

# XX Novos Enfoques na Produção e Reprodução de Bovinos

---

## Beef Calf Health

**Richard L. Wallace, DVM, MS**

Losses caused by disease represent a major obstacle to the profitability of many cow/calf beef operations. Disease results in animal death, failure or decreased efficiency in reproduction, and decreases in growth and productivity. Some diseases exist at subclinical levels, meaning signs are not observable so losses continue undetected, robbing the cow/calf operator of profits. If high levels of health are maintained, healthy cattle generally will have a higher value at sale time.

Prevention rather than treatment is the most economical approach to keeping disease losses low. Treatment of a disease after its onset is not always effective and is often costly. Production losses often occur before diagnosis and treatment can be instituted. Herd health programs are designed to provide routine, planned procedures which will prevent or minimize disease.

### **Disease Prevention and Calf Processing**

The calving environment is the foundation for rearing healthy calves. When parturition is eminent, wild ruminants instinctively isolate themselves from the herd while attempting to hide from predators. Dry cows and springing heifers need to have a clean, dry, quiet environment in which to calve. The neonatal calf is being delivered from virtually a sterile environment into one in which it will be exposed to numerous microorganisms. Consider the maternity wing at the local hospital and the effort expended to maintain a germ-free atmosphere. Accomplishing this level of sanitation on cow/calf operations may not be achievable, but every effort needs to be given to keep it as clean as possible.

Routine screening of newborns for infectious diseases can be a helpful monitoring tool. Not all herds will need to perform all tests. If problems exist within the resident herd, some neonatal screening may be in order. Tests to consider include assessment of passive transfer of maternal antibodies from colostrum, bovine virus diarrhea infection status, and possibly neosporosis infection status. Management of these calves may be different depending on the results of the screening and the risk level attributed to the herd problems.

Several management practices are routinely performed on calves between birth and weaning. Numerous vaccines covering multiple diseases are available for young calves. A strategic and effective vaccination program should be developed with a herd veterinarian. Dehorning and removal of supernumerary teats can be performed as early as one month of age. Performing these actions prior to weaning and other associated stresses will prevent adverse reactions to the procedures.

## XX Novos Enfoques na Produção e Reprodução de Bovinos

---

### **Colostrum management**

While vaccination targets protection against specific pathogens, adequate consumption of high quality colostrum will provide broad-spectrum protection against most diseases prevalent on a dairy farm. Calves are born with little or no immunity or resistance to disease and infections. The immunity that newborn calves acquire by absorbing immunoglobulins from colostrum is crucial for their survival. Disease exposure and vaccination status determine the quality of immunoglobulins present in colostrum of cows. The more diseases cows have had or been exposed to, the more varied the antibodies in their colostrum. For this reason, newborn calves raised on the same farm as their dams usually have good protection against diseases on that farm. Purchased calves and calves that are born of recently purchased cows or heifers will be deficient.

Resistance to disease in newborn calves is greatly affected by the timing of the colostrum intake and the quality of the colostrum. Calves can absorb whole antibodies through their gut wall during the first twenty-four hours of life. These antibodies then circulate in the calf's bloodstream to help fight off infections. The number of antibodies that can be absorbed is directly proportional to the timing of colostrum feeding after birth. By six hours, the ability of the gut walls to absorb immunoglobulins decreases by one third. By twenty-four hours, the gut walls can absorb only 11 percent of what could originally be absorbed. The intestinal walls eventually turn off the absorption mechanism. At this point, enzymes break down and digest all the antibodies, thus reducing their disease-fighting capabilities. An estimated one fourth of the antibodies consumed by calves reach the bloodstream.

Unfortunately, the digestive tract of the calf can absorb infectious organisms as well as antibodies. Colostrum and calves should be kept free from bacteria through proper sanitation of the teats and udder of calving cows. The percentage of antibodies in colostrum decreases rapidly with each milking. Usually, the second milking contains 60 to 70 percent as many immunoglobulins as the first milking. The NAHMS Dairy 96 study showed that over half (52%) of operations allowed calves to nurse from their dams, while one third (38%) allowed nursing but removed calves within 24 hours. One third (33%) of producers used the first nursing to deliver colostrum, 63 percent hand fed colostrum in a bucket or bottle, and only 4 percent tube fed colostrum. Of herds that hand fed colostrum within 24 hours, only 32 percent fed four or more quarts

