PED and Our Industry

“Why me? Now what?”

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Solutions for the food supply chain
PEDv

• Why Me?
  – Virus history
  – Virus activity
  – Biosecurity
  – Clear and Present DANGER

• Now What?
  – What can I do now?
  – How long will this last?
  – How severe are the losses?
  – Will we ever get this stopped?
Porcine Epidemic Diarrhea

• A coronavirus closely resembles transmissible gastroenteritis (TGE)
• PEDv is more severe in activity and losses

**Historical Information**

- **1980s – Two virulence types in Europe**
  - In Europe, outbreaks now are rare
  - Usually affect feeder and fattening pigs
  - Today are not economically important

- **1990s – Moved aggressively through Asia**
  - The disease in Asian countries is **highly virulent**

Epidemiology Of Introduction

• Currently unknown
  – Geographically separated (Indiana and Colorado in May 2013, Oklahoma in June...)
  – Very Few cases in Canada (Ontario in Jan 2014)

• Teams are working on potential introduction vectors
Occurrence

• PEDv occurs only in swine
  – In previously unexposed herds, all age groups are susceptible
  – All ages get diarrhea
  – Small pigs dehydrate and die nearly 100%

Why Small Pigs Die

• Birth to day 10
  – Very little surface area to absorb nutrients

• Day 10-21
  – Mature and develop

• Day 24 and above
  – Thick villus lining
  – Shag Carpet

Villus scan of jejunum intestinal morphology (Pigs weaned on d 21)

Cera et al., 1998
What does PEDV do to pigs?

- 100% mortality of baby pigs < 10 days of age
  - Total loss of production in farrowing for 3-4 weeks

- Diarrhea and vomiting in older animals
  - Loss of growth & reduced reproduction

- Animals do recover post-infection
  - Immunity developed within 2-3 weeks post-infection
Clinical Signs in Sows

• Sows show a fever, off feed, some vomit.
• Watery diarrhea is a clear signal of concern
Progression in Baby Pigs
Clinical Signs in Growing Pigs
Clinical signs in Growing Pigs
Why Me....
Why Me?

• Production Systems
  Moves quickly

• 8 herds in 4 days

• "Just one vets opinion but this moves in ways we have not controlled before."

• Livestock shows
  will blow if it comes in

• “Spread the word”
  – If the pigs have watery diarrhea.....DON'T GO
  – If they show up with it.....DON'T SHOW

• Show Organizers
  – use your resources
Where is the virus today?

Dr Bob Morrison, U of Minnesota and NPB Funding
Is there more virus now than before?
NPB - PED Resources

• Recommendations available: 32 PAGES
  – Positive in Breeding Herd
  – Positive in Nursery/Grow-Finish
  – Line of Separation
  – Create Clean Crossing
  – Additional resources...
Plan Ahead

Plan for Clean Boots

Plan for a Safe Disposal
Biosecurity Guidelines

• PED is a complex virus to deal with, so create barriers between farm/pigs and potentially contaminated areas

• Line of Separation: *is defined as the line between the area that is to be used by the non-farm personnel and the area to be used by farm personnel* Applies to ALL (transport; manure haulers etc.)

• *Don’t Give Up.....Don’t Give In.....*
Identify the “Line of Separation”

No cross traffic at this point!
Trailer Drying and Inspection Systems

Dr Butch Baker of Iowa State University
Examples of the Line of Separation
PED Resources

• www.pork.org/PED

• Resources include: biosecurity updates, newsletters and research updates
PED Manure Hauling Guidelines

Biosecure Manure Pumping Protocols for PED Control: Recommendations for Commercial Manure Haulers

Key Points

- The recent introduction of the Porcine Epidemic Diarrhea Virus (PED) into the United States presents a new challenge for manure pumping. Infection with PED can create tremendous financial losses to producers and can lead to a producer being declared a potential source of infection for pigs.

