Australian Government

Biosecurity Australia

Generic Import Risk Analysis Report for Chicken Meat

Final Report

Part A

October 2008

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Foreword

This import risk analysis report is issued in four parts:

- Part A contains a brief summary of the import risk analysis (IRA)
- Part B contains background material, an explanation of the method used in the IRA, and a report of the Hazard identification and Hazard refinement steps
- Part C contains the detail of the assessments for each of the identified hazards, together with the risk management measures, and Health Certification requirements
- Part D contains appendices with comments received from stakeholders in earlier stages of the risk analysis process, and further explanatory or background material.

This document is Part A

It contains a brief background on risk analysis, a summary of the method used and the results and conclusions of the analysis. Part A is intended to assist stakeholders' understanding but it does not contain the full details of the analysis. Although care has been taken in preparing Part A, it should not be relied upon as a complete and accurate representation of the risk analysis or the results of this process.

This final IRA report has been issued by the Chief Executive of Biosecurity Australia. Stakeholders have 30 days from the publication of this report to lodge an appeal.

Appeals must be lodged in writing with the Import Risk Analysis Appeals Panel – a body independent of Biosecurity Australia – on one or both of the following grounds:

- there was a significant deviation from the process set out in the Import Risk Analysis Handbook (2003) that adversely affected the interests of the stakeholder
- a significant body of scientific information relevant to the outcome of the IRA was not considered.

In lodging appeals, stakeholders must provide a statement of reasons, including relevant material to support the appeal.

The Appeals Panel normally has up to 45 days to consider its finding and report to Australia's Director of Quarantine. If there is no appeal, or once any appeals are resolved, the process is complete and the recommended policy will be submitted to the Director of Quarantine for determination.

Appeals should be submitted to:
IRAAP Secretariat
Corporate Policy Division
Department of Agriculture Fisheries & Forestry
GPO Box 858
Canberra ACT 2601
Facsimile: (02) 6272 4506
Email: IRAAP@daff.gov.au
Further details of the appeal process are provided in the Handbook.

Contents

Summary

Australia currently has conditions to allow the import of cooked chicken meat from the United States of America, Denmark, Thailand and New Zealand. This import risk analysis (IRA) considers quarantine risks that may be associated with the importation to Australia of chicken meat from any country. The IRA assessed all potential disease agents that may be introduced to Australia via the importation of uncooked chicken meat and risk management options, which may include cooking and other meat processing techniques. This IRA report recommends that the importation of chicken meat to Australia could be permitted subject to compliance with risk management measures to manage the quarantine risks of a range of significant diseases to a very low level, in line with Australia's conservative approach to quarantine. These diseases include highly pathogenic notifiable avian influenza (HPNAI) virus, low pathogenicity notifiable avian influenza (LPNAI) virus, Newcastle disease virus (NDV), very virulent infectious bursal disease virus (vvIBDV), exotic antigenic variant strains of infectious bursal disease virus, *Salmonella* Pullorum, *S*. Gallinarum, *S*. Enteritidis, and multi-drug resistant strains of *S*. Typhimurium. For the purposes of this risk assessment, exotic antigenic variant strains of IBD virus are defined as strains that are antigenically and genetically different from those that exist in Australia, and include United States variant strains.

Details of risk management measures which have been deemed acceptable are as follows:

- The chicken meat must be from flocks raised in a country or zone which is free of highly pathogenic notifiable avian influenza virus, to the satisfaction of Australian Government authorities. Where these conditions do not apply, the product must be processed off-shore to ensure destruction of avian influenza virus. The product must be heated to a minimum core temperature of 70 °C for at least one minute (or time/temperature equivalent)
- The chicken meat must be from flocks raised in a country or zone which is free of low pathogenicity notifiable avian influenza virus, to the satisfaction of Australian Government authorities. Where these conditions do not apply, the product must be processed off-shore or on-shore under quarantine control, to ensure destruction of avian influenza virus. The product must be heated to a minimum core temperature of 70 °C for at least one minute (or time/temperature equivalent)
- The chicken meat must be from flocks raised in a country or zone which is free of Newcastle disease, to the satisfaction of Australian Government authorities. Any live vaccines used on chickens from which the meat was derived must have been produced from lentogenic strains of Newcastle disease virus. Where these conditions do not apply, the product must have been processed, off-shore or on-shore under quarantine control, to ensure destruction of Newcastle disease virus. The product must be heated to a minimum core temperature of 70 °C for at least 8.2 minutes (or time/temperature equivalent)
- The chicken meat must be from flocks raised in a country or zone which is free of very virulent infectious bursal disease virus, to the satisfaction of Australian Government authorities. Where these conditions do not apply, the product must have been processed, off-shore or on-shore under quarantine control, to ensure destruction of infectious bursal disease virus. The product must be heated to a core temperature of 80 °C for at least 125 minutes (or time/temperature equivalent). Requirements for thermal processing to ensure destruction of very virulent infectious bursal disease virus in chicken meat have been published previously and are included in Part D at Appendix 8

