

Calf Scours 101: Basics of Calf Diarrhea for the Beef Cattle Producer

What is scours, and what causes it?

Scours is a term for diarrhea; another term that may be applied to this disease is “enteritis,” which means inflammation of the intestinal tract. While cattle of any age can develop diarrhea, most cases of calf scours occur under one month of age, with the majority occurring between roughly 3 and 16 days of life.

There are a variety of causes of scours in baby calves. Most of these are infectious agents.

- Viruses: Examples include rotavirus and coronavirus, bovine virus diarrhea (BVD)?
- Parasites such as *Cryptosporidium* and coccidia
- Bacteria: Certain strains of *Escherichia coli*, *Salmonella*, and *Clostridium perfringens*

Scours is often caused by more than one of these infectious agents acting together.

Overcrowding is a major contributing factor to calf scours. Overcrowding causes the number of these infectious agents in the environment to increase dramatically.

- Certain dietary items may result in diarrhea. These include excess milk production by the dam (the calf ingests more than it can digest), ingestion of foreign objects such as dirt and sand, and from people feeding things that baby calves can’t digest, such as molasses or table sugar (sucrose).

How do scours harm the calf?

The primary harm from scours is loss of water and electrolytes (body salts) in the diarrhea. This loss of water and salts creates dehydration and alteration of the acid-base balance of the bodily fluids. Inflammation of the intestinal lining impairs the calf’s ability to digest nutrients, creating weight loss and the potential for hypoglycemia (low blood sugar). If untreated, these changes can be severe enough to result in death. In addition, certain bacteria (certain strains of *Salmonella* and *Clostridium perfringens*) can release toxins that cause harm to multiple vital organs in the calf.

How do baby calves become infected with the infectious agents that cause scours?

Research has shown that a substantial proportion of normal, healthy-appearing adult cattle can shed many of the infectious agents that cause calf scours; the agents are mostly shed in fecal matter. This shedding is particularly common for rotavirus, coronavirus, and *Cryptosporidium*. In a landmark study, shedding of these two viruses in the normal-appearing feces of healthy, pregnant beef cows was found to increase as the pregnant cows approached the calving date. Shedding was heaviest by heifers, and shedding tended to increase after cold weather. Further, healthy older calves can become infected with these agents, remain otherwise healthy, and shed large numbers of these agents into the environment, thereby contributing to accumulation of these agents in high enough numbers on a ranch that a calf scours outbreak ensues.

If some of these infectious agents are commonly shed by healthy cows, why is it that scours outbreaks can occur on one ranch but not another, and vary in occurrence from year to year on the same ranch?

This variability in the rate of occurrence of scours from ranch to ranch and year to year likely reflects the fact that the rate of occurrence is influenced by many different factors, including:

- Genetic makeup of the herd. This is always tough to quantify and verify, but certain breeds and lines appear to have “heartier” newborns than others.
- Nutritional status of the cow herd: Protein, energy, and micronutrient (mineral and vitamin) malnutrition during the latter half of gestation can have significant impact on calf health.
- Age of the cow herd. Calves born to heifers are at significantly higher risk of developing scours than are calves born to cows.
- Stocking rate: Essentially, this is the number of cattle per unit area on the ranch. Scours risk increases with higher stocking rates.
- Duration of time on a pasture: In general, the longer that cattle are kept on a pasture, the more fecal contamination of the ground will occur. This translates to more scours agents being present on that pasture to infect the baby calves.
- Weather: Cold, wet, windy weather will cause cattle to congregate together in wind breaks and other sheltered areas. As the amount of fecal contamination increases in these areas, so will the amount of scours agents. Wet conditions favor survival of these agents in the environment. Remember, when the cows lay down, whatever is on the ground is going to contact their udder – and therefore be taken in by the calf when it nurses. Cold weather also increases the rate of shedding of certain agents by the cows.
- Immunization status of the cow herd: This influences the availability of antibodies in the colostrum (first milk) that may help protect the calf against certain scours-causing agents.
- The number of calves that become affected with scours. Once infected, calves can produce millions, even billions, of these infectious agents each day. This can cause the number of affected calves on a ranch to increase at a rapid rate.
- The infectious agents involved, and the various strains that may exist for a given agent, can vary over time and between ranches.

Therefore, because so many factors can coalesce to influence the rate of occurrence of scours, there can be tremendous variation in the rate of occurrence of scours from one ranch to the next and from one year to the next.

What are the common signs of scours?

