## HFHA Biosecurity Learning Module 4 Screenshots - Biosecurity Strategies

Screenshots of all module layers. Each screen is numbered in the order it appears in the module. Section 2 (separate document) includes accessibility screenshots for participants using screen readers.

<table>
<thead>
<tr>
<th></th>
<th>![Screenshot 1]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><img src="https://via.placeholder.com/150" alt="Image 1" /></td>
</tr>
<tr>
<td>2</td>
<td><img src="https://via.placeholder.com/150" alt="Image 2" /></td>
</tr>
<tr>
<td>3</td>
<td><img src="https://via.placeholder.com/150" alt="Image 3" /></td>
</tr>
</tbody>
</table>
Biosecurity Learning Modules

Biosecurity Learning Module - Healthyagriculture.org

What do you know about biosecurity?
This may be review for you. Drag and drop the groups of words below into the boxes above to create the definition of biosecurity.

Please complete activity to continue.

Correct
Select "Next" to continue.

Biosecurity is necessary for a variety of reasons.
Let's explore some of the main reasons below. Click on each box to learn more.

Prevent animal illness and suffering
Prevent zoonotic disease
Prevent economic loss
Keep food prices low for consumers
Positive public opinion
Keep trade open
Biosecurity is necessary for a variety of reasons.

Let's explore some of the main reasons below. Click on each box to learn more.

1. "Did you know that practicing good biosecurity prevents animals from getting sick or suffering? If animals get a disease that affects their lungs, like pneumonia, or one that gives them painful sores, like coronavirus, they may die. That's why I tell my veterinary clients that controlling the environment or vaccinating may prevent or reduce animal suffering."

   Positive public opinion
   Keep trade open

2. "Last week I noticed my lamb had a sore on its mouth. I opened its mouth and saw it had sores inside, too. Before I had a chance to tell my manager and the school bus company and I had to run to catch it. This week, some of my classmates and I have painful sores on our tongues."

   Prevent animal illness and suffering
   Positive public opinion
   Keep trade open

3. "For added income, my family and I hoped to buy a herd of high-quality registered dairy goats to produce breeding stock and dairy products for sale. We selected the best animals we could find, including a buck with a great pedigree. However, the buck became sick recently and was diagnosed with Scrope. Now we can't use any of our goat products for human food or keep sheep or goats on our farm for many years."

   Keep food prices low for consumers
   public opinion
   Keep trade open
Biosecurity is necessary for a variety of reasons. Let's explore some of the main reasons below. Click on each box to learn more.

- Prevent animal illness and suffering
- Prevent zoonotic disease
- Prevent economic loss
- Keep food prices low for consumers
- Positive public opinion
- Keep trade open

"I can't tell any of these animal diseases apart: BSE, FMD, Avian Influenza, E coli, listeria? I know some of them can make people seriously sick, and I have to protect my family, so I may just quit buying meat altogether."

"Hi. My business is selling day-old chicks internationally. Now that highly pathogenic Avian Influenza has been found in poultry farms in my state, I can't ship my chicks into any usual markets of Europe or Canada. Because more are hatching every day, and I don't have a way to shelter and feed them, I may have to euthanize them. I sure hope we can contain this outbreak and open up the borders for trade again soon."
Biosecurity Learning Modules

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Biosecurity Learning Modules

Explore the 5 Routes of Infection

Ingestion
An animal or person can get sick by eating food, drink, or putting something in their mouth, like a finger or object, that carries the disease agent. This is one way porcine epidemic diarrhea (PED) is spread in pigs.

Inhalation
Some disease agents can be in the air that an animal or person breathes and then get into the lungs and cause disease. A good example of this route of infection is cows contracting aspergillosis by breathing in the fungal spores.

Breaks in skin
One of the skin’s main functions is to act as a barrier to keep out infections. But if there is a break in the skin, like a cut or a bite, some disease agents can get in to cause infection. This is what happens with rabies. A break in the skin is also the way that sheep and goats get caseous lymphadenitis, or CL for short, caused by Corynebacteria. Be careful! This is a zoonotic disease.

Biosecurity Learning Modules

Healthyagriculture.org
In utero
Disease agents can infect a fetus while it is in its mother’s uterus before being born. Bovine viral diarrhea, or BVD, can infect a fetus through the bloodstream.

Mucous membranes
Mucous membranes are moist membranes that line our eyes and all body cavities open to the exterior, such as respiratory, digestive, urinary and reproductive tracts. Disease agents can get absorbed by the mucous membrane to cause infections. For example, the mucous membrane of the eye is the main route of infection for pink eye.
We call this **means of transmission.**

**Means of transmission**

Routes of infection are the ways diseases get into the body.

But how are diseases spread among animals and between animals and people?

**Means of transmission**

How are diseases spread? By means of transmission. Here is one way of categorizing the means of transmission and a few of the terms used to describe them.

- Direct Contact
- Indirect Contact

**Fomites**

- Animal - Animal
- Animal - Human
- Fomite
- Vector

Diseases can be transmitted through direct contact when an animal (or human) comes in close contact with an infected animal.
How are diseases spread? By means of transmission, here is one way of categorizing the means of transmission and a few of the terms used to describe them:

**Direct Contact**
- Animal - Animal
- Animal - Human

**Indirect Contact**
- Fomite
- Vector

Animals can also spread diseases to humans through indirect contact. Diseases passed from animals to humans (directly or indirectly) are called zoonoses.
There are many places on a farm where disease transmission can occur. A useful way to think about sources of transmission is to sort them into four categories. Click on each picture to see what the categories are.
## Biosecurity Learning Module

### Biosecurity Strategies

**We use biosecurity strategies to prevent disease transmission.**

Listen to the following situations and think of some changes you could make to prevent disease transmission.

