NVAP Reference Guide: Chronic Wasting Disease (Control and Eradication)

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Appendix

CWD is a TSE of cervids in the genera *Odocoileus, Cervus, and Alces*. Known susceptible species are white tailed deer, mule deer, black tailed deer, Rocky Mountain elk, and moose. Transmission studies involving direct or indirect contact between CWD infected deer and elk, and other ruminant species including wild ruminants and domestic cattle, sheep, and goats have shown no evidence of transmission of CWD to these other ruminant species.

First recognized as a clinical “wasting” syndrome in 1967 in mule deer in a wildlife research facility in northern Colorado, it was identified as a TSE in 1978. CWD is typified by chronic weight loss leading to death. There is no known relationship between CWD and any other TSEs of animals or people.

In the mid-1980s, CWD was first detected in free-ranging deer and elk in contiguous portions of northeastern Colorado and southeastern Wyoming. In May 2001, CWD also was found in free-ranging deer in the southwestern corner of Nebraska (adjacent to Colorado and Wyoming). At that time, the limited area of northern Colorado, southern Wyoming, and western Nebraska in which free-ranging deer and elk positive for CWD have been found was referred to as the original endemic area.

Since 2001, CWD has been identified in free-ranging cervid populations in 21 States: Colorado, Illinois, Kansas, Maryland, Minnesota, North Dakota, Nebraska, New York, New Mexico, South Dakota, Utah, Virginia, Wisconsin, West Virginia, Iowa, Michigan, Missouri, Pennsylvania, Arkansas, Texas and Wyoming. The first CWD-positive free-ranging moose was identified in Colorado in 2005.

Since 1997, CWD has been found in farmed cervids (white-tailed deer, red deer, and elk) in 16 States: Colorado, Kansas, Michigan, Minnesota, Missouri, Montana, New York, Oklahoma, South Dakota, Iowa, Nebraska, Ohio, Pennsylvania, Texas, Utah and Wisconsin.

CWD also has been found South Korea, Norway and two Canadian provinces, Saskatchewan and Alberta.

Like the causative agents of scrapie and Bovine Spongiform Encephalopathy (BSE), the agent responsible for CWD has not been completely characterized. The CWD agent is thought to be an abnormal prion protein. It is smaller than most viral particles and does not evoke a traditional whole body immune response in the host animal, but does cause neuroinflammation. On the basis of experience with other TSE agents, the CWD agent is assumed to be resistant to enzymes and chemicals that normally break down proteins as well as to heat and normal disinfection procedures.

Clinical Signs

CWD has been reported to occur in susceptible cervids 6 months of age and older. The disease is progressive and always fatal. The most obvious and consistent clinical sign of CWD is long-term weight loss with loss of body condition, as well as increased drinking and urination. Behavioral changes also occur in the majority of cases, including decreased interactions with other animals in the pen, aggression, listlessness, depression, and lowering of the head. These changes may be subtle and may not appear until late in the disease progression.

Testing

Currently, definitive diagnosis is based on IHC testing of the obex area of the brain stem or the medial retropharyngeal lymph nodes. Gross lesions seen at necropsy reflect the clinical signs of CWD, primarily emaciation and sometimes aspiration pneumonia, which may be the primary (acute?) cause of death. On microscopic examination, lesions of CWD in the central nervous system resemble those of other spongiform encephalopathies. At this time, abnormal prion proteins can be detected using immunohistochemistry (IHC), Western blotting, enzyme-linked immunosorbent assay (ELISA), prion misfolding cyclic amplification (PMCA), and real-time quaking induced conversion (RT-QuIC)**,** however, approved diagnostic assays are limited to IHC and ELISA. Research is being conducted to develop live-animal diagnostic tests for CWD. The rectal biopsy test, while not yet approved for routine regulatory testing, appears promising but may have limited applicability due the number of positive animals in the early stages of the disease that may not be detected.

Official CWD tests are performed only at APHIS-approved university, State, or Federal veterinary diagnostic laboratories. If the animal to be tested is a farmed deer or elk, accredited veterinarians should check with Federal or State regulatory veterinarians for information on sample collection and appropriate sample submission. If the animal to be sampled is a wild deer or elk that is suspected of having CWD, accredited veterinarians should inform State and Federal authorities and work with their State wildlife management agency to find out how officials would like the sample collected and submitted.

If the animal to be sampled is a clinically normal wild animal that an individual hunter would like tested, accredited veterinarians should also work with their State wildlife management agency or department of agriculture to find out how best to proceed. Several approved laboratories exist with sufficient capacity to provide fee-for-service testing for samples collected by individual hunters. Accredited veterinarians should always check with the diagnostic laboratory to make sure samples are properly collected, packaged, and shipped.

Disposal

Horizontal transmission of CWD has been demonstrated from environments contaminated with CWD-positive organic materials. Therefore, the proper disposal and decontamination of potentially CWD- infected fomites and tissues is an important factor in reducing the risk of CWD transmission. Carcass and tissue disposal options may be regulated by the Environmental Protection Agency (EPA), FDA, or State or local authorities. Accredited veterinarians should check with these entities first before attempting to decontaminate fomites or dispose of a suspect or positive carcass.

Management

APHIS has provided assistance to State officials in diagnosing CWD and in monitoring international and interstate movements of animals to help prevent further spread of CWD. An extensive nationwide surveillance effort was started in 1997–98 to better define the geographic distribution of CWD in free-ranging cervids.

Surveillance for CWD in farmed cervids began in 1997 and has been a cooperative effort involving State agriculture and wildlife agencies and APHIS. Farmed cervid surveillance has been increasing each year since 1997 and is now an integral part of the USDA program to prevent and control CWD in farmed cervid herds and wild cervid populations.

In 2002, at the request of Congress, USDA and the U.S. Department of the Interior worked with the States to create a national plan to assist States, Federal agencies, and Indian tribes in addressing CWD in both farmed and wild animals. Unfortunately, funding for the wildlife surveillance program was discontinued in FY2012.

USDA has continued to develop a national herd-certification program with a goal to control and prevent the spread of CWD in farmed cervids. The program includes requirements for fencing, animal identification, animal inventory, and continued surveillance testing for herd advancement. After 5 years of continual surveillance with no evidence of disease, a herd is considered to be certified and can move animals interstate.

Learn more about CWD.

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