NATIONAL JOHNE'S MANAGEMENT PLAN
PHASE III

EXECUTIVE SUMMARY

The National Johne's Management Plan Phases 1 and 2 have delivered a sustained improvement in Johne's Disease (JD) control since 2015.

The NJMP focuses on training of JD Advisors, providing the framework for six JD control strategies, and encouraging widespread engagement with effective JD control across the dairy sector of Great Britain.

From 2015 to 2024 the median herd's Average individual milk ELISA Test Value (ATV) reduced from 9.7 to 5.8 and the median within-herd prevalence reduced from 5.5% to 2.0% in quarterly testing herds.

Challenges in herds with relatively high within-herd prevalences and the impact of JD on cow welfare, economics, the environment, along with wider societal concerns, reinforce the need to further progress JD control.

The major changes of the NJMP in Phase III are:

- **Challenging the GB dairy sector to achieve a national Johne's Control Index of 5.5 by 2030, where the JCI is defined as the average of all herd ATVs.**
- **Requiring participating herds to assess their ATV, with a random 60 cow screen being the minimum requirement (30-cow screens will not be accepted).**
- **Monitoring industry progress through the JD Tracker database using ATVs and within-herd prevalence together with the drivers of infection.**
- **Updating the benchmarks within the JD Tracker Tool annually from 31st March 2025 using rolling 3-year averages.**

CURRENT OPERATION OF THE SCHEME

1. The National Johne's Plan has so far run through two phases. Phase I ran from 1st April 2015 to 31st December 2017. Phase II was based around:

    - Farmers determining their risk and disease status and putting in place one of six control strategies recommended by the scheme.

    - Farmers obtaining a signed declaration from a trained BCVA (British Cattle Veterinary Association) Accredited Johne's Veterinary Advisor (BAJVA) that they had:

        - re-assessed their risk and status within the last 12 months and reviewed their Johne's management plan with their BAJVA; and

        - that the necessary management protocols, equipment, husbandry and resources are being implemented to adhere to this plan.

    - Vets obtaining training from the BCVA to qualify themselves to certify farmers.

    - Processors co-funding with the AHDB a Delivery Team that focuses on recruiting members and creating and disseminating information to the industry.

    - Incorporation into Red Tractor standards in October 2019. Under standard AH 1.3 Johne's Disease must be managed through the implementation of the National Johne's Management Plan.

    - Development of the Johne's Tracker report which presents farmers with the history and analysis of their ELISA test results. Key to the report is the calculation of the Average Test Value (ATV) for the individual farm which is a simple average of ELISA titre values of all cows tested, as a proxy for the level of infection on an individual farm.

    - The creation of a National Johne's Tracker Disease Database funded by processors that pulls together the milk ELISA titre data from farms which use the milk ELISA on a quarterly basis and associated milk recording data collected by CIS and NMR.

2. This framework has sought to:

    - Ensure that only properly trained and accredited JD Advisors are permitted to provide the signed declaration

    - Create and maintain a regular dialogue between vets and farmers

    - Include external verification in the implementation of the scheme

    - Provide commercial incentives for all parties to engage, through:

- Purchaser commitment to requiring the involvement of their supplying farmers
- Leaving the provision of veterinary advice to farmers on a commercial basis
- Requiring vets to be trained before being able to verify farmer compliance
- Demonstrating to farmers the commercial benefits of tackling the disease

3. This framework has generated a creditable degree of progress in the management of JD. The median ATV has reduced from 7.6 in 2010 to 5.8 in 2024 in quarterly testing herds.

