



Addressing Influenza a Shot in the Arm for Industry

By Geoff Geddes, for Swine Innovation Porc

If you think caring for a sick child is a challenge, try dealing with a feverish, fully grown hog. In any battle, understanding the enemy is the first step to success, so as the influenza virus continues to have a major impact on Canadian swine production, researchers analyzed the diversity and circulation of influenza A viruses in pig populations.

“A couple of things converged to prompt this study (*Dynamics of influenza infection in swine populations*),” said Dr. Zvonimir Poljak, Veterinary Epidemiologist at the University of Guelph.

“First, there has been a growing focus in the veterinary community on handling infection in different parts of the swine barn. Also, we had a number of ongoing projects in this area looking at both the big picture and specific production systems.”

Big picture thinking

To grasp the larger picture, Dr. Poljak said you must first understand what’s happening in these individual systems. That can help bridge the gap between results in experimental settings and in the field where not everything is controlled.

“The other motivator was a desire to examine particular infections through different lenses including observational, virological and through simulation modelling.”

Researchers thus conducted a comprehensive



Understanding the diversity and circulation of the influenza virus is key to learning how to control it. Source: Stock photo.

genomic analysis of 16 influenza A virus samples from different clinical outbreaks within swine herds in Alberta, Manitoba, Ontario and Saskatchewan. In addition, by intensively following individual animals over a period of time, they could track how often animals were infected and with which viruses while observing the results when producers implement large-scale treatment strategies.

“We found that once one virus was cornered, another one that was circulating at a low prevalence would often emerge to start a new epidemic.”

The sickening truth about viruses

What really stood out for Dr. Poljak and his colleagues was the great diversity of viruses that exist in Canada, and the fact that infection with one virus does not guarantee protection from others in the same sub-lineage. As well, even in production systems that appeared to be rela-

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tively closed (low replacement rates, smaller herd sizes), it wasn't unusual to find nursery pigs with multiple positives for the same virus.

“When we filtered the data we collected through mathematical models, we found that even with very good vaccination programs, you won't completely eliminate influenza viruses from your farm but rather change the timing of major outbreaks.”

The new normal

The take-home message for researchers was that we're living in a world where the influenza situation has changed dramatically in the last 10 years. Pools of genes are now circulating in swine populations and combining in unexpected ways.

“Our conclusion is that the successful infection control stage for influenza depends greatly on what's happening in the sow herd, but every farm will be different. The best way to start dealing with disease is discussing it with your veterinarian and understanding the pool of genes that circulate in your production system.”

Part of this research also focused on processing and summarizing the laboratory swine influenza information in a user-friendly report for producers, swine veterinarians and regulatory experts.

Though more work must be done to analyze the impact of influenza virus on production and health, this study was an eye-opener in revealing how massive some viral outbreaks can be and how long viruses will circulate in certain nursery barns. And like any progress, this was clearly a team effort.

“I would like to acknowledge the late Dr Helena Grgić, who worked as a research associate at the University of Guelph. Helena's expertise in classical and molecular virology and next generation sequencing, her enthusiasm and leadership were the driving force for the success of this project.”

Clearly, the challenge posed by the influenza virus is an area that demands further study as researchers combat what Dr. Poljak calls “one of the top three viral pathogens of importance to the North American swine industry”. Letting influenza get the upper hand in the long term would be like a 200 kg sow with the sniffles: not a pleasant sight.

Learn more...

You may find additional resources related to the project *Dynamics of influenza infection in swine populations* by consulting our website:

www.swineinnovationporc.ca/research-animal-health

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