

36 Herd Health

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Objectives

- **Learn how to use commercial beef cow-calf health guidelines as an outline for designing a herd health plan.**

Developing a sound and practical commercial beef cow-calf herd health program requires more than obtaining a recipe from a cookbook, because production objectives may vary considerably between individual producers. Producers with knowledge about the production cycle on their premise should be working with veterinarians who have expertise about disease biology.

Herd health programs must be customized to meet the needs of individual producers. Herd health program choices are impacted by:

- geographic locations,
- climate/weather variations,
- housing,
- density at different points in the production cycle,
- resource availability,
- individual animal differences,
- nutritional status,
- exposure to non-herd cattle in shared grazing or across fence line,
- end use of cattle,
- marketing considerations and
- human population demographics.

Every rancher should develop a good working relationship with a local veterinarian in developing the herd health program. This should include proper animal drug usage and adherence to food safety principles. Successful herd health programs should be reviewed annually for changes in herd management and to incorporate new information. Beef quality assurance is of particular importance and the producer must be a part of the veterinarian-client-patient relationship to assure violative drug residues and damaging injection-site lesions do not occur.

Herd health programs often have focused on infectious disease treatment and prevention as well as parasite control.

However, in modern production animal agriculture, the focus is on optimizing herd health, efficient production and maximizing net return to the business unit. Working closely with a veterinarian will allow identification of individual herd needs and development of customized health programs to address these variables and challenges.

Table 36.1 has been developed as a template to follow when initially developing herd health programs for commercial beef cow-calf operations. This table has been designed as simply as possible to minimize or eliminate many of the confusing issues related to these types of programs. Refer frequently to Table 36.1 for a more thorough understanding of the points stressed in this chapter.

The table is divided into columns and organized so producers can apply the information and guidelines to their own individual situations. Producers can utilize this table as a checklist to prepare for the events in their individualized production cycle.

1. The left-hand column identifies times in the production cycle when beef cattle are most commonly processed and decisions regarding health and business should be implemented. Recommendations designed around these times are more readily accepted by the producer and have the best potential for optimizing health of the entire herd.
2. The center column presents basic or minimal guidelines for most commercial beef cow-calf herds.
3. The right-hand column provides information producers of certain herds may need to address to optimize health and production. For the specific considerations outlined in this column, it is strongly recommended to consult a veterinarian.

Again, it is stressed that these are general guidelines and recommendations. Programs should be customized to meet the needs and objectives of every herd.

It is beyond the scope of this chapter to discuss details of goal setting; however, the health and viability of any business, including commercial beef cow-calf operations, must define long- and short-term goals. To determine if goals are being attained, pertinent information must be recorded. Accurate records can be used for measuring goals and measuring financial and production parameters of the business. Data collected must be reviewed and used

All Web addresses given in this chapter are subject to change. The links to these websites will be updated regularly at the Master Cattleman website at extension.okstate.edu/programs/master-cattleman.html

Table 36.1. Commercial beef cow-calf herd health guidelines.