- The chicken meat must be from flocks raised in a country or zone which is free of exotic antigenic variant infectious bursal disease virus, to the satisfaction of Australian Government authorities. Where these conditions do not apply, the product must have been processed, off-shore or on-shore under quarantine control, to ensure destruction of infectious bursal disease virus. The product must be heated to a minimum core temperature of 80 °C for at least 125 minutes (or time/temperature equivalent). Requirements for thermal processing to ensure destruction of infectious bursal disease virus in chicken meat have been published previously and are included in Part D at Appendix 8
- The chicken meat must be from flocks raised in a country or zone which is free of *Salmonella* Pullorum, *Salmonella* Gallinarum, *Salmonella* Enteritidis, and multidrug resistant *Salmonella* Typhimurium to the satisfaction of Australian Government authorities. Where these conditions do not apply, the product must have been processed, off-shore or on-shore under quarantine control, to ensure destruction of *Salmonellae*. The product must be heated to a minimum core temperature of 70 °C for a minimum time of 2.5 minutes (or time/temperature equivalent).

Full details of the analysis and the conclusions reached are provided in Parts B and C of this IRA report.

Introduction

The objective of Australia's biosecurity policies is to protect Australia against the risks that may arise from exotic disease agents entering, establishing and spreading in Australia, thereby threatening Australia's agricultural industries that are relatively free from serious diseases, as well as Australia's native fauna and flora, including some species which are unique.

The import risk analysis (IRA) process is an important part of Australia's biosecurity policies. It enables the Australian Government to consider formally the risks that could be associated with proposals to import new products into Australia. If the risks are found to be above Australia's appropriate level of protection (ALOP), risk management measures are proposed to reduce the risks to an acceptable level. But, if it is not possible to reduce the risks to an acceptable level, then trade will not be allowed.

Successive Australian Governments have maintained a conservative approach to the management of biosecurity risks. This approach is expressed in terms of Australia's ALOP, which reflects community expectations through Government policy and is currently described as providing a high level of protection aimed at reducing risk to a very low level, but not to zero. This definition of ALOP, and its illustration by way of the risk estimation matrix shown below in Table 1, was endorsed by Primary Industries Ministerial Council on 2 May 2002 (Primary Industries Ministerial Council 2002).

Australia's IRAs are undertaken by Biosecurity Australia using teams of technical and scientific experts in relevant fields, and involving consultation with stakeholders at various stages during the process. The recommendations from Biosecurity Australia are provided to the Director of Animal and Plant Quarantine (the Secretary of the Australian Government Department of Agriculture, Fisheries and Forestry), who is responsible for making the formal decision as to whether or not trade will occur, and under what conditions. The Australian Quarantine and Inspection Service (AQIS) is responsible for implementing the import protocol, including any risk management measures.

Full details of the processes used by Biosecurity Australia are given in Part B of this report, and in the *Import Risk Analysis Handbook* (Biosecurity Australia 2003).

Scope

Australia currently has conditions for the importation of cooked chicken meat from the United States of America (USA), Denmark and Thailand which were promulgated in 1998. These conditions require that the chicken meat is cooked to a core temperature of 80 °C for at least 125 minutes or an equivalent time/temperature in order to address the quarantine risk associated with very virulent infectious bursal disease virus. Conditions for the importation of cooked chicken meat from New Zealand were promulgated in 1989 and require that the chicken meat is cooked to a core temperature of 80 °C for at least one minute.

This IRA considers quarantine risks that may be associated with the importation to Australia of chicken meat from any country. The IRA will include assessment of all potential disease agents that may be introduced to Australia via the importation of uncooked chicken meat, and risk management options, which may include cooking and other meat processing techniques. It has been prepared in response to applications made by the European Union, USA, Thailand, New Zealand, Brazil, China and Malaysia, seeking access for chicken meat into Australia.

In this IRA, chicken meat is defined as:

'the whole or part of the carcass of any domestic chicken (Gallus gallus) (but excluding the head, feathers, and all offal other than the liver, heart, gizzard, neck and feet), which has been slaughtered in an abattoir that meets standards at least equivalent to those contained in the "Australian Standard for Construction of Premises and Hygienic Production of Poultry Meat for Human Consumption" (Food Regulation Standing Committee 2006)'.

