

Building on Biosecurity: Reducing the Risk

Overview:

In the Building on Biosecurity lesson, participants will learn how to evaluate the biosecurity risks in the housing and overall environment of their own 4-H project animal and discuss how to reduce those risks. They'll visually and physically inspect and then decontaminate a "Pathogen Package," which represents an animal environment filled with biosecurity risks.

Volunteer Note: We suggest that you introduce the topic of biosecurity to your group with the 4-H Animal Science Anywhere activity called Basics of Biosecurity (Michigan 4-H Youth Development, 2014). In it, participants learn about the Biosecurity CHIP (cleanliness, history, isolation, proper management practices), a series of biosecurity measures they can take to reduce the risk of their animals getting sick.

Objectives:

After completing this activity, participants will be able to:

- Describe three animal disease prevention strategies.
- Explain why it's important for animal agriculture operations to consistently practice appropriate biosecurity measures.
- Evaluate animal housing situations and identify the biosecurity risks in and around them.
- List at least four methods for reducing biosecurity risks in an animal operation.

Time: 15–20 minutes

Materials:

- Clock, stopwatch or other timer
- Flipchart or other large paper
- Markers
- Easel or display space
- Pathogen Packages (one per person or small group)
 - 2 dinner-sized disposable plates with sturdy, slightly raised sides, or 2 pie tins
 - About 1 cup flour or similar substance
 - 1 spoonful brown sugar or similar substance that would be visible against the flour
 - 1 or 2 bite-sized, wrapped chocolate bars
 - 5 or 6 small, flat pieces of candy (such as Smarties, SweeTARTS or StarBurst)
 - 6 or 7 fruit-flavored gummy candies
- Trash bags
- Disposable spoons (one per person)
- "The Biosecurity CHIP: Basics of Biosecurity" resource sheet (one per person, optional)

(**Volunteer Caution:** Check for wheat and other grain-related allergies, celiac disease and gluten intolerance among your group members before preparing the “Pathogen Packages.” Don’t include flour made from wheat or certain other grains if anyone in your group is allergic to or has other problems with them. For more information about food allergies, visit the Food Allergy Research and Education website at foodallergy.org. To create nonedible Pathogen Packages, replace the edible pieces with inedible objects of roughly the same shape and size.)

PROCEDURE:

Before the meeting:

1. Review the Basics of Biosecurity lesson



2. Review this lesson and gather any supplies you will need. (**Note:** It’s okay to substitute supplies you have on hand for those mentioned in the “Pathogen Packages” material list. You may want to adapt the “What’s on the plate” chart that follows to reflect any substitutions you’ve made so it’s easier for you to review it with the group during the meeting.)



Examples of “Pathogen Packages.”

3. If you distributed “The Biosecurity CHIP: Basics of Biosecurity” resource sheet to your group as part of the Basics of Biosecurity lesson, you could simply review the key concepts from the resource sheet with the group. If you didn’t distribute it during the earlier lesson, you may want to print enough copies to share it with your group during this lesson.
4. Decide whether you’ll have the participants work individually or in two-or three-person teams, then prepare the appropriate number of “Pathogen Packages.” Start by placing one spoonful of brown sugar in the center of a base plate for each kit. Next distribute the following items, representing biosecurity hazards or risks, randomly on each base plate.
 - 6 or 7 fruit-flavored gummy candies

- 1 or 2 bite-sized, wrapped chocolate bars
- 5 or 6 small, flat pieces of candy

Note: Each “Pathogen Package” should wind up with about 15 biosecurity risks (counting all of the brown sugar as one item and not counting the flour and plate).

5. Now dump about one cup of flour onto each base plate to hide most or all of the items on it, then put the second, empty plate on top as a lid. Depending on the ages of your group members and whether your meeting space is outdoors and windy or indoors and carpeted, it might be a good idea to secure the lids in place with tape or rubber bands to reduce the risk of flour spills. Move the completed “Pathogen Packages” to a table or other flat surface at the front of your meeting space.

6. (Optional) Print an enlarged copy of the “What’s in the Pathogen Package?” table that follows or recreate it on flipchart paper. If you do print or recreate the table, display it where everyone can see it, but keep it covered until the appropriate point in the lesson.

Table 1. What's in the Pathogen Package?

