



## Equine Infectious Anemia (EIA)

EIA is an infectious and potentially fatal viral disease of horses. No vaccine or treatment exists for the disease. Clinical signs of EIA include fever, weight loss, icterus (yellowing of body tissues), anemia, swelling in the limbs, and weakness. However, not all equids infected with the equine infectious anemia virus (EIAV) show signs of illness, and these animals serve as inapparent carriers.

### EIAV transmission

EIAV is usually transmitted from horse to horse by large biting insects such as horseflies and deerflies. The bites from these flies stimulate defensive movement by the horse, which often results in an interruption of the flies' blood feeding. When interrupted, flies are motivated to complete feeding as soon as possible. They then attack the same or a second host and feed to complete their meal. In this manner, any infective material from the blood of the first host that is present on the mouthparts of the flies can be mechanically transmitted to the second host.

Needles and equipment contaminated with blood from an infected horse can also spread the virus when used on unexposed horses. Horses demonstrating clinical signs of EIA pose the greatest risk of spreading the virus because they have the greatest concentrations of circulating virus. However, even inapparent carriers pose a risk to other horses.

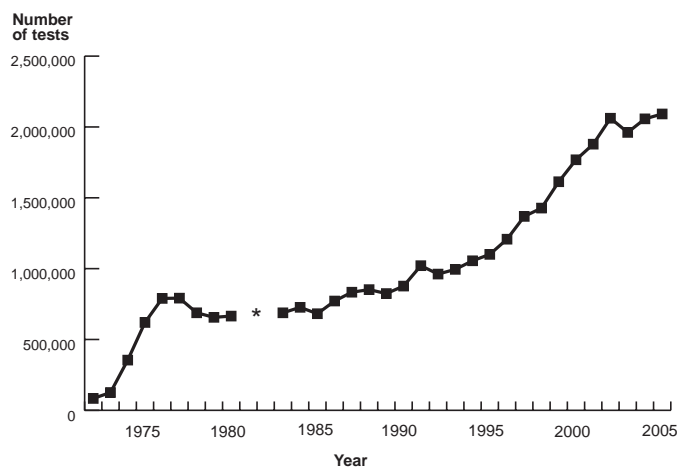
### Diagnosis

Diagnosis of disease associated with EIA and inapparent EIAV infection was not readily available until an effective serologic test for antibodies specific to the virus was developed in 1970 by Dr. Leroy Coggins. This agar-gel immunodiffusion or Coggins test is able to identify carrier animals. Although other serologic tests have been developed and approved for diagnosing EIA, the Coggins test is internationally recognized as the standard to which all other tests are compared. Currently, the Coggins test or some of the newer tests for EIAV are commonly required when moving horses within and among States.

### Testing

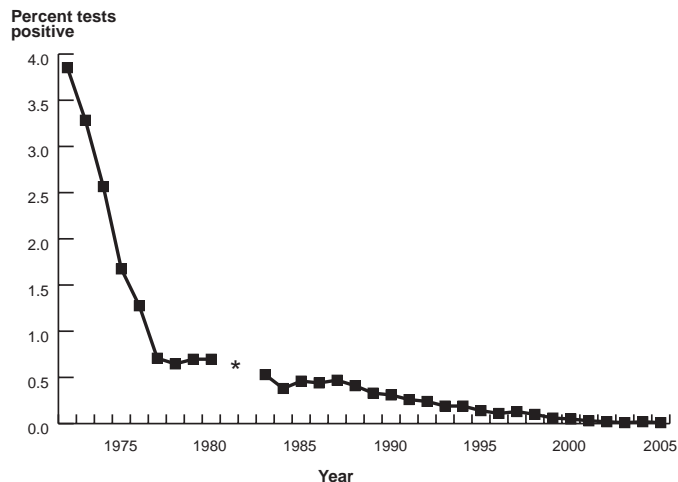
EIAV testing in the United States utilizing the Coggins test began in 1972. Data exist from 1972 to 2005 on the number of tests performed by each State annually and the percentage of those tests that were positive for EIAV (figures 1 and 2). The percentage of test-positive samples in the United States decreased dramatically from nearly 4 percent in 1972 to less than 0.01 percent in 2005 <[www.aphis.usda.gov/vs/nahps/equine/eia](http://www.aphis.usda.gov/vs/nahps/equine/eia)>.

Figure 1. Number of EIAV Tests Performed in the United States, 1972-2005



\*Data not available for 1981 and 1982

Figure 2. Percentage of Samples that Tested Positive for EIAV in the United States, 1972-2005



\*Data not available for 1981 and 1982

Historically, until the mid-1990s, 92 percent of test-positive samples have originated from horses located in what is referred to as the “hot zone” (see map 1). Risk of EIAV infection is highest in this region in part because environmental conditions are ideal for the insect vectors that transmit the virus and, presumably, because a reservoir of untested horses infected with EIAV exist. However, in the past decade clusters of EIAV-infected horses on individual premises have been recognized in areas outside the historical hot zone. Interactive maps of EIA testing results are available at: <[www.aphis.usda.gov/vs/naahps/equine/eia/web-mapping.html](http://www.aphis.usda.gov/vs/naahps/equine/eia/web-mapping.html)>.

