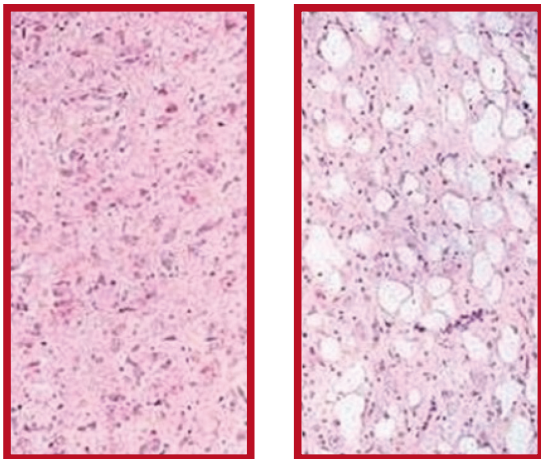


Chronic Wasting Disease (CWD) is a contagious neurological disease that affects deer and other cervids. CWD is a transmissible spongiform encephalopathy (TSE) disease also known as a prion disease. Prions are misfolded cellular proteins located on the surface of cells that infect and change other cellular proteins as they spread and accumulate in the body. Once infected, CWD and all other TSEs are irreversibly fatal. As the prions accumulate in the brain, microscopic holes called vacuolar degenerations develop giving the brain a sponge-like appearance, hence the name “spongiform” (see Figure 1 below).



HEALTHY

INFECTED

Figure 1: A comparison of healthy brain tissue (left) and tissue showing signs of vacuolar degenerations, astrocytosis, and amyloid plaque accumulation common to TSE diseases (right).

The structural changes that occur to the prions make it so that they cannot be destroyed by the body’s immune system, nor by other physical conditions, including normal cooking, cleaning or sanitizing processes. Scrapie, bovine spongiform encephalopathy (BSE) also known as “mad cow disease”, Creutzfeldt-Jakob Disease (CJD), and Kuru are other examples of TSEs.

ORIGINS

CWD was first identified in 1967 in a closed herd of captive mule deer in northern Colorado. It became classified as a TSE in 1978 and later discovered in free-range cervid herds. Since then, CWD has spread all across the United States, Canada, and even beyond North America to Scandinavia and South Korea.

HOST RANGE

Cervid species found to be infected include almost the entire Cervidae family:

- White-tailed deer
- Mule deer
- Sika deer
- Caribou
- Elk
- Moose

Table 1: Cervid Tissue Proven or Suspected to Harbor CWD Prions

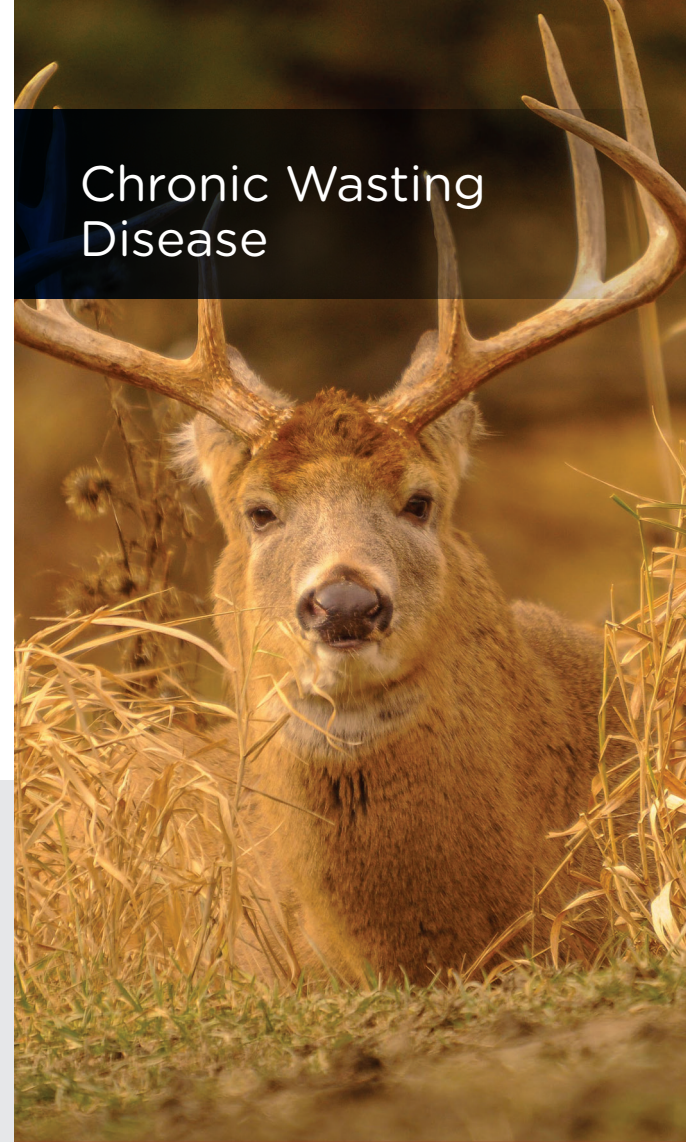
Tissues Confirmed Positive for CWD	Tissues Suspected or at Risk for CWD
Brain	Mucosal Membranes
Pituitary Gland	Salivary Glands
Spinal Cord	Tongue
Eyes (optic nerve, ganglion cells, retina)	Intestines
Tonsils	Liver
Heart	Kidneys
Lymphatic Tissues (associated with the head, neck, joints, digestive system and rectum)	Bladder
Spleen	Urethra
Pancreas	
Adrenal Glands	
Peripheral Nerves (near the spinal cord)	



