

Thinking Physiologically

Know calf physiology to avoid compromised newborns this spring.

by *Shelby Mettlen*, assistant editor

If you're a cattle producer, you've practiced the drill a thousand times: It's spring, and calving season is here.

Chances are, you've seen a few calves hit the ground. You prepare for it every year, and you feel like you've mastered the art pretty well. Still, year after year, there's something you wish you would have done differently.

Three core principles can help the success of your calving endeavors this spring: Get them breathing, keep them warm, and give them colostrum.

Chilly calves

Cold stress is "additive to the basic things that happen to baby calves anyway," says Frank Garry, Extension veterinarian for Colorado State University (CSU). "That's true if it's 40 [degrees Fahrenheit (F)] or if it's zero. It just gets more pronounced."

He stresses to producers that calving should never be taken for granted, regardless of the temperature or environment, but there are extra precautions that can be taken during cold weather that can help reduce complications and death in newborn calves.

"There's a whole management issue to coast into preparing for calving time," he says, including having heifers and cows well-prepared, and bulls selected. Still, he asks producers, now that your cows are calving, "What are you going to do?"

Garry reminds producers to pay special attention to cows and calves that experienced dystocia during the birthing process.

"Calves with dystocia have a special liability in addition to the stress of being born, and all calves born in a cold environment have a special liability," he says. Calves born in dystocia or in really cold weather, "now you really need to up the ante."

Big changes

"The process of being born is a crazy intense thing," says Garry, who specializes in a variety of disease, mortality, education and management practices in cattle. "It's the biggest single transition an animal ever makes in its entire life until it dies."

The process of being born is "a really unique thing" because the calf must transition from an environment where its



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every need is met, to the cold, harsh outside world.

"*In utero*, a calf doesn't worry about the temperature or the weather or nutrition or oxygen supply because those things are dealt with," he says. "Mom takes care of every bit of that, and then, in a very short period of time, the calf goes from being inside the uterus to the very difficult process of being born. Therefore, at the time it's born, everything has to change in a really radical fashion."

When a calf is born, "Every single organ system is in awesome flux," Garry says. "The calf's never used its neurologic system before. It's never used its musculoskeletal system. It's never had to breathe on its own. Its entire cardiovascular system has to adapt. Its metabolism has to change. It's gone from an anabolic state, where it's growing all the time, to suddenly, in literally minutes, it has to change that process to say, 'You're done storing energy; now you've got to use the energy.'"

Controlled by "hormones, circumstances and physiological parameters," the changes

calves undergo immediately after birth are extreme and quick.

"What I try to get producers to think about is that even at a non-medical level, these things make sense," Garry says. He compares the physiological changes undergone by calves being born to a human leaving a swimming pool.

"Even when you get out [of a swimming pool] on a nice, 70° day, you chill out really fast," he says. "So what do you do? You towel off, because if you don't, you start shivering. Calves that aren't breathing don't shiver well because they don't have enough oxygen."

Garry points out that almost all of the physiological happenings are intertwined. If one thing fails, it makes all these other things fail, too, he says.

If a calf is strong and robust in one area, it can overcome the liability in another organ system. If the calf breathes well, the abundance of oxygen can generate more energy, giving the calf greater muscular capability and making it stronger. Conversely, he says, a calf that suffers from dystocia or is

born in the cold runs a higher risk of becoming chilled, lethargic and less capable of dealing with the cold.

Good managers watch for compromised, cold or dystocia-plagued calves.

Just breathe

The first thing a calf needs to do is breathe, Garry says.

When a calf hits the ground, it's "laterally recumbent," he says, and must move into a vertical position, on its sternum, to breathe effectively.

"The sooner that happens, the better the calf can breathe," he says. "When the calf is lying flat on the ground, it can't breathe well."

The sooner the cow stimulates the calf and licks the haircoat, "the quicker the placental fluids are being removed, the sooner the haircoat is dried out, the better protection it has against the cold, and the better the calf is breathing."

All physiological processes require oxygen. The better the calf breathes, the stronger it gets. Plus, the more oxygen it has, the more energy it can generate.

"When oxygen is low, there's certain things that fail — you don't close the cardiac shunts, you don't redirect blood flow. You don't move the blood into the lungs better. If you don't move the blood into the lungs better, they don't get as much oxygen. Therefore you get these vicious cycles of things that tend to spiral downward instead of upward," Garry explains. There's magic in paying close attention and acting promptly when cattle are calving in cold weather.

"Every facility is different, and you have to find a balance," he says. "If you calve all your cows in congested environments, then you expose them to other pathogens so you lose the game somewhere else."