- Prior to the time of going to a site to pump, COMMUNICATE with the producer:
  - Contact the producer to discuss the upcoming pumping season and the biosecurity plan.
  - Communicate on when you will be going to the farm.
  - Share the contact information between the manure pumping crew and farm personnel.
  - Be prepared to share the history of the site, where the pumping crew has been.
  - Plan entrance and exit to the site with minimal cross-over with other farm traffic or areas used by farm personnel. Ask the routes that will be used to transport manure to and from the site.
  - Ask about the use of manure storage tanks and the management of the tanks. Share your intentions for the manure storage tanks. Ensure that all manure storage tanks meet veterinarian requirements discussed with the producer.

- At the time of pumping and spreading manure:
  - Manure haulers should wait for all manure to be spread onto the field.
  - At the time of spreading manure, the manure minimizes the risk of spreading PED virus when spreading manure.

Biosecure Manure Pumping Protocols for PED Control: Recommendations for Land Owners

Key Points

- Producers and Manure Haulers face some challenges in order to control the risks of spreading PED virus when pumping manure:
  - The type of manure being pumped needs to be taken into account when deciding whether to pump manure or not. In general, it is recommended that manure be pumped from a facility that has been negative for PED for at least 2 weeks prior to pumping.

- At the time of pumping and spreading manure:
  - Ensure that all manure handling equipment is properly cleaned, disinfected, and maintained.
  - Ensure that all manure handling equipment is adequately sanitized before moving to a new site.
TRANSPORTATION BIOSECURITY PROTOCOLS FOR PEDV CONTROL

1. The truck should be prepared for loading market hogs.
   - The truck should be clean and free of any visible manure or dirt.
   - The truck should be disinfected with an approved disinfectant, as directed by the disinfectant manufacturer.
   - Hauling vehicles should be thoroughly cleaned and disinfected after each load.

2. The loading site should be ready for animal movement.
   - All equipment should be clean and in good working order.
   - The load-out area should be ready to market the hogs.
   - Coral should be disinfected from transport vehicles.
   - Coral should be disinfected from transport vehicles.

3. The truck should be loaded carefully.
   - The truck should be loaded with pigs in a manner that minimizes stress.
   - The truck should be loaded in a manner that minimizes stress.
   - The truck should be loaded in a manner that minimizes stress.

4. The truck should be driven carefully.
   - The truck should be driven carefully.
   - The truck should be driven carefully.
   - The truck should be driven carefully.

5. The truck should be unloaded carefully.
   - The truck should be unloaded carefully.
   - The truck should be unloaded carefully.
   - The truck should be unloaded carefully.

6. The truck should be cleaned and disinfected.
   - The truck should be cleaned and disinfected.
   - The truck should be cleaned and disinfected.
   - The truck should be cleaned and disinfected.

7. The truck should be stored in a secure location.
   - The truck should be stored in a secure location.
   - The truck should be stored in a secure location.
   - The truck should be stored in a secure location.

8. The truck should be disinfected regularly.
   - The truck should be disinfected regularly.
   - The truck should be disinfected regularly.
   - The truck should be disinfected regularly.

9. The truck should be inspected regularly.
   - The truck should be inspected regularly.
   - The truck should be inspected regularly.
   - The truck should be inspected regularly.

10. The truck should be maintained in good condition.
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33. The truck should be inspected regularly.
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Risk Reduction of Fecal-Oral Spread

• Transportation – Dedicate trailers
  – Create **clean and dry** time after shipments
  – Movement of the virus is highest risk from processing and cull buying stations back to sites

• Dead disposal – monitor dead pickup

• Growing barns
  – Contract washers
  – Inspect before loading in
Reduce The Risk of Fecal-Oral Spread

• Transportation
  – All trailers are washed immediately after movement
  – Wash, dry, disinfect all transport
    • Survives at 122 degrees F but not 140 degrees
  – Dry – increase temperature
    • 140 degrees – **20 min**
    • 160 degrees – 10 min

Reduce The Risk of Fecal-Oral Spread

- Isolation/Quarantine
  - All replacement gilt are quarantined a minimum of 28 days
  - Careful observation for signs of diarrhea and diagnostic testing should be performed if any clinical signs are observed
Reduce The Risk of Fecal-Oral Spread

