



## CHAPTER 7

# Animal Health Events in 2005

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This chapter documents important animal-health events that occurred in the United States in 2005, including the bovine spongiform encephalopathy (BSE) case in Texas; the animal component of the U.S. hurricane response; and incidents of vesicular stomatitis virus, anthrax, bluetongue, and equine herpesvirus.

### Texas BSE Case

On June 24, 2005, the U.S. Department of Agriculture (USDA) announced that the Veterinary Laboratories Agency in Weybridge, England, confirmed that a sample from an animal that did not enter the food supply in November 2004 had tested positive for BSE. Of the more than 375,000 animals USDA tested to that point as part of its enhanced BSE surveillance program, 3 animals tested inconclusive and were subsequently subjected to immunohistochemistry, or IHC, testing.

USDA's Office of Inspector General—which had been partnering with the Animal and Plant Health Inspection Service (APHIS), the Food Safety and Inspection Service, and the Agricultural Research Service by impartially reviewing BSE-related activities and making recommendations for improvement—recommended that all three samples be subjected to a second internationally recognized confirmatory test, the World Trade Organization-recognized SAF immunoblot test, often referred to as the Western blot test. Two of the samples

were negative, and the third, which was reactive, was sent to the Weybridge lab for further confirmatory testing.

USDA's investigation determined that the positive animal, known as the index animal, was born and raised on a ranch in Texas. It was a cream-colored Brahma cross approximately 12 years old at the time of death. It was born prior to the implementation of the 1997 feed ban instituted by the Food and Drug Administration (FDA) to help minimize the risk that a cow might consume feed contaminated with the agent thought to cause BSE. The animal was sold through a livestock sale in November 2004 and transported to a packing plant. The animal was dead upon arrival at the packing plant and was then shipped to a pet-food plant, where it was sampled for BSE. The plant did not use the animal in its product, and the carcass was destroyed in November 2004.

During the course of the investigation, USDA removed and tested 67 “animals of interest” from the farm where the index animal's herd originated. Test results were negative for BSE for all 67. Two hundred adult animals of interest were determined to have left the index farm. Of these 200, APHIS officials determined that 143 had gone to slaughter, 2 were found alive (1 was determined not to be of interest because of its age, and the other tested negative), 34 were presumed dead, 1 was known dead, and 20 were classified as untraceable. In addition to the adult animals, APHIS traced two calves born to the index animal. Due to recordkeeping and identification issues,

APHIS had to trace 213 calves. Of these 213 calves, 208 entered feeding and slaughter channels, 4 were presumed to have entered feeding and slaughter channels, and 1 calf was untraceable.

To determine whether contaminated feed could have played a role in the index animal's infection, the FDA and the Texas Feed and Fertilizer Control Service conducted a feed investigation with two main objectives: (1) to identify all protein sources in the animal's feed history that could potentially have been the source of the BSE agent, and (2) to verify that cattle leaving the herd after 1997 were identified by USDA as animals of interest and were rendered in compliance with the 1997 BSE/ruminant feed rule.

The feed history investigation identified 21 feeds or feed supplements that were used on the farm since 1990. These feed ingredients were purchased from three retail feed stores and were manufactured at nine feed mills. This investigation found that no feed or feed supplements used on the farm since 1997 were formulated to contain prohibited mammalian protein.

The FDA investigation into the disposition of herdsmates from this farm involved visits to nine slaughter plants and eight rendering plants. The investigation found that all of the rendering plants were operating in compliance with the BSE/ruminant feed rule. A review of the inspection history of each of these rendering firms found no violations of the FDA feed-ban rule.

