

**Title:** Epidemiological surveillance of influenza A viruses in pigs entering swine exhibitions -  
**NPB # 14-059**

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### **Scientific Abstract:**

Swine play a key role in the evolution and ecology of influenza A virus (IAV) infecting humans as pigs are a host species in which reassortment of the IAV segmented genome commonly occurs. Exhibition swine provide a critical human-swine interface allowing for the bidirectional zoonotic transmission of IAV. During agricultural fairs, these exhibition swine come into contact with not only their handlers/owners but also large numbers of other swine and the general public. These swine that are shedding IAV serve as the pathogen source, leading to infections in other pigs and people during the course of the fairs. Previous IAV surveillance in these unique settings occurred at the end of the fairs, after IAV had the opportunity to spread through the exhibition swine population. Little was known about the prevalence of IAV among pigs when they first arrive at exhibitions. To estimate the geographical location of exhibition swine in the Midwestern United States, the number of exhibition swine per county was compiled during 2013 and a heatmap was generated for the six participating states, showing a concentration of exhibition swine in Indiana and Ohio. In 2014, snout wipes were used to sample pigs during the first day of nine agricultural exhibitions in Indiana and Ohio. Samples were screened for IAV using real-time reverse transcription polymerase chain reaction (rRT-PCR) and virus isolation was attempted on positive samples. The sampling detected an IAV prevalence of 1.5% (52/3,547) among swine arriving at exhibitions. In addition, a survey was administered to the families of exhibitors to determine the on-farm management history of the exhibition swine. From the nine exhibitions, a total of 480 surveys were collected and correlated to 614 swine. Results of the survey revealed that exhibition swine frequently move between multiple exhibitions, which creates a pathway for widespread pathogen dissemination. Movement of swine through chutes during entry to fairs was identified as a possible transmission point for pathogens between entering swine. Participants that hosted and open house or sale had 3.933 times the odds of having an IAV positive pig compared to the odds of participants that did not host an open house or sale. Overall, this research yields a better understanding of the epidemiology of IAV in exhibition swine and allows for improved prevention of IAV transmission between swine and humans at agricultural fairs. This study illustrates that a small number of pigs arrive at the fair shedding IAV, identifies a possible transmission point for IAV, and expands upon the limited knowledge that is known about exhibition swine management.

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