

The effect of colostrum supplementation on milk intake and performance when administered at a diarrhea alert

Allison Welk¹, Melissa Cantor^{1,2}, Joao Costa³, Jannelle Morrison¹, Charlotte Winder¹, David Renaud¹

¹Department of Population Medicine, University of Guelph, Guelph, ON, Canada.

²Department of Animal Science, Penn State University, State College, PA, USA

³Department of Animal and Veterinary Science, University of Vermont, Burlington, USA.



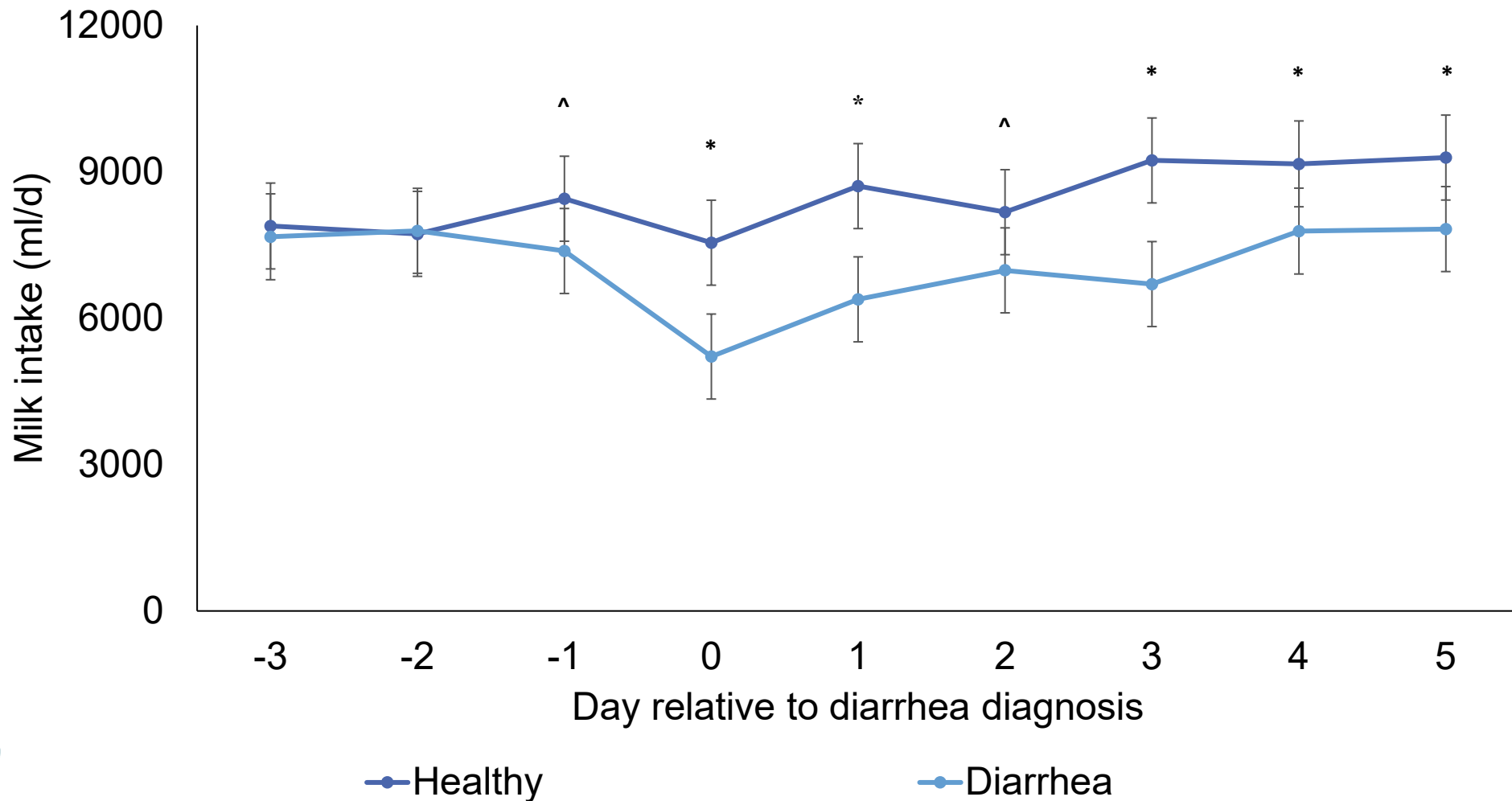
80% to 95% incidence of diarrhea observed on farms (Whalin et al., 2022; Guevara-Mann et al., 2023)

Antimicrobials are a common treatment for diarrhea (Urie et al., 2018; Uyama et al., 2022).

However, 70% diarrheic calves only have viral or parasitic pathogens present in feces (Cho et al., 2013).

There is a need for early disease detection and treatment strategies.

Can we use changes in feeding behaviour to detect the onset of diarrhea?



Can we use changes in feeding behaviour to detect the onset of diarrhea?



