



Getting Heifers Off to a Good Start for Disease Immunity

Understand how to tailor your vaccination program to best suit your operation.

by Heather Smith Thomas

It is important to start building good immunity in replacement heifers before they enter the cow herd and to time their vaccinations appropriately throughout their adult life — to keep immunity strong. Chris Chase, Ph.D., Department of Veterinary and Biomedical Sciences, South Dakota State University, says the key in heifer development is to get started with vaccinations at a young age.

“The biggest problem I see with heifers is when people buy them and don’t know their vaccination history,” he says. “It is important to get a couple doses

of vaccine into them before they are bred.”

He says the three diseases he would be the most concerned about and which can be prevented most effectively with a vaccination are leptospirosis, BVD (bovine viral diarrhea) and IBR (infectious bovine rhinotracheitis). He explains there are some other reproductive diseases like neospora that are not as much of a problem in beef cows as in dairy cows but notes there isn’t

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a very good vaccine for it. Additionally, he says Trich is a big issue, but it’s not an easy disease to vaccinate for because the nature of the organism, protozoa, doesn’t make a good candidate for an effective vaccine.

Leptospirosis

Chase explains the lepto strain *Leptospira borgpetersenii* serovar *hardjo* type *hardjo-bovis* (HBP) is generally more of an issue in a dairy herd. Dairy heifers are often vaccinated

very young for the HBP strain since cows act as a reservoir for that one.

In contrast, he says the strains we generally think of in beef cattle are *Leptospira hardjo*, *Leptospira pomona*, *Leptospira canicola*, *Leptospira icterohaemorrhagiae*, and *Leptospira grippityphosa*. He explains those are the strains found in wildlife and, thus, in the environment.”

He says the best time to vaccinate beef heifers with lepto is when they are ready for their first breeding season.

“We can include lepto with the IBR-BVD vaccines we give at weaning time,” he explains,

“either as a combination, or given separately. If you are vaccinating heifers that are not going to be replacements in the herd, you don’t have to worry about leptos.”

BVD-IBR

Chase advises a couple of doses of MLV (modified live vaccine) should be administered to beef heifers between six and 10 months of age. Some producers prefer to use killed vaccine, and he says that is an acceptable option, but when it comes to BVD and persistence, heifers need a couple of doses of BVD MLV vaccine early.

“A lot of people give IBR-BVD to their calves at branding time,” he says. “My personal opinion is that vaccinating at that age is generally to prevent respiratory disease. After those calves are weaned, we need to get a couple doses of MLV vaccine into them. This can be done at weaning age and then again before their first breeding season.”

Research by Oklahoma State University has shown the first dose starts the immune process and the second dose a couple weeks after weaning acts as a booster. Chase explains this can be as effective as giving it to the calves three weeks before weaning and then as a booster a couple of weeks after weaning, but he still prefers to get a couple of doses into them after they have been weaned.

Brucellosis

Chase stresses the importance of giving all breeding heifers this vaccination by weaning time. He says he likes to give this vaccination completely separate from others when possible.

“It’s a challenge for many producers to do it at a different time, but it’s better,” he explains. “When a producer is getting ready to give the second dose of MLV, I’d rather give the Brucella to them when giving a clostridial or some kind of killed vaccine.”

He notes interesting work in England that shows both TB (tuberculosis) testing and brucellosis vaccination may be affected if done at the same time as MLV vaccines, and it can decrease the reaction and immune response.

Brucella is an intracellular bacteria, so, he says, there needs to be a response that turns on cellular immunity for the vaccine to be effective. For most bacteria, an antibody response is effective but not for brucella. Chase explains the brucella likes to spend its time in the cell and

a cell-mediated immunity would turn it on.

He notes if something suppresses immunity a little bit, it would not be good.

“Brucella [Bangs vaccination] by itself can be pretty hard on heifers anyway, so it helps to have a clean sweep at it,” Chase advises. “If you have to give something else at that same time, just give a killed vaccine or bacterin. That way we’re not doing anything that would compromise their immune response.”

Precautions with MLV vaccines

Once the heifers are bred and they’ve had their two doses of MLV vaccines before breeding, Chase says he only recommends MLV vaccine when they are open. He explains even though there are safety claims for pregnant animals, efficacy and protection have not been demonstrated for that next reproductive period. He says this situation holds true to all vaccines during pregnancy.

“If I have a well-vaccinated animal and I give her a MLV vaccine, her immune system doesn’t know the difference between a vaccine virus and a field strain,” he says. “That’s why it does a good job of neutralizing the vaccine virus and makes it safe, but then why are we vaccinating her? We vaccinate to try to get a better immune response.”

An animal that didn’t respond very well the first time may get a little more benefit from giving another MLV, but he says once he’s established heifers on their MLV



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program, he doesn’t mind using killed vaccine in pregnant cows.

However, for optimal protection against PI (persistently infected) in BVD, he recommends administering the vaccine prior to breeding. All the safety studies for this vaccine were done in naïve animals, so Chase says researchers involved in the studies still don’t know how good the efficacy is when a vaccine is given to a pregnant animal in terms of the next calving and how well protected the fetus is.

“No one has looked at the pregnant animal for protection for her next calf,” he says. “The safety studies established that it was safe, in terms of abortions, but every year we see some herds in which they followed the label instructions and still had some abortions.”

He says because of this problem he is not a big fan of giving the pregnant animal an MLV vaccine.

“I feel a lot more comfortable giving that animal inactivated vaccine, from a safety standpoint,” he explains. “There is plenty of antigen there, and it will certainly boost antibodies in colostrum and there is a lot to be said for that aspect.”

