

2011

Johne's Disease Testing Toolkit

Frequently Asked Questions

The following document provides answers to the most frequently asked questions concerning Johne's surveillance tests offered by NMR.



Healthcheck department
National Milk Laboratories
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Customer Services Contact Details

Customer Services on 0844 7255567

customerservices@nmr.co.uk

Introduction

What is Johne's Disease?

Johne's disease is a bacterial disease caused by the organism *Mycobacterium Avium* subspecies *paratuberculosis* (MAP). Infection results in a thickening of the intestinal wall. This prevents the animal from successfully absorbing nutrients and thus body condition may start to diminish in infected animals.

The disease is widely acknowledged to cause considerable production losses within both dairy and beef herds worldwide. Clinical symptoms also include scour and weight loss. However, often the disease can exist unnoticed within a herd where culling rates are high as animals may be culled for repeated high Somatic Cell Count (SCC), repeat mastitis, poor yields, infertility or lameness long before clinical symptoms are evident. In some individuals, the immunosuppressant effects of Johne's could be the underlying cause of these commonly seen symptoms.

Why tackle Johne's disease?

For farms to be motivated to tackle infectious disease issues on farm there must be a tangible benefit in doing so.

The control and prevention of Johne's disease would:

- Reduce or prevent the loss of production and income that results in disease.
- Reduce the animal welfare implications of Johne's infection.
- Reduce the levels of forced culls and maximise the value of infected animals in the cull market by allowing farmers to predict when condition and welfare may suffer and control when animals can be removed from the herd.
- Increase the value of breeding stock for farms which can demonstrate the herd disease status or show that they are taking a proactive approach to disease control.
- To reduce the level of MAP in milk and the environment, in line with the Food Standards Agency recommendations.

Johne's management

How is the disease spread?

The main route of infection is via faeces from infected animals contaminating youngstock housing and pastures. However, transmission is also possible via milk, colostrum and intra uterine. Animals are at their most susceptible in their first 6 months of life, with the first month contributing to the highest risk of infection (80% of cases). Johne's management therefore includes identifying cattle that are infected, avoiding contact of these animals with youngstock (including their own calves) and the avoidance of pooling milk or colostrums from infected animals for calf rearing. MAP can exist within the soil for over a year and thus care should be taken when spreading slurry or cow grazing on youngstock pastures.

How do I manage Johne's disease on my farm?

Every farming system is different and facilities can vary greatly. It is important to consider walking the farm with your farm vet to establish the risks of entry and the risks of spread of the disease on the farm. Most vets will establish a control plan with their clients that could involve herd status testing, surveillance testing, risk analysis and day to day management procedures. Culling is not always the only option but can be considered under veterinary advice. Johne's is a complex disease and it is easy to overlook a seemingly small risk that could have huge potential consequences on your farm.

If I tackle Johne's now, how long will it be before I am 'clear'?

The disease primarily infects young calves but is rarely detectable until the animal is around 3 years old due to the slow growth of the pathogen. This means that prevalence detection is retrospective. The process of reducing the herd prevalence can take many years depending on the on-farm risks of spread or entry and the current on-farm Johne's level. Our data shows that before a farm can see a significant reduction in Johne's cases in the herd, there is a perceived increase in the prevalence. This is because the more we look for the disease, the more we find infected cattle. This 'hump' effect is seen on almost every farm Johne's surveillance testing their cows.

Test methods

What is the difference between antigen and antibody?

Antibodies are large proteins produced by animals to identify and neutralise foreign objects like bacteria and viruses. They recognise specific regions, which are termed antigens.

How do NML test for MAP?

Cattle are able to mount an immune response to MAP infection. This results in the production of specific antibodies to target the pathogen. These antibodies can be detected by the NML antibody Enzyme Linked Immuno-Sorbent Assay (ELISA) test. This involves the addition of a dye-labelled secondary antibody that binds to the animal's MAP antibody. When the assay is washed, the dye colour intensity is proportional to the amount of antibody in the original sample. This provides a method for measuring an animal's antibody levels.

What sample format is required for testing?

Testing can be carried out on milk or blood samples. NMRs CHecs accredited Herdwise surveillance screen relies on individual milk recording samples. Bulk milk is not recommended as a sample format as it can give false confidence in the herd Johne's status. A 30-cow screen is a more efficient way of monitoring herd status (where only the animals most likely to be infected are selected). The blue preservative bronopol and lactabs do not affect the Healthcheck testing process. However, freezing does affect the ELISA test and therefore frozen samples cannot be used. Blood is the most suitable sample format for beef animals.