1 Meating Place
 Elizabethtown, PA 17022
 Phone: 717-367-1168
 Fax: 717-367-9096
 Email: aamp@aamp.com
 www.aamp.com

SOURCES

- Chronic Wasting Disease and Potential Transmission to Humans - Ermias D. Belay et. al., 2004
- Chronic Wasting Disease of Cervids: Current Knowledge and Future Perspectives - Nicholas J. Haley and Edward A. Hoover, 2015
- Cross-Species Transmission of CWD Prions - Timothy D. Kurt and Christina J. Sigurdson, 2016
- Chronic Wasting Disease: Emerging Prions and Their Potential Risk - Samia Hannaoui et. al., 2017
- Inactivation of Chronic Wasting Disease Prions using Sodium Hypochlorite - Katie Williams, et. al., 2019
- Figure 1 - <https://www.slideshare.net/hillcountrychapter/chronic-wasting-disease-101-by-dr-bob-dittmar-v2018>
- Figure 2 - <https://www.trcp.org/2019/02/01/25-states-took-additional-steps-fight-chronic-wasting-disease-past-year/cwd-high-risk-parts-blog-version/>



Chronic Wasting Disease

What Hunters and Processors Need to Know and Do



PATHOLOGICAL SIGNS

CWD is a slow-developing disease with a prolonged incubation time. Most animals are asymptomatic carriers meaning that the animals are infectious while showing no sign of the disease. Signs early on could be easily missed because they can be mistaken for normal behavior or seasonal body mass fluctuations. The clinical signs become more pronounced and noticeable towards the end of the disease's course.

- Impaired balance and coordination (Axataia)
- Excessive teeth grinding and jaw clenching (bruxism)
- Altered posture (wide-based stance), and abnormal head carriage (droopy head and ears)
- Excessive drooling and salivating (sialorrhea/ptyalism)
- Blank facial expression
- Excessive eating and hunger (polyphagia)
- Head tremors
- Extreme thirst (paradoxical polydipsia)
- Listlessness
- Excessive urination (polyuria)
- Behavioral changes
- Excessive urination (polyuria)
- Progressive weight loss
- Roughened haircoats and/or retention of the winter hair coat

Since all signs of CWD can occur in conjunction with other diseases, it cannot be diagnosed based on appearance or behavior alone. Microscopic examination of brain tissue is necessary to diagnose CWD.

TRANSMISSION AND ENVIRONMENTAL CONTAMINATION

Transmission of CWD can occur in a few different ways:

- **Direct transmission** – the spread of a disease through contact between two or more animals
 - » Contributes to the spread of CWD into a new area and sites where cervids gather
- **Indirect transmission** – the spread of a disease through contact with surfaces or objects that carry the infectious material
- **Horizontal transmission** – the spread of a disease through contact with excreta (saliva, urine, feces, blood)
 - » Carcasses and gut piles from infected animals also spread the disease

For CWD and all other TSEs, similar animal species are necessary for transmission between the host and recipient organism. Currently, there have been no cases of CWD transmitting to non-cervids or humans. Differences between species have been shown to act as a barrier to the transmission of prion diseases. However, over time mutations can occur and potentially overcome these species barriers; the possibility that CWD can cause disease in humans cannot be eliminated.