## **Hurricane Response (Animal Health Component)**

APHIS was presented with unique animal-health and -welfare challenges in Louisiana and Mississippi following back-to-back hurricanes in the gulf region in 2005. The aquaculture, cattle, dairy, and poultry industries experienced significant management hardships due to storm damage, loss of power, and negative economic impacts from market losses in New Orleans and on the Mississippi gulf coast. After each hurricane, town hall meetings were held with owners of dairy and cattle operations to assess their needs that would ensure continued operations, including fencing, generators, hay, and medicine. APHIS, as well as the American Veterinary Medical Association and the veterinary medical associations within the affected States, also assisted the State and veterinary medical-assistance teams in efforts to reestablish veterinary clinics that were not operational.

Nearly 50 APHIS veterinarians, wildlife specialists, and other experts worked with the States, veterinary medical-assistance teams, The Humane Society of the United States, and other animal-rescue groups to rescue, shelter, and feed displaced and vulnerable livestock, companion animals, and research animals in Louisiana and Mississippi. More than 11,000 small animals and nearly 3,000 large animals were recovered and supported from storm-ravaged areas of Louisiana and Mississippi.

The first animal rescue as part of the Federal-State response in Louisiana was the removal of 64 horses found stranded in a stable next to the New Orleans airport. APHIS also helped rescue 2,300 head of cattle in Cameron Parish, one of the parishes hit hardest by Hurricane Rita, using specialized machines, airboats, and pontoons.

Research primates, rabbits, dogs, cats, and transgenic mice were rescued from Tulane Medical Center and Louisiana State University Health Science Center. Eight sick and distressed dolphins that had been swept out of an aquarium into the Mississippi Sound were recovered, cared for, and relocated. Of the 9,000 poultry houses in Mississippi, approximately 2,400 sustained damage, and 300 were devastated. APHIS assisted in carcass disposal efforts with the cooperation of USDA's Natural Resources Conservation Service and the Army Corps of Engineers.

## **Vesicular Stomatitis**

Vesicular stomatitis is a disease that primarily affects cattle, horses, and swine, and occasionally sheep and goats. Humans can be exposed to the virus when handling affected animals but rarely become infected.

In affected livestock, vesicular stomatitis causes blisterlike lesions in the mouth and on the dental pad, tongue, lips, nostrils, hooves, and teats. Animals usually recover within 2 weeks. While vesicular stomatitis can cause economic losses to livestock producers, it is a particularly important disease because its outward signs are similar to—although generally less severe than—those of foot-and-mouth disease, a foreign animal disease of cloven-hoofed animals that was eradicated from the United States in 1929. The clinical signs of vesicular stomatitis are also similar to those of swine vesicular disease, another foreign animal disease. The only way to distinguish among these diseases is through laboratory tests.

The mechanisms by which vesicular stomatitis spreads are not fully known; insect vectors, mechanical transmission, and movement of animals are probably responsible. Once introduced into a herd, the disease apparently moves from animal to animal by contact or exposure to saliva or fluid from ruptured lesions.

Historically, outbreaks of vesicular stomatitis in domestic livestock occur in the southwestern United States during warm months and particularly along riverways. However, outbreaks are sporadic and unpredictable. In 2005, nine States reported quarantined vesicular stomatitis premises (Arizona, Colorado, Idaho, Montana, Nebraska, New Mexico, Texas, Utah, and Wyoming) (table 16).

Control of vesicular stomatitis spread occurs via State quarantine of affected premises and control of movement of animals from affected areas. Insect control also helps prevent occurrences of the disease on the premises. Because vesicular stomatitis occurs randomly, accredited and regulatory veterinarians and producers strive to detect the disease quickly, quarantine affected premises and animals, and control future outbreaks.

## Anthrax

Cases of anthrax, caused by the spore-forming bacterium *Bacillus anthracis*, occurred in unusual numbers and locations in the United States during 2005. Although anthrax cases are reported almost every year, North Dakota and South Dakota both experienced relatively high numbers of cases in 2005, and Texas reported the disease in a county that had not had a confirmed case for 20 years.

Information available from the North Dakota Department of Agriculture indicates that more than 100 cases of anthrax occurred, involving 16 counties in the eastern half of the State. Most of the affected animals were cattle, with some cases occurring in horses, bison, farmed cervids, sheep, and llamas. Herds with infected animals were quarantined, and animals were vaccinated. Heavy rains early in the summer might have created conditions conducive to increased exposure of animals to the bacterium.

