigue that persists for several days or weeks. The disease has a sudden onset with headache followed by weakness, chills, fever, myalgias, and malaise. These symptoms become more pronounced in the following days, with vomiting, drowsiness, confusion, and prostration. Neurological symptoms are limited to weakness and generalized tremors, especially of the

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hands, lips, and tongue. Improvement usually begins several days after defervescence, between one week and 10 days. There is no specific antiviral treatment, and care measures include complete rest, adequate hydration, and symptom management (1,3,4).

At-risk groups include people who live, work, or participate in outdoor recreational activities in endemic areas or where there are declared active outbreaks of the disease. To date, no human cases of WEE have been reported in the regions where the current outbreaks are occurring (4,5).

Situation in South America

WEE, as well as EEE and EEV, is found throughout the Americas. A report by the World Animal Health Information System (WAHIS) shows that, from 2019 to 2023, Equine Encephalomyelitis has been reported in more than 10 countries across the continent. During that period, WEE was reported in equines in Brazil (2019 and 2022), Mexico (2019), and Argentina and Uruguay (2023) (5).

On 25 November 2023 in **Argentina**, the National Food Safety and Quality Service (SENASA per its acronym in Spanish) reported positive results for Equine Encephalomyelitis in the provinces of Corrientes and Santa Fe. On 27 November 2023, WEE was confirmed, and, over the next few days, more cases were confirmed, including in the provinces of Buenos Aires, Entre Ríos, Córdoba, Chaco, Formosa and Santiago del Estero. On 30 November, SENASA Sanitaria declared a state of health emergency throughout the national territory (6). The last time a case of WEE had been reported in Argentina was in 1988. According to SENASA's 18 December report, 920 outbreaks have been confirmed (laboratory-diagnosed = 26; clinically and epidemiology = 894). The province of Buenos Aires has the highest number of cases (n=501), followed by Santa Fe (n=147), Córdoba (n=127), Entre Ríos (n=69), Corrientes (n=41), Chaco (n=16), Formosa (n=6), Santiago del Estero (n=5), La Pampa (n=4) and Rio Negro (n=4) (7).

On 25 November 2023, in response to Argentina's first report, the animal health authorities of Paraguay and Uruguay issued statements urging citizens to report neurological symptoms in equines (horses and mules).

On 5 December 2023, the Ministry of Livestock and Agriculture (MLA) of **Uruguay** confirmed a case of WEE in equines in the municipality of Salto, on the coast of the Uruguay River (8). The last record in the country was a fatal human case that occurred in 2009, not associated with cases in equines. In recent weeks, visits have been made to 219 establishments with complaints of equines with suspected WEE in all municipalities of the country. In the 13 December report, 20 cases of WEE were confirmed by laboratory, adding outbreaks to a total of 9 municipalities: Río Negro (n=5), San José (n=4), Artigas (n=2), Durazno (n=1), Salto (n=1), Soriano (n=1), Tacuarembó (n=1), Durazno (n=1) and Flores (n=1). In the same report, there are 260 cases with well-founded symptoms of WEE, for which the laboratory results are pending (9).

Recommendations

Below is a summary of the main recommendations for surveillance, prevention measures, and risk communication.

Laboratory diagnosis of WEE in humans

The laboratory diagnosis of WEE is complex. In case of suspicion of WEE in humans with epidemiological risk and compatible clinical presentation, it is suggested to start the diagnostic process with RT-PCR molecular techniques, according to availability and in the first suspected cases with samples taken in the first 2 or 3 days after the onset of symptoms. Since viremia during WEE virus infection is highest during the pre-symptom onset phase, a negative PCR result does not rule out infection. Once symptoms are present, serology (detection of IgG/IgM antibodies by ELISA) is the recommended methodology to make the diagnosis and should be prioritized (1,4). Depending on the epidemiological situation in the affected area, it is important to consider the possible cross-reactivity between different alphaviruses, including Chikungunya, for the analysis of the results.

Vigilance

Human Surveillance: Early detection of cases in humans, taking into account febrile syndrome without other diagnosis in risk areas, with declared active outbreaks. Active institutional and community search in areas at risk for compatible neurological syndromes without any other defined diagnosis, considering incubation period, geographic area, and environmental conditions (1,4).

Entomological surveillance: Through the search and identification of vectors and breeding sites (1).

Patient Management and Infection Prevention Measures in Health Facilities

There is no specific antiviral treatment. Most infections are characterized by a mild clinical presentation in which treatment is symptomatic. Patients presenting with neurologic signs should be evaluated by a specialist and require close monitoring.

Regarding the prevention of infections in health facilities, it is encouraged to strictly comply with standard precautions, including hand washing with soap and water or glycerinated alcohol and the use of gloves for contact with mucous membranes or non-intact skin and for contact with excretions or secretions. Cleaning the environment with soap and water is recommended.

Vector isolation of the patient for at least five days after the onset of the disease prevents its spread.

Prevention Measures

Preventive actions should be organized within the framework of One Health, considering inter-institutional and comprehensive action between animal health, human health, and environmental health (3,4).

Managing the Environment

Considering the ecology and biology of the main vectors of WEE virus, the main prevention measure is the modification of the environment and the environmental management of the environment, seeking to reduce the number of mosquitoes and their contact with equines and humans. These measures include:

- Filling or draining water collections, ponds, or temporary flooding sites that may serve as sites of female oviposition and breeding sites for mosquito larvae.
- Elimination of weeds around the premises to reduce mosquito resting and shelter sites.
- Equines can be protected by sheltering them in stables with mosquito nets during the hours when mosquitoes are most active.
- Although the main vectors do not have indoor habits, it is advisable to protect homes with mosquito nets on doors and windows; in this way other arboviruses are also prevented.

Vector Control

Vector control measures for WEE should be considered within the framework of Integrated Vector Management (IVM). It is important to consider that the decision to carry out vector control activities with insecticides depends on entomological surveillance data and the variables that may condition an increase in the risk of transmission, including insecticide resistance data.

- Insecticide spraying may be considered as an additional measure and, where technically feasible, in areas of transmission where high mosquito populations are detected. The methodology should be established based on the ecology and behavior of local vectors.

Vaccination

- Vaccines are available for equines. It is advisable to seek high vaccination coverage in susceptible equines in areas considered at risk and to carry out annual vaccination boosters in these equines.

Personal Protective Measures

- Use of clothing that covers the legs and arms, especially in homes where someone is sick.
- Use of repellents containing DEET, IR3535 or Icaridin, which may be applied to exposed skin or clothing, and their use must be in strict accordance with the instructions on the product label.
- Use wire mesh/mosquito netting on doors and windows.
- Use of insecticide-treated or non-insecticide treated nets for daytime sleepers (e.g., pregnant women, infants, bedridden, elderly, and night shift workers).
- In outbreak situations, outdoor activities should be avoided during the mosquitoes' peak feeding period (dawn and dusk).

Risk Communication

Aimed at citizens in endemic and at-risk areas on surveillance, prevention, and control strategies (2):

- Avoid the presence of mosquito breeding sites (improve the conditions of hygiene, handling, and final disposal of waste).
- Protection from mosquito bites (use of mosquito nets, repellents, long sleeves, and pants if outdoor activities).
- Recognize symptoms of the disease in equines and people, recommending that animal and human health services be consulted in the event of any suspicion to report them immediately and in a timely manner (1,2).

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