



THE GLOBAL STANDARD
FOR LIVESTOCK DATA

Network. Guidelines. Certification.

Carryover in the milking parlour and AMS; learning from the past to improve sample quality in the future, and what ICAR can do to help.

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What's the MRSD Sub Committee doing?

- The Measuring, Recording and Sampling Devices (MRSD) Sub Committee, has been asked to review and produce some tangible practical actions, that will enable ICAR to help MRO's on a day to day basis.
- A subgroup consisting of Christian Ammon, Kees de Koning, Rene van der Linde and Justin Frankfort:
 - will be building a survey of ICAR members to then produce a 'best practice' guidelines document to mitigate carryover, that can be used as required
 - Have produced a new statistical model to check carryover in AMS parlour.

What is carryover, and why bother now?

- Carryover can be defined as ‘something that comes from the past’.
- In this case part of a milk sample from a previous animal using the same milking unit – be it from a conventional parlour or AMS.
- Undetected carryover gives distorted results and diminishes the value milk recording brings to the farm business.
- Johne’s and PAG also carry higher risk of misdiagnosis with poor outcomes for the animal as there are smaller carryover margins.

Different tests carry different risks

| Milk component | Service affected | Carry-over risk | Negative outcome (cow dies too soon) |
|----------------|---------------------|-----------------|--------------------------------------|
| Protein | Core milk recording | Low | Low |
| Butterfat | Core milk recording | Medium | Low |
| SCC | Cell count services | Medium | Medium |
| Johne's (MAP) | Johne's services | Medium | Medium |
| BVD | BVD services | Medium | High |
| PAG | Pregnancy services | High | High |

How does carryover affect a farm business?

- False positive test results could:
 - Generate unneeded medical intervention – e.g. antibiotics
 - Cull healthy animals
 - Make milk recorded data less trustworthy
 - Increase management time reviewing data.
- All the above directly affect the farm's bottom line making them less profitable.

How carry over is affected: guidelines, technology & technicians.

- Guidelines for milk recording and sampling
 - Cow ID and representative sample needed.
 - Standard operating procedures, maintenance of equipment.
 - Training of MRO technicians or farmers.
- Effect of technology & technician
 - Get rid of milk left-overs after sampling a cow;
 - Careful sampling, however, some carry-over is inevitable;
 - Capacity vs quality, carry over can be doubled when in hurry.

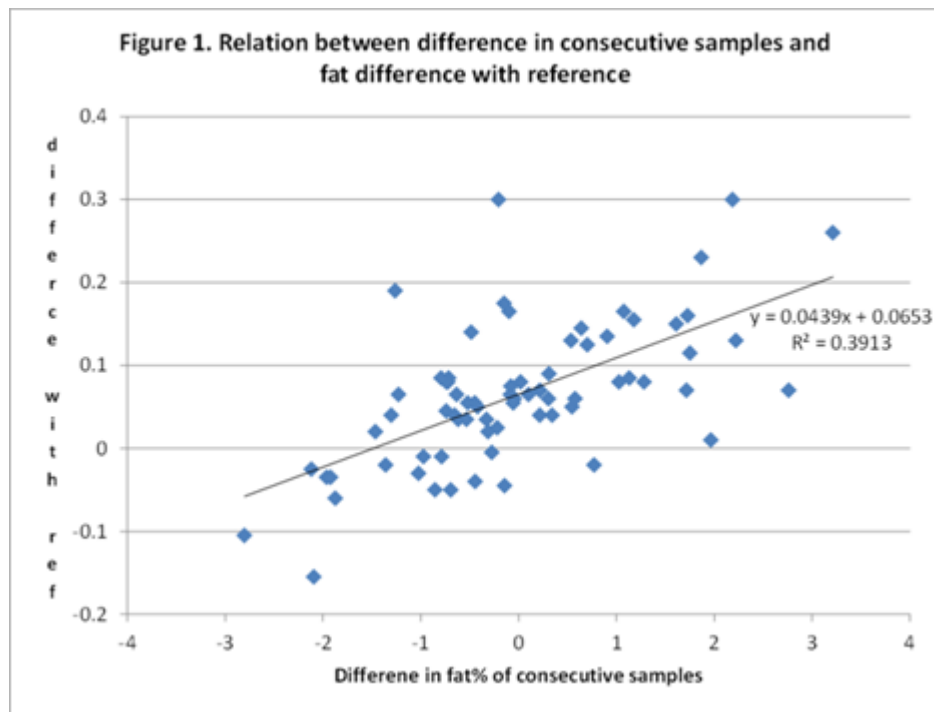
Real world carry over during milk recording