In accordance with the Agreement on the Application of Sanitary and Phytosanitary Measures (the SPS Agreement), IRAs assess risks to human, animal and plant life or health. Under Australian administrative arrangements, Biosecurity Australia provides advice to the Director of Animal and Plant Quarantine in relation to the life or health of animals and plants, while risks to human health are the responsibility of the Australian Government Department of Health and Ageing (DoHA). Risks to human health associated with the consumption of imported chicken meat or chicken meat products are assessed by Food Standards Australia New Zealand (FSANZ). Risks to the environment are the responsibility of the Department of the Environment, Water, Heritage and the Arts (DEWHA), formerly the Department of Environment and Water Resources (DEW).

Biosecurity Australia consulted with DoHA and FSANZ on public health issues, and with DEWHA in relation to environmental issues associated with the importation of chicken meat, during the preparation of this IRA.

Imported chicken meat must comply with the *Imported Food Control Act 1992* and the Australia New Zealand Food Standards Code (FSC) in its entirety. Under the Imported Food Control Act, AQIS may inspect, or inspect and conduct an analysis of imported chicken meat to determine its compliance with the FSC. Details of inspections and analyses currently required under the Imported Food Control Act were notified to industry in Imported Food Notice 03/08. A copy of this notice, so far as is relevant to the import of chicken meat, is reproduced in Part D at Appendix 3.

In relation to human health and food safety issues, the Australian Chief Medical Officer advised Biosecurity Australia (in the course of discussion on the draft IRA report released in 2006) that officers of DoHA "are satisfied that the list of pathogens considered in the risk assessment is complete and that adequate provisions have been made for imported chicken meat to comply with the Food Standards Code. The officers are satisfied that there are no issues in this risk assessment that are not food related and that the management measures proposed by Biosecurity Australia to meet animal health concerns are appropriate to meet human health concerns".

A number of issues raised by stakeholders after release of the draft IRA report relate to matters of human health, which were referred to DoHA for their consideration. The Eminent Scientists Group (ESG) subsequently recommended that the matters raised by stakeholders could be more adequately addressed by DoHA. Biosecurity Australia has advised DoHA and FSANZ that it will continue to keep informed of the progress of the IRA and of any permit applications to AQIS to import cooked and uncooked chicken meat following finalisation of the IRA report.

A summary of disease agents identified as hazards in uncooked chicken meat, and their potential effects on native Australian wildlife species, has been included at Appendix 4.

What is risk?

There are many different concepts and definitions of risk and what constitutes risk. However, in the context of an IRA, risk is considered to consist of two major components: the likelihood of a disease agent – such as a bacteria, virus or prion – entering, establishing and spreading in Australia from imports; and the economic, environmental and social impacts that may result. These two components are combined to give an overall estimate of the risk.

Import risk analysis – an overview

An IRA for animals or animal-derived commodities has three key stages:

• **hazard identification** (identifying disease agents that might be associated with the commodity in question)

• **risk assessment** (assessing the likelihood that the identified disease agents would enter, become exposed to susceptible Australian animals, and establish and spread, as well as the types and likely magnitude of consequences that this would have)

• **risk management** (assessing measures that could be used to mitigate the assessed risks, if possible).

Hazard identification

Hazard identification is described in the OIE Terrestrial Animal Health Code (World Organisation for Animal Health (OIE) 2008) as a classification step that is undertaken to identify pathogenic agents, or clearly defined strains of pathogenic agents, that could be associated with the importation of a commodity. Agents thus classified are termed ‘potential hazards’.

The OIE Code states that, to be identified as a potential hazard, a pathogenic agent should comply with *all* of the following criteria:

- The pathogenic agent should be appropriate to the animal species to be imported, or from which the commodity is derived
- The pathogenic agent could produce adverse consequences in the importing country
- The pathogenic agent may be present in the exporting country
- The pathogenic agent should not be present in the importing country. If present, the pathogenic agent should be associated with a notifiable disease, or should be subject to control or eradication measures.

Risk assessment

Estimating the likelihood of entry, exposure, establishment and spread

An incursion of a previously exotic animal disease into Australia as a result of trade in chicken meat requires an unbroken chain of events from the farm of origin in the exporting country, to susceptible host animals in Australia. Disease transmission may occur via direct or indirect pathways, but in all cases there must be a means by which an infectious dose of intact viable disease agent is transferred from the exporting country via the imported commodity, to a susceptible animal within Australia. There are a great number of possible pathways by

which this can occur. The IRA team considered that the more direct pathways were most likely to occur, as with the more indirect pathways, there were more chances that the chain would be broken before completion. The IRA team further considered that risk management measures sufficient to manage risk associated with more likely direct pathways would also be sufficient to manage risk arising from less likely indirect pathways.

For convenience, the pathways by which this chain of events can be completed are subdivided into three components, known as the 'release' (entry) pathway, the 'exposure' pathway, and the 'establishment and spread' pathway. While there are many possible pathways, there are relatively few which are likely to be completed. The present analysis concentrates on those pathways which are most likely to be completed and therefore have the greatest influence on the outcome of the risk analysis.

