

Australia's export meat products – how do they rate at the Hygiene Olympics?

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We've written a monograph: *Research and development in the Australian red meat industry: its impact on food safety and shelf life*

Objectives:

1. To gather, in one publication, objective evidence surrounding the hygiene status of Australian meat products
2. Provide the research and development which has underpinned this status
3. Provide material to the Dept to help them negotiate a new deal with overseas regulators

Acknowledgments

The following people read early drafts and put us right:

Robert Barlow, Ian Eustace, Narelle Fegan, David Jordan, Jenny Kroonstuiver, Glen Mellor, Clive Richardson and Tom Ross.

Executive summary

- The Australian system
- Testing and monitoring
- Carcase hygiene – how does Australia compare globally?
- Final product hygiene - how does Australia compare globally?
- Food safety
- Shelf life of vacuum packed cuts

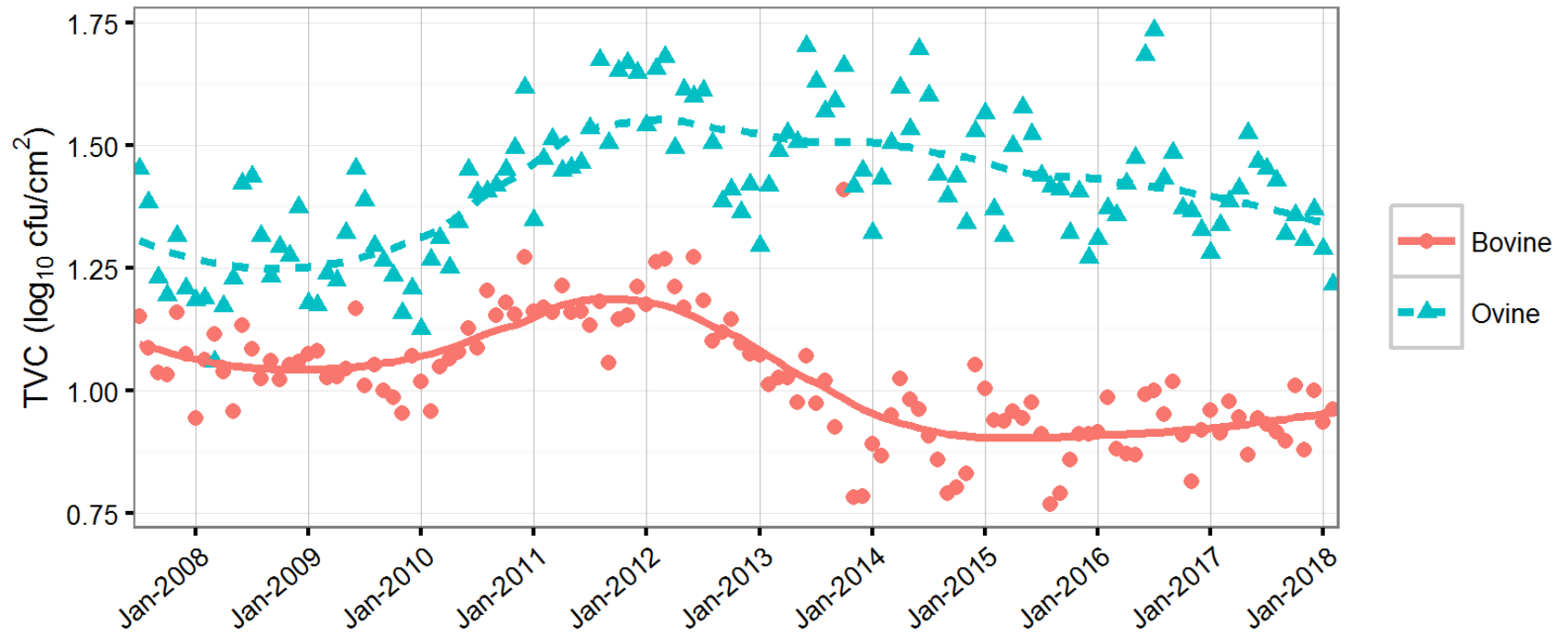
Main document

1. Introduction: an industry is born
2. Hygienic status of Australian red meat carcasses
