

# Increased mosquito surveillance testing in response to equine cases of eastern equine encephalitis virus in East Texas



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The Texas Department of State Health Services Arbovirus/Entomology Laboratory modified workflows and methods to increase mosquito surveillance testing for eastern equine encephalitis in East Texas counties. Local jurisdictions were able to use timely data to initiate response plans to reduce virus transmission and to prevent veterinary and human disease cases.



## The “What”

In August of 2021, the Texas Department of State Health Services (DSHS) Zoonosis Control Branch (ZCB) received notification of an eastern equine encephalitis virus (EEEV) equine case in East Texas, with additional reports of EEEV in the same area that showed neurological signs and died or were euthanized during the same time frame. EEEV is a mosquito-transmitted arbovirus of public health concern. Approximately 30% of people who get infected will die and many survivors are left with long-term sequelae, including neurological problems. Fortunately, human cases are rare, with only a few neuroinvasive cases reported each year to CDC. In 2019, there was a significant increase in EEEV activity in the northeastern U.S., with 38 neuroinvasive disease cases reported, which resulted in 19 deaths. With this recent outbreak in mind, along with the multiple EEEV equine case reports coming in from East Texas, ZCB initiated a request for the Arbovirus/Entomology Laboratory to increase mosquito surveillance testing for EEEV by testing all mosquito collections submitted from counties with equine cases and also collections from surrounding counties.

To address the request for increased EEEV mosquito surveillance testing, the Arbovirus/Entomology Laboratory had to modify workflows to ensure counties of interest received the correct testing and to handle the increase in sample volume. The Arbovirus/Entomology Laboratory provides mosquito identification and arbovirus testing services to local jurisdictions in Texas. These services are provided free of charge, which is made possible by support through Epidemiology and Laboratory Capacity for the



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Prevention and Control of Emerging Infectious Diseases (ELC) funding of staff positions and supplies. Routine mosquito testing provided by the Lab consists of a multiplex real-time polymerase chain reaction (RT-PCR) assay that screens for three arboviruses: West Nile, St. Louis encephalitis, and western equine encephalitis viruses. A single-plex EEEV assay is also available for mosquito testing, but it is only used when a request is submitted by the local jurisdiction.

To handle the request for broad EEEV mosquito testing in August 2021, covering multiple East Texas counties, the Arbovirus/Entomology Laboratory Team designed modified testing workflows. The alternate workflows enabled more efficient batching of samples assigned

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additional EEEV testing and streamlined the process. These changes allowed the Lab to accommodate the increase in testing volume in a way that made efficient use of reagents and supplies. Additional EEEV equine cases were detected in September and October, further expanding the list of counties needing EEEV mosquito testing and increasing the incoming sample volume. With the modified workflows in place, the Lab was able to provide EEEV testing as needed while maintaining routine testing.

### The “So What”

The Arbovirus/Entomology Laboratory was able to accommodate the need for increased EEEV mosquito testing by modifying workflows to optimize efficiency. From August through November 2021, the Lab conducted EEEV surveillance testing on hundreds of additional mosquito pools on a weekly basis. This testing resulted in the detection of EEEV in two mosquito pools, from Jasper County and Orange County. This testing provided important information regarding continued virus activity in local mosquito populations for Jasper County as they had previously documented several EEEV positive equine cases. The detection of an EEEV positive mosquito pool in Orange County was critical as this was the first detection of EEEV activity in that county for 2021. Local mosquito control programs in Orange County were able to quickly initiate response plans to reduce virus transmission and to prevent veterinary and human disease cases. This story highlights the value of mosquito surveillance testing for detecting and tracking arboviruses of public health concern.

### The “Now What”

The Arbovirus/Entomology Laboratory Team worked together to optimize workflows so that additional testing volume could be accommodated. Frequent team meetings were crucial for facilitating communication regarding workflow updates and allowed all team members to provide insight and perspective. This increased collaboration has continued beyond this response. In addition, the workflow modifications used to address this issue can potentially be used to accommodate increased sample volumes for future outbreak response situations. Continued ELC funding will ensure the Lab can maintain and build capacity to be prepared to respond to changing testing needs in a timely and efficient manner.

Key contributors to this project Arbovirus/Entomology Laboratory Team, Texas Department of State Health Services.