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MEAT & LIVESTOCK AUSTRALIA

AUSTRALIAN Pork

Health 4 Wealth: Red meat pilot trials

Final Report
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Commercial-in-Confidence

Acknowledgements

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Other Health 4 Wealth project partners were Agriculture Victoria and the South Australian Research and Development Institute.

MLA acknowledges the contribution of the eight red meat processing plants who participated in the Health 4 Wealth red meat pilot trials.

Executive Summary

The project, "Enhancing supply chain profitability through reporting and utilisation of peri-mortem information for livestock producers" Health 4 Wealth) is one of the 17 projects that received funding under Round 2 of the Rural Research and Development for Profit Program.

The Health 4 Wealth Project was conducted over four years (July 2016 – June 2020) and aimed to develop standards for the consistent reporting, recording and analysis of disease-related peri-mortem information for use by producers, processors, regulators and other key stakeholders. Whilst many meat processing recording systems are already in place, data collection on disease-related carcase and offal condemnations and feedback of this information to producers varies considerably. The Health 4 Wealth project aimed to introduce a standardised and comprehensive approach to data collection of disease-related carcase and offal condemnations and feedback to producers. This will allow producers to monitor disease prevalence in their livestock and make informed decisions to maximise yield outcomes.

This report describes the red meat pilot trials conducted in eight red meat processing plants as part of Activity viii of the Health 4 Wealth project.

The purpose of the red meat pilot trials was to enhance the utilisation and sharing of disease and defect data for the benefit of the red meat supply chain. The pilot trials tested the capture and collection of disease and defect data during processing and provided feedback to producers through either Livestock Data Link (LDL) or alternative feedback system chosen by the participating company.

LDL is an online application that facilitates improved information sharing in the supply chain between processors and their producers with the aim of optimising supply chain performance.

Livestock Data Link (LDL) is an online program that enables the timely sharing of carcase and animal disease information between processors and their producers with the aim of optimising supply chain performance.

LDL links carcase data from the National Livestock Identification System (NLIS), Meat Standards Australia (MSA) and the central Animal Health databases with analytical tools, benchmarking reports and the Solutions to Feedback library.

Producers can use LDL to understand why their consignment did or did not comply with market requirements, including carcase compliance and animal health issues.

The objectives of the red meat pilot trials were to:

1. Demonstrate that individual and lot-based animal health data can be effectively and efficiently transferred to producers
2. Demonstrate that animal health data can be correlated to an individual animal where individual ID is present
3. Provide animal health and disease inspection information to red meat producers to assist them in making better informed decisions regarding on-farm practices to improve livestock/carcase performance
4. Provide learnings and recommendations that can be incorporated into the wider Health 4 Wealth project.

5. Provide recommendations that can be incorporate into the NLIS and LDL project plan to develop these systems capability in the animal health area if the proof of concept was successful.

ISC-MLA, in collaboration with APL, developed a set of key activities that were required to be completed under the red meat pilot trials. These included:

1. Recruitment of processors.
2. Data standards development.
3. Reviewing and updating existing plant systems to enable standardised defect and diseases to be recorded.
4. Designing new and/or upgrading existing producer reporting systems through LDL or a third-party system that the participating processor chose to use. Designing and building the required reporting functionality in LDL or a third-party system.
5. Identifying infrastructure and hardware required, including the preliminary data collection method to be used for the trial i.e., iPad, touch screen terminals, voice recognition. Develop app or web-based system to collect data.
6. Training of meat inspectors.
7. Validating that the data being collected is correct (Data validation).
8. Processor soft launch of animal health information within their supply chains.
9. Review of the pilot trial.

The project has demonstrated proof-of-concept that individual carcase disease and defect data can be effectively and efficiently transferred from beef abattoirs to producers through existing industry infrastructure such as LDL and NLIS and/or through company owned proprietary feedback systems.

Most of the beef plants that participated in the pilot trials already had IT systems in place to collect disease and defect data on the slaughter floor. Only minor amendments were required to align to the draft *Australian National Standard for the Development, Collection and Reporting of Animal Health Data* and enable data to upload to LDL or back through the business supply chain in the case of vertically integrated companies with company owned and operated feedlots. One plant developed and implemented a proprietary feedback system that allowed them to provide feedback to their feedlot as well their producer suppliers.

Software system vendors played a vital role in the red meat pilot trials as they were required to embed the draft *Australian National Standard for the Development, Collection and Reporting of Animal Health Data* into their systems. Significant development was required by the vendors to incorporate the standards into their kill floor systems to enable plants to collect post-mortem data in a consistent way.

Software vendors will continue to play an important role in the adoption of the *Australian National Standard for the Development, Collection and Reporting of Animal Health Data* within their systems.

Some plants found the most difficult part of amending their existing systems was the formatting of the animal health data file for export to MLA. In addition, one plant was off-line for several months after their software provider updated the animal health data file before matching changes were made in LDL. This highlights the importance of ease of integration at all levels, including the slaughter floor, plant IT systems and LDL. This is important to facilitate uptake of animal disease and defect data collection and feedback by other plants.

In addition, the processor reporting functions within LDL need to be improved to allow processors to download and manipulate data more easily.

The project was not able to demonstrate proof-of-concept that individual or lot-based carcase disease and defect data can be effectively and efficiently transferred from small stock abattoirs to producers through existing industry infrastructure such as LDL and NLIS, or through company owned proprietary feedback systems.

The pilot trial at one sheep abattoir identified many challenges associated with a standardised and comprehensive approach to individual disease-related carcase and offal condemnations and feedback from sheep processors to producers. These ranged from IT systems to changes in the process on the slaughter floor to hardware issues.

Despite this, the plant attempting to demonstrate this concluded that the proposed objectives of the *Health 4 Wealth* project were robust. A system to record individual carcase disease and defects was implemented within the plant, although with challenges. An assigned staff member to consistently drive the project was important for this success. In addition, a clear vision of how the data will be distributed and used is extremely important to ensure there is patience and a commitment to ensuring success.

At the remaining small stock plants, significant cost savings were achieved in moving from paper-based to electronic recording and reporting systems of lot-based disease and defect data, which should not be overlooked.

In addition, a potentially significant benefit from the electronic collection and analysis of animal health data from rangeland goat production systems is the ability to conduct a targeted "Animal Health Audit" on a regular and national basis. The results from these audits could be used to quantify and prioritise investment in education and mitigation programs. This means that while animal health feedback to rangeland goat producers may not be feasible, significant benefits to this important industry can be achieved by the electronic capture and analysis of animal health information on a lot/mob basis.

The *Health 4 Wealth* project and the red meat pilot trials required the meat inspection team at participating abattoirs to take on a new role in identification and recording of animal disease and defect data.

As part of the red meat pilot trials, MLA worked with plants that used different meat inspection services, including Government Inspectors, company-employed Inspectors and Inspectors provided by third-party companies.

Plants that included their meat inspection team early in the project at the design phase were more successful in getting buy in to the project. The plants that did not do this found it challenging to engage the meat inspection team.

Improved engagement with government bodies is an objective that could be considered in further projects on animal disease and defect data collection in processing plants. Some plants found the most difficult part of the project was attempting to engage DAWR inspectors possibly because they did not engage their meat inspection team in the design phase of the project.

It also became evident during the pilot studies that the DAWR inspectors did not value the disease and defect training available through the project provided by MINTRAC. A possible explanation for

this could be that MINTRAC is not usually involved in delivering training to DAWR inspectors. Future projects could investigate preferred training options for DAWR inspectors.

Further engagement with DAWR to encourage a 'top down' approach may also create greater involvement and commitment from inspectors and on-plant Veterinarians at a plant level.

The beef plants involved in the pilot trials all believe that it helps industry to know the disease and defects in the Australian beef herd. Collecting animal disease and defect data sheds light on geographic distribution of disease, highlighting problems at a regional level. This allows individual farm treatment, management, and control programs to be developed, thereby maximising yield outcomes.

All beef producers who participated in the soft launch for carcase and disease data feedback and associated online feedback surveys indicated that they would use the animal disease report within LDL to track progress towards controlling or eliminating a disease within their herd. Most indicated that, with this information, they would be more likely to consult with an animal health professional for advice on reducing and eradicating disease within their herds. This finding provides further evidence to support the aim of the *Health 4 Wealth* project to introduce a standardised and comprehensive approach to data collection of disease-related carcase and offal condemnations and feedback to producers, thereby allowing producers to monitor disease prevalence in their livestock and make informed decisions to maximise yield outcomes.

Table of Contents

Acknowledgements **2**

Executive Summary **3**

1. Background to Research **9**

1.1 Health 4 Wealth *9*

1.2 Livestock Data Link *10*

2. Objectives of the Research Project **11**

3. Research Methodology **12**

4. Results **14**

5.1 Recruitment of processors *14*

5.2 Standardize recording of agreed conditions *14*

5.3 Review current state against the draft Australian National Standard for the Development, Collection and Reporting of Animal Health Data *16*

5.4 Review and update existing plant systems *17*

5.5 Design and/or upgrade producer reporting systems *18*

5.6 Identification of infrastructure and hardware required *20*

5.7 Data Validation *21*

5.8 Training of meat inspectors *22*

5.9 Launch of animal health information within the supply chain *23*

5.10 Review of the pilot trial *23*

5. Discussion **24**

6. Future Research and Recommendations **27**

7. Appendix 1: Health 4 Wealth Pilot Trial Checklist **29**

8. Appendix 2: Individual plant case studies **31**

List of Figures

Figure 1: Livestock Data Link beef disease and defect producer report example 18

Figure 2: Livestock Data Link Solutions to Feedback library – Liver Fluke 19

Figure 3 – Livestock Data Link animal disease and defect report (NSHMP data) 20

1. Background to Research

Health 4 Wealth

The Australian Government's Rural Research and Development for Profit Program is a $200 million competitive research initiative with funding available over eight financial years (2014-22). The objective of the program is to realise productivity and profitability improvements for primary producers by:

a) generating knowledge, technologies, products or processes that benefit primary producers

b) strengthening pathways to extend the results of rural R&D, including understanding the barriers to adoption

c) establishing and fostering industry and research collaborations that form the basis for ongoing innovation and growth of Australian agriculture.