3. Rapid increase in microbiological knowledge of carcasses
4. The modern Australian slaughter and dressing system
5. Process evaluation and improvement
6. Microbiological quality of Australian carcasses, then and now
7. The National Carcass Microbiological Monitoring Program
8. How does Australia compare globally?
9. The impact of the Australian system on carcass contamination
10. Interventions to decontaminate the carcass
11. The Shiga toxin-producing *E. coli* (STEC) problem
12. Risk of illness from meat consumption
13. Chilled meat to distant markets – flexible packing and modified gas atmospheres
14. Shelf life of Australian VP chilled meats
15. Meat regulation and quality systems
16. Predictive microbiology
17. National baseline surveys

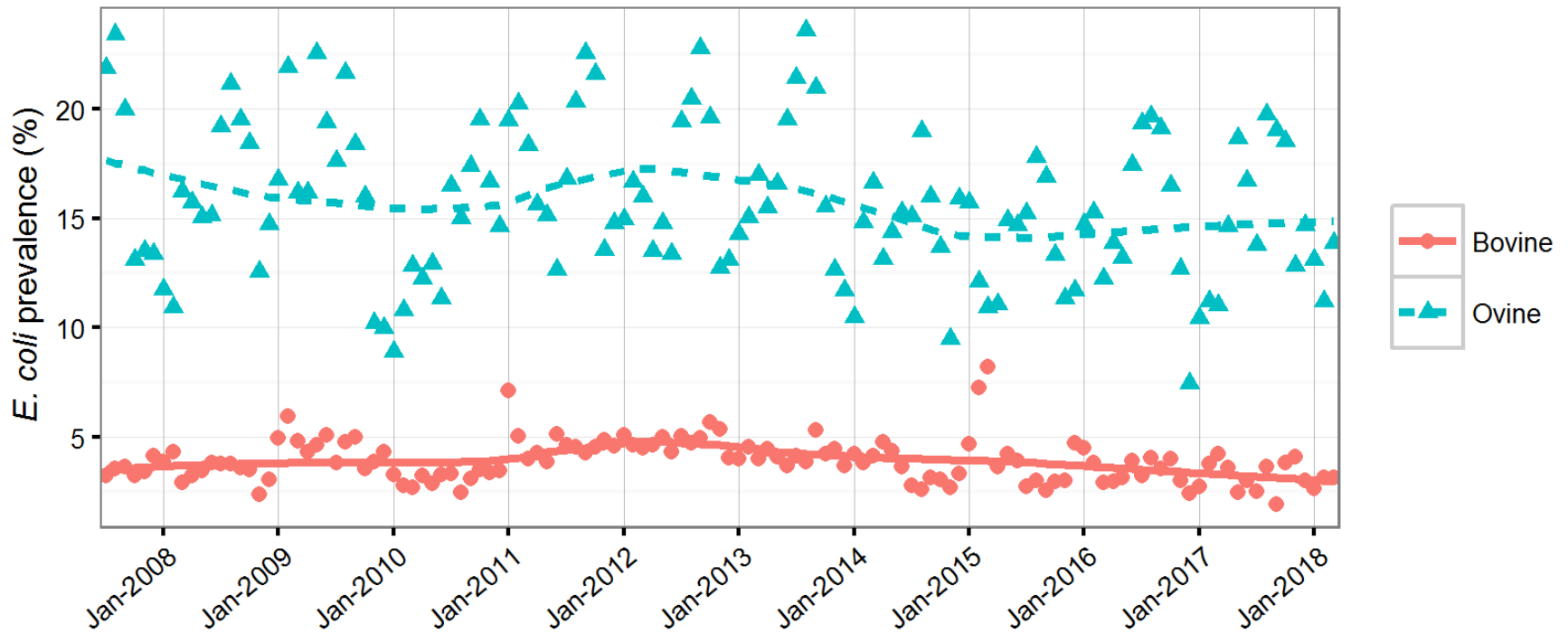
The Australian system

1. Livestock generally enter the slaughter facility in a clean condition
2. Slaughter and dressing chain speeds are low
3. Improved unit operations for hide/pelt removal
4. Well-trained operators and managers
5. Establishments trim to a standard specification
6. Microbiological monitoring
7. Technical underpinning

