Herd Health Planning:
A 9-Step Process

NCBA Cattlemen's College
January 31, 2007
Nashville, TN

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Herd health planning is a subject that is certainly not new. However, after decades of discussing the need for comprehensive herd health programs, many beef cow operations have not gone through the steps necessary to look at the health goals of their operation and develop a tangible document that summarizes the planned herd health activities on an annual basis. There are many reasons why it is important to not only go through the process of protocol development but to also put it in written format.

A health management calendar can be easily posted, possibly laminated, and serve as a handy reminder of scheduled activities. A written summary of the year's herd health activities can serve as an excellent planning tool and reminder system to assure that the right products are purchased and used at the right time. When this planning process is performed with your veterinarian, there is tremendous opportunity for improved communication and understanding of the specific health needs of the individual operation. Improving the veterinarian's knowledge of clients' individual herd events allows for better coordination, especially when services such as pregnancy examination and breeding soundness examinations are to be performed.

This planning process serves as an educational tool by pointing out opportunities for potential management improvements. Following are examples of questions that may arise in this process. Could there be potential for improving reproductive performance by enhanced product selection and moving cow vaccinations from the fall to spring, prior to the breeding season? If this step were taken, could a springtime deworming program be initiated simultaneously to provide a more strategic approach to control of internal parasites? Are some handling "events" based on tradition, rather than optimizing animal health inputs?

High profit, low cost producers are adept at constantly improving efficiency, while simultaneously decreasing overall costs. A herd health planning program is essential for improving efficiency and decreasing costs. The planning process helps assure that the most cost-effective products are ordered at the best possible price and available at the right time. Planning the entire years' animal health needs may result in considerable cost savings by entering into yearly contractual arrangements with animal health suppliers.

Planning a herd health program that fits a unique operation is becoming increasingly more challenging. A quick look at the latest Compendium of Veterinary Products shows there are over 400 commercial beef cattle vaccines currently available from which to choose. The various combinations available for single injection and the combining of various products using multiple injections present a mind-boggling array of possibilities. How do we take the information provided on package inserts, the marketing

hype sometimes associated with these products and the feasibility of practical application in the field to build a simple, yet comprehensive program that is cost-effective? The answer lies in working closely with your veterinarian and setting aside some time for planning and documentation.

Following is a nine step process for developing a comprehensive herd health program, summarized in a one-page calendar format (Figure 1):

Step 1. Work with your local cattle-oriented veterinarian!

In the National Animal Health Monitoring System (NAHMS) Beef '97 Report, nearly two-thirds (60.8%) of all producers indicated that the veterinarian was a "very important" source of information for the cow/calf operation. Despite this obvious level of trust and respect, too little time is spent with veterinary practitioners specifically developing written herd health plans. Scheduling a time with your cattle-oriented veterinarian to develop a health plan that is tailored for your unique operation could be a very good investment. This plan may be the first step in development of a consulting relationship with your veterinarian that focuses on preventive health as opposed to crisis management.

Step 2. Determine the optimal time of the year for calving/breeding seasons for your operation.

Many calving/breeding season(s) for ranches are "etched in stone." However, periodically re-evaluating this time period is worthwhile. Calves begin to depend more on grass as part of their diet at about 90 days of age. One strategy is timing the birth of calves so the quantity of high-quality grazing coincides with calves' shift towards increased grass intake (December – February calving). Another strategy would be to have cows calve whenever they are naturally in the best body condition to facilitate maintenance of condition for lactation and rebreeding (April-May calving). Still another one of many strategies would be to calve in the fall to take advantage of traditionally higher calf prices in late spring/early summer. All of these examples have advantages and disadvantages. Careful analysis of management and forage resources at a specific operation is required to calve in the optimal time period for each unique operation. Circumstances that favor one season over another may change over time. The reasons for breeding/calving at certain time periods should be based on the ultimate goals of the operation. As an example, traditional calving times that were originally based primarily on avoiding screwworms (over 50 years ago) may need to be re-evaluated. Since everything in a herd health planning program revolves around the breeding season, occasional justification and consideration of alternatives may be beneficial.

Step 3. Determine the optimal length for your calving/breeding seasons.