<i>Time</i>	<i>Basic program recommendations^a</i>	<i>Other considerations to discuss with your veterinarian^b</i>
Pre-calving	Evaluate facilities and environment Equipment: sterile, proper function Review protocol for monitoring and when to assist delivery Ensure record system data is current Monitor herd for nutrition and separate by age and BCS to manage feed intake appropriately	Quality frozen colostrum Scours vaccine
60 days pre-calving all females	If management is adequate, should not need any vaccinations Evaluate BCS (see chapter 20)	Scours vaccinations
Calf born	Individually identify Record birth Assure adequate colostrum	Dip navels Weigh calves Castrate Dehorn (complete)
Bulls	Viral respiratory diseases (IBRV, BVDV) Leptospirosis Parasite control program (location and season dependent) ^c Breeding soundness examination	PI ₃ V, BRSV Vibriosis
Start breeding heifers	Finish all calving. Start breeding heifers 30 days before cows	
Start breeding adult cows		
Remove bulls	40 days to 90 days after introducing, depending on goals	
Branding time Two months to four months	Individually identify (if not already performed): brand, ear tag Castrate Dehorn (complete) Clostridial: 7- or 8-way (location dependent) Parasite control program (location and season dependent) ^c	Brucellosis (bangs) - heifers - (marketing decision) (follow age restrictions) Viral respiratory diseases Leptospirosis Pinkeye Tetanus
Weaning Five months to nine months	Clostridial: 7- or 8-way (location dependent) 4-way or 5-way viral respiratory diseases (IBRV, BVDV, PI ₃ V, BRSV) Leptospirosis Parasite control program Weigh calves and evaluate BCS (see chapter 20) BCS and Pregnancy test cows and evaluate culling criteria	Brucellosis (bangs) - heifers - (marketing decision) (follow age restrictions) Preweaning/weaning vaccination program Weaning/post - weaning vaccination (location and season dependent) ^c program Pinkeye
Replacement heifers 13 months to 16 months	4-way or 5-way viral respiratory diseases (IBRV, BVDV, PI ₃ V, BRSV) Leptospirosis Clostridial: 7- or 8-way (location dependent) Parasite control program (location and season dependent) ^c Monitor growth: Rule of Thumb-heifers should weigh 65% of mature weight at start of breeding season	Make sure individually identified Vibriosis
Process adult cow herd	Viral respiratory diseases (IBRV, BVDV) Parasite control program (location and season dependent) ^c Leptospirosis Evaluate individual animals: udder, eyes, disposition, feet, joints, legs, soundness Pregnancy check and evaluate culling criteria Evaluate BCS (see chapter 20)	PI ₃ V, BRSV Anaplasmosis control Vibriosis

a These are general guidelines and recommendations. Individual herd programs may vary considerably. Consult your veterinarian for specific recommendations.

b Follow all label directions and your veterinarian's recommendations.

c See chapters 37 and 38.

to make informed business decisions. In other words, do not collect information just to be collecting information. Record systems for commercial beef cow-calf operations can be as simple as a pocket calendar or as technical as a software computer program. Regardless of the system chosen, it is imperative information is recorded and the system in place prior to calving. For more information about keeping records, refer to chapter 3.

This chapter will arbitrarily start with pregnant females just prior to calving and designate this occurrence or event as pre-calving.

Pre-Calving

The left column of Table 36.1 refers to occurrences in the cow-calf production cycle where business decisions should be made and implemented by producers. Producers should prepare personnel who will be involved in the process and evaluate the environment as early as possible, usually one week to four weeks prior to the first anticipated delivery or calculated calving date. One of the first places to begin is the evaluation of the facilities or the calving environment. If pregnant heifers and cows are to deliver in structural facilities, the facilities must be in good repair to avoid physical injuries to the dam and calf as well as personnel. Most structural facilities for calving purposes are only needed for part of the year; farmers and ranchers frequently store equipment and feedstuffs in the same areas. Therefore, calving areas or pens need to be properly cleaned and ready for use prior to the anticipated delivery of the first calf. Where heifers and cows are to deliver in open pasture or range conditions, the calving areas must be dry or well drained. If many females are anticipated to deliver in a short period of time, rotation of the calving areas should be practiced. By providing clean areas or rotating pastures, the buildup of potential disease-causing agents (pathogens) will be minimized. In certain locations and seasons, shelter may need to be provided for optimal health.

It is not uncommon for cattle to go into labor after normal working hours. In certain situations, such as dystocias (difficult births), physical assistance during the parturition (calving) process is needed. Timely intervention can mean the difference between life and death of the dam and her offspring and therefore, potential revenue for the producer. Delivery equipment such as fetal calf extractors (calf pullers), obstetrical (OB) chains and snares, protective sleeves for personnel, lubricant, etc. should be clean or sterile, in good working order and easily accessible.

Experienced personnel are not always available during delivery; therefore, employees, family members and neighbors are commonly asked to observe and assist during calving. A written protocol outlining normal events during parturition and the criteria indicating the need for intervention during the delivery process will increase the chance for a successful birth. Producers should review and discuss the protocol with all personnel involved in this phase of production to alleviate potential complications or problems that may arise.

Calves are born with simple immunity against many

common diseases. Without additional protection against disease-causing agents, the chances of long-term survival or productivity are poor. Short-term passive immunity for the calf is provided by the dam's colostrum. In certain situations, neonatal (newborn) calves will not receive this protection. Therefore, as listed in the right-hand column of Table 36.1, a source of high-quality colostrum, which is the first milk containing antibodies after calving, should be available to administer to the deficient calf.