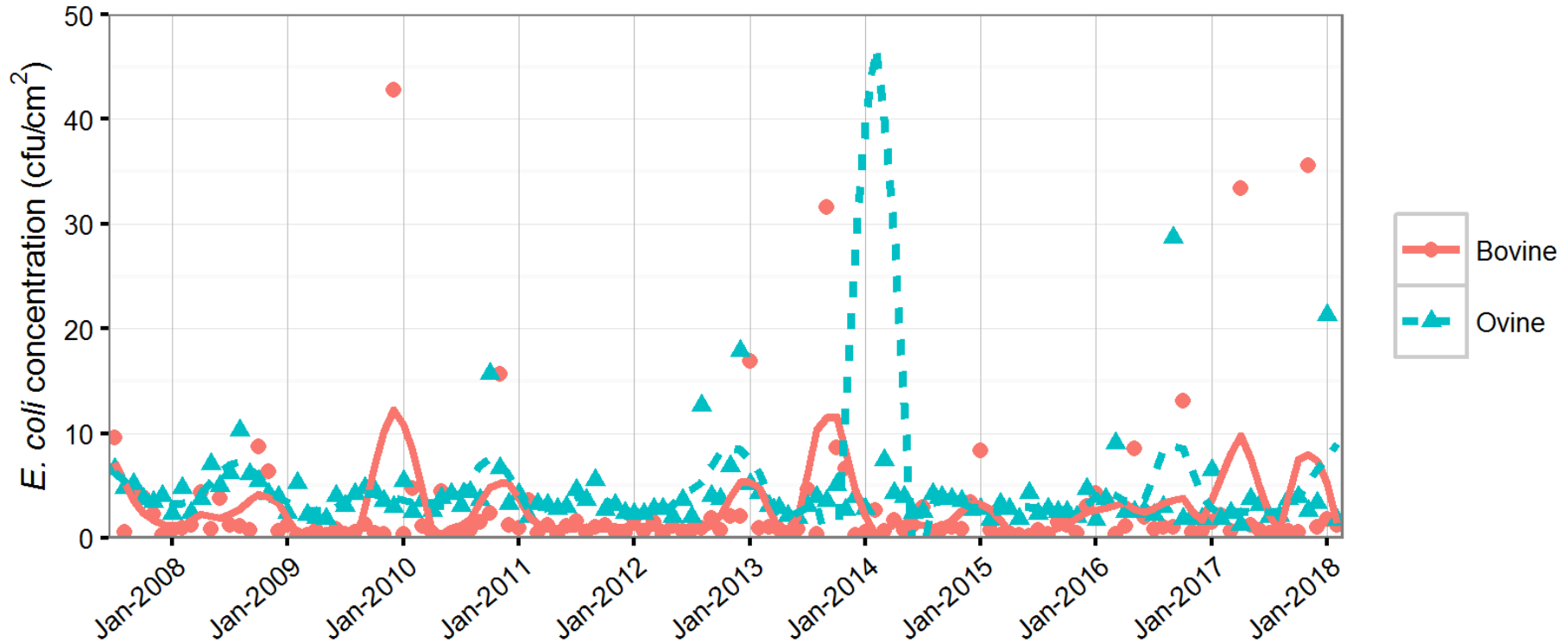
Indicators - Low total bacteria



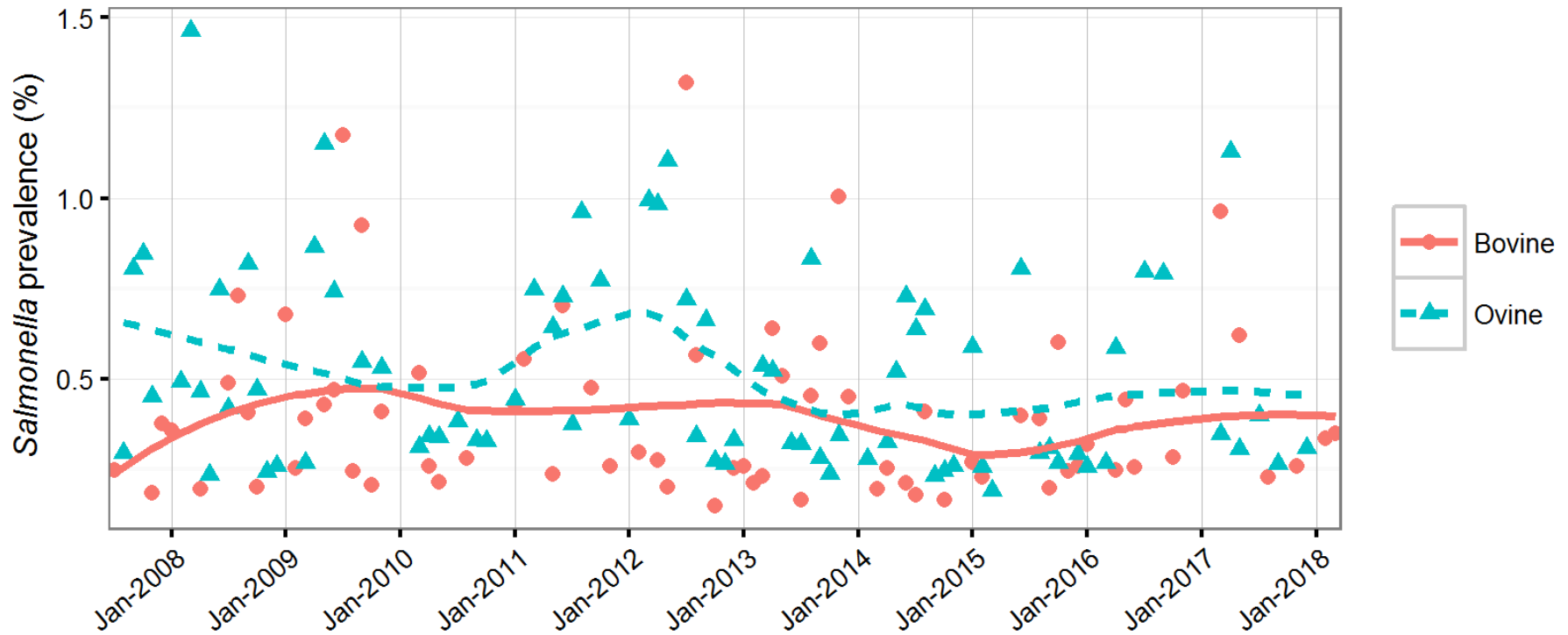
Indicators - *E. coli* prevalence



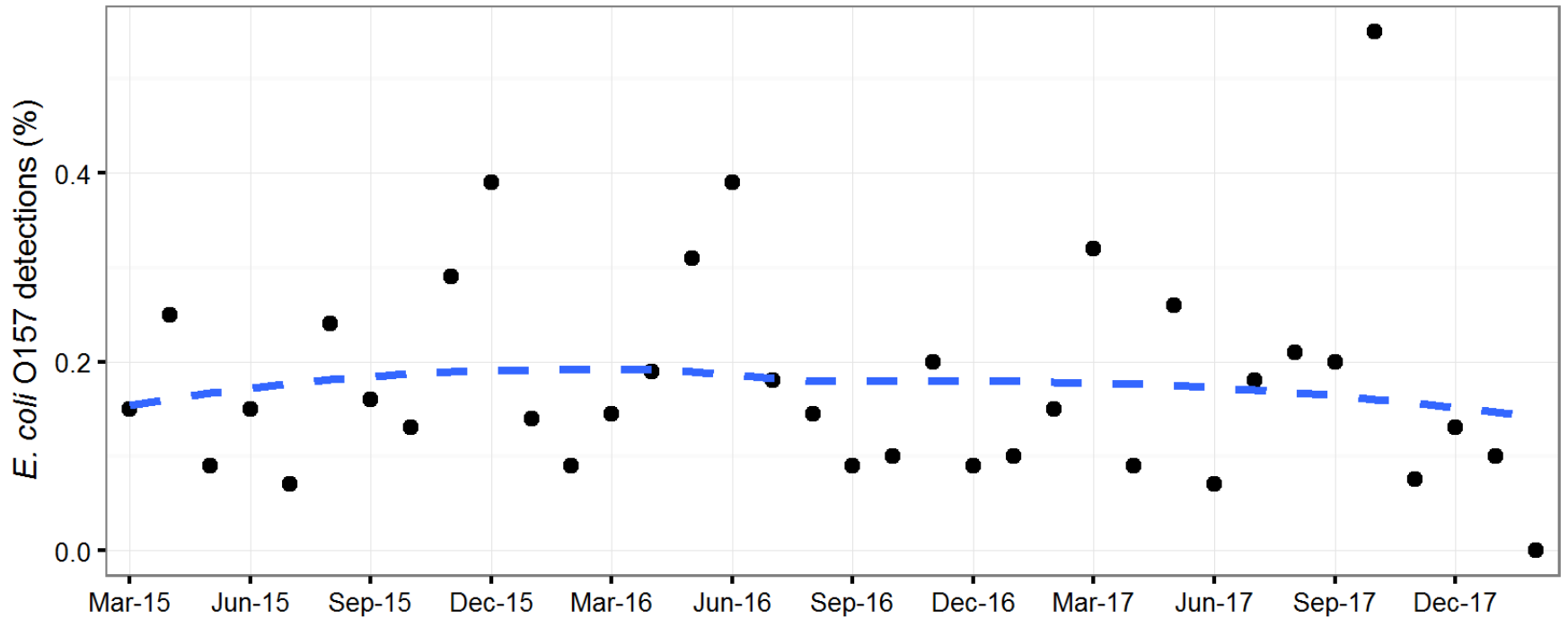