Come up with ideas for each scenario, then compare them with our suggestions.

<table>
<thead>
<tr>
<th>Photos with Audio Stories</th>
<th>What strategies could you use to address the concern?</th>
<th>Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal-Animal</td>
<td>type the strategy you would use here</td>
<td>Compare</td>
</tr>
<tr>
<td>People on the Farm</td>
<td>type the strategy you would use here</td>
<td>Compare</td>
</tr>
<tr>
<td>Contaminated Food/Water</td>
<td>type the strategy you would use here</td>
<td>Compare</td>
</tr>
<tr>
<td>Equipment, Vehicles, &amp; Facilities</td>
<td>type the strategy you would use here</td>
<td>Compare</td>
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*Please complete activity to continue.*

Close
### Biosecurity Learning Module

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<td>type the strategy you would use here</td>
<td>Compare</td>
</tr>
<tr>
<td>Equipment, Vehicles, &amp; Facilities</td>
<td>type the strategy you would use here</td>
<td>Clean and disinfect all tools between grooming goats. Don’t borrow equipment.</td>
</tr>
</tbody>
</table>
The Skip ahead is a little slow.
Click the "X" to close each pop up box.
<table>
<thead>
<tr>
<th>Page</th>
<th>Biosecurity Strategies</th>
<th>Exploration points left</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Old Barn</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Area A</td>
<td></td>
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<td></td>
<td>Old, contaminated</td>
<td>3</td>
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<tr>
<td></td>
<td>wooden rails in feed</td>
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<td></td>
<td>area</td>
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<td>- Facilities that are</td>
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<td>structures or dirt</td>
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<td>stains) can harbor</td>
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<td></td>
<td>disease-causing agents;</td>
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<td></td>
<td>a buildup of &quot;food&quot;</td>
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<td>things can overwhelm</td>
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<td></td>
<td>animal and cause</td>
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</tr>
<tr>
<td>11</td>
<td>Old Barn</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Area A</td>
<td></td>
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<tr>
<td></td>
<td>&quot;Smell that ammonia</td>
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<td></td>
<td>from the wet</td>
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<tr>
<td></td>
<td>bedding? Not enough</td>
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<tr>
<td></td>
<td>airflow in this barn?&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poor ventilation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Air in ammonia from</td>
<td></td>
</tr>
<tr>
<td></td>
<td>hay and feed can irritate</td>
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<tr>
<td></td>
<td>linings of the nose,</td>
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<td></td>
<td>throat, and lungs and</td>
<td></td>
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<tr>
<td></td>
<td>increase likelihood of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>respiratory disease</td>
<td></td>
</tr>
</tbody>
</table>
Biosecurity Strategies

Area A

Exploration points left
1

Old Barn

The Okons house their weaned heifers in the old barn. Click on each image framed in white for more information about the disease transmission source and the risks it poses. Hide info after viewing each image.

Skid steer in barn

* Vehicles, tires, or skid steer's shoes could be contaminated and spreading disease agents.

Biosecurity Strategies List

CLOSE

Biosecurity Strategies

Area A

Exploration points left
1

Bred Heifer Barn, Old Barn, Barnyard

This area contains several sources of potential disease transmission. What risks do they pose? Click on the magnifying glasses to get a closer look and click each picture with a white frame to review the specific risks.
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Biosecurity Strategies

**Bred Heifer Barn, Old Barn, Barnyard**
This area contains several sources of potential disease transmission. What risks do they pose? Click on the magnifying glasses to get a closer look and click each picture with a white frame to review the specific risks.

- Dave’s brother just delivered a new heifer they bought for a good price at the sale barn.
- New or returning animals
- Lack of quarantine for incoming animals allows new animals to spread disease to existing animals.
- Shoes, certain marketed ligating, breeder shoes are the most likely cause of disease introduction.

Biosecurity Strategies

Let’s explore the strategies.
Drag and drop the strategies for each source that can be used to reduce the risks. You can also refer to the Strategies List in your Resources.

- Chronically sick animal
- Brother-in-law’s bull
- New heifer from sale barn
- Poor ventilation
- Skid steer in barn
- Contaminated wooden rails

Biosecurity Strategies

Let’s explore the strategies.
Drag and drop the strategies for each source that can be used to reduce the risks. You can also refer to the Strategies List in your Resources.

- Chronically sick animal
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Biosecurity Learning Modules Healthyagriculture.org
Let’s explore the strategies.

Drug and drop the strategies for each source that can be used to reduce the risks. You can also refer to the Strategies List in your Resources.

Correct

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronically sick animal</td>
<td>Cull animals that do not respond to treatment, or that are asymptomatic disease carriers.</td>
</tr>
<tr>
<td>Brother-in-law’s bull</td>
<td>Use AI for breeding whenever possible; do not share breeding males between farms.</td>
</tr>
<tr>
<td>New calf from sale barn</td>
<td>Have a closed herd (grow own replacements; do not take livestock to shows).</td>
</tr>
<tr>
<td></td>
<td>Quarantine herd additions or returns.</td>
</tr>
<tr>
<td></td>
<td>If you do buy animals, purchase healthy, test-negative animals. (Don’t buy from auction yards).</td>
</tr>
<tr>
<td>Poor ventilation</td>
<td>Ensure good air quality through effective barn ventilation systems.</td>
</tr>
<tr>
<td>Skill steer in barn</td>
<td>Clean and disinfect vehicles, equipment, facilities.</td>
</tr>
<tr>
<td></td>
<td>Separate equipment for feed and manure.</td>
</tr>
<tr>
<td>Contaminated wooden rails</td>
<td>Avoid dirt and wood-based facilities.</td>
</tr>
</tbody>
</table>

Biosecurity Strategies List

Here is your Biosecurity Risk Report and Action Plan so far.