How does bTB testing affect my Johne's test?

The bTB test will cross react with the Johne's test to give false positive readings. NML recommends at least 6 weeks between bTB testing and Johne's testing to ensure a more accurate result.

How does vaccination affect my test results?

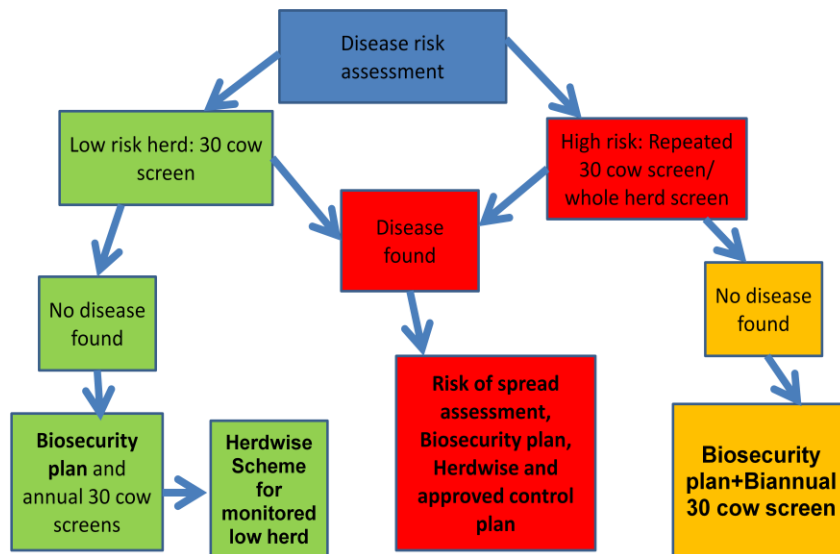
Johne's testing vaccinated animals is pointless as they will always show a high result. Vaccination will merely mask clinical symptoms and may not prevent the transmission of the disease. Veterinary advice should be sought on this matter and vaccination should be considered extremely carefully before a decision is made.

What testing strategies are available?

- 30-cow milk screen – this gives a good indication as to the prevalence of Johne's disease within the herd. The cows most likely to be infected are chosen for the screen, which makes it a targeted, active search.
- Biannual 30-cow milk screen – This monitors herd Johne's incidence by sampling twice each year. It should only be used if the herd has shown a low prevalence.
- Ad Hoc screen – this is a flexible strategy for testing individual milk or blood samples for suspected animals that have been selected or for the whole herd.
- Herdwise Surveillance Scheme – this is a CHecs accredited surveillance scheme that tests individual milk samples from the whole milking herd, quarterly. It builds up a result profile for each animals and classifies these animals as red, amber or green according to the risk of further transmission.
- Johne's Essential Scheme – This is a similar scheme to Herdwise that can be offered as a herd management tool. It is not as structured as Herdwise nor is it CHecs accredited. However, it is a flexible system that does not require the farmer to be recording with NMR.

How do I know which test strategy to use for my herd?

It is important to consider all of the risks of entry and spread of disease when considering a surveillance and control plan. This should be done in collaboration with the vet. Below is a basic workflow that illustrates how testing could fit into a fully integrated control plan.



30-cow screen test

This is an active search for disease within a 30-cow cohort of the herd. Animals should be chosen according to the likelihood of infection. All animals should be between 3 and 7 years old. Any animals that have demonstrated repeat high cell counts, lameness, fertility problems or mastitis, should be prioritised for the screen. The 30-cow screen provides the farmer with an indication of herd prevalence and thus we recommend to repeatedly test individual animals if a cull decision is necessary. Faeces or milk, from animals showing high or medium results, should be kept away from calves and youngstock until they can be confirmed with further testing. With a 30-cow screen the 'traffic light' colour code refers to the test result rather than the Johne's status of the individual cow.

To order a 30-cow screen, farmers can fill out a 'blue' form (available from the Area Coordinator) with the identification or all of the cows required for testing. The testing will be carried out on milk recording samples. If the customer is not recording with NMR, call customer services on 0844 7255567 and ask for a 30-cow screen kit.

Ad Hoc Johne's testing

Ad hoc testing provides a flexible method of testing a variety of samples. Any number of samples can be submitted.

What sample format is required?

Blood or milk can be tested. Standard 'red-top' blood tubes can be used for blood samples. Milk samples can be submitted or animal identifications can be specified and NMR milk recording samples can be used.

How much does it cost?

