Goal of lesson study: Participants will gain knowledge on what biosecurity is and how diseases are spread. They will understand what a good biosecurity plan might entail, and participants will form attitudes and opinions towards the importance of animal biosecurity.

Student Engagement

- Ask students to define the term “biosecurity” as it relates to people and schools. Have students brainstorm ways to keep themselves safe from disease in school (i.e. washing hands, cooking food thoroughly) and write them on the board/paper.
- Next, ask students to apply these ideas they generated to a farm setting. What biosecurity practices may they already be using on their farms to keep livestock safe from disease? Record student ideas on the board/paper.
- Define biosecurity: Establishing and maintaining measures on a farm operation to reduce the risk of the introduction and spread of disease.
- Ask how disease might be spread?
  - Direct transmission - The spread of disease from one host to another host.
    - Contagious/Communicable Disease - spread of disease from person to person
    - Aerosol - airborne droplets and/or dust
    - Fecal-Oral - contamination of food or water
    - Fomites - inanimate objects involved in disease transmission
    - Zoonotic Disease - spread of disease from animals to humans
      - Animal Bites
      - Contact with infected animal tissue, fluids, feces
  - Indirect Transmission - The spread of disease from host to host by means of a vector. A vector is usually some type of invertebrate animal.
    - Ask them what the common vector is for the spread of West Nile (Answer: Mosquitos)
    - Zoonotic Disease example for indirect transmission (Ring Worm is a good example)
      - Infected Animal >>> Vector >>> Person
Divide students into groups to discuss producer scenarios:

Read the following scenario you are assigned to and determine what went wrong and how it could be prevented. (HINT: more than one thing may be wrong.) Make some notes about the scenario, and discuss with your group. Establish a representative for your group who will present your findings once time is complete.

Producer #1

- This producer doesn’t know what a biosecurity program is, his cattle are frequently running loose and every time he buys bulls they end up in the neighbors’ herd.
- Visitors are welcome anytime. The neighbors frequently stop by to talk to him about the cows being out and if he going to fix his fence.
- He only works his cattle once a year and gets whatever vaccine and pour-on the vet says to use.
- When he buys new animals, he brings them home and puts them right into the pasture with the rest of the herd.
- His facilities were designed in the 1920’s and that is what his grandpa and father used so that is what he uses too.
- If he has a sick animal and it is easy to catch, he will bring it up into the yard for a couple of days to see if it will get better and their health will turn around. He doesn’t quarantine his animals, because they do that themselves, if they aren’t feeling well they usually don’t stay in the herd.
- This producer still has 10-year-old hay sitting in the yard that he hasn’t gotten around to cleaning up yet. The cats on the farm think this old hay is great because that is where all of the rats and mice stay so they are over there hunting.
- The birds nest on the barn and there is poop covering the ground at its entrance.
- Sometimes this producer uses soap and water to clean his supplies but water is often easier so he often just uses water.
- He wears the same old coveralls every day for chores and hasn’t washed them in a while.
Producer #2

- This producer has a strict protocol when it comes to biosecurity. He does have an open herd with a quarantine area that he keeps new cows, calves, or bulls in for a minimum of 2 weeks before introducing them into the herd.
- Visitors and international travelers are welcome but they are only allowed in certain areas of the yard, and never in with the cows.
- His vaccine program in his cow herd includes a pre-breeding shot before pasture turnout and a pour-on parasite control.
- Calves receive vaccines at birth, pasture turnout, and weaning. Pour-on parasite control.
- Bulls receive vaccinations every year when they are tested. Pour-on parasite control.
- His facilities are designed to be a low stress cattle handling operation, quarantine areas are set up for new cattle and areas for sick cattle so it is easier to treat them. Sick cattle are isolated until they show no signs of illness.
- Quarantining is a practice that has helped keep his herd healthy for years. New and sick animals are kept away from the healthy herd until a time when they are healthy enough or have passed a certain time period when we know they will not pass anything to the herd.
- Cats are kept on the farm to control the rats, mice, and birds on the farm.
- The barn yard is cleaned out once a year to help control the flies in the area.
- This producer keeps a disinfectant from the vet in his barn if he needs to clean anything that he might use.
- He wears coveralls every day in the fall, winter, and spring. He washes them when there gets to be too much gunk on them. In the summer he just wears jeans, t-shirt, and boots.

Producer #3

- This producer has a biosecurity program in place and has a closed herd. There are no visitors allowed on the farm, but they can come up to the house to visit.
- He doesn’t believe that he needs a vaccine program with a closed herd and a tight biosecurity program, he uses a rotational grazing pattern that helps to reduce the parasites in the cows.
- This producer doesn’t do a lot of buying outside the herd, he tries to only buy bulls every 10 years from the same guy he buys bulls from in previous years. The new bulls stay in a separate pasture until turn out time, usually about 1 month.
- His working facility has to work for everything from a sick cow/bull to a calving cow or working calves.
- He will keep sick animals up in the working facility to make sure it is easy to treat them and turn them out when they are feeling better.
- This producer doesn’t allow cats on his farm because they spread disease and are messy critters. Rats, mice, and birds are an issue.
- He uses a disinfectant that he gets at TSC to scrub his boots and hand equipment in.
- He washes his coveralls once a week when everything is healthy and swaps out for clean coveralls every other day when he has sick cattle.
One Minute Mysteries:

- Taylor owns two horses that live in a pasture by her house. They are the only horses in the area, and they never travel. However, Taylor takes lessons on horses at a different barn and often rides her friends’ horses. She wears the same boots wherever she rides. She has one set of brushes and tack that she uses on whichever horse she is riding. She only cleans the brushes when they are really dirty. Out of the blue, her normally healthy horses are coughing and have runny eyes.

- Lexi likes to walk her neighbors’ dogs on the weekends to earn some extra money. To save time, she often walks more than one at a time. She carries one portable water bowl for them on hot days, and since they all get along well, they drink out of the same bowl. One of the dogs she walked had a runny nose, but she assumed that it was just allergies and walked the dog as usual. A few days later, all of the dogs she walks are sick.

- Your neighbor has a large contract turkey operation and they have just had a confirmed case of avian influenza (bird flu). You do not want your 4-H chickens to become infected. Right now your chickens roam outside during the day and are penned up at night. What biosecurity measures can you take to prevent your birds from getting sick?
  - **Answers:** Bird Flu is spread by direct bird-to-bird contact and also when birds come in contact with contaminated surfaces or materials. Migratory birds also spread the disease.
    - Restrict access to your property and your birds. If visitors have birds of their own, do not let them near your chickens.
    - Your birds should not have contact with wild birds and migratory waterfowl because they can carry the virus and other diseases. Keep your birds inside where they cannot come in contact with other birds.
    - Wash your hands before and after handling your birds. Wear clean clothes and scrub your shoes with disinfectant. Clean and disinfect all equipment that comes in contact with your birds or their droppings.
    - Buy birds from reputable sources so you know you are getting healthy birds. Keep new birds separate from the rest of the flock for 30 days. If you take your birds to a fair or exhibition, keep them separated from your flock for 2 weeks after the event.
    - Do not share garden equipment or poultry supplies with your neighbors or other bird owners.
    - Know the symptoms of the bird flu and observe your birds every day. Write down any changes that occur and isolate any birds that appear to be ill.
Utilize **GLO-germ kit** for hands on demonstration activity:

