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Case Study: A Milk Quality Programme in a UK Dairy Herd

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Objective & Introduction

To evaluate a multi-faceted approach (Milk Quality Programme, MQP) to reduce mastitis on a large commercial dairy farm through management changes, vaccination and use of new technology.

European legislation (EU 92/46) dictates the minimum standard for milk. Bulk milk somatic cell count (BMSCC) level is used by milk processors for contract quality measurement. Mastitis impacts BMSCC and milk sales: with direct (therapies/dumped milk) and indirect costs (production loss/quality payments). Mastitis costs the UK dairy industry £300 million (Hillerton & Berry, 2005) with vets challenged to reduce this loss. An MQP, where vet and farmer work together in a targeted approach to udder health, is relatively new for the UK – what impact would this show on a commercial farm? Consideration of responsible use of parenteral therapies to address future antibiotic resistance concerns is now maybe just as important as milk quality?

Materials & Methods

In January 2008, a 1,300 cow Holstein herd (10,900 L/cow/year) milked through a 60 point rotary (Boumatic) parlour, in Cornwall, UK introduced an MQP following a review of udder health (see pic 1). The herd was housed 365 days on sand cubicles (see pic 2) and milks 3X.

Although the farm sold quality milk (BMSCC <200,000 cells/ml) there was a rising rate of clinical mastitis (from 35 to 58 cases/100 cows/year). Losses due to toxic/chronic mastitis were excessive with 32% of all culls/deaths (173/540 head culled) recorded due to udder health issues.

DHI data (Cattle Information Services, milk recording) was utilised to select new and chronic SCC cows to sample for individual bacteriology. The records were used to identify risk periods and divide the herd into high (SCC >200,000 at 25% and >400,000 cells/ml at 18%) and low (SCC <200,000) cows. Targets were set for the herd individual SCC split to <20% of all cows >200,000 cells/ml and <10% of the herd >400,000. See fig 1

Bacteriology – 98 samples were taken initially from clinical and chronic (subclinical) cases identified: main environmental bacteria *Streptococcus uberis* (25%) and *E.coli* (16%); main contagious bacteria *Staphylococcus aureus* (12%) and Coagulase negative Staphs (7%).

Investigation – a full mastitis plan (DairyCo) was undertaken: in-depth data analysis and questionnaire; parlour visit to check milking routine, lactocorder milk let-down curves, teat end vacuum levels plus static/dynamic testing; housing/environment; youngstock management and rearing system; dry-cow/transition management.

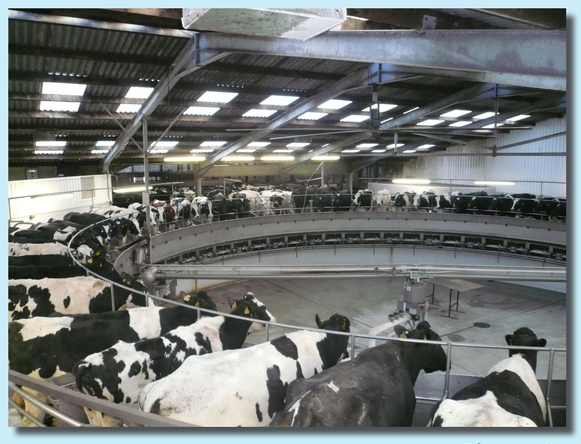
The overall investigation indicated that changes would be needed in the environment, parlour and dry-cow/transition management.

Management changes were implemented: full pre-prep with stripping, foam pre-dip (see pic 3 & 4), mats for spatial/timing placement of milking team were installed for 60 second lag time before paper towel wipe (see pic 5); selective dry cow therapy (see fig 2); sand cubicles for dry cows; separate mastitis barn with separate parlour to remove treatment cows from main string.

Through 2009 mastitis rate and BMSCC levels improved, but repeat cases and culls/deaths were still deemed excessive. In February 2010 vaccination for *E.coli* (J5), *Staph. aureus*, and coagulase-negative *Staphylococci* (CNS) with an EU licensed product (Startvac, Hipra UK Ltd) with an initial course of 2 doses 28 days apart then a booster dose every 90 days to all milking and dry cows. Primiparous heifers were given initial course pre-calving.

In June 2011 a clusterflush (Cotswold, UK) system was fitted to the parlour to reduce cross contamination as the herd expanded in milking numbers.

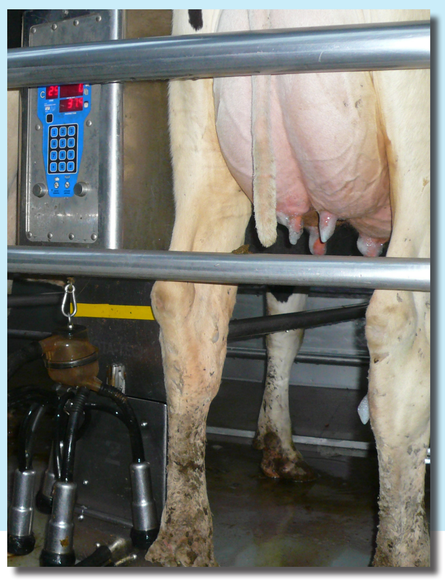
Picture 1.