Following the approach of this chapter, the next focus should be on the event in Table 36.1, Calf born, which correlates to the time after the calf is born.

Calf Born

Records are one of the most important management tools used in evaluating the financial and productive health of commercial beef cattle enterprises. Profitable commercial beef herds need to cull nonproductive animals. Difficulty in delivering a live calf (dystocia) should be one criterion used in this process. Any assistance given in the delivery of the calf should be recorded for future evaluation of the cow. Also, the dystocia should be recorded on the bull's record. If an increased number of difficult births are associated with a particular bull, the producer may want to cull the bull.

Individual records on the neonatal calf should be started as soon after birth as possible. To create these records, the calf must be individually identified. Individually identifying newborn calves may not always be practical in every commercial operation; however, no matter which record system the producer uses, it is best to start an individual record as early in the animal's life as possible. In several instances, it is fairly easy to catch a calf that is less than 24 hours old and administer a unique identification, such as a bangle tag. This step is frequently not performed at this stage in the animal's life because it is not convenient for the producer.

The importance of colostrum and its role in the future of the calf's life from both a health standpoint and an end-product standpoint were discussed in the pre-calving section. A newborn calf vigorously nursing its dam shortly after birth will usually correlate to an adequate intake of colostrum. With first-calf heifers, the quality of colostrum is usually not as high as that of an older adult cow. Therefore, in cases where a partial failure of passive immunity transfer occurs, supplementing the newborn with high-quality colostrum may be necessary. Management changes may be needed to avoid the need for supplementation in the future.

Factors Affecting Passive Immunity

A successful cow-calf operation requires a large percentage of cows wean a live calf every year. A live calf at weaning time requires survival of the offspring from birth to weaning. Cattle that are healthy as calves, healthy as weaned stockers and remain healthy throughout finishing are more productive and generally are much more cost efficient. In addition, healthy cattle not repeatedly treated with antibiotics or other therapeutic products will have a higher

likelihood of producing a wholesome, high-quality carcass with fewer injection-site blemishes and no antibiotic or drug residue. As the percentage of cattle needing antibiotics for disease control or prevention dwindles, consumer confidence in the wholesomeness of beef should increase. As vertically integrated alliances become more popular, healthy calves that have strong natural or acquired disease immunity will be in greater demand.

Resistance to disease is greatly dependent on antibodies or immunoglobulins and can be either active or passive in origin. In active immunity, the body produces antibodies in response to infection or vaccination. Passive immunity gives temporary protection by transfer of certain immune substances from resistant individuals. An example of passive immunity is passing of antibodies from dam to calf via the colostrum. This transfer only occurs during the first 24 hours following birth, with the majority of the antibodies being absorbed in the first 12 hours of life.

At the USDA experiment station in Clay Center, Neb., Drs. Tom Wittum and Louis Perino monitored health events and growth performance in a population of range beef calves to identify associations of these factors with passive immune status. Blood samples were collected at 24 hours postpartum from 263 crossbreed calves to determine the amount of passive maternal immunity that had been obtained from colostrum. Growth performance and health events in the study population were monitored from birth to weaning and after weaning throughout the feeding period. The lowest levels of passive immunity were observed among calves that were sick or died prior to weaning. Calves with inadequate passive immunity had a 5.4 times greater risk of death prior to weaning, 6.4 times greater risk of being sick during the first 28 days of life and 3.2 times greater risk of being sick any time prior to weaning when compared to calves with adequate passive transfer. The risk of being sick in the feedlot also was three times greater for inadequate-immunity compared to adequate-immunity calves.

Passive immune status was associated indirectly with growth rates through its effects on calf health. Sickness during the first 28 days of life was associated with a 35-pound lower expected weaning weight. Respiratory disease in the feedlot resulted in a 0.09-pound lower expected average daily gain. Thus, passive immunity obtained from colostrum was an important factor determining the health of calves both pre- and post-weaning and indirectly influenced calf growth rate during the same periods.

Factors affecting the production of colostrum antibodies by the cow:

A. Genetics of the dam

Genetics of the dam may influence both the quality and the quantity of the colostrum.

Genetics may influence the shape and size of the udder, which can impact calf intake as noted below.

B. Age of the dam

Mature cows commonly produce more colostrum than first-calf heifers of similar genetic makeup. Mature cows may provide additional protection in their colostrum due to their previous disease exposure and vaccinations.