In South Dakota, more than 50 cases of anthrax were confirmed, resulting in the deaths of hundreds of animals in the northeastern and central parts of the State.

According to the South Dakota Animal Industry Board, in 1 instance nearly 300 unvaccinated bison and rodeo bulls were exposed to the anthrax bacterium, and almost 40 animals died. The remaining animals in the pasture were treated with antimicrobials and vaccinated.

In Texas, confirmed cases of anthrax occurred in horses, deer, and cattle. Although anthrax cases occur almost every year in the southwestern region of the State, the cases in 2005 occurred in the west-central part of the State in a county that had not reported a case for 2 decades.

TABLE 16. **Vesicular stomatitis outbreaks**

	2005	2004
States affected	9	3
Positive premises quarantined	445	294
Animals found positive	786	470
Bovine	202	63
Equine	584	405
Ovine	0	0
Llamas	0	2

Anthrax spores are extremely resistant and can remain viable in the soil for many decades. Outbreaks in grazing animals tend to occur after extreme weather conditions. Drought or severely wet conditions can force buried spores to the surface, where they can easily be ingested by grazing animals. Vaccination effectively prevents anthrax in livestock, and antibiotics may be effective in treating exposed animals if administered very soon after exposure.

Anthrax is a notifiable disease in the United States, so occurrences must be reported to State health authorities.

## Bluetongue Serotype 1 in Louisiana

Bluetongue is a noncontagious, infectious disease of sheep and wild ruminants. Cattle are generally asymptotically infected and considered an amplifying host of the causative agent, bluetongue virus (BTV). In the United States, the principal BTV vector is *Culicoides sonorensis*, except in Florida, where *C. insignis* is also present and a factor in BTV transmission. Of the 24 types of BTV that are recognized globally, 5 are considered endemic in the United States: BTV-2, BTV-10, BTV-11, BTV-13, and BTV-17.

BTV-1 was isolated from a deer in St. Mary Parish, LA, in fall 2004. BTV-1 had not previously been identified in the United States, although it had been recognized in the Caribbean. Like BTV-2, *C. insignis* is a competent vector for BTV-1. The introduction of BTV-1 into the gulf coast region of the United States could have occurred as a result of wind-borne vectors, particularly in light of the numerous hurricanes and tropical storms that occurred in 2004.



In spring 2005, a total of 549 domestic ruminants in St. Mary Parish were sampled and tested for evidence of exposure to BTV-1. The group included 460 cattle, 47 sheep, and 42 goats. None of the animals was reported to have a history of illness associated with BTV, and none had been vaccinated against BTV.

Serum was screened by competitive enzyme-linked immunosorbent assay (cELISA) for antibodies to any BT serotype. Sixty-one samples (11 percent) tested positive in the screening cELISA. The cELISA-positive samples were examined further in virus neutralization (VN) assays to detect neutralizing antibodies to BTV-1 and BTV-2. Among the 24 BT serotypes, BTV-1 is most closely related to BTV-2. Of the 61 samples tested by VN, 20 demonstrated detectable neutralizing antibodies to BTV-1. Of these, six animals (five cattle, one sheep) had significantly higher titers to BTV-1 compared to BTV-2. Presence of BTV-1-specific antibody titers in the serum from the six animals is evidence of a prior exposure to BTV-1. Additional studies of domestic and wild ruminants as well as *Culicoides* spp. are in progress. These studies will continue to investigate whether BTV-1 has become established in the study area.

### Equine Herpesvirus Type 1 (EHV-1)

Although chiefly a respiratory pathogen, EHV-1 is associated with a variety of clinical manifestations in equids, including abortion and paralysis. The virus is enzootic throughout the world, and almost all horses over 2 years of age have been exposed. After an equid's initial exposure, EHV-1 can cause a latent infection, which provides a reservoir of virus for continual transmission. Nationally, reports of neurologic EHV-1 have increased in recent years, which might be attributable in part to a strain of virus that encodes for a particularly robust replicase enzyme. This strain of virus can reproduce rapidly and has a predilection for the blood vessels of tissue of the nervous system.

