



# FOOD SAFETY AND QUALITY ASSURANCE

## Member's Manual

---

### **TABLE OF CONTENTS:**

Introduction

Chapter 1: Record Keeping

Chapter 2: Veterinarian and Drug Usage in Project Livestock

Chapter 3: Healthy Production Practices

Chapter 4: Care and Handling

Chapter 5: Feed & Feed Additives

Chapter 6: Biosecurity for your 4-H Project

Chapter 7: Ethics



# Introduction

## Introduction

Why is food safety and quality assurance a part of the 4-H program? The 15,000 Iowa 4-H'ers enrolled in livestock projects produce about 17 million pounds of meat. Add that to the poultry and dairy projects. That's a whole lot of pork chops, steaks, milk and eggs! Because that meat and food all goes to the public to be consumed, 4-H'ers need to do the best job we can to be sure it is safe and wholesome to eat. The goal of this program is to help you and your parents better understand what you can do to produce the safest food possible.

Much of this program will focus on the consumer – the person who eats the food you raise. That includes you, your family, and everyone else who eats! When you sit down for dinner, do you ever wonder if what is on your plate is safe to eat? Most of us just assume that it will be safe, tasty, and good for us. We make that assumption because all our partners are doing their job.



## Partners

We have many partners who help us produce the safest food in the world. Some of our partners are the Food and Drug Administration (FDA), the Environmental Protection Agency (EPA), and the Food Safety and Inspection Service (FSIS). The FDA is a part of the Department of Health and Human Services. It is responsible for regulations for all animal medications and most health products. New medications must go through rigorous testing before the FDA will approve it for use on food animals. Such tests determine what rate of the medication is effective, how it can be used, and what the withdrawal time will be.

The EPA has control over all pesticides, including those used in animal production. It also requires testing before it will approve a pesticide that can be used for animals. Some pesticides we use on animals include dewormers, fly sprays, mange or grub treatment, or other parasite controls.

The FSIS is a part of the United States Department of Agriculture (USDA), and it is responsible for inspecting the packing plants, lockers, and processing facilities where animals are harvested and food is processed. It is also responsible for regulations related to meat, milk, and egg safety including sanitation and residues.

Thanks to these three partners in food production, and concerned and dedicated livestock producers, the United States has one of the safest food supplies in the world. As 4-H food producers, it is your responsibility to help maintain that safe food supply.

Other partners help in producing safe food such as the person from whom you purchase your animals, the trucker who delivers animals to the packer, and the packer. Still other partners in producing safe food include feed companies who help us provide the best nutrition to our animals; veterinarians who help us keep animals healthy; and chefs who help us sell the best tasting product. Who are other partners in producing safe food?

Did you think about the partners who help advertise our food? How about those who research new medications? Did you remember to list other 4-H producers? How about your fair committee

helpers? You depend on these partners to produce safe food just as much as they depend on you. No one partner can fix the problems created by the others, so each one of the partners has to work together to ensure safe food.

## HAACP

### **H**azard **A**nalysis and **C**ritical **C**ontrol **P**oints



**What is HACCP?** - A system used in meat packing plants to prevent food safety problems Regulated by the United States Department of Agriculture - Food Safety and Inspection Service (USDA – FSIS) 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 for short. HACCP is designed to prevent problems before they happen. Government regulations require that all packing plants must use a HACCP plan.

A HACCP plan identifies where and how problems may occur and how to prevent those problems. Communication between the packer and the pork producer is essential so that the animals supplied to the packer are free from violative drug and chemical residues and physical hazards such as broken needles.

### **Risks**

The 4-H Food Safety and Quality Assurance program will focus on potential food production risks areas in which the food being produced could be contaminated or damaged, and what can be done and prevention measures you can take to minimize the risks. You will learn about three major types of risk - chemical, physical, and microbial; and the Good Production Practices (GPP's) for prevention of those risks. Food production is not risk-free, but by following the Good Production Practices, you will be doing everything you can to produce the safest food possible.

The three major food contamination risks are chemical, physical, and microbial. Chemical contamination includes drug residues, illegal drugs, or any medications in food that might cause humans to become ill. Physical contamination includes injection site lesions, bruising, or metal objects in the meat. Most physical contamination can be seen in the meat. Microbial contamination is bacteria or other microbes in or on the food, such as E. coli or Salmonella.

Following the Good Production Practices will help you prevent these contaminations.

### **Good Production Practices**

- 1) Keep Accurate Records
  - a) Animal identification records
  - b) Records of all medications used
    - i) Date
    - ii) Product
    - iii) Delivery method & location
    - iv) Who administered
    - v) Withdrawal time
    - vi) Individual animal or pen identification
  - c) Appropriate show records as required (Drug use, pseudorabies, feed restrictions, etc.)
  - d) Provide traceability of carcass

- 2) Establish a Veterinary-Client-Patient Relationship
  - a) Only use medications in Conjunction with a Vet-Client-Patient Relationship
  - b) Use products extra-label only under vet instructions
  - c) Never use feed additives extra-label
  - d) Work with your vet to establish a herd health plan
  
- 3) Follow Healthy Production Practices
  - a) Read and follow label instructions for all medications, including injectibles, water and feed medications, and topical products
  - b) Store medications according to label instructions
  - c) Use safe delivery methods and appropriate equipment
    - i) Appropriate sites for injectibles
    - ii) Appropriate methods for injectibles (SQ whenever possible)
    - iii) Appropriate needle size and care
  - d) Observe withdrawal times
  
- 4) Proper Care and Handling
  - a) Provide adequate feed, water, and environment
  - b) Always handle animals carefully to prevent injury
  - c) Always handle animals carefully to reduce stress
  
- 5) Provide adequate and safe feed according to their nutrient requirements
  - a) Read and follow feed label instructions
  - b) Use quality ingredients
  - c) Provide balanced rations
  - d) Follow current Good Manufacturing Practices for feed manufacturing
  
- 6) Maintain Biosecurity
  - a) Reduce external vector transmission
    - i) Reduce rodent infestation
    - ii) Reduce bird infestation
    - iii) Reduce human and vehicle traffic
  - b) Reduce internal vector transmission
    - i) Separation of different stages of production
    - ii) Quarantine new animals
    - iii) Control spread by you
  - c) Improve sanitation
  
- 7) Exhibit Strong Character Traits (Ethics)
  - a) Provide proper care for animals.
  - b) Exhibit respect and trustworthiness by following the GPPs for safe food production
  - c) Be responsible and fair by knowing and following 4-H and show rules



# Chapter 1

## Record Keeping

Keeping records is an important part of any livestock operation. Accurate records let you identify specific animals for medication, analyze your efficiency, and find changes you could make to improve your operation. What are some other things you do that require record keeping?

Keep three main areas of records: individual animals, process verification, and production records.

### Animal Identification

In order to keep records on animals, we need some way to identify individual animals.

There are many different methods of identifying animals, and all of them have advantages and disadvantages. What are two ways to identify your project animals?

---

See Chart 1 for various types of identification systems.

For your 4-H project, you must record individual animal identification and turn it in to your local extension office before the deadline. Market animal projects, such as beef and sheep, will be identified with a 4-H ear tag at a county weigh in. Market swine need to be ear notched and/or tagged. Breeding beef need to be tattooed, breeding sheep need to be tagged, and breeding swine need to be notched.

Check with officials in your area for information on what identification is required for any show you might enter.



### Individual Animal Records

Identifying individual animals lets you know which calf belongs to which cow or which pigs are littermates. You can compare the performance of these animals to help select replacement females, select animals for your project, and determine rate of gain.

You must also provide individual identification to register purebred animals and for identification on health certificates.

**Chart 1.**

<b>Animal Identification</b>			
<b>Identification method</b>	<b>Animal Species</b>	<b>Advantages</b>	<b>Disadvantages</b>
Photo/drawing	Dairy cattle, goats	Used for registration on colored breeds, shows exact color markings	Not useful on animals without distinct markings
Tattoo	Cattle, goats, rabbits, sheep, swine	Permanent mark, not easily changed	Not visible from a distance, readability depends on technique of application
Branding	Cattle	Permanent mark, freeze brands do not affect hide quality and can be individual animal ID	Hot brands damage quality of the hide which is a valuable co-product, often a farm ID rather than individual animal ID, freeze brands only useful on dark solid colored cattle
Ear notch	Swine, sheep	Permanent mark, allows individual animal ID, easily done on young animals, relatively easy to read with some practice	Sometimes mistaken with rips or tears, not visible from long distances
Nose print	Cattle, sheep	Individual ID similar to finger prints, not tamperable, used in livestock shows	Not visible for daily management
Electronic chip or tag	Cattle, sheep, swine, goats	Individual ID, not easily tamperable, can be used with computer management systems	Not easily read from a distance unless used in combination with a tag, requires electronic readers, expensive,
Ear tags	Cattle, sheep, swine, goats	Easily read from a distance, used for daily management, easily applied, inexpensive	Easily ripped from ears by fences and feeders leaving no ID in the animal
Neck chains/leg bands	Dairy cattle	Easily visible for daily management, easy to apply, inexpensive	May be lost or ripped off leaving no ID in the animal
Paint brands	Sheep, swine, rabbits	Easily visible, easily applied, short-term identification	Not long-term ID, easily washed or rained off
Wing bands	Poultry	Relatively permanent	Not easily visible from a distance

### **Process Verification**

Any time you use medication or growth promotants in your livestock project, you must identify the individual animals and their treatments. Many livestock processors and shows require information listing how and when an animal was treated with any medication or drug. This includes product, dosage, method of treatment, location of injection, who administered it, and withdrawal time. Also required are the dates implants were inserted and what feeds were used.

If you are feeding more than one species of animal, it is important to keep the feed separate to eliminate contamination of the feed. Feeds are many times not the same across species and animals can get sick from eating feed intended for other species.

Remember: Keep all beef records for at least two years, and all other species records for at least one year after selling the animal.

It is especially important that records are kept on feed fed to ruminant animals such as cattle and sheep. Because of the bovine spongiform encephalopathy (BSE) outbreak in the United Kingdom, the U.S. Federal Food and Drug Administration does not allow proteins from ruminants to be fed back to ruminants. This makes it very important to read feed labels, and also keep copies of feed labels. When you sell your calves or lambs, you will be asked to sign a statement that you have not fed "restricted" proteins to these animals, and the feed labels are your method of documentation.

