Vaccination Programs: Is There An Answer?

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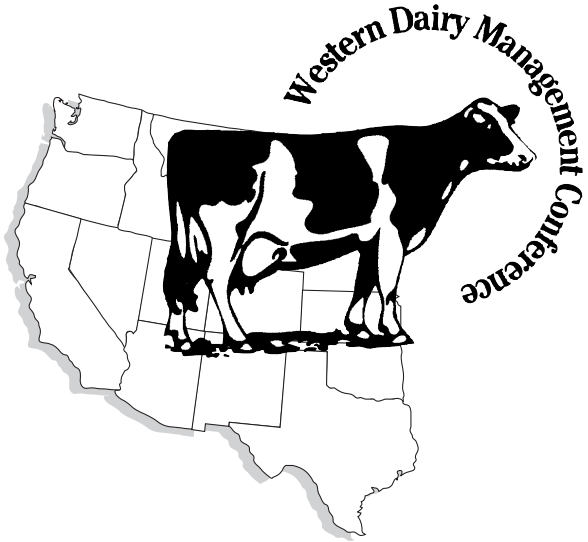

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In order to scientifically chose a vaccine or design a particular vaccination program it is necessary to consider many variables. Some of these include:

1. Presence and degree of challenge of the particular diseases on the farm or ranch.

2. Management practices available that lend themselves to vaccination programs.

3. At what times or ages are the disease problems occurring and are they associated with any stressor.

4. How the disease is protected against by the body.

5. Some basic immunology concepts.

6. Information available on products being considered, and the source and quality of the information.

Challenge

One thing to keep in mind is that challenge and protection are in a constant state of fluctuation. We like to think that when we vaccinate an animal, they all develop a certain level of protection. However, biological variability affects the level of protection. The same is true with the amount of exposure to a pathogen. Overwhelming challenge can override the immunity and lead to disease in vaccinated animals.

Timing Of Disease

Many of the farms we work with have a consistent time when certain diseases occur. The timing may give some insight into stresses that are occurring in the management of the cattle that can be dealt with and have more of an impact than vaccination. Furthermore, this type of a history is helpful to determine the timing of vaccinations. This is a tool that is often under utilized in veterinary medicine but if we know when a problem is occurring prevaccination schedules that will give maximum immune responses close to the expected trouble time can be very beneficial.

Designing A Vaccination Program

Vaccination programs in a cow herd need to be custom designed for the particular need of the herd. Vaccination programs in the replacement stock have two specific goals that need to be met. the first is to prepare the calf against any pathogens that are causing disease problems in the calves. The second is to prepare the calf for entry into the adult herd with a good foundation of protection from which to build herd immunity. Although herd programs vary in pathogens contained for most cow/calf and dairy herds the minimum vaccination program should be built around the four major viral diseases (BVD, IBR, PI3 and BRSV) the five Leptospira serovars and for most parts of the country the major Clostridial diseases and Brucellosis. This should be the cornerstone of the program other pathogens are then optional and are added depending on herd or area problems At least one four way modified live viral vaccine should be included for replacement animals to establish a strong baseline immunity against BVD and IBR.

Booster Importance

It is important to follow the label directions for administering vaccines. Killed vaccines and modified live BRSV require a booster before protection is complete. The first time a killed vaccine is administered the primary response occurs. This response is fairly short lived and is not very strong. The predominant antibody is IgM. The response seen after a booster vaccination is called the secondary response or anamnestic response. This response is much stronger and long lived and is primarily IgG. Also, there is more memory made in response to the booster. If the booster is given too early, the anamnestic response doesn't occur; and if too much time elapses before the booster is given, it acts as a primary shot not as a booster. With modified live vaccines, the primary shots also stimulates the secondary response without needing a booster since the virus or bacteria is growing in the animal.

Adverse Reactions

Adverse reactions are a potential risk with any vaccination used. These reactions fall into three primary types:

1. Immediate hypersensitivity is mediated by IgE and the release of granules from basophils and mast cells. This reaction is seen within minutes of vaccination and

often begins with shaking or sweating. The majority of these animals respond very well to epinephrine.

2. Delayed hypersensitivity is mediated by a subset of T cells and is delayed by up to 24 hours following vaccination. The signs are similar to immediate hypersensitivity and treatment is again epinephrine.

3. One of the more common reactions seen in dairy cattle has been associated with the endotoxin found in some vaccines. This is seen primarily in Holsteins due some genetic predispositions and can be seen following administration of any gram-negative bacterin. The pre breeding yearling heifer appears to be the most sensitive. The signs seen vary depending on farm or individual sensitivity and/or the number or severity of the gram negatives in the vaccination program for the day and include:

a. anorexia and milk drops
b. early embryonic deaths
c. abortions
d. gram negative bacterial (endotoxic shock), requiring steroids, antihistamines and fluids.

Summary:

Designing a vaccination program involves a good history of the individual farm as well as a basic understanding of the immune system. The vaccines chosen should have good solid efficacy studies as well as effectiveness and efficiency studies if possible to ensure that the product can fulfill the needs of the farm or ranch. Management decisions may be made that do not maximize the potential of the products chosen and realistic expectations of all products should be well explained to the producer before they are used. The owner should be involved in the vaccine decision process so that all the information on the product is shared.

The establishment of good baseline immunity of replacement heifers and the foundation vaccination program can determine much of the replacements future health status and should be stressed in vaccination programs

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Notes