

SWINE HEALTH

Title: Impact of Influenza vaccination of growing pigs on bioaerosol generation. Identification - NPB # 11-038.

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Scientific Abstract:

The 2009 influenza pandemic and the recent H3N2v events have highlighted the constant threat that influenza A viruses (IAV) represent for people and animals. In this study we evaluated the effect of IAV vaccination in aerosol shedding in pigs. Thirty-six, three-week old weaned pigs were obtained from an IAV negative herd and were randomly allocated to one of 4 groups: a) In group 1 (VAC-HOM), pigs were vaccinated with a homologous vaccine to the challenge virus A/Sw/IA/00239/04 H1N1 strain; b) In group 2 (VAC-HET MULT) pigs were vaccinated with a commercial multivalent heterologous vaccine, c) In group 3 (VAC-HET MONO) pigs were vaccinated with a commercial monovalent heterologous vaccine, and d) Pigs in group 4 (NON-VAC) were left unvaccinated to serve as the control group. Pigs were vaccinated and revaccinated two wks later by intramuscular injection and challenged after that. Pigs in NON-VAC group were left unvaccinated but were sham injected with 2ml of saline solution and followed the same protocol as the vaccinated groups. All pigs were inoculated intratracheally and intranasally with the challenge virus A/Sw/IA/00239/04 H1N1. Environmental temperature and relative humidity readings were taken throughout the study. Nasal swabs, oral fluids and air samples were collected daily for a total of 9 days. All samples were tested by RT-PCR and positive air samples were cultured by virus isolation and results compared between groups. Average temperature and relative humidity throughout the study was 27C (80F) and 53%, respectively. Vaccinated groups had lower levels of virus shedding in nasal secretions compared to non-vaccinated pigs and IAV was not detected in the air of any of the vaccinated groups. In contrast, positive air samples were detected in the NON-VAC group at 1, 2 and 3 days post infection. Overall level of influenza detection in air samples was low most likely due to the elevated environmental temperature. Nevertheless IAV could be detected in aerosols even in conditions of elevated ambient temperature and moderate relative humidity. In conclusion, IAV was detected in air samples from non-vaccinated pigs, and not in vaccinated animals, suggesting that vaccine may have an effect not only in decreasing the levels of nasal shedding but also in decreasing the risk of aerosol transmission by reducing the amount of virus shed in the air. This study offers a new perspective to the use of vaccination to potentially decrease the risk of IAV virus interspecies transmission and IAV regional dissemination.

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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