- Watery stools that may be brown, green, yellow, or grey in color. Occasionally, flecks of blood and mucus may be evident in the stools. Rust colored or very bloody stools are often associated with infection with *Salmonella*, coccidia, or *Clostridium perfringens*.
- The calves are often weak and depressed, and may lose their desire to nurse.

- The calves develop a sunken-eyed appearance as a result of dehydration. The bony prominences of their hips, shoulders, and ribs may become more apparent as the calves dehydrate and burn their body fat supplies.
- The calves may stagger or sway as they walk; this often reflects weakness, low blood sugar concentrations, and/or alteration of the acid-base balance of their bodily fluids.
- The calves may become too weak to stand. Death typically occurs within a day if treatment is not initiated.
- Depending on the cause(s) and the severity of the infection, a case of scours in a calf can last 1-2 days or as long as 2 weeks.

How can scours be treated?

- It is important to note that some infectious agents that make calves ill can also make people sick. People working with scouring calves should wash their hands before and after handling calves, their feed, or their bedding. Ideally, people working with these calves should wear waterproof outer boots that can be cleaned with soap and water and disinfected with Lysol® after use. People working with scouring calves should wear coveralls or a dedicated set of working clothes and change these before handling other calves or returning to the ranch office or house. People with immune system disorders, pregnant women, and very old or very young individuals should not come into contact with scouring calves, their bedding, feeding utensils, or the clothing of individuals who have handled these calves. It is important to feed and perform daily chores for the healthy animals before treating the sick calves with scours. Ideally, the person treating the sick calves should not work the healthy calves,
- Whenever possible, scouring calves and their dams should be isolated from healthy calves and from pregnant cows.
- The highest priority in treating scours is to give back to the calf the water and electrolytes that it has lost in scours – this is called **fluid therapy**. This corrects dehydration, restores the normal acid-base balance, and replaces salts in the calf's bodily fluids. There are two primary methods for providing water and electrolytes:
 - 1) By oral administration. This option is most appropriate for scouring calves that are still able to stand and who are alert enough to follow their dams and move away when approached. Since most beef calves will not accept being fed by a bottle, water and electrolytes are most often delivered by an esophageal feeder. Learn how to properly use an esophageal feeder. Electrolyte powders that have been prepared by veterinary pharmaceutical manufacturers are carefully balanced to provide the correct proportions of salts relative to water for optimal benefit to the calf; these are recommended over home-prepared recipes. Many different products exist, but in general, the most effective products contain salts, dextrose (to improve blood sugar concentration in the calf), and either bicarbonate or acetate to restore acid-base balance. Consult with your veterinarian to find an appropriate product, and a target volume to administer for the average baby calf on your ranch.
 ALWAYS prepare these electrolyte solutions by adding the recommended amount of powder to the recommended amount of clean water as directed on the product label. Adding more or less powder than what is prescribed can cause additional health problems

for the calf. Mixing electrolytes with milk or solutions other than clean water is not recommended.

Depending on the size of the calf and the severity of the scours, 2 to 8 quarts (roughly equal to 2-8 liters) of electrolytes may need to be administered each day. Typically, the total volume of fluid is divided into two or more feedings per day. As a rough rule, most average-sized beef calves will require approximately 4 quarts (~ 4 liters) of oral fluids per day until the scours resolves.

2) By intravenous administration. This route of fluid administration is typically reserved for those calves that are too weak to stand or too lethargic to follow the dam or avoid being caught. The fluids are typically administered through a catheter placed in the jugular vein. Although some experienced lay personnel can place a catheter in a scouring calf's vein, this is most often performed by a veterinarian or veterinary technician. The fluids that are used for intravenous administration are purified and carefully balanced with the appropriate balance of salts and dextrose (for blood sugar). Occasionally, these fluids are administered under the calf's skin. The volume to be given depends on the calf's size and the severity of the scours.

- Nutritional and thermal support: A calf with severe scours may not want to nurse much in the first day or two of the illness. Most calves will regain their appetite with appropriate fluid therapy, as described above. However, since scours can last several days, baby calves who fail to nurse or be fed milk for that duration of time are at risk of starvation. Consult with your veterinarian to develop a feeding regimen for scouring calves. Thermal support implies providing deep bedding, shelter from wind, rain, and snow, and even blankets for the scouring calf, so that it does not experience excessive cold stress on top of its existing disease.
- Intestinal protectants, such as Kaopectate® or Pepto-Bismol®, may provide some level of relief from nausea, as in people. Similarly, calves with fever or signs of abdominal discomfort may benefit from non-steroidal anti-inflammatory drugs; however, many of these have side effects, and it is important that you discuss drug selection and dosage with your veterinarian.
- Some veterinarians advocate administration of live, helpful bacterial cultures called "probiotics." These can range from commercially-prepared cultures to plain yogurt.
- On the other hand, antibiotics may be used to treat scours caused by certain agents, or to treat or prevent the development of superimposed infections, such as bacterial pneumonia, in the scouring calf. Consult with your veterinarian to determine the criteria that he or she feels should be applied when considering antibiotic administration for scouring calves. There is not a uniform, one-fits-all policy for this topic.