Picture 2.

Picture 3.

Picture 4.



Picture 5.

FIG 2. Dry cows – strategic dry-off decisions

- Treat persistent infections
- Prevent new infections
- Allow easy milk-out and prompt return to saleable milk
- Herdsman to review all cows on CIS records at 90 days pre-calving date

1. Short – aim 42 day average use teat sealant
   a. All healthy cows – no lameness or disease problems
   b. Higher production – over 25ltrs/day at 90 days prior to calving
   c. Normal condition score (BCS 3 cows)
   d. No noted compromise to udder health:
      i. Mastitis history – no cases in this lactation
      ii. SCC history – has normal SCC on CIS records:
      <100,000 for whole lactation
      Apparently clear at 90 days pre-calving recording
      CMT test check – if suspicious then use short acting antibiotic dry cow therapy (ADCT)
2. Conventional – aim 60 day average use long acting ADCT and teat sealant
   a. Majority of herd – will be all normal cows
   b. Low production – less than 25ltrs/day at 90 days prior to calving
   c. Normal condition score (BCS 3 cows)
   d. Little or no noted compromise to udder health:
      i. Mastitis history – 0, 1 or 2 cases in this lactation
      ii. SCC history – has normal SCC on CIS records:
      <200,000 for majority of this lactation
3. Extended dry-period – aim 84 days using long acting ADCT and teat sealant
   a. Problem cows – lameness, extended lactation, low BCS (BCS <2.5)
   b. Poor udder health:
      i. Mastitis history – two or more cases in this lactation
      ii. SCC history – using CIS records:
      Three or more recordings >200,000 in lactation
      Apparent SCC issue (>200,000) at 90 days recording
   c. Add tylosin – injection given at drying-off to all extended dry cows:
      i. Two sites over ribs – 2 x 15ml sub-cutaneous injections

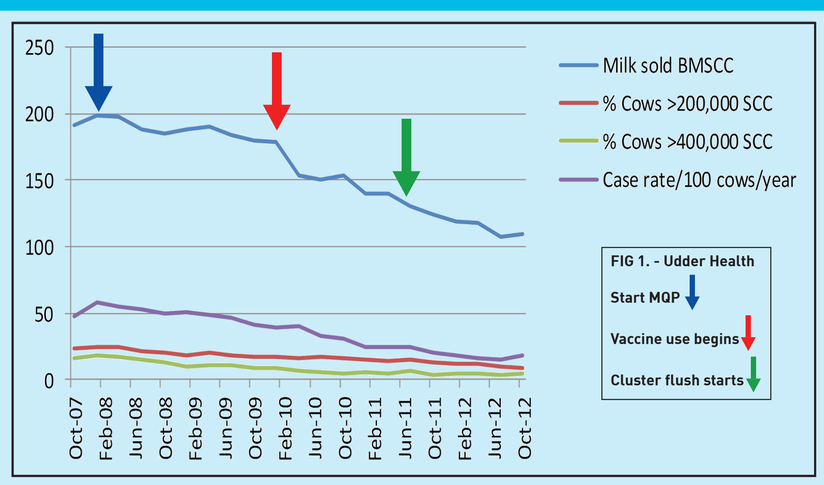
Results

Since the MQP was implemented udder health has steadily improved (see fig 1):

- BMSCC reduced from 199,000 to 109,000 cells/ml.
- Clinical mastitis from 58 to 18 cases/100 cows/year.
- Cows >200,000 in the herd as reduced to 9% with 5% over 400,000 cells/ml.

Culling/deaths for udder health have improved from 173/1,300 lactations in 2008 to 96/1,450 in 2012. Comparing toxic culls/deaths these have reduced from 27 of 173 dead/culled to 1 from 96.

At the same time total milk sales have increased from 10,900 litres per cow per year to 11,550 with consistently better herd DHI recording data cited by the farmer as playing a large part in this success.



Discussion

A targeted approach through an MQP can work on a commercial dairy by working with the dairy team to control specific areas of udder health. Mastitis can be split into environmental and contagious risk management through analysis of data and investigation. Management changes and staff education play a large part in any MQP, but additional tools must also be available to the vet.

Vaccination may have offered benefits in this herd with known *Staph. aureus* and coliform mastitis problems. Fitting clusterflush to reduce contagious spread may also have impacted clinical mastitis and longer term culling due to SCC. Reducing the number and severity of toxic cases helped reduce culling and increased production through milk sales in this instance.

Return on Investment - does an MQP offer Cost Benefit

Taking an average cost of a case of mastitis at £218 (Hillerton & Berry, 2005) against investment in capital and ongoing health – does an MQP offer cost benefit?

Improved udder health helped see 650 litres more milk sold/cow in the year compared to 2008. Extra milk sales equates to 942,500 litres = £282,750 additional income at £0.30/litre.

Investment in vaccination (£20/cow/year x 1,400 cows/year) and clusterflush (£500 x 60 points as single cost) totalled £58,000 in '11-12.

Return on investment in year = £224,750

References

Hillerton, J.E., and E.A. Berry, 2005. Treating Mastitis in the Cow. Journal of Applied Microbiology vol.98 pp1250-1255

Science • Commitment • Results