Precalving vaccines to protect the calf from disease

Since newborn calves are vulnerable to many pathogens, he recommends making sure there are plenty of antibodies in colostrum. He advises timing the vaccination of the heifer so she will give her calf protection.

“Most people are vaccinating a little too early for that benefit because typically they are vaccinating at preg check time, which would be late fall and the heifer may not be calving until early to mid-spring,” he explains. “With most of these vaccines, this timing is not ideal, but the response is certainly better, even that far out, than what you’d see with a MLV vaccine at that stage of pregnancy.”

He recognizes it’s not ideal, but producers should administer the scours vaccine later, closer to calving. He stresses the importance of this timing in heifers especially.

“Make sure you get that into them 10 to 12 weeks before calving for the first dose and then

continued on page 42...



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...Getting Heifers Off to a Good Start for Disease Immunity continued from page 41

four to six weeks before calving for the second dose,” he says.

Additionally, the killed IBR-BVD vaccine should be administered at one of those times.

How often should we vaccinate?

After a heifer’s first calving, Chase says some herds get by with one annual MLV vaccination during the open period before the next breeding season.

“Vaccination is cheap insurance and this kind of program seems to work,” he says. “It all depends on risk, regarding how often a person needs to vaccinate.”

In a region where producers are using community pastures with cattle intermingling from multiple ranches and a lack of biosecurity, Chase says the risk is higher and requires more frequent vaccines. In contrast, if there is minimal risk, producers can get by with less frequent vaccination.

“We did a study in the late 1990s in South Dakota with a herd of 1,200 cows,” he recalls. “We devised a five-year experiment in which we vaccinated part of the herd every

year, and the other part of the herd every three years, with a MLV vaccine. When we looked at the cattle at the end of five years, there wasn’t any difference.”

However, Chase says the interesting thing is that Type II BVD got into the herd between year two and three. Individuals conducting the experiment pulled serum from every cow that was culled from the herd and from some of the other cows every year just to see what was going on. He notes Type II BVD came into that herd, yet there wasn’t a blip in terms of anything reproductively.

“We were using Singer strain of BVD vaccine and we showed a long time ago that it has good cross protection,” he says. “There are several strains of BVD out there that actually give good cross protection.”

He says even though the cows in that herd were only vaccinated every year or every third year, there was still a strain in the vaccine that gave them good cross protection and they had good immunity even though some were only being vaccinated every three years. He explains the only reason this system of vaccination worked

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is because it was a closed herd in a part of South Dakota where there are no community pastures. These ranchers control all the land around them. Chase says a ranch has to look closely at its own management and to assess its level of biosecurity regarding how often it needs to vaccinate.

“We have to look at what our risk is and our biosecurity level,” he says. “It’s like the human population. We have exposure as well as immunization. In cattle we don’t want exposure, yet it can give some immunity. If we have exposure, and know that our immunity is broad enough, we can be OK.”

He explains that’s what happened in the South Dakota herd because those cows’ immunity was broad enough the herd was completely protected. He notes the herd had no PI cattle and no drop-off in reproductive rate and were completely protected even though only part of the animals were being vaccinated every year and some every third year.

“If you have a closed herd and are cognizant of what you are doing, you might get by with less vaccination,” he explains, “but that’s a big ‘if’ because sometimes things happen.”

Chase gives a scenario that producers might think they have a closed herd and then their neighbor buys a bunch of new cattle and his bull gets out and comes down the road to jump in with some of the producer’s cattle.

“Something like this obviously happened in the South Dakota herd, because it was a closed herd, and yet they got Type II BVD,” he explains. “They had some adjoining pastures with other cattle, so they did get exposure. This all goes back to why it is so important to have a solid basis of immunity to begin with.”

The need for a solid foundation
Chase says getting the proper vaccinations into a young heifer while she’s growing and developing, not while she is pregnant for the first time

or under stress, is crucial. If cattle are on a good nutritional plane and the minerals in their diet are well balanced, he explains, these elements lead to development of immune memory. Proper immunization during the heifer stage is so important because once that basis is there and heifers have good solid immunity, Chase says they will do fine. “Even if you miss one in later years when vaccinating” he says, “the chances that she will respond later will be excellent.”

“There is no way, biologically, to guarantee 100% immunity,” he explains. “There’s no way to get 100% response to any vaccine. If we can get 70 to 80% of the animals protected with BVD or IBR vaccine, the chances of having any issues in that herd are going to be very low. That’s how it works, in the real world.”

In all the studies where Chase has been involved, the cattle achieve 90 to 95% protection, and he says that is probably as good as they can do, in the most ideal conditions.

“This is excellent because these viruses have to move from animal to animal, and if they go into an animal that’s already immunized we won’t have a herd problem,” he says. “We have adequate herd immunity.”

He says the goal is to take care of the heifers adequately on the front end, and then the vaccines available today work very well. He stresses the importance of assuring the brucellosis vaccination is administered separately, and then, he says, producers can adopt an annual vaccination program. If people have an issue with something like leptospirosis, it obviously has to do with exposure, such as cattle getting it from waterways contaminated by wildlife. Chase says if cattle have continual exposure, it may be a benefit to vaccinate twice a year.

Every vaccination program needs to be tailored for a particular ranch or farm. Chase says a producer can’t always go by what his neighbor does or what the vaccine company says he should do.

“You really need an assessment of your own risk,” he says. “Work with your veterinarian on herd health, to figure out what is best for your herd.”

He says if any problems arise in a herd, it is crucial to understand the cause of the problem so the vaccination program can best be tailored to address those issues, as well. **HW**



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