Milk


| Banding: | NMR* | Non NMR |
|----------------|--------|---------|
| 0 - 50 cows | £ 3.15 | £4.73 |
| 51 - 99 cows | £ 2.52 | £3.78 |
| 100 - 149 cows | £ 2.37 | £3.56 |
| 150 - 199 cows | £ 2.24 | £3.36 |
| 200 + cows | £ 2.10 | £3.15 |

*includes Essential sampling


Blood testing is invoiced directly to the vet. A separate vet pricelist is available for milk and blood samples.

How do I receive my results?

Results can be sent out by email, post or fax. Farmers can specify this when the tests are ordered. An example result report is shown below.



NML
national milk laboratories



HEALTHCHECK

Customer: NML

Address: Woodthorne
Wergs Road
Wolverhampton
West Midlands
WV6 8TQ

Phone:

Email:

Total Pages: 6

Report Date: 04/08/2011

NML HEALTHCHECK RESULTS (INDIVIDUAL COW SAMPLES)

Batch #: 30071008h

We recommend that you analyse the results below in consultation with your veterinary surgeon, to whom a copy of this letter has been sent.

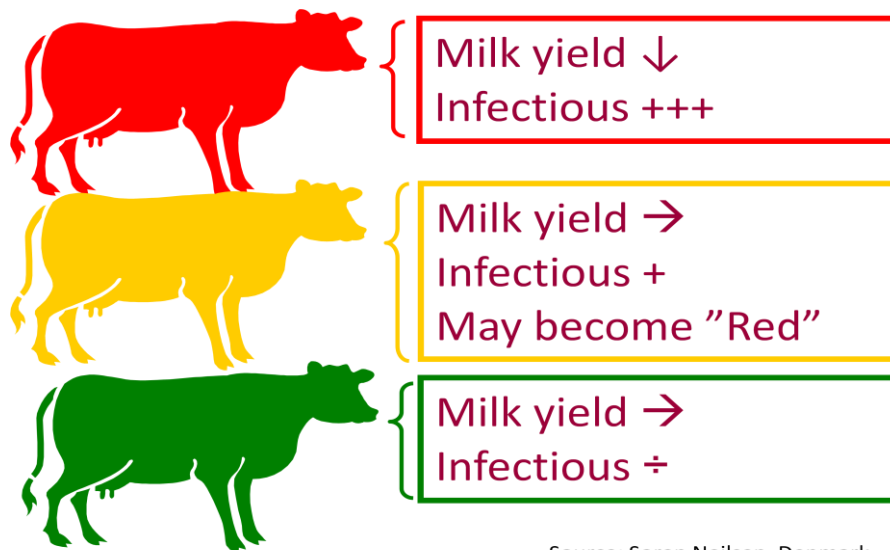
Table 1: Results For The Detection Of Mycobacterium Avium Paratuberculosis (Johne's) in Individual Cow Milk.

| SAMPLE ID | SAMPLE DATE | MAP | |
|-----------|-------------|--------|----------|
| | | % S/P | Category |
| 5 | 26/07/2010 | 2.88 | Low |
| 17 | 26/07/2010 | 75.04 | High |
| 18 | 26/07/2010 | 29.49 | Medium |
| 26 | 26/07/2010 | 0.88 | Low |
| 28 | 26/07/2010 | 3.00 | Low |
| 39 | 26/07/2010 | 123.66 | High |
| 41 | 26/07/2010 | 2.41 | Low |
| 44 | 26/07/2010 | 21.60 | Medium |
| 45 | 26/07/2010 | 1.59 | Low |
| 49 | 26/07/2010 | 1.12 | Low |
| 50 | 26/07/2010 | 3.00 | Low |
| 60 | 26/07/2010 | 3.94 | Low |
| 64 | 26/07/2010 | 0.77 | Low |
| 65 | 26/07/2010 | 4.30 | Low |
| 67 | 26/07/2010 | 52.32 | High |
| 75 | 26/07/2010 | 2.30 | Low |
| 79 | 26/07/2010 | 0.41 | Low |
| 81 | 26/07/2010 | 23.01 | Medium |
| 83 | 26/07/2010 | 13.13 | Low |

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Herdwise

Herdwise is NMRs CHECS accredited Johne's surveillance scheme. Cows are classified using a colour coded 'traffic light' system according to their Johne's status (see below). The classification is based on work carried out by the well respected Danish scientist, Soren Nielsen. Every cow within the milking herd is tested quarterly for Johne's from the NMR milk recording samples. The four test results build up a profile for each cow. The classification of these animals is shown in the table below.