Indicators – low *E. coli* numbers



Pathogens - *Salmonella* prevalence

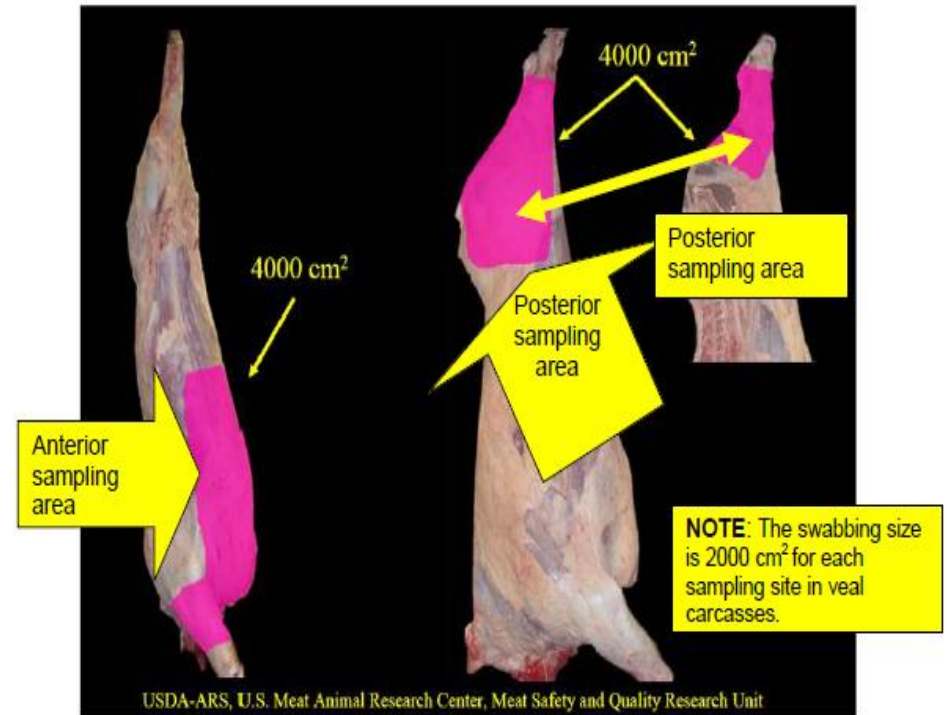


Pathogens – O157 prevalence

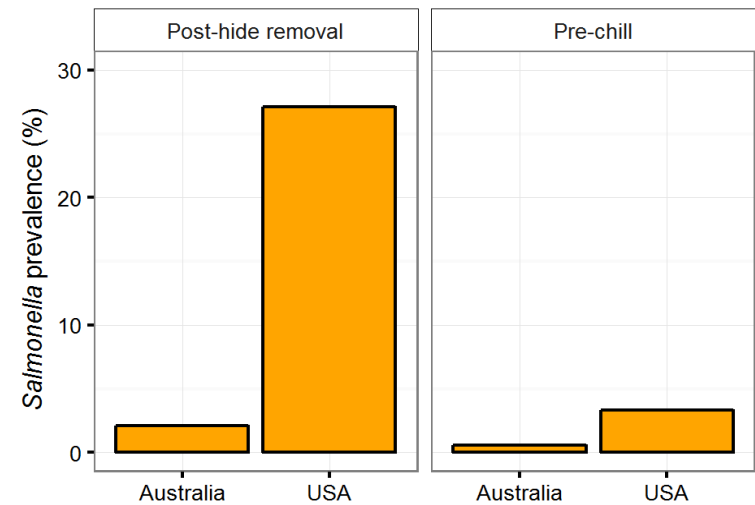
