



Chronic Wasting Disease

(a prion disease)

in Alberta



Common name

chronic wasting disease
CWD
cervid prion disease
cervid spongiform encephalopathy

Scientific name

CWD prion

Significance

Chronic wasting disease (CWD) is a prion disease associated with premature mortality in members of the deer family. It occurs in wild and farmed cervid populations as a progressively debilitating disease that primarily results from changes to proteins in the brain. In wild populations it causes early mortality of infected individuals as well as long-term changes in population demographics (sex and age structure) and productivity (number of fawns produced). Chronic wasting disease is a significant economic concern with farmed cervids. There is no evidence that CWD is a risk to the health of humans or traditional livestock.

What? Where? How?

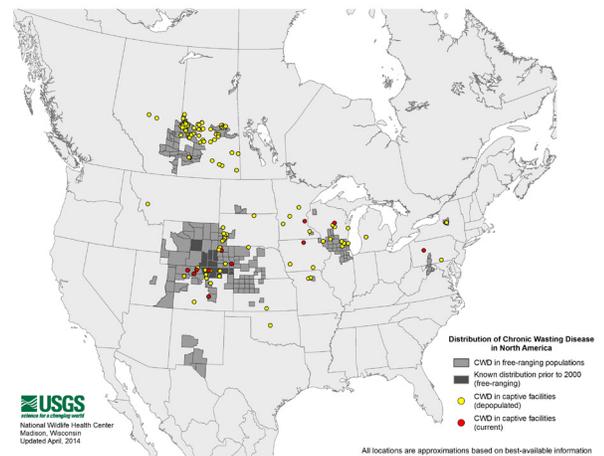
Chronic wasting disease is one of a group of diseases broadly lumped under the term transmissible spongiform encephalopathies (TSEs). This term simply means that these diseases can be passed from one individual to another and share the characteristic of being associated with holes or spaces in brain tissue. Each disease has a distinct form of abnormal protein, or prion, which can be used to identify and differentiate it from other TSEs.

The lymphatic and nervous systems are the preferred habitats for prion disease agents. The changing of normal protein to abnormal protein leads to spaces in the brain tissue until eventually the microscopic structure of the brain looks somewhat like a sponge. Needless to say, such damage in vital brain tissues results in changes to behaviour, attitude, and metabolism that lead to clinical signs in infected animals.

CWD is known to occur only in cervids. The

disease can remain unnoticed as a "silent" infection for many months but eventually, infected deer and elk cannot maintain body weight and slowly waste away. Emaciation, excessive salivation, lethargy, poor coordination, trembling, and drooping head and ears are common signs in individuals that are in the late stages of CWD. Infection appears to be fatal in all cases.

Although identified in the 1970s and 1980s, CWD probably existed in a localized area of Colorado/Wyoming/Nebraska for quite some time. We may never know where CWD came from but it may be the result of local changes in a similar prion associated with scrapie in domestic sheep. In recent years human activities have transported CWD to other locations in the US, Canada, and South Korea.



Transmission Cycle

To date, we still do not know the specific mechanisms of transmission of CWD. The disease can pass from one individual to another, particularly among groups of overwintering deer as well as between females and their offspring. Infectious material also can survive in the environment for an unknown period of time. Trace amounts of prion can occur in various body fluids.

What's Bugging Wild Critters?

Fact sheet #10 :
Chronic Wasting Disease

Chronic wasting disease

Distribution in Alberta

In 1996 Alberta began testing wild deer and elk that displayed abnormal behaviour or were clinically emaciated. Ongoing annual surveillance of hunter-killed deer and elk began in 1998.

CWD was detected in a wild deer in September 2005. Subsequent surveillance revealed that CWD invaded eastern Alberta via wild deer from adjacent areas of Saskatchewan. The disease is now established in the Battle River and Red Deer/South Saskatchewan River systems in eastern Alberta and continues to spread.

In Alberta CWD occurs primarily in mule deer, particularly older males. Infected white-tailed deer and one moose also have been found.

In 2002, CWD was identified in a farmed elk and two farmed white-tailed deer in central Alberta. The infections were found in conjunction with Alberta Agriculture's ongoing surveillance of farmed cervids. Federal CWD eradication programs were implemented immediately. All farmed cervids that moved on or off the premises in the previous three years as well as the current animals on the farm were killed and tested. No further CWD was found. Targeted surveillance of wild deer in the vicinity of the two infected farms for four years did not detect CWD.

Alberta maintained a moratorium on the importation of farmed cervids from 1988 to 2004 in order to avoid importation of undesirable parasites and diseases, including CWD. The moratorium was lifted only after the development of rigorous protocols for import of farmed cervids.