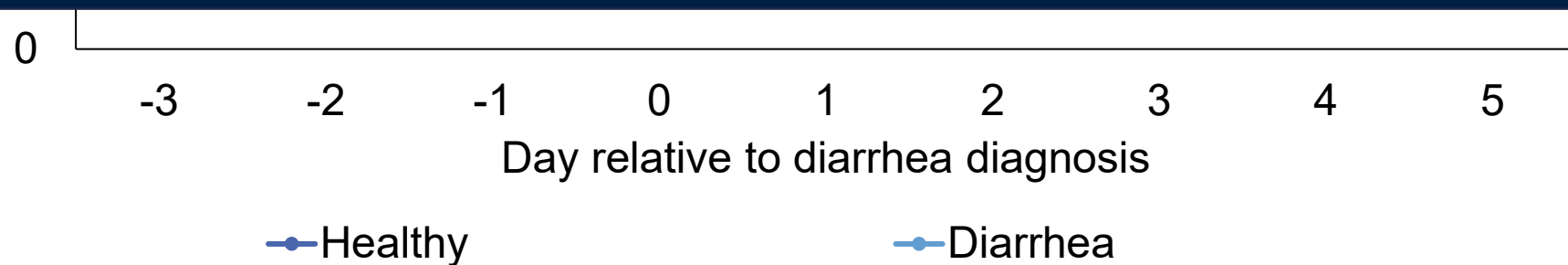
Diarrhea alert:

$\leq 60\%$ of 2 d rolling dividends in milk intake and/or drinking speed

sensitivity = 86%
precision = 94%

accuracy = 82%
specificity = 50%

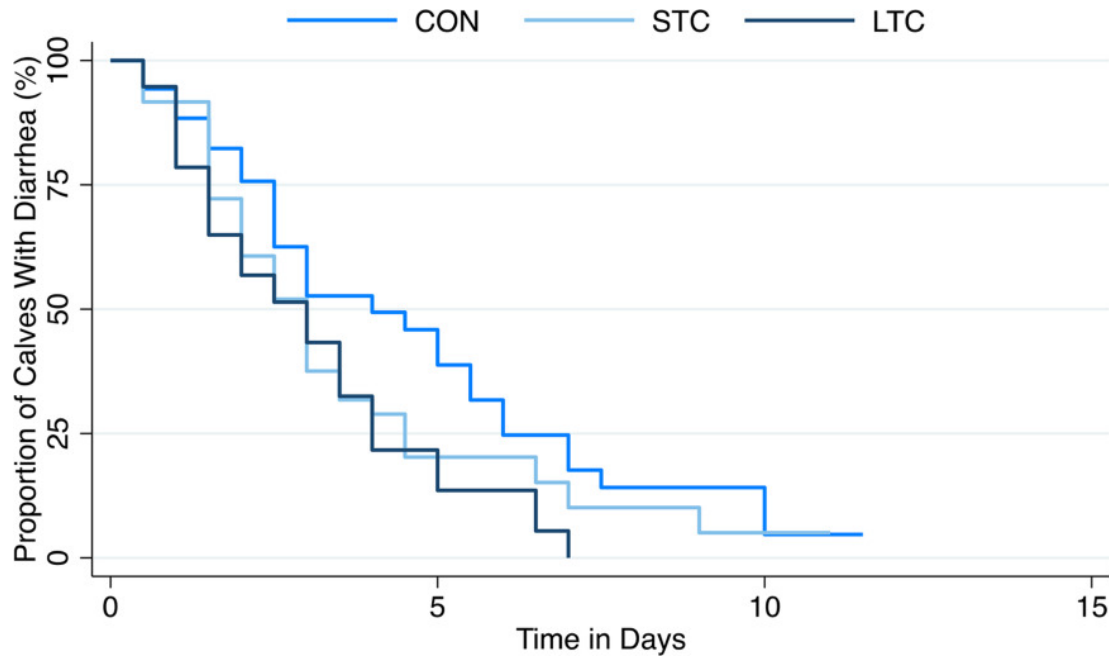
Cantor et al., 2023



Colostrum as a therapy for diarrhea

Calves supplemented with colostrum for 4 consecutive days at the onset of diarrhea

