



**PEDV Brings Its Worst.
Pork Checkoff Brings Its Best.**



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Porcine Epidemic Diarrhea Virus (PEDV)

The introduction of porcine epidemic diarrhea virus (PEDV) into the United States in 2013 has caused harm to the pork industry in many ways, but there is one potential upside -- the industry has pulled together like never before to find a solution to this costly disease.

The Pork Checkoff took unprecedented action to fund more than \$1 million of PEDV research in 2013 to get results into producers' hands as quickly as possible. This action, coupled with ongoing collaboration with the American Association of Swine Veterinarians, the National Pork Producers Council, state pork associations and of course, the USDA, have helped to ensure the industry gets answers about PEDV and potential control measures as soon as possible.

As an enteric disease affecting the pig's intestine, PEDV spreads via fecal-oral exposure. Anything that can be contaminated with manure such as the clothing and footwear that people wear, trucks and equipment easy carriers. In pigs three weeks of age and younger, PEDV can lead to 100 percent mortality. Meanwhile, PEDV-infected feeder and grower pigs develop diarrhea and vomiting, which reduces feed efficiency and leads to additional days to market. For sows, reduced body condition may negatively impact reproductive performance.

From a practical standpoint, producers, exhibitors, livestock haulers and anyone handling pigs or coming onto a farm must practice strict biosecurity to help protect against the spread of PEDV. The following collection of fact sheets underscores this fact as they all relate to some facet of biosecurity. These resources are continuously updated and added to on the Checkoff website, pork.org. To make it even easier for producers and others in the pork industry to find information about PEDV, the Pork Checkoff has created a shortcut web address at www.pork.org/pedv.

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Swine Health Guide



Porcine Epidemic Diarrhea Virus (PEDV) – What Is It?

Background:

- PEDV is caused by a virus (Coronavirus) that is related to transmissible gastroenteritis (TGE) virus.
- PEDV only infects pigs (NOT humans or other livestock).
- This is a new virus to the U.S. and was first confirmed in the country on May 17, 2013.

Clinical signs:

- In previously naïve herds, PEDV is similar to TGE and includes:
 - » Severe diarrhea in pigs of all ages
 - » Vomiting
 - » High mortality - almost 100% in preweaned pigs

Diagnosis: Requires sample submissions to a diagnostic laboratory (contact your veterinarian).

Transmission: Oral contact with contaminated feces. The most common sources of infected feces are pigs, trucks, boots, clothing or other fomites.

Incubation period: (*time from exposure to clinical signs*) Only 12-24 hours.

Shedding: (*amount of time animals can infect others*) Up to 3 to 4 weeks.

Immunity/Protection:

- No cross-protection with between TGE and PEDV even though both are Coronaviruses.
- Maternal protection through colostrum from previously exposed sows can be quite effective.
- No protection is long lasting (herds can re-break).
- Vaccine studies are in progress.

Treatment: Supportive care through hydration. Provide clean, dry, draft free environment with access to high quality drinking water (electrolytes may be beneficial).

Prevention: Limit cross contamination with any suspected pigs' feces.

- **Clearly define and communicate a Line of Separation which marks the separation between your facility, transport vehicles or the outside / inside of your production site.**
- Contact your veterinarian and enhance biosecurity procedures.
- Biosecurity of transportation vehicles is important; they should be clean, disinfected and dry.
- Several disinfectants have been demonstrated to effectively inactivate PEDV, such as formalin, sodium carbonate, lipid solvents, and strong iodophors in phosphoric acid.
- Replacement breeding stock should originate from a negative herd.

Challenges to Industry: Infection with PED can create tremendous financial losses to a pork producer.

For more information on biosecurity and PED: pork.org or contact a veterinarian.



Diseases like to hitch a ride, separate yourself from cross-contamination!

The organisms that cause disease in pigs (bacteria, viruses and parasites) can survive in different types of materials. Organic matter (shavings, manure) or water, mud or snow can carry diseases on boots, clothing, tires, undercarriages, trailers, shovels, winter panels, sorting panels and people can infect healthy pigs. Other activities, such as walking into a contaminated barn or packing plant can increase risk for disease spread because boots and trailers can become contaminated with diseases the farms you serve are trying to keep out. Assume every site you touch is a risk. Do not be responsible for transferring this disease.



Swine Health Producer Guide



Guidelines for Diagnosis of PED Virus

Key Points

The recent introduction of the Porcine Epidemic Diarrhea (PED) virus into the United States has greatly increased the risk of spreading disease for pig producers.

- When sow farms are first infected, all ages of pigs develop diarrhea and suckling pigs will die.
- The severity of piglet diarrhea will usually decrease over time in infected sow farms.
- After weaning, diarrhea from PED virus can be either severe or mild like other diseases.

Accurate diagnosis through proper testing is **essential** to know a herd's infection status.

- PED virus cannot be contained without knowing where the virus is present.
- Knowing the infection status of herds or sites will help all of us manage our biosecurity practices and control protocols.

Contact your herd veterinarian if you suspect PED.

Guidelines for sow herds

Do piglets or sows have diarrhea?

YES → PED virus is a differential

Sow herd: collect feces from piglets or sows acutely affected with diarrhea

Minimum: PCR on 3 pools of feces: Each fecal pool composed of feces from 5 diarrheic pigs from different litters or locations.

Optional: Submit live pigs or pig tissues, along with pools of feces to a laboratory

NO or not much looseness → PED virus may be harder to detect

Sow herd: collect feces from any pigs with diarrhea and older piglets with soft feces

Minimum: 3 pools of feces: Each fecal pool composed of feces from the 5 loosest pigs from different litters in farrowing rooms

Optional: Serum from at least 10 dams (highly recommended) and/or submit live pigs or pig tissues, along with pools of feces and serum



Guidelines for weaned (nursery, grower, finisher) pigs

Do pigs have diarrhea?

YES → PED virus is a differential

Nursery / Grower / Finisher

Oral fluids and feces: At least 2 oral fluid samples AND 3 pools of 5 loose/diarrheic feces each

Optional: Submit representative pigs or pig tissues to a diagnostic laboratory

NO or not much → PED virus may be endemic/chronic or harder to detect

Nursery / Grower / Finisher

Oral fluids and feces: At least 2 oral fluid samples AND 3 pools of 5 feces from five of the loosest pigs in the barn
Optional: Serum from 10-15 pigs for serology (highly recommended)



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Positive Diagnosis of PEDV in a Breeding Herd: What Next?

