

Youth

BEEF QUALITY ASSURANCE

Program Manual for the Pacific Northwest



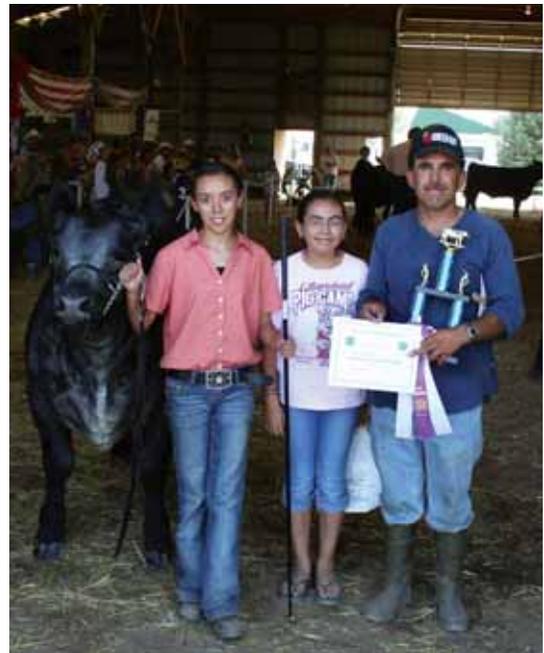
Beef Quality Assurance Program Manual

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What Is Beef Quality Assurance?

Beef quality assurance (BQA) is a program designed to help producers raise an animal that will provide a safe and wholesome beef product for the consumer. BQA is designed to improve food safety by preventing chemical/drug residues, pathogen contamination, and defects such as injection-site blemishes and bruises.

Youth BQA objective

Youth BQA programs assist youth in understanding their role as producers in the food supply chain and their responsibility to produce a safe food product while caring for animals in an ethical manner.

Why is BQA so important?

Even though youth are learning through participation in 4-H and FFA livestock projects, those project animals are being produced for food for many people. Sometimes participants get so wrapped up in showing animals that the very important matter of beef quality gets overlooked. Consumers, any people who have the opportunity to purchase and eat meat products, want to know that they are eating safe and wholesome food. It is the responsibility of everyone involved in raising youth project animals to make sure that everything done while raising our animals accomplishes that goal.

BQA components

Beef Quality Assurance has many different parts. Each is equally important. It is important to pay attention to all the parts to be successful. BQA topics in this manual include the following:

- Handling and Management of Animals (Chapter 1)
- Ethics and Animal Welfare (Chapter 2)
- Record Keeping (Chapter 3)
- Animal Health (Chapter 4)
- Biosecurity (Chapter 5)
- Beef Carcass Quality (Chapter 6)

All of these areas make up the beef quality assurance program, and each will be discussed in this manual.

How the Youth BQA manual is layed out

Each chapter starts with a discussion of the topic to give leaders, parents, and youth background information. Next is a lesson that the leader or parent can discuss with youth. Activities reinforce each lesson.

OBJECTIVES

1. Raise awareness of youth leaders, parents, and youth regarding beef quality assurance (BQA) principles and practices.
2. Provide training and education for youth leaders, parents, and youth on proper beef cattle management practices that lead to the production of safe, wholesome, high quality beef and beef products.
3. Demonstrate the level of stewardship by beef cattle producers in animal husbandry and beef quality assurance (BQA) to youth leaders, parents, and youth.

Targeted life skills

Life skills enable an individual to be productive, responsible, and to achieve personal goals. Specific life skills that are achieved from this program include:

- Leadership
- Responsible citizenship
- Contributions to group effort
- Teamwork
- Self-motivation
- Self-responsibility
- Self-discipline
- Stress management
- Disease prevention
- Concern for others
- Cooperation
- Communication
- Keeping records
- Wise use of resources
- Planning/organizing
- Goal setting
- Critical thinking
- Problem solving
- Decision making
- Computer skills

The way in which animals are handled plays a significant role in final carcass quality. It is important that you pay attention to proper handling and management procedures throughout your project in order to produce a high quality carcass. This section will help you understand best management practices in the handling and management of your animals.

Stress

Stress can play a significant role in production, animal health, and carcass quality. Stress can be caused by a variety of things, some of which are beyond our ability to control. Extreme heat and cold are examples. Other potential stress triggers such as feeding inconsistencies, handling, and transportation can be minimized through proper management practices.

Animals that are stressed exhibit reduced weight gains and are more susceptible to sickness and disease. Research also shows that short-term stress occurring during handling or transportation can interfere with reproduction. Stress at or near slaughter can cause a condition known as a dark cutter. The meat is much darker in color, tends to be dry, and has a reduced shelf life. This causes the carcass to be of less value to the packer.

Feeding

Proper feeding practices are important in reducing stress. Cattle are creatures of habit and respond well when fed a consistent ration at the same time every day. Feedstuffs should be of sufficient quality and quantity to ensure that the animal has what it needs to perform at the required level. Water is an essential part of any feeding program and should not be overlooked. Be sure that your animals have a sufficient quantity of good, clean water available at all times. Water can often be a problem at fairs and shows. Animals become accustomed to the taste of water at home and will drink less at a fair if the water is chlorinated or has a different taste. In extreme cases, you may need to haul water for your animals from home to the fair.



A youth practices with her steer at a county fair.

Photo by Mark LaMoreaux

Handling cattle and facilities

Cattle should be handled in a quiet, gentle manner. Avoid getting in a big hurry. Attempting to “rush” the working of cattle often leads to increased stress, both on the animal and on you. The use of animal prods such as whips, sorting sticks, paddles, and hot shots should be kept to a minimum. These types of devices used improperly can cause bruising of the carcass.

When cattle prods are used, avoid contact with the eyes, rectum, genitalia, and udder. Caution should also be exercised to avoid bruising the loin and round areas. Typically cattle that are worked in a steady and gentle manner require minimal prodding. If cattle continuously balk, handlers should investigate the cause rather than resort to excessive prodding.

When working cattle, it is important to be well prepared in advance. The working facilities (corrals, alleyways, and chute) should be inspected to ensure that everything is in proper working condition. Be sure to check for broken boards, protruding nails, etc., that might cause injury to animals or handlers. Assemble all of the needed supplies and equipment prior to bringing in the cattle.

Diagram 1. Flight Zone is the area surrounding an animal within which that animal is comfortable with its surroundings. If a potential threat moves inside of that zone, the animal will move away. *Illustration courtesy of Steve Cote, USDA-Natural Resources Conservation Service, Arco, Idaho*

Work animals between
The X's on each side.
Don't work them between
X's in front and rear.

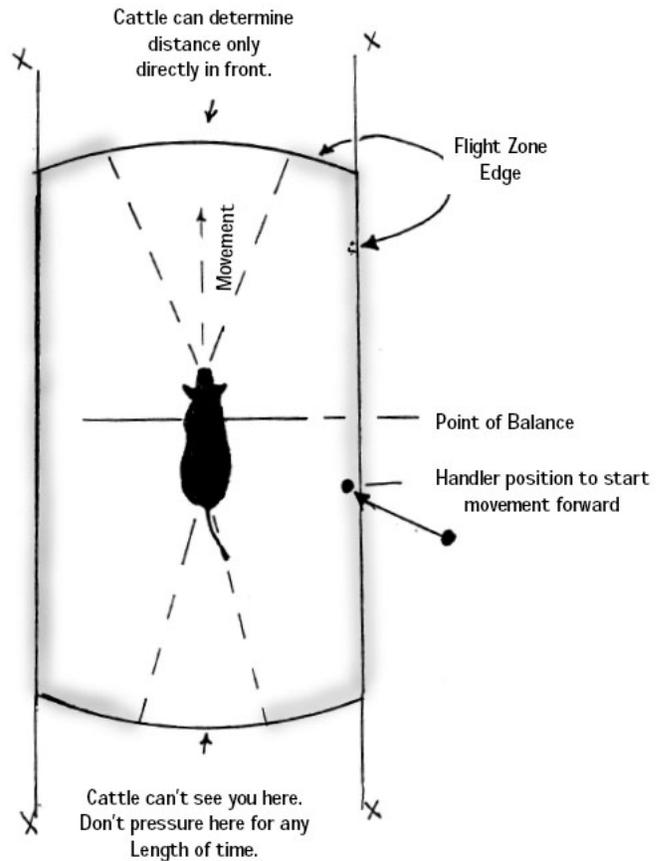
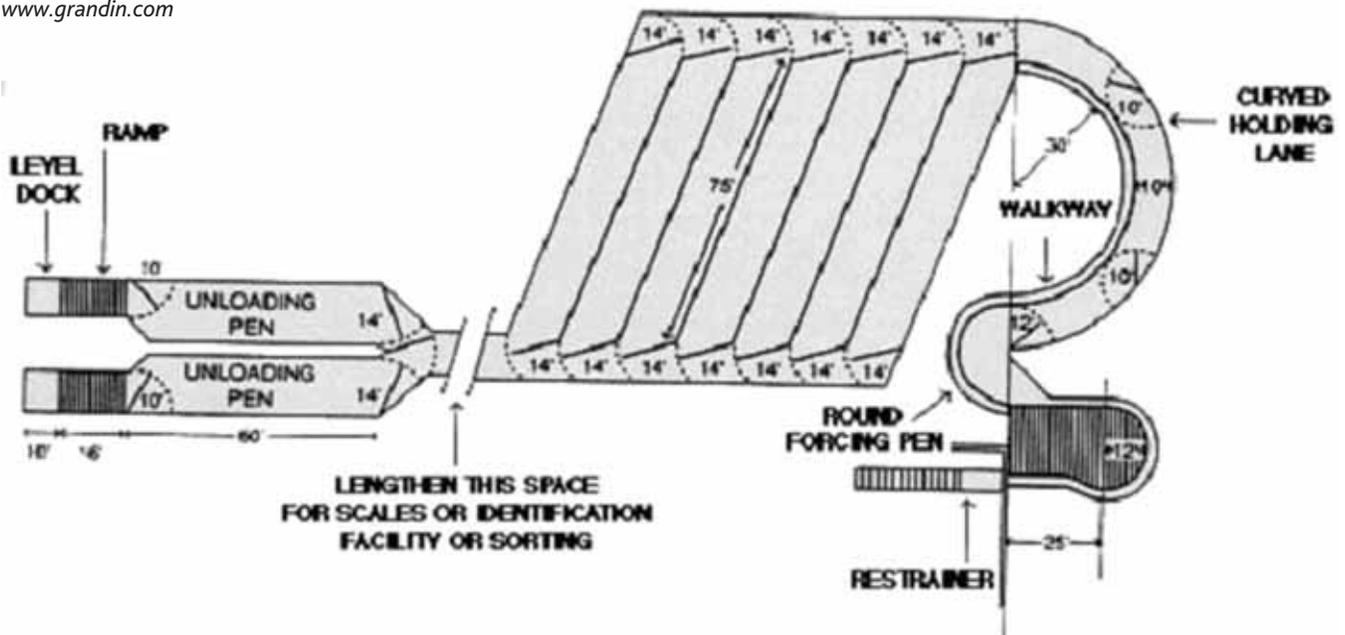


Diagram 2. Cattle move more quietly in a curved alleyway where they do not see a "dead end" in front of them. Solid sides on the alleyway keep them from being spooked by things outside the alley. A round forcing pen eases the process of loading the final alley. *Illustration courtesy of Temple Grandin, Colorado State University, www.grandin.com*



Moving cattle

Flight zone. Animals have what is known as a flight zone. It is simply the area surrounding an animal within which that animal is comfortable with its surroundings. If a potential threat moves inside of that zone, the animal will move away. It is similar to a human's personal space. The size of the flight zone will vary among animals and will also change with changing conditions. Human personal space requirements also differ among people and circumstances. You might be more comfortable around family members or certain friends but back off when approached closely by strangers.

Point of balance. Having knowledge of how animals tend to respond when approached within the flight zone can be very helpful when moving cattle. Cattle have a point of balance, which is located at the shoulder. If the handler approaches behind the shoulder the animal will move forward. When approached in front of the shoulder, the animal will move backward. Often a handler makes the mistake of standing in front of the point of balance of an animal in a crowding alley while attempting to make that animal move forward. Groups of cattle will often move forward with no prodding when the handler walks past the point of balance in the opposite direction of each animal in the chute.

Blind spot. When cattle are approached at the hip, they will turn in the direction of the pressure. For example, approaching an animal toward the left hip will cause that animal to turn left. Cattle also have a blind spot directly behind them. Quite often a handler will approach an animal directly from behind expecting that animal to move forward. Instead, the animal will turn in order to see what is approaching. Understanding how cattle will respond to your movements will result in reduced stress levels for both the handlers and the livestock.

Facilities—simple improvements help

In most circumstances, the livestock handler will use the existing facilities to work cattle. While major changes might not be possible, simple improvements can often improve cattle flow and handling. Look for tight corners, slippery surfaces, or other problem areas that might be corrected.

In general, cattle will move more quietly in a curved alleyway where they do not see a “dead end” in front of them. Solid sides on the alleyway will keep them from being spooked by things outside the alley. A round forcing pen will ease the process of loading the final crowding alley.

If you have the opportunity to build new cattle-working facilities, extreme care and planning should go into the design to ensure the long-term functionality. Very seldom will you be able to make any significant changes once the facility is constructed. Diagram 2 indicates general characteristics of a good livestock handling facility. For additional information and guidance on facility design, visit world-renowned animal behaviorist Temple Grandin's website at www.grandin.com.