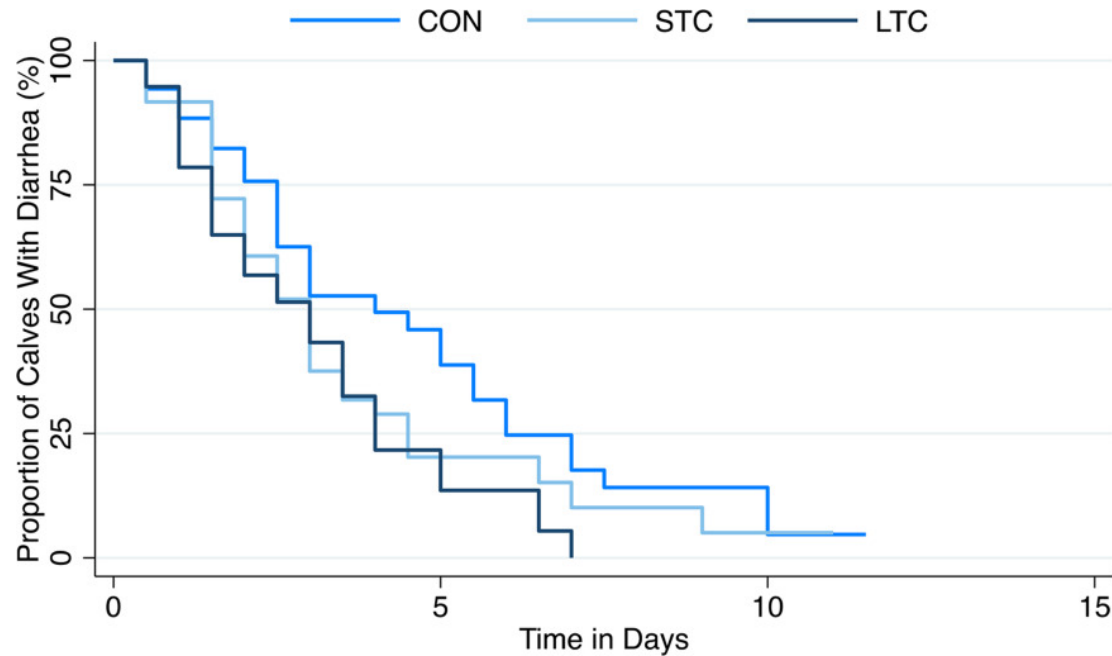
Reduced diarrhea duration



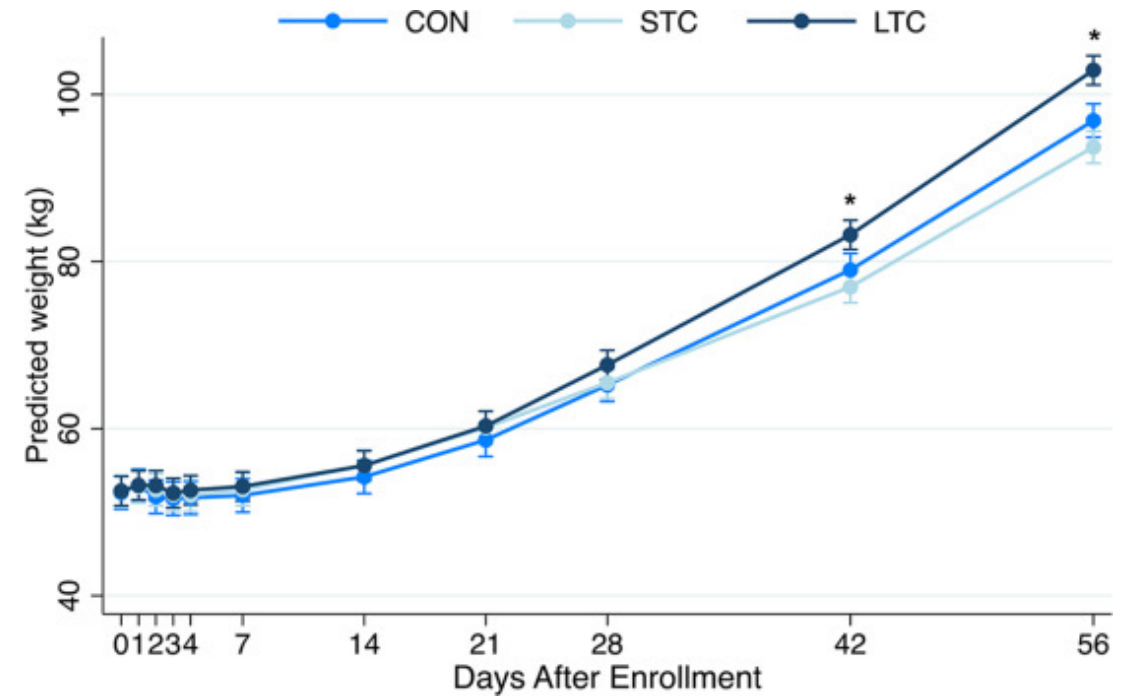
Colostrum as a therapy for diarrhea

Calves supplemented with colostrum for 4 consecutive days at the onset of diarrhea

Reduced diarrhea duration



Improved weight gain





Objective

To evaluate the effects of colostrum supplementation when administered at a diarrhea alert on:

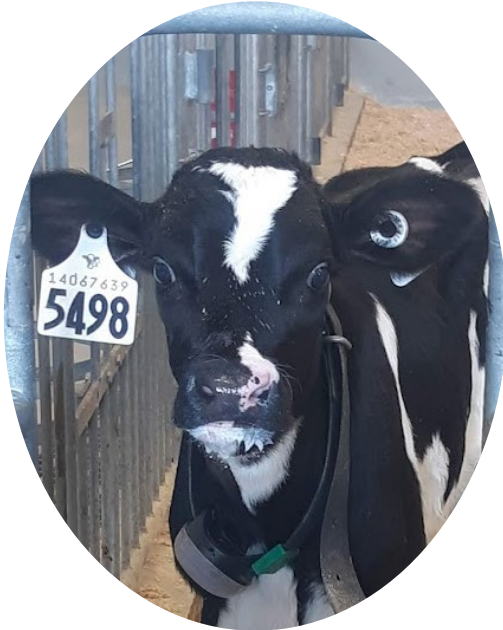
- Diarrhea duration
- Growth
- Feeding behavior at the milk feeder
- Activity behavior