• Buildings
  – Sow farms
    • Shoe change are to prevent cross contamination
    • Shower
    • Visual inspection of loading chutes by manager prior to any movements.
  – Wean to Market barns
    • Visual inspection of loading chute, barns, and office for sanitation by 3rd party prior to restocking
    • Separate people from BTW
    • Wear plastic boots from vehicle to barn
    • Shower
Reduce The Risk of Fecal-Oral Spread

• Fomites – Disease Carrying Objects
  – All service providers have confirmation of previous history prior to arrival to your site and follow the system’s downtime requirements
  – Create a Site Confirmation or Farm Visit Checklist/Verification before entry
  – No outside equipment enters the site
    • If absolutely necessary, visual inspection by the farm manager and disinfection with Synergize is necessary
Risk Reduction of Fecal-Oral Spread

• Dead Disposal
  – Tractor or loader activity
  – Rendering?

• Truckwashes
  – Can you prevent dragging back
Why Me....?

• Even after all of that security and review...
  – Investigations ongoing into :
    • Ingredients
    • Transport
    • Supplies
    • Materials
  – Large numbers infected in rapid time period...
Diagnosis

I think my pigs have PEDv?

• Grab a fecal sample – simple ziplock bag on ice sent with a lab submission form to DxL
• PCR test answer within 24 hours

— Why test immediately??

Diagnosis

• Suckling pig
  – Watery diarrhea in all the pigs in the room
  – Diarrhea and vomiting increases by the hour
  – High mortality

• Growing pigs
  – Mild but watery diarrhea
  – Necrosis of back muscles in older swine is suggestive

Need laboratory confirmation
Now What?

Block and Tackle

Take Action

Build Immunity and Clean Up
Now What??

• If POSITIVE and you have sows in farrowing
  – ...WEAN THE OLDEST PIGS NOW.....
Now What

• Moving older pigs (10 days and above) off the sows and onto solid feed
  – Helps reduce virus activity
  – Helps restore hydration to the pig
  – Reduces virus load in farrowing
Control

• Exposure and herd closure
  – Feedback of watery feces to the sow herd
  – Include gilt exposure and NO ENTRY for 90+ days
  – **Disciplined program under veterinary direction**
  – **Has the obvious risk of spreading other diseases (PRRS)**

• Sanitary and quarantine measures slow the spread
  – There is no effective treatment other than good care and the provision of adequate water to combat dehydration
Risk Areas

• Routine Highest Risk for movement of PED
  – Feeder pig movement
  – Breeding stock entry
  – Livestock shows
  – Packing plants

• Contamination of all trucks, trailers, or supplies can occur

• Recognize those activities – Establish Security
PEDv

• Pigs will be weaned from 7-21 days of age to improve survivability
• Set up your barns, diets, and pig care for the weight and age of the pigs you receiving

Success will be high with your management
**Pig Starting** Supplies needed

- Keep these supplies on inventory or be able to obtain quickly (also on weekends and nights)
  - **Equipment**
    - Anemometer (1)
    - Mats or 3/8” plywood (500 sq ft/1000 head)
    - Gruel bowls/pan
  - **Water supplement**
    - Liquitein (1 gallon/1000 head/day)
    - Blue 2 (1 gallon/1000 head/day)
    - Gen-Gard (1 jar)
  - **Feed**
    - N0 or Intensive Care (1 lb/ lb less than 12 lbs of body weight/head)
    - Rolled Oats (50 lb/1000 head/day)
    - Restart (1 bag/1000 head)
  - **Option for Gruel**
    - UltraCare Gel (.2 lb/head/day for 2 days or 200 lbs per 1000 hd)
Pig Starting Building Environment

- Start building set point +2-4°F higher temperature
- Barn temperature: 85°F
- **Zone** temperature at pig level will need to be 95°F
- Purchase hydrometer
  - Target 50-60% room humidity
- **Airspeed** – 600 – 800 fpm
- Increase mat coverage by 25%
  - Target 0.5 sq ft/pig
  - Use 3/8” plywood as a temporary mat in emergency
Pig Care

• Pen Allocation
  – Leave 10% empty pens for fall-behinds in middle of barn
  – Sort off lightest 10% of pigs at placement

• Extend grueling and mat feeding
  – Pigs will be weaker at arrival
  – Mat feed once every 2 hours
  – Get all pigs up every 2 hours - push towards water and feed
  – Gruel until all pigs in the pen have full bellies (4-12 days)

• Drip/leak 1 nipple per 50 head for 5 days
  – Water pressure 15 psi

• Beginning 2 day post placement, pull pigs daily to fall behind pens
What Now?