Source: Soren Nielsen, Denmark

| 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 within 3 previous tests |
| HIGH | Yellow | J3 | ELISA -ve/+ve interchangeably |
| | Yellow | J4 | Last ELISA +ve, all previous tests negative |
| | Red | J5 | Repeat ELISA +ve (minimum 2 tests) |

How do I receive my results?

Results are reported in three separate reports available from the Herd Companion website (www.nmr.co.uk/herd-companion/). There is both a high and low risk report and a summary report (shown below).

|  | |  | | | | | | | |
|--|--------------|---|--------------------------|-------------------------------------|------------------------------------|---------------------------------|-----------------------|----------------------------------|---|
| <u>HERD SUMMARY REPORT</u> | | | | | | | | | |
| Producer Details | | NMR Herd Number | Scheme Commencement Date | No. cows in High-Risk Group (J5-J3) | No. cows in Low-Risk Group (J2-J0) | No. cows present at latest test | Page 1 of 2 | | |
| Results based on cows sampled on: (Only valid up to 4 months from specified sample date) | | | | | | | | | |
| Line No. | Ear Tag | ELISA 1 01/04/2007 | ELISA 2 01/07/2007 | ELISA 3 01/10/2007 | ELISA 4 01/01/2008 | ELISA 5 01/04/2008 | ELISA 6 01/07/2008 | Infection Group on 01/07/2008 | |
| 374 | 890001100070 | -- | -- | 40.68 | -- | 87.33 | 60.39 | J5 | ! |
| 454 | 890001100217 | -- | -- | 126.01 | 99.96 | 164.72 | 144.80 | J5 | ! |
| 676 | 890001100700 | -- | -- | 0.00 | 55.84 | 63.36 | 116.30 | J5 | ! |
| 728 | 890001100749 | -- | -- | 19.46 | 0.39 | 32.25 | 88.62 | J5 | ! |
| 757 | 890001100833 | -- | -- | 0.00 | 126.01 | 99.96 | 164.72 | J5 | ! |
| 762 | 890001100840 | -- | -- | 0.00 | 0.00 | 44.51 | 195.47 | J5 | ! |
| 417 | 890001100168 | -- | -- | 0.95 | 11.01 | 1.93 | 114.45 | J4 | ? |
| 426 | 890001100182 | -- | -- | -- | -- | -- | 45.71 | J4 | ? |
| 623 | 890001100581 | -- | -- | 7.46 | 57.50 | 18.55 | 46.50 | J3 | ? |
| 631 | 890001100602 | -- | -- | 4.32 | 0.00 | 46.62 | 3.31 | J3 | ? |
| 665 | 890001100651 | -- | -- | 26.98 | 298.78 | 2.58 | 11.45 | J3 | ? |
| 687 | 890001100686 | -- | -- | 0.00 | 145.93 | 17.88 | 41.43 | J3 | ? |

How much does Herdwise cost?

| Herd size* | Price per cow per year | Monthly invoice per cow** |
|------------|------------------------|---------------------------|
| 1-50 | £9.94 | 83p |
| 51-100 | £8.75 | 73p |
| 101-200 | £7.54 | 63p |
| 201-400 | £6.50 | 54p |
| 401-600 | £6.04 | 50p |
| 601-1000 | £5.82 | 49p |
| 1001+ | £5.58 | 47p |

*Based on the number of cows at milk recording in the month of the invoice.

**Paid monthly throughout the year from point of enrolment onto the scheme.

Prices correct as of 01/04/2011 and are subject to change. Minimum contract – 12 months

How do I enrol?

An enrolment can be downloaded from www.nmr.co.uk or can be posted out on request. Alternatively, please call customer services on 0844 7255567 to arrange for a visit from your local Area Field Manager to discuss options and pricing. Please note that the enrolment form will require a veterinary signature.

Should I cull my 'red' cows?

Every farming system is different. Culling may be a necessary procedure for some animals but animals can be effectively managed until they show signs that welfare is becoming compromised. Much depends on the prevalence of 'red' cows within the herd and the risks to that herd. NML are unable to make specific recommendations of this nature and would urge that farmers consult with their farm vet to aid with their decision.

Johne's Essential

Johne's Essential is a quarterly testing scheme that classifies animals in a similar way to Herdwise. It is designed for farmers who do not record with NMR. It is not a CHeCS accredited service and thus will not certify stock for society sales or supermarket contracts. It simply acts as an on-farm management tool. Samples are tested for Johne's with or without the addition of Essential Sampling (cells, fats and protein data). If you are interested in such a service, please contact your local AFM or customer services for more information.

For more information on any of our services please call customer services on 0844 7255567



www.nationalmilklaboratories.co.uk