

**USDA-APHIS Disease Report for the
AAEP Infectious Disease Committee**

**Provided by: Angela Pelzel-McCluskey, DVM, MS
Equine Epidemiologist
USDA-APHIS-Veterinary Services
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Update on Equine Piroplasmiasis (EP) and Equine Infectious Anemia (EIA)

In calendar year 2020, there were 29,595 domestic U.S. horses tested for equine piroplasmiasis (EP) as part of active ongoing surveillance. While a significant portion of the testing focused on the previously identified high-risk groups of sanctioned and unsanctioned Quarter Horse racehorses where iatrogenic transmission of the disease is well recognized, many other types of horses were also tested for interstate movement, clinical disease rule-out, change of ownership, and export. A total of 23 horses were found to be infected with *Theileria equi* during this time period in 7 states (Colorado, Georgia, Kansas, Louisiana, Michigan, New Mexico and Texas). Twenty-two (22) of the 23 horses were Quarter Horse racehorses and 1 horse was an Arabian stallion with a history of life-long ownership by unsanctioned racing participants. Iatrogenic transmission was either confirmed or suspected to have been the cause of spread in all cases. Needle/syringe/IV set reuse was a common finding among the cases and the Arabian stallion specifically had been used in blood-doping activities between horses. The common practice in this population of reusing a single IV blood set for blood doping often leads to blood-borne disease spread not only to the blood recipient horses but also back to the donor horse. Two of these EP-positive horses in 2020 were co-infected with equine infectious anemia (EIA).

More than 20,000 U.S. horses have been tested for EP so far during the 2021 calendar year with 30 *T. equi*-positive horses found in 6 states (Florida, Georgia, Iowa, Louisiana, Tennessee and Texas) as of October 1, 2021. Twenty-seven (27) of the EP-positives are current or former Quarter Horse racehorses with iatrogenic transmission of the disease either suspected or confirmed. The three remaining EP-positive horses are currently under investigation for suspected illegal movement directly from Mexico where the disease is endemic. Twelve (12) of these 30 EP-positive horses were found to be co-infected with EIA. The horses that were co-infected with both EP and EIA have been euthanized and many of the remaining EP-positive horses have been enrolled in the USDA-APHIS EP Treatment Program. All EP-positive horses will remain quarantined until permanent clearance of *T. equi* through high-dose imidocarb dipropionate treatment is achieved and the horse maintains *T. equi*-negative status on all diagnostic testing. To date, there have been 365 horses treated in the U.S. for EP with 326 horses having met the clearance and test negative criteria required for quarantine release.

In calendar year 2020, a total of 1,337,829 EIA tests were conducted in the U.S. with 29 horses confirmed as EIA-positive in 6 states (California, Colorado, Georgia, Iowa, New Mexico and Texas). Twenty-three (23) of the 29 EIA cases occurred in Quarter Horse racehorses with iatrogenic transmission either suspected or confirmed to have been the source of spread in those

cases. So far in 2021, there have been at least 1,208,751 EIA tests performed by approved laboratories in the U.S. (January-October 2021 reporting) with 87 new EIA cases confirmed in 14 states as of October 1, 2021. Seventy-four (74) of the 87 EIA positives occurred in Quarter Horse racehorses with iatrogenic transmission of the disease either suspected or confirmed. Many of the EIA-positive horses were found to be participating in unsanctioned racing. The EIA cases identified over the past few years further highlight our recognition of a recent shift in the epidemiology of EIA in the U.S. While prior to 2017, many of the EIA cases were found to be in untested or under-tested equine populations where natural vector-borne transmission of the disease had occurred over time, since 2017 the majority of the EIA cases each year are now being found in Quarter Horse racehorses with iatrogenic transmission involved. Iatrogenic transmission of EIA is a preventable occurrence and targeted educational outreach is needed in these high-risk populations to reduce the incidence of EIA and eliminate further spread.

Annual EIA reports are available on the USDA-APHIS website at the following link:

<https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/equine/eia/equine-infectious-anemia>

West Nile Virus (WNV) and Eastern Equine Encephalitis (EEE)

Equine case counts for WNV and EEE are sourced from the CDC's ArboNET database and summarized by APHIS-VS in consultation with state animal health officials. Annual reports for each disease are compiled by calendar year and more current case counts during the active vector season are posted bi-weekly to the APHIS website. This information can be accessed at the following links:

For WNV information: <https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/equine/wnv>

For EEE information: <https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/equine/eee-wee-vee>

In calendar year 2020, there were 71 equine WNV cases identified in 19 states. So far in 2021, there have been 204 equine WNV cases identified in 33 states as of mid-November 2021. For EEE, there were 142 equine cases reported in 13 states in calendar year 2020 and in 2021 a total of 108 cases in 15 states have been reported as of mid-November 2021. Breakdown of these individual cases by state and county are available at the USDA websites listed above. Delays in reporting equine arboviral cases in ArboNET are routinely recognized and may be magnified this year due to the public health community's necessary prioritization of response to COVID-19.

