Iowa Pork Industry Center

May 17, 2013

Useful facts about the epidemiology and control of Porcine Epidemic Diarrhea Virus (PEDV)

- The presence of PEDV was confirmed in the U.S. on May 17, 2013.
- PEDV is a coronavirus that is related to transmissible gastroenteritis virus (TGEV) and causes enteric disease clinically indistinguishable from TGE. Yet, there is little-to-no cross protection afforded by immunity developed to one against the other. Similarly, diagnostic tests designed to detect TGE virus will not detect PEDV or vice versa.
- PEDV was first diagnosed in 1971 in Great Britain. Since that time there have been sporadic outbreaks in Europe and it has become an endemic pig disease in Asia since 1982.
- PED is not a World Organization for Animal Health (OIE) reportable disease and as such should not affect export markets.
- As the name implies, the primary clinical sign in outbreaks that occur in previously naïve herds is severe diarrhea in pigs of all ages. Clinical signs will be essentially identical to those expected with acute TGEV infection.
- Like TGE, after the initial epidemic, PED commonly becomes endemic in a herd and population. In some countries (i.e. much of Europe), PED has evolved into a relatively minor problem with occasional epidemics (i.e. Italy in 2005-2006) whereas in other countries (i.e. China), PED continues to be a major disease challenge.
- The virus is spread via the fecal-oral route. The most common sources of infected feces are pigs, trucks, boots, clothing, or other fomites.
- Once infected, the incubation period is very short (12-24 hours) and the virus is shed for 7-10 days.
- Mortality rate in suckling and early weaned pigs in a naïve herd can be in the 30-100% range.
- If a sow or gilt has been previously exposed and has developed immunity, protection is provided to her suckling pigs through consumption of PED virus-neutralizing antibodies in milk. When pigs are weaned, they become susceptible and develop disease if exposed to virus.
- Veterinarians should contact a veterinary diagnostic laboratory to determine what samples are preferred for that laboratory. The Iowa State University Veterinary Diagnostic Laboratory (ISUVDL) (http://vetmed.iastate.edu/diagnostic-lab) is well prepared to diagnose PED and other pathogens that may mimic PED. Currently, testing capacity to detect PEDV is limited so turn-around times on testing will be slower than typical for routine testing at ISUVDL. However, high capacity PEDV tests are currently being developed and will soon be implemented. In general, desired samples are live pigs in acute stages of disease, several segments of fresh and formalin fixed small intestine and colon from several pigs euthanized in the acute stage of disease, fresh feces from acutely affected pigs, and tissue from a variety of other organs as appropriate.
- Like other viral enteric diseases, treatment for PED is supportive. Providing a clean, dry, draft free environment is important. Providing access to high quality drinking water is critical. Supplementing the water with electrolytes may be beneficial. If other bacterial diseases (*E. coli*, salmonella, *Clostridium* spp. etc…) emerge during the outbreak, appropriate antimicrobials may be beneficial.

- PED only infects pigs. There are no other known hosts for this virus. It poses no known public health threat. Limited research indicates the virus is not systemic and may not enter other tissues other than enterocytes that line the intestine.
- Control: Herd closure followed by 100% feedback exposure has been a successful strategy to eliminate TGE virus both in continuous flow single site and standalone breeding herds in multi-site systems. It stands to reason due to the similarities of the two viruses that this is likely an effective control and farm elimination method for PED. Contact your veterinarian for consultation on herd elimination protocols.
- Prevention: Current biosecurity methods have been highly successful in keeping TGE virus out of farms and it is likely that those same methods will be effective for PED. This virus is transmitted by direct pig exposure or indirect exposure through fomites which are contaminated with fecal material which contain virus. Transport vehicles can quickly spread the virus. Likewise personnel can track the virus if exposed to virus shedding pigs, or fecal material on trucks, stockyards, slaughter facilities, or other locations where pigs or pig workers have been who have been exposed to infected pigs. Contact your veterinarian for biosecurity information concerning exclusion methods.
- Attenuated live vaccines have been developed and utilized with mixed results in Asia. TGE vaccines are NOT effective against PED.
- Several virucidal disinfectants have been demonstrated to be effective to inactivate PEDV, such as formalin (1 percent), sodium carbonate (4 percent anhydrous), lipid solvents, and strong iodophors (1 percent) in phosphoric acid. Examples of disinfectants effective against PEDV include Clorox®, Virkon S®, 1 Stroke Environ®, and Tek-Tol®.[1] Any disinfectant use must adhere to Environmental Protection Agency and State/local regulations.
- Sanitizing and drying or heating pig trailers is effective against PEDV. Temperatures above 150° F for more than 10 minutes will inactivate the virus. Complete drying after sanitizing is also an effective inactivation method. A minimum of 12 hours down time between pig exposures, a complete change of clothing before entry, shower systems, and fumigation of all supplies and equipment entering the farm are, when used together an effective deterrent against people tracking the virus.

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[1] Pospischil A, Stuedli A., Kiupel M. (2002).