

Vaccination Programs: Beef Cow Calf Operations

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Goals

A comprehensive herd health and management program for a commercial cow calf operation should function to maximize production efficiency and reduce production losses. Ten components of a sound program can be easily identified.

Pregnancy Testing	Breeding Bull Soundness Exams
Implanting	Parasite Control
Nutritional Program	Disease Prevention
Genetic Improvement	Forward Planning
Financial Management	Marketing

It may be best to view these ten components as adjuncts to profits because the ultimate effect is to maximize monetary return to management over costs expensed. Disease prevention and proper immune system protection are critical to these profit factors. Three central goals exist for any disease prevention program.

These goals are:

- reduce the probability of devastating disease outbreaks
- reduce the severity of disease agents present in a herd
- improve the value of products sold.

The central elemental factor in a vaccination program is reduction in devastating disease outbreaks. The two other goals listed above may be less readily apparent, but just as significant. This is true especially when attempting to determine the beneficial return for the time, labor and cost of a sound vaccination program.

In addition to limiting disease outbreaks, vaccination should reduce the severity of disease agents present in a herd. By achieving this goal, the “iceberg” effect of disease can be minimized. The analogy to an iceberg is appropriate because with some diseases one only sees a small portion of disease cases (i.e. the tip of the iceberg). Significant economic losses may be occurring below the surface resulting because of disease effects such as reduced milk production and reduced growth.

An ultimate goal for management should be to improve the market value of the product produced. One way to improve the value of calves produced by North Carolina cattlemen is to attempt to produce a calf that can be marketed in standard market channels and arrive at a commercial cattle operation in the Midwest or the High Plains and remain healthy. Ultimately, buyers will measure and appreciate this advantage and purchase these calves preferentially over others that are available. While this goal may not drive the decision as to which vaccine to employ in a beef herd, management should appreciate the future effect of health decisions made in the herd environment.

Program Determinants

Determination of which diseases to vaccinate for can be quite confusing considering the possible disease present in a beef herd. Further confusing the issue is the number of different vaccines available. Not one vaccination program will function for all herds and the program used will vary depending on past problems observed, the predicted or potential problems, and the management goals of a beef operation. I find it best to categorize the relevant herd level vaccination issues into three decision variables:

- important infectious disease agents
- division of the herd into four production groups
- herd classification relative to herd additions.

Infectious Agents

The infectious diseases that can affect a beef herd in North Carolina can be divided into ten groups. A short summation of these diseases can help put these diseases into perspective.

Campylobacteriosis (Vibriosis)

Vibriosis is caused by the bacteria Campylobacter fetus. Vibriosis is a widespread disease that causes abortion and temporary infertility in females. This disease is spread by sexual contact with an affected bull. There are several commercially available vaccines for this disease.

Trichomoniasis

The protozoa, Trichomonas fetus, is responsible for this disease. Trichomoniasis is a sexually transmitted disease that results in abortion and repeat breeding in females. Recently, a vaccine has been approved for an aid in control of this disease.

Leptospirosis

The bacteria, Leptospira interrogans, causes leptospirosis in beef cattle. A serovar of this disease, Leptospira pomona, is the most agent in beef cattle. Leptospirosis is very common in the southeastern United States and affects all age groups. Abortions are the most common sign of this disease, but infection can also result in decreased milk production and weight gains. Death is an uncommon expression of this disease, but can be sporadically important. Vaccines are available for this disease, but immunity only last for four to six months.

Clostridial Disease

Most cattlemen are familiar with the calf form of this disease, “blackleg” caused by bacteria, Clostridium chauvei. Other forms of this disease can be seen and vaccines normally contain four to seven different types of clostridial organisms. Blackleg is a disease of young calves that results in high rates in the most heavily muscled calves in a herd. The disease is sporadic but can result in significant economic losses if it occurs. Inexpensive and effective vaccines are available.

Viral Respiratory Disease

Infectious Bovine Rhinotracheitis (IBR), Bovine Viral Diarrhea (BVD), Parainfluenza 3 (PI3), and Respiratory Syncytial Virus (RSV) are viral diseases of stressed beef cattle. Although more common in young calves that have been purchased from a sale barn, this disease can be very severe in weaned

calves or stressed adult cattle. Abortions can occur in pregnant animals if exposed during the middle or latter periods of gestation. Vaccines are available for the aid in control of these diseases.

Bacterial Respiratory Disease

Pasteurella multocida, Pasteurella hemolytica, and Hemophilus somnus are generally diseases of stressed calves purchased from a sale barn. As with viral respiratory diseases, these bacteria can infect adult cattle under certain stressful situations. Reproductive disorders have been described with these infections. Vaccines are available for the aid in control of these diseases.

Calf Diarrhea (Scours)

Rotavirus, coronavirus, Cryptosporidia, E. coli, and Salmonella have been shown to play a role in calf scours. Herd outbreaks are uncommon in North Carolina but some herds and management practices seem to increase the prevalence of these diseases. Scours normally affects calves less than three weeks of age and can result in very high death rates. Vaccines are available for use in adult pregnant animals and newborn calves that can reduce the incidence and severity of disease outbreaks.