- **Farm visitation contamination – powder experiment**
  - Put **powder** on carpet upon entrance to see who tracks it around at the end of the lesson by shining black light around the room and on the bottom of shoes

- **Glo Germ liquid Gel** is rubbed onto student hands
  - 1) have students use hand sanitizer ONLY to clean hands. Use light to see how much germs the sanitizer removed.
  - 2) repeat the liquid rubbed onto hands and have students **WASH** hands with soap and water for 20 sec (saying the ABC’s). Use light to see how much germs the soap and water removed.
  - Discuss which method removes more germs

- **Water Temperature – Gel Experiment**:
  - Try rubbing Glow Germ™ gel onto your hands, making sure to apply it to all areas, front, back, and around all the fingers.
  - Rinse your hands in **cold** water. Rinse for 1 minute (don’t rub your hands against each other), and then observe the results in a dark room with the blacklight.
  - Turn the water temperature up to **warm**, and stick your hands in for 60 more seconds without rubbing your hands together. What was the effect?
  - Turn the water to hot (but not burning!), and stick your hands under the water for 60 seconds. Again, don’t rub your hands against each other.
  - Is the Glo Germ™ gel all gone? Which water temperature seemed to work best? (Wash your hands thoroughly with soap and water after the experiment is finished.)

- **Head of Lettuce – Powder Experiment**:
  - To show the way bacteria spreads by cross-contamination, use an unwashed head of lettuce and the bottle of Glo Germ™ powder to thoroughly coat the lettuce in ‘germs.’
  - Sprinkle the powder onto the head of lettuce, getting in between the leaves and on the outside. Spread the powder around a little with your fingers, and look at the lettuce (and your hands) with the blacklight.
  - Tear the lettuce leaves apart from the head. Rinse the lettuce like you would when making a salad. Use a dish towel to dry the lettuce.
  - Cut or tear the lettuce into small pieces, and put them in a bowl. Now, turn on the blacklight, and take a look at the kitchen you made the salad in. Look at the sink, your hands, the lettuce, the bowl the lettuce is in, the towel, knife, and the cutting board.
  - There are little spots of glowing germs all over the objects you used to make the salad, spread from your hands and the lettuce. Not only is it important to wash your hands, it is important to wash fruits and vegetables carefully. Be sure to throw away the lettuce after the demonstration is done, and clean the entire area thoroughly with soap and water. If you do not want to do this experiment with a whole head of lettuce, try just a few leaves, or cut half a head. The experiment will still work using less lettuce; it just won’t be as dramatic.
Utilize **Glitter Pig** for hands on demonstration activity or an *ice breaker activity*:

**WARNING** Glitter does get everywhere, but is a super fun activity!

1. Do not tell students what the pig or glitter is for.
2. Prepare pig BEFORE participants arrive by sprinkling glitter all over the pig. Make sure the glitter gets into its fuzz really good.
3. Have sitting on the table, glitterized, before participants arrive.
4. Pass around the glitter pig to ask names, favorite animal, tell something about themselves etc.
5. Once everyone in the room has held the pig, direct the participants attention to the glitter that is EVERYWHERE.
   a. Notice that some may have touched their face and now there is glitter on their face
   b. Where else has the glitter spread to?
6. The glitter represents a disease or sickness that has now been passed from the animal to other humans and different surfaces.
7. Discuss the importance of biosecurity of washing hands after touching an animal before spreading something to other humans, surfaces, or animals.

Utilize **Mucus Swap** for hands on demonstration activity

This game is designed for trainers to use for the adult “Train the Trainer”

4-H Leaders can easily do this with their students

1. Use clear plastic cups: 1 per person
2. Put a small amount of blue food coloring in 9 of 10 cups for 90% of healthy “pigs”
3. Put a small amount of yellow food coloring in 1 of 10 cups for 10% of “ill” pigs
4. Have each person pick a cup, don’t reveal what the colors mean
5. Instruct everyone to pour their contents into another person’s cup, mixing their solutions together and then they pour the liquid back so each cup has an equal amount of liquid in it “Swapping Mucus”
6. Repeat with another person, so each person shares with two other people
7. Afterwards see how many people have “green”, infected cups from the 10% that started
8. This demonstrates how one sick pig per 10 possible pigs can turn into many more sick pigs in a barn at a fair, show, or sale event.

This is an easy game for adults to do with their kids with easily obtainable materials.
Things to think about in the classroom discussion:

- Make a list of student ideas from each producer scenario; these will be useful if you work with the students to create their own biosecurity plans.
- Ask which part of the missing details of the scenario is most important for creating secure environment and why.
- Lead a discussion on the importance of biosecurity on farms from both ethical and business perspectives.
  - Livestock producers have an ethical responsibility to keep their animals safe, and diseased animals cost producers money.
  - Diseased animals reduce profits because of increased mortality, reduced performance, and increased medication costs.
- Tell the students to work on their extension skills.
  - Contact a local large-scale livestock operation asking the owner or manager to share their biosecurity plan and how they developed it.
  - Interview a local large animal veterinarian about biosecurity practices he or she implements.

Career Connections

- Government Animal Health Specialist — This person works for the U.S. Department of Agriculture (USDA) or North Dakota Department of Agriculture (NDDA) checking animals for signs of disease and dealing with disease outbreaks.
- Farm Manager — This person oversees the management of a farm and makes decisions about when, where, and how to house, feed, breed, harvest, treat, and otherwise care for the animals.
- Large Animal Veterinarian or Vet Technician — This person diagnoses, treats, and helps prevent disease in livestock animals.

Reflection questions for Head, Heart, Health, and Hand:

The reflection tools are used to measure the content covered in the current lesson study for the Common Measures 2.0 grant. Don’t feel like you have to ask all of these or any of these questions, these are simply examples:

- **Head** — goals for youth (i.e. knowledge, competence)
  - List the steps an owner or manager might take to diagnose and correct a biosecurity problem
  - What are the parts of a good biosecurity plan? (list in the book lesson study)
  - What are good biosecurity supplies to have? (list in the book lesson study)
- **Heart** — Intrapersonal goals for youth (i.e. Confidence, character, interest, attitudes)
  - What are the two transmission ways diseases are spread?
  - What are 5 ways diseases could be brought onto your farm. Be specific.
  - Why is biosecurity important?
- **Hands** — Applied skill goals for youth (i.e. problem solving & critical thinking)
  - List three biosecurity practices a farm might use to protect the health of its animals.
- **Health** — Interpersonal goals for youth (i.e. teamwork, contributions, communication, using ideas from others)
  - Imagine you are a farmer speaking to a group of customers who have never heard of the term biosecurity. Explain why you practice biosecurity on your farm.

https://www.ndsu.edu/4h/
Food Safety in 4-H
Quality Assurance Activity
Practicing Injections – Agent and Volunteer Guide

Injecting Bananas Experience
Quality Assurance
Skill Level: Intermediate to Advanced

Learning objective:
✓ Types of injections and how to give them – intravenous (IV), intramuscular (IM), subcutaneous (SC)

Importance: Ensure safety and wholesomeness for customers. Maintain quality assurance by producing a wholesome product to decrease chances of drug residues and lesions that result in carcass cutouts or meat blemishes. Animal health.

What is a lesion? A lesion is a region in an organ or tissue that has suffered damage through injury or disease, such as a wound, ulcer, abscess or tumor.

