# BUGGED BY HEIFER MASTITIS? THE WHYS AND WHAT CAN BE DONE

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## Is heifer mastitis a problem?

Several overseas studies have shown heifers have higher incidence of mastitis than older cows, and anecdotal evidence would say that is also the case in N.Z, although there is little local published data to support this. An unpublished Dexcel survey found an average 13% of heifers were diagnosed with mastitis in the early postpartum period, with a within herd range of 0-61% (Williamson 2002). This compares to the findings of McDougall (1999) that approximately 10% of cows had one or more cases of mastitis in the first 2 months of lactation, and that the herd prevalence was higher where the proportion of heifers was also higher. The published study by Pankey (1996) in eleven Waikato dairy herds found an average 8.1% of heifers calved with clinical mastitis, and that the environmental pathogen *Streptococcus uberis* was isolated from 67.6% of these clinical cases. Williamson (2002) reported results from another Dexcel study on 195 heifers on No. 2 dairy showing 15.3% had intramammary infections (IMI) due to *Streptococcus uberis* post-calving.

No studies from New Zealand have been published on the risk factors for mastitis in heifers around the time of calving. Overseas studies show that pre-calving intramammary infection, udder oedema and short distance of teat ends to the ground (Slettbakk, Jorstad, et al. 1995), blood in the milk and milk leakage (Waage, Odegaard, et al. 2001) increase the risk of mastitis in heifers at calving . Without such local knowledge however, designing control programmes may be at best only guess-work.

In addition to understanding the pattern of disease, it is necessary to measure its long-term effects on udder health and production to allow a cost-benefit analysis of any control programme. One N.Z study has shown that heifer mastitis reduces milk production in each of the first and following lactations by 8% (Woolford, Williamson, et al. 1983), and several others from overseas have shown that it causes long-term elevation in somatic cell counts, and increases the chance that a heifer will be culled.

## What did our study on heifer mastitis aim to achieve?

Our first aim was to describe the pattern of infection and mastitis in heifers, and its long term consequences. This follows the belief, if you can't measure it, you don't understand it.

The second aim was to identify risk factors for infection and mastitis to help develop control programmes, and direct further areas for research.

## How was our study carried out?

The study was carried out on 708 heifers randomly selected from 30 spring-calving dairy herds that were clients of the Animal Health Centre. The heifers selected were approximately equal proportions of Friesian, Jersey or other (mainly Friesian-Jersey crossbreds). From within each herd, between 6 and 27 heifers were randomly selected to enter the study. At one farm visit approximately a month prior to the start of calving, the heifers had milk samples from each dry-gland taken, a blood sample collected, and body condition score and degree of udder contamination recorded. Within 4 days of calving the heifers had further blood and milk samples taken (from each quarter), as well as body condition score, udder hygiene score and teat height and placement measurements taken. All clinical mastitis cases in heifers occurring within 14 days of calving were also recorded and milk sampled by a technician. Finally, at approximately 4 months after the start of calving, the udders and teats of the heifers were examined for light or dry quarters, and for teat canal scarring. Records of all cow disease treatments, cow removals through death or culling and herd test data were also collected for analysis.

## What were the study results?

At the first pre-calving sample, we found that 38% (herd range 11-63%) of heifers had one or more quarters with some bacterial intramammary infection. The bacteria cultured were mainly minor bacteria (less likely to cause clinical mastitis) such as *coagulase negative staphylococci* (cns), but 12% of heifers had infections due to major bacteria (more likely to cause clinical mastitis) such as *Strep uberis* (su) and *Staph aureus* (sa) or *Strep dysgalactiae* (sd). Forty-eight percent of all heifers had 1 or more quarters with any infection within four days of calving. Nine percent of all quarters from these heifers were positive for cns or su with less than 1% of quarters positive for sa and sd. The relative change in infection prevalence over time is shown in Figure 1, with minor infections relatively common pre-calving and diminishing at calving, and the major pathogen su peaking in prevalence at calving.

