RESEARCH ABSTRACT

PUBLIC HEALTH/WORKER SAFETY

Title: Phenotypic and Genotypic Characterization of Methicillin Susceptible *Staphylococcus aureus* (MSSA) in Pigs and Farm Workers - **NPB #:11-071** revised

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Date Submitted: June 26, 2012

Scientific Abstract:

The present study was conducted to characterize methicillin susceptible *Staphylococcus aureus* (MSSA) isolates recovered from pigs and farm workers using phenotypic (antimicrobial susceptibility testing) and genotypic (PFGE and *spa* typing) approaches to determine the antimicrobial resistance profiles and genotypic relatedness of the isolates and clonal lineages. In addition, the phenotypic and genotypic traits of the MSSA with the simultaneously circulating MRSA clones in swine herds and farm workers were compared. The MSSA isolates were recovered from a set of swine conventional and antimicrobial-free farms from all study sites (Iowa, Illinois, Minnesota, North Carolina and Ohio) during a previous study (NPB Project #08-179). The antimicrobial susceptibilities of the isolates were determined by the broth microdilution method using the Sensititre™ and the relatedness of isolates using the pulsed-field gel electrophoresis (PFGE) and staphylococcal protein A (*spa*) typing methods. The MSSA isolates recovered from pigs and farm workers exhibited various resistance patterns ranging from one to eight antimicrobials. The isolates were resistant to penicillin (93%), ampicillin (87.7 %), tetracycline (82.5%), erythromycin (11.8%), gentamicin (5.7%), synercid (4.5%) and oxacillin (4.4%). Resistance <4% was detected to ceftriaxone, gatifloxacin, levofloxacin, linezolid and rifampin. About 93% of the isolates exhibited multidrug resistance (resistance to three or more antimicrobials) patterns. All MSSA isolates tested were susceptible to the antimicrobial effects of ciprofloxacin, clindamycin, daptomycin, streptomycin, sulphamethoxazole and vancomycin. The predominant *spa* types identified among the tested MSSA isolated included t0337 (36.6%), t539 (29%), t02 (10.6%) and t036 (4.8%). Some of the *spa* types including t02, t021, t034, t036 and t337 detected among the MSSA isolates in our study have been previously reported in methicillin resistant *Staphylococcus aureaus* (MRSA) elsewhere. Results of the present study show that MSSA isolates showing similar multidrug resistance patterns and *spa* types to MRSA were detected among pigs and farm workers in the study sites suggesting the need for further detailed studies on the significance and association with MRSA in commercial swine production units.

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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