Materials Needed:
✓ Needles (18 gauge or 20 gauge) and syringes (1 inch) – one per person
✓ Food coloring
  o Vial or cup to draw food coloring from
  o Red or blue colors work great
✓ Gloves
✓ Banana – one per person
✓ Bring a few oranges for practice, too
✓ Tape
  o Duck tape for sharps container
✓ Plastic container with lid for sharps container
  o Old coffee container/Tupperware

Life skills:
✓ Communication, critical thinking and decision making

Time:
✓ 30 to 45 minutes

Injection sites

Swine injection sites:
A. Behind ear for IM injection
B. For SC injection: under loose flaps of skin in flank and elbow of small pigs; behind ear of sows

Cattle and sheep injection sites:
Subcutaneous (SC)

Preparation:
Have participants visualize the banana as an animal, with the stem corresponding to the neck of the animal.
Discussion Directions:
- Cover importance of quality assurance
  - What is quality assurance? What does it mean? Is it important? Why?
    - **Background:** Quality assurance is the production of meat that meets or exceeds customer expectations. Expectations may include taste, tenderness, nutrition, value, packaging, color, safety, leanness, ease of preparation and other attributes that are important to the consumer. The idea of total quality management was developed by W. Edward Deming, a quality management expert. He defined quality in two ways:
      1. A product that conforms to a set of standards
      2. A product that meets consumer wants and needs
    - **Background:** Consumers demand that meat is easy to fix, tasty, tender, wholesome and affordable. Everyone involved in the food chain must take responsibility for safe and proper practices to assure a high-quality, consistent product is produced. Quality assurance emphasizes five main topics:
      1. Proper injection sites
      2. Proper facilities
      3. Proper nutrition
      4. Reading and following labels
      5. Proper handling and care

As a 4-H’er with a livestock project, you are a producer. Your animal goes into the food chain and you have a responsibility to produce a good-quality product.

Education and Discussion:
- Today we cover No. 1, Proper Injection Sites. Ask: Why are injection sites important in animal agriculture?
  - **Background:** The meat industry has changed drastically during the last few years. The Hazard Analysis Critical Control Points (HACCP) food safety system now outlines quality assurance programs in processed foods and the packing industry. As a result, this affected everyone in the food chain. Injection-site lesions have been identified as a serious problem.
    - **Injection-site lesions** are scar tissue that results when an intramuscular injection is administered within the muscle tissue. These blemishes result in loss of product because they must be removed from the meat product. Further studies have shown that these lesions have substantial impact on tenderness of the wholesale cut as well. Injection-site lesions cost the beef industry $188 million annually and cost producers approximately $7.05 per head, according to the 1995 National Beef Quality Audit.
  - Quality assurance is used to ensure safety and wholesomeness for customers. Maintain quality assurance by producing a wholesome product to decrease the chances of drug residues and lesions that result in carcass cutouts or meat blemishes.

4-H exhibitors are financially and ethically responsible for their animal. This is true even if they have adults who help them care for their animal.
Education and Discussion:
- Stress importance of education before a shot or medicine ever is given. Discuss:
  - Why is reading the label on what you are injecting important?
    - Storage? Dosage? Where to give? Is a booster needed? Expiration date? Withdrawal time?
    - Storage: Read the label! Check the expiration date. Do not overstock. Check and log temperatures where being stored weekly. Discard vaccines that freeze. Refrigerate all vaccines at 35 to 45 F unless otherwise specified on the label. When chute-side, keep in a cooler and out of the sunlight.
    - Dosage: Read the label! Mix gently and thoroughly prior to filling guns or syringes. Excessive agitation can diminish vaccine efficiency. Practice good sanitation.
    - Withdrawal time: Reflect on the amount of time necessary for an animal to metabolize an administered product and the amount of time necessary for the product’s concentration level in tissues to decrease to a safe, acceptable level before the animal is harvested. The purpose is to ensure that foods do not contain residues of pharmacologically active substances in excess of the maximum residue limit (MRL).
  - Why are medications given?
    - Medications commonly are given to livestock as part of regular husbandry practices to improve health and control disease, which can increase productivity.
  - Choose the correct needle length and size for different injection sites (Table 1).
    - Measured in two ways: length and gauge (diameter).
    - The higher number of the gauge, the smaller the diameter.
      - Example: 18-gauge needle is smaller than a 16-gauge needle
    - Typically, longer needles are used for intramuscular injections (1½ inches)
    - SC injections should be shorter needles (½ to 1 inch).

Table 1. Needle sizes for different species and important tips to remember.

<table>
<thead>
<tr>
<th>Animals</th>
<th>Intramuscular (IM)</th>
<th>Subcutaneous (SC)</th>
<th>Intravenous (IV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calf, &lt; 500 lb.</td>
<td>16G x ¼”</td>
<td>16G x ¾”</td>
<td>18G x 1”</td>
</tr>
<tr>
<td>Cattle, &gt; 500 lb.</td>
<td>16G x 1-1/2”</td>
<td>18G x 1”</td>
<td>20G x 1”</td>
</tr>
<tr>
<td>Colt</td>
<td>20G x 1”</td>
<td>20G x ¾”</td>
<td>18G x 1”</td>
</tr>
<tr>
<td>Horse</td>
<td>20G x 1-1/2”</td>
<td>20G x 1”</td>
<td>18G x 1-1/2”</td>
</tr>
<tr>
<td>Pig</td>
<td>20G x 5/8”</td>
<td>20G x ½”</td>
<td>20G x 1”</td>
</tr>
<tr>
<td>Hog</td>
<td>18G x 1”</td>
<td>18G x ¾”</td>
<td>18G x 2”</td>
</tr>
<tr>
<td>Sow</td>
<td>18G x 1-1/2”</td>
<td>18G x 1”</td>
<td>18G x 4”</td>
</tr>
<tr>
<td>Sheep</td>
<td>18G x 1”</td>
<td>18G x ¾”</td>
<td>18G x 1”</td>
</tr>
</tbody>
</table>

*adapted from Leedstone⁹. Inches are noted as ”.

- Store vaccines in cool area away from sunlight
- Always inject into a clean, dry area
- Reconstitute only amount of vaccine to be used within two to three hours
- To avoid injury, use only sharp needles of correct size and length
- Inject subcutaneously when label permits
- No more than 10 milliliter (mL) per injection site
- Do not mix different products in the same syringe
- Do not clean syringes and needles with chemical disinfectants that can inactivate vaccine
Food Safety in 4-H
Quality Assurance Activity
Practicing Injections – Agent and Volunteer Guide

