

HEIFER NOTES

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DAIRY CALF & HEIFER ASSOCIATION

Prepare a calf's immune response



If properly prepared, a calf's immune response can protect it from viruses, bacteria, fungi and parasites.

Did you know that a calf's immune system is completely functional at birth? However, it is naïve and cannot respond as strongly or as rapidly as when the calf becomes older, explained Amelia Woolums, Mississippi State University College of Veterinary Medicine professor, during the 2021 Dairy Calf and Heifer Association (DCHA) Annual Conference. If properly "prepared," a calf's immune response can protect it from an amazing variety of viruses, bacteria, fungi and parasites.

It takes five to eight months for a calf's immune response to function like an adult. "Until then, antibodies, proteins that specifically attack infectious agents, which the calf first receives from colostrum, provide important protection," reported Woolums. It's been said time and time again, but it's worth repeating. Calves that fail to get enough good-quality colostrum are more likely to get sick, more likely to leave the herd early and more likely to die, compared with calves that get enough good-quality colostrum. "There is still room for improvement in colostrum management on U.S. dairies and vaccination cannot substitute for this."

Young calves respond to vaccination

Even though a calf's immune response is naïve and immature during its first few months, young calves respond to vaccination, which helps them resist disease. "Healthy calves on a diet providing adequate protein, energy, vitamins and minerals can respond to vaccination as early as the first day of life," said Woolums. "Remember that early-life vaccination requires a booster within the first six months of life." This practice helps yield reliable protection.

Vaccine programs are not a "one size fits all." They are specific to each dairy farm/calf ranch and timing is key. "A vaccine given at the wrong time can make a disease worse," Woolums noted. "Also, if multiple (different) vaccines are given at the same time, a component in one vaccine could compete against a component in another, causing the calf to fail to respond adequately to the second vaccine." When a multivalent vaccine (single vaccine containing multiple viruses or bacteria) is given, the manufacturer has proven that an adequate immune response to all agents in the dose will occur.

Use a tested vaccination program

When it comes to vaccines from more than one manufacturer, the scenario changes. Not much research has tested the effects of giving different brands of multivalent vaccines at the same time. "Thus, for most possible combinations, we just don't know whether a complete immune response will occur to all components in all vaccines that could be given at the same time," warned Woolums. She recommended only giving the "absolutely necessary" vaccines at one time. "Giving multiple vaccines that contain Gram-negative bacteria – such as *E. coli*., *Salmonella* spp., *Mannheimia haemolytica*, *Pasteurella multocida*, *Histophilus somni*, *Moraxella bovis* and/or *Moraxella bovoculi* – can be particularly problematic because these bacteria all contain endotoxin, which can cause adverse reactions or even death following vaccination."

Woolums reminded DCHA members of vaccine capabilities and limitations.

1. Vaccines cannot overcome poor management.
2. Vaccines will not work well in animals with nutrient deficiencies.
3. Vaccines don't work well if they are given too close to the time the calf is exposed to infection.
4. Modified live vaccines (MLV) cannot work if they have died before they are given.
5. A vaccine can't protect against viruses or bacteria that aren't in the vaccine.

For more details about vaccine capabilities and limitations, read the paper that Woolums provided for the 2021 DCHA Annual Conference Resource Guide. Go to www.calfandheifer.org and click on "2021 Resource Guide" under the "Conference" tab.

In conclusion, Woolums said dairy producers/calf ranch managers should work with their veterinarian to develop a calf vaccination plan. This plan should include the selected vaccines and when they should be given. "In many cases, the apparent failure of vaccines to protect calves can be traced to use of vaccines in ways that don't make sense – given what we know about what vaccines can do and what they can't do," she added.

Wisconsin graduate student receives DCHA scholarship



Faith Baier

The Dairy Calf & Heifer Association named Faith Baier, Durand, Wis., as its \$1,000 scholarship recipient. This program honors an outstanding student pursuing a degree in agriculture, with a particular interest in calf health and future productivity.

Baier earned her bachelor's degree in animal science from the University of Wisconsin-River Falls, master's degree in livestock behavior and welfare from Colorado State University, and is pursuing a doctorate degree in animal welfare from UW-Madison. At UW-River Falls, Baier served as a teaching assistant, undergraduate research assistant and animal welfare lab coordinator.

While pursuing her master's degree, Baier facilitated beef cattle welfare research projects. She also co-taught undergraduate courses related to low stress cattle-handling techniques. Baier's current research involves providing simple brushes to post-weaned dairy heifers. Her study examines how the quantity of brushes per pen of heifers affects their brush use and competition, with practical implications for providing dairy heifers with simple and cost-effective environmental enrichments to enhance animal welfare. Furthermore, Baier is conducting research on feed efficiency and resource competition among lactating cows. These research results will provide insights into grouping strategies to promote feed efficiency, reduce competition and improve animal welfare.

