"The Burden of Neurocysticercosis in Endemic Areas"

Wednesday, July 10, 2013, 11:00 a.m. – 12:00 p.m. United States Eastern Time

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Dr. Carabin graduated with a Doctorate in Veterinary Medicine in 1992 and a Masters in Veterinary Clinical Sciences in 1994 from the Université de Montréal and has a PhD in epidemiology from McGill University (1998). She gained experience in the area of health economics and infectious disease transmission dynamics while completing her post-doctoral research at the Department of Infectious Disease Epidemiology at Imperial College in the UK. Since starting her position at the University of Oklahoma Health Sciences Center, she has received seven grants from the NIH, WHO and CONACYT to study the epidemiology and burden of Taenia solium cysticercosis in humans and pigs. She has participated at two WHO expert committees on evaluating the burden of foodborne diseases and zoonotic infections. She has published 75 peer-reviewed articles and nine book chapters.

ABSTRACT: The adult form of Taenia solium resides in the intestines of humans. Each proglottid shed with feces of infected individuals contain tens of thousands of eggs. In the absence of improved sanitation and poor pig management, the contaminated environment becomes a source of infection for the pig intermediate hosts. When the oncospheres (larvae) in the eggs are ingested by pigs, they migrate to different tissues, including muscles, where they establish as cysts. Humans develop the adult form of the parasite by ingesting undercooked pork meat contaminated with cysts. When humans ingest the eggs from the environment through food contamination or indirect contact, the oncospheres may migrate to the brain, resulting in a condition known as neurocysticercosis (NCC).

The distribution and frequency of different manifestations associated with NCC remain poorly understood because the diagnosis of NCC required brain imaging, rarely available in developing countries, and because the natural history of the infection remains misunderstood. This makes it nearly impossible to estimate accurately the burden of NCC in terms of its costs, reduction in quality of life and associated disability. A first step to estimate burden was thus to conduct systematic reviews of the literature of the contribution of NCC to epilepsy and of the distribution of manifestations among case series of NCC. These reviews resulted in finding that a median of

29% (95%CI: 23%-36%) of people with epilepsy residing in endemic areas had brain imaging lesions of NCC and that epilepsy and seizures, followed by increased cranial pressure, were the most frequent presenting symptoms among case series of NCC. Only two studies, both conducted in Sub-Saharan Africa, have estimated the combined monetary burden of NCC-associated epilepsy and porcine cysticercosis. These studies resulted in estimates of US$12.8 million and between US$18.6 million and US$34.2 million in Cameroon and the Eastern Cape Province of South Africa, respectively. The impact of NCC on the quality of life as compared to healthy controls has only been assessed in Mexico where is was demonstrated that people with NCC-associated epilepsy have their quality of life highly affected by the disease. Estimates of the disability adjusted life years (DALYs) associated with NCC are available from Mexico and Cameroon. In Mexico, 25 (95% credible interval: 12 to 46) DALYS per 100,000 person-years can be attributed to NCC-associated epilepsy and severe chronic headaches. In Cameroon, 900 (95% CI: 280-2040) DALYs per 100,000 person-years were estimated to be attributable to NCC-associated epilepsy. This highly contrasts with the most recent estimates of the global burden of diseases, where 7 DALYs and 253 per 100,000 person-years were attributed to NCC and epilepsy, respectively.

Methodological challenges and possible solutions to better estimate the burden of cysticercosis in endemic countries will be discussed in this webinar.