Release pathways

The analysis of pathways for disease entry is concerned largely with activities in the exporting country. The starting point for this pathway is the farm where the chickens are grown. In some cases, the farm will be free of the disease under consideration, while other farms may be infected. The analysis considers epidemiological data relating to the between-flock prevalence of the disease, as well as the possible existence of disease-free countries or zones.

Some diseases cause severe clinical signs, and infected flocks are unlikely to be maintained to slaughter age for disease control or commercial reasons, so that the likelihood of infected animals being processed for export is decreased. Other diseases are less likely to lead to culling of infected flocks. The analysis considers the nature of the clinical signs, and the nature of the disease control response expected to be taken in the exporting country.

With infected flocks that do progress to slaughter age, some birds will be infected, while others will not. Ante-mortem and post-mortem inspection procedures affect the likelihood that infected or contaminated carcasses will be removed from the processing line, while the nature of poultry processing equipment, along with the nature of the disease process, affect the likelihood that an uninfected carcases will be cross-contaminated with infectious material from an infected carcass. These factors are considered in the analysis.

Finally, the nature of the disease agent and the degree of processing affect the likelihood that a disease agent will remain viable in or on the product after arrival in Australia. The analysis takes account of differences between the ability of disease agents to survive outside the host animal, their resistance to disinfectants such as chlorine in processing plant water supplies, and their resistance to environmental factors, including refrigeration.

Exposure pathways

The IRA team considered that there were four groups of potentially susceptible animals in Australia which needed to be considered in the analysis. These exposure groups were wild birds, low biosecurity poultry, medium biosecurity commercial poultry, and non-avian species. These were considered separately, as the most likely pathways of exposure differed between wild and domesticated birds, and between different types of domesticated birds depending on the level of biosecurity practised.

Wild birds were considered most likely to be exposed as a result of the disposal of wastes derived from imported chicken meat, following the disposal of either household wastes, or commercial wastes from businesses dealing with imported meat.

Low biosecurity poultry were considered to include backyard poultry, free-range egg layers and meat chickens as well as ratites, and other poultry such as turkeys, ducks, pheasants, quail and other game birds. This group was most likely to be exposed as a result of the feeding of household wastes to backyard poultry. Some may also be exposed to commercial poultry feeds containing meat meals that may have been derived, at least in part, from rendered scraps of imported chicken. Although this was considered a possibility, the IRA team considered that there was a negligible likelihood that such meat meal would contain a sufficient dose of infectious agent to cause infection in that exposure group, and disease in susceptible individuals within that group, due to the high temperatures involved in the rendering process.

The IRA team considered that the most feasible route for exposure of medium biosecurity commercial poultry to imported chicken meat scraps would be through poultry feed containing inadequately rendered processing waste. However, there are strict controls on the rendering process and the likelihood that pathogens would remain viable following rendering of contaminated imported carcasses and parts was considered negligible.

Non-avian species, such as domestic pets, rodents and zoo animals, were considered most likely to be exposed either by being fed imported chicken meat or by consuming wastes. However, non-avian species are not susceptible to many of the disease agents under consideration, and in these cases, were not considered further.

In order to derive estimates of the likelihood that these exposure groups would be in contact with imported chicken meat, the IRA team considered the likely distribution pathways for imported chicken meat, including the likely proportions of imported chicken meat that would go to retail sale for household use, to further processing, or to the restaurant and food service trade. In the analysis, the disposal of waste from households, food service establishments and processors was also considered.

In addition to these distribution factors, the characteristics of the disease agent were taken into consideration, including the likely quantity of disease agent that would be present in or on imported chicken meat and its resistance to environmental factors. The susceptibility to infection of the different species involved in each exposure group was also considered.

Overall, the analysis considered the likelihood that each exposure group would have access to a sufficient quantity of imported chicken meat, containing a sufficiently high titre of disease agent, to produce infection in an individual member of that exposure group.

Establishment and spread pathways

In performing the analysis, the IRA team recognised that the extent to which a newly introduced disease might spread within Australia could vary, depending on the nature of the exposed population and the disease agent involved. The analysis considered a discrete set of outbreak scenarios which were assumed to be representative of the broad range of possible outcomes arising from an exposure of susceptible Australian animals. These outbreak scenarios were defined as follows:

Outbreak Scenario 1: Disease agent does not establish or is not recognised within the directly exposed population

Outbreak Scenario 2: Disease agent establishes within the directly exposed population, is identified and is eliminated by human efforts, or by natural means

Outbreak Scenario 3: Disease agent establishes in the directly exposed population, spreads, including into other exposure groups if applicable, and is eliminated by human action or by natural means

Outbreak Scenario 4: Disease agent establishes in the directly exposed population, spreads, including to other exposure groups if applicable, and becomes endemic in Australia.

