Herd Health Programs in Semi-Arid Regions of North America

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Introduction

Two guiding principles must be followed in establishing any herd health program. First, the program should be specifically tailored for the individual producer; and second, cost effectiveness must be the program's key objective. The program, in other words, should be designed to encompass a producer's goals in a manner that financial returns are greater than costs incurred from implementing change. To successfully develop such programs, veterinarians must be knowledgeable and experienced. Otherwise, they will not be able to effectively influence management decisions. Such factors as herd size and procedures for economically handling various numbers of cattle are major variables in developing and assessing herd health programs. Therefore, knowledge of management practices, nutritional regimens, breeding programs, marketing and finance, as well as of disease entities in the area, are needed to develop a herd health program.

Herd health programs are successful only when they meet the needs of cattle owners. Questions of what individual cattlemen want to accomplish must be answered in detail. You must satisfy yourself that a producer has an aversion to losses from diseases that can be prevented. Prevention of waste is one of the essential goals of programmed animal health. In order to reduce losses, livestock owners must be willing to make reasonable management changes. Owners who are motivated to change because they have a genuine interest in their cattle and the economic advantage that good management imparts are the catalysts to successful herd health systems.

In areas of low annual rainfall, cattle production revolves around limited water supply and seasons of inadequate forage. Outlined in this presentation are veterinary procedures utilized in areas of North America where the total annual precipitation ranges from 28 cm. to 30 cm. While procedures in this presentation are applicable to many different situations, remember that adjustments must be made for each individual production unit. For example, ranches that irrigate pastures to increase concentration of cattle probably need to incorporate procedures for controlling severe parasite burdens.

Vaccination Methods

To structure a vaccination program that meets producers' needs, veterinarians must have knowledge of cattle population management, be familiar with diseases present in the geographic area, and possess a working understanding of local management practices. The vaccination program should specify type of vaccine, frequency of administration, route of administration, and time of year to vaccinate. Development of a vaccination program must be on a herd-by-herd basis.

All personnel working with the cattle should be informed about the reasons for vaccination and manner of administering each product. It is equally important that they be reminded of the individual variance of response that can occur within a population. All personnel should also be advised about procedures for adding new animals to the herd. Such instruction helps assure the proper handling of sick or naive animals. I cannot overemphasize the importance of these procedures, because I believe a key cause of vaccination failure is management's reluctance to address the challenges of introducing new additions to the herd.

Outlined here by season of the year is our basic herd health vaccination program:

- Spring (prior to the breeding season)
  - Calves (about 6 weeks of age)
    - —Multivalen clostridius vaccination
    - —Anabolic implant
    - —Castration of bull calves
  - Cows (all females to be bred)
    - —IBR/BVD/Leptospirosis/Vibriosis vaccination
  - Bulls (of breeding age)
    - —IBR/BVD/Leptospirosis/Vibriosis vaccination
- Fall (pregnancy exams, administration of anthelmintic and ecto-parasiticide):
  - Pregnant Replacement Heifers
    - —Rota-Corona/E. coli/Cl. perfringens C&D vaccination
  - Heifer Calves for Replacement
    - —Brucellosis/IBR/BVD. Leptospirosis/Vibriosis vaccination

—Multivalent Clostridium vaccination

Feeder Cattle

—IBR/BVD/Clostridum vaccination

—Anabolic implant

Winter

Cows (immediately prior to calving)

—Rota-Corona/*E. coli*/Cl. perfringens C&D vaccination

To meet specific problems within a given herd or geographic area, veterinarians can add appropriate vaccinations or other preventive procedure. For example, many veterinarians administer *Moraxella bovis* bacterin and insert insecticide ear tags as aids to reducing the incidence of pinkeye. Others administer *Haemophilus somnus* bacterin in herds where the agent is a common pathogen.

Unfortunately, we do not yet possess immunogens for several diseases that are ubiquitous in our cattle population. Included in this category are Blue Tongue, Bovine Respiratory Syncytial Virus infection, Pasteurellosis, and *Clostridium pyogenes* infection. These are economically significant diseases, and good vaccine to prevent them are sorely needed. Another significant disease is trichomoniasis, which causes severe reproductive losses in many states of North America. Clearly, research is needed in this area to determine whether cattle can be effectively immunized.