Measuring carry-over by determining Chemical Oxygen Demand (COD), lab testing, yield 12.5 kg and standard milk recording equipment used by MRO technicians (1997)

| | Tru Test Correct sampling | Tru Test 'speedy' sampling | EMM Correct sampling | EMM 'speedy' sampling |
|----------|---------------------------------|----------------------------------|----------------------------|-----------------------------|
| Milking | 0,09% | 0,31% | 0,09% | 0,31% |
| Device | 0,95% | 1,82% | 0,92% | 1,80% |
| Sampling | 0,47% | 0,84% | 1,04% | 1,84% |
| Total | 1,51% | 2,97% | 2,05% | 3,95% |

Carry Over: Effect of previous milking on next sample

- Data of a test in figure 1
- Higher fat in previous milking will result in positive effect, lower fat gives negative effect on next sample,
- Reference milk is collected and ref_sample is compared with device sample (result A),
- Result A is plotted against difference with previous milking (X-axis),



Carryover survey -

- The MRSD SC will be producing a survey to go to the ICAR family, asking for examples of the documentation you use, so that a generic best practice investigation form/SOP can be produced.
- This will improve the quality of samples coming into labs, off farm.
- ICAR's role is to provide toolkits for MRO's so that templates, working practices and error rates by test type can be produced.
- This will elevate the value of ICAR to the dairy industry

The MRSD SC survey will consider:

- Why carryover is important
- How to build in parlour sampling supervision into regular on farm practices.
- How does the in-parlour sampling techniques compare to the ideal?
- Help provide the 'right' questions to ask when looking at meter and sample device maintenance.
- What if carry over cannot be eliminated?
- What are the clues to spotting carryover at a lab level

MRSD survey to consider:

| | Why do farmers want to record/sample | Parlour sampling system | Parlour checked and serviced - date | Staff trained and motivated to sample correctly | Outputs / reports explained and understood |
|--------------------|---|---------------------------|--|---|---|
| DIY Service | Legislation, milk buyer quality requirements | Jars, meters and samplers | Clean, operational and accurate. Annual check / service | Enough people to do a timely job. Do they know why they are sampling? | Where to find the results and then take action |
| Supervised | Legislation, milk buyer requirements, breed society, personal satisfaction | Jars, meters and samplers | Clean, operational and accurate. Annual check / service | MRO's own staff should be motivated to do a good job, but we all have off days. | Customers paying for a milk recorder still need to be shown where the results are |
| AMS | Legislation, milk buyer quality requirements, MRO's can do things the AMS cannot e.g. Johne's testing | Automated | Hopefully | Once trained, usually works well | AMS reports normally suffice |

The survey will ask:

- The largest area of risk for carry over is from within the milking parlour.
- Sample quality can be delivered by:
 - Ensuring plant is installed and maintained to original (ICAR) standards
 - Milk sample and animal identification routines are robust and effective.
 - Recognizing that some parlour sampling systems will not be able to take an accurate sample, how are those results flagged?

Milk sampling training, the soft interface

- Training milk samplers, farm staff or contractors to take a representative milk sample is critical.
- It can be compromised by:
 - Farm staff pressurizing samplers to speed up
 - Not allowing enough time to agitate a jar or meter (10 seconds is a long time)
 - Working with substandard sampling equipment, and not reporting it.
- Everyone needs to know why a representative sample is important, we too often focus on the how.