## Treatment Record Example

### Individual or Pen Animal Treatment Records

Animal ID or Pen Location	Treatment Date	Product Name	Amount of Drug Given (cc, water or feed concentration)	Route (feed, water injectable by IM or SQ, topical)	Remarks/Initials or Who Administered	Withdrawal Time Needed Before Harvest	Date Withdrawal Completed

### Caretaker Training Documentation

One of the most important factors in animal well-being is the skill of the people caring for the animals. The people caring for your animals are the people that ensure your pigs' well-being. Three common areas in which producers train swine caretakers are: euthanasia, animal handling and husbandry. You should always record training that each of your animals' caretakers has received.

All employees and family members involved in caring for livestock should be trained. Everyone should know their responsibilities when caring for and treating animals and understand their specific job or task. Training can be done by person to person meetings, training manuals, CD's, DVD's, videos, etc. Be sure to document who was trained, when they were trained, and what job/responsibility they were trained in.

### Euthanasia and Emergency Action Plans

Youth Livestock projects will face daily management and possible catastrophic emergencies that will require animals to be euthanized in order to maintain a humane welfare standard. Therefore all 4-H livestock project participants need to have in place a written plan for euthanizing their animals. Possible emergencies might be: Unhealthy animals that will not recovered from veterinarian care, animals with severe broken limbs, severely injured animals due to fighting,

animals with prolapsus, and catastrophic injuries due to fire or weather (wind, floods, etc) Animals should not be allowed to suffer for an extended period of time; therefore, an aggressive euthanasia plan should be established for the welfare of the animal.

Along with an euthanasia plan a written emergency action plan should be established for youth livestock projects. The emergency action plan should have phone contact information for DNR, law enforcement, fire, rescue, hospital/clinics, electrical and water, outage, veterinarian, etc, The emergency plan should establish how animal care will be maintained in case of power, water, feed and heat interruption as well as in case of a catastrophic event due to a weather disaster (wind, floods, etc), fire,, manure spill, or security/biosecurity breaches.. The plan should have the sufficient back-up equipment in place such as emergency generators, alarm systems, and vehicles (tractors, trucks and/or trailers) to cope with the emergency situation.

### **Production Records**

Production records let you measure animal performance and business performance. Examples of production records include the 205-day adjusted weaning weights in beef calves, litter weight in swine, or pounds of milk in dairy cattle.

Business records show how profitable the operation is. This includes income and expenses and break-even price per pound.

4-H livestock records combine the animal performance of the project with the business record. 4-H project records focus on the income, expenses, and profitability of the livestock projects, along with performance records like daily gain and feed efficiency. Animal performance records also may be used in fair evaluation and in derby swine and sheep and beef carcass shows, and dairy production contests.

Records from different years can be compared to see how your livestock project has progressed. You can evaluate the selection of replacement breeding stock and set goals for next year.



## **Chapter 2 Veterinarian and drug usage in project livestock**

---

Veterinarians were listed as one of our partners in food production. They have been trained to be knowledgeable about animal diseases and the methods to prevent and treat those diseases. Your vet should know you and your animal operation, and should be one of your first contact people for help in producing safe food. A vet will help you plan how to prevent illnesses in your animals and diagnose and treat illness if they should happen. Part of what vets study is how drugs interact with illnesses and animal systems.



Animal drugs come in several forms, including injectable, oral, or topical. Injectables are used to vaccinate or treat individual animals. They include vaccines to prevent diseases like clostridium or vibriosis, or medications to treat illnesses like penicillin or liquimycin. Oral drugs can be mixed with the water or mixed with the feed, and are intended to treat an entire pen or group of animals. Often, oral drugs are used to prevent illness such as sulfa or lincomycin. Usually water medications are more effective than feed; when animals get sick they stop eating, but will continue to drink water. The third type of drug is topical. That would include anything put on the outside of the animal, including sprays or salves for cuts, or pesticides to control external parasites.

Drugs must be tested and approved for use by the Federal Food and Drug Administration (FDA). Part of this testing determines dosage rates, effectiveness, and the species to which it applies. The FDA will then label it one of two ways - over-the-counter (OTC) or prescription (Rx). Over-the-counter medications, such as penicillin, can be purchased from any livestock supply store. They can



be safely and effectively used by properly following the label instructions. Prescription (Rx) drugs are those products that may impose safety concerns for the animals or humans who administer them. They require professional assistance from a licensed veterinarian to be used safely. Prescription products will have the following warning statement on their label, "For use only by or on the order of a licensed veterinarian."

You might hear some producers use the term "extra-label use." In some cases, a veterinarian may need to use a legal product at a higher rate or in animals not listed on the label. A licensed veterinarian has the ability to do so, provided there is a valid veterinarian/client/patient relationship (VCPR).

There are four major parts to a valid VCPR

1. Veterinarian assumes the responsibility for the animals' care.
2. The owner agrees to follow treatment and withdrawal instructions.
3. The veterinarian is familiar with the animals by virtue of an examination or timely visits to the farm.
4. A veterinarian is readily available for follow up treatments or in the event of allergic or other unexpected effects of treatment.

Before using a medication extra-label, the vet must first determine that there are no labeled products available for this treatment, then consider what other animal drugs may be effective and at what level. A vet also needs to estimate a pre-slaughter withdrawal time for this product. Usually, the vet will allow an extra long withdrawal period to provide for customer safety. This information is written on a drug label and is to be used only for that specific situation.

Some products **cannot** be used in an extra-label manner including chloramphenicol, clenbuterol, nitrofurans other than topical use, fluoroquinolones, glycopeptides, and unapproved sulfa drugs in dairy cattle.

Feed medications also must go through a testing and approval process similar to other drugs. However, feed medications can be used only according to their label recommendations. **No one**, not even veterinarians, can legally use a feed additive other than as listed on the label. However, a new class of feed additives was developed, call the veterinary feed directive (VFD), which allows the vet to vary the level of the drug for treatment of some diseases, but vets still must follow the label restrictions. If the medication is an extra-label product, it must also include the veterinarian's name and address.

All medications must have the following information on their labels-use instructions, animal species or type, dosage, frequency of treatment, length of treatment, route of administration, precautions, and withdrawal times.



Read the label each time you use a medication to ensure you are using it properly. Improper use can result in residues at harvest that may affect the safety of the meat. For more information on labels, review Chapter 3.

Veterinarians are not only a partner in producing safe food, but also are critical to help us use medications legally and safely.



## Chapter 3

### Healthy Production Practices

#### Injections, Reading Labels, Withdrawals

One of your biggest jobs as a food producer is to keep animals healthy, because treatment of unhealthy animals is often what leads to food safety concerns. However, all animals must be vaccinated to prevent disease or treated for illness at some point in their life. Following proper procedures will reduce chances of food safety problems. Remember that consumers trust you to provide them safe wholesome food!

Good records are the first step in producing healthy animals. Remember what was discussed in the chapter on records? First you need to individually identify animals in order to keep track of them. Next you need to record any vaccination, treatment, or medication given to that animal. Include the date, the product given, dosage, delivery method, and location, who administered it, and withdrawal times. Use the forms to help keep track of this information.

#### Reading Labels

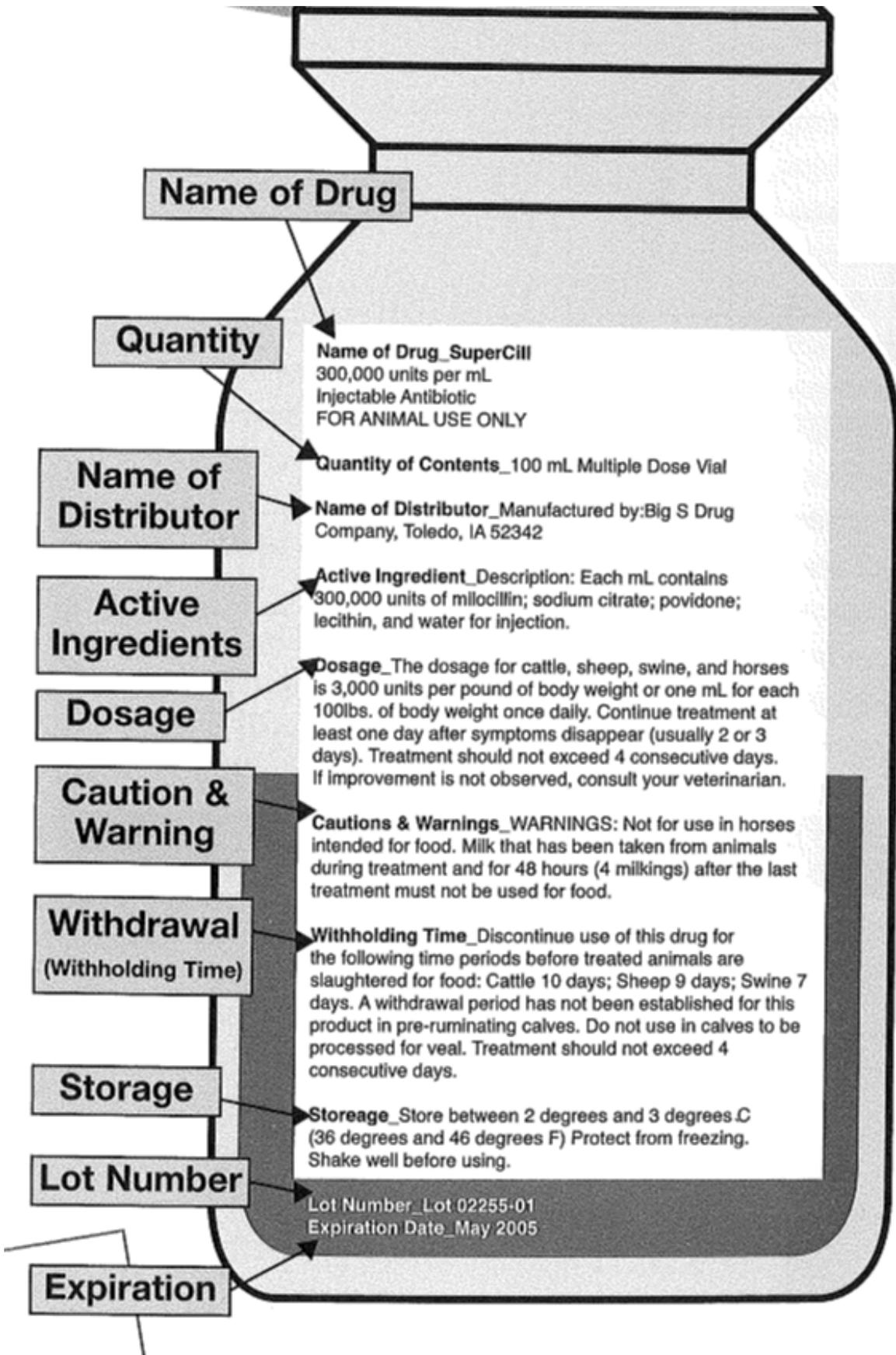
In order to keep good records, you first need to read labels on the products you use. All medications, whether injectable, oral, or topical, must have a label attached to tell you what the product is and how to use it. Labels should tell you the name of the product, the active ingredient, any cautions or warnings, and any withdrawal times. Withdrawal time is the number of days



needed to remove the drug from the muscle of the animal, so it is safe for consumers to eat. If a product has a 21 day withdrawal time, that means the animal cannot be harvested until at least 21 days after the medication was given or the medicated feed or water was taken away. Medication labels also should state how to store it, what lot number the product was (in case there was a problem manufacturing it), and an expiration date (when it is no longer effective). Most medications also will include a medication insert that gives you more information about the product.

