

Research Paper Summary

Feeding behaviour and activity as early indicators of disease in pre-weaned dairy calves

Short title: Early indicators of disease

Key words: Dairy calves; early detection; feeding behaviour; respiratory disease.

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Practical point

There are differences between diseased and healthy calves in their activity levels and feeding behaviour on days prior to disease, which can be measured via an animal-mounted sensor. Utilising precision technologies to identify changes could aid early intervention and optimised treatment of calf disease – reducing antimicrobial usage and associated costs and losses.

Background

There is variation across the sector in the health status of dairy calves and the resulting disease incidence and antibiotic use is high. Calf disease has significant impact on animal welfare, productivity and profitability of dairy and dairy-beef production systems. Whilst technology-based early detection systems could help combat this issue, methods have not been widely explored for dairy calf disease detection.

Work undertaken

The study by Duthie et al (2021) demonstrated the ability of animal-mounted sensors to identify change in feeding behaviour and activity as an early indicator of disease in pre-weaned dairy calves. The study utilised 91 pre-weaned male Holstein calves, ranging in age from 8-42 days, based at SRUC Dairy Research and Innovation Centre. Calves were

group housed on straw, fed milk through an automatic calf feeder and had access to starter pellet, straw racks, and ad lib water.

Each calf was fitted with a leg-mounted activity monitor for the duration of the trial and Wisconsin scored daily, being classified as “diseased”, “intermediate” or “healthy”. Wisconsin scoring is a cumulative score based on rectal temperature, presence of a cough, nasal discharge, eye discharge, ear posture and faecal consistency. For this study, ear posture and faecal consistency were not considered. The peak day of disease was identified for each sick calf, and diseased and healthy animals paired for analysis, based on age and bodyweight.

Compared to healthy calves, diseased calves lay for longer ($p < 0.01$) and tended to have longer lying bouts ($p = 0.09$). Diseased calves also fed for a shorter time ($p < 0.05$) and had fewer feeder visits each day compared to healthy calves ($p < 0.05$).

Table 1: Summary of activity measures for diseased and healthy pre-weaning Holstein calves.

	Diseased Calves	SD	Healthy Calves	SD
Lying time (hour)	17.6	±0.3	16.7	±0.2
Lying bout length (min)	74.8	±10.6	56	±3.7
Feeding time (min)	19.3	±1.4	22.8	±1.5
Rewarded visits (no.)	2.1	±0.2	3.2	±0.4

To identify whether technology could be used for early detection of disease, differences between diseased and healthy calves on days prior to the peak day of disease were explored. Lying bout length was greater in diseased calves for the 2 days prior to the peak day ($p < 0.05$), lying time was longer on day -1 ($p < 0.05$) and rewarded feeder visits were less frequent on day -3 ($p < 0.05$).

This work suggests that utilising animal-mounted sensors for measurement of feeding and activity could aid early detection, intervention and optimised treatment of calf disease.

Reference

Duthie, C-A., Bowen, J.M., Bell, D.J., Miller G.A., Mason, C. and Haskell, M.J., (2021). Feeding Behaviour and activity as early indicators of disease in pre-weaned dairy calves. *Animal* 15 (3): 100150

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