

# Impact of Management Practices on Antimicrobial Resistance in Bovine Mastitis Pathogens

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Antimicrobial therapy is commonly implemented for mastitis prevention and control. Unfortunately, despite the best possible antimicrobial treatments, failure of bacteriological cure is common, and antimicrobial resistance (AMR) is considered one of the reasons for low cure rates. The proposed study will study factors that influence AMR in these mastitis bacteria in Canadian dairy cattle. The objectives of the proposed study are 1) to determine the occurrence of drug-specific AMR in isolates from clinical and subclinical bovine mastitis cases in Canadian dairy cattle; and 2) to assess and evaluate a relationship between on-farm antimicrobial use, management practices and AMR.

The AMR profile will be obtained using the minimum inhibitory concentration (MIC) of 2,000 coagulase-negative staphylococci isolates. These results will be combined with the MIC profiles of *Staphylococcus aureus* and *Escherichia coli* that were already published in another study. Data on management practices of each dairy farm have been collected in the past using face-to-face questionnaires. The survey contained information on housing style, bedding types, bedding management, antimicrobial usage in adult cows (heifers, dry and lactating cows) for mastitis and non-mastitis related conditions, milking technique and milking hygiene, and owner/farm worker/veterinarian involvement in prevention, control and treatment of mastitis. On-farm antimicrobial use data have been collected as well.

The proposed study has benefits that are highly significant in the field setting. For example, for the very first time in Canadian dairy cattle, we will have information about management practices that impact AMR in bovine mastitis bacteria, and could be modified by a dairy producer. The availability of such information can aid in interpreting patterns and trends of AMR, serve as a basis of risk assessment of AMR, as a basis of decision-making for control measures, and to evaluate the effect of interventions for controlling AMR. In conclusion, the clinical and public health significance of collecting information on modifiable determinants of AMR in bovine mastitis pathogens in Canadian dairy cattle cannot be understated.