Swine Enteric Coronavirus Diseases

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Where Pigs are Located in the United States
What is Porcine Epidemic Diarrhea Virus?

- A coronavirus

- Causes intestinal damage
  - Villous atrophy

- Resulting malabsorption syndrome

- Clinical signs in swine are indistinguishable from transmissible gastroenteritis, also a corona viral disease.

- Not a food safety or public health concern

Iowa State University, Veterinary Diagnostic Lab
Disease History

• TGE-like outbreaks in the UK and elsewhere in Europe in the early 1970s.
  • Observed in young and growing pigs.
  • Considered insignificant today
• More recently, severe disease in Southeast Asia with severe outbreaks and persistent endemic situations in China and South Korea
• First Diagnosed in US swine in May 2013
Disease Progression in the United States

- Index case diagnosed in Ohio in May 2013
- 5500 cases in 28 states nationwide by April 2014
Factors in Disease Spread

- Transport vehicles, lairage at collection points and animal movement.
- Dual usage of vehicles for transport of animals to positive slaughter plants and movement of production swine.
- Ability of virus to overcome intensive biosecurity measures
  - Massive amounts of viral particle shedding compared to TGE
- Area spread – especially where there are high concentrations of breeding herds
Disease Characteristics

- **Virus Shedding**
  - Extraordinary Level of shedding
  - >10 million viral particles in one quarter teaspoon of infected feces
- **Viral persistence in the presence of maternal antibody**
  - Infected sow units take over 90 days to produce negative pigs
  - Environmental samples remain positive up to 6-8 weeks post exposure
- **Mixed response to conventional TGE disease management techniques (“feed back”).**
  - Massive viral dose is the problem
Magnitude of Disease Impact

- Reports of on-farm losses of thousands of piglets
  - Irreversible malabsorption syndrome in very young animals
  - Devastating to farrowing and nursery operations

- Adult pigs show very mild clinical signs
  - Transient diarrhea
Additional Viral Strains/Reinfections

• In recent months a second coronavirus with effects similar to PEDV has emerged
  • Porcine Delta Corona Virus (PDCoV).
  • This virus has been diagnosed in Pennsylvania swine.
• The disease complex is now referred to as swine enteric coronavirus diseases (SECD)
• There are documented incidents of herds considered to be immune having become re-infected.
  • This was not characteristic of transmissible gastroenteritis virus (TGE)
International Trade

% of Domestic Production Being Exported”  
(Carcass Weight Basis)

- Beef
- Pork
- Chicken
- Turkey

National Pork Board and Dr. Steve Meyer
Systems of Response Required for Effective Disease Containment and Continuity of Business

• Swift, Calculated, Coordinated and Firm
  • Built around continuity of business plans
  • Compartmentalization
  • For safe, secure, and continuous movement of food from unaffected farms in disease control zones

Milk, Egg, Pork, Turkey industries are developing plans
Regulatory Strategy

• Since July 2013 USDA has provided a weekly PEDV update to state animal health officials and industry stakeholders
• USDA Federal Order issued June 5, 2014
  • Producers, veterinarians and diagnostic laboratories are now required to report all cases of new SECD including PEDV and PDCoV.
    • Federal/State collaboration to manage disease in a manner to support business continuity for producers and maintain a plentiful supply of pork
  • Operators of premises found to be infected must work with their herd veterinarian or state or federal animal health officials to develop and implement a disease management plan.