THE EPIDEMIOLOGY OF MASTITIS IN AUSTRALIAN DAIRY CATTLE

A dissertation submitted in partial fulfilment of the requirements
for the degree of
Masters of Veterinary Studies (Epidemiology)
at Massey University

Richard William Shephard

2000

Abstract

This study represents an aggregation of knowledge on mastitis within the Australian dairy industry. Aspects of the epidemiology and economics of mastitis have been collated and areas of missing knowledge identified. A clinical treatment trial was conducted on subclinical mastitis to identify the role of therapy upon subclinical infection. The effect of individual variables on mastitis risk was studied and aggregated in order to facilitate the development of a computer simulation model of mastitis within Australian dairy herds.

A literature review of mastitis within the Australian dairy industry was conducted. The economic impact of mastitis was examined and the pathway of economic loss to the dairy industry is discussed. The epidemiology of mastitis was studied with special emphasis on quantification of the effect of individual risk factors on the occurrence of disease. Performance parameters for the current diagnostic tests applied within the dairy industry are presented and their suitability for use in a commercial environment discussed. The impact of self-cure and the efficacy of therapeutic intervention in the disease are examined. The role of culling is presented. The chapter concludes with an estimation of the total economic losses experienced on a commercial dairy farm in Victoria in 1998 for three different mastitis levels. The economic benefit to be gained from a reduction in mastitis is also presented.

A clinical treatment trial of subclinically infected cows (high somatic cell count) was conducted in order to determine if therapeutic intervention was an effective management tool. Cows with somatic cell counts in excess of 500,000 cells per ml and more than 14 days calved were selected and randomly assigned to treatment and control groups. A pooled quarter milk sample was taken prior to treatment and repeated at around six weeks after treatment. Treated cows received a course of intramammary and parenteral antibiotics and control cows were untreated. Cows were followed for the rest of the lactation of treatment and into the subsequent lactation and somatic cell counts were recorded. The major pathogens identified were *S aureus* and *S uberis*. Treatment did not have a significant or commercially useful effect upon bacteriological cure rates, survival of cows to the next lactation or somatic cell count for the remainder of the lactation. Treatment of high somatic cell count cows during lactation is not recommended and is discussed.

A requirement exists for the development of a stochastic simulation model of mastitis within Australian dairy herds. The structure of such a model was developed and is presented. Underlying production and somatic cell count responses in Australian cattle were derived. Infection status variables were included and stochasticity was introduced through the use of control variates. State transition probabilities were collected from the literature. Deficiencies in knowledge were identified and methods for modelling these deficient areas discussed. The aggregated information is presented. It is expected that a working stochastic simulation model of mastitis within Australian dairy herds will be developed from information collected in this dissertation.

Acknowledgments

I would like to thank a few key people who have helped me achieve this goal. I was only able to undertake this course of study because Terri, my wife, was willing and able to handle the increased responsibility of caring for our small children whilst I was absent. Terri also has a genuine interest in my work. This has made it easier for me to balance study, full time work and family. This is a shared honour.

This study has been the most stimulating and enjoyable educational experience that I have undertaken. The knowledge gained and the techniques learned have helped me to investigate problems that previously were impossible to me. I now have the confidence and skills to learn many more techniques of the discipline under my own guidance. Most importantly, I now think in a logical manner. I thank three people in particular for these abilities: Dr Dirk Pfeiffer, Professor Roger Morris and Dr Ron Jackson.

Dr Dirk Pfeiffer gave me the necessary skills through his quality teaching. He presented information in a way that was always interesting but also at the limits of my understanding and knowledge. This approach enabled me to make great advances during the few weeks of contact time that we had each year. Professor Roger Morris gave inspirational demonstrations of his use of epidemiology in answering relevant animal health questions the world over. The motivation (and enjoyment) that I obtained from these discussions was enormous. Dr Ron Jackson helped me to understand and apply my new skills in my own area of expertise through many hours of casual discussion. He was able to guide me around the relevant problems of the dairy industry in such a way that I was able to visualise how many of them could be investigated and answered. His greatest skill was making me believe that I had reached the necessary conclusion on my own. Ron's input gave me the confidence to take my training and use it with real problems in my home environment. Ron and June Jackson also welcomed me into their family whenever I was attending Massey. Their company, guidance and friendship have been a highlight of this adventure.

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ABV	Australian Breeding Value
AMMTA	Australian Milking Machine Trade Association
BMCC	Bulk milk cell count
CMT	California mastitis test
Coag. neg. Staph	Coagulase negative staphylococcus spp.
DCT	Dry cow therapy
DOF	Degrees of freedom
DRDC	Dairy Research & Development Corporation
E. coli	Escherichia coli
EBMSCC	Estimated bulk milk somatic cell count
EC	Electrical conductivity
GMSCC	Geometric mean somatic cell count
ICCC	Individual cow cell count
IQCC	Individual quarter cell count
LT	Lactation therapy
MHI	Maffra Herd Improvement Co-operative Ltd.
MID	Macalister Irrigation District
NAGase	N-acetyl-α-D-glucosaminidase
NIR	New infection rate
PI	Production index
QIR	Quarter infection rate
S. aurues	Staphylococcus aurues
S. uberis	Streptococcus uberis
SAMM	Seasonal Approach To Managing Mastitis
SCC	Somatic cell count
SCS	Somatic cell score
SOL	Stage of lactation (days)
VMRG	Victorian Mastitis Research Group