Summary

The proper handling and management of your beef project is critical to the quality of the final product that you are producing. Remember to be consistent in your feeding regimen and to handle your animals in a quiet, gentle manner. Inspect your facilities and make necessary repairs prior to working the cattle. Following these simple procedures will help ensure a quality eating experience for consumers of beef products.

References

- Chapman, C.K., editor. 2002. *Utah Youth Beef Quality Assurance Program Manual*, page 2-4. Utah State University.
- Cote, Steve. 2004. *Stockmanship*. USDA Natural Resources Conservation Service.
- Grandin, Temple. Web site at www.grandin.com.
- Stull, C.L. and D. Hansen. *Identifying and Minimizing Stress in Cow-Calf Operations*. Western Beef Resource Committee Cow-Calf Management Guide and Cattle Producer's Library, Second Edition. CL 601. University of Idaho.



Start the lesson by asking the youth, parents, and leaders to define what stress is and what some contributing factors might be. Use poster paper or white board to list the responses.

Results of stress

Explain that stress can affect an animal in many ways. It can cause reduced feed intake, which in turn will cause reduced weight gains. It also causes animals to have a reduced immune response, which causes them to be more susceptible to diseases. Animal temperament and stress can cause injury due to the animal trying to jump or go through fences. Be sure to talk about dark cutters and the resulting losses in carcass quality.

Handling cattle

Handling cattle is necessary during the production process. It is important to learn to handle cattle in a very calm and gentle manner to avoid stress and maintain high carcass quality.

The suggested activity in Chapter 2 Animal Welfare and Ethics can help reinforce proper handling procedures.

Moving cattle activity

Place one magnet on a flat surface. Use the second magnet to approach the first (with like ends together). The magnets will repel each other and the first will move away from the second. Use this to demonstrate how livestock will move away as someone moves into the flight zone.

Personal space activity

As a part of this activity, talk about personal space. Demonstrate this by having one “volunteer” stand in front of the group. Talk about flight zone and personal space as you approach this person—closer and closer until he or she moves back. This could be used to discuss also how the flight zone changes depending on the

MATERIALS NEEDED

- Poster paper or white board
- Markers
- Cow magnets or other large, strong magnets
- Plastic toy fences, toothpicks, Popsicle sticks, etc.
- Working facility pictures/diagrams (see page 9)
- Computer with Internet access

situation (i.e., weather, stress, confinement, etc.). For humans, space can change depending on familiarity with the person. You could talk about boys requiring more personal space when talking to other boys but less when talking to girls.

Using plastic farm animals, have participants demonstrate proper positioning to have the animal move or behave in a required manner. For example, place a plastic animal on the table, and then ask a participant how they might approach the animal to turn it a certain direction. Discuss how having this knowledge can be beneficial when moving cattle.

Facilities activities

Discuss the fundamentals of good working facilities.

Facilities activity 1

Have participants draw a rough sketch of how they might design a small series of pens, alleyways, and chutes. Log onto www.grandin.com (or print off examples from this site) and show the suggested facility layout. Have participants make comparisons between their sketches and layouts Dr. Grandin recommends.

CHAPTER 1 ANIMAL HANDLING AND MANAGEMENT

LESSON & ACTIVITIES

Facilities activity 2

Use children's plastic toy fences, toothpicks, Popsicle sticks, or other items to have participants build a prototype of a working facility. Be sure to allow them the opportunity to talk about their design. Discuss potential trouble spots with the design.

Facilities activity 3

Have participants review pictures provided on the next page to identify the positives and negatives of each facility. Discuss the facilities and what might be done to fix any problems.

- **Positive examples** include solid sided alleyway, elevated walkway, access gate behind chute, covered working area, curved alleyway, and so on.
- **Negative examples** include straight alleyway, no stops to prevent cattle from backing up, severe angle from crowding pen to alleyway, and straight sided alleyway.

Summary

Review what participants have learned about stress, feeding, handling cattle, moving cattle, and facilities. Remind them about how each of these can affect the quality of the beef product that they are producing. Remind them about the importance to the industry of producing a high quality product and a good eating experience for the consumer.



When trailing cattle, avoid trying to hurry. It's best to handle cattle in a quiet manner. *Photo by Cindy A. Kinder*

**CHAPTER 1 ANIMAL HANDLING AND MANAGEMENT
FACILITIES IDENTIFICATION**

Picture A



List positives: _____

List negatives: _____

Picture B



List positives: _____

List negatives: _____

Picture C



List positives: _____

List negatives: _____

Picture D



List positives: _____

List negatives: _____

photos courtesy of Scott Jensen

Raising a beef animal is one of the most rewarding experiences a youth beef project member will ever have. The life skills learned will be tremendously valuable and will be used repeatedly as an adult. One of the most important lessons to be learned through the project is how to properly care for your steer, heifer, or cow.

The general public trusts that farmers and ranchers along with youth project members will provide for the welfare of beef cattle. This is why people involved in raising beef cattle need to be sure that their animals are cared for properly.

Animal welfare is defined as the concern for the well being of animals. People are responsible for the care of the animals they own. This includes minimizing pain, stress, and suffering, and providing food, water, and shelter, along with protecting them from harm. Taking good care of animals is also known as humane treatment. Some examples of humane treatment of the beef animal include:

- Feeding a balanced ration that meets the protein, energy, vitamin, and mineral requirement of the animal.
- Providing plenty of cool, clean water at all times.
- Putting the animal in a pen with plenty of space to allow for exercise.
- Providing a warm, dry shelter that is well bedded.
- Keeping the pen and barn clean by removing manure on a regular basis.
- Keeping the bedding dry and clean.
- Observing the beef animal on a daily basis to check for sickness and providing treatment when needed.
- Vaccinating to prevent diseases.
- Treating the project for parasites such as flies, lice, and worms that cause stress and reduce gain.
- Teaching the animal to tie and lead at an early age to reduce stress and possible injury.
- Spending time grooming the animal.



Youths practice putting on a halter properly at a halter-breaking workshop in Gooding County, Idaho.

Photo by Cindy A. Kinder

- Protecting the animal from predators.
- Using a safe trailer to transport cattle.
- Showing respect for the animal and treating it with compassion.

Carefully providing for the welfare of a beef project animal will help ensure that you produce a product that consumers want. It will also help preserve the program so that future generations will be able to be involved in a 4-H beef-raising project as well.

Ethics

Ethical behavior is a personal choice about what is good or bad, right or wrong, or about your duties and obligations. Ethics are based on personal principles or values. Youth beef projects must accept and follow approved ethical management practices (See Appendix for the Idaho Youth Livestock Program Commitment to Excellence Form).

Beef project participants will have many opportunities to do the right thing. It all starts at the beginning weigh-in of the animal. The ethical thing to do is weigh the animal without manipulating feed and water intake in order to falsify the starting weight. This should also be the practice followed when weighing your animal at the final show.

Properly feeding the beef animal is key to a successful experience. The animal must be fed so that it can gain rapidly on the least amount of feed and reach a target end weight (see Chapter 6 Beef Carcass Quality). The ethical thing to do is make sure animal feed is approved for cattle. Health care products used during the year should only be those that are labeled for use on cattle.

If the project chosen is a breeding animal, the ethical thing to do is record the correct birth date and birth weight after the heifer or cow has a calf, as outlined in Chapter 3 Record Keeping. Youth producers earn respect from professional producers when they truthfully represent their cattle.

At the fair

Fitting and showing your animal at the local county fair is really fun. Participants must be sure to be ethical in all that is done at this event. Having a professional fitter prepare the animal for a youth show is not ethical. Fitting an animal can be difficult for young people from 8- to 12-years-old. They may require help from an adult or an older member. Young exhibitors should ask someone with experience to teach them how to clip and fit the animal so they can learn how to do all of their own work. Also, be sure to use only products that are acceptable when fitting the animal.

Youth beef project members should always be ethical. This means knowing the difference between right and wrong while making the choice to do the right thing.

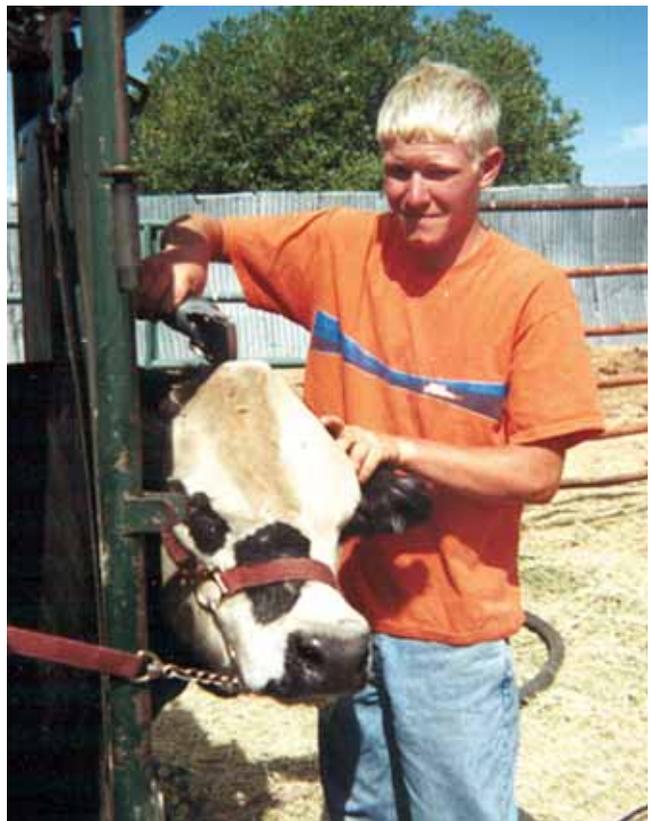
References

- Black, Jodi. 1994. "Quality Assurance and Animal Care: Youth Education Program," Ohio Agricultural Educator Curriculum Materials Service, Beef Learning Laboratory Kit, Educator/Leader Activity Sheet, Unit 1, Level 1, page 13. Ohio State University.
- Chapman, C.K., editor. 2002. *Utah Youth Beef Quality Assurance Program Manual*, page 4-5. Utah State University.
- Goodwin, Jeff, Ph.D. 1995. "A Step Beyond: A Question of Ethics," Activity Guide. Texas A&M University.
- Goodwin, Jeff, Ph.D. 1997. *Quality Assurance: Strengthening the Chain of Wholesome Food Production*. Texas A&M University.



A youth blows off straw and dust in preparation for the quality show at the Gooding County Fair in Idaho.

Photo by Cindy A. Kinder



Clipping, or trimming long hair and cleaning up a steer's head and body so it shows at its best, is part of the 4-H county fair time preparation.

Photo by Cindy A. Kinder



Start the session by asking the youth, parents, and leaders to define what “animal welfare” means. Use a white board or poster paper to record the responses.

What is animal welfare?

Explain that animal welfare reflects people’s concern for the well being of animals. Animal welfare suggests that humans are responsible for the care and well being of animals. The general public wants producers to care for animals in a humane manner.

Break the participants into small groups of three to five people. Give participants 5 minutes to identify as many humane and inhumane management practices conducted with beef cattle as they can. Have each group record their thoughts on a large poster paper. After 5 minutes, ask each group to share their answers with all participants. (See Supplement 2 Examples of Humane and Inhumane Practices.)

Discuss the answers and indicate how important it is for leaders, parents, and youth project members to take good care of their animals so they perform well and support a positive public image of animal agriculture.

Animal welfare activity

Animal welfare involves the proper handling and care when moving or hauling beef cattle.

Explain to the group that they are going to role-play with some of the group acting as cattle and others acting as handlers. Have all the participants construct obstacles using chairs, tables, or whatever is available in the room. Obstacles should simulate alleys, pens, or chutes.

Once the obstacles have been built, ask for three to four volunteers. These volunteers will serve as cattle in the activity. Have everyone else in the group serve as handlers. Handlers will round up the cattle and run them through the obstacles as a group or one at a time. It doesn’t matter.

MATERIALS NEEDED

- Flip chart
- Poster paper or white board
- Markers
- Tape for posting charts on wall
- Ethics Scenarios sheet (p. 14)
- Humane and Inhumane Practices sheet (p. 15)
- Large cardboard boxes for handling activity
- Show sticks or canes

Handlers can simulate loading cattle into a trailer, running them into an auction ring, or up an alley into a chute. Handlers can shout, make loud noises, whatever, to get the cattle to move. Do this activity for a few minutes and then have the volunteers who acted like the cattle discuss how they felt. The leader should review what happened and relate this activity to the importance of animal welfare while:

1. Hauling
2. Moving
3. Fitting and showing

Discuss that rough handling causes bruising and increases stress on the animal, which can cause dark cutters (refer to Chapter 6 Beef Carcass Quality), plus it is a horrible display of abuse and animal mistreatment.

Ethics activity

Ethical behavior is a personal choice about what is good or bad, right or wrong, or about your duty and obligation. Ethics are based on personal principles or values. With youth beef projects, we must accept and follow only approved ethical management practices.

CHAPTER 2 ETHICS AND ANIMAL WELFARE

LESSON & ACTIVITIES

Break participants into groups of three to five people. Pass out an ethics scenario and have the small group decide whether it is an ethical or unethical practice. They will have a few minutes to discuss their scenario, and then have them share their answer with the entire group. They should also be ready to defend their position. Ask them why they chose one over the other.

Six ethics scenarios are on the next page (Ethics Scenarios sheet p. 14) and answers are in the Appendix (p. 47).

Summary

At the end of the class summarize what you have discussed.