Infection with Porcine Epidemic Diarrhea Virus (PEDV) can create tremendous financial losses to a pork producer. PEDV transfers via feces and survives in manure for extended periods of time. Any object that is contaminated with pig manure can be a source of infection for pigs. There are a number of important actions to take once the diagnosis of PEDV has been confirmed on your site.

Good neighbor policy, COMMUNICATE

Farm/Production System

- At the production level, review all biosecurity protocols for potential enhancement. In a production system, it's proper to notify the main office so that biosecurity protocols can be reviewed.
- If applicable, make sure all supervisors are notified immediately.

Semen Delivery

- Contact the Boar Stud to make sure the route of semen delivery to the site is not compromising biosecurity.
 - It is best to have a designated drop box location and avoid having the semen delivery person going to the infected farm premise.

Neighbors

- Contact your neighbors that have pigs in your area. Tell them that you have had a positive diagnosis and that you are working to control the infection on your site.
 - As a general rule, notify farms located within 1-2 miles of your site.

Feedmill

- Contact the feedmill if you are purchasing feed.
 - Let them know that your herd is positive so they can adjust the delivery schedules to your site.

- Let them know that you will be communicating with them about the break as it progresses.

Transporters

- Assign dedicated equipment to the site, especially to move weaned pigs and culled animals.
- Communicate with the sites that just received your weaned pigs to make them aware of the positive diagnosis.
- Ensure transport equipment is properly cleaned, disinfected and dried.

Mortality Pickup

- If using a commercial mortality pickup, make them aware so if they have flexibility in their routes they can make adjustments.

Part-time Workers, Contractors, Electricians, Maintenance Staff

- Inform everyone who has been on the site or helped with load out, chores or repairs so they can take precautions and measures to prevent spread to their own or somebody else's pigs.
- Check to be sure that there is adequate on-farm equipment for repairs and maintenance of the farm facilities to avoid transporting equipment on or off the farm.

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Veterinarians

- Ask your veterinarian to contact the veterinarian of the site where, within the last 2 weeks, any pigs were purchased and brought onto your site or shipped off of your site and received.
- Ask your veterinarian to contact the veterinarians of neighboring herds.
- Ask your veterinarian to contact the veterinarian of multiplication herd(s) that may be the source of replacement breeding stock for your operation.

Contain the virus to your site and avoid further spread of the virus

Ensure that the Line of Separation, which marks the separation from outside the facility to the inside area with your people and pigs, is strictly enforced.

Refer to the Pork Checkoff fact sheet titled *Establish a Line of Separation: Help Control the Spread of PEDV and Other Swine Diseases* for more detailed information.

Site stabilization

The objective should be to establish herd immunity quickly by assuring all animals are exposed and infected as soon as possible.

Following the outbreak, exposure or feedback, mark each sow card when a sow has shown at least one of the PED clinical signs.

Natural infection is rapid (incubation=1 day) but may need to be augmented by intentional exposure.

The sooner ALL pigs are infected, the sooner the shedding of PEDV will be limited (herd immunity established) thereby minimizing the chances of PEDV becoming endemic.

- Rapid herd exposure and induction of immunity allows a more rapid return to normal production.

Herd closure

- Work with your breeding stock replacement supplier to develop a strategy to manage replacement gilts.
- Determine the number of replacement animals that you can inventory for the site.
 - For PEDV elimination as the goal, you may need to make sure the herd is closed for at least 120 days.

» Additional sites may be needed to do this. Check the biosecurity capabilities of these sites taking into account the local swine density since your replacement animals will need to be exposed.

- Develop a timeline with your genetic supplier for animal delivery, preferably with staged ages and weights. If delivery must be delayed, gilts will need to be exposed as soon as possible.

Feedback

- Feedback can be used to ensure uniform exposure of the herd (gilts and sows) leading to immunity:
 - Contact your herd veterinarian to develop a specific strategy for your herd, based on its unique attributes.
 - » Procedures and number of times to feedback will vary with sites. Work with your veterinarian to track the initial outbreak so you won't be doing multiple feedback procedures unnecessarily.
 - Ensure all animals get exposed.
 - » Mark each sow card when feedback occurs and when clinical signs (diarrhea, off feed, lethargy) are observed. Identify animals that do not show clinical signs or have questionable exposure so that these animals may be blood tested to ensure seroconversion.
 - Wait a minimum of 3 weeks following exposure to collect blood samples to be tested.
 - » Work with your herd veterinarian and diagnostic lab to determine the appropriate tests to run.

Approximately 3 weeks after acute infection or feedback exposure, piglet condition will improve but expect that they may still be PEDV positive. Production of PEDV negative pigs may take up to 120 days after the initial outbreak and will depend on the success of your exposure, cleanup and biosecurity procedures.

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Lactation management

Expect the severity of diarrhea to be worse in piglets consuming milk.

If adequate space is available and your nursery staff can manage it, consider weaning all piglets at 10 days of age in the early stages of the outbreak and in particular those piglets not yet exhibiting clinical signs. Early weaning can save piglets during the initial outbreak by removing them before they are exposed to PEDV.

Once exposure is completed and clinical signs have subsided.

- ❑ Implement strict McREBEL (Management Changes to Reduce Exposures to Bacteria to Eliminate Losses) procedures. McREBEL is a management protocol that involves:
 - Only move piglets to balance litter numbers during the first 24 hours of their life
 - » Allow no pigs held back at any stage in the facility.
- ❑ In herds that have already been infected with PEDV and it has spread through the farrowing house, maximize weaning age to allow for as big a pig as possible in the nursery. Bigger pigs can handle infection better than smaller, younger pigs.

Pathogen load reduction - Cleanup

Once the herd has been completely exposed to PEDV and severity of diarrhea begins to subside, it is important to reduce the environmental load of virus on the site.

- ❑ Don't risk the virus load in the environment overpowering the immunity that the sows are trying to pass on to the piglets in the milk.
- ❑ Do not do multiple feedback procedures unless directed to by your veterinarian.
- ❑ Completely wash and disinfect alley ways, hallways and load outs after animal movements have occurred. Inspect the facilities to ensure complete washing and disinfecting has been carried out.

Once there are no more clinical signs in gestation wash down the entire facility.

- ❑ The goal is to further reduce the virus load in the environment in pursuit of elimination.

Continue to wash and disinfect complete farrowing rooms and, when possible, allow to dry overnight. Disinfect the facility using products according to label directions.

