

Integrating Milk Recording Data and Disease Test Results to Provide a System for the Management of Johne's Disease in UK Dairy Herds

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Abstract

This paper describes a voluntary Johne's (*Paratuberculosis*) control programme in milk recorded herds in the UK dairy industry between 2008 and 2011. Utilising routine milk samples from herd recording and a commercial ELISA test for the detection of *Mycobacterium avium* subspecies *paratuberculosis* antibodies, a Johne's control programme was developed by National Milk Records (NMR) Plc in conjunction with industry.

The aim of the programme is to encourage farmers to understand their Johne's risks and disease status through completion of a disease risk assessment (www.myhealthyherd.com) and to manage these risks to reduce prevalence in the herd.

Milk samples are tested every three months during routine herd recording and storage of consecutive lab results in the herd recording database along with traffic light scoring of cows allows farmers to prioritise herd management protocols with the aim of reducing disease prevalence. Herd status allows farmers to clearly understand likely future prevalence of Johne's disease if these risks are not managed effectively.

Farmers received a consistent education program coordinated by the milk recording organisation and delivered through the milk processors using trained consultant veterinarians. The engagement program has progressed to more effective veterinary led control plans being applied in the UK.

By using routine herd recording samples and regular testing as the basis of the paratuberculosis control programme producers have access to a hassle-free and cost effective system for the management of Johne's disease leading to significant increase in disease awareness and uptake in control programmes in the UK dairy industry.

Key words: Johne's, Paratuberculosis, ELISA, Milk Samples, Risk Assessment, Disease Control

Introduction

The rising incidence of Johne's disease prompted by increases in the risks of transmission between and within herds (herd size, expansion, labour shortages) and the development of practical tools to manage the disease has facilitated a new approach to Johne's disease in the UK dairy industry.

Materials & Methods

Risk Assessment

A specific Johne's disease module was created in the herd health planning software MyHealthyHerd.com which assesses the risk of Johne's disease entry & spread. These risks were based on work by Rossiter et al (1998) and Søren Nielsen (2009). The module was used

to gather information on the biosecurity and biocontainment risks for Johne's disease in each herd. The vet or farmer could enter data onto the program and each answer was then evaluated by applying both a weighting and a score to the answer. The sum total of the risk score was grouped using a traffic light system and given a red, amber or green icon. This allowed a structured prediction to be displayed for the likelihood of disease introduction and spread. This information was then used to help determine the most appropriate biosecurity, surveillance and control plan for the herd.

Education

Veterinary practitioners participating in the regional control schemes were required to attend a Johne's training day to update them on Johne's disease and its control. Over 360 vets were trained through this route or through other voluntary training programmes.

Farmer education is also a critical aspect of the control programme. Farmer meetings were jointly sponsored by the milk processors and DairyCo (statutory levy board for the dairy industry) to create a producer awareness campaign. In excess of 80 farmer meetings were held throughout the country over the three year period and over 3000 farmers have been trained in the risk-based management of Johne's disease in the dairy herd.

The methodology and approach was also integrated into regional control programs within the South and North West of England again using standardised presentations and approaches.

Diagnostic Screening

In 2007 NMR established an animal health lab at the subsidiary company National Milk Laboratories (NML) in Wolverhampton. This saw the introduction of Enzyme Linked Immuno-sorbent Assay (ELISA) based milk testing for antibody against *Mycobacterium avium* subspecies *paratuberculosis*. Milk samples collected for routine herd recording could be sent for ELISA testing after component analysis reducing the cost of sample collection and simplifying the process of disease testing in the dairy herd.

The producer awareness campaign centred on the use of targeted 30 cow screens (in conjunction with risk assessment) to predict the likely infection level within the herd. Depending on herd status, different control strategies were available to the producer (Figure 1). The most popular programme adopted in herds with Johne's disease was the risk based control strategy (Nielsen, 2007) in which individual cows are tested on a quarterly basis (four times per year) using the IDEXX Paratuberculosis Screening Antibody Test on milk samples.