Discussion points

1. Ask students to define animal welfare.
2. Ask students to name some of the basic needs of cattle.
3. Emphasize that show animals should be handled as if they are fragile, like a kitten or pet dog. This helps to prevent stress, dark cutters, and bruising. Plus it is the correct thing to do.
4. Discuss why, in the youth project area, everyone must accept and follow approved ethical management practices and do the right thing.



Weather extremes—very cold or very hot—can stress animals. *Photo by Cindy A. Kinder*

ETHICS SCENARIOS

Ethics Scenarios

Give each group a different scenario:

.....
1. A parent of a junior livestock exhibitor has a friend who is a very good fitter. The parent invites the fitter to come to their home and clip the beef project a couple days before the fair.

Ethical Unethical

.....
2. An exhibitor notices that his/her steer is unwilling to drink city water at the fair due to chlorination. Molasses is added to the water to get the steer to drink, which also makes the animal look better when shown.

Ethical Unethical

.....
3. Two weeks before the show a steer develops foot rot. The junior exhibitor contacts a veterinarian and is given antibiotics to treat the steer. The antibiotics do not have a minimum withdrawal requirement prior to slaughter.

Ethical Unethical

.....
4. A first-year junior livestock exhibitor does not know how to clip his/her steer. An adult helps the exhibitor by showing him/her how to clip and then allows him/her do as much as he/she can.

Ethical Unethical

.....
5. A steer is slightly underweight so the parent of the exhibitor “drenches” (water forced into the stomach using a tube) the steer in order to make the appropriate weight for the fair.

Ethical Unethical

.....
6. A calf is born on February 15. It is a calf that has the genetic background to be successful in the show ring. A birth date of March 2 is recorded on the registration papers to give the calf an advantage when shown.

Ethical Unethical

.....
Suggested answers for the scenarios are in the Appendix, p. 47.

EXAMPLES OF HUMANE AND INHUMANE PRACTICES

Humane practices examples 😊

- Feed a balanced ration
- Provide plenty of clean water
- Prepare facilities before getting animal
- Keep animal in a warm dry place that is adequately ventilated and well bedded
- Start training animals at a young age
- Castrate and dehorn animals when they are young
- Observe animals daily, and get treatment for those that need it
- Follow a planned health and vaccination program
- Protect animals from predators
- Provide rest time during trips that require hauling animals long distances
- Don't bring an animal that is sick or injured to the show
- Give animals enough stall space at the show
- Make sure people see that youth respect and have compassion for animals

Inhumane practices examples ☹️

- Failure to feed and water animals regularly
- Failure to keep pens and stalls clean and dry
- Failure to treat a sick or injured animal
- Pulling animals behind a vehicle to train them to lead
- Leaving animals tied for long period of time in direct sunlight
- Beating, kicking, or using a hot-shot to train animals
- Hauling animals in the heat of the day in the summer
- Handling animals roughly when they arrive at the show
- Using hot-shots, whips, canes, sticks, etc., to beat animals when unloading, moving to pens, or to the show ring
- Kicking, kneeling, beating, jerking, slapping, or slamming an animal in the ring
- Allowing animals to fight and injure each other
- Lack of animal grooming
- Improper medicating of animals

To understand the importance of records in beef cattle production, consider the following: Which cows should be culled from the herd? Do any of the bull calves have what it takes to be a potential herd sire? How many calves got sick and required treatment? These are just a few of the questions that beef cattle producers must face each year and must address to have a competitive, productive, and profitable business.

Animal selection

When selecting a beef animal for a junior livestock project, youth have a number of questions to ask as well. They include: Which steer or heifer is most structurally correct? Which heifer is most reproductively sound? Have the animals been vaccinated? Have any of the animals been treated for sickness? Which animal has the greatest growth potential? Which steer or heifer has the greatest amount of muscling? Which heifer will ultimately make the best cow?

Goal setting

The most important and most difficult part of beef cattle management is setting goals. Examples of goals that might be set by a beef producer include herd pregnancy rate, herd weaning weight, etc. Goals set by junior livestock exhibitors for their beef projects might include market (show) weights attained in a certain time period, carcass quality measures, etc. Record keeping is a tool that can be used to determine if progress is being made toward meeting specified goals. Keeping production (performance) and financial records is essential in evaluating the performance, productivity, and profitability of a beef cattle operation or a junior livestock project.

During goal setting exercises, producers and exhibitors must determine what traits (growth, reproduction, carcass, etc.) are important to their enterprise or project. Production (performance) records are a means for beef producers and junior livestock exhibitors to keep track of how animals perform with regard to specific traits. Performance records can take many shapes and forms, and may include a number of different traits and measurements. These depend on an individual producer's or exhibitor's goals and objectives.



County fair goers check out a 4-H record book.

Photo by Mark LaMoreaux

Record types

Examples of records used to evaluate beef cattle performance include the following:

- *Calf birth weight records* assist in determining the size of calves a certain bull might sire and assist in reducing dystocia (calving difficulty).
- *Calf weaning weight records* assist in evaluating the mothering ability and productivity of the cow, as well as growth potential of a calf.
- *Yearling weight records* are a more direct reflection of a calf's ability to grow than weights taken earlier in the animal's life.
- *Feedlot and carcass records*. Many people feel these provide the most complete evaluation of an animal. Feedlot and carcass records are usually an evaluation of a sire's (possibly dam's) ability to produce desirable calves.

For junior livestock exhibitors, performance records may take a little different form. Consider the follow example. As a beef animal is selected or purchased, it should be weighed and a height taken. Each month during the project, weight and heights should be taken and recorded. The collected records should be observed and analyzed on a regular basis to make sure the beef animal is making satisfactory gains or satisfactory progress toward its finished-weight goal. If gains are not being made, feeding and management practices should be checked and necessary changes made.

Financial records track profit and loss

Financial records (costs, income, etc.) are a means for beef producers to keep track of the money that is spent and received in a beef cattle enterprise. Financial records are a way that junior exhibitors can keep track of the money that is spent and received while maintaining their livestock project. These records can help determine if a beef cattle enterprise or junior livestock project resulted in a profit or loss at year's end. Additionally, financial records provide an opportunity for producers and junior exhibitors to identify areas in which costs can be cut in future endeavors or projects.

Production (performance) records and financial records are essential in determining if producers and junior exhibitors have met their goals and objectives with their beef enterprises and projects. Without a doubt, record keeping, by computer, record book, forms, papers, or cards, is an important management tool. Records related to beef quality assurance (BQA) are important as well.

Beef quality assurance (BQA) record keeping

Today's consumers expect each food product they buy to be safe, wholesome, high quality and consistent. Consumers have various choices for protein sources (poultry, pork, etc.) in the marketplace today. To maintain consumer demand for beef, the beef industry has found it necessary to address and eliminate quality and consistency shortfalls. To ensure consumer confidence and maintain market share, beef producers and junior livestock project participants must be able to document the safety and quality of their product.

Drug records. An example of how BQA records can be useful is in the reduction/elimination of drug residues. Control drug residues by keeping records on the identification, treatment, and handling of beef cattle. Records allow producers to compare drug withdrawal times to the dates of treatment and can help stop drug residue problems.

Good records that show appropriate compliance with training, inventory control, use orders, animal identification, adherence to withdrawal periods, and proper disposal methods will help avoid liability from a residue problem when a regulatory inspection is conducted. Inspections may be administered by the Food and Drug Administration (FDA), United States Department of Agriculture (USDA), Food Safety Inspection Service (FSIS), or Environmental Protection Agency (EPA).

The only way to know if you are in compliance with withdrawal times is to know the following:

- Type of product given (vaccine, antibiotic, dewormer, implant, etc.)
- Amount of product given (1cc, 5cc, 10cc, etc.)
- Location the product was given
- Route of administration (subcutaneously, intramuscularly, intravenously, etc.)
- Date the product was given

The key to record keeping is finding a method that is easy and one you will continue on a regular basis. To help you with records, you may also put together a veterinary drug order and a treatment record book.

Veterinary drug order

A veterinary drug order (VDO) is a veterinarian-approved list of medications that can be used on your farm or ranch and that fit BQA guidelines.

The VDO should include all products that have a withdrawal time, including vaccines, dewormers, and all injectables (including vitamins). If all medications are managed like prescription items, a greater level of quality assurance and safety is obtained.

All cattle medications and vaccines should be included on the VDO and should be updated at the same time as the treatment record book.

Treatment record book

Ask your veterinarian to develop a “Treatment Record Book” specific to your operation. Keep the treatment record book on file and available in the barn or near the squeeze chute (working facility).

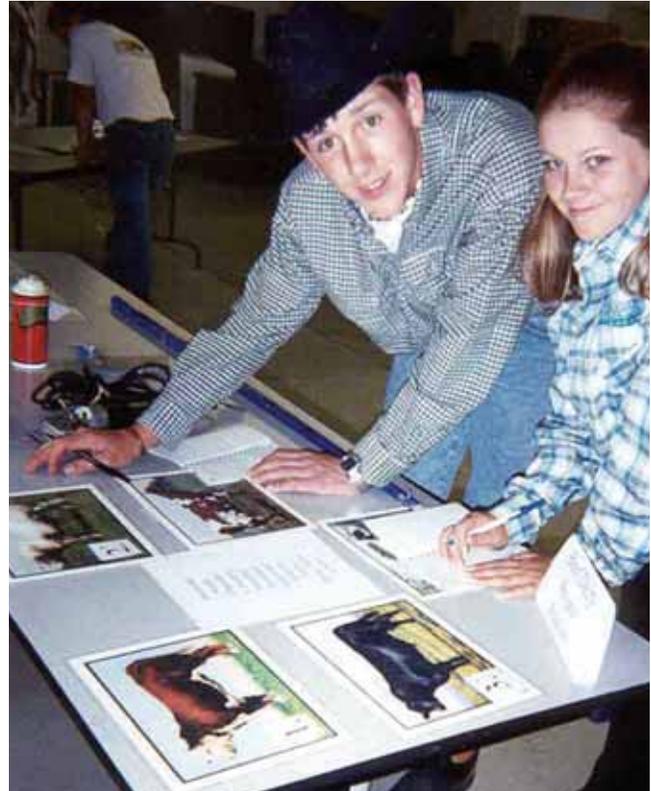
This concept of a treatment record book may be more familiar to feedyards, large stocker operations, and dairies. However, it is a valuable management tool for cow-calf producers of all sizes and junior livestock project participants. It is simply a written plan for what treatment(s) is (are) to be used when cattle get sick for various reasons.

The treatment record book is also the place to write down your plan for follow-up and/or alternative treatments if the first treatment does not produce the desired result.

The book should be reviewed regularly and updated as treatment procedures and options change. As you update the treatment record book, previous versions should also be kept on file for a year or more so that you can refer back to treatments that have worked in previous situations. When the book is updated, it should have your veterinarian’s signature and date recorded.

Why are treatment records important?

1. Cattle not responding to treatments may require an extended withdrawal period. Good records show if this was the case.
2. Extra-label drug usage (ELDU) is only permitted under FDA guidelines involving a veterinarian-client-patient relationship. Individual animal identification and record keeping is important.
3. Should a beef producer be cited for a residue problem and that producer believes a mistake in identity has been made, good records may be the only proof of compliance.
4. Records will show the list of drugs used by a beef producer. Questions on whether certain drugs have been used can be avoided when the feedyard can prove it does not use specific drugs.



Youth identify breeds Hereford, Angus, Charolais, and Longhorn at a Pacific Northwest beef skillathon.

Photo by Cindy A. Kinder

Accurate records also allow you to know exactly what is going into each animal. This information prevents the re-administration of treatments that have previously failed to work. Furthermore, the information tells the consultant/veterinarian what treatments you are applying so they can (1) make sure treatment recommendations are being followed, and (2) judge whether treatment regimens need to be adjusted for changing animals and conditions.

Common types of records

Animal treatment records

1. Keep all records for at least three years from the date of transfer or sale of the cattle.
2. Treatment records should contain:
 - Treatment date
 - Animal or group identification

- Approximate weight of animal or group average
 - Product administered
 - Product lot/serial number
 - Earliest date the animal could clear withdrawal time
 - Dose given
 - Route of administration (subcutaneously, intramuscularly, intravenously, etc.)
 - Location of injections
 - Name of person who administered the treatment
3. A copy of records should be made available to the buyer of your cattle. Records should include all individual and group treatment/processing history.

Feed records

1. Keep all feed records for at least three years from the date of transfer or sale of the cattle.
2. It is a good management practice to require that all feed products be accompanied by an invoice that includes the:
 - Date
 - Kind of feed (corn, oats, hay, etc.)
 - Amount
 - Lot/batch/field number
 - Signatures of the person who delivered the product and the person receiving the product
 - Place the feed was purchased
 - Feed additives (medications, etc.)
 - Feed restrictions (not for horses, etc.)

Chemical records

1. Private pesticide applicators must maintain a record of each restricted-use pesticide or general-use pesticide application for three years. Restricted-use pesticides require a private applicator's license to apply the product. Records must include the following:
 - Brand or product name and the EPA registration number of the pesticide applied
 - Total amount of pesticide applied

- Location of application, size of treated area and the crop, commodity, stored product or site where the product was applied
 - Month, day, and year of application
 - Name and certification number of certified applicator who made or supervised the application
 - The animal(s) exposed to the pesticide and the withdrawal time
2. Pour-on products are considered pesticides even though they are referred to as insecticides. Their usage can be included on the processing record for the group of cattle.

Summary

Record keeping is often viewed by producers and junior exhibitors as a major inconvenience. Good records allow producers and exhibitors to make informed decisions related to a number of management issues. In today's agricultural industry, survival and success depend on the ability to accurately evaluate all aspects of the enterprise or project. Accurate and complete records are the first step in the evaluation process.