### **Common Diarrheal Diseases**

Colibacillosis - *E. coli* - Colibacillosis usually occurs in calves 1-10 days old. Typically, calves out of first calf heifers are more susceptible. Other associated factors include seasonal variation, overcrowding and poor sanitation which allow build up of organisms in calving pens. Milk pails and feeding equipment can become contaminated. Signs include frequent and effortless diarrhea, pasted rear quarters, fluid or semisolid malodorous feces with chunks of partially digested milk, rapid dehydration and weight loss, depression, anorexia, weakness, and death. Body temperature is normal at first but subnormal as the disease worsens. Death can occur in 3-5 days. Mixed infections can occur along with rota/corona virus and/or cryptosporidiosis. Illness can occur in up to 75

## XX Novos Enfoques na Produção e Reprodução de Bovinos

---

percent of calves on a farm, while death losses can range from 10 to 50 percent in unvaccinated herds.

Disease prevention is primarily achieved by early, rapid ingestion of colostral antibodies. Hours matter. A recent study showed that if colostrum was given 3 hours after infection with *E. coli*, the calves were protected against disease. If colostrum consumption was delayed until 4 hours after infection up to 40 percent of the calves died. All calves became ill if colostrum was given 5 hours after infection. *E. coli* bacterins used to prevent calf diarrhea are different from *E. coli* mastitis bacterins. Monoclonal antibodies work if given early (immediately after birth). Once the diarrhea has commenced, orally acquired antibodies against *E. coli* antigens are principally prophylactic and have little effect on the outcome of the existing infection.

Rota virus - Rota virus infections affects calves between 1 and 21 days old. The disease is characterized by sudden onset and rapid spread. Calves become reluctant to stand and nurse, mildly depressed, salivate, and have watery, yellow diarrhea. The diarrhea lasts 1-2 days and maybe longer with secondary infection (3-5 days). Under germ-free conditions rota virus infections are self-limiting and of short duration 6-10 hours (like the 24 hour flu). Serum antibodies do not protect calves from infection. As the level of colostral antibodies present in the intestines decline, calves become more susceptible.

Corona virus - Corona virus infections are similar to rota viral infections except, usually the clinical signs are more severe. Calves up to 3 weeks old can be affected. Clinical signs include sudden onset of diarrhea, moderate depression, reluctance to nurse, passage of feces containing mucus and milk curds. After 2-4 days of diarrhea, calves become severely depressed, weak, gaunt, and eventually die. Under germ-free conditions corona virus is more severe and can lead to death. Typically, corona virus is found along with other diarrheal disease agents.

*Clostridium perfringens* - Clostridial infections are manifested by acute deaths or severe diarrhea with abdominal pain. Calves may be bloated causing them to bellow and kick at their abdomen. Sudden death of vigorous fast-growing calves is typical. Calves surviving 4-5 hours after onset of colic may develop bloody stool. Under conditions where rich protein and carbohydrate substrate are fed (such as abrupt changes in diet), *Clostridium* can proliferate and produce toxins. Rapid feed changes disturbs the normal adaptive pattern of intestinal microbes. Overeating can lead to gut stasis, preventing the normal flushing of toxins. Viral infections may predispose calves to clostridial diarrhea due to altered intestinal flora and overgrowth of the organism. *Clostridium perfringens* Type A has been associated with abomasal ulcers in calves.

Cryptosporidiosis - Transmission of cryptosporidia is by fecal-oral route. Within the intestines auto-infection can occur in immuno-suppressed calves. The entire developmental cycle can occur within 72 hours. Natural infection occurs in calves 1-3 weeks of age. Clinical signs include increased frequency of defecation, straining, anorexia, weight loss, depression, and dehydration. Diarrhea is profuse, watery, and has a yellow color. Usually many calves are affected but few die as a direct consequence of cryptosporidiosis. There appears to be a seasonal effect with more disease occurring

## XX Novos Enfoques na Produção e Reprodução de Bovinos

---

during fall/winter or stressful periods. Affected calves need supportive care since the disease is self-limiting and the intestinal repair can be prolonged. Cryptosporidia oocysts are difficult to detect. Routine fecal tests will not find the organism. A special acid-fast stain is required to diagnose cryptosporidiosis. Oocysts do not survive freezing or temperatures above 150F for 30 minutes, but will survive at 40F in liquid slurries. Neither bleach nor alcohol is effective at killing the oocysts. Strong Lysol (5% solution available from hardware stores) can be used to disinfect contaminated surfaces. Cryptosporidiosis is a public health hazard! In humans, clinical signs include abdominal cramps, vomiting, diarrhea, and fever (flu-like symptoms).