C. BCS of cows

Research in Colorado found that calves from thin cows (less than BCS 5) had lower amounts of circulating antibodies at 24 hours of age than did calves from heifers in adequate to good body condition score (BCS 5 or BCS 6) at calving (Odde, Abernathy and Greathouse).

Factors affecting the absorption of colostrum antibodies by the calf:

A. Timing of intake

Research has demonstrated absorption of the very large protein antibody molecules (also referred to as immunoglobulins) must occur in the first 24 hours of life (Besser and Gay). The intestinal lining of the baby calf undergoes changes (called intestinal closure), reducing the ability of the intestine to absorb the immunoglobulins. In fact, most absorption takes place in the first 12 hours or less. By the time the calf is six hours old, only 66% of the antibodies consumed can be absorbed. When the calf is 12 hours old, less than half of the available antibodies will be absorbed into the blood; and when the calf is 24 hours of age, intestinal closure is nearly complete. Sluggish or weak calves may take a long time to stand, and therefore a long time before looking for the teat to nurse. Anything that comprises the vigor of the baby calf can have an adverse effect on passive immunity.

B. Udder shape and size

Another factor shown to influence the transfer of passive immunity includes the shape and size of the dam's udder. Cows with large pendulous teats and/or with very low udder attachments may be difficult for the calf to locate and get the teat in its mouth to nurse.

C. Weak calves associated with difficult delivery

Calves subjected to a long, difficult delivery often are weakened and slow to rise. In addition, the respiratory acidosis resulting from the difficult birth can have an additional negative impact on the intestinal lining and its ability to absorb. This combination of advancing time and acidosis often means greatly reduced antibody absorption. Colorado State University scientists found greater concentrations of antibodies in the blood of calves born with quick, easy deliveries compared to those born after a long, difficult labor and delivery process (Odde, Abernathy and Greathouse).

D. Severe weather stress

Calves born under severe weather stress as well as those that have not bonded with the mother both have been shown to have reduced absorption capability, even if colostrum was available.

The development of lifetime identification, vertically integrated alliances and niche markets will heighten the need for calves with highly developed disease immunity. Management factors that enhance the development of the passive immunity include:

1. Provide proper replacement heifer development programs and adequate prepartum nutrition for the cow herd to ensure heifers are in a BCS 6 and cows are at least in a

- BCS 5 at calving (see chapter 20).
2. Breed heifers to bulls that sire low-birth-weight calves and cows to bulls that sire moderate-birth-weight calves to reduce the incidence of difficult births.
 3. Offer early, appropriate obstetrical assistance to heifers or cows observed in labor so the calf is not allowed to become extremely acidotic and weakened and therefore have inhibited immunoglobulin absorption or be unable to nurse the cow.
 4. Calves born to first-calf heifers that have little colostrum or baby calves too weak to nurse naturally need to be given fresh or frozen colostrum. Dr. E. R. Homersoky and associates from the University of Calgary found a significant health advantage to giving 2 quarts of first milk within the first four hours of life compared to the previously recommended six hours. This needs to be followed with 2 more quarts within 12 hours.

Other Baby Calf Procedures

During the birthing process, the umbilical cord, from which the fetus has been receiving its needed life support during gestation, is open for a short time. During this short time, bacteria can enter through the umbilicus and gain entry into the blood stream of the newborn. Most of the time, the passive immunity transfer the calf receives through its intake of colostrum will eliminate the infection. However, in some situations the infection will overwhelm the system, causing complications. In situations with overwhelming infection challenges, disinfectant such as iodine or chlorhexidine should be applied to the navels of newborn calves. Dipping navel cords should be a short-term solution. Management needs to be evaluated and appropriate actions taken to avoid or eliminate the need to perform this procedure.

If management is progressive and can proactively determine the future purpose of individual animals, castration and dehorning can be performed at this time. It is frequently more practical and efficient to perform these two procedures at branding time rather than shortly after birth. These procedures and justifications will be covered in much more detail in the next section.

Branding Time

Historically, the term branding time designated the time when young cattle were processed and a mark was made using a hot iron brand to identify the owner. Cattle producers and veterinarians still use this term to indicate the time after all calves have been born and are worked together as a group. Calves are usually 2 months to 4 months of age, but the range can vary considerably between operations and even seasons. From a health standpoint, this is an opportune time to prepare the calf for where it is going, not where it is coming from.