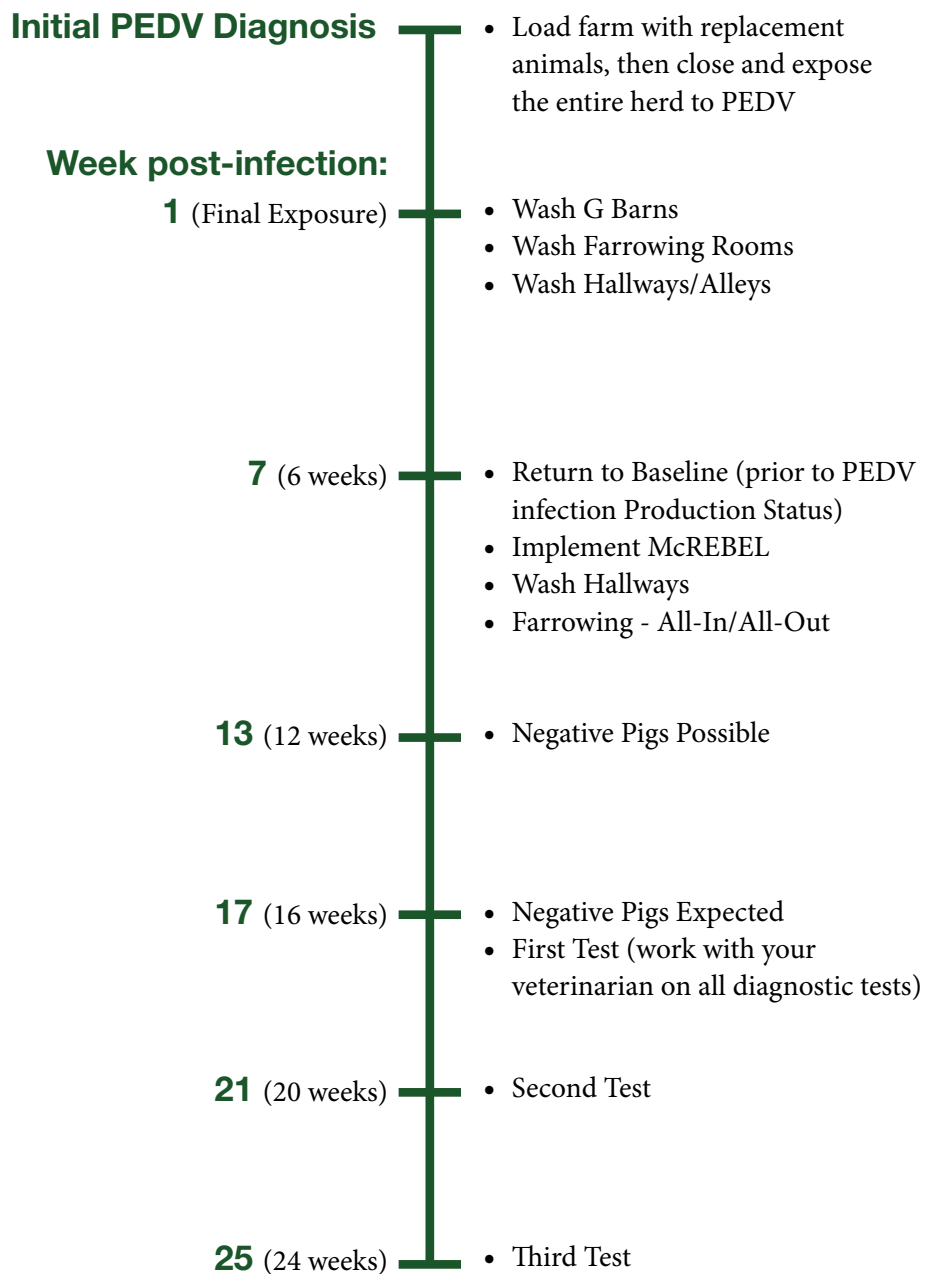
Biosecurity

- ❑ Follow biosecurity guidelines as published in www.pork.org/PEDV

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Example of a PEDV Management Timeline Post-Infection

Infection with PEDV can create tremendous financial losses to the producer. The timeline below highlights key post-infection management steps that will assist producers in getting back to PEDV-negative health status. Work with your veterinarian to develop a herd-specific management timeline for your herd.





Swine Health Producer Guide



Positive Diagnosis of PEDV in Nursery, Finisher or Wean-to-Finish Sites: What Next?

Infection with Porcine Epidemic Diarrhea Virus (PEDV) can create tremendous financial losses to a pork producer. PEDV transfers via feces and survives in manure for extended periods of time. Any object that is contaminated with pig manure can be a source of infection for pigs. **There are a number of important actions to take once the diagnosis of PEDV has been confirmed at your site.**

Good-neighbor policy, **COMMUNICATE**

Production system

- If in a production system, notify the main office so that biosecurity protocols are adjusted.
- Make sure all supervisors are notified immediately.

Neighbors

- Contact your neighbors who have pigs in your area and let them know that there has been a positive diagnosis and that you are working to control the infection on your site.
 - As a general rule, notify farms located within 1-2 miles.

Feedmill

- Contact the feedmill if you are purchasing feed.
 - Let them know your herd is positive so that they can adjust their delivery schedules and trucks to your site.
 - Continue to communicate with them about the status of the break as it progresses.

Transporters

- Communication is important. It is especially important if marketing pigs at the time of the diagnosis or if weaned pigs or feeders were just delivered.
 - This allows them to make sure their equipment is properly cleaned and to adjust the order of transport of the rest of your pigs.

Mortality pickup

- If using a commercial mortality pickup, let them know your farm's PEDV status. Rendering trucks can often make adjustments to routes.

Part-time workers, contractors, vaccination crews, electricians, maintenance staff

- Notify anyone that has helped with load-out, chores or repairs so they can take precautionary measures and prevent spread to their own or someone else's pigs.

Contain the virus to your sites and avoid further spread of the virus

- Establish and respect the Line of Separation which marks the separation from outside the facility to the inside area of people and pigs.
- Set up a bench-entry system or establish a clear Line of Separation to the site to avoid carrying material out of the barn.
 - Create a clean crossing of the Line of Separation (bench or entryway) by using separate coveralls and boots for the site. Cover up with gloves and



Swine Health Producer Guide



Elimination of PEDV from a Nursery, Finish or Wean-to-Finish Site

Infection with Porcine Epidemic Diarrhea Virus (PEDV) can create tremendous financial losses to a pork producer. PEDV transfers via feces and survives in manure for extended periods of time. Any object that is contaminated with pig manure can be a source of infection for pigs. **There are a number of important actions to take once the diagnosis of PED has been confirmed at your site.**

Empty the site, move all pigs to finishers or market all the animals from the site:

- Make sure all animals and feed are removed from the site.
 - Include any mortality that has occurred.
- Clean up all manure, feed spills and wood shavings around the building.
- Drag the rock perimeter around the facility to expose materials to sunlight and UV radiation.