Coccidiosis - Like most other diarrheal diseases, a fecal-oral route spreads coccidiosis within a calf pen. *Coccidia* oocysts must sporulate (hatch) before they become infective, so autoinfection is not possible. The incubation period is typically 17-21 days. In mild cases, calves will have diarrhea with little or no blood, anorexia and be listless for several days. In more severe cases, the feces become liquid with blood, mucus and strands of intestinal mucosa. These calves become emaciated, dehydrated, weak, and listless. Occasionally, fly strike occurs in warmer months. Calves that develop nervous coccidiosis will have acute diarrhea, tremors, convulsions, blindness, and death. In chronic cases, calves will have rough hair coats, drooping ears, and sunken eyes. Recovery is slow and some calves' growth will be stunted. The number of sporulated (hatched) oocysts ingested determines the disease severity. To control coccidiosis avoid overcrowding which leads to stress and increased exposure. Many producers are using milk replacers and calf starters medicated with decoquinate. In order to prevent coccidia infections, replacement heifer feed should contain one of the ionophores (lasalocid or monensin). Amprolium can be used for treatment or control in all ages.

Salmonellosis - Salmonellosis usually affects calves between 10 days and 3 months of age. The most common sero-types are *Salmonella typhimurium* and *S. dublin*. Disease severity will be determined by the virulence of the sero-type(s) involved, the concentration of *Salmonella* in environment and the immune status of the calves. *Salmonella* can be transmitted by fecal-oral contamination or aerosolized.

Three disease conditions occur; septicemic, enteric, and/or carrier. Calves with the septicemic form can die with no clinical signs (slight depression and in appetite) or diarrhea and colic with convulsions. The course of disease is a few hours, but rarely more than 1-2 days. The enteric form is most common. Calves will have slightly watery diarrhea, changing to voluminous feces with mucosal shreds, casts and/or blood. Initially, calves will have a fever but their temperature falls rapidly as dehydration progresses. Chronic salmonellosis is responsible for the carrier state. Carrier calves are typically 6-8 weeks old. They will have loose stool but not diarrhea. Body temperature will be normal to slightly elevated. These calves fail to thrive as evidenced by a rough hair coat and undersized body. *Salmonella* control is best achieved by good management practices including individual calf hutches with adequate spacing. Vaccinations have minimal effect.

## XX Novos Enfoques na Produção e Reprodução de Bovinos

---

### Common Respiratory Diseases

Viral Respiratory Pathogens - Many different viruses have been found to be associated with pneumonia in dairy calves. Frequently, more than one virus is present during an outbreak of respiratory disease. In most cases, viral infections initiate the disease and secondarily, bacterial pathogens invade the damaged lung tissue. The viruses most frequently isolated from cases of calf pneumonia are Parainfluenza 3 (PI3) and Bovine Respiratory Syncytial Virus (BRSV) and Bovine Virus Diarrhea Virus (BVDV). BVDV infections in dairy calves begin as respiratory problems. Infectious Bovine Rhinotracheitis (IBR) has been associated more often with feedlot pneumonia.

Severe pneumonia outbreaks in Illinois have occurred due to BRSV. As with most respiratory diseases, BRSV infections tend to break most commonly in fall and winter months. Clinical signs include decreased feed consumption, mild depression, clear nasal discharge, salivation, tearing, rapid breathing and elevated body temperature (104-108°F). The virus progresses rapidly and occasionally the death occurs before any clinical signs are observed. In later stages of the disease, calves will begin open-mouthed breathing, frothing of saliva, and develop bottle jaw. Some calves may be seen standing over water tanks apparently unable to drink. Nearly all calves will be affected and up to 20 percent may die.

Bacterial and Mycoplasmal Respiratory Pathogens - *Pasteurella sp.* and *Haemophilus somnus* are the most common bacterial agents found in outbreaks of calf pneumonia. These organisms may be present in the nasal passages of normal, healthy calves. These bacteria invade the lung tissue damaged by toxic and/or viral agents. Typically, they exacerbate initial clinical signs and may be responsible for the most fatalities associated with respiratory disease. *Salmonella sp.* may also contribute to pneumonia in dairy calves.

