

final report

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Technical advisors for the Joint Food Safety Program 2016-2020

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Executive summary

The project objective was to engage five technical advisors to provide technical support for the MLA Food Safety R&D Program and the Program Manager and thereby assist MLA in remaining at the forefront of scientific and technical developments and public health concerns related to red meat food safety and market access.

The approach undertaken included a number pre-defined sub-objectives to support the Program Manager and therefore inform the Food Safety Program. These essentially included providing scientific/technical advice and support on a regular basis, assisting in communications such as preparation of written scientific and technical documents, making and attending relevant presentations to stakeholders, providing technical input to other program projects and to program risk management groups, contributing to strategic direction planning, and assisting in forming strategic links with national and international government, research and other groups.

Through ongoing scans of current knowledge and scientific evidence and technical advice on food safety relevant to the red meat industry and awareness of potential issues on food safety, public health and regulation both locally and internationally, the Program Manager has been able to keep at the forefront in this area and to undertake and plan the various food safety risk management responsibilities effectively and pro-actively. Significant developments, issues, and challenges in food safety have been communicated by the program Manager directly to red meat industry stakeholders and others or indirectly through other Program activities. The technical advice and the Consultant's experience and other professional work has provided beneficial support for R&D projects (e.g. review of food safety and market access risks in red meat supply chains and the potential of application of new genome technologies, various baseline surveys), and Program management groups.

During the project, a range of issues and activities were addressed and included a public health perspective complimenting food safety science and technology disciplines. For example, changing approaches to management of the public health risk of shiga toxin-producing *Escherichia coli* and non-typhoidal *Salmonella* in red meat and evolving epidemiological evidence, increasing awareness of risk management of animal wastes, their potential risks for other food production systems and implications of epidemiological investigations. Briefing papers and advice were provided on issues as they arose from members of the red meat industry and trade delegates e.g. red meat product manufacture and interpretation of regulatory measures locally and internationally.

To be effective microbial food safety risk management has to be based on sound and current scientific evidence and knowledge. The activities in this project have assisted the Food Safety Program Manager to be at the forefront of red meat food safety and thus to undertake food safety risk management responsibilities for MLA and stakeholders effectively and pro-actively.

Table of contents

1	Ba	ckground	5		
2	Pro	oject objectives	5		
3	Me	Methodology6			
	3.1	Specified contractual requirements	6		
	3.2	Objective 1	6		
	3.3	Objective 2	6		
	3.4	Objective 3	7		
	3.5	Objective 4	7		
	3.6	Objective 5	7		
	3.7	Objective 6	7		
	3.8	Objective 7	8		
	3.9	Objective 8	8		
	3.10	Objective 9	8		
	3.11	Objective 10	8		
4	Re	sults	8		
	4.1	Dr Patricia Desmarchelier (V.MFS 0421)	8		
	Ob	jective 1	8		
	Objective 29				
	Objective 39				
	Objective 49				
	Objective 5				
	Objective 6				
	Objective 7				
	Objective 8				
	Objective 9				
	Ob	jective 10	11		
	4.2	Paul Vanderlinde (V.MFS 0411)	12		
	Ob	jective 1	12		
	Objective 3				
	Objective 5				
	Ob	jective 7	12		
	Ob	jective 9	12		

Key messages	. 16
Conclusions/recommendations	. 16
Discussion	. 14
Objective 9	. 14
Objective 8	. 14
Objective 7	. 14
Objective 5	. 14
Objective 3	. 14
Objective 1	. 14
I.5 John Sumner (V.MFS.0416)	. 14
Objective 9	. 13
Objective 7	. 13
Objective 3	. 13
Objective 1	. 13
I.4 David Jordan (V.MFS 0413)	. 13
Objective 8	. 13
Objective 7	. 13
Objective 3	. 13
Objective 1	. 12
I.3 Andreas Kiermeier (V.MFS 0412)	. 12
	3 Andreas Kiermeier (V.MFS 0412) Objective 1 Objective 3 Objective 8 Objective 8 .4 David Jordan (V.MFS 0413) Objective 1 Objective 3 Objective 2 Objective 7 Objective 9 Objective 9 .5 John Sumner (V.MFS.0416) Objective 1 Objective 3 Objective 5 Objective 5 Objective 7 Objective 7 Objective 9 Objective 5 Objective 5 Objective 7 Objective 8 Objective 8 Objective 9 Discussion Conclusions/recommendations Key messages

1 Background

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 (Food Safety / Market Access Science 2019-2020 Achievement Report, 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.

