

PUBLIC HEALTHWORKER SAFETY

Title: Epidemiological survey to determine the prevalence of *Clostridium difficile* in swine in an integrated swine operation” NPB #06-156

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Abstract

The objectives of this study were to compare the prevalence of *Clostridium difficile* (Cd) among different age and production groups of swine in a vertically integrated swine operation in Texas in 2006 and to compare our isolates to other animal and human isolates. Results are based on 131 Cd isolates from 1008 swine fecal samples and pork trim samples (overall prevalence of 13%). The prevalence (number positive/number tested in production type) of Cd was different between the groups ($P \leq 0.001$), and was highest among farrowing barn inhabitants (predominantly piglets, but also included lactating sows and effluent) at 36.5% (95/260), followed by 8.2% (10/122) for nursery, 6.5% (4/62) for pork products, 3.9% (15/382) for grower-finisher, and 3.8% (7/182) for breeding boars and sows. Of the 131 isolates, 122 were positive by PCR for both toxins A (*tcdA*) and B (*tcdB*) genes, 129 isolates harbored a 39 base pair deletion in the *tcdC* gene, 120 isolates were toxinotype V, and all 131 of the isolates were positive for the *cdtB* binary toxin. All isolates were resistant to cefoxitin, ciprofloxacin, and imipenem, whereas all were sensitive to metronidazole, piperacillin/tazobactam, amoxicillin/clavulanic acid, and vancomycin. The majority of isolates were resistant to clindamycin; resistant or intermediate to ampicillin; and sensitive to tetracycline and chloramphenicol. There was an increased

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($P \leq 0.001$) number of isolates for the timeframe of September to February compared to March to August. Cd most commonly originated among farrowing barn production types (primarily piglets) and not in grower/finisher production.

Since 2003, the incidence and severity of disease associated with toxigenic *Clostridium difficile* (Cd) have increased in hospitals in North America [1,2]. Indications are that this increase may be due to emergence of a new strain, (North American pulsed field gel electrophoresis 1, [BI/NAP1]) of toxigenic Cd that has increased resistance, virulence, or both. Health care officials are concerned because the emergent strain can be community-acquired as well as hospital-acquired [2]. The origins of this epidemic strain have yet to be determined. Animals can be colonized and/or infected with various strains of Cd including the above-mentioned NAP1 [3]. However, the strains predominantly isolated from food animals belong to pulsed field group NAP7 [3]. Researchers have isolated Cd from food animals and from retail beef, turkey, and pork, and some speculate that Cd could be transmitted to humans through food sources [3-5]. No epidemiologic information is available on the prevalence and the genetic make-up of toxigenic Cd from healthy swine in commercial operations.