

Mastitis Focus: a core part of the mastitis control toolkit

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Introduction

Dairy herds in Australia could be described as falling into two mastitis camps. There are those that are effectively controlling mastitis risk, or fine tuning that risk control, in the face of acceptable Bulk Milk Cell Counts. There are also those herds battling elevated BMCC levels and/or clinical case rates where problem solving and intervention is desirable. The Mastitis Focus report, developed by Countdown, Australia's National Mastitis and Cell Count program is a practical and accurate tool for assessing new infection rate, clinical case rate and mastitis control efficiency across multiple farm management areas, particularly where the farm is enrolled in herd testing.

Development

The Mastitis Focus report (MFR) was first developed in 2007 and evolved to the final version now in use through 2009. The genesis for its development was via a mastitis risk management process developed by Countdown named Countdown Max. This process is described more fully in the Achieving Sustainable Improvement report (Countdown and University of Melbourne Rural Innovation and Research Group). In essence, it was difficult for an adviser to have a more effective conversation with a farmer about mastitis control options on an individual farm if there was not an accurate measurement of farm milk quality performance. This description of performance had to be more than just daily BMCC or annual average BMCC. What was required was an accurate and efficient method of providing new infection rate information as well as the results of intervention through control options such as dry cow treatment.

Through quirks of dairy industry evolution in Australia, the country has five separate herd testing systems. Whilst all five systems share data into the Australian Dairy Herd Improvement Scheme evaluation system through a communal file pathway (Data Interchange Files or DIF) the reports for farms generated from the five systems are all subtly different. In most cases the methodology within the herd test day reports for assessing new infections relies on the percentage increase in first lactation animals recording an elevated Individual Cow Cell Count (ICCC) and this is an unrefined measure. In Australia an ICCC threshold of 250,000 cells/ml is used as the cut-off point to indicate subclinical mastitis infection for both heifers and cows (Victorian Mastitis Group) and this differs to the threshold levels employed in NZ.

Mastitis Focus relies on data amassed during the herd recording process such as cow ID, age, lactation start and stop dates and ICCC data from each herd test period. In some cases the herd testing software also records mastitis treatments (lactation and dry cow). In all cases the data employed by the MFR is in the DIF format provided by all five herd test systems. Around 48.8% of Australian dairy farms herd tested in 2010/11.

Where the MFR differs to the reports already offered by the five herd testing systems is in the analysis built into MF. The assessment of new infections draws data from both ICCC and clinical cases treatment data, where available, and uses more complex algorithms to track new infection rate over time. All of the relevant data collated through herd testing is also analysed through MF in various mastitis management areas such as calving period management and dry period management. Regardless of the herd testing system, the report appearance and analysis provided by MF remains constant.

The MF software resides only on a single dedicated web server or within the data servers of the herd improvement organisations. With this architecture there are strict controls on software performance, analysis and upgrades. This arrangement is seen as being advantageous to having multiple software versions on hundreds or thousands of personal computers.

Analysis within the Mastitis Focus program

The report can be tailored for any nominated 12 month period where there is data available. Herd details as well as the reporting period is described in the top right corner of the report along with a yearly mastitis control performance summary section.

First lactation new infection proportion

This is the proportion of animals classified as first lactation animals at any point in the last 12 months that became infected. For the calculation the numerator is the number of these animals that had any ICCC greater than 250,000 cells/ml in the last report period. Only ICCCs greater than 250,000 cells/ml after the first 10 days of calving were counted. The denominator is the total number of first calving animals in the report period (Dyson *et al.* 2007).

New infection rate for all milking animals

This is the rate at which uninfected cows become infected each month. The reported NIR describes the NIR during the interval between herd tests. For this calculation the numerator is the sum of previously uninfected cows that had a cell count above 250,000 cells/ml at the end of the period, multiplied by 3000 (100 cows multiplied by 30 days). The denominator is the total time-at-risk for all previously uninfected cows from calving onwards.