Experimental Design

- 48 calves were housed in groups of 15 from 3 d – 28 d and offered 15 L/d of milk replacer (150 g/L) from automated milk feeders
- Calves were health scored daily and body weight was measured at birth and on 0, 3, 7, and 14 d relative to the alert
- Activity monitors (CowAlert, Peacock Technology) were used to measure lying behavior
- Diarrhea = loose feces for ≥ 2 d or watery feces for ≥ 1 d



Diarrhea alert generated by the milk feeder



$\leq 60\%$ of 2 d rolling
dividends in milk intake
or drinking speed
(Cantor et al., 2023)

Diarrhea alert generated by the milk feeder



**AMF Alert
Generated**

≤ 60% relative change
in milk intake or
drinking speed
(Cantor et al., 2023)

Experimental Treatments

Colostrum Replacer (CR)

(1 L at 130 g/L for 4 d)

Milk Replacer (MR)

(1 L at 150 g/L for 4 d)

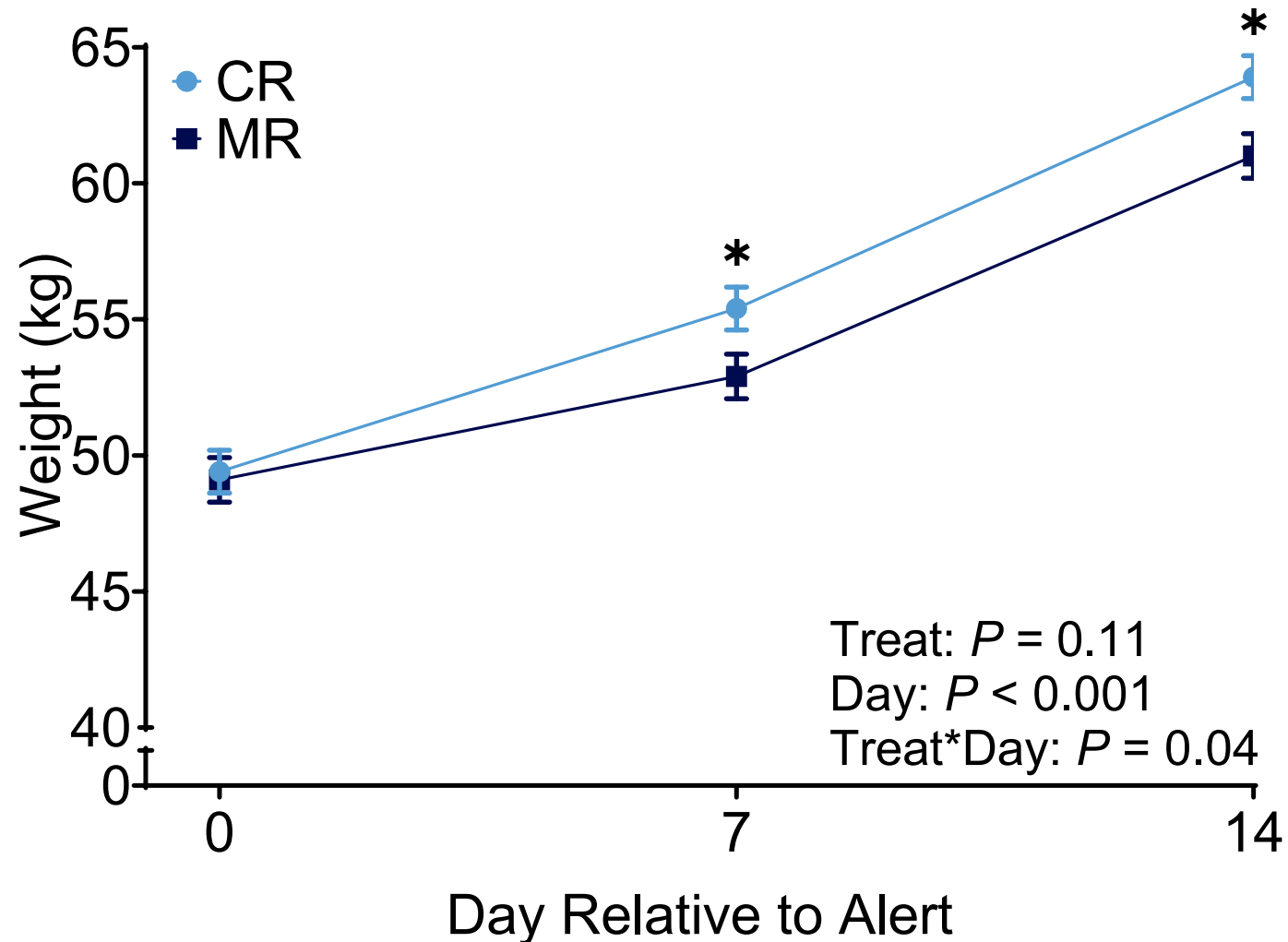
Exclusion Criteria

1. Calves not trained to use automated feeder
2. Calves that did not create an alert
3. Calves with diarrhea for more than 3 days