## 1. Name of Drug

2. **Active Ingredients** - The product ingredients will identify what is contained in the package.
3. **Caution and Warning** - This states the required withdrawal period. The animal may not be marketed or sold for processing before the number of days required for withdrawal. Other cautions and warnings are listed on the medication labels such as side effects and route and location to administer the medication. It is important to make yourself aware of any potential consequences of using the medication.
4. **Withdrawal (withholding time)** – The implication of treating unhealthy livestock with medication is the potential for medication residue (medicine left in an animal's tissue after giving them medication). It is necessary to allow enough time for all of any medical substance to naturally be eliminated from the animal. This natural process is critical to provide a wholesome and safe product to consumers. If a withdrawal period is required, it will be listed on the label of the medicated product. The withdrawal period is typically based on a required number of days following the last treatment. If any medications are left in the meat, it can be harmful to humans. Giving an animal more than the recommended dose may cause a longer withdrawal period. The United States Department of Agriculture Food Safety Inspection Service (USDA-FSIS) visits each of the packing plants that process animals into products sold to both retail and restaurant businesses. USDA-FSIS veterinarians and inspectors conduct routine testing for drug residue daily. Animal carcasses with drug residues above acceptable rates are condemned and the owner is not paid for the animal. The owner is no longer able to sell or market animals until further follow-up tests are conducted.
5. **Storage** - Proper storage of medication is required to maintain 100 percent effective medication. Two main factors affect medication product quality, 1) temperature and 2) air or moisture. The product label provides accurate information regarding temperature and air requirements for the medication. Excessive amount of light also may affect the potency or activity of a drug. Do not store medications in syringes. Syringes should be used only for administration and should be properly cleaned and stored after use.
6. **Size** - The label identifies the size of the bottle and the amount of contents. It is important to purchase the adequate size based on the number of doses required and time you plan to use the contents. Purchasing the correct size minimizes the possibility of the product expiring.
7. **Name of Distributor and Lot Number** - Should you have any questions, comments, or concerns regarding the product, the distributor is listed for reference and contact information. The manufacturer identifies the lot number for traceability and accountability.
8. **Expiration** - Not all medication will last indefinitely. Just like products such as milk or the meat we are producing, medications don't stay in a usable form forever. Medicated products need to be used prior to the expiration date or the ingredients that make up the product could become ineffective or even harmful to the animal and end user. The medication insert includes some of the same information, such as the name of the product, the active ingredient, cautions and warnings, and withdrawal time. But it also has more information, including the species and animal class on which to use it, approved uses, dosage, route of administration, and sizes available.



Name of Drug

Quantity

Name of Distributor

Active Ingredients

Dosage

Caution & Warning

Withdrawal (Withholding Time)

Storage

Lot Number

Expiration

Name of Drug\_SuperCill  
300,000 units per mL  
Injectable Antibiotic  
FOR ANIMAL USE ONLY

Quantity of Contents\_100 mL Multiple Dose Vial

Name of Distributor\_Manufactured by:Big S Drug Company, Toledo, IA 52342

Active Ingredient\_Description: Each mL contains 300,000 units of milocillin; sodium citrate; povidone; lecithin, and water for injection.

Dosage\_The dosage for cattle, sheep, swine, and horses is 3,000 units per pound of body weight or one mL for each 100lbs. of body weight once daily. Continue treatment at least one day after symptoms disappear (usually 2 or 3 days). Treatment should not exceed 4 consecutive days. If improvement is not observed, consult your veterinarian.

Cautions & Warnings\_WARNINGS: Not for use in horses intended for food. Milk that has been taken from animals during treatment and for 48 hours (4 milkings) after the last treatment must not be used for food.

Withholding Time\_Discontinue use of this drug for the following time periods before treated animals are slaughtered for food: Cattle 10 days; Sheep 9 days; Swine 7 days. A withdrawal period has not been established for this product in pre-ruminating calves. Do not use in calves to be processed for veal. Treatment should not exceed 4 consecutive days.

Storage\_Store between 2 degrees and 3 degrees C (36 degrees and 46 degrees F) Protect from freezing. Shake well before using.

Lot Number\_Lot 02255-01  
Expiration Date\_May 2005

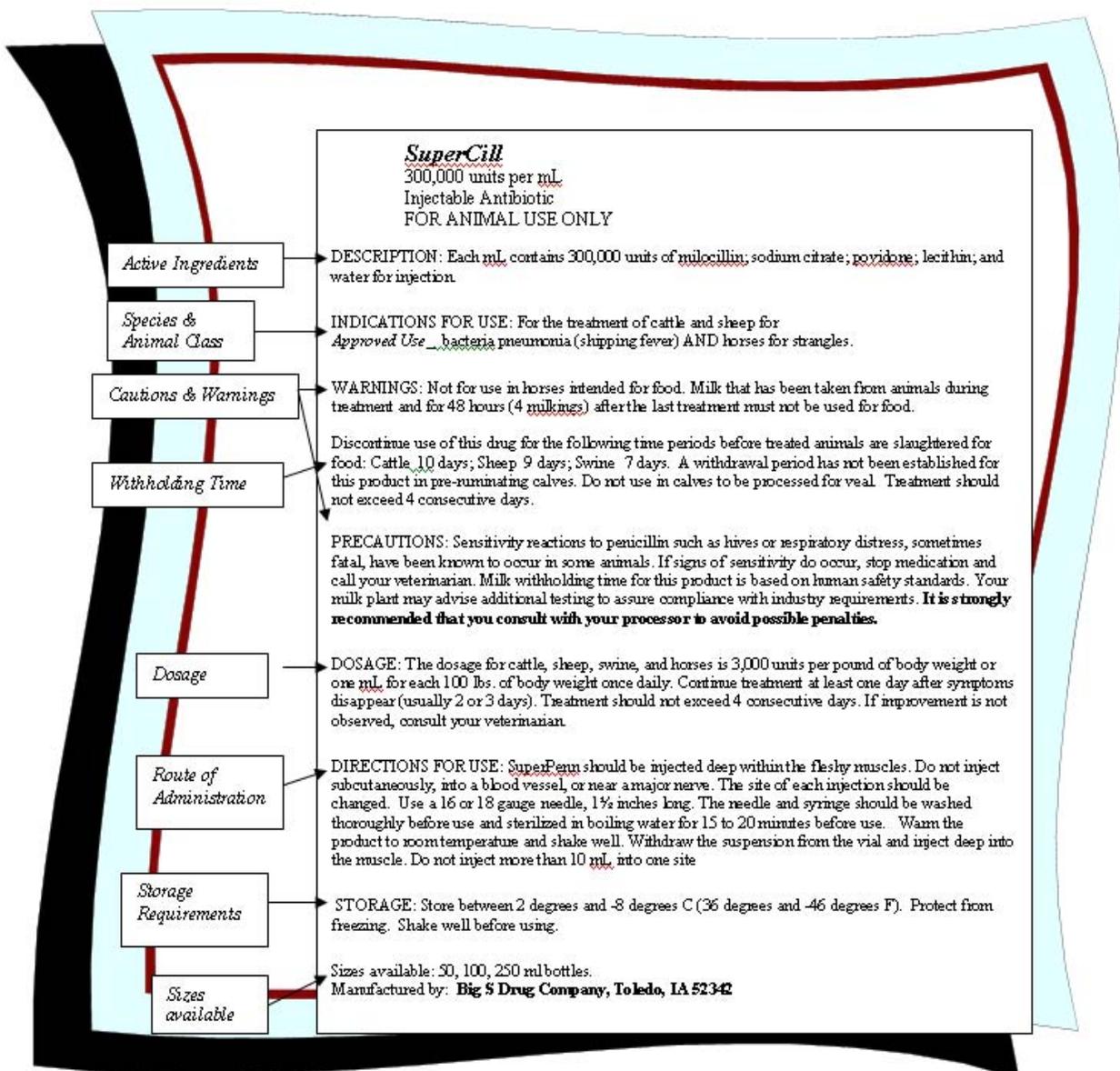
**Species/Animal Class** - Not all medications can be used for all animals. Many medications are designated for specific species and will be identified on the label (i.e. beef, dairy, swine, sheep, poultry, rabbit, goat). Often the medication is also designated for a specific class of animals within species. For example a growth implant is most often designated for finishing cattle and not useable for breeding animals.

**Approved uses** - Specific health problems will be listed for which to use this vaccine or treatment. For example, it may say "use for the treatment of respiratory problems in cattle."

**Dosage** - The need to follow label directions can greatly affect the effectiveness of the medication. "More" is NOT better! The label strictly identifies the needed quantity for a specific animal typically by size or weight.

**Route of administration** - This will tell you how to administer the product. You'll learn about routes of administration later in this chapter.

**Sizes available** - Since all sizes of a product have the same insert it will list the sizes available. For instance, it might say "Available in 100, 250, and 500-ml bottles."



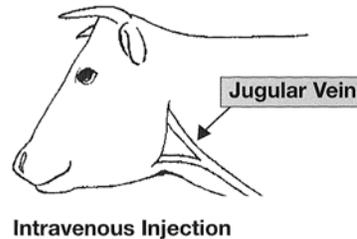
## Administration

Medication may be administered in three ways - injectable, oral, or topical.

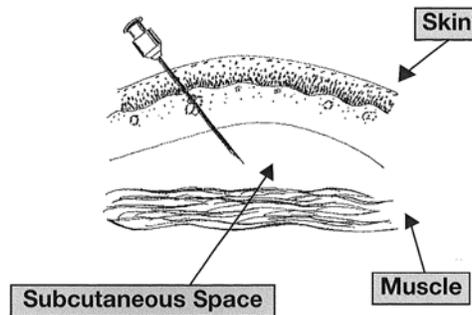
## Injection Techniques

There are six injection techniques, but only three that you are likely to see - intravenous, subcutaneous, and intramuscular.

