

Vaccination Programs for the Cow/Calf Operation

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Disease prevention is of utmost importance in a cow-calf operation because it is a low profit margin enterprise. Adequate nutrition, strategic deworming, sanitation and a well designed vaccination program are all necessary to maintain herd health. This paper focuses on the vaccination program aspect of herd health and the goal is to provide producers with information they need to evaluate their own program if necessary. However, this is not to be used as a substitute when advice from a local veterinarian is available. The local veterinarian understands the predominant diseases in a particular area and has the ability to design a vaccination program that is tailor made for the needs of each operation. In addition, producers currently on a vaccination program designed by a veterinarian should not make changes to the program without first consulting with their veterinarian. Failure to do so may lead to undesired consequences.

Overview of the vaccination Program

Vaccine programs used in the breeding herd are primarily designed to prevent against diseases that cause reproductive losses which includes failure to conceive, embryonic death, abortion and stillbirths. Vaccinating the breeding herd also protects the developing fetus and has the additional benefit of increasing antibodies in colostrum which helps protect the newborn calf. In calves, the vaccination program is primarily designed to prevent respiratory disease and diseases that cause sudden death.

Diseases

The first step in designing or evaluating a program is to know the diseases that are most likely to impact a cow/calf

operation. The following is a description of the diseases that typically make up the core of most vaccination programs and when the vaccines for the disease are to be administered. Vaccines for other diseases can be added when deemed necessary.

Viral diseases

Infectious Bovine Rhinotracheitis (IBR) - in a non-immune pregnant cow, exposure to this virus can cause abortions. The abortions typically occur after four months of gestation but can occur at anytime and abortion rates of 5-60% have been reported. In calves, IBR is responsible for respiratory disease outbreaks. Calves with IBR will exhibit fever, lethargy, heavy nasal discharge and open mouth breathing. IBR may also affect the eye creating symptoms similar to pinkeye. This "ocular form" of IBR may not occur in conjunction with respiratory disease. Cows and replacement heifers should be vaccinated for IBR before the breeding season begins and calves should be vaccinated near weaning.

Bovine Virus Diarrhea (BVD) - BVD is a complicated disease and can cause a wide variety of problems in a cow/calf herd. In pregnant animals, infections may result in early embryonic death, abortions or calves may be born with congenital defects. BVD infections also have an immunosuppressive effect and can make the cowherd more susceptible to other infectious agents. Calves exposed to this virus may show severe diarrhea but respiratory disease outbreaks are more common. The immunosuppressive effect of this virus also makes calves more susceptible to other infectious agents. The greatest impact of BVD is seen in herds that have one or more persistently infected (PI) animals. The creation of a persistently infected (PI) animal happens only during pregnancy and occurs in the following manner: Around 60 to 125 days of gestation, the immune system

of the unborn calf is in the recognition period. If a non-cytopathic strain of the BVD virus infects the unborn calf during this recognition period, the virus may be recognized as "normal" by the calf's immune system. If this occurs, the virus is never eliminated from the calf's body and the calf is infected for life. Once this animal is born it is the primary source of maintenance of BVD in the herd since it sheds high levels of the virus in body secretions and excretions. Pregnant cows and calves that come into contact with these PI's experience the problems described in the previous paragraph. Because PI animals are so detrimental, the common recommendation for herds that suspect they have one or more PI's is to test and remove the infected animals under the guidance of a veterinarian. Vaccination alone is not enough to overcome the effects these PI's may have. If a herd is currently PI free, it is recommended that all purchased cattle are tested before they are introduced into the herd and a BVD vaccine should be given to the cowherd pre-breeding. If the cow is protected, this greatly reduces the risk of the unborn calf becoming infected if the herd is accidentally exposed to the virus. Calves should be vaccinated for BVD near weaning.

Bovine Respiratory Syncytial Virus (BRSV) - Even though BRSV is occasionally reported to be the cause of respiratory disease outbreaks in nonimmune adult cows, it is more likely to cause respiratory disease outbreaks in calves. Calves that develop a severe form of BRSV have steadily increased breathing difficulty, fluid accumulates in the lungs and they may have open mouth breathing. If it is decided a BRSV vaccine should be used in the breeding herd it should be administered at the same time the IBR and BVD vaccines are administered. Calves should be given the vaccine near weaning.

Parainfluenza (PI3) - This virus has traditionally been considered to be part of the respiratory disease complex in calves but there is little evidence to indicate how significant its role is. Even though the importance of this virus is in question, producers will find that vaccines containing IBR, BVD and BRSV will also contain PI3 and therefore they will be vaccinating against this disease by default.

Bacterial diseases

Leptospirosis - This bacterial agent predominately affects cows and causes abortions, stillbirths or weak born calves. Abortions may occur as early as the third month of gestation, but more frequently occur in the 3rd trimester. Historically, vaccinating against leptospirosis has been done with a multivalent (several strains) vaccine containing *L. hardjo*, *L. pomona*, *L. canicola*, *L. icterohaemorrhagiae* and *L. grippityphosa*. Vaccination of the breeding herd normally occurs before the breeding season begins and again at pregnancy examination time because the duration of immunity of this vaccine is less than one year. More recently, animal health companies have been offering a vaccine that contains another strain of leptospirosis called *L. hardjobovis*. Producers should consult with their veterinarian to determine if this additional strain should be included in their vaccination protocol.