Optimal length of breeding seasons is dictated by operation goals, management resources, forage resources, geography, breed and other factors. A short, controlled breeding season not only allows for improved uniformity, marketability and concentration of labor inputs, but allows for positioning of animal health inputs for maximum effect. The positive herd effect of reproductive vaccines, for example, is partially negated when cows are vaccinated in widely varying stages of gestation or lactation. Blanket recommendations for short, controlled breeding seasons (60 days in

cows, 45 days in heifers) without consideration of the nutritional resources and management capabilities of the operation are ill-advised. Management conditions resulting in long postpartum intervals may produce more net income with more extended breeding seasons. Nevertheless, whenever management and resources are compatible, net income and responses to scheduled herd health inputs are optimized with short, controlled breeding seasons.

Step 4. Become more knowledgeable about the specific diseases/parasites that are economically significant in your area.

Your veterinarian is an excellent source for information about the diseases and parasites that are economically significant in a specific geographic region. A better understanding of how these diseases affect animal populations allows for development of disease control programs that incorporate appropriate biosecurity and health management practices.

Effective vaccination of all breeding animals against IBR, BVD, Leptospirosis and Campylobacter (Vibrio) should be routine throughout the United States. Other diseases should be considered based on geography, biosecurity practices and other factors.

Following is a brief review of some of the common diseases causing reproductive losses in beef cattle for which proven vaccines are available.

Infectious Bovine Rhinotracheitis (IBR)

Though most known for its role in bovine respiratory disease (BRD), IBR remains one of the most important causes of abortion and reproductive losses in cattle. Abortions can occur at any time, but IBR is most commonly diagnosed during the last half of gestation. Abortions occur weeks after infection and aborted fetuses tend to decompose prior to expulsion, thus reducing accurate diagnosis of positive cases. IBR virus has been shown to cause infertility in heifers and temporary damage to the ovary. IBR is a herpes virus and becomes hidden (latent) in nervous tissue after the disease subsides. The virus reactivates during times of stress. Cattle latently infected with IBR exhibit no clinical signs during reactivation, but can spread the virus to susceptible animals. Modified live virus (MLV) vaccines administered to the entire cow herd are the most effective products for IBR control. Label recommendations should be closely followed, since modified live IBR vaccines may cause abortions in pregnant animals.

Bovine Viral Diarrhea (BVD)

BVD virus can cause abortions, birth defects, stillbirths, undersized and/or weak calves. Additionally, this virus suppresses the immune system, allowing other infectious diseases to occur. Cow herd production and reproduction losses from BVD are most severe when BVD-persistent infection (BVD-PI) is present in the cattle population. PI calves are created when the fetus is exposed to the most common form of BVD virus (non-cytopathic) during the first four months of pregnancy. In the first four months, fetuses have an underdeveloped immune system which is incapable of recognizing BVD virus as a foreign agent. The BVD-PI condition remains with the animal until death. Many BVD-PI animals die during the first year of life, but a small percentage survive to reproduce and continue the cycle of herd infection. Throughout their life, PI cattle will

secrete large amounts of virus -- up to 1,000-fold more virus than acutely infected animals will shed. The only way to effectively control BVD is to incorporate appropriate control measures, including vaccination, to prevent viremia (virus in blood) and keep the virus from reaching the fetus, thus preventing birth of BVD-PI calves. This is best accomplished with an effective pre-breeding BVD (Types 1 and 2) vaccination program and by eliminating exposure to BVD virus, particularly BVD-PI animals, during the critical first four months of pregnancy.

Campylobacter (Vibrio)

This is a common venereal disease of cattle. Infection of the female is temporary and may manifest as infertility or occasionally, abortion. Males, especially older animals, are chronically infected, possibly for life. Very little new information has been published about Vibrio in the last twenty years. Nevertheless, this organism continues to interfere with optimum reproductive rates and remains a potential source of economic loss throughout much of the U.S. Effective vaccines are available which provide good protection for both bulls and females. There are even reports with one product of clearing infection in cows and bulls by vaccinating in the face of an outbreak. The mechanism for clearing infection is poorly understood by immunologists.