Water lines and rodent control:

- Drain water lines and bleach them to ensure they are clean.
- Renew rodent-control baits

Begin detailed cleanup:

- Do a complete wash of the site to remove as much organic matter as possible.
- Use a soap/detergent to help with the removal of organic matter.

- Don't try to do it all in one washing, but try to get as much as possible with the first wash then repeat as needed.
- Clean, disinfect and remove any unnecessary materials or equipment from the site.
- Any equipment that will remain at the site must be thoroughly washed, disinfected and dried.
- Make sure to include office, load-out and any storage areas when cleaning and disinfecting.
- Don't forget equipment that is in the barn:
 - Discard any cracked plastic panels, sort boards or paddles that cannot be properly cleaned.
- Inspect the site after the clean up:
 - Make a check list and do methodical in-pen inspections so nothing is missed. Any feed, hair or manure found suggests the barn needs cleaning again.
 - Make sure the barn is dry before inspection, it is difficult to do a good job of inspection when wet.
 - Use a flashlight and screwdriver to check cracks to make sure everything is clean.
 - Use sidewalk chalk to mark spots that need to be rewashed. This makes it easier to not miss something on the final wash.
- Repeat with one final inspection prior to disinfection to confirm that the facility is completely cleaned.



Swine Health Producer Guide



Biosecure Mortalities Removal for PED Control

Always assume the mortalities box/Animal Disposal Unit (ADU) is contaminated with swine pathogens such as Porcine Epidemic Diarrhea Virus (PEDV), TGE, PRRS, Brachyspira, APP, etc. Therefore, it is very important to follow strict biosecurity measures when going to an ADU. Healthy pigs are not found in a ADU and the rendering truck, equipment and personnel can move infectious material from one ADU to another! ***Infection with PED and other pathogens can create tremendous financial losses to a pork producer.*** This is why it is important to establish a biosecure and responsible way to manage mortalities.

Location of the ADU

- Place the ADU in a location away from other livestock. Prevent access to wildlife.
- Two-sided entrance points ensure that your farm vehicle does not drive over the same path as the rendering truck. Have clear instructional signs in a highly visible location illustrating the **Line of Separation** for the rendering truck driver.

Procedure for Hauling Mortalities to the ADU

- Mortalities transported to the ADU should be the last task of the day.
- Mortalities are moved to the Line of Separation so those transporting the mortalities to the ADU do not have to cross to the pig side of the Line of Separation. When the building doorway is the Line of Separation, place the mortalities right inside the doors.
- Leave barn, crossing the Line of Separation to the outside of the barn, and put on coveralls and boots that are used for the mortalities run only. (A different color of coveralls and boots is recommended to help keep these items from entering the barns.)
- Tractor or truck and any equipment that will cross to the pig side of the Line of Separation for animal transport to the ADU needs to be cleaned, disinfected and dried before use.
- Load today's mortalities with minimal contact with buildings and farm staff. Cover up with protective gear or clothing if necessary to cross the Line of Separation (have the Line of Separation clearly marked).
- Approach ADU from farm side.
- Place mortalities in ADU box without crossing the path of the rendering side.
- Close the lid or cover securely. Drive tractor/truck to a secure location and thoroughly wash and disinfect vehicle and all equipment used. This process is necessary when equipment hauling mortalities crosses back to the pig side of the Line of Separation.
- Leave tractor/truck and equipment in a secure location to dry. Do not return to the farm site immediately.
- Remove clothing designated for the mortalities chore. It is highly suggested that they be washed in a different location, and returned to site clean and dry.
- Insure a clean crossing if re-entry into the farm facilities is required. Remove all contaminated protective gear and properly clean or dispose of them to insure nothing is brought back into the facilities.



Swine Health Producer Guide



Establish a Line of Separation: Help Control the Spread of PEDV and Other Swine Diseases

Infection with Porcine Epidemic Diarrhea Virus (PEDV) can create tremendous financial losses to a pork producer. PEDV transfers via feces and survives in manure for extended periods of time. Anything that is contaminated with pig manure can be a source of infection for pigs. Live pig hauling is an essential part of the pork industry and can play a key role in the control of disease. All pork producers and transport drivers should be aware of the role they may play in the spread of PEDV and other swine diseases. In order to prevent the spread of PEDV from one farm to another, establish a line of separation.

The Line of Separation is defined as the line between the area that is to be used by the transporter and the area to be used by farm or market personnel. Be aware and be informed of where the line of separation is in every situation.

There may be multiple areas where the line of separation is drawn.

Be aware of where the Line of Separation is when arriving at a producer's site or at a market.

At the cab of the truck:



At the back of the trailer and the loading chute:



At the farm:



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Assume There is Risk!

- Approach every contact with a site or market as if it could contaminate your truck and trailer.
- Have a biosecure plan to manage the ***Line of Separation*** between you and the site.
 - » Use dedicated ***storage containers*** to hold clean equipment for each movement.
 - » Use ***clean equipment*** for each movement of animals.
 - » Follow a ***disposal plan*** to remove and contain used/contaminated equipment.

Examples are listed below:

Storage Containers



Clean Equipment



Disposal Plan



Diseases like to “Hitch a Ride” so separate yourself from cross contamination. Control the accidental spread of disease!

The organisms that cause disease in pigs (bacteria, viruses and parasites) can survive in different types of materials. Organic matter (shavings, manure) or water, mud or snow can carry diseases on boots, clothing, tires, undercarriages, trailers, shovels, winter panels, sorting panels and people’s clothes can infect healthy pigs. Other activities, such as walking into a contaminated barn or packing plant can increase risk for disease spread because boots and trailers can become contaminated with diseases the farms you serve are trying to keep out. Assume every site you touch is a risk. Do not be responsible for transferring this disease.



Swine Health Producer Guide



Create a Clean Crossing: Help Control the Spread of PEDV and Other Swine Diseases

Infection with Porcine Epidemic Diarrhea Virus (PEDV) can create tremendous financial losses to a pork producer. PEDV transfers via feces and survives in manure for extended periods of time. Anything that is contaminated with pig manure can be a source of infection for pigs. Live pig hauling is an essential part of the pork industry and can play a key role in the control of disease. Live-haul drivers should be educated about the risks PEDV and other swine diseases bring to the pork industry. In order to prevent the spread of PEDV from one farm to another, create a clean crossing.

