

# BREAKOUT SESSION 1: Swine Health

By Geoff Geddes

## Part one - Preparedness for a foreign animal disease: Is the swine industry ready?

If you thought putting your foot in your mouth was awkward, try dealing with Foot-and-Mouth disease (FMD). As part of his work, Dr. Chris Byra of Byra Consulting has encountered the latter (and maybe the former). In the process, Dr. Byra has seen first-hand the need to prevent a foreign animal disease (FAD) from affecting the swine industry and, in case we can't, the importance of preparation for dealing with it if it does arrive.







The 2001 FMD epidemic in the U.K. cost industry between \$5-8 billion, and the damage stemming from a similar outbreak in Canada is pegged at up to \$58 billion. With Canada exporting 70 per cent of our swine production, we are especially vulnerable to an FAD. Since FMD represents a worst-case scenario in that regard, Byra used it as a basis for this discussion.

### Components of FAD Preparedness

**1. Prevention:** Whether it's a head cold or a deadly pig disease, the best way to deal with an unwanted illness is by preventing it in the first place. To that end, Byra recommended the following for the pork industry:

- Encourage government to increase border control measures regarding illegal importation of meat/products to a level applied to illegal drugs, guns, money or other trafficking, especially from high-risk areas.
- Ensure that the risk of bioterrorism is being addressed (sage advice for protecting human health as well!).
- Continue to ensure compliance with established biosecurity measures. In particular, visits to high-risk sources such as assembly yards and auctions where commercial agriculture and non-commercial farmers mix should be minimized and followed by appropriate sanitation measures. As with PED, fomites such as vehicles and equipment are the primary carriers of FMD.
- Identify and manage the risks by monitoring potential international sources of FADs and controlling the risk from animals, feed and other product sources.

**2. Early Detection:** If you can't prevent disease, at least detect it as soon as possible to limit the

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damage. It sounds simple enough, but reducing the time between finding infection on farm and reporting it to the Canadian Food Inspection Agency (CFIA) requires a number of elements:

- Diagnostic capability and capacity to quickly diagnose suspect cases; Canada has this.
- Further training of producers to recognize abnormal symptoms that may be caused by a FAD. Fact sheets regarding Seneca Valley Virus are a recent example of success in this area.
- Further training of meat inspectors to recognize the signs of FADs.
- More familiarity among veterinarians with the clinical picture of known FADs.
- Industry understanding of the need for immediate reporting of suspicious clinical disease signs.
- Continued support and improvement of regional/national swine health surveillance networks.
- Ongoing communication with national government disease surveillance programs.

**3. Response to a Positive FAD Case:** So in spite of your best efforts, FAD has been detected on farm; now what? Now is the time to address that, because if you wait until disease is at your door, the window of opportunity to nip it in the bud has come and gone. Here are some critical areas to focus on in mounting a response:

### Movement Control

Movement of animals made recent FMD outbreaks bigger and badder. The UK outbreak would have been half the size with the imposition of movement controls two days earlier. The lesson for Canada is clear: Since the minister of agriculture de-

clines the size of the movement control zone based on tracing of the potential spread, industry should implement voluntary movement control until the control zone is established, thereby reducing the size of the outbreak and time to recovery.

### Livestock Market Interruption Strategy (LMIS)

This is a national strategy to enhance industry and governments' preparedness to deal with the fallout from an FAD and the impact of key decisions during market interruptions. It focuses primarily on impacts to healthy animals from border closures.

In the swine industry, the depopulation of isowean pigs that are normally exported would have to be implemented almost immediately. There must be effective coordination and cooperation of all parties in determining which animals enter the domestic market and which are surplus and thus, candidates for depopulation. This will involve some tough decisions for all concerned parties:

1. Producers: How much to produce and what to do with surplus animals for which there may be no market.
2. Processors: How much product the Canadian market can absorb; where and how best to source the products; how to continue competing with imported products and how to deal with the surplus product returning to Canada.
3. Governments: Whether intervention is required and, if so, where, when and how to initiate intervention measures to facilitate industry response to the change in markets.

Through it all, parties must find ways to effectively coordinate consistent messaging within and between stakeholder groups, as well as with the general public. LMIS can help prepare key stakeholders to act and provide them with key tools, information and approaches to guide decision-making and actions, as well as the development of individual stakeholder plans, during an actual response.

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### Emergency Response Plans

Industry and governments must have developed emergency response plans, roles and governance for an outbreak.

4. Recovery to Resume Trade: Once the danger has passed, we will need to support government efforts to develop policy changes that would shorten the recovery period. These include allowing containment zones within a country, using emergency vaccinations and allowing vaccination by producers, and improving stockpiles of vaccine through sharing agreements.

Reducing the number of pigs that need to be depopulated is also crucial in maintaining a social license to produce.

While industry and government have already initiated many of the recommendations in this article, others have yet to be widely considered. One way or another, the swine industry must do all it can to prevent an FAD from entering Canada and prepare for a worst case scenario should prevention fail. Otherwise, the next FAD could render the industry DOA.