For this measure cows are considered to be previously uninfected when: They are a first lactation animal with no high cell count ($>250,000$ cells/ml); They were uninfected in their previous lactation with at least four low cell counts ($\leq 250,000$ cells/ml) and no subsequent high cell counts; They were infected in the current lactation but have subsequently had at least four low cell counts ($\leq 250,000$ cells/ml); They were infected in the previous lactation, received antibiotic DCT at dry-off, calved, had a low cell count at their first herd test, which must be within 10-90 days of calving and had no subsequent high cell counts; and they were infected in the previous lactation and have had four or more low cell counts ($\leq 250,000$ cells/ml) in this lactation.

Infected cows were defined as animals with a cell count greater than 250,000 cells/ml or where they have been recorded with a clinical mastitis treatment. Once infected, cows are omitted from the NIR calculation until they meet the last three conditions described above for being uninfected.

For uninfected cows the time-at-risk definition is the number of contributing days as determined by the number of days since the last herd test or termination date. For infected cows, the time-at-risk is the number of days at the mid-point between herd tests. Here an assumption has been made to locate new infections mid-way between herd tests rather than on the date of detection via ICCC measurement as on average this is when infections are likely to have occurred.

Average new infection rate

The calculation of average NIR follows the same method as described for the calculation of NIR for all milking animals between herd testing dates. However the calculated NIR covers the entire report period of 12 months rather than just the intra herd test period. The same unit of subclinical infections per 100 cows per month applies.

Your calving system and clinical mastitis

Where clinical case treatment data is available, either through the herd testing system software or a synchronised on-farm software platform, monthly clinical case rates are provided for the calving period and lactation period. If the clinical case is recorded in the first 14 days in milk this information appears in the 'your calving system' section and beyond 14 days in milk in the 'clinical mastitis' report section.

The second page of the MFR provides a data checking table where the electronic data can be checked against existing hard copy records. This is a 'checks and balances' feature within the MF software.

Triggers for action

The MFR contains a number of trigger levels contained within certain management areas. The key ones are: a) overall new infection rate to be less than five cases per 100 cows in milk per month b) calving cow clinical case rates to be less than five cases per 100 cows and c) lactation cow clinical case rates to be less than two cases per 100 cows per month. The report contains trigger lines within the analysis boxes which assists indicating where the trigger points have been exceeded. Performance relative to the trigger points is linked to the star rating system.

The triggers for action reflect the best practice information contained in both the Countdown farm Guidelines for Mastitis Control and the Countdown Technotes.

Adapting MFR for SmartSAMM

The SmartSAMM program has adopted MF for use on NZ dairy farms and it will form part of the monitoring and investigation toolkit available from the Dairy NZ national mastitis initiative. The changes that have been made to the MF analysis are: a) ICCC thresholds indicating infection status have been altered from 250,000 cells/ml to 150,000 for cows and 120,000 for heifers and this affects new infection rate calculations b) triggers for action have been adjusted to reflect these lower ICCC thresholds, and c) the 'Plan your next drying off' section has been deleted and will be replaced with hyperlinks to SmartSAMM Factsheets.

Obtaining a report for an individual farm

A MFR can be obtained in two ways in Australia. Firstly, a DIF file 'dump' can be requested from the herd via compatible on-farm software, or the farms herd test organisation, and then passed through the MF web server interface to obtain a report which is emailed to the adviser or farmer. The person requesting the report has complete control over the reporting period and there is no cost in generating the report.

Secondly, a report can be obtained directly from the farms herd test provider. In this scenario the MFR is produced by the herd testing centre software and the finished report provided via email to the farmer or adviser. Again there is no or minimal cost for this service. Two herd test centres trialled providing the MFR along with the standard herd test day report in 2011. The MFR was seen as an adjunct report for the farms and covered the previous 12 months from the herd testing day. This practice has now been discontinued and the vast majority of farms receiving reports are via an adviser working directly with the herds.

Using MF when working with an individual farm

Countdown Technote 13 outlines the investigation pathway for a mastitis problem and the first step is define the problem in light of available information.