Stress occurs anytime cattle are handled. Too much stress can affect performance and health. Processing young calves at branding time has a major advantage of allowing the calf to return to its familiar environment, including

nursing its dam after the procedures have been completed. It is thought that returning the calf to its familiar environment minimizes some of the stress of handling, allowing the calf to perform more closely to its genetic potential, hence, increase production.

If individual identification has not already been performed, it must be done at this time. Even if this is the first opportunity to individually identify animals, records should have already been initiated on each calf through the dam's records. Individual records should be started or updated, depending on previous identification.

Bull calves to be harvested for meat can be castrated at this time. From both a production and an economic standpoint, performing this health procedure makes sense. From the production side of this equation, studies have demonstrated that implanted steers nursing cows can gain the same as bull calves nursing cows (Baker, et al.). From the economic side of this equation, steers are more valuable commercially at marketing times than are bulls of equal quality.

Four issues will be commented on regarding horned cattle in this section. Commercial producers should be aware of all four issues and the effect each has on production. The first involves behavioral characteristics of cattle. Cattle use their horns offensively in feedlot situations to gain advantages at the feed bunks and in establishing social order. When cattle use their horns to butt other cattle, muscle bruising occurs. Bruises have to be trimmed out at harvest, thus decreasing the value of the carcass. In the 2016 National Beef Quality Audit (NBQA-2016), bruises declined compared to NBQA-2011, but bruises on the round, loin, rib and chuck have significantly increased compared to NBQA-2011. Realistically, bruises cannot be totally eliminated; however, dehorning can eliminate bruises caused by horns.

Another issue concerns animal well-being. Cowboy heritage has been we do the things because of tradition. Modern operations are evolving from this type of philosophy because of the influence of the consumer. Consumers view animals as conscious beings that should be treated and cared for as such. The consumers want to be assured the product they consume has been produced with consideration to the well-being of the animal. Therefore, producers must be aware of these concerns and produce a product that meets the demand. Consumers view the well-being of dehorned cows housed with horned cattle may be compromised.

The third issue regarding horns pertains to safety of personnel handling and caring for the cattle. Injuries to producers, family members and employees can be serious, and thus, affect the efficiency of the operation. While dehorning will not eliminate all potential injuries, it will remove one of the causes of injury.

Finally, cattle with horns frequently are tipped or completely dehorned upon arrival at feedlots for the reasons mentioned above. In some situations, the sinus cavity extends into the base of the horn. When the animal is dehorned or closely tipped, the sinus cavity may be exposed. Infection can develop in this open sinus cavity. Successful treatment is very time consuming and expensive. Cattle with sinus infections are less productive, decreasing the potential

return to the producer.

Horns have no economic value commercially in the production of beef, so all horned animals should be dehorned at branding time when there are fewer complications and less stress.

One final thought on castration and dehorning, both of these procedures are painful. With consumers concerned about the welfare of animals, it is becoming more common to use local anesthesia and pain control when performing these procedures. Producers need to consult with their veterinarian about proper drug selections and amounts to prevent pain when castrating or dehorning cattle.

Veterinarians commonly recommend producers take advantage of the opportunity at branding time to start priming the animal's immune system against common diseases, for example, clostridial disease. Vaccination programs begun at branding time can reduce disease and death losses. *Clostridium* spp. are bacteria found in protective spores in the environment and can cause disease and death in cattle. *Clostridium* spp. have different predilection sites in the body of the animal. The most familiar of these clostridial diseases is blackleg, which causes severe muscle damage and death of tissue. The products available on the market are in the form of bacterin/toxoids (vaccines) and commonly include components or antigens against seven or eight different clostridial diseases. Hence, the vaccines are commonly referred to as a 7- or 8-way clostridial or blackleg shots. The choice of a 7- or 8-way vaccination will depend upon the geographic location of the herd and the amount and type of risk in the population. A local veterinarian will be most familiar with the needs in specific geographical locations and can make appropriate recommendations.

