



What's New In Calf Research? - Seasonality and Colostrum Quality & Calf Health

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This past summer, members of our Innovation & Development team participated in the 2024 American Dairy Science Association annual meeting. From the hundreds of calf research studies showcased there, we picked several that we'll be presenting over the next months. In this article, we'll summarize two complementary studies that integrate the seasonality of colostrum quality with that of transfer of passive immunity and calf health.

The first study was presented by a research group from University of Georgia (Roper et al.) in the United States. They evaluated the colostrum quality of cows and the transfer of passive immunity of the heifer calves over a 12-month period in a commercial dairy.

Calves ($n = 699$) were fed maternal colostrum within 2 hours of birth, and blood was collected between 2 to 4 days of age. Colostrum quality and

transfer of passive immunity in blood serum were evaluated using a Brix refractometer as a proxy of immunoglobulin G concentration. The ambient temperature in the barns over the year varied from -16 °C in December to 31°C in August.

During the first seven months of the year, they observed a synchrony between colostrum quality and the level of transfer of passive immunity, which both were maintained from January to April, decreased from April to June and increased from June to July. However, from July to October the transfer of passive immunity decreased despite an increase in colostrum quality, which was mainly attributed to the negative impact of maternal heat stress during the dry period on the calf's ability to absorb the immunoglobulins in colostrum. From October to December colostrum quality and transfer of immunity decreased.

In the second study, researchers from University of Guelph (Edwards et al.) used complete calf health records from birth to 56 days of age from 2,361 female Holstein calves from 11 dairy farms in the province of Ontario to explore factors associated with diarrhea, respiratory disease, and mortality in preweaning calves.

The variables considered in the study were season of birth, birth body weight, calving ease, colostral Brix, number of colostrum feedings, and transfer of passive immunity, among others. They found that the odds of contracting diarrhea were 1.5 times greater in calves born in the summer compared to those born in winter. Interestingly, compared to the odds for respiratory disease in calves born in the winter, those born in the summer have 1.5 times lower odds, while those born in the fall had 1.5 times greater odds (figure 1). The researchers reported that calves with excellent transfer of passive immunity (> 6.1 g proteins/dL) had 1.4 times lower odds of contracting a respiratory disease compared with those with poor transfer (< 5.1 g proteins/dL). Likewise, calves with excellent or good (5.8-6.1 g proteins/dL) transfer of passive immunity also had 4.3- and 2.9-times lower odds for mortality, respectively, compared with those with poor transfer of immunity. The odds of mortality were 20 times

higher for calves with a health event compared with those with no health events.

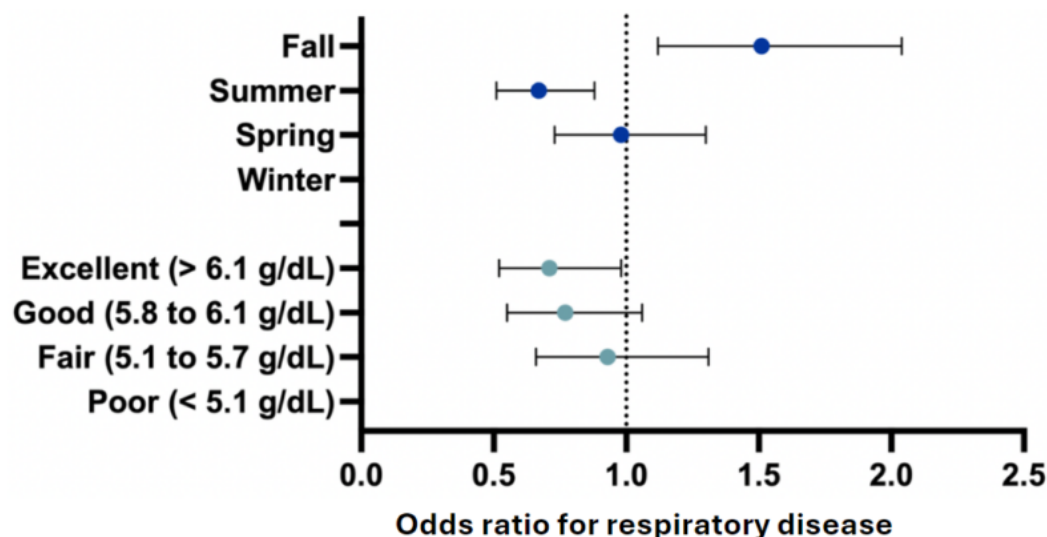


Figure 1. Odds ratio for respiratory disease by season (winter as reference = 1.0) and transfer of passive immunity status (poor as reference = 1.0) based on a multivariable model. Adapted from Edwards et al., 2024 ADSA annual meeting.

Although the results from both studies confirm already well-known facts, like the relationship between colostrum quality and transfer of immunity, and the protective effect of a successful transfer of immunity against death and disease, their findings highlight that there is an important seasonal component that should be considered to adapt our colostrum and newborn management practices on farm to ensure healthy calves all-year-long.

For instance, in the October issue of [Le producteur de lait Québécois](#) (French only) as well as the September [QFA Advocate](#) (English only), we discuss some critical areas on calf rearing during fall and propose some key practices to consider. These are aimed to counterbalance the potentially reduced capacity of the calf to absorb the antibodies in colostrum and higher risk of respiratory diseases during fall indicated by the above-mentioned studies. Similarly, given the greater risk of diarrhea

during the summer, other areas like hygiene, water quality and heat abatement should be reviewed and adjusted.

Finally, these studies reinforce the advantage of taking measurements and keeping records on key parameters like colostrum quality, transfer of passive immunity and health events in order to identify areas of improvement, guide decisions and assess the impact of new practices.

References

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