References

- Chapman, C.K. 2002. *Utah Youth Beef Quality Assurance Program Manual*. Utah State University.
- National Cattlemen's Beef Association Quality Assurance Fact Sheets. 2002.
- Nebraska Cattlemen Beef Quality Assurance Program, *Nebraska Beef Quality Assurance Certification Manual*. 2003.
- Troxel, T. R. 2002. *Arkansas Beef Quality Assurance Program Handbook*. 3rd ed. University of Arkansas Cooperative Extension Service.
- Yoder, Mike. 2001. "Meat Quality Assurance for America's Youth Meat Producers." *North Carolina 4-H Youth Meat Quality Assurance Program Handbook*. North Carolina State University Extension.



Start the lesson by asking 4-H members, parents, and leaders to discuss what records are, why records are important, and methods of keeping records. Use the poster paper or white board to list responses.

BQA record keeping activity

Discuss the basic fundamentals and value of complete records.

Have participants select a drug label from the bag or box. This is similar to purchasing animal drugs from an animal health store or veterinarian. Have the participants enter the needed information from their purchase on the Animal Health Product Record form (p. 49).

Have the participants select an ear tag from the bag or box. This is similar to identifying an animal in the sick pen that is in need of treatment or selecting an animal from the herd that is in need of vaccination or treatment. Have the participants “treat” the animal and record the needed information from their actions on the Individual Animal Treatment Record form (p. 48).

Summary

On the flip chart or white board, give every participant the opportunity to list one thing they learned regarding BQA records. Ask participants to share some of their record entries. Give participants an opportunity to identify other types of records that may be important to livestock producers and junior livestock exhibitors. Remind participants about the importance to the beef industry of producing a safe, wholesome, consistent, and quality product and the role records play in that effort.

MATERIALS NEEDED

- Poster paper or white board
- Markers
- Bag or box of cattle ear tags
- Bag or box of animal drug labels
- Blank *Individual Animal Treatment Record* (Form 4 in Appendix, p. 48)
- Blank *Animal Health Product Record* (Form 5 in Appendix, p. 49)

CHAPTER 3 RECORD KEEPING

FORMS 1 & 2

SAMPLE OF ANIMAL HEALTH PRODUCT RECORD

Farm Name: Hermitage Owner: Andy Jackson Address: In the Country, Idaho

DATE RECEIVED	SUPPLIER/DISTBUTOR	PRODUCT NAME	QUANTITY	COST	LOT#/SERIAL#	EXPIRATION DATE
2/15/09	Duravet	Cattle Vac Pinkeye 4	100 ml		1121 T	12/05
3/10/09	Duravet	Duramycin 100	500 ml		3752 T	01/06

SAMPLE OF INDIVIDUAL ANIMAL TREATMENT RECORD

Farm Name: Hermitage Owner: Andy Jackson Address: In the Country, Idaho

DATE	ANIMAL ID	PROBLEM/DIAGNOSIS	PRODUCT	DOSAGE	RT. OF ADMIN	SITE	WITH-DRAWL TIME	SAFE MARKETING DATE	INIT.	BOOSTER
2/15/09	63	Pinkeye	Cattle Vac-4	2 ml	IM	Right side neck	60 days	05/01/09	LJ	YES
3/10/09	22	Pneumonia	Duramycin 100	12 ml	IV	Right side neck	22 days	04/05/09	LJ	NO

When a person is healthy, typically he or she is more alert, has a clearer mind, and more energy. A healthy animal is much the same. A healthy animal has an appetite, drinks more water, and gains weight more efficiently than a sick animal. For the livestock beef project, an animal that is healthy has a higher average daily gain and a lower feed cost per pound of gain.

A healthy beef animal is one that is up, eating, and drinking water. Signs of a healthy animal are eyes that are bright and alert. Its ears are “perked,” and they are listening. Its coat is shiny and its nose is moist. Symptoms of a healthy animal are a normal temperature, pulse, and respiration. The standard temperature for a beef animal is 101.0°F. The pulse should be between 60 to 70 beats per minute, and the respiration rate between 10 to 30 breaths per minute.

Sick animals

A sick animal may show several signs. These can include humped back, droopy ears, snotty nose, dry crusty nose, matted, dry hair coat, scours (runny manure, some just loose but could be very watery: a variety of colors), slow moving, or lack of appetite. Symptoms may include an abnormal temperature, pulse, and/or respiration.

Keeping animals healthy

A beef project member with a market steer or beef breeding project can do several things to help ensure the animal stays healthy. Members can provide a consistent supply of feed to meet the animal’s nutritional needs, have shelter available, follow the biosecurity plan (see Chapter 5 Biosecurity), and develop a herd health program with the necessary vaccinations. If the animal does become sick, consult a veterinarian for the proper treatment.

Importance of reading labels

It is important that label directions are read before administering any antibiotic or vaccine to the beef animal. Items that need to be specifically checked include:



Youth examine various sized needles used to inject animals to either treat disease or prevent a disease.

Photo by Cindy A. Kinder

Medication Label

Before administering any drug to an animal, you must have a knowledge of the information found on the drug label and insert. Make sure you are able to identify the parts of the medication label and medication insert.

Name of Drug **OMNIBIOTIC** *Active Ingredient(s)*
(hydrocillin)

Directions for use:
See package insert

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. Exceeding the highest recommended dosage level may result in antibiotic residues in meat or milk beyond the withdrawal time.

Store between 2° and 8° C (36° and 46° F)
Keep dry and away from light

Quantity of Contents Net contents: 100 ml
Distributed by **USA Animal Health, Inc.**

Lot Number Lot # 0009900-Q123
Expiration Date 05/17/XX

Date of Expiration

This activity adapted from information found in the Quality Assurance and Animal Care: Youth Education Program - based upon work supported by the Extension Service, United States Department of Agriculture, under special project number 15-2750-0000

Sample label alerts animal owners how to preserve integrity of medication and how to protect customers from residues in meat or milk after withdrawal time.

Illustration courtesy of Ohio State University Extension, 4-H Youth Development, from 117R Beef Resources Handbook.

- **Expiration date:** if the medication has expired, do not use it.
- **Species:** if the product is not labeled for use in cattle, do not use it unless it has been prescribed by a veterinarian with exact dosage amount and withdrawal time.
- **Storage instructions:** if refrigeration is required, make sure to keep medications in the refrigerator or cooler, except when in use.
- **Use of product:** if the beef project is not suffering from the labeled illness, signs, symptoms, or disease, do not use it.
- **Dosage:** use the correct amount for treatment; make a note if a booster is required or how often it is to be given. Note these dates on the calendar and in your records. Giving more animal health product than recommended does not cure the animal faster, it just wastes medication and money, and it requires a longer withdrawal time.
- **Placement of injection:** this is very important as antibiotics and vaccines differ in how they are absorbed by the body to be the most effective.
- **Withholding or withdrawal time:** this is the length of time after giving the medication before residues are reduced to safe levels. Chapter 3 Record Keeping (p. 18) provides more on how to record this information.

Prevention and treatments

Beef animals should be treated for two reasons. One is to prevent a disease, and the other is to assist the animal to return to good health.

Various routes of administration for treatments (ways to give the injection) include:

- Subcutaneous (sub-q): under the skin
- Intramuscular (IM): in the muscle
- Intravenous (IV): directly into the vein
- Intranasal: into the nostril
- Intramammary: directly into the teat

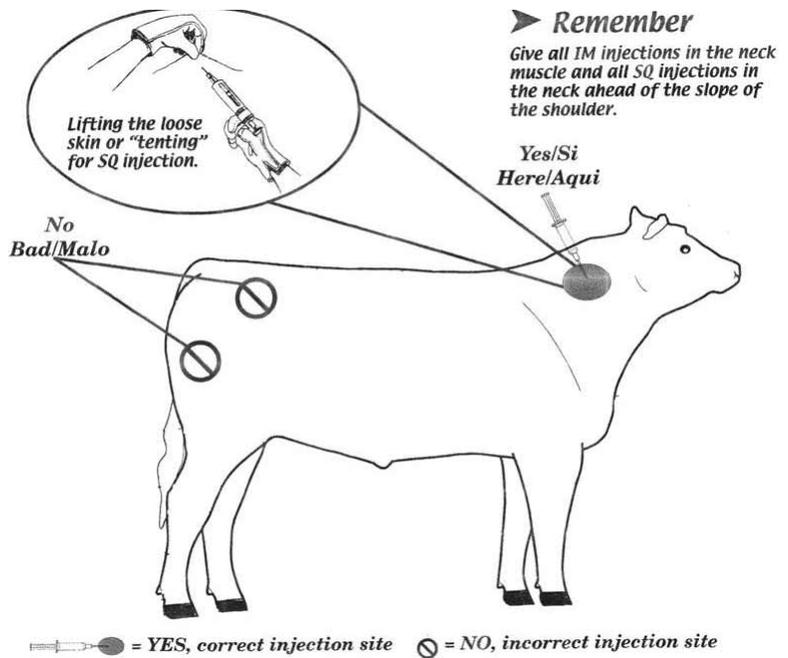


Illustration courtesy of Ohio State University Extension, 4-H Youth Development, from 117R Beef Resources Handbook.

- Orally: directly into the mouth
- Topically: applied to the skin
- Intraperitoneal: into the peritoneal cavity (right side of the animal)
- Intraruminal: into the rumen (left side of the animal)

Parasites

Organisms that live off of another animal are called parasites. Beef projects are susceptible to both internal and external parasites. Animals infested with parasites have reduced weight gain and reduced feed conversion. External parasites include flies, lice, and grubs. Internal parasites are worms that live in various sections of the digestive tract or in other organs. Parasites can be controlled utilizing topical, oral, or injectable solutions. Consult a veterinarian to treat your animal.

Injections

Injections are commonly given to beef animals. Administering them correctly is important to providing a safe wholesome product. Injections given improperly have an effect on the final product as discussed in Chapter 6 Beef Carcass Quality.

Table 1: Needle selection

Select the proper needle for injections based on product consistency (thickness) and whether directions indicate sub-q (under the skin), IV (directly into a vein) or IM (into the muscle—usually in the beef animal’s neck).

<i>Route of Treatment</i>	Sub-q	IV	IM
<i>Needle Length</i>	½” to ¾”	1 ½”	1 to 1 ½”
<i>Product Consistency</i>			
Thin	16 to 18 gauge	16 gauge	16 to 18 gauge
Thick	14 to 16 gauge	14 to 16 gauge	16 gauge

The first step in properly giving an injection is to read the label. The second is to select the proper application equipment. Injectable vaccines and antibiotics differ in their consistency (thickness). This determines what gauge of needle needs to be used. If the directions indicate sub-q or IV or IM, select the appropriate needle based on the information in Table 1.

You’ll find a number of syringes for use on the market at your local farm store. Select one that is clean, holds the correct dosage, and is easy to handle.

Filling the syringe. Filling the syringe is the next step in giving an injection. It is important that this is done correctly to prevent air bubbles. Air bubbles within the syringe cause the dosage to be inaccurate. If giving an IV injection, an air bubble injects air directly into the blood stream, which is damaging to the animal.

To fill the syringe

1. Start by pulling the stopper back; put about two cc’s of air in the syringe to prevent a vacuum in the bottle.
2. Insert the needle into the bottle of medication, holding the bottle upside down, and push the stopper in to add the air.
3. Pull back on the stopper slowly to draw in the medication. After removing the proper amount of vaccine plus a little more, withdraw the needle from the bottle.

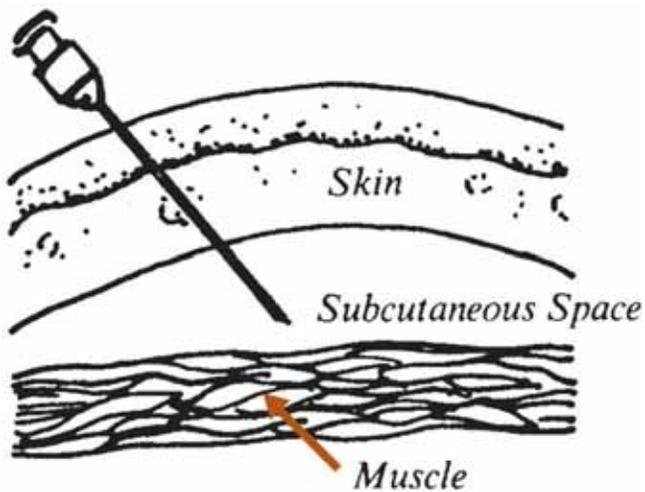
4. Tap the sides of the syringe to move any air bubbles to the top of the syringe closest to the needle. Carefully push the plunger forward, squeezing all the air out through the needle.
5. Check to see that you have the proper dosage.

Restrain the animal

The label has been read, the syringe is filled with the proper dose, and the correct needle chosen; now it is time to inject the animal. Be sure that the animal is properly restrained. This is important to assure the safety of the animal, the person giving the shot, and that the injection is given properly and with the complete dose.

Where to inject

The injection needs to be given in the proper place on the body. Injections given in the wrong place or site affect the final beef product. Injection-site blemishes affect meat tenderness as much as three to four inches away from the injection site. Abscesses can also form and must be trimmed away on carcasses. This adds up to pounds of meat. For these reasons, injections should be given in the neck region rather than in the shoulder or hip regions. The injection should be in front of the shoulder bone. This way there is little chance of affecting the high-priced meat cuts.