**Control measures**

Minimizing or eliminating contact between nonexposed horses and the secretions, excretions, and blood of EIAV-infected horses can help control the spread of EIAV. This is accomplished in most areas of the world by testing horses for EIAV and either euthanizing or segregating test-positive horses from test-negative horses. Once the reservoirs of EIAV are identified, separated, and maintained at a safe distance from nonexposed horses, the transmission of EIAV is broken.

The major regulatory actions to control EIAV are carried out by individual States. However, States’ rules, while encompassing a broad scope of EIA concerns, are not consistent. In 2002, USDA created a Uniform Methods and Rules to facilitate the development of a uniform control program for EIA <[www.aphis.usda.gov/lpa/pubs/eiaumr.pdf](http://www.aphis.usda.gov/lpa/pubs/eiaumr.pdf)>.

**NAHMS Equine ’98 serum bank**

While there has been a decline in the percentage of positive tests among horses tested as part of the EIA programs, the EIA subcommittee of the Infectious Diseases of Horses Committee of the U.S. Animal Health Association suggested looking at the prevalence of EIAV in the entire U.S. equine population. To accomplish this task, the subcommittee requested that the existing serum bank generated during the NAHMS Equine ’98 study be tested for EIAV, thereby providing a more accurate representation of EIAV infection in the general equine population. The American Horse Council’s Health and Regulatory Committee along with State Veterinary Regulatory officials from the 28 States participating in the Equine ’98 study (see map 2 next page) agreed that testing the serum bank was a priority for the industry and an appropriate use of the banked sera.

The Equine ’98 study estimated that overall 40.9 percent of equine operations tested at least one resident horse for EIAV in 1997 and that just over 35 percent of horses were tested annually. For operations that tested for EIAV, the most common reason for testing was attending an event like a show within the State (41.4

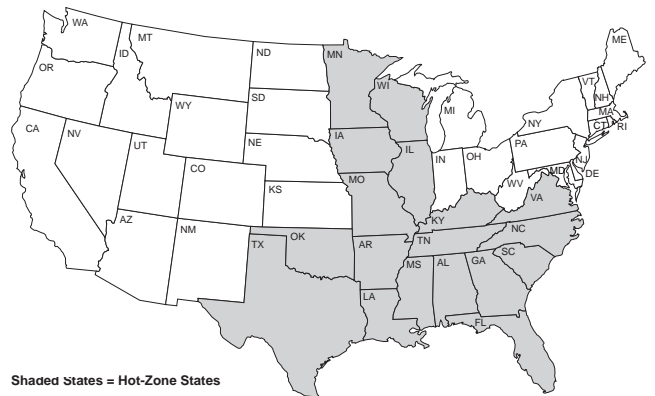
percent of operations that tested) followed by interstate transportation (19.2 percent of operations that tested).

As part of the NAHMS Equine ’98 study, biologic samples including blood were collected. A serum bank was established—based on the collection of blood from a subset of horses enrolled in the study—and stored at the National Veterinary Services Laboratory (NVSL) in Ames, IA.

To participate in the biologic sampling phase of the study, operations had to have three or more horses as of January 1, 1998, and complete questionnaires associated with the study. Sera contributed to the serum bank were collected from horses in 28 States during summer 1998 (June 15 to September 23) or winter 1999 (October 2, 1998, to March 3, 1999). The number of horses sampled per operation was on a sliding scale up to 20, based on the number of horses on the operation; each horse was sampled only once. For this study horses were defined as full-size breeds, usually standing 14 hands or taller when mature. No horses on race tracks were included in Equine ’98 biological sampling.

Sera in the Equine ’98 serum bank were tested by NVSL using the Coggins test to detect antibodies to EIAV. There were certain limitations in using these sera to precisely predict EIAV test-positive horses in the general population—the main limitation being the relatively small number of operations and horses included in the study. If the study’s original goal had been to precisely estimate the prevalence of EIAV test-positive horses—which was expected to be low—then a larger number of operations and horses would have been included.

**Map 1. Historical Equine Infectious Anemia (EIA) “Hot Zones”**



Map 2. Equine '98 Participating States



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Based on testing of banked sera from Equine '98, the weighted estimate of EIAV-positive horses was 0.003 percent with a 95-percent confidence interval for the estimate between 0.001 and 0.008 percent. This equates to being 95-percent confident that the true national prevalence of EIA-positive horses (as described above) was less than 8 in 100,000.

Inferences cover the population of horses on operations with 3 or more horses in the 28 participating States. All respondent data were statistically weighted to reflect the population from which they were selected.

Due to the low prevalence of test-positives in the serum bank no further analysis could be performed, such as regional estimates or animal-risk factors for positivity. It would appear that no clustering of positive horses occurred on a given premises based on this testing of sera from the approximately 900 equine operations included in the Equine '98 study. The EIAV prevalence estimate based on regulatory testing activity from 2002 through 2005 (0.01 to 0.02 percent) is consistent with the level estimated from testing the NAHMS Equine '98 serum bank (0.001 to 0.008 percent).

More information on the Equine '98 study can be found at  
<<http://nahms.aphis.usda.gov/equine/index.htm>>

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