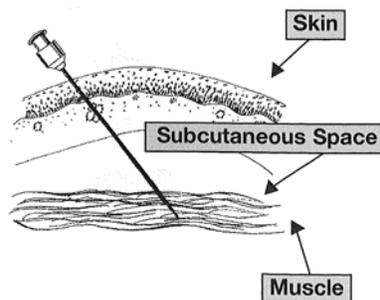
*Intravenous* (IV) means to inject or administer directly into the vein or blood stream. This method usually requires a veterinarian to administer and brings the quickest results.



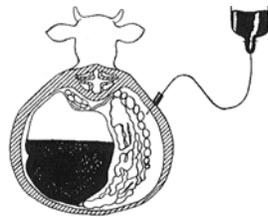
*Subcutaneous* (SQ) means to inject under the loose skin area. Used for both prevention and treatment, it causes the least damage to muscle tissue (meat), so is the preferred injection method for most procedures.



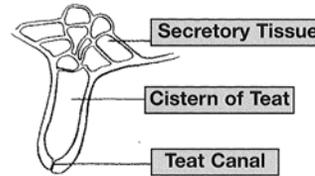
*Intramuscular* (IM) means to inject into the muscle. The maximum amount of injection in one site is 10cc for cattle and 5cc for sheep. Intramuscular injections may cause muscle tissue damage, lesions, or residue challenges.



The other three are intraperitoneal, which means into the abdominal cavity; intranasal, which means into the nasal passages (nose); and intramammary, which means into the teat canal. Intraperitoneal is seldom used, except by a vet. Intranasal is sometimes used for vaccines. Intramammary is used in dairy cattle to treat infections in the mammary system. Both intranasal and intramammary injections use special plastic needles that differ from those used for other methods of injection.



Intraperitoneal Injection



Intramammary Injection

ORAL medications may be administered by mouth either by mixing with feed or water, or by squirting into mouth. Oral products often are used for both treatment and preventive measures.

TOPICAL medications may be sprayed, poured, or rubbed on the skin. This is most often used to treat external parasites or injuries.

All injections pose the risk of introducing contaminants into the animal, creating abscesses or lesions, or causing bruising.

## NEEDLES

Needle selection is an important part of giving injections. Consider two key areas-size and flaws. Select the proper sized needle for the animal and products you are using. Use this chart to help in needle selection. Check the needle for flaws – a dull or burred end, bends, or dirt – that will cause problems in the animal.

Needles have a life expectancy based on size, quality, and intended use. If a needle breaks during an injection, it creates an emergency that requires immediate action. A broken needle migrates in tissue; a needle that cannot be found and removed requires destroying the animal. Under no circumstances should animals with broken needles be sent to a packer.

### Suggested Needle Sizes

Swine - IM		Gauge	Length
	Baby pigs	18 or 20	5/8" or 1/2"
	Nursery pigs	16 or 18	3/4" or 5/8"
	Finisher	16	1"
	Sows or Boars	14 or 16	1" or 1 1/2"
Swine - SQ			
	Nursery	16 or 18	1/2"
	Finisher	16	3/4"
	Sows or boars	14 or 16	1"
Cattle -IM			
	Calves < 300 lbs	18	1 to 1 1/2"
	Calves 300-700 lbs	16-18	1 to 1 1/2"
	Cattle >700 lbs	16	1 to 1 1/2"
Cattle -SQ			
	Calves < 300 lbs	18-20	1/2 to 3/4"
	Calves 300-700 lbs	16-18	1/2 to 3/4"
	Cattle >700 lbs	16-18	1/2 to 3/4"
Sheep - SQ			
		18	1/2 to 5/8"

## CATTLE IMPLANTS

The same concepts apply for implants as for injections. Always make sure that the needles are clean and sharp. The ear needs to be dry and clean. Proper implanting techniques result in faster growth and more profit. Always work with your veterinarian to design and implant strategy.

As with injections, read the labels properly for implanting cattle. When reading labels for implants, look for the following:

- Active Ingredient
- Indications
- Dosage and Administration
- Storage
- Cautions and Warnings
- Quantity

Also, record the implant products used and dates inserted on all treatment records.

## INSECTICIDES AND PESTICIDES

Medications and vaccines are not the only drugs we use in animals. Pesticides also are important for healthy animals. Both internal (worms) and external (flies, mange, lice) pests affect animals. Following label instructions and recording treatment dates and products used are just as important with pesticides as with medications.



# Chapter 4 Care and Handling

---

The way you care for your animals can have a big impact on how they grow and how they behave. Care includes supplying what the animals need for health and safe handling when your animals need to be treated, broke to lead, and prepared for show.

### Animal Needs

All animals have three basic needs - feed, water and environment. Be sure animals have the proper ration for the kind of growth you expect, the proper quantity of feed, and feed that is safe to consume.

Water is important for your animal's survival. First, you need to be sure they have access to clean fresh water. Would you rather drink clean water or muddy water? Your animal has the same preference. Stale, green water is not appealing to them either! Second, you need to be sure they have enough water every day. Water is critical for survival and growth. It is a part of most body functions, and makes up over half of most animals' bodies.

So how do you know how much water your animal needs? Take a guess at how much water your animal needs. Then check out the tables.

How close was your guess? \_\_\_\_\_

What factors affect water needs of animals?

---

### Water Consumption Tables

			Gallons per day
<b>Beef Cattle</b>	Feeder Calves - 400-800 lb.	Hot weather	8-15
		Cold weather	4-7
	Finishing Cattle - 800-1200 lb.	Hot weather	15-22
		Cold weather	8-11
	Bred heifers	Hot weather	15
		Cold weather	7
<b>Dairy Cattle</b>	Calves	(1-1.5 gallons per 100 lb. body weight)	6-10
	Heifers		10-15
	Dry cows		20-30
	Milking cows		35-45
<b>Sheep</b>	Feeder lambs 30-110 lb.		1.5
	Ewes with lambs		3
	Dry ewes		2
<b>Swine</b>	Nursery pig		1
	Growing pig		3
	Finishing pig		4
	Sow and litter		8
	Gestating sow		6

Information taken from "Beef Housing and Equipment Handbook," MWPS-6, Midwest Plan Service, Iowa State University, Ames, Iowa 50011.

"Dairy Housing and Equipment Handbook," MWPS-7, Midwest Plan Service, Iowa State University, Ames, Iowa 50011.

"Sheep Housing and Equipment Handbook," MWPS-3, Midwest Plan Service, Iowa State University, Ames, Iowa 50011.

"Swine Housing and Equipment Handbook," MWPS-8, Midwest Plan Service, Iowa State University, Ames, Iowa 50011.

The third main need of animals is environment. That includes the space they need, the temperature around them, and the air movement around them. It also includes keeping them clean. How much space do you think your 4-H animal needs? Is that enough space to sleep, eat, and exercise? Use the space requirement tables on the following pages to determine how much space your animals need. It might be easier to visualize if you layout an imaginary pen on the floor. You could use masking tape or rope to help visualize how big the pen needs to be.

What factors affect space requirements?

---

## Animal Space Requirements

### Dairy Data

#### Cow Stall Platform Sizes

Cow weight	Stanchion stalls		Tie stalls	
	Width	Length	Width	Length
Under 1,200 lb	4'0"	5'6"	4'0"	5'9"
1,200-1,600 lb	4'6"	5'9"	4'6"	6'0"
Over 1,600 lb	Not recommended		5'0"	6'6"

#### Free Stall Dimensions

Heifers	Width	Length
6-8 mo	30"	60"
9-12 mo	33"	64"
13-15 mo	37"	72"
16-24 mo	42"	70"

#### Cows (average herd weight)

Weight	Width	Length with forward lunge
800-1200 lb	42-44"	7'6" - 8'0"
1,200-1500 lb	45-48"	8'0"-8'6"
Over 1,500 lb	48-52"	8'6"-9'0"

#### Replacement Animal Space Requirements

##### Calf Housing

Housing type	Pen size
0-2 mo ( individual pens)	
Calf hutch (plus 4' x 6' outdoor run)	4' x 8'
Bedded pen	4' x 7'
Tie stall	2' x 4'
3-5 mo (groups up to 6 head)	
Super calf hutch	25-30ft <sup>2</sup> /hd
Bedded pen	25-30ft <sup>2</sup> /hd

##### Replacement Heifer Housing

Housing type	6-8	9-12	13-15	16-24
	sq. ft./animal			
Resting area and paved outside lot	25	28	32	40
Total confinement resting area*				
Bedded	25	28	32	40
Slotted floor	12	13	17	25

\*(assume access to 10' wide scraped feed alley)

#### Feeding Space Requirements

	Age (months)					Mature Cow
	3-4	5-8	9-12	13-15	16-24	
	in./animal					
Self feeder						
Hay or silage	4	4	5	6	6	6
Mixed ration or grain	12	12	15	18	18	18
Once-a-day feeding						
Hay, silage, or ration	12	18	22	26	26	26-30

#### Swine Data Space Requirements Enclosed Housing

Pigs	Weight Lb	Area Ft <sup>2</sup>			
Prenursery	12-30	2-2 1/2			
Pig-nursery	30-75	3-4			
Growing	75-150	6			
Finishing	150-220	8			
	Weight	Solid floor ft <sup>2</sup>	Totally or partly slotted floor <sup>2</sup> ft <sup>2</sup>	Animals per pen	Stall size
Breeding					
Gifts	250-300	40	24	Up to 6	
Sows	300-500	48	30	Up to 6	
Boars	300-500	60	40	1	2'4" x 7'
Gestating					
Gifts	250-300	20	14	6-12	1'10" x 6'
Sows	300-500	24	16	6-12	2'0" x 7'

<sup>2</sup>or flushed open gutter.

## Swine Data (continued)

### Shed with Lot

More lot area is often provided to facilitate manure drying.

