



An Australian Process that Assesses Country BSE Food Safety Risk

Hong Jin^{1*}, Leise Berven¹, Rosalind Dalefield¹, James Conlan¹, Marion Healy¹ and Scott Crerar¹

¹*Food Standards Australia New Zealand, 55 Blackall Street, Barton ACT 2600, Australia.*

Authors' contributions

This work was carried out in collaboration between all authors. Author SC led the development and implementation of and author MH provided leadership and direction to the Australian process that assesses country BSE food safety risk. Author HJ developed the concept of this paper and drafted the manuscript. Author LB provided significant input to the development of the assessment process. Authors RD and JC contributed to the country BSE food safety assessments as risk analysts. All authors were involved in the critical revision of the manuscript, and read and approved the final manuscript.

Article Information

DOI: 10.9734/EJNFS/2015/16124

Grey Literature

Received 8th January 2015
Accepted 21st January 2015
Published 26th February 2015

ABSTRACT

Background: Bovine spongiform encephalopathy (BSE) is a transmissible, fatal neurodegenerative disease of cattle. Recognised in 1986, the disease causes a spongiform degeneration of the neural network in the brain and spinal cord of infected cattle leading to incoordination, ataxia and ultimately death of the infected animal [1]. The agent causing BSE in cattle is a structurally modified prion protein. The BSE epidemic that started in the United Kingdom (UK) resulted in the destruction of more than 3.3 million cattle in the UK alone [2]. Variant Creutzfeldt-Jacob Disease (vCJD), a fatal neurodegenerative human disease described for the first time in 1996, is putatively linked to the consumption of specified tissues from the carcass of cattle infected with the BSE agent that causes BSE [3]. By June 2014, 184 people have died of vCJD infection and most of these lived in the UK <http://www.cid.ed.ac.uk/documents/worldfigs.pdf>.

As a result of the worldwide prohibition on processed animal proteins being fed to cattle, BSE is no longer a major threat to food and feed safety provided that appropriate control measures are effectively implemented.

This paper discusses Australia's approach to conducting country assessments to determine the

*Corresponding author: Email: hong.jin@foodstandards.gov.au;

food safety risk posed by the classical form of BSE but does not discuss the atypical forms of BSE, i.e. the H-type BSE and L-type BSE, identified more recently [4,5].

Australia has not recorded a case of BSE. In recognition of Australia's effective BSE surveillance and control measures it has been assigned by its trading partners and the World Organisation for Animal Health (the OIE) the most favourable BSE risk status. In response to the identification of the linkage between BSE and vCJD in the BSE inquiry report [6], the Australian Government in 2001 introduced measures that prohibited the importation of beef and beef products from all countries that had reported cases of BSE. The Australia New Zealand Food Standards Code was amended in 2002 to ensure that beef and beef products sold in Australia were only derived from animals free of BSE. Some products were exempted from this requirement including: (a) collagen and gelatine sourced from bovine skins and hides; (b) bovine fat or bovine tallow at no more than 300 g/kg in a food product; and (c) dairy products sourced from bovines. Countries without BSE cases and wishing to export beef or beef products to Australia at the time were assessed by Food Standards Australia New Zealand (FSANZ) for country BSE risk status using a method based on the geographical BSE risk assessment methodology [7] between 2001 and 2003. As a result, retorted beef products were permitted for importation into Australia from 27 countries that included Argentina, Brazil, Chile, Croatia, Latvia, Lithuania, Mexico, New Zealand, Sweden, and Vanuatu.

In view of the updated scientific information on BSE, the Australian Government announced a revised BSE food safety policy in 2009 that permitted the importation of beef and beef products from any country, providing that the country had been assessed by FSANZ as having appropriate and effective BSE controls in place. Countries wishing to export fresh beef (chilled or frozen) to Australia need to apply to the Australian Department of Agriculture for assessment of a broader range of animal health and quarantine risks.

Since the announcement of the revised BSE food safety policy, FSANZ received submissions from 16 countries requesting country BSE food safety assessment and determination of their country's BSE food safety risk status.

This extended abstract describes an Australian process developed and applied by FSANZ for assessing country BSE food safety risk.

Aims: To describe the features of a process developed and applied by FSANZ for assessing country BSE food safety risk.

Study Design: The Australian process that assesses country BSE food safety risk is comprised of: 1) a food safety risk assessment across the beef supply chain; 2) a framework to assure the quality of the assessment outcomes; and 3) a set of arrangements to deliver transparent risk communication.

Place and Duration of Study: FSANZ, Canberra, Australia, between April 2010 and December 2014.

Methods: The Australian process to assess country BSE food safety risk was developed in accordance with the 2009 Australian Government's BSE food safety policy <http://www.foodstandards.gov.au/industry/bse/bseimports/documents/BSE%20Policy%2025%20September2009.pdf>, and the principles described in the BSE chapter of the Terrestrial Animal Health Code published by the OIE. http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_bse.htm.

