

PUBLIC HEALTHWORKER SAFETY

Title: Evaluation of influenza dynamics in exhibition swine at jackpot shows
- **NPB #17-101**

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Scientific Abstract:

Pigs play a critical role in the ecology and epidemiology of influenza A viruses (IAVs) by serving as a source of novel reassortant viruses infecting humans. Agricultural fairs and livestock exhibitions create an environment conducive to zoonotic IAV transmission by commingling pigs and people for a prolonged period of time, resulting in a dramatic increase in the number of documented variant influenza A cases in people during 2011-2017. The epidemiological investigations into the 306 reported human cases of variant H3N2 influenza A (H3N2v) that occurred in 2012 linked the majority of them to human-swine exposure occurring at fairs. Research conducted by this study team provided molecular confirmation of zoonotic H3N2v transmission at county fairs in addition to evidence that IAV infections are common among apparently healthy swine at agricultural fairs.

H3N2v outbreaks in 2011-2017 show that swine infected with IAV at fairs and livestock exhibitions are a public health threat. Reducing zoonotic transmission of IAV between pigs and people is crucial to both agriculture and public health. Swine industry leaders and public health officials are seeking strategies to reduce intra- and inter-species transmission of IAV at swine exhibitions. The ultimate objective of this project was to provide new knowledge and insight into the dynamics of IAVs circulating in exhibition swine that can be used to make evidence based recommendations to prevent cases, outbreaks, epidemics, and/or pandemics caused by swine-to-human transmission of IAV occurring at agricultural fairs and livestock exhibitions.

In order to estimate the prevalence of IAV among swine at jackpot shows, nasal wipes were collected from 53-600 pigs per show at 22 selected jackpot shows, resulting in 3,665 samples. Overall, 5% of samples tested from swine at jackpot shows were positive for viable influenza A virus. In comparison, 9.5% of exhibition swine tested during the 2017 agricultural fair season were shedding active influenza A virus. The reduced prevalence of IAV in pigs within the jackpot circuit as compared to agricultural fairs could be due to the

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shortened period of time in which the pigs are co-mingled. A majority of jackpot shows are one to two days, with many pigs being housed within trailers rather than exhibition barns to minimize contact with other animals and their infectious diseases. A decrease in IAV prevalence due to the shortened show duration could be extrapolated as the effects of implementing a 72 hour rule at agricultural fairs, as is recommended in the “Measures to Minimize Influenza at Swine Exhibitions” document.

In an effort to mitigate risk associated with exposure to IAV in swine through these events, the recommendation document “Measures to Minimize Influenza Transmission at Swine Exhibitions” was developed to be used by show organizers, volunteers, and exhibitors. These recommendations are updated and released each year; however, it is not clear if youth swine exhibitors are aware of the recommendations; support the recommendations; and would be willing to practice recommended behaviors. Therefore, a cross-sectional survey method was used to understand swine exhibitor perceptions and their adoption of swine production practices aimed at reducing the transmission of IAV at the human-animal interface. The instrument created consisted of 11 recommendations put forth in the “Measures...” document. Each statement was followed by three to six statements regarding the participant’s perception of the recommendation, their opinion of their ability to implement the recommendation, and their current behavior related to the recommendation. In addition, the survey asked participants their state of residence and the number of shows they would attend in 2017. In all, 155 participants who showed swine on a regular basis (\bar{x} =11 shows per year), from at least 18 states within the US, completed the survey. At least 67% of participants believed each statement was a good recommendation, with 6 of 11 recommendations being supported by >90% of participants. When asked if recommendations could be implemented, 65-94% of respondents agreed, and 21-89% of participants had already implemented each recommendation, respectively. Although significant efforts have been made to increase signage at swine exhibitions warning of risks associated with eating/drinking in animal areas, a majority of respondents report eating/drinking in the barn and are unwilling to change their behaviors. This study provides evidence that developing and disseminating static recommendations to reduce zoonotic disease transmission is not enough to change human behavior and interactive methods must be deployed to preventive future variant IAV infections associated with swine exhibitions.