The 2019 and 2020 EEE case count in equids, while elevated, did not set any historic high records, however there were several observations surrounding EEE infections recently that have raised concerns both in the veterinary and human medical communities. Firstly, there were a record-setting number of human EEE infections reported in 2019; a total of 38 human cases in 10 states with 15 fatalities. The number of human EEE cases across the years 2009-2018 had an average of 7 cases per year recorded with the highest case count in a single year being 15 cases

in 2012. Another unexplained observation was that for the first time in history, the ratio of equine WNV cases to equine EEE cases was inverted in both 2019 and 2020. In previous years, equine WNV cases usually outnumber equine EEE cases 2:1. In 2019 and 2020, the number of EEE cases was double that of WNV in equids. Finally, the number of EEE cases confirmed in alternate and wildlife species had not been recognized at such a high level and with so many species of animals represented as were reported in 2019. These anomalies for EEE in 2019 and 2020 have yet to be explained and there is concern that 2021 could continue to be an unusually active year for EEE infection in all species.

2019 and 2020 Vesicular Stomatitis Outbreaks (no cases in 2021)

The 2019 vesicular stomatitis virus (VSV) outbreak in the United States was the largest in the past 40+ years of recorded history. The outbreak was entirely VSV-Indiana serotype, which hadn’t been isolated in the U.S. since 1997-1998, it lasted from June 21 to December 27, 2019, and included 1,144 affected premises in 8 states (Colorado, Kansas, Nebraska, New Mexico, Oklahoma, Texas, Utah, and Wyoming). Of the total affected premises, 1,128 premises had only equine species clinically affected, 15 premises had only clinically affected cattle, and 1 premises had both equids and cattle with clinical signs. Given the size and scope of the 2019 outbreak, it was expected that overwintering of the virus would occur and that new cases were likely to appear in the historically affected southwestern and Rocky Mountain region states beginning in the spring of 2020.

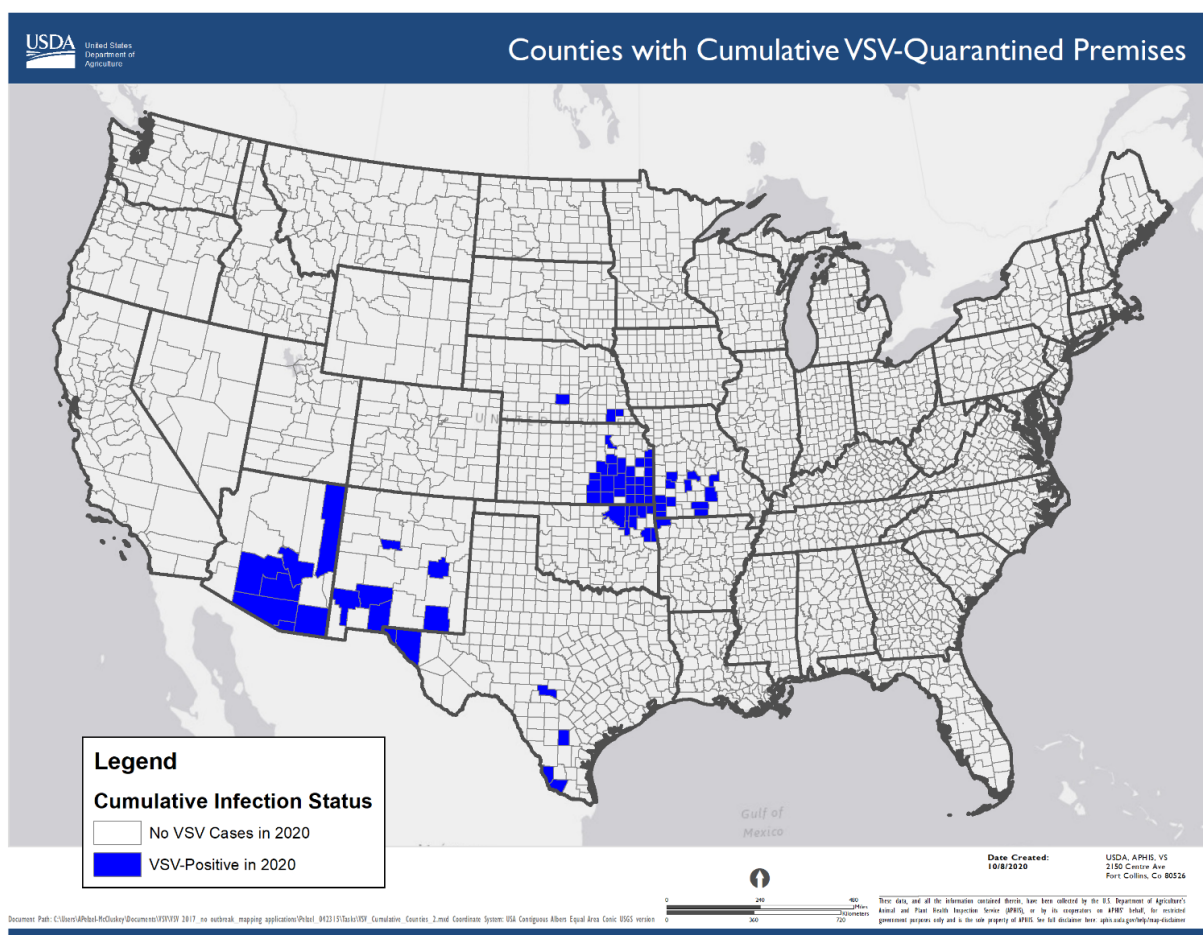
On April 13, 2020, the National Veterinary Services Laboratories in Ames, Iowa, confirmed a finding of vesicular stomatitis virus (VSV) infection (Indiana serotype) on an equine premises in Dona Ana County, New Mexico. This was the index case of VSV for the 2020 outbreak and for the state of New Mexico. As the outbreak progressed, 7 additional states became confirmed as VSV-affected: Arizona on April 22, Texas on April 23, Kansas on June 16, Nebraska on June 24, Oklahoma on July 7, Missouri on July 13, and Arkansas on July 27, 2020. A total of 326 premises in these 8 states were suspected or confirmed as VSV-infected during the outbreak and placed under state quarantine. Quarantines remained for a period of 14 days from the onset of lesions in the last affected animal on the premises. Vector mitigation strategies and enhanced biosecurity procedures were recommended on quarantined premises to reduce within-herd spread of the disease. The breakdown of the number of quarantined premises and affected counties by state for the VSV 2020 outbreak are shown in Table 1 below and the distribution of affected premises is shown in Figure 1.