Leptospirosis

Leptospirosis is a bacterial disease which affects animals and man. It can cause abortions, embryonic death, stillbirths, infertility and loss of milk production. The most common cause of leptospirosis in the United States is *Lepto hardjo-bovis*. This type of hardjo is antigenically different from the hardjo-prajitno identified in Europe and currently used in most combination leptospirosis vaccines in the United States.

Cattle are carriers (maintenance hosts) for *hardjo-bovis*, which has been shown to decrease conception rates and increase the number of stillbirths and weak calves. While carriers do not always develop signs of being sick, they do continue to shed the organism. Diagnosis is often difficult because carrier animals may have low antibody titers. Currently, the best method for diagnosis is a combination of a urine sample to identify the presence of leptospires and a blood sample to differentiate which type (serovar) is involved.

An effective *hardjo-bovis* vaccine became available in the United States in 2003. This vaccine prevents urinary shedding, kidney and reproductive tract colonization, provides yearlong immunity and provides protection to calves as young as four weeks. Heifers can be infected with *Lepto hardjo-bovis* early in life, resulting in subsequent infertility and/or pregnancy loss. Vaccination of replacement heifers and bulls should be performed as early in life as possible to reduce infections and infertility.

Step 5. Determine the best time to administer preventive measures for each disease/condition.

Prior to “putting it all together” in the form of a simple and brief health management plan, it is helpful to review specific recommended time periods for vaccination and parasite control.

Prebreeding immunization against reproductive diseases allows for a peak in immunologic responses in correlation with breeding season exposure. Likewise,

administration of vaccines for value-added calf programs is most effective prior to meeting the disease challenges of weaning and the traditional marketing environment. The basic tenet of any immunization program should be to vaccinate prior to disease challenge. This equates to targeting vaccination before weaning in calves and before breeding in heifers, cows and bulls.

In the South, the single most important time to treat cows and calves for GI parasites is in May through early June, just before the summer brownout for the brown stomach worm (June-August). Products with persistent activity can be given as early as late April and achieve the same affect. If treatment is given too far in advancement of the summer brownout, animals will become reinfected.

In many fluke-infested areas, August through September is the best time to treat. Treating at the end of summer ensures that most flukes infecting cattle are in the adult stage, and any recently released eggs have a month of unfavorable (hot/dry) weather in which to die. This is also when the snail population required for transfer is estivating (buried in mud) and is unavailable as an intermediate host. Infected snails will generally die during estivation.

Failure to vaccinate or treat for parasites at the correct time may result in decreased health performance, even when the best products available are used.

Step 6. Select specific products that have research-proven efficacy and the best data available.

All animal health products are not created equal. For instance, just because a vaccine is licensed and available does not mean that it works. USDA vaccine licensing does not require evidence of efficacy in cattle under normal farm and ranch conditions and only requires evidence of efficacy against specific aspects of the disease. Product selection should be based on peer-reviewed research information (when available), specific label claims and proven efficacy under field conditions.

Selection of specific products, based on the best science available, should be an important component of a documented herd health plan. By planning in advance for yearly animal health product needs, producers can avoid the confusion associated with animal health product marketing and literally hundreds of product choices. If a specific animal health product is determined by your veterinarian to be the “best fit” for your operation, then this product (AND ONLY THIS PRODUCT) should be purchased. Many products are delivered and used under the quise of “it’s the same thing”, when in many cases, tremendous differences exist between products. A little forward planning of animal health needs prevents settling at the last minute for an inferior product or a product that does not fit the unique circumstances of your operation.

Beware of “me too” products, such as certain dewormers. By law, generic equivalents can have ± 20% the active ingredient that is required in an original product, thus product variability is an issue. Additionally, generic approvals do not require product stability studies. Even though a generic product may have the proper amount of active ingredient at the time of packaging, information is not available documenting the stability of active ingredient once on the shelf.

The U.S. beef industry is rapidly becoming more value-based and data-driven. Source verification, carcass data, growth performance information, estimated progeny differences (EPD’s) and improved record system technologies are just a few examples.

Animal health products should be aligned with the changing beef industry and selected based on science, data and technical support. Total annual veterinary expenses in a cow/calf operation typically average approximately 4% of total per cow production costs. This 4% includes all animal health products used, as well as veterinary services. A few cents saved for a "me too" vaccine or dewormer product without supporting data is usually a poor decision and could produce inconsistent results.

