



## Achievement Report

# Food Safety Market Access Science 2018-19



**Meat & Livestock Australia – Research Development & Innovation  
and  
Australian Meat Processor Corporation – Process Hygiene, Quality  
June 2018 2<sup>nd</sup> edition**

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## Executive summary

The Food Safety / Market Access Science Program arises from the Meat Industry Strategic Plan (MISP), which identifies the need to ensure market access and to enhance and ensure systems for product integrity. This Achievement Report responds to the MISP 2020. The program supports the activities of SAFEMEAT, the primary role of which is to oversee and promote management systems that will deliver safe and hygienic product to the marketplace.

The Program has maintained the same approach for a number of years, while responding to changes in the expression of food safety / market access objectives by the industry. Needs are assessed, scientific research and development activities are undertaken, and these are communicated widely to industry, government and scientific stakeholders both nationally and internationally. Change in practice may occur within the industry as a result of research, resulting in lower risk of non-conforming or unsafe product, or achieving safety more efficiently. Australia has an accepted excellent reputation internationally, thus, the majority of efforts are in efficiency of achieving safety. The safety of product then needs to be measured, and communicated to stakeholders as a preliminary activity to addressing existing technical barriers to trade or preventing the formation of new barriers. The latter activity requires data to be available well ahead of time so that industry/government can rapidly respond to proposals by other countries for new regulations.

Major outputs resulting from the food safety program over the past twelve months have been made available to the industry:

- Shelf life prediction model has been validated, and the value in supply management has been demonstrated. Some processors are adopting the model to design their cold chains.
- Real time data loggers have been used in international supply chains to assess cold chain management through to retail/food service
- Pilot trials have commenced to protect the integrity of exported product through to the final customer
- A survey of pathogenic E. coli (STEC) and antibiotic resistance in sheep, indicate that no additional risk management is needed.
- Concerns of some regulators and retailers of the potential for botulism from retail vacuum packaged meats has been demonstrated to be unfounded
- Revised version of the guidelines for the safe production of dry age meat will provide industry and regulators with guidance to produce safe and suitable product.
- The first round of changes to post mortem inspection practices were approved and are being implemented in domestic meat inspection.

A stakeholder survey found that two-thirds of government and industry respondents were satisfied with the performance of the program. 71% of the stakeholders are satisfied with being aware of the program and are focusing on topics which are important to them. In particular 88% of the stakeholders are aware of the MLA publications for industry with 76% percent are happy with the publication meeting their needs.

## 1. Reason for being

The Food Safety / Market Access Science Program arises from the **Meat Industry Strategic Plan (MISP)**<sup>1</sup>. The MISP does not address food safety specifically, which is seen to reflect the absence of market access failures relating to food safety and the maturity of the industry in incorporating food safety issues as a component of everyday business. The text of the MISP that aligns with this program:

### **MARKET GROWTH AND DIVERSIFICATION FOR AUSTRALIAN RED MEAT AND LIVESTOCK**

Gaining competitive access to global markets with customer and consumer preference for our products based on quality and integrity systems.

#### **Key issues**

- We are an export industry and must be focussed on reducing barriers to trade.

#### **Addressing the issues**

- Efficiency and value in trade and market access
  - Reducing technical barriers to trade

**MISP Objective** progress in reducing technical barriers to trade new market opportunities are made available or cost savings achieved worth \$100 million by 2020 and \$250 million by 2030 with stakeholders satisfied with service providers' contribution to these results

### **SUPPLY CHAIN EFFICIENCY AND INTEGRITY ACROSS OUR INDUSTRY**

Enhancing and ensuring the integrity of our whole of supply chain quality/integrity systems and paying all sectors in the supply chain on objective performance.

#### **Key issues**

- We must ensure our integrity systems deliver the products that we promise.

#### **Addressing the issues**

- Livestock and **product assurance through integrated integrity systems**

**MISP Objective** As technological advances become available and as customer requirements change, ongoing development of red meat and livestock integrity systems occurs to the satisfaction of stakeholders

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<sup>1</sup> The Red Meat Advisory Council (RMAC) was formed in 1998 as a single industry touch-point for the Federal Government when dealing with cross-sectoral matters. RMAC comprises a membership of five Peak Industry Councils: Cattle Council of Australia, Sheep Producers Australia, Australian Lot Feeders' Association, Australian Livestock Exporters' Council and Australian Meat Industry Council. The Goat Industry Council of Australia also maintains a link, but not as a member.

## 2. Sub-program overview

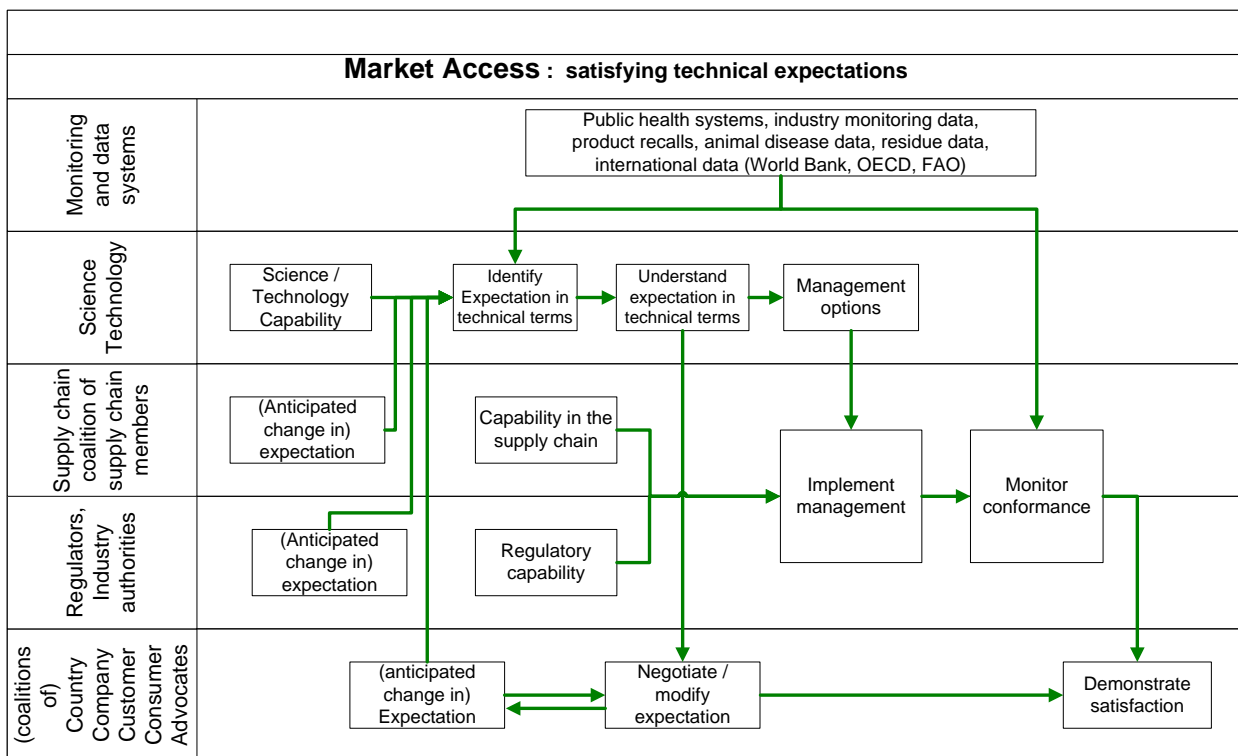
The joint program strategy addresses externally-facing technical market access, and internally-facing process effectiveness and efficiency, both leading to safe product and supply chain confidence at a competitive price.

The *R&D-oriented component* can be divided into two areas of work:

- address key access issues and demonstrate technical quality of product & systems
- research and development and science-based evidence for safety and integrity systems employed or introduced

Other issues are monitored and managed when required.

The R&D is conducted within the framework of satisfying the expectations of customers (whether they be countries, companies or consumers) and considering the expectations of advocacy organisations. The needs may be expressed by customers, in which case there is usually a short-term need to satisfy the expectation. On the other hand, it is also the role of the program to anticipate future expectations, and to provide the scientific basis for meeting future expectations. The diagram below shows how the components of the science program interact with customers and the major stakeholder groups.

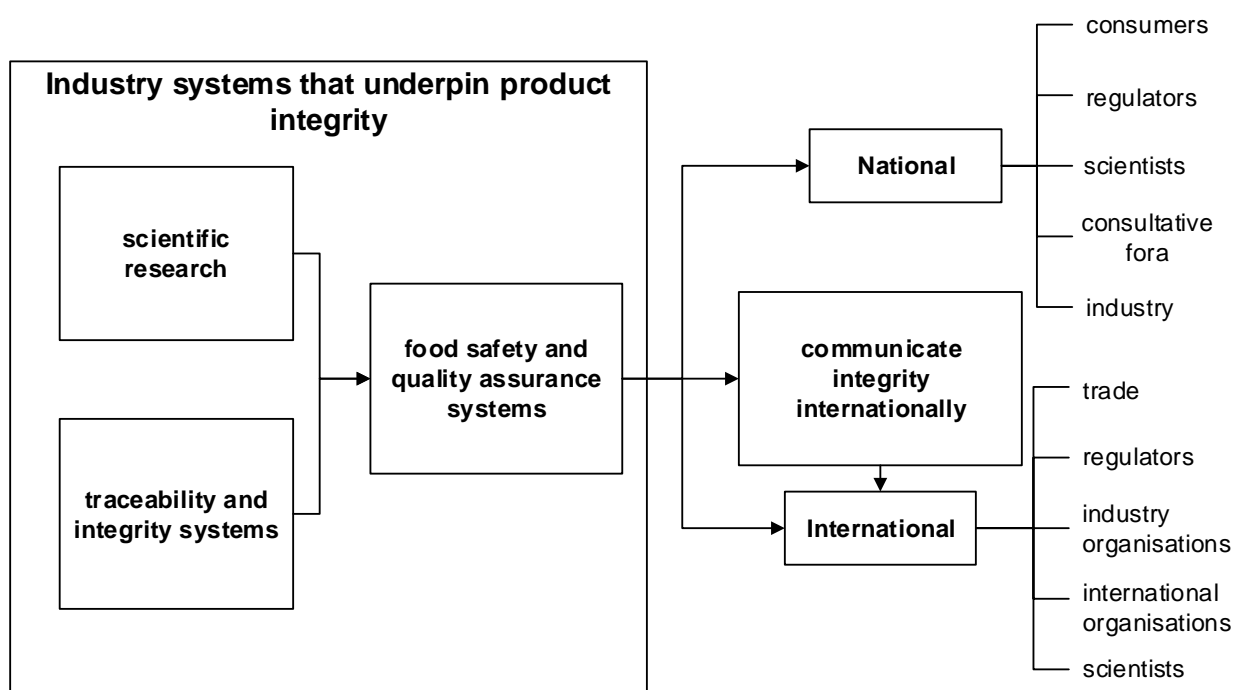


**Model for the cooperation of science providers, regulators, public health systems and industry in meeting customer requirements through the work of the food safety / market access science program**

The Food Safety / Market Access Science Program focuses on communicating knowledge about food safety risks and technical access expectations in the red meat supply chain, and their control, so that industry, regulators and the marketplace worldwide are aware and satisfied that risks are understood and are being controlled effectively. The communications components ensure that the high level of food safety of Australian meat is acknowledged. MLA international offices, websites with a focus on food safety, and materials for industry/regulator use (brochures, downloadable reports and tools etc.) are all key communication channels. The work of the program is often transmitted to the target audience through other activities in MLA. The diagram below illustrates the linkages between this program, other MLA activities in delivering integrity systems and reducing economic barriers, and recipients of information including decision-makers.



Section 4 of this report will describe the outputs of the scientific research program.



***How the science projects in the Food Safety Program lead to the development of systems to deliver safety, quality and integrity and are used to influence key stakeholders nationally and internationally.***

The activities of the Food Safety / Market Access Science Program will utilise methods that are:

- **Science-based** – producing credible scientific data and information to support its strategies.
- **Risk-based** – concerned with addressing real food safety issues and the protection of public health.
- **Efficient and effective** – are economic for industry to implement

### 3. Sub-program implementation

#### 3.1 Joint Program

Over the past few years, the Australian Meat Processor Corporation (AMPC) has operated a food safety program. Since late 2015, MLA and AMPC have agreed to operate the food safety program jointly.