The project, "Enhancing supply chain profitability through reporting and utilization of peri-mortem information for livestock producers" Health 4 Wealth) is one of the seventeen projects that received funding under Round 2 of the Rural Research and Development for Profit Program. The Health 4 Wealth Project is a partnership between APL, MLA, AMPC, DEDJTR and SARDI.

The Health 4 Wealth Project was conducted over four years (July 2016 – June 2020) and aimed to develop standards for the consistent reporting, recording and analysis of disease-related peri-mortem information for use by producers, processors, regulators and other key stakeholders. A national approach to reporting this information will contribute to streamlining investments in systems that are commonly used in abattoirs, such as processing automation, accreditation and certification, and slaughter floor design.

Whilst many meat processing recording systems are already in place, data collection on disease-related carcase and offal condemnations and feedback of this information to producers varies considerably. The Health 4 Wealth project aimed to introduce a standardised and comprehensive approach to data collection of disease-related carcase and offal condemnations and feedback to producers. This will allow producers to monitor disease prevalence in their livestock and make informed decisions to maximise yield outcomes. A standardised approach may also provide the quantitative data to support on-going risk assessments of inspection procedures for diseases with pathognomonic post-mortem changes.

The Health 4 Wealth Project included eight Activities, each with its own outputs and KPIs:

i) Project Initiation Activities

ii) Project Planning and Management Activities

iii) Communication and Extension Activities

iv) Business Case Activities

v) Standards Activities

vi) Business Information Storage and Analysis Activities

vii) Software Activities

viii) Pilot Trial Activities

This report describes the red meat pilot trials conducted in eight red meat processing plants as part of Activity viii of the Health 4 Wealth project.

The purpose of the red meat pilot trials was to enhance the utilisation and sharing of disease and defect data for the benefit of the red meat supply chain. The pilot trials tested the capture and collection of disease and defect data during processing and provided feedback to producers through either Livestock Data Link (LDL) or alternative system chosen by the participating company.

Livestock Data Link

Livestock Data Link (LDL) is an online program that enables the timely sharing of carcase and animal disease information between processors and their producers with the aim of optimising supply chain performance.

LDL links carcase data from the National Livestock Identification System (NLIS), Meat Standards Australia (MSA) and the central Animal Health databases with analytical tools, benchmarking reports and the Solutions to Feedback library.

Producers can use LDL to understand why their consignment did or did not comply with market requirements, including carcase compliance and animal health issues.

Non-compliance with market specifications is estimated to cost the beef industry an estimated $127-$163 million per annum across four key markets. This includes value lost due to:

- downgrades (discounts) for out of specification carcases ($51 million per annum)
- carcase condemns ($64 million per annum)
- loss of meat and offal value due to animal health and disease ($12 – 49 million per annum).

Similarly, the Australian lamb industry has a potential cost of non-compliance to market specification in an excess of $8.4 million per annum across two major markets.

In addition, it is estimated that over $110 million is lost annually on 10 diseases/conditions in the small stock (sheep, lambs, and goats) industries. This equates to an average annual cost of just over $11 million per disease. The burden of cost varies by disease/condition, but overall, the on-farm sector bears 86% of the cost.

To find out more information about the Livestock Data Link program please go to Livestock Data Link (LDL) | Integrity Systems.

2. Objectives of the Research Project

The objectives of the project were to:

1. Demonstrate that individual and lot-based animal health data can be effectively and efficiently transferred to producers
2. Demonstrate that animal health data can be correlated to an individual animal where individual ID is present
3. Provide animal health and disease inspection information to red meat producers to assist them in making better informed decisions regarding on-farm practices to improve livestock/carcase performance
4. Provide learnings and recommendations that can be incorporated into the wider Health 4 Wealth project.
5. Provide recommendations that can be incorporated into the NLIS and LDL project plan to develop these systems capability in the animal health area if the proof of concept was successful.

3. Research Methodology

MLA, in collaboration with APL, developed a set of key activities that were required to be completed under the red meat pilot trials. These included:

1. Recruitment of processors

- Finalising the contract agreements for the three processor companies involved in the LDL animal health direct upload pilot already underway at MLA.
- Circulating an expression of interest for the red meat trials to additional processors. MLA directly targeted some red meat processors that had already started the conversation with as they were interested/engaged in Animal Health monitoring.

2. Data standards development.

- Agreeing on the critical animal health conditions to be included in the trial. A minimum of four-six conditions were to be included for a viable sample.
- Reviewing current processor data collection systems against the draft *Australian National Standard for the Development, Collection and Reporting of Animal Health Data.*

3. Reviewing and updating existing plant systems to enable standardised defect and diseases to be recorded.

- Systems for head and carcase data collection, as well as current viscera disease and defect data collection
- Develop disease and defect lists to determine and build a process for importing disease and defect standard
- Map the draft *Australian National Standard for the Development, Collection and Reporting of Animal Health Data* standards to existing company-based disease and defect codes
- Collect and export the disease and defect data to the proposed data set
- Automatically email the export CSV files to one or more nominated email addresses based on the operator
- Test and deploy software changes. This included testing and deploying the link between the software program and any third party i.e. NLIS.

4. Designing new and/or upgrading existing producer reporting systems through LDL or a third-party system that the participating processor chose to use. Designing and building the required reporting functionality in LDL or s third-party system.

5. Identifying infrastructure and hardware required, including the preliminary data collection method to be used for the trial i.e. iPad, touch screen terminals, voice recognition. Develop app or web-based system to collect data.

6. Training of meat inspectors.

- Implementing a training system that allowed for familiarisation of the system and assessment of the meat inspectors against the chain speed and time available for them to enter the data (e.g., MINTRAC unit of competency).
- Developing a draft work instruction, on the line demonstration and implementation of the system.
- Conducting a data collection trial to validate that the meat inspector has enough time to collect the data and that their duties are not compromised.

7. Validating that the data being collected is correct (Data validation).

- Analysing animal health and disease data to identify any data inaccuracy issues and resolve them.
- Monitoring and assessing the performance of data collected at the different points of the chain.

8. Processor soft launch of animal health information within their supply chains.

- Soft launching to a selected group of producers through either LDL platform or the company's selected feedback system.
- Presenting and demonstrating the animal health and disease component to a selected group of producers.

9. Review of the pilot trial.

- Reviewing each pilot trial after the systems had been operating for a minimum of three months in each plant. The review included incorporation of necessary changes.
- Seeking feedback on effectiveness of the animal health feedback system from producers and processors.
- Collating and providing feedback on the usability and functionality of the producer disease reporting interface.
- Conducting key producer interviews to seek feedback on effectiveness of the animal health feedback system and providing this feedback to MLA.

4. Results

Recruitment of processors

Eight red meat abattoirs were selected for inclusion in the red meat pilot trials, including beef, sheep, and goat processing companies.

In the initial development of the pilot trials, a Health 4 Wealth checklist was formulated to ensure all companies involved in the trials included key components of work to be completed. Please refer to Appendix 1 for the Health 4 Wealth trials checklist.

An expression of interest was circulated to potential processing companies to be involved in the Health 4 Wealth red meat pilot trials. MLA received 10 applications from companies to be involved in these trials. MLA then evaluated each of applications against the following criteria:

- Species, to ensure both beef and small stock were represented
- Inspection service provider
- Software provider
- Chain speed
- Individual ID of carcases through the plant
- Feedback system - Livestock Data Link and/or alternative system chosen by the company
- State/geographical region
- Client
- Cost
- Covered the key components of the Health 4 Wealth trial checklist.

Of the 10 applications, seven companies were selected to be part of the trials and were contracted to MLA. The companies that participated in the red meat pilot trials were:

- Australian County Choice Processing (ACC)
- Bindaree Beef
- Gundagai Meat Processors (GMP)
- JBS Brooklyn (Beef only)
- Meat Inspectors (at two of their processor clients covering beef, sheep and lamb, and goats)
- Northern Co-operative Meat Company (NCMC)
- Wingham Beef Exports (WBE)

The red meat pilot trials with these companies commenced in February and March 2019.

Standardise recording of agreed conditions

i) Beef Plants

A data analysis was completed on sample data files that were provided by LDL plants to identify the top disease conditions across the three sites. The analysis identified eight key conditions:

- Kidney Nephritis
- Kidney Retention cysts
- Liver abscesses
- Liver Fluke

- Liver hydatids
- Lung hydatids
- Lung pathology
- Lung Pneumonia

Defects such as contamination and others were not included in the analysis since producers cannot do anything about this issue; therefore, this data should not be included as feedback to producers. From a processor perspective, all condemnation reasons are important due to analysis of yield loss and providing this information to them would be useful.

A teleconference was held with key processing companies to discuss and agree on the top conditions for the red meat pilot trials. It was agreed that the five disease conditions for the pilot would be:

- Hydatids
- Liver abscess
- Liver Fluke
- Nephritis
- Pneumonia

It was also agreed once the companies were comfortable with collecting these five conditions, they would start to add on additional conditions that were a priority for their supply chain.

One beef plant decided to release all the post-mortem data as it was mainly going back to their feedlot. However, they did note that they would reconsider what disease conditions would go to direct consignment producers in the future as certain conditions are processing related.

ii) Small Stock Plants

One of the sheep abattoirs completed an initial analysis on the data collected through the National Sheep Health Monitoring Project (NSHMP) to identify the top conditions to focus on for the trial. A phased approach was decided upon, where a small number of conditions would be captured initially on an individual carcase basis and expanded over time. This approach was to ensure the meat inspectors were not overwhelmed with too many tasks and able to collect the data. The four conditions included in the data pilot were:

- Nephritis
- *Cysticercus tenuicollis* (bladder worm)
- Pleurisy
- Arthritis

For the other two plants, there had been no significant recording of disease and defect data prior to the pilot study so an initial data analysis could not be completed to identify the key conditions. The pilot studies in these two plants focussed on mob based (lot) rather than individual carcase data.