How can calf scours be prevented?

Because many of the infectious agents that cause calf scours are shed by healthy cows and calves, it is not considered practical to expect to prevent scours from ever occurring on a ranch. Rather, a target should be to have no more than 2-3% of calves born each year develop scours.

- Maintain a clean calving area. Do not calve on pastures where cows have been kept in large numbers for long periods of time.

- Segregate calves by age to prevent passage of infectious agents from apparently healthy, older calves to newborns

These two principles are combined in the Sandhills Calving System, developed by veterinarians at the University of Nebraska-Lincoln. The land on a ranch is divided into multiple pastures through the use of natural barriers and fence. Cows are turned into the first pasture (Pasture 1) when the first calf is born.. Calving continues over a two-week period in Pasture 1. At the end of that two-week period, cows that have not yet calved are moved to Pasture 2, and the cow-calf pairs are left in Pasture 1. After one week of calving in pasture 2, cow-calf pairs born in pasture 2 remain there, and the cows that have not calved are moved to Pasture 3. Each week thereafter, cows that have not yet calved are moved to a new pasture and pairs remain in the pasture in which they were born. This keeps the cows and calves distributed over multiple pastures on the ranch, thereby limiting accumulation of infectious agents in the environment. It also keeps the ages of calves in each pasture roughly similar, which prevents the problem of older calves passing infectious agents to younger calves. More details are available at:

<http://vetext.unl.edu/stories/200703050.shtml>

Additional preventive principles include:

Ensure that all newborn calves receive colostrum. If the delivery was difficult, the dam may be tired or painful, and the calf may be weakened as well; this may result in a failure of the calf to nurse colostrum. In such cases, it is prudent to milk the colostrum from the dam and feed it to the calf via an esophageal feeder. How much colostrum should a calf receive? The calf must nurse or be given 2 quarts of colostrum during the first 2-4 hours after being born, with a repeat feeding of the same volume given 4-6 hours later. It is often a good plan to obtain fresh colostrums from a local dairy and freeze it for occasions when the dam does not have colostrum for its calf. Colostrum from dairy cows is usually more dilute than that taken from beef cows, so the aforementioned volumes should be increased by roughly 50% to compensate.

- Use pregnancy examinations to sort cows into early and late-calving groups. Cows that are due to calve late in the year can be kept on land other than that used for calving, and moved to the calving pasture as they approach their due date.
- If you keep your heifers in a separate area to monitor them for calving problems, make sure to 1) use as large of an area as possible, to limit contamination of the udder with manure, and 2) once born, the calves and their dams need to be removed from this area ASAP!
- Maintain adequate protein, energy, and micronutrient nutrition during gestation. Having your veterinarian or livestock extension specialist rate the body condition score of your pregnant cows and heifers halfway through the gestation period can help detect and correct thin body condition, which often reflects inadequate nutrition, heavy internal parasite burdens, or both.
- When possible, slope or drain pastures or corrals to minimize accumulation of moisture.

- When possible, rotate feeding and bedding sites in the calving pasture to prevent accumulation of manure in these areas. If rotation of these sites is not possible, drag the pastures to promote dispersion and drying of manure. Remove soiled bedding from sheltered areas on a regular basis, and replace with clean bedding. Calf shelters that are heavily soiled with manure can be a major source of infection.
- When possible, isolate scouring calves and their dams from the remainder of the herd. This may not be practical when a rotational calving area program such as the Sandhills calving system is used; however, for smaller herds with less land, this principle is important, as a single scouring calf can shed enough pathogens to threaten many other calves.
- Immunizing the cow herd against scours-causing pathogens may aid in augmenting the calf's immunity to these agents. The antibodies generated by these vaccines are passed to the calf in colostrum. It is important to note that vaccination alone is unlikely to prevent calf scours. Have your veterinarian develop an annual vaccination program for the cow herd.

Optimal prevention of calf scours requires integration of sound genetic selection, pasture management, nutrition, immunization, and basic husbandry practices.