

New diagnostic tools protect dogs and humans from deadly parasite

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USask Western College of Veterinary Medicine student Temitope Kolapo is investigating how a known parasite may pose a threat to dogs and humans in Canada. Credit: University of Saskatchewan

An emerging parasite known as *Echinococcus multilocularis* has been

increasingly appearing in coyotes in Western Canada as well as in new regions of North America recent years, and poses a potential threat to the health of dogs and humans, said University of Saskatchewan (USask) graduate and veterinarian Dr. Temitope Kolapo (Ph.D.).

The tapeworm can have a severe impact on dogs if they ingest the parasitic eggs and develop a condition known as alveolar echinococcosis (AE).

"These eggs are immediately infective, and can survive for years in the environment," said Kolapo, who earned her Ph.D. in veterinary microbiology from the Western College of Veterinary Medicine (WCVM) in February under the supervision of Dr. Emily Jenkins (DVM, Ph.D.). "AE behaves like an invasive tumor disease and is very debilitating and costly to treat in both humans and dogs."

In her recent study published in the journal *Transboundary and Emerging Diseases*, Kolapo showed that a diagnosis of AE in a dog in Western Canada can cost the owner over \$10,000.

Kolapo said there has been an increase in the prevalence of *E. multilocularis* [parasites](#) in Western Canada in recent years, and thus, an increased risk of developing AE for both dogs and humans exists today. *E. multilocularis* adult parasites flourish in the intestines of dogs, coyotes, foxes and wolves, who often pass eggs eaten by rodents; when dogs and humans accidentally consume these eggs, they are at risk of contracting the parasite. AE can develop in the liver, and if the disease goes undetected in the early stage, treatment options and outcomes are often poor.

With her Ph.D. research, Kolapo developed new diagnostic tools for veterinarians to help diagnose both intestinal and liver stages of the parasite infection in dogs. These tools will allow for early detection and

treatment of the parasite, which is key to the survival of exposed dogs.

Because the parasite and the development of AE can have such widespread effects, Kolapo engaged directly with communities who work with affected animals to participate in her research.

"My research relied heavily on the engagement of hunters, trappers, and provincial and territorial veterinarians for wildlife samples," said Kolapo. "I also worked with infectious disease physicians, human health personnel and veterinarians and pathologists who volunteered information and samples for canine case studies."

A team of WCVU summer research students who have been integral to Kolapo's research include Sarah Revell, Mila Bassil, Joy Wu and Allison Hay.

The importance of the research—besides saving infected dogs—is also to better understand the potential risk for humans, including dog owners and clinicians who work with exposed dogs. This One Health research approach recognizes the interconnectedness of people, animals and the environment.

Kolapo said taking a One Health view of the research was crucial to its success.

"My research on AE in dogs is important from an animal health perspective and also from a human health perspective as infection in dogs serves as an indication of risk to humans," said Kolapo.

Research results indicated that [diagnostic tests](#) can be designed to help clinicians catch and treat AE early. Kolapo was a co-author on [a publication](#) in the *Journal of Infectious Diseases* describing that the first human AE case in Saskatchewan most likely came from infected

wildlife or dogs in Western Canada.

"Already, tests that I have developed have been used to detect the first cases of dogs shedding eggs of the parasite in Western Canada, helping mitigate risk to their owners and to veterinary personnel," said Kolapo.

Kolapo had the opportunity to give almost ten presentations showcasing the results of her research, and published three academic papers.

In the future, Kolapo plans to continue to take her work to the next level to continue to protect animals and humans from these types of health risks.

"It is important to continue to get base line data on *E. multilocularis* in wildlife and domestic dogs in other regions of Canada," she said. "This knowledge will aid in the formulation of prevention and control strategies. We also hope to continue to improve diagnostics as well as consider vaccine development."

"I am excited to see what the future holds for me," she said.

More information: Temitope U. Kolapo et al, Canine Alveolar Echinococcosis: An Emerging and Costly Introduced Problem in North America, *Transboundary and Emerging Diseases* (2023). [DOI: 10.1155/2023/5224160](https://doi.org/10.1155/2023/5224160)

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