



Beef and Dairy Cattle Vaccination Programs

Introduction

Infectious diseases threaten beef and dairy cattle health and welfare and can decrease productivity and profitability. Vaccination is an important component of control and prevention of these diseases. A vaccination program, however, is not a substitute for good nutrition, adequate ventilation, effective sanitation, and other health management procedures.

Vaccines help prevent infectious diseases, but no vaccine provides 100 percent immunity for all animals in a herd. Vaccines raise the general level of herd immunity so that the spread of an infectious disease or severity of clinical illness is minimal.

Vaccination programs should be developed in cooperation with the herd veterinarian. Individual herd circumstances, including disease history, biosecurity, management, housing, and other factors, affect the specific vaccination programs in any beef or dairy operation. Type of vaccine, such as killed or modified live, stage of production, costs, benefits, and other factors must be considered. Rigid recipes that fit all production units are impractical and even dangerous if not instituted in individual herds with professional care. Improper use of vaccines can result in cattle that are not adequately immunized.

General Considerations When Designing a Vaccination Program

Antiserums are made from the blood of animals that are hyperimmunized to a given disease. They contain antibodies against that disease and afford immediate protection. They are of relatively short duration, usually providing protection for only two or three weeks. Antiserum is given in fairly large volumes, is usually expensive, and is not available for many infectious diseases. It is usually used in the face of a disease outbreak such as enterotoxemia in nursing calves.

Some vaccines are produced by modifying the infectious agent in such a way that the organisms remain alive, multiply, and produce immunity in the vaccinated animal, but do not produce disease. Many modified live viral (MLV) vaccines should not be given to naive pregnant cattle because they can invade the fetus and cause birth defects or abortion. Examples are injectable modified live infectious bovine rhino-tracheitis and bovine virus diarrhea vaccines. Modified live vaccines generally produce a higher level of immunity than killed vaccines, but may have a degree of risk when given to either pregnant or highly stressed cattle.

Vaccines are often ineffective at eliciting new antibody production when given to young calves. Very young animals have a functional immune system that can respond to vaccines or antigens but is immature compared to older animals and may not be able to respond to the vaccine or antigen as effectively. Antibodies acquired from the dam through colostrum that protect the calf from many infectious diseases also may block and destroy the antigens in the vaccine. This phenomena is referred to as maternal antibody interference and is a potential reason for not vaccinating very young calves against some infectious diseases. However, there are vaccines that can produce an effective immune response, even in newborn animals. Consult with your veterinarian regarding the use of vaccines in animals less than 4 to 6 months of age.

Vaccination Programs for Beef Cow-Calf Herds

Neonatal Calves

Vaccines containing bovine rotavirus and bovine coronavirus can be given orally to newborn calves. The oral MLV vaccine should be given prior to ingestion of colostrum or it will not be activated.

Many veterinarians prefer to use injectable rotavirus/coronavirus/*E. coli* in the dam prior to calving and depend on colostral antibodies to protect calves.

Vaccination of calves for infectious bovine rhino-tracheitis (IBR), bovine virus diarrhea (BVD), parainfluenza-3 (PI-3), and bovine respiratory syncytial virus (BRSV) is usually delayed until pasture turnout or pre-weaning. Veterinarians occasionally advise use of this vaccine in selected herds with a history of these diseases in young calves, but this is not a standard recommendation. Vaccination of neonatal calves with an intranasal IBR/PI-3/BRSV vaccine may be more beneficial than standard injectable vaccines in young calves.

Pastured Beef Calves

Clostridia

Calves are usually vaccinated for the major clostridial diseases prior to pasture turnout with a 7-way clostridial vaccine. Some clostridial vaccines can be given to newborn calves but immunity will be improved if vaccination is delayed until branding or grass turnout. The Clostridial diseases include:

- *Clostridium chauvoei*—Blackleg
- *Clostridium septicum*—Malignant edema
- *Clostridium perfringens*—Enterotoxemia (types B, C, and D)
- *Clostridium sordellii*—Sudden death
- *Clostridium novyi*—Sudden death
- *Clostridium haemolytica*—Redwater occurs in limited endemic areas associated with liver flukes and is uncommon in the Midwest and is not included in a standard 7-way clostridial vaccine.

Pinkeye

In some herds, pinkeye is a continuous problem for calves during summer grazing season. Vaccines, either commercial or autogenous, generally have poor efficacy. Vaccination of cows or neonatal calves is not rewarding as colostral immunity is depleted or neonatal calves do not respond well. To be most efficacious pinkeye vaccines should be given when calves are 3 to 4 month of age prior to maximum risk of disease in midsummer.

Pre-weaning vaccinations

Producers who intend to retain ownership of their calves or desire to market preconditioned calves should vaccinate 14 to 21 days prior to weaning. The stressful weaning period is avoided so that calves have a better immune response and immunity is developed to respiratory disease prior to weaning, when risk is highest. This program also should be

performed on all replacement heifers that are to be kept in the herd. There are many MLV vaccines approved for nursing pregnant cows as long as the cow has been previously vaccinated.

- IBR (infectious bovine rhino-tracheitis)
- BVD (bovine virus diarrhea)
- PI-3 (parainfluenza-3)
- BRSV (bovine respiratory syncytial virus)
- *Mannheimia haemolytica*
- *Histophilus somni*
- 7-way clostridia vaccine

Weaned Calves

Ideally calves should receive a second vaccination against IBR, BVD, PI-3, and BRSV after weaning. Calves that did not receive pre-weaning vaccinations should be vaccinated at weaning although the immune response may be decreased due to the stress associated with weaning. As part of an overall health program calves should be treated for parasites at this time.