• What about the Markets??
• Estimates of a 7.7% loss in industry flow for 2014
• Assuming a Price Flexibility of 2.37 and a reduction in supply of 7.7%
• Market hog prices would rise by
  \[7.7\% \times 2.37 = 18.25\%\]
  (Up $16.42 from $90 to 106.42)

(Provided by Dr. Derald Holtkamp Iowa State University)
What can WE do?

• Industry Action
  – AASV Survey
  – NPB Research funding
  – Premise ID
  – Rapid Response Team
What can we do?

AASV Epidemiologic Survey

www.aasv.org/Resources/Diseases/PorcineEpidemicDiarrhea.php

• Scan or Email completed surveys to AASV@aasv.org
Study the Epidemiology Of Introduction – AASV Survey

Herd or system
  – Transportation
  – Dead removal
  – Gilts and Semen
  – People
  – Dead disposal
  – Feed and Transport
  – Supplies and Trash disposal
  – Biologicales/pharmaceuticals
PEDv Research Efforts

• Since June of 2013, the Board has approved $>1 million for use for PEDv since June 2013
  – Additional $$$ from State Associations

• 2013 research focus:
  – Study of how PEDv effects pigs
  – Development of diagnostic tests for PEDv
  – Development of methods to grow the virus (vaccine and test development)
  – Survivability in feed, water, manure, slurry, and in trailers
  – Methods to kill PEDv/PRRS
2013/2014 PEDv research focus

• **Fall 2013** – Focus on formation and duration of sow immunity after infection
  – What level of immunity is needed for full protection?
  – How do we measure sow status and response to feedback?

• **Spring 2014** – Focus on continued management strategies and surveillance for PEDv
  – How do we continue to develop/validate diagnostic tests to provide information on disease status?
  – Seed-money for vaccine development
  – Evaluate effectiveness of biosecurity interventions
PEDv – what do we know so far?

(All research information is posted at www.pork.org/PEDV)

• PEDv spread = fecal/oral
  – Transmits through contaminated manure; anything in contact with PEDv + manure can be a potential source of infection

• Rapid spread especially in high density areas!

• Virus survives under different conditions:
  – Survive in cold conditions
  – Can survive in dry and slurried feed
  – Can survive in slurry, feces, water
PEDV Research Results

- Fecal shed peaks at 5-6 days post infection and most animals stop shedding virus after 21 days.
- Virus is NOT shed in the respiratory tract and not aerosolized...BUT, does it move in the wind on dust particles?
- Virus can be killed at 160°F for 10 minutes OR maintaining them at room temperature (68°F) for at least 7 days. (This is without cleaning or disinfection)
Ongoing Lessons from PED
Preparation for the Next Disease Events

Issues

1. Data confidentiality - Premises ID and permission to use for disease analysis
2. Housing of data, analysis and reporting
3. Cooperation of VDLs when acting as a business center
4. PRV Control Board model for emerging diseases
5. Rapid Response Teams for outbreak investigation
Summary

Why Me?

• Biosecurity
• Monitor status
• Identify risks
• Minimize cross traffic
• Participate in AASV Survey
• Help identify activity and location – PREMISE ID#

What Now?

• Move weaned pigs
• Prepare to care for very young weaned pigs
• Load Close and Expose
• Prepare for 90 days minimum closure
• CLEAN CLEAN CLEAN CLEAN
Special Thanks

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• David Henderson of TechMix
• Dr Joe Connor of CVS
Thank You ... Any Questions??

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