A joint approach to portfolio development and project contracting, management and extension will ensure that the strategic priorities of each sector can be addressed in an efficient manner while avoiding duplication of effort and resources. Similarly, adoption of outcomes from these portfolio areas typically impacts across the value chain and a collaborative approach between AMPC and MLA will serve to reinforce and underpin the importance of a whole-of-industry approach.

Meat & Livestock Australia and the Australian Meat Processor Corporation are required to incorporate MISP strategic themes into their own strategic planning. The plan is also endorsed by SAFEMEAT. The program therefore supports the activities of SAFEMEAT, the primary role of which is to oversee and promote management systems that will deliver safe and hygienic product to the marketplace.<sup>2</sup>

Both AMPC and MLA express the MISP aspirations and objectives in their own plans.

#### 3.2 Sub-program position in the MLA strategic plan

In MLA's Strategic Plan 2016-2020<sup>3</sup>, two priorities relating to this program area are identified:

MISP Objective	Priorities
Through progress in reducing technical barriers to trade new market opportunities are made available or cost savings achieved worth \$100 million by 2020 and \$250 million by 2030 with stakeholders satisfied with service providers' contribution to these results	<p><b>EFFICIENCY AND VALUE IN TRADE AND MARKET ACCESS</b>            Australian red meat faces tariffs, quotas and technical barriers to trade across the globe, imposing billions of dollars in additional costs across the value chain. These barriers also prevent or restrict trade which limits the diversity of markets and, consequently, reduces the number of potential customers for Australian red meat. MLA will collaborate with the Australian Government, the Australian Meat Processor Corporation and industry stakeholders to drive growth in exports. MLA will do this by prioritising and taking action to reduce economic and technical barriers to trade in global markets.</p>
As technological advances become available and as customer requirements change, ongoing development of red meat and livestock integrity systems occurs to the satisfaction of stakeholders	<p><b>GUARANTEEING PRODUCT QUALITY AND SYSTEMS INTEGRITY</b>            For years Australian red meat has been marketed as clean, safe and natural, underpinned by its disease free status and advanced food safety and integrity systems. As our competitors build their own capabilities to deliver a similar product claim, it is essential for Australia to enhance our systems and technologies to keep ahead of our competitors and maintain our point of difference. Raising the bar of our integrity systems also helps Australia capture price premiums from discerning consumers and customers willing to pay more for higher levels of product assurance.</p>

<sup>2</sup> SAFEMEAT is a partnership between the Australian meat and livestock industry and State and Federal governments. SAFEMEAT's primary role is to oversee and promote sound management systems. SAFEMEAT also initiates R&D projects, particularly in relation to microbiology and food-borne pathogens and examines emerging issues, such as gene technology, that could have an impact on the red meat industry at some point in the future.

<sup>3</sup> <http://www.mla.com.au/About-the-red-meat-industry/About-MLA/Company-overview/Corporate-documents>

### 3.3 Sub-program position in MLA annual investment plan

MLA's Annual Investment Plan (AIP) for 2018-19<sup>4</sup>. guides the practical delivery of MLA's long-term investment priorities and outcomes, which are set out in MLA's Strategic Plan 2016-2020. The work described here is positioned in the AIP as follows:

**Program: Integrity Systems**

MLA's integrity systems program assists MLA to foster the prosperity of the Australian red meat and livestock industry by protecting its disease-free status and underpinning the marketing of Australian product as clean, safe and natural. It also helps Australia capture price premiums from customers and consumers willing to pay more for higher levels of product assurance.

**Sub-program: Market access science**

MLA's market access science sub-program delivers assurance of product safety to customers and reduce non-tariff (technical) barriers to trade by applying science and technology to the supply chain.

### 3.4 AMPC implementation

AMPC invested funds jointly into the Food Safety program with MLA. The funds are invested on behalf of the membership and aim to reach food safety outcomes to benefit the Red Meat Processing Industry, with the aim of reducing Non-Tariff Technical Barriers to export trade.

Programs that AMPC fund directly that are related to the areas Food Safety and Integrity Systems, in which the outcomes will benefit processors in the form of higher food safety outcomes and greater export market access.

### 3.5 Program budget

The budget for the work of the joint program, as described in detail in the following section has funds from three sources:

- MLA Annual Plan (25% producer, 25% processor, 50% Commonwealth)
- AMPC funds (50% processor, 50% Commonwealth)
- MLA Donor Company (MDC) Funds (50% Donor, 50% Commonwealth)

In the case of projects utilising levy funds, the Food safety Joint Portfolio Management Team determines which of the RDCs is in the best position to manage the research contract.

#### Forecast project expenditure (\$ '000) in 2018-19\*

	Source of funds			
	Producers	Processors	Donor	Commonwealth
MLA managed**	437.5	437.5	-	875
AMPC managed***	-	321	-	321
MLA managed through MDC	-	-	150	150

\* estimated values at the time of reporting – not final reporting by RDCs

\*\* includes program support as well as project expenditure

\*\*\* includes processor levy only projects and jointly funded projects

<sup>4</sup> <https://www.mla.com.au/globalassets/mla-corporate/about-mla/documents/planning--reporting/mla-aip-2018-19.pdf>



## 4. KPIs, outputs and activities

### 4.1 Achievement of Key Performance Indicators

The MLA Annual Investment Plan specifies Key Performance Indicators:

Program / subprogram / product group	Key Performance Indicator	Status	Further information
Integrity systems /  Market access science /  Market access technical research	Adoption of the shelf life model in domestic supply chain.	Achieved	The shelf life model has been used to demonstrate opportunities to redesign some domestic retail supply chains. Export supply chains have been investigated to find and correct problems. Further details in Highlight section 6.4.
	Antimicrobial resistance in sheep is known.	Achieved	Antimicrobial resistant bacteria in sheep/lamb faeces at the time of slaughter is extremely low, and not for antibiotics of high importance to human medicine. Further details in Highlight section 6.1.
	Changes to post-mortem inspection practices are implemented in domestic meat processing to manage risk and reduce costs.	Achieved	Changes to post mortem inspection practices have been implemented and further changes are being progressed which is anticipated to provide a substantial return to the sector.
	Qualitative assessment of the risk of toxoplasmosis in sheep for humans.	Not achieved	A survey is planned and has been contracted for this year. An alternative design will delay the results but provide more complete information.
	Approaches to protecting the integrity (identity) of product in supply chains are piloted.	Achieved	An MDC project to develop Australian authenticity markers has commenced. Pilots with two supply chains commenced in June 2019. Discussions are being held with a number of supply chains about conducting further trials. Further details in Highlight section 6.6.

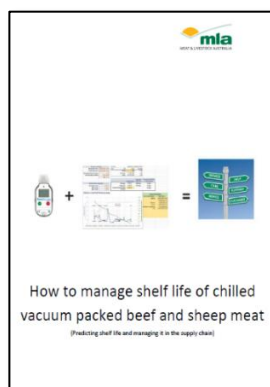
### KPI in Business Plan (but not AIP)

Program / subprogram / product group	Key Performance Indicator	Status	Further information
Integrity systems /  Market access science /  Market access technical research	Maintaining a high level of satisfaction (above 85%) by industry and government stakeholders with MLA's contribution to reducing impact of non-tariff (technical) barriers.	TBA	This will be determined by a stakeholder survey in July 2019 following release of the 2018-19 Achievements report
	Identify the risk of botulinum in vacuum packed meats	Achieved	A risk assessment and challenge tests indicate the risk of botulism from vacuum packed meats is extremely

			low. Further details in Highlight section 6.2.
	Characterisation of pathogen strains, and risk management options for enteric pathogens in sheep	Achieved	Sheep are a potential reservoir for STEC O157 and O26; however, the very low prevalence of, and lack of isolation of other Top 7 STEC, suggests these are uncommon, or not present in Australian sheep populations. Maintaining current practices would be sufficient to manage the risk.
	Watch and response on WTO notifications to minimise trade disruptions	Achieved	MLA has continued to work with NRS on responding to SPS notifications, which may potentially cause trade disruptions.

## 4.2 Publications for industry

There are a number of previous significant publications for industry that are listed on the MLA website (see below). These are the materials added in the past year:



### How to manage shelf life of chilled vacuum packed beef and sheep meat

Shelf life has always been important in the meat trade, and is becoming increasingly so, as Australian retailers and importers in overseas countries request information to substantiate company claims about how long their products will remain saleable and increase in export activities such as retail ready. In this document we give examples of cold chain monitoring to give you an idea of what you can learn by careful temperature monitoring and using the shelf life predictor. Most of the focus will be on storage life of vacuumed chilled primals. Further details in Highlight section 6.4.

June 2019

### Sheepmeat shelf life webinar

Cold chain trials has provided insights on the management of lamb MLA hosted a webinar. All Lamb processors/exporters we invited especially those in QA, Logistics and Sales roles were encouraged to join the Webinar. The Session was to communicate the impact of cold chain on shelf life, how current cold chain maybe insufficient and actions to take to ensure quality of your sheep meat in markets. Further details in Highlight section 6.4.

<http://redback.events/amp-acr30> (only viewable till 26/07/2019)

June 2019





**Antimicrobial Stewardship in Australian Livestock Industries**

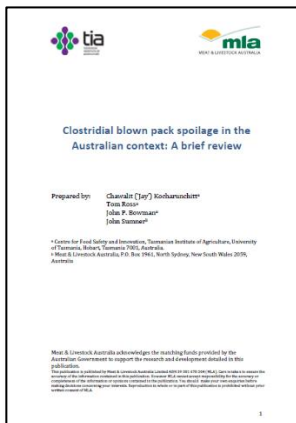
In comparison to other countries Australia holds a reputation for low use of antimicrobial agents and low frequency of AMR, meaning our animal industries have a strong foundation from which to address AMR. We have strong legislation around antimicrobial registration and use with prescription by registered veterinarians only. Antimicrobials important for human health that are of significant concern overseas have either not been registered or banned for use in animals in Australia. Similarly, Australia has legislation banning the use of antimicrobials as growth promotants within our intensive livestock industries.

Australia has been proactive in the adoption of antimicrobial stewardship (AMS) principles, and continuation of this momentum through collaborative efforts will be vital to maintaining and improving our positive status for AMS.

This report provides an overview of historical and current practices relevant to AMS in each of the contributing industries and is primarily intended for the stakeholders who are interested to know how the livestock industries operate in Australia

[file:///C:/Users/ijenson/Downloads/Antimicrobial-Stewardship-in-Australian-Livestock-Industries-2018%20\(1\).pdf](file:///C:/Users/ijenson/Downloads/Antimicrobial-Stewardship-in-Australian-Livestock-Industries-2018%20(1).pdf)

Further details in Highlight section 6.1  
November, 2018

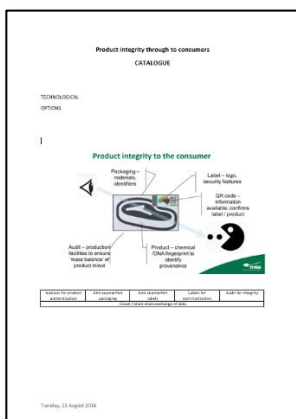


**Clostridial blown pack spoilage in the Australian context: A brief review**

Recently, an EU customer tested Australian VP meat and found C. estertheticum, leading to requests that the Australian establishment undertake a number of initiatives including testing the abattoir environment for C. estertheticum plus improving cleaning regimes. The information contained in this report provides a brief review on C. estertheticum and how it may affect Australian meat, and a draft example of a response back to any European customers who make a request for process control.

This document is available upon request from MLA – [lhuynh@mla.com.au](mailto:lhuynh@mla.com.au)

November 2018

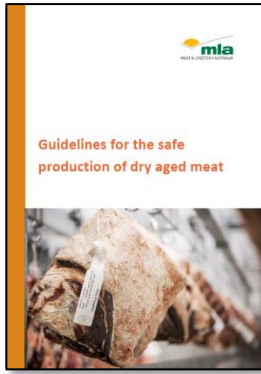


**Product Integrity Through to Consumers Catalogue**

This “Living” catalogue contains a number of vetted and verified technology providers in the Consumer Integrity space. These technology providers are the first approached when a relevant Request for Tender is circulated by MLA.

