RESEARCH ABSTRACT

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PORK SAFETY

Title: A Survey of Patterns and Persistence of Antimicrobial Resistance on Swine Farms Using Three Different Antimicrobial Use Strategies **NPB# 98-236**

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Abstract

This study characterizes antimicrobial resistance patterns on three farms with varying antimicrobial use strategies. Farm A uses antimicrobics extensively in the feed and as needed for individual animal therapy. Farm B uses antimicrobics in the feed on a limited basis and as needed for individual animal therapy. Farm C has not used any antimicrobics in the past 28 years. Salmonella, campylobacter, and E. coli isolates are characterized.

Salmonella and campylobacter prevalence between farms are not consistent. The highest Salmonella prevalence is on Farm A and the lowest Salmonella prevalence occurs on Farm C. There are no common serotypes on any of the farms suggesting that there is geographic grouping of isolates which may be influenced by production type, facilities, presence of other livestock in the area, and other factors. The prevalence of Campylobacter was high on all farms. Of the Campylobacter isolated, all were Campylobacter coli as determined by PCR.

Characterization of azithromycin, clindamycin, erythromycin, and tetracycline resistance patterns in campylobacter suggests an association with stage of production. The same pattern occurs with and flofenicol in salmonella. Sows, both gestating and lactating (farrowing), have the least detectable resistance. Suckling, finisher, and nursery pigs, respectively demonstrate higher levels of resistance. This finding is consistent across farms and suggests an age or stage of production associated effect on phenotypic resistance.

Significant antimicrobial resistance variation exists between farms. Farm C tended to have less resistance overall than did Farms A and B. However, resistance testing results on Farm C Campylobacter, Salmonella and E. coli isolates suggest that antimicrobial resistance can persist on farms for long periods of time after discontinuation of antimicrobial use. It is likely that factors other than antimicrobial use influence persistence of resistance.

For pork producers considering restricted use of antimicrobics to improve pork safety, results of this study suggest that resistance will decrease with withdrawal. However, resistance is likely to persist. Further, the degree of resistance reduction is inherently linked to the type of bacteria surveyed, the antimicrobics for which resistance is monitored, and the age of the animals surveyed. Antimicrobial use is an apparent contributor to resistance outcomes, however, factors other than antimicrobial use affect antimicrobial resistance outcomes.