Technote 13 (February 2003) contains a Mastitis Investigation Pack to help the advisory team systematically collect, collate and prioritise information. See www.countdown.org.au

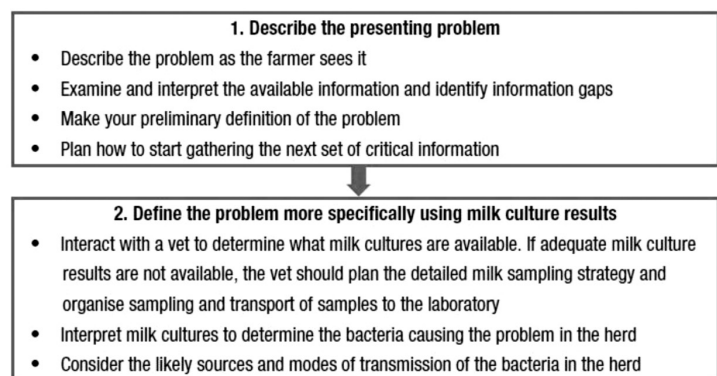


Figure 1. Extract of Countdown Technote 13 mastitis investigation flowchart

Here MF fits well into the second step within box #1 which is examine and interpret the available information and identify information gaps.

The MFR has a clear role in accurately defining the new infection rate pattern for a herd under investigation. Here the accuracy of the new infection picture becomes clearer as the number of herd testing periods within a

12 month period increases. A farm with four herd test periods does not provide as accurate a picture of changes in infection pressure compared with a herd where there has been eight or more herd test periods for example.

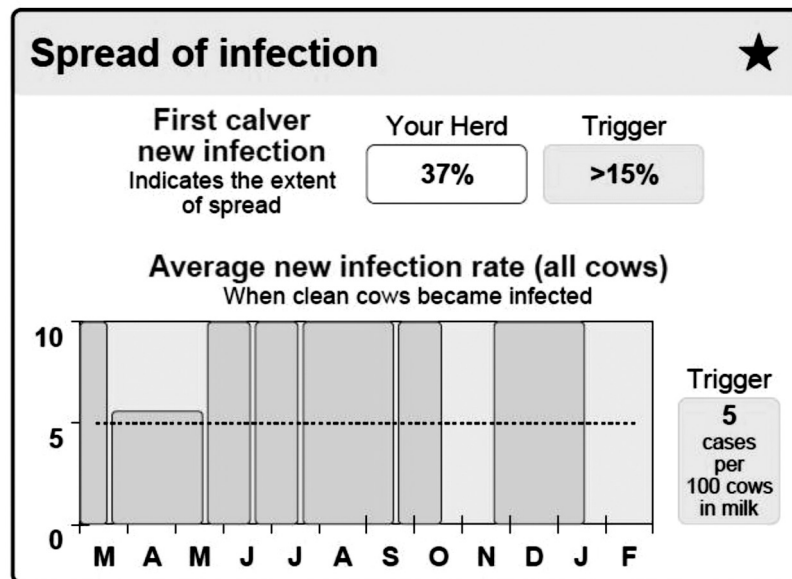


Figure 2. Example herd MFR spread of infection section

In this example herd the adviser knows that part of the investigative process is to examine what was occurring in this herd during October and November and that this can be viewed in light of the annual performance summary of new infection rate contained in the top section of the MFR report. Where available this new infection rate information is augmented by clinical case information during the calving or lactation period. Around 10% of Australian herds have clinical case treatment information available in an electronic format that is compatible with MF.

Where treatment information exists in a compatible form (lactation treatments and dry cow treatments) the assistance MF provides in targeting certain management area of the farm increases. For example, where an increased new clinical case rate is identified in calving animals, but not in animals past the first 14 days of lactation, attention can be focussed on the transition cow management practices on farm. In essence MF assists in fine tuning the investigation pathway.

After an investigation has been concluded and mastitis control interventions established, or where a herd is investing in risk assessment around mastitis control, MF has a role in assisting the farm team and adviser in tracking progress. If interventions are effective, or mastitis risk control measures put in place through a risk management consultancy (Countdown MAX) tracking progress through MF can occur after each herd testing period. Where a farm herd tests each month this monitoring can occur in the same interval if required. MF can also be employed as part of the communication strategy for the farm team where progress towards a lower new infection rate can be assessed on farm in ways beyond a simple assessment of BMCC or clinical case data.

Conclusion

Countdown Mastitis Focus is now well established in the adviser community as a 'first line' tool for mastitis investigations or where herds are reassessing mastitis control risk across individual management areas. Especially where farms are enrolled in herd recording, the MFR provides a rich picture of mastitis dynamics within the herd allowing more targeted investigation and intervention.

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