The fundamental goal of an adequate vaccination program is the prevention of ubiquitous and endemic diseases. An often overlooked goal is the production of cattle that meet all legal requirements for the interstate shipment and marketing of livestock. Diseases like brucellosis that can restrict freedom of movement or marketing must be eliminated to prevent an economic loss.

Inapparent Disease

The livestock industry is just beginning to recognize that Bovine Virus Diarrhea (BVD) and Blue Tongue (BT) are ubiquitous in our cattle populations. Usually BVD produces no clinical signs of disease in mature cows, but it does manifest itself at an insidiously low level by infecting the fetus. The virus has an affinity for undifferentiated neural cells. Infection results in a variety of conditions, including mummification, abortions, hydrops amnii, stillbirths, cerebellar hypoplasia, hydrancephally, microhydrancephally, ataxia, "dummy calves", cataracts, nystagmus, conjunctivitis, and retinal degeneration. Skeletal defects attributed to BVD include brachygnathia inferior and arthrogryposis. Some calves are born premature; others are born dysmature. Skin disorders such as partial alopecia and "rat tail" have been observed. Often calves are born with a very curly hair coat and never grow well. Because the incidence of abnormalities is low in calves within a given population (1-3%), and because infection exhibits such a panorama of conditions, only recently have we determined that BVD can play economic havoc with production. Economic damages caused by Blue Tongue are even less well defined, but we suspect that it too has significant impact on production.

Reproduction Considerations

The two *most important* criteria for economic success are that a cow produce a calf every year, and that the cow herd calve within a 60-day time frame. When I'm asked to evaluate a production unit, I begin by looking at the parity distribution within a herd. Generally speaking, the most productive cow is 5 to 8 years of age. I want to see a reasonably even age distribution. If there is a bulge at either end of the parity chart, you know there is trouble, and the magnitude of the bulge can help you determine how much of a problem you have.

This brings us to one of the major topics of the day, namely, improving reproductive performance. We know it is relatively easy upgrading the performance of a well-managed herd, and we will discuss specific methods later. But how do you improve the performance of a poorly managed herd? The task is formidable because many changes must be made all at once, including refinancing in order to correct an unbalanced parity profile. Let's look at three classes of management and compare their needs. Remember these examples are fairly typical of herds raised in semi-arid regions of North America.

Replacement Needs

Cow	Optimum Management	Average Management	Poor Management
Failed to conceive	6%	10%	17%
Aborted	1%	2%	2%
Partum Losses	4%	8%	12%
Diseased/Old Age	10%	12%	15%
Total	21%	30%	42%

In poorly managed herds—and in some herds of average management—where parity is skewed, replacement requirements exceed the availability of good replacements.

The critical question is: How many heifers do we need to keep a program going? If 20% of the cow herd must be replaced with first calf heifers, it is necessary to breed one and one half times your anticipated needs. Thus, if you need 20 heifers with calves at their side entering a 100 cow herd, you should select and breed 30 heifers.

Why so many? We all know the answers: heifers simply do not conceive as well and have more dystocia and a higher culling rate. Too often though we overlook such basic considerations, and that is one good reason why a parity profile becomes lopsided. When I see age groups bunched at either end of the curve instead of in the middle, I know I am looking at an operation that is in financial trouble or is soon going to be. Unfortunately, the average or poor manager with his age groups bunched cannot afford to raise his own replacements. In fact, replacement needs or poorly managed herds are so extensive that it is impossible to meet them with the herd's own heifers. Managers of these herds do not have the option of being selective. Refinancing and development of management skills must precede a herd health program in these marginal operations.

Typically, we breed our heifers to calve at 23 months of age. Our goal is to have them calve before the balance of the cow herd so they will have extra time to prepare for the next breeding season. This is done because in dry rangeland situations, our most pronounced infertility problem usually occurs during the second breeding season. An extra month gives the first calf heifer time to gain in body condition, so that she comes in estrus along with the mature cow herd. Heifers are managed as a separate entity through the breeding season and again 30 days prior to calving.