Biosecurity Risk Report and Action Plan

Farm Name: Olson Farm  
Date: 02/08/22  
Biosecurity Investigator: Bob  
Livestock Type: Dairy

Potential Disease Transmission Sources

<table>
<thead>
<tr>
<th>Source</th>
<th>What is the risk?</th>
<th>What strategies can be used to reduce the risk?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle farm, visitors, and terns</td>
<td>Contaminated farm environment and other animals.</td>
<td>Cull animals that do not respond to treatment or that have contagious disease carriers.</td>
</tr>
<tr>
<td>Borrowed bull</td>
<td>Some animals carry diseases without showing signs of illness.</td>
<td>Use AI for breeding whenever possible. Don’t share breeding males between farms.</td>
</tr>
<tr>
<td>New or returning animals</td>
<td>Lack of quarantine for incoming animals allows new animals to spread disease to existing animals.</td>
<td></td>
</tr>
<tr>
<td>Poor ventilation</td>
<td>Air and dust/smoke from barn and pens contaminate lungs of the new, old, clean, and tory are the most likely cause.</td>
<td></td>
</tr>
<tr>
<td>Vehicle in barn</td>
<td>Vehicles, tools, or other's shoes could be contaminated and spreading.</td>
<td>Ensure good air quality through effective barn ventilation systems.</td>
</tr>
<tr>
<td>Contaminated facility</td>
<td>Indicates recent access and contamination by infected livestock.</td>
<td>Avoid dirt and wood-based facilities.</td>
</tr>
</tbody>
</table>

Biosecurity Strategies List

Given the importance of hand washing, test your knowledge. See how well you do on this short self-test.

When should you wash your hands?

- Before eating
- After handling animals
- Anytime they are dirty
- Anytime you want to keep from getting ill
- All of the above

Submit
Biosecurity Strategies

Given the importance of hand washing, test your knowledge. See how well you do on this short self-test.

Question 1 of 4

When should you wash your hands?

- Before eating
- After handling animals
- Anytime they are dirty
- Anytime you want to keep from getting ill
- All of the above

Submit

Correct!

Select “Next” to continue.

Biosecurity Strategies List  BACK  NEXT

Biosecurity Strategies

Do you know how to wash your hands properly? See how well you do on this short self-test.

Question 2 of 4

When is sanitizing hand gel use NOT acceptable for disease prevention?

- When hands are not visibly dirty
- When soap and water are not available
- When hands are covered with dirt and/or manure

Submit

Correct!

Select “Next” to continue.

Biosecurity Strategies List  BACK  NEXT
<table>
<thead>
<tr>
<th>Page</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td><img src="image17.png" alt="Image" /></td>
</tr>
<tr>
<td>17</td>
<td><img src="image17.png" alt="Image" /></td>
</tr>
<tr>
<td>18</td>
<td><img src="image18.png" alt="Image" /></td>
</tr>
</tbody>
</table>

Video Length = 1 minute, 27 seconds
Cleaning and Disinfecting (C&D)

Help close put together a visual aid to show employees how to clean and disinfect their boots. Drag and drop the images below into the lower section in the right order. Roll over each image for a description or click to enlarge. To close image, hover over the X in the upper right corner and click when the arrow becomes a pointer.

Biosecurity Strategies

You also probably know it’s important to have clean footwear and clothes when you work with animals. But for disease prevention and control, everything that comes in contact with the animals and their environment needs to be clean and disinfected. (Remember indirect contact?)

Cleaning and Disinfection Protocol

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
<th>Step 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 5</td>
<td>Step 6</td>
<td>Step 7</td>
<td></td>
</tr>
</tbody>
</table>

Remove all grossly visible debris. The presence of gross contamination or organic material, especially feces, will inactivate most disinfectants.
Biosecurity Learning Modules

HealthyFarms

HealthyAgriculture.org
19

Biosecurity Strategies

Cleaning and Disinfecting (C&D)

Help clean out together a visual aid to show employees how to clean and disinfect their boots. Drag and drop these images below into the lower section in the right order. Roll over each image for a description or to enlarge. To close image, hover over the X in the upper right corner and click when the arrow becomes a pointer.

**C&D Protocol**  **Biosecurity Strategies List**  **<BACK NEXT>**

20

Click “Skip Ahead” to move ahead to next activity.

*The skip action is slow.

Good job! Now let’s go on to the next area.

Select “Next” to move to another area.

21

Biosecurity Strategies

Freestall Barn and Milking Parlor

This area contains additional sources of potential disease transmission. What risks do they pose? Click on the magnifying glass to get a closer look and click each picture with a white frame to review the specific risks.
Biosecurity Learning Module s Healthyagriculture.org

21

![Image of a milking parlor with text: "Vaccines/medicines left on tabletop. Temperatures that are too high or too low can inactivate vaccines so they don’t work. Needles left in the caps of vaccines can introduce bacteria that can make animals sick."]

C&D Protocol | Biosecurity Strategies List | CLOSE

21

![Image of a milking parlor with text: "Exploration points left: 2""]

C&D Protocol | Biosecurity Strategies List | CLOSE

21

![Image of a freestall barn and milking parlor with text: "Freestall Barn and Milking Parlor. This area contains additional sources of potential disease transmission. What risks do they pose? Click on the magnifying glass to get a closer look and click each picture with a white frame to review the specific risks."]