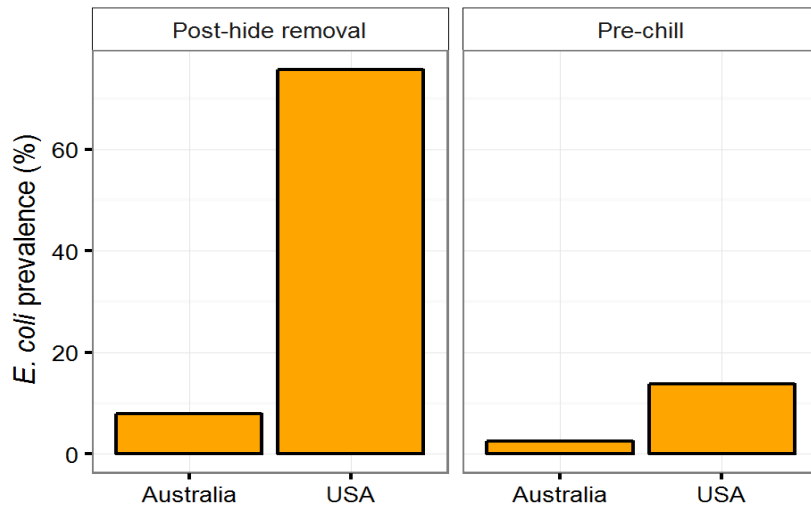


Baseline survey - US comparison

- FSIS carcass baseline – we duplicated it
- More than 5000 carcass samples from both industries
- Large area sampling



USA - how do we compare?



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U.S. Department of Agriculture compared beef trim from Australia, New Zealand, Uruguay with their own domestic product.