In estimating the likelihood of each outbreak scenario occurring following exposure of a susceptible individual, the analysis considered numerous matters, including the following:

a) the infectivity and pathogenicity of the agent
b) method of transmission
c) persistence of the agent
d) possibility of mechanical transmission by humans or other species, or fomites
e) species, age and immune status of the exposed host
f) behavioural characteristics or management of the host population
g) shedding of the agent and duration of shedding
h) presence of suitable vectors
i) the morbidity rate and evident clinical signs of the disease
j) frequency and thoroughness of observation or inspection
k) level of awareness of exotic disease signs
l) mechanisms for investigation, diagnosis and reporting of the disease outbreak
m) effectiveness of existing surveillance and monitoring programs within the exposure group under discussion
n) existence and successful implementation of eradication plans for the disease agent
o) the natural epidemiology of the disease
p) mechanisms for secondary spread of the disease agent
q) levels of biosecurity in the exposed group
r) seasonal or climatic effects
s) options for control of the disease, and the costs and benefits of each
t) method of spread of the agent.

Probability of entry, exposure, establishment and spread

The results of the release, exposure, and establishment and spread analyses were combined with an estimate of the likely annual volume of trade to provide an overall estimate of the partial annual likelihood of each of the outbreak scenarios occurring, for each disease agent.

Consequence assessment

The other component of the risk assessment is an estimate of the potential impact of the disease agent establishing in Australia.

Estimating impacts of each outbreak scenario

The impacts were considered at four levels – local, district or region, State/Territory and national – to determine an overall estimate of the consequences. The approach used in this assessment allowed for consideration of direct effects of the disease agent on the life and

health of animals and on the environment. Indirect consequences such as eradication costs, effects on domestic and international trade, indirect impacts on the environment and impacts on communities were also assessed.

Scores for these impacts, ranging from 'unlikely to be discernible' through to 'highly significant', were applied to the direct and indirect criteria.

Unrestricted risk

The annual probability of entry, exposure, establishment and spread, and the impact scores for each outbreak scenario were then assessed according to the matrix shown in Table 1 to provide an estimate of the partial annual risk (PAR) for each outbreak scenario for each disease agent, ranging from 'negligible' through to 'extreme'. The PAR for each outbreak scenario was then combined, according to a series of rules, to provide an estimate of the unrestricted annual risk for each disease. 'Unrestricted risk' means the estimated risk if chicken meat were to be imported with no risk management measures in place. The reference to 'annual' indicates that the likelihood estimate is based on one year of trade. One year of trade is a convenient timescale to estimate the likely volume of trade and the risk analysis system is based on using this volume. However, it does not mean that the quarantine protection only applies to one year. Clearly the consequences of disease entry, establishment and spread will normally extend beyond a year, and the assessment of consequences is not restricted to a particular time period. In addition, it is possible to modify the quarantine measures in response to changes in disease status, scientific knowledge and new treatments.

Table 1. Risk estimation matrix

Likelihood of entry, exposure, establishment and spread	*Negligible impact*	*Very low*	*Low*	*Moderate*	*High*	*Extreme impact*
High likelihood	Negligible risk	Very low risk	Low risk	Moderate risk	High risk	Extreme risk
Moderate	Negligible risk	Very low risk	Low risk	Moderate risk	High risk	Extreme risk
Low	Negligible risk	Negligible risk	Very low risk	Low risk	Moderate risk	High risk
Very low	Negligible risk	Negligible risk	Negligible risk	Very low risk	Low risk	Moderate risk
Extremely low	Negligible risk	Negligible risk	Negligible risk	Negligible risk	Very low risk	Low risk
Negligible likelihood	Negligible risk	Negligible risk	Negligible risk	Negligible risk	Negligible risk	Very low risk

Consequences of entry, exposure, establishment and spread

NOTE: The band of cells in Table 1 marked 'very low risk' represents Australia's ALOP.

Risk estimates of 'low', 'moderate', 'high' or 'extreme' were considered to exceed the level of risk that is acceptable to Australia. Estimates of 'very low' or 'negligible' were considered to be acceptable. If the unrestricted risk estimate for a disease agent exceeded 'negligible' or 'very low' then risk management measures were required.

Risk management measures and restricted risk

Where the unrestricted annual risk estimate for an individual disease was unacceptable (that is, above ‘very low’), appropriate risk management measures were needed to reduce the risk estimate to an acceptable level. The effectiveness of the proposed measures were then evaluated by repeating the analysis after the effects of a proposed risk management measure had been included to give a ‘restricted annual risk’. This was repeated for each proposed measure and proposed combination of measures. This value was then checked against the matrix to determine whether the proposed measure reduced the risk to a ‘very low’ or ‘negligible’ level.