SAFETY MEASURES FOR HUNTERS AND MEAT PROCESSORS

General Precautions:

- Do not shoot, handle or consume any animal that acts abnormal or shows any sign of illness
- Ensure the meat from positive-testing or suspected animals are not allowed to enter the human and animal food supply
- Take caution when handling or processing an animal (assume it is infected and treat it as such)
 - » Wear Latex or rubber gloves when field dressing and when breaking down the carcass
 - » Minimize the handling of all high-risk tissues and organs
 - Normal field dressing coupled with boning out a carcass will remove most, if not all, of these body parts (FIGURE 2)
 - » Remove as much fat, connective tissue, membranes and lymphatic tissue as possible
- Avoid the consumption of all high-risk tissues and organs (TABLE 1)
- Always check with your area's game commission or other wildlife management organization for the most appropriate procedures, especially if you are in or near a disease management area (DMA)

Hunters:

- Decrease or stop the use of natural urine-based attractants (potential carrier of infected prions)
- Have your game tested and share the results with the processor
 - » Wait for the test results before having the animal(s) processed or before consuming it
- If your animal is being commercially processed, request that your animal is processed individually, without mixing meat from other animals

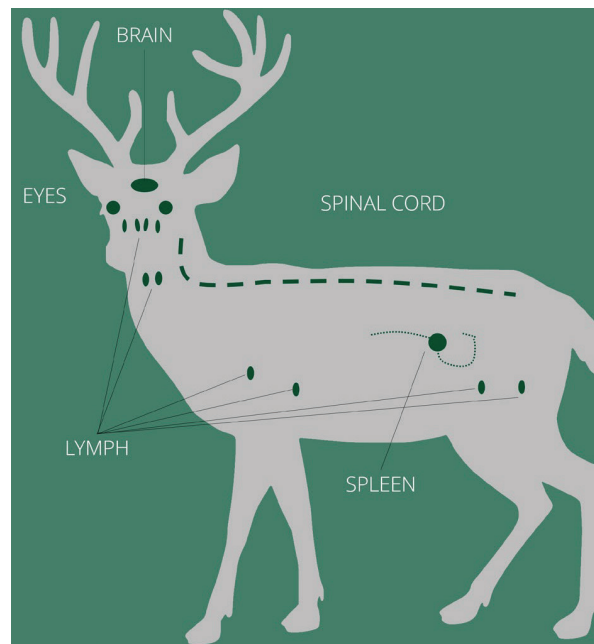


Figure 2: A diagram showing the anatomical location of CWD high-risk tissues.

Processors:

- Require hunters to have all animals tested before handling and processing
- Have dedicated knives and equipment for processing game meats
- Bone out ALL the meat from the animal
 - » Do not saw through bone, especially the head or the spinal cord
- Thoroughly clean and sanitize all knives and equipment in between every individual animal (unless the animal(s) tested negative for CWD)

INACTIVATING CONTAMINATED EQUIPMENT AND SURFACES

As previously mentioned, prions are notoriously difficult to inactivate. Water alone is ineffective at removing prions; spraying or soaking does nothing to remove dried on tissues or decrease prion amount. Bleach (sodium hypochlorite [NaClO]) in high concentrations has been shown to inactivate CWD and other TSE prions. A five-minute treatment with a 40% dilution of household bleach is effective at inactivating prions on stainless steel surfaces. For easier mixing and increased

efficacy, use a 1:1 solution of household bleach (with a $\geq 6\%$ concentration) with cold water and allow the items to soak for at least five minutes. It is very important to remove all solid and visible tissues from equipment before applying a bleach disinfecting treatment. Bleach has poor penetrating abilities and has a much lower efficacy when organic matter is present.

Recommended Cleaning Procedure:

- » Rinse all knives, equipment, and surfaces with cold water
- » Apply a 1:1 solution of household bleach (with a $\geq 6\%$ concentration) and cold water to all items and surfaces
 - Soaking items in the solution is more effective than spraying on it in the surface
- » Let all items and equipment set undisturbed for at least five minutes
 - Increasing the treatment time will increase the efficacy
- » Rinse all items and surfaces with cold water
- » Proceed to clean and sanitize all items and surfaces as normal
- » When finished processing, apply the bleach solution to all floors and drains
- » Let floors and drains sit undisturbed for at least five minutes
 - Increasing the treatment time will increase the efficacy
- » Rinse everything down the drain

CONCLUSION

There is no scientific evidence that CWD will dissipate naturally over time. Evidence suggests that once the environment is contaminated, it will remain infective for an unknown period of time. Doing nothing will only result in the disease increasing in known areas and spreading to novel areas.

Hunters and processors should consult with their local wildlife and game agencies to identify areas where CWD has been detected and to get the most up-to-date information.

Other resources for hunter and processors:

- the Center for Disease Control and Prevention (CDC)
- the Center for Infectious Disease Research and Policy (CIDRAP)
- the USDA Animal and Plant Health Inspection Service (APHIS)