Maryland reflects on lessons learned from swine influenza outbreak at county fairs (from the Frederick Newspaaper)

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In the green and white barn at the rear of the Frederick Fairgrounds, close to 300 breeding and market pigs were housed together for a week. It was unseasonably warm for September, with temperatures 10 degrees above normal, but as the sun went down on the final Saturday of The Great Frederick Fair, a different temperature caught the Fair Board's attention.

A pig with a 106-degree fever was found in the swine barn, which is about four degrees above normal for a healthy pig.

Just six days earlier, influenza A virus had been detected in pigs at the Charles County Fair, and state Secretary of Agriculture Joe Bartenfelder signed an emergency order pre-emptively shutting down swine exhibits at St. Mary's and Calvert County fairs. Now, a pig showing clinical signs of the virus was in Frederick, and by the end of the day, one animal was dead.

Nearly five months later, state officials and the Fair Board are still learning what happened and how it can be prevented in the future.

One change to be implemented in 2018 is a reduction in the length of time pigs are on the fairgrounds, according to Karen Crum Nicklas, executive assistant of The Great Frederick Fair.

"The 4-H/FFA and Open Class Swine schedules are undergoing some revisions in order to ensure pigs are on the property for the least amount of time necessary," Nicklas said in an email on Feb. 9.

The fair board collaborated with the Maryland Department of Agriculture on a schedule that would limit pigs' stays to 72 hours. But even with this new preventive timeline, it is not expected to be the last time swine influenza appears at the Frederick fair.

"You have to pretty much assume pigs are going to show up at the fair infected with flu," said Andrew Bowman, who runs the Animal Influenza Ecology and Epidemiology Research Program at Ohio State University.

Bowman has researched swine flu since 2007. He found that 1.5 percent of swine entering agriculture fairs in the Midwest are infected with influenza, and after 72 hours, between 60 and 90 percent of pigs at the fair will test positive.

Commingling of the animals allows the few sick pigs to spread the virus until it amplifies to all

the swine at the show, he said. Within 24 hours, new infections can be detected, and within a couple of days there is a "cloud of virus" — which is when the risk of human infection goes up.

Catching the swine flu

In total, 40 people were sickened at Maryland agricultural fairs in 2017 by a variant strain of influenza known as H3N2v, and 60 percent of the cases affected children under the age of 5.

"It's important to know children are at risk for variant influenza in these settings, and that, historically, has been the case," said Monique Duwell, an epidemic intelligence service officer with the Centers for Disease Control and Prevention.

Duwell had just started a two-year fellowship with the CDC at the Maryland Department of Health when the swine influenza outbreaks struck. Since then, she has worked with a team of state officials to put the outbreak in context.

Her analyses found that 75 percent of the people with confirmed cases of H3N2v were already in a "high-risk group" for flu complications — namely children under age 5, adults over 65 or those with chronic illnesses.

What was surprising, however, was that more than one-third of the people to contract swine flu at the Charles, Frederick and Anne Arundel fairs had no direct contact with the pigs.

Back in 2012, when swine flu appeared at one county fair in Maryland, exhibitors in direct contact with the livestock were the ones who got sick, said State Veterinarian Michael Radebaugh. In 2017, it was the opposite, with almost three-fourths of confirmed illness reported by fair visitors.

"This was definitely a learning experience," Radebaugh said.

During next summer's fair season, the Maryland Department of Agriculture, Department of Health and CDC will work together to get better signage for fairgrounds across the state. On top of hand-washing and "no food" signs outside the barns, new notices will discourage families from taking sippy-cups, pacifiers and strollers into the barns.

Influenza is a respiratory illness, so pigs cough into the air and droplets carrying the virus often land on animal and human skin or on surfaces that can then be touched, Duwell said.

An 18-month-old from Mount Airy became so ill after being taken through the swine barn in his stroller that he required medical attention at Children's National Medical Center for over a week.

The toddler recovered, but the case renewed the The Great Frederick Fair's commitment to keeping strollers out of its barns.

"The fair will continue to provide handwashing stations around all the animal exhibits, as well as signage. And keep designating stroller parking areas outside the barns with signs

discouraging strollers inside the barns," Nicklas said by email.

Room to breathe

What didn't come out of the barns, however, was just as important.

A perfect storm hit Frederick County during the week of the fair, when unseasonably warm weather and the virus arrived in the poorly ventilated barns.

Radebaugh speculated early in the outbreak that the warm weather had made the situation worse. The few sick pigs overheated and began to shed the virus rapidly — spreading it throughout the swine exhibits.

Bowman's research has shown that poor ventilation contributes to the spread of influenza during fairs. The Frederick County Fair Board is collecting bids to add ridge vents and a tunnel system to the center of the swine barn to improve ventilation, Nicklas emailed.

Bowman recommended separately that a seven-day hold be placed on all animals between shows. That way, exhibitors can watch for signs of infection and keep pigs away from fairs when they are are symptomatic. While sick pigs can pass the infection to other pigs on their farm, keeping them away from fairs would protect the public.

Additionally, the Maryland Department of Agriculture is recommending pre-event meetings and that all fairs broaden their internal emergency animal disease plans to encompass influenza outbreaks, Radebaugh said. Because even the best prepared groups can miss the symptoms of sick animals.

An outbreak of H3N2v in Ohio earlier in the fair season put Radebaugh's office on alert, but a few weeks later, nearly the same strain appeared in Maryland.

"We don't actually track pig IDs, but if we look at the signatures of [the] viruses — they're very similar. It would indicate there's some link," Bowman said.

Animal Health inspectors were looking for signs of swine influenza as animals were checked into The Great Frederick Fair, but it wasn't until a week into the fair when the first fever was recorded.

"The predictable thing about flu is it's unpredictable," Bowman said.