

## NSERC Industrial Research Chair in Infectious Diseases of Dairy Cattle – the Next 5 Years

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### NSERC IRC Overview

The Natural Sciences and Engineering Research Council of Canada (NSERC) promotes and supports discovery research and fosters innovation by encouraging organizations to participate and invest in postsecondary research projects. One of the ways they do this is through appointment of Industrial Research Chairs (IRC), to collaborate with the public and private sectors to support Canadian universities in major research endeavours and providing an enhanced learning environment for graduate students and post doctoral fellows. There are a number of IRCS in dairy cattle research across Canada, with two being held by researchers in Alberta. Alberta Milk is currently contributing funds to three IRCS: Herman Barkema at the University of Calgary, Anne Laarman at the University of Alberta and Dan Weary/Marina von Keyserlingk at the University of British Columbia.

### IRC – Infectious Diseases of Dairy Cattle

Late 2019, Herman Barkema, a professor of epidemiology, was renewed as an NSERC IRC for infectious diseases of dairy cattle, which will last for another 5 years. The ultimate goal of this research program is to decrease the impact of infectious diseases in the Canadian dairy industry. In the last 5 years as an IRC, Dr. Barkema has trained dozens of graduate students, published hundreds of scientific papers, and spoken in front of thousands of dairy industry members across the globe. His research program has resulted in valuable information and management practices in understanding and controlling infectious diseases important to the dairy industry.

### The Next 5 Years

As this IRC position was renewed for another 5-year term, Dr. Barkema and his team have released their research plan. The current partners for this IRC are NSERC, Alberta Milk, Sask Milk, BC Dairy Association, Dairy Farmers of Manitoba, DFC, Lactanet, WestGen and MSD Animal Health. For this term, the IRC program will focus on 4 main areas:

**Johne's Disease:** a substantial amount of research has already gone into this topic to understand the cause, development, transmission and control of Johne's disease. The future for this work lies in characterizing breed and individual animal susceptibility, as well as development of rapid control and potential eradication of infections.

**Mastitis:** mastitis remains one of the most important infectious diseases on dairy farms, despite the amount of research already completed in this area. Future directions include identifying risk factors for heifer mastitis (at the herd and cow level), improving detection of mastitis in automatic milking systems, and continuing classification of pathogens.

**Antimicrobial Resistance:** antimicrobial use and resistance is becoming a more important topic for the dairy industry. In the next term, this program will evaluate selective dry cow and mastitis treatment, level of antimicrobial resistance (also in farmers and personnel), and drivers to reduce use and resistance. Ideally, this will be done in all Western provinces.

**Communication Between Vets and Farmers:** based on work from the last IRC term, this program will continue to evaluate communications between vets and farmers to develop and validate communication training for vets. Improved communications can help to strengthen relationships, increase adoption of advice and improve performance on-farm.

## Proposed Projects

### Johne's Disease

- Johne's disease in Western Canadian dairy herds
  - determining economic losses due to Johne's disease and evaluation of control practices

### Mastitis

- Identification of common genes associated with mastitis
  - aid in developing better genomic selection methods for mastitis resistance
- Deep learning for mastitis detection on farms using automated milk systems
  - developing models to use additional data in robots to improve mastitis detection
- Good and bad bacteria in the udder leading to decrease and increase of mastitis
  - reducing the use of antimicrobials with beneficial bacteria to prevent mastitis

### Antimicrobial Resistance

- Reducing antimicrobial use and improving infectious disease surveillance
  - providing a comprehensive approach to disease control on dairy farms
- Critically important antimicrobials are not needed to treat milk bovine mastitis
  - reducing antimicrobial use and resistance when managing mastitis

### Communication between Vets and Farmers

- Communication between veterinarians and dairy farmers
  - development of communication training for vets to better help farmers
- The voice of dairy farmers: implementation of immersive field methods to address antibiotic use
  - understanding the experience of producers and local context for developing effective antibiotic stewardship programs

### Other

- Understanding producer perspectives to providing outdoor access for dairy cows
- Determining effects of various types of outdoor access on dairy cattle health



### Interested in learning more about Dr. Barkema's research?

- ["Key findings from the IRC in infectious diseases of dairy cattle"](#) – Dairy Farmers of Canada
- List of [scientific publications](#)
- UCVM [bio and contact](#)