	Weight Lb	Inside ft <sup>2</sup> /hd	Outside ft <sup>2</sup> /hd	Sows	
Nursing pig	30-75	3-4	6-8	Pig (12-30 lb)	1'/self-fed sow
Growing/finishing pig	75-220	5-6	12-15	Pig (30-50 lb)	2'/group-fed sow
Gestating sow	325	8	14	Pig (50-75 lb)	2 pigs/feeder space
Boar	400	40	40	Pig (75-220 lb)	3 pigs/feeder space
Sow in breeding	325	16	28		4 pigs/feeder space
					4-5 pigs/feeder space

## Sheep Space Requirements

		Rams 180-300 lb	Dry ewes 150-200 lb	Ewes with lambs 5-30 lb	Feeder Lambs 30-110 lb
Building					
Floor space (ft <sup>2</sup> /hd)	Solid	20-30	12-16	15-20 <sup>a</sup>	1.5-2 ft <sup>2</sup> Of creep
Lot space (ft <sup>2</sup> /hd)	Dirt	25-40	25-40	30-50	20-30
	Paved	16	16	20	10
Feeder <sup>b</sup> Space (in./hd)	Limit-fed	12"	16"-20"	16"-20"	2"/lamb
	Self-fed	6"	4'-6"	6"-8"	1"-2"

<sup>a</sup>For lambing rates above 170%, increase floor space 5 sq ft/hd.

<sup>b</sup>Feeder space/animal depends on animal size, shorn vs unshorn, breed, pregnancy stage, number of times fed/day, and feed quality.

Reproduced with permission from *Sheep Housing and Equipment Handbook, MWPS-3, 4th edition, 1994* © Midwest Plan Service, Ames, Iowa 50011.

## Beef Cattle Space Requirements

	Feeder cattle		Bred	Cows	Cows
	Calves 400-800 lb	Finishing 500-1,200 lb	Heifers 800 lb	1,000 lb	1,300 lb
ft <sup>2</sup> /animal					
Lot Space					
Unpaved lot with mound (includes mound space)	150-300	250-500	250-500	300-500	300-500
Unpaved lot without mound	300-600	400-800	400-800	500-800	500-800
Paved lot	40-50	50-60	50-60	60-75	60-75
Barn Space					
Barn with lot	15-20	20-25	20-25	20-25	25-30
Enclosed barn slotted floor	17-20ft <sup>2</sup> /1,000 lb			-Not recommended-	
In./animal					
Feeder Space					
Once-a-day feeding	18-22	22-26	22-26	24-30	26-30
Twice-a-day feeding	9-11	11-13	11-13	12-15	12-15
Self fed grain	3-4	4-6	4-6	5-6	5-6
Self fed roughage	9-10	10-11	11-12	12-13	13-14

## Poultry Data

Type	Type of housing and floor	Floor area/bird	Feeder space/bird
Broilers	Floor pen housing	1-2 sq ft/bird	2 in. feeder space
Laying hens		16 sq ft/bird	3 in. feeder space

Another environmental factor is temperature.

What temperature makes you the most comfortable? \_\_\_\_\_

Do you like it better at 50° or 85°? \_\_\_\_\_

Do you think your animal prefers the same temperature as you? \_\_\_\_\_

What might make them prefer a warmer or cooler temperature? \_\_\_\_\_

Different animals prefer different temperatures, called their comfort zone. You need to know what temperature makes them most comfortable so you can provide that environment for them. When you get too cold, you can put on a sweatshirt. But when an animal gets cold, it has to find other ways to warm up. When you get too hot, you can go into an air-conditioned room, or find a fan to cool off. Animals depend on you to provide for their comfort.

What are some ways to help keep animals warm? \_\_\_\_\_

What are some ways to keep animals cool? \_\_\_\_\_

We can increase the temperature when animals are too cool by using heaters or deeper bedding (for insulation), by placing more animals in a small area to increase body heat exchange, or by preventing drafts, which tend to cool the environment. We cool an animal when the environment gets too warm by providing shade to prevent radiation heat, increasing air movement with fans, or sprinkling water intermittently to provide evaporative cooling.

An animal can lose body heat in four ways – evaporative, conductive, radiant, and convective. Understanding these can help us better manage our animals' environment. Evaporative heat loss occurs when moisture from the animal's skin or lung surface evaporates and reduces the temperature of the body. Remember the feeling when you get out of the swimming pool on a windy day? Evaporation of the water from your skin makes you feel cooler. This is why we sprinkle hogs or cattle in extreme heat. The key is to sprinkle them, then allow time for the moisture to evaporate. Constant moisture with no time for evaporation does not allow for cooling.

Conductive heat loss is the transfer of heat from the body to another object it contacts. When an animal lies on a cold cement floor, the heat from its body is reduced as heat is transferred to the cooler floor. In the winter, you can reduce conductive heat loss by providing adequate bedding.

Radiant heat loss is the movement of body heat from the animal to another surface that it is not touching. You experience this when traveling in a car on a cold day. The heater keeps the air temp in the car at a comfortable level, but the side of your body closest to the window will often feel colder because your body heat radiates to the cold window. Uninsulated walls and ceilings allow for radiant heat loss in the winter.

Convection heat loss occurs when body heat is removed by moving air. Continual air movement, such as that from a fan, keeps the external air temperature lower than the body temperature, which allows loss of body heat.

We need to be concerned about temperatures that are too low and too high for comfort,

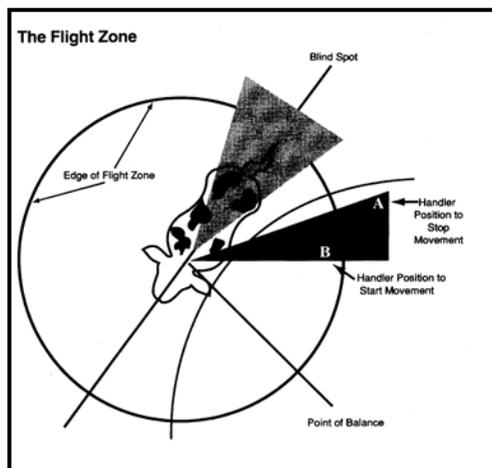
**Bedding** serves two purposes – temperature control and sanitation. First, bulky bedding such as straw or corn stalks provides insulation between the animal and the cold floor or walls to reduce the amount of conductive or radiant heat loss. Yet damp sand or wood shavings bedding can help to cool animals in the summer by allowing for evaporative heat loss. Bedding also affects sanitation. Clean bedding is needed to keep the animals clean from manure and urine, which can affect performance in extreme cases, but can also increase the potential for microbial contamination, such as E.coli.

**Sanitation** is another important component of animal care. Clean environments reduce the amount of disease organisms, reducing the spread of diseases. Regular removal of wastes, and cleaning and disinfecting facilities and equipment are all parts of a good sanitation program to reduce the potential for disease spread. Buildups of manure, urine, and spoiled feed allow for the growth of microorganisms such as bacteria, protozoa, and viruses, which may cause digestive or respiratory problems in animals. Two of these we have concern about are E.coli and salmonella, which both cause severe diarrhea and are a bigger problem in unclean environments. Manure build up also provides an environment for fly populations to multiply.

Manure management is more than just removal from the animal pen. It includes the appropriate use of that manure as a crop nutrient. For most producers, utilizing manure in crop production is both cost effective and environmentally appropriate. However, some 4-H'ers may not have the ability to apply manure to fields, and may consider composting as a way to reduce the quantity of manure to dispose of while still allowing for its use as a plant nutrient. Proper composting reduces the quantity of manure, reduces the moisture, enhances the nutrient composition, and reduces the concerns of odors and flies. Piling manure is NOT proper composting! If you are interested in composting, read "On-Farm Composting", NRAES-54 available from MidWest Plan Service, 122 Davidson Hall, Iowa State University, Ames, Iowa 50011-3080, or from your county Extension Office.

## Handling

Handling animals carefully is another way to prevent injury or physical contamination of meat. You need to understand an animal's natural instincts to better understand how to handle it safely. Two



main animal instincts are flight or fight. If they can get away from you or their predator (flight), they will. If they can't escape from you, their next instinct is to fight to protect themselves. At first they will think you are an enemy out to hurt them. When you understand that, you are ready to start working with your animal. Slow quiet movements, interaction at feeding time, and non-threatening approaches will help animals learn you are not their enemy. Knowing how they will try to get away from danger will help you know how to move them where you want them to go.

An animal's flight zone could also be called its comfort zone. We become uncomfortable when others invade our private space, and animals do too. The diagram shows an animal's flight zone and blind spot. If you approach an animal from

its blind spot, it cannot see you and will likely spook when it realizes you are there. Entering an animal's flight zone will cause it to move away from you. Your position in the flight zone will determine the direction of movement. Your behavior will also affect an animals' movement. Your quiet, calm, slow movements will result in the same movement by the animal. Your loud, quick, wild movements will likely result in wild fast movements by the animal as well! By understanding this, you should be able to safely move an animal in the direction you desire without the use of buzzers, prods, or other abusive tools. This is also important as we design handling facilities such as working corrals, chutes, and loading pens. Properly designed and maintained facilities should reduce the stress on the animal as well as improve the safety of the producer.

## Stress

Animals experience stress just like humans do. Heat, cold, or excitement can all create stress in an animal. Changes in feed, illness, or movement also can create stress. Stress can reduce the amount of feed or water an animal consumes, reduce its production, and affect the quality of the meat they produce.

Exhibiting animals can create stress for your animal, but you can help reduce that stress level. Having your animal well broke to reduce the excitement of the show will help reduce stress. Keeping your animal on a regular feeding and exercise schedule will help. Don't change the feed right before fair. Try to keep water consumption normal; get your animal accustomed to strange water, or flavored water before fair. Also, don't mix animals before harvest. They will usually start fighting with each other when strangers are added to the pen, and this fighting the night before harvest often results in poor quality carcasses. Commit to providing the best possible care for your animals to provide the most profit to your bank account, and the best quality meat to the consumer. Talk over the Animal Care Agreement with your parents, and commit to it together!

### **Daily Observation of Both Animals and Facilities**

It's very important to not only observe your animals each day, but it's also key to be sure your facilities are safe and in working order.

Daily observation of animals should include how comfortable they appear. Are they breathing normal, or do they seem to be overheating by panting or cold by shivering? It's important that they have access to appropriate amounts of feed and water each day, and to notice if they stop eating or are separated from other animals and are off by themselves. If an animal is off by itself for an extended period of time, it's usually a sign of something wrong with its health.

You also want to make sure you observe the extremities and actions of your animals. Be sure they are walking with equal weight on all legs, and notice if they have any sores or lesions on their body. A good time to do this is while animals are eating.

Not only are animals important to observe, but your facilities can be just as important. Take notice each day of your facility in that all electrical items are working properly. There should be no objects around that could cause harm to your animals such as nails sticking out, or metal sticking out. There should be proper ventilation, whether just having fans inside your building, or whether you have an automatic system. All animals, if kept outside, should still have a facility to get out of the sun from heat, or out of the cold in winter.