Item	What it represents	Biosecurity risk it poses	Biosecurity measures to reduce that risk
Plate and flour	The project animals' overall environment, such as barns, trailers, stalls and pens, lots and pastures (including any bedding), paddocks and pastures (including grass).	Can harbor disease-causing pathogens that can transfer to animals if not cleaned carefully or rotated properly (pasture).	<ul style="list-style-type: none"> ▶ Clean and disinfect animal facilities thoroughly before new animals arrive ▶ Quarantine new animals for at least 21 days. ▶ Rotate pastures or paddocks on a set schedule.
Brown sugar	The equipment that project animals come into contact with, such as brushes, clippers, show sticks, blankets, halters, feed buckets and pans, and water troughs.	Can carry disease-causing pathogens from one animal to another if not cleaned carefully between uses.	<ul style="list-style-type: none"> ▶ Avoid sharing equipment between farms, barns, pens or animals. ▶ Disinfect any equipment that must be shared before it changes locations or animals. ▶ Disinfect all equipment (including trailers) when returning from off-farm events like fairs, shows, sales and exhibitions.
Bite-sized, wrapped chocolate bars	People – both visitors and those who live or work on the farm – who haven't followed proper biosecurity measures.	Animals can get sick from pathogens that are airborne or carried on equipment and clothing, and that are in the animals' environment. People can also carry pathogens that spread to other people and animals.	<ul style="list-style-type: none"> ▶ Establish and enforce strict clothing and footwear rules for everyone who visits the animal facilities, such as: <ul style="list-style-type: none"> • Everyone must wash hands with soap and water or use alcohol-based hand sanitizer before entering and after leaving the animal care area. • All visitors must wear disposable plastic footwear, footwear covers or footwear that they wear only on your farm. • Consider disposable coveralls or having visitors bring a change of clothing that they wear only on your farm. • Everyone who lives or works on the farm must wear clothing and footwear that is either clean or worn only in the animal area. • Everyone who lives or works on the farm must disinfect footwear when moving from one animal facility to another. ▶ Limit the number of visitors to your farm.
Small, flat, unwrapped pieces of candy	Wild and domestic animals and insects that aren't supposed to be in the animal facility, such as birds, mice, ticks, mites, deer, raccoons, cats, and dogs.	Wild and domestic animal visitors can bring in pathogens and can pick up and spread pathogens from contact with the facilities, equipment, feed and water supplies, from fecal matter, and from the project animals themselves.	<ul style="list-style-type: none"> ▶ Store animal feed in covered containers to reduce the risk of contamination by pest animals. ▶ Clean and disinfect automatic waterers, water tanks and troughs regularly. ▶ Follow appropriate pest management practices to reduce the number of rodents, flies and other insects in the animal facility. ▶ Install and maintain fences of the right size and type to reduce wildlife access to animal pastures, buildings, stalls and pens.
Fruit-flavored gummy candies	<ul style="list-style-type: none"> ▶ Trash such as empty feed bags, empty product packaging, baler twine, contaminated animal feed, beverage containers, food wrappers, and outdated feed supplements and other products. ▶ Misplaced and surplus equipment. 	<ul style="list-style-type: none"> ▶ Trash that isn't picked up and stored properly provides food for wildlife, insects and other pests that can harbor and spread pathogens. ▶ Misplaced and surplus equipment left in animal facilities can cause accidental injuries to animals and people. Equipment in the wrong place can provide housing for wildlife, insects and other pests. 	<ul style="list-style-type: none"> ▶ Pick up and store trash in closed containers until it can be taken to a landfill. Keep trash cans away from animal feed storage areas. ▶ Store equipment in proper locations to limit risk of accidental injury and harboring additional undesired wildlife.

During the meeting:

1. Introduce the activity by reading aloud or paraphrasing the following:

Nearly every animal and human gets sick at some point. Illnesses caused by pathogens (disease-causing viruses, bacteria, fungus and other organisms) can spread quickly through a herd or flock, or from animal to human or human to animal. Some pathogens travel through the air (after a sneeze, for example) and some travel from pen to pen or even farm to farm on people's shoes or on the tools or equipment they move from one site to another.

*While it's impossible to remove absolutely every biosecurity hazard from your animals' environment, you can greatly reduce these hazards. The management practices you follow to help prevent the spread of pathogens and keep your animals healthy are called **biosecurity measures**.*

Today we're going to talk about how to identify biosecurity risks in your 4-H project animals' environment and about some of the biosecurity measures you can follow to reduce the biosecurity risks for your own and any other animals you interact with. We'll start by examining a "Pathogen Package" that represents some of the common biosecurity risks in a 4-H project animals' environment.