Be respectful of where the calf is born and be ready to assist if a cow drops a calf in a snowdrift or in mud. Open spaces free of snow and mud and sheltered from the wind should be set up ahead of time.

Keep a close eye on heifers

Because they haven't experienced the act of giving birth before, heifers need special attention close to calving time. If a calf is born and doesn't immediately start showing action, heifers don't really know what to do, Garry says. They may show aggression toward the calf or indifference.

"There's a close connection between maternal behavior and aggression," he points out.

"The point is that the heifer is more confused than a mature cow. The mature cow knows exactly what she's doing. She'll take a stillborn calf and still lick the dickens out of it, but a heifer, sometimes you need to intervene."

Garry encourages producers to set up separate areas to get the calf to bond with the heifer as soon as possible, and get the heifer engaged in the process.

"Next time around she'll do better, but the first time around, they're just a little slow on the draw," he says.

Towel off

Once the calf is on the ground, Step 2 is to make sure it's dry to protect it from the cold. Garry recommends having towels available to dry calves, and suggests having a source of forced warm air. Those options could include anything as simple as a hair dryer to a calving shed with forced air directly connected to it. Forced hot air dries the hair coat quickly and stimulates the calf.

"What's really important is to watch how the calf responds to that," Garry says. Calves that respond vigorously are probably good to go, but calves that remain weak or slow need to remain under shelter with extra attention.

Have oxygen available

Garry makes sure oxygen is available for slow calves or calves that experienced dystocia.

"I recommend people always have an oxygen tank," he says. If you have an oxy-acetylene torch at your facility, attach flexible tubing to the oxygen tank, plug in some surgical tubing and insert it into the calf's nose to administer supplemental oxygen.

"Why is that good?" he asks. "Well, the more oxygen a calf has, the more it can use its cardiovascular system, the better it breathes, and the better oxygen supply it has for the metabolic processes that need to happen to generate body heat."

Colostrum

As promptly as possible, within a half hour, make sure the calf ingests warm fluids. As any seasoned calver knows, the ideal warm fluid a calf needs is colostrum. If needed, put the heifer aside and milk her out, Garry says.

"Make sure you get all the colostrum out of her as promptly as possible, keep it warm and feed it to the calf," he says.

Yes, the calf needs antibodies and protein only colostrum can provide, but more importantly, it needs fluid. "If you don't have fluid, you can't maintain your cardiovascular tone," Garry explains.

When calves are born, they're relatively "volume-depleted," meaning the total amount of circulating blood is less than ideal, he continues, reverting back to his swimming-pool example.

When you're in a swimming pool, all of your tissues are very well-hydrated, but you need more fluid to support the amount of blood flow through the tissues.

Calving checklist

Here's a quick look at measures you can take to keep your spring calving season running smoothly.

- ▶ Create wind blocks.
- ▶ Hire help.
- ▶ Get sleep.
- ▶ Adjust feeding times so cows calve during the day.
- ▶ Ensure adequate shelter for all cows and calves.
- ▶ Keep a close eye on calves with dystocia or that aren't vigorous.
- ▶ Have a calving shelter or shed.
- ▶ Make sure the heifer bonds with the calf.
- ▶ Make sure the calf is protected from the elements.
- ▶ Make sure the calf is dry and clean.
- ▶ Make sure you have a place to milk colostrum out of the cow.

"If you jump out of a swimming pool, what are the things you do?" he asks. You immediately towel off, and then you hit the restroom.

"The reason you dump fluid is because your peripheral vasculature contracts and drives the fluid centrally," he explains. Your kidneys see this as too much fluid and excrete it.

"The third thing you do is drink fluid after you get done swimming, because your body knows that you're relatively volume-depleted. You don't have as much blood supply as you need," he says. You can survive that way, but you don't feel well, he points out. It's the same way for newborn calves.

The sooner you can get blood volume and total fluid intake up, the better.

Colostrum can be given to a calf up to an hour after birth, Garry says, but within a half hour is most effective.

Take a temperature

Garry encourages producers to take a rectal temperature on calves they didn't see born or that don't seem to be doing well.

"One of the most important assessments you can do is take a rectal temperature," he explains. "If the calf's body temperature is below 101° and certainly if it's below 100, that calf is starting to get chilly, and it probably needs supplemental heat."

"Just assume that if the calf is chilly, it probably will do well to get extra nutrition, extra warmth and maybe even extra oxygen."

Garry encourages producers in the High Plains and Rocky Mountain states to be set up to deliver oxygen through a tube to a calf for 15-20 minutes to help it get out of the starting gate.