Further details in Highlight section 6.6.

For further details, please contact Emily Walker at [ewalker@mla.com.au](mailto:ewalker@mla.com.au)

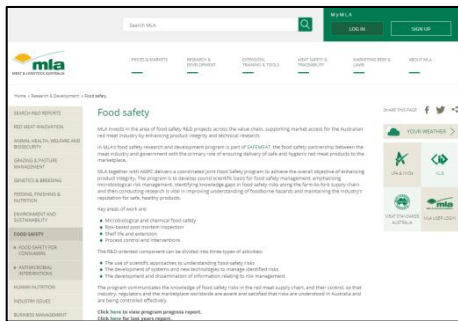


**Guidelines for the Safe production of dry aged meat**

The popularity of dry aged meat has increased in recent years, and concerns have been raised about the methods that need to be employed to ensure that it is safe and suitable for human consumption. A group of scientists, regulators, and dry ageing processors combined to produce this guide, which will be submitted to the Australian Meat Regulators Group, for endorsement. MDC and levy funded. Further details in Highlight section 6.5.

<http://publications.mla.com.au/go/pnS3UKSgcnS6sRPj>  
 April, 2019

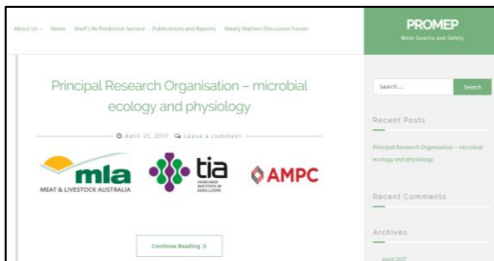
**4.3 Websites for industry**



**Food Safety website**

The Food Safety website has gone through significant changes. The new webpage is part of the MLA website and provide a point of reference on all things related to food safety. Contents on the website is significantly streamlined, to provide an overview of all our activities and the range of information and resources available, with links to more detailed reports on the MLA comprehensive reports database.

<https://www.mla.com.au/research-and-development/food-safety/>



**Microbial Ecology and Physiology The UTas PRO website**

The University of Tasmania is working on the website which will be the main source of provide an overview of all the latest activities, information related to the Principal Research Organisation: microbial ecology and physiology II project.

<http://blogs.utas.edu.au/promep/>

**4.4 External Communications**

Communication to scientists and technologists, both nationally and internationally holds a critical place in the strategy of the food safety program. There is a demand within government for risk-based and science-based transparent regulation with demonstrated cost-benefit. Communication through the scientific literature in peer-reviewed publications makes this information available to governments over a long period of time. It also influences scientific/technological thinking about meat safety and risk management.

A detailed list of scientific publications can be found in section 9.3

The program has a number of target groups (identified in the diagram in section 2), that may be influenced by different kinds of activities either directly by the MLA staff working on the Food Safety R&D Program, or by the scientists who work most closely with the program. A detailed list of activities can be found in section 9.4

A “Smart Packaging” workshop was held in March 2019 for processors and value chain partners to showcase a number of integrity technologies in the Packaging and wider traceability space. This workshop was well received by attendees with high evaluation scores.

#### **4.5 Joint Levy funded (SAFEMEAT) activities**

The Market Access Science sub-program frequently develops projects to address anticipated needs for information.

Antimicrobial resistance is an ongoing international issue and will require the industry to produce significant data on an ongoing basis. The research we are conducting, and are planning will address the immediate demands for information, provide input to deciding how data are collected in future, and provide a basis for trade negotiation. Further details in Highlight section 6.1.

Access to markets will require data to support claims of hygienic production. Carcase and primal data was produced by survey, which has now been substituted with on-going data from Department of Agriculture-supervised testing. The need for additional data is reviewed when annual plans are produced. A comprehensive survey of offals is nearing completion, which will fill a significant gap in availability of data to support exports. Further details in Highlight section 6.3. Shelf life (customer satisfaction) and food waste are important objectives that can be met through the science developed by the program. Building on the success of the shelf life model, we are continuing to conduct work in domestic, and also in international, supply chains. Real time data from supply chains, including through to international retail/food service will allow shelf life, and therefore, customer satisfaction to be delivered with a higher level of assurance. Further details in Highlight section 6.4.

#### **4.6 Processor Levy funded activities**

AMPC is funding a number of projects as part of its Food Safety program. Current projects include a study into the impact of extending the shelf life of chilled beef in overseas markets, the use of plasma technologies in disinfection of carcasses and primals for food safety and shelf life extension purposes, and the use of shock wave technology on cryovac meats.

In the area of Integrity Systems, AMPC are funding projects and research in areas such as a review of process monitoring for the Australian meat industry, a study on the microbiological food safety and storage life of Australian red meat and AMPC also contributes to the TSE Freedom Assurance Program. AMPC has also worked with MINTRAC to educate the regulators and OPVs on the operations of red meat processing facilities.

AMPC are leading Joint Industry projects in the real time spectroscopy of for the detection of surface contamination of meat, as well as a couple of projects investigating non invasive methods of determining meat quality characteristics.

#### **4.7 Other levy funded activities**

The Sub-program has also part-funded (via support costs, i.e. largely, staff time) work, primarily funded through other programs, that is relevant to the objectives of the Sub-program.

The importance of managing antimicrobial resistance is important to all Australian food exporters. MLA has been involved with many other animal industries and the Department of Agriculture to develop consensus about the direction for Australia. Reports on stewardship have been produced, the first Australian Veterinary Antimicrobial Stewardship conference has been held, and national plans for animal industries working on antimicrobial resistance and stewardship are being developed. Further details in Highlight section 6.1.

There is a small but increasing interest in systems that will ensure that the identity (integrity, authenticity) of product can be maintained through to food service/retail and the final consumer. We are only beginning to conduct work in this area. A key output is the compilation of a catalogue of technology providers who offer services ensuring integrity through to consumers. Companies within this catalogue have been approached with Requests for Tender to address product integrity concerns for various value chain partners. These proposals, if accepted, become projects via the MLA Donor Company. Further details in Highlight section 6.6.

#### **4.8 MLA Donor Company funded activities**

An increasing number of activities relevant to this sub-program are conducted through MDC funding mechanisms. MLA Donor Company (MDC) funded projects do not use industry levies, since they are funded by the involved companies and the Commonwealth. Some projects are with processing companies and others are with technology suppliers, or organisations that have interests in common with the Australian red meat industry.

Shelf life and cold chain studies are being funded through the MDC. The information from these projects has helped to validate the shelf life model, determine secondary shelf life- including retail ready export products, develop an understanding of how to manage supply chains, and to determine where the value of this technology can be applied. It also provides specific information to the supply chain on how to manage their product. These projects will continue to be funded, using new technologies and ideas, which are then shared with the industry. Further details in Highlight section 6.4.

Following the industry-funded work to evaluate STEC testing, some technology suppliers are engaging in MDC-funded projects to evaluate new/improved test methods for manufacturing beef, under Australian conditions. The learnings from these projects will introduce new technologies to the Australian market, gain regulatory approval for new tests, and deliver benefits that can be calculated through the spreadsheet cost:benefit tool that has been developed.

The sale of vacuum packed chilled beef and lamb faces restrictions in the UK due to concerns by the regulator about the potential for botulinum toxin production. These restrictions extend to Australian product, and may affect regulators and retail customers in other countries also. The Donor Company project, funded with the British industry, has conducted a risk assessment to determine how long products can be in retail supply chains with safety. Further details in Highlight section 6.2.

Humane slaughter and the use of stunning methods acceptable for religious slaughter represent a different kind of technical market access barrier. The MLA Donor Company has funded a method of stunning based on the application of microwaves (Diathermic syncope, DTS) for some time. The current work is focussed on application in a commercial environment and collection of data that will allow the method of stunning to be recognised by the EU Animal Health and Welfare Panel, should that be desired. The current phase of work should be completed in early 2020. At AMIC's request in conjunction with the Western Australian Department of Primary Industries, and the Dry Age expert panel, has revised the Guidelines for the safe production of dry aged meat. This now includes new scientific information after the guide was completed last financial year. The guide will ensure Australian dry age producers have an increased awareness of the risks associated with Dry Aging, and will resolve common questions such as the effectiveness of salt blocks. Further details in Highlight section 6.5.

Increasingly, Australian red meat value chains are recognising both the risks of not having a fully traceable supply chain, and the benefits of being able to ensure provenance to the end consumer. Following the circulation of Requests for Tender, a number of Integrity technology providers have started working with value chain partners to provide traceability and assurance solutions. Further details in Highlight section 6.6.

## 5. Evaluation: outcome and impact

### 5.1 Periodic program evaluation

A comprehensive program evaluation is currently underway in preparation for MLA's five year review under the statutory funding agreement, and will also provide the basis for reporting against the current MISP, due in June 2020.

### 5.2 Towards outcomes and impact

The definition of outcomes and then determining the impact on the industry is a complex and time consuming task, which is why it is only performed periodically. This section indicates the potential outcomes of current work and identifies the potential resultant impact. Outcomes and impact are the result of cumulated efforts of many organisations over a long period of time; the program only plays one part of delivering on behalf of industry.

Project	Potential outcome / impact
Monitor scientific developments in meat food safety research to respond, as needed, at an international level.	1. Little, if any, information, suggests new or unaddressed risks in red meat supply chains. Antimicrobial resistance has become a bigger international issue and is being addressed. Further details in Highlight section 6.1.
Ensure risks associated with Australian meat are known and controlled.	1. This project has confirmed the low food safety risks associated with Australian meat and will ensure that this low risk is acknowledged in national and export markets. Further details in Highlight section 6.2.
Promote the exceptional shelf life of Australian meat.	1. 2017 UAE changes to shelf life is estimated to return \$60m to the Australian industry
Achieving optimum shelf life of Australian meat	2. Plans have been developed to gain changes to shelf life by other GCC countries which would have a sizeable impact 3. Plans have been developed to obtain improved access to the Egyptian, and Lebanese markets through shelf life increases, which would have a significant impact 4. Trials in a domestic supply chain suggest that losses could be reduced worth \$3.6m pa 5. Application of shelf life models with real time temperature monitoring in international markets demonstrate the potential for shelf life to be managed in supply chains 6. Visual indicators of remaining shelf life may provide a simple check on product shelf life at the carton level Further details in Highlight section 6.3.
Demonstrate the very low risk of enteric pathogens (E. coli, salmonella) in Australian beef.	1. Australia is well-prepared to respond to US imposition of performance standards on Salmonella / process control in beef processing/ lymph nodes/raw ground beef components. The impact can only be determined once Australia has negotiated compliance with US requirements. 2. Results and publications of this work will support claims of achievement of high standards of process hygiene and provide a basis for making claims to change monitoring systems.