Another consideration at branding time is tetanus prevention. The causative organism of tetanus is *Clostridium tetani*. Tetanus is not a common entity in cattle. The disease may manifest itself in situations with devitalized tissue, contaminated wounds or surgical sites and/or an overwhelming challenge dose of the organism from the environment or contaminated equipment. Administration of tetanus prevention may be needed in these situations and should be included in the health program. Also, cattle producers that choose banding as the method of castration will need tetanus prevention.

The prevalence of disease will vary from one herd to another. In a recent national survey, respiratory disease was a commonly known cause of loss of unweaned beef calves, second only to weather-related loss USDA National Animal Health Monitoring System (NAHMS). The most common viruses involved in the bovine respiratory disease (BRD) complex include infectious bovine rhinotracheitis virus (IBRV, red nose virus), bovine viral diarrhoea virus (BVDV), parainfluenza Type 3 virus (PI3V) and bovine respiratory syncytial virus (BRSV). Several vaccines for these diseases are available. In herds that experience a high incidence of BRD with an underlying viral component or herds at high risk of acquiring BRD, vaccination at this time may be beneficial.

Leptospirosis, commonly referred to as leptos, is a spirochete organism that can cause anemia and death loss in calves. The

incidence of this disease can vary greatly within a small geographic area as well as from herd to herd. Different serovars or species of *Leptospira* infect calves. The veterinarian will be most familiar with which serovar(s) is/are important and the specific program that best benefits each herd.

Pinkeye is associated with the bacterium *Moraxella bovis*. Recent findings and veterinarians' experiences suggest there are multiple agents involved in pinkeye infection. Experience and field reports pertaining to the efficacy of including a pinkeye vaccination as part of a herd health program are ambiguous. If pinkeye is included in a vaccination program, producers must have a thorough understanding of all aspects of the pinkeye disease process.

Internal and/or external parasite control may be needed at branding time. A sound and economical parasite control program depends upon many factors, including the life cycle, source of nutrition and management. Recommended parasite control programs also vary depending on location and season (chapters 37 and 38).

Weaning

Weaning refers to the time when the calves are removed from their dams. Management of commercial beef cow-calf operations is extremely variable. The age at which a beef calf is weaned depends upon several factors including the producer's goals, financial aspects of the business, available feedstuffs, labor and facilities. In the U.S., beef calves are commonly weaned between 5 months and 9 months of age. The majority of weaned beef calves will be commingled into larger groups for stocker (grazing), backgrounding or preconditioning and finishing phases of production.

Weaning and commingling can be very stressful events in a calf's life – mentally, physiologically and physically. These stressors can increase the animals' susceptibility to disease by suppressing its immune system, and hence immune response to infectious agents. Exposure to disease-causing agents, called pathogens, can occur with commingling of cattle. The source of this exposure to infectious agents comes from normally appearing animals that are carriers of disease or from animals incubating the agents and have not had enough time to exhibit any clinical signs of illness.

Experience and university studies have concluded healthy animals perform better than animals that have been ill. Vaccines can reduce illness. When used as a management tool, vaccines, bacterins and toxoids can improve the health of the animal, allowing the individual to perform more closely to its genetic potential. Several good-quality products are available. While vaccinations are a useful tool, they do not prevent all sickness. Vaccinated animals can still get sick. Vaccinations do not take the place of sound management.

Prior to weaning, producers should determine which marketing option is best for the individual business. Recently, producer interest and participation in source-verified and/or process-verified special marketing sales has increased. Several state associations and individual livestock auction markets provide producers with marketing options by sponsoring special sales. Health guidelines have

Replacement Heifers

been developed for each program and should be followed accordingly. These special sales provide buyers with a known health background of the cattle, allowing buyers to better manage risk in their operations. Producers should develop the mindset of preparing the animal for where it is going, not where it is coming from.

More in-depth information about the specific diseases and reasons for vaccinating cattle were provided in the previous section. At weaning, calves should be vaccinated against the clostridial diseases and respiratory viruses (IBRV, BVDV, PI3V, BRSV). Questions may be, “Which is the best brand of vaccine to use?” and “Should a killed or a modified live viral (MLV) vaccine be used?” There are so many variables concerning the environment, management and resource availability that there is no medical or scientific basis for a blanket recommendation for weaned beef calves. The best and most sound advice is to consult a veterinarian about the brands and types of products to be used.

Internal and/or external parasite control may be needed at this time. A sound and economical control program depends upon many factors. Please refer to chapters 37 and 38 for specific guidelines.