2. Ask participants to name one biosecurity risk that might exist in a 4-H project animal's environment. Record their answers on flipchart paper and display the paper where everyone can see it. (Examples include humans – whether visitors or animal caretakers – who carry germs into the animal's environment on their shoes, clothes, skin or hair; wild animals and domestic dogs and cats; equipment that is brought in from another animal's environment without being disinfected first; pathogens carried on the wind; trash; misplaced equipment and supplies.)

3. Divide the group into two-or three-person teams or have participants work alone (depending on the size of your group and the number of "Pathogen Packages" you've prepared). Have each person or team pick up a Pathogen Package and take it to a location where they can work. Have participants leave the lids on their Pathogen Packages after they reach their work location and not touch or move the plates or their contents.

4. Tell the group that when you give the signal, you want them to take the lids off of their Pathogen Packages. They'll then have 1 minute to examine the contents of the package without touching or intentionally moving anything in or on it. Keep track of the time (or have a volunteer do it for you) and monitor the participants to make sure they aren't touching the Pathogen Packages during their inspection.

5. When the minute is up, draw the participants' attention back to you, then read aloud or paraphrase the following:

You've just spent a minute visually examining your Pathogen Packages. Now we're going to review what you've seen in them so far.

First, the plates represent your 4-H project animals' environment. That includes the barns, stalls, feedlots, paddocks, pastures, cages, crates and trailers that your animals would commonly

be housed or transported in. Second, the flour on the plate represents the bedding in the housing areas, and the grass and other items that are continuously around your animal.

In an ideal biosecurity situation, the housing, bedding material and forage might be the only things in your project animals' environment. That's rarely the case though, and it's not the case in the Pathogen Packages in front of you.

So, did any of you see anything more than the plate and flour during your visual inspection? (A few participants may have seen wrapped and unwrapped candy, fruit-flavored gummy candies or brown sugar [though they may not have recognized the brown specks as brown sugar], while others may have seen only the plate and flour.)

You may not have seen anything but the plate and flour during this first, visual inspection of the environment represented by your Pathogen Package. If you went home right now and inspected your 4-H project animals' environment, you might not see many obvious biosecurity risks there, either. But I can guarantee that there are potential biosecurity risks here in your Pathogen Packages – about 15 of them – and I'll bet there are some in your project animals' environments, too. When you've trained yourself to look more closely for them, you can plan and follow the biosecurity measures that will reduce their potential to harm your animals and you. We're going to start that training right now.

You've already done a preliminary visual inspection of your Pathogen Package. In a moment, I'm going to pass out utensils you can use to conduct a physical inspection. You'll have about 4 minutes to sift through the flour and decontaminate it by moving any foreign objects you find to the collection area using only your spoon – no hands! (The collection area is the plate that was serving as the lid of your Pathogen Package.)

Remember that pathogens and other biosecurity risks can be hard to find because they can be very, very small. So you'll need to keep a sharp eye out for one tiny risk in particular. You'll also need to be careful to keep the animals' environment livable. In this case that means you'll need to keep the flour on the original plate.

6. Give each participant a spoon. Then tell the group to start the physical inspection and decontamination of their Pathogen Packages. Walk around and answer any questions the participants may have as they work. Give them a 1-minute warning when time is running out.

7. When time is up or the participants seem to have finished sifting through the flour, ask them following questions:

- What were some of the things you found? (Bitesized chocolate bars, unwrapped candies, brown sugar – or just brown specks if they couldn't identify the specks as sugar, gummy candies)
- Were you able to identify all of the biosecurity risks in your Pathogen Package and completely decontaminate it by removing all of those risks? Why? (Most teams will probably answer that they could identify but not remove all of the biosecurity risks because the brown sugar or brown specks were too small to separate from the flour.)
- What was the most challenging part? (Keeping the flour on the plate, sorting the tiny brown sugar or brown specks out of the flour, not eating the candy.)

8. If no one has mentioned the brown sugar yet, ask the participants whether they saw any tiny brown specks in the flour and if they did, whether they were able to remove them. If anyone says they managed to remove the brown sugar, ask them to explain to the rest of the group how they did it.

9. If you have time and if the participants seem to want to, give the group another couple of minutes to work on sorting out the brown sugar. Otherwise, read aloud or paraphrase the following:

People who raise animals aren't the only ones who have to be concerned about pathogens and other biosecurity risks. We all need to be aware of the environment and the biosecurity risks around us and take precautions to avoid exposure to pathogens – even the ones we can't see without a microscope. To make things even more complicated, most pathogens reproduce quickly, so we can't inspect, clean and disinfect our environment once and be done. We have to practice biosecurity measures consistently and continually to keep humans and animals safe and healthy.