The meat inspection service undertaking the pilot studies at these two plants worked with the Quality Assurance teams at the plants to determine the agreed list of conditions to be included in the pilot. One plant decided to focus on six disease conditions for the pilot. The other plant had significant number of conditions on the list and the meat inspectors were concerned that the team might not have enough time to collect this data and could impact on their ability to maintain the quality of inspection. It was agreed that once the pilot was underway, they would re-evaluate the list to ensure it was feasible.

Review current state against the draft Australian National Standard for the Development, Collection and Reporting of Animal Health Data

i) Beef Plants

Most of the beef plants involved in the project were already collecting information on condemns or partial condemn carcases and offal but this was in a form for internal purposes to measure daily yields, not from a producer feedback perspective. The plants assessed their current systems against the draft *Australian National Standard for the Development, Collection and Reporting of Animal Health Data* to identify any differences. Any difference in the reporting were resolved to ensure that all data was collected in a consistent way. However, for a couple of the sites it was the first time they were electronically capturing disease and defect data, so they needed to build these data standards into their software system.

Any changes or gaps in the draft *Australian National Standard for the Development, Collection and Reporting of Animal Health Data* were noted. For example, it was noted that for a small number of disease attributes (e.g., Hydatids, Cysts, *Cysticercus bovis*), confirmation may require pathological assessment.

Software system vendors played a vital role in the pilots as they were required to embed the draft *Australian National Standard for the Development, Collection and Reporting of Animal Health Data* into their systems. Significant development was required by the vendors to incorporate the standards into their kill floor systems to enable plants to collect post-mortem data in a consistent way. A mapping exercise was required for the conditions listed on the touch screen terminal buttons to link to the draft *Australian National Standard for the Development, Collection and Reporting of Animal Health Data*. For processors not involved in the H4W trials, software vendors will continue to play an important role in the adoption of the standard within their systems.

ii) Small Stock Plants

The red meat pilot studies were the first attempt at individual disease and condition data capture in a small stock species plant. The draft *Australian National Standards for the Development, Collection and Reporting of Animal Health Data* is only applicable to small stock plants that are capturing individual data, not mob-based data.

Overall, the red meat pilot studies have identified several potential improvements to the draft *Australian National Standard for the Development, Collection and Reporting of Animal Health Data*:

- In the draft data standard, there is supply chain code and suffix to identify where on the kill floor and body location the condition was found. For example, Pneumonia is found in the lungs, the supply chain code and suffix would be 32211204 Processing Slaughter Floor/Viscera/Lungs. It was recommended the supply chain code and suffix be expanded to include the middle section of the animal. This is because the fore and hind quarter do not include this section, and there can be occurrences where the rib cage is removed due to a disease or defect.
- Left and right sides are available for particular disease and defects but not all i.e. broken ribs or inoculations. It is recommended that forequarter and hindquarter are included as they are more relevant to sheep carcases. This is due to sheep carcases not being split into sides like beef carcases.

- Trim severity in general could be added for other defects and diseases. Did the operator trim the carcase or was part of the carcase removed? This becomes important when thinking about the cost of disease and defects to the producer, and for providing information up the supply chain to the boning room.
- Recording whether broken ribs are calcified or fresh is another important piece of information.
- Several disease and defect conditions observed in small stock are not currently listed as attributes, i.e. Sheep measles, Cheesy gland, Bladder worm and dog bites. These should be considered for inclusion.
- Attribute sequence number 19- 'Wound' is not considered specific enough.

Review and update existing plant systems

i) Beef plants

All beef plants were able to amend their kill floor systems to embed the draft *Australian National Standard for the Development, Collection and Reporting of Animal Health Data* into their software systems. This was achieved by providing an animal disease and defect specification file to software vendors to amend and/or build this functionality into their kill floor systems. These specifications enabled the plants and/or their software vendor to align their system to the draft standard and to create a CSV file to either upload to LDL or alternative system chosen by the company.

The three plants using LDL as their feedback mechanism were able to build the upload requirements into their systems to enable the disease and defect data to be collected and transferred to LDL. Only some minor software development and improvements of data collection were required to enable the capture of this data.

All plants using LDL plants as the feedback mechanism were able to successfully upload disease and defect data into the system. If any files contained incorrect information an email notification was sent to the plant to let them know the basis and source of the error. The development of the animal disease ingestion pipeline for LDL was funded through MLA under its Annual Investment Plan.

ii) Small stock plants

Most small stock plants in Australia do not currently have in place IT systems to record disease and defect data. For plants involved in the NSHMP, disease and defect data are recorded on paper on the slaughter floor and later manually transcribed into in an excel spreadsheet.

One of the sheep plants installed an animal disease system data capture system on the slaughter floor to facilitate the pilot trial. Installation included embedding the draft *Australian National Standard for the Development, Collection and Reporting of Animal Health Data* into the on-floor software system and installing hardware to facilitate data capture (i.e. touch screens, number pads, RFID readers) linked to a hook tracking system to allow data capture against individual carcasses.

Although, the other two pilot sites had their own kill floor software system available, Meat Inspectors decided to custom build their own as a value add to offer to their clients. This was in part because they decided it was not economically viable for them to use the existing system vendor solution available at the plants as part of the pilot. MLA was supportive of this approach as it was key for the red meat pilots to test different business models and use different software and feedback systems. The

draft *Australian National Standard for the Development, Collection and Reporting of Animal Health Data* was embedded into the Meat Inspectors software animal health data capture and reporting system.

Design and/or upgrade producer reporting systems

MLA did not stipulate what feedback mechanism that the companies were required to use for the red meat pilots. Companies could either deliver the animal disease or defect data through LDL program or a third-party system that the company choose to use.

i) Beef Plants

Three of the beef plants used LDL as their feedback mechanism to provide disease and defect data to their producers. LDL is an online program that enables the timely sharing of carcase and animal disease information between processors and their producers with the aim of optimising supply chain performance. LDL presents a table and graph of the top five disease conditions observed within a consignment. In the table, each condition is linked through to the 'Solutions to Feedback' library where information on the general description, cause, clinical signs, diagnosis, treatment, and prevention, as well as further reading, can be found. Please refer to Figures 1 and 2.

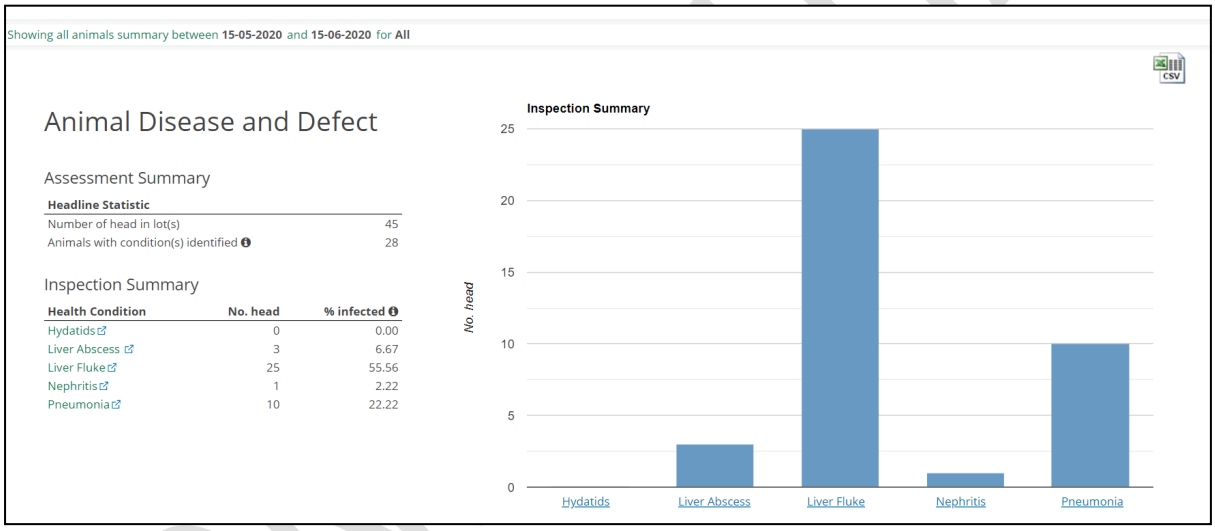


Figure 1: Livestock Data Link beef disease and defect producer report example

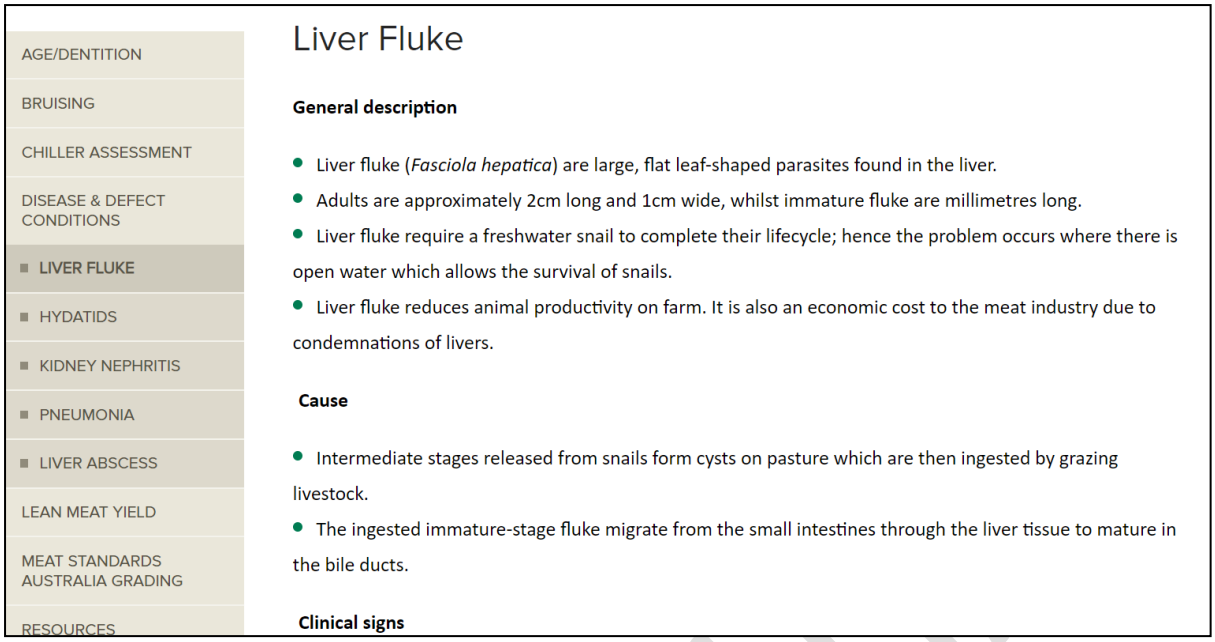


Figure 2: Livestock Data Link Solutions to Feedback library – Liver Fluke

Please note, a body might have multiple conditions identified at inspection so the number of head under the inspection summary might be higher than the animal observed with a condition. For example, an animal might have both liver fluke and pneumonia. The development of the animal disease report within LDL was funded through MLA under its Annual Investment Plan.