Importance for Wildlife Management

Deer are a primary herbivore and keystone species in many native ecosystems. CWD is an invasive exotic disease that is a new risk factor for deer populations in Alberta. The interplay between these two is still unfolding on Alberta's landscapes.

CWD causes fatal infections. Prior to death, these deer also may be more susceptible to predation or vehicles, and perhaps to hunters.

CWD is a long-term insidious disease in wild populations. Without active control programs, there is a steady increase in the prevalence (percent infected) and geographic distribution of the disease. Infected individuals die prematurely and their overall contribution to sustaining the population is reduced.

Mortality has limited effect on populations in the short term. Free-ranging deer have a relatively high reproductive capacity and the effects of early losses to CWD can be balanced by the number of new deer produced each spring.

However, over the long term, theoretical models and real-world data indicate mule deer populations at the heart of an affected area decline and will eventually disappear. Disease losses are greater than the number of fawns produced. There is no indication of CWD resistance nor protective immunity within affected populations.

During the intermediate term, mule deer populations grow smaller and include fewer older deer (particularly older bucks) and fewer fawns.

Dealing with CWD is made more difficult because it is often misrepresented as equivalent to bovine spongiform encephalopathy (BSE) ["mad cow disease" of cattle]. BSE is associated with a similar prion disease in humans and poses worldwide concern for public health and agricultural economics. However, CWD and BSE are not the same and can be differentiated on various aspects of the known biology and molecular makeup of the two prions.

Wildlife managers throughout North America spend considerable time, effort, and monies on surveillance programs aimed at defining where CWD does or does not occur in the wild. In addition, numerous CWD research projects helped to better define the host range, method of transmission, diagnostic tests, impact on wild cervids, and risk to the public and livestock.



Pub. No:
I/169
ISSN:
1710-4327
ISBN Print:
0-7785-3580-0
ISBN Online:
0-7785-3581-9

Chronic wasting disease

Public Significance

This disease poses significant economic concerns for farmers of elk and deer. CWD was unintentionally introduced into farmed elk populations from live wild elk and deer taken from affected areas in the U.S. It was then translocated to farms in various states as well as Saskatchewan and South Korea. The source of the CWD found on farms in Alberta in 2002 could not be determined. The economics of trade in live elk and their products (primarily antler velvet) are seriously affected by the occurrence of CWD in North America.

The association with BSE has led to concerns over the potential for possible human infection. To date there is no scientific evidence to suggest that CWD can infect humans, and growing evidence that it is indeed quite different from BSE. The U.S. Centers for Disease Control advise that the human health risks from CWD, if any exist, are extremely low. However, as a precaution, the World Health Organization (WHO) recommends that all products from animals suspected of or infected with any prion disease should be excluded from the human food chain.

Prevention/Control

Alberta conducted a program of combined surveillance and control of CWD in wild deer in eastern regions in 2005-2008. Voluntary submission of the heads of hunter-killed animals was the primary source of surveillance samples. Disease control was targeted in the immediate vicinity (10-12 km) of each infected deer. The program was effective at finding and removing infected deer and reducing local deer density. It also appeared to reduce the rate at which CWD increased in local deer populations and the rate at which it spread across the landscape.

Chronic wasting disease in farmed cervids is managed by provincial and federal surveillance and control programs. These include ongoing surveillance (test slaughtered animals, report clinical signs), quarantine of suspect and confirmed affected premises, detailed trace outs from all known affected premises, destruction of infected herds, and compensation of owners of infected elk or deer. Affected premises are thoroughly cleaned and disinfected. In addition, Alberta has stringent programs developed among government agencies, game farmers, and other stakeholders to continually search for evidence of CWD in farmed and wild cervids and to limit the possibility of introducing infections in animals imported into the province.

Summary

Chronic wasting disease is established in mule deer populations in eastern Alberta. It shows up occasionally in white-tails, one moose, and was found in one farmed elk and two farmed whitetailed deer in central Alberta. CWD continues to spread and increase in wild deer. Ongoing surveillance programs are designed to document the rate at which the prevalence and geographic distribution increase in Alberta. Strict programs are in place to provide continual surveillance of farmed cervids and to limit the risk of spreading or reintroducing this disease.

Additional Information

Alberta Agriculture Food and Rural Development: <http://www.agric.gov.ab.ca/>

Chronic Wasting Disease Alliance: <http://www.cwd-info.org/>

Canadian Food Inspection Agency: <http://www.inspection.gc.ca/english/anima/disemala/cwdmdc/cwdmdce.shtml>