A good way for all of the caretakers of your animals to stay on the right track is to keep a log or observation diary. This would include observations on both animals and facilities. For example, you may keep track of the feed intake of your animals in a notebook, or perhaps which animals were treated for the week, or a "To Do" list of items that need to be repaired in your barn.

### **Factoid:**

Instincts are reactions that animals have when they are born; they don't have to learn them.

## 4-H Animal Care Agreement



As a 4-H livestock producer I agree to:

- Provide clean facilities to protect my animals from weather extremes.
- Provide a balanced ration that will result in adequate daily gains.
- Provide plenty of clean fresh water daily.
- Provide health care, including immunizations and treatments when necessary.
- Follow the seven good production practices of the Iowa 4-H Food Safety and Quality Assurance Program.
- Work with my veterinarian to develop a health care plan and monitoring process for my animals.
- Handle my animals to reduce stress on them, and provide for my families' safety.
- Observe my animals daily and immediately treat those that need care.

4-H'ers Signature \_\_\_\_\_

Parents or Guardians

We agree to support our 4-H'er in following the above care and management guidelines, and to follow the seven good production practices.

Parents' Signature \_\_\_\_\_



## Chapter 5 Feed & Feed Additives

### They Are What They Eat

Quality assurance also includes feed management. The diet your animal consumes may affect the health, growth rate, efficiency of feed utilization (or conversion to meat or milk), food safety of meat or milk marketed, and economic return (profit or loss).

Good nutrition starts with ingredient selection, proper diet formulation, proper feed manufacturing, proper feed handling and storage, and management of the feeder or bunk where animals eat. You will need a trustworthy person to assist you in decisions related to your animals' diet.

The ability to read a feed tag is just as important as reading medication labels. It will tell you if the purchased complete feed or supplement is for the animals you are producing. The product label also will show if it contains medication, and the withdrawal and warning messages.



## Reading Feed Labels

Feed labels are regulated by the State Department of Agriculture and, if medication is used, the United States-Food and Drug Administration (FDA). Feed labels are required for all commercial feeds and ingredients. The feed label is required to follow the following format:

- **Brand or Product Name**
- Intended species and production phase
- **“Medicated”** must appear below product name if medication is used and a statement of the medication purpose must be followed by a listing of the active ingredient(s) with their amount.
- A **“Guaranteed Analysis”** is required, followed by a listing of nutrient analyses required for the product and species. The guaranteed analysis must list “not less than” (“minimum”) or “not more than” (“maximum”) depending on the nutrient.
- **“Ingredients”** is followed by a listing of each ingredient .
- **“Feeding Directions”** or **“Mixing Directions”** is followed by instructions for mixing or feeding the product.
- If medication has a withdrawal, a **“Warning”** or **“Caution”** statement is listed.
- The **manufacturer’s name** and address must be listed.
- **“Net Weight”** must be listed indicating the weight of the product.

Look at a feed label from feed you are currently using.

Does it include all this information? \_\_\_\_\_

Does it look the same or different from the example? \_\_\_\_\_

How? \_\_\_\_\_

Why? \_\_\_\_\_

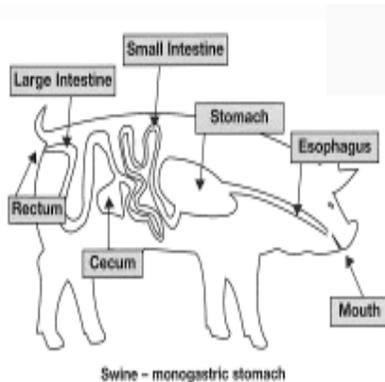
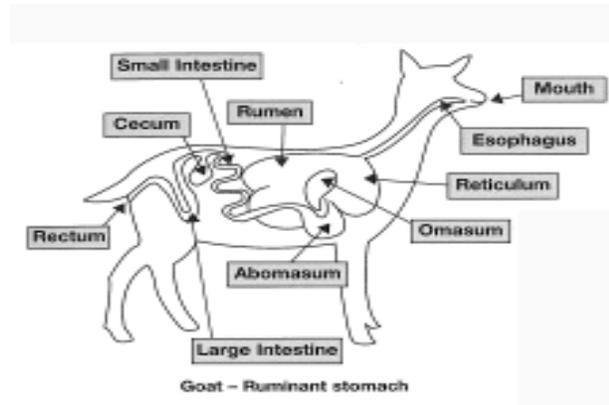
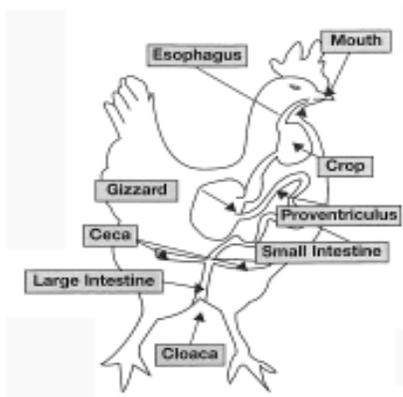
Keep a copy of all feed labels for one year after animals are harvested. This provides documentation of the type and manufacturer of your feeds if questions arise about the quality of the meat produced. In 1997 due to the Bovine spongiform encephalopathy (BSE) outbreak in the United Kingdom, the Federal Food and Drug Administration adopted a new regulation that disallowed cattle and other ruminant animals from being fed proteins derived from the rendering of ruminant animals. The ruling is 21 CFR 589.2000, which is referred to in the Market Beef and Lamb Disclosure Statement you need to sign before marketing cattle or sheep. By signing this disclosure statement, you ensure that you have not fed any ruminant derived protein feeds to cattle or sheep. How do you know if you have not fed ruminant proteins? Start by reading your feed tag! If the feed should not be fed to cattle or sheep, it will carry the statement: “Do not feed to cattle or other ruminants.”

Can you tell the quality of a feed is just by looking at it? Probably not. Although you can see some molds on hay or grain, you might not see those that produce toxins harmful to your animals. You also won't know the nutrient content of feeds just by looking at them. That is why it is important to have homegrown feeds tested to determine both the nutrient content and their safety. Many feed companies and colleges have labs that can test feeds. Knowing the nutrient content of your feeds is necessary to determine the ration for your animals.

## Digestive Systems

Before you can balance rations, you need to know the differences between animals and their individual needs. Digestive systems are not the same for all animals. Some differences are great, like between cattle and swine. However some differ only in how they function, like the differences between swine and horses.

Digestive systems are classified as monogastric or ruminant. A monogastric digestive system is a one-stomached animal and includes swine, poultry, and horses. The ruminant digestive system has four so-called stomachs or compartments. The reticulum traps hardware and helps in regurgitation. The rumen (largest compartment) contains microorganisms to break down fibrous materials like hay. The omasum helps to break down the particle size even further. The abomasum, or true stomach, is where the true digestion takes place. The ruminant animal is also known as a "cud chewer" because the animal regurgitates fibrous materials to chew and add saliva to help breakdown materials. Examples of ruminants include beef cattle, dairy cattle, sheep, and goats.



**Follow the feed through each of these different animals:**

Monogastric	Monogastric	Ruminants
Swine	Poultry	Cattle, Sheep and Goats
Mouth	Mouth	Mouth
Esophagus	Esophagus	Esophagus
	Crop	
Stomach	Stomach	Rumen
		Reticulum
		Omasum
		Abomasum
Small Intestine	Small Intestine	Small Intestine
Cecum	Ceca	Cecum
Large Intestine	Large Intestine	Large Intestine
Rectum	Cloaca	Rectum

What parts of the digestive system are common to all animals?

---

What parts are unique to one species?

---

Which is the closest to humans?

---

Species differences also will affect what feed ingredients are used. Since cattle and goats are ruminants, they can utilize fiber sources such as hay, grass, and silages to meet most of their energy and protein needs. Sheep are also ruminants and can utilize forages; however sheep are very sensitive to copper. Copper levels that are normal for cattle may be toxic for sheep. That is why cattle products should not be feed to sheep.



Swine are monogastric, so they do not use forage very well. In general pigs have a greater energy and protein need than ruminants, so we feed more grains or concentrates to pigs. Poultry are also monogastric, but their energy and protein needs are even greater than swine. They also get most of their needs from grains or concentrates. Horses are monogastric but they have a large cecum that allows some fiber digestion. They can't digest roughage as well as ruminants, but can digest enough to get the majority of their nutrient needs from forages. Non-Protein Nitrogen (NPN) sources like urea or ammoniated feedstuffs, or ionophores should not be fed to horses. These feeds are toxic to the horses due to their monogastric digestive system.

An animal's nutrient needs are based on its digestive system, age, weight, and stage of production. So, just as a ration designed for a pig may not be appropriate for a beef cow, the ration for a young growing calf is much different than a mature cow. You will want to work with your feed supplier, nutritionist, or Iowa State University Extension specialist to plan the ration for your animals. What nutrients do you "balance" a ration for? The major nutrient categories are energy, protein, minerals, vitamins, and fat. Water is also critical for keeping animals healthy and growing.

## Good Manufacturing Practices

When you buy your feed, you can be assured that you are getting what you order because manufacturers follow guidelines, called current Good Manufacturing Practices (cGMPs), to prevent feed contamination and provide reasonable assurance the feed is manufactured appropriately. The cGMPs guidelines have been established by the Association of American Feed Control Officials (AAFCO) and apply to all non-registered feed mills. The four primary areas include facilities and equipment, product quality assurance, labeling, and record keeping. Manufacturers must maintain their facilities and equipment. This includes maintaining a pest control program for rodents and insects. They also must maintain good housekeeping to prevent contamination of feed and provide worker safety. Adequate space also must be available for equipment, and processing and storage of medicated feeds. They need to check equipment to ensure accuracy. Manufacturers also ensure workspace and storage areas are designed to avoid accidental contamination of feed. They need to ensure that feed work areas, and equipment and storage areas for animal drugs and feeds are physically separated from work areas and equipment used for herbicides, pesticides, fertilizers, petroleum products, and other toxic substances.

Where do you store your feeds?

---

How do you prevent potential contamination? \_\_\_\_\_

Feed manufacturers need to provide quality assurance for their products, just like you do. They do laboratory tests to guarantee that your animal is consuming the nutrition you think it is. They establish equipment cleanout procedures to prevent unsafe cross contamination. They test to prove they prevent unsafe carryover of medicated feed products, and prevent unsafe contamination of ruminant feeds by non-ruminant protein feeds.

