Vaccines I would Not Use in My Cattle

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There are numerous vaccines available for cattle. Each of them were developed with the intent to provide protection from infectious agents that are believed to cause clinical disease. However, development of disease in susceptible animal is dependent not only on the host and pathogen, but also on many management factors. Certain of the current vaccines are better than others in providing protection from specific diseases. Differences among vaccines are significant and depend on the amount of antigen, the serotype (specificity) of the antigens, whether the antigen is live or non-infectious, the route of administration, the number of doses given, the adjuvant and other vaccine factors. Equally important are the many host factors such as age of the animal, the amount of passively acquired antibody present at time of vaccination, the nutritional status of the animal, immunogenetics and additional host factors. Management must also be considered such as crowding, ventilation, sanitation, water and feed sources (e.g. contamination), stress related to movement, assembly of animals from various sources, environmental factors such as fluctuations in temperatures, as well as other management factors.

Consideration of and an understanding of the multiple vaccine, host and management factors are critical to a successful outcome when effective vaccines are given properly since all factors determine if protective immunity develops in a majority of the vaccinated animals. Vaccines alone cannot improve problems in management! Protective immunity is defined as that immunity providing protection against significant clinical disease from the pathogen(s) covered by the vaccine. It is not only important to develop a vaccination program that provides protection from diseases it is also critical that the vaccination program does not negatively impact production (e.g. weight gain, milk production). It is not always possible to achieve both of these goals, therefore, one must carefully measure risk/benefit, and cost/benefit for a specific vaccine or a specific vaccination program.

It should be realized that most vaccines fail to immunize a very young, severely stressed animal with high levels of passively acquired maternal antibody, however, these animals probably are already protected by passively acquired immunity, therefore, you don't need to vaccinate. The period of suppression or refractiveness to effective immunization after birth from various stress factors will be as short as 24 to 48 hours or as long as 2 to 3 weeks depending on how the calf is managed at birth and shortly thereafter (e.g. is left on the dam, receives adequate colostrum, is shipped to a sales barn, is put in a calf hutch on farm, is not cleaned off, is in an extremely cold or hot environment, etc.). Because of this period of immunosuppression there are few vaccines I would recommend during the first 24 to 48 hours after birth. One exception, if one wanted to use it, would be a corona/rotavirus vaccine recommended to be given as soon after birth as possible. After the first 3 to 7 days depending on the amount of stress the calf incurred, vaccines like an intranasal IBR/PI-3 vaccine which is safe and effective, but a nuisance to administer in beef calves, could be given. However, I don't recommend that product prior to two weeks of age, since maternal antibody levels interfere even with intranasal immunization in a significant percentage of calves (e.g. (50%). In veal calf studies, we find a majority of veal calves independent of colostral antibody titers, cannot respond or responded poorly to modified live or killed vaccines containing IBR, BVDV, PI-3 and BRSV if given during the first week of life. Thus in our experience the practice of vaccinating veal calves at 3 to 4 days after they arrive in the barn provides little chance of stimulating significant protective immunity. In contrast, vaccinating dairy heifers or beef calves raised on farms under low stress situations results in good immune responses especially when maternal antibodies levels are not high enough to interfere with active immunity.

I do not recommend a killed IBR, BVDV, PI-3, BRSV vaccine for the first series of vaccinations in any animals regardless of age. There is one notable excep-

tion, that is in a pregnant animal. The pregnant animal for obvious reasons should not be vaccinated with an MLV viral combination vaccine because if she has not previously been immunized by vaccine or infection the IBR and BVDV would have a significant chance of causing an abortion, or infecting the fetus and causing congenital anomalies or causing a weak calf ("poor doer"). I cannot agree with the recommendations made by some to vaccinate third trimester cows with a combination MLV viral vaccine for the above reasons. That practice provides no benefit to the cow or calf and it may cause significant harm when the cow does not have adequate immunity to prevent the IBR and BVDV from reaching the fetus. I see little or no reason not to use a killed viral vaccine combination to revaccinate animals previously immunized with a modified live vaccine or in animals previously immunized by natural infection.

I do not currently recommend any killed BVDV product other than one that contains type 1 and type 2 BVDV when the immune status for BVDV is unknown. Killed products containing only one type of BVDV can only stimulate immunity to that one type of BVDV. There is one company with a BVDV vaccine containing both types and several other companies at various stages of licensing killed BVDV vaccines with both types. At present the one company having both types of BVDV is Grand Laboratories and their killed vaccine of all those I have tested is the only one that induces significant antibody to type 2 BVDV. In contrast to primary vaccination with killed products, when an animal is first immunized with a MLV vaccine containing BVDV or naturally infected with BVDV and then revaccinated with any of the killed vaccine containing BVDV, all killed products will enhance the immune response to type 1 and 2 BVDV. This occurs because the MLV vaccination stimulated memory cells for type 1 and 2 BVDV and memory cells are readily stimulated by the type 1 only killed product on the market. (I will explain the mechanism during the talk).

It is important to have cattle immunized against both types of BVDV! Further, I do not recommend trying to control problems associated with BVDV by vaccination if the herd has any animals persistently infected with BVDV. No commercial vaccine will be effective in such a herd! The only way to effectively control BVDV in those herds is to identify and remove the PI animal(s). There is nothing that will better guarantee the failure of your BVDV vaccination program than the introduction or presence of one or more PI animals in a herd.

I do not recommend nor do I think it is necessary to revaccinate properly immunized cattle more often than once a year with viral vaccines and it is probably not even necessary to immunize more than once a year with the bacterial products. Neutralizing antibody and memory cells persist for years in the absence of revaccination or reinfection to many of the viruses and bacterial antigens present in current cattle vaccines. Further in my opinion the costs and/or risks of revaccinating, more than once a year outweigh the benefits

I do not recommend vaccinating animals simultaneously with modified live BVDV, BRSV and Haemophilus somnus because our research has demonstrated that this combination is lethal in some animals and is likely to cause significant amounts of IgE antibody to develop to BRSV and to H. somnus. Further, I would rarely recommend H. somnus vaccines, although they have been improved by removing much of the endotoxin so that they are less likely to cause adverse reactions.

I presently do not recommend any of the *Salmonella sp.* vaccines, because none to my knowledge or satisfaction have been found effective. I never recommend a killed BRSV and in most instances I do not recommend a MLV BRSV vaccine. However, if an intranasal BRSV product were developed that was safe and efficacious I would recommend it in many but not all circumstances. I would not use a commercial wart vaccine, hairy or otherwise since I don't believe there is any information to show wart vaccines are effective. My biases with additional vaccines will be covered during the discussion period.

My philosophy is to use those vaccines that are going to provide a benefit to the animals being vaccinated. It is important to know the products and their efficacy to administer effective products to animals that are well managed and are likely to develop immunity. Frequently no or few vaccines are the best protocol to use rather than giving whatever happens to be available in the combination products. Remember vaccines can have a negative effect on production and profits just like disease can have those effects.