



SCIENCE SNAPSHOT

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Report Overview

Chronic Wasting Disease Spillover Preparedness and Response:
Charting an Uncertain Future

Center for Infectious Disease Research and Policy (CIDRAP)

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On January 8, CIDRAP released a report titled Chronic Wasting Disease (CWD) Spillover Preparedness and Response: Charting an Uncertain Future. The purpose of this document is to assess the risks of CWD spreading to other species, including humans, and to provide recommendations for improving surveillance, research, communication, and preparedness to prevent and respond to potential spillover events. It aims to protect wildlife, public health, and ecosystems by addressing gaps in knowledge, coordination, and resources.

The document offers the caveat that *this report represents a multidisciplinary effort to define key issues that can inform contingency planning for possible CWD detection outside of its natural hosts. The findings and conclusions within the report do not necessarily reflect the positions or policies of individuals or their respective agencies.*

General Overview of CWD: *CWD is a fatal neurodegenerative disease of cervids (e.g., white-tailed deer, mule deer, elk, moose, and reindeer). It is caused by prions, infectious proteins that target normal brain proteins to fold abnormally. Infected animals shed CWD prions in body fluids, potentially exposing other cervids during social encounters. In addition, shed prions can persist in soil for extended periods and be taken up by plants, leading to environmental contamination and serving as another potential source of infection...CWD was first identified in 1967 in a captive mule deer in Colorado and was found in free-ranging cervids in Colorado and Wyoming in 1981. To date, CWD has been identified in 35 US states, as well as in Canada, Finland, Norway, South Korea, and Sweden (excerpt from 2025 CIDRAP Report, Executive Summary).*

Important notes:

- CWD is the only prion disease that has been detected in free-ranging wildlife.
- CWD prions are introduced into the host through the gastrointestinal (mouth), nasal (nose), or ocular(eyes) tracts. They are transported into the bloodstream, entering the peripheral nervous system, and ultimately infecting the central nervous system where they accumulate.
- CWD is terminal, with death commonly occurring between 18 months and 2 years after infection.
- Infected animals shed CWD prions in body fluid such as saliva, semen, urine, feces, antler velvet, and blood.
- The spread of CWD through animal-to-animal contact is called horizontal transmission. CWD can also be spread through vertical transmission, from infected mothers to newborns.
- The increasing prevalence and distribution of CWD among wild cervids stems from prions' high transmissibility and prolonged stability in the environment, among other factors.

Scientific Implications of the CIDRAP Report

Growing Risk of Spillover

Implications: As the prevalence of CWD increases in cervid populations, the likelihood of encountering an infected animal or prion-contaminated environment inherently increases for all species sharing the affected ecosystem. Surveillance measures are not in place to detect spillover to wildlife species that share the same ecosystem as cervids. Moreover, as CWD continues to spread, additional prior strains with potentially greater propensities to impact species transmission may emerge. So, the risk of CWD spillover is not static and may increase as new strains emerge. This suggests a critical need for improved surveillance and cutting-edge research.

Scientific Priority: Investigating strain diversity, the mechanisms of prion adaptation, host specificity, and environmental persistence to predict and mitigate spillover risks.

Knowledge Gaps in Prion Biology

Implications: Limited understanding of CWD strain diversity and its implications for interspecies transmission challenges the development of predictive models and diagnostics.

Scientific Priority: Advancing strain-typing technologies and conducting large-scale studies to characterize prion strains and their cross-species transmission potential.

Limitations in Diagnostics and Surveillance

Implications: CWD is spreading relatively quickly across North America, leading to increasing areas of endemicity, which may in turn result in a higher prevalence of infection and greater environmental contamination. These metrics are difficult to measure because of the uneven intensity of surveillance among jurisdictions. Current testing methods lack scalability and sensitivity for early detection, especially in novel host species. This limits the ability to identify spillover events rapidly.