Project	Potential outcome / impact
<p>Demonstrate appropriate post-mortem procedures for a risk-based approach.</p> <p>Implement new post-mortem procedures based on risk approach.</p>	<p>1. Agreement to change post mortem inspection could have a large impact on cost of inspection, and/or condemnation of carcasses and carcass parts. An early estimate is that \$35m could be gained from complete implementation of the current proposals, most arising from not incising masseter muscles.</p>
<p>Responding to international standards changes to keep the risk of residue violation in international markets low.</p>	<p>1. Reduced risk of violating an importing country's residue limits. A number of potential issues have been identified with MRLs proposed by Korea. These have been reported to NRS, for action by the DA.</p> <p>2. Responding to new regulations to keep residue within an acceptable limit. In 2018 abamectin MRLs for sheep meat in Japan were negotiated, which protected this market valued at \$118m pa</p>
<p>Prepare a position on pyrrolizidine alkaloids and plant toxins</p>	<p>1. Work on pyrrolizidine alkaloids has not been required because they have not become a significant international issue</p>
<p>Controlling the risks of <i>Toxoplasma gondii</i></p>	<p>1. Defining the risks of <i>Toxoplasma</i> continues. It is possible that the risk will need to be controlled within the capability of the industry to do so. Benefits from this work, for animal and human health will take some years to develop.</p>
<p>Controlling the potential risks associated with enteric pathogens in sheep</p>	<p>1. Results obtained from this work indicate that there are no risks associated with sheep that are not also associated with cattle to the same degree.</p>
<p>Demonstrate that antimicrobial resistance risks in Australian livestock are low.</p>	<p>1. Outcomes (avoidance of adverse publicity, avoiding implementation of ongoing surveillance programs) may accrue from having good antimicrobial resistance data which is well-known by stakeholders</p> <p>2. Favourable interactions with government and international groups accrue from having a history of achievement.</p> <p>3. These data underpin the development of appropriate antimicrobial stewardship programs by industry</p> <p>Further details in Highlight section 6.1.</p>
<p>Assessing new technologies for application by the program</p>	<p>1. New technologies are being investigated, both for research and application in the industry. Whole Genome Sequencing has the potential to provide data that could be very useful to industry.</p> <p>2. Microwave decontamination has promise of being able to result in product that is even safer than usual and may have particular applications that could command a significant premium.</p> <p>3. The program is investigating near real-time temperature logging that will allow the management of cold chains and reduction in customer complaints and product loss.</p> <p>Further details in Highlight sections 6.4 and 6.6.</p>
<p>Ensuring the system meets market expectations</p>	<p>1. There is little evidence of product failing to meet market expectations. Unnecessary technical barriers are therefore a major issue.</p>



Project	Potential outcome / impact
Maintaining and improving control of food safety and associated hazards	<ol style="list-style-type: none"> <li>1. Novel chemical interventions on sub primal prior to vacuum packing, have the potential to improve food safety.</li> <li>2. The hygienic status of beef, sheep and goat offals provide a baseline on the effectiveness of process control in offal process</li> </ol>
Maintaining and improving quality systems and building capability	<ol style="list-style-type: none"> <li>1. Providing assurance of product identity and quality will ensure the maintenance of market share, avoid the loss of markets, and may increase the willingness of the market to pay for product.</li> </ol>
Animal Stunning	<ol style="list-style-type: none"> <li>1. A technology that will more certainly meet both animal welfare and religious requirements for stunning at the time of slaughter will reduce the risk of being excluded from markets with religious requirements.</li> </ol>

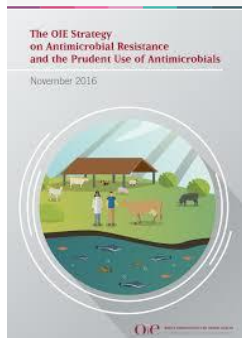
## 6. Highlights

### 6.1 International conversations about antimicrobial use

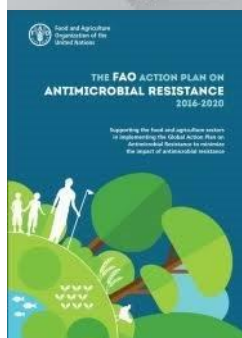


Antibiotic resistance has become an agenda item at the highest level of international and inter-governmental meetings. While all uses of antibiotics are under scrutiny, use of antibiotics in animal agriculture is singled out as a 'One Health' issue. One Health is an approach where both animal and human health sectors, as well as others, work together to achieve better public health outcomes through the One Health Triad: healthy animals, healthy environment, healthy people.

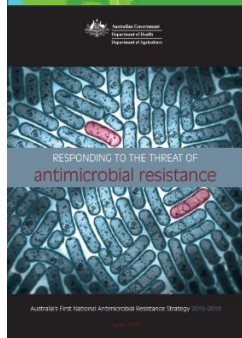
MLA has been involved since the development of the 1<sup>st</sup> National Antimicrobial Resistance Strategy 2015-2019, and specific activities listed in the Implementation Plan acknowledge the involvement of the red meat sector.



Research has been funded to determine the prevalence of resistant bacteria in cattle and sheep at the time of slaughter. These bacteria may be involved in human infections, but more importantly, are indicators for the prevalence of antibiotic resistant genes in animal production systems at the point in the supply chain where animals become food. The level of resistance have proven to be very low, which is a pleasing result. The cattle survey is currently being repeated so that any change in the prevalence of resistance can be measured; increases in the prevalence of resistance may indicate the need to change animal husbandry practices. The feedlot sector has funded the development of stewardship guidelines. Stewardship is an approach to managing the use of antibiotics to avoid the development of resistance. Good stewardship will result in a decreasing dependence on antibiotic use. Projects will commence in this calendar year to develop better estimates of the use of antibiotics at both sector and enterprise levels. Funding will be provided to the Australian Veterinary Association to develop prescribing guidelines for veterinarians, to encourage prudent use of antibiotics.



MLA has joined together with other animal industries to discuss areas of common interest and to work collaboratively in the area of antimicrobial stewardship. Collaboration has proved valuable in discussions with the Commonwealth, and developing cooperation with the Chief Medical Officer and the Chief Veterinary Officer. A Stewardship conference was held in late 2018 to bring together all those interested in the area, with international experts, to discuss and reflect on stewardship efforts in Australia. Currently, a group of animal industries are working together to develop an Antimicrobial Stewardship Research, Development and Extension Strategy, which will become part of future animal and national plans for addressing resistance.



MLA continues to be involved in consultation with the Commonwealth. Our approach to surveillance of resistance has been used as a model by the Commonwealth with other industry sectors and our experience has been used to encourage other sectors to engage with the issue. Many consultations about surveillance of resistance, the measurement of usage, and future strategies and plans for the animal industries as well as the next Australian plan have been attended.



Antimicrobial resistance has become an element in the Australian Beef Sustainability Framework which provides a focus for summarising and reporting on efforts to supply chains and consumers.



## 6.2 Botulism risks in vacuum packed, chilled beef and lamb are extremely low

Botulism is a feared illness, the result of consuming foods in which the bacterium *Clostridium botulinum* has grown and produced toxin. Consumption of a very small quantity of botulinum toxin can cause paralysis and death. *Cl. botulinum* grows in the absence of oxygen and some strains can grow and produce toxin without causing spoilage at temperatures above 3°C. In the United Kingdom, in recent times, retail display of vacuum-packed meats has been restricted to 10 days, and the guidance potentially extends to demonstrating that vacuum-packed meats have not been held above 3°C for more than 10 days since packing. Israel has standards that mimic the UK guidance, and other countries and supply chains could follow suit.

Through the MLA Donor Company, Quadram Institute (formerly, Food Research Institute) in Norwich, UK was commissioned to conduct a risk assessment. Our funding partner was the British Meat Processors Association (BMPA).

The findings of the risk assessment were that:

- there are no reports in the medical/scientific literature of botulism from vacuum-packed meat
- more than 10<sup>10.8</sup> servings of vacuum-packed chilled meat have been consumed in the UK under current industry/retail storage conditions without problems being noted
- If a mixture of *Cl. botulinum* strains are added at a high level to vacuum-packed beef or lamb, and held at 8°C, then the product can be held for 50 days for beef and 35 days for lamb before toxin is able to be detected

A spokesperson for the BMPA was quoted in an industry publication<sup>5</sup> as saying:



**This is important news for British meat processors as it potentially removes a significant technical barrier to trade as well as offering the opportunity to decrease waste and cut costs. It also suggests that any restriction should only be applied if there is a clear food safety benefit.**

The BMPA are submitting the report to the UK's Food Standards Agency and seeking revision of their guidance document. The work is also being prepared for publication in a scientific journal.

The UK requirements are also found in Israeli regulation, and are inclined to be followed by some retailers. For these reasons, the implications of this work are broader than the UK market.

<sup>5</sup> <https://www.newfoodmagazine.com/article/82635/meat-in-depth-focus-2019/>

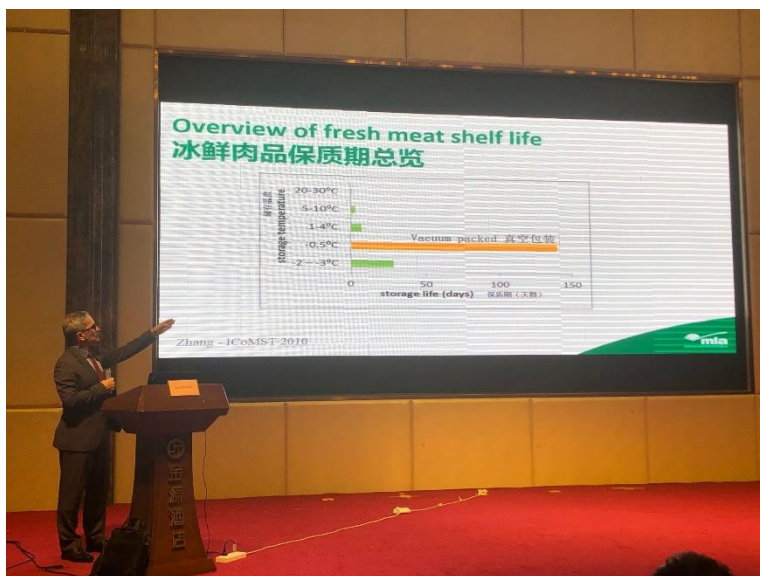
### 6.3 Technical market access: ongoing activities to support change

Access to all markets, free of technical requirements above those of the Australian Standard, are a dream of Australian exporters. Importing countries have a number of non-tariff barriers, including technical barriers, to entry of foreign product. While the legitimacy of the technical requirements could be argued against under the rules of the World Trade Organisation, it is usual to engage in a negotiation of some form, so that importing countries accept that Australian product is equivalent to their domestic product, or to allow Australian exporters to utilise an alternative means of achieving the same outcome.

The rate of progress can be difficult to measure; a lot of effort can be made for little obvious response, and then the response can be positive, large and instantaneous.

The ongoing activities in technical market access include:

- **UK** retail display periods – mounting a scientific challenge against regulatory guidance that is unsupported. Restricting the shelf life of vacuum packed product at retail would have a significant deleterious impact on supply chains
- **EU** antibiotic policy – Legislation that passed the European Parliament in November 2018 allows restrictions on antimicrobial use in animals whose meat is to be exported to the EU. SAFEMEAT are discussing the need for a working group on this issue
- **Egyptian** standards for chilled shelf life – a seminar was held in Cairo in October 2018 for government officials, which has led to an agreement to run some shelf life verification trials
- **GCC** shelf life standard -- changes to the standard have not been agreed by the GSO's ministerial council, and a submission has been prepared to provide further information
- **China** chilled beef and lamb – seminars have been held that have supported chilled beef sales, including a presentation on the importance of cold chain management and the research on temperature effects on shelf life
- **Vietnam** chilled beef standard – MLA is supporting the development of a chilled beef standard in Vietnam and will participate in the work of the standards committee
- Responding to changes in MRLs – MLA keeps a watch on the notifications of new or changed MRLs that are made to the **World Trade Organisation**, so that those that may have a significant impact on industry can be discussed between the Australian and importing country governments.



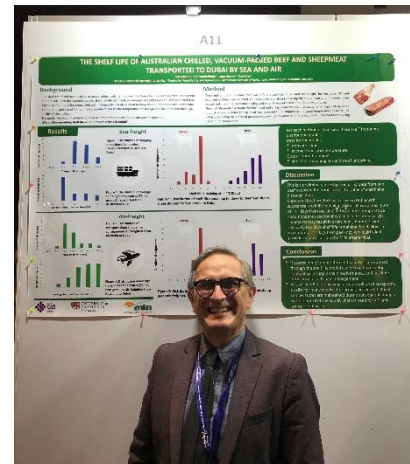


## 6.4 Managing shelf life through cold chain management (domestic, international) and Cloud based data logger trials.

Industry has always tracked the cold chain, using mostly single use USB loggers. This is considered important data, however, historically, very little can be derived from the temperature data when it deviates from the norm. Which usually results in the product being monitored closely. In addition to the limited ability to get meaning from the data there may be no visibility on an exported product once it has entered the importing country. This has resulted in negative claims regarding product quality, that are hard to defend when the establishments have limited visibility on how the products were stored or treated after arrival.