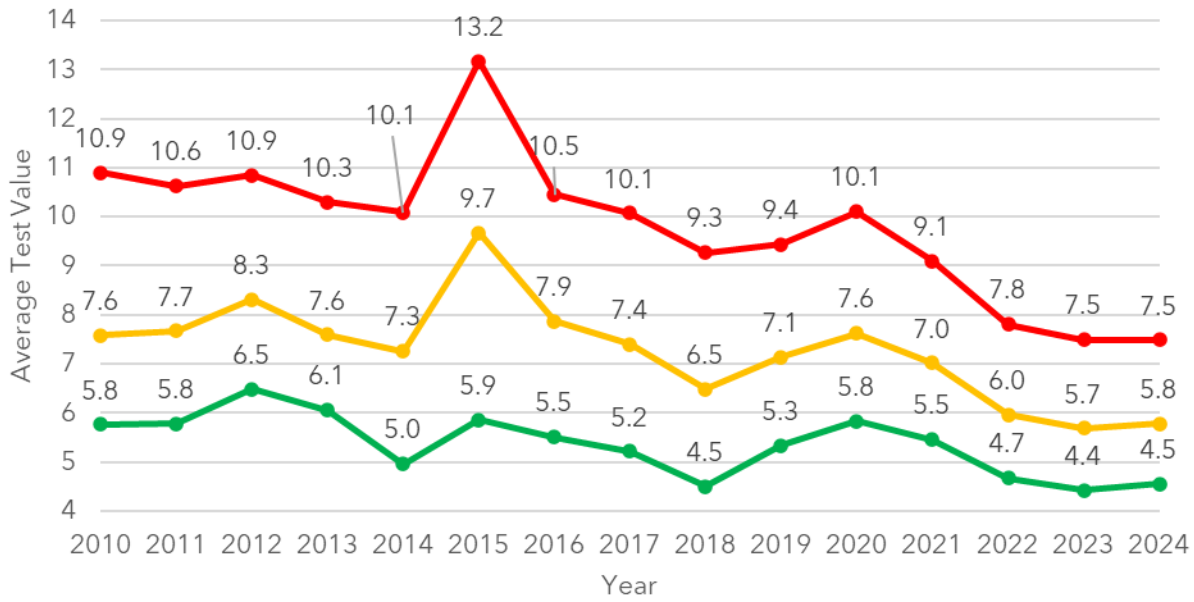

Figure 1. The annual median and quartile values for herd ATVs for JD milk ELISAs carried out during 'whole herd' tests in the National JD Tracker database, by year. Green = quartile 1, orange = median, red = quartile 3. As the popularity of milk ELISA testing has increased, the number of herds included annually varies from 99 herds in 2010 to a peak of 1855 in 2022.

4. The fall in ATV is testament to an enormous investment by committed and responsible dairy farmers to improve the disease status of their herds and protect the reputation of the British dairy industry.

5. The scheme is performing well against its international counterparts. The overall mean prevalence (% of milk ELISA test positive) in herds in the National Johne's Disease Tracker Database is currently 2.7%% (2024 data). Based on a 2016 international review Belgium, Italy and Ireland have a stated prevalence of 1-5% with other countries either unknown or higher. (The prevalence figure should not be taken as a national prevalence figure as the selection is non-random and a large proportion of quarterly herds adopted that control strategy as they had above average prevalence initially).

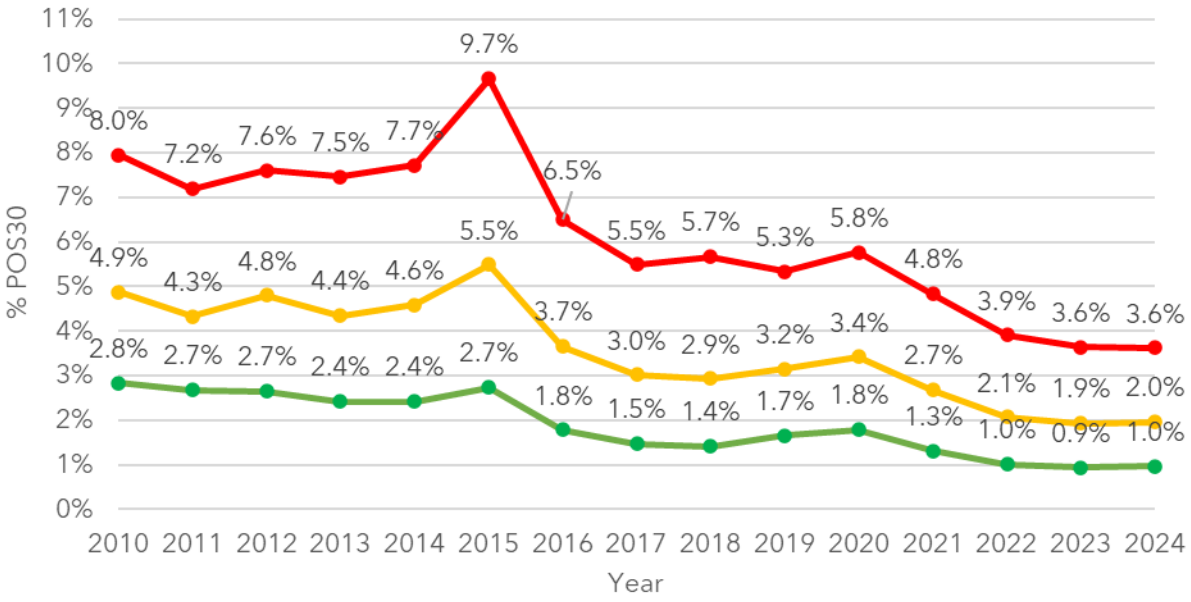

Figure 2. The annual median and quartile values for herd % positive (cut off at 30.0) for JD milk ELISAs carried out during 'whole herd' tests in the National JD Tracker database, by year. Green = quartile 1, orange = median, red = quartile 3.