Step 7. Determine which additional health or management practices will require cattle handling and "package" health management practices into a limited number of "events".

Obviously, animal health product inputs need to be packaged (when appropriate) with management practices such as calf working, pregnancy testing or breeding soundness examinations. It is impossible to perform every procedure and administer every product at the precise time necessary for maximum effect. Decisions should be made based on careful prioritization of the relative importance of products or procedures to be administered. For instance, administration of reproductive vaccines prior to the breeding season has the highest priority in replacement heifers. In some areas, administration of fluke treatment at the appropriate time may be of the highest priority. Ultimately, product administration and other health procedures must be positioned, often competitively, with tradition, labor issues, other farm/ranch enterprises, weather and many other factors. While the design and implementation of a cost-effective health program can never be perfect, every operation has the opportunity to improve profitability through better planning and coordination.

In a commercial cow operation, handling cows twice per year (spring and fall) is often feasible and allows for administration of an effective preventive health program. This would also apply to calves, unless being marketed in a Value-Added calf program that includes weaning and two additional rounds of respiratory vaccines. Replacement heifers may require an additional handling to facilitate adequate prebreeding immunization.

Step 8. "Put it all together" in a one-page summary calendar and/or flow protocol

Figures 1 and 2 provide examples of a herd health calendar and flow diagram approach, respectively. These examples are not designed to be a specific recommendation for any other operation than the specific operation they represent. Standardized protocols should be avoided, because every operation is unique and requires a specific protocol tailored for the unique operation. A better approach is the design of unique protocols based on completion of standardized questions.

Effective beef herd health planning ultimately is a series of optimal comprises that interweaves immunology, management and economics into a simple, cost-effective program.

Step 9: Provide periodic updates.

Recommendations should be modified as management changes occur and improved products become available to provide a proper "fit" for each unique operation. Any change in events, such as prebreeding heifer vaccinations, time period for

vaccinating nursing calves or alterations in breeding season, could create a “domino effect” and necessitate other changes in the overall health management program.

Summary

This paper has outlined the basic steps for designing and implementing a comprehensive health management program. A short, written summary in a calendar and/or flow diagram format should be developed for every cow/calf operation. This tool serves as a helpful reminder of the proper timing for animal health inputs during key events, improves communication with ranch employees, veterinarians and others and assists in developing a list of yearly animal health needs. The health calendar should receive regular updates to include new and improved products and to adjust to improved management opportunities over time.

“Failing to plan is planning to fail.”

Figure 1. Example Herd Health Calendar Approach

Assumptions:

1) 283 day gestation (Generally younger cows and smaller breeds calve up to 10 days earlier and older cows and larger breeds calve up to 10 days later)
2) ~ 60 day cow breeding season (~ May 1 – June 30)
3) ~ 60 day heifer breeding season (~ April 1 – May 31)
4) Processing calves in late April
5) Weaning calves in October/November
6) Pregnancy check when calves are weaned
7) Calves retained for 45 days to be marketed as VAC 45
8) Maximum of two handling "events" for cows, bulls and calves through weaning
9) Maximum of three handling "events" for heifers from weaning to breeding

Abbreviations used in Calendar

1) IBR – Infectious Bovine Rhinotracheitis
2) BVD – Bovine Virus Diarrhea
3) PI_3 – Parinfluenza 3
4) BRSV – Bovine Respiratory Syncitial Virus
5) Lepto - Leptospirosis
6) L5 – "5 Way" Lepto
7) VL5 – Campylobacter and "5 Way" Lepto
8) MLV – Modified Live Virus
9) K – Killed or Inactivated
10) VAC 45 – Vaccination program requiring 45 day weaning period, two doses of a "4 way viral", Mannheimia (Pasteurella) hemolytica leukotoxoid, "7 way clostridial
11) "4 Way" Viral – IBR-BVD-PI_3-BRSV
12) "5 Way" Lepto – Pomona, Hardjo, Grippotyphosa, Icterohaemorrhagiae, Canicola
13) "7 Way" Clostridial – Clostridium Chauvoei, Septicum, Novyi, Sordelli, Perfringens Types C&D
14) TS – temperature sensitive, chemically inactivated