With the help of the UTAS/MLA shelf life predictive model, the temperature data can be transformed into information, and this data will allow industry parties to understand and work with customers to improve quality and reduce negative claims. To further Australia's reputation in the Middle East, MLA presented a poster on the favourable cold chain, and long shelf life, of Australian meat at the 12<sup>th</sup> Dubai International Food Safety Conference (DIFSC). The poster was well received and resulted in MLA receiving first prize for 2 consecutive years.

MLA has since investigated various methods of remotely tracking and receiving data, with the least amount of changes/impact on current procedures, which narrowed the favourable options to just a few cloud based logger companies.



A trial was conducted that compared 2 different loggers with GPS capability across 12 shipments and 22 individual carton traces. Additional information gathered included GPS, light, air pressure, motion/shock, relative humidity and storage orientation. This further information may prove useful in also monitoring packaging integrity and what the carton has experienced during shipment. The loggers successfully tracked carton movement within Australia, during shipment, transport, and ultimately to the processors' customers' cold store. Once the data was analyzed it became apparent certain parts of the cold chain needed more monitoring or other solutions.

MLA has communicated these outcomes through:

- AMPC Meat Inspection Quality Assurance Network
- Report on "How to manage shelf life of chilled vacuum packed beef and sheep meat"
- A chilled sheep meat shelf life webinar (14 industry members attended the session)

We encourage industry to approach MLA for access to the shelf life model and assistance to help with deriving information from historical temperature data or to gather supply chain performance data.



With the limited information on the actual rate of occurrence and claim amounts, the benefits are estimated to be worth more than \$5 million per annum to industry.

## 6.5 Dry aging of red meat

The popularity of dry aged (DA) meat has increased in recent years, and concerns have been raised about the methods that need to be employed to ensure that it is safe and suitable for human consumption. Besides the one CSIRO/MLA dry ageing publication in 2010, there is currently limited international research carried out on dry aged product, of which most has been completed in the United States. As changes in processing practices, plant design, consumer demands, supply chain, and technological advances, ultimately may cause changes in both eating quality and food safety, Australia needs to revisit this area.

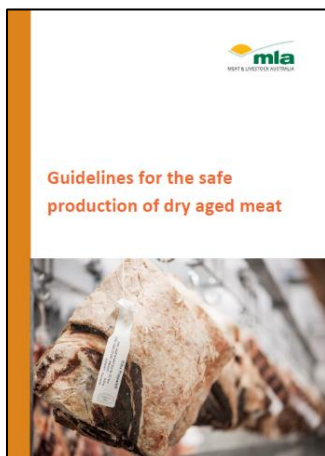
A combination of Levy and MDC funded projects were able to fill the research gaps and capture market opportunities such as:

- Using wet aged beef for Dry ageing (export market),
- DA of lamb and mutton,
- Consumer insights and taste panel of Australian DA products,
- DA during transit (utilising shipment time),
- Good manufacturing practices, plant recommendations and a nationally recognised Guideline (first in the world).



First place at ICoMST 2018

There has been great progress. The project on DA beef using wet aged beef was successful, and allowed processors to use up to 21 days wet aged beef loins to produce a DA beef with comparable results of non-wet aged DA beef. This was submitted to The International Congress of Meat Science and Technology (ICOMST) 2018, up against more than 300 other submissions globally. MLA won 1<sup>st</sup> place. MLA was also invited by MINTRAC to present on the Online Meat Retail Training Conference.



The dry age expert panel (consisting of scientists, regulators, and dry ageing processors) has revised the DA guide and updated it to include new information; the new edition will provide more information to anyone looking to start or improve their DA business.

DA product during transit was successful and provides a viable option compared to the current process of using wet age products, however challenges still exist where international markets are yet to define what they consider DA meat is and which tariff product code it should fall under.

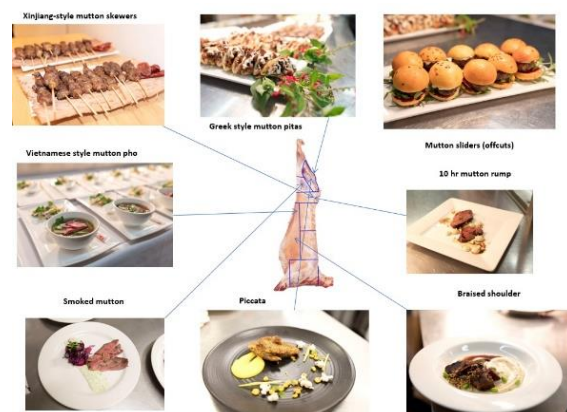
DA mutton work has been completed and it was concluded that DA sheep will remain a niche product. In addition, the project looked at value adding opportunities including processing methods. As the lamb/mutton market is still strong we do not expect this work to be adopted yet, however this piece will become useful to increase demand when the mutton market

becomes weak. It is expected DA will bring new value of \$3.5m to the sheep meat industry with a 20-30% premium over wet-aged sheep meat.

The advantage of being recognised, and further increasing Australia's international reputation on this topic, is that it allows Australia to set the specification and requirements rather than following other countries.

This will greatly assist parts of the Australian supply chain to export wet age product to DA or directly export DA products to international markets.

Link to all DA related projects and reports click [HERE](#)



## 6.6 Enhancing consumer confidence through supply chain integrity

Food fraud is estimated to cost the global food industry \$50bn annually<sup>6</sup>. Certain Asian markets- particularly China and Hong Kong- are experiencing both a growth in pirated and counterfeit goods, and a growth in their middle class income bracket, resulting in raised consumer awareness of the potential dangers of non-genuine food products, and the means to reduce the risks of purchasing fake products.

When an end consumer encounters a product in a supermarket, or other retailer, they make choices based, in part, on the evidence of the integrity of the product. A number of elements work together to provide consumer confidence before purchase, and MLA believes that multiple components are required to satisfy the consumer need to ensure a high level of product integrity.

The components may include:

- Known composition or addition of a specific tag to meat as a unique identifier
- Packaging materials that may have specific/difficult-to-counterfeit features
- A label that has security features (e.g. holographic labels)
- A label that provides access to information that flows in one or two directions between the product owner/customer/end-consumer (e.g. QR/NFC codes)
- Auditing and information at points in the chain where a process (such as cutting and repacking) occurs,

Many of these components may be supported by data storage and transfer in the cloud, or backed up by verified ledgers such as Blockchain.

MLA has created a catalogue of technology providers that offer product integrity through to consumers (more details in section 4.2). As Australian brand owners recognise the importance of taking action to ensure integrity in their value chains, a number have worked with MLA to create Requests for Tender that have been circulated to the technology providers in the catalogue. As a result there are a number of MDC partnership projects underway or in the pipeline that will address these concerns for the Australian red meat industry. Some of these include:

- A validation study of Oritain's *chemical fingerprinting* technology that claims to be able to detect and differentiate Australian Beef and Lamb from other geographies/meats using their natural concentrations of trace elements and isotopes. This will give exporters the ability to audit meat in market and verify its origin.
- Blockchain trials, tracking meat from farm to end consumer in-market
- Traceability trials using IoT devices, blockchain and two-way communicative anti-counterfeit labels (such as Near Field Communication (NFC) labels) in to market

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<sup>6</sup> McLeod, R. (2017) Counting the Cost: Lost Australian food and wine export sales due to fraud. Food Innovation Australia Ltd.

## 7. Government Research Priorities

The program is responsive to government policies and frameworks on research, development and innovation. The table below shows how the MISP priorities fit with Australian government priorities

Meat industry strategic plan priorities	Australian government priorities	
	Science and research priorities	Rural research, development and extension priorities
Efficiency and value in trade and market access	Food	Advanced technology Adoption of research and development
Guaranteeing product quality and systems integrity	Food Transport	Advanced technology Adoption of research and development

Further analysis can be found in section 9.5



## 8. Where to from here

### 8.1 Major activities towards achievement of 2020 MISP Objectives

In the remaining year of the current MISP, the program will engage in projects that will deliver immediate value to the industry, as well as projects that will provide a firm defence against future requirements and expectations:

- demonstration of shelf life achievable in international supply chains and management of the shelf life may bring market access benefits, as well as benefits to individual supply chains due to improvements in efficiency estimated to be \$5 million annually
- risks due to antimicrobial resistance in beef will be qualitatively assessed, reported, and used to define further surveillance activities.
- equivalence cases for post-mortem inspection changes will be prepared for North American and European markets.
- a cost-benefit model for common integrity protection approaches will be developed which clearly shows the advantage of a proactive approach to fraud, and traceability.

### 8.2 MLA Donor Company initiatives

MLA Donor Company activities are likely to cluster around two themes that may converge over time:

- demonstration of cold chain integrity, improvement in cold chain management and management of shelf life through to customer to make supply chains more efficient, reduce wastage, better manage stock and reduce product sold at a discount near the end of anticipated shelf life
- demonstration and protection of the integrity of product through to consumers, and data flowing to/from consumers, through traceability, supply chain management, product verification through analysis, and IT platform technologies and infrastructure.

Initiatives in both of these areas will contribute to the MISP 2020 objectives.

## 9. In detail

### 9.1 Communications in media



# McDonald's helps curb antibiotic resistance threat with new beef policy



ABC Capricornia By [Chloe MacKenzie](#)

Updated 20 December 2018 at 4:32 pm

First posted 20 December 2018 at 1:49 pm

**Fast food giant McDonald's says it will work with its top 10 beef producing markets to cut down on the amount of antibiotics used in its meat.**

In a statement, McDonald's said it will establish "reduction targets for medically important antibiotics for these markets" by 2020, having developed the policy over the past 18 months after consulting with a "cross-section of expert stakeholders", including veterinarians, public health leaders and beef producers.



The fast food giant, McDonald's, understands its influence will encourage supply chains to respond to its move. (ABC News)



**COUNTING THE COST:**  
LOST AUSTRALIAN FOOD  
AND WINE EXPORT SALES  
DUE TO FRAUD

Ross McLeod



[https://fial.com.au/Story?Action=View&Story\\_id=711](https://fial.com.au/Story?Action=View&Story_id=711)



## Protecting brand 'Australia'

**T**eys Australia has teamed up with MLA in a 'proof-of-concept' project to determine the possible uses and value proposition of blockchain technology for the Australian red meat export industry.

Teys' Chief Value Chain Officer Tom Maguire said a critical component of the project is assessing blockchain's potential to help overcome substitution and other food fraud.

"Australian red meat is a valued brand around the world and, like other high-cost, luxury products, people try to cash in on it through substitution and misrepresentation," Tom said.

"Teys Australia has a growing stable of brands that are exported around the world and underpinned by Meat Standards Australia. Trust and security in those brands is of paramount importance to us and our suppliers."

Tom said Australian red meat's clean, green image commanded a price premium overseas which must be safeguarded.

"Australia' is a valuable brand and we need to use whatever technology we can to ensure consumers are getting the real McCoy," he said.

"Substitution and the subsequent market disruption affects all of us.

"Blockchain is like a virtual ledger, providing a record that can't be altered. It could potentially underpin provenance stories for Australian red meat around the world, to improve trust and traceability."

Tom said the technology could potentially create a record of all product information collected along the supply chain, which could then be shared with customers.

"All information recorded by producers, lot feeders, processors and distributors would be available to consumers so they could have absolute certainty about where the product had come

from, how the animals were raised, how the meat has been handled, and so on."

At the Integrity Systems Company, Program Manager for Digital Value Chain Development Rebecca Austin said that given this is a proof-of-concept project, the blockchain environment will not be integrated with all the systems that exist across the supply chain.

"However, key opportunities for integration will be identified and tested," Rebecca said.

"MLA is also investigating other applications of blockchain and all final reports and case studies will be publicly available on completion."

According to Tom, the technology also has potential application within maintenance systems of processing plants. ■

### RESEARCH IN REVIEW

#### PROJECT NAME

Blockchain technology to support provenance

#### RESEARCH ORGANISATIONS

Teys Australia and Unico

#### FUNDING ORGANISATIONS

MLA Donor Company

#### GOAL

To prove or disprove the following concepts:

- blockchain can provide a transparent, trusted lineage of a value chain
- blockchain technology has the potential to integrate into existing processes
- blockchain offers an advantage over existing industry systems.