CHALLENGES

6. There remain significant challenges. Among the quarterly testing herds in the National Johne's Disease Tracker Database there is a considerable disparity between herds in the best quartile of performance (low ATV) compared to those in the worst (high ATV). On average, the herds in the best quartile have an ATV of 3.44 whilst those in the worst quartile are over two and a half times higher at 8.68.

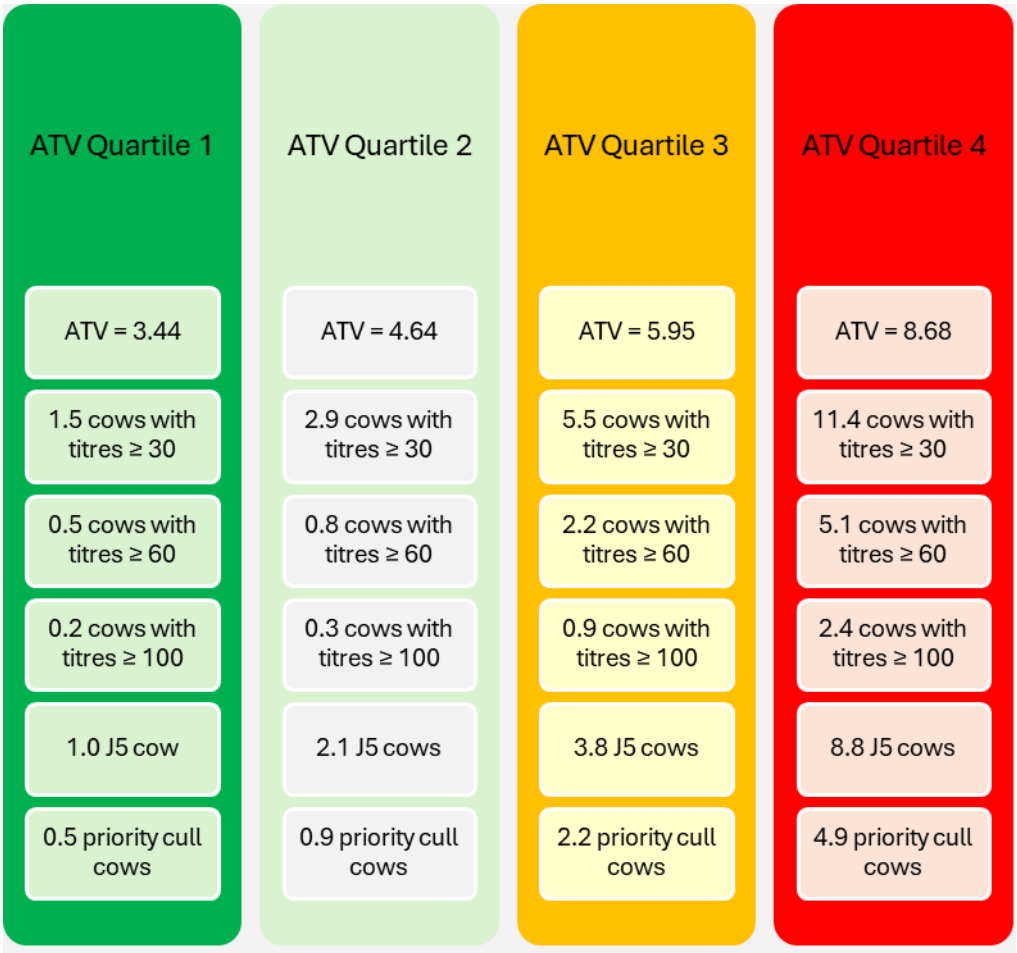

Figure 3. Herd profiles detailing the overall ATV, average expected number of cows with milk ELISA titres >=30, >=60, >=100 and number of J5 and PC cows to be found in a typical 227 cow herd within the best quartile (1), quartile 2, quartile 3 and worst quartile (4) for ATV (2023 data).

7. As a result, these worst quartile herds comprise a significant reservoir of the disease. Given the proportion of high-test positive animals, which will be heavy shedders of MAP within the worst quartile herds, it is likely that over vast majority of MAP challenge (heavy shedding cows, total bacterial load on farm) is within the farms in the worst quartile.