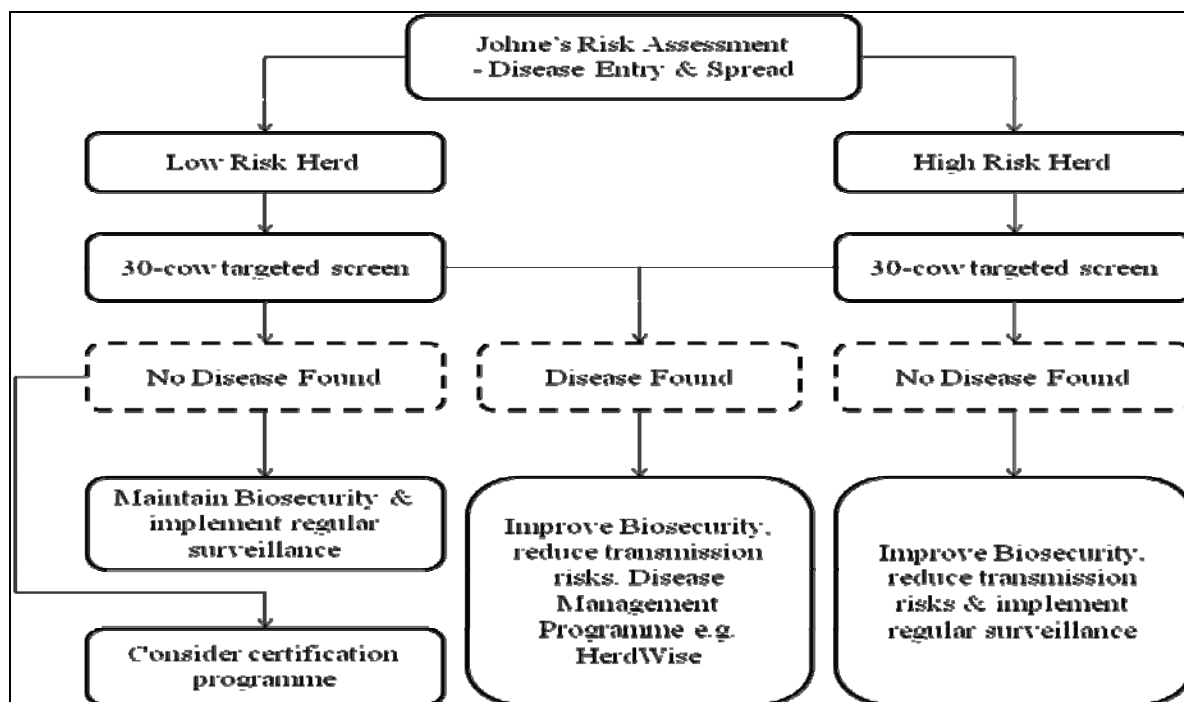


Figure 1 - A logical approach to Johne's control in the dairy herd

Data Management

The HerdWise service from NMR takes consecutive test results from the quarterly milk screening programme and transfers them to the NMR database where they are analysed to provide a status for each cow in the herd. Cows are categorised according to risk of disease transmission in one of six groups (J0-J5). These are then summarised as low, medium and high risk groups for disease management purposes (Table 1). Results are presented through Herd Companion, an online data analysis tool for producers engaged in milk recording through NMR. This website enables producers to view results from herd recording as well as data from the animal health lab and other parameters such as mobility scores and fatty acid profiles.

Presenting Johne's disease test results through the same portal as the herd recording site has enabled the development of reports combining both disease status and cow management information resulting in a streamlined information system for producers. The veterinarian also has access direct to his/her client reports and more advanced reports are available to view by the veterinarian only through Herd Companion PRO.

Risk Level	HerdWise Classification	Johne's Infection Group	Definition
LOW	Green	J0	Repeat ELISA negative (minimum 2 tests)
	Green	J1	ELISA negative but only one test
	Green	J2	ELISA negative but positive within 3 previous tests
HIGH	Yellow	J3	ELISA negative/positive interchangeably
	Yellow	J4	Last ELISA positive, all previous tests negative
	Red	J5	Repeat ELISA positive (minimum 2 tests)

Table 1 Classification rules for risk status of cows with individual milk ELISA results

Discussion

Quarterly testing of all milking cows and division of the herd into high and low risks groups according to test results has proven to be the most popular control programme adopted in the UK to date. Effective separation of high risk cows at calving allows for a more practical control option to be applied. This reduced input management provides options for larger UK herds unable to adopt the traditional improved farm management approaches and provides a more constructive approach to Johne's control than test and cull.

By using samples already collected for milk recording and simplifying the reporting of results into a single database, the control of Johne's disease becomes hassle-free and cost effective for producers.

Conclusion

The success, to date, of this industry driven voluntary control program has been due to the adoption of the milk ELISA test as the standard approach for surveillance and in the majority of cases control within infected herds. Creating a structured approach based on best science and incorporating this within a herd management database has allowed a methodology based on "ask rather than tell" and avoids the didactic approach often provided by compulsory control schemes. This provides an inclusive framework for managing the disease in increasingly complex and varied farming systems.

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