Subcutaneous injection should go just below the skin, but avoid muscle under the skin. Such a shot will not negatively impact product value. *Illustration courtesy of Ohio State University Extension, 4-H Youth Development, from 117R Beef Resources Handbook.*

Observe the animal

Once the treatment has been completed, observe the animal for any reactions to the medication. These reactions can be the animal returning to good health or a negative reaction to the medication.

Syringe, needle care

Properly clean the syringe and needles after use. Most needles should only be used a few times. Check the needle to make sure it is not bent, dirty, or burred. Discard the needle if those problems are found. Beef quality standards suggest replacing the needle every ten animals when doing ordinary group vaccinating.

Syringe, needle cleaning

When cleaning the syringe and needle, it is best to use hot water and soap. Do not use a chemical disinfectant as it will kill the next modified live vaccine used in the syringe and irritate the tissue of the animal. When treating animals with a vaccine, it is important to follow a biosecurity plan to prevent the spread of illness or disease (see Chapter 5 Biosecurity).

Summary

A healthy beef animal is a joy to own and can be economical to produce. To insure health, there will be a time when the animal will need some type of treatment or injection. Done properly, it will not affect the quality of the beef product. Remember to read the label, administer properly, adhere to withdrawal times, and keep accurate records.

References

- Black, Jodi. 2001. *Beef Resource Handbook*, Ohio State University Extension, section 5, page 7. Ohio State University.
- Black, Jodi. 1994. "Quality Assurance and Animal Care: Youth Education Program," Ohio Agricultural Educator Curriculum Materials Service, Beef Learning Laboratory Kit, Educator/Leader Activity Sheets, Unit 5, Level 5, pages 81-85. Ohio State University.
- Chapman, C.K., editor. 2002. *Utah Youth Beef Quality Assurance Program Manual*, page 5-8. Utah State University.
- Glaze, Benton, editor. 2001. *Idaho Beef Quality Assurance Program Manual*, page 27-30, 40-43. University of Idaho.
- Rice, Duane, Ph.D. 2003. "The Normal Animal," Unit 1 4-H Veterinary Science, Lesson 3, pages 16-18. University of Nebraska.



Please review the Animal Health chapter and then have an open discussion and activity session.

Preparation hints

- **Oranges or grapefruit:** check with local grocery store and see what they are throwing out. Many times they will give you this produce.
- **Dyed sterile water:** Check with local veterinarian early to have him/her save the sterile water. The water bottles can be reused. The water needs to be two different colors. One color will be used for sub-Q and one for IM. Bottles can be dyed two ways:
 1. Draw out some of the water with a syringe, and then insert the dye. It only takes a little.
 2. Insert a needle for the release of pressure; insert dyed water into the bottle.
- **Whole chicken (prepared):** the chicken is used to demonstrate what happens to a vaccine and how much meat is lost when vaccinated improperly or withholding times are not observed. Inject the chicken breast on one side with colored water sub-q. Inject the other side with colored water IM. Bake in covered dish at 350°F for approximately 45 minutes until there is an internal temperature of 160°F. (This reduces the food poisoning issue.) If more than one workshop is to be done with the same chicken, both injections can be given on the same side using different colors. Use one side for one workshop and the other side for the second workshop.

Healthy animal discussion

Use the flip chart and markers to record responses. This can be done as a whole group or in teams.

- What does a healthy animal look like?
- What does a sick animal look like?
- How do we keep an animal healthy?

MATERIALS NEEDED

- Flip chart
- Markers
- Oranges or grapefruits—one per participant
- Syringes (6cc) & needles (18 x ¾ or whatever you can get for free)—best one per participant but can be shared
- Dyed sterile water in vaccine bottles—2 different colors—these can be shared
- Paper plates
- 2 sharp knives
- 1 whole chicken (prepared)

Injection discussion

Discussion questions:

- In what two (2) situations would you give an injection?
- What are the routes for injections and treatments?

Injection activity

Demonstrate to the youth how to properly fill a syringe without having air mixed in with the solution. Allow each youth to fill a syringe with 2cc of colored solution. Once all participants have the syringes filled, ask them to give the fruit a sub-q injection. Next, have them fill the syringes with second color and give the fruit an IM injection. After the injections are given, slice the fruit to determine if the solution went into the right areas (sub-q injection will be just under the orange's skin; IM injection will show in the orange's flesh center).

CHAPTER 4 ANIMAL HEALTH

LESSON & ACTIVITIES

Proper placement discussion

Ask youth why it is important to adhere to withhold time.

Proper placement activity

Introduce “Skinny the Chicken” and tell everyone that “Skinny” was sick , and he was given some antibiotics. Unfortunately, “Skinny” is the snack for today and was processed for everyone to eat. Tell them to just slice around where the antibiotics were given. Have the youth guess how much meat they’ll have to throw away.

Note: The chicken is cooked and used for the activity, not for the snack.

Proper injection site discussion

“Skinny” was injected in the best meat area for a chicken. Because of that he wasn’t worth as much money. The best cuts of meat on a beef are where there is the most muscle. This includes the round, loin, and shoulder. Therefore, do not give injections in these areas. The best place to give an injection is in the neck area in front of the shoulder.

Summary

On the flip chart paper, give every youth the opportunity to list one thing they learned regarding animal health.

Youth beef projects are fun and exciting. Youth can learn many different life skills including recognizing diseases. Young people enrolled in beef projects are beef producers. Youth will raise animals that will become food products as well as other valuable products for consumers. Being able to understand biosecurity and diseases allows youth to raise healthy animals that will provide a safe product to consumers.

Biosecurity

Biosecurity refers to policies and measures taken for protecting a nation's food supply and agricultural resources from both accidental contamination and deliberate attacks of bioterrorism. Bioterrorism might include such deliberate acts as introducing pests intended to kill United States food crops; spreading a virulent disease among animal production facilities; and poisoning water, food, and blood supplies.

For this manual, biosecurity can be defined as an integrated plan to stop the spread of diseases that may be found within a herd or to prevent the introduction of diseases that are common in the area around a herd. A good biosecurity plan can also prevent the spread of foreign or exotic diseases.

Disease

Diseases can have a major effect on the health of livestock and the cost of production for owners.

Taking care of livestock is very important, whether that is ensuring proper nutrition and health care or maintaining facilities. Knowing what diseases can possibly affect your project can help you prevent harm to your animal(s).

Early detection by recognizing the signs and symptoms of a disease can help stop disease from spreading. Prevention is the best way to treat disease because diseases can have major economic consequences on the ability to make money with beef. Biosecurity plays an important part in preventing disease outbreaks and reducing the spread of disease found within a herd or preventing the spread of foreign/exotic diseases. Youth should visit with a local veterinarian about diseases that are common in your area.



Critical control points (CCP) are places where disease control or prevention can be applied. Examples include receiving areas for new livestock, fence lines, feed bunks, or water tanks. *Photo by Cindy A. Kinder*

Disease spread

Diseases can have a variety of signs and symptoms associated with them and can be spread in a variety of ways.

Direct contact with animals that have the disease or direct contact with carriers that have the disease but do not show signs of illness are common ways of transmission. Vectors can transport a disease agent between hosts and are critical for the disease agent's lifecycle. Typically, vectors are insects such as ticks or mosquitoes, but vectors also can be other animals such as birds. Fomites—inanimate objects such as boots, clothing, brushes, combs, and vehicles—can indirectly transport disease agents. Contamination of soil, feed, and water as well as air-borne infection can also rapidly spread disease.

Foreign disease

Examples of foreign diseases that have entered or could enter the United States include Bovine Spongiform Encephalopathy (BSE), West Nile Virus, and Foot-and-Mouth (FMD) disease. It is important to be very careful around certain zoonotic diseases because they can spread to humans. It is a serious challenge for you and producers to keep foreign diseases out because our domestic livestock have no immunity to them, and an outbreak could cause great losses.

Disease control

Targeting specific diseases can help reduce costs and allow healthy high-quality livestock to be raised. Table 2 gives many examples of monitoring locations, cause of disease spread, and corrective actions.

Biosecurity plan

In order to keep animals healthy and prevent a disease outbreak and the spread of disease, all producers should develop a biosecurity plan. This plan is made up of the following:

1. **Conduct a disease potential analysis**
 Develop a list of possible diseases that your animal(s) may come in contact with at each location at your facility. For example, possible diseases may include ringworm, lice, pneumonia, and blackleg.
2. **Determine monitoring locations or critical control points**
 Critical control points (CCP) are places where control or prevention can be applied and are essential to prevent, eliminate, or reduce a disease. The identification of CCP is important in controlling the spread of a disease. An example of a CCP may include a receiving area for new livestock, fence line, feed bunk, or water tank.
3. **Prevent disease spread**
 The goal of a biosecurity plan is to keep the disease agent from entering the herd. Protection may be done in a variety of ways depending on the CCP. For example, increasing immunity of the herd, isolating new animals, quarantining sick animals, using disinfectants, and cleaning equipment or clothing. Producers need to determine at each CCP what is the correct mode of action. These actions also need to be understood by all workers within the operation.
4. **Record keeping**
 Keep records of what was done to facilities and animals. Examples of records may include vaccinations given, medications given, visitors, and date of facility cleaning. Refer to the Chapter 3 Record Keeping in this manual for further information.



Fomites—objects such as combs, boots, clothing, brushes—can transport disease agents, so youth are wise to clean such objects before using them on animals. *Photo by Cindy A. Kinder*

Summary

Establishing a biosecurity plan and following through is very important to the health of your animal(s) and the survival of your project and farm. A high-quality, safe, wholesome food product is the goal of every livestock producer. Knowing diseases and how they spread is very important in achieving this goal.

References

Chapman, C.K., editor. 2002. *Utah Youth Beef Quality Assurance Program Manual*, page 17-20. Utah State University.

Glaze, Benton, editor. 2001. *Idaho Beef Quality Assurance Program Manual*, page 43-45. University of Idaho.

Kerr, Susan. 2004. *All Systems Go*. Chapter 2: Diseases, Pests and Problems. Biosecurity Blanket lesson, page 14-15. Veterinary Science 4-H CCS Curriculum Book 2. BU-08049.

TABLE 2 gives examples of monitoring locations, causes of disease spread, and corrective actions. Column 1 lists locations to monitor (critical control points—CCP) in order to prevent outbreaks and spread of a disease. Column 2 lists diseases or disease groups and typical ways the disease can spread. Column 3 lists corrective actions to prevent or reduce disease spread.

Monitoring locations/critical control points (CCP)	Disease & mode of spread	Corrective action(s)
Fence line	Entry of stray animals Entry of people/visitors Example: respiratory and reproductive diseases	<ul style="list-style-type: none"> • Maintain fences to keep out strays and unknown animals. • Establish fences, gates, signs to stop and inform people.
Facility entrance	Visitors, clothes, footwear Example: Foot-and-Mouth disease (FMD)	<ul style="list-style-type: none"> • Allow public to enter designated areas away from livestock. • Restrict visitors who have been out of the U.S. in the past two weeks. • Provide protective covers for footwear or on-farm boots and/or on-farm coveralls.
Barn/receiving pen for newly arrived animals	Animal carrying disease Example: respiratory diseases, lice	<ul style="list-style-type: none"> • Isolate for 3 to 4 weeks. • Know status of herd of origin.
Vehicles—cars, trucks, motor-bikes, and trailers Parking lot	Manure on or in vehicle (including tires & undercarriage) Example: <i>E.coli</i> , <i>Salmonella</i> , enterotoxaemia.	<ul style="list-style-type: none"> • Restrict vehicles to public area only. • Wash vehicle and tires.
Farm personnel	Clothes, footwear Examples: <i>E.coli</i> , <i>Salmonella</i>	<ul style="list-style-type: none"> • Wear boots, clothes, or coveralls specific for this farm only.
Raw feed products and standing water in pen/pasture	Contaminated feed and water Examples: <i>BSE</i> , beef measles, liver flukes, foot rot	<ul style="list-style-type: none"> • Don't feed ruminant-derived protein. • Remove standing water. • Keep dogs, cats, rodents, and wildlife out of feed and feeding areas.
Feed bunks and water tanks	Personnel Contaminated feed and water Examples: beef measles, <i>Salmonella</i> , and <i>E. coli</i>	<ul style="list-style-type: none"> • Provide clean feed. • Clean out water source often. • Provide restrooms for personnel.
Manure/bedding pile	Contaminated manure in feed and water Examples: <i>E.coli</i> , flies	<ul style="list-style-type: none"> • Use separate tractor bucket to move feed and manure. • Don't apply lagoon water to hay or grazing areas.
Equipment box/tack room	Brushes, combs, etc. Examples: ringworm, lice	<ul style="list-style-type: none"> • Clean equipment.
Pastures/common allotments	Animals Examples: brucellosis, leptospirosis, BVD	<ul style="list-style-type: none"> • Vaccinate.
Squeeze chute Clip chute	Needles and equipment Example: anaplasmosis	<ul style="list-style-type: none"> • Exchange needles and clean equipment.



Read and discuss with the group the following lesson, conduct the domino activity (activity 1), do activity 2 if time permits, then finish the lesson with the “what you can do” section.

Ask participants to define these terms. Write their answers on the flip chart.

What is biosecurity?

Biosecurity can be defined as an integrated plan to stop the spread of diseases that may be found within a herd or to prevent the introduction of diseases that are common in the area around a herd. A good biosecurity plan can also prevent the spread of foreign or exotic diseases.

What is a disease?