Education and Discussion:
  o What are the correct injection sites?
    ▪ Refer to P 1 for correct injection placement.
    ▪ Ensure proper and safe restraint of the animal prior to injections.
    ▪ Does dosage make a difference?
      • Yes! Multiple injections should be spaced several inches apart or on different sides of the animal.
      • What do the instructions say? Read the label.
        o If an antimicrobial (antibiotic) says to deposit no more than 1 cc in one injection site but you need to deliver 2 cc, use two injections sites.
        o Never exceed 10 cc at any intramuscular injection site (for sheep no more than 5 cc. per injection site).
        o Residues are a concern, so follow directions for withdrawal times.
        o Every time you inject an animal, a reaction is possible. To minimize this, you need proper restraint, needle size and technique so you can administer the appropriate amount in the appropriate number of locations.
        o Some products can be given intranasally or put into the mouth, rather than as injections. Read labels and make sure you are doing it properly and using the proper dosage.
    ▪ Clean the injection site. Injecting into a spot that is damp, muddy or covered with manure greatly increases the risk of infection.
    ▪ Don’t spread infection by going back into the vaccine bottle with the same needle previously used to vaccinate. If the needle is contaminated from an infected animal, the vaccine also can be contaminated.
    ▪ Change the needle every 10 to 15 head or every syringe full of vaccine.
      • This may seem expensive at the time, but the alternative could be much more costly.
        Also, if a needle develops a bend or burr, discard it immediately because it will tear the tissue.
    ▪ Replace broken, bent or dull needles.
      • Never use a bent needle or try to bend it back; it will break and could leave a piece or break off in the animal.
  o Discuss the importance of keeping records.
    ▪ Consistently giving a certain vaccine at the same site is helpful.
    ▪ Knowing that you give product A in the left side of the neck, rather than randomly on either side, will help you identify what might have caused a reaction.
    ▪ Occasionally, certain batches of a product are associated with reactions. If you don’t know where you gave the shot, you can’t determine if that product was associated with a problem.
    ▪ Often we are giving more than one injection.
      • Always put the same vaccine in the same syringe. Mark syringes, or put color-coded tape on them so you never make a mistake.
  o Never mix products!
    ▪ Don’t mix products. If traces of bacterin are left in a syringe that is later used for a modified live product, the bacterin could destroy the modified live vaccine. Also, mixing products can damage carcass tissue. Educate yourself on killed verses modified live vaccines.
    ▪ Make sure your multidose syringe is giving an accurate dose each time. If it’s a big syringe and a small dose, such as 2 cc, is it injecting the full 2 cc’s, or is it off a little?
Food Safety in 4-H
Quality Assurance Activity
Practicing Injections – Agent and Volunteer Guide

Education and Discussion:

- Cover proper disposal and make a sharps container if necessary.
  - Take a plastic container with lid.
    - You also can order official sharps containers.
      - www.sharpsassure.com
  - Put a piece of duct tape for reinforcement on center of lid and cut an “X” in the lid as shown.
  - Duct tape all four sides down so lid cannot be taken off.
  - Once full, the sharps container can be dropped off at doctors’ offices, hospitals, pharmacies, health departments, medical waste facilities and police or fire stations. Disposal services may be free or have a nominal fee.

- Talk about the different kinds of safety, tools and injections.
  - Discuss the angle of the needle and hand placement to prevent being stuck by a needle.
  - Table 2 discusses options to choose for a patient and example tool for intramuscular (IM) and subcutaneous (SC) injections.
  - An **intramuscular (IM) injection** is given directly into the muscle (the meat of the banana).
    - Remember, all IM injections can reduce meat tenderness at the injection site.
    - Give IM injections in the neck muscles, never the rear leg or rump, regardless of age.
    - Use only injectable products that meet beef quality assurance guidelines.
  - Do any injectables approved by the Food and Drug Administration not meet guidelines?
    - Use SC products whenever possible to avoid injectable medications that are irritating to tissues.
  - A **subcutaneous (SC) injection** is given been the skin and the muscle. Show the youth how to “tent the skin,” or in this case, tent the plastic bag, and inject between the bag and the muscle.
  - An **intravenous (IV) injection** is given directly into the vein, or in this case, the straw.
  - An **intranasal (IN) injection** should be deposited from a syringe with a needle removed through the nasal passage with the head tilted upward.

When used correctly, medications improve animal health and well-being, increase food safety and provide the consumer with a higher-quality food product.

Get Quality Assurance Certified through:

| Instructor lead training: $3 – goes live mid-June |
| Online module training: $12 – YQCA.org |

*YQCA certification is required to compete at the North Dakota State Fair in a 4-H livestock competition.*
Banana Injection Activity Directions:

- Give each youth a banana.
- The uncapped needle in the picture to the right is a 20 gauge needle.
- Put banana on a paper towel and have lots of extra paper towels to absorb any possible spills or catch food coloring that may drip out of injection locations.
- Before giving the youth a syringe, talk about how to handle needles properly and to cap all needles when not in use.
  - Do not uncover or unwrap the sharp object until time to use it.
  - Keep the object pointed away from you and other people at all times.
  - Keep your fingers away from the tip of the object.
  - Properly dispose of the sharp object in a sharps container, not the trash.

- Explain and show how to give an IM injection.
  - Give each youth a cup or vial filled with food coloring.
  - Instruct them to draw ¼ cc of food coloring (labeled medication) into the 3 cc syringe.
  - The smaller amount of food coloring drawn up into the syringe will help prevent fluid from spraying out of injection site.
  - Have them inject their banana using the IM injection method very SLOWLY to prevent spraying, keeping needle at a perpendicular (90 degree angle) to the animal.
  - Have them practice drawing back syringe plunger with SAME HAND to check for a flash, then administer medication in the absence of a flash.
  - Have them record the date, name/ID of animal, the medication, the time, and the location of where injection was given to practice the importance of proper record keeping skills.

**Disposal:**

- Proper disposal of sharps is an important lesson to be taught!
- Instruct to always dispose of sharps in a proper sharps container.
Food Safety in 4-H
Quality Assurance Activity
Practicing Injections – Agent and Volunteer Guide

- Explain and show how to give a **SC injection**.
  - Proper tenting of the “skin” on yourself. You won’t be able to do this on a banana.
  - Food coloring should be **between** the “skin” and “muscle.” You should be able to see the streaking of food coloring in the banana peel skin.
  - Instruct them to draw ¼ cc of food coloring (labeled medication) into the syringe.
  - Have them inject their banana using the SC injection method very SLOWLY to prevent spraying.
  - The food coloring should go between the yellow skin of the peel and the actual meat of the banana.
  - Have them record the date, name/ID of animal, the medication, the time, and the location of where injection was given to practice the importance of proper record keeping skills.

**EXPERIENCE**

- **SC injection** – Hold needle at a 45 degree angle to the animal. Pinch (tent) skin first, then give injection
- **SC injection** – You should be able to see the food coloring just under the banana skin
- **SC injection** – Peeled banana to reflect on the streaking nature of where the medication should be absorbed into the tissue verses a deep IM tissue

**Disposal:**
- Proper disposal of sharps is an important lesson to be taught!
- Instruct to always dispose of sharps in a proper sharps container.

*Share > Process > Generalize > Apply:*

Unpeel banana and look at injection results.
• Explain how to give an IV injection.
  o Utilize a veterinarian or become proficient before proceeding.
    ▪ A missed vein can cause serious bleeding under the skin, and accidental injection can cause bad
      reactions and sometimes sloughing of skin. Worse, if done too quickly or incorrectly, it can kill or do
      serious damage to the animal.
    ▪ For example, when injecting calcium solutions IV, a veterinarian may listen to the heartbeat to gauge the
      rate of injection by the response of the heart. Without this, sudden death can occur.
  o Give IV injections into the jugular vein in neck, which can be tricky to find. Animal should be well restrained.
    Have participants palpate the vein (ridge on the banana) with their index finger.
  o If drawing blood, always check date on vacuum tube and needle. If dates are old on tubes they can lose their
    vacuum suction. Expired needles can no longer be guaranteed as sterile.
  o Instruct participant to draw ¼ cc of food coloring (labeled medication) into syringe. Have them feel for the
    ridge on the banana (simulating jugular vein) with their index finger. The jugular vein is very close to the skin,
    and thus you do not have to poke deep into the neck. Remain fairly parallel with the neck, with the needle
    pointing towards the head of the animal.
  o With non-dominant hand, anchor the vein (ridge of banana) by taking your thumb and gently press
    down and back to pull skin tight. Remove cap off needle by placing cap in non-dominant hand, check for
    any barbs and that the needle is straight, insert needle IV to give medication. Always pull back the
    syringe plunger to check for a flash of blood (will be dark red not a bright red) to ensure you are in the
    vein. If you have a flash, you can then administer medication. Otherwise, you will need to work to find
    the vein again. This does take practice.