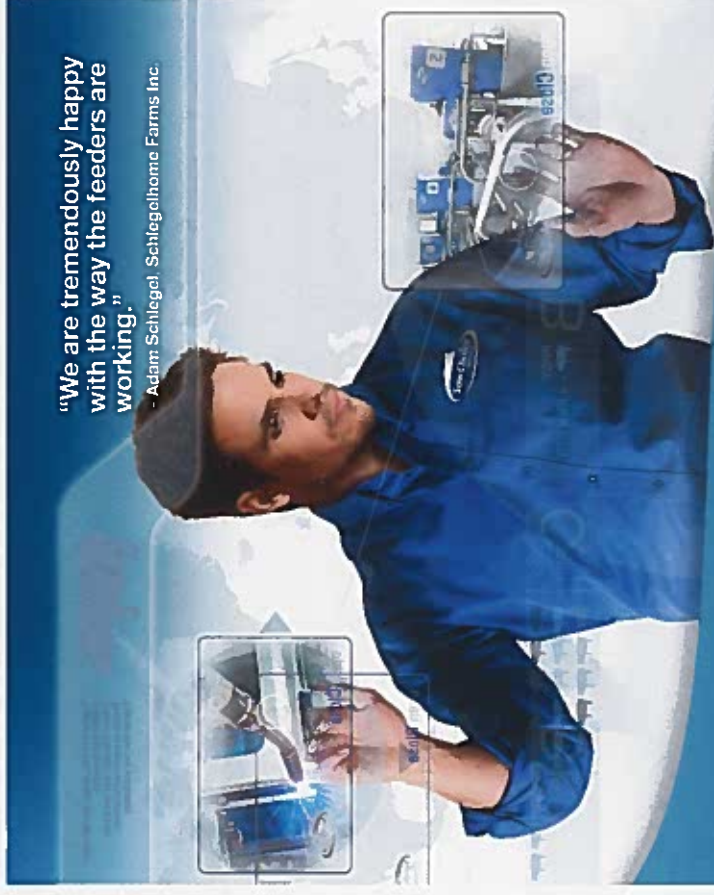
## Part two: Modeling the transboundary survival of foreign animal disease pathogens in contaminated feed ingredients

Another expert who fears the impact of FADs is Scott Dee, Director - Pipestone Applied Research with Pipestone Veterinary Services. That impact could include crippling our export markets, inducing significant animal suffering and initiating a major domestic economic crisis. Based on the widely held belief that PEDV originated in China before spreading to North America, Dee and his colleagues studied one possible source of the disease: Importation of high volume ingredients used in swine feeding from China.

This study began by developing a model to study whether PEDV harbored in imported ingredients could remain viable during a trans-Pacific shipment from Asia to the United States, especially given the time and environmental conditions involved. The model employed ingredients imported to the United States from China including organic and conventional soybeans and meal, lysine hydrochloride, D-L methionine, tryptophan, Vitamins A, D & E, choline, carriers (rice hulls, corn cobs) and feed grade tetracycline, all of which were inoculated with PEDV.

To mimic conditions on land and sea, historical temperature

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and percent relative humidity (% RH) data were programmed into an environmental chamber which stored all containers. To evaluate PEDV viability over time, ingredients were organized into 1 of 4 batches of samples, each batch representing a specific segment of transport.

At the conclusion of the simulated 37-day shipment, viable PEDV was detected in soybean meal (organic and conventional), Vitamin D, lysine hydrochloride and choline chloride. In contrast, viable PEDV was not detected in any samples treated with one of two chemical mitigants. These results demonstrated the ability of PEDV to survive in a subset of feed ingredients using a model simulating shipment from China to the U.S. This suggested to researchers that contaminated feed ingredients could serve as transboundary risk factors for PEDV and also identified effective mitigation options.

Based on the success of the model, researchers used it to evaluate the survival of FAD viruses in ingredients using viral surrogates to represent the actual pathogens. In doing so, they had two objectives:

1. To model if foreign animal diseases could survive in feed ingredients shipped from Asia to the United States.
2. To evaluate whether two chemical mitigants could reduce the risk of disease survival.

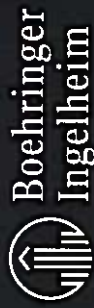
The study was based on the hypothesis that pathogen survival will be influenced by ingredient and treatment.

### Materials and Methods

Researchers identified 10 FAD viral pathogens as significant risks to the U.S. swine industry and used surrogate viruses for the study which were structurally similar to the actual pathogens. Using a model previously validated to study the risk of contaminated feed ingredients for the transboundary spread of PEDV, they selected feed ingredients known to be imported from China to the United States. These included organic & conventional soybean meal, soy oil cake, DDGS, lysine, choline, vitamin D, pork sausage casings and several pet foods (dry & moist). Ingredients were inoculated with representative surrogate viruses and some were treated with two mitigants.

### Results

Preliminary data indicate the survival of two surrogate viruses at all points during the simulated 37-day shipping period: FMDV (Seneca Virus A) and PRV (Bovine HerpesVirus-1). Under the conditions of this study, these results suggest that contaminated feed could serve as vehicles for FAD introduction to the United States, which supports the previous findings regarding PEDV. Results from follow-up phases of this study are expected soon. ■



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