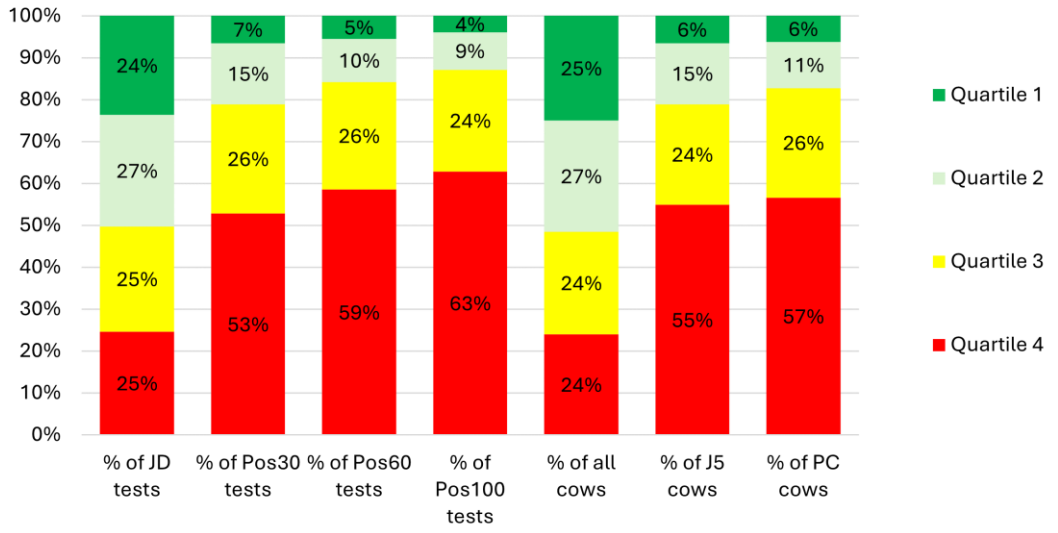

Figure 4. Relative distribution of absolute numbers of positive tests and J5 and PC cows found in the 509 studied herds in 2023, by herds in each ATV quartile.

Parameters shown in figure 4:

- ELISA titre results over 30, 60 and 100
- Percentage of all J4 cows: Last ELISA positive, all previous tests negative
- Percentage of all J5 cows: Repeat ELISA positive (minimum 2 tests)
- Percentage of all PC (priority cull): Either two consecutive tests with results value greater or equal to 60 or one test with result value greater or equal to 100.

8. The reasons why some herds struggle with control are not totally understood. The worst quartile herds may include farmers that have just started controlling the disease and have yet to see an improvement. Other reasons as to why farmers may be struggling to control the disease could be due to attitudes (low level of engagement with their BAJVA, belief, importance) or resources and conflicting priorities. There is also a variation in the degree of processor engagement.

REASONS FOR SEEKING FURTHER PROGRESS

9. There remain compelling reasons to seek further progress in reducing the incidence of Johne's Disease in the British dairy herd.

Industry Reputation

10. In eyes of consumers and stakeholders, the industry's reputation rests on several elements:

Food Safety

- There remains an unresolved scientific debate on the potential link between Johne's Disease in cattle and Crohn's Disease in humans. Currently all food

safety authorities around the world do not regard MAP (the causative bacteria of Johne's Disease) in milk as a food safety hazard. However, if a link is proven, then the industry needs to demonstrate that it has been acting responsibly and has the means to reduce any risk to consumers. There is much debate as to whether MAP exposure is causative or associative in terms of the link to Crohn's disease(https://johnes.org/zoonotic-potential/)

Animal Welfare

- Johne's Disease poses a major obstacle to achieving higher standards of animal welfare, both from its own disease effects and its association with other diseases such as lameness and mastitis. A rising incidence in herds directly impacts on the farmer's ability to remove other animals of high disease risk and this further magnifies the economic and welfare impact.

- Infected herds pose a risk to other herds through the sale of stock, contamination of the environment and herd dispersals.

- The industry has demonstrated that it is possible to reduce the incidence of Johne's Disease. There are compelling economic, industry and societal reasons as to why all herds should engage in effective JD control.

Sustainability

- Sustainability is an industry priority. Sustainability includes economic, social and environmental elements.

- Johne's control contributes to improving the sector's environmental performance, particularly in respect of greenhouse gas emissions. If new JD infections can be prevented this reduces overall cull rates. Furthermore, more productive, longer living animals produce fewer emissions per unit of output.

- Tackling Johne's also contributes to economic sustainability. More productive cows create a more profitable industry. In respect of social sustainability, demonstrating the sector's care for its livestock maintains the sector's social licence to produce.

- The importance of investing in health to improve the sustainability of cattle production in the United Kingdom is demonstrated by research (Capper, J.L. and Williams, P. 2023)

Economic impacts

11. Johne's Disease still causes severe economic impacts on a dairy herd if the disease is allowed to spread. Johne's Disease causes reduced yield in affected animals, greater

associations with other diseases, such as mastitis and cell count, and increased risk of premature culling. If the prevalence of Johne's rises, further consequential losses occur as additional emergency cull rates lead to retention of cows with poorer economic performance and fertility potential. UK based examination of the financial impact of MAP infections reported a total loss of £113 per infected cow, including £61 through milk yield losses and £51 via voluntary culling (Barratt et al., 2018). The economic losses due to indirect impacts in high prevalence herds can drive costs much higher.