Table 1. Total number of VSV-affected premises by state during the 2020 outbreak

| State | # Counties Positive | # Confirmed Positive Premises | # Suspect Premises | Total # Premises Quarantined |
|--------------|----------------------------|--------------------------------------|---------------------------|-------------------------------------|
| Arizona | 7 | 18 | 1 | 19 |
| Arkansas | 1 | 4 | 0 | 4 |

| | | | | |
|------------|----|-----|-----|-----|
| Kansas | 26 | 101 | 95 | 196 |
| Missouri | 12 | 37 | 17 | 54 |
| Nebraska | 3 | 5 | 0 | 5 |
| New Mexico | 6 | 13 | 3 | 16 |
| Oklahoma | 9 | 18 | 4 | 22 |
| Texas | 6 | 10 | 0 | 10 |
| TOTAL: | 70 | 206 | 120 | 326 |

Figure 1. Cumulative map of VSV-affected counties during the 2020 outbreak



Of the 326 VSV-affected premises in 2020, 313 premises had only equine species clinically affected, 12 premises had only cattle clinically affected, and 1 premises had both equine and cattle clinically affected. The final quarantine for this outbreak was released on October 15, 2020.

While the overwintering event and identification of new VSV-Indiana positive cases were expected in 2020, there were several unusual occurrences associated with this outbreak that were not predicted. Firstly, in addition to the VSV-Indiana cases that occurred in New Mexico, Arizona, and far west Texas in April/May 2020, a new incursion of VSV-New Jersey virus from Mexico simultaneously appeared in south Texas and continued northward as far as south central Texas affecting 7 premises in 4 counties. An outbreak involving both VSV-Indiana and VSV-New Jersey serotypes concurrently had not been seen in the U.S. since 1997-1998. Secondly, the expected continuation of the VSV-Indiana outbreak from 2019 in the Rocky Mountain region (Colorado, Utah, and Wyoming) never materialized in 2020. There were extreme drought indicators that presented in this region in late spring and early summer which may have had a significantly negative impact on the VSV-competent vector populations, but further study is needed to evaluate the climate variables that may have played a role. Finally, the appearance of an outbreak cluster in the Kansas, Missouri, Oklahoma, and Arkansas region was not expected and VSV cases this far east had not been seen since the 1930s.

