Identification of milk samples and linking to the recorded cow

- A challenge to NMR with more and more samples destined for additional disease or pregnancy diagnosis after the traditional milk recording tests.
Background Information NMR

- 5,500 recording customers (47% GB herds)
- Average herd size 157 cows
- Samples collected from farm by tanker.
- NMR transport, 20 vans, 100 collection points daily
- 2 laboratories (Glasgow & Wolverhampton)
- Testing 9.00pm overnight
- 60 milk buyers (100% payment testing GB)
NMR Groups locations
IT systems

- THOR – on farm data collection/processing and web link to NMR database.
- Sample Manager- lab based link to THOR to allow sample racking out checks.
- Lab system- runs the NMR sample testing and data collection.
- HAMSTA- Disease testing management and reporting.
- No pot of money to scrap all systems and start again with bar codes/RFID tags.
Concerns

• More and more samples are destined for additional testing after the traditional Fat, Protein and Somatic Cell Count tests have been completed.

• NMR systems rely on accurate positioning of NMR samples in racks/boxes to match cow with results.
Additional milk sample testing offered to recording farmers

- Johnes disease (Herdwise/ Herd Tracker)
- Bovine Viral Diarrhoea (BVD)
- Leptospirosis
- Infectious Bovine Rhinotracheitis (IBR)
- Pregnancy diagnosis imminent
NMR sample identification
Cow numbers onto sample vials
Sample identification
Sample Manager system
Checking sample position
Samples marked for additional testing
Lids and identities removed
Cows identified by rack position
Why don’t we use a hinged vial?

• Looked into trying to clean the permanent marker off a hinged lid- difficult.
• We could dispose of vials.
• It is more economical and environmentally friendly to wash and reuse vials.
Boxes, racks and vials washed and reused
Preservative liquid added to pots and new lids attached
Manual entry into Hamsta
Rack out into white racks that fit the Tecan Robot sampler
Samples into ELIZA wells on Tecan robot
NML HEALTHCHECK RESULTS

(INDIVIDUAL COW SAMPLES)

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

Analysis methodology: Indirect ELISA using commercial test kit.

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<th>SAMPLE DATE</th>
<th>MAP</th>
<th>% S/P</th>
<th>Category</th>
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</table>

Comments:
† Indicates the tests are within the NML scope of UKAS accreditation.
* These results indicate the disease status of 'Milk' samples tested at the laboratory & taken on the date specified above

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

• We needed to improve the sample identification, increase the confidence that the right sample analysis was going to the right cow, reduce the manual keying errors and link the systems to reduce the staffing requirement.
Labels for disease/ PD samples
Bar code enabled
QR code enabled
Our vision/ reality

• Application of labels to sample pots
  – More robust method of identifying the sample after the pot lid has been removed.
  – Removes the requirement to write cow identities on every sample vial
  – Reminder to the lab technician that additional tests are required on that sample
Automatic population of HAMSTA

- Reduces keying errors
- Reduces staffing requirement to manually enter animal identities
NMR Boxes direct to robot

• Removes the requirement to rack out samples from NMR boxes into separate racks.
Conclusions

- Reduction in discarded samples in error by the combi operators
- Improved sample identification- an additional marker on the pot to confirm cow identity meaning the correct cow gets the correct analysis.
- Reduced keying errors by automatic population of the HAMSTA system.
- Reduced staffing requirement to manually key cow identities into HAMSTA.
- Use of the NMR box on the sampling robot means no need to rack out samples into different racks
- Set up to introduce automation using bar coded labels in the future
• Video of capper machine at the end of the presentation.