12. A study of 385 UK dairy herds showed that Johne's test positive cows were 2x more likely to have a cell count > 200,000 cells/ml and were 2x more likely to have milk yields 25% below their adjusted herd average (Hanks et al., 2013). Johne's Disease costs can rise more than 1-2p/ litre with higher disease incidences and these costs remain for several years until the disease is brought under control. Likewise, the disease was still ranked number one in terms of its impact on national production efficiency in a survey of 794 professionals in the sector and 441 dairy farmers (AHDB, 2021).

International Competitiveness

13. If the British dairy industry is to remain internationally competitive and able to demonstrate to customers in both UK and export markets that it is taking a responsible industry approach, then it needs to proactively tackle the disease. Johne's Disease status is thankfully not currently a trade issue, but it may prove to be at some point in the future.

Antimicrobial Resistance

14. The industry must participate in efforts to reduce antimicrobial resistance. Because of its association with other disease conditions (lameness and mastitis), Johne's is a contributor to antibiotic use on farms. The UK dairy industry fully supports the targets for the reduction in medicine usage developed by RUMA (Responsible Use of Medicines in Agriculture Alliance). Reducing Johne's assists in efforts to reduce antibiotic use on farms and address AMR.

Industry Customers

15. Retailers remain heavily committed to reducing the incidence of Johne's in their aligned supply chains and several retailers have instituted standards that go beyond the existing requirements of the scheme.

Industry Cohesion

16. Progress in tackling Johne's Disease is the result of the sustained effort in time and resources by responsible committed farmers. Their commitment and achievement

will be undermined if the industry disregards underperforming or uncommitted farmers that continue to pose a risk to the industry's reputation.

PHASE III OF THE NJMP

Objective

17. The objective of Phase III is unchanged from the previous two phases of the plan which is to seek to control and reduce the incidence of Johne's Disease. Eradication is not feasible for the foreseeable future. The aim of the NJMP is to provide a framework for effective JD control and management. **The most effective method of control is to prevent youngstock from becoming infected through risk management, hygiene maintenance, segregation of high-risk animals from areas of high transmission risk and the removal of priority culls/ test positive animals.**

18. **Phase III retains the basic architecture of Phase II, of requiring regular farmer/vet dialogue that focuses on risk management and implementation of an appropriate control strategy**, backed up by annual certification, supplemented with the employment of a Delivery Team and the operation of Johne's Tracker database. The new element would be the introduction of a **Johne's Control Index National Aspirational Standard.**

National Aspirational Standard- Johne's Control Index

19. The National Aspirational Standard will be for the British dairy sector to achieve a national **Johne's Control Index (JCI) of 5.5 by 2030**. The national JCI is defined as a simple mean (annual average) of the average test values (ATVs) of all the herds for which data are available. The calculation of an annual value mitigates the effects of seasonal and yield impacts on test results. In practice, the national JCI will be calculated from data stored in the National Johne's Disease Tracker Database. This data is gathered annually through updates of the National Johne's Disease Tracker Database to monitor progress towards the JCI National Aspirational Standard.

20. The JCI National Aspirational Standard would provide a focus for industry efforts to ensure continued progress in reducing prevalence of Johne's Disease in the national dairy herd.