A disease is an illness that affects the health or decreases the performance of an animal. A disease can have a variety of signs and symptoms associated with it. Early detection of a disease can help producers reduce losses. Prevention of diseases is the best way to treat them because diseases can have major economic consequences to a producer’s ability to make money. You can visit with a local veterinarian about the common diseases found in your area.

How do diseases spread?

Diseases can spread in a variety of ways:

1. Direct contact with animals that have the disease
2. Direct contact with carriers
3. Vectors, for example, mosquitoes transport disease agents between hosts
4. Fomites (any inanimate object—brush, boots—that can transmit infectious agents from one person or animal to another) indirectly transport diseases.

Contamination of soil, feed, and water as well as airborne infection can also rapidly spread disease. Producers need to keep the environment where their animals are located clean. Ask if anyone can give an example of a foreign disease that has entered the United States or the Pacific Northwest recently. (BSE and West Nile Virus.)

MATERIALS NEEDED

- Flip chart
- Markers
- 3 sets of dominos (28 pieces each)
- Enough tables for 3 to 5 per table
- If you do activity 2, bring at least 1 BQA Biosecurity Plan (Form 3) worksheet for each participant (more if you want each participant to plan on separate sheets for separate potential problems).
- Pens or pencils for each participant

Besides spreading to other livestock, ask why it is important to be very careful around these particular diseases? (They may spread to humans.) It is critical for you and producers to keep foreign diseases out because the livestock have no immunity to them, and the disease outbreak would cause even greater losses.

Activity 1—Dominos

Depending on the number of youth in the group, you can do the domino activity together or separate the youth into smaller groups.

If you separate youth into three groups, give each group one set of dominos.

- Have group 1 set up the dominos in any arrangement so that all of the dominos will fall down when the first domino is knocked over.
- Group 2 should set up the dominos so that one domino is protected from falling down.
- Group 3 should arrange the dominos so that only one domino falls down.

After each group has constructed their domino configuration, tell the youth the standing dominos represent healthy animals, and the fallen dominos represent diseased animals. Have groups review their domino situation

CHAPTER 5 BIOSECURITY

LESSON & ACTIVITIES

and explain how they arranged their dominos. Relate that to how diseases spread in that group's herd of dominos.

Reflection

Discuss with the group the following questions:

- How did disease spread in your herd? Tell me some other ways disease can spread.
- Is disease prevention important? Why?
- How could you prevent your herd situation?

Activity summary

A high-quality, safe, wholesome food product is the goal of every livestock producer. Knowing diseases and how they spread is very important in achieving this goal.

Activity 2— BQA biosecurity plan

Activity 2 can be conducted if time allows, or youth can do the BQA biosecurity plan on their own.

Hand out the worksheet on page 33 to help youth develop a biosecurity plan. Biosecurity plan worksheets could be included in participants' record books.

One worksheet per disease is ideal; however, the worksheet can be used for one plan with multiple diseases. Using one worksheet per disease shows participants the specific location to monitor and the corrective action to stop the spread of that particular disease.

1. Help youth determine the possible disease(s) that their animals may come in contact with.
2. Determine the critical control point or monitoring location for the possible disease.
3. Select the corrective action needed to stop or prevent the spread of the potential disease.

Each biosecurity plan should include:

1. List of possible diseases
2. List of critical control points
3. List of methods of protection or corrective action
4. List of records to be kept

Preventing disease outbreak: what you can do

In order to prevent a disease outbreak and the spread of a disease, all producers should develop a biosecurity plan. This plan is made up of the following:

1. Conduct a disease potential analysis

Develop a list of possible diseases that your animal(s) may come in contact with. For example; possible diseases may include ringworm, lice, pneumonia, and foot rot.

2. Determine monitoring locations/critical control points

Critical control points (CCP) are places at which control or prevention can be applied and are essential to prevent, eliminate, or reduce a disease. The identification of CCP is important in controlling the spread of a disease. An example of a CCP may include the receiving area for new livestock, fence line, feed bunk, or water tank.

3. Prevent disease spread

The goal of a biosecurity plan is to keep the disease agent from entering and spreading among the herd. Protection may be done in a variety of methods depending on the CCP. For example: increasing immunity of the herd, isolating new animals, quarantining sick animals, using disinfectants, and/or cleaning equipment or clothing. Producers need to determine at each CCP what is the correct mode of action. These actions also need to be understood by all workers within the operation.

4. Record keeping

Keep records of what was done to facilities and animals. Examples of records may include animal identification, vaccinations given, medications given, visitors, and date of facility cleaning.

Summary

A high quality, safe, wholesome food product is the goal of every livestock producer. Knowing diseases and how they spread is very important in achieving this goal. The implementation of a biosecurity plan allows producers to prevent disease outbreaks, reduce the spread of disease, and increase the quality of their animals.

_____ **BQA BIOSECURITY PLAN** What I can do to prevent diseases from spreading within my project.
 (Year)

Possible Diseases

Check each of the potential disease(s) your animal(s) may come in contact with.

- | | | |
|---|---|---------------------------------------|
| <input type="checkbox"/> Blackleg | <input type="checkbox"/> Foot rot | <input type="checkbox"/> Pneumonia |
| <input type="checkbox"/> Brucellosis | <input type="checkbox"/> IBR PI3 | <input type="checkbox"/> Red water |
| <input type="checkbox"/> BSE | <input type="checkbox"/> Lice | <input type="checkbox"/> Ringworm |
| <input type="checkbox"/> BVD | <input type="checkbox"/> Liver fluke | <input type="checkbox"/> Warts |
| <input type="checkbox"/> Enterotoxaemia | <input type="checkbox"/> Trichomoniasis | <input type="checkbox"/> Tuberculosis |
| <input type="checkbox"/> Flies | <input type="checkbox"/> Pasteurella | <input type="checkbox"/> Other (list) |

Determine Monitoring Locations or Critical Control Points (CCP)

Check the area(s) in your facility that would prevent or control the above-selected diseases from spreading.

- | | | |
|--|--|---|
| <input type="checkbox"/> Feed bunk/pan | <input type="checkbox"/> Squeeze /clip chute | <input type="checkbox"/> Visitors/workers |
| <input type="checkbox"/> Water tank | <input type="checkbox"/> Manure pile | <input type="checkbox"/> Vehicles |
| <input type="checkbox"/> Fence line | <input type="checkbox"/> Pasture | <input type="checkbox"/> Receiving area |
| <input type="checkbox"/> Barn | <input type="checkbox"/> Water/mud hole | <input type="checkbox"/> Equipment box |
| <input type="checkbox"/> Other (list) | | |

Corrective Action

Circle and/or list the methods you will use in order to protect your project animal(s).

- | | |
|-------------------------|-------------------------|
| Vaccinations | Fence/ gates |
| Isolating new animals | Clean feed storage area |
| Quarantine sick animals | Clean pen/facilities |
| Use disinfectants | Protective clothing |
| Clean equipment | Proper and clean feed |
| Clean clothing | Clean water |
| New needle | Other _____ |

Record Keeping

Attach records.

Delivering a beef product that is high quality for consumers is a challenging task for the beef industry. From breeding cattle to consuming hamburger and steaks, beef flows through many hands, with each segment contributing to product quality and each needing to make money.

Every segment of the beef industry has different production goals. The cow-calf producer must have animals that grow and reproduce in the ranch's environment. The stocker-feeder producer wants animals that gain weight on the least amount of feed. The packer wants pounds of red meat without waste and retail products that are of the same size and quality. All inputs from each segment have an impact on carcass quality and make it difficult to determine what type of animal is best for the entire industry.

Youth market beef exhibitors make up another segment of the cattle industry. They need to understand that they are beef producers. Typically youth are involved in the fun experience of raising and showing market steers at the fair.

Youth should understand they are raising animals that will become food products for consumers. Even though youth-raised market beef make up only about one percent of the beef produced, if a consumer has a bad experience from that beef, it becomes a negative for the beef industry. Youth producers are ambassadors for the beef industry and should do all they can to promote and raise quality beef.

In beef carcass evaluation, the term quality refers to the characteristics that are related to the appearance and consumer acceptability of fresh beef cuts. Consumers care about appearance, eating quality, and cost. A bad eating experience will influence the amount of money the consumer will spend on beef. A good eating experience tends to make the cost a less-important factor in buying beef. All beef producers need to provide a high quality product in order to ensure consumers continue to buy beef.



Youth discuss meat quality at a beef education day in Camas County, Idaho. *Photo by Cindy A. Kinder*

Table 3. This table translates 1991 industry terms and targets into ideal sizes.

Live Weight	1,050 to 1,300 lbs.
Hot Carcass Weight	600 to 800 lbs.
12th rib fat thickness	0.30 to 0.45 inches
Rib-eye Area	12.5 to 14.0 sq. in.
Yield Grade	2.0 or less
Quality Grade	Select+ to Average Choice

What makes a quality product?

National Cattlemen's Beef Quality Audit in 1991 found the following carcass characteristics to be optimal for consumer satisfaction:

Consumer satisfaction studies from the audit determined the beef product that consumers selected as being high quality was from cattle fitting in Table 3 ranges. Therefore, these industry targets were recommended. Striving to raise cattle to fit the targets should provide continued consumer satisfaction.

Carcass characteristics

Carcass characteristics in live animals are defined by body type and muscling. The mature body size of a beef animal will affect carcass weight. To reach a carcass weight between 600 and 800 pounds, cattle should have a live weight from 1,050 to 1,300 pounds at harvest. Frame size plays a factor in the ideal live weight of market cattle. Large-framed cattle typically weigh more than 1,300 pounds, medium-framed cattle weigh 1,050-1,250 and small-framed cattle weigh less than 1,050 pounds when they reach the ideal body composition.

12th rib fat. These cattle should have .30 to .45 inches of fat at the 12th rib. Cattle with less than .30 inches typically have not been fed long enough to reach industry ribeye size and quality grade targets. Less than .25 inches will cause carcasses to shrink in the cooler due to dehydration. Cattle with more than .50-inch rib fat have too much fat or waste that must be trimmed.

Beef that consumers eat is primarily muscle. Cattle with average to heavy amounts of muscling are desirable. Muscular beef carcasses that fit the weights discussed earlier will produce ribeye areas of 12.5 to 14.0 square inches. Typically the ribeye area size points toward the amount of muscling throughout the carcass. Producers need to select for cattle that will produce muscular beef carcasses in moderation, according to industry standards.

Beef quality grade is determined by the amount of marbling and the muscle color in the ribeye and the age of animal. Marbling is intramuscular fat and the score is determined in the *longissimus dorsi* (ribeye) muscle. The amount of marbling ranges from devoid (least) to abundant (most). Table 4 shows the amount of marbling and

the corresponding quality grade. Cattle that grade Select+ to Average Choice have a slight to modest degree of marbling, which is in the middle of the marbling scale.

Age or maturity of cattle is based on bone ossification, lean color, and texture. As cattle get older, the bone gets harder and more yellow. Maturity scores are from "A" to "E". "A" maturity cattle are young, 30 months of age or less. "E" maturity cattle are usually older cows. Most cattle raised and exhibited by youth are "A" maturity cattle. Table 5 shows the relationship of maturity score to age of the cattle in months.

Beef yield grade is a numerical score from 1 (less fat) to 5 (more fat) that is calculated from 12th rib fat thickness, hot carcass weight, percent kidney, pelvic, and heart fat (KPH) and ribeye area. The yield grade number corresponds to the yield of boneless, closely trimmed retail meat cuts. Yield Grade 1 cattle are generally leaner and more muscular cattle while Yield Grade 5 cattle have more fat and less muscle.

Consistency and uniformity

Knowing what the industry wants provides cattle producers a target to aim for when raising cattle. Producing a consistent and uniform beef animal will provide the consumer with an acceptable product and should earn more money for the producer. In order to raise a consistent product, producers need to know as much as they can about the cattle and eliminate extremes from their operation. Extremes in a cattle operation can be cattle that are too big or too small to hit the industry target, cattle that are a variety of ages, and even cattle with structural problems.

Knowing the cattle is an important way to help eliminate extremes. Keeping records on the cattle is an excellent way to "know the cattle." Carcass traits are highly heritable and are important to beef cattle quality. Keep track of information about the sires of calves and performance records such as weaning weights, yearling weights, average daily gain (ADG), and carcass information such as ribeye size, 12th rib fat, and marbling. Record keeping will allow producers to enhance the quality of the cattle through genetic selection and help their herd reach the carcass targets. Refer to Chapter 3 Record Keeping to help determine records that need to be kept on your project animal.

Table 4 shows the relationship between marbling, maturing, and carcass quality grade¹.

RELATIONSHIP BETWEEN MARBLING, MATURITY, AND CARCASS QUALITY GRADE ¹					
DEGREES OF MARBLING	MATURITY ²				
	A	B	C	D	E
Abundant					
Moderately Abundant	PRIME				
Slightly Abundant				COMMERCIAL	
Moderate					
Modest	CHOICE				
Small				UTILITY	
Slight	SELECT				
Traces		STANDARD			
Practically Devoid				CUTTER	

¹ Assumes that firmness of lean is completely developed with the degree of marbling and that the carcass is not a “dark cutter.”

² Maturity increases from the left to right (A through E).

Table 5. Relationship of maturity scores to age of cattle in months.

Maturity	Approximate Age
A	9 – 30 months
B	30 – 42 months
C	42 – 72 months
D	72 – 96 months (6 – 8 years)
E	More than 96 months (more than 8 years)

Eliminating extremes

Once carcass information has been gathered, it's time for a cattle producer to put the information to work. Narrow the carcass weight variation in your herd by removing cattle that do not meet quality-product targets. Aim for an optimum carcass weight range between 700 to 800 pounds to provide the most flexibility.