Just as you read labels, manufacturers use labeling to receive, handle, and store medications in a way that prevents confusion. They also make sure that the correct label is fixed to all medicated feeds you receive. A label also should accompany bulk feed shipments and deliveries. This provides important information if the feed is medicated, but it also provides a record of nutrient guarantees.

Record keeping is important to manufacturers also. They keep written records of feed manufactured, stored, and sold.



## Chapter 6 Biosecurity for Your 4-H Project

---

Part of the success of your 4-H livestock project is determined by the health of your animals. One step to keep your animals healthy is the development and implementation of a farmspecific biosecurity plan. Such a plan may be set up in many different ways depending on your operation and goals. The key point is to reduce the risks of diseases, parasites, and pests in your project. Your biosecurity plan should focus on external and internal risks. But before developing a biosecurity plan, you must understand how animals contract diseases, as well as what diseases and pests your project animals are likely to be exposed to. Your veterinarian is an excellent partner to help you in developing a biosecurity plan for your 4-H livestock operation.

## Disease Spread

How do diseases spread? Generally, most animal diseases spread from one animal to another through direct contact or through their excretions. Animal excretions that can spread diseases include manure, urine, nasal fluids, or aerosol fluids (from coughing or sneezing). Therefore the first line of defense against diseases and pests is to separate healthy animals from other animals with unknown health.

One example is the external parasite that causes mange, a skin disease, in pigs. It does not survive off the pig for very long. Therefore, it is spread through direct contact with infected pigs, where they actually touch each other. Keeping pigs in separate pens with no contact with each other will help stop the spread of mange.

An example of a pest spread through excretions is gut parasites (worms). Gut parasites are usually spread from one animal to another through eggs that are in the animal's manure. An animal with worms passes the eggs through its manure and another animal eats from the ground where the manure is, picking up the worm eggs. Some worm eggs may live in the soil for weeks to years depending on the worm and the environment. Regular deworming needs to be a part of your health care plan.

The organism that causes swine dysentery, *Brachyspira hyodysenteriae*, is also spread in manure. This organism can live for days to weeks in fresh manure or for months in frozen manure. Swine dysentery can be spread by animals and by anything that can carry manure from one group of pigs to another, including boots, tractors, skid loaders, and feed trucks. Cleaning and disinfecting equipment and facilities and controlling animal contact is needed to reduce the risks of introducing this type of disease.

In contrast, some viruses and bacteria can be spread from farm-to-farm on the winds when weather conditions are right. This is often called aerosol spread. Some examples are Pseudorabies, Foot and Mouth Disease, and Mycoplasma. Favorable weather conditions include cloudy days, cool temperatures, high humidity, and gentle winds. Iowa has warm winter days with melting snows that often provide the perfect environment to spread these diseases. The viruses or bacteria form an "infectious plume" or cloud that can spread to animals down wind. This "infectious plume" acts like the "odor plumes" you smell from manure sources. When the wind blows the plume into obstacles, like trees or building sites, it often reduces the concentration of the virus or bacteria in that plume. The lower the concentration of the virus or bacteria, the less chance of disease spread. The only way to eliminate aerosol spread is to build your animal facilities away from other facilities. Since most 4-H facilities are not moveable, we depend even more on a good vaccination program. Work to minimize aerosol spread and use routine immunization to reduce your risk.

## Biosecurity plans

Biosecurity plans are usually divided into two areas, external and internal risk control. External strategies include unit location, transportation controls, isolation and acclimatization practices, and visitor entry policies. Internal activities include vaccination controls, animal movement, people movement, cleaning and sanitation, and other management decisions (ie. Feed medications, dead animal disposal, animal examination schedule). Biosecurity plans contain the same basic strategies common to all, but also should include some strategies specific to your own operation.

## External Strategies

*Unit location and maintenance:* Most of Iowa has a high concentration of animals, and is considered at higher risk to spread those diseases that can move by air. Disease organisms may be spread from one farm to another by winds, rodents, wildlife, birds, and mechanical means. Generally once a unit is placed in an area there are few successful interventions, other than vaccination, to minimize

aerosol spread. 4-H'ers cannot move their operation, but need to be aware of others around them and the potential risk their presence poses.

Your biosecurity plan needs to include control strategies for rodents, wildlife, and birds. Effective rodent control usually includes excluding them from enclosed animal housing areas and effective baiting practices. Some ways to exclude rodents, wildlife, and birds from enclosed animal housing includes cleaning up the area around the building so there are no hiding or nesting areas for the rodents. Mowing around the building or including a rock barrier will also help. Be sure to keep doors closed, fill in any cracks in the foundation, and keep screens over windows. Cleaning up any spilled feed also will help control rodents and wildlife. Baits also can help control rodents and wildlife, but be sure to have adults do the baiting. Pets like dogs and cats also can eat the bait and be poisoned so plan strategic places to use baits. Operations with animals housed outdoors also need a plan to reduce rodents and wildlife, but it may be more dependent on baiting and good sanitation practices.



*Transportation controls:* Vehicles that transport animals can be a major biosecurity risk. Any vehicle called to transport swine and poultry of any age should be cleaned and disinfected before use. Consider the same guidelines for other species. Drivers should be given disposable boots and coveralls to wear, rather than use those previously worn on other locations. All loading or unloading should be done by your family – keep the truck driver in his truck. Consider building special loading areas that can be easily cleaned, and keep the truck and driver away from your main herd. Loading areas should be designed for easy and humane loading. They also should

not allow animals to get off the truck and move back into your barns. Feed trucks and other deliveries can also spread diseases if they come from another farm. Wherever possible, keep feed trucks and delivery personnel outside your animal areas. You also need to be careful not to wear the same boots and coveralls when delivering pigs off the farm as you wear on the farm. Whenever you return from fairs, sale barns, or livestock facilities, you need to change into clean boots and coveralls.

Anyone who enters your livestock areas or has contact with your animals should be treated as “visitors” and follow the guidelines below.

*Isolation and acclimatization:* Most disease organisms are transmitted by contact with infected animals. Such animals may look healthy on arrival, but may be coming down with an infectious disease or be a recovered carrier. This is one reason to require that all inspections and certifications for movement comply with state and federal laws. Even after all these protections are in place, a 30-day isolation period should be planned. All newly purchased animals should be held away from all other animals for two reasons. First, if entering animals are coming down with a disease, they will show symptoms in a few days. Second, if the farm where they originated develops a disease soon after your animals leave, they may be exposed as well. The source site may call with information about a disease outbreak, and if your animals are still in isolation, you can decide whether to start them on a medication program or to remove these animals from your operation. In either case, the infected animals were prevented from entering the main herd until you had a chance to analyze the risks of introduction. During the isolation period, additional blood testing can be done to reduce the risks of introducing a carrier animal with a disease you do not have in your herd.

Any animals that are taken to exhibitions or fairs, and are to return home should be isolated for 30 days. In most cases swine should only be taken to terminal shows or to market. Following isolation

of animals after shows could reduce the spread of club lamb fungus in lambs, and ringworm and warts in cattle.

Acclimatization is the 60 to 90 day period after isolation when new animals are exposed to the main herd and given the opportunity to develop immunity. This practice is particularly important for introduction of breeding stock. This period is the time to vaccinate new entries before they become part of the main herd.

*Visitor entry policies:* Production areas should be clearly identified by signs that limit access. Visitors should be asked to sign their names, addresses, and the date of entry in a book. Also ask about their history around livestock for the past few days. This practice is used most in swine and poultry operations. Requests for 48 to 72 hours “free from swine” or “shower-in” policies have been widely used to minimize disease spread between units. For most 4-H operations these measures are not required, but are effective methods to limit visitors on commercial operations. Adequate initial protection might include making sure visitors have stayed away from the same species overnight and have changed into clean clothes before arrival.

If the visitor is from another country or has recently been in contact with animals in another country, more stringent restrictions are required – stricter clothing restrictions and a seven (7) day minimum time before coming on farm. Visitors should be given disposable boots and coveralls before entry into the swine or poultry areas. They should be asked to wash hands and put on a farm cap if they are to have direct contact with livestock. These steps should minimize risks of human disease transfer, if they are practiced each time visitors view your project.

### **Internal Strategies**

*Vaccination protocols:* Know the difference between vaccination and immunization. Vaccination is the process of exposing animals to a disease. Immunization is when their body develops immunities to that disease. Successful immunization of your animals requires that proper vaccines be selected, handled to maintain effectiveness, and given according to label instructions using good administration techniques. More details on that can be found in Chapter 3 Healthy Production Practices. Many effective vaccines are available for use. Important decisions for individual operations include selecting the vaccines and selecting the production stages during which to administer the

vaccines. Many animals are vaccinated at a young age (before or soon after weaning) as a convenience to the animals and caretakers. For some vaccines this is the proper time for administration. However, at weaning maternal antibodies may block vaccines from working effectively or the immunity may not last until market weight. These limitations are two common reasons why erysipelas vaccinations fail in pigs. Maternal antibody blockage may occur for up to 6 to 8 weeks after birth. Also many available erysipelas vaccines are only protective for 90 to 120 days. Revaccination at about 150 pounds may be required in finishing swine, particularly during summer months or when taken to heavier weights. Your local veterinarian can help you decide what vaccines to use and when to use them. Proper vaccination techniques and vaccine storage and handling must be used to assure that the vaccinated animals respond and build up immunities. Professional advice from your veterinarian can provide valuable assistance.



*Animal movement:* Animals of different ages may have very different populations of organisms, even on the same location. One method to reduce disease spread is to keep animals of different ages separated and to minimize traffic between them. If housed in confined buildings, each group should

be held in separate air spaces when possible. Generally, young animals have the least disease organisms. Most animals collect disease organisms as they become adults. Mixing different aged animals should be discouraged. Once a group has been established new entries should not be allowed until they have gone through the isolation practices above. All of these steps are designed to minimize the spread of disease organisms from one group to another.

*People movement:* People moving from one group of animals to another may spread disease. A farm movement plan should be implemented. Boots and clothes can be short-term carriers of disease. Changes of boots and coveralls between groups will minimize disease spread. The healthiest groups should be visited first in the day, then others in descending order of health. Generally under this plan nursery pigs are first, followed by grow-finish, breeding herd and isolation units. A change of boots and coveralls should be required if healthier units are revisited later in the day. Visitors should follow the visitor policy outlined above.



Remember, NEVER go from the fair, sale barn, or other livestock facility right out to your 4-H project animals! This is a simple biosecurity practice that is easily forgotten. Always change clothes and boots before going into your own facilities.