21. Drawing on Johne's Tracker data, the evolution of the national JCI has been:

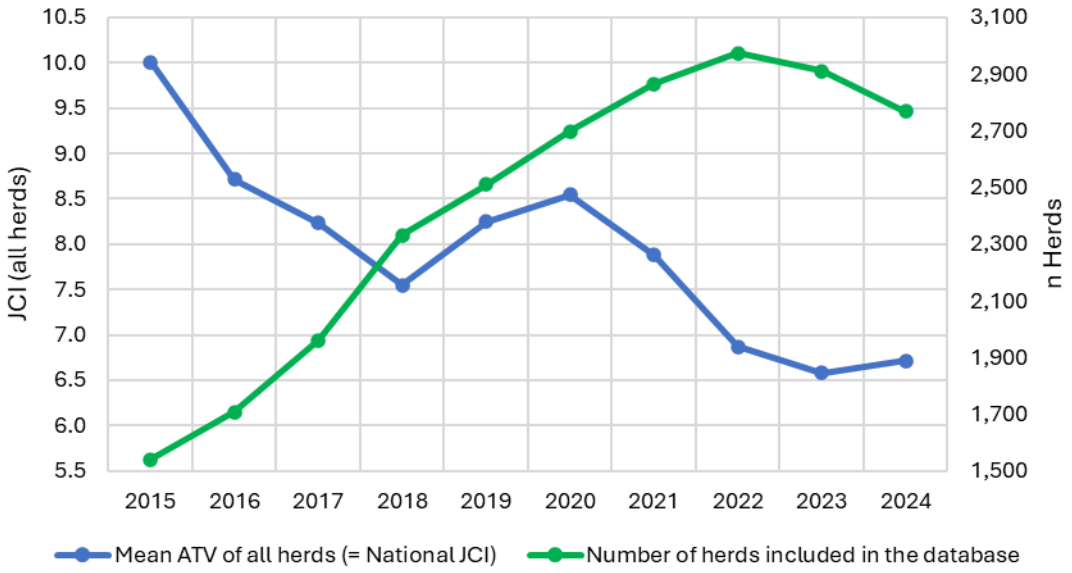

Figure 5. Annual values for the simple average of all herd's milk ELISA average test values (JCI) between 2015 and 2024, based on herds in the National Johne's Disease Tracker Database in each year.

22. The JCI **National Aspirational Standard of 5.5 by 2030** represents an ambitious but achievable aspiration for the industry. Figure 6 demonstrates that many (40.8%) of the herds recorded in the National JD tracker database have already met or exceeded this standard.

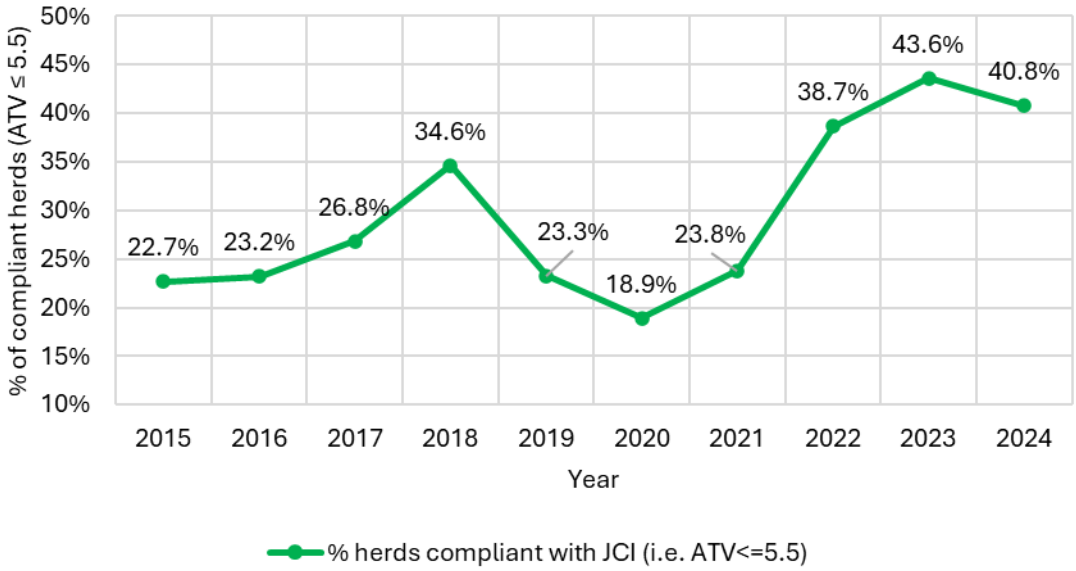

Figure 6. Annual values for the % of all herds compliant with the proposed JCI (i.e. with milk ELISA average test values <=5.5) between 2015 and 2024, based on herds in the National Johne's Disease Tracker Database in each year.

23. The JCI National Aspirational Standard of 5.5 would also provide a benchmark around which individual farmers or groups of farmers, supported by their technical advisers, can compare their performance, and monitor their progress in the control of the

disease. Farmer groups could cover retailer milk pools, clients of milk buyers, vet practices, consultancy companies or any other combination of interested dairy herds.

24. The JCI National Aspirational Standard would be entirely aspirational. It would be intended to help focus continued efforts by the sector to work on Johne's Disease control. **The scheme would not create, operate, or recommend any type of incentive programme based on the JCI National Aspirational Standard, or require members of the NJMP to do so.**

25. Creation of incentive schemes would be an entirely voluntary matter for industry organisations participating in the scheme. Several organisations have already adopted this approach. If organisations wish to go down this road, then the scheme strongly recommends that they do so only after exhaustive dialogue with farmers and vets to ensure that standards and incentives are tailored to the needs of the farmers covered by any scheme.

Monitoring Individual Herds

26. At the annual herd consultation, the BAJVA would be required to compare their Average Test Value with the national JCI standard. Change in Average Test Value from previous years should also be provided where possible. This should form the basis for vet- farmer discussions and the choice of possible options for improved control measures appropriate to that herd.

