

# Back to Basics: Frozen Vaccines

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Chances are that old, second-generation refrigerator of Grandma's is on its last leg. It freezes items placed near the rear element, while items placed near the door are warm. In the summer it barely keeps items cool because the molding is worn and does

not properly seal the door. In addition to being worn out, most of these old units are very inefficient compared to modern refrigerators. Let me guess — you purchased a new refrigerator for the house and moved that old one to the barn to store vaccines.

This scenario is much too often the case. This could very well be one of the costliest management decisions you make in your ranching operation. Improperly stored vaccines are a leading cause of immune response failure. When we use these improperly stored vaccines we get a false sense of security that our cattle are protected. However, did the cattle actually mount an immune response to the once frozen or overheated vaccines?

Vaccine failures can occur for many reasons. Regardless of the cause, the result is sick or dead cattle. We need to minimize the occurrence of vaccine failures due to variables we have control over, such as proper storage and handling.

## Label recommendations

Most labels suggest storing vaccines between 35° and 45° F. "Temperatures above or below those recommended on vaccine labels will adversely affect all vaccines, killed or modified-live," says Mike Lathrop, Pfizer Animal Health technical services veterinarian. "The impact depends upon the vaccine, as well as the duration and the degree of variance.

"Freezing is one of the worst events that can happen to a vaccine," he continues. "All killed vaccines, as well as many modified-live virus (MLV) vaccines, include an adjuvant to enhance the immune response. When vaccines with an adjuvant freeze, the adjuvant, or portions of the adjuvant, usually separate from the antigen(s) in the vaccine. This can happen immediately after freezing, resulting in a vaccine that will provide very limited or no protection. The result is that we can no longer expect or have confidence the vaccine will function to the level of the efficacy claims stated on the label."

David Thain, University of Nevada (UN) Cooperative Extension veterinarian, agrees with Lathrop and states, "There is also the possibility that the separation that Dr. Lathrop speaks to may increase the amount of free endotoxin in a bacterin with a resulting increase in the potential for adverse reactions. It is for this reason, and the likely possibility that the vaccine is no good, that I recommend throwing vaccines out that have reached temperatures outside those recommended on the label."

It is important to **monitor** and **manage** vaccine storage. This means checking on them every once in awhile and monitoring the thermometer in the refrigerator to make sure it is maintaining the temperature within the range indicated on the vaccine label, generally between 35° and 45° F.

*(Continued on page 74)*

## Back to Basics *(from page 72)*

### Trial and error

UN Cooperative Extension conducted a field study during the winter of 2005-2006. The purpose of the study was to sample refrigerators being used by western livestock operations to evaluate the suitability and effectiveness of these vaccine

storage facilities. In October 2005, 24 maximum/minimum recordable thermometers were placed in 20 ranching operations and in four feed store refrigerators. In June 2006 these same thermometers were read for minimum and maximum temperatures recorded during that time period.

Twenty-five percent of producer refrigerators failed to maintain vaccines in the safe range. Three of the five failed producers' refrigerators actually froze vaccines to 10° for an extended period of time. All five failed producers' refrigerators froze vaccines as well as allowing them to warm to unsafe levels.

In all cases, feed store refrigerators maintained adequate temperatures during the entire period.

Even if you purchase a good refrigerator for the barn, an extended subzero cold spell will freeze everything if the unit is not stored in a heated room. Turning the refrigerator off will do no good. If the ambient outside temperature is 0° F for an extended period of time, the refrigerator will not maintain temperatures within the safe range. A refrigerator that is seldom opened will creep down in temperature just like a refrigerator that is continually opened will permit the temperature to creep up. Vaccines stored on the door will be warmer, and vaccines near the freezer compartment will be colder.

A good refrigerator stored in an environmentally controlled room is a must. Freezers placed in outbuildings need to be monitored because the outside temperature, whether up or down, will have a profound effect on the refrigerator. If refrigerators are not monitored, leftover vaccines stored in the fall may appear to be normal in the spring. However, these vaccines may have been frozen for an extended period of time during the cold winter months.

It is the author's suggestion that every ranch vaccine refrigerator have a recordable minimum/maximum thermometer placed in a visible area within the unit. The refrigerator and thermometer should be monitored on a frequent basis. Additionally, only enough vaccine should be purchased for an operation's immediate needs. Feed stores and pharmaceutical companies can do a better job of storage and handling of vaccines than most ranching operations. This is going to require advanced planning and ordering of vaccines.

The bottom line is **management** and paying attention. We can vaccinate cattle, but we cannot get cattle to mount an immune response to vaccine that is not good. If your refrigerator is not reliable, do not trust it with your vaccines. That is the same as trusting it with the health of your cattle.

Perhaps a more concerted effort to care for your pharmaceutical products would be warranted. The purchase of a \$14 thermometer that records minimum and maximum temperatures and a close monitoring program will pay big dividends. We must change our mind-set of "just getting the job done" to "did we do the job right?"

As always, if you would like to discuss this article or simply would like to talk cows, do not hesitate to contact me at (775) 738-1721 or [torellr@unce.unr.edu](mailto:torellr@unce.unr.edu).