Analysis of these abnormalities along with other variables involved in the 2020 outbreak are underway by the VSV Grand Challenge Team, a multidisciplinary group sponsored by USDA-Agricultural Research Service (ARS) and involving 4 different ARS research hubs and APHIS-VS. This team, established in 2015, explores climatic, ecological, hydrological, virus, vector, host, and epidemiological variables that drive VSV incursion and expansion in the U.S. with the goal of establishing reliable predictive information on disease transmission and outbreak scope to support the state/federal field response. The team is currently producing several peer-reviewed publications per year that capture and share the research results. A publication entitled “Review of Vesicular Stomatitis in the United States with Focus on 2019 and 2020 Outbreaks” was published in the peer-reviewed journal *Pathogens* in 2021 and can be accessed at the following link: <https://doi.org/10.3390/pathogens10080993>

Complete situation reports for the 2019 and 2020 VSV outbreaks can be accessed on the USDA-APHIS website: <https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/cattle-disease-information/vesicular-stomatitis-info>

There have been no VS cases confirmed in the U.S. during the 2021 calendar year and routine surveillance for the disease is ongoing.

Equine Brucellosis Cases—2020

While clinical equine cases of brucellosis historically were caused by *Brucella abortus* infection from exposure to infected cattle or wildlife reservoirs, success of the USDA’s national brucellosis eradication program in cattle over the past 100 years has reduced these findings to near zero in most years. Cases of *B. abortus* in horses are still occasionally found in the Greater Yellowstone area in the western U.S. from exposure to known infected wildlife reservoirs in the region, such as bison and elk. Recently, however, cases of clinical brucellosis in horses caused by *B. suis* are becoming more common and the epidemiology in these cases indicates feral swine exposure to be the likely source of infection.

In 2020, there were two confirmed cases of clinical *B. suis* infection in horses in which the organism was isolated and described. The first case occurred in March 2020 when *B. suis* biovar 1 was isolated from a case of fistulous withers in a 15-year-old Quarter Horse gelding in Brazos County, Texas. Feral swine were routinely encountered on the horse's premises and epidemiological investigation identified either direct or indirect exposure to feral swine in the horse's pasture as the most likely source of the infection in the case.

The second case was identified in November 2020 when a pregnant 11-year-old Quarter Horse mare of 7 months gestation unexpectedly aborted her fetus in Shelby County, Tennessee. Both the fetus and placenta were submitted for diagnostic testing and *B. suis* biovar 1 was isolated from the mare's placenta. The mare was newly purchased from a premises in Navarro County, Texas, and had only arrived to Tennessee a few weeks prior to her pregnancy loss. She had been maintained in isolation from other horses in a stall with a run and had no access to pasture since her arrival in Tennessee. Investigation on the originating premises in Texas indicated that the mare's either direct or indirect exposure to feral swine in her pasture on that premises was the likely source of infection. While feral swine had not be specifically seen in that pasture, the area around the originating premises was confirmed to have dense populations of feral swine present year-round. Additionally, genetic sequencing of the *B. suis* isolate was determined to be closely related to other isolates previously collected in Navarro County and surrounding counties in that region of Texas.

These two cases of clinical *B. suis* in horses highlight the need for equine practitioner awareness of the likelihood of *B. suis* exposure in areas of the U.S. where feral swine populations are present and expanding. While cases of possible fistulous withers or poll evil may elicit an automatic inclusion of brucellosis on a practitioner's list of differentials, cases of brucellosis abortion in horses, like the one identified in 2020, are likely to be missed. Practitioners should be advised to consider the possibility of *B. suis* exposure in any of these clinical manifestations, especially in regions of the country where feral swine contact with horses may occur either through contaminated feed/water or in a pasture setting.

Alert: Venezuelan Equine Encephalitis in Mexico

In June 2021, a neurologic horse in the State of Veracruz, Mexico, was confirmed by PCR to be infected with Venezuelan Equine Encephalitis (VEE). Upon confirmation of the finding through Mexican animal health authorities, USDA-APHIS immediately instituted import restrictions requiring a 7-day quarantine on all equids being presented for importation into the U.S. from Mexico, as is the minimum standard for importation of equids from all VEE-affected countries. This import restriction on equids from Mexico remains in place to date. Recent information provided by Mexican authorities indicates that sporadic cases of VEE occur in Mexico routinely and this may present an ongoing risk of incursion into the U.S. especially in southern border states. The last outbreak of VEE in the U.S. occurred in 1971 when an outbreak of VEE in Mexico moved northward and ultimately led to confirmation of equine and human VEE cases in

26 counties in Texas. Given the ongoing risk of incursion, equine practitioners in southern border states are encouraged to consider routine VEE vaccination for equids in potentially at-risk areas.