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Calf Note #160 – Variation in refrigerator temperatures

Introduction

Vaccines, antibiotics, probiotics and many other compounds, medications and other products require special care on the farm. [Calf Note #159](#) contains information regarding storage of functional protein products such as antibody products and probiotics.

Most calf feeding operations maintain some type of cold storage – refrigerator or freezer in the calf barn. Refrigerators are kept in barns to keep important drugs, vaccines and biological at the proper storage temperature. But how do they work? It's a common experience when I visit a farm to find a refrigerator in the calf area that isn't working or working improperly. It may be broken, or in some cases, just not plugged into an outlet. These refrigerators, when working, are commonly used to store the lunches of the workers in addition to maintaining temperature of vaccines and drugs.

Figure 1 is a photo of a freezer compartment I took on a farm in the Western U.S. You can see that in addition to a vial of Salmonella dublin vaccine, it was also a storage place for an empty beer cup, used needles and a host of dead flies. Not a satisfactory situation.

On another farm I visited recently, it appeared that the producer had implemented a program to monitor the internal refrigerator temperature. Inside the fridge was a thermometer that was placed in the back of the fridge. At the time I visited the farm, the fridge was unplugged and the temperature inside the fridge was about 70 F. I asked the calf worker why it wasn't plugged in. He replied that it was "making funny noises" so they unplugged it. When? I asked. "About a week ago, maybe more" was the response. "Did you tell the manager?" "No" was the reply. "They've had too many other things to do and just forgot." "Did you move the contents?" "No" again was the reply. "Too busy. Besides, we don't use the stuff in the fridge very often." I then asked about the four bottles of colostrum in there. "How long have they been in the fridge?" I asked. "Oh, just a few days. We try to use colostrum right away." I opened the fridge and picked up one of the bottles. It smelled nasty and had chunks of coagulated protein (along with a bunch of flies) floating in the top of the two quart bottle. "Looks like this one's gone bad" I said. "You won't be using this one, will you?" The worker replied, somewhat sheepishly "No, of course not." He grabbed the bottle from my hand and dumped it into the sink. Clumps and chunks of clotted protein dropped



Figure 1. Example of a poorly managed refrigerator/freezer. Source: Jim Quigley.

into the sink with a thud. “Well”, I thought to myself, “my visit has been productive – at least one calf’s life saved” as I watched the last of the colostrum disappear into the drain.

A survey of refrigerators

In 2009, Troxel and Barham survey dairy farms, vet clinics and retail stores and installed data loggers in refrigerators in these operations. Let’s assume that a fridge is “working properly” when it can maintain the inside temperature between 2 and 7 C (36 and 45 F) at least 95% of the time. Using this definition, the authors evaluated 191 refrigerators on farms (76% of the observations), retail stores (18%), and vet clinics (6%). There were many different styles (freezer above fridge, side by side, etc.) and ages (some >20 years old).

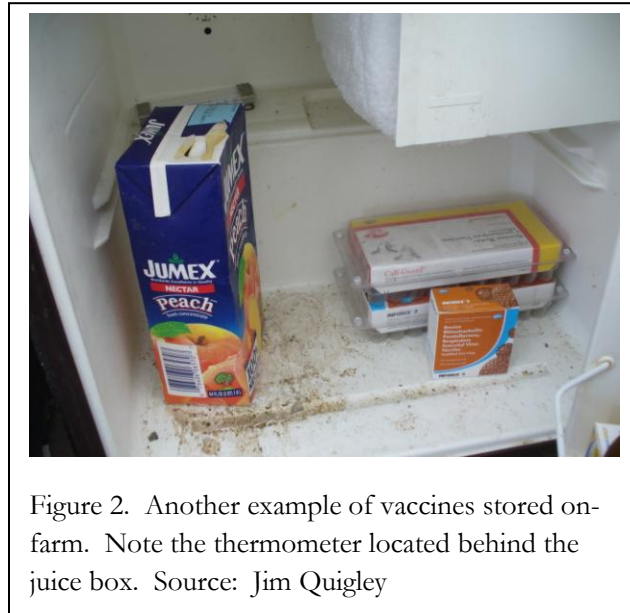


Figure 2. Another example of vaccines stored on-farm. Note the thermometer located behind the juice box. Source: Jim Quigley

What the researchers found was telling. Fully 24% of refrigerators failed to maintain proper temperature even 5% of the time. And less than 1/3 of the refrigerators (27%) maintained proper temperature >95% of the time.