C&D Protocol | Biosecurity Strategies List | BACK NEXT
Biosecurity Learning Modules

Outside Milking Parlor
What are the potential disease transmission sources shown here?
Do you know the risks they present? Click on each image framed in white for more information about the disease transmission source and the risks it poses. Hide info after viewing each image.

Exploration points left
1

Visiting caregivers (self, family, vet, etc.)
Caregivers often go from farm to farm and can carry disease agents on their hands, clothing, and equipment.

Exploration points left
0

Dirty boots and clothes
Clothing, equipment, etc. can carry and spread disease agents to healthy animals.

C&D Protocol | Biosecurity Strategies List | CLOSE
**Outside Milking Parlor**
What are the potential disease transmission sources shown here? Do you know the risks they present? Click on each image framed in white for more information about the disease transmission source and the risks it poses. Hide info after viewing each image.

**Freestall Barn and Milking Parlor**
This area contains additional sources of potential disease transmission. What risks do they pose? Click on the magnifying glasses to get a closer look and click each picture with a white frame to review the specific risks.

**Area B: Strategies**
Which of these strategies should be used to reduce disease transmission by visiting caregivers?

- Restrict visitors; keep a log of visitors
- Clean and disinfect (C&D) before and after working with animals
- Use clean personal protective equipment or PPE (gloves, boots, coveralls)
- All of the above
Biosecurity Learning Modules

Area B: Strategies

Which of these strategies should be used to reduce disease transmission by visiting caregivers?

- Restrict visitors; keep a log of visitors
- Clean and disinfect (C&D) before and after working with animals
- Use clean personal protective equipment (PPE) like gloves, boots, coveralls

Correct!

Select "Next" to continue.
Area B: Strategies

Which of these strategies will reduce disease transmission by your workers? Select all that apply.

- Discourage employees from owning the same species of livestock.
- Wash hands; clean and disinfect (C&D) footwear and equipment; shower in/out.
- Wear the same clothing and footwear at home and work.
- Use clean personal protective equipment (PPE) like gloves, boots, and coveralls.

Correct! Select “Next” to continue.
Area B: Strategies
Animals need to be vaccinated against diseases of concern, but if vaccines (and medicine) are not stored properly they lose their effectiveness or can become contaminated.

Check all the statements that are examples of correct storage:

- Keep vaccines and medicine in the freezer
- Wipe tops of bottles with alcohol and keep them covered to keep them sterile.
- Read and follow manufacturer’s instructions on label.

Incorrect. Correct answers are outlined. Select “Next” to continue.

Biosecurity Risk Report and Action Plan
Farm Name: Olson Farm
Date: 08/08/22
Biosecurity Investigator: Bob
Livestock Type: Dairy

<table>
<thead>
<tr>
<th>Potential Disease Transmission Sources</th>
<th>What is the risk?</th>
<th>What strategies can be used to reduce this risk?</th>
</tr>
</thead>
</table>
| Area A: Vaccines and Meds being stored in a freezer, etc. | Vaccines may change over time and can carry disease agents on their own. | Store vaccines in a clean, dry area with a temperature of 2-8°C (36-46°F).  
- Use proper ventilation and aseptic techniques.  
- Use clean, well-kept equipment. |
| Area B: Vaccines and Meds being stored in a refrigerator, etc. | Vaccines may change over time and can carry disease agents on their own. | Store vaccines in a clean, dry area with a temperature of 2-8°C (36-46°F).  
- Use proper ventilation and aseptic techniques.  
- Use clean, well-kept equipment. |
| Area C: Vaccines and Meds being stored in a freezer, etc. | Vaccines may change over time and can carry disease agents on their own. | Store vaccines in a clean, dry area with a temperature of 2-8°C (36-46°F).  
- Use proper ventilation and aseptic techniques.  
- Use clean, well-kept equipment. |

Good job! Now let’s go on to the next area.
Explore the areas for sources of disease transmission risk. Remember to think about ways you could reduce this risk as each point is presented.

Select “Next” to move to another area.
Calf Hutches

This area contains five sources of potential disease transmission. What risks do they pose? Click on the magnifying glasses to get a closer look and click each picture with a white frame to review the specific risks.

Please complete activity to continue.

Biosecurity Learning Modules

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<table>
<thead>
<tr>
<th>Exploration points left</th>
<th>C&amp;D Protocol</th>
<th>Biosecurity Strategies List</th>
<th>CLOSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exploration points left</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exploration points left</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Biosecurity Learning Modules

1. Biosecurity Strategies Activity
   - Click on two boxes at a time until you've matched a Source of Risk photo with its corresponding Strategy. Keep trying until all the boxes disappear.

2. Biosecurity Risk Report and Action Plan
   - Farm Name: Olson Farm
   - Date: [blank]
   - Biosecurity Investigator: [blank]
   - Livestock Type: Dairy

   Potential Disease Transmission Sources
   - What is the risk?
   - What strategies can be used to reduce the risk?

3. Good job! Now let's go on to the next area.
   - Explore the areas for sources of disease transmission. (Note: Remember to think about ways you could reduce the risk as you go through each area.)

4. Skip ahead
   - If you have finished the Suggested Transmission Risk Learning Module and want to skip ahead, select this button.
What strategies would you recommend to reduce the risk posed by each of these sources of disease transmission?

Using the Biosecurity Strategies List below, write in your own words the strategy you would recommend for each source of disease transmission.

<table>
<thead>
<tr>
<th>Source of disease transmission</th>
<th>Your recommendation</th>
<th>Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please write down your ideas first to continue.