**Disposal:**
• Proper disposal of sharps is an important lesson to be taught!
• Instruct to **always** dispose of sharps in a proper sharps container.
Table 2. Choosing model patients for intramuscular (IM) and subcutaneous (SC) injections.

<table>
<thead>
<tr>
<th>Potential model patient</th>
<th>Suitability as model for intramuscular (IM) injections</th>
<th>Suitability as model for subcutaneous (SC or SQ) injections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicken breast meat (skinless)</td>
<td>Most realistic option because it mimics the texture participants will encounter when injecting live animals, but it’s also the most expensive</td>
<td>Poor option because no skin to inject solution under and it’s expensive</td>
</tr>
<tr>
<td>Chicken breast meat (with skin)</td>
<td>Most realistic option because it mimics the texture participants will encounter when injecting live animals, but it’s also the most expensive</td>
<td>Most realistic option because it mimics injecting an animal; also can be challenging because the skin is thin</td>
</tr>
<tr>
<td>Yellow banana</td>
<td>Usable option, but hard to see injection results without peeling away the skin</td>
<td>Good option because the skin is thick; can be more challenging to inject into the skin because it is more densely packed than the skin of other options</td>
</tr>
<tr>
<td>Unpeeled orange</td>
<td>Usable option, but hard to see injection results without peeling away the skin</td>
<td>Best option because the skin is thick, with large air pockets between the skin and the flesh of the fruit</td>
</tr>
<tr>
<td>Hamburger bun</td>
<td>Usable option when put inside a Ziploc because you can add props to the bag; hard to see injection results without opening bun</td>
<td>Good option to learn how to pinch skin as you pinch the Ziploc bag up to create a pocket; can see results right away</td>
</tr>
</tbody>
</table>

Resources

A guide to understanding animal drug withdrawal times (Beef Magazine)
- www.beefmagazine.com/blog/guide-understanding-animal-drug-withdrawal-times

Nebraska Beef Quality Assurance: Focused on the safety, wholesomeness and quality of beef
- http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1012&context=nbqa

How to Properly Store and Handle Cattle Vaccines (Beef Magazine)
- www.beefmagazine.com/health/vaccination/0401-vaccine-etiquette

Cattle Vaccine Handling and Management Guidelines
- www.cals.uidaho.edu/edcomm/pdf/PNW/PNW637.pdf

Modified-Live Vs. Killed Vaccines
- www.beefmagazine.com/mag/beef_modifiedlive_vs_killed

Livestock Injection Methods & Placement activity

References:
3. Purdue University. I Q + beef resource manual: The intelligence choice. 2004. West Lafayette, Purdue University

ANSWERS TO QUIZ:
1. d 4. a 7. b 10. a
2. a 5. d 8. b
3. a 6. a 9. IM, SC/SQ, IV
Proper Injection Sites

1. The financial and physical responsibility of my animal belongs to:
   a. My 4-H project leader
   b. My friends who helped me
   c. My 4-H adviser
   d. Me

2. The gauge and length of the needles should be elected using a reference chart.
   a. True
   b. False

3. Bent needles never should be straightened and should be disposed of properly after use.
   a. True
   b. False

4. A drug residue is what is remaining in the meat from an animal drug.
   a. True
   b. False

5. Where should you never give a shot on an animal?
   a. Leg
   b. Loin
   c. Behind the ear
   d. Both a and b

6. A needle with a burr never should be used.
   a. True
   b. False

7. Glass containers are OK for storing used needles.
   a. True
   b. False

8. Only the owner of the animals needs to know and use proper techniques for administering medication.
   a. True
   b. False

9. List three types of injections:
   1. ___________________________
   2. ___________________________
   3. ___________________________

8. Caretakers should know how to calculate when a withdrawal time is complete and when an animal is safe to market.
   a. True
   b. False

Adapted from: National Pork Board Youth Curriculum
WHERE CAN YOU GIVE AN INJECTION ON THIS COW?
APPLY – Where can you give an injection on this sheep?
Apply – Where can you give an injection on this pig?
Animal Word Scramble

Unscramble the words below to match the picture.

owc
_______________
hesep
_______________

otga
_______________
ckechni
_______________

pgi
_______________
ucdk
_______________

osher
_______________
babrit
_______________
Feasting on Food Safety
Biosecurity and Quality Assurance

Swine Helper’s Guide – 4-H Curriculum
Common Measures 2.0 Biosecurity & Zoonoses Lesson Study # 3
Paige 14 & 15 – Feasting on Food Safety
Appropriate for ages 14+

Goal of lesson study: Participants will gain knowledge on the importance of food safety; taking into consideration the importance of quality assurance and the responsibilities as producers of food entering the food chain to ensure a safe and wholesome food supply to consumers. Participants will learn proper injection sites for medications on different species and why these are important. Subsequently, participants will increase their understanding of their role in the industry as animal owners and producers. Additionally, they will tie this back to the important concept of biosecurity; subsequently, quality assurance.

Student Engagement

- Define and discuss different terms regarding food safety in the industry (page 2). Handout and have participants try to discuss and define in groups.
- Stress the importance of the production of a safe, high quality and consumer friendly product is dependent on many parts across each species industry, from pasture to table.
- The 7 Good production Practices:
  - Have students make their own list of what they think are the seven MOST important good production practices to ensure food safety.
- Banana Injection Demonstration – refer to other document (Quality Assurance Activity)
  - Have participants identify on species where proper injection sites are (QA activity will have printouts of animals for participants to mark on).
  - Banana seems to be a good model to showcase blotching via IM and streaking via SQ when evaluating the banana after injecting the food coloring.
  - Show pictures of meat bruises and/or injections sites to discuss the importance of proper injection sites.
    - This also fosters a great opportunity to discuss human treatment and ethics for our animals.
Feasting on Food Safety - Define Industry Food Safety Terms

Who is responsible for food safety?

What is HAACP?

Dark Cutter

DFD Pork

PSE Pork

How does “livestock handling” fit into food safety?

What are good “ethics” in food safety?

What are seven (7) good production practices you can think of?

1.

2.

3.

4.

5.

6.

7.
Definitions defined – Feasting on Food Safety

Who is responsible for food safety?
- It is not just proper cooking techniques when grilling your favorite hamburger, but all the way back to the producer to those that handle the animal throughout its lice, the processors at packing plants, your local grocery store, and those that buy and eat the food all have a responsibility to ensure food safety
  - Producers, handlers, processors, food suppliers, and consumers.