Brucellosis in cattle, also commonly known as bangs, is an abortion disease caused primarily by *Brucella abortus*. The bacteria can also affect humans, bison, goats, sheep and horses. All states in the U.S. are considered free from cattle brucellosis by the USDA. However, the presence of free-ranging bison and elk in the Greater Yellowstone Area (GYA), Yellowstone National Park and Grand Teton National Park and the area around those parks, threatens the brucellosis free-status of the surrounding states. The presence of brucellosis in free-ranging bison and elk in the GYA threatens the brucellosis status of the surrounding states and the health of their cattle and domestic bison herds, which are free of the disease. From a disease standpoint, Oklahoma cattle producers do not need to vaccinate their cattle for brucellosis. However, from a marketing standpoint, producers may want to consider vaccinating their heifers. Heifers vaccinated against brucellosis (official calfhood vaccination, OCV) may have a marketing advantage compared to females not vaccinated, since certain states still require brucellosis vaccination. Producers should evaluate their marketing options and replacement stock requirements to decide if vaccinating heifers against brucellosis has advantages. Currently in Oklahoma, heifers may be vaccinated against brucellosis between 4 months and 1 year of age. An opportune time to vaccinate against brucellosis is at weaning time, when most heifers will be between 5 months and 9 months of age. Age restrictions vary between states, and this particular vaccination must be administered by a USDA-accredited veterinarian.

Depending on prevalence of leptospirosis in certain areas, a lept vaccine may need to be given at weaning. Producers need to visit with their veterinarian about adding this vaccine to their vaccination program.

Pinkeye vaccinations may be warranted in certain herds or situations. Again, all the agents need to be identified prior to implementing a pinkeye vaccination program.

The replacement heifers’ section refers to the time prior to breeding, when females chosen as replacement animals receive their final processing before joining the main herd. The future productivity of any commercial cow-calf herd depends on the quality of its replacements. Producers must view these replacements as contributors to the overall genetic improvement of the herd. These animals have tremendous impact on the future of the business on the production and economic standpoints. As such, these animals should be given the best chance from a health standpoint to start their productive careers in the herd.

The following prebreeding recommendations are for replacement heifers ranging in age from 13 months to 16 months. Individual identification should have already been performed and records started.

In most situations, the heifers should have been vaccinated against the common clostridial diseases. However, in instances where heifers have not received appropriate vaccinations against clostridial diseases (7- or 8-way) or in situations where an overwhelming challenge of these agents will likely occur, a booster vaccination is recommended.

As discussed above, it is impossible to make a blanket recommendation for a specific brand or type of vaccine. However, most professionals recommend a MLV vaccine including IBRV, PI3V, BVDV and BRSV be administered to replacement heifers at this time. The vaccinations should be administered at least 30 days prior to breeding.

As a replacement animal, the ability to cycle, conceive and carry a viable calf to term is critically important. Campylobacteriosis, also known as vibriosis, is a bacteria causing infertility. Vibriosis is transmitted sexually (venereally) and causes death of the developing fetus (early embryonic death). The first hint animals may be suffering from vibriosis is females coming back into estrus (heat) at abnormal times, such as cycling at 33 days to 38 days, instead of the normal 21-day intervals. Vibriosis is not a universal problem. The incidence of the disease can vary considerably. In problem areas, vaccination prior to breeding is another important management tool.

Leptospirosis was mentioned earlier in the branding time section as causing anemia and death loss in calves. It causes these problems, as well as reproductive problems in females, including replacement heifers. The disease generally causes abortions and infertility later in gestation. Herds experiencing a leptospirosis reproductive outbreak frequently report an unusual number of open cows after the calving season has finished. At the normal time of processing the adult herd, the cows were pregnant but did not deliver a calf. In areas experiencing a lot of reproductive problems caused by leptospirosis, vaccinations will be needed to minimize the loss due to this bacteria. It generally is recommended to include the leptospirosis vaccinations in the prebreeding program.

Internal and/or external parasite control may be needed at this time. A sound and economical control program depends upon many factors. Please refer to chapters 37 and 38 for specific guidelines.

Replacement heifers that have been managed following the general recommendations outlined above should have a good healthy start to their reproductive careers.

