

# Use of Mastitis Pattern Analysis Reports to Monitor Udder Health on UK Dairy Farms

Al Manning<sup>1</sup>, Katharine Leach<sup>1</sup>, Karen Bond<sup>2</sup>, Janette Mathie<sup>3</sup>, Jake Thompson<sup>4</sup>, Robert Hyde<sup>4</sup>, Luke O'Grady<sup>4</sup>, Martin Green<sup>4</sup> and Andrew J Bradley<sup>1,4</sup>

<sup>1</sup> Quality Milk Management Services Ltd, Cedar Barn, Easton Hill, Easton, Wells, BA5 1DU, UK.

<sup>2</sup>National Milk Records Ltd., Greenways Business Park, Fox Talbot House, Chippenham, Wiltshire, SN15 1BN.

<sup>3</sup>The Cattle Information Service Ltd., Scope House, Hortonwood 33, Telford, Shropshire, TF1 7EX.

<sup>4</sup> School of Veterinary Medicine and Science, University of Nottingham, Sutton Bonington Campus, Sutton Bonington, LE12 5RD, UK.

**Background:** Diagnosis of the predominant mastitis pattern is an essential part of the Mastitis Control Plan approach. In 2021, an automated Mastitis Pattern Analysis Tool (MPAT) was developed, which uses machine learning to predict the predominant mastitis pattern on farm (Hyde et al 2020). Farmers milk recording with QMMS, NMR or CIS can register to receive an MPAT report each time they milk record, highlighting the predominant mastitis pattern on farm. Since 2022, over 400 farms have signed up.

**Aim:** To describe trends in MPAT reports in 2022 and 2024.

**Methods:** MPAT reports were generated for all farms on the 10/05/2022 and 10/05/2024. The current predominant pattern was identified, using data from the most recent quarter, and any farms with >10% contagious risk were noted. Bulk Milk Somatic Cell Count (BMSCC) was calculated based on milk recording data. The clinical mastitis case rate was also recorded, to identify farms which were not recording, or might be under-recording (<5 cases per 100 cows per year in the current quarter). For farms with accurate data in 2022 and 2024, statistical comparisons were made by a non-parametric Wilcoxon Rank to account for paired data.

Table 1: Key udder health metrics across MPAT subscribing farms in 2022 and 2024

	Calculated BMSCC (,000 cells/ml)				Clinical mastitis rate (per 100 cows per year)			
	Median	Mean	Range	IQR	Median	Mean	Range	IQR
May 2022	168	174	57-387	134-203	23.2	26.4	5.1-109.8	13.9-34.8
May 2024	165	172	66-564	132-201	20.7	23.8	5.4-101.8	14.8-29.1

**Results:** Calculated BMSCC was available for 93% of farms in 2022, and 99% in 2024. Clinical mastitis data were available for 49% in 2022 and 63% in 2024. There was a small, but significant reduction in calculated BMSCC between 2022 and 2024 ( $p < 0.05$ ). Average mastitis rate dropped by 2.5 cases per 100 cows per year ( $p < 0.05$ ). Mastitis patterns were broadly similar in 2022 and 2024, with the majority of farms having an 'Environmental Lactation' pattern (Figure 1a,c). This is similar to the patterns reported across the AHDB sentinel herds (Leach et al 2024). Approximately 3.5% of farms had evidence of a contagious epidemiology in each year. Despite the similarities in both years across all farms, 45% changed patterns between 2022 and 2024 (Figure 1b): 34% of farms with a dry period pattern in 2022, had a lactation pattern in 2024; 20% of farms with a lactation pattern in 2022 had a dry period pattern in 2024.

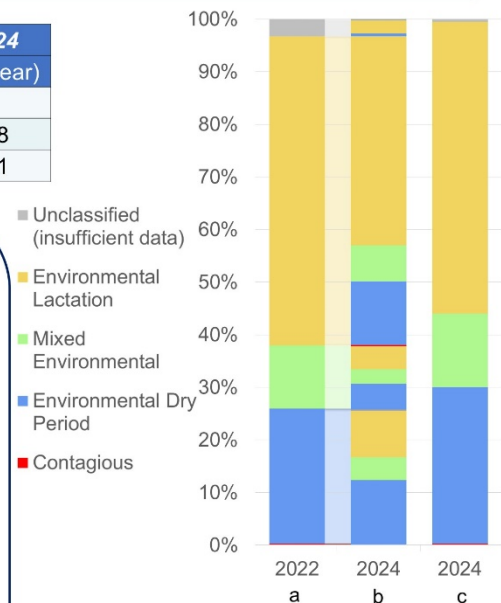


Figure 1: a Proportion of farms with predominant mastitis patterns in 2022, b How farms were reclassified in 2024, c The overall proportion of farms with each pattern in 2024

**Conclusions:** Data recording has improved between 2022 and 2024. In the same time calculated BMSCC and clinical mastitis rate have both reduced across the MPAT farms. Mastitis patterns are likely to change, and should be reviewed regularly. While in the minority, contagious patterns still exist, though few farms remained with a contagious pattern across the two years.

## References:

Hyde, R. M., Down, P. M., Bradley, A. J., Breen, J. E., Hudson, C., Leach, K. A., & Green, M. J. (2020). Automated prediction of mastitis infection patterns in dairy herds using machine learning. *Scientific Reports*, 10(1), 1–8. <https://doi.org/10.1038/s41598-020-61126-8>

Leach, K. A., Holsey, H. J., Bradley, A. J., & Green, M. J. (2024). Improvement of mammary gland health in 81 'sentinel herds' in England and Scotland between 2012 and 2021. *Veterinary Record*, 194(4), no. <https://doi.org/10.1002/vetr.3605>