What is HAACP?
- The USDA has adopted a program designed to prevent food safety problems in meat packing plants. This program is called Hazard Analysis and Critical Control Points or HACCP (pronounced “Ha-sip”) for short.
- HACCP is regulated by the USDA Food Safety and Inspection Service. It is designed to prevent problems before they happen. Government regulations require that all packing plants must use a HACCP plan.
- It’s important to identify a problem before it can affect the safety of the animals, those that work with the animals or the food safety of the animal.
- For example, if you notice that you have nails or wire hanging out by your gates and your animals catches one with its eye or leg, this could cause bruising in their meat and you could receive less money from your packer due to the meat having to be thrown out.
- Another example might be that you have your feed medication right beside your pen and your animals get out. You now have to take protective measures to be sure the animal won’t get sick and that their meat is safe to eat. So it’s important to keep your medications in a safe place.
- The 4-H’er’s/producer’s responsibility under the HACCP program is to supply the packer with animals that are free from drug and chemical residues and physical hazards such as broken needles.
- Hazards in meat products can be classified into three categories: microbial contamination, chemical hazards, and physical hazards.
  - **Microbial contamination** means the presence of pathogens such as E.coli or salmonella. **Chemical hazards** refer to the residues left from antibiotics and medicated feeds. **Physical hazards** describes broken needles, metal, or other foreign objects in the meat.
  - If unacceptable levels of these hazards are found in meat, consumers may be afraid to purchase the product. It is up to you as a 4-H’er to be responsible with the products you use.

Dark Cutter: Dark-cutting beef is a condition in cattle that makes muscles of cattle appear very dark. Consumers are not willing to buy dark beef and thus the value is decreased. That means if your animal gets stressed and turns out to be a dark cutter, you could receive less money when you sell it.

DFD Pork: Dark, firm, dry pork is caused by stress over longer periods of time before slaughter.

PSE Pork: Pale, Soft, exudative port is due to genetics and improper handling before slaughtering, and poor carcass chilling.

**NOTE:** PSE and DFD pork are less desirable to consumers because of altered color, dry taste and shrinkage during cooking.

How does “livestock handling” fit into food safety? People are always watching how you treat your animals at shows, auctions, and on the farm. Proper handling reduces stress on your animal and you. By reducing stress, you can gain better quality meat.

What are good “ethics” in food safety? Ethical behavior is really the demonstration of good character traits (caring, respect, trustworthiness, fairness, responsibility, citizenship). Knowing and doing the right thing. Knowing is the easy part - doing the right thing is often very difficult. This is not only how you treat your animals.
The 7 Good production Practices:

- Have students make their own list of what they think are the seven MOST important good production practices

  1) Keep Accurate Records: Keeping accurate records could be one of the most important production practices there is. It’s important to keep an animal identified throughout its life to keep track of any treatments given to that animal and to also take advantage of increased premiums for age and source verification.

  2) Establish a Veterinary Client Patient Relationship & Drug Usage: Only use medications in conjunction with a Vet Client Patient Relationship, Use extra-label products only under vet instructions, never use feed additives extra-label and Work with your vet to establish a herd health plan. ALWAYS maintain medication and treatment records that identify: animals treated, date(s) of treatment, drug(s) administered, who administered the drug(s), amount administered, withdrawal time prior to slaughter.

  3) Follow Healthy Production Practices: Read & follow label instructions for all medications, including injectables, water & feed medications, and topical products; Store medications according to label instructions; Use safe delivery methods and appropriate equipment; and Observe withdrawal times. This includes the need to properly store, label and account for all drug products and medicated feeds, to educate all family members on proper administration techniques, and to use drug tests when appropriate.

  4) Provide Proper Care and Handling: Provide adequate feed, water and environment; Always handle animals carefully to prevent injury; Always handle animals carefully to reduce stress. How you handle your animal at home or at a show can not only be watched by someone else, but harming an animal and bruising the meat tissue can affect its carcass meat and can lead to you receiving less money for that animal or the carcass being condemned and not available for people to consume. Educate employees and family members involved in treating, hauling and selling animals on: proper administration techniques, observance of withdrawal times.

  5) Provide adequate and safe feed according to their nutrient requirements: Read and follow feed label instructions; Use quality ingredients; Provide balanced rations; and Follow current Good Manufacturing Practices for feed manufacturing. Also be sure that you talk to your local feed cooperative to make sure the feed you’re receiving is free of any medications or feed additives. For example, Paylean, a feed additive that’s present in some swine diets is NOT approved for use in sheep. So it’s important that the feed company gives you a clean batch of feed for your animals.

  6) Maintain biosecurity and practice good animal welfare: Reduce pest infestation, reduce human and vehicle traffic, Reduce internal vector transmission, and Improve sanitation. A good example of biosecurity is to be sure you clean up your show equipment when returning home or if you purchase an animal to isolate that animal to be sure it’s free of any diseases before mixing it with the rest of your herd.

  7) Exhibit strong Character Traits (Ethics): All 4-H’ers want to have fun when showing their livestock but also want to be as successful as they can. It’s important to remember that success doesn’t always mean winning that Champion banner. Not only is providing proper care important for your animals but also how you present yourself to others and the public. Behaving honestly, being courteous and showing respect to others.
Meat bruises and injection site abscess

Deep chuck roast injection abscess – an entire piece of meat had to be discarded due to the infection and contamination by this injection. (photo from NDSU Meat Lab)
Nodular injection site lesion

Green discoloration of an injection site lesion

Photos from Beef Check off project summary:
Meat bruises and injection site abscess

Bruising:
Bruising can develop when animals crush each other against doorways, sharp corners and obstacles. Bruising certainly happens when pigs fall over, and this occurs frequently when pigs are moved too quickly and when they walk on wet and slippery floors. A bruise is painful and can be evidence of poor animal handling. Bruising can also be found around the femur and in the leading margin of the hind leg. Not all bruises occur before the pig is slaughtered: some occur post-mortem and therefore have no welfare implications. Bruising can lead to downgrading of the carcass and sometimes the need for trimming. In the photo below bruising of loin decreases the meat quality and has an animal welfare impact. This was the result of other pigs having pushed this pig against the ceiling in the chute during driving to the harvest.

Animal Welfare and Ethics
When pigs are mixed into new groups, it is their natural behavior to fight to establish a new hierarchy. Dominance aggression often results in carcass damage and has detrimental effects on meat quality, which can be presumed to compromise animal welfare. The pig in the photo below has been fighting, resulting in skin damage, and poor meat quality. Furthermore, the pig is now exhausted and welfare is poor.

Photos from interactive “Driving Pigs to Stunning” webpage: http://qpc.adm.slu.se/Driving_to_stunning/page_10.htm
Reflection questions for Head, Heart, Health, and Hand:
The reflection tools are used to measure the content covered in the current lesson study for the Common Measures 2.0 grant.

1. What did you learn about food safety?
2. What are some consequences of not storing a medication properly?
3. What are some consequences of medication contamination?
4. Why is needle safety important?
5. What are some consequences of not practicing proper food safety measures?
6. What did you learn from the last three lessons that you didn’t already know?
7. What have you learned that you can implement into your herd or everyday life (animal or not animal related)?
8. How does this relate back to biosecurity? Zoonotic diseases?

