Hepatitis E virus: potential zoonosis in swine production?

Wilhelm, B.¹, Trottier, G.², Greig, J.¹; Waddell, L.¹,³, Rajić A.¹,³

¹ Laboratory for Foodborne Zoonoses, Public Health Agency of Canada, Guelph, Ont.
² Canadian Food Inspection Agency, Ottawa, Ont.
³ Dept of Population Medicine, Ontario Veterinary College, University of Guelph, Guelph, Ont.

Hepatitis E occurs in man both endemically and in outbreaks, primarily in tropical countries where it is frequently a waterborne disease transmitted by the fecal-oral route. Recently, hepatitis E virus, the causative agent of hepatitis E, has increasingly been detected in more temperate industrialized countries, both in individuals with no history of travel to the tropics, as well as in swine and other animal species.

A systematic review was undertaken to investigate the following question:

What is the evidence for potential zoonotic transmission of hepatitis E virus from food producing animals to humans?

Supplementary research questions were posed:

1. What is the prevalence of hepatitis E virus in swine/pork, and in humans having contact with swine/pork?
2. What is the evidence for hepatitis E virus transmission between species?
3. What is the evidence from human case reports/outbreaks, identifying food as a source of infection?

A broad and replicable search strategy, employing search terms for both population (n=21) and exposure (n=2), was conducted in Current Contents, Commonwealth Agricultural Bureau Abstracts, Agricola, and PubMed, to identify all potentially relevant primary research. A hand-search of the reference lists of 10 topic-related literature reviews was conducted to verify the search strategy.

Over 1600 citations were screened for relevance. Relevant studies were categorized by investigation themes/population/continent, and evaluated for methodological soundness of study design and reporting, by two independent reviewers, using tools developed a priori. Of 206 relevant studies, 120 investigated seroprevalence or detection of hepatitis E virus. Swine were sampled in 74 studies, conducted largely in Asia (36), Europe (17), and North America (8). Human subjects were sampled in 40 studies conducted in locations including Asia (24), Europe (12), and North America (4). In 75 studies, genetic characterization and relatedness of viral isolates from multiple host species was investigated. Intra- and inter-species transmission was investigated in 32 laboratory-based studies. Twenty-seven case reports explored possible food-related sources of human exposure, including swine/pork.

A summary of evidence of reported prevalence of hepatitis E virus in swine and humans, risk factors for infection, and potential for zoonotic transmission will be presented, as well as identification of knowledge gaps, and suggestions for future research to aid in risk assessment.