Food safety management in the meat industry is dynamic and has to be alert for and respond to ongoing changes in industry practice and scientific developments, and related public health developments related to meat consumption both locally and globally.

The purpose for this project was to provide five technical advisors to the MLA food safety program who would each provide technical support, specifically in food safety, and consult regularly with the Program Manager of the MLA food safety program. This included support for individual projects, involving working with researchers or processing companies, preparing reports and discussion papers, and providing technical advice to meat industry participants, individually and at industry meetings.

2 Project objectives

- 1. Providing technical support for individual projects within the Joint Food Safety Program as required by MLA from time to time.
- 2. Assisting in communication between MLA, AMPC, scientists, industry, regulators, and others, as required;
- 3. Preparing project briefs, discussion papers and reports on:
 - a. Scientific technical issues at the request of the Program Manager
 - b. Relevant scientific literature, collated with data to highlight significant issues that need to be brought to MLA's attention;
 - c. Strategic directions for the food safety research program component of the SAFEMEAT operating plan and providing recommendations on possible future directions for the medium to longer term;
- 4. Assisting MLA to consolidate strategic relationships with relevant national and international industry and government bodies, research bodies and others appropriate associations;
- 5. Attending meetings and making presentations as required;
- Assisting MLA to remain at the forefront of scientific knowledge and technological developments in the areas of food safety science, regulation, consumer concerns and industry implementation strategies by providing regular updates to MLA in a form approved and accepted by MLA;
- 7. Consulting with the Joint food safety program Manager to provide technical support to meat industry participants (including peak councils, plant personnel, industry committees) and members of the scientific risk management panel;

- 8. Conducting sampling, testing and other data gathering activities on the sites of meat processors, further processors, or other members of the supply chain as required;
- 9. Attending the risk management panel to provide technical advice on the program on a biyearly basis or as indicated by the program manager; and
- 10. Other activities as determined by MLA from time to time.

3 Methodology

3.1 Specified contractual requirements

The Technical Advisors were required to provide effective and efficient contribution to MLA's food safety program through complementing and responding to the needs identified by the Program Manager(s).

The contract specified the contractors would focus on the following areas and this applies to each objective:

- Participate in the *E. coli* sampling, testing and management Expert Panel run by MLA;
- E. coli risks to public health;
- *E. coli* risk of product rejection;
- Projects, panels, and paper review in the area of *E. coli*;
- Collection of new data on pathogens and indicators;
- Provide information as required by the Program Manager.

This list was not exhaustive and may have expanded as required by the program manager which may include *Salmonella*.

3.2 Objective 1

Providing technical support for individual projects within the Joint Food Safety Program as required by MLA from time to time

Technical support to projects was provided by promptly responding to requests for scientific critique of project proposals, reports and publications and recommendations for action; providing relevant information and notice of meetings or activities to the researchers with which they may not be familiar; providing new knowledge and stimulating dialogue on the research objectives as it occurs; providing response to requests for advice and comment on activity from researchers; participation in face to face review meetings and reporting to the Program Manager; and, by general encouragement to achieve project objectives in a successful and timely manner.

3.3 Objective 2

Assisting in communication between MLA, AMPC, scientists, industry, regulators and others, as required

Communications with stakeholders and others were assisted as requested by the Program Manager by provision of technical input based on current scientific background and evidence on the communication topic provided.

3.4 Objective 3

Preparing project briefs, discussion papers and reports on:

- a. Scientific technical issues at the request of the Program Manager
- b. Relevant scientific literature, collated with data to highlight significant issues that need to be brought to MLA's attention;
- c. Strategic directions for the food safety research program component of the SAFEMEAT operating plan and providing recommendations on possible future directions for the medium to longer term.

Project briefs, discussion papers and reports were prepared as requested by Program Manager. Preparation of these documents was based on my experience, networks, and literature searches together with activities in Objective 6.

3.5 Objective 4

Assisting MLA to consolidate strategic relationships with relevant national and international industry and government bodies, research bodies and others appropriate associations Assistance to the Program Manager was provided as requested in consolidating strategic relationships by direct contacts and drawing on my network of contacts in government, academia, research bodies, food industry and consumer groups and professional societies and through my other professional consultancies where appropriate.