Close
### Biosecurity Strategies

**What strategies would you recommend to reduce the risk posed by each of these sources of disease transmission?**

Using the Biosecurity Strategies List below, write in your own words the strategy you would recommend for each source of disease transmission.

<table>
<thead>
<tr>
<th>Source of disease transmission</th>
<th>Your recommendation</th>
<th>Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal-Animal</td>
<td></td>
<td>- Prevent contact with neighboring animals or their discharges through water, air, or direct fence-line contact.</td>
</tr>
<tr>
<td>People on the Farm</td>
<td></td>
<td>- Wash hands and disinfect S.3.5.3.1 before and after entering farm.</td>
</tr>
<tr>
<td>Contaminated Feed and Water</td>
<td></td>
<td>- Wash equipment and keep it clean.</td>
</tr>
<tr>
<td>Equipment, Vehicles, and Facilities</td>
<td></td>
<td>- Establish effective barrier ventilation systems.</td>
</tr>
</tbody>
</table>

- Prevent contact with neighboring animals or their discharges through water, air, or direct fence-line contact.
- Wash hands and disinfect S.3.5.3.1 before and after entering farm.
- Wash equipment and keep it clean.
- Establish effective barrier ventilation systems.

**Close**
Biosecurity Learning Modules

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Biosecurity

Biosecurity Strategies

What strategies would you recommend to reduce the risk posed by each of these sources of disease transmission?

Using the Biosecurity Strategies List below, write in your own words the strategy you would recommend for each source of disease transmission.

<table>
<thead>
<tr>
<th>Source of disease transmission</th>
<th>Your recommendation</th>
<th>Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>your answer</td>
<td>Do not share equipment with others</td>
<td></td>
</tr>
<tr>
<td>your answer</td>
<td>Have separate equipment for feed and manure</td>
<td></td>
</tr>
<tr>
<td>your answer</td>
<td>Clean and disinfect vehicles, equipment, facilities</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Have an effective on-farm computing system for manure and mortality data</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Manage manure effectively</td>
<td></td>
</tr>
</tbody>
</table>

Here is your Biosecurity Risk Report so far.

Biosecurity Risk Report and Action Plan

Farm Name: Olson Farm  Date: 5/26/23
Biosecurity Investigator: spgs  Livestock Type: Dairy

Potential Disease Transmission Sources

What is the risk?

What strategies can be used to reduce the risk?

Area I:  Pasture

Potential disease agents can be spread by manure contact and feed contaminated with manure or feed.

• Do not share equipment with others

Area II:  Feed

Potential disease agents can be spread by manure contaminated with feed or feed contamination with manure.

• Have separate equipment for feed and manure

Area III:  Manure

Potential disease agents can be spread by manure contaminated with feed or feed contamination with manure.

• Clean and disinfect vehicles, equipment, facilities

Area IV:  Shared equipment

Potential disease agents can be spread by equipment contaminated with feed or feed contamination with manure.

• Manage manure effectively

Costs of Biosecurity

Our list of biosecurity strategies includes 25 different strategies. That’s a lot of strategies to put in place and most farmers can’t afford to do them all at once. Some strategies cost a lot and others are fairly cheap. But we can’t just look at what’s cheapest to do. We have to consider costs of NOT preventing disease.

Take a look at some examples of costs presented below and place them in the correct column.

Costs to Consider in Deciding if a Biosecurity Plan Needed

<table>
<thead>
<tr>
<th>Cost of prevention</th>
<th>Cost of treatment</th>
<th>Poor performance</th>
<th>Animal loss</th>
<th>Contamination</th>
</tr>
</thead>
</table>

Contamination of food or water
### Costs of Biosecurity

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Take a look at some examples of costs presented below and place them in the correct column.

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<th>Cost of Treatment</th>
<th>Poor Performance</th>
<th>Animal Loss</th>
<th>Contamination</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Veterinary fees</td>
<td>Loss of milk</td>
<td>Calling animals</td>
<td>Contamination of food or water</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Medications</td>
<td>Labor costs</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Can you think of other costs?

Type your text here:

C&D Protocol | Biosecurity Strategies List | <BACK NEXT>

---

### Vaccination Example

Let’s say you have a herd of beef cattle consisting of 100 cows and 100 calves.

To replace a bred cow would cost $1500 or more.

Wearied steer calves are worth $700.

A loss of a calf due to abortion equals the value of one calf at weaning ($700).

The cost for BVD vaccination is $34/calf for a total of $3500 for your herd.

<table>
<thead>
<tr>
<th>Expenses of vaccinating and not vaccinating</th>
<th>Less Disease</th>
<th>Cost of Vaccination ($/calf)</th>
<th>Cost of Bred Cow Deaths ($1500/cow)</th>
<th>Cost of Weaned Steer Deaths ($700/calf)</th>
<th>Cost of Abortions ($700/calf)</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0</td>
<td>1500</td>
<td>1</td>
<td>2</td>
<td>$0</td>
</tr>
</tbody>
</table>

Submit
Biosecurity Strategies

Vaccination Example

Let's say you have a herd of beef cattle consisting of 100 cows and 100 calves.

To replace a bred cow would cost $1500 or more.

Weaned steer calves are worth $700.

A loss of a calf due to abortion equals the value of one calf at weaning ($700).

The cost for BVD vaccination is $3/calf for a total of $300 for your herd.