The other two beef plants were integrated companies with feedlots as well as the processing establishment. These plants used their own internal feedback systems to provide disease and defect data to the feedlot part of the business. One of these plants was also interested in exploring LDL to provide feedback to their producer suppliers.

ii) Small stock plants

LDL already has sheep disease and defect report available for the NSHMP data (Refer to Figure 3). However, LDL does not currently include reporting of sheep disease and defect data on an individual carcase basis. MLA is currently scoping out the design of the LDL report for individual disease and defect data for sheep plants before it is officially built into the program.

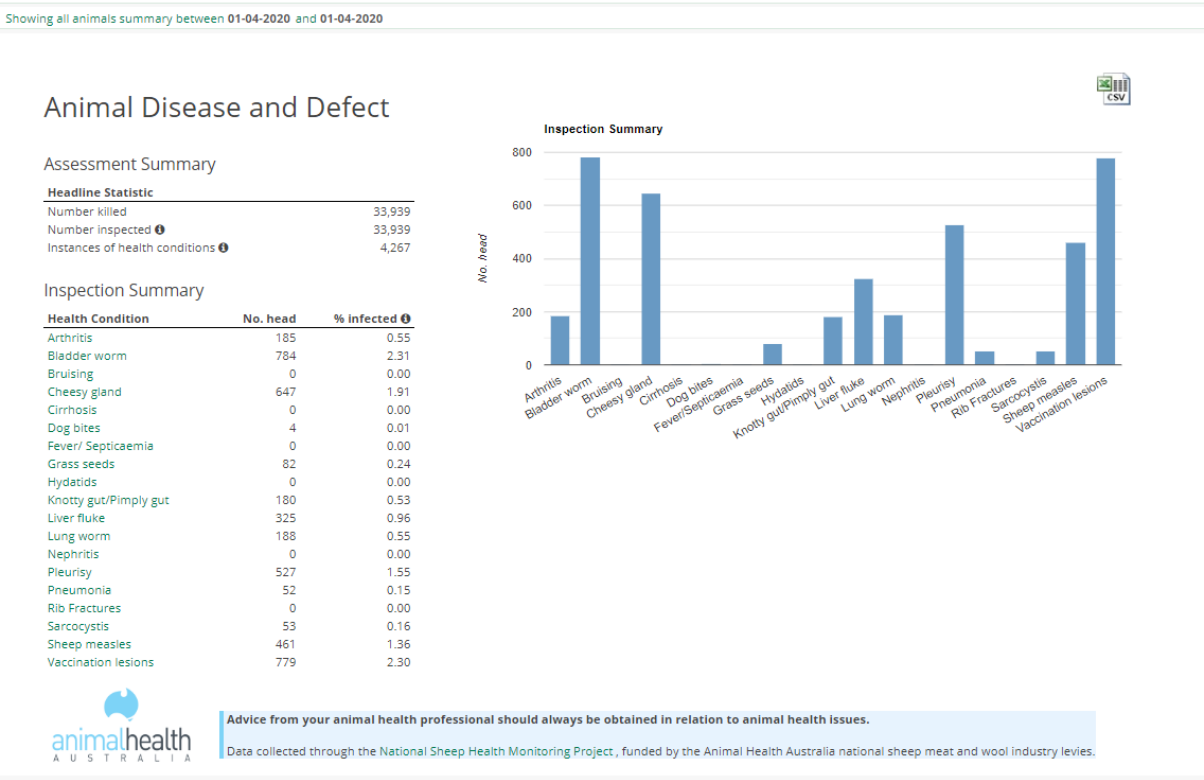
As one of the sheep plants were aiming to report disease and defect data on an individual carcase basis, substantial software changes were required to integrate disease and defect data information into current carcase reporting.

The pilot study at another sheep plant was based on disease and defect data collection of a lot/consignment basis. For this trial site, Meat Inspectors developed a report that included a simple count of conditions within the inspected consignment that could be emailed to the client.

The procurement model at the goat plant involved sourcing rangeland goats predominantly via depots on a mob or lot basis, which means there were very limited opportunities for providing feedback to the original supplier on animal health performance through the supply chain. There are, however, opportunities to provide feedback when large lots may be sourced from a single locality. In addition,

carcase disease or condition data can be used to identify trends in animal health issues from broader regions or on a seasonal basis.

For the goat plant, Meat Inspectors developed a report that included simple count of conditions within the inspected consignment that could be emailed to the client.



Showing all animals summary between **01-04-2020** and **01-04-2020**

Animal Disease and Defect

Assessment Summary

Headline Statistic	
Number killed	33,939
Number inspected	33,939
Instances of health conditions	4,267

Inspection Summary

Health Condition	No. head	% infected
Arthritis	185	0.55
Bladder worm	784	2.31
Bruising	0	0.00
Cheesy gland	647	1.91
Cirrhosis	0	0.00
Dog bites	4	0.01
Fever/ Septicaemia	0	0.00
Grass seeds	82	0.24
Hydatids	0	0.00
Knotty gut/Pimply gut	180	0.53
Liver fluke	325	0.96
Lung worm	188	0.55
Nephritis	0	0.00
Pleurisy	527	1.55
Pneumonia	52	0.15
Rib Fractures	0	0.00
Sarcocystis	53	0.16
Sheep measles	461	1.36
Vaccination lesions	779	2.30

animalhealth AUSTRALIA

Advice from your animal health professional should always be obtained in relation to animal health issues.

Data collected through the National Sheep Health Monitoring Project , funded by the Animal Health Australia national sheep meat and wool industry levies.

Figure 3 – Livestock Data Link animal disease and defect report (NSHMP data)

Identification of infrastructure and hardware required

i) Beef Plants

The beef plants chose to capture disease and defect data on a touch screen terminal at key points on the slaughter floor i.e., retain rail, carcase, head and viscera. This is because these touch screens were already present as part of their kill floor system, or the software vendor provider offered an animal health touch screen terminal with the software already built in.

ii) Small stock plants

The small stock plants involved in the pilot studies also chose to install touch screen terminals in selected locations on the slaughter.

The sheep plant collecting individual disease and defect data used carcase hook tracking in conjunction with touch screen terminals and keypads to capture information at two locations, the retain rail and the evisceration trays.

Data Validation

A vital component of the red meat pilot trials was the validation of data to ensure it was correct before it was released to producers. Providing incorrect data to producers that are using this feedback to make informed management decisions would cause a negative experience and potentially led to losing producer trust in the future.

i) Beef Plants

An independent consultant engaged by MLA undertook an external data audit to compare the plant data to the draft *Australian National Standard for the Development, Collection and Reporting of Animal Health Data*. This was done to identify any inaccuracy or gaps that the plants need to resolve to ensure they were aligned to the draft national standard.

Minor data mapping issues were identified by the participating beef plants that needed to be resolved in the system, i.e. LDL was mapping all abscesses to Liver abscesses. Also, one plant picked up that a default category was coming through in their data that did not align with the draft national standard. Training was provided to key staff around not allocating default categories to the disease and defect data collected.

All issues identified through the data validation process were able to be resolved.

In addition, four plants undertook a series of monitoring cycles to ensure the accuracy of disease and defect identification and touch terminal data entry. This monitoring activity was either undertaken by a senior meat inspector and the cycle focused on 10 offal sets, or a data comparison was completed between the electronic record versus the manual record. The results from the monitoring concluded that the meat inspectors were effective in disease and defect identification and accurate in recording this data. After that, these plants moved to monthly or daily monitoring periods to check the accuracy of the data collected.

During one of the pilot trials one of the software providers updated their software package prior to changes being made in LDL. This meant the plant using that software system was not able to upload disease and defect data for a three-month period until LDL was updated. The missing animal disease and defect data files were upload once LDL was updated; however, this highlights the need for coordination and communication between software providers and LDL administrators moving forward.

ii) Small Stock Plants

The three small stock plants used different approaches to data validation.

One plant had MINTRAC come on site and compare each inspector to a NSHMP inspector at the carcase and offal inspection points. Inspection accuracies of 75% correct diagnosis and 25% missed and/or misdiagnosed were selected as thresholds to indicate that further training may be required. These levels were selected by MINTRAC to allow for the pressure of assessment conditions.

Each assessment period was 30 minutes for each inspector at each inspection point with the identity of the inspector kept confidential. Disease samples were sent to a Veterinary Diagnostic Laboratory to verify the findings of the inspector. It was found that the inspectors were correct 86% of the time, with 6% misdiagnosed and 8% missed. Of the histopathology analysis undertaken, 85% were most likely to be confirmed as the condition assigned by inspectors.

One plant validated the accuracy of the meat inspector by comparing the existing paper-based system to the new electronic system to ensure there was consistency between the two methods. Prior to electronic data collection the meat inspection team completed paper reports, which was then transcribed into an excel spreadsheet and emailed as record of inspection items at the end of the day. This was then verified against the plants' management systems. For the data validation process, the focus was only on the whole carcase issues that caused a carcase to be condemned as not fit for human consumption. Over a 30-day period the company verified the records against the paper records collected daily on the floor against the electronic reports. Once the data that was collected electronically was consistent with the paper records the team ceased the use of the paper records and relied on the electronic systems only.