Now let's talk about what each item you removed from your Pathogen Package represents in the real world, the biosecurity risks associated with it and the biosecurity measures you can take to reduce those risks.

10. Use Table 1 to guide a group discussion about the contents of the Pathogen Packages (including the plate and flour) and the biosecurity risks and biosecurity measures associated with them.

11. Read aloud or paraphrase the following:

By now you may be thinking that nearly everything in an animal housing facility can be a biosecurity risk. And you're right. That's why it's so important for us to carefully inspect our facilities and then implement the appropriate biosecurity measures related to what we find to help reduce the risk of spreading diseases. We need to inspect:

- *Animal housing and pasture areas*
- *Feed storage and delivery systems*
- *Automatic waterers, water tanks, water buckets and water troughs*
- *Animal handling equipment (both the everyday and show equipment)*
- *Products we use with and around our animals, such as healthcare-related products*

We also need to be on the lookout for items that are misplaced or improperly stored in animal housing areas, whether accidentally or on purpose, because of the biosecurity risks they pose. Remember to also practice biosecurity measures in places where your animals tend to spend only a short time, such as trailers and crates. Those areas can also be contaminated and should be inspected, cleaned and disinfected regularly.

12. Remind the group that taking steps to reduce health risks and improve animal care is a great biosecurity practice, then ask for volunteers to name some biosecurity measures that haven't been mentioned yet that animal producers could follow to help reduce disease risks. Record their

answers on flipchart paper and display the sheet where everyone can see it. A variety of measures that you could work into the discussion follow:

- Check your animals frequently for signs of sickness or injury.
- Isolate any sick animals and care for them after you've taken care of the healthy animals.
- Separate new animals from each other and from resident animals for 21 to 30 days, if possible.
- Don't wear or store barn boots inside the house.
- Wear different shoes or boots at the fair than you do around your own barn.
- Ask health-related questions about any animals you're considering buying or bringing onto your property before you do so.
- Disinfect any shared equipment between animals.
- Require all visitors to wear disposable boots or shoe covers you provide.
- Require visitors to disinfect their vehicle tires when they arrive at your farm or to park as far away from the animal facilities as possible.
- Create and post copies of an emergency contact sheet in every building and animal facility on your farm that includes contact information for: Local police, fire, ambulance and other emergency services • Your local veterinarian • Your family (home, work, and cellphone numbers) • An emergency contact who doesn't live on your farm
- Maintain sound animal care and management practices such as the following good production practices described in Youth Pork Quality Assurance Handbook (Pork Checkoff, 2013), including:
 - Develop an appropriate Veterinarian/Client/Patient Relationship (VCPR) as the basis for medication decision-making.
 - Establish and implement an efficient and effective health management plan.
 - Use antibiotics responsibly.
 - Properly store and administer animal health products.
 - Follow proper feed processing protocols.
 - Establish effective animal identification practices, medication records and withdrawal times.
 - Practice good environmental stewardship.
 - Maintain proper workplace safety.
 - Provide proper animal care to improve animal wellbeing.
 - Use tools for continuous improvement.
- Consider also putting these practices into place:
 - Make sure that the rations you're feeding are meeting your animals' nutrient requirements.
 - Provide easy access to plenty of fresh, clean water.
 - Ensure that your animals' housing facilities are well-ventilated, but not drafty.
 - Protect your animals from extreme weather.

13. To summarize, read aloud or paraphrase the following: Although we can never fully prevent human and animal illness, consistent attention to biosecurity measures will help reduce disease risks, and can also benefit your financial bottom line as a producer. You're part of the agriculture industry, and your efforts to keep your animals healthy ultimately help ensure the safety of our entire food supply. Keep in mind what we learned from the Biosecurity CHIP diagram, noting

the cleanliness, history, isolation and proper management practices that are so important in keeping our animals healthy.

14.(Optional) Distribute the “Biosecurity CHIP: Basics of Biosecurity” resource sheet and encourage the participants to take it home and review it occasionally as a refresher about sound biosecurity practices to follow.

ADAPTATIONS & EXTENSIONS:

For older or more experienced participants:

- Have participants brainstorm a list of ways that they can help reduce risk at the local fair or other animal-related events. Then have them research and prepare a presentation on the topic that they could share with the fair board or 4-H livestock or specie specific council.
- Challenge teen leaders to travel to younger participants’ barns to help them identify ways that they can reduce biosecurity risks. Have the teens help younger members choose one biosecurity practice and work to keep it up throughout the 4-H year.