Vibriosis - Vibriosis is a venereal disease that can be spread from an infected cow to uninfected cows via the bull. Vibriosis may cause embryonic death and resorption which goes unnoticed by the producer or it may lead to infertility and the producer notices his/her cows rebreeding several times before they finally conceive. Infected cows usually recover and become normal breeders after a normal pregnancy is obtained. However, a few cows will carry

the infection through gestation, deliver a normal calf and then infect bulls in the next breeding season. Vaccinations for vibriosis should be given to all breeding animals prior to the breeding season.

Clostridial diseases - Clostridium bacteria can cause disease of the muscle, liver or intestine in cattle. Terms frequently used when muscle is involved are blackleg and malignant edema and the term redwater is used when the liver is involved. Clinical signs of a clostridial infection are dependent upon the organ involved. In most instances, producers will find the affected animals dead rather than sick due to the rapid progression of the disease. Occasionally, clostridial diseases affect older animals but in most instances the greatest impact is seen in calves. Vaccines against clostridial diseases are commonly referred to as 7-way or 8-way blackleg vaccine and they are normally given to calves at marking and branding time and again near weaning.

Brucellosis - Signs of this disease in cattle are abortions, weak calves, failure to settle, faulty cleaning and decreased milk production with no apparent signs of sickness. Even though testing and slaughtering has greatly reduced the incidence of this disease, it is highly recommended that replacement heifers still be vaccinated for it. This vaccine is normally administered around weaning time and must be administered by a licensed veterinarian.

Vaccines

Vaccines contain bacteria, viruses or a combination of both. To prevent the vaccine from causing disease when it is administered to an animal, the vaccine manufacturers will alter the organisms during the manufacturing process. Currently, vaccines used by cattle producers can be divided into two major

categories. They are the inactivated or killed vaccines and the modified live vaccines. These terms are referring to the condition of the bacteria or virus in the vaccine. "Killed" means the organisms are no longer alive and "Modified Live" means the organisms are still alive and have the ability to replicate, but they have been altered in such a way they don't cause disease when they are administered to the animal. Common examples of killed vaccines producers may be familiar with are blackleg and leptospirosis which are bacterial diseases. However, killed vaccines may also contain viruses such as IBR, BVD, BRSV and PI3.

When the term modified live is used, people are generally referring to viruses only even though there are a few modified live bacterial vaccines available. It is also important to be aware that modified live vaccines may have a killed component to them. A common example of this is a vaccine that contains a modified live IBR, BVD, BRSV and PI3 and also contains the five strains of a killed leptospirosis. There are also some vaccines that contain both killed and modified live viruses. Carefully reading the vaccine label will indicate whether the vaccine is killed, modified live, or a combination of both.

A question that commonly arises is which type of vaccine should be used when vaccinating for viral diseases - killed or modified live?

The advantages most frequently cited for using modified live vaccines are they provide quicker protection, better protection, and longer lasting protection against viral diseases than do the killed vaccines. Another advantage commonly cited is that one dose of a modified live vaccine may elicit a protective immune response in an animal that has never been vaccinated before, whereas a killed vaccine will require a second dose 3-4 weeks later. Even

though one dose of a modified live may be adequate in some instances, it is generally recommended that a second dose of the vaccine be administered 3-4 weeks later to ensure a greater percentage of the herd is immunized. Once the animals have been properly immunized, one dose of either the killed or modified live annually, is usually sufficient to "booster" immunity. The primary disadvantage of the modified live vaccines is the precautions they have associated with them. Some modified lives are not labeled for use in pregnant cows or calves nursing pregnant cows. Those that are approved for use in these circumstances requires the cows be vaccinated with a modified live vaccine from the same company within the past 12 months.

There is also some that information that suggest a modified live should be administered no sooner than 30 days before the start of the breeding season; especially in cows or heifers in which a modified live vaccine has never been used before. The reason behind this is the modified live IBR component of the vaccine may cause inflammation of the ovary thereby reducing fertility for a short period of time. If the vaccine is administered 30+ days in advance, the inflammation will have subsided and fertility will have returned to normal by the breeding season. Producers that can follow these precautions are encouraged to use modified lives because of the advantages previously mentioned. For those that cannot, killed vaccines will still provide protection as long as label directions are followed. Talking with the local veterinarian will help the producer decide if a modified live viral vaccine will fit with their management style.

Vaccine Timing

Since the purpose of vaccinating a group of animals is to reduce the likelihood that a disease outbreak will occur or instead,

reduce the impact of an outbreak if it does happen, it would make sense that the vaccine should be administered before the disease is likely to occur. Therefore, it is important to assure that the appropriate vaccines are administered in the breeding herd prior to the breeding season and to the calves before weaning time. Failure to do so increases the risk of a disease event. Timing of vaccination is also important for a achieving an adequate immune response. Administering vaccines during stressful periods, such as during weaning, reduces the ability of the animal's immune system to properly respond to the vaccine resulting in poor protection. This is why vaccination programs often recommend administering the respiratory disease vaccines 2-4 weeks prior to weaning and then again at weaning. Administering the vaccine prior to weaning not only gives the calves time to respond to the vaccine but the calves are under less stress at this time because they are still with the cows. Other factors lead to a poor vaccine response is poor nutrition, parasitism, overwhelming disease challenge and mishandling of vaccine.