We all know

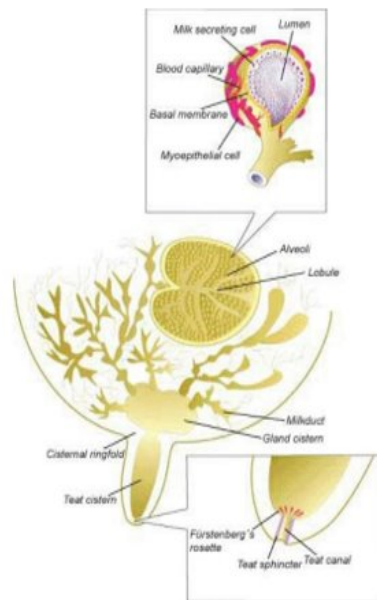
- When a cow is being milked:
 - Low fat milk is released first
 - The high fat milk comes towards the end
 - SCC's are attached to fat globules
 - Milk protein is distributed throughout the milking process
- Good agitation of the milk sample before subsampling therefore ensures the mixing process of the entire milking
- Do the sampling teams know this cow biology? Many will not.

Anatomy of the mammary gland

- Alveolar and cisternal part of udder
- 4 independent 'quarters'
- Milk production in alveoli
- Oxytocin release compresses alveoli cells
- Milk flows to cisternal part
- Milk composition differs during milking
- Well-known link between Fat and SCC
- Need for homogenization before sampling

(Part of ICAR test procedure for MRO measuring & sampling devices)

Internal structure of mammary gland



Survey questions around Milking parlour maintenance

- How does one ask a farmer when was the sampling equipment last serviced? (tone of voice, we are not the police!)
- What questions do you ask – why it's important, you need accurate data to make accurate decisions
- If the farm refuses to get the sampling equipment serviced, do you withdraw or down grade the service, lose income and reputation?

What if there is no positive outcome?

- Do you withdraw or downgrade the service level?
- What is the farm sampling for? Milk processor contacts, pedigree certification etc. – Does it matter?
- Johne's and PAG testing demand high sampling standards
- Flag as 'non authentic' records??

Survey questions around Lab discrepancy reports

- Automation – what do you use?
- Herd average compared to bulk tank results
- How long do you ‘let it ride’ before escalating?

A heads up, we need your help!!

- An on-line survey will be produced and dispatched following this meeting.
- Responses (this means you), will be gathered, reviewed and summarized. -
- A best practice document will be produced by 30th Oct 2024.

Final thoughts - Milk components and why carry over matters. Testing for Johne's as an example.

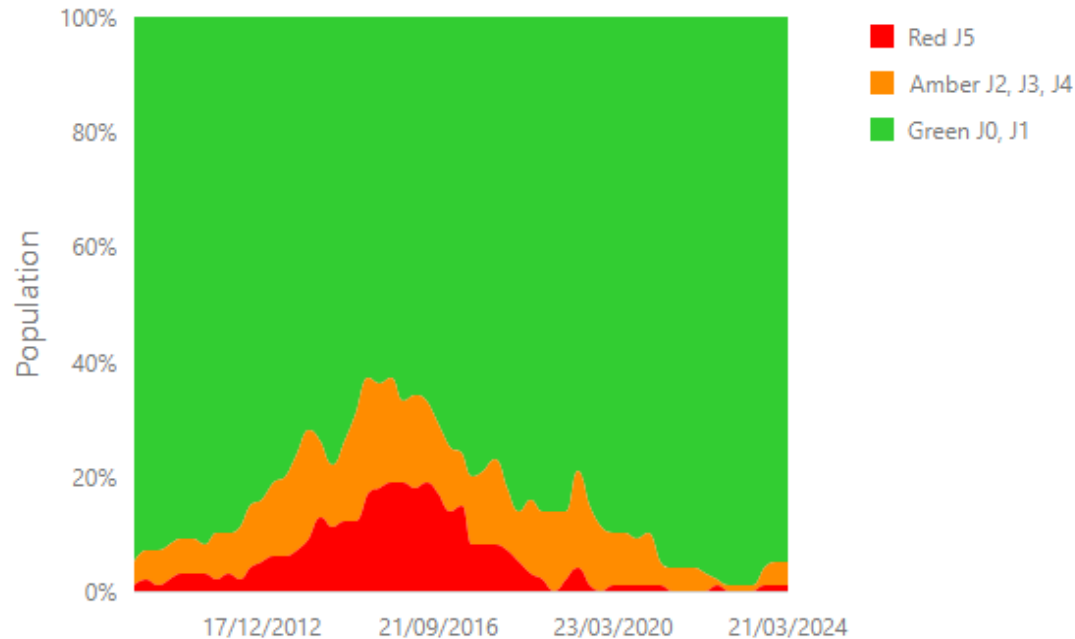
- What is it -an incurable wasting and scouring disease of the dairy cow, acquired at birth, but not detectable through a milk sample until about 4-5 years old.
- Possible links to Crohn's disease in humans.
- Johne's testing in the UK.
 - NMR tests about 150,000 Johne's samples a month, having started about 15 years ago.
 - UK Milk buyers have Johne's testing as one of the criteria of farm assurance.