Cull the cow herd by removing the extremes in cow size. This practice, over time, will lead to more uniformity in the calf crop. Choose replacement heifers with average frame scores, rejecting those below average and those that are too large. The big fancy heifer will be the one to sell rather than the one to keep in the future. Bulls should be selected to fit a uniform target. When evaluating a bull herd, look for uniformity of type and size. Shorten the calving season and calves can be marketed as a group relatively the same age. Uniformity of the animals should increase if these practices are used.



Learning to identify different parts of a beef carcass is part of a challenge at a Pacific Northwest beef skillathon. Photo by Cindy A. Kinder

Eliminating excess fat

Excess fat continues to be the number one factor affecting how competitive beef is when compared to other meat sources. Eliminating excess fat is important to the consumer and the entire beef industry. Producers can identify and employ the use of genetics to help them produce leaner carcasses without sacrificing marbling. Cattle that have too much 12th rib fat cost the producer money and could provide a poor eating experience for the consumer. The average consumer wants to eat lean meat, not fat. Genetic selection for cattle that will have a quality grade of average choice and a yield grade of 2 is attainable.

120- to 150-day diet. Research shows for the beef product to provide a good eating experience to consumers, cattle need to be fed a high-concentrate diet for at least 120 days. Depending on the age of cattle when they are placed on feed, it usually takes an average of 150 days for cattle to reach their genetic potential for carcass quality. The longer time on feed increases 12th rib fat and KPH. The amount of time on feed also increases feed costs. Cattle need to be fed and managed to attain industry targets. The amount of time on feed can also affect your herd's genetic selection. If cattle are genetically selected to be leaner but are on feed longer because they don't "look" finished, the genetic selection of your herd is not truly represented.

At the 2004 National Angus Conference at Iowa State University, a vivid reminder of excess waste fat was demonstrated. Iowa State University staff members with the assistance of their ultrasound technology identified two pairs of steers for this event. All were videotaped, and one out of each pair was harvested and then processed into closely trimmed retail cuts.

Steer #612 represents a steer that is very close to an average steer certifying for the Certified Angus Beef program. His quality grade was Average Choice and his calculated yield grade was 3.6. The other steer, #985, was also Average Choice, yield grade 1.6; but was heavier muscled and leaner in 12th rib fat cover by 1/2 inch. Both steers were within 30 pounds of each other in live weight and 12 pounds in carcass weight. The greatest difference in the two steers was that #985 had the ability to marble and grade with considerably less fat cover than #612.

Steer #612



Steer #985



Photos by Mario De Haro Marti, University of Idaho Extension

From steer #612 demonstrating lots of back fat.



From steer #985 demonstrating little back fat.



Photos by Cindy A. Kinder

Table 6. Carcass data comparison

	Steer #612	Steer #985
Live WeightF, lbs.	1,171	1,198
Hot Carcass Weight, lbs.	718	730
12th Rib fat	0.65"	0.15"
Ribeye Area in square inches	11.2"	13.9"
USDA Yield Grade	3.6	1.6
USDA Quality Grade	Average Choice	Average Choice
Carcass Value	\$1,067	\$1,279
Amount Retail Product, lbs. (lbs. of meat)	381	473

Importance of quality, consistency, no-waste fat

The battle cry for the beef industry since the National Beef Quality Audit has been "improve quality and consistency." While this objective is important to gaining market share for the beef industry, don't forget that breeding and feeding programs also need to address excess waste fat. The good news is that we have genetics that can do both, but just not in high enough numbers of cattle, yet.

Health and carcass quality. The health of the animal can have an impact on the carcass quality of beef. A proper herd health program as outlined by a veterinarian will help young producers raise healthy cattle. Sick animals must be treated appropriately. If animal health products are used they must be administered according to labeled directions or as prescribed by a veterinarian. Cattle that are not vaccinated or doctored according to guidelines can produce an inferior or unacceptable product. If withdrawal times for vaccines or medicines are

not followed, the beef carcass will not be suitable for human consumption.

Injections given improperly can cause abscesses in the muscle. These abscesses can cause the muscle to have discoloration and lesions. This makes the meat product unacceptable unless the abscesses are trimmed from the muscle. Trimming away abscesses is a loss to the producer because it takes away from the pounds of meat sold and costs money in labor to remove them. The muscle surrounding the lesion is also tougher. Chapter 4 Animal Health discusses injections and reading labels. Please follow guidelines to ensure a high-quality beef product.

Avoiding dark cutter meat. Another carcass quality defect is dark, firm, and dry beef, (DFD) or dark cutter. It is a condition determined after death of the animal but is a result of long-term stress to the live animal. The incidence of DFD is one to five percent of fed cattle carcasses in the United States.

Factors shown to cause stress include: transportation distance, time of year, weather, and mixing of strange cattle. It is very difficult to determine which animals will produce a DFD carcass. If the animal is allowed to rest and replenish the energy stores before slaughter, meat with normal color should be produced.

Youth market animals have a higher chance to be dark cutters because of the stress they are placed under at fair time. Exposing a project animal to new situations during the feeding period can help reduce the incidence of stress. The carcasses with the DFD condition do not pose a threat to consumers if eaten. However, the visual dark appearance is not appealing to consumers causing these carcasses to lose market value.

Summary

Raising a high quality, consistent beef product for the consumer should be the goal of every beef cattle producer. To achieve the goal, beef producers need to know the value of their cattle based on industry targets, eliminate extremes, keep accurate records, use proper genetic selection, and follow a recommended beef quality assurance program. The goal is attainable but will take time, effort, and attention to detail of those involved in the beef industry.

References

- 1997-2003. *Meat Evaluation Handbook*, American Meat Science Association, page 47. American Meat Science Association, Savoy, IL.
- Black, Jodi. 2001. *Beef Resource Handbook*, Ohio State University Extension, section 2, page 15; section 8, page 5. Ohio State University.
- Chapman, C.K., editor. 2001. *Utah Youth Beef Quality Assurance Program Manual*, page 9-11 and 14-15. Utah State University.
- Pater, Susan. 2002. Pater developed PR Cupcakes. University of Arizona Extension Agent, 4-H Youth Development.
- Ritchie, Harlan, Ph.D. 1990. *Live Animal Carcass Evaluation and Selection Manual*, page 101. Michigan State University Kendall Hart Publishing.



Cupcake activity

This cupcake activity will demonstrate why quality matters to consumers. Panelists will sample six different cupcakes, each doctored in some way before or after cooking to represent similar problems in the carcass evaluation of beef. Cupcakes (4 each) need to be kept separate and identified just with the numbers as follows, based on special ingredients at the time of preparing them:

- #1 – normal
- #2 – salty
- #3 – ground chili
- #4 – overcooked
- #5 – red food coloring
- #6 – pudding inside

Cupcake ingredients and preparation

- 1 box of white cake mix (makes about 28 cupcakes)
- 1 can of prepared white frosting (plain)
- Paper baking cups
- 1 package instant banana or vanilla pudding mix
- Salt
- Chili pepper, ground
- Food coloring

Prepare cupcakes as directed on the box. Fill each baking cup about half full.

Before cooking:

- Add ½ teaspoon salt to 4 of the cupcakes—mix in. (Remember these will be #2).
- Add 1 teaspoon of ground chili pepper to 4 of the cupcakes—mix in. (These will be #3)

Bake according to instructions.

- Leave 4 cupcakes in oven to overcook to very dry—not burned. (These will be #4).

MATERIALS NEEDED

- Flip chart
- Markers
- 28 cupcakes made from following the recipe on this page
- Tables: 1 for each group of 4 taste panel participants
- New, clean syringe and needle
- Small paper plates
- Napkins
- Plastic gloves for serving cupcakes

Allow all cupcakes to cool.

Prepare instant pudding according to directions; refrigerate. This will be used after cupcakes are frosted for the 4 #6 cupcakes.

Frost cupcakes

- Use food coloring to create green frosting for 4-H, or blue and gold (FFA) or mixed.
- Inject 4 cupcakes with many small drops of red food coloring. (These will be #5).

Preparing #6 cupcakes

- Cut a circle from the center of 4 cupcakes. Save the top as a cap. Trim underneath cap and hollow out the center of the cupcake. Fill the hole with chilled pudding and replace the cap.

Depending on the number of youth in your group, serve 6 cupcakes per person on the taste panel or 6 cupcakes per subgroup of four or five people.

CHAPTER 6 BEEF CARCASS QUALITY

LESSON & ACTIVITIES

Cupcake evaluation activity

The activity will take 30 to 45 minutes depending on the length of discussion. Begin by discussing quality assurance.

Discussion questions

1. What does quality mean? How good is it?
A measure of good and bad.
2. What is "assurance"?
I can "assure" you. A promise or a guarantee.
3. What is the name of those really good tasting donuts?
(Krispy Kreme).

Why do we remember that?
(Because they are good!)

Would you buy them again? Would you recommend them to a friend? Why?

Have each taste panel assemble at a table with the six types of cupcakes labeled in front of them. Tell the taste panel not to touch the cupcakes.

Moderator states:

"When a company develops a new product they go through a testing phase to evaluate public response. The cupcakes you have represent six trial recipes. We need you to help us decide which ones are the best to use for a fundraising project open to youth groups."

Panel evaluation

Ask each taste panel to evaluate each cupcake. As each cupcake is evaluated—one at a time—go through the following procedure for each one. Start with #1 (normal) and work your way through #6.

1. **Look at the cupcake.**

Just evaluate the appearance. Hold up 1 finger for great, 2 for good, and 3 for "give it to the dog."

A recorder will write down each taster's response. Provide a general summary of the results. Ask for a visual evaluation of taste. 1 finger for great, 2 for good, and 3 for dog food or less. Verbally note the range of scores.
2. **Now eat only part of the cupcake, because we will evaluate the appearance of the inside and taste.**

Walk among the group while they eat. Ask for an evaluation of taste.

1 finger for great, 2 for good, and 3 for dog food or less.

Verbally note the range of scores.
3. **Repeat 1 and 2 until you have gone through all six types of cupcakes and noted the good and bad points of each.**

Then ask the question, "What does this tasting panel demonstration have to do with youth raising livestock projects for a fair?"

Answer: Youth are producing food, and that food must be a wholesome product that customers enjoy seeing and eating.
4. **Then ask what percentage of food animals (beef, sheep, and swine) produced in the United States are marketed through a youth livestock show.**

Answer: about 1%. That is a large enough number of animals to cause a consumer confidence problem and a small enough number of animals for commercial agriculture to disown the youth livestock show.
5. **Now go back through the six types of cupcakes that have been tested and relate each problem with a potential quality assurance problem with youth livestock project animals.**

CHAPTER 6 BEEF CARCASS QUALITY

LESSON & ACTIVITIES

#1 Good Cupcakes.

It is hoped this is like the food animals you are producing in your youth livestock project: healthy, well taken care of, no medicine residues.

#2 Normal looking but salty.

Caused by a drug residue in the steer. The person may have not provided an adequate withdrawal time prior to slaughter or administered a higher dose of medicine than recommended.

#3 Brown spots inside—ground chili pepper.

May be a result of an improper diet or feeding something not labeled for animals.

#4 Overcooked/Dry.

These were overdone, or over-baked. Like an animal that is held for six months and continued to be shown for six months after it is market-ready.

#5 Red food coloring/Dark.

Tastes OK, but it is a sign the animal was stressed, a dark cutter.

#6 Soft/Pudding inside.

Injection site abscess. This is from an improper vaccination. The needle may have been dirty. How would you like to find this in your steak!

Be creative in making the cupcakes, and develop a scenario that might have happened to cause the problem.

Wrap-up

“Our goal is to be able to assure our buyers that they are getting a high quality product, one that is safe, nutritious and good tasting. Satisfied customers give us repeat business, and they will tell others. Remember this important fact. Whenever we market an animal, we are promoting not only ourselves and our clubs, but the livestock industry as well.”

This information can be presented differently depending on the size of the group. With a small group you could just serve the different types of cupcakes randomly at break or refreshment time and help lead the discussion when problem cupcakes are discovered. This way everyone would be tasting the cupcakes.

Reflecting discussion questions

- What are some factors that may influence the quality of the product we produce?
- What can we do to produce a quality product?
- What can we do to assure our buyers they are getting a quality product?
- In what ways has this activity affected how you think about animal production?

Applying discussion questions

- What happens when you produce a poor quality product?
- What happens when you produce a quality product?
- What changes do you need to make in raising your animals?



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Form 5, Animal Health Product Record, Chapter 3p. 49

Form 6, Idaho Youth Livestock Program
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PRE/POST TEST

Handling and Management Section:

1. T or F Stress can be caused by irregular feeding habits.
2. T or F The use of animal prods has no effect on bruising and meat quality.
3. The area surrounding an animal within which that animal is comfortable with its surroundings is known as the _____.
4. A _____ results from an animal being exposed to long-term stress prior to slaughter and results in a lower quality beef product.
5. T or F The design of handling facilities has little impact on beef carcass quality.

Ethics and Animal Welfare Section:

6. T or F Animal welfare is defined as the concern for the well being of animals
7. Who is responsible for taking care of animals? _____
8. T or F It is ethical to falsify the starting weight of your beef project at weigh-in.
9. At the fair it is appropriate to have the following people fit the beef project:
 - A. Professional fitter
 - B. Mom and Dad
 - C. The owner of the animal with some advice and help from older members and adults
 - D. The club leaders
10. T or F It is acceptable to give beef projects a veterinary product labeled only for horses.

