

Basics of Biosecurity



Skill Level:

- ▶ Beginner to intermediate

Life Skills:

- ▶ Communication, critical thinking and disease prevention

Setting:

- ▶ An outdoor or indoor space where participants can easily hear; seating is optional

Time:

- ▶ 15–20 minutes

Materials:

- Markers
- Flipchart or other large paper
- Easel or display space
- Biosecurity bags (one per small group)
 - ▶ Paper lunch bags (one per small group)
 - ▶ 16 ounces dry kidney beans
 - ▶ 16 ounces penne (or similarly shaped) pasta
 - ▶ 3 ounces decorative food sprinkles
- “The Biosecurity of CHIP: Basics of Biosecurity” resource sheet (one per person, optional)

Overview:

The *Basics of Biosecurity* lesson is designed to introduce participants to the procedures and general concepts of biosecurity related to 4-H animal projects. The lesson features a hands-on component to help participants understand that we can't always see the biosecurity challenges we're facing.

Objective:

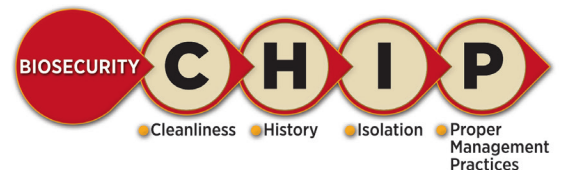
After completing this activity, participants will be able to:

- ▶ Describe why it's important for animal agriculture operations to consistently follow biosecurity measures.
- ▶ Describe animal disease prevention strategies.
- ▶ Identify and name the biosecurity practices currently in use in their own animal operations.

PROCEDURE:

Before the meeting:

1. Review the lesson and gather any supplies you will need. If you decide to distribute “The Biosecurity CHIP: Basics of Biosecurity” resource sheet, make one photocopy per person.



2. Prepare one biosecurity bag for every three or four participants in your group. Place two shakes of sprinkles, one handful of pasta and one handful of kidney beans into each paper lunch bag. Fold over the tops of the filled lunch bags and set them on a table or other flat surface at the front of your meeting space.
3. Write the word “Biosecurity” at the top of a piece of flipchart paper and the word “CHIP” (one letter per line) down the left side of the page below the heading. Display the paper where everyone can see it, but keep it covered until the appropriate point in the lesson.
4. You may also want to recreate the following table on another sheet of flipchart paper. If you do, display it where everyone can see it, but keep it covered until the appropriate point in the lesson.

What's in the bag?

Item	What it represents	How it relates to biosecurity
Brown paper lunch bag	The environment (such as barns, trailers, stalls or pens, lots and pastures) and equipment (such as brushes, clippers, show sticks, blankets, halters, feed buckets and water troughs) that animals come into contact with and that could carry and spread germs	Can carry disease-causing pathogens from one animal to another if not cleaned carefully between uses.
Pasta	People	Can get sick from pathogens carried in the air, on equipment and by other humans and animals. Can carry the pathogens that spread illnesses to other people and animals.
Beans	Animals	Can get sick from pathogens carried in the air, on equipment and by other animals and humans. Can carry the pathogens that spread illnesses to other animals and people.
Sprinkles	Pathogens (disease-causing bacteria and viruses) – Note that the sprinkles are visible, but real pathogens are too small to be seen without a microscope.	Can cause diseases and be spread from farm to farm and animal to animal without proper biosecurity measures.

During the meeting:

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

Nearly every animal and human gets sick at some point. When an illness is caused by a pathogen (a virus or bacteria), it 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.

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 some of the biosecurity measures you should follow with your 4-H project animals and any other animals under your care. We'll start by working with biosecurity bags to discover the major players in biosecurity.

2. Divide the group into three- or four-person teams (depending on the size of your group and the number of biosecurity bags you've prepared). Have each group form a circle, then ask one person from each group to collect a biosecurity bag for the team.

3. Tell the group that when you say “go,” they should open their bags and – without taking anything out – look at what’s inside and talk about how those things could relate to biosecurity.
4. Give the teams a few moments to examine the contents of their lunch bags, then use the “What’s in a Bag” table to guide a group discussion of how each item in the bags relates to biosecurity. (**Note:** If you made one, uncover the “What’s in the Bag” flipchart paper so that everyone can refer to it during the discussion.)
5. Now tell the teams to close their lunch bags, give the bags a good shake, then reopen them and look to see if anything inside has changed.
6. Ask for volunteers to answer the following questions:
 - ▶ After you shook your team’s lunch bag, could you still see the disease-causing pathogens (sprinkles)? (*Some teams may answer yes, and others no.*)
 - ▶ Even if you couldn’t see the pathogens, were they still there? Why is that important? (*Because pathogens such as viruses and bacteria are so small that we can’t see them without a microscope. And even though we can’t see pathogens, they still have the potential to make both animals and humans ill.*)
7. Next, read aloud or paraphrase the following:

So why should we be concerned about biosecurity? As I said earlier, biosecurity is the set of steps we take to prevent animals from being infected with or spreading pathogens. Biosecurity is also a vital step in ensuring that our food supply is safe. Now we’re going to learn about the biosecurity measures we can use with the help of the Biosecurity CHIP.

