Lameness and the Impacts of Exercise and Outdoor Access in Dairy Cattle

How Canadian Dairy Research Supports the Code of Practice

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Over the last 25 years, the University of British Columbia (UBC) Animal Welfare Program has conducted research that has led to the improvement of animal care and welfare in Canada and around the world. Dairy cattle welfare researchers, Dan Weary and Marina (Nina) von Keyserlingk, are key leaders in this program. Through their NSERC Industrial Research Chair (IRC) in Dairy Cattle Welfare, funded in part by the Dairy Farmers of Canada, they have been investigating novel approaches to addressing industry-wide topics, including lameness and the impact of outdoor access.

Key Takeaways

Lameness is a Major Concern: Lameness is a common issue that causes pain, reduces productivity and reproductive performance, and limits natural behaviors.

Regular Monitoring Improves Detection: Producers should implement protocols for regularly observing cattle (including their feet and claws), diagnosing lameness, and providing prompt, appropriate treatment.

Outdoor Access Supports Recovery: Studies show that lame cows with pasture access recover faster and display improved mobility and welfare.

Exercise Promotes Health: Access to outdoor areas increases movement, improves gait scores, and enhances overall cow soundness.

Cows Value Pasture: Research indicates cows actively seek outdoor access, demonstrating their motivation to graze and move freely, especially in favorable weather.

What Does the Code Say?

CODE OF PRACTICE

The *Code of Practice for the Care and Handling of Dairy Cattle* (Code)[1] was updated in March of 2023. With this update came revisions to Canada-wide requirements related to a variety of key welfare topics for Canadian dairy cattle.

Lameness

A number of changes came into effect for lameness prevention and treatment, including:

- Housing systems should be designed and maintained to minimize lameness, and areas must be available to segregate, care for, and treat lame cattle.
- Producers must set thresholds for the occurrence of lameness and leg injuries and take corrective actions when the thresholds are exceeded.
- Personnel must regularly observe cattle for signs of lameness or leg injuries, to diagnose and treat them quickly.
- Feet and claws must be inspected and hooves trimmed as required to promote a normal gait and minimize lameness.
- Lame cattle must receive prompt care and be monitored at least twice a day.
- Lactating cattle that are severely lame or down must be milked where they are located to prevent mammary engorgement.
- Infectious hoof lesions must be treated to control the infection.
- Therapeutic hoof trimming must include strategies to relieve pain and pressure on the injured area and promote healing.
- Pain control must be included in the treatment of cattle that receive an invasive hoof trim (ie, a trim involving the sensitive laminae of the hoof and/or deeper tissues below the sole, hoof wall, or heel).

Exercise and Outdoor Access

The Code revisions also introduce new requirements and recommendations for exercise and outdoor access that have lameness implications, specifically:

- Starting April 1, 2027, cows must be provided with regular opportunity to move freely without being tethered throughout the entire production cycle.
- For newly built barns, cows must be allowed daily, untethered freedom of movement and interaction with other cows.
- Though not a requirement, the Code suggests cows should be provided with approximately 50 hours of outdoor access within any given 4-week period and during feasible weather and conditions.

In Canada, the proAction® program is implemented on all Canadian dairy farms and ensures that program requirements are aligned with the Code. The DFC has committed to incorporating the new 2023 Code requirements into proAction. This work is currently underway by proAction's Animal Care Technical Committee.

Scan this QR code to visit the Code.

proAction

What Does the Science Say?

Lameness is viewed as a priority condition by many industry stakeholders – from dairy producers, to veterinarians, academics, and industry specialists[2]. Researchers at UBC and other institutions across Canada have made significant contributions to the science of measuring and preventing lameness, as well as ways to help treat lame cows – including strategies such as increased access to the outdoors.

SO, HOW BIG OF A PROBLEM IS LAMENESS?

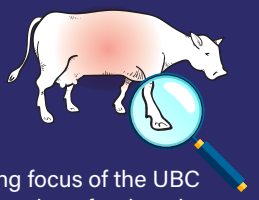
In a review on dairy cattle welfare, UBC researchers highlighted lameness as a top concern as it[3]:

- Causes pain
- Reduces milk productivity and reproductive performance
- Limits mobility and expression of natural behavior

Lameness is common. von Keyserlingk and her team investigated prevalence in 3 regions of North America, British-Columbia, California, and the northeastern United States, and reported an average prevalence of clinical lameness of 28%, 30%, and 55%, respectively[4]. This variation in prevalence shows there is room for great improvement.

Lameness in the dry period: Research from UBC aimed to identify risk factors for lameness in non-lactating cows and found that by the end of the dry period, 50% of cows had developed lameness, with only 36% recovering[5]. Hoof trimming helped prevent lameness in heifers but not multiparous cows. Low body condition score (<3 out of 5) and non-infectious hoof lesions before dry off were also associated with chronic lameness[5].

WHAT DO WE KNOW ABOUT MEASURING LAMENESS?



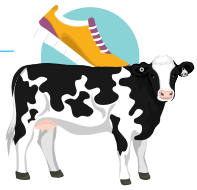
Lameness assessment has been a strong focus of the UBC research team and other Canadian researchers for decades. Here are a few key insights from some of this work:

Gait scoring: A study from 2006 by Flower and Weary established the 1 to 5 numerical gait scoring system that uses lameness-associated behaviors like weight bearing ability, gait speed, and posture when walking[6]. Findings from a recent series of studies suggest that cattle should be observed for lameness at least every two weeks, and that two consecutive assessments are helpful for accurately classifying lame cows[7,8].