For younger or less experienced participants:

- Tell the participants before they start searching exactly how many of each item they are looking for in their Pathogen Packages.
- Include fewer pathogen items in the Pathogen Packages. Also consider leaving out the brown sugar or using brown sugar that has dried out and is clumpier so that participants can sort it out of the flour more easily.
- Help participants come up with a creative song, slogan or catchphrase about keeping themselves and their animals safe. For example, a poster could feature a photo or drawing of a pig and be captioned “Be healthy around animals. People and animals can share germs.”

TALKING IT OVER:

Ask the group the following questions. What steps can you put into place to reduce risks and improve the biosecurity of your 4-H project animals? What biosecurity practices can you help put into place at local fairs or other animal-related community events you attend or participate in? How can you help reduce risk of animal disease and harm in your community? Why is it important for humans to consider animal well-being and health as they plan their own actions and activities related to and around animals?

REFERENCES & RESOURCES:

References

- American Association of Swine Veterinarians & National Pork Board. (2013). A champions guide to youth swine exhibition: Biosecurity & your pig project. Des Moines, IA: National Pork Board. Retrieved from

<http://porkcdn.s3.amazonaws.com/sites/all/files/documents/NPB%20A%20Champions%20Guide%20to%20Youth%20Swine%20Exhibition.pdf>

- Michigan 4-H Youth Development. (2014). 4-H animal science anywhere: Basics of biosecurity [4H1661]. East Lansing: Michigan State University, MSU Extension. Retrieved from http://msue.anr.msu.edu/uploads/236/65684/4H1661_AnimalScienceAnywhereBiosecurity.pdf
- National Research Council. (2012). A framework for K-12 science education: Practices, crosscutting concepts, and core ideas. Washington, DC: National Academies Press.
- Pork Checkoff. (2013). Youth pork quality assurance plus handbook (version 2.0). Des Moines, IA: National Pork Board. Retrieved from <http://porkcdn.s3.amazonaws.com/sites/all/files/documents/YouthPQAPlus/2014/YPQAhandbook.pdf>

Resources

Visit these online resources for more information about biosecurity.

Michigan Department of Agriculture and Rural Development (michigan.gov/mdard/) –

- Backyard biosecurity – Dr. Nancy Barr, MDARD. (2015). Retrieved from <https://www.youtube.com/watch?v=BDnWRQynY2w>
- Fair biosecurity recommendations. (n.d.) Retrieved from http://michigan.gov/documents/mdard/Resource_2_-_Fair_Biosecurity_Recommendations_449295_7.pdf
- Generally accepted agricultural and management practices for the care of farm animals. (2015). Retrieved from http://michigan.gov/documents/mdard/2015_CARE_OF_FARM_ANIMALS_GAAMPs_480521_7.pdf
- 2016 exhibit requirements for livestock exhibited in Michigan. (2016). Retrieved from http://michigan.gov/mdard/0,4610,7-125-1571_7075---,00.html

Michigan State University Extension (msue.anr.msu.edu) – MSU Extension offers a variety of resources on biosecurity and animal health. Selected MSU Extension resources related to animal health and biosecurity follow.

- Be a zoonotic disease detective (2014, 4H1671, adapted from Georgia 4-H). Retrieved from http://msue.anr.msu.edu/uploads/236/60789/MI_4-H_Zoonotics-WEB.pdf
- Biosecurity sign for visitors. (n.d.). Retrieved from http://msue.anr.msu.edu/uploads/235/63481/biosecure_sign_lg.pdf
- What if we could see germs? (2013). Retrieved from http://msue.anr.msu.edu/news/what_if_we_could_see_germs

Animal and Plant Health Inspection Service (<https://www.aphis.usda.gov/wps/portal/aphis/home>) –

APHIS is a division of the U.S. Department of Agriculture. The APHIS website explains: “Our Mission - To protect the health and value of American agriculture and natural resources. The Animal and Plant Health Inspection Service is a multifaceted Agency with a broad mission area that includes protecting and promoting U.S. agricultural health, regulating genetically engineered organisms, administering the Animal Welfare Act and carrying out wildlife damage management activities. These efforts support the overall mission of USDA,

which is to protect and promote food, agriculture, natural resources and related issues.” Selected APHIS resources related to animal biosecurity follow.

