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Precalving Vaccination Programs for Cows

by Heather Smith Thomas

C calves have a better chance of staying healthy during their first weeks of life if they get an adequate amount of good-quality colostrum containing antibodies against most of the pathogens they may encounter soon after birth. If the dam has a chance to build high levels of antibodies before calving, she can pass this temporary immunity to her calf. Preventing calfhood disease is a combination of many factors which include a clean environment and well-nourished, healthy cows with strong immunities.

Shelie Laflin, a veterinarian formerly with Kansas State University, says the cow starts collecting antibodies into her mammary glands about four to six weeks prior to calving.

"This gives us an idea about when we should give pre-calving vaccines," she explains. "Since it takes about two weeks for an animal to respond at maximum potential to the vaccination, we're looking at a minimum of eight weeks prior to calving for giving the vaccine. If the vaccine is given too close to calving, you won't get much effect, and if you vaccinate them really close to calving you won't get any effect at all."

Regarding types of vaccines commonly recommended, these will vary depending on the problems a ranch is having. "If you have problems with Clostridial abomasitis (inflammation or infection of the abomasum, caused by *Clostridium*

perfringens) in calves, a Clostridial vaccine would be appropriate. If it's a scours problem, certain vaccines can be helpful, but no vaccine can make up for poor management," she says.

Steve Hendrick, DMV, Coaldale Veterinary Clinic in Coaldale, Alberta, says that in many herds precalving vaccinations mean scours vaccines. "Some people are also starting to add BVD-IBR vaccines to that program. There are some modified-live vaccines on the market now that are labeled for use in pregnant cows, provided those cows were

vaccinated previously and have some immunity already," he says.

Can vaccination cause abortion?

If abortions occur in late pregnancy, some producers wonder if the abortions occurred because they vaccinated the cows.

"There is always the question about how well protected the animals are, when you start giving modified-live virus vaccine to pregnant cows," Hendrick says. "We experience some abortions in herds that have gone this route. The question then is whether the cows didn't have enough immunity

when they received the vaccination or was it the fault of the vaccine?"

Sometimes cows are given a lot of different vaccines at once. "In some herds they are being given a scours vaccination along with the clostridial and BVD-IBR vaccine," he says. "Perhaps in some cases this overwhelms the cows' immune system."

Hendrick says the *E. coli* in scours vaccine is a gram negative bacterium meaning the bacteria have an endotoxin within the cell wall that is released when the bacteria die. "This toxin can make the cow sick," he says. "That vaccine, by itself, isn't enough to make the cow sick. But the clostridials and even some of the BVD vaccines, with leptos, etc. will have some other gram negative bacteria added to all this. The more vaccines with gram negative bacteria that we give the cow at one time could possibly be detrimental and could potentially make her abort. I worry when we throw so much at these cows at the same time."

Hendrick says vaccination should always be tailored to each rancher's own herd. By working with a local veterinarian, cattlemen can create a herd health program that fits their situation. "It's also crucial to consult with your vet to know what's safe to give your cows pre-calving, and not something that you'll regret later," he says.

If cows are purchased without a known vaccination history, breeders need to be careful of what vaccinations are then given.

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“In these cases we generally use a killed vaccine rather than modified-live, just to be safe, and then give them the modified-live after they’ve calved and before they are bred again,” says Hendrick.

Vaccines to prevent scours

Scours vaccinations can be beneficial in herds that have certain problems. However, Hendricks says there are limitations regarding what the vaccinations cover and which problems can actually be helped. The important thing is to have healthy cows with strong immune systems to produce strong calves that can take full advantage of the antibodies in colostrum. Sometimes cows are unable to develop immunity when they are vaccinated, especially if they have inadequate nutrition.

Some types of scours vaccines provide more protection than others. University of Calgary Faculty of Veterinary Medicine’s Eugene Janzen says the *E. coli* vaccines work very well but may not be as necessary today as they have been in the past since many stockmen have moved away from calving in confined or contaminated areas.

“Some of the viral fractions of the pre-calving vaccines, such as the rotavirus and coronaviruses, may not perform as well as the *E. coli* vaccines, and timing is much more critical,” Janzen says. “If calves will be at high risk between two to four weeks of age for viral infections, you need to make sure that there will be enough antibodies in the colostrum to help them at that time.” The cow will need peak antibody levels when she calves to have enough passive immunity for the calf to give it protection that long.

“With those particular viruses, if you boost the cow’s immunity, those antibody levels rise fairly quickly and would be deposited in the colostrum fairly quickly. But they also wane quickly. If you vaccinate cows in early February and the majority of your calves arrive the end of March, efficacy of that vaccine will be compromised,” Janzen says. Cattlemen need to vaccinate the cows closer to when their calves will be at risk or to give a booster shot closer to that time.

“If calving is strung out, and especially if it’s behind the barn rather than out on pasture, we encourage ranchers to vaccinate the late calvers again,” Janzen explains. Peak antibody response at the proper time will help the calves.

Some products are a combination, giving protection against rotavirus and coronavirus as well as *E. coli* in young calves. There are several brands and types of scours vaccines on the market. Hendrick says, “Talk with your own vet to know what might be recommended in your situation. The timing for these

may also differ, depending on the type of vaccine.”

There are differences on what the manufacturers advise, whether it’s two weeks or a month to six weeks before calving. Make a plan, in consultation with your veterinarian, regarding what product to use and when, depending on when it is feasible, to have the cows accessible for vaccinating. Ranch facilities and calving seasons will dictate what would be most practical.

“Boosting at least on an annual basis can help maintain immunity,” Hendrick says. “If you skip a year or two during the life of a cow and then come back with another vaccination, it may not give much protection. You need to start over with a two-shot series.”