Scientific Priority: Developing rapid, sensitive, and cost-effective diagnostic tools that are standardized across jurisdictions and applicable to multiple species.

Environmental Persistence of CWD Prions

Implications: The extreme stability of prions in the environment poses long-term challenges for disease management and spillover prevention.

Scientific Priority: Conducting controlled studies to assess prion fate in various environmental media and evaluating potential decontamination strategies.

Need for Cross-Disciplinary Collaboration

Implications: The complexity of CWD spillover risks calls for integrated efforts across wildlife management, public health, veterinary sciences, and prion biology. For purposes of this report, CIDRAP identified five areas of focus within the broad field of CWD prevention and control: human medicine and public health, cervid and production animal health, prion biology and disease diagnostics, carcass and contaminated item disposal and the environment, and wildlife health and conservation. A working group

was established for each respective area. Each working group was asked to consider three scenarios and report on CWD emergency preparedness and response: (1) the status quo, in which no spillover events were identified, (2) spillover into non-cervid production animals (e.g. cattle), and (3) spillover into human populations. Outcomes from these exercises can be found in Chapter 3, Spillover to Non-Cervid Production Animals (page 47) and Chapter 5, Detecting CWD Spillover into Humans (page 68).

Takeaways:

- Research is urgently needed to answer critical questions about the potential of CWD transmission to non-cervids. Specifically, large animal studies, ideally using different strains of CWD prions, should be performed to explore the clinical signs, tissue distribution, and shedding potential of CWD prions in non-cervid production animal hosts.
- There is currently no evidence of CWD transmission to humans. It should be noted, however, that CWD spillover-related collaboration among public health, wildlife, and agriculture agencies is somewhat limited. Obstacles include cooperation and buy-in related to data privacy, funding, and the significant number of unknowns on the subject.

Scientific Priority: Establishing collaborative frameworks that leverage expertise across disciplines to address CWD challenges comprehensively.

Impacts on Public Health and Food Safety

Implications: The report draws parallels to the bovine spongiform encephalopathy (BSE) crisis (commonly referred to as Mad Cow disease), emphasizing the potential for significant public health and food security impacts if CWD prions cross species barriers.

Scientific Priority: Monitoring human populations with high exposure risk (e.g., hunters) for early signs of spillover and expanding research on zoonotic potential.

Uncertainty Around Long-Term Risks

Implications: The lack of historical precedence for CWD spillover complicates risk assessments. The emergence of novel prion strains could shift species barriers, altering transmission dynamics unpredictably.

Scientific Priority: Developing scenario-based modeling and long-term cohort studies to account for evolving risks and inform contingency planning.

Call for Innovation in Carcass Disposal

Implications: Current disposal methods are inconsistent and may not effectively contain environmental contamination. A significant spillover event could overwhelm disposal systems.

Scientific Priority: Innovating scalable, environmentally safe carcass disposal technologies and assessing their effectiveness in limiting prion spread.

Educational Gaps

Implications: Limited awareness among healthcare providers and the public about CWD and prion diseases hinders early detection and response to spillover incidents.

Scientific Priority: Creating educational initiatives to enhance recognition of prion diseases, particularly among professionals involved in human and animal health.

Overall Takeaway

The 2025 CIDRAP report frames CWD as a significant emerging challenge requiring an interdisciplinary and global approach. It highlights the urgent need for research, funding, and collaboration to address the multifaceted threats posed by CWD. It mirrors the call to action from scientists in the conservation and hunt-fish communities to focus on understanding prion biology, improving diagnostic capabilities, and developing innovative management strategies to mitigate the risks of spillover and ensure ecosystem and public health resilience.

The full report can be found at [CWD Report 2025_0.pdf](#).

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The Science Snapshot is intended to provide an overview of convenings addressing science-based topics that are relevant to the mission of the TRCP. If you have additional questions, please get in touch with Jamelle Ellis at jellis@trcp.org.