In the third plant, the meat inspection company designed a validation process to ensure there was accuracy in terms of both the identification of animal disease and defect and a correlation to the carcase or part of the carcase. This process was simply cross checking the correlation between animal/carcase or parts of the carcase presented for inspection to the body number or lot number on the screen. This was validated by a senior inspector verifying there was correlation and correct numbers of carcases with data collected. The most fundamental issue that was determined during the validation process was to ensure data being entered correlated to the animal or lot inspected. This was achieved by a tag being applied to the carcase hook at the start of each lot being processed. This tag signified change in lots and was applied at the time of knocking.

Training of meat inspectors

All plants developed work instructions detailing the data recording process and requirements by meat inspectors for recording all disease and defects in the animal health terminals operating at chain speed.

Pilot sites that use government inspectors experienced some resistance and challenges with them collecting the disease and defect data as part of the trial. Four beef plants were required to complete time and motion studies to demonstrate that the inspectors had adequate time to collect and enter this data into the terminal.

During the project, it became evident, through lack of participation, that government inspectors did not value the disease and defect training available through the project provided by MINTRAC. This could be because government inspectors do no normally received training from MINTRAC, but instead have their own training program.

One beef plant arranged training the senior DAWR inspector on the identification of hydatids from recognised experts on the condition. The senior inspector then trained all other inspectors on plant and conducted verifications of each to ensure the training and calibration was effective. All staff were found to be effective and consistent in the identification and recording of defects, through trial data collections.

Meat Inspectors developed their own work instructions for their meat inspection staff working at their two processor client sites and delivered the training. In addition, an animal health data policy was developed and communicated to their meat inspection services workforce, the On Plant Veterinarian (OPV) and plant staff. This policy was developed to ensure there was no impact on the inspection procedures or process from the introduction of this data capture system.

Launch of animal health information within the supply chain

i) Beef Plants

All beef plants involved in the pilot trials have launched animal disease and defect feedback within their supply chain via either LDL or their company owned system.

Three plants are now providing ongoing animal disease and defect feedback within their supply chain via LDL. The remaining two plants are part of vertically integrated businesses and are now providing animal disease and condition data to the feedlot parts of the business.

ii) Small Stock Plants

None of the small stock processing plants have released animal health information within their supply chain.

At one small stock plant there were significant delays implementing the individual carcase hook tracking system on the slaughter floor. Hook tracking systems that allow recording of disease and defects on an individual carcase level, as well as pre- and post-trim weights, will provide opportunities for more accurate estimates of revenue losses due to disease

Even though the plant did not launch individual animal disease feedback, several producer workshops were conducted. These workshops have focused on providing awareness of the NSHMP, the Health 4 Wealth Programme and the data that will come available through the H4W initiative.

In addition, this plant undertook a case study to develop a severity scoring system for arthritis in lambs. A scoring system was developed which consisted of four categories of arthritis trim (foreshank, hindshank, foreleg and hindleg). The average proportion of carcase loss across all mobs was 4.6% of HSCW, which ranged from 1.1% and 20.4%. This equated to a cost of range from $2.95 for a forequarter shank to $18.08 for a hind quarter leg. Provided as feedback to producers, these revenue losses due to disease provide a financial incentive to drive change to reduce risk of disease and improve productivity.

At the other two plants the Coronavirus Pandemic during 2020 caused significant disruptions to plant operations and priorities, and restrictions on the Meat Inspectors staff and management to visit the sites. This meant the soft launch component of the project could not be completed. However, Meat Inspectors will continue to work with plant management to provide disease and defect reports and to their suppliers where possible to assess the value of such feedback

Review of the pilot trial

i) Beef Plants

The three beef plants that launched animal disease and condition reporting via LDL ran producer webinars or producer days to introduce their suppliers to the animal disease feedback. These webinars

or workshops provided producers with information on the processor's business especially around livestock and the current market; H4W pilot trials; LDL, and on-farm production impacts due to disease condition. Agriculture Victoria and Local Land Services District Veterinarians undertook the on-farm production impacts session to highlight to producers the symptoms of the five top conditions; their impacts on productivity and the cost associated with this; and how and why the LDL feedback will benefit producers in managing these diseases.

Surveys were provided to producers who attended the webinars or producer days to gather feedback on whether they would use their animal disease feedback to monitor herd health and make change on farm; whether the report was easy to use and what additional reports would be useful; and lastly what extension support they would need to interpret their animal disease feedback.

All producers who participated in the soft launch for disease and defect data feedback and associated online feedback surveys indicated that they would use the animal disease report within LDL to track progress towards controlling or eliminating a disease within their herd. Most indicated that, with this information, they would be more likely to consult with an animal health professional for advice on reducing and eradicating disease within their herds. Over time this will result in reduced incidence of animal disease being identified in processing plants, reducing industry losses due to condemnations.

The remaining two plants involved in the red meat trials were integrated businesses and more focused on providing animal disease and defect data back to their feedlots. This enabled them to start linking their feedlot and slaughter data together to better understand trends and reasons associated with the condemning of body parts affected by disease and defects. These companies were also able to start analysing this data internally and provide key insights around the impact of disease and defect has to their business. One of the companies commented how surprised they were at the higher-than-expected amounts of offal that were being condemned on a regular basis. This prompted the business to work through the data associated with their own supply chain and look at ways to make improvements within their supply chain.

5. Discussion

The project has demonstrated proof-of-concept that individual carcase disease and defect data can be effectively and efficiently transferred from beef abattoirs to producers through existing industry infrastructure such as LDL and NLIS.

Most of the beef plants that participated in the pilot trials already had IT systems in place to collect disease and defect data on the slaughter floor. Only minor amendments were required to align to the draft *Australian National Standard for the Development, Collection and Reporting of Animal Health Data* and enable data to upload to LDL or back through the business supply chain in the case of vertically integrated companies with in-house feedlots.

Software system vendors played a vital role in the red meat pilot trials as they were required to embed the draft *Australian National Standard for the Development, Collection and Reporting of Animal Health Data* into their systems. Significant development was required by the vendors to incorporate the standards into their kill floor systems to enable plants to collect post-mortem data in a consistent way.

Software vendors will continue to play an important role in the adoption of the *Australian National Standard for the Development, Collection and Reporting of Animal Health Data* within their systems.

Some plants found the most difficult part of amending their existing systems was the formatting of the animal health data file for export to MLA. In addition, one plant was off-line for several months after their software provider updated the animal health data file before matching changes were made in LDL. This highlights the importance of ease of integration at all levels, including the slaughter floor, plant IT systems and LDL. This is important to facilitate uptake of animal disease and defect data collection and feedback by other plants.

In addition, the processor reporting functions within LDL need to be improved to allow processors to download and manipulate data more easily.

The project was not able to demonstrate proof-of-concept that individual or lot-based carcase disease and defect data can be effectively and efficiently transferred from small stock abattoirs to producers through existing industry infrastructure such as LDL and NLIS, although not all plants were trying to upload data to these industry systems.

The pilot trial at one sheep abattoir identified many challenges associated with a standardised and comprehensive approach to individual disease-related carcase and offal condemnations and feedback from sheep processors to producers. These ranged from IT systems to changes in the process on the slaughter floor to hardware issues.

Despite this, the plant attempting to demonstrate this concluded that the aim of the *Health 4 Wealth* project is sound. A system to record individual carcase disease and defects was implemented within the plant, although with challenges. An assigned staff member to consistently drive the project was important for this success. In addition, a clear vision of how the data will be distributed and used is extremely important to ensure there is patience and a commitment to ensuring success.

At the remaining small stock plants, significant cost savings were achieved in moving from paper-based to electronic recording and reporting systems of lot-based disease and defect data, which should not be overlooked.

In addition, a potentially significant benefit from the electronic collection and analysis of animal health data from rangeland goat production systems is the ability to conduct a targeted "Animal Health Audit" on a regular and national basis. The results from these audits could be used to quantify and prioritise investment in education and mitigation programs. This means that while animal health feedback to rangeland goat producers may not be feasible, significant benefits to this important industry can be achieved by the electronic capture and analysis of animal health information on a lot/mob basis.

The *Health 4 Wealth* project and the red meat pilot trials required the meat inspection team at participating abattoirs to take on a new role, identification and recording of animal disease and defect data.

As part of the red meat pilot trials, MLA worked with plants that used different meat inspection services, including Government Inspectors, company-employed Inspectors and Inspectors provided by third-party companies.

Plants that included their meat inspection team early in the project at the design phase were more successful in getting buy in to the project. The plants that did not do this found it challenging to engage the meat inspection team.

Improved engagement with government bodies is an objective that could be considered in further projects on animal disease and defect data collection in processing plants. Some plants found the most difficult part of the project was attempting to engage DAWR inspectors.

It also became evident during the pilot studies that the DAWR inspectors did not value the disease and defect training available through the project provided by MINTRAC. A possible explanation for this could be that MINTRAC is not usually involved in delivering training to DAWR inspectors. Future projects could investigate preferred training options for DAWR inspectors.

Further engagement with DAWR to encourage a 'top down' approach may also create greater involvement and commitment from inspectors and on-plant Veterinarians at a plant level.

The beef plants involved in the pilot trials all believe that it helps industry to know the disease and defects in the Australian beef herd. Collecting animal disease and defect data sheds light on geographic distribution of disease, highlighting problems at a regional level. This allows individual farm treatment, management, and control programs to be developed, thereby maximizing yield outcomes.

All beef producers who participated in the soft launch for carcase and disease data feedback and associated online feedback surveys indicated that they would use the animal disease report within LDL to track progress towards controlling or eliminating a disease within their herd. Most indicated that, with this information, they would be more likely to consult with an animal health professional for advice on reducing and eradicating disease within their herds. This finding provides further evidence to support the aim of the *Health 4 Wealth* project to introduce a standardised and comprehensive approach to data collection of disease-related carcase and offal condemnations and feedback to producers, thereby allowing producers to monitor disease prevalence in their livestock and make informed decisions to maximise yield outcomes.

6. Future Research and Recommendations

The project identified several issues with the draft *Australian National Standard for the Development, Collection and Reporting of Animal Health Data*, including that:

- Clear definitions and training need to be provided to have consistent application of grades for severity of conditions.
- Guidelines will need to be developed to standardise mapping to generic conditions that are observed (e.g. Cysts) unless pathological confirmation of the specific causes are attained (e.g. Hydatid Cysts).
- Guidelines need to be developed to ensure standardized methods of data capture and collection.