ABC Ranch Health Management Program (Based on Assumptions Listed)

January	July
8 Begin 2-year old Heifer Calving Season	
February	**August**
7 Begin Cow Calving Season	
March	**September**
9 End 2-year old Heifer Calving Season **Yearling Heifers–Prebreeding (30-60 days)** - Parasite control[1] - IBR-BVD-PI_3-BRSV (TS MLV) +VL5 (with fetal protection claim for BVD I, II & IBR) - Lepto *hardjo-bovis* vaccine[2] **Bulls – Breeding Soundness Exams** -Parasite control[1] -IBR-BVD-PI_3-BRSV (*MLV)* + L5 - Lepto *hardjo-bovis*[2] -Campylobacter (Vibrio) oil adjuvant – 2 ml	
April	**October**
1 Begin Yearling Heifer Breeding Season **8 End Cow Calving Season** **Cows – "Prebreeding"** - IBR (TS MLV)-BVD (K)-PI_3 (TS MLV)-BRSV (MLV) - VL5[3] with Lepto *hardjo-bovis*[2] -Parasite control **Process Calves** -IBR (TS)-BVD (K)-PI_3 (TS)-BRSV (MLV) + L5[4] -"7 way" Clostridial, Parasite control - Implant, Castrate	**Heifers/ Cows Preg Check**[5] -"5 way" lepto, -Parasite control **WEAN Calves** -IBR-BVD-PI_3-BRSV (*MLV)* + L5 -Mannheimia haemolytica (leukotoxoid) -Parasite control, "7 way" Clostridial **Bulls-** Parasite control, "5 way" lepto
May	**November**
1 Begin Cow Breeding Season **31 End Yearling Heifer Breeding Season**	**Revaccinate weaned calves** *(VAC 45/ WeanVac – Option 2)* -IBR-BVD-PI_3-BRSV (*MLV)* + L5 -"7 way" Clostridial
June	**December**
Cow Breeding Season (continued) **30 End Cow Breeding Season**	*Prepare for calving season*

Key Handling "Events" marked in **Bold** LETTERS

[1] Parasite control would be more beneficial in the May-June time period, requiring an additional handling period.

[2] Lepto *hardjo-bovis* vaccine should be administered to breeding animals twice at 4-6 week intervals the first year of administration. Lepto *hardjo-bovis* vaccine should be administered as early in life as possible (after 4 weeks of age) to provide immunity prior to exposure and potential development of the carrier state. A prebreeding vaccination is included in the protocol. However, this could be given earlier (followed by a 4-6 week booster).

[3] IBR-BVD-PI_3-BRSV (*MLV* with fetal protection label for BVD I, II & IBR) may be substituted for IBR (temp sensitive)-BVD (K)-PI_3 (temp sensitive)-BRSV (MLV) + VL5 in open cows

[4] *Approved* IBR-BVD-PI_3-BRSV (*MLV)* + L5 should be substituted for IBR (temp sensitive)-BVD (K)-PI_3 (temp sensitive)-BRSV (MLV) + L5 if dams vaccinated with *Approved* IBR-BVD-PI_3-BRSV (*MLV)* prior to breeding

[5] Alternative 1: If cows not to be vaccinated prebreeding (and no labeled IBR-BVD-PI_3-BRSV has been given in the previous 12 months), then give IBR (TS MLV)-BVD (K)-PI_3 (TS MLV) - BRSV (MLV) + L5and Vibrio (oil adjuvant)

Alternative 2: If cows previously vaccinated with *Approved* IBR-BVD-PI_3-BRSV (*MLV)* then may administer *Approved* IBR-BVDPI_3-BRSV (*MLV)* + L5 and Vibrio (oil adjuvant)

ABC Ranch
Heifer (and Bull) Development

Adequate prebreeding immunization of yearling heifers and bulls is essential to prevent reproductive diseases in the initial breeding season, as well as stimulation of immunity that may extend well beyond this period. The cow vaccination recommendations listed in the above calendar will be most effective if preceded by the following heifer prebreeding immunization schedule. It is imperative that heifers receive *at least* two MLV IBR-BVD prior to breeding:

