

## **NML HerdWise Johne's Screening Programme**

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## 1. Introduction

Welcome to the NML **HerdWise** Johne's Screening Programme. Below you will find all the information necessary to set you on the path to Johne's control within the dairy herd. This programme has been established to provide the tools for vets and their farmers to control infection and ultimately reduce the prevalence of Johne's disease in the dairy herd.

Participating herds will test all lactating cows up to four times per year using a milk antibody ELISA and results will be used for risk-based management of infectious animals. By using a risk-based approach it is hoped that farmers will be able to implement effective management decisions to control spread of infection within the herd. It is important that the farmer and vet work together to carry out a risk-assessment which will help with identification of transmission risk areas and as such this programme is only available to farmers through their consulting veterinary surgeon.

Entering into the screening programme requires commitment from both the vet and the farmer. Due to the nature of the disease it is likely that the programme could last between 5-8 years however much depends on the initial disease prevalence and the successful implication of management changes on farm.

## 2. What is Johne's Disease?

Johne's disease (JD), also known as paratuberculosis, is a chronic infectious intestinal disease caused by *Mycobacterium avium* subspecies *paratuberculosis* (*Map*).

It is a disease that causes considerable economic losses through decreased productivity and increased wastage of adult cattle as well as the cost of monitoring, diagnosis and control.

The bacteria are shed in large numbers in faeces and can be found in milk and colostrum. Animals are infected by ingesting the agent and young animals (<3 months) are considered to be the most susceptible to infection.

The progression of the disease is usually very slow with the majority of animals becoming clinically ill from between 2 and 6 years of age despite infection occurring as young animals.

Johne's disease is more common in dairy cattle than other ruminants. This is likely a function of animal husbandry methods used for dairy cattle that differ from most other species. Johne's disease is fairly common in small ruminants like sheep, goats in many countries but precise survey data have not been published.

## 3. How is Johne's Disease Transmitted?

*M. paratuberculosis* bacteria are obligate pathogenic parasites of animals. This means that the only place they can multiply in nature is inside an animal. Most accurately, it is inside cells that are part of the animal's immune system called macrophages. When *M. paratuberculosis* leaves an animal, for example in the faeces, it can survive for a long time in environments such as soil and water, but it

cannot multiply once it is outside the animal. Consequently, the primary source of infection is infected animals.

Herds or flocks of animals acquire the infection by being exposed to the bacteria from an infected animal. When an infected animal is introduced to a herd, the opportunity for transmission of *M. paratuberculosis* bacteria to other animals increases the longer that animal remains in the herd. As the infection progresses in the animal, the frequency and number of *M. paratuberculosis* bacteria being excreted or shed increases.

*M. paratuberculosis* infects the intestine, thus faeces (manure) is the most common mode of exit of the bacterium from the animal. Ingestion of *M. paratuberculosis*-containing faeces, or faecal contaminated feed or water is the most common way animals become infected. In manure, *M. paratuberculosis* can remain alive for over a year, depending on environmental conditions.

Milk from infected female animals is a second source of *M. paratuberculosis* infection. The likelihood of *M. paratuberculosis* being excreted into milk increases with time as the infection progresses. The probability of young animals becoming infected by drinking milk from infected cows is a direct function of the time spent with the mother and/or how often they are fed milk from infected females. In animals where husbandry practices allow young animals to remain with the dams and nurse naturally, the chance for transmission of the infection from mother to off-spring is greatest. *M. paratuberculosis* may be excreted directly into the mother's milk and/or the surface of the teats might be contaminated with infected manure.

Pond water contaminated with manure carrying *M. paratuberculosis* is another potential source of infection. A less likely, but possible, infection source is pasture land contaminated with the bacteria.

Johne's disease has been reported in free ranging wildlife, but their role in the ecology of *M. paratuberculosis* is not known. Similarly, it is not known if wild birds can become infected or transfer *M. paratuberculosis* bacteria between farms.

#### **4. Control of Johne's Disease**

The largest number of *M. paratuberculosis* bacteria excreted by infected animals are in the faeces. Farm sanitation and slurry management are critical to controlling of Johne's disease. Because of the susceptibility of young animals to *M. paratuberculosis* infection, it is important to keep them well away from adult manure that may harbour the infection. The longer the separation of young stock and adults can be maintained the better.

Animals should be born in a clean dry environment with minimal faecal contamination. For dairy cattle, prompt removal of the newborn from its mother is recommended for control of Johne's disease, as well as several other dairy cattle diseases. This practice is not practical for many other animal species although in certain circumstances it should be considered.

Manure contamination of feed can occur when the same equipment is used to move both feed and manure - this practice should be avoided. Also, manure contamination of water, particularly ponds, wallows or streams that animals can drink from, must be avoided to limit spread of the infection.