#### BUDGET

\$234,898

#### DURATION

January to July 2019

✉ Tom Maguire  
T: 07 3198 9000



# TRUST: THE KEY TO BLOCKCHAIN'S APPEAL

**W**e're hearing the term 'blockchain' a lot these days, but what is it and how might it benefit the red meat industry?

MLA's Manager of Information Architecture and Solution Design Andrew Skinner is part of the team tasked with answering those questions.

"Blockchain first hit the headlines because of the cryptocurrency 'bitcoin'," Andrew said.

"It's one of the underlying technologies that enables bitcoin transactions to take place, but blockchain's potential is far broader than cryptocurrency."

MLA is running levy and MDC-funded research projects to identify valuable blockchain opportunities for the red meat industry.

"MLA has chosen to investigate blockchain to understand how it could improve supply chain efficiency, compliance and traceability, increase trust in product provenance and transform the way transactions are managed," Andrew said.

## How does it work?

According to Andrew, the concepts behind blockchain technology are mathematically complex but, at its core, it enables trust in the transfer of value or assets between two parties, without the need for a trusted middle institution, such as a bank.

Blockchain technology is often referred to as 'distributed ledger' technology because all the transactions are recorded in a list that is shared between all users of the blockchain. This is the first potential benefit of blockchain for the Australian red meat industry: decentralisation of data.

"The detail of each transaction recorded in the list is referred to as a 'block' of data," Andrew said.

"What's important about these exchange records is that the cryptographic technology that enables blockchain ensures the records written into the

shared ledger cannot be altered by any single party or minority group. This is the second potential benefit: immutability.

"It's the running transaction history saved to the ledger, or database, that is called the blockchain.

"Every party using the blockchain has to agree on the values saved into the ledger.

"If one party changes one of the values in the database, the other parties will notice when checking their copy and the change will be made known to the majority."

Additionally, if one of the ledgers fails or goes offline, the system remains unaffected. This is benefit three: transparency and high availability.

## Enabling trust

"In today's digital world where it's hard to judge what's authentic, where information has come from and who has had a hand in changing it, it's easy to see why these benefits are important," Andrew said.

"For red meat supply chains, one area in which blockchain technology is showing potential is supply chain security and provenance due to the increasing use of 'internet of things' (IoT) devices, such as sensors.

"When details such as compliance measures, carton contents, shipping temperature and customs information are continuously sensed, recorded and

stored in a blockchain, all parties with access to the ledger can be assured each actor in the supply chain did the right thing.

"By giving customers access to the data, they can be reassured of the provenance of their meal and even be prepared to pay premiums."

## Smart contracts an added function

According to Andrew, there are several technologies that build on the core blockchain which add additional desirable functionality, such as 'smart contracts'.

"Smart contracts are immutable 'if this, then that' type actions that can be stored on the blockchain," he said.

"An example of a smart contract might be: 'If X conditions are met, then make a payment of Y.'"

In an on-farm situation, where a producer is using IoT sensors to capture information about health treatments or organic feed sources, a smart contract may be created in which a processor agrees to pay a per animal premium if certain health and feeding conditions are met.

The premium would be paid more quickly than a traditional transaction, because proof of the producers' actions would be 'sensed' and immediately entered into the database, which could then immediately execute the contract terms. ■

✉ Andrew Skinner  
E: askinner@nlis.com.au



## 9.2 Current status of Projects

Product	Progress
<b>Information and program management</b>	<p>The Program Advisory Group consisting of Peak industry members and Stakeholders to the Food safety program, which meets twice a year for a progress update and consultation for the programs direction; the next meeting is due in September 2019. The Scientific Risk Management Panel met on 28 Nov, 2018 and identified areas for attention in the next, and subsequent years. These include, pathogens from animals contaminating the environment then food, needs for horizon scanning for emerging threats, characterisation of organisms such as STEC and Salmonella for virulence, industry preparedness for recall/problems, availability of capability in 2030.</p> <p>The MLA website has a page dedicated to food safety information with links to reports, publications, fact sheets etc. <a href="http://www.mla.com.au/foodsafety">www.mla.com.au/foodsafety</a></p>
<b>Product Integrity risks</b>	<p>The risk assessment project is complete; no significant new risks were uncovered, confirming the safety position of Australian red meat. Scientific publications are being prepared. Other than ensuring that data continues to be collected to be sure that we remain in a good position, and the need to provide advice on needle/blade tenderisation/injection, there are no significant recommendations about investigating issues other than those of which we are already aware and addressing.</p> <p>Further information and copies of past reports in this area can be found <a href="#">here</a></p>
<b>Shelf life</b>	<p>The shelf life status of Australian meat has been presented to Egyptian government officials to support increased limits for both beef and lamb primals. Some verification work may commence in the near future.</p> <p>A submission is being prepared for the Saudi Food and Drug Authority to support extension of shelf life consistent with the decision that has already been taken in the UAE.</p> <p>A risk assessment has been conducted on Clostridium botulinum in vacuum packed, chilled meat through the MLA Donor Company. This assessment aims to address the limitations placed on the retail display period in the UK due to botulism concerns. Extremely low risk is indicated by lack of epidemiological evidence, sale of billions of servings of product under current industry practise and by favourable challenge studies.</p> <p>The 24 month frozen shelf life of Australian beef and lamb primals and trim in international markets is underway with samples being held at -12, -18 and -24°C for comparison. Results from 0, 2 and 6 month storage shows slight differences, but no strong significant trends appearing yet. Sensory results were all similar and overall the flavour were acceptable.</p> <p><i>Further information about this area and copies of past reports can be found <a href="#">here</a>.</i></p>
	<p>The Shelf life tool is available under a licence for research purposes and a number of establishments have access to the model. Feedback is being gathered and continuous improvements will be made.</p> <p>Processors have been invited to share their shelf life data, or questions about shelf life in supply chains. A number of supply chain studies have commenced and others are under discussion. Secondary shelf life for portioned primal cuts in vacuum and beef vacuumed skin packs are predicted with the shelf life model.</p> <p>We have investigated some international supply chains (ME and USA) with real time temperature and GPS data loggers available in the market. The trial was successful and we are able to demonstrate new approaches in conjunction with the shelf life model to effectively manage the shelf life in the supply chain. In addition, the logger provided additional in-country cold chain data, which the establishment originally could not collect. Investigation of other international supply chains are currently under discussion with exporters.</p>

	<p>We have packaged the learnings on shelf life into a webinar, targeted particularly at sheep meat exporters where benefits would accrue from better cold chain management. We plan to work with a number of these supply chains in the coming year.</p> <p>Opportunities for the use of visual tags that can be calibrated to provide a guide to the remaining shelf life at a carton/pallet level are being explored. Two possible technologies are being investigated and opportunities for trials will be sought.</p>
<b>Enteric pathogens (beef)</b>	<p>The FSIS carcass baseline survey report was published in September 2017. A scientific publication is being drafted for further industry consideration and publication. It is likely that FSIS will develop performance standards for Salmonella in beef products.</p> <p>Projects are underway through the MLA Donor Company to evaluate some test methods and approaches that may provide the industry with more efficient and cost effective options for STEC testing. The industry has been encouraged to utilise tests that have low prevalence of screening test positives.</p> <p>Recent international publications suggest a consensus about the identification of STECs that have higher (or lower) risk. Implementation of this consensus in test systems and product disposition would likely provide a significant benefit for Australian industry.</p> <p>Further information and copies of past reports in this area can be found <a href="#">here</a>.</p>
<b>Post mortem procedures</b>	<p>The AMRG has approved changes to post mortem inspection standards covering a range of conditions. Post mortem inspection practices (other than inspection for C. bovis) will commence in early 2019, with C. bovis inspection changes to follow once alternate risk management approaches have been determined.</p> <p>Implementation of disposition changes will occur in 2020, following a period for retraining in disposition judgements. The DA is considering the preparation of equivalence cases for markets such as US and EU.</p> <p>Further information and copies of past reports in this area can be found <a href="#">here</a>.</p>
<b>Chemical residues</b>	<p>MLA continues to respond to Technical Barriers to Trade (TBT) notifications on MRLs for beef and sheep meat. MLA has developed, and agreed with SAFEMEAT, a protocol for raising these issues to an industry level when a response is required.</p> <p>The cadmium (Cd) in adult sheep offal (liver and kidney) project is finished. These results have been shared and will assist the NRS's cadmium project.</p> <p>Further information and copies of past reports in this area can be found <a href="#">here</a>.</p> <p>No action has been necessary at the Codex level. MLA is not continuing to fund work on the toxicology of indospicine, but keeps a watch on this area.</p>
<b>Toxoplasma gondii (sheep)</b>	<p>There has been increased attention to the significance of T. gondii as a public health hazard in sheepmeat. Work commenced in November 2016 to produce risk assessment data on the prevalence and concentration of T. gondii cysts in sheep meat for human consumption. Viable cysts can be found in ovines at the time of slaughter. A survey to determine the prevalence, concentration and genotype of these in a national, rather than pilot survey has been agreed. It will take some time to collect data, which will then need to be used in risk assessment.</p> <p>Further information and copies of past reports in this area can be found <a href="#">here</a>.</p>
<b>Enteric pathogens (sheep)</b>	<p>The baseline survey on the prevalence of pathogenic bacteria and antimicrobial resistance in bacterial isolates from sheep has been completed. The prevalence of Salmonella and STEC generally lower than found in cattle. The Salmonella serovars were not of particular concern. Few STEC of potential public health concern were detected.</p> <p>AMR results indicate that the prevalence of AMR in Salmonella and E. coli is very low with no observed resistance to antimicrobials considered critically or highly important to human medicine. The work will fulfil the expectations of Australia's antimicrobial resistance strategy.</p> <p>Based on these results, there is no need for risk management actions in sheep supply chains beyond process hygiene measures.</p>

	Further information and copies of past reports in this area can be found <a href="#">here</a> .
<b>Antimicrobial resistance</b>	<p>MLA continues to represent the sector in discussions on the National Antimicrobial Resistance Strategy.</p> <p>Discussions continue to be held with other animal industries and with the CVO and CMO on the next national antimicrobial resistance strategy, an animal sector plan, and an RD&amp;E strategy.</p> <p>A document has been released on how the red meat industry, along with other animal industries is implementing antimicrobial stewardship practices.</p> <p>A repeat survey on the prevalence antibiotic resistant bacteria in cattle at the time of slaughter, is (so far) not indicating significant differences from the 2013 survey. The survey will not be completed until the first half of 2020.</p> <p><i>Further information and copies of past reports on work in this area can be found <a href="#">here</a>.</i></p>
<b>Novel product integrity technologies</b>	<p>MLA is seeking opportunities through the MLA Donor Company to co-invest in technologies that may provide the industry with significant advantages in the detection and destruction of foodborne hazards, and ensuring product integrity.</p> <p>Further work on the chemical interventions on sub primal prior to vacuum packing, has not found a significant effect, which is possibly due to inadequate application of the chemical.</p> <p>Further information and copies of past reports on work in this area can be found <a href="#">here</a>.</p>
<b>Product integrity systems</b>	<p>MLA is maintaining oversight of technical requirements for red meat products and how the industry can best respond to these requirements.</p> <p>The offal survey for beef, Lamb, sheep and goat is completed</p> <p>Overall the results were good, however for RGBC it will have implications if Salmonella testing is implemented in the US. This information will be shared with stakeholders to provide a better understand of the Australia's offal hygiene, and will be used to maintain, defend or open new markets for exporting offal</p> <p>An MDC project to develop Australian authenticity markers has commenced.</p> <p>Pilots with two supply chains commenced in June 2019. Discussions are being held with a number of supply chains about conducting further trials</p> <p>DA has implemented MEDC, which will replace the PHI and ESAM input portal into an online system. SARDI have continued to produce monthly reports since introduction of MEDC, as data has been available. It is not intended to continue this reporting once reporting is available from MEDC.</p> <p>Further information and copies of past reports on work in this area can be found <a href="#">here</a>.</p> <p>MLA has assisted an AMPC-managed project to review the monitoring systems for food safety in processing. An equivalence case seeking to modify PHI is being prepared for submission to the US and EU. MLA will contribute to the AEMIS review, being managed by AMPC.</p>
<b>Animal Stunning</b>	<p>Current year goals: pre-commercial scale trials successfully completed.</p> <p>Preparation of material for a submission to the EU Animal Health and Welfare Panel for assessment of DTS as an 'alternative stunning intervention'</p>



### 9.3 Scientific publications

The following table provides a list of scientific publications from the sub-program over the past year. The status of a publication is classified as: in preparation, submitted, under revision, accepted, published (either on line or in print). Publications appear in this list until they are recorded as being published.