3.6 Objective 5

Attending meetings and making presentations as required

Meetings were attended and presentations made as requested by the Program Manager.

3.7 Objective 6

Assist MLA to remain at the forefront of scientific knowledge and technological developments in the areas of food safety science, regulation, consumer concerns and industry implementation strategies by providing regular updates to MLA in a form approved and accepted by MLA

Regular scanning was undertaken of scientific databases and other electronic media sources for scientific publications, reports, and technological developments, particularly those relevant to the topics specified (See 3.1). Reports including reference source, summary, and comment if appropriate, were prepared at least monthly and any particularly noteworthy news or publications were communicated to the Program Manager when they were identified.

3.8 Objective 7

Consulting with the Joint food safety program Manager to provide technical support to meat industry participants (including peak councils, plant personnel, and industry committees) and members of the scientific risk management panel

Technical input was provided as requested.

3.9 Objective 8

Conducting sampling, testing and other data gathering activities on the sites of meat processors, further processors or other members of the supply chain as required

These activities were completed as required.

3.10 Objective 9

Attend the risk management panel to provide technical advice on the program on a bi yearly basis or as indicated by the program manager

Attendance at and contribution to the risk management panel was provided as scheduled.

3.11 Objective 10

Other activities as determined by MLA from time to time

4 Results

Each of the five different technical advisors accomplished various tasks during the 4 year contract. Each advisor provided support to the MLA Food Safety R&D Program under a different project code (outlined below).

4.1 Dr Patricia Desmarchelier (V.MFS 0421)

Objective 1

Technical support was provided for a variety of projects with most time given to projects V.MFS 0410 and 0415 (Table 1). Support for V.MFS 0410included membership of the project steering group, review of draft project proposals, provision of data and information, review of reports, presentations, and attendance at project meetings.

Contribution to V.MFS.0415 was mainly in guiding the project relevance to the red meat industry and related developments of the technologies in public health, in development and review of reports and presentations. Support for other projects was in the form of participation in a steering group, critical review and discussion of results and publications.

Year	Project / Activity
2016 - 2017	 V. MFS 0410 Review of food safety and market access risks in red meat supply chains / Member of the steering group and input to project data collection. V.MFS 0415 Developing an industry strategy for use of new genetic identification systems and surveillance / Technical advice technologies Project j12911 Beef and Lamb offal survey for improving market access / Technical advice Risky meat survey <i>Salmonella</i> and FSIS
2017 - 2018	 V. MFS 0410 Review of food safety and market access risks in red meat supply chains / Member of the steering group and input to project data collection. V.MFS 0415 Developing an industry strategy for use of new genetic identification systems and surveillance / Technical advice technologies MLA National Beef and Veal carcass baseline study. Provided technical advice and data on human health incidence of <i>Salmonella</i> serotypes.
2018 – 2019	 Review sheep meat survey, steering group member Opinion on dry aged beef document

Table 1 Projects for which technical advice was provided within Objective 1

Objective 2

Input in technical advice was provided to the *E. coli* Panel meetings by reviewing and commenting on issues and reviewing and commenting on project proposals, milestones reports and publications. Examples of projects included baseline surveys of beef and veal, sheep meat and offal.

Objective 3

The major discussion paper prepared at the request of the Program Manager was *Environmental contamination, red meat supply chains and human health risks*. This included a review of environmental microbial hazards of significance to public health that potentially could be produced along the red meat chain, research undertaken in the past by MLA and international agencies on prevalence and risk management of environmental contamination, challenges in research and risk management of the such hazards and the increasing

concerns among other agricultural food systems that may be exposed. See also Objectives 4 and 5.

Objective 4

 During this project increasing interest was noted in the potential health risks posed by waste materials (e.g. manure, runoff) and emissions (e.g. dust) from animal production and processing facilities for other food production systems, in particular horticulture production, in similar production regions. This interest was noted in in Australia in FSANZ and the ANZ Fresh Produce Safety Centre and in the United States of America Food in the USA Drug Administration and USA horticulture industries and was stimulated by foodborne illness outbreak investigations in these countries. The Program Managers were kept informed on research results and regulatory developments in the area such as meetings of and publications of guidelines and fact sheets from these organisations and any implications for the red meat industry. The Food Safety annual conference of the ANZ Fresh Produce Safety Centre was attended on behalf of the Program Manager (Objective 5).