Bull selection is an important factor in reducing the number of dystocias in beef heifers. Bulls used to breed heifers are selected for small birthweights. In the last ten years, Texas longhorn bulls have beome very popular because the birthweight of these calves is low, and the incidence of dystocias in heifers has been greatly reduced whereever they are used.

Breeding bulls are usually purchased from purebreed breeders. We require tuberculosis and brucellosis testing. In addition, we conduct serological evaluations for BVD, BT, leptospirosis, and anaplasmosis. All bulls in the herd are vaccinated annually for IBR, BVD, leptospirosis, and vibriosis. We recommend an annual semen and breeding soundness exam. Our overall cull rate in bulls averages about 10%. It is very important to remember that highly fertile bulls increase first service conception rates, and that fact alone makes bull evaluation an economically sound practice. In areas where trichomoniasis is a problem, bulls are cultured and if necessary treated.

Often reproduction is a function of nutritional status. We are especially attentive to the ration our cows receive 30 days prior to calving and during the early lactation period. Adequate levels of protein and carbohydrates during this time help assure that the cow herd will cycle and breed back during a 60-day period. An economic evaluation comparing additional feed costs versus conception rate provides the producer with the necessary information to meet his goals. Macro- and micro-mineral needs vary by geographical area, so ready access to these minerals should be provided.

Management at calving is important because the neonatal death loss during this time can be quite high. We have found that fewer disease problems occur when herds are maintained at a considerable distance from the area in which they will eventually calve. Dissemination of cow/calf pairs one or two days following parturition also reduces death loss. Because we supplement feed at this time, we prefer to maintain cow/calf pairs in groups of one hundred or less. By doing so, we effectively reduce disease morbidity and mortality. We stress the importance of timely and adequate consumption of colostrum. Experience has shown that birth weights and seasonal variation in colostral uptake play a key role in neonatal survival.

Pregnancy determinations are routinely conducted on an annual basis. Testing takes place about 60 to 90 days following removal of the breeding bulls. Because prolonged calving seasons result in lighter weaning weights and lowered profits, our goal is to calve all cows in a 60-day time frame. Pregnant cows that fall within this 60-day period are identified as early or late in gestation so that they can be managed more efficiently at calving time. All open cows and cows with unacceptable pregnancies are removed from the herd. At pregnancy testing, we also examine teeth, eyes, feet, and udders. Any noticeable defect is cause for removal from the herd. Heifers are examined, and any animal showing potential for dystocia is culled. Culled heifers are aborted and shipped to a feedlot.

Records—An Overview

Records are an essential part of any herd health program. They should include disease morbidity and mortality, vaccination history and costs, pregnancy rates, birth and weaning weights. Because our operators are producers first and foremost, and not record keepers, we prefer concise, useable systems. Records are only of value if an identity system is adequate. Our identity system includes ownership brands, herd identity by color of ear tag and individual identity by numbered ear tag. Records provide us with growth rates, milking indexes, conversion comparisons, reproductive performance, and death loss by cause. All these determinants can provide standards for selection. The value of a management change can also be determined when the change is measured against response over time.

Annual review of health management procedures should be conducted. Assessment of response and evaluation of economic values should be the major consideration in adjusting a program. The evaluations should be thorough and committed to writing. Review of the program coupled with an educational update on new procedures often provides managers with motivation for maintaining high herd health standards.

There are several areas of management where new changes might be accomplished. Exposing cows to bulls at calving may shorten total days to estrus and could be readily accomplished in small herds. Recent studies indicate that medium-sized crossbred cows with medium rather than maximum milk production most efficiently convert feed energy to retail meat. Maintenance requirements for high milk production may overshadow the additional weight gains in calves nursing these dams. More emphasis could also be placed on selection for earlier calving within the desired 60-day time frame. Finally, greater emphasis could be placed on nutrition as it relates to reproduction.

In the future, a major change in reproduction management will be a dramatic expansion in the area of syncronizing estrus. This will facilitate ova transfer and help improve genetic potential for disease resistance and growth. Grouping the calving interval, improving heifer management, and learning how to reliably determine sex should result in a strong demand for estrus synchronization. Small operations will utilize synchronization to take advantage of the genetic benefits of A.I. Large operations will synchronize and artificially inseminate for very selective reasons such as length of gestation and sex determination.

