# Behavior and productivity of fresh cows in robotic herds prior to diagnosis of health disorders

M. King[1], S. LeBlanc[2], E. Pajor[3], T. Wright[1], and T. DeVries[1].

[1]Dept. of Animal Biosciences, University of Guelph, 50 Stone Rd E, Guelph, ON, N1G 2W1. [2]Dept. of Population Medicine, University of Guelph. [3]Fac. of Veterinary Medicine, University of Calgary, 2500 University Dr NW, Calgary, AB, T2N 1N4.
*Corresponding author: Trevor DeVries, Email: tdevries@uoguelph.ca

We examined associations of electronically-recorded data before diagnosis of health disorders in early-lactation cows in herds with robotic milking systems.

Rumination time, activity, and robot data were collected for 8 mo for 605 fresh cows in 9 commercial herds. Controlling for parity and DIM, we examined data relative to the day of diagnosis for health disorders occurring in absence of, or at least 14 d before, another disorder: mastitis (n = 13), new cases of lameness (n = 45), and subclinical ketosis (SCK; n = 113). However, all cases of displaced abomasum (DA; n = 8) occurred in conjunction with other disorders. Deviations from baseline for sick cows were examined, as well as differences from a group of healthy cows and an average group of all cows, who were given mock diagnosis days using the mean DIM at diagnosis for each disorder.

On 6 to 14 d of the 2 wk before diagnosis, cows with DA or mastitis had lower milk yield, rumination time, milking frequency, activity, and milk temperature compared to healthy cows, as well as deviations from their own baseline rumination time and milk yield starting 4 to 12 d before diagnosis. For both disorders, daily rumination time declined 1 d prior to milk yield, on average. Cows with DA had lower AMS supplement intake than healthy cows, and deviations from their baseline activity and milk temperature starting 6 and 4 d before diagnosis, respectively. Cows with mastitis had greater milk conductivity than healthy cows, and deviated from their baseline milking frequency and conductivity 8 and 12 d before diagnosis, respectively. Compared to healthy cows, those with SCK or new cases of lameness generally had lower milk yield, rumination time, milk temperature, supplement intake, and milking and refusal frequencies. Only the milk temperature of lame cows deviated from baseline.

Implications: Acute health disorders (DA and mastitis) were associated with sharp deviations from baseline AMS data, whereas more chronic disorders (SCK and lameness) were associated with significant, but subtle, longer-term changes in milk production and behavior. Because sick cows differed from the healthy group before they deviated from their own baseline and the average of all other cows, including a healthy reference group in health alerts could refine the ability of detection models to identify subtle deviations in early lactation.