



# Cattle Producer's Handbook

Animal Health Section

645

## Calf Scours: Cause, Prevention, Control, and Treatment

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### Cause of Calf Scours

Calf scours is a multi-factorial disease of calves less than 30 days of age. The disease has two major causes: stress or infection. Stress scours is a result of the calf's inability to adapt to the neonatal environment from the fetal environment that results in what animal scientists call physiologic scours. Physiologic scours is an upset in homeostasis resulting in intestinal function and fluid and electrolyte imbalances. This is reported to be the most common form of calf scours! Stress, of course, can lead to increased susceptibility to infectious agents with concomitant disease exacerbation.

Infectious causes of calf scours include parasites, bacteria, and viruses. The common parasitic cause is *Cryptosporidium parvum*. This small unicellular parasite is a common inhabitant of the intestines of adult cattle and is readily transmitted via fecal contamination to a newborn calf. Cryptosporidial scours generally develops at 14 to 21 days of age in heavily contaminated calving areas. In stressed calves, cryptosporidium diarrhea can develop as early as 1 week of age.

The common bacterial causes of calf scours include *Escherichia coli* and various strains of *Salmonella*. These infections are transmitted via fecal contamination of teats and milk as well as direct ingestion of fecal material. *E. coli* can cause disease as early as 3 days of age while *Salmonella* generally does not cause disease before 10 days of age.

Bacterial scours is generally accompanied by a fever. *Salmonella* scours may be blood tinged with evidence of intestinal lining sloughing in the feces. Both of these infections can become septicemic, which compounds the disease course and worsens the prognosis.

The clostridial organisms are occasionally associated with calf scours. Enterotoxemia, the common intestinal disorder caused by these organisms, may be seen in calves that have been off feed for a period of time and when reintroduced to food may overeat resulting in the classical sudden death that may or may not be accompanied by actual diarrhea.

Coronaviruses and rotaviruses are the significant viral causes of calf scours. Both viruses cause disease after 14 days of age. These viruses remain localized in the intestine and do not spread to other organs. Infections with rota- or coronaviruses may predispose an animal to secondary bacterial infections, but the common bacterial (*E. coli*, *Salmonella*) calf scours occurs before these viruses infect the newborn calf. Bovine Virus diarrhea virus is not associated with calf scours except possibly in the rare persistently infected calf!

### Control and Prevention of Calf Scours

Control and prevention of calf scours has four basic herd health management plan components: nutrition, hygiene, colostrum, and vaccination. These components must be applied to both the calf AND the dam and should be considered in the above listed order.

Calf scours prevention and control begins with nutrition, including minerals. The nutrition of the dam is the first step in prevention. Nutrition provides the energy and substrates (proteins, etc.) necessary to support fetal growth and development, lactation (also colostrum quality and quantity), and immune system function to produce antibodies and immune cells for transfer to colostrum. Proper mineral nutrition for the dam is essential for the survival of calves because their reserves at birth are dependent on maternal status.

Calf nutritional requirements are initially provided by the dam through the colostrum and milk. Colostrum and milk are deficient in most minerals, therefore, the calf's reserves must be adequate to support growth and immune functions until the calf begins mineral intake (supplementation) from sources other than milk. As the calf grows, the nutritional requirements change on an almost daily basis; therefore, the nutritional program, of both the cow and the calf, needs to be regularly monitored and adjusted.

Hygiene and environmental health are significant factors in the prevention AND control of calf scours. While animal scientists argue that the mature cow, because of her environmental/disease exposure, may produce the best quality colostrum, it is indisputable that cattle perform better in a healthy environment. The environment should be as clean as possible and provide protection from adversity.

The calving environment is often the bottleneck in a healthy environment for the calves. Minimizing stress (cold, mud, rain/snow) and disease exposure from a contaminated environment are predominant steps in control of calf scours. The "Sandhill's pasture rotation program" is an effective method of limiting calving ground contamination and calf exposure to potential infectious agents.

Disinfection of facilities and materials is important in controlling the introduction and spread of calf scours organisms. Cleaning of calving stalls to bare surface and allowing them to dry should be performed after every calving. Sanitation of dirt stalls is difficult, but a dilute hypochlorite (bleach; see 601) spray is advisable; however, the stall MUST be allowed to thoroughly dry to avoid respiratory complications to newborn calves due to chlorine fumes. Cattle producers need to wash nursing bottles, buckets, and tube feeders after every use and disinfect them with diluted bleach.

Colostrum certainly is the key to the future lifetime productivity of all calves. Colostral quality is dependent on the diversity of pathogen exposure of the dam's immune system. Environmental exposure and dam's age also influence colostral quality through exposure and immune response to a broad range of pathogens. The dam's vaccination program complements the antibody makeup of colostrum, therefore, a comprehensive, specific cow vaccination program will improve the quality of the colostrum.

Colostrum uptake by the calf's system is time dependent and is reduced by 1/2 at 12 hours and ceases at 24 hours postpartum. The sooner after birth a calf receives colostrum the more antibody uptake occurs. Nursing colostrum results in better antibody uptake than colostrum delivered via feeding tube. Colostrum received directly from the cow has the added benefit of providing viable and functional immune cells that

are vital to the complete development of the neonatal immune system.

