

## PUBLIC HEALTHWORKER SAFETY

**Title:** *E. coli* O157:H7 prevalence and characterization from NAHMS 2006 swine fecal samples, NPB #06-170

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**Date submitted:** December 4, 2007

### Abstract:

*E. coli* O157:H7 has been recognized as a foodborne pathogen since 1982. It is estimated that there are more than 73,000 symptomatic infections annually in the U.S. from food exposure, resulting in more than 1,800 hospitalizations and 61 deaths (Mead *et al.*, 1999). There is particular concern for children under the age of five where a disproportional incidence rate occurs and as many as 3000 cases of hemolytic uremic syndrome may occur annually.

Epidemiology studies suggest that ground beef is the primary foodborne source of human exposure to *E. coli* O157:H7. Early studies in Germany (Gallien *et al.*, 1994), Australia (Sidjabat-Tambunan and Bensink, 1997), and Canada (DesRosier *et al.*, 2001) did not find any *E. coli* O157:H7 in swine. These studies were corroborated in the 1996 U.S. swine NAHMS study (Bush, 1997) where no *E. coli* O157:H7 was seen in 4,229 samples from 152 herds in 6 states. However, others have reported low levels of *E. coli* O157:H7 in Japan (Nakazawa and Akiba, 1999), Norway (Johnsen *et al.*, 1999), Chile (Rios *et al.*, 1999). Improvements in sensitivity of methods to recover *E. coli* O157:H7 including inclusion of immuno-magnetic beads to concentrate these pathogens and rainbow agar to better distinguish colonies have been widely recognized and led to a revision of the USDA, FSIS microbiological laboratory guidebook in 2002 (Weagant *et al.*, 1995, Taormina *et al.*, 1998). These changes led to a substantial increase in recovery of *E. coli* O157:H7 from ground beef and other products.

After using more sensitive methods for recovery, Feder and co-workers (2003) found *E. coli* O157:H7 in about 2% of 305 colon fecal samples in the U.S. All isolates recovered in this study were sensitive to the antimicrobial agents tested with the exception to one isolate that was resistant to streptomycin. In this study, there were no difference in ribotype patterns of the isolates, but there were four distinct PFGE patterns. The objective of the current study was to determine the prevalence, antimicrobial characterization, and genetic profile of *E. coli* O157:H7 from U.S. swine.

*Clostridium difficile* is a spore-forming bacterium that has been associated with severe colitis. Historically thought of as a hospital acquired enteric disease primarily in patients with severe underlying medical problems, recently published information suggest that *Clostridium difficile* may be associated with foods of animal origin (Rodriguez-Palacios *et al.*, 2007). The epidemiology of *C. difficile*-associated diarrhea (CDAD) appears to have changed with increased illness and relapse rates (Pepi *et al.*, 2005, Pituch *et al.*, 2006) associated with the emergence of one toxigenic strain, classified according to PCR as ribotype 027/toxinotype III and pulsed-field gel electrophoresis (PFGE) as NAP1 (Warny, *et al.*, 2005) *C. difficile* which are

*These research results were submitted in fulfillment of checkoff funded research projects. This report is published directly as submitted by the project's principal investigator. This report has not been peer reviewed*

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indistinguishable from human isolates have also been associated with enteric diseases in animals including pigs (Arroyo, *et al.*, 2005). The potential for these non-hospital or community acquired strains of *C. difficile* to be associated with human illnesses have increased the need to better assess the prevalence and genetic types of *C. difficile* from agricultural animals including pigs.