Current progress in implementing national mastitis control scheme

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Categories: Vets

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Andrew Bradley, James Breen, Martin Green, Chris Hudson describe the DairyCo Mastitis Control Plan initiative, which, it is hoped, will enable the cattle industry to make progress in the control of an important endemic disease in the UK.

MASTITIS problems continue to constitute one of the largest costs to the dairy industry and are a significant cause of poor dairy cow welfare – a subject that will be discussed at the forthcoming BCVA Congress in a lecture on a national mastitis control plan.

Antibiotics used to control endemic diseases, such as mastitis, in food-producing animals also reduce consumer confidence in the farming sector and the industry as a whole.

Exact levels of mastitis on UK dairy farms are rarely quantified, and there is much debate about its apparent resurgence. Notably, there is a lack of widespread structure or coordination in the approach to understanding and solving mastitis problems in dairy herds.

By gathering a team of UK veterinary surgeons and advisors to collaborate in developing a control scheme, the DairyCo Mastitis Control Initiative was formed. Having begun in spring 2009, the initiative aims to reach at least 750 dairy herds by 2012.

Development

The problem with research into endemic diseases, such as mastitis, is that their multifactorial...
nature means any control programme must use a number of simultaneous management changes. A change in just one risk factor alone may improve mastitis control marginally, negligibly or may even increase the risk of mastitis from a different pathogen.

While extensive research identified specific risk factors and control interventions for bovine mastitis, there was a need to test whether those risk factors were causal or explanatory, and whether a control plan could be implemented using these risk factors to reduce mastitis incidence in commercial UK herds.

To confirm the situation, a randomised clinical trial was carried out on 52 commercial dairy herds in England and Wales in 2004. Its aim was to determine whether a well-specified control plan (the DairyCo Mastitis Control Plan [DMCP]), implemented in herds with a high incidence of clinical mastitis, could reduce disease and the somatic cell count (SCC) of individual cows.

A clearly defined plan was developed for diagnosis and control based on a review of the research literature. Half of the total was allocated at random to receive the plan from the start of the study period (intervention herds) and the other 26 herds were left alone. The proportional change in clinical mastitis is illustrated in Figure 1.

Results from statistical modelling (including confounding factors) showed a significant, 22 per cent reduction in the proportion of cows affected by clinical mastitis on intervention (plan) farms compared with control farms. Reductions were also shown in the incidence of clinical mastitis, and new infections as measured by change in SCCs. Further exploration of the data demonstrated that the degree of compliance with plan recommendations had a big impact on outcome.

**Implementation**

Having formulated a structured plan in a research setting – resulting in important clinical benefits – the next aim was to make the plan widely available. A small pilot study was set up with 20 veterinary surgeons to investigate and develop suitable methods for training and DMCP application. After developing the electronic resources (see later), training in DMCP use began in April 2009.

Funded by DairyCo, the initial aim was to train 150 plan users over three years. Training consists of two full days of interactive learning about theory and practical implementation. One day is devoted to detailed discussions of the experiences of plan users following implementation of the plan on the first farm.

To date, four training courses have been held, and more than 100 plan users have been trained, consisting of mainly veterinary surgeons, but also consultants and members of the dairy industry. The distribution of plan users is available to members of the public, farmers and vets on an interactive online map, as shown in Figure 2, so farmers wishing to implement the DMCP will be able
to identify a registered plan user.

At the time of writing this article, around 180 herds have had data collated, analysed and a plan put in place; approximately 25 per cent of the DairyCo target of 750 herds in three years.

**How it works**

The mastitis control plan comprises three main elements:

- an assessment of herd patterns of mastitis and categorisation of each herd according to those patterns;

- an assessment of the current farm management practices and prioritisation of the most important management changes required (this is conducted using an electronic tool); and

- monitoring of the farm data to assess the subsequent impact on clinical mastitis and SCCs.