Depending on the characteristics of individual diseases, various risk management measures were available. Some examples of risk management measures that could be applied up to the point of import included sourcing chicken meat from countries or zones free of a disease, restricting imports to bone-in or boneless cuts, or applying a treatment (such as cooking) known to inactivate the pathogen of concern.

Risk management measures that can be applied at or after importation of the chicken meat tend to be limited. However, treatments such as cooking in an approved facility, under quarantine supervision, were considered to be acceptable. Such on-shore processing would be subject to appropriate controls on the siting of the processing facility at or near the port of entry, and on controls of waste material and packaging, as well as the processing of the imported meat.

In developing final recommendations on risk management measures, consideration is given to the potential impact of the measures on trade and to minimising the negative effects on trade. Where there are alternative and equivalent risk management measures that achieve the required degree of risk reduction, the final recommendations need to take account of Australia’s international obligations to ensure that its SPS measures are not more trade-restrictive than those required to achieve its acceptable level of protection.

Among the alternatives which may be accepted in principle are measures such as compartment freedom or flock freedom accreditation schemes. These would need to be assessed on a case-by-case basis, but Biosecurity Australia will consider proposals from exporting countries if appropriate data on the nature of the alternative risk management measure are provided.

A rigorous assessment of any application for approval of compartmentalisation or flock accreditation schemes will be undertaken to ensure that effective biosecurity measures are implemented and maintained throughout the complete chain from farm to slaughter to export. A detailed submission will need to be provided by the veterinary authority of the exporting country and Australia will conduct an on-ground assessment of the proposed compartment or flock accreditation scheme.

Hazard identification

The list of potential hazards for consideration in this IRA was compiled from the list of diseases notifiable to the OIE, and a list of the causative agents for other diseases considered to be of importance to the importation of chicken meat. Of the disease agents considered as being potentially of quarantine concern, 24 were retained for further risk assessment after the process of hazard refinement. Table 2 shows the results of the hazard refinement process.

Table 2. Hazard refinement

Disease agent	**Hazard identification criteria (Yes/No)**				**Retain for risk assessment (Yes/No)**
	Agent infects domestic chicken	**Potential for transmission via chicken meat[1]**	**Capable of adverse impact[2]**	**Occurrence in Australia[3]**	
OIE-listed disease agents					
Highly pathogenic avian influenza virus	YES	YES	YES	NO	YES
Low path. notifiable avian influenza virus (H5 & H7)	YES	YES	YES	NO	YES
Newcastle disease virus	YES	YES	YES	NO[4]	YES
Avian infectious bronchitis virus	YES	YES	YES	YES[5]	YES
Avian infectious laryngotracheitis virus	YES	YES	YES	YES	NO
Duck hepatitis virus	NO	NO	YES	NO	NO
Pasteurella multocida	YES	YES	YES	YES	NO
Salmonella Gallinarum	YES	YES	YES	NO	YES
Infectious bursal disease virus	YES	YES	YES	YES[5]	YES

Disease agent	Hazard identification criteria (Yes/No)				Retain for risk assessment (Yes/No)
	Agent infects domestic chicken	**Potential for transmission via chicken meat[1]**	**Capable of adverse impact[2]**	**Occurrence in Australia[3]**	
Marek's disease virus	YES	NO	YES	YES	NO
Mycoplasma gallisepticum	YES	NO	YES	YES	NO
Mycoplasma synoviae	YES	NO	YES	YES[5]	YES
Chlamydophila psittaci	YES	NO	YES	YES	NO
Salmonella Pullorum	YES	YES	YES	NO[6]	YES
Avian metapneumovirus	YES	YES	YES	NO	YES
EEE/VEE/WEE viruses[7]	YES	YES[8]	YES	NO	YES
West Nile virus	YES	YES[8]	YES	NO	YES
Japanese encephalitis virus	YES	YES[8]	YES	YES[9]	YES
Salmonella Enteritidis	YES	YES	YES	NO[10]	YES
Multidrug resistant strains of *Salmonella* Typhimurium	YES	YES	YES	NO[11]	YES
Other diseases/agents					
Haemophilus paragallinarum	YES	YES	YES	YES[5]	YES
Avian encephalomyelitis virus	YES	YES	YES	YES	NO
Borrelia anserina	YES	NO	YES	YES	NO
Salmonella Arizonae	YES	YES	YES	YES[12]	YES
Avian leucosis virus	YES	NO	YES	YES	NO
Group 1 fowl adenovirus serotype 1	YES	YES	YES	NO	YES