<table>
<thead>
<tr>
<th>Expenses of vaccinating and not vaccinating</th>
<th>Less Disease Cost</th>
<th>More Disease Cost</th>
<th>Vaccination Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of vaccination ($3/calf)</td>
<td>0</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Cost of bred cow deaths ($1500/cow)</td>
<td>1</td>
<td>1500</td>
<td>0</td>
</tr>
<tr>
<td>Cost of weaned steer deaths ($700/calf)</td>
<td>1</td>
<td>700</td>
<td>0</td>
</tr>
<tr>
<td>Cost of abortions ($700/calf)</td>
<td>2</td>
<td>1400</td>
<td>0</td>
</tr>
<tr>
<td>Total Costs</td>
<td>$ 3600</td>
<td>$ 36000</td>
<td>$ 300</td>
</tr>
</tbody>
</table>

Can you afford to vaccinate...?
Can you afford NOT to??

FYI: While vaccination is not a guarantee of no disease, it significantly reduces the risk.

Additional Benefits to a Biosecure Farm

There are other advantages to having a biosecure farm. Can you think of some?

Type your text here

Please complete activity to continue.
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Additional Benefits to a Biosecure Farm

There are other advantages to having a biosecure farm. Can you think of some?

Type your text here

Did you think of any of these?
- Protect against many diseases, even new, as yet unknown, diseases
- Improved relations with neighbors and agricultural community
- Consumer trust in products
- Open trade outlets

Effectiveness

Use these words to fill in the blanks:

<table>
<thead>
<tr>
<th>strategy</th>
<th>bang</th>
<th>buck</th>
<th>cost effectiveness</th>
<th>risks</th>
</tr>
</thead>
</table>

Besides cost, it is also important to consider how effective a strategy is. Some are very effective at reducing risks while some only help a little.

In other words, which strategies are worth the cost of implementing them... ...which give us the biggest bang for our buck!
Printable C&D Protocol and Biosecurity Strategies List are included at the end of this document.

Bang for the Buck
Open the Biosecurity Strategies List and select strategies you recommend. Close this list to see how much of the hidden image you have uncovered. Go back to the list and keep selecting strategies until you uncover the image or run out of money.

Instructions
### Biosecurity Strategies

**Using this list, see if you can uncover the hidden picture before you run out of money.**

**Each strategy will reveal more of the picture depending on how effective it is.**

<table>
<thead>
<tr>
<th><strong>Bang for the Buck</strong></th>
<th><strong>Efficiency</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Effective</strong></td>
<td>$100</td>
</tr>
<tr>
<td><strong>Very Effective</strong></td>
<td>$200</td>
</tr>
<tr>
<td><strong>Extreme</strong></td>
<td>$300</td>
</tr>
</tbody>
</table>

**Instructions**

- Reduce animal to animal disease spread
- Reduce spread through people on the farm or off
- Grass roots, keep off of any area
- Present/absent testing of oral host disease species in these areas
- Control traffic: dirt road, fencing, vehicle access
- Manage feed, live animal/vehicle access to the farm and animal areas
- Ensure good quality through effective biosecurity systems
- Avoid high-risk areas (e.g., feedlots, composting areas, etc.)

**Biosecurity Strategies List**

- Close and disinfect the facility, equipment, and facilities
- Establish effective biosecurity (e.g., fencing, road, etc.) Control traffic to the farm
- Manage feed, live animal/vehicle access to the farm and animal areas
- Ensure good quality through effective biosecurity systems
- Avoid high-risk areas (e.g., feedlots, composting areas, etc.)

**C&D Protocol**

- Biosecurity Strategies List
- RETURN
Biosecurity Learning Module s Healthyagriculture.org
Ultimately the decision as to which biosecurity strategies and how many to implement is up to each farmer. One important question is how much tolerance does the farmer have for risk. Some people are more comfortable with accepting more risk of disease outbreaks in their operation than others.

Maybe they:
- Don’t think the risk of disease outbreaks is that high;
- Have enough cash flow and profit to absorb losses;
- Are willing to accept some losses.

But their tolerance for risk is affected by changing circumstances.

Let’s use an example of porcine epidemic diarrhea (PED), a disease that can cause severe diarrhea in sows and the death of up to 100% of piglets. So far there have been no cases in your state so you might be less interested in spending the money to put in a truck washing station.

With these new developments you might be less tolerant of the risk and decide you should vaccinate your animals (and perhaps implement other strategies as well). You need to balance your risk against the cost of disease prevention.
A Balancing Act

Each farmer needs to balance the costs of disease prevention against their perception and tolerance of risk.

With these new developments you might be less tolerant of the risk and decide you should vaccinate your animals (and perhaps implement other strategies as well). You need to balance your risk against the cost of disease prevention.

Biosecurity will decrease the probability of an infection exposure and curtail its effect. At the same time, strategies need to make some financial sense.

Every farm should have a biosecurity plan that includes short term and longer term goals and an emergency plan in the case of emerging disease outbreaks.

---

Top Recommendations for the Olson Farm

Open your biosecurity plan below and select your top recommendation for each farm area. Refer to the biosecurity strategies list to check cost effectiveness before you make your selection. Gliding on the recommendation will automatically fill in the blanks below. Compare your selection with that of two experts.

Area A:

Area B:

Area C:

Area D:
Biosecurity Learning Modules

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Biosecurity Risk Report and Recommendations for Biosecurity Strategies

Of the strategies listed, select what you think would be your one top recommendation for each area. Then submit your choices and compare them to what two experts would have chosen.

Don’t forget to check the Biosecurity Strategies List for cost effectiveness.

C&D Protocol  Biosecurity Plan  Biosecurity Strategies List  CLOSE

Top Recommendations for the Olson Farm

Open your biosecurity plan below and select your top recommendation for each farm area. Refer to the biosecurity strategies list to check cost effectiveness before you make your selection. Clicking on the recommendation will automatically fill in the blanks below. Compare your selection with that of two experts.