Tested indicator organisms

Indicator	1 st place	2 nd place
Total Count	Australia	NZ

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<i>E. coli</i>	NZ	Australia
Staph. aureus	Australia	NZ

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HUS-related non-O157	Australia	NZ

The USA researchers stated that the results revealed significant differences between samples “*with the lowest pathogen numbers in samples from AUS*” (Bosilevac *et al.* 2007).

Set of steak knives - STECs

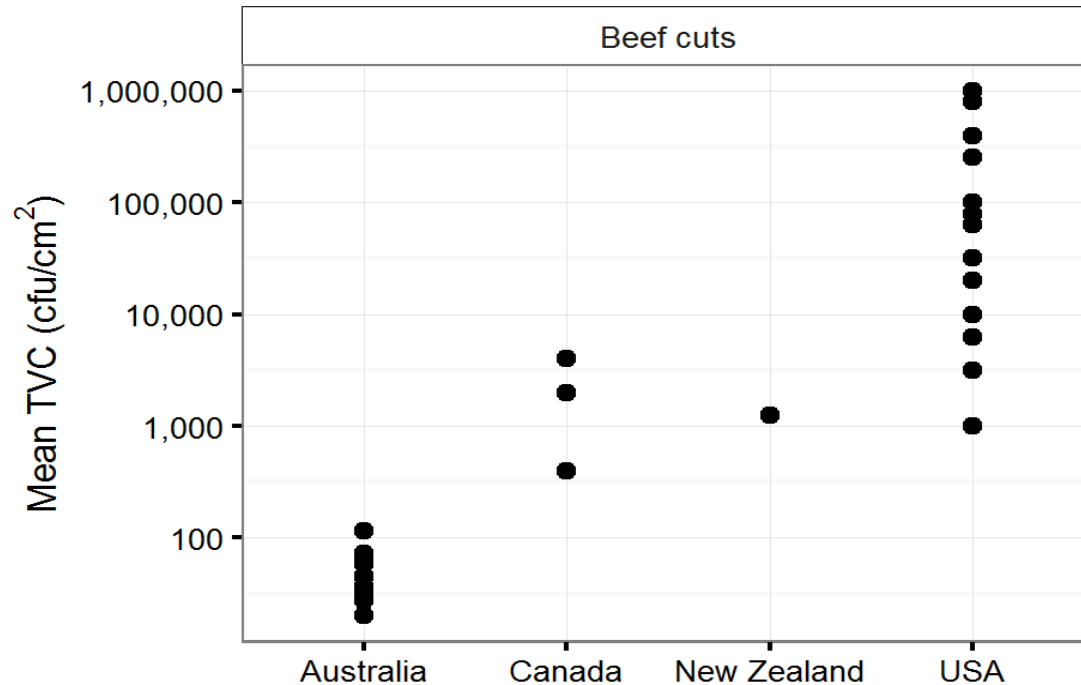
1. If all Australian trim exported to the USA was manufactured into “Aussie” hamburgers (no comingling), they would cause less than 1 illness/decade in quick serve restaurants (Kiermeier *et al.* 2015).
2. ANU did a 10-year analysis of STEC illness – not one illness from meat.

Set of steak knives - STECs

3. We have very low rates of STEC illness compared with the rest of the world.
4. CSIRO research with USA found Australian O157 was 'less virulent' than USA O157.
5. This based on the type of toxin genes they carry, the amount of toxin they produce and location of the toxin genes in the genome (Mellor *et al.* 2013).

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Low counts = long shelf life



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Beef	Mean storage (°C)	Shelf life (days)	Reference
Striploin	-0.5	189-203	Small <i>et al.</i> 2012
Striploin	-1	280	Tunnage 2018
Cube roll	-0.5	189-203	Small <i>et al.</i> 2012
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Lamb	Mean storage (°C)	Shelf life (days)	Reference
Boneless leg	0	103	MLA 2017
Bone-in leg	0	97	MLA 2017
Rack	0	94	MLA 2017