

# Public Health Implications of Cysticercosis Acquired in the United States

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[Karen Hunter] Hello, I'm Karen Hunter. With me today is Dr. Patricia Wilkins, a research microbiologist in the Center for Global Health at CDC. Dr. Wilkins is co-author of a paper appearing in the January 2011 issue of CDC's journal, *Emerging Infectious Diseases*. The article looks at the public health implications of cysticercosis acquired in the United States. Welcome, Patty.

[Patricia Wilkins] Thanks, Karen. It's great to be here.

[Karen Hunter] Patty, what is cysticercosis?

[Patricia Wilkins] Cysticercosis is an infection of both people and pigs that is caused by the pork tapeworm, *Taenia solium*. Cysticercosis is a leading cause of adult onset epilepsy, and can sometimes be fatal. The infection is caused by ingesting tapeworm eggs or tapeworm segments that contain eggs that were shed in the feces of a human tapeworm carrier. Excreted eggs can contaminate soil, hands, and even food. Once eggs are ingested, the larvae hatch in the intestine, invade the intestinal wall, and migrate to striated muscles, the brain, liver, and other tissues, where they develop into cysticerci. In humans, these cysts can cause serious sequelae if they localize in the brain, and that results in a condition known as neurocysticercosis.

[Karen Hunter] How is cysticercosis transmitted? Is it caused by eating pork?

[Patricia Wilkins] Well, people typically become infected when they eat food, and it can be any food that has been handled by a person who has a tapeworm but doesn't know it. For that reason, human cysticercosis can be found in populations that neither eat pork nor share environments with pigs. Human infection can result from either ingestion of contaminated food or by autoinfection. And autoinfection occurs when a person carrying an adult *Taenia solium* tapeworm and infects himself, usually through the fecal-oral transmission route.

[Karen Hunter] Does that mean cysticercosis is considered a foodborne illness?

[Patricia Wilkins] Yes it can be, and like other foodborne illnesses, cysticercosis is caused by people eating or drinking something that has been contaminated with a pathogen. In the case of cysticercosis, the contamination usually is a result from food handlers not practicing good hygiene such as handwashing, but it may also result from fresh produce that may have been contaminated in the field. Under favorable conditions, the tapeworm eggs can remain viable for long periods of time in the soil and one of the reports that we reviewed for our study described finding tapeworm eggs on vegetables from northeastern Mexico, but whether those eggs were from pork, the pork tapeworm is unknown. The eggs of several species of tapeworms are similar,

so you can't really tell from even a microscopic examination if a tapeworm egg is from the pork tapeworm or from the beef tapeworm.

[Karen Hunter] You mentioned people not knowing they were infected with *Taenia solium*. Is it really possible for a person to have a tapeworm and not know it?

[Patricia Wilkins] Yes it is. Frequently people with tapeworm infections are asymptomatic. The lifecycle of the pork tapeworm involves two stages: the adult tapeworm, which lives in the human intestine, and the larval stage, which causes cysticercosis. Human tapeworm infections occur after people eat undercooked pork containing the larval stages, or cysticerci. Cysti evaginate – that is, they turn inside out -- and attach to the small intestine by their scolex. And the scolex is the tapeworm's head, and has it both hooks and suckers that allow it to attach to the intestinal wall. Adult tapeworms develop, and can grow to up to two to seven meters in length and produce up to 1000 proglottids. And proglottids are the segments that form at the tail of the tapeworm and then break off while the parasite remains attached in the intestinal wall. Each one of these segments can contain up to approximately 50,000 eggs. Even large tapeworms can reside in a host's small intestine for several years without causing any severe symptoms. Unless people notice the tapeworm segments being passed in their stools, a person may never realize he or she is hosting a parasite.

[Karen Hunter] Is cysticercosis very common in the United States?

[Patricia Wilkins] That's a good question, and is one reason we did our study. Cysticercosis is frequently thought of as an imported disease and that's often the case. *Taenia solium* is widely prevalent in Latin America and parts of Africa, but not in the United States. Because pigs are intermediate hosts of the parasite, completion of the life cycle occurs only in regions where humans live in close contact with swine and where sanitation is poor. For that reason, when we did see cases of cysticercosis those cases were usually in immigrants or in people who had traveled to those regions. We reviewed reports published over the past 50 years to see if cases of cysticercosis acquired within the United States did occur.

[Karen Hunter] What did you find?

[Patricia Wilkins] There have been cases and sometimes even clusters of locally-acquired cysticercosis in the United States. We hope our study will help raise awareness of cysticercosis and how it's transmitted. Physicians and public health officials should examine a patient's household members for evidence of tapeworm infection, and also consider the possibility that a patient with cysticercosis may be a tapeworm carrier as well.

[Karen Hunter] Where can people get more information about cysticercosis?

[Patricia Wilkins] People can get more information at the CDC website. They can go to [www.cdc.gov/parasites/cysticercosis](http://www.cdc.gov/parasites/cysticercosis). And cysticercosis is spelled c-y-s-t-i-c-e-r-c-o-s-i-s.

[Karen Hunter] Thanks, Patty. I've been talking with CDC's Dr. Patricia Wilkins about a paper that appears in the January 2011 issue of CDC's journal, Emerging Infectious Diseases. You can

see the entire article online at [www.cdc.gov](http://www.cdc.gov). If you'd like to comment on this podcast, send an email to [eideditor@cdc.gov](mailto:eideditor@cdc.gov). That's eideditor -- one word -- at cdc.gov. I'm Karen Hunter, for Emerging Infectious Diseases.

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