Area A: Call animals that do not respond to treatment or that are asymptomatic disease carriers

Compare

Area B: Restrict visitors: Keep a log of visitors

Compare

Area C: Use personal protective equipment (PPE: gloves, clean boots, coveralls)

Compare

Area D: Prevent contact with neighboring animals or their discharges through water, air, or direct fence-line contact

Compare

Dr. Smythe, my best recommendation is to cull animals that don’t respond to treatment or are carrying diseases without signs of illness. Occasionally sick animals that don’t get better, their condition is suffering and they can act as a source of infection to other animals. Also, healthy-looking animals that seem to be carrying a disease can spread disease to others, but it does increase expenses to find them through testing. I think identifying and culling animals that put others at risk is an efficient use of a biosecurity budget. Would you agree, Dr. James?

Dr. James agrees, that’s an easy and effective biosecurity strategy. However, not allowing new diseases onto the farm in the first place is my key priority. I recommend creating a quarantine for new herd additions and all receiving animals. A manageable task to increase even more if the animals are new. This way, you can keep all new receiving animals separate from the herd for two weeks, which should minimize any possibility of a disease spreading.

C&D Protocol  Biosecurity Plan  Biosecurity Strategies List  RETURN

Top Recommendations for the Olson Farm

Open your biosecurity plan below and select your top recommendation for each farm area. Refer to the biosecurity strategies list to check cost effectiveness before you make your selection. Clicking on the recommendation will automatically fill in the blanks below. Compare your selection with that of two experts.

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Compare

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Compare

Area C: Use personal protective equipment (PPE: gloves, clean boots, coveralls)

Compare

Area D: Prevent contact with neighboring animals or their discharges through water, air, or direct fence-line contact

Compare

Dr. James: I’d like to implement a policy for animals in the correct order. Healthy animals first, then quarantined, and then sick animals who need washing and changing your PPE between groups. This doesn’t cost any money, but it requires a change in management and it’s a great first step for biosecurity farm.

Dr. Smythe: That’s very true. But I would also recommend isolating and treating sick animals as a biosecurity strategy here. These animals need to be treated in an isolated hospital area, so they will get better without spreading infection to other animals. Creating an isolation area decreases disease spread and makes it easier to treat animals. And it would also make caring for animals in the correct order easier.
### Top Recommendations for the Olson Farm

**Top Recommendations for the Olson Farm**
Open your biosecurity plan below and select your top recommendation for each farm area. Refer to the biosecurity strategies list to check cost-effectiveness before you make your selection. Clicking on the recommendation will automatically fill in the blanks below. Compare your selection with that of two experts.

<table>
<thead>
<tr>
<th>Area A: Call animals that do not respond to treatment or that are asymptomatic disease carriers</th>
<th>Compare</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area B: Restrict visitors: Keep a log of visitors</td>
<td>Compare</td>
</tr>
<tr>
<td>Area C: Use personal protective equipment (PPE) gloves, clean boots, coveralls</td>
<td>Compare</td>
</tr>
<tr>
<td>Area D: Prevent contact with neighboring animals or their discharges through water, air, or direct fence-line contact</td>
<td>Compare</td>
</tr>
</tbody>
</table>

**Area E Cattle Health Area:**

Dr. Jones: I would say that cleaning and disinfecting, C&D for short, before and after working with animals is most important here. These young cows are just developing their immune systems, so anything you can do to clean up on their clothing, boots, or hands from working with other sick animals can help prevent disease. To prevent this, always wash your hands, and put on clean boots and coveralls before working with calves.

Dr. Smith: Cattle can act as reservoirs of disease and spread disease-related pathogens in their milk as well as in their manure. Keeping things clean and maintaining a good hygiene practice is crucial for preventing disease spread.

Dr. Jones: I agree! Cleaning and disinfecting are very important, but keeping proper hygiene can help prevent disease from spreading even more. Maintaining proper hygiene standards is essential for keeping your animals healthy and preventing disease spread.

**C&D Protocol | Biosecurity Plan | Biosecurity Strategies List | RETURN**

---

### Biosecurity Risk Report and Recommendations for Biosecurity Strategies

**Biosecurity Risk Report and Recommendations for Biosecurity Strategies**

<table>
<thead>
<tr>
<th>Farm Name</th>
<th>Dave and Deedee Olson</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>9/4/2022</td>
</tr>
<tr>
<td>Livestock type</td>
<td>Dairy</td>
</tr>
</tbody>
</table>

**Biosecurity Strategies**

- **Biosecurity Strategies**
  - **Biosecurity Strategies**
  - **Biosecurity Strategies**

**Area A: Call animals that do not respond to treatment or that are asymptomatic disease carriers**

**Area B: Restrict visitors: Keep a log of visitors**

**Area C: Use personal protective equipment (PPE) gloves, clean boots, coveralls**

**Area D: Prevent contact with neighboring animals or their discharges through water, air, or direct fence-line contact**

**Area E Cattle Health Area:**

Dr. Jones: Until now the biosecurity strategy has been to prevent contact with neighboring animals or their discharges through water, air, or direct fence-line contact. It’s important to maintain a good hygiene practice on the farm to prevent the spread of disease among the herd. Keeping things clean and maintaining a good hygiene practice is crucial for preventing disease spread.

Dr. Smith: I agree! Cleaning and disinfecting are very important, but keeping proper hygiene standards is essential for keeping your animals healthy and preventing disease spread.

**C&D Protocol | Biosecurity Plan | Biosecurity Strategies List**

**<BACK NEXT>**
*Do not click “Next”. Allow for an automated slide show.

Hi there. Nice to see you again. Thanks again for all your work evaluating our farm. Based on your report we’ve made some changes to improve our biosecurity.
We started off by having a meeting with everyone who works with our animals, including my brother. We explained biosecurity and ensured they understood what we were trying to do and why. We knew this wasn’t going to work without their cooperation.