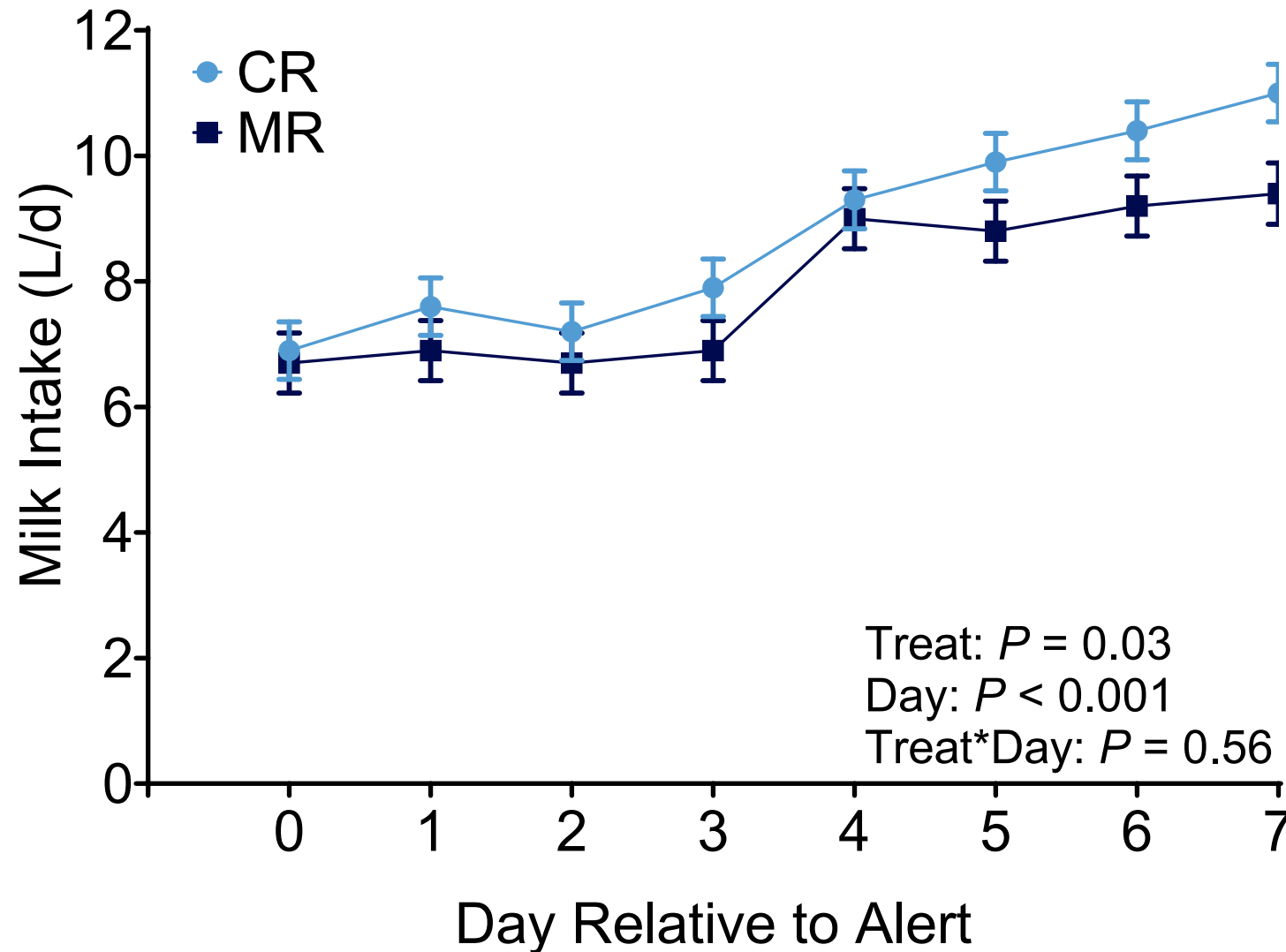
Results

- Calves triggered an alert at (mean $\pm$ SD) 10.2 ± 3 d of age
- 21 calves were healthy (CR = 10; MR = 11) and 29 calves were diarrheic (CR = 14; MR = 13) on the day of the alert
- 42 calves (CR = 20; MR = 22) were diagnosed with diarrhea at (mean $\pm$ SD) 11.1 ± 3 d of age
- No difference in diarrhea duration between treatments (CR: 2.5 ± 0.5 vs MR: 3.0 ± 0.5 d)