Following this and an earlier report on potential environmental hazards and the red meat food chain, MLA has recently requested tenders for a project *Microbiological food safety of effluent from animal industries* that is a survey of the microbiological quality of processed waste and effluent, along the supply chain from animal production sites to processing establishments, which will provide clarity and identify potential risks that may not have been previously considered.

2. Shiga toxigenic *E. coli* (STEC) are foodborne pathogens of concern and subject to regulatory control in export destinations for Australian red meat. Knowledge of STEC continues to evolve and approaches to assessment of the health risk posed by the presence of STEC in food were reviewed by JEMRA (Joint FAO/WHO expert meetings on microbiological risk assessment) for Codex from 2016-2019. The Program Manager was kept up to date with outputs from these meetings. These meetings resulted in a revised health risk-based approach recommended for STEC risk characterisation and an updated global food attribution study. Similar conclusion was drawn by a study of the USA government. Another study was undertaken in the EU on STEC virulence and public health risk assessment that had different conclusions. These activities all have potential implications for red meat import regulations. The Program Manager suggested an evaluation of the impact of

these developments for Australian red meat and a conversation with interested groups in Australia (e.g. public health, food industry and regulators etc) would be beneficial to update and discuss these important developments. Extensive discussion was held with key figures in these areas; however, it was not possible to successfully engage the public health sector. Presentations were made at a Mintrac meeting to share these developments with the red meat industry.

3. The contractor was a consultant on a source attribution study of salmonellosis in New South Wales. In collecting industry data for meats, the consultant was able to engage with the Program Manager and ensure comprehensive and accurate data was included for red meat.

Objective 5

Attending meetings and making presentations as required

The following meetings were attended for or on behalf of the Program Manager:

- Mintrac. Presentation *STEC, a work in progress*. 2018
- Food Safety annual conference of the ANZ Fresh Produce Safety Centre. Attendance and reporting. (See Obj.4 for more detail).

Objective 6

Literature sources, databases and other electronic media sources were scanned daily. New scientific knowledge, technological developments and related regulatory activity of immediate or urgent interest were communicated immediately to the Program Manager while those of more general interest were reported on a regular basis from weekly to monthly depending on the amount of material collated.

This material was reported as agreed with the Program Manager with a reference source, summary, comment, or appraisal on the relevance to the Food Safety Program and links to further information as appropriate. Examples of report contents included:

- Human and veterinary epidemiological surveillance and studies in Australia and in our trading partner countries,
- advancements in understanding the biology and ecology, detection, virulence, phenotypic and genomic characterization of microbial hazards relevant to the red meat industry (e.g. non-typhoidal *Salmonella* and pathogenic *Escherichia coli*),
- food safety science and red meat relating to foodborne pathogen transmission,
- risk management and regulatory developments and reports,
- consumer practices and concerns, and,
- advances with and critiques of strategic approaches to food safety management in the red meat supply chain.

Notification of relevant activity and publications from the Food and Agriculture Organization, World Health Organization and Codex Alimentarius and regulatory agencies in Australia and trading countries were provided. For example, outcomes of WHO/FAO expert consultations on Shiga toxin producing *E. coli*, food attribution, risk characterization and monitoring, Safety and quality of water used in food production and processing, and reports from the US FDA for food regulations and investigations (e.g. horticulture) interfacing with and having implications for red meat production.

Objective 7

This objective was completed in association with Objectives 2 (4.2) in participation in the *E. coli* Panel meetings and 10 (4.10) in attendance at the scientific risk management panel meetings. Outside of these, reports were prepared for the Program Manager on the safety of biltong and dry aged beef manufacture to assist manufacturers in interpretation of regulations.

Objective 8

No requests were received for conducting sampling, testing and other data gathering activities on the sites of meat processors, further processors or other members of the supply chain as required.

Objective 9

Four risk management panel meeting were attended, generally over 2 days. In addition to participation presentations were made at the request of the Program Manager. For example:

- Industry strategy for use of new genetic identification systems,
- Environmental sources,
- Meat outbreaks Salmonella in beef and lamb USA and UK.

Meeting discussions included contribution to discussion of future directions for the Food Safety Program annually.