Johne's and carryover

- We recognised that giving the wrong result to a cow would have terminal conclusions.
- Needed a way of reporting Johne's over a period of time.
- Based on the Danish model, we use a traffic light system over a period of 3 tests built up over a 9 month period.
- It's a case of managing out, rather than culling out straight away.
- Having a good quality sample to test, is the bedrock that all decisions are made

Johne's reporting through NMR.

Johne's Historical Data Percentage



Johne's action list

Herd Details

Field chooser Export Style PDF XLS XLSX CSV

Page 1 of 10 (187 items) << < [1] 2 3 4 5 6 7 8 9 10 > >>

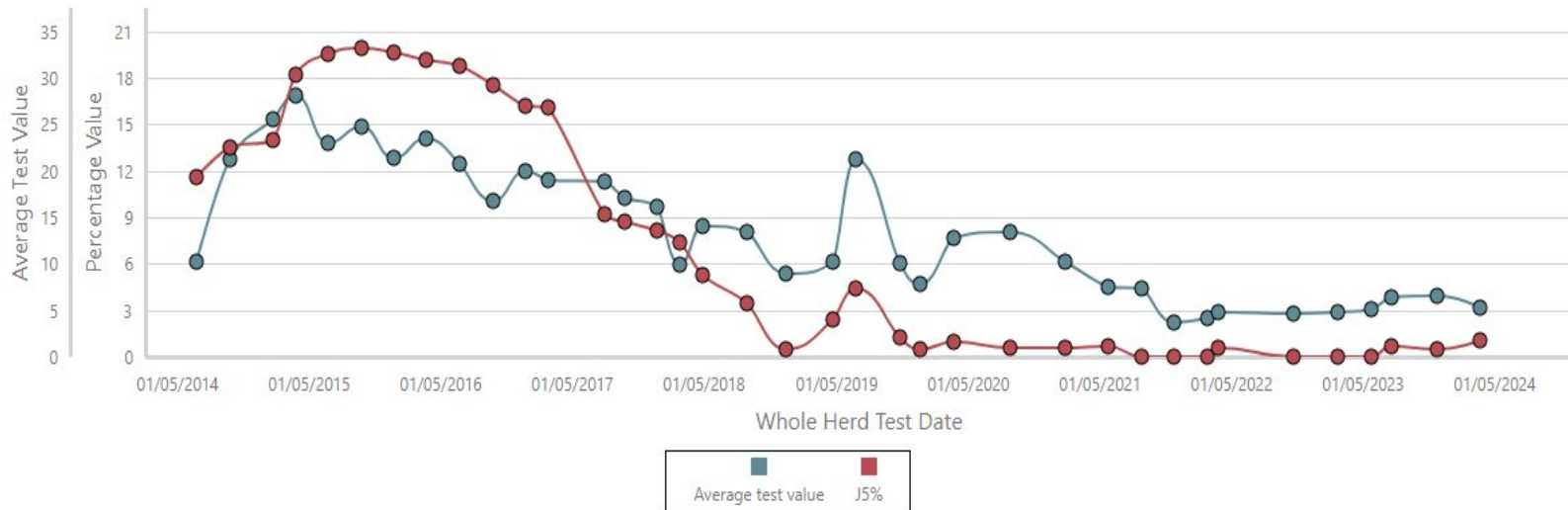
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| Line No | Lactation | Days In Milk | Fertility | Predicted Calving Date | 20/10/2022 | 20/02/2023 | 22/05/2023 | 19/07/2023 | 21/11/2023 | 21/03/2024 | Johne's Code | Comments |
|---------|-----------|--------------|-----------|------------------------|------------|------------|------------|------------|------------|------------|--------------|---------------|
| 5365 | 2 | 187 | Barren | | 26.13 | 24.49 | 43.16 | 44.57 | 49.37 | 133.19 | J5 | Priority Cull |
| 5573 | 1 | 216 | Pregnant | 14/09/2024 | | | | | 56.58 | 47.37 | J5 | |