There will need to be further economic analysis at an industry scale to confirm that for the beef industry the:

- Increase in offal recovered by the processor provides enough of an increase in profitability that processors will be willing to pass this on in part to producers to reward them for their additional efforts thus creating a win-win environment.
- Financial uplift for producers is enough incentive for them to improve their on-farm practices and that the reward matches the effort required to make the changes.

Significant costs are involved to upgrade IT systems to allow for electronic capture of inspection data in small stock plants. There will need to be further economic analysis at an industry scale to confirm benefits of this investment for the sheep and goat industries.

A mob-based specification for animal health data collection in small stock plants has now been developed. It is recommended that this specification be tested in a collaborating small stock plant.

Close engagement with all stakeholders is imperative when setting up a disease and condition feedback systems within a processing plant. Stakeholders have varying needs and wants in relation to understanding the impacts of diseases and defects and animal health feedback. A key learning from the project was the importance of ease of integration at all levels, including the slaughter floor, plant IT systems and LDL. This is important to facilitate uptake of animal disease and defect data collection and feedback by other plants.

In addition, the processor reporting functions within LDL need to be improved to allow processors to download and manipulate data more easily.

There may need to be further education of producers in the use of the LDL platform.

Improved engagement with government bodies is an objective that could be considered in further projects on animal disease and defect data collection in processing plants. Some plants found the most difficult part of the project was attempting to engage DAWR inspectors. The DAWR inspectors did not value the disease and defect training available through the project provided by MINTRAC. A possible explanation for this could be that MINTRAC is not usually involved in delivering training to DAWR inspectors. Future projects could investigate preferred training options for DAWR inspectors.

Further engagement with DAWR to encourage a 'top down' approach may also create greater involvement and commitment from inspectors and on-plant Veterinarians at a plant level.

A suite of case studies was developed from pilot studies at the participating beef and lamb processors and are available for use by other plants considering implementing an animal health feedback system.

7. Appendix 1: Health 4 Wealth Pilot Trial Checklist for pork, sheepmeat and beef

Key components to be included	Yes	No
Standardised recording of agreed conditions/data standards development		
Agree on the critical animal health conditions to be included in the trial. A minimum of 4-6 conditions to be used for a viable sample.		
Review current state against the draft Australian National Standard for the Development, Collection and Reporting of Animal Health Data.		
Amend existing systems to enable standardised defect and diseases to be recorded.		
Review and update current plant systems: • Head, carcase and viscera disease and defect data collection to be reviewed; • To be able to collect data against the standard; • To report sub-sets of the data to various parties including producers and operators as required; • To investigate efficient mechanism for data exchange including export of CSV files.		
Testing and deployment of software changes. This will include testing and deploying the link between the software program and any third party ie. NLIS.		
Design new and/or upgrading existing producer reporting systems.		
This can be delivered through Livestock Data Link or through an in-house or third party system that the company choose to use.		
Design and build the required reporting functionality in LDL or third party system.		
Identification of infrastructure and hardware required		
Identify and develop the preliminary data collection method to be used for the trial ie. Ipads, touch screen terminals, voice recognition		
Development of an app or web based system to collect data.		
Training of meat inspectors		
Implement a training system that allows for familiarisation of the system and assessment of the meat inspectors against the chain sped and time available for them to enter the data (eg. Mintrac unit of competency)		
Develop a draft work instructions, on the line demonstration and implementation of the system.		

Conduct a data collection trial to validate that the meat inspector has enough to time to collect the data and that their duties are not compromised.		
Validating that the data being collected is correct (Data validation)		
Analyse animal disease and defect data to identify any data accuracy issues and resolve them.		
Monitor and assess the performance of data collected at the different points of the chain.		
Data collection trial – 9 month period		
Processor soft launch of animal health information within their supply chain		
Animal health information is soft launched to a selected group of producers		
Present and demonstrate the animal health and disease components to a selected group of producers.		
Review of the pilot trial		
Review of the pilot trial outcomes after the systems have been operating for a minimum of 3 months in each plant. This review should include incorporation of necessary changes.		
Seeking feedback on effectiveness of the animal health feedback system from producers and processors		
Collate and provide feedback on the usability and functionality of the producer disease reporting interface.		
Assist MLA/APL with key producer interviews to seek feedback on effectiveness of the animal health feedback system.		
Processor company provide feedback on effectiveness of the animal health feedback system.		
Project reporting		
Provide quarterly milestone reports to provide an update on the progress of the pilot trials; identify any challenges or issues that arose; any key learnings or recommendations.		
Submit a publishable final report which will include content from the final versions of the milestone reports. This report will also include the description of the methodology used; the lessons learnt; identification of the challenges or barriers to implementation of the data capture collection system and the value the system is generating.		

8. Appendix 2: Individual plant case studies

Please find below the individual plant case studies. We are currently working with the communication team to finalise these for public release on the MLA website.

Australian Country Choice Animal Health Data Pilot Study

The purpose of the Australian Country Choice (ACC) animal health data pilot study was to demonstrate the value of sharing and utilising animal health data along the supply chain to improve productivity and profitability.

The project was part of the red meat pilot trials for the Rural Research & Development of Profit project *Health 4 Wealth*.

While many meat processing recording systems are already in place, data collection on disease-related carcase and offal condemnations and feedback of this information to producers varies considerably. The *Health 4 Wealth* project aims to introduce a standardised and comprehensive approach to data collection of disease-related carcase and offal condemnations and feedback to producers. This will allow producers to monitor disease prevalence in their livestock and make informed decisions to maximise yield outcomes.

The objective of the ACC animal disease data pilot study project was to:

1. Demonstrate that individual and lot-based animal health data can be effectively and efficiently transferred to producers.
2. Demonstrate that animal health data can be correlated to an individual animal where and individual ID is present.
3. Provide animal health inspection information to producers to help them make better informed decisions regarding on-farm practices to improve livestock/carcase performance.
4. Provide learnings that can be incorporate into the wider *Health 4 Wealth* project.

Methodology

The main activities undertaken in the project were:

- Standardising recording of agreed conditions
- Amending existing systems to enable standardised animal health data to be recorded
- Identification of infrastructure and hardware required
- Training of meat inspectors
- Validating that the data being collected was correct (Data validation)
- A soft launch of animal health information within the supply chain.

Results/key findings

The key finding from the project was that individual and lot-based animal health data could be effectively and efficiently transferred to producers. The project also revealed that standardised recording and reporting of animal health conditions offers significant benefits to all Supply Chain participants; and that ACC's ability to gain value from implementing an improved animal health system was significantly enhanced and underpinned by its investment in its Data Laboratory and digital infrastructure across its whole business and supply chain.

As part of the project a cost benefit analysis was conducted by Greenleaf Enterprises to quantify any benefits resulting from the identification and reporting of animal disease information. The benefits of livestock suppliers responding to improved feedback on animal health conditions from processors to the supply chain include increased offal yields for human consumption, with reduced health related burdens ranging from 10% to 30%, producing Annual Net Benefits ranging from $42,900 to $142,300. Reduced trimming of infected areas from carcases was calculated at $0.75/ head slaughtered to vendors/producers during the pilot period and benefits from reducing health related burdens by the range of 10% to 30% was estimated to reduce the cost of trimming on carcase weight by $0.07 to $0.22 per head.

Benefits to industry

ACC believes that the benefits to its business of an efficient and robust system for the collection and reporting of animal health data also translate to the broader industry. The accurate, standardised and timely reporting of animal health feedback enables businesses to make critical decisions and provides accurate and consistent feedback to vendors/producers. This enables vendors to modify management practices to respond issues identified and reduce the incidence of animal health-related issues, thus increasing the value of carcases.

Future research and recommendations

The project identified several issues with the draft Australian National Standard for the Development, Collection and Reporting of Animal Health Data, including that:

- Clear definitions and training need to be provided to have consistent application of subjective grades for severity of conditions.
- Guidelines will need to be developed to standardise mapping to generic conditions that are observed (e.g. Cysts) unless pathological confirmation of the specific causes are attained (e.g. Hydatid Cysts).

Other recommendations for realising benefits from recording and providing animal health feedback to vendors/producers include further analysis of animal health data collected over a 12-month period to understand seasonal and regional impacts of animal health-related issues and identify variability in levels of animal health-related issues between vendors over a full production season; and to conduct more detailed analyses and quantification of the impact of animal health-related issues on carcase yield.

Useful Resources

Health 4 Wealth https://australianpork.com.au/industry-focus/research/health4wealth/
Livestock Data Link https://www.integritysystems.com.au/data--feedback/livestock-data-link/
Rural Research & Development of Profit https://www.agriculture.gov.au/ag-farm-food/innovation/rural-research-development-for-profit

Bindaree Beef Animal Health Data Pilot Study

The purpose of the Bindaree Beef animal disease data pilot study was to demonstrate the value of sharing and utilising disease and defect data along the supply chain to improve productivity and profitability.

The project was part of the red meat pilot trials for the Rural Research & Development of Profit project *Health 4 Wealth*.

While many meat processing recording systems are already in place, data collection on disease-related carcase and offal condemnations and feedback of this information to producers varies considerably. The Health 4 Wealth project aims to introduce a standardised and comprehensive approach to data collection of disease-related carcase and offal condemnations and feedback to producers. This will allow producers to monitor disease prevalence in their livestock and make informed decisions to maximise yield outcomes.

The objectives of the Bindaree Beef Animal Disease Data Pilot Study project were to:

1. Demonstrate that individual and lot-based animal disease and defect data can be effectively and efficiently transferred to producers.
2. Demonstrate that animal disease and defect data can be correlated to an individual animal where and individual ID is present.
3. Provide animal disease and defect inspection information to producers to help them make better informed decisions regarding on-farm practices to improve livestock/carcase performance.
4. Provide learnings that can be incorporate into the wider Health 4 Wealth project.