8. Reveal the flipchart paper headed “Biosecurity” that has the word “CHIP” written down the side. As you discuss the meaning of each letter, write the corresponding word next to it. Continue with the lesson by reviewing “The Biosecurity CHIP: Basics of Biosecurity” resource sheet with the group. (**Note:** You may wish to pass out copies of the resource sheet now or after you’ve reviewed it with the group.)
9. Ask for volunteers to list some ways that they could practice the Biosecurity CHIP principles. (*Separate new animals, don’t take barn boots inside the house, wear different shoes or boots at the fair than you do around your own barn, ask questions about any animals you’re considering buying before you buy them, contact breeders to ask other questions, disinfect equipment between animals, require all visitors to wear disposable boots you provide*). Record their answers on flipchart paper and display the sheet where everyone can see it.

10. To summarize, read aloud or paraphrase the following:

By following the measures outlined in the Biosecurity CHIP, you'll help keep yourself and your animals healthy and help ensure the safety of our food supply. If your animals are exposed to a contagious illness, though, you'll need to work closely with your veterinarian to contain the outbreak. This will be easier if you already have an emergency plan in place and already have a veterinarian/client (you)/patient (animal) relationship.

ALIGNMENT TO SCIENCE & ENGINEERING PRACTICES:

How 4-H Increases Science Literacy

Nationally and in Michigan, 4-H has long enjoyed a reputation for engaging young people in positive, experiential (hands-on), and nonformal activities that are inquiry-based. The lessons in the *4-H Animal Science Anywhere* series can be used to enhance classroom science education in Michigan and elsewhere. The lesson activities are aligned with the eight Scientific and Engineering Practices (SEP) from *A Framework for K-12 Science Education* (National Research Council, 2012, p. 42).

The Michigan State Board of Education adopted a set of new state science standards in late 2015 that are based on the SEP. The activities in the *4-H Animal Science Anywhere: Basics of Biosecurity* lesson were evaluated for their alignment with the Scientific and Engineering Practices by MSU Extension Educator Tracy D'Augustino in 2016.

Table 2. How This Lesson Aligns With the Science and Engineering Practices (National Research Council, 2012, p. 42)

Science & Engineering Practice	Action	Activity Step
1. Asking questions and defining problems	Participants brainstorm reasons for biosecurity and the CHIP principles.	4 & 8
2. Developing and using models	Participants use the provided biosecurity bags as models for how pathogens can spread.	4
3. Planning and carrying out investigations		
4. Analyzing and interpreting data	Participants use the "What's in the Bag?" table and the CHIP resource sheet to discuss biosecurity measures.	4 & 8-9
5. Using mathematics and computational thinking	Participants discuss the steps needed to be biosecurity conscious.	8-9
6. Constructing explanations and designing solutions	Participants connect the items in the biosecurity bags to real life using the information provided and discuss ways to improve their biosecurity practices using the CHIP resource sheet.	4 & 8-9
7. Engaging in argument from evidence	Participants share different biosecurity measures they can take and explain why it will help improve biosecurity.	9
8. Obtaining, evaluating, and communicating information	Participants obtain information about biosecurity, evaluate it through their discussions, and share it with others during the lesson, at home, and at the fair and other events.	Whole lesson

ADAPTATIONS & EXTENSIONS:

- ▶ For older or more experienced participants:
 - Have participants brainstorm a list of ways that biosecurity practices can be improved 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 species-specific council.
 - Provide poster board, markers and other items for the participants to use in creating biosecurity signs for display at a local fair or educational event.
- ▶ For younger or less experienced participants: Help participants come up with a creative song, slogan or catchphrase about keeping themselves and their animals safe. For example, a poster could show a pig with the caption, “Help keep me healthy, wash your hands before you visit.”

REFERENCES & RESOURCES:

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 www.pork.org/filelibrary/NPB%20A%20Champions%20Guide%20to%20Youth%20Swine%20Exhibition.pdf

Michigan Department of Agriculture and Rural Development, Animal Industry Division (2014). *2014 exhibition requirements*. Lansing, MI: Author. Retrieved from michigan.gov/mdard/0,4610,7-125-1571_7075-300958--,00.html

Shulaw, W. P., & Bowman, G. L. (2001). *Biosecurity for youth livestock exhibitors*. Columbus: Ohio State University, OSU Extension. Retrieved from ohioline.osu.edu/vme-fact/0007.html

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Author: Julie Thelen, 4-H Livestock and Veterinary Science Educator, Michigan State University Extension

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TALKING IT OVER:

Ask the group the following questions.

- ▶ Why is it important for humans to consider animal well-being and health as they plan their own actions and activities around animals?
- ▶ What steps can you put into place to 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?

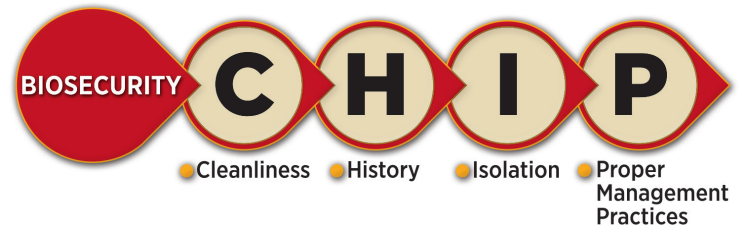
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The Biosecurity CHIP

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.