*Cleaning and disinfecting:* A clean environment encourages healthy animals. Prompt removal of manure reduces the contamination of the environment, and keeps your animals clean. Build-up of manure allows disease organisms to grow and to reach harmful levels. These conditions may cause a disease outbreak by overcoming animal immunity even in otherwise healthy animals. Diseases such as E.coli, swine

dysentery, and ileitis are more prevalent in unsanitary conditions. Before entry of new pigs, cleaning and disinfecting the pens, walls, and equipment minimizes the transfer of disease from one group to another. Allow several days of down time for drying to occur.

When cleaning, the important step is the removal of all manure and other animal materials. This is best done with a high-pressure sprayer with hot water and detergent, but scraping the surfaces followed by washing can be effective. Equipment should be removed or cleaned in place. All feed should be removed from feeders before cleaning. To clean manure packs off solid surfaces, overnight wetting of the area with a lawn sprinkler can loosen the manure and make cleaning easier. Once all the manure and other materials have been removed, the area can be sprayed with a disinfectant that will kill the organisms of concern. Your veterinarian can help determine what disinfectant should be used.

On solid or dirt floors an application of lime or other dessicants after cleaning may decrease the number of organisms by drying up the surface.

This drying effect will assist in killing the harmful bacteria. Removal of all manure and bedding should be completed before the lime is spread on the surface.

All manure cleaned from the pens must be properly disposed to avoid environmental contamination. For many 4-H projects this manure will need to be stockpiled until land application is possible. Composting may be considered. Before starting a compost pile, you should familiarize yourself with the proper steps and the environmental requirements. Composting information is available from your county Extension office, from brochures like "On-farm Composting" NRAES-54 available from the Midwest Plan Services, 122 Davidson Hall, ISU, or on the Iowa Pork Industry Center Web site.

**Develop Your Own Biosecurity Plan**

You need to develop your own written plan to minimize the risks identified for your project and facilities. Organize it using the headings above, or complete the following form. Remember that animals are the most likely cause of disease transmission to other animals. Plan according to your facilities, the size and scope of your operation, and the potential risk exposure for your animals. Have a leader or veterinarian review your plan for completeness.

**My Biosecurity Plan**

***External Strategies***

**Farm location and Maintenance**

I plan to reduce risk from neighboring farms by

---

I plan to reduce rodents, wildlife, and birds by

---

**Transportation Control**

When vehicles come to transport my animals I will reduce risk by

---

When feed or delivery trucks come to my farm, I will reduce risk by

---

**Isolation and acclimatization**

I plan to reduce the risk of disease from new animals by

---

I will introduce new animals into my operation by

---

**Visitor Entry Policy**

Visitors to my operation will

---

***Internal Strategies***

**Vaccination Protocol**

My vet and I have decided to vaccinate my project animals for

---

When? \_\_\_\_\_

I will handle these vaccines to provide the most effectiveness by

---

**Animal Movement**

I will house animals

---

The order I care for my animals is

---

## People Movement

To prevent the spread of diseases by people, I will

---

## Cleaning and Disinfecting

I plan to clean my buildings (how and when)

---



# Chapter 7 Ethics

---

The goal of the 4-H livestock project is to teach youth the basics of animal production and management, to teach youth to exhibit animals, and to help build the life skills youth need for success. These life skills include record keeping, decision-making, responsibility, self-esteem, leadership, and citizenship. These life skills are also closely related to ethics and character traits. Some say ethics are just character traits in action.

Some say ethics means knowing and doing the right thing. Knowing the difference between right and wrong is easy, but doing the right thing is often much more difficult! Building our character traits helps to make doing the right thing a little easier.

**Caring** means showing concern for others. As a 4-H'er, you have many opportunities to show that you are a caring person, both to people you work with and to your animals.

You can find many ways to express to others that you care about them and appreciate the work that they do to help you. You show your care for others when you try to understand their personal concerns, help new exhibitors, and share your equipment with others. You also show caring for others when you say "thank you" and express your appreciation for their help, or when you congratulate other exhibitors when they do well. Avoiding gossip, negative publicity, taunting, and teasing others also shows a caring attitude.

Caring exhibitors show they care about their animals by providing good care and management, regular feeding and watering, protection from the elements, and reduction of the stress on the animal. Caring for animals includes placing more importance on the health and safety of the animal than the opportunity to go to the big show!

**Respect** is treating people like you would like to be treated. You show respect in the way that you treat people and animals. Showing respect for your 4-H leaders, fair committees, and fellow 4-H'ers includes speaking kindly, listening to others, and following rules. If an advisor, educator, or professional offers advice, show respect by listening to what he or she has to say.

Treating animals with respect means that you must consider their comfort needs. For example, clipping sheep to ensure that they are cool and comfortable would show that you were concerned about the animals' comfort and were treating them humanely. When you handle your animals properly, you are eliminating unnecessary stress, also a way to show respect.

Although nearly all livestock producers and 4-H members treat their animals properly, it only takes one isolated incident to cause bad publicity for all of us. An example of inhumane treatment would be neglecting to water your steer for several days so that you can make the weight limit at the county fair. Daily feeding and watering is part of the proper care and respect you show your animals.

Finally, show respect for your consumers. Consumers have the right to expect that the food they consume is safe. This means that every livestock owner has the responsibility to care for his or her animals and follow proper drug use to produce a safe, high quality product for the consumer. Showing respect for the needs of the public will help build a positive image of 4-H and the livestock industry.

**Trustworthiness** means doing what you say you will do; being honest, don't lie, cheat, or steal. As a trustworthy 4-H'er you provide care for your animal's daily or make arrangements in advance for others to care for your animals when you can't. You follow the rules for animal ownership and registration, and you consult with a veterinarian and read labels before administering any medication.

When your parents helped you purchase your animals, they put their trust in you to take care of the animals. When you are loyal and follow through on your promises, people will say you are trustworthy!

Exhibitors also show trustworthiness when they follow all food safety rules. Consumers have a right to know that their food is safe and free from any drug residues. When you use only approved drugs and medications and follow the withdrawal times on all medications used, you are ensuring that their food will be safe.

Iowa 4-H'ers produce approximately 17 million pounds of meat for consumers annually. Just think how many families that will feed. If each and every livestock producer follows the quality assurance principles, consumers will be confident of the safety of their food. So when you follow withdrawal times and use only approved drugs, consumers will consider you to be trustworthy.

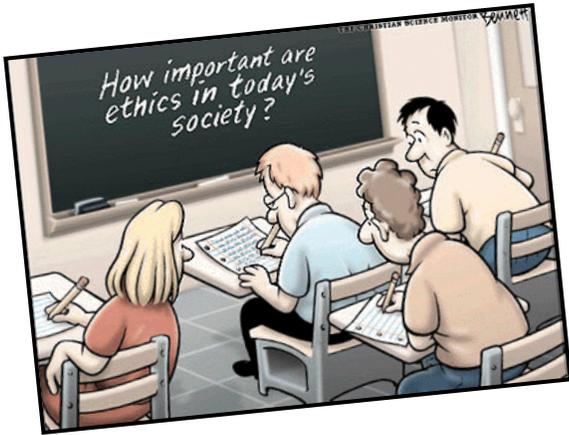
**Fairness** means listening to others, and playing by the rules. It also means being equally good to everyone and treating everyone equally and with consistency. Following the Golden Rule: "Do unto others as you would have others do unto you" is a standard measure of fairness. This is the kind of treatment that a fair and ethical person will display in all areas of life, including working with their livestock.

There are many opportunities in the livestock project to show fairness. Following ownership and registration deadlines, knowing and following show rules, sharing space with other exhibitors, and caring for your own animals all show fairness. When barn space or wash rack space is limited, the 4-H'er practicing fairness will share space with others, or quickly finish washing to allow time for the next 4-H'er to get his or her animal washed. 4-H'ers can also show fairness in the ring by being considerate of the other exhibitors and animals in the class with them. Allow adequate room between animals and don't infringe on their opportunity to exhibit their animal. Speaking well of winners and resisting the temptation to gossip also shows fairness.

**Responsibility** means doing the right thing, considering the consequences of your actions, and being accountable for your decisions. 4-H livestock projects have been known for teaching responsibility to youth. How many times have you been told to "be responsible?"

4-H livestock projects teach responsibility in many ways, the first of which is simply the length of the project and the total dependence of the animals on the 4-H'er. Some projects like market broilers are only 30 to 60 days in length, but others like breeding beef require year-round care. In addition to

the care of the animals, 4-H'ers must also show their responsibility in training the animals. Many show animals require lots of time to get ready to be exhibited safely, and being concerned about the safety of others also shows responsibility!



Responsible exhibitors will take the time to read the fair book and know and abide by all rules. They also will assist others as much as possible. They also take the time to read and follow all drug and medication rules and regulations. Responsible exhibitors also respect and care for their property and the property of others. Responsibility is also demonstrated by good sportsmanship, good herdsmanship, and good showmanship at ALL times, not just when the judge is watching!

**Citizenship** means helping others and obeying the law. This definition of citizenship has two distinct parts - first helping others, and second obeying laws.

Truly practicing the helping part of citizenship means getting involved. No one can make a difference without becoming personally involved in trying to make things better. In other words, if you think you have an idea of how things could be done better, don't just stand around and complain about how they are done. Instead, share your idea with others and become a catalyst to implement change and improvements for others. Or if you see someone needing help, offer to assist him or her. This might include other exhibitors, show management, or fairgoers. Work with less experienced exhibitors so that they improve their skills and knowledge. Be willing to share resources to help others.

The second part of citizenship is obeying laws. 4-H has plenty of rules or laws, to obey, including enrollment, identification, entries, ownership, food safety regulations, and much more. The trait of responsibility helps you learn these rules, and the trait of citizenship helps you to follow these rules.

Using quality assurance methods to ensure that you are producing a product that is safe for consumers is an excellent way of practicing citizenship. Even though you may not have a lot of livestock, there are consumers in the United States who will eat the meat that comes from your animals. (Those consumers might include yourself and your family!) All consumers should be able to have confidence that their meat supply is safe. Practicing quality assurance methods will help build consumers' trust in our livestock industry, and shows your concern for others.

Over the past decade, scandals have developed in both 4-H and FFA shows due to the illegal use of drugs, physical alterations of animals, false ownership, and use of professional fitters when the rules specified that it was not allowed. This has been damaging to the program and to consumers confidence in the product that we produce. It is time to turn the tide and place emphasis on learning rather than winning, and building your character traits can help do that.

By exhibiting the six character traits of caring, respect, trustworthiness, fairness, responsibility, and citizenship, you will help to build the positive image of 4-H, and demonstrate 4-H accomplishments in helping grow productive young adults.