**Data collation, pattern analysis and diagnosis**

A vital first stage in the mastitis control plan is the collation and interpretation of both SCC and clinical mastitis data from herd records. This usually involves electronic data sets from milk recording service providers in the UK (Cattle Information Service, National Milk Records and Quality Milk Management Services), on-farm software (for example, parlour software or herd management packages), and collation of paper records from the farm diary. Once collated, support is available from the DMCP team ([mastitiscontrol@qmms.co.uk](mailto:mastitiscontrol@qmms.co.uk)) on interpretation of the data, including the production of charts and reports.

Herds are initially categorised according to the main mastitis patterns as:

- environmental pathogens of mainly dry period origin;

- environmental pathogens of mainly lactating period origin;

- contagious pathogens of mainly dry period origin; and

- contagious pathogens of mainly lactating period origin.

**On-farm assessment using eplan software**

A farm visit is conducted using a structured questionnaire printed from software provided to the plan user. The 12 sections cover areas of management relating to dry cows, milking cows and
young stock, and areas of routine relating to the milking parlour, milking equipment, treatment and biosecurity. All questions and observations (some of which are calculated), are answered as either “yes”, “no” or “not applicable”, and no areas are left out for any herd.

A diagnosis based on the pattern analysis already discussed is entered into the software to generate farm-specific prioritisations in a hierarchical format termed “must”, “should” and “could”, depending on the particular diagnosis (Figure 3). Finally, the plan user uses his or her clinical judgement to select the priorities likely to give the “biggest win” for the herd in question. Usually no more than eight to 12 are chosen to ensure compliance.

Monitoring

Following the introduction and implementation of the plan, users are encouraged to engage in an ongoing mastitis monitoring process. This could involve using the incidence rate of index cases of clinical mastitis and the rate of new intramammary infection as measured by SCCs to measure outcomes following changes made to management. This is then used to observe trends in the data at roughly three-monthly intervals to ensure the plan is kept up to date and relevant to the herd.

Online resources

The DMCP website is available to members of the public, farmers and registered plan users. Restricted areas are available to registered plan users and include additional resources to support implementation of the DMCP as outlined below.

Cost calculators

Identifying herds to take part in the scheme is often difficult, and a key starting point for the plan user is often a discussion about the cost of endemic disease. In particular, the cost of mastitis is often subject to massive variation and discussion, depending on labour, drug costs and prevalence of infection, and incidence of clinical cases.

Figure 4 shows the full function cost calculator, which allows plan users to estimate the true cost of mastitis on their clients’ farms and estimate the likely cost benefit of implementing recommendations from the DMCP.

High SCC cow decision support tool

Figure 5 shows the high SCC cow decision support tool, which can aid the practitioner when making short-term treatment decisions with currently infected cows at the start of the DMCP implementation process. Both this and the cost calculator are available to registered plan users as an electronic download.
Discussion forum

An important obstacle to the successful implementation of control plans is the issue of farmer compliance and the ability of the plan user to think outside the box when discussing recommendations regarding the diagnosis reached.

With this in mind, a discussion forum has been set up to allow registered plan users to swap and share ideas, request further information from the DMCP team, and ultimately work in a collaborative manner, which is often not achievable during day-to-day general practice work. An example of the topics within a discussion title is shown in Figure 6. Discussions relevant or useful to the plan user can be subscribed to, allowing the user to minimise time required to access the site.

Future

The authors see the DMCP and national initiative as an ongoing, self-funding scheme that veterinary surgeons and other herd advisors will make their own.

It is important that the plan does not remain static; fundamental to the initiative is the incorporation of latest research evidence, the sharing of experience and resources and the encouragement of clients and younger colleagues in the future.

As part of this, registered plan users will be required to attend an annual mastitis control plan CPD day to remain registered, where, in addition to getting an update on the progress of the scheme, specific areas of the plan will be discussed in detail and expanded on using the latest research knowledge and evidence from the literature.

Summary

With the development and widespread implementation of the Five Point Plan, the control of bovine mastitis in the UK has historically been good. However, there is no evidence that mastitis control has improved in the past 20 years or so, and there is data that suggests a recent possible worsening of the national herd situation.

While it is clear that some individuals play an important role in advising and correcting herd problems, a wide-ranging collaborative approach on a national scale is required if a substantial impact is to be made on mastitis and milk quality in the national dairy herd. The DMCP uses a process to encourage widespread application.