We had everyone go through the first two modules and then showed them your report and recommendations. Now we have weekly get-togethers to discuss how things are going. If everyone’s followed the biosecurity rules that week, we have a pizza party!
Let’s show you what we’ve done. But first, as you suggested, we’ve gotten more selective about who is allowed on our farm and we’re keeping a big. So would you mind signing in before we look around?

We started with the easy and inexpensive things we could do, even if they didn’t work 100% effectively. So the strategies just required a change in our processes. And the people that did them make them effective.
First, we looked at how we were caring for our animals. Changing the order of how we tend to the animals was a simple fix. Now we start from younger to older, and from healthy animals to those of unknown status, before ending with the sick animals.

Oh, and we made washing hands and wearing personal protective equipment (PPE) a priority. Whenever anyone goes from one area to another, they’re supposed to wash their hands and boots and change their gloves and coveralls.
Biosecurity Learning Modules

Epilogue: Six Months Later

That incudes us too! If we don’t do it, how can we expect our workers to do it? We have to lead by example. Of course, that meant we had to spend some money to have boots and coveralls available.

And it sure increased our laundry!

Epilogue: Six Months Later

We’ve also cleaned out and rearranged some things in the old barn so we could establish a quarantine area for new additions or returning animals. We also set up a hospital area to isolate and treat sick animals away from the healthy animals. And we’re stricter about culling animals that just don’t seem to get better and the ones whose tests show they are carriers of disease even if they aren’t actually sick.

Plus, we keep an eye on our pregnant cows for signs of abortions. We make sure to remove the placentas and fetuses quickly and dispose of them as our vet advises.

Epilogue: Six Months Later

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Plus, we keep an eye on our pregnant cows for signs of abortions. We make sure to remove the placentas and fetuses quickly and dispose of them as our vet advises.

Eventually, we would like to have a closed herd and we’re working up to that. But in the meantime, we don’t take any of our livestock off the farm. If we have to buy animals, we ask for herd test results and health histories first, and then we only buy test-negative animals.
Epilogue: Six Months Later

DON’T BUY DISEASES!

Yeah! To remind us how important that is we have a sign in our office, “Don’t buy diseases!” Did you see it?

49

Epilogue: Six Months Later

VISITORS PLEASE RESPECT FARM BIOSECURITY

Speaking of signs, we spent a little more money to put up signs in an effort to control car and truck traffic on our farm. We now keep vehicles away from the animals and their feeding areas as much as possible.

49

Epilogue: Six Months Later

Once we had done the quick and easy fixes, we took a look at our budget and decided on some strategies we could afford to do this year.

50
We reviewed our herd's health history and vaccination schedule with our veterinarian. We adjusted our vaccinations a bit to give us more protection from some of the more common or serious diseases. We'll plan for more protection in our budget in the future.

As we said before, we're working on having a closed herd, so we're starting to grow our own replacements. Artificial insemination isn't in our budget yet, so we bought a test-negative bull from a test-negative herd, of course, so we won't have to borrow one anymore. And we won't loan him out, either!
As we said before, we’re working on having a closed herd, so we’re starting to grow our own replacements. Artificial insemination isn’t in our budget yet, so we bought a test-negative bull from a test-negative herd, of course, so we won’t have to borrow one anymore. And we won’t loan him out, either!

Speaking of sharing, we also bought more shovels, pitch forks, and wheelbarrows, so we can have separate equipment for feed and for dealing with manure, dead animals, and fetuses. Oh, and our Extension agent taught us how to better manage the animals’ manure and dirty bedding.

We also learned that we qualified for a cost sharing program to develop safe watering sites away from streams for the cattle. This keeps both the livestock and stream water cleaner and safer year-round.
And last but not least, by any means, we’ve added handwashing facilities in all the areas where we work with animals. We’re not going as far as to have showering in and out or having special vehicle wash areas. However, we have set up an area near the vehicle entrance where someone can wash and disinfect their vehicle.

We’ve also started a biosecurity savings account. Every month we put money into it. Here’s a plan of the strategies we’re going to put in place over the next 3.5 years. Which 3 strategies would you recommend we start with?
We've also started a biosecurity savings account. Every month we put money into it. Here's a plan of the strategies we're going to put in place over the next 3-5 years. Which 5 strategies would you recommend we start with?

Invalid Answer

You must complete the chart below before submitting.

Interesting choices. Did you pick the most cost-effective strategies first? Individual farm circumstances may cause people to pick strategies that aren't the most cost-effective for a variety of reasons, such as lower labor costs or inexpensive materials available, or the risk the strategy addresses may be a significant problem on that farm. The important thing is for producers to have a plan and continue to improve biosecurity on their farms.
There’s one more recommendation on your report that we’re having trouble doing. We have two employees who keep the same type of animals as us. We feel bad about firing them and besides, they’re good workers! So, we make sure they wash up and use PPE when they arrive. And as we hire more employees, we’ll look at whether they keep dairy cows and try to hire ones that don’t.

Well, there you have it. Thanks to you, our farm is more biosecure than it was and we have a well-thought-out and reasonable plan to make it even safer.
Well, there you have it. Thanks to you, our farm is more biosecure than it was and we have a well-thought-out and reasonable plan to make it even safer.

Oh! And our neighbors have asked us what we think they should do on their farms. Together, we're going to make our agricultural community a more biosecure place to raise beef and dairy cattle, pigs, sheep, and goats.

See what you've started?! Thanks again!!!