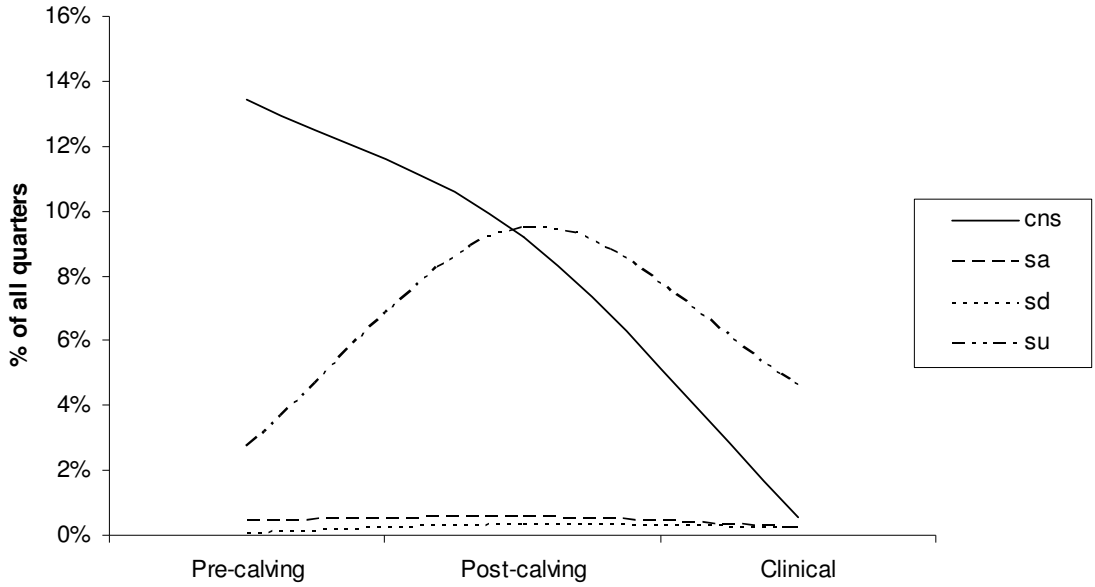


**Figure 1:** Prevalence of intramammary infection over time by bacterial species

Overall 20% (herd range 4-48%) of all heifers were diagnosed by the farmer as having clinical mastitis with any bacteria cultured within 14 days of calving (only culture-positive cows counted to eliminate false-positive cases). The large majority of these cases occurred within 4 days following calving and this change in risk of a heifer being diagnosed with mastitis in the days following calving is shown in Figure 2. The scale on the y-axis is probability, which may be read as almost 0.08 or 8% of all heifers being diagnosed with mastitis on the first day following calving.

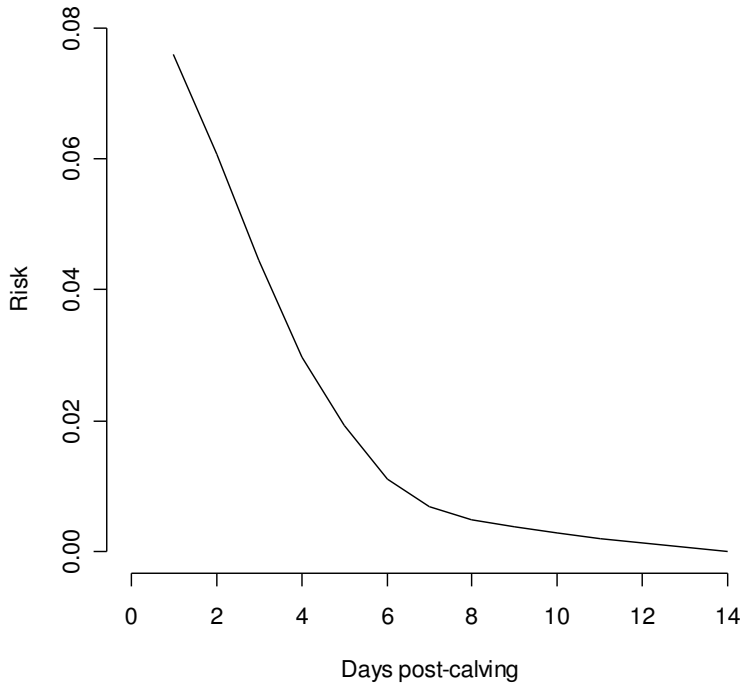


**Figure 2:** Risk of diagnosis of clinical mastitis in heifer by days post-calving

Several risk factors for clinical mastitis with any bacteria in the first 14 days of lactation were identified in heifers (Table 1.). These risk factors were tested by statistical tests and were significant with probability < 5%. The overall prevalence of the risk factor in the study heifers combined with the relative risk of that factor, indicate how great is the impact of that factor on clinical mastitis in the population. For example, udder oedema was relatively common, and with a relative risk of 1.8, it is associated with a large amount of mastitis; whereas the Jersey breed was less common, had a smaller protective effect (1-0.7 = 0.3 or 30% less risk), and therefore a smaller overall population impact.

**Table 1:** Risk factors for clinical mastitis in heifers within 14 days of calving, prevalence of risk factors, prevalence of disease with and without risk factors, and relative risk of disease with risk factor

| Risk Factor | Overall prevalence of risk factor | Clinical mastitis prevalence with risk factor | Clinical mastitis prevalence without risk factor | Relative increase or decrease in risk of clinical mastitis |
|---|---|---|---|---|
| Pre-calving intramammary infection | 38% | 28% | 15% | 1.9 |
| Udder oedema post-calving | 60% | 24% | 14% | 1.8 |
| Jersey breed vs. Friesian breed | 30% | 16% | 22% | 0.7 |
| Minimum teat height greater than below average (52cm) | 50% | 17% | 23% | 0.7 |
| Dirty udder vs. clean udder | 62% | 18% | 13% | 1.4 |

Long-term effects of mastitis were relatively common – 13% of all heifers had one or more light or dry quarters and half that number with scarred teat canals after 4 months of lactation.