27. On farms with an Average Test Value higher than the national standard, at least three key substantive actions targeting a sustained reduction in Average Test Value would be agreed during the annual consultation with the BAJVA. The examination of other Johne's Disease parameters would be part of the process in developing these actions. These key actions would be recorded along with appropriate protocols for the farmer to follow. (See Appendix for examples of typical changes)

28. On farms a with an Average Test Value that is already better (lower ATV) than the national standard, the farmer and BAJVA would agree and record any current or new measures that will either maintain or improve their existing control of Johne's Disease.

29. In filling out Johne's Certificates vets would be required to list the three actions identified with the farmer. Dialogue between farmer and vet, including close analysis of the farms Johne's Tracker Report where available, would ensure the resulting recommendations are tailored to the specific circumstances of the farm.

30. The revised annual declaration is attached. As currently required, the farmer would be obliged to share the declaration with their milk purchaser if requested.

31. Improved vet training would be put in place to ensure that veterinary certification is a meaningful exercise that is tailored to the needs of the individual farm.

Obtaining an ATV

32. The requirement for farmers to benchmark their performance against the JCI National Aspirational Standard means that farmers must obtain a reliable average test value for their herd. Many farmers are already undertaking quarterly or annual whole herd testing which provides an average test value (ATV). However, a significant proportion of farmers are not doing so under the control strategies that they have adopted. Therefore obtaining at least an estimate of ATV would result in additional costs being incurred by farmers.

33. Whole herd testing provides the basis of JD surveillance worldwide. Quarterly whole herd testing provides a robust and effective surveillance programme for medium to high prevalence herds as it provides a higher level of sensitivity of identifying high risk animals. Biannual testing is also utilised as a method of testing for control in seasonally calving herds or those with a low prevalence where new infections are minimal (Biosecurity Test and Monitor). Once infection is controlled effectively or the disease is not thought to be present then testing for surveillance needs to be tailored to the farm (60 cow annual random sample, annual whole herd test).

34. **To achieve an estimate of the ATV for purposes of assessing herd performance the minimum testing requirement will be for a minimum of 60 randomly selected cows. Farmer guidance on the practicalities of random sampling has been developed.**

35. Providing a more robust minimum evaluation of a herd's average test value will also facilitate improved risk-based trading of animals between farmers. At the very least, when acquiring cattle, farmers should seek to obtain the ATV of the selling farm combined with a testimony from the farmer as to their levels of risk, animal movements, control and prevalence of JD.

36. **A 30-cow targeted screen is not sufficient or appropriate to determine an individual farmer's ATV as this sample size is neither random nor large enough to be representative of a herd. 30 cow screens, using appropriate targeted selection of animals, can only be used to determine whether Johne's Disease is prevalent in a herd.**

Social Science

37. In developing these proposals, the Action Group on Johne's has been mindful of the social science research that has been undertaken on farmer engagement with Johne's Disease control, particularly the recent research funded by the BBSRC from Cranfield University on Barriers and Drivers of Johne's Control (Morrison et al., 2023,2024). The key challenges identified were expectation management, space, cost benefit of control, free rider problems and the quality of the vet farmer relationship.

38. Increasing efforts to engage the farmers yet to fully take part in the NMP remains a top priority. As a result, there will be renewed emphasis on training vets in 2025 to enable them to optimise farmer engagement and to communicate more effectively

with farmers to help develop a robust practice plan for JD control (Orpin and Sibley 2024).

Investment to maintain the scheme

39. Phase III will not alter the current fee and cost structure of the scheme.

FREQUENTLY ASKED QUESTIONS

Why use the Average Test Value as a measure of JD within a herd?

40. The development of the JD Tracker through co working between the Action Group and PAN Livestock Ltd revealed 4 key outcome measures of JD infection that could be identified readily in milk ELISA tested herds (Orpin et al., 2022). Average Test Value, % positive at three thresholds- test positive (>=30), high test positive (>=60) and very high (>=100). JD is a non-binary disease and is ideally monitored using a continuous variable (ATV) rather than a binary variable (positive vs negative). Unpublished work revealed that in medium/ high prevalence herds, where the test positives were removed, the remaining inconclusive animals still resulted in a higher ATV when compared with low prevalence herds.

41. The ATV is influenced both by the incidence (number of animals testing positive) and the severity of the disease (test values). Herds with higher ATVs will have one or both more test positives and more high-test value, high risk positive animals

42. The annual aggregated ATV is therefore a more useful parameter than simply looking at the % of test positives, which are highly influenced by culling behaviours and do not consider the severity of infection. The focus on the ATV directs the farmer and vets' attention to the key drivers of the disease rather than just relying on varying the intensity of culling alone to control the disease.

What are the key drivers to ATV?

43. The ATV is influenced by the number of test positive animals and the value of the test results.

44. The Johne's Tracker measures 4 specific drivers. The new detection rate (J4%), the prevalence of repeat test positive animals (J5%), relative risk of service of J5 cows and relative risk of cull of J5 cows.