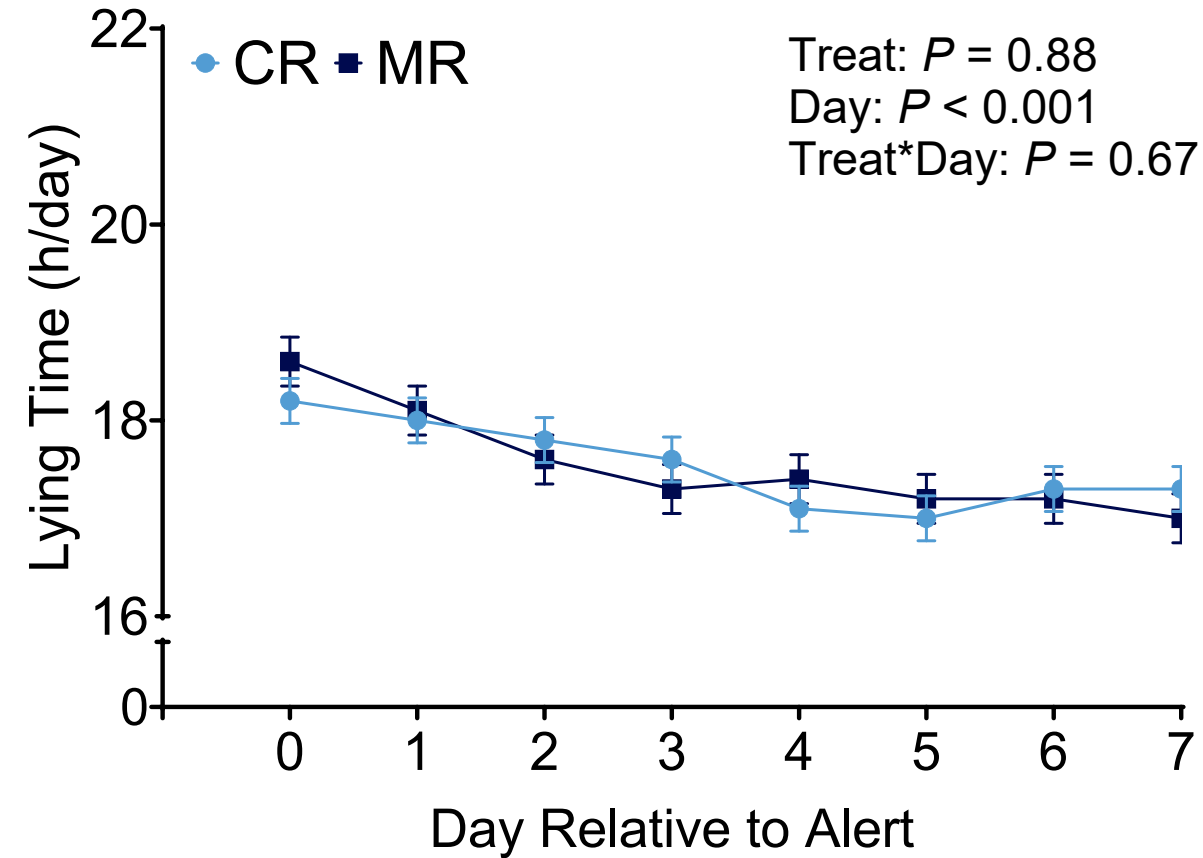
CR calves gained 0.4 kg/d more during the 7 d after alert and maintained a 3 kg advantage 14 d after the alert