Conclusion

Herd health management in semi-arid regions must include disease prevention, diagnosis, therapy, education, nutrition, and reproduction. Change is implemented by constant monitoring of reliable records which provide information needed to adjust the program. Vaccinations coupled with adequate nutrition remain the essential ingredients in our herd health programs.

Paper presented at the XIIIth World Congress on Cattle Diseases, Durban, S. Africa, Sept. 17-21, 1984.

Abstracts

Post mortem studies on infertile buffalo bulls: Anatomical and microbiological findings

M. Ahmad, M. Latif, M. Ahmad, I. H. Khan, N. Ahmad, M. Anzar
Veterinary Record (1985) 117, 104-109

Twenty-two buffalo bulls suffering from three different types of infertility were slaughtered and used for this study. Except for the reproductive system, no signs of localised or generalised disease were observed. Microbiological investigations were negative for brucellosis, vibriosis, mycoplasma and other non-specific microorganisms. Nine bulls with type 1 infertility had low bodyweight and underdevelopment of testes, accessory sex glands and endocrine glands. This picture suggests a total dysfunction of the pituitary-growth-gonadal axis. One bull of this type also showed bilateral epididymitis. Four out of 11 bulls with type 2 infertility had low bodyweights and most suffered from underdevelopment of testes, accessory sex glands and endocrine glands. Six bulls of this type had lesions of either epididymitis or orchitis or both. Two of these animals showed adhesions of periorchitis. One also showed seminal vesiculitis. In two bulls with type 3 infertility, bodyweights, reproductive organs and endocrine glands were normal. In later life, they yielded poor quality semen. Semen samples collected a few months before slaughter from nine bulls with type 2 and type 3 infertility were of poor quality and had higher percentages of abnormal spermatozoa in most cases.

Vaccination of cows with clostridial antigens and passive transfer of clostridial antibodies from bovine colostrum to lambs

M. J. Clarkson, W. B. Faull, and J. B. Kerry
Veterinary Record (1985) 116, 467-469

Two Friesian cows were used to attempt to produce colostrum containing a high concentration of colostridial antibodies which could be fed to newborn lambs in order to passivly transfer immunity to diseases caused by clostridia. One cow was given a commercial multicomponent clostridial sheep vaccine in two successive pregnancies and the second cow in one pregnancy. The first cow produced a low concentration of epsilon antitoxin *(Clostridium perfringens,* type D) in its blood and colostrum after the first course of three injections of vaccine. A higher concentration was produced by cow 2 after a course of six injections and by cow 1 after a further course of four injections in its next pregnancy. Two hundred ml of colostrum from cow 1 (after the second course of vaccine) was given to 12 newborn colostrum-deprived lambs. All showed a high concentration of antitoxin 48 hours later. The lambs were actively immunised by injections of the same clostridial vaccine at three and nine weeks or six and 12 weeks old and all produced sufficient antitoxin to protect up to slaughter at 24 weeks. It is concluded that colostrum from cows vaccinated with sheep clostridial antigens can be fed to protect lambs passively.

Veterinary Anesthesia, 2nd ed.

This is the second edition of the standard books on animal anesthesia. All chapters have been revised and many new references have been added to give readers the most timely and comprehensive text on animal anesthesia available today. Responding to the most recent trends in veterinary anesthesia, the authors have updated all material, particularly information on anesthetic techniques, facilities and equipment, anesthetic narcotics and their dosages, durations and physiological effects; and administration and monitoring methods. Numerous illustrations and charts enhance the book's usefulness as a valuable reference source.

By William V. Lumb, D.V.M., Ph.D., Colorado State University College of Veterinary Medicine and Biomedical Sciences. Fort Collins, Colorado; and E. Wynn Jones, M.R.C.V.S., Ph.D., Mississippi State University College of Veterinary Medicine, Mississippi State, Mississippi. 693 pp. (7 x 10), 302 llus. (including 3 in color), tables, 1984, $69.50. (Canada $92.50)

PRACTICE TIP

To keep a plastic OB sleeve up, fasten a garter "snap" to each end of a 35 to 40″ elastic (½ to 3″ wide) and then clip to sleeve. It works really well to keep the sleeve up and it slips right in your pocket or grip. It's a lot less expensive than hemostats.

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