A calf needs to receive approximately 100 grams of antibody to be adequately protected! Most commercial colostrum supplements/replacements contain only 30 to 50 grams of antibody per unit.

Dystocia can have a negative effect on the ability of the calf to absorb colostrum. In stressed calves the "window" for colostrum uptake may be cut in half.

Because the newborn calf has a minimally functional immune system, hence the dependence on colostrum antibody, vaccination programs for newborn calves have been largely unsuccessful in the prevention or control of calf scours. While research has shown that newborn calves do have functional aspects to their immune system, the windows of opportunity, and the proper immune stimulants, to induce a protective immune response are poorly defined; therefore, calf scours vaccination programs are generally directed at dam vaccination!

Vaccination of the dam has been shown to be effective in helping to control the severity and spread of calf scours by enhancing the immune quality of the colostrum. At approximately 30 days pre-partum, the dam's immune system begins transferring antibodies and immune cells into the mammary gland for inclusion into colostrum. The immune system transfers those antibodies that are circulating within the dam's system while stimulating further production to replace the transferred antibodies.

Research indicates that those antibodies that are being actively produced by the dam's immune system may be transferred to the mammary gland at a higher level than preformed maternal antibodies. Therefore, it is suggested that the dam be vaccinated (boosted) at 60 to 30 days pre-partum for maximum antibody transfer. Colostrum has three to four times the level of antibodies that the dam's serum contains with or without vaccination 60 to 30 days before calving.

## **Treatment of Calf Scours**

Treatment of calf scours is directed at correcting the fluid and electrolyte losses and imbalances, nutritional maintenance, and elimination of infectious agents. Calves have limited energy reserves and must continue to receive adequate nutrition in the face of scours. Always continue to feed a scouring calf the normal intake requirements during treatment.

Viral infections (i.e., coronaviruses and/or rotaviruses) are unaffected by antibiotic therapy. Cryptosporidial scours, likewise, is untreatable. Supportive therapy, that is, fluids and electrolytes AND nutrition, is required to permit the system to eliminate the organisms and allow the damaged intestinal system to regenerate to normal structure and function.

Bacterial calf scours treatment may also include the use of antibiotics in addition to fluid, electrolyte, and nutritional support. Most of the commonly used antibiotics are not approved for use in scouring calves. However, these antibiotics have routinely been utilized for scours treatment with predictable results.

Confirming the specific bacteria associated with the scours by culture AND having an antibiotic sensitivity profile is the best assurance of a successful treatment while minimizing the likelihood of inducing antibiotic resistance. Barring the availability of culture and sensitivity, producers should select an antibiotic with activity against the common bacterial causes of scours. Most of the commonly used antibiotics require a prescription. The over-the-counter antibiotics such as penicillins, tetracyclines, and sulfas are often ineffective due to bacterial resistance.

In summary, prevention and control of calf scours requires a comprehensive health management plan for both the cow and the calf. A health program plan will include vaccinations, endo- and ectoparasite control, hygiene (environmental health), and, most importantly, a complete nutritional program. A well managed colostrum program is the primary contributor to the success of the calf's production throughout its entire life.

Scours treatment is largely designed to support the calf through the fluid and electrolyte losses while the system adapts to the new extra-uterine environment or overcomes a viral or parasitic infection. Infectious bacterial scours may be treated with appropriate antibiotics. Because the available armamentarium of antibiotics is limited, an accurate identification and antibiotic sensitivity optimizes antibiotic therapy. Generally, antibiotic therapy is empirically directed at the most common bacterial causes of scours.

### Suggested Calf Scours Treatment Protocol

Scouring calves 3 days to 2 weeks of age (**Most calf scours less than 4 days of age is not infectious!**)

1. Collect feces and submit to a local lab for culture and sensitivity.
2. Determine hydration status (see 641).
  - a. If calf exhibits signs of dehydration, sunken eyes, and/or tenting of skin but is not recumbent, then administer an oral electrolyte replacement twice a day until scours cease—give 30 to 60 minutes post nursing or feeding of milk.
  - b. **Be sure calf is eating or being fed milk or replacer at all times—do not withhold milk!**
  - c. Calf is recumbent, which indicates severe dehydration—then initiate intravenous fluid therapy.
  - d. **If calf has a temperature >103.5 degrees, suspect infection, initiate therapy—*E. coli* is the most common in calves 3 to 10 days old. Treat as follows (Note: These medications require a prescription from a veterinarian and label directions must be followed!):**
    - i. Excenel @ 1 ml/100# daily for 4 days.
    - ii. Banamine @ 2 ml/100# every 12 hours for two or three times.
    - iii. Be sure calf is eating or being fed regularly.
3. Cryptosporidium and viruses are common causes of scours in calves >10 days of age—there is no treatment, only supportive care.
  - i. Banamine @ 2 ml/100# every 12 hours for two or three times.
  - ii. Be sure calf is eating or being fed regularly.
4. Keep protected from weather.