During 2005 and early 2006, seven episodes of neurological EHV-1 in the United States were reported by State animal health officials. Five of the disease events involved racing venues in Kentucky, Michigan, Pennsylvania, and Maryland, and two occurred in boarding facilities in New York and Maryland.

- Starting in December 2004 and continuing through February 2005, an outbreak of neurologic EHV-1 occurred at the Northville Downs Standardbred racetrack in Michigan. Of four horses considered affected, three were euthanized. Additional information

indicated that 12 horses with contact to the case horses were vaccinated against EHV-1 in December 2004 as a precautionary measure.

- In February 2005, a mare at the Meadows racetrack in Pennsylvania was euthanized after being diagnosed with neurologic EHV-1.
- During March 2005, 10 cases of EHV-1 paralysis were reported from the Columbia Horse Center in Columbia, MD. Five animals either died or were euthanized due to complications of their clinical conditions.
- In early March 2005, three horses at a boarding facility in Tioga County, NY, died or were euthanized after being diagnosed with a combination of neurologic and respiratory forms of EHV-1 infection. Three additional horses that showed clinical signs consistent with EHV-1 infection fully recovered.
- Another outbreak of EHV-1 neurological disease began in May 2005 at Churchill Downs in Louisville, KY. Two horses housed in separate barns were euthanized after they developed progressive paralytic disease associated with EHV-1 infection. Movement restrictions were placed on 3 barns, but the outbreak was mainly confined to 1 stable, where 9 of 37 horses developed signs consistent with neurologic EHV-1. For this outbreak, a relatively new nested polymerase chain reaction (PCR) assay for detecting viral deoxyribonucleic acid (DNA) was used to determine the extent of viral spread and to help manage the outbreak. By mid-June, the quarantine on all three barns was lifted following a period of 27 days without evidence of clinical disease.
- In December 2005, a 3-year-old filly at Turfway Park in Florence, KY, developed progressive rear-limb ataxia. Following confirmation of EHV-1 infection, regulatory and testing measures were instituted for exposed animals at the racetrack. The investigation documented the occurrence of EHV-1 in horses housed in three barns at Turfway Park and an additional training facility in Henderson, KY. During the investigation, more than 132 horses considered at risk were tested using the nested PCR assay for EHV-1. Of these, positive test results were obtained on buffy coat specimens for approximately 42 animals. Of three horses diagnosed with the neurologic form of EHV-1, two were euthanized.

In all instances, regulatory authorities used movement controls and a variety of biosecurity measures to prevent viral spread. In some cases, races were cancelled because of continuing transmission of virus within the exposed population and insufficient numbers of nonexposed horses to compete. Overall, use of a quarantine period of at least 21 days appeared to prevent further spread of virus; however, in most of these situations, the criteria used to determine the beginning timeframe were not defined.

From a regulatory perspective, State agencies vary in their requirements for veterinary practitioners to report cases of EHV-1 to State animal health authorities. Most States encourage reporting under general regulations for reporting of communicable diseases, yet few specifically designate cases of EHV-1 as a reportable disease. With the exceptions of required statements of disease-free status of horses intended for export and of the condition for States to participate in the National Animal Health Reporting System, there is no federally mandated reporting of disease conditions attributable to equine herpesvirus.

From a diagnostic perspective, EHV-1 is difficult to isolate, and the most commonly requested serologic tests indicate only prior exposure to viral antigen without differentiating antibody response attributable to vaccination from that associated with disease exposure. Likely, the numbers of cases of neurologic EHV-1 are underreported nationwide, and the cases that reach the attention of animal health authorities are those that occur in public venues or settings where large numbers of horses are stabled.