Pre-breeding (beef cows and heifers)

- Vaccination for viral reproductive diseases (IBR and BVD) using a MLV vaccine 45 days prior to breeding is best time to provide protection for the cow herd. Replacement heifers should receive three vaccinations (pre-weaning, weaning and pre-breeding) with a MLV IBR and BVD virus before their first breeding season.
- Pre-breeding vaccination for vibrio and leptospirosis (5 strain) is optional for well managed beef herds. Producers who only handle the breeding herd once per year should perform lepto vaccinations in the fall when cows are pregnancy tested.

The pre-breeding vaccinations should be done approximately 5 to 6 weeks prior to breeding to avoid any possible vaccine induced stress or complications that could affect fertility.

Pregnancy testing (beef cows and heifers)

Booster vaccinate cows and heifers if not vaccinated pre-breeding for:

- BR, PI-3, BVD, BRSV. Generally killed vaccines are used in pregnant cows. Some MLV are approved for pregnant cows if the cows have been vaccinated previously with that vaccine. Consult with your veterinarian before giving MLV vaccines to pregnant cows.
- Leptospirosis vaccines should be boosted in herds that have a history of abortions due to leptospirosis, have high risk of lepto exposure, or are a confined beef cow operation.

Pre-calving

Rotavirus, coronavirus, and *E. coli*—Scours vaccines should be given to replacement heifers twice, approximately six and three weeks prior to calving. Vaccinate cows once, three weeks prior to calving, or twice according to the same schedule as first-calf heifers in herds not previously vaccinated or in problem herds.

Bulls

IBR, BVD, PI-3, BRSV, and leptospirosis vaccines annually. Herds with a risk of *Campylobacter fetus* (Vibrio) or *Tritrichomonas foetus* (Trich) may benefit from an annual vaccination against one or both of these sexually transmitted diseases.

Vaccinating Feedlot Cattle

Feeder cattle should be vaccinated after arrival in the feedlot. There are only very rare exceptions to this guideline. Generally, a single MLV vaccine is recommended for feeder calves unless special circumstances exist. High risk calves may benefit from an intranasal vaccine followed by a traditional injectable vaccine two weeks later.

Vaccinations on arrival

- IBR, PI-3, BVD, BRSV
- 7-Way Clostridia (if calves have not previously received a Clostridial vaccine)
- *Histophilus somni* (not normally recommended in large western feedyards)
- *Mannheimia haemolytica* vaccination optional

Vaccination Programs for Dairy Herds

Neonatal Calves

- An oral vaccine containing bovine rotavirus and bovine coronavirus can be given orally to newborn calves. The oral MLV vaccine should be given 30 minutes prior to ingestion of colostrum or it will be inactivated. Some veterinarians prefer to use injectable rotavirus/coronavirus/*E. coli* in the dam prior to calving and depend on colostral antibodies to protect calves.
- Vaccination of calves for infectious bovine rhinotracheitis (IBR), bovine virus diarrhea (BVD), parainfluenza-3 (PI-3), and bovine respiratory syncytial virus (BRSV) is usually delayed until 3-6 months of age. Veterinarians occasionally advise use of this vaccine in selected herds with a history of these diseases in young calves, but this is not a standard recommendation. Vaccination of neonatal calves with intranasal IBR/PI-3/

BRSV vaccine may be more beneficial than standard injectable vaccines in calves. In order to assure adequate immune response, intranasal respiratory vaccines should be administered at 3 days of age or older. Intranasal vaccines generally have a shorter duration of immunity than injectable vaccines.

- Recent research suggests that vaccinating calves against Johnes disease is an effective aid in the control of this disease. The vaccine can only be administered by a veterinarian and must be done according to state regulations. Consult with your veterinarian regarding the need to use this vaccine in your herd.

4 to 6 months of age

- IBR, BVD, PI-3, BRSV
- Leptospirosis (5 strain)
- Clostridial group – 7 or 8 way
- *Histophilus somni* (Needs to be risk based-consult with your veterinarian)
- De-worm
- Lice treatment
- Grub treatment in early fall, repeat as needed

Pre-breeding

- BR, BVD, PI-3, BRSV
- Leptospirosis (5 strain)
- Clostridial group – 7 or 8 way
- De-worm
- Lice treatment
- Grub treatment in early fall, repeat as needed

Pre-calving

- Clostridial group – 7 or 8 way
- *E. coli* mastitis vaccine at least twice, at six and three weeks prior to calving
- Rotavirus, coronavirus, & *E. coli* scours vaccine twice, at six and three weeks prior to calving
- De-worm
- Lice treatment
- Grub treatment in early fall, repeat as needed

Adult Cows

Cows are generally vaccinated for IBR, BVD, PI3, and BRSV virus, leptospirosis, *clostridial*, *E. coli* mastitis, and calf diarrhea diseases during the lactation period and/or the dry period. Modified live virus vaccines may not be able to be used at this time. Consult with your veterinarian before using MLV products in pregnant cows.

Adult dairy cattle should be regularly treated for lice. Frequency of such treatments depends upon exposure and products used. This group of cattle is fairly resistant to significant intestinal worm burdens; therefore, strategic deworming programs are most effective. Consult with your veterinarian to design a cost-effective parasite control program.

Authors

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