- Biosecurity: Protecting your livestock and poultry. (2007). Retrieved from https://www.aphis.usda.gov/publications/animal_health/content/printable_version/fs_bio_sec_07.pdf
- Biosecurity tips for horse owners. (2014). Retrieved from https://www.aphis.usda.gov/publications/animal_health/2014/fsc_equine_biosecurity.pdf
- Biosecurity – Biosecurity principles. (2013). Retrieved from https://www.aphis.usda.gov/animal_health/emergency_management/downloads/ed_materials/bio_principles_handout.pdf

Center for Food Security and Public Health (<http://www.cfsph.iastate.edu/>) – The center is located at the Iowa State University College of Veterinary Medicine and according to the website, is supported “through grants and cooperative agreements from federal and state governments and industry and nonprofit organizations.” The organization provides a variety of print, online and video resources for veterinarians, agriculture producers and the public. They also offer PDF files (at http://www.cfsph.iastate.edu/Infection_Control/Sign/index.php) of signs and visitors information on a variety of biosecurity-related signs that can be printed, laminated and posted around the farm.

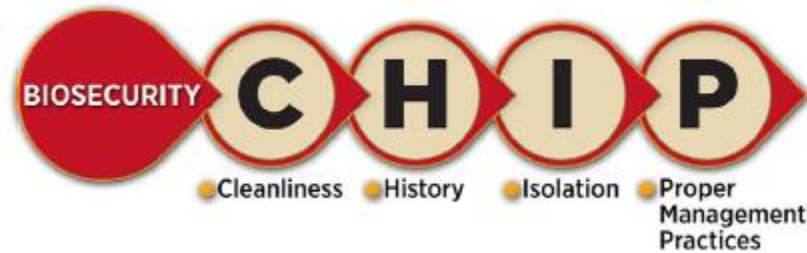
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The Biosecurity CHIP



Biosecurity related to animal and human interactions is broken down into four basic principles. One way you can remember these principles is by thinking of the word “CHIP.”

“C” is for **cleanliness.**

Cleanliness starts with keeping both your animals and the equipment you use on and around them clean. Sharing grooming equipment is one of the most common ways that pathogens spread, because their surfaces can be easily contaminated with hair, dander and other debris. Avoid sharing equipment with others at shows or other animal events without properly cleaning it between animals (for example, by soaking it in a 6-percent bleach solution, then rinsing it thoroughly). If your animals will be sharing equipment such as trailers and feed and water buckets, make sure the items are safe, are clean and have been recently disinfected before using them.

Human health and personal hygiene are also part of the cleanliness step of biosecurity. Ringworm, E. coli, salmonella and other pathogens can pass from animals to humans and humans to animals. Wash your hands with soap and water after handling animals, and keep your clothing and shoes clean to help prevent the spread of pathogens.

“H” is for **history.**

Ask questions about any animals you’re considering buying before you purchase them. The first step in disease prevention is to be as familiar as possible with the general animal health and management practices of the operation you’re buying from. Knowing the diseases that animals have been vaccinated against is another way to prevent a variety of pathogens and be more prepared for future health concerns. Again, don’t be afraid to ask questions! They’ll save you time and money in the long run.

Check with all visitors to your farm to see if they have traveled to an area that may be infected with a pathogen that could spread to you or your animals (for example, foot and mouth disease is still a problem in the United Kingdom).

“I” is for isolation.

When new animals arrive on your farm, keep them separate from other animals for at least 14 days, and if possible, 30 days. This helps reduce the number of animals that would get sick if a newcomer brought a contagious disease into your facility. When returning from a show or other off-farm event, initially keep the returning animals separate to avoid passing along any infections they may have been exposed to.

Keep your clothes and shoes or boots separate, too. Don't wear the same boots you wear in your barn to a show or fair, if possible. Diseases like the deadly Porcine Epidemic Diarrhea virus (PEDv) are spread via fecal matter, and shoes and boots are the most common carriers of manure, and therefore, the pathogen. Consider drawing a line that no barn shoes are allowed to cross to help avoid such contamination.

“P” is for proper management practices.

Proper animal management practices include observing your animals for signs of sickness, conducting appropriate vaccination programs and providing proper animal nutrition.

Controlling visitors' access to areas where your animals are housed and often travel is another important management practice. Be sure that your own and all visitors' shoes and boots are clean before and after visiting any farm. If you're not sure visitors' shoes and boots are clean, requiring everyone to wear disposable plastic boots that you provide is a good biosecurity safeguard. Some pathogens can also travel on clothes and on humans, so take extra precautions if there is an animal disease outbreak in your area or anywhere you or your animals are traveling.