@Weaning
IBR-BVD-PI_3-BRSV (*MLV)* + L5
(Lepto includes *hardjo-bovis*)
Mannheimia haemolytica (leukotoxoid)
"7 way" Clostridial
Parasite control with persistent activity

@60 Days Prebreeding
Campylobacter (Vibrio) + L5
(Lepto includes *hardjo-bovis*)

@30 Days Prebreeding
IBR-BVD-PI_3-BRSV (*MLV)* + VL5 (*BVD I&II, IBR Fetal Protection*)
Lepto *hardjo-bovis*[1]
Parasite control with persistent activity

@Pregnancy Check
L5 only
(If planning to continue with prebreeding vaccination in the cowherd)

Or
IBR-BVD-PI_3-BRSV [2] + L5 + Campylobacter
(If planning to continue vaccinating once annually in the cowherd)

And
Parasite control with persistent activity

[1] Lepto *hardjo-bovis* vaccine should be administered to breeding animals twice at 4-6 week intervals the first year of administration. Lepto *hardjo-bovis* vaccine should be administered as early in life as possible (after 4 weeks of age) to provide immunity prior to exposure and potential development of the carrier state. A prebreeding vaccination is included in the protocol. However, this could be given earlier (followed by a 4-6 week booster).

[2] Alternative 1: If heifers/cows not vaccinated prebreeding (and no labeled IBR-BVD-PI_3-BRSV has been given in the previous 12 months), then give IBR (temp sensitive)-BVD (K)-PI_3 (temp sensitive) - BRSV (MLV) + L5and Vibrio (oil adjuvant)

Alternative 2: If cows previously vaccinated with *Approved* IBR-BVD-PI_3-BRSV (*MLV)* and they will not be vaccinated prebreeding, then administer *Approved* IBR- BVDPI_3-BRSV (*MLV)* + L5 and Vibrio (oil adjuvant)

Figure 2. Example Vaccination Flow Protocol
XYZ Cattle Company

Based on the specific information obtained for this example, the following is a proposed vaccination protocol that optimally positions products into a herd health management program. These suggestions should be modified as management changes occur or improved products become available to provide a proper "fit" for this unique operation. Any change in events, such as prebreeding heifer/cow vaccinations or time period for vaccinating nursing calves, could create a "domino effect" and necessitate other changes in the overall health management program. The protocol is designed to place animal health inputs into pre-existing "event" time periods.

Timing	**Product**
~ 1- 4 months	Respiratory Viral (MLV)[1] Clostridial Dewormer
Preweaning/Weaning	Respiratory Viral (MLV)[1] (Repeat in 2-4 weeks) Mannheimia haemolytica (Leukotoxoid) Clostridial Dewormer
Prebreeding (heifers/developing bulls)	IBR-BVD (MLV) L5, Campylobacter Lepto hardjo-bovis [2] Dewormer
Prebreeding (cows/bulls annually)	IBR-BVD (MLV) L5, Campylobacter Lepto hardjo-bovis[2] Dewormer

[1] Appropriately labeled MLV viral product may be given to calves nursing pregnant cows if cows have been vaccinated within the previous year with an appropriately labeled product.

[2] Lepto hardjo-bovis vaccine should be administered to breeding animals twice at 4-6 week intervals the first year of administration. Products should be administered as early in life as possible, per product label, (after 4 weeks of age) to provide immunity prior to exposure and potential development of the carrier state. A prebreeding vaccination is included in the protocol. However, this could be given earlier (followed by a 4-6 week booster).

Notes

- No more than three gram (-) vaccines administered at one time
- "5-way" Lepto administered twice annually (~ 6 month intervals) in "high risk" herds and once annually in "low risk" herds
- Lepto hardjo-bovis administered twice the first year and once annually (product with labeled 12 month duration of immunity) .
- *With some products Lepto hardjo-bovis titers may be a problem for export requirements or AI centers. Consult your veterinarian or AI center personnel prior to administration to breeding animals destined for export or semen collection.*
- Appropriately labeled MLV respiratory viral products (IBR-BVD-PI_3-BRSV) may be used in calves nursing pregnant heifers/cows or in pregnant heifers/cows if the heifers/cows were vaccinated within 12 months with a labeled product. **Appropriately labeled MLV IBR-BVD-PI_3 – BRSV products must be given initially to open females.**