Objective 10

No requests were received for other activities as determined by MLA from time to time.

4.2 Paul Vanderlinde (V.MFS 0411)

Objective 1

Technical support was provided for a variety of projects with most time given to assisting the microbial requirements of the frozen product and shelf life requirements from a regulator point of view.

Input in technical advice was provided to the *E. coli* Panel meetings by reviewing and commenting on issues and reviewing and commenting on project proposals, milestones reports and publications. Examples of projects included baseline surveys of beef and veal, sheep meat and offal.

Objective 3

The major discussion paper prepared at the request of the Program Manager was, "Port rejections in USA and Japan".

Objective 5

The following meetings were attended for or on behalf of the Program Manager:

Mintrac. Presentation. 2017

Objective 7

This objective was completed in association with Objectives 2 in participation in the *E. coli* Panel meetings and 10 in attendance at the scientific risk management panel meetings. Outside of these, reports were prepared for the Program Manager on the safety of biltong and dry aged beef manufacture to assist manufacturers in interpretation of regulations.

Objective 9

Four risk management panel meeting were attended, generally over 2 days. In addition to participation presentations were made at the request of the Program Manager. For example:

- Industry strategy for use of new genetic identification systems,
- Environmental sources,
- Meat outbreaks Salmonella in beef and lamb USA and UK.

Meeting discussions included contribution to discussion of future directions for the Food Safety Program annually.

4.3 Andreas Kiermeier (V.MFS 0412)

Objective 1

Technical support was provided for a variety of projects with most time given to assisting the microbial requirements of the frozen product and shelf life requirements from a regulator point of view.

Input in technical advice on updating and making the UTAS shelf life model more user friendly.

Objective 3

The major discussion paper prepared at the request of the Program Manager was to assist plants on understanding shelf life trials.

Objective 7

Outside of these, reports were prepared for the Program Manager on the use and updating of the shelf life model and how to interpret the data.

Objective 8

At the request of the Program Manager was to assist plants collect and test samples for lamb shelf life trials.

4.4 David Jordan (V.MFS 0413)

Objective 1

Technical support was provided for a variety of projects with most time given to assisting the microbial requirements of the frozen product and shelf life requirements from a regulator point of view.

Input in technical advice was provided to the *E. coli* Panel meetings by reviewing and commenting on issues and reviewing and commenting on project proposals, milestones reports and publications. Examples of projects included baseline surveys of beef and veal, cadmium in sheep kidney and liver, advice on Antimicrobial resistance.

Objective 3

The major discussion paper prepared at the request of the Program Manager was to assist on Vet drugs and Antimicrobial resistance.

Objective 7

This objective was completed in association with Objectives 2 in participation and attendance at the scientific risk management panel meetings. Outside of these, reports were prepared for the Program Manager on the level of Cadmium in Australia and sampling plan.

Objective 9

Four risk management panel meeting were attended, generally over 2 days. In addition to participation presentations were made at the request of the Program Manager. For example:

- Industry strategy for use of new genetic identification systems,
- Environmental sources,
- Antimicrobial resistance

Meeting discussions included contribution to discussion of future directions for the Food Safety Program annually.

4.5 John Sumner (V.MFS.0416)

Objective 1

Technical support was provided for a variety of projects with most time given to assisting the microbial requirements of the frozen product and shelf life requirements from a regulator point of view.

Input in technical advice was provided to the *E. coli* Panel meetings by reviewing and commenting on issues and reviewing and commenting on project proposals, milestones reports and publications. Examples of projects included baseline surveys of beef and veal, sheep meat and offal.

Objective 3

The major discussion paper prepared at the request of the Program Manager was to assist plants on understanding shelf life trials.

Objective 5

The following meetings were attended for or on behalf of the Program Manager:

- Mintrac. Presentation. 2018
- Mintrac conference 2017-2019

Objective 7

This objective was completed in association with Objectives 2 (4.2) in participation in the *E. coli* Panel meetings and 10 (4.10) in attendance at the scientific risk management panel meetings. Outside of these, reports were prepared for the Program Manager on the safety of dry aged beef manufacture to assist manufacturers in interpretation of regulations.

Objective 8

At the request of the Program Manager was to assist plants collect and test samples for lamb shelf life trials, including micro testing. In addition, to assist plant on communicating the impact of the trial.