Project Outcome

Bindaree Beef implemented an animal disease system on the slaughter to be able to capture real time animal disease and defect data for individual carcases. This included embedding the *Draft Australian National Standard for the Development, Collection and Reporting of Animal Health Data i*n the plant on-floor software system to be able to capture animal disease and defect data in a consistent way. Software was procured through Bindaree Beef on-floor software provider who have implemented the *Draft Australian National Standard for the Development, Collection and Reporting of Animal Health Data*. This means that other processor companies using the same software will be able to switch on the animal disease and defect data functionality quite quickly.

Installing the animal health station within the business was a multistep process that included:

- Internal management signoff.
- Reaching agreement on critical animal health conditions to be include in the pilot study.
- Amending existing plant systems to allow standardised defects and disease to be recorded, including reviewing carcase disease and defect data collection against the *draft Australian National Standard for the Development, Collection and Reporting of Animal Health Data*.
- Reviewing and updating plant system maintenance for carcase disease and defect data so the disease and defects reported for vendor feedback could be controlled.
- Data validation and training.

- Soft launch of animal health information within the Bindaree Beef supply chain.

The company decided to start small and grow capability. Data collection started with an initial pilot of selected number of disease and defect, followed by all Myola feedlot cattle for all disease and defect codes. Once this was working smoothly data collection was expanded to all cattle processed.

Bindaree Beef processed approximately 100,000 animals through the animal health station between May and November 2019. Analysis of the data revealed that on average:

- 20% of bodies per lot processed contained disease and defects.
- The number of total faults identified within a lot was typically one third the number of head of cattle being processed within the lot.
- The cost associated with condemning of carcase parts was $2 per head.

Within their own supply chain, the collection and analysis of animal disease and defect data helped Bindaree identify that cattle backgrounded prior to feedlot entry were less likely to have bovine respiratory disease. The data also highlighted the importance of yarding new animals together to reduce stress for a period regardless of backgrounding prior to commencing a high protein ration.

As a direct result of data collection, Bindaree Beef is now considering the expansion of its feedlot induction yards on the basis that it can improve offal retention by 10% for every animal within the feedlot over the next 5-year period.

Benefit for Industry

As a result of participating in the data pilot Bindaree Beef reached the conclusion that the aim of the Health 4 Wealth project is sound. However, there will need to be further economic analysis at an industry scale to confirm that the:

- Increase in offal recovered by the processor provides enough of an increase in profitability that processors will be willing to pass this on in part to producers to reward them for their additional efforts thus creating a win-win environment.
- Financial uplift for producers is enough incentive for them to improve their on-farm practices and that the reward matches the effort required to make the changes.

Useful Resources

Health 4 Wealth https://australianpork.com.au/industry-focus/research/health4wealth/
Livestock Data Link https://www.integritysystems.com.au/data--feedback/livestock-data-link/
Rural Research & Development of Profit https://www.agriculture.gov.au/ag-farm-food/innovation/rural-research-development-for-profit

Gundagai Meat Processors Animal Disease Data Pilot Study

The purpose of the Gundagai Meat Processors (GMP) animal disease data pilot study was to demonstrate the value of sharing and utilising disease and defect data along the supply chain to improve productivity and profitability.

The project was part of the red meat pilot trials for the Rural Research & Development of Profit project *Health 4 Wealth*.

While many meat processing recording systems are already in place, data collection on disease-related carcase and offal condemnations, feedback of this information to producers varies considerably. The Health 4 Wealth project aims to introduce a standardised and comprehensive approach to data collection of disease-related carcase and offal condemnations and feedback to producers. This will allow producers to monitor disease prevalence in their livestock and make informed decisions to maximise yield outcomes.

The objectives of the GMP Animal Disease Data Pilot Study project were to:

1. Demonstrate that individual and lot-based animal disease and defect data can be effectively and efficiently transferred to producers through existing industry infrastructure such as NLIS and LDL.
2. Demonstrate that animal disease and defect data can be correlated to an individual animal where individual ID is present.
3. Determine if the cost of animal disease and defect can be recorded and calculated reliably, and if this information will be valuable as feedback to producers.
4. Provide animal disease and defect inspection information to producers to assist them in making better informed decisions regarding on-farm practices to improve livestock/carcase performance.
5. Provide learnings that can be incorporated into the wider 'Health 4 Wealth' project.
6. Provide recommendations that can be incorporated into the NLIS and LDL project plan to develop systems capability in the animal health area if the proof of concept is successful.

Project Outcome

The first stage of this project was to determine the diseases and defects to focus on within the project. The critical disease and defects observed at GMP include pleurisy, bladder worm, bruising, vaccination lesions, sheep measles, arthritis, and nephritis. To reduce the number of diseases and defects recorded at the offal station and retain rail whilst the Australian Authorised Officers (AAO's) were learning the system, two diseases and defects were selected for each recording area: nephritis and bladder worm at the offal trays, and pleurisy and arthritis at the retain rail.
An animal disease system data capture system was installed on the slaughter floor. Installation included embedding the Draft Australian National Standard for the Development, Collection and Reporting of Animal Health Data in the on-floor software system and installing hardware to facilitate data capture (i.e. touch screens, number pads, RFID readers linked to a hook tracking system to allow data capture against individual carcasses).

AAO's working at the plant were heavily involved in the decision making during the installation. Communication with meat inspectors was important to assist in the changes impacting their roles. Emphasis was placed on ensuring dialogue about the importance of recording disease and defect information, and the systems changes that would occur.

AAO's were trained to use the new system, followed by data collection trials to ensure system changes allowed meat inspectors enough time to collect data, and that their duties were not compromised. This was tested at the gambrel up station, evisceration trays and retain rail. Work instructions were drafted considering the amendments required to ensure AAO duties are not compromised.

A case study to develop a severity scoring system for arthritis was conducted. The scoring system consisted of four categories of arthritis trim (foreshank, hindshank, foreleg and hindleg). The average proportion of carcase loss across all mobs was 4.6% of HSCW, which ranged from 1.1% and 20.4%. This equated to a cost of range from $2.95 for a forequarter shank to $18.08 for a hind quarter leg.

Benefit for Industry

The project identified many challenges associated with a standardised and comprehensive approach to data collection of disease-related carcase and offal condemnations and feedback from sheep processors to producers. These ranged from IT systems to changes in the process on the slaughter floor to hardware issues.

However, the project has presented many opportunities for producers and for GMP. The capture of individual disease and defect information provides more transparency to producers and the ability to link different pieces of information back to individual carcases (such as hot standard carcase weight and Dual Energy X-Ray Absorptiometry (DEXA) information), allowing producers to make informed management decisions on farm in relation to their lambs. For GMP the introduction of a more accurate system will remove the paper-based system currently used by AAO's for the National Sheep Health Monitoring Project and remove the need to estimate the incidence of disease within lines of lambs.

As a result of participating in the data pilot GMP reached the conclusion that the aim of the Health 4 Wealth project is sound.

- A system to record individual carcase disease and defects can be implemented within sheep processing plant, although with challenges.
- A clear vision of how the data will be distributed and used is extremely important to ensure there is patience and a commitment to ensuring success. An assigned staff member to consistently drive the project is important for success.
- It is possible to achieve an enhanced feedback system to producers, including cost of disease as this relates to carcase trim and revenue losses.

Useful Resources

Health 4 Wealth https://australianpork.com.au/industry-focus/research/health4wealth/
Livestock Data Link https://www.integritysystems.com.au/data--feedback/livestock-data-link/
Rural Research & Development of Profit https://www.agriculture.gov.au/ag-farm-food/innovation/rural-research-development-for-profit

JBS Brooklyn animal disease data pilot study

The purpose of the JBS Brooklyn animal disease data pilot study was to demonstrate the value of sharing and utilising disease and defect data along the supply chain to improve productivity and profitability.

The project was part of the red meat pilot trials for the Rural Research & Development of Profit project *Health 4 Wealth*.

While many meat processing recording systems are already in place, data collection on disease-related carcase and offal condemnations and feedback of this information to producers varies considerably. The Health 4 Wealth project aims to introduce a standardised and comprehensive approach to data collection of disease-related carcase and offal condemnations and feedback to producers. This will allow producers to monitor disease prevalence in their livestock and make informed decisions to maximise yield outcomes.

The objectives of the JBS Brooklyn animal disease data pilot study project were to:

1. Demonstrate that individual and lot-based animal disease and defect data can be effectively and efficiently transferred to producers.
2. Demonstrate that animal disease and defect data can be correlated to an individual animal where and individual ID is present.
3. Provide animal disease and defect inspection information to producers to help them make better informed decisions regarding on-farm practices to improve livestock/carcase performance.
4. Provide learnings that can be incorporate into the wider Health 4 Wealth project.
5. Provide recommendations that can be incorporated into the NLIS and LDL project plans to further develop these systems in carcase disease and defect data collection and dissemination.

The project was limited to the beef slaughter floor at JBS Brooklyn. It did not include the small stock floor.

Project Outcome

JBS already had IT systems in place to collect beef disease and defect data on the slaughter floor in Brooklyn. Through configuration, JBS were able to collect, exclude and map different diseases for sending through to LDL.

With the use of their Pentaho experts, JBS were able to create an interface to move the data from site to their Head Office and out to LDL without any additional work needed by anyone on site. This was an important learning from the project as it demonstrated that some beef plants are already collecting disease and defect data. Under this scenario, modifications are only required to align to the draft Australian National Standard for the Development, Collection and Reporting of Animal Health Data to allow data to be uploaded to LDL.

Review of approximately four months of carcase disease and defect data collected during the project identified inaccuracies, including missing National Vendor Declaration (NVD) serial numbers, Property

Identification Codes (PIC), Livestock Production Assurance source and inspector codes, as well as disease and defect data coding errors. This suggests that carcase and defect data collected on the slaughter floor of an abattoir will need to be periodically audited to ensure it remains accurate.

JBS Brooklyn began including carcase disease and defect data in their Carcase Analysis Reports to producers in January 2020, with release of carcase disease and defect data to producers through the MLA LDL commencing in June 2020.

During August 2020 webinars were held with producers supplying animals to JBS Brooklyn, one for producers in the western district of Victoria and the south-east of South Australia, one for producers in Gippsland and one for producers in northeast Victoria.