Mycoplasmas are frequently recovered from the respiratory tract of dairy calves. Mycoplasma can complicate primary viral pneumonia or initiate lesions which lead to secondary bacterial infection. Antibiotics used to treat bacterial infections are ineffective at treating mycoplasma. Flare-ups of mycoplasma mastitis are not uncommon following outbreaks of mycoplasma pneumonia in dairy calves.

### Physical Examination of Sick Calves

Typically, a sick calf is identified because feed intake is depressed or the calf is recumbent and reluctant to rise. Determination of the cause of the illness is essential to successful therapy. A complete physical examination by a veterinarian is important with the initial assessment to include and evaluation of appetite, attitude, rectal temperature, heart rate, respiratory rate, lung sounds, hydration status, and stool consistency. Differentiation of simple diarrhea from septicemia (bacterial infection in the blood stream) will help guide therapeutic choices. The success rate for calves with uncomplicated diarrhea is high, while calves with septicemia and secondary diarrhea require more extensive therapy and have a poor prognosis.

Assessing hydration status in calves with diarrhea will help determine therapeutic options. Skin tenting is one method of determining the amount of dehydration. Pinching

## XX Novos Enfoques na Produção e Reprodução de Bovinos

---

the skin on the upper eyelid and measuring the time for the skin to return to normal is how this test is performed. Scouring calves with normal demeanor but the eyes are mildly recessed and the eyelid skin remains tented for 5 seconds are approximately 6 percent dehydrated. Diarrheic calves with eyelid skin tent in excess of 7 seconds, more significantly sunken eyes and depressed demeanor are more likely 10 percent or more dehydrated.

When calves develop diarrhea, often the electrolyte status and acid-base balance are disrupted. Estimating the acid-base status can help direct therapeutic choices. Administration of fluid therapy with incorrect medication can cause more harm than good. Without appropriate equipment to accurately determine acid-base status and calculate appropriate replacement therapy, producers are better off providing electrolyte replacement fluid therapy. For cases of uncomplicated diarrhea (without septicemia), simply correcting the dehydration often minimizes the need to adjust the acid-base status.

### **Sandhills Calving System**

Neonatal calf scours is a multifactorial disease. The ideal scenario for an outbreak is to have susceptible hosts (naïve calves) existing in an environment (infected communal calving area) that's conducive to the proliferation of (and continued exposure of the host to) the disease agent, be it *E. coli*, *Salmonella*, rotavirus, cryptosporidia, etc. Even the healthiest calf can fall prey -- particularly in the wet, muddy conditions common to spring calving periods -- if the pathogen load is high enough, or the exposure long enough, to overcome the passive immunity provided by the calf's mother.

The Sandhills Calving System (SCS) was developed by the University of Nebraska. Named after the Sandhills area of north-central Nebraska where it was tested, SCS is a system that utilizes a series of calving pastures to minimize newborn calves' contact with disease agents. The idea is to minimize both the disease load and newborns' exposure to the disease agents until their immune systems have sufficiently matured to better withstand them. The system is designed to recreate the conditions of the first week of calving season during each of the remaining weeks of the calving season. The goal is to provide a clean calving area without the presence of older calves that may be shedding pathogens. Cows are turned into the first calving pasture as soon as the first calves are born, and calving continues for two weeks. After two weeks, the cows that haven't calved are moved to Pasture 2, with cow-calf pairs remaining behind in Pasture 1. After a week of calving in Pasture 2, the cows that haven't calved are moved to Pasture 3, and cow-calf pairs born in Pasture 2 remain in Pasture 2. With each subsequent week, cows that haven't calved are moved to a new pasture, and pairs remain in their pasture of birth.

The result is multiple pastures, each with calves within one week of age of each other. Cattle from different pastures can be commingled after the youngest calf is four weeks of age. The segregation of calves by age prevents the transfer of pathogens from older to younger calves. In addition, moving pregnant cows to new calving pastures helps minimize the pathogen load in the environment, as well as a newborn calf's contact time with those pathogens. The key component is the age segregation of calves and the movement to new pastures of cows that haven't calved rather than moving pairs.

## XX Novos Enfoques na Produção e Reprodução de Bovinos

---

The program was designed for beef operations typical of western Nebraska – larger herds on larger acreages. Age segregation of calves is the most important factor, not the number of acres and stocking density, so it should work for smaller herds on smaller acreages, as well. Implementing SCS isn't without its challenges. Making sure there's water access for the groups is another concern. Feed delivery in a spring-calving operation might entail more labor and producers are encouraged to vary their feeding locations within any given pasture.