Disease agent	Hazard identification criteria (Yes/No)				Retain for risk assessment (Yes/No)
	Agent infects domestic chicken	Potential for transmission via chicken meat[1]	Capable of adverse impact[2]	Occurrence in Australia[3]	
Group 1 fowl adenovirus serotype 4	YES	YES	YES	NO	YES
Group 1 fowl adenovirus serotype 8	YES	YES	YES	YES	NO
Avian adenovirus Group 2	YES	YES	YES	NO	YES
Avian adenovirus Group 3	YES	YES	YES	YES	NO
Fowl pox virus	YES	YES	YES	YES	NO
Avian nephritis virus	YES	YES	YES	YES	NO
Antibiotic-resistant *Campylobacter jejuni*	YES	YES	YES	YES	NO
Chicken anaemia virus	YES	YES	YES	YES	NO
Duck enteritis virus	NO	NO	YES	NO	NO
Goose parvovirus	NO	NO	YES	NO	NO
Enterohaemorrhagic *Escherichia* coli (EHEC)	YES	YES	YES	YES	NO
Muscovy duck parvovirus	NO	NO	YES	NO	NO
Mycoplasma meleagridis	NO	NO	YES	YES	NO
Mycoplasma iowae	YES	YES	YES	NO	YES
Ornithobacterium rhinotracheale	YES	YES	YES	NO	YES
Riemerella anatipestifer	YES	NO	YES	YES	NO
Avian reovirus	YES	YES	YES	YES[5]	YES

Disease agent	Hazard identification criteria (Yes/No)				Retain for risk assessment (Yes/No)
	Agent infects domestic chicken	**Potential for transmission via chicken meat[1]**	**Capable of adverse impact[2]**	**Occurrence in Australia[3]**	
Reticuloendotheliosis virus	YES	NO	YES	YES	NO
Transmissible proventriculitis virus	YES	YES	YES	YES	NO
Turkey coronavirus	NO	NO	YES	YES	NO
Mycobacterium avium	YES	YES	YES	YES	NO
Avian Paramyxovirus-2	YES	YES	YES	NO	YES
Avian Paramyxovirus-3	YES	YES	YES	NO	YES
Internal parasites	YES	NO[13]	YES	YES	NO
External parasites	YES	NO[14]	YES	YES	NO

Legend:

1. *Potential for transmission via chicken meat*: Chicken meat could potentially serve to transmit the pathogen to susceptible Australian animals.

2*. Capable of adverse impact*: The pathogenic agent (or a clearly identified strain of the pathogenic agent) could potentially produce adverse consequences in susceptible humans or animal/bird species in the importing country.

3*. Occurrence in Australia:* The pathogenic agent (or a clearly identified strain of the pathogenic agent) should not be present in the importing country. If present, the pathogenic agent is associated with a notifiable disease, or is subject to an official control or eradication program.

4. Virulent Newcastle disease virus of Australian origin has occurred in Australia, but has been eradicated.

5. Although the disease occurs in Australia, more pathogenic serotypes are known to exist overseas, which have not been reported in Australia.

6. Australian commercial poultry are considered to be free of *S.* Pullorum. There has been no isolation of the agent in Australia for greater than 10 years.

7. Eastern equine encephalomyelitis (EEE); Western equine encephalomyelitis (WEE); Venezuelan equine encephalomyelitis (VEE).

8. Oral transmission of some arboviruses occurs between some species of animals. The IRA team is not aware of evidence that arboviruses have been transmitted from commercially produced chicken meat to animals or humans. However, after consideration of stakeholder submissions on the draft IRA report, a chapter examining the scientific literature on arboviruses was added to the final IRA report (see Part C of this IRA report).

9. One human case of Japanese encephalitis acquired on the Australian mainland has been reported, and there has been serological evidence of exposure in sentinel and surveyed pigs on Cape York Peninsula.

10. A few isolations of *S*. Enteritidis from commercial poultry have occurred, most recently in Queensland in 2005. Affected flocks were subject to control measures and intensive monitoring, and no further isolations have occurred since July 2006.

11. *S.* Typhimurium occurs commonly in Australia, but multi-drug resistant strains, as defined in Part C of this report, have not been reported in Australian commercial poultry.

12. Some serotypes of *S.* Arizonae occur in Australia. *S*. Arizonae serovar 18:Z4,Z32 is considered to be exotic.

13. Intestinal parasites will be removed during the evisceration process; tissue-based parasites (e.g. *Sarcocystis* species) are unlikely to be transmitted in chicken meat because of their complex life cycles requiring specific hosts.

14. External parasites will be removed during the defeathering process.

At the completion of the hazard refinement process, the following disease agents were retained for further consideration in the IRA.