| 5170 | 3 | 210 | Pregnant | 14/09/2024 | 1.72 | 12.52 | 25.32 | | 25.2 | 31.09 | J4 | |
| 5130 | 3 | 70 | Barren | | 4.05 | 6.31 | 5.78 | 6.32 | 30.09 | 6.99 | J3 | |
| 5388 | 2 | 236 | Open | | 6.61 | 3.99 | 5.61 | | 43.97 | 3.62 | J3 | |
| 39 | 5 | 213 | Barren | | 5.22 | 5.76 | 8.2 | 32.33 | 4.23 | 3.84 | J2 | |
| 59 | 6 | 191 | Barren | | 17.15 | 22.87 | 25.52 | 32.84 | 6.82 | 10.99 | J2 | |
| 153 | 6 | 194 | Barren | | 13.44 | 18.9 | 21.1 | 39.41 | 24.07 | 15.76 | J2 | |
| 4902 | 4 | 191 | Barren | | 1.51 | 16.68 | 8.92 | 48.28 | 11.65 | 5.37 | J2 | |
| 5507 | 1 | 128 | Ready | | | | | | | 7.81 | J1 | |
| 5510 | 1 | 134 | Served | 19/01/2025 | | | | | | 3.3 | J1 | |
| 5518 | 1 | 170 | Open | | | | | | | 0.92 | J1 | |
| 5533 | 1 | 100 | Ready | | | | | | | 2.74 | J1 | |
| 5571 | 1 | 117 | Served | 18/01/2025 | | | | | | 1.32 | J1 | |
| 5572 | 1 | 171 | Served | 25/01/2025 | | | | | | 1.32 | J1 | |
| 5589 | 1 | 195 | Pregnant | 30/11/2024 | | | | | | 2.51 | J1 | |
| 8050 | 1 | 168 | Pregnant | 29/10/2024 | | | | | | 1.16 | J1 | |
| 8052 | 1 | 121 | Ready | | | | | | | 2.51 | J1 | |
| 3 | 7 | 109 | Served | 26/01/2025 | 0.61 | 1.41 | 1.4 | 1.11 | | 0.86 | J0 | |
| 14 | 5 | 74 | Barren | | 10.33 | 13.88 | 12.58 | 14.76 | 22.86 | 13.2 | J0 | |