Create A Clean Crossing

If you must cross over areas with farm, market personnel or live-haul equipment.

Cover-up

- Wear protective gear when crossing a line of separation:
 - » Boots
 - » Coveralls
 - » Gloves



Contain

- Dispose of or store away contaminated supplies



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Clean up to Remove Risk

- Clean up by washing and disinfecting all contaminated supplies



Assume There is Risk!

- Approach every contact with a site or market as if it could contaminate your truck and trailer.
- Have a biosecure plan to manage the *Line of Separation* between you and the site.
 - » Use dedicated *storage containers* to hold clean equipment for each movement.
 - » Use *clean equipment* for each movement of animals.
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Swine Health Producer Guide

Transportation Biosecurity Protocols for PEDV Control

Key Point

Infection with Porcine Epidemic Diarrhea (PED) virus can create tremendous financial losses to a pork producer. PED virus transfers via feces and survives in manure for extended periods of time. Any object that is contaminated with pig manure can be a source of infection for pigs. Live haul is an essential part of the pork industry and plays a key role in the control of disease. Live haul drivers should be educated about the risk PED virus is to the pork industry.

Ensure you are Prepared for Swine Transportation

1. The market truck should be prepared for hauling market hogs.
 - a. The cab of the truck, including floor-boards, pedals, steering wheel, gear shift handle, door handles, etc, should be cleaned and disinfected between loads.
 - b. The trailer should be
 - Washed clean and free of any visible manure or shavings,
 - Disinfected with an appropriate disinfectant, at the correct rate, for the proper contact time, and applied so that all surfaces are covered, and
 - Allowed to dry completely (Thermal assisted drying truck bakers speed this process greatly).
 - c. All equipment, including sort-boards, rattle-paddles, electric prods, etc. need to be thoroughly cleaned, disinfected, and dried.
 - d. Clean boots, coveralls, gloves, knee pads, etc. should be used for each load and stored in a designated clean area. A separate area for storage should be used for these articles after they are used and until they can be cleaned and disinfected for future use.
2. The Production Site should be ready for animal movement
 - a. All load out equipment should be clean and in good working order
 - b. The load out area and chute should be clean and ready to market pigs
 - c. Communicate where the Line of Separation is located. This marks the separation between the production facilities, its animals and its workers from trucks, trailers and people outside of the production facility.
 - **An effective Line of Separation is the back of the trailer but may be at the barn door, the chute or gate.**
 - Be sure it is clearly marked and visible to all.
 - Provide plastic disposable footwear and a place to dispose of the footwear for the driver if they must to cross the Line of Separation.
 - d. There should be enough trained farm personnel available to help load pigs from the site.
 - *The truck driver should never cross the Line of Separation to help move pigs from the barn.*
3. Communication between the livestock hauler and livestock owner or site manager should take place. Expectations for loading and unloading animals

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should be communicated prior to arrival.

- a. A clear Line of Separation should be identified and communicated.
 - No human foot traffic is allowed to cross the Line of Separation from either direction.
 - If animals are being loaded for slaughter, farm personnel move the animals up to the Line of Separation.
 - The driver handles the animals after they cross the Line of Separation.
- b. No farm equipment or transportation equipment may cross the Line of Separation to be shared for loading hogs
- c. *Specific requirements may be needed for different stages of production or health status. A more detailed protocol may be required in many operations or production systems.*
 - If biosecurity protocols for the farm are not completely clear ask the farm personnel or site manager for guidance.

Responsibilities during the Loading Process

1. Livestock haulers
 - a. Must stay on the out-bound side of the Line of Separation at all times for load out.
 - b. No driver equipment may cross the Line of Separation or be used in the barn.
 - c. No pigs should be allowed to exit the truck during the load out process.
 - d. The driver should remove all boots and clothing on the truck side of the Line of Separation.
 - All dirty boots and coveralls should be placed in a designated area, outside the cab (for example in a dirty boot box).
 - e. Hand paperwork to farm load crew personnel away from the truck and barn.

2. Loading crew or farm personnel

- a. The farm load crew must observe the Line of Separation at all times.
 - If the Line of Separation is crossed, farm personnel **MUST** follow reentry biosecurity measures (such as shower in/out or change of clothes/boots and wash of hands) before they can resume the loading process.
 - Dirty coveralls or gloves should be placed in a container or directly into a washer.
 - Dirty boots should be placed where they can be washed and disinfected away from farm clothing. Do not place them where everyday foot traffic occurs.
 - Do not share loading equipment with livestock haulers.
- b. Do not cross foot traffic at any time with livestock haulers including after pigs are loaded.
- c. No farm equipment should be shared with the livestock haulers.
- d. Do not allow drivers to help load pigs out of the barn.
- e. Do not allow drivers to fill out paperwork in the office.

Responsibilities after the Loading Process

1. Farm personnel should clean and disinfect the load out area immediately after the transport vehicle has been loaded and pulled away.
2. Farm personnel that cross the Line of Separation to clean the chute or load out area must follow the biosecurity protocols of the site, such as shower in/out or change of clothes and boots and wash hands.

Diseases Like to Hitch a Ride, Separate Yourself From Cross Contamination

The organisms that cause disease in pigs (bacteria, viruses and parasites) can survive in different types of materials. Organic matter (shavings, manure) or water, mud or snow can carry pathogens on boots, clothing, tires, undercarriages, trailers, shovels, winter panels, sorting panels and people that can infect healthy pigs. Other activities, such as walking into a contaminated barn or packing plant can increase risk for pathogen spread because boots and trailers can become contaminated with pathogens the farms you serve are trying to keep out. Assume every site you touch is a risk. Do not be responsible for pathogen transfer.



Swine Health Producer Guide



Biosecure Truck Wash Protocols for PED Control: Recommendations for Truck Wash Facilities

Key Point

Infection with Porcine Epidemic Diarrhea (PED) virus can create tremendous financial losses to a pork producer. PED virus transfers via feces and survives in manure for extended periods of time. Any object that is contaminated with pig manure can be a source of infection for pigs. Truck wash facilities are an essential part of the pork industry and plays a key role in the control of disease. All truck wash personnel should be educated about the risks PED virus is to the pork industry.

Basic Guidelines for Sanitation, Disinfection, Drying and Downtime

- Proper cleaning prior to disinfection is a critical step for preventing disease spread. The truck and trailer must be thoroughly cleaned, washed, disinfected and completely dry.