Clostridial vaccines

Janzen encourages ranchers to vaccinate their cow herd for Clostridial organisms especially *perfringens*, since *perfringens* may occasionally be to blame for various enterotoxemias. “It is often difficult to make this diagnosis in calves, and even our diagnostic labs may have trouble diagnosing Clostridial diseases in the young calf, but we suspect that some of the *perfringens* (like Type C and D) can cause toxic gut infection. At least this particular vaccine is relatively inexpensive so most of us vaccinate in case it might help,” he says.

There are many vaccines with many label claims. “The *E. coli* vaccines work so well that we tend to think everything else should work in a similar fashion, but it’s not that simple,” Janzen says. “Some of the diagnoses regarding diarrhea in calves are not definitive. Most of the time we don’t know with certainty what we are dealing with, and we just play the odds.”

In some instances, in some herds, other types of *perfringens* can cause toxic gut infections (such as *C. perfringens* type A or E), and those are not included in the 8-way Clostridial vaccines. If one of these has been diagnosed in a herd, a separate vaccine or an autogenous vaccine can be used.

Protective colostrum

After the cows have been vaccinated prior to calving, the important thing is to make sure each newborn calf nurses his dam in a timely manner and gets an adequate amount of colostrum. If the calf can’t nurse for some reason or is delayed in nursing, it won’t have that protection, and money was wasted on the vaccine. If the cow’s teats are too big or the calf gets chilled before it gets the job done, it won’t obtain immunity.

“We know that after about 12 hours of age, the calf’s ability to absorb antibodies is very diminished, and completely gone by 24 hours of age,” Laflin says. Optimum time to absorb the

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maximum amount of antibodies is within the first two to four hours after birth.

“Making sure the calf gets up quickly and suckles an adequate volume is important. An 80-100 lb. calf should readily suck out both quarters on one side of the average cow, at first nursing,” she says.

There are many factors involved in protecting calves during their first weeks of life. Some cows don’t mount a strong immunity to vaccines, so their colostrum may not be as protective. The main thing is to keep improving herd health through good management. Laflin says all too often people want an easy answer and think vaccine will do it all or become disappointed if the vaccine “doesn’t work.” It can’t take the place of good management.

“Vaccinations can be helpful, but people shouldn’t try to depend on vaccine as a crutch,” she says. “You can vaccinate a cow multiple times, but if she is lying in manure in a dirty calving lot, and the calf gets a mouthful of *E. coli* as he is being born and before he gets the colostrum, he won’t be protected. Even if he suckles quickly, if the cow’s teats are dirty and he ingests *E. coli* or *Salmonella* bacteria, he’ll probably get sick,” she says. It’s always a race between the antibodies and pathogens to get to the calf’s GI tract first.

“I don’t blanket-recommend any particular vaccine except the clostridial vaccines. If you’ve historically had problems with scours, you’d also consider some of the other products as well. One product has a good *corona virus* vaccine in it, but if *E. coli* is your main problem, there are other products that might work best for that disease,” Laflin says.

Veterinarians can help cattle select the best product for their particular situation after diagnosing the actual cause of a specific problem by posting some dead calves or taking diagnostic samples to determine the cause(s) of scours and then figure out the best strategy for minimizing future losses.

Laflin says a scours problem can also vary within the same herd between heifers and cows. “If you can maintain them in separate pastures, this can make a difference too,” says Laflin. On average, heifers have less quantity and quality of colostrum and may not give their calves as much protection.

“Often the volume is less than from a mature cow, and a heifer has not been exposed to as many different types of pathogens in her short life,” Laflin explains. “Thus the quality of colostrum is less.” To best protect heifers’ calves, diligently address any management issues and make sure the heifers are appropriately vaccinated.

“If I only get one ‘swing of the bat’ with ranchers on scours prevention I usually target the heifers as opposed to the cows, though this might vary with the situation on that particular ranch,” she says. “Maybe they are doing a really good job of handling the heifers and keeping them in a clean environment and scours might not be a problem in the calving heifers.”

Scours prevention isn’t as simple as using a vaccination. “There is definitely a place for vaccine, but some producers may try to lean too heavily on it and disregard some of the important management protocols or proper attention to newborn calves to make sure they get up and suckle,” Laflin says. “Pre-calving vaccines do work. They increase immunity in the cow and antibody production in the mammary gland — if given at the appropriate time before calving. But whether they decrease disease in the young calf will depend on other factors, such as whether the calf gets enough of the colostrum within the appropriate time, and whether the environmental pathogen load is not too high,” she explains. Overall, nutrition and management are much more important than vaccine in the total picture, but it can be one part of the equation. **HW**

Protozoal diarrheas

Some calf scours are caused by protozoal infections such as cryptosporidiosis or coccidiosis. “There are no vaccines for these infections,” says University of Calgary Faculty of Veterinary Medicine’s Eugene Janzen. “Some people put an ionophore into the cows’ ration to prevent shedding of those organisms in their feces so there will be less

for the calves to pick up, but microbiologists tell us that the infectious pressure is much greater coming from the contemporary calves than from the cows.”

If a calf gets sick, it sheds many times more pathogens than what might be in the cow’s feces. “The sick calves will greatly amplify the infectious pressure,” Janzen says. “Feeding cows ionophores may help at the beginning of calving season by preventing introduction of the organism into the calf population. But if any calves get sick and contaminate the calving ground, feeding the cows an ionophore won’t make much difference. As they go through a calf, these organisms proliferate tremendously, whereas the cow might have a few in her digestive tract but she’s immune and not shedding to the same extent that a calf will.”

Janzen says the old rule about getting cows spread out on clean ground at calving is still the best advice for preventing disease in young calves. Prevention depends more on good management and clean calving areas than a vaccine bottle. **HW**