Many animals infected with *M. paratuberculosis* will excrete the bacterium in their milk. *M. paratuberculosis* excretion in milk happens most often in animals with clinical signs of Johne's disease, but can occur in infected animals that appear healthy too. Because no diagnostic test can detect all infected animals, to control Johne's disease it is best to avoid feeding of raw, non-pasteurized milk and natural nursing. This is easier for dairy cattle than for most other species of animals, but always should be considered. Artificial milk replacers are pasteurized and considered free of *M. paratuberculosis*.

Colostrum, the antibody-rich milk produced by dams during the first few days after giving birth, can contain *M. paratuberculosis*. Because colostrum is critical to the health and survival of newborns, feeding of colostrum is essential. However, the risk of transmitting *M. paratuberculosis* along with the benefits in colostrum can be minimized by:

1. using colostrum from Johne's test-negative animals only
2. not pooling colostrum from multiple animals
3. thoroughly cleaning the udder and teats before collection of colostrum to avoid manure contamination (for bottle feeding vs. natural nursing of colostrum).

## **5. Why Control Johne's Disease?**

The disease can have a significant economic impact on farm through loss of output, poor health and early culling. It has been suggested that *Map* may also be a possible cause of Crohn's disease in humans. Control and prevention of Johne's Disease makes sound long term sense for many reasons:

- 1) To reduce or prevent loss of production and income that results from this disease;
- 2) To reduce the animal welfare implications of infection with paratuberculosis;
- 3) To increase the value of breeding stock through certification of herd for known disease status;
- 4) To reduce the level of *Map* in milk and in the environment in line with the recommendations of the food standards agency

## **6. Structure of the HerdWise Johne's Screening Programme (JSP)**

The Johne's Screening Programme is run under the HerdWise brand by National Milk Laboratories (NML) and administrated by the NMR Group.

The consulting veterinary practice or farmer (if nominated by vet to pay) will be invoiced for diagnostic testing (£5-10/cow/year)\* and an annual herd administration fee (£30-45/herd/year)\*.

It is up to the vet to produce a package for the specific farm based on a combination of the testing fee and consultancy for the service. NMR will invoice the designated party on a monthly basis based on the number of cows in the herd at the monthly recording.

\* Depends on the number of cows in the Herd.

Samples tested as part of this programme will be the same milk samples used by NMR at the monthly recording and as such this is a unique service for full NMR recording herds.

Prior to enrolling on the HerdWise scheme you may wish to gain some understanding of the level of prevalence of Johne's in the herd. This can be done easily using a 30 cow targeted screen i.e. selecting 30 high-risk cows – old/sick/reduced production.

## **7. Biosecurity Risk-Assessment**

Prior to embarking on the quarterly testing it is strongly advised that a biosecurity risk assessment is carried out for the premises. This can be done independently or through the Biosecurity module in MyHealthyHerd.com. For vets signing herds up to the JSP and wishing to use MyHealthyHerd a £10 discount voucher will be available for the cost of MHH in the first year of use.

General Biosecurity will be assessed covering:

- Cattle;
- People and;
- Animals

In addition to this a disease specific Johne's risk assessment should be carried out covering:

- Disease risk status;
- Vaccine status;
- Surveillance status and;
- Control/current status

More information on the Johne's module will be available in the HerdWise vet pack.

Once these have been completed you will have a better understanding of the risks to which the herd may be exposed. This will enable you to better understand the aims and aspirations of entering a farm into the Johne's surveillance programme.

## **8. Diagnosis and testing**

Once the testing schedule (quarterly) has been identified, testing can begin. Each quarter in the specified month, all samples submitted for milk recording will be tested for antibody against MAP.

After laboratory analysis all data will be transferred to the NMR database for analysis and results will be available on Herd CompanionPRO for vets to review. No results will be sent through the post but all reports will be fully downloadable in pdf format from Herd Companion.

The following reports will be available from the launch of the programme however additional reports will be developed going forward according to the needs of the programme participants.

- 1) High risk cow management report (see Appendix 1 for example)
- 2) Low risk cow management report
- 3) Summary report of last 6 test results for all cows in the herd

Cows are categorized into different risk-categories after each test (Table 1) based on their antibody profile. The risk levels can either be simplified into high/low risk cows or divided into three cow types, “Green”, “Yellow” and “Red”.

“Green cows” are non-infectious and potentially non-infected; “Yellow cows” are controlling the infection, but may become “Red” or be in the initial phase of no control of infection; and “Red cows” no longer control the infection.

Table 1 - Risk levels and categories for cows in Screening programme

Risk Level	‘Classification’	Johne’s ‘Infection Group’	Definition
LOW	Green	J0	Repeat ELISA -ve (minimum 2 tests)
	Green	J1	ELISA -ve but only one test
	Green	J2	ELISA -ve but +ve >3 tests previously
HIGH	Yellow	J3	ELISA -ve/+ve interchangeably
	Yellow	J4	Last test ELISA +ve, all previous tests –ve
	Red	J5	Repeat ELISA +ve (minimum 2 tests)

ELISA cut-off set at 30%SP (>30%SP classed as +ve)

In addition to the cow types, there are a number of “infection groups” (Table 1) into which the cows are placed. This covers aspects of transmission as well as predictions related to milk production loss. Cows with one positive test result in the last four tests (infection groups 3, 4 & 5) are considered infectious to some extent.

