

## **Association between antimicrobial resistance, subtypes, and virulence in *Salmonella* from humans and swine**

**Presenter:** Derek Coombs, RIT International, and North Carolina State Veterinary College

**Session:** Oral

**Date/Time:** Monday, April 23; 4-5PM

The high frequency of multi-drug resistance (MDR) in *Salmonella* is well established. The public health threat that *Salmonella* represents may be amplified by environmental and occupational exposure, particularly in high livestock areas. This may be the case in North Carolina, where 10 million heads of swine are marketed per year. To examine this, we obtained clinical isolates from humans from the State Laboratory of Public Health (N=1038). These isolates were comprised of serotypes Typhimurium, Newport, Heidelberg, and Muenchen. Swine isolates (N=1873) were also included. Phenotypic and genotypic characterization of the human and swine isolates were compared. We found that the frequency of antimicrobial resistance, particularly to tetracycline and ampicillin, was higher among isolates from swine (84 & 41)% than humans (17 & 16)% [p<0.05]. Conversely, a wider spectrum of MDR was observed in the human isolates including resistance to ceftriaxone (n=22) and ciprofloxacin (n=1). Based on PCR analysis of virulence genes (*spvA*), there was no evidence that the predominant *Salmonella* shed by asymptomatic pigs were phenotypically and/or genotypically linked to strains that caused illness. However, clinical isolates from swine were genotypically similar to the human isolates. The genotypic similarity of the disease causing *Salmonella* in swine and humans is an important finding. We found that only specific strains causing clinical illness in swine have the ability to make humans ill. This was supported by the PFGE and occurrence of similar virulence gene markers. However, the strains prevalent in asymptomatic pigs were not found in clinical cases from swine and humans.

### **Biography:**

Derek H. Coombs is an Epidemiologist at RTI International with an interest in infectious disease epidemiology, analytical epidemiology, and biostatistics. He has experience in epidemiological methods, from study design and management to data collection, processing, and analysis. Derek has experience in food-safety studies and (veterinary) clinical trials. He also has substantive coordinating center experience with large-scale, randomized, controlled intervention studies and large-scale clinical trials. This experience stems from his work at the Collaborative Studies Coordinating Center (CSCC), which is part of the Biostatistics Department of the University of North Carolina at Chapel Hill. Derek spent three years at the CSCC as a Statistician involved in all facets of the study life including Data and Safety Monitoring Board (DSMB) and Institutional Review Board (IRB) reports. Derek is currently pursuing his doctorate in Comparative Biomedical Sciences at North Carolina State University, majoring in Population Medicine with minors in Statistics and Biotechnology. Before joining the CSCC, Derek was a research analyst for the American Cancer Society and took part in international tobacco research as well as obesity and sun exposure projects.

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