This involves 5 steps

1. Removal of all manure and bedding
 2. Soaking with soap and/or degreaser
 3. Pressure washing with hot water
 4. Disinfecting by foaming with an appropriate disinfectant
 5. Drying
- The trailer and all equipment must be free of visible manure, shavings or dirt prior to disinfection.
 - The use of wash soap or degreasers can decrease cleaning time versus just using water alone.
 - Disinfectants should be used on trucks and trailers only after they have been cleaned because manure and dirt will inactivate and reduce the effectiveness of most disinfectants.
 - Check on the disinfectant's label to ensure it mixes safely with any cleaning product or wash soap that is being used.
 - Follow label directions when using disinfectants to ensure the disinfectant is being used at the proper concentration and temperature.
 - Follow label directions for adequate contact time to ensure effectiveness.

- Using disinfectants in a manner other than what is on the label may decrease effectiveness or may be unsafe.

Drying helps inactivate pathogens that cause disease and maximizes the benefit of disinfectants.

- Heat delivered to a trailer for the appropriate temperature and time can assist in disinfection.
- If heat isn't available, fans or enough drive time to allow complete drying will help.

All manure and shavings for bedding cleaned from a trailer may contain pathogens that could cause disease.

- Dispose of these in a way that will prevent their spread to other trailers or locations.

Be aware of the source of water used for cleaning.

- Recycled wash water may still contain pathogens that could cause disease so disinfecting and adequate drying are especially important.

Pork producers will expect clean trailers are free of PED and other diseases. On the other side of this document are key elements of a biosecure cleaning process.

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Biosecure Cleaning Protocol To Prevent Transfer of PED virus:

Before Entering the Wash Bay

1. Understand the traffic flow for entry and exit of clean and dirty vehicles
2. The bay must be clean before the truck enters.
3. Scrape and sweep all manure, bedding and debris from the trailer.

In the Wash Bay

1. Clean out the truck cab.
2. Allow vehicle to thaw if necessary before washing.
3. Empty shavings bags, dirty rubber boots, used coveralls and gloves should be placed in designated locations (recycle bin, garbage or laundry).
4. Position all equipment including winter panels, brooms, shovels, sort board and paddles for washing.

Washing Process

1. Thoroughly rinse the interior cargo area free of manure and shavings (both decks even if both were not used). When using winter panels pull all panels off of the vehicle and wash both sides.
2. Apply soap according to label directions, to all interior surfaces of pig space, working from the floor up.
3. Then, apply soap to the exterior of the trailer and the truck, including the trailer boxes.
 - Do not let the detergent dry on any surface.
4. Working from the top going down, high pressure wash the exterior of the trailer and truck first, then the trailer interior, including any winter panels, ramps, gates, crowd boards, brooms, shovels and dirty and clean boxes.
5. Apply disinfectant to all exterior surfaces and then apply to interior surfaces of the cargo area including any winter panels, ramps, gates, crowd boards, brooms, shovels and dirty and clean boxes.
6. Allow the appropriate contact time per instructions on the disinfectant bottle.
7. Clean and disinfect the cab. Be sure the pedals and floor of the cab are clean.

8. Before entering the cab to move the unit, remove the rubber boots and coveralls you are wearing and place in designated location or dirty box. Don't drag anything back into the truck.
9. Clean other surfaces of the cab (steering wheel, door handles, and dashboard) using a clean cloth that is wet with disinfectant solution or disinfectant wipes.

After Washing

1. Move the washing equipment to a "CLEAN" area and dry.
2. Park trailer on slope to drain off excess standing water.
3. Use heat assisted drying when possible and/or circulating fans or adequate drive time to assist in the drying process.

Final Items

1. Apply a pyrethrin insecticide inside the cab to kill any insects if needed.
2. Disinfect the exterior of the cab.
3. Rinse the floor of the wash bay area.
4. Return the hoses to the appropriate locations.
5. Turn the fan off.
6. Change out of the uniform used for washing, and place in dirty laundry.



Swine Health Producer Guide

Feed Delivery Biosecurity for Control of Disease

The recent introduction of the Porcine Epidemic Diarrhea (PED) Virus into the United States presents a new challenge for the industry. PED virus transfers via feces and survives in manure for extended periods of time. Contamination of trucks, equipment, and clothing or footwear with feces can spread the virus. Infection with PED virus can create tremendous financial losses to the producer. It is important that everyone do their part to prevent spread of this disease.

1. Transport drivers arrive at work wearing clean clothes and footwear which hasn't been worn around livestock.



2. Carry cover-ups (clean, disinfected rubber boots or disposable boots) in a clean container in the truck cab. As exiting the truck, put on the cover-ups.



3. Stay as close to the truck as possible to minimize the areas you access.



4. To keep you on your side of the Line of Separation between you or your equipment and the production facilities. Whenever possible, communicate with the farm staff and ask them to open and close the bin lids.



5. Remove cover-ups when climbing back into the truck and contain and dispose of garbage in a separate bag or plastic container.



6. Apply hand sanitizer to maintain a clean cab before touching surfaces.



7. Do not cross the Line of Separation that is between the production facilities and you or your equipment. This includes not entering the barn office or facilities. Invoices should be left in a designated area, such as mailboxes attached to the bin leg or outside of the office.



8. Bagged feed is dropped in a designated area, without crossing the Line of Separation that is between you and the production facilities.





Swine Health Producer Guide



Biosecure Manure Pumping Protocols for PED Control: Recommendations for Pork Producers

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 a producer.** PED virus transfers via feces and survives in manure for extended periods of time. Any object that becomes contaminated with pig manure can be a source of infection for pigs.

COMMUNICATE with the Manure Hauler:

- When scheduling with the manure hauler:
 - Find out when the manure hauling crew will be coming to the farm and require to be notified when they arrive.
 - Ask where the manure hauling crew has been prior to coming to your site.
 - Ask what biosecurity procedures the manure hauling crew uses between customers to understand disease risks to your herd.
 - Share contact information between the manure hauling crew and farm personnel.
- Discuss your biosecurity expectations for the manure hauling crew.
 - Plan entrance and exit to the site with minimal cross-over with the path for the manure hauling crew and the rest of farm traffic or areas used by farm staff.
 - Explain the routes that will be used to transport manure to fields.
 - Discuss how any manure spills are to be handled.

- Explain where the “**Line of Separation**” is between the set-up, hauling equipment and farm site.
 - This separates the area that is to be used by the manure hauling crew and the area to be used by daily farm traffic and personnel.
 - Do not let the manure hauling crew cross over the Line of Separation.
- Inform all your employees of the biosecurity requirements discussed with the manure hauling crew.**

At the time of pumping **COMMUNICATE with the Manure Hauling Crew:**

- The manure hauling crew is not to enter the barns, office areas or walk over areas used by farm personnel and should never come in direct contact with the pigs.**
- Farm personnel needs to avoid any direct contact with the manure hauling crew and the pumping and application equipment.