Results: *The BSE food safety assessment:* The food safety assessment across the beef supply chain for BSE risk is comprised of: (a) a desk-based assessment that evaluates information provided by the applicant country; and (b) an in-country verification assessment that verifies the effectiveness of the key BSE control measures implemented in the applicant country. The desk-based assessment evaluates the applicant country's response to the Australian Questionnaire to Assess BSE Risk (the Questionnaire),

<http://www.foodstandards.gov.au/industry/bse/bsequestionnaire/pages/default.aspx>, information provided as appendices to the applicant country's response to the Questionnaire, and any relevant information that is publicly accessible. The latter may include data and information published by the applicant country, relevant statistics and audit reports published by the OIE, the European Commission, the United States of America and others, and articles in relevant scientific journals. In addition to undertaking a desk-based assessment for each applicant country, FSANZ risk assessors conducted in-country inspections of all applicant countries that have been assessed to date, to verify the effectiveness of BSE-related controls. The in-country verification inspection assesses the competent authority's oversight of BSE control and prevention measures, verifies the effectiveness of BSE related control measures implemented on beef and/or dairy farms, in feed producing establishments, and at slaughtering and rendering establishments in the applicant country.

The adequacy of the BSE-related food safety control measures developed by the applicant country and the effectiveness of their implementation are assessed against the following key areas:

- 1) The likelihood of the introduction and release of the BSE agent through importation of live cattle, bovine commodities and animal feed products;
- 2) The likely exposure of domestic cattle herds to the BSE agent via potential recycling of the BSE agent within the animal feed system;
- 3) The specific food safety controls around beef and beef products produced for human consumption;
- 4) The adequacy of BSE control and prevention related infrastructure including an animal identification and traceability system, and the competent authority's oversight of BSE prevention and control measures; and
- 5) BSE notification, laboratory diagnostic and surveillance activities.

A detailed BSE food safety assessment report is prepared to describe the BSE food safety controls established by the applicant country and the effectiveness of their implementation. The report recommends a BSE food safety risk category for the applicant country as part of the overall conclusion. This BSE food safety risk category then determines the trading conditions for beef products that may be exported from the applicant country to Australia.

Governance and quality assurance: The FSANZ country BSE food safety assessment process is supervised by the Australian BSE Food Safety Assessment Committee comprised of experts in the fields of food safety and risk assessment, animal health, animal and agricultural production systems, international trade, and animal identification and traceability. The assessment report prepared by FSANZ is peer reviewed by food safety and veterinary experts, and comments are also invited from the competent authority of the applicant country. The assessment outcomes including the recommended BSE risk status are reviewed and endorsed by the Australian BSE Food Safety Assessment Committee and subsequently approved by the Chief Executive Officer of FSANZ prior to notification to the applicant country and the Australian Department of Agriculture. The Australian Department of Agriculture establishes the export certification required from the competent authority of the applicant country based on the BSE risk status assigned.

Risk communication and transparency: Once a country's status is finalised, FSANZ communicates the assessment outcome to the applicant country and relevant stakeholders including the OIE. The full country BSE food safety assessment report is subsequently published at <http://www.foodstandards.gov.au/industry/bse/bsestatus/Pages/default.aspx>.

Consistency with established international risk assessment framework: The Australian process to assess country BSE food safety risk is consistent with the risk assessment framework applied by the OIE [8] in determining a country's BSE risk status for animal health purposes. The OIE framework is comprised of: (1) release assessment; (2) exposure assessment; (3) BSE notification and investigation assessment; (4) BSE diagnosis assessment; and (5) BSE surveillance assessment. The Australian country BSE food safety assessment, based on the above OIE framework, addresses additional elements around food safety systems and controls in the applicant

country aimed at preventing the contamination of beef and beef products for human consumption with the BSE agent and their tracing within the human food supply chain. Consequently, slaughterhouse operations, cattle identification and traceability, meat traceability and recall systems in the applicant country are examined for their effectiveness to ensure the safety and traceability of exported products of bovine origin.

The final outcome of the country BSE food safety assessment conducted by FSANZ is a categorisation of an applicant country's BSE food safety risk status. A *Category 1* country risk status is applied to countries for which there is a minimal likelihood that the BSE agent has or will become established in the national herd of the applicant country and will enter the human food supply chain. Beef and beef products produced in countries with a *Category 1* status are considered to pose a minimal risk to human health. The Australian *Category 1* BSE risk status is broadly equivalent to the OIE's "negligible" country BSE risk status for animal health. A *Category 2* country risk status means that countries have effectively implemented appropriate BSE control measures to prevent both the introduction and amplification of the BSE agent in a country's cattle population, and contamination of the human food supply with the BSE agent. However, there are identified risk factors, for example some of the measures may not have complied with international standards for sufficient duration to achieve *Category 1* status. Beef and beef products produced in countries with a *Category 2* status are also considered to pose a minimal risk to human health. The Australian *Category 2* risk status is broadly equivalent to the OIE's "controlled" country BSE risk status for animal health. More stringent export certification requirements apply to *Category 2* countries in that they are additionally required to certify that BSE specific risk materials are removed and appropriate stunning techniques are practiced during the slaughtering process.