Conclusion:
By completing this activity, 4-H members and youth participants have been able to explore some concepts of animal science. They have asked questions, answered questions, gained some factual knowledge, and have hopefully been prompted/encouraged to ask more questions. As they grow/expand their knowledge with Inquiry Based Learning, they are learning life skills that they will use again and again as capable adults.
A Healthy Word Find

Candy  Duck  Fun  Kids  Pigs  Soap
Chick  Fair  Hands  People  Ribbon  Washing
Cow  Feed  Horse  Petting zoo  Rides  Water
**Investigating Medications**

**Biosecurity and Quality Assurance**

**Beef Helper’s Guide - 4-H Curriculum**

Common Measures 2.0 Biosecurity & Zoonoses Lesson Study # 2

*Paige 20 & 21 – Investigating Medications*

Appropriate for ages 14+

**Goal of lesson study:** Participants will gain knowledge on the importance of making informed decisions regarding medications; taking into consideration the importance of quality assurance and the responsibilities as producers of food entering the food chain. Participants will learn how to read and comprehend critical information on labels of medications. Subsequently, participants will increase their understanding of drug residues and withdrawal times of medications. Additionally, they will tie this back to how medications might be important when bringing the concept back to biosecurity.

**Student Engagement**

- Ask students to try to define the following definitions on pages 3 & 4 (pass out to participants).
  - Go through the definitions and discuss their importance.
- Pass out an example of a medication label and cover different parts (page 5).
- Pass out medication worksheet and have them find the answers to the questions now that they understand the different parts of the medication label (page 6).
- Provide a few different products/bottles/medications and have the participants fill out the product chart from the book. This would work great on a large sticky note sheet. Printing out medication labels works well too if you cannot provide actual medication bottles.
  - Product
  - Active ingredient
  - Withholding Time
  - Method of usage
- **Residue Activity with chocolate milk:** Complete a residue example using chocolate milk (if they want to drink it they can)
  - Pour chocolate milk into cups and let sit for 3 to 5 minutes to establish a residue
    - Styrofoam or plastic cups work best
  - Have participants estimate how many times the cup will need to be rinsed before the residue from the milk is completely gone. Write participants guesses on the board/paper chart for everyone to see.
  - Have participant dump or drink milk
  - Have participant rinse cup until they think the residue is all gone
    - Should take over three rinses.
  - Take away message: Participants take away that once a drug is administered it takes a long time for the residual to go away. If we can’t get the cup rinsed in less than three tries, imagine how long it would take inside the body of an animal with the different tissues the residue might reside in. As a result, it is very important to follow and understand why every drug has a withdraw time.
Withdrawal time Activity with M&M’s

- Take 2 flavors of M&Ms that are similar in shape and size (Ex: Peanut butter WARNING PEANUT ALLERGIES and Mint)
- I place the same 4 colors in every bag so that no one can compare bags and try to see the difference right away. The mint M&Ms always come in the green color.
- Have each student look at the bag, comparing the M&Ms to a pasture of cattle. Explain to the participants that one of the cows (M&M’s) has been treated. Ask them to guess which cow (M&M’s) they think was the cow that was treated by just visually looking at them. Participants will find it difficult to visually evaluate the treated cow (M&M).
- Now have the participants determine the treated cow by eating the M&M’s to see if they can taste the difference. Students will find the mint M&M, which will then stand out amongst the peanut butter M&M’s.
- Talk to the students about the importance of recording the treatment given to their livestock. It is imperative to keep good records on treatments to ensure that no cow enters the food system before the withdraw time is over.

Answer reflection questions on last page.
Definitions – *print and hand to participants*

Withdraw times/Withholding times:

**Scenario 1:**
If the date of the sale is September 1, what would be the LAST day/date a drug could be administered to their animal if the drug had a 30 day withdrawal time?

**Scenario 2:**
The date of the sale is August 15. Members with dairy cows can sell milk from their project animal. If a cow has been treated with omnibiotic August 1 – August 7, what is the first day that milk from that animal can be safe for consumption without the worry of the drug in the milk?

**Brand/Product Name:**

**Drug name/Active Ingredient:**

**Cautions and warnings:**

**Storage of drug:**

**Expiration date:**

**Type of animal drug is intended for:**

**Approved uses:**
Recommended dosage:

**Scenario 1:**
4-H’er Brenda has a lamb that has pneumonia. The animal weighs 80 pounds. Using the medication label handout, how much Omnibiotic should be administered to the animal and for how many days?

**Scenario 2:**
4-H’er Chris has a market steer that has bronchitis. The animal weighs 800 pounds. How much Omnibiotic should be administered to the animal and for how many days?

Method of administration:

**Intramuscular:**

**Subcutaneous:**

**Intravenous:**

**Oral:**

**Topical:**

**Insufflation:**

**Quality Assurance:**

**Extra-Label vs Off-label:**
Investigating Medications – *Parts of a Medication Label*

**Name of Drug**
OMNIBIOTIC

(Hydrocillin in Aqueous Suspension) **Active Ingredient(s)**

For use in Beef Cattle, Lactating and Non-Lactating Dairy Cattle, Swine, and Sheep

**Species and Animal Class**

*Read Entire Brochure Carefully Before Using This Product.*

**Active Ingredients:** Omnibiotic is an effective antimicrobial preparation containing hydrocillin hydrochloride. Each ml of this suspension contains 200,000 units of hydrocillin hydrochloride in an aqueous base.

**Indications:** Cattle — bronchitis, foot rot, leptospirosis, mastitis, metritis, pneumonia, wound infections. Swine — dysentery, pneumonia. Sheep — foot rot, pneumonia, mastitis, and other infections in these species caused by or associated with hydrocillin-susceptible organisms.

**For Intramuscular Use Only**

**Recommended Daily Dosage**
The usual dose is 2 ml per 100 lb. of body weight given once daily. Maximum dose is 10 ml/day.

**Dosages**

<table>
<thead>
<tr>
<th>Body Weight</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 lb.</td>
<td>2 ml</td>
</tr>
<tr>
<td>300 lb.</td>
<td>6 ml</td>
</tr>
<tr>
<td>500 lb. or more</td>
<td>10 ml</td>
</tr>
</tbody>
</table>

Continue treatment for 1 to 2 days after symptoms disappear.

**Caution:** 1. Omnibiotic should be injected deep within the fleshy muscle of the neck. Do not inject this material in the hip or rump, subcutaneously, into a blood vessel, or near a major nerve because it may cause tissue damage. 2. If improvement does not occur within 48 hours, the diagnosis should be reconsidered and appropriate treatment initiated. 3. Treated animals should be closely observed for at least 30 minutes. Should a reaction occur, discontinue treatment and immediately administer epinephrine and antihistamines. 4. Omnibiotic must be stored between 2° and 8°C (36° and 46°F). Warm to room temperature and shake well before using. Keep refrigerated when not in use.

**Warning:** Milk that has been taken from animals during treatment and for 48 hours after the last treatment must not be used for food. The use of this drug must be discontinued for 30 days before treated animals are slaughtered for food.

**Sizes Available**

How Supplied: Omnibiotic is available in vials of 100 ml.

Exp. Date 01OCT2020
Investigating Medications - Medication Label Worksheet

Directions: Using the medication label below answer the following questions.