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- IF farm personnel must cross over the Line of Separation they must do the following:
 - **Cover-up** with clean protective gear (clean boots, coveralls, gloves) before crossing to the manure hauling crew side of the Line of Separation.
 - **Dispose of or properly contain** any contaminated clothing in plastic bags / totes before crossing back to the farm side of the Line of Separation.
 - **Follow all shower-in or other biosecurity protocols** of the farm before crossing back to the farm side of the Line of Separation.
 - Clean and disinfect any reusable gear before it is again moved and used on the farm side of the Line of Separation.

After pumping COMMUNICATE with the Manure Hauling Crew:

- Require to be contacted when pumping is done.
- Identify and discuss if there were any problems, biosecurity breaches, manure spills or need for any clean up after pumping and hauling.
- Consider providing a water source away from the facility or traffic patterns for the manure hauling crew to use to clean your manure from their equipment before leaving the farm.

PED virus infection at the sow farm can create near 100% mortality of piglets. Cleaning, disinfecting and drying all equipment is mandatory if moving to a sow site.

The biosecurity protection of your herd is your responsibility. Protect the health of your herd and communicate your biosecurity expectations with your manure hauler to avoid disease introductions.



Swine Health Producer Guide



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 the producer.** PED virus transfers via feces and survives in manure for extended periods of time. Any object that becomes contaminated with pig manure can be a 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 sites 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 fields.
- Ask where the "Line of Separation" is between the set-up, hauling equipment and farm site. This defines the area that is to be used by the manure haulers and the area to be used by daily farm traffic and personnel. *Don't cross over the line.*
- Discuss how any manure spills will be handled.
- **Inform all your employees of the biosecurity requirements discussed with the producer.**

At the time of pumping **COMMUNICATE** with the producer:

- Manure haulers are not to enter the barns, office areas or walk over areas used by farm personnel and should never come in direct contact with the pigs.
- Avoid any direct contact with farm personnel and do not allow pumping equipment access by farm personnel.
- Use always clean coveralls, boots and gloves at each site.
- IF personnel must **CROSS-OVER** the line of separation they must do the following:
 - **Cover-up** with protective gear (boots, coveralls, gloves).
 - **Dispose of or properly contain** any contaminated clothing in plastic bags / totes.
 - **Clean and disinfect** any re-usable gear for the next site.

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After pumping COMMUNICATE with the producer:

- Inform farm contact person when pumping is done.
- Identify and discuss with producer if there were any problems, biosecurity breaches or manure spills.
- If possible clean, disinfect and dry equipment on site away from traffic before traveling to the next farm site.
- Avoid bringing disease with you by changing outer clothing and boots between farms.
- Clean the cab of trucks, tractors and contaminated equipment before going to next site.

PED virus infection at the sow farm can create near 100% mortality of piglets. Cleaning, disinfecting and drying all equipment is mandatory if moving to a sow site.

Leave the risks behind! Protect yourself and assume responsibility for the biosecurity of your manure hauling equipment and hauling crew.



Swine Health Producer Guide



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

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 a producer.** PED virus transfers via feces and survives in manure for extended periods of time. Any object that becomes contaminated with pig manure can be a source of infection for pigs.

Producers and Manure Haulers face some challenges in order to control the risks of spreading PED virus when pumping:

- The steps necessary to prevent PED from being moved from farm to farm during manure pumping and hauling take planning and may impact the timing of getting your fields applied.
- Increased time between sites may be required for washing and cleaning of equipment.
- Previously known positive sites for PED virus are strongly suggested to be last in the sequence of sites for a producer or system.
- Communicate and find out when the manure haulers will be going to pump manure and ask when you can expect your fields to have manure application.

At the time of pumping and spreading manure:

- Farm land personnel and your farm equipment need to avoid any direct contact with manure, manure hauling personnel or the manure hauling equipment because disease can be spread to other farms through accidental transfer from manure contamination of people or your vehicles and equipment.

PED virus infection at the sow farm can create near 100% mortality of piglets. Cleaning, disinfecting and drying all equipment is mandatory if moving to a sow site.



Swine Health Guide

Swine Health Recommendations: Exhibitors of All Pigs Going to Exhibits or Sales

With the animals being commingled at an exhibition, show or sale, spreading disease is a risk. The recommendations listed apply to all swine at an exhibit or sale that are physically on the premise. Having a plan in place to identify and handle sick animals properly will help reduce the chance of disease spread.

In preparation for the exhibit or sale:

Consult a veterinarian to understand and implement applicable biosecurity and swine health practices; keep the veterinarian's phone number in your barn with your pig's papers and if possible, in your cell phone.

Have a premises identification number for your farm or where the pig(s) are housed (required for PQA Plus® certification or state equivalent)

Utilize an individual, readable identification method for each pig:

- Individual identification helps accurately and quickly identify a pig in the event of a health issue, validation of ownership or for other exhibit needs; papers can get lost or misplaced, but individual identification will remain with the pig
- Refer to the exhibit organizers and the State Veterinarian for specific requirements for individual animal identification

Become familiar with the clinical signs of a sick pig (such as fever, off-feed, lethargy, nasal discharge, cough, “thumping” or hard time breathing, and diarrhea).

- Normal rectal temperature of a pig = 101.5° - 102.5° F
- Pigs can't sweat, they need help staying cool on hot days.
 - › During hot weather a pig's temperature may be elevated.
 - › If its temperature is raised, allow the pig to cool off and re-take the temperature in 15 minutes.
- Work with your veterinarian if your pig becomes sick.

How do I take my pig's temperature?

1. Restrain your pig to avoid injury to you or the pig
2. Use a thermometer to measure temperature:
 - a. Digital – insert into the rectum; push the button and wait for the beep; read temperature
 - b. Mercury – shake down the thermometer so the red line is not showing; insert into the rectum of the pig and wait 30 seconds before reading the temperature
 - c. Laser: point the laser at the space on the skin behind the ear and read temperature

NOTE: Laser thermometer may not be as accurate as rectal thermometer



Digital Thermometer

Some diseases can transmit from humans to pigs and from pigs to humans, so it is important to not go to the exhibition or show if you or your pig is sick.

Make sure that you have all of your equipment, including your show box and its contents, clean, disinfected and ready to go prior to the exhibition. Do not share any equipment with other exhibitors once at the exhibit.