Acknowledgements

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Bullock, Kate Cross, Hugh Black and George Fisher.

**About the authors**

The authors of this article are RCVS cattle health and diploma holders with varied backgrounds encompassing clinical and research experience. They are all members of staff at the University of Nottingham veterinary school and divide their time between clinical work, research and teaching.

- Andrew Bradley and James Breen are also involved in the day-to-day management of the initiative at Quality Milk Management Services.

Andrew Bradley and Martin Green present the National Mastitis Control Plan lecture at BCVA Congress on Saturday, November 28 at 10am.

**Further reading**

Figure 1. The proportional change in incidence rate of clinical mastitis in the first year following implementation of the mastitis control plan (intervention [plan] herds are shown in red and control herds are shown in blue).
The authors from left to right: James Breen, Martin Green, Chris Hudson and Andrew Bradley.
Figure 2. Map showing the distribution of registered plan users in the UK (as at July 2009). A cross indicates that more than one plan user is in the area shown.
Figure 3. Prioritising the list of recommendations generated by the DairyCo Mastitis Control Plan software.
**DairyCo**

**Mastitis Control Plan Cost Benefit Calculator Tool**

<table>
<thead>
<tr>
<th>General Farm Information</th>
<th>Labour Costs</th>
<th>Herdsperson Time (£/hr)</th>
<th>10.41</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Milk Price (ppl)</td>
<td></td>
<td>Vet Call Out Charge (£)</td>
<td>25</td>
</tr>
<tr>
<td>Number of Cows in the Herd</td>
<td></td>
<td>Vet Time (£/hr)</td>
<td>100</td>
</tr>
<tr>
<td>Feed and Fertilizer Cost (ppl)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average Milk Yield (305d) (litres)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Bulk Milk Somatic Cell Count,(000 cells/ml)</td>
<td></td>
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<tr>
<td>Current BMSCC - Penalties (ppl)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Current BMSCC - Lost Bonuses (ppl)</td>
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<table>
<thead>
<tr>
<th>Replacement Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of Replacements Homebred</td>
</tr>
<tr>
<td>Homebred (£)</td>
</tr>
<tr>
<td>Purchased (£)</td>
</tr>
</tbody>
</table>

| Cull Cow Value (£) | 300 |
| Carcass Disposal (£) | 150 |

**About Clinical Mastitis Cases on Your Farm**

| Number of Cases of Clinical Mastitis in the last 12 months | 100 |
| Proportion of Cases that were Severe (ie Sick Cow) (%) | 5 |
| Proportion of Cases that were Mild/Moderate (%) | 95 |

**About Sub-Clinical Mastitis on Your Farm**

| How many cows did you cull for high somatic cell count last year? | 5 |

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**Figure 4. Online resources include the full function cost (benefit) calculator used in conjunction with the control plan.**
**Figure 5. The high somatic cell count cow decision support tool.**

Here is the decision support tool for high somatic cell count cows. Enter data on the high SCC cow you are considering treatment of...

<table>
<thead>
<tr>
<th>Data entry and chance of cure</th>
<th>Cost of treatment and likely cost benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lactation number</td>
<td></td>
</tr>
<tr>
<td>Number of quarters affected</td>
<td></td>
</tr>
<tr>
<td>Bulk milk SCC (x1,000/ml)</td>
<td></td>
</tr>
<tr>
<td>Treatment duration (days)</td>
<td></td>
</tr>
<tr>
<td>Udder pathology?</td>
<td></td>
</tr>
<tr>
<td>Individual cow SCC history</td>
<td></td>
</tr>
<tr>
<td>(last three individual SCCs)</td>
<td></td>
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</tbody>
</table>

**Estimate of likelihood of cure for this cow**

- **Chance of cure (%)**
  - Mean: 95.0
  - Min: 81.6
  - Max: 97.9

You have chosen a cow in lactation number 1, with 1 quarters affected, an individual cell count history of last three SCC all under 400 (but over 200) and no palpable udder pathology, for >6 days of treatment in a herd with a bulk milk SCC of <100.
Figure 6. The plan user discussion forum allows users to collaborate with others. This page shows topics in a category.