

Protecting Calves from BRD: Consider Your Vaccine Choices

Spring calving season, branding and turnout may seem far away, but the next calf crop will be here before we know it. Now is an ideal time to talk with a veterinarian and ensure your current protocol is the right fit for your herd.

Protecting young beef calves from bovine respiratory disease (BRD) should be high on the list of considerations, since the disease costs producers **\$900 million** annually.¹

For cow/calf producers, BRD is a common cause of death in young calves, and it can occur without warning on pasture when the passive immunity received through colostrum begins to wane. In addition, studies show that calves experiencing BRD, or summer pneumonia, can be up to **36 pounds** lighter at weaning than their healthy pasture mates.^{2,3}

Risk factors influence vaccination timing, type

When developing a plan to protect your calves against BRD, it is important to evaluate the risk factors for calves, according to Jody Wade, DVM, Boehringer Ingelheim. Risk factors may include:

- Purchasing females with unknown health status, particularly young heifers
- Closely grouping animals in a dry lot during a concentrated calving period
- Crowding for prolonged periods of time, such as during breeding or synchronization
- Herds with a known history of early respiratory health challenges
- The prevalence in your area of common BRD-causing viruses such as bovine viral diarrhea virus (BVDV), bovine respiratory syncytial virus (BRSV), infectious bovine rhinotracheitis (IBR) and bovine parainfluenza 3 virus (PI₃)

“Intranasal vaccines may be considered at birth, or shortly after, when exposure is likely to occur early in the calf’s life,” Dr. Wade said. “When risk of exposure is low and calves are receiving good passive immunity from their dams, intranasal vaccination may not be beneficial, and the administration of an injectable vaccine can take place at branding or prior to turnout.”

In choosing vaccines, it also is important to understand the animal’s immune system, the distinct types of vaccines, and how each works to stimulate an immune response in the animal.

Building calf immunity

When a calf is born, it may not be fully protected from disease. Since it has no antibodies in the blood to fight off pathogens or disease-causing viruses and bacteria, the calf relies on the maternal antibodies it receives via colostrum, ideally through nursing in the first six to eight hours after birth.

These maternal antibodies bind to specific pathogens and destroy them, but they are generally short-lived, gradually waning over the first few months of the calf's life.

Two types of immunity

Two types of antibodies protect animals from disease. Immunoglobulin G (IgG) antibodies are the main type of antibody found in blood and extracellular fluid, controlling infection throughout the body. IgG antibodies provide systemic immunity, and are produced primarily by injectable vaccines. IgG antibodies also are the main component of cattle colostrum, accounting for 85 to 95% of the total Ig concentration.

Immunoglobulin A (IgA) antibodies are prevalent in the lining of the upper respiratory tract (nasal-passage mucosa), where respiratory viruses and bacteria typically enter. These IgA antibodies provide protection (local immunity) against respiratory pathogens in the airways, before they can penetrate deeper into the lungs and really cause damage.

"Intranasal vaccines stimulate a local immune response in the nasal passages, so they can be useful when early-exposure risks to respiratory illness are high, but there are downsides," Dr. Wade explained. "The main immune response from intranasal vaccines based on IgA antibodies does not last as long as the immunoglobulin G [IgG] antibodies produced primarily by injectable vaccines."

Dr. Wade recommends that when administering an intranasal vaccine, it is important to vaccinate again at 30 days of age with an [injectable modified-live virus \(MLV\) vaccine](#).

Protect young calves from BRSV-based summer pneumonia

The risk of respiratory disease continues as calves age. Summer pneumonia can occur in the late summer or early fall, when the calves reach 90 to 120 days and colostrum protection is running out. IBR and BRSV have been identified as two of the common viral causes of BRD.⁴ These pathogens are another reason to consider an injectable vaccine prior to turnout.

In the past, it was believed there was no point in giving injectable respiratory vaccines before about 4 months of age, because they would be inactivated by maternal antibodies. But a recent study proves that an injectable respiratory vaccine, when

given to calves at 30 days of age, can overcome maternal antibodies to stimulate a rapid response and provide protective immunity against BRSV.⁵

In the study, calves with maternal antibodies to BRSV from colostrum were given an injectable modified-live virus respiratory vaccine for BRSV or a placebo at 30 days of age.⁵ The calves were then exposed to BRSV about 72 days later. Compared to calves that received a placebo, those administered the vaccine had fewer clinical signs and lung lesions, as well as less viral shedding.

“That’s not to say all injectable vaccines can do this,” Dr. Wade said. “This particular product uses a unique adjuvant that protects vaccine antigens from maternal antibodies and enhances the immune response, even in calves still maintaining high levels of maternal antibodies from colostrum.”

Both mucosal and systemic immunity important, possible

“For many years, it was believed that only intranasal vaccines produced the front-line mucosal immunity provided by IgA antibodies and interferon, and that injectable vaccines were responsible only for systemic immunity with IgG antibodies,” continued Dr. Wade. “But it’s not that cut and dried, because newer technologies are available.”

The BRSV study found that calves receiving the injectable vaccine developed an IgA mucosal immune response to BRSV when antibodies in the nasal secretions were measured. Vaccinated calves also had significantly higher interferon levels than their unvaccinated counterparts.⁵

“We now know we can use specific injectable vaccines to produce IgA antibodies and interferons in the mucosa of calves that are at least 30 days of age,” clarified Dr. Wade.

Consider the value of broad-spectrum immunity

“Intranasal vaccines may benefit very young calves at high risk of exposure to respiratory pathogens early in life,” Dr. Wade noted. “However, injectable vaccines should be used at 30 to 60 days of age before turnout to stimulate the kind of strong, more long-lasting immunity that is needed for calves prior to weaning.”

Injectable respiratory vaccines also protect calves against important viruses not covered by intranasal vaccines, such as BVDV Types 1 and 2. BVD Type 1 is the leading cause of persistently infected (PI) calves, which can continually shed the BVD virus to their herd mates.³ Consideration should be given to injectable vaccines that protect against the most prevalent BVDV, Type 1b.⁶

Every herd is different, so remember to consult a veterinarian to develop the most effective protocols for your operation.

References:

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