

Protecting Against Porcine Epidemic Diarrhea Virus



Porcine epidemic diarrhea virus (PEDV) is an alphacoronavirus that causes severe diarrhea, vomiting, and dehydration in pigs. Other than oral hydration, no specific treatment exists and this often results in mortality, particularly in piglets.

PEDV is highly infectious and survives well in the environment, which makes it difficult to control through biosecurity and management practices. This potential for transmission also makes it a significant threat to the Canadian swine industry.

DISEASE TRANSMISSION HISTORY

PEDV was first identified in the United Kingdom in the 1970s. The disease has spread to many parts of Europe and Asia, and it recently appeared in North America, where it has killed millions of pigs.

PEDV was first reported in Canada in 2014. Manitoba has experienced outbreaks for several years and recently the virus was reported in Alberta. Because PEDV has not yet appeared in Saskatchewan, all research on this virus is conducted in our high containment facility.

INNOVATION AND PROGRESS

VIDO developed a vaccine for PEDV that has been licensed for commercial development. This vaccine is administered to sows, who pass antibodies to their offspring through milk and colostrum and ultimately protect their piglet from infection.

The vaccine was used with special regulatory permission to help contain outbreaks in Manitoba in 2016, 2017, and 2018.

The Vaccine and Infectious Disease Organization (VIDO) is a world leader in infectious disease research and vaccine development.

Collaborating with national and international partners from government, academia, and industry, we aim to improve animal health, protect Canadian herds and ensure food safety by:

- Understanding how pathogens cause disease;
- Developing novel vaccines and therapeutics;
- Improving vaccine formulations and delivery methods.

Our work has resulted in vaccines for porcine epidemic diarrhea and *Actinobacillus pleuropneumoniae*, as well as several others for cattle and poultry.

We have also developed more potent adjuvants that enhance the immune response of vaccines, and novel approaches for needle-free delivery.

OUR RESEARCH

In addition to our work on the PEDV vaccine, we are working with the swine industry and researchers from the University of Saskatchewan and the Prairie Agricultural Machinery Institute to help the industry improve their biosecurity and reduce the risk of PEDV infections. For example, we have developed better techniques for washing and baking transport trailers, and have been involved in a study on the effect of various disinfectants.

We are also testing material from manure lagoons on farms that have had PEDV outbreaks to determine if the material can cause infection. This information is critical for ensuring the safe field application of manure as fertilizer.

WHAT'S NEXT

Due to the nature of the virus, PEDV variants continue to emerge. We are now working on next-generation vaccines that will be effective for multiple PEDV strains and allow us to distinguish between animals that have been infected and those that have been vaccinated (DIVA vaccines).



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