## 9. Risk-Based Management

Control and eradication of Paratuberculosis from a herd can be achieved by reducing transmission of MAP. Calves (<3 months of age) are considered to be the most susceptible animals and should be protected from faeces and milk from infectious cows.

The main routes for transmission of MAP have been outlined earlier in this document and farm specific risks should be assessed prior to entry into the Johne’s Screening Programme. This can be done independently or by using MyHealthyHerd.com (£10 discount voucher for all herds on the JSP). Completion of a within-herd-transmission risk assessment will allow more calculated management of high/low risk cows.

Risk based management can be initiated when diagnostic results are available in Herd Companion. Once the within-herd risk assessment has been carried out, specific risks should be addressed in agreement between the vet and farmer. Risks related to calvings are recommended to encompass the following:

- “Red” cows should be culled prior to next calving and should not be allowed near the main calving area.
- “Yellow” cows should be allowed to calve but calving pens should be cleaned subsequent to each calving and calves born by a “yellow” dam removed immediately from the cow.
- Housing of calves should be away from the calving area and not in contact with adult cattle.
- If a calf is born to a ‘high-risk’ cow, and the calf is to remain in the herd it should be isolated from other calves that will remain in the herd for more than 1 year (e.g. a heifer calf born to a “yellow” dam can be housed with a bull calf the is sent to slaughter prior to one year of age).
- Regarding milk feeding, any surplus milk (colostrum, antibiotic, high SCC) should not be used from “red” or “yellow” cows (based on results which are continuously updated – not more than four months old).

It is suggested that “red” cows be culled however this can be tailored to specific farms according to the level of infection and other aspects such as replacements and pedigree status. These strategies could include:

- Looking at the antibody level of the last test(s) – highest cows top of the list for culling
- Deviations in milk yield relative to expected yield
- Clinical signs of disease e.g. diarrhoea
- High SCC
- Other factors such as lameness, age and general performance.

Control of MAP in a herd can be a long process and requires total commitment from both the farmer and his advisors. Farmers should be fully aware of this prior to entering into a screening programme to ensure that motivation is maintained through the course of the programme. All reports have been developed to assist communication between the herd manager and the advisor.

## **10. Further information**

Background information on the disease is available from a variety of sources including [www.myhealthyherd.com](http://www.myhealthyherd.com), [www.Johnes.org](http://www.Johnes.org) & [www.defra.gov.uk](http://www.defra.gov.uk).

For more information on the NML HerdWise Screening Programme call NMR Customer Services on 0870 1622547 or email: [customerservices@nmr.co.uk](mailto:customerservices@nmr.co.uk)

Appendix 1 – Example report (High-risk cows)

## MANAGEMENT REPORT - HIGH RISK COWS

<b>Producer Details:</b>	<b>NMR Herd Number:</b>	<b>Scheme Commencement Date:</b>	<b>Cows tested at latest test :</b>	<b>Page:</b>
Mr R James Home Farm Tiverton Devon EX28 3ZY	11/11111/11	01/12/2006	105	1/4

**Results based on cows sampled on: 01/04/2008** (only valid up to 4 months from specified sample date)

Line No.	Ear Tag	ELISA 01/01/08	ELISA 01/04/08	Days in Milk*	Milk Yield (kg)*	Parity	Milk Yield Drop	Predicted Calving Date	Infection Group on 01/04/08	
1	UK 101203901	89.36	125.31	230	13.20	3	Very Likely	23/07/2008	J5	!!!!
5	UK 101203905	63.24	76.10	105	23.77	4	Very Likely		J5	!!!!
7	UK 101203907	63.01	176.10	110	29.77	4	Very Likely		J5	!!!!
23	UK 101203923	12.08	73.23	97	29.87	4	Likely		J4	!!!
67	UK 101203967	23.10	65.11	73	34.50	3	Likely		J4	!!!
83	UK 101203983	134.20	0.23	256	9.98	4	Possible	16/07/2008	J3	!!
146	UK 1012039146	78.23	13.41	63	30.14	6	Possible		J3	!!
174	UK 101203967	23.10	65.11	73	34.50	3	Likely		J3	!!
223	UK 101203983	114.20	1.45	206	9.98	4	Possible	27/08/2008	J3	!!
275	UK 1012039146	73.23	16.87	64	12.46	6	Possible		J3	!!

'RED' cows (High-risk cows) potentially culled prior to next calving (start with high value cows). NO COLOSTRUM/MILK USED FOR CALVES

'YELLOW' cows (High-risk cows) require good hygiene around calving. Cull only if few high-risk cows. NO COLOSTRUM /MILK USED FOR CALVES

**VET COMMENTS:**

\* These parameters are measured on the date of sampling as specified above.

**For more information regarding this scheme or any of the other NMR group services please call customer services on 0870 1622547**