- ***The New Detection Rate (J4%) is strongly correlated with ATV (R^2 =0.7). Experience has shown that controlling the New infection/ New Detection rate is essential by ensuring a robust risk assessment and management plan is in place to prevent youngstock from being infected. This is vital for success. Premature culling is the most costly element of JD control. Preventing animals from being infected in the***

first instance is therefore a key priority and an over reliance on culling as a single control point is to be avoided if sustainable control is intended outcome.

- **Early removal of Priority culls, segregation or culling of test positives** (dependent on strategy, prevalence and replacement numbers) is part of a successful control plan. Culling alone however, whilst leaving new infections unchecked, will not provide a sustainable method of control and the incidence may simply level off rather than decline. The primary purpose of culling is to remove animals before they enter the heavy shedding phase and pose greater challenges to within herd spread. The additional and important benefit is ensuring the affected animals do not develop visible disease and associated welfare impacts

How did we set the Johne's Control Index?

45. The JCI level set at 5.5 will approximate to a test prevalence of around 2%. This is the stage whereupon herds typically may move from Test and Manage to Test and Cull. A prevalence less than 2% is often linked to sustained control with low levels of MAP circulating within the herd and very low risk of Priority Culls and subsequent heavy shedding.

46. The primary objective of the JCI is to provide an industry measure of successful control and to encourage as many herds as possible to achieve this target. This can be compared to similar approaches using Somatic Cell Counts with an agreed industry target which is set and agreed based on what is possible within the industry. Social science studies (Morrison et al., 2024) identified that a fixed target for the industry was preferable to an ever-shifting quartile target or indeed pursuing eradication with all the limitations of the ELISA sensitivity and specificity.

What is the rationale behind the random 60-cow sample to estimate herd ATV?

47. For herds ***NOT*** using a whole herd JD test there are two reasons for estimating the ATV, given that a National Aspirational Standard for the JCI has been set:

    i. To gauge their JD situation relative to the standard and relative to other herds in the National JD database.

    ii. Estimates of ATV in non-whole-herd-testing herds are needed to give an overview of the JD situation in the whole dairy sector.

48. The recommendation is that the estimated ATV should be based on a ***RANDOM*** sample of cows in the herd. Although there are no pre-defined accuracy and precision targets for the sample-based ATV estimate, the relevant statistical considerations were explored using real data from the National JD database to arrive at a recommendation for the size of random sample to be used. In general, a bigger sample will deliver a more precise estimate (with a smaller margin for error), however the precision benefits diminish as sample size is progressively increased. It was found that for a herd size of 250 cows with a true ATV around 5.5, a sample size

of 60 would give a standard error of 0.9 units. This sample size is recommended as a ***pragmatic reasonable compromise***. A sample of 30 is too small and a sample of 100 is likely to be too onerous/costly.

Can the results of a 30-cow screen be used to estimate herd ATV?

49. **No.** The 30 cow screen was designed specifically to identify the presence or absence of JD in a herd, based on sampling cows identified as most likely to test positive. The 60-cow random sample aims to estimate the severity of disease prevalence in the herd (if present). To generate this more detailed information requires more animals to be sampled ***AND*** these ***MUST*** be a true random sample of cows in milk on a test date.

Why did we not set a minimum standard of surveillance at a whole herd screen?

50. At this stage of the programme, we believe that aiming for a more costly (albeit more robust) surveillance strategy of whole herd sampling may tend to disengage the farmers we wanted to engage (those yet to take part fully in the programme). The 30-cow targeted low-cost surveillance method underpinned the success of the Phase I and II of the NJMP.

51. The move to the randomly selected 60 cow sampling method would allow for an estimate of the ATV and allow farmers yet to engage fully with JD control to establish where their herd prevalence was likely to be compared to the JCI at an affordable cost.

52. If the ATV is above the JCI further testing for control and hygiene improvements may be required to reduce the level of within herd spread and prevalence.

At the annual vet review what could the 3 key priorities be within a herd?

53. The aim of the 3 priorities is not to create a management plan with 3 points! The aim is to create key priorities or focus points for the farmer. The statements should be SMART (Specific, Measurable, Achievable, Realistic and Time based). Any of the following statements could include a date, who is going to do the task and reference more detail within the management plan. These could include (but are not limited to):

    - Detailed risk assessment of all potential areas where JD could be spreading within the herd
    - Further training for all the farm staff on JD control
    - Specific areas of the control plan that need attention or focus (identification, segregation)
    - Change of strategy – e.g. Test and Manage to test and cull or breed to terminal sire.
    - Deciding on frequency of vet review of data/farm risks/ management plan

- Refining criteria for culling based on resources and heifer numbers
- Breeding and risk management in newer areas e.g. to reduce the risk of transmission from dam to calf or calf to calf
- etc

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