

CALVING EASE

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VACCINATION DOES NOT EQUAL IMMUNIZATION

Vaccinate for the Right Bugs

We usually vaccinate calves for two reasons. First, we want to increase the calves' resistance against pathogens that regularly cause disease on our farm. Second, we want to get the calves ready to enter the herd as adults. Our goal is to match vaccines with the disease-causing pathogens. When we vaccinate for the right bugs the heifers at least have a chance of being more immune against the pathogens most likely to be a problem on our farm.

Following Vaccine Directions

Many vaccines require a second injection in order to effectively increase a heifer's resistance to disease. In a two-injection sequence the first dose stimulates a "primary response." This is fairly short-lived, not very strong and is mostly antibodies in the form of IgM. The second dose is much stronger and lasts a lot longer.

What happens if the second dose is given too soon? The secondary or anamnestic response is much smaller and too little of the antibody IgG is created. If the second dose is given too late this dose will act like another primary vaccination. To get the greatest amount of immunity from a vaccine, follow the manufacturer's instructions. Give the booster injection at the correct time.

Maximize a Vaccine's Potential

Remember the principles of increasing immunity through vaccination. By injecting a vaccine we present the animal's immune system with a dead or weakened form of the pathogen (sometimes called antigens). The immune system reacts to this stimulus. All kinds of new protein bodies and cells are formed to circulate in the blood. They form the defense against invasion by the "real thing."

What conditions weaken the immune system's response to the vaccine? What should calf and heifer managers do to maximize a vaccine's potential?

First, provide enough of a good quality balanced ration to meet not only the heifers' maintenance needs but also what's required for growth. An immune system response to a

Calving Ease December 2000

vaccination depends partly on how much energy and protein is available in the animal. If a heifer's ration provides barely enough groceries to maintain herself she has a poor chance to mounting a maximum response to the vaccine antigens. For example, the ration that was adequate in July may not contain enough energy in January. Or, protein levels for breeding-age heifers may not be adequate for two month old calves.

Second, provide free-choice clean good quality water. This may sound too simple to be included. But, calves in individual pens may have an inadequate volume of water to sustain growth of any kind, including immune system growth. Al Kertz reminds us to be sure that calves have at least four pounds of water for each pound of dry matter consumed. For a recently weaned heifer eating five pounds (or quarts) of starter grain and two pounds of dry hay daily that comes to over three gallons daily. Or, consider the case where not enough waterer space is provided for a group of older heifers. The less-aggressive ones drink too little. So, why is this important? An immune response to vaccination is growth. New cells have to be formed and they require water.

Third, manage stress carefully. At any age stress events have the potential to ruin a bovine vaccination program. These include handling, transporting, changes in feed and/or housing, docking, dehorning, housing where heifers consistently get wet and dirty, poorly ventilated housing and wide swings in environmental temperature. Heifers get sick because stresses impair their immune systems' ability to overcome pathogens.

These same stresses impair heifers' ability to respond to vaccine antigens, also. The real world says, "The greater the stress the poorer the vaccination response." Manage for less stress in order to maximize the return on your vaccination dollars. On hot summer days this might mean giving vaccines early in the cool morning rather than when heifers' temperatures peak in late afternoon. Managing around stress could mean moving a vaccination routine to a week before or after a change in feed rather than giving vaccines the same time the heifers have a change in ration.

Fourth, handle the vaccine correctly. All vaccines are weakened when exposed to sunlight. Heat is another enemy of vaccines. For example, the tray on top of the pickup dashboard is definitely a bad place to carry vaccines. Modified Live Virus (MLV) vaccines have a limited useful life once reconstituted. Maximize the effectiveness of MLV vaccines by minimizing the time between mixing and injecting them. Beyond three or four hours after mixing most MLV vaccines are already ineffective. Forget storing MLV vaccines in the refrigerator to use tomorrow

References: Cortese, V.M., "Designing Vaccination Programs for Today's Cattle," paper at AABP annual meeting, September, 2000. and Cortese, V.M. "Heifer Vaccination Program Fundamentals," *The Western Dairyman*, March, 1999. Kertz, A.F. and Others, "Ad libitum water intake by neonatal calves and its relationship to calf starter intake, weight gain, feces score, and season." *Journal of Dairy Science* 67:2964-2696.

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