



DON'T LOOK AT TRANSITION COWS solely as a disease situation that must be managed. View transition cows differently. Look at these cows as a production and reproduction opportunity.

Let's rethink transition cow "success"

Recent studies indicate we can improve milk yield and reproductive health by changing the way we care for transition cows.

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THE transition cow has been a topic of intense research and farm-level focus for nearly 25 years. For much of this time, we have had a largely disease-centric approach to both research and evaluation of transition cow programs at the farm level. In other words, we have generally judged the success and failure of our transition cow nutrition and management programs based upon the presence or absence of clinical health disorders such as retained placenta, milk fever, displaced abomasum, metritis, ketosis, and mastitis.

When elevated rates of any of these diseases occur, we believe there is improvement potential for transition cow care. At the same time, we think that, in many cases, we have falsely interpreted good control of clinical disease as a lack of opportunity for improved transition cow nutrition and management at the farm level. In doing so, we have forgotten that the transition period is really about launching the cow into a successful lactation from a milk yield and reproductive performance standpoint. Accordingly, a farm can have good to excellent control of clinical disease rates but still have significant opportunity to boost milk yield and reproductive performance based upon improved transition cow nutrition and management.

Based on a solid foundation

The basis for this argument comes from the results of a series of large, epidemiologic studies involving multiple herds and large numbers of cows over the past 10 years. Several of these have been collaborative efforts between our research groups at Cornell University and one was a very large study led by the University of Guelph with a number of collaborators across the U.S. and Canada.

In general, these studies evaluated the relationships between serum- or plasma-based markers of energy metabolism such as non-esterified fatty acids (NEFA) or B-hydroxybutyrate (BHB), minerals such as calcium, and acute-phase proteins such as haptoglobin (a non-specific marker of inflammation in the cow). These measurements were connected to disease risk, subsequent milk yield, and

reproductive performance.

The studies are listed in the table and vary in approach, sampling times relative to calving, and in analytical strategy. However, in general, these studies were focused on determining relationships between the percentage of cows in a herd that would have concentrations of NEFA and BHB above critical thresholds and calcium below a critical threshold during the time period of interest. They also measured outcomes related to clinical disease, subsequent milk yield, and reproductive performance. Although the thresholds and the percentage of cows within a herd that would indicate an "alarm" level vary across studies, the results generally indicate very meaningful associations of these serum and plasma markers with subsequent milk yield and reproductive performance.

What we have learned

In the study conducted by Nuria Chapinal and co-workers, there was no relationship between NEFA and clinical diseases of inter-

est at the herd level. There was, however, very important negative relationships between the percentage of cows in these herd with elevated NEFA and outcomes related to milk yield and reproduction. We should not entirely discount relationships of NEFA and BHB with disease as the relationships of these markers with disease are also important, particularly at the cow-level. We miss the mark, though, if we focus solely on clinical disease as our outcome.

Although the study conducted by Julie Huzzey as part of her Ph.D. program at Cornell focused on inflammation in the transition cow, it was not designed to determine herd-level alarms. Even so, nearly 40 percent of first-calf heifers and 30 percent of second-lactation or later cows had elevated concentrations of haptoglobin during Week 1 postcalving and relationships at the cow-level with subsequent milk yield and reproduction were large. We currently are evaluating relationships of inflammation as indicated by elevated haptoglobin levels with postpartum outcomes in a large, commercial farm-based study with cooperating farms in New York and Vermont.

Results from these studies have supported the development of herd-level monitoring programs for BHB to better understand the prevalence of, and opportunity to manage, subclinical ketosis. Subclinical hypocalcemia is also highly prevalent, even in herds with low rates of clinical milk fever. With further development, we anticipate that there will be additional opportunities to create more convenient and cost-effective herd-level monitoring programs related to calcium, NEFA, and inflammation markers such as haptoglobin in the future.

The future of transition cow health

We have made great progress caring for the transition cow over the past 25 years. That will continue going forward with the combination of continued research and implementation of new knowledge and strategies to enhance transition cow management and keep pushing the bar of success even higher. 🐄

Studies investigating relationships between plasma or serum analytes in transition cows with postpartum outcomes			
Study	Marker and threshold	Herd-level alarm (% of cows)	Associated with (herd-level)
Ospina et al., 2010	Prepartum NEFA > 0.3 mEq/L	>15%	+3.6% DA or clinical ketosis -1.2% 21-day pregnancy rate -529 lbs. milk (all animals)
Ospina et al., 2010	Postpartum NEFA > 0.6 – 0.7 mEq/L	>15%	+1.7% DA or clinical ketosis -0.9% 21-day pregnancy rate -640 lbs. of milk in Lactation 1 -1,272 lbs. of milk in Lactation 2+
Ospina et al., 2010	Postpartum BHBA > 1.0 – 1.2 mM	>15 – 20%	+1.8% DA or clinical ketosis -0.8% 21-day pregnancy rate -1,179 lbs. of milk in Lactation 1 -732 lbs. of milk in Lactation 2+
Chapinal et al., 2012	Prepartum NEFA > 0.5 mEq/L	>30% >50%	-6.6 lbs. of milk first test day (Lactation 2+) 50% decrease in conception first A.I. No relationship with DA, retained placenta, or metritis
Chapinal et al., 2012	Postpartum NEFA > 1.0 mEq/L	>30%	40% decrease in conception first A.I. No relationship with disease or milk
Chapinal et al., 2012	Postpartum BHBA > 1.4 mM Postpartum BHBA > 0.8 mM	>25% >20%	Twice the odds of DA (all cows) -12 lbs. of milk first test day (Lactation 2+)
Chapinal et al., 2012	Postpartum calcium < 2.1 mM	>35% >15% >20%	2.4 times the odds for DA (all cows) -8.4 lbs. of milk first test day (all cows) 30% decrease in conception first A.I.
Huzzey et al., 2015	Increase in haptoglobin by 1 g/L during Week 1	Not determined	-1,022 lbs. of milk in lactation (all cows) 20% lower risk of conception by 150 DIM (all cows)

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