

**Reducing the Incidence of Neonatal Calf Diarrhea through Evidence-Based Management**  
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*The following is a paper I published to help producers look at the potential for having calf scours before the calving season starts. Once you read the article, assess the risk on your farm using the table at the bottom of the article.*

**Reducing the Incidence of Neonatal Calf Diarrhea through Evidence-Based Management**

Neonatal calf diarrhea is a major concern to the beef industry. Twenty one percent of producers felt that calf scours had a significant economic impact on their cow/calf operation in the NAHMS Beef 97 study. Risk factors for the disease can relate to host immune function, environmental stresses, or factors contributing to level of bacteria in the environment (pathogen load).

The cause of neonatal diarrhea is often multi-factorial, with several disease-causing agents contributing to an outbreak. Combinations of *Escherichia coli*, rotavirus, coronavirus, or *Cryptosporidium* species are frequently identified as causative pathogens by diagnostic laboratories. These ubiquitous pathogens are frequently found wherever neonatal calves are concentrated. The concept of disease occurring when the disease challenge overwhelms the resistance of calves can be applied to prospective disease investigations. At the most elementary level, disease occurs when the disease challenge (pathogen load) is greater than the calves' resistance. When a calf ingests more pathogens than its immune system is capable of responding to, disease occurs. The level of contamination determines pathogen load at the production unit level.

Levels of management and quality of facilities vary throughout the beef industry. Therefore the goal of prospective risk assessment is to identify factors that increase contamination and decrease the immune response of neonatal calves and to apply management practices that address those risk factors before the calving season begins.

**Risk-Assessment Format**

An instrument to assess the risk of an epidemic of neonatal diarrhea was developed for use in beef herds. Risk factors for neonatal diarrhea were assigned numeric values, and a range was estimated that might reflect herds at high risk (Table 1). The total value of all these risk factors was determined, and a potential risk of an economically significant number of neonatal diarrhea cases in a given year on a specific beef production unit was estimated using this scoring system:

0 to 55 = Slight risk

56 to 70 = Moderate risk

71 to 155 = High risk

This risk-assessment vehicle was developed for use at producer meetings or on individual farm consultations as a preliminary step that could facilitate a more comprehensive field investigation of the herd.

**An Example of a Specific Herd Assessment**

In February 1999, the Iowa State University Rhoads Research Farm had 290 bred, mature cows that were potential embryo recipients and 251 virgin heifers that were artificially inseminated to develop a herd of 400 foundation cows. This was approximately 100 more cows than were normally calved at the farm. The heifers were purchased from five different sources. The

temperature had been 20°F to 40°F, and a cold rain had been a consistent weather factor for several weeks. Thus haircoats of the cattle were frequently wet. Because the ground was not frozen, the cattle were constantly in cold mud 2 to 12 inches deep (Figure 1). As part of a biosecurity plan, the current conditions on the farm were assessed.

### Risk Analysis Conclusions

A quantitative score of 110 of 155 possible points indicated that this herd was at high risk for a neonatal diarrhea epidemic during the calving season. Therefore intervention was recommended.

### Intervention

Proactive intervention was planned using the risk factors identified on the risk-assessment form. The intervention plan for this herd in spring 1999 included the following recommendations: **Separate cows from heifers.** In herds where cows and heifers are wintered on the same ground the heifers were 3.60 time more likely to have calves with neonatal diarrhea. The odds ratio that cows and heifers calved on same ground would have an outbreak of calf diarrhea was 1.67 time greater than calving heifers on a different pasture.

**Reduce group size.** The ideal group size is less than 50 cow or heifers per pasture.

**Improve nutrition.** Cows with a body condition score less than 4 have reduced calf serum antibodies (both IgG and IgM). This results in poor quality of colostrum and results in increased calf scours (neonatal diarrhea).

**Reduce the energy requirement to move from one location to another in the mud.** Maintenance energy requirements increase with mud depth. A 13% increase in net energy of maintenance occurs when mud is up to the fetlock.

**Change calf flow.** A calf movement design that allows calf flow to be a one-way flow reduces contamination.

To reduce the likelihood of neonatal diarrhea, heifers were divided into two groups **and not commingled with the cows until all calves were at least 3 weeks of age**. Calf flow was unidirectional; once moved from a location, they were not to return to that location. Reducing group size from a single group of 541 cows to a group of 290 cows and two heifer groups of 125 and 126 reduced the potential for neonatal diarrhea. The facilities would not allow for groups of 50 or less. A hospital area was developed at each calving area to treat sick calves and house at-risk calves that had difficult births. A separate area was developed at each calving site, and calves were kept in isolation from the herd until the youngest calf in each group was 3 weeks of age. Studies have shown that calves shed bacteria and viruses for up to 30 days after they have recovered from calf scours. **Cows were placed in a pre-calving area and moved into the calving pasture approximately 2 weeks before calving to reduce contamination of the calving area with pathogens from adult carriers.** Cows or heifers that had calved were rapidly moved into the post-calving areas. Each of the three groups needed a pre-calving area, an obstetric area, a hospital area, an isolation area, and a post-calving area. To reduce the labor required at night, all pre-calving cows and heifers were given access to feed only from 4:00 PM to 6:00 AM, reducing the number of calves born at night. These recommendations were followed, but the isolation area for both groups of heifers was a single area and the calves were kept for 3 weeks and then placed back into their original groups.

Because of the risk assessment, management decisions were made that reduced a possibly devastating neonatal diarrhea problem. Twelve calves were treated for a variety of health problems.

By using one-way calf flow, relocating all calves with neonatal disease to a hospital area, and continuing to isolate calves until all were 3 weeks of age, the exposure to neonatal pathogens was reduced, dramatically decreasing expected neonatal diarrhea. Only two calves died because of diarrhea-related causes.

#### Implications for Practice

Each production unit and geographic area has unique characteristics that vary each year. Veterinarians are in an excellent position to help producers by assess risk for their producers. A prospective assessment of potential risk factors allows veterinarians to inform producers of preventive management practices that could significantly reduce the risk of disease losses.

The following is a list of risk factors for neonatal diarrhea (calf scours). I suggest you grade you operation using this scale.

**Table 1**  
**Risk-Assessment Form for Neonatal Diarrhea in a Herd**

<b><u>Risk Factor</u></b>	<b><u>Total Value Possible</u></b>
Herd performance not analyzed	+5
Forages not tested	+5
>2% abortions in herd this year	+5
Heifers calved before March 10 in northern climates	+5
>20% first-calf heifers	+20
History of significant calf diarrhea	+15
Average body condition score $\leq 4$	+ 5
Winter weight loss	+15
>30 days in the pre-calving area before calving	+10
Poor drainage in pre- and post-calving areas	+10
Sick cows/calves not isolated from calving area	+15
Heifers calved in same area as cows	+10
Newly purchased cows/calves added during calving season	+15
Foster calves purchased to replace a lost calf	+20
Total possible points	155

0–55 = a slight risk, 56–70 = a moderate risk, and 71–155 = a high risk of a neonatal diarrhea epidemic this year.