Countries that are not categorised as *Category 1* or *Category 2* risk status are unable to export beef products to Australia.

At the time of preparation of this publication, FSANZ has completed BSE food safety assessments for nine applicant countries. Among the 16 country submissions received, two countries have since withdrawn their applications. BSE food safety assessments for the remaining countries are expected to be completed by mid-2016

<http://www.foodstandards.gov.au/industry/bse/bsestatus/Pages/default.aspx>.

Conclusion: The Australian process that assesses country BSE food safety risk has utilised an established international risk assessment framework for determining a country's BSE animal health risk status and built upon this to incorporate additional elements to address the food safety and traceability of beef products. The in-country verification step to assess the effectiveness of a country's BSE-related controls has provided Australia with further assurances around the safety of beef products that may potentially be exported to Australia.

The approach taken by FSANZ in assessing a country's BSE food safety risk has been well accepted by applicant countries, many of which have sought categorisation through Australia's process to demonstrate their BSE risk status. The rigorous risk assessment and transparent risk communication practices applied by FSANZ in determining a country's BSE food safety risk status has helped to ensure applicant countries' engagement with and support of the assessment process.

Keywords: Bovine spongiform encephalopathy; risk assessment process; food safety.

ACKNOWLEDGMENTS

The authors wish to acknowledge the support and assistance provided in the development and implementation of the Australian BSE food safety assessment process from the Australian Department of Agriculture, Australian Department of Foreign Affairs and Trade, Australian Department of Health, and the Australian BSE Food Safety Assessment Committee; and Dr Andrew Bartholomaeus and Mr Joel Tan, previous staff members of FSANZ.

The FSANZ BSE food safety risk assessment process is reflected in a number of HTML web pages along with the full country assessment reports that are published on FSANZ website. These can be accessed at <http://www.foodstandards.gov.au/industry/bse/Pages/default.aspx>.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Wells GA, Scott AC, Johnson CT, Gunning RF, Hancock RD, Jeffrey M, Dawson M, Bradley R. A novel progressive spongiform encephalopathy in cattle. *Veterinary Record*. 1987;121(18):419-420.
2. Beck M, Kewell B, Asenova D. BSE Crisis and food safety regulation: a comparison of the UK and Germany, University of York. The York Management School; 2007. Working Paper No. 38, ISSN Number: 1743-4041, Available: <https://www.york.ac.uk/media/tyms/documents/research/workingpaper/wp38beck.pdf>, Accessed 20 August 2014.
3. Brown P, Will RG, Bradley R, Asher DM, Detwiler L. Bovine spongiform encephalopathy and variant Creutzfeldt - Jakob disease: background, evolution, and current concerns. *Emerging Infectious Diseases*. 2001;7(1):6-16.
4. Biacabe AG, Laplanche JL, Ryder S, Baron T. Distinct molecular phenotypes in bovine prion diseases. *EMBO Reports*. 2004;5(1):110-114.
5. Casalone C, Zanusso G, Acutis P, Ferrari S, Capucci L, Tagliavini F, Monaco S, Caramelli M. Identification of a second bovine amyloidotic spongiform encephalopathy: molecular similarities with sporadic Creutzfeldt-Jakob disease. *Proc. Natl. Acad. Sci. USA*. 2004;101(9):3065-3070.
6. Lord Phillips of Worth Maltravers, Bridgeman J, Ferguson-Smith M. The BSE Inquiry. London: The Stationery Office; 2000, Available: <http://collections.europarchive.org/tna/20090505194948/http://bseinquiry.gov.uk/report/index.htm>, Accessed 20 August 2014.
7. Scientific Steering Committee. Opinion of the SSC on the Geographical Risk of Bovine Spongiform Encephalopathy (GBR); 2000. Available: http://ec.europa.eu/food/fs/sc/ssc/out113_en.pdf, Accessed 20 August 2014.
8. OIE. Chapter 11.4 Bovine Spongiform Encephalopathy, Terrestrial Animal Health Code, World Organisation for Animal Health; 2014. Available: http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_bse.htm, Accessed 20 August 2014.

© 2015 Hong et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:

The peer review history for this paper can be accessed here:
<http://www.sciencedomain.org/review-history.php?iid=854&id=30&aid=8281>