Fill out the appropriate paperwork for the exhibition including health certificates

For your pig's health certificate, you will need to provide the following information:

- Your name, contact information and farm address
- Individual pig identification and physical description for each animal going to the exhibit or sale
- If exhibiting in a state other than where you live, have your veterinarian check with the state you are exhibiting in for specific requirements
- Include information for exhibit-specific requirements
- If requested, list any current vaccines the pig has received (i.e. influenza or PRRS) and current disease testing (i.e. PRRS; PRV)



Animals like cats and dogs can carry pathogens that can make pigs sick. It is important to prevent the spread of pathogens to your pigs or to others. Keep pets at home, do not let them be in contact with your pigs and do not bring them to the exhibit.

At the exhibition or sale:

- Assess your pigs' health on a daily basis
- Report any swine health issues to the exhibit organizer (i.e. swine superintendent) or show veterinarian so they can assess the pig in question
- Ask the exhibition organizer about any specific actions that may be required if a pig becomes sick at the show.
- Keep your area clean and free of manure contamination
- Do not share equipment with other exhibitors
- Do not bring your pets (cats or dogs) at the exhibit

Once you get home:

When pigs from different farms are brought to an exhibit or sale and commingled with other pigs of a different health status, the risk of catching a disease can be high. Just like people can spread illness to each other when gathered in a group, pigs from many locations in an exhibit can also spread illness to each other. Therefore, when you bring your pig back home from an exhibit or sale, it is best to place them in isolation.

Isolate returning pigs from the other pigs at your farm.

- Work with your veterinarian for an isolation plan. The isolation/observation period before returning to contact with other pigs should be no fewer than 7-30 days in order to detect an illness.
- Consult a veterinarian if your pig becomes ill.
- Clean and disinfect equipment, clothing, shoes, show box and contents, and vehicles/trailers that were used at the exhibition.

Clean-up can be as simple as washing, disinfecting and allowing your equipment to dry out in the sun

Clean and dry equipment will help to prevent the spread of pathogens

Recommendations for isolation: (if you have other pigs at your farm)

- Isolation will allow for time for pigs to be observed for disease after they return from an exhibition or sale. When pigs are in isolation, additional testing can be complete to check for diseases before pigs are added back to the rest of the farm (e.g. PRRS). Check with your veterinarian for testing recommendations.
- Have a designated area away from other pigs that have not been to a show.
- Do chores for the pigs in the isolation area as the last task of the day after you have already worked with your other pigs.
- Have dedicated boots and coveralls for isolation only. Another option is to use disposable coveralls and plastic boots for use in isolation and then thrown away when done in isolation.
- Have a separate trash can for use in isolation only.
- Supplies such as buckets and feed pans should not be shared between pigs in isolation and other animals.
- All equipment should be thoroughly cleaned, disinfected and allowed to dry after use in the isolation area.



Swine Health Guide

Swine Health Recommendations: Organizers of Exhibitions and Sales

With the animals being commingled at an exhibition, show or sale, spreading disease is a risk. The recommendations listed apply to all swine at an exhibit or sale that are physically on the premise. Having a plan in place to identify and handle sick animals properly will help reduce the chance of disease spread.

Prior to the exhibition:

Identify a veterinarian being available for activities to assist the organizers with the show, including:

- Animal check-in
- Daily health evaluation during the show or exhibit
- Sample collection and submission
- Determining actions for sick pigs including: removal from the exhibit, isolation and/or treatment

Post the veterinarian's contact number at the exhibit office and within the barn.

Write up and discuss a plan to address potential animal health issues with the veterinarian and exhibit staff in order to coordinate all efforts including sample collection if needed.

Ensure that all exhibition staff assisting with the event become familiar with the clinical signs of a sick pig (such as fever, off-feed, lethargy, nasal discharge, cough, and diarrhea) and will relay that information to the veterinarian or primary organizer contact.

- Understand the risks to both humans and animals of having a sick pig at an exhibition.
- See link for fair information: www.usaha.org/Portals/6/news/Swine%20Exhibitions%202013.pdf
- Locate an isolation area away from the main exhibit to be used in the event sick pigs are identified:
 - › An off-site location is preferable
 - › If not possible, utilize an area blocked off from public and animal traffic
 - › Utilize staff personnel that do not have any contact with other pigs on the fairgrounds

Other animals, such as dogs and cats, can physically transfer pathogens. To prevent spread of diseases, request that pets be kept home and not brought to the exhibit.

At the exhibit:

At check-in, each pig should be evaluated and any sick pigs should not be unloaded. Options can include:

- Send the pig(s) immediately home
- Utilize isolation

Check-in recommendations to prevent potential disease spread:

- Exhibit officials should avoid entry into the trailers; Owners should provide health certificate for exhibit staff to review outside of the trailer
- If exhibit officials have to enter a trailer to examine an animal, use disposable coveralls and boots and dispose of after single use
- Use a hand-washing station between loads or have hand sanitizers or wipes available

All animals shall have an accompanying health certificate signed by an accredited veterinarian

- Include premises identification number (Required for PQA Plus® certification or other state equivalent)
- Record the official ID for each pig taken to the exhibition on the health certificate
- Refer to the State Veterinarian's office for specific animal identification requirements
- Health certificates are valid for 30 days

Observe swine daily for signs of illness, which may include fever, lethargy, lack of an appetite, nasal discharge, cough or diarrhea.

Report any illness to the primary veterinarian or the appropriate exhibition staff (i.e. swine superintendent) so the pig can be evaluated.

Swine deemed to be ill should be removed from the exhibition immediately.

Use precautions when caring for sick pigs to minimize the opportunity for disease transmission to other pigs or people:

- Do not re-stock the sick pigs' pen with other animals
- Halt or limit foot traffic around the pen
- Scoop or sweep manure back into the pen and then carry the shovel or broom to isolation
- Wash hands after handling sick pigs and change clothing and boots



Recommendations for isolation:

- The isolation area is an area away from general exhibit traffic and other animals. It can be a small room or an area of the barn where no other animals are housed.
- Only the individuals who care for the pig and the attending veterinarian should enter the area.
- Disposable coveralls and plastic boots should be worn when entering the area and removed and thrown away when leaving.
- A hand-wash station or hand sanitizer should be available at the entrance of the isolation.
- A trash can should be placed in a convenient location for use in isolation only.
- Supplies such as buckets and feed pans should not be shared between pigs in isolation and other animals.
- All equipment should be thoroughly cleaned, disinfected and allowed to dry after use in isolation.



For the latest Checkoff-funded PEDV information
and resources, go to pork.org/pedv



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