Pinkeye

Infection of the eye by the bacteria, Moraxella bovis, can be widespread if certain risk factors are present. Light or white faced cattle seem to be predisposed to this infection. Dry, dusty conditions, tall weeds, and flies may cause injury to the eye leading to infected animals. Vaccines are available for prevention of this disease.

Brucellosis

Brucellosis or Bang's Disease is caused by the bacteria, Brucella abortus. Regulatory Efforts have concentrated on vaccination and eradication. This disease can cause serious reproductive disorders in an affected herd. North Carolina is a brucellosis free state (no diagnosed infection in the last three years). A state regulated vaccine is available for the aid in prevention of this disease.

Anaplasmosis

While this protozoal disease of the red blood cells was not considered important in North Carolina, recent studies have shown the prevalence of this disease to be on the rise within the state. Anaplasma marginale cause severe damage to red blood cells resulting in anemia, reduced weight gains, and death. A vaccine is available for the aid in prevention of this disease.

Production Groups

In a beef herd at least four production groups can be identified: cows, replacement heifers, bulls, and calves. Separating the animals, at least conceptually, allows for easier discussion and enables the management goals of each group to be more closely aligned with the herd vaccination goals.

Herd Classification

The probability of disease exposure is increased whenever new animals are introduced into a herd. This becomes an important consideration when looking at disease prevention programs. A herd that does not bring in new animals will need a much simpler herd vaccination program than one that is buying numerous replacements or feeding stocker cattle on the same premises as the cow herd. Three classifications can be used to categorize herds on the basis on herd additions and possible herd exposure:

- **Closed herd** – there are restricted introductions of new animals generally limited to purchased herd bulls.
- **Modified open herd** – there are limited additions to the herd. Additions generally comprise purchased herd bulls and purchased replacement heifers. Increased risk of respiratory disease and abortions in young animals.
- **Open herd** – there are not restrictions on introductions, including herd bulls, replacement heifers, stocker cattle. Commingling of purchased cattle and farm reared cattle occurs. Greatly increased chance of respiratory disease and abortions.

Program Structure

The approach that I use to best determine which vaccination program to employ in a particular herd situation is to first review the possible infectious agents that are currently a disease problem or have been a problem in the past. In North Carolina there are several diseases because of their high prevalence or possible devastating economic effect that should be considered in a base vaccination program. Once this basis has been determined, I classify the herd as to the manner that herd additions are made. This allows for a more accurate assessment of potential infectious disease problems. Lastly, I divide the herd into production groups so that the program can be more readily understood and discussed. The vaccination program for a closed herd is as follows:

Vaccination Program – Closed Herd

<u>Cows</u>	Leptospirosis (twice yearly) Vibriosis (30-60 days prior to breeding)
<u>Heifers</u>	Leptospirosis Vibriosis (30-60 days prior to breeding)
<u>Bulls</u>	Leptospirosis Vibriosis (2X label dose)
<u>Calves</u>	7 Way Clostridia

When a herd is more characteristically a modified open herd, the chance for respiratory disease and infectious abortion is increased. The vaccination program for a modified open herd is as follows:

Vaccination Program – Modified Open Herd

<u>Cows</u>	Leptospirosis (twice yearly) Vibriosis (30-60 days prior to breeding)
<u>Heifers</u>	Leptospirosis Vibriosis (30-60 days prior to breeding) IBR-BVD-PI3-RSV Pasteurella-Hemophilus (optional)
<u>Bulls</u>	Leptospirosis Vibriosis (2X label dose) IBR-BVD-PI3-RSV Pasteurella-Hemophilus (optional)
<u>Calves</u>	7 Way Clostridia

The highest risk herd will be the one that brings in new animals on a regular basis and exposes them to the commercial herd present on the farm. The vaccination program for an open herd is as follows:

Vaccination Program – Open Herd

<u>Cows</u>	Leptospirosis (twice yearly) Vibriosis (30-60 days prior to breeding) IBR-BVD-PI3-RSV Pasteurella-Hemophilus (optional)
<u>Heifers</u>	Leptospirosis (twice yearly) Vibriosis (30-60 days prior to breeding) IBR-BVD-PI3-RSV Pasteurella-Hemophilus (optional)
<u>Bulls</u>	Leptospirosis (twice yearly) Vibriosis (30-60 days prior to breeding) IBR-BVD-PI3-RSV Pasteurella-Hemophilus (optional)
<u>Calves</u>	7 Way Clostridia IBR-BVD-PI3-RSV Pasteurella-Hemophilus (optional)

These programs illustrate a core program of vaccination. Diseases such as calf scours, pinkeye, anaplasmosis, trichomoniasis may be of particular concern on some operations and can be addressed through proper vaccination procedures. Should regulatory concerns arise concerning brucellosis, vaccination by an accredited and licensed veterinarian can satisfy regulations for interstate shipment of animals.