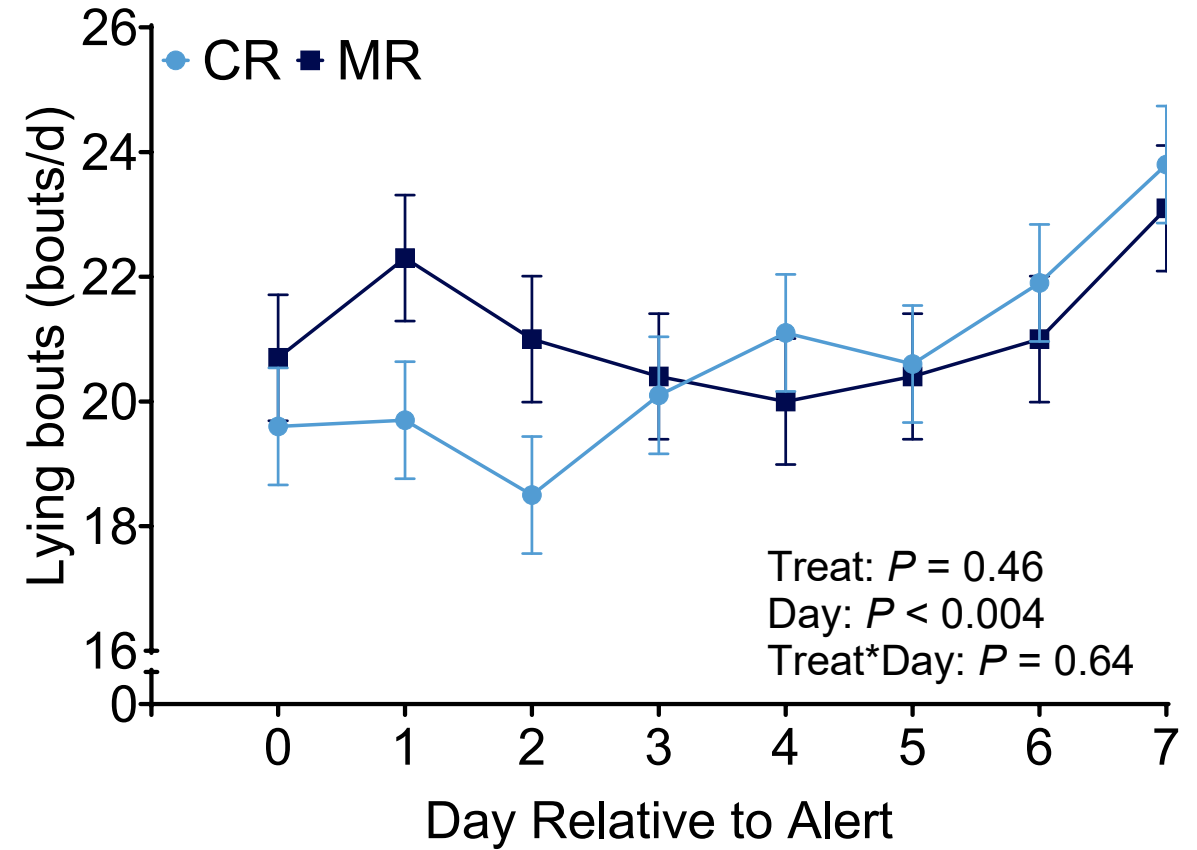
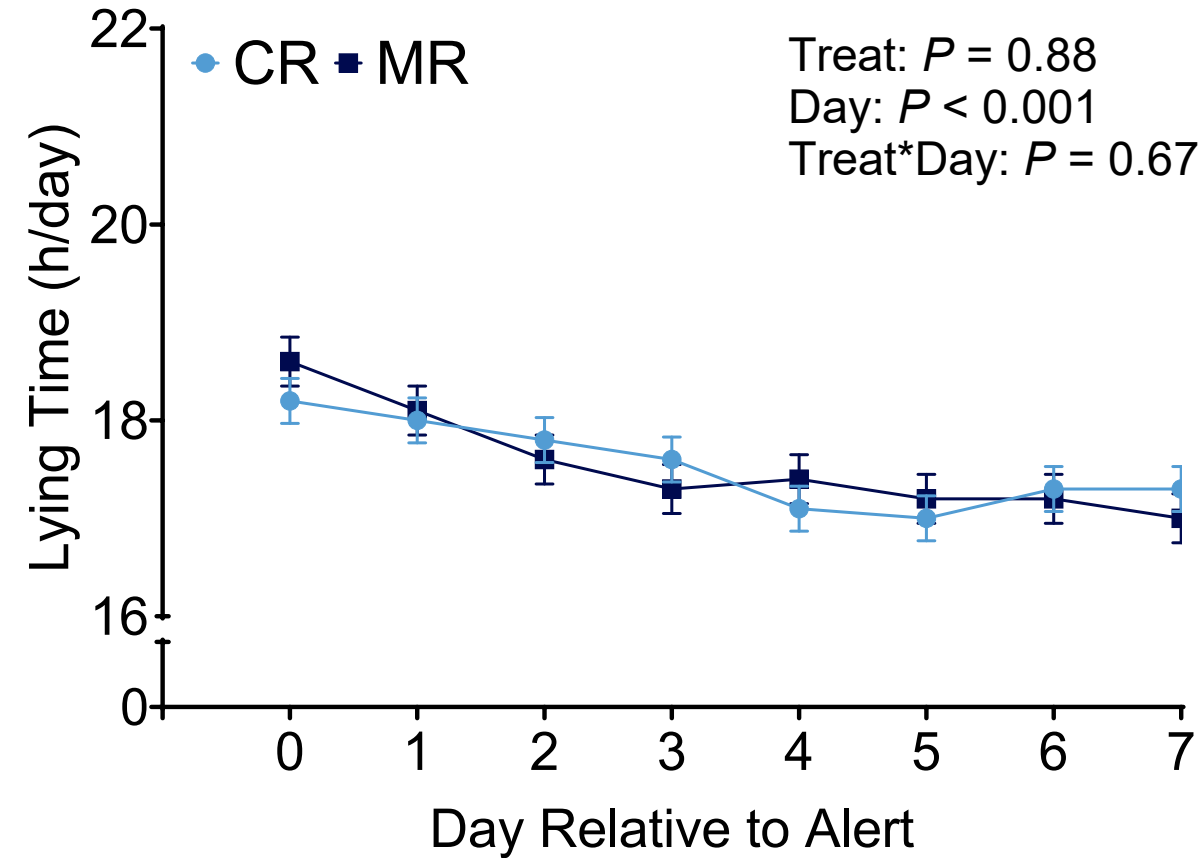
CR calves consumed 1 L/d more milk than MR calves over the 7 d following the alert