Objective 9

Four risk management panel meeting were attended, generally over 2 days. In addition to participation presentations were made at the request of the Program Manager. For example:

- Industry strategy for use of new genetic identification systems,
- Environmental sources,
- Meat outbreaks Salmonella in beef and lamb USA and UK.

Meeting discussions included contribution to discussion of future directions for the Food Safety Program annually.

5 Discussion

Microbiological food safety is most important for the red meat industry as it influences market access through regulations and requirements and a safe red meat supply is a key expectation of

consumers and governments both nationally and internationally. Risk management of pathogens in red meat is a dynamic and multi-factorial activity that has to be based on current and sound scientific and technical knowledge of the key risk factor determinants.

Fulfilling the objectives of this project has assisted the Food Safety Program Manager and other mangers to remain at the forefront of scientific knowledge and technological developments across broad areas of microbial food safety science, regulation, consumer concerns and industry implementation strategies. This has allowed these risk managers to undertake their ongoing microbial food safety risk management responsibilities effectively, to be pro-active and have preparedness measures in place as required, and to be informed for future planning. In particular, the consultant has been able to provide a public health perspective of food safety to the Program Manager that complements other disciplines in red meat science and technology and to which they may otherwise not have been exposed. A holistic and current knowledge base is critical in food safety risk management programs.

For example, a key area addressed during the time frame of this report were observations of shifts in epidemiological trends and attribution of meat-borne bacterial pathogens (pathogenic *E. coli* and non-typhoidal *Salmonella*) and developments in their risk characterisation that impact on risk assessments and approaches to food safety risk management in Codex and potentially member countries. Similar reviews have been undertaken in the EU and the USA and such information is used to inform regulation setting.

Another area identified for monitoring was public health concern for zoonoses resulting from environmental contamination connected to animal production and meat processing facilities. Investigations of foodborne illness outbreaks are increasingly being expanded to include traceback investigations through the whole food chain from farm to the consumer. Increasing numbers of foodborne illness outbreaks attributed to fresh produce and sprouted seeds have been or have been suspected to be linked with environmental exposure of crops in the field to emissions or waste from meat chains. This may result in regulatory measures in the USA that may indirectly impact on their meat industry. Similar activity is taking place in Australia and New Zealand and exists in the EU.

Valuable support was available to the Program Manager through technical input for other Food Safety R&D Program projects especially where there was limited experience with red meat production and processing food safety management and meat-borne infections. During the first 2 years, the contractor was a member of the steering group for project V.MFS. 0410 *Review of food safety and market access risks in red meat supply chains*, a significant project to assist MLA in future food safety risk management planning. Advice and review were provided for other project areas e.g. application of WGS in the red meat industry and various meat and offal surveys and publications.

Similarly, new developments in red meat food safety were identified for the Program Manager and in turn communicated within and between MLA and other stakeholders, industry and regulators, and were used in preparing discussion papers and reports on topical issues and industry-initiated requests and industry presentations. The contractor's knowledge and experience helped to compliment those of other participants at the *E. coli* Panel and the Risk Management Panel meetings. At the same time, these activities helped the Program Manager build strategic relationships with relevant external groups and to ensure MLA had appropriate input representing their food safety interests.

6 Conclusions/recommendations

To be effective microbial food safety risk management has to be based on sound and current scientific evidence and knowledge and risk managers and advisors have to be at the forefront of scientific knowledge and technological developments in a broad area of disciplines. The activities in this project have assisted the Food Safety Program Manager in achieving this and hence to undertake food safety risk management responsibilities effectively and pro-actively by providing an essential multi-discipline perspective.

Further, throughout the project support has supported communications with red meat industry stakeholders and others of significant developments, issues, and challenges in food safety and public health to which they may otherwise not have been exposed. Beneficial input has been provided similarly to enhance other MLA Food Safety Program R&D projects, industry and Program risk management panels and in responses to industry requests for information.

7 Key messages

- Community concern and regulatory issues surrounding red meat-borne pathogens and microbial contamination of meat are important for public health and influential in market access.
- Management of microbial food safety risks is dependent on sound and current scientific evidence and knowledge that is broad, covering both public health and red meat production and processing considerations.
- New knowledge on achievements, threats and challenges should be communicated to risk managers and other stakeholders is a timely and effective manner.