Product	Citation	Status*
Risk assessments	Fegan, N. and I. Jenson (2018). "The role of meat in foodborne disease: Is there a coming revolution in risk assessment and management?" <i>Meat Science</i> 144:22-29	Published
	A risk profiling approach to investigate food safety risks within the red meat industry in Australia M. Hernandez-Jover, F Culley, J Heller, M Ward	Submitted
	Semi-quantitative food safety risk profile of the Australian red meat industry Marta Hernandez-Jover, Fiona Culley, Jane Heller, Michael Ward, Ian Jenson Target journal: International Journal of Food Microbiology	in preparation
Shelf life	Kaur, M., Bowman, J.P., and Ross, T. Abattoir-associated microbial influence on vacuum-packaged beef and lamb shelf-life	In preparation
	Ross <i>et al.</i> Development and validation of shelf-life prediction tool of Australian VP beef and lamb	In preparation
Enteric pathogens	Ahlstron, C., P. Muellner, G. Lammers, M. Jones and J. Heller. E. coli O157 shedding dynamics in Australian beef cattle Front. Vet. Sci. <a href="https://doi.org/10.3389/fvets.2017.00200">https://doi.org/10.3389/fvets.2017.00200</a>	Published
	Gardner, T., Kocharunchitt, C., Pinfold, T., Corkrey, R., Tamplin, M., and Ross, T. Exploring mechanisms of the viable but non-culturable state of <i>Escherichia coli</i> as induced by combined cold and water activity stresses	Submitted
	Kocharunchitt, C., Mellefont, L., Bowman, J.P., and Ross, T. Potential application of an oxidant during spray chilling as a potential antimicrobial intervention during beef processing	Submitted
	Jenson, Sumner, Vanderlinde, Horchner et al. Beef Slaughter and Dressing Hygiene and the Application of Risk Management Metrics at Australian Export Establishments. Journal of Food Protection	In preparation
	Mellor, G. E., Barlow, R. S., Duffy, L. L., McMillan, K. E., Bishop-Hurley S., Chandry, P. S., Jordan, D., Fegan, N., Chandry, P. S. National survey of Shiga toxin-producing <i>Escherichia coli</i> serogroups O26, O45, O103, O111, O121, O145, and O157 in Australian sheep faeces.	In preparation
	Kocharunchitt, C., Porteus, B., Sumner, S., and Ross, T. Does spray chilling improve the microbiological condition of beef carcasses?	In preparation
Antimicrobial resistance	Barlow, R. S., K. E. McMillan, L. L. Duffy, N. Fegan, D. Jordan, G. E. Mellor and I. Jenson (2019). "Antimicrobial susceptibility of bacteria from healthy cattle and sheep at slaughter." <u>Australian Veterinary Journal</u> .	Published
	Mellor, G. E., Fegan, N., Barlow, R. S., Duffy, L. L., McMillan, K. E., Bishop-Hurley S., Chandry, P. S., Jordan, D. National prevalence, concentration and antimicrobial resistance of <i>Salmonella</i> , <i>E. coli</i> and <i>Enterococcus</i> from Australian sheep at slaughter.	In preparation
Post-mortem procedures	Kiermeier, A., D Hamilton and A. Pointon. Quantitative risk assessment for Human <i>Taenia saginata</i> infection from consumption of Australian beef. Microbial Risk Analysis <a href="https://doi.org/10.1016/j.mran.2019.01.001">https://doi.org/10.1016/j.mran.2019.01.001</a>	Published
	Pointon, A.M., Hamilton, D.H. and Kiermeier, A. (2019). Equivalence of alternative post-mortem inspection procedures for Caseous Lymphadenitis in Australian sheep and goats. Veterinary Record, <a href="http://dx.doi.org/10.1136/vr.105353">http://dx.doi.org/10.1136/vr.105353</a>	Published
	Allan, S., ?others and Pointon, A. (2019). Risk-based review of post-mortem inspection procedures and disposition judgement criteria of Australian cattle, sheep, goats and pigs. <i>Fleischwirtschaft international</i>	In preparation

#### 9.4 External education and promotion of food safety and integrity

Arena	Group	Activity	Nature of interaction
<b>NATIONAL</b>	<b>Consumers</b>	Website information	MLA's consumer website, <a href="http://www.beefandlamb.com.au">www.beefandlamb.com.au</a> , is used as a way of communicating specific meat safety messages to consumers. The FAQ section can be updated in response to consumer concerns.
	<b>Regulators</b>	Food Standards Australia New Zealand	MLA communicates with FSANZ about meat-related food safety matters. There are no current issues in this area.
		Standards Australia	Participating in the development and review of Australian Standards, as well as the development of International Standards through the International Standards Organisation.
	<b>Scientists</b>	Australian Association for Food Protection	A professional association, where the position of the Australian industry as technically competent is communicated.
		Australian Society for Microbiology	A professional association, where the position of the Australian industry as technically competent is communicated.
		Australian Institute of Food Science and Technology	A professional association, where the position of the Australian industry as technically competent is communicated.
	<b>Consultative</b>	SAFEMEAT	An opportunity to regularly update all red meat industry sector participants on the progress of the program.
		Export Meat Industry Advisory Committee	Provides an opportunity to gain agreement between export processors and Department of Agriculture on the application of MLA and AMPC research to the industry. Sometimes responsive projects are developed. A current example is the convening of a working group on the refrigeration index.
		Export Meat Industry Advisory Committee Food Safety and Animal Health Subcommittee	The food safety subcommittee provides opportunities to discuss food safety and microbiological issues in detail. Some activities, such as revision of microbiological methods for the industry, will require professional input from MLA and consultants

<b>NATIONAL</b>	<b>Industry</b>	Meat Inspection Quality Assurance (MIQA) Network	About 12 presentations were given in the past year to industry QA Managers in all states on antimicrobial resistance, trends in ESAM data and process control. Also an opportunity to learn about industry needs.
		MINTRAC MIQA Conference	This popular conference for industry QA Managers and trainers was an opportunity to share R&D relating to shelf-life, antimicrobial interventions, and process control and the changes that are being made by processors as a result of following the approaches developed.
		MLA publications	Feedback issue February/March 2019 provided insight in to how Blockchain technology supports provenance, giving an overview of why new technologies are valuable in the food Integrity space.
		Enquiry services	MLA provides an enquiry service for processors, exporters, customers, regulators etc. who require technical information on the safety of meat.
		Panels	MLA has previously run an E. coli expert panel to interact with stakeholders on this important issue and to provides advice to Department of Agriculture and AMIC in dealing with their own interests in this area. There are no panels currently running, though working groups on dry ageing and refrigeration index have been convened in recent times.
<b>INTERNATIONAL</b>	<b>Trade</b>	Working relationship with North American Meat Institute, National Cattlemen's Beef Association	MLA keeps in touch with like organisations in the USA, as well as individual processors to discuss issues of common interest.
		Enquiry services	Enquiries are often directed through MLA regional offices to provide information, or technical support, on trade enquiries.
	<b>Regulators</b>	Australia's position at Codex Alimentarius	Reviewing the development of Codex documents, which are a basis for international trade, to ensure that they reflect Australia's approach to meat safety. Particular attention is being paid to documents on Salmonella in beef, antimicrobial resistance, and pyrrolizidine alkaloids.
		Opportunity to input into Australia's position at OIE	Reviewing the development of documents to ensure that they do not impinge negatively on Australia's meat safety approach.
		National food control systems	Opportunities, through MLA regional offices, to make technical representations to assist in

			policy development relating to Australian meat products. Currently, there are interactions with authorities in Saudi Arabia, Egypt and Vietnam.
	<b>Industry organizations</b> <b>International organizations</b>	International Standards Organisation- ISO standards and working groups	Opportunity to comment on the development of International Standards, including participation on working groups, and obtaining advance notice of standards being developed.
		International Association for Food Protection (IAFP), member	A professional association, where the position of the Australian industry as technically competent is communicated.
	<b>Industry organizations</b>	International Commission on Microbiological Specifications for Foods	Scientists close to MLA are members of this group which is the leading international scientific food safety influencer.
	<b>International organizations</b>	Consultants to FAO/WHO	A number of scientists close to MLA work as consultants for the FAO/WHO food safety program.
		FAO/WHO Joint Expert Meetings on Risk Assessment (JEMRA)	Several scientists close to MLA are on the roster of experts for JEMRA.
	<b>Scientists</b>	Editorial Board, <i>Applied and Environmental Microbiology</i>	AEM is a leading food microbiology journal and MLA staff are frequently asked to peer review papers prior to publication.
		Reviewer for <i>International Journal of Food Microbiology and Meat Science</i>	The IJFM and Meat Science are leading food safety and meat science journals internationally. MLA staff are sometimes asked to peer review papers prior to publication.
		Editorial Board, <i>Food Protection Trends</i>	MLA staff have been invited to be members of this IAFP journal. It provides international recognition for the Australian industry.
		Invited speaker, international conferences	MLA staff and scientists working closely with MLA are frequently invited to be keynote and major speakers at international conferences
		Publications	See 9.3 Scientific / Technical publications

## 9.5 Government priorities

### 9.5.1 Science and Research priorities

In May 2015, the Government established a set of Science and Research Priorities, and corresponding Practical Research Challenges.<sup>7</sup> These Priorities and Challenges will be reviewed every two years. Food is identified as one of the priorities. It is suggested that priority be given to research that will lead to:

1. knowledge of global and domestic demand, supply chains and the identification of country specific preferences for food Australia can produce.
2. knowledge of the social, economic and other barriers to achieving access to healthy Australian foods.
3. enhanced food production through:
  - novel technologies, such as sensors, robotics, real-time data systems and traceability, all integrated into the full production chain.
  - better management and use of waste and water; increased food quality, safety, stability and shelf life.
  - protection of food sources through enhanced biosecurity.
  - genetic composition of food sources appropriate for present and emerging Australian conditions.

With respect to food safety, the program is responding to the priorities for research:

**Knowledge of global and domestic demand, supply chains and the identification of country specific preferences for food Australia can produce.**

It is fundamental to the planning process for the program, and also continued development in areas such as shelf life, that the program develops an understanding of safety and quality expectations and that we develop reliable ways of meeting those expectations.

**Knowledge of the social, economic and other barriers to achieving access to healthy Australian foods**

Some work in the program is devoted to technical barriers to trade and overcoming those barriers through the provision of information to government and educating supply chains about the safety and suitability of our products.

**Enhanced food production through novel technologies, such as sensors, robotics, real-time data systems and traceability, all integrated into the full production chain**

The program has a clear vision to utilise supply chain data and research results to enhance the quality and safety of food delivered to consumers.

**Enhanced food production through better management and use of waste and water; increased food quality, safety, stability and shelf life**

Increased meat quality, safety, and shelf life is at the core of the market access science/ food safety program at MLA. Appropriate attention is given to improving management to achieve outcomes and to reducing water use where possible.

**Enhanced food production through protection of food sources through enhanced biosecurity**

Attention is given in the food safety program, where appropriate, to the impact of microorganisms originating from animals, and how they can be best controlled through the supply chain.

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<sup>7</sup> <http://www.science.gov.au/scienceGov/ScienceAndResearchPriorities/Pages/default.aspx>

### 9.5.2 Rural research and development priorities<sup>8</sup>

#### **Productivity and Adding Value: improving the productivity and profitability of existing industries.**

The Food Safety / Market Access Science program has a very clear focus on providing a sound scientific basis for continued development of quality systems within the Australian red meat industry. Providing a sound scientific basis for regulations allows the industry and regulators to control meat processing in a cost-effective way, by concentrating attention on the critical issues, and allowing the industry to innovate while maintaining food safety.

