

## Diagnosis and treatment of endometritis in New Zealand dairy cows

### Introduction

Endometritis is inflammation of the uterine lining caused by bacterial infection following calving. Cows with endometritis on average take longer to show heat and longer to conceive<sup>1</sup>, so treating endometritis is economically beneficial to farmers.

The Metricheck tool enables practical on-farm detection of endometritis. McDougall<sup>2</sup> (2007) showed an advantage in metrichecking the whole dairy herd rather than just 'at risk' animals (i.e. cows with dystocia, dead calf within 24 hours of calving, retained foetal membranes, or vaginal discharge). This study showed that if cows were checked 4 weeks prior to start of mating then 18% of cows with no risk factors at calving were Metricheck positive (MC+). In a second study, Runciman<sup>3</sup> (2009) showed that 71% of MC+ cows were not classified as 'at risk'.

Many New Zealand vets traditionally screen cows for endometritis in a single whole herd metricheck 4 weeks before planned start of mating (PSM). Given seasonal dairying herds within a region generally commence mating at a similar time, Metrichecking whole herds within a short period can create resourcing challenges for veterinary practices.

The value of early diagnosis and treatment of cows with endometritis has been well established. Runciman<sup>4</sup> (2008) showed that a single intrauterine infusion of 500mg cephalosporin given to cows with endometritis was effective in improving reproductive performance. There was a greater effect in cows treated within 28 days of calving than in cows calved for longer than 4 weeks.

### Study: Early detection and treatment

A large multi-herd study in 2015 compared early intervention (at 8 to 28 days post-partum) with traditional metricheck screening at 4 weeks prior to PSM, to determine the effect of early intervention on reproductive performance (Clews 2016)<sup>5</sup>.

Over 15,000 lactating dairy cows from 29 seasonally-calving herds in the central North Island were enrolled in the study. All cows were less than 29 days postpartum at time of enrolment and were randomly assigned to a treatment or control group. All herds were visited on three separate occasions at 21 day intervals, approximately 69, 48 and 27 days before the herd's PSM. MC+ cows in the treatment group were administered an intrauterine antibiotic (500mg cephalosporin), whilst cows in the control group were not treated until the last metrichecking visit at 4 weeks before PSM (refer to Figure 2).

### Results

#### 1) Metricheck positive cows relative to calving date

The proportion of cows detected as MC+ is highest 8-18 days post-partum, with a steady decline in MC+ cows from day 19 to 33 (Figure 1). The odds ratio of cows being MC+ between the two groups (19 to 28 days pp and 8 to 18 days pp) was OR=0.74 (0.68-0.80) from 15,336 observations.

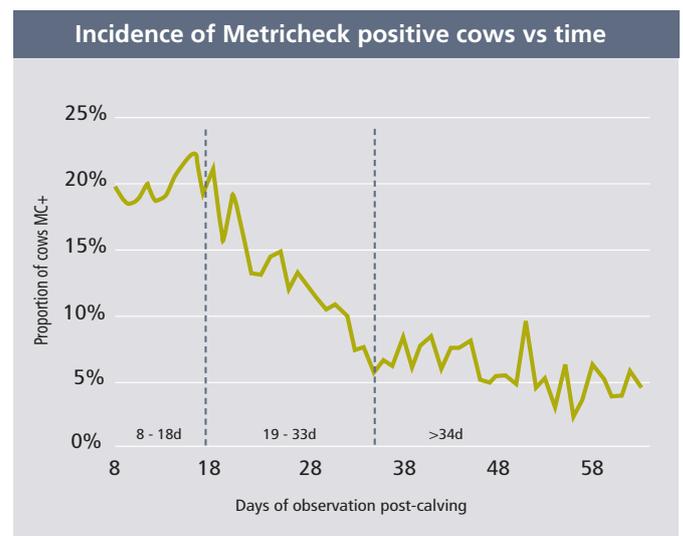


Figure 1. Proportion of Metricheck positive cows post partum

#### 2) Treatment cure vs apparent 'self-cure'

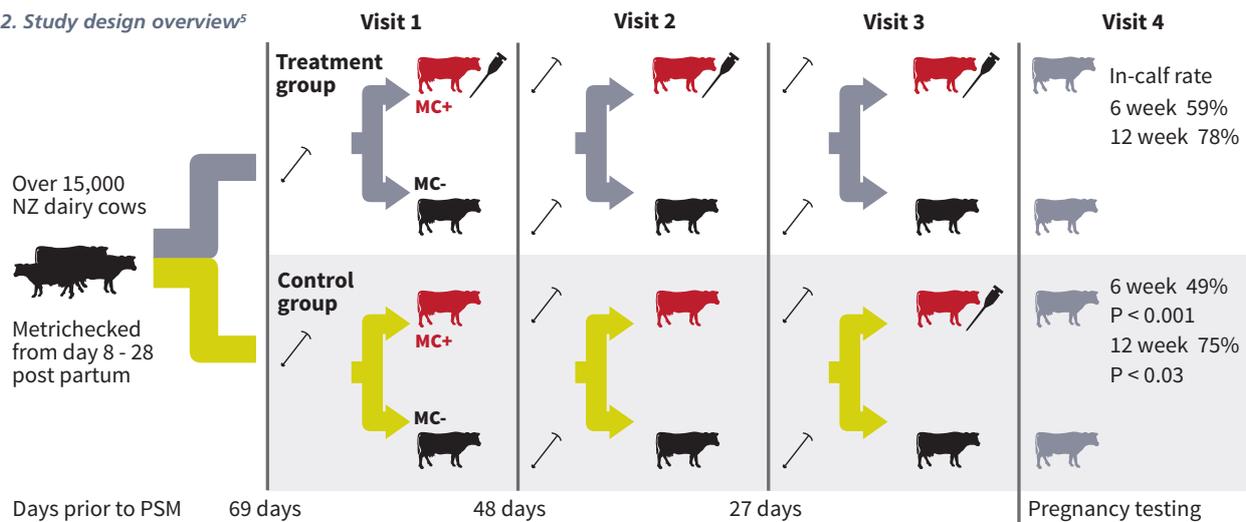
If a cow in the control group was MC+ at visit 1 and/or 2, and then Metricheck negative (MC-) at 27 days prior to mating at visit 3, this was considered an apparent 'self-cure'. However, a MC- result is not necessarily a bacteriological cure, as bacteria and inflammation may still be present within the uterus.