Another observation made by these researchers is that most refrigerators (60%) contained drinks and 40% contained food. Generally, it’s a good idea to keep human food and animal drugs and biological separate.

Finally, the researchers counted the total number of animal health products and whether they were opened or expired. They counted 1,800 total products. Of these, 11.8% were expired and 29.3% were previously opened. In the case of vaccines, the general recommendation is to discard mixed modified live vaccines one hour after mixing. Killed vaccines should be discarded approximately 10 days after opening (Troxel and Barham, 2009).

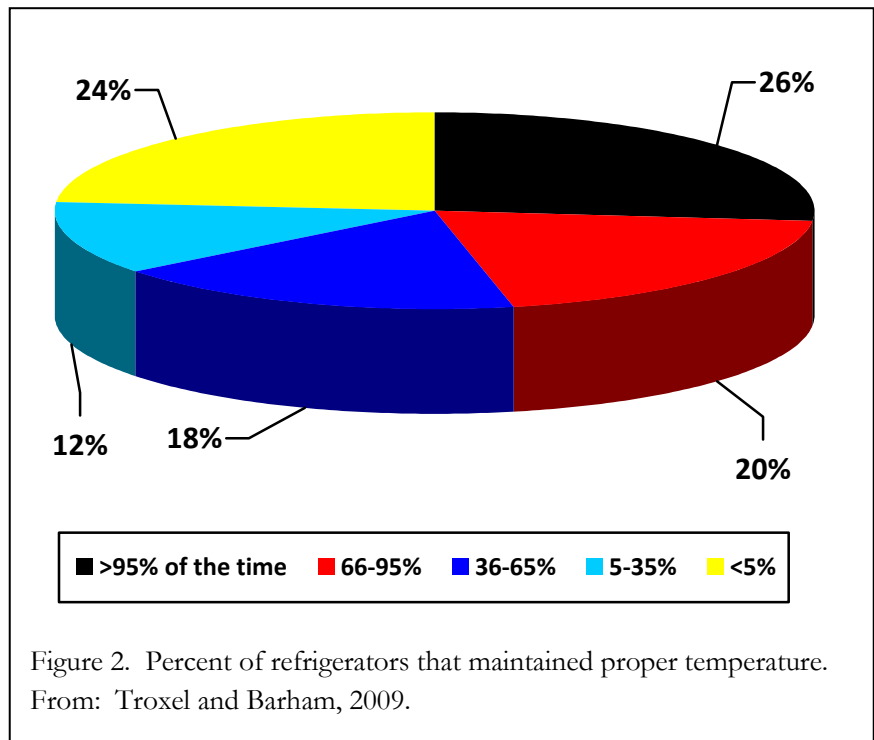


Figure 2. Percent of refrigerators that maintained proper temperature. From: Troxel and Barham, 2009.

Summary

Drug storage is important. Producers spend hundreds or thousands of dollars on vaccines, antibiotics, and other compounds every year. These products must be maintained according to the manufacturer's recommendations to maintain their efficacy. Drugs that are stored improperly or have expired may be ineffective and can pose a risk of infection if bacterial growth is allowed to occur. Maintaining proper inventory conditions for these products is essential. It is an area of management that most producers can improve. Setting up a routine maintenance program – sometimes just to check things like refrigerator temperature – can go a long way to reducing variation and improve calf performance.

References

Troxel, T. R., and B. L. Barham. 2009. Variability of refrigerators storing animal health products. *Professional Animal Scientist*. 25:202-206.

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