Following each webinar, participating producers were asked to complete a short survey on the value of the webinar to their business, as well as questions about LDL and animal health. All producers who participated in the soft launch for carcase and disease data feedback and associated online feedback survey indicated that they would use the animal disease report within LDL to track progress towards controlling or eliminating a disease within their herd.

Additional reports survey participants would like incorporated into LDL include heat mapping of current disease conditions in their region/state, tracking of regional and seasonal trends and benchmarking against other beef producers in their region. They prefer to receive ongoing support through targeted on-line webinars, either focused on a particular region or a particular disease over extension materials, such as flyers or tech tips, or face-to-face workshops including plant tours to see infected or diseased offal.

Benefit for Industry

The project has demonstrated proof-of-concept that individual and lot-based carcase disease and defect data can be effectively and efficiently transferred from the abattoir to producers through existing industry infrastructure such as LDL and NLIS.

JBS Southern believes that it helps industry to know the disease and defects in the Australian beef herd. Collecting animal disease and defect data sheds light on geographic distribution of disease, highlighting problems at a regional level.

A key learning from the project was the importance of ease of integration at all levels, including the slaughter floor, plant IT systems and LDL. This is important to facilitate uptake of animal disease and defect data collection and feedback by other plants.

In addition, the processor reporting functions within LDL need to be improved to allow processors to download and manipulate data more easily.

Useful Resources

Health 4 Wealth https://australianpork.com.au/industry-focus/research/health4wealth/
Livestock Data Link https://www.integritysystems.com.au/data--feedback/livestock-data-link/
Rural Research & Development of Profit https://www.agriculture.gov.au/ag-farm-food/innovation/rural-research-development-for-profit

Meat Inspectors animal disease data pilot study

The purpose of this project was to support Meat Inspectors Pty Ltd to develop their systems to record animal health and disease condition in small stock species on lot/consignment basis, and to develop and implement producer feedback reports.

Meat Inspectors is uniquely positioned to record disease and defect data as an independent employer of Australian Government Authorised Officers (AAOs) providing independent inspection services to Australian meat processors.

This project provided Meat Inspectors with the opportunity to work with two of their processor clients covering beef, sheep and lamb and goat processing to demonstrate the value they could offer in the sharing and utilizing of animal disease and defect data.

The project was part of the red meat pilot trials for the Rural Research & Development of Profit project *Health 4 Wealth*.

While many meat processing recording systems are already in place, data collection on disease-related carcase and offal condemnations and feedback of this information to producers varies considerably. The *Health 4 Wealth* project aims to introduce a standardised and comprehensive approach to data collection of disease-related carcase and offal condemnations and feedback to producers. This will allow producers to monitor disease prevalence in their livestock and make informed decisions to maximise yield outcomes.

The objective of the Meat Inspectors animal disease data pilot studies project was:

1. To demonstrate that lot-based animal health and disease data can be effectively and efficiently transferred to producers.
2. To demonstrate that animal health data can be correlated to an individual animal where individual ID is present.
3. Provide animal health and disease inspection information to producers to assist them in making better informed decisions regarding on-farm practices to improve livestock/carcase performance.
4. To provide learnings that can be incorporated into the wider ‘Health 4 Wealth’ project.

Methodology

The pilot trial was designed to include the following key components:

1. Standardising recording of agreed conditions
2. Amending existing systems to enable standardised defect and diseases to be recorded
3. Designing new and/or upgrading existing reporting systems
4. Identifying infrastructure and hardware required
5. Training of meat inspectors
6. Validating that the data being collected was correct (Data validation)
7. Soft launch of animal health information within the processor supply chain.

Results/key findings

The role of Meat Inspectors in the project was slightly different to the other *Health 4 Wealth* red meat pilot trials because the company is not directly involved in the purchase or sale of product along the supply chain. It does however deliver independent inspection services to processors as an independent employer of Australian Government Authorised Officers (AAOs) to satisfy importing market requirements for Australian Government health certification. As such, it is uniquely positioned as an expert in the identification, recording and analysis of carcase disease and defects and the provision of these services to the processing sector. The MI business operates in meat processing establishments across four states and has an intimate understanding of meat inspection and its role within processing plants and is positioned to provide value-added services to its meat inspection role.

Key findings from the project of value to the business and supply chain were that:

- Close engagement with all stakeholders is imperative when setting up a disease and condition feedback systems within a processing plant. Stakeholders have varying needs and wants in relation to understanding the impacts of diseases and defects and animal health feedback.
- Significant costs are involved to upgrade IT systems to allow for electronic capture of inspection data in small stock plants.
- The development and implementation of hardware for use in the harsh environment of an abattoir slaughter-floor can be a significant challenge.
- Within Australia there is a shortage of software programmers with experience in the meat processing sector.
- The *draft Australian National Standard for the Development, Collection and Reporting of Animal Health Data* can be simplified into a specific "Data Dictionary" to improve communication and training to meat inspection personnel.
- The type of livestock production system supplying a processor influences the usefulness of disease and condition feedback from the processors to its suppliers.
- When considering the establishment of a feedback system for animal health, consideration should be given to the ability and potential use of this information to the given supply chain.
- Very small slaughter lots are typical of production systems in southern Australia. This increases the challenge of producer education and limits the ability to significantly improve animal health performance across the whole supply chain. Implementing change, particularly through production systems where livestock production is not necessarily the primary source of income (and in many cases, is a sideline or opportunistic) presents significant challenges.
- The ability for an information flow from some small stock procurement models in Australia may be managed on a mob or lot basis, which means there are very limited opportunities for providing feedback to the original supplier on animal health performance through the supply chain.

Benefits to industry

The transition from paper-based systems for recording meat inspection data to electronic collection and reporting systems can result in immediate savings in terms of time and accuracy. In addition, there are direct benefits gained from reduced offal and carcase downgrades resulting from sourcing better performing livestock.

A potentially significant benefit from the electronic collection and analysis of animal health data is the ability to conduct a targeted "Animal Health Audit" on a regular and national basis. The results from these audits could be used to quantify and prioritise investment in education and mitigation programs.

This means that while animal health feedback to some small stock producers may not be feasible, significant benefits to this important industry can be achieved by the electronic capture and analysis of animal health information on a lot/mob basis including regional variations.

Useful Resources

Health 4 Wealth: https://australianpork.com.au/industry-focus/research/health4wealth/
Livestock Data Link: https://www.integritysystems.com.au/data--feedback/livestock-data-link/
Rural Research & Development of Profit: https://www.agriculture.gov.au/ag-farm-food/innovation/rural-research-development-for-profit

Wingham Beef Exports animal disease data pilot study

The purpose of the Wingham Beef Exports (WBE) animal disease data pilot study was to demonstrate the value of sharing and utilising disease and defect data along the supply chain to improve productivity and profitability.

The project was part of the red meat pilot trials for the Rural Research & Development of Profit project *Health 4 Wealth*.

While many meat processing recording systems are already in place, data collection on disease-related carcase and offal condemnations and feedback of this information to producers varies considerably. The *Health 4 Wealth* project aims to introduce a standardised and comprehensive approach to data collection of disease-related carcase and offal condemnations and feedback to producers. This will allow producers to monitor disease prevalence in their livestock and make informed decisions to maximise yield outcomes.

The objectives of the WBE animal disease data pilot study project were to:

1. Demonstrate that individual and lot-based animal disease and defect data can be effectively and efficiently transferred to producers.
2. Demonstrate that animal disease and defect data can be correlated to an individual animal where and individual ID is present.
3. Provide animal disease and defect inspection information to producers to help them make better informed decisions regarding on-farm practices to improve livestock/carcase performance.
4. Provide learnings that can be incorporate into the wider Health 4 Wealth project.
5. Provide recommendations that can be incorporated into the NLIS and LDL project plans to further develop these systems in carcase disease and defect data collection and dissemination.

Project Outcome

WBE was able to demonstrate that individual and lot-based carcase and defect data can be effectively and efficiently transferred from the abattoir to producers using the Promptu, NLIS and LDL systems, although formatting and amendments to the systems had to be undertaken prior to the carcase and defect data feedback systems becoming operational. Formatting the animal health data file for export to MLA was the most difficult part of amending the existing WBE systems to allow standardised animal disease and defect data to be collected.

Once the carcase and defect data system was operational, data comparisons between Promptu and LDL were verified as being accurate, and the animal health data was able to be matched to the individual carcase identified on the slaughter floor. The carcase disease and defect data was then able to be provided to producers through the LDL interface.

The data provided to producers allows them to understand the disease and defects that may affect their animals and helps them to gauge the potential production impacts on their herd. Many

producers were unaware of the potential impacts of animal health issues. The availability of this information transfer from processor to producer will allow them to make more informed decisions regarding their on-farm practices. This will assist producers in improving their livestock and carcase performance.

Now that producers supplying WBE have access to the disease and defect feedback, they indicated that they are more likely to consult with an animal health professional for advice on reducing and eradicating disease within their herds. Over time this will result in reduced incidence of animal disease being identified in processing plants, reducing industry losses due to condemnations.

Benefit for Industry

The project has demonstrated that individual and lot-based carcase disease and defect data can be effectively and efficiently transferred from the abattoir to producers through existing industry infrastructure such as LDL and NLIS.

Improved engagement with government bodies is an objective that could be considered in further projects on animal disease and defect data collection in processing plants. The most difficult part of the project was attempting to engage DAWR inspectors to work with WBE and to show commitment to the collection of the data for producers.

The DAWR inspectors did not value the disease and defect training available through the project provided by MINTRAC. A possible explanation for this could be that MINTRAC is not usually involved in delivering training to DAWR inspectors. Future projects could investigate preferred training options for DAWR inspectors.

Further engagement with DAWR to encourage a 'top down' approach may also create greater involvement and commitment from inspectors and On-Plant Veterinarians at a plant level.

Useful Resources

Health 4 Wealth: https://australianpork.com.au/industry-focus/research/health4wealth/
Livestock Data Link: https://www.integritysystems.com.au/data--feedback/livestock-data-link/
Rural Research & Development of Profit: https://www.agriculture.gov.au/ag-farm-food/innovation/rural-research-development-for-profit