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Epidemiology of Mastitis in Peripartum Dairy Heifers

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by

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________________________________

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Abstract

An observational field study was conducted on 708 heifers in 30 spring-calving dairy herds in the Waikato region of New Zealand. The aim of the study was to describe patterns and determinants of intramammary infection (IMI) and clinical mastitis (CM) in the peripartum period. Mammary secretion samples for bacteriological testing were taken from all quarters approximately 3 weeks prior to the planned start of the calving period and within 5 days following calving, in addition to quarters diagnosed with CM within 14 days of calving. Pre-calving IMI was diagnosed in 18.5% of quarters, and of these coagulase negative staphylococci (CNS) were the predominant isolate (13.5% of quarters). Post-calving, *Streptococcus uberis* (*S. uberis*) prevalence increased four-fold to 10.0% of quarters. Prevalence of all pathogens decreased rapidly following calving. Clinical mastitis cases were predominantly associated with *S. uberis*. The hazard of diagnosis was higher in heifers than other parity groups combined and highest in the first 5 days of lactation. Intramammary infection was associated with an increased risk of removal from the herd and high somatic cell count (> 200 000 cells/ml) at subsequent herd tests, but neither CM nor IMI were associated with reduced milk yield or milk solids production. Multilevel logistic regression models in combination with path analysis were used to investigate postulated causal pathways between risk factors for CM and subclinical mastitis (SCM) post-calving. Significant risk factors for SCM were found to be pre-calving intramammary infection (IMI), low minimum teat height above the ground and poor udder hygiene post-calving. Significant risk factors for CM were pre-calving IMI, Friesian breed, low minimum teat height above the ground, udder oedema, and low post-calving non-esterified fatty acid serum concentration. Possible causal pathways for SCM and CM are discussed, and preventive measures against both environmental exposure and host factors recommended.
Epidemiological studies in veterinary medicine collecting original field data require the involvement of many people to reach a conclusion, and this study is no exception. Throughout this study, I have been assisted, encouraged and challenged by many people. Dr. Scott McDougall, my mentor and colleague has been instrumental in not only starting me on this new career path, but also helping me complete this particular study. He has advised me on areas of study design and analysis, aided in logistic planning, and critically reviewed my work and writing. I also wish to acknowledge the encouragement and direction of my academic supervisor, Dr Cord Heuer. Further thanks go also to my colleague and fellow-student Dr Katrina Parker for her help in reviewing my written work.

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Approval for this study was sought and gained from the Ruakura Animal Ethics Committee (Approval No. 13548)

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# Table of Contents

Abstract.................................................................................................................................................. ii  
Acknowledgements......................................................................................................................... iii  
Table of Contents............................................................................................................................... iv  
List of Abbreviations ....................................................................................................................... vi  
List of Tables ....................................................................................................................................... vii  
List of Figures ................................................................................................................................... viii  
Introduction......................................................................................................................................... 1  
Chapter 1- Literature Review of Epidemiology of Mastitis in Dairy Heifers .................. 2  
  Introduction....................................................................................................................................... 2  
  Descriptive epidemiology of heifer mastitis .................................................................................... 5  
  Risk factors for heifer mastitis........................................................................................................ 11  
  Prevention of heifer mastitis ......................................................................................................... 14  
  Long-term effects and economic cost of heifer mastitis ............................................................ 16  
  Conclusions...................................................................................................................................... 18  
Chapter 2- Descriptive Epidemiology of Mastitis in Pasture-Grazed Peripartum Dairy  
  Heifers and its Effects on Productivity ....................................................................................... 20  
  Introduction...................................................................................................................................... 20  
  Materials and methods ................................................................................................................ 21  
    Herd and Heifer Selection............................................................................................................. 21  
    Sample and Data Collection ....................................................................................................... 22  
    Milk Sample Analysis.................................................................................................................. 23  
    Data Handling ............................................................................................................................ 24  
    Statistical analysis ..................................................................................................................... 25  
  Results............................................................................................................................................ 28  
    Quarter-level microbiological results ........................................................................................ 29  
    Heifer-level results..................................................................................................................... 34  
    Herd-level results ....................................................................................................................... 36  
    Productivity effects.................................................................................................................... 36  
  Discussion....................................................................................................................................... 39  
  Conclusions.................................................................................................................................... 46  
Chapter 3- Risk Factors for Peripartum Mastitis in Pasture-Grazed Dairy Heifers ...... 48  
  Introduction...................................................................................................................................... 48
List of Abbreviations

BTMSCC = bulk tank milk somatic cell count
CNS = Coagulase negative staphylococcus species
CM = clinical mastitis
IMI = intramammary infection
ISCC = individual somatic cell count
SCM = subclinical mastitis
List of Tables

Table 1. Cumulative incidence (%) of clinical mastitis in quarters and heifers (bold type) in periparturient heifers. ................................................................. 9

Table 2. Prevalence of intramammary infection by bacteriological species in quarters and heifers (bold type) in periparturient heifers. ........................................ 10

Table 3. Names and definitions of quarter-level results from microbiological testing of milk samples. ......................................................................................... 25

Table 4. Count and percentage ( ) of results of bacteriological sampling from heifer quarters and clinical mastitis quarters over prepartum and peripartum period in pasture-grazed dairy heifers .............................................................. 30

Table 5. Associations between post-calving intra-mammary infection (IMI) type and clinical mastitis (CM) and reduced quarter function and teat thelitis in mid-lactation ........................................................................................................... 37

Table 6. Predicted population average milk volume, milk solids production and somatic cell count in heifers of differing post-calving bacteriological and clinical mastitis status ........................................................................................................ 38

Table 7. Abbreviations and definitions of variables used in null and final path models of risk factors for peripartum mastitis in pasture-grazed dairy heifers ............... 53

Table 8. Description of variables used in null and final path models of risk factors for peripartum mastitis in pasture-grazed dairy heifers ........................................ 60

Table 9. Description of regression models used in final path model of risk factors for peripartum mastitis in pasture-grazed dairy heifers ........................................ 62

Table 10. Estimates of population attributable fractions for risk factors for subclinical and clinical mastitis in 708 pasture-grazed dairy heifers ................................. 64
List of Figures

Figure 1. Smoothed logistic regression of probability (prevalence) of quarter intramammary infection (IMI) by day relative to calving for major and minor pathogens pre- and post-calving. ................................................................. 32

Figure 2. Smoothed instantaneous hazard (daily risk) of clinical mastitis in pasture-grazed dairy heifers or in cows > 2 yrs of age relative to individual calving date. 35

Figure 3. Null path model of hypothesized causal pathways between measured risk factors and subclinical and clinical mastitis. .......................................................... 56

Figure 4. Final path model for significant risk factors for subclinical and clinical mastitis .................................................................................................................... 63

Figure 5. Postulated causal pathway for factors affecting peripartum mastitis in dairy heifers that require more knowledge. ................................................................. 73