OIE-listed disease agents

Notifiable avian influenza viruses (HPNAI AND LPNAI)

Newcastle disease virus

Avian infectious bronchitis virus

Very virulent and exotic antigenic strains of infectious bursal disease virus

Salmonella Gallinarum

Salmonella Pullorum

Mycoplasma synoviae

Avian metapneumovirus (Turkey rhinotracheitis virus)

Salmonella Enteritidis

Multi-drug resistant *Salmonella* Typhimurium

Other disease agents

Haemophilus paragallinarum

Salmonella Arizonae

Group 1 fowl adenovirus, serotype 1

Group 1 fowl adenovirus, serotype 4

Group 2 avian adenovirus

Mycoplasma iowae

Ornithobacterium rhinotracheale

Avian reovirus

Avian paramyxovirus-2

Avian paramyxovirus-3

EEE/VEE/WEE

West Nile virus

Japanese encephalitis virus

Risk assessment

Risk assessments were conducted on all 24 diseases that were identified as requiring further assessment following the hazard refinement stage. The unrestricted risk posed by the following disease agents was above Australia's ALOP:

Highly pathogenic notifiable avian influenza (HPNAI) virus

Low pathogenicity notifiable avian influenza (LPNAI) viruses

Newcastle disease virus

Very virulent infectious bursal disease virus

Exotic antigenic variant infectious bursal disease virus

Salmonella Pullorum and *S.* Gallinarum

Salmonella Enteritidis and multi-drug resistant *S.* Typhimurium.

Therefore, specific risk management measures were required for these disease agents to reduce the risks to achieve Australia's ALOP. The unrestricted risk of the other diseases assessed was below Australia's ALOP and therefore risk management measures were not required.

Risk management

The risk management measures for the disease agents that had an unrestricted risk above Australia's ALOP are summarised below.

- The chicken meat must be from flocks raised in a country or zone which is free of highly pathogenic notifiable avian influenza virus, to the satisfaction of Australian Government authorities. Where these conditions do not apply, the product must have been processed before importation to ensure destruction of avian influenza virus. The product must be heated to a minimum core temperature of 70 °C for at least one minute (or time/temperature equivalent)
- The chicken meat must be from flocks raised in a country or zone which is free of low pathogenicity notifiable avian influenza virus, to the satisfaction of Australian Government authorities. Where these conditions do not apply, the product must be processed off- shore, or on-shore under quarantine control, to ensure destruction of avian influenza virus. The product must be heated to a minimum core temperature of 70 °C for at least one minute (or time/temperature equivalent)

- The chicken meat must be from flocks raised in a country or zone which is free of Newcastle disease, to the satisfaction of Australian Government authorities. Any live vaccines used on chickens from which the meat was derived must have been produced from lentogenic strains of Newcastle disease virus. Where these conditions do not apply, the product must have been processed, off-shore or on-shore under quarantine control, to ensure destruction of Newcastle disease virus. The product must be heated to a minimum core temperature of 70 °C for at least 8.2 minutes (or time/temperature equivalent)
- The chicken meat must be from flocks raised in a country or zone which is free of very virulent infectious bursal disease virus, to the satisfaction of Australian Government authorities. Where these conditions do not apply, the product must have been processed, off-shore or on-shore under quarantine control, to ensure destruction of infectious bursal disease virus. The product must be heated to a core temperature of 80 °C for at least 125 minutes (or time/temperature equivalent). Requirements for thermal processing to ensure destruction of very virulent infectious bursal disease virus in chicken meat have been published previously and are included in Part D at Appendix 8
- The chicken meat must be from flocks raised in a country or zone which is free of exotic antigenic variant infectious bursal disease virus, to the satisfaction of Australian Government authorities. Where these conditions do not apply, the product must have been processed, off-shore or on-shore under quarantine control, to ensure destruction of infectious bursal disease virus. The product must be heated to a core temperature of 80 °C for at least 125 minutes (or time/temperature equivalent). Requirements for thermal processing to ensure destruction of infectious bursal disease virus in chicken meat have been published previously and are included in Part D at Appendix 8
- The chicken meat must be from flocks raised in a country or zone which is free of *Salmonella* Pullorum, *Salmonella* Gallinarum, *Salmonella* Enteritidis, and multidrug resistant *Salmonella* Typhimurium to the satisfaction of Australian government authorities. Where these conditions do not apply, the product must have been processed, off-shore or on-shore under quarantine control, to ensure destruction of *Salmonellae*. The product must be heated to a minimum core temperature of 70 °C for a minimum time of 2.5 minutes (or time/temperature equivalent).

Further steps in the import risk analysis process

The administrative process adopted requires that the following steps be undertaken:

- consideration of appeals, if any
- if there are no appeals or the appeals are rejected, the recommended policy will be submitted to the Director of Animal and Plant Quarantine for a policy determination
- if an appeal is allowed the IRA Appeal Panel may advise the Chief Executive of Biosecurity Australia on how to overcome the identified deficiencies. When this process is completed the recommended policy will be submitted to the Director of Animal and Plant Quarantine for a policy determination
- Notification of the proponent/applicant, registered stakeholders, and the WTO of the policy determination.

Stakeholders will be advised of any significant variation to the process.

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