1. What is the name of this medication? 

2. How should this medication be administered? 

3. Looking at the temperature this medication should be stored at, where should it be stored? 

4. List two cautions you should remember when administering this medication. 

5. What is the withdrawal time on this medication, for cattle? ______. What is the withdrawal time for swine? ______

6. What is the dosage for a swine weighing 300 lbs? ______

7. Can the entire dosage from question 6 be administered to the same injection site? ______
Definitions

Withdraw times/Withholding times:
Withdrawal periods reflect the amount of time necessary for an animal to metabolize an administered product and the amount of time necessary for the product concentration level in the tissues to decrease to a safe, acceptable level. Every federally approved drug or animal health product has a withdrawal period printed on the product label or package insert. Products carry meat withdrawal periods ranging from 0 to 60 days. Examples for meat range from no withdrawal period with ceftiofur, 4-15 days with different penicillin products, to 28 days with Pirlimycin. Animals treated with a product that has a withdrawal period of 45 days should be withheld from sale or slaughter for at least 45 days. Withdrawal times are not the same for all drugs. Examples for milk include: Pirlimycin, 36 hours; Cloxacillin, 48 Hours, Amoxicillin, 60 hours, Penicillin, 72 hours, and Cephapirin, 96 hours. Milk produced during that period must be disposed of. Dairy animals to be slaughtered must be withheld for the meat withdrawal period specified. Withdrawal periods may be extended when combinations of drugs are used or when drugs are used in an extra-label manner. In these situations or at any time a producer is uncertain of a specific drug withdrawal period, a veterinarian should be consulted. Source: http://www.ext.vt.edu/pubs/dairy/404-403/404-403.htm

Simplified: Time that must pass between the last dosage and the time of sale, consumption and/or slaughter (harvest).

Quiz them:
Scenario 1:
If the date of the sale is September 1, what would be the LAST day/date a drug could be administered to their animal if the drug had a 3—day withdrawal time? Answer: 31 days before September is August 1.

Scenario 2:
The date of the sale is August 15. Members with dairy cows can sell milk from their project animal. If a cow has been treated with omnibiotic August 1 –August 7, what is the first day that milk from that animal can be safe for consumption without the worry of the drug in the milk? Answer: Milk taken from the animal during treatment and for 48 hours after the last treatment must not be used. So milk collecting on August 10 would be safe for consumption.

Brand/Product Name:
A product name is the name of an item or service produced and offered by the company for sale. A brand name, however, is the name that a business chooses for one of their products. Example: Product - Toilet Paper: Brand name – Charmin or Soft and Gentle

Drug name/Active Ingredient:
The drug name and active ingredient are usually one in the same. The name of the therapeutic agent.

Cautions and warnings:
Special instructions to be aware of. May be handling or toxic to other animals, etc.

Storage of drug:
How the drug should be properly stored in order to preserve the product. If light sensitive, it will state to store in a dark location; if it needs to be refrigerated it will state 40° F, etc.
Expiration date:
Drugs should be discarded once the expiration date has been reached. The effectiveness of drugs is not guaranteed after the expiration date, and is not a recommended management practice.

Type of animal drug is intended for:
What the product is designed for

Approved uses:
The FDA approves each drug for one or more “indications.” This may mean the medication is approved to treat a specific condition for a particular specie, the duration of treatment, and at a particular dose. For example, Tylenol has two major indications: one is that of a pain-killer, the other is that of a fever-reducer. Tylenol can treat either pain or fever or both.

Recommended dosage:
The highest amount of the drug/agent that can be given safely without complication to the animal while maintain its efficacy.

Scenario 1:
4-H’er Brenda has a lamb that has pneumonia. The animal weighs 80 pounds. Using the medication label handout, how much Omnibiotic should be administered to the animal and for how many days? Answer: Dosage is 2ml per 100 lb body weight, with a maximum dosage of 15 ml/day. So Brenda should administer 2ml x 80 lbs/100lb = 1.6 ml/day until the animal exhibits no symptoms for 2 days.

Scenario 2:
4-H’er Chris has a market steer that has bronchitis. The animal weighs 800 pounds. How much Omnibiotic should be administered to the animal and for how many days? Answer: Dosage is 2ml per 100 lb body weight, with a maximum dosage of 10 ml/day. So Chris should administer 10 ml/day until the animal exhibits no symptoms for 2 days.

Method of administration:
How and where to give the product.

- **Intramuscular:**
  Meaning in the muscle, a location for injection. Abbreviated as IM.

- **Subcutaneous:**
  Meaning under the skin, a location for injection. Abbreviated as SC or SQ.

- **Intravenous:**
  Meaning in the vein, a location for injection. Abbreviated as IV.

- **Oral:**
  Meaning in the mouth or by way of the mouth, a method of ingesting medication. Abbreviation – OP, per os

- **Topical:**
  Meaning application to the body’s surface.
  Example: Liniment – rub on to sore muscles

- **Insufflation:**
  Through the nose into the nasal passage. Not commonly abbreviated.
Quality Assurance:
Quality Assurance programs focus on food safety, animal well-being, and striving to be a responsible, professional producer. North Dakota has a youth quality assurance called Youth for the Quality Care of Animals (YQCA) if you are interested in getting certified (YQCA.org).

Extra-label vs Off-label:
Extra Label - Extra-label drug use occurs when a drug only approved for human use is used in animals, when a drug approved for one species of animal is used in another, or when a drug is used to treat a condition for which it was not approved.
Off Label - "Off-label" means the medication is being used in a manner not specified in the FDA's approved packaging label, or insert.

Both off label and extra label can only be done or prescribed by a veterinarian. Doing either of these actions without supervision from a vet is illegal.

Medication Label Worksheet Answer Key:
1. Baytril 100
2. Subcutaneous injection for cattle and either subcutaneous or intramuscular for swine
3. Should be stored in a cool dark room with no access to direct sunlight.
4. a) this medication is not approved for female dairy cattle 20 months or older.
b) do not use in calves to be processed as veal
5. a) 28 days.
b) 5 days.
6. 10.2 ml
   3.4 mL x 300 lb = 1020 mL/lb ÷ 100 lb = 10.2 ml
   OR [ 1 kg = 2.2 lb]
   300 lbs to kg is 300 lb/2.2 kg = 136.36 kg then 136.36 x 7.5 mg/kg = 1022.7 ÷ 100 lb = 10.2 ml
8. No (it must be given in 3 different injection sites)

Vaccinations
Vaccines do have a withdrawal time, typically most vaccines will have a minimum of 21 days, and may be up to 60 days.
   a. Example Bovi-Shield Gold 5/One Shot has this wording in the label. Do not vaccinate within 21 days before slaughter.
   b. Vira Shield a killed vaccine with a strong adjuvant has this wording. Do not vaccinate within 60 days prior to slaughter.
Reflection questions for Head, Heart, Health, and Hand:
The reflection tools are used to measure the content covered in the current lesson study for the Common Measures 2.0 grant.

1. What did you learn about using medications?
2. What information do you think is most important on the labels?
3. What are some consequences of giving the wrong medication at the wrong time?
4. What are the consequences of giving the wrong dosage of a medication?
5. How do you decide which medication to use in different situations?
6. What will you do to use medications properly in the future?
7. How does this relate back to biosecurity? Zoonotic diseases?

Conclusion:
By completing this activity, 4-H members and youth participants have been able to explore some concepts of animal science. They have asked questions, answered questions, gained some factual knowledge, and have hopefully been prompted/encouraged to ask more questions. As they grow/expand their knowledge with Inquiry Based Learning, they are learning life skills that they will use again and again as capable adults.

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https://www.ndsu.edu/4h/

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