Adult Cow Herd and Bulls

Herd sires and the adult cow herd have similar needs from a health standpoint. The adult cow herd is generally processed once or twice per year. The primary health concern for the adult beef cow is reproductive diseases. Viral diseases that can cause reproductive problems included IBR and BVDV. Leptospirosis is a bacterium that can cause abortion and infertility. The incidence of vibriosis is very location dependent. In herds experiencing outbreaks of vibriosis, booster vaccination prior to breeding will be necessary. If possible, all of these vaccinations should be administered 30 days prior to turning the bull into the herd. If this is not possible, the beef cow herd should be vaccinated annually for these diseases.

Under normal conditions, any of the disease syndromes caused by clostridial pathogens such as blackleg are generally not a problem in adult cattle. Also, adult beef cows rarely experience clinical respiratory disease associated with PI3 or BRSV. From the individual cow's health, annual revaccination against these PI3, BRSV and blackleg is not necessary. However, vaccinations with PI3, BRSV and blackleg may benefit passive immunity to the calf and in those rare instances where herds may suffer from these pathogens.

Producers may have questions such as "Which is the best brand of vaccine to use?" and/or "Should a killed or a modified live viral vaccine be used?" Modified live vaccines must be used with caution with pregnant cattle. The best recommendation for producers is to work closely with their veterinarian and customize the program to meet the individual herd needs.

Anaplasmosis is a blood parasite. The parasite attaches to the animal's red blood cells (RBC). The animal's immune system recognizes the RBC with anaplasma parasites as abnormal and removes the red cells from circulation. The removal of RBC can result in a significant anemia. Clinical signs associated with anaplasmosis are age related and include fever, loss of appetite, depression, weight loss, abortion and death. Animals less than 1 year of age rarely, if ever, exhibit clinical signs because they have a very efficient bone marrow system to replace the damaged red cells. Animals between 1 year and 2 years of age may show clinical signs; however, death loss is unusual. Cattle more than 2 years of age that have not been previously immunized against the disease may exhibit severe clinical signs and may die. Transfer of blood during routine health management procedures, such as through contaminated vaccination needles or dehorning equipment, must be avoided. Consult with a veterinarian regarding the availability and use of vaccines available for anaplasmosis in your herd.

The parasite control program for the adult cow herd is based upon the type of parasites, challenges and goals of strategic deworming programs (chapters 37 and 38).

Many producers believe herd bulls do not need to be

included in any type of health program. Neglecting the herd sire can be a very costly mistake. Bulls should receive basically the same vaccination program as the cow, which includes IBRV, BVDV and leptospirosis vaccinations. For the same reasons as discussed for adult cows, in rare instances, a PI3V, BRSV and vibriosis vaccination may be included.

Another important aspect of a sound health program is a breeding soundness examination on the bull prior to exposing him to the females. The breeding soundness examination should include examination of the reproductive anatomy, sperm motility, sperm morphology (physical characteristics), locomotion, eyesight and body condition score (chapter 20). A bull that passes the breeding soundness examination appears to be sound for breeding purposes as best as science can determine at that point in time. It is recommended the exam be performed prior to turning the animal in with the females. If a bull fails the exam, producers need enough time to replace the animal with a sound bull for the breeding season.

Sixty Days Pre-Calving, All Females

The last segment focuses on pregnant females prior to calving. If management is adequate throughout the year, females should not need any vaccinations within 60 days before the calving season begins. In some instances, pregnant females may need a scours vaccination in the hopes of being able to pass on some protection through their colostrum to their newborn calf. Common components of a scour vaccine are rotavirus, coronavirus, *Escherichia coli*, and *Clostridium perfringens* type C. If a scours vaccination is needed as part of the herd health program, producers should investigate the management of that herd very closely. In most instances, changes in management including calving environment, nutrition, etc. will correct any deficiencies, making vaccination unnecessary.

Conclusion

Evaluating the economic efficiency of herd health management procedures requires good recordkeeping. An in depth understanding of the circumstances affecting health and production are essential. In a closed herd for instance, the producer may get minimal benefit from a number of vaccines offered because animals are seldom exposed to the disease causing agents. At the other extreme, herds with frequent movement of animals may get minimal benefit from available vaccines, due to the lag time between vaccination and exposure.

It is hoped this chapter can be used as a template for producers and their veterinarians when designing a commercial cow-calf herd health plan.

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