Early intervention had no statistically significant effect on MC status when re-examined 21 days later. Control cows had an apparent 'self-cure' rate (i.e. MC-) of 87%, compared with treated cows at 90% MC- ( $p=0.13$ ).

#### 3) Early vs delayed treatment

Reproductive performance was significantly improved for cows identified as MC+ early and promptly treated with cephalosporin, compared to the delayed treatment group (i.e. cows identified as MC+ and treated 4 weeks prior to PSM).

Cows in the early treatment group had a 9.6% higher six week in-calf rate (59.05% vs 49.45%  $p<0.001$ ), and 3.26% higher 12 week in-calf rate (78.16% vs 74.90%  $p=0.029$ ). Cows in the early treatment group conceived 8 days earlier on average than the delayed treatment group.

Figure 2. Study design overview<sup>5</sup>

## Discussion

Endometritis is a significant cost to NZ dairy farmers even when infected cows are identified and treated early. Delayed treatment of endometritis reduces six week in-calf rates by almost 10% compared to early detection and treatment, so there is a significant opportunity to improve in-calf rates with earlier veterinary intervention.

This study highlights opportunities for improving in-calf rates by early detection and treatment of endometritis. Results strongly supported the hypothesis that apparent 'self-cured' (ie. MC-) cows may actually remain infected and simply become harder to detect with the Metricheck tool. Delayed identification and/or not treating infected cows increases the cost of endometritis.

New Zealand data suggests 175,000 doses of cephalosporins are sold annually, which represents 3.5% of the five million lactating NZ dairy cows. There is a large opportunity to lift reproductive performance by treating MC+ cows early, i.e. a typical vet practice with 50,000 dairy cows could increase treatments from 1,750 to 8,500 cows.

Endometritis in NZ cows	Potential treatments	Actual treatments	Gap
Early detection	1,000,000	175,000	825,000
Delayed detection			
>day 34 post partum	350,000	175,000	175,000

## Summary

- Identify and treat endometritis within 3-4 weeks of calving for significantly higher in-calf rates in NZ dairy herds
- Consider utilising veterinary technicians to Metricheck and detect endometritis, to help spread the clinic workload
- Ideally Metricheck dairy cows at 8 to 28 days post partum

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## Return on investment

Dairy NZ In-calf publications<sup>6</sup> place a value of \$4 per cow per 1% difference in 6 week in-calf rate and \$10 per cow per 1% difference in 12 week in-calf rate.

When comparing early vs delayed metrichecking for a 500 cow herd, early intervention shows a 10% increase in six week in-calf rate and 3% increase in 12 week in-calf rate.

Using Dairy NZ figures, if 20% of this herd was MC+ the additional income from treating these cows would be \$7,000<sup>7</sup>, less treatment cost of \$25 per cow, providing a net return of \$5,500 for a 500 cow herd (excluding cost of metrichecking).

This results in a 460% return on investment from early identification and treatment of cows.

## References

- 1) McDougall S., 2001. Effect of intrauterine antibiotic treatment on reproductive performance of dairy cows following periparturient disease. NZVJ 49 (4), 150-158.
- 2) McDougall S., Macaulay R., Compton C. 2007. Association between endometritis diagnosis using a novel intravaginal device and reproductive performance in dairy cattle. Animal Reproduction Science 99: 9-23
- 3) Runciman DJ. 2009 Comparison of two methods of detecting purulent vaginal discharge in postpartum dairy cows and effect of intrauterine cephalosporin on reproductive performance. Australian Veterinary Journal Volume 87, No 9.
- 4) Runciman DJ, Anderson GA, Malmo J, Davis GM. 2008. Effect of intrauterine treatment with cephalosporin on the reproductive performance of seasonally calving dairy cows at risk of endometritis following periparturient disease. Australian Veterinary Journal Volume 86:250-258.
- 5) Clews M. 2016. Assessment of daily post-partum change in proportion of cows positive to a commercially available test instrument designed to indicate endometritis. World Buiatrics Congress, Dublin.
- 6) DairyNZ, 2007. The InCalf book for New Zealand Dairy Farmers.
- 7)  $(\$4 \times 10\% \text{ in-calf rate increase} \times 20\% \text{ MC+} \times 500 \text{ cows}) + (\$10 \times 3\% \text{ in-calf rate increase} \times 20\% \text{ MC+} \times 500 \text{ cows})$  less \$1,500 cost of 60 extra cows treated  $\times$  \$25.00, i.e. 20% - 8% cows traditionally treated 4 weeks prior to PSM.