#### **Supply Chain and Markets: understanding and responding to domestic and international market and consumer requirements through the whole supply chain, including to consumers.**

MLA is leading or actively involved in a number of key initiatives designed to maintain and improve consumer confidence in the integrity of products produced by the beef and sheep meat industries based on sound science, risk analysis and the adoption and communication of research outcomes. The program also collects data that demonstrate the effectiveness of the Australian supply chain in producing quality products.

The sound scientific approach being taken to substantiate claims for market access is seen as a key factor for current and future market access. The Food Safety R&D Program develops information to support market access and also develops approaches to process validation and data collection and analysis to support future actions for technical market access.

#### **Biosecurity: protecting Australia's community from biosecurity threats.**

Threats in other countries are assessed and protocols for assessing their significance to Australia are part of the program's approach to pro-active management of food safety issues. Biosecurity is an approach that is relevant to ensuring that problems in overseas countries do not become established in Australia.

#### **Supporting the Rural Research and Development Priorities: improving the skills to undertake research and apply its findings.**

*Undergraduate training:* The program works with students and processors to work on projects that have real benefit to the industry, thus giving both parties the opportunity to innovate and see the potential for further innovation within the industry.

*Post-graduate training:* MLA and AMPC continue to support investment in post-graduate training with PhD and masters students currently supported through our post-graduate scholarship program and project-based support.

*Researcher training:* Funds are provided to support researchers to attend leading conferences to present their R&D results and to network with the world's leading scientists in this area.

*Industry training:* Workshops, network (professional development) meetings, and tools are provided to the industry to increase their knowledge and skills in doing their jobs but also to increase their ability to take up the results of research.

#### **Supporting the Rural Research and Development Priorities: promoting the developing of new and existing technologies.**

Researchers working on MLA projects are using cutting-edge proteomic and genomic technologies to provide an understanding of food safety issues and possibly find breakthroughs in food safety. We continue to keep the Australian industry ahead of the world in application of new ideas and approaches to food safety.

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<sup>8</sup> <http://www.agriculture.gov.au/ag-farm-food/innovation/priorities>

### 9.5.3 Agricultural Competitiveness white paper priorities<sup>9</sup>

The Government released a white paper in July 2015 with the aim of strengthening the sector and ensuring it remains as competitive as possible.

The Government acknowledges that the RD&E system will give our farmers access to the latest innovations, new technologies and best management knowledge available to seize opportunities.

The food safety / market access science program responds to priorities in the white paper. In particular the program responds by:

- developing and evaluating advanced technologies that lead to innovative processes and practices;
- evidence-based control of food safety risks for improving market access;
- emphasising the adoption of R&D through multiple channels

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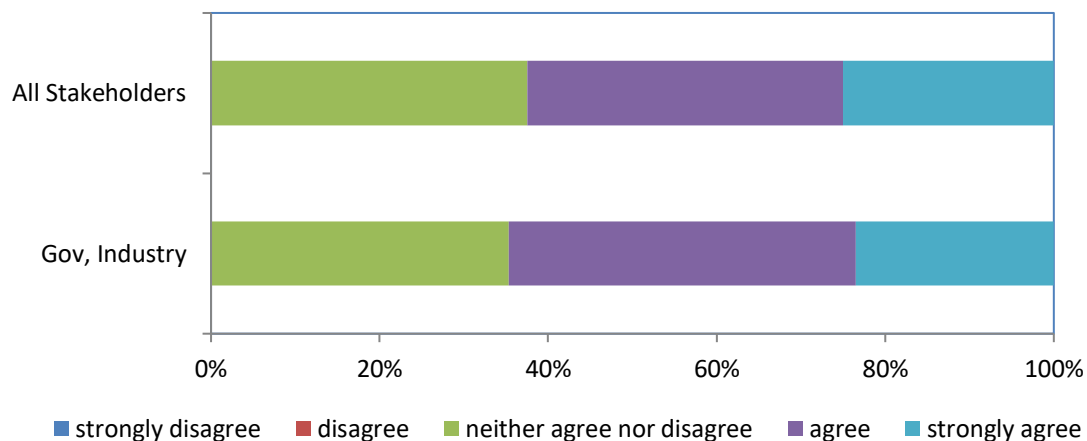
<sup>9</sup> <http://agwhitepaper.agriculture.gov.au/>

## 9.6 Stakeholder survey

A stakeholder survey was conducted which focussed on whether the food safety program was conducted in a way which met with stakeholder satisfaction. Respondents were representatives of peak councils, government, processor companies and researchers, who had some involvement with the program during the year.

A total of twenty four responses were received, of which 17 were from industry organisations and meat processing company representatives. Questions were largely asking for agreement with a statement, on a 5-point Likert scale, supplemented by open-ended responses.

Two-thirds of respondents were positive (agree or strongly agree) that they are satisfied with the program.

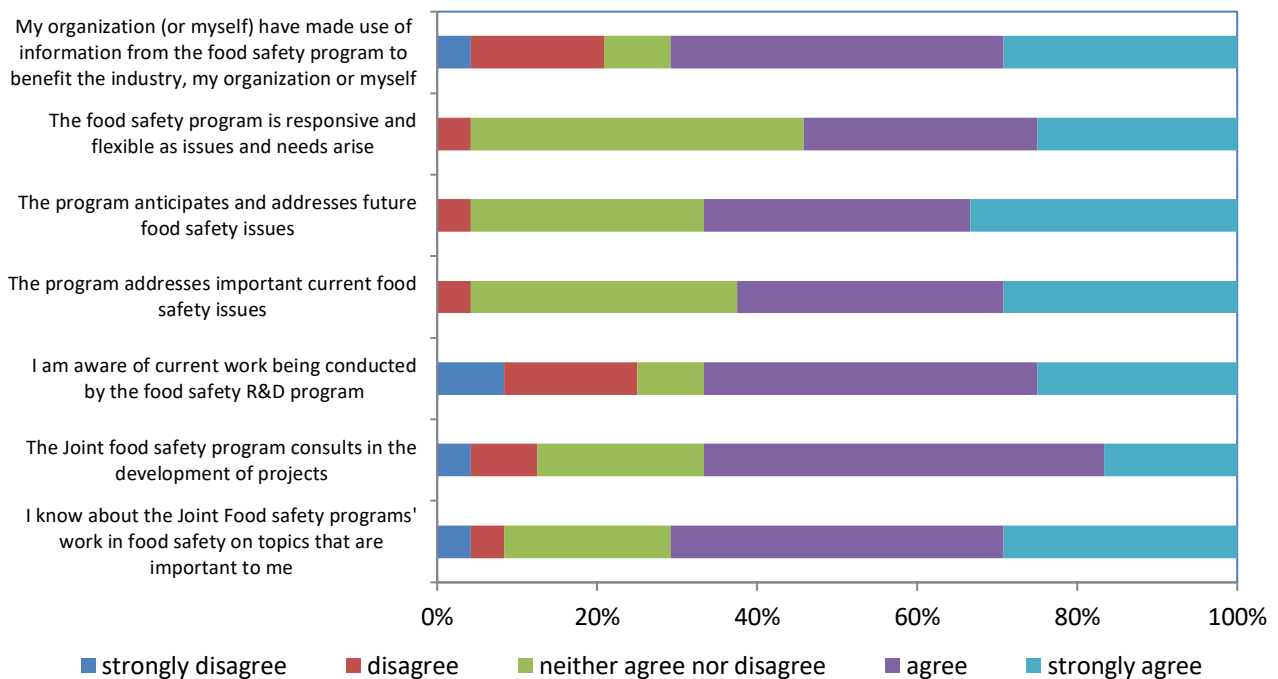


Overall the respondents are happy with the work conducted, direction and outputs of the food safety program. 71% of the stakeholders are satisfied with being aware of the program and are focusing on topics which are important to them. In particular 88% of the stakeholders are aware of the MLA publications for industry with 76% percent are happy with the publication meeting their needs.

Positive comments received from government and industry stakeholders included:

- It's always a pleasure to interact with any of the MLA staff involved in this area - conversations and presentations are informative and comprehensive as well as topical and interesting.
- Webinars are great, video and data explained in visual format (eg graphs etc) so we can communicate the knowledge in simple terms for the customers who may or may not have strong English language skills, a production background or a scientific background.
- Very happy with the interaction and level of communication that already exists.
- Continued dialogue in person. Continued access to MLA web site for findings. Continued presence of MLA sponsored research in scientific literature.





In response to the question on what areas of research / development / adoption / impact MLA should focus on, the following responses were received on the program, along with our initial response. It is our intention to discuss these comments with the Program Advisory Group.

Comment	Response
Interventions that reduce micro load during processing	We have been keeping a watch on this area and we are willing to investigate new technologies. However, we also note that, overall, our hygiene quality is very good. We are pursuing approaches to reducing the volume of product requiring heat treatment for the presence of STEC. Since there are differences between processors, we are willing to consider projects for improvement in performance of individual processors, conducted as a Plant Initiated Project, through the MLA Donor Company.
Reducing food safety hazards	We are actively working on STEC in beef, and keep a watch on issues with Salmonella and AMR that may affect trade. We also look on the horizon for potential issues and investigate those.
More work to establish Microbial baselines in Australia across a broader range of products	We will consult with processors/exporters about their need for new baselines. We last conducted a boxed meat baseline in 2011.
Perhaps application of block chain technologies - this seems to be an emerging area for many industries. I've also found the shelf life work so far quite interesting and think this should continue.	The program is currently investigating and trialling various integrity/authenticity technologies, including Blockchain, with projects funded through the MLA Donor Company. Highlight section 6.6 within this report provides some detail on the work undertaken in this space this year. We will be communicating more about this in the coming year. Work in the shelf life area will continue.
Technical and reputation barriers to domestic and international trade including real public health threats and perceived. Attempting to anticipate the major future issues so that solutions are available when the problems arise.	We are actively working on STEC in beef, and keep a watch on issues with Salmonella and AMR that may affect trade. We also look on the horizon for potential issues and investigate those.

Meeting market expectations and working with government to obtain positive outcomes for industry. This requires a proactive approach.	We are commencing work with a European group about the future of meat inspection, and continue to have informal discussions with the US on these issues. Ultimately, we contribute to advising and influencing standards rather than following.
Antimicrobial resistance, new technologies for predicting the disease-causing potential of Australian STEC, tools/research for improved prediction and extension of shelf life.	We are actively working on these areas.
Alternative methods (less costly) for STEC detection (screen testing) Impact of WGS.	We continue to examine methods (with MLA Donor Company funding) that may be advantageous to the industry, although the newer methods appear to have had little traction with industry. Cost can be reduced by a lower number of tests requiring confirmation (that is, getting a negative result early in the testing process), less expensive confirmation methods (project is still underway) and gaining agreement about appropriate product disposition.
Forward focus and proactive research. Being a lead organisation globally when it comes to considering the issues around meat safety and market access.	We like to think we are already in that position and strive to stay that way.
Consultation about strategic objectives and inclusion on relevant project governance groups.	We consult with a Program Advisory Group with representatives from Peak Industry Councils, Commonwealth and State government. We form project consultative groups when that seems appropriate and involve the stakeholders we believe are appropriate. We will respond to any specific requests for interaction on any project.
Make growers aware of how you are spending their money	We report to Peak Industry Councils, and SAFEMEAT and EMIAC on a regular basis. MLA also reports on the work through the Annual Report. We will respond to any request from these groups for further information or specific reporting.
Provide reports on current work - who is doing what by when	We will discuss this with our Program Advisory Group. The data exists within MLA systems, so we will discuss the most appropriate way to provide.
Needs to be a more accessible summary of research outcomes and a better way of letting stakeholders know the results of research.	We strive to make the information available on the MLA website more accessible, including a summary of each research report. We provide written reports on progress, and make presentations to a number of industry meetings. We will consider any request to make research outputs more available to the industry.
Maybe workshops on specific areas in addition to the publication materials.	We recently conducted our first webinar to communicate recent research, and received a positive response. We will consider more opportunities to communicate on specific topics.