Record Keeping Section:

11. Keeping _____ and _____ records is essential in evaluating the performance, productivity, and profitability of a beef cattle operation.
12. T or F A Treatment Record Book is a written plan for what treatments are to be used when an animal is sick.
13. T or F Treatment records are an essential tool in determining withdrawal periods.
14. Performance records include such things as _____ and _____ efficiency.
15. T or F Feed records need to be kept for one year after the sale of cattle.

PRE/POST TEST

Animal Health Section:

- 16. T or F The only situation when an animal should be treated is to prevent a disease.
- 17. _____ is an injection that is given under the skin.
 - A. Intramuscular C. Subcutaneous
 - B. Intranasal D. Intraruminal
- 18. T or F It is okay for air to be in the syringe at the moment you deliver a shot.
- 19. T or F Injections should be given in any location on the animal.
- 20. Needles and syringes should be cleaned with _____.
 - A. Chemical disinfectant B. Hot water and soap

Biosecurity Section:

- 21. List three ways disease can be transmitted.
 - 1. _____
 - 2. _____
 - 3. _____
- 22. Name one foreign disease. _____
- 23. Give one example of a location you could monitor for a biosecurity program.

- 24. T or F A biosecurity plan can reduce the spread of diseases.
- 25. T or F Manure cannot spread disease.

Carcass Quality Section:

- 26. Carcass quality can be defined as _____.
- 27. A quality beef product comes from a beef animal that meets industry standards with live weight from _____ to _____ lbs., a 12th rib fat thickness of _____ to _____ inches and a quality grade of at least _____.
- 28. What are the two factors that determine beef quality grade? _____ and _____.
- 29. Eliminating extremes from a cattle operation will help a producer raise industry acceptable cattle. List three extremes that should be eliminated from an operation.
 - 1. _____
 - 2. _____
 - 3. _____
- 30. T or F Cattle that have too much 12th rib fat cost the producer money and could provide a poor eating experience for the consumer.

PRE/POST TEST & ETHICS SCENARIOS ANSWERS

Handling and Management Section:

1. True
2. False
3. Flight Zone
4. Dark Cutter
5. False

Ethics and Animal Welfare Section:

6. True
7. People
8. False
9. C
10. False

Record Keeping Section:

11. Production and Financial
12. True
13. True
14. Weights and feed efficiency
15. False—three years

Animal Health Section:

16. False
17. C
18. False
19. False
20. B

Biosecurity Section:

21. Direct contact, carriers, vectors, and fomites
22. BSE, West Nile Virus, Foot-and-Mouth disease
23. Fence line, facility entrance, barn receiving area, vehicles, parking lot, raw feed products, pen, feed bunks, manure pile, equipment box, pastures, squeeze chute, clip chute.
24. True
25. False

Carcass Quality Section:

26. Eating quality, appearance
27. 1,050 to 1,300 lbs.; 0.30 to 0.45 inches; Select plus
28. Marbling in the ribeye and age of the animal
29. Cattle too big to hit the industry target, cattle too small to hit the industry target, cattle that are a variety of ages, cattle that are a variety of colors, and cattle with structural problems.
30. True

Answers to Ethics Scenarios

1. **Unethical.** This is unethical because the 4-H or FFA member is not doing his/her own work. Youth is benefiting from the expertise of someone else. This gives an unfair advantage over the competition.
2. **Ethical.** Molasses is used in beef cattle rations. Using molasses as a sweetener to get the animal to drink the city water is not unethical.
3. **Ethical.** The antibiotics that were prescribed and used do not have a withdrawal period. The exhibitor also contacted a veterinarian and was following his/her instructions.
4. **Ethical.** The young member needs help and education on how to clip the animal. Teaching youth how to clip an animal by first showing the proper procedure and then allowing the exhibitor to do the rest of the clipping is ethical.
5. **Unethical.** Abusing the animal by forcing water into the stomach is not only unethical, but it is a misrepresentation of the animal for the deceptive and deceitful purpose of breaking the rules. This is not something we want to teach our young people. In the legal world, this is known as fraud.
6. **Unethical.** This is another case of misrepresenting an animal. It is a dishonest and fraudulent act. Obtaining an advantage over the competition by falsifying birth records is dishonest and unethical, another example of purposely breaking the rules.

FORM 5 ANIMAL HEALTH PRODUCT RECORD

Farm Name: _____ Owner: _____ Address: _____

DATE RECEIVED	SUPPLIER/DISTRIBUTOR	PRODUCT NAME	QUANTITY	COST	LOT# / SERIAL#	EXPIRATION DATE

**PACIFIC NORTHWEST YOUTH LIVESTOCK PROGRAM
COMMITMENT TO EXCELLENCE**

- I believe that participation in the Pacific Northwest Youth Livestock Program should demonstrate my own knowledge, ability, and skill as a feeder and exhibitor of livestock.*
- I will do my own work to the full extent of which I am capable and otherwise will only accept advice and support from others.*
- I will not use abusive, fraudulent, illegal, deceptive, or questionable practices in the feeding, fitting, and showing of my animal(s), nor will I allow my parents, my supervisor, or any other individual to employ such practices with my animal(s).*
- I will read, understand, and follow the rules, without exception, of all livestock shows in which I am a participant and ask that my parents and the supervisor of my project do the same.*
- I wish for my livestock project to be an example of how to accept what life has to offer, both good and bad, and how to live with the outcome.*
- I realize that I am responsible for:*
 - the proper care and safe humane treatment of my animals,*
 - the production of a high quality, safe, and wholesome food,*
 - demonstrating strong moral character as an example to others.*
- I consent to having my animal(s) subjected to drug testing.*

Exhibitor

Date

Parent or Guardian

Date

Project Supervisor

Date

Completed signatures certify that the exhibitor is eligible to participate fully in the youth livestock program in

_____ County

_____ State

GLOSSARY

12th Rib Fat Thickness: the measurement of subcutaneous fat over the ribeye, in tenths of an inch taken between the 12th and 13th rib.

Abscess: localized collection of pus in the body tissues.

Additive: ingredient or substance added to a basic feed mix. Ingredients may include nutrients, stimulants, and medications.

Animal prods: devices such as whips, sorting sticks, hot shots, and paddles used to prod or move cattle in confinement.

Antibiotic: class of drugs such as penicillin, streptomycin, and tetracycline, used in the treatment of various infectious diseases.

Biosecurity plan: a written plan to stop the spread of diseases that may be found within a herd or to prevent the introduction of diseases that are common in the area around a herd.

Box: See “The Box” below.

BQA: Beef Quality Assurance (BQA) is a program designed to help producers raise an animal that will provide a safe and wholesome beef product for the consumer. BQA improves food safety by preventing chemical/drug residues, pathogen contamination, and defects such as injection-site blemishes and bruises.

Carriers: animals that have the disease but do not show signs of illness.

CCP: critical control points (CCP) are places where control or prevention can be applied and are essential to prevent, eliminate, or reduce spread of a disease.

Certified Angus Beef: a program that pays premiums to cattle producers who raise cattle that are 51 percent or more black-hided, have a modest or higher degree of marbling, and a quality grade of at least average choice.

Compliance: obeying the law, following guidelines.

Concentrates: feed that is high in energy and low in fiber. Examples are barley, corn, and wheat.

Dark cutter (DFD): a condition in which the meat is much darker in color, tends to be dry, and has a reduced shelf life. The condition can be caused by stress and rough handling; also dark, firm, dry beef (DFD).

Disease: an illness that affects the health or decreases the performance of an animal.

EPA: Environmental Protection Agency.

Ethical behavior: doing what is right; or an accepted standard of good behavior.

Extra-label drug use (ELDU): use of a drug, or other substance, in a manner not specified on the label, which is only allowed involving a veterinarian-client-patient relationship. Also see Off label.

Falsify: to alter with intent to misrepresent.

FDA: Food and Drug Administration.

Flight zone: an animal’s personal space within which it is comfortable with its surroundings. When approached within this zone, the animal will move in another direction.

Foot-and-Mouth disease (FMD): an animal health problem. It does not affect humans. The U.S. Department of Agriculture and its partners—including the beef industry—use aggressive prevention measures and surveillance to keep FMD out of the United States. There has not been a case of FMD in the United States since 1929. While FMD is not a concern for human health, it can cause severe problems for animals with cloven (divided) hooves, such as cattle, pig, sheep, goats and deer, as once it’s contracted, the disease can spread rapidly.

Fomites: inanimate objects such as boots, clothing, brushes, combs, and vehicles that can indirectly transport disease agents.

FSIS: Food Safety Inspection Service.

Frame size: the size of the beef animal, in relation to its age and height measured at the hip. There are three sizes: small, medium, and large. The industry trend is toward moderate- or medium-framed animals. A 52-inch, 1,250-pound market steer is an example of a medium frame size.

Gauge: the diameter of a needle. The larger the gauge number, the smaller the diameter of the needle.

Heritable: traits that are passed on from parents to the offspring.

Hot carcass weight or HCW: the weight of the carcass of the animal at the packing plant before it is put into the cooler. It is a factor used in determining yield grade.

Humane: showing kindness towards animals and treating them well. Providing animals food, water, and shelter.

IM (intramuscular) injection: placement of drugs or other substances directly into a muscle.

Injection: A method of administering a substance such as a drug into the skin, subcutaneous tissue, muscle, blood vessels, or body cavities, usually by means of a needle. In beef the injection should be given in the neck region rather than in the shoulder or hip, so there is little chance of affecting high-priced meat cuts.

Intramammary injection: placement of drugs or other substances directly into the udder.

Intramuscular (IM) injection: placement of drugs or other substances directly into a muscle.

Intranasal: placement of drugs or other substances directly into the nostril.

Intraperitoneal: placement of drugs or other substances into the peritoneal cavity (the animal's right side).

Intraruminal: placement of drugs or other substances into the rumen (the animal's left side).

Intrauterine injection: placement of drugs or other substances directly into the uterus.

Intravenous (IV) injection: placement of drugs or other substances directly into a vein.

KPH—kidney, pelvic, and heart fat: the amount of fat found in regions of the kidney, pelvis, and heart as a percentage of the carcass weight. KPH makes up about 3 percent of the total carcass and is a factor used in determining yield grade.

Manipulate: to make dishonest changes, such as holding animals off feed and water, in order to suit one's purposes.

Marbling: the flecks of fat distributed in the muscle used to determine quality grade. Marbling is evaluated at the rib eye between the 12th and 13th rib.

Off label: Using a product but not following the label instructions. This is not allowed. (Also see Extra-Label.)

Oral Administration: placement of drugs or other substances in an animal's mouth.

Ossification: when cartilage turns from soft tissue to a hard, bone-like structure.

Parasites: organisms that live off of another animal. Beef projects are susceptible to both internal and external parasites. Animals infested with parasites have reduced weight gain and reduced feed conversion. External parasites include flies, lice, and grubs. Internal parasites are worms that live in various sections of the digestive tract or in other organs. Parasites can be controlled using topical, oral, or injectable solutions. Consult a veterinarian for best treatment.

Pesticide: class of chemicals used to kill fungi, insects, rodents, weeds, etc.

Point of balance: the point of balance is at the animal's shoulder. All species of livestock will move forward if the handler stands behind the point of balance. They will back up if the handler stands in front of the point of balance.

Protocol: written set of procedures, rules, or steps used to carry out a particular task.

GLOSSARY

Pulse: the beating of the heart while pumping the blood causes waves in the arteries that can be felt. This can be best measured on the outside of the jaw, just above of the lower border.

Residues: small amounts of substances, chemicals, or drugs that remain in an animal's body tissues and fluids after the animal has been exposed to or given that substance. Also found in feed.

Respiration: the act of breathing by which animals take in air, use oxygen, and release carbon dioxide.

Rib eye area: the surface area of the *longissimus dorsi* (eye) muscle between the 12th and 13th rib of a beef carcass. It is measured in square inches and is a factor in determining yield grade. It is an important indicator of muscling. Rib eye is also the location where quality grade is determined.

Route of administration: method by which a medicine, or other substance, is given to an animal (i.e. intramammary, intramuscular, intrauterine, intravenous, oral, topical).

Scours: loose or extremely runny feces, colors may vary due to different types of infections and diseases.

Seed stock: bulls and heifers, usually purebred or registered, raised by a producer and sold to other cattle producers as breeding stock.

Signs/symptoms: the indication that something exists that is evidence of a disease.

Stress: strain, tension, or pressure put on an animal that can lead to panic, undesirable behavior, poor performance, and/or disease.

Subcutaneous (sub-q): placement of drugs or other substance under the skin.

The Box: When a beef carcass has been processed, it is packaged for shipment into a standard size box. Carcasses with a hot carcass weight (HCW) of more than 950 pounds will sometimes not fit into the box. Heavy carcasses can also cause damage to the carcass rails in some packing plants.

Topical: application of a drug or other substance directly to the skin of an animal, usually over the back.

USDA: United States Department of Agriculture.

Vaccinate: act of giving a vaccine.

Vaccine: preparation of microorganisms given to an animal to produce immunity to a specific disease or organism.

Vectors: transport a disease agent between hosts and are critical for the disease agent's lifecycle. Vectors typically are insects but could also be birds or other animals.

Veterinary drug order (VDO): a veterinarian-approved list of medications that can be used on your farm or ranch and that fit BQA guidelines.

Withdrawal/withholding period (time): period of time (hours, days, weeks, months) a treated animal must be held prior to marketing following administering of a medication.

Zoonotic transmission: disease transmissible under natural conditions from animals to humans.

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