Assessment programs: Lameness scoring is a key component of many industry welfare assessment programs, but balancing accuracy with feasibility is essential. UBC researchers found that evaluating cows from high-producing pens can serve as an acceptable proxy for the rest of the lactating herd. While more assessments increased accuracy, the researchers recommended considering practicality and acceptable misclassification levels when determining the assessment strategy[9].

Stall-based assessment: Since locomotion cannot easily be assessed in dairy cattle housed in tie stalls, research led by Elsa Vasseur at McGill University has investigated the use of video and live stall lameness scoring[10]. The assessment system was developed by European researchers in 2009, and includes behaviors related to how the cow bears weight while standing in a stall[11]. When compared to live gait scoring, stall lameness scoring underestimated lameness prevalence, but was a reliable tool when comparing lameness between farms[10], and is cited in the new code in Appendix E[1].

WHAT IMPACT CAN EXERCISE AND ACCESS TO THE OUTDOORS HAVE ON LAMENESS?



The benefits of pasture: In a 2007 UBC study, von Keyserlingk and Weary found that moderately lame cows on pasture showed significant improvement in gait scores over 4 weeks, averaging a 1-point increase on the 5-point scale[12]. Compared to cows kept indoors, cows on pasture:

- Spent less time lying down
- Lost more weight
- Produced more milk

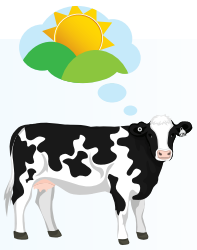
A more recent (2022) study supported these findings, showing that lame dairy cows with free-choice access to pasture made use of it, especially at night, and recovered better[13]. Weary and von Keyserlingk also examined how climatic conditions affect cattle behavior on six Brazilian pasture-based dairy farms. They found that daily lying time decreased with rainfall, especially for lame cows, suggesting reduced benefits during periods with heavy preciptiation[14].

Outdoor access: The Weary and von Keyserlingk team conducted a review of the impact of different types of outdoor access on dairy cattle behaviour:

- Pasture offers cows the opportunity to graze, and facilitates lying, standing, and walking.
- Outdoor loafing areas (i.e., concrete or bedded packs) are less desirable to cattle, though bedded packs provide benefits for lying, standing, walking, and social behavior[15].

Other studies support outdoor access and exercise for cows in tie stalls, showing that providing cows access to an exercise area increased their daily steps and improved locomotion, especially in large outdoor areas[16]. For example, 1 hour of outdoor access per day for 5 weeks improved gait scores by 1 point on a 5-point scale in non-lame cows.

DO COWS EVEN WANT TO ACCESS THE OUTDOORS?



In a study on cattle motivation, UBC researchers discovered that cows exerted similar force when pushing a weighted gate to access a pasture as they did to access fresh feed after millking[17]. Climatic conditions also play a role, with another UBC study showing cows spent on average, 25% of their time outside on a bedded pack in the summer compared to 2% in winter[18]. **Cattle's desire to access the outdoors is variable[15] and depends on:**

- Previous experience
- The type of indoor and outdoor facilities
- The climatic conditions
- The time of day

WHAT DO PRODUCERS AND THE PUBLIC THINK ABOUT OUTDOOR ACCESS?

In a 2014 survey, the Weary and von Keyserlingk group found that **most participants considered pasture access important for dairy cows** due to benefits such as exposure to fresh air, freedom of movement, social living, improved health, and the perception of healthier milk products produced from pasture-raised cattle[19]. Participants were primarily from the US and Canada (90%), and 44% were familiar with the dairy industry as students or teachers, animal advocates, dairy producers, or veterinarians, while 56% had no dairy industry involvement[19].

Similarly, in focus group studies with Western Canadian dairy producers, Drs. von Keyserlingk, Weary, and collaborators from the University of Calgary found that producers recognized the importance consumers place on pasture access[20,21]. **Producers also identified challenges such as maintaining consistent milk production, adverse weather, udder health issues, and farm-specific limitations like land prices and facility design.** However, they noted potential benefits, including improved lameness and opportunities for premium milk prices that could offset profitability concerns[20,21].

How Can Producers Use This Information?

Producers should follow the Code requirements to minimize lameness, and in doing so promote good welfare, meet public expectations, and support high milk production and reproductive performance. Established lameness assessment strategies should be used and updated as needed to efficiently monitor cattle and identify affected cows early for appropriate interventions, such as hoof trimming. Additionally, providing cattle access to the outdoors, especially to pasture under favorable weather conditions, can improve cow soundness and welfare.

Producers should establish:

- Solid lameness detection and prevention strategies
- Treatment strategies that align with new Code requirements

The Bottom Line

- Lameness prevention and control must continue to be a key area of focus for the dairy industry; implementing actions from the updated Code can help minimize its impact.
- Regular lameness monitoring for dairy cattle is required, followed by prompt, appropriate treatment.
- Providing exercise and outdoor access can promote cow soundness and support ongoing improvements to animal care standards.

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