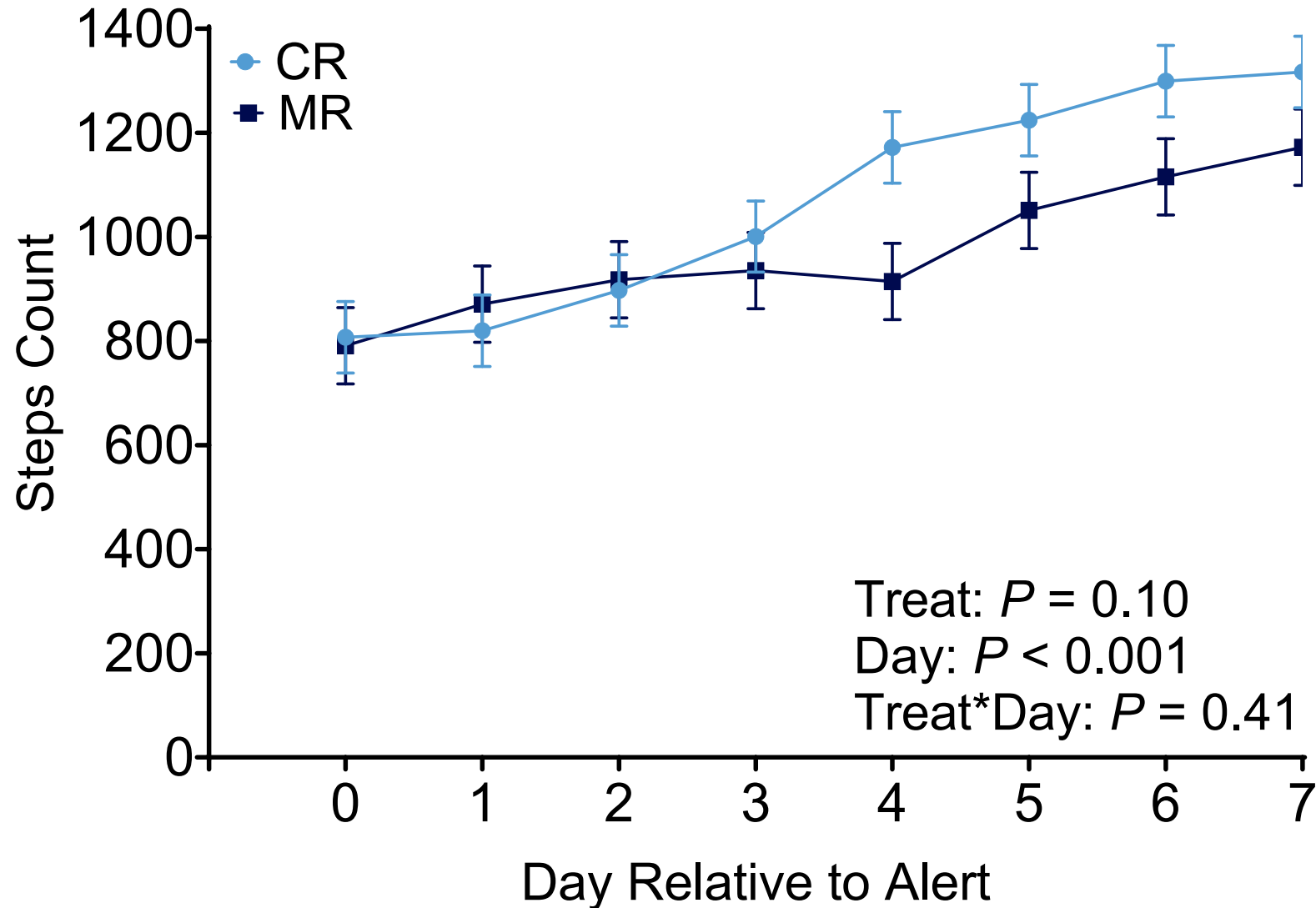
No difference in lying time or number of lying bouts between study treatments



No difference in lying time or number of lying bouts between study treatments



There was evidence CR calves had a greater step count 7 d following the alert



Take Home Messages

Supplementing colostrum at the time of a diarrhea alert did not influence the duration of diarrhea and had little impact on activity and lying behavior.

However, colostrum supplementation improved milk intake and weight gain over the 7 d following the alert, indicating improved recovery from disease.

Acknowledgments

Thank you!

- Dave Renaud
- Melissa Cantor
- Co-authors
- Staff and Students at the Elora Research Station



Limitation - Alert performance

Total of 103 calves followed

48 calves triggered an alert
(43 diarrheic calves and 5 healthy calves)

26 calves diagnosed with diarrhea but did not create an alert

12 calves remained healthy

Overall alert performance:

Sensitivity: 62%

Specificity: 70%

17 calves did not learn to use on the milk feeder