

BHBA in the high peak BHBA group could be related to short-term drops in dry matter intake, which in turn could be triggered by metabolic or external (non-metabolic) factors.

Further studies should aim at finding what those triggers may be, and how their effect could be mitigated.

## Concentrations of Serum Non-Esterified Fatty Acid (NEFA) and Beta-Hydroxybutyrate (BHB) through the Transition Period and their Associations with Risk of Clinical Disease

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### Introduction

Serum non-esterified fatty acid (NEFA) and Beta-Hydroxybutyrate (BHB) concentrations provide important insight into the metabolic health of transition dairy cows. Previous studies have linked elevated prepartum NEFA and postpartum BHB concentrations with an increased risk of developing displaced abomasum. The objective of this study was to further characterize the relationship of both prepartum and postpartum serum NEFA, and postpartum serum BHB concentrations with clinical disease in transition dairy cows across different regions of North America.

### Materials and Methods

A field study was conducted using 56 commercial dairy herds across Canada and the United States. Herds sampled were divided into four geographic regions consisting of the Midwest, Northeast (including Ontario, Canada), Southeast and Western United States. Each herd in the Midwest and Northeast regions had approximately 35 cows per herd enrolled in the study, whereas in the Southeast and Western herds included approximately 60 and 80 cows per herd, respectively. A total of 2403 Holstein cows were enrolled in the study one week prior to calving. A technician visited herds weekly at

approximately the same time, after the morning feeding. During each visit a coccygeal vein blood sample was collected from cows in the week before their expected calving date, and again from the same cows in weeks 1, 2, and 3 postpartum. Body condition was scored at week -1. Blood samples were kept cool, allowed to clot and serum was harvested, and stored at -20°C within 8 hours of collection. All serum was shipped to the Animal Health Laboratory at the University of Guelph for measurement of NEFA and BHB using a Hitachi 911 auto-analyzer. The incidence of retained placenta (RP), puerperal metritis, and displaced abomasum (LDA) were recorded.

### Results

Results were available from 1771 cows. Considered alone and assuming equal weight on sensitivity and specificity, the optimal cut-points for prediction of LDA were, prepartum: NEFA  $\geq 0.5$  mEq/L; week 1 postpartum: mol/L (i.e. mNEFA  $\geq 1.0$ ); or week 1 or 2 postpartum: BHB  $\geq 1400$  subclinical ketosis (SCK). The 23% of cows with NEFA  $\geq 0.5$  in week -1 were 2.8 times more likely to subsequently have LDA than cows below this cut-point. The 20.5% of cows with NEFA  $\geq 1.0$  in week +1 were 4.6 times more likely to develop LDA. The prevalence of SCK and relative risk for affected cows to develop LDA were 14% and 4.4 in week +1, and 16% and

3.6 in week +2. Cows that did not have elevated NEFA pre- or postpartum or SCK had the lowest risk of LDA (0.8%) whereas cows that experienced all three risk factors had a high rate of LDA (12%). Among the 53% of cows with NEFA  $\geq 0.3$  mEq/L in week -1, there was a significant ( $P = 0.005$ ) but modest increase in risk of RP (9% vs. 6%; RR = 1.6). Neither metabolite had a predictive univariable association with development of metritis.

## Significance

These data confirm the associations of NEFA and BHB with health in the transition period and support their use as tools for monitoring or investigation of transition dairy cows. However, used alone, the positive predictive value of these associations is low, which is expected given the multifactorial nature of both RP and LDA.

## The Use of Rumensin® Premix in Dairy Cows: Factors Influencing its Effects on Milk Production and Milk Fat Percentage

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### Introduction

Monensin premix (Rumensin® Premix, Elanco Animal Health, Canada) has been approved in Canada for use in lactating dairy cows since 2004 at a dose range of 8 to 24 ppm (7-22g per ton). Several studies have found that monensin increases milk production and decreases milk fat percentage in lactating dairy cows. Recent research has found that some dietary factors influence the monensin effect on milk production and milk fat percentage. To assist bovine practitioners in making recommendations about the use of monensin in dairy herds, there is a need for knowledge about those dietary factors influencing monensin effects. The objectives of this project were to evaluate the effects of 16 ppm (15g per ton) of monensin on milk production (PROD) and milk fat percentage (MFP), and to find dietary factors influencing those effects.

### Materials and Methods

A randomized field clinical trial was conducted using 49 Holstein dairy herds in Québec (Canada) be-

tween November 2005 and May 2006. The herd was considered as the unit of interest. Herds were balanced in two groups by milk production, housing system, feeding system and size of farm. Enrolled herds were followed for a 7-month period. Monensin treatment was allocated in a crossover design for each group. Monensin was added to the lactating dairy cow rations for a consecutive 3-month period within this time frame. No other source of monensin was provided during this trial. Diet composition and diet particle size evaluation (using the Penn State Particle Separator) data were collected on each farm every two months. Milk production and milk fat percentage data were from weekly averages of daily bulk tank data. Data were analyzed in linear mixed models where PROD and MFP were considered as outcome variables.

### Results

The majority of the 49 herds were fed a total mixed ration (n=30; 61%) and were housed in tie-stalls (n=42; 86%). Mean herd size was 73 cows (min: 40, max: 175). Overall monensin effect on PROD was not significant