## How can I apply these findings to my own heifers?

It is important to realise that heifer mastitis is common. Just because heifers may have never been to a milking shed before, or only milked a few times, that does not mean that they will not get mastitis. The pattern of mastitis in these first-calvers is quite different to older cows, the likely time of infection is in the last few days before calving, and apparently has little to do with milking.

### *Take-home message No. 1*

Closely examine heifers for clinical and subclinical infection in the colostrum period. Carry out a test for subclinical mastitis of all heifers at least once before they enter the main milking mob, and hold back from supply or re-test or treat as required.

Planned management may reduce three risk heifer mastitis risk factors — udder oedema and udder contamination of heifers in the "springer" mob and low-stature heifer replacements.

***Take-home message No. 2***

Ancedotal evidence suggests that springing heifers should not be steamed up on large amounts of high-protein, high potash feeds e.g. N and K fertilised ryegrass, neither should they be kept on muddy or dung-contaminated paddock breaks or feed/stand-off pads. It is good practice to grow well-proportioned (tall) heifers, not short and over-conditioned animals.

Owners who are concerned about the amount of heifer mastitis in their herd should discuss with their veterinarian the possibilities of using Teatseal pre-calving as a preventive measure. (Another study run by us at the same time found that Teatseal (Pfizer NZ Ltd) applied in dry quarters of heifers 1 month prior to the start of calving reduced the risk of mastitis post-calving by 30%).

## Case study of herd mastitis problem

This is a real-world example of a problem with mastitis in a dairy herd — how the problem showed itself, what the farmer did about it, and what lessons can be learnt from it.

Herd Description:

Size, age distribution, calving date/pattern – 173 cows, Friesian and Friesian cross, 35% heifers, calving start date 12th July

Physical and labour features – flat land, well-maintained tracks and shed, wet and cold spring, first year lower-order share-milker (mainly sole-charge)

Recent milking plant test – apparently O.K.

Farmer phoned 15/10/03, requesting a visit to investigate a "mastitis problem". He reported:

High number of clinical cases – 38 cases since the start of calving (20% of herd)

High number of light quartered cows, especially in heifers.

What records were available, and how were they used? The first tool in understanding the problem (helpful when do not have a lot of experience) is examining records

Bulk tank milk somatic cell count – good for graphing change over time

Clinical mastitis records for current season – checked for trends with age, days in milk

Sub-clinical mastitis records from rapid mastitis test – assess prevalence of hidden infection, but care needed that do not over-interpret (14-21 days for cured previously infected gland to return to normal cell count)

Bacterial culture (microbiology) on milk samples (farmer collected) – gives a head-start in investigation (know your enemy)

Individual cow records for whole herd (age, breed, previous season's mastitis records)- get the big picture, don't just look at problem cows – it's necessary to compare diseased with healthy animals to make comparisons for risk factors.

What was done at the herd visit?

A number of current and recently treated cows udders and teats examined – obvious teat-end damage

6 of 15 cows examined had light quarters – all had previous clinical or subclinical infections

Further milk samples taken for microbiology.

What was found after analysing the records and milk culture results?

Bulk tank somatic cell counts high and erratic – suggesting high incidence of infection and these cows staying in herd for some days before detection and removal

Age effect – older cows had higher risk of mastitis

Stage of lactation effect- not an early-lactation problem – most clinical cases in cows more than 21 days in milk

Strep uberis most frequently isolated bacteria (6/20), with lesser numbers of minor bacteria and contaminated samples and one Staph aureus (a potential threat in herd with teat-end damage problem).

What were the conclusions and recommendations?

Problem mainly due to environmental contamination of teats – wet and muddy conditions

High number of light-quarterd cows possibly have arisen because of undiagnosed mastitis – in future RMT all cows and heifers before milked into factory vat and increase vigilance for clinical mastitis in main milking mob

Teat-end damage a problem and probably weakening teat-end defences against infection – consult with milking machine specialist on best liner/shell combination for herd (later found that an intermittent fault was present in electronic pulsator control)

Increase effectiveness of teat-spray (iodine-based) – increase concentration of emollient(no extra added) and ensure full coverage twice-daily to help teat skin condition during wet and cold weather

Milk mastitis-treated cows in a separate mob last – lots of cows on buckets means difficult to find new cases – reduces stress. Farmer comment: I'm just putting out fires with them all in the mob!

## Acknowledgements

Many people contributed to this study. We thank the technicians employed by Animal Health Centre for collecting and handling the samples and data – Fiona Anniss, Kathryn Berry, Elizabeth Bythe, Rhonda Cooper, Judith Forno, Helena Habgood, Mike Kingstone, Shelley Roberts. Our thanks also go to the farmers and their workers who generously provided their animals and time to make this study possible. Finally we thank Dairy Insight, Eltham District Veterinary Services, Animal Health Centre, Elanco Animal Health, and Pfizer Animal Health for the funding they provided.

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