

# Vaccine Selection

The best vaccine decisions come with local veterinarian's input.

by **Barb Baylor Anderson**

**W**hile some general rules may apply when deciding whether to use today's killed or modified-live virus (MLV) vaccines, the ultimate recommendation should come from your veterinarian. Both types have advantages and disadvantages, and both types are better products than a decade ago.

"There are so many products out there, and each has its good points and its challenges," says Russ Daly, South Dakota State University (SDSU) Extension veterinarian. "The best first step for producers looking to change vaccine programs is to call your vet. Veterinarians work with hundreds of herds in a given area and have hundreds of examples of how products might be expected to work on your farm."

## How they work

When deciding whether to go with a killed or MLV vaccine, gain an understanding of how each works. A killed vaccine contains bacteria or viruses that have been inactivated through heat or

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**— Russ Daly**

chemical processes. Killed vaccines contain the antigens that can produce an effective immune system response. Veterinarians say the products are generally easier to store, probably do not contain contaminating pathogens and are not likely to cause the disease.

MLV vaccines contain whole viruses that have been altered but are still able to replicate without causing the disease. They must infect living cells within the body and interact with antigen-presenting cells to activate the immune system. Advantages

to using MLV vaccines include a strong, long-lasting immune response with fewer doses. Unlike killed vaccines, adjuvants (pharmacological agents added to a drug to increase or aid their effect) are not needed. Producers also may have less chance of seeing any allergic reaction.

## Tradeoffs

"You can't say one type is better than the other. We know that either can work well, and attitudes toward killed vs. MLV have gone back and forth over time," says Daly. "The best advice is to know your

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## Sensible vaccine reminders

Russ Daly, South Dakota State University Extension veterinarian, and Grant Dewell, Iowa State University Extension beef veterinarian, offer some reminders to producers working with any vaccines:

- ▶ **Vaccinate before needed.** Preweaning vaccinations for respiratory diseases like bovine viral diarrhea (BVD) and bacterial diseases should be given to calves at least two weeks before weaning. Prebreeding vaccinations for cows and heifers are best given before breeding season begins.
- ▶ **Follow all label directions, and handle, store and use vaccines accordingly.**
- ▶ **Keep vaccines cool and limit ultraviolet light exposure to get the best immune response.** Proteins disintegrate according to time and temperature, and proteins are the major components of organisms in killed and modified-live virus vaccines (MLV) vaccines.
- ▶ **Most common disinfectants will render modified-live organisms inactive.** Traces of disinfectant left in syringes, tubing or transfer needles following cleaning will reduce the effectiveness of vaccines. Store vaccines in original packaging.



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products and their limitations. Use often comes down to individual operation timing and booster issues. For example, MLV timing is less picky.”

Grant Dewell, Iowa State University (ISU) Extension beef veterinarian, sees a little more risk with the use of MLV vaccines, but adds producers may get a better immune response.

“You can use today’s MLV products in a wider window with the new label specifications. They mimic the natural infection, while body cells present the antigens,” he says. “At the same time, killed products are very safe. The Vira Shield® line of products, for instance, also contains a good adjuvant that makes a big difference in product performance. The adjuvant is the most important part of the killed vaccine. It



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increases the immune response.”

Dewell advises beef producers concerned most about safety to consider killed vaccine products.

“Killed vaccines also are generally preferred for cows that only are vaccinated in the fall,” he says. “MLV is good for use prebreeding and can be used in a well-vaccinated herd and for calves going to the feedlot. Approval of MLV vaccines for calves nursing vaccinated cows has made a big difference to producers, and we see more widespread use of MLV because of that.”

Research continues into producing vaccines that are safer and easier to use. Most recently, Daly says biotechnology is being utilized in producing killed vaccines that use subunits of a virus or bacteria as vaccine antigens. Instead of killing the whole bacteria for the vaccine, Daly explains

that just certain parts of the protein of the bacteria are used.

### Continued improvement

“It is a high-tech engineering process to

use other bacteria to produce the pieces, or subunits, needed,” he says. “The result is a vaccine with a more targeted immune response that may be safer and smoother. It makes a lot of sense, and we will likely see more of it in the future. The potential is there for an even better killed vaccine.”

Novartis introduced a new vaccine this spring produced using biotechnology. Nuplura™ PH protects against *Mannheimia*

*haemolytica*, or bovine pneumonia. The new vaccine reportedly provides immunity within 10 days after vaccination.

Daly anticipates DNA-type vaccine development in the future, similar to the horse vaccine for West Nile virus no longer on the market. The goal is to enhance vaccine safety and efficiency.

“Nasal vaccines are an area of interest,” says Dewell. “The traditional IBR (infectious bovine rhinotracheitis) and PI<sub>3</sub> (parainfluenza-3 virus) vaccine now has BRSV (bovine respiratory syncytial virus). It has been hard to get an immune response to BRSV, but Pfizer’s Inforce™ 3 seems to have improved coverage. Younger animals ready for branding or during summer pneumonia season seem to benefit from nasal vaccines, as their young immune system starts working. We may see a five-way vaccine with three strains of BVD in the next year or so.”

Dewell adds that needleless vaccines coming down the pike will be beneficial for producers certified for the Beef Quality Assurance (BQA) program.

“Even further down the road, we could see exploration of creating vaccinations that could be administered in cattle drinking water and feed,” says Daly. “That will likely require complicated procedures for product approvals, but it may be better for animal welfare in the long run.”



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