In addition to her research, Baier is dedicated to teaching and mentoring agricultural science students. She helps coach UW-Madison's animal welfare judging team, serves as a guest lecturer for dairy management and lactation physiology courses, and supervises undergraduate research assistants who help her with on-farm data collection, processing samples and coding digital data in the laboratory.

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Heifer Notes is published quarterly by the Dairy Calf and Heifer Association and distributed to all DCHA members and associated organizations through a partnership with *Hoard's Dairyman*.

Utilizing 2 electrolyte protocols in calves

In the dairy industry, it is a first principle to provide electrolytes to calves as part of a comprehensive health and welfare program. Most farmers and calf-raisers understand that electrolytes are beneficial to a stressed or dehydrated calf. However, it may be uncommon for that same person to understand how to choose the very best calf electrolyte or how to make a value judgment on which electrolyte to use, depending on the circumstances.

The idea of electrolytes started as an adjunct therapy in children dehydrated from cholera. It was brought to athletes by University of Florida researchers and branded as Gatorade. Essentially, salt, sugar and potassium were all that was thought to be necessary to support rehydration. Now we know more; yet some of the products being used in calf rehydration therapy still follow these same outdated strategies.

Stress vs. scouring

Stressful events for calves include, but may not be limited to, temperature extremes, transportation, vaccination, dehorning, weaning, diet change and socialization/re-socialization. The first several weeks of life can be very stressful, yet will ultimately set the stage for how that animal will perform for the rest of its life. These stresses steal from the calf's energy reserves, strain the immune system and are why many farmers and calf-raisers have decided to incorporate an electrolyte into the diet of their calves as a routine management practice. Most

often, electrolytes are offered between milk feedings. These producers recognize the importance water intake has on feed intake and how routine electrolytes can drive water intake and absorption.

Scouring calves present a dirtier situation. These calves lose more fluid and critical electrolytes of sodium, potassium and chloride, with sodium being the most critical. The best electrolytes contain amino acids, such as glycine and other ingredients that will facilitate sodium absorption. High-quality electrolytes also have the appropriate osmolarity to stimulate proper absorption in the gastro-intestinal tract. This can be a delicate balancing act, because each nutrient added to an electrolyte can increase osmolarity. Finally, a buffering agent must be added to overcome the acidemia that calves face. Not all buffers are created equal. The majority of university experts have found sodium acetate to be the best buffer and sodium bicarbonate to be the poorest.

Today's most progressive farms use a two-level electrolyte strategy. A simple electrolyte designed to drive water intake and absorption is used for stressful situations – as described above and fed on a routine basis. Calves that are experiencing a digestive upset or scouring episode receive an electrolyte that is specifically formulated to meet their needs, including a buffering agent. Tailor your electrolyte supplementation to meet a calf's requirements for a given situation and develop written protocols to provide that product in a proper and timely fashion.

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Considering feeding whole milk?

It's common for me (Alyssa Dietrich of Cargill) to be approached by clients who are considering making a change in their liquid feeding programs for calves. However, when asked whether whole milk or milk replacer is "better," I can't answer without asking the producer about their capabilities and goals. I have seen success on farms using whole milk, milk replacer or a combination, and I've seen failures with every kind of feeding program, as well. There are nutritional arguments for and against any of these programs; still, none will meet your calf health and growth goals if not executed correctly.

Let's say you've decided to switch from milk replacer to whole milk because you have it available. Before you pull the trigger, ask yourself these questions:

How are liquid feed costs determined?

I rarely see costs compared fairly between milk replacers and whole milk. It's much easier to determine the cost of milk replacer because you get a bill! However, whole milk fed to calves should never be considered free. If it is saleable, you must consider its opportunity cost. And, if not saleable, at least consider the production cost. There are a few other things that are more difficult to compare. Whole milk tends to be more calorie dense per gram of dry matter. However, it does not include the beneficial additives and fortification provided in milk replacer. Also, consider the value in convenience

and labor savings that come with mixing milk replacer vs. managing whole milk.

How consistent are protocols between feedings?

No program will work if there are major inconsistencies in mixing, solids, temperature and/or volume. Milk replacer requires precise mixing of water and powder. However, there are generally more steps involved with managing whole milk, like pasteurizing and transporting milk. If you can't be sure that preparation and feeding protocols can be executed consistently, you should choose the simplest program possible.

Can employees pay attention to detail?

Proper equipment sanitation requires attention to detail. There are more surfaces whole milk touches between the cow and the calf compared with milk replacer, which is often mixed and fed immediately. With whole milk, there is higher risk of bacterial contamination when sanitation protocols are not followed correctly. Unfortunately, I've seen cases where milk is pasteurized and then re-contaminated with bacteria because of unclean milk feeding tanks.

There are many other questions to ask yourself when deciding what to feed your calves, regarding nutritional differences. Start by answering these questions and reach out to a Cargill dairy focus consultant or Alyssa Dietrich (Alyssa_Dietrich@cargill.com) for more calf and heifer solutions.

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