Diarrhea is an important cause of illness and death of young beef calves. The economic effects to beef cattle producers from neonatal diarrhea can be profound. Economic costs of the disease include loss of performance, mortality, and the expense of medication and labor to treat sick calves. In addition, herd owners and their employees often become disheartened after investing long hours to treat scouring calves during an already exhausting calving season. Neonatal calf diarrhea is a multifactorial disease. Agent, host, and environmental factors play important roles in the occurrence of undifferentiated neonatal calf diarrhea; and knowledge of these factors become the basis for management intervention to control the disease.

In theory one could prevent outbreaks of undifferentiated neonatal calf diarrhea by eliminating the presence of the pathogens, decreasing calf susceptibility, or altering the production system to reduce opportunities for pathogen exposure and transmission. However, the endemic nature of the common pathogens of neonatal calf diarrhea makes it unlikely that cattle populations could be made biosecure from these agents. Also, maternal immunity is clearly important to calf susceptibility to these agents, but lactogenic immunity wanes with time and managers of extensive beef cattle systems have limited practical opportunities to improve rates of passive transfer. In addition, vaccines are not available against all pathogens of calf diarrhea, may not be sufficiently cross-protective, and pathogens may evade the protection afforded by vaccination by evolving away from vaccine strains. For these reasons a biocontainment approach to control neonatal calf diarrhea seems prudent. Various biocontainment systems have been proposed to prevent neonatal calf diarrhea by minimizing pathogen exposure and transmission.

**Sandhills Calving System**

An effective contact is an exposure to pathogens of a dose-load or duration sufficient to cause disease. Effective contacts can be prevented by physically separating animals, reducing the level of exposure (e.g. through the use of sanitation or dilution over space), or minimizing contact time. These principles have been successfully applied in calf hutch systems to control neonatal diseases in dairy calves. The management actions we defined as the Sandhills Calving System prevent effective contacts among beef calves by: 1) segregating calves by age to prevent direct
and indirect transmission of pathogens from older to younger calves, and 2) scheduled movement of pregnant cows to clean calving pastures to minimize pathogen dose-load in the environment and contact time between calves and the larger portion of the cow herd. The effect of the system is to re-create the more ideal conditions that exist at the start of the calving season during each subsequent week of the season. Those more ideal conditions are that cows are calving on ground that has been previously unoccupied by cattle (for at least some months), and older, infective calves are not present.

The Sandhills Calving System uses larger, contiguous, pastures for calving rather than high animal-density calving lots (Figure 1). Cows are turned into the first calving pasture (Pasture 1) as soon as the first calves are born. Calving continues in Pasture 1 for two weeks. After two weeks the cows that have not yet calved are moved to Pasture 2. Existing cow-calf pairs remain in Pasture 1. After a week of calving in Pasture 2, cows that have not calved are moved to Pasture 3 and cow-calf pairs born in Pasture 2 remain in Pasture 2. Each subsequent week cows that have not yet calved are moved to a new pasture and pairs remain in their pasture of birth. The result is cow-calf pairs distributed over multiple pastures; each containing calves within one week of age of each other. Cattle from different pastures may be commingled after the youngest calf is four weeks of age and is considered low-risk for neonatal diarrhea.

It can be difficult to manage many cattle groups in intensive grass management systems; therefore, the Sandhills Calving System in these herds is modified slightly to reduce the number of groups. Cattle are moved to different pastures throughout the calving season as appropriate for forage utilization; however, every 10 days, or whenever 100 calves are born, the herd is divided by sorting cows that had not calved from the cow-calf pairs of the preceding group. In this manner, fewer cattle groups are required, although the number of calves within any pasture group never exceeds 100, and all calves within a group are within 10 days of age of each other.

The Sandhills Calving System was designed to prevent effective contacts by using clean calving pastures, preventing direct contact between younger calves and older calves, and preventing later born calves from being exposed to an accumulation of pathogens in the environment. The specific actions to implement the system may need to differ slightly between herds to meet the specific needs of each production system. Key components of the systems are age segregation of calves, and the frequent movement of gravid “heavy” cows to clean calving pastures. Age segregation prevents the serial passage of pathogens from older calves to younger calves. The routine movement (every seven to 10 days) of gravid cows to new calving pastures prevents the build up of pathogens in the calving environment over the course of the calving season, and prevents exposure of the latest born calves to an overwhelming dose load of pathogens.

Development of a ranch-specific plan for implementing the Sandhills Calving System must take place well in advance of the calving season. Available pastures must be identified and their use coordinated with the calving schedule. Water, feed, shelter and anticipated weather conditions must be considered. The size of the pastures should be matched to the number of calves expected to be born in a given week. Use of the pastures must not be damaging to later grazing. The plans should be developed and mapped in consultation with a veterinarian and, in some circumstances, a range specialist.

The Sandhills Calving System may offer additional benefits to management. For example, there may be some efficiency because cattle movement could be scheduled once a week as labor is
available. Moving cows without calves to a new pasture is often easier than moving individual cow-calf pairs. Also, the workload is partitioned between pasture groups such that cows at risk for dystocia are together in one pasture while calves at risk for diarrhea are in another. Information from pregnancy examination, when available, enables sorting cows into early and later calving groups. Cows expected to calve later in the season can be maintained elsewhere and added to the calving pasture as appropriate, thereby reducing the number of cattle moving through the initial series of pastures.

We have tested the Sandhills Calving System in two privately-owned ranch herds and observed important and statistically significant reductions in morbidity and mortality due to neonatal calf diarrhea, and greatly reduced use of medications on these operations. The prevention of illness and death in these herds has been observed consistently over six and five calving seasons, respectively. Although the system has been tested and adopted in ranches typical of the Nebraska Sandhills, it should be useful elsewhere because the principles on which it is based are widely applicable.

**Week 5**

![Pasture Diagram]

**Figure 1.** Schematic of the Sandhills Calving System in the fifth week of the calving season. During Week 5 cows are calving in the 4th pasture and calves born in the previous pastures remain behind in age-related groups. The goal is to prevent exposure of calves to high dose-loads of pathogens by re-creating the favorable conditions of the first weeks of the calving season each subsequent week of the season.
References