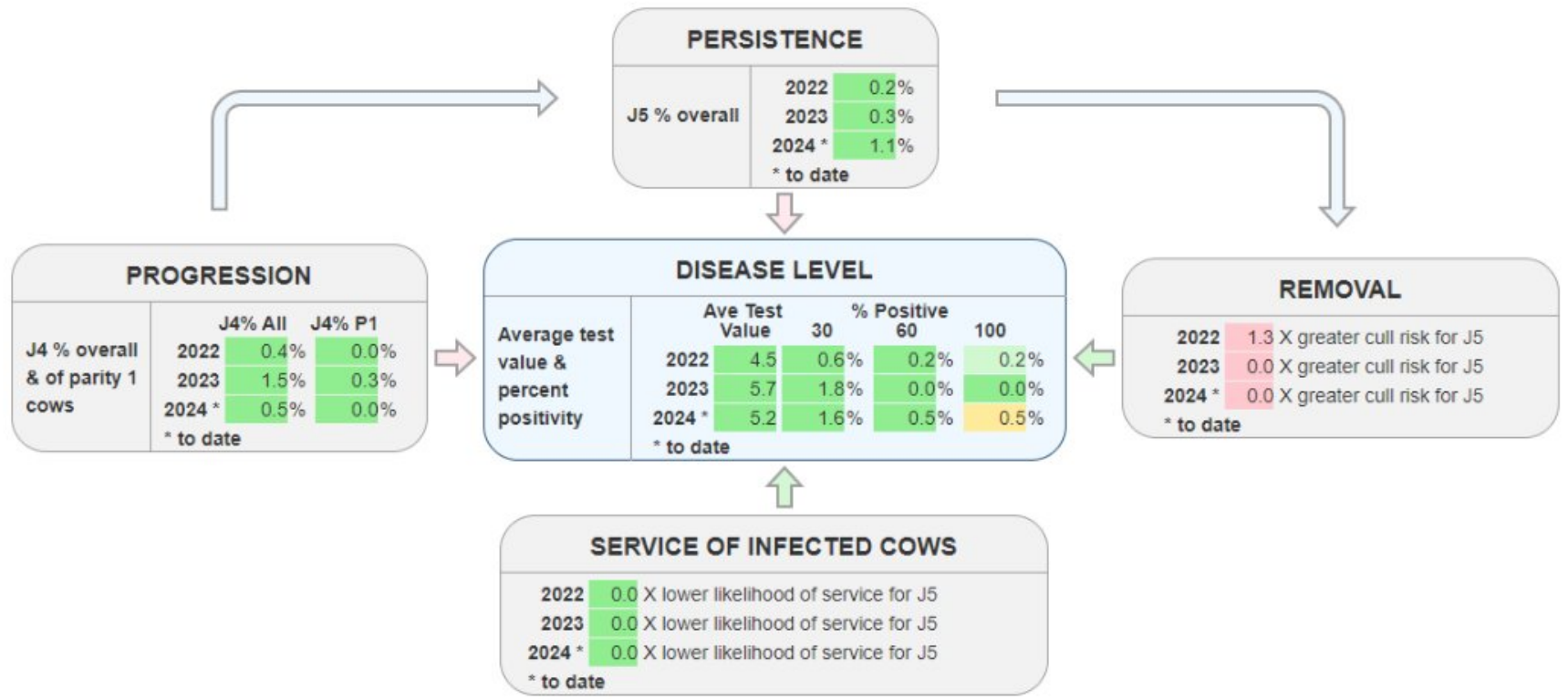
Data that vets like to look at

Average Test Value



Johne's Progress Tracker

[Dashboard](#) | [Summary](#) | [Help and Guidance](#)



The bottom line:

- We would like to understand what other MRO's are doing to reduce carry over and share best practice.
- This will help ensure ICAR remains relevant and useful to the dairy industry.



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Thank you,



Best Practice – Sampling Checklist (might be useful)

1. Before adding a herd to additional testing services, ensure that the technician has carried out a review of sampling equipment and addresses potential areas of carryover contamination
- 2. Verify that cow identification systems have been checked for suitability prior to testing
- 3. Collect samples using an ICAR certified milk meter and ensure that milk sample collection equipment and milking equipment are optimized to reduce carryover
- 4. Dispense samples into clean vials that contain approved preservative
- 5. Mix the sample thoroughly to ensure complete dissolution of preservative in the milk
- 6. Thoroughly drain meter flasks, lines and clusters between samples to reduce carryover contamination
- 7. Follow best practice process for recording of cow IDs and sample identification to ensure correct assignment of results at the laboratory
- 8. Modify result interpretation if appropriate and look for indicators that carryover may be affecting results