



*Salmonella* Risk  
Management Strategy  
2009 – 2012

## Prelims

Amendment 0

March 2009

# Table of Contents

Prelims .....	2
<b>1 Executive Summary.....</b>	<b>3</b>
<b>2 Introduction .....</b>	<b>4</b>
<b>3 Background .....</b>	<b>5</b>
3.1 What is <i>Salmonella</i> ? .....	5
3.2 Human Salmonellosis .....	5
3.3 Pathways to Humans.....	6
3.4 Market access implications.....	10
3.5 Research .....	11
3.6 Current status of information on <i>Salmonella</i> .....	12
<b>4 Objectives.....</b>	<b>18</b>
<b>5 Strategic Application.....</b>	<b>19</b>
5.1 Risk Management Framework.....	19
5.2 <i>Salmonella</i> Risk Management Strategy Working Group .....	19
5.3 Stakeholders.....	19
5.4 Strategy Update and Reporting .....	20
<b>6 Work Programme.....</b>	<b>21</b>
6.1 Preliminary Risk Management Activities .....	22
6.2 Risk Management Options .....	26
6.3 Implementation of Control Measures.....	28
6.4 Monitoring and Review .....	29
6.5 Risk Communication.....	31
6.6 International Standards.....	32
<b>Annex 1: Completed Work .....</b>	<b>33</b>
<b>Annex 2: Key milestones for current work -2009 .....</b>	<b>39</b>
<b>Annex 3: Sector activity under the Risk Management Framework.....</b>	<b>43</b>

# 1 Executive Summary

Amendment 0

March 2009

This document provides the New Zealand Food Safety Authority's (NZFSA) risk management strategy for *Salmonella* for 2009-2012.

NZFSA's mandate is to protect consumers by providing an effective food regulatory programme covering food produced and consumed in New Zealand as well as imports and exports of food products. NZFSA has therefore established three strategic goals in relation to non-typhoid *Salmonella*:

- to achieve a 30% reduction in reported annual incidence of foodborne salmonellosis after five years)
- to detect and control exotic genotypes that are known to be more virulent and/or have multiple antibiotic resistance, and that require specific risk management strategies
- to support market access.

While there is anecdotal evidence to suggest that *Salmonella* may involve many exposure pathways, lack of scientific data on *Salmonella* is a problem.

Given the degree of NZFSA investment in managing the important foodborne pathogens in New Zealand, NZFSA's *Salmonella* risk management strategy begins with a primary focus on intelligence gathering including data, from those food and food-related sectors where little is known about their *Salmonella* status, to better inform the strategic direction. The current work programme within this document reflects this commitment.

## 2 Introduction

NZFSA recognises the importance of the non-typhoid *Salmonella*, as a cause of human illness being ranked as one of the three most important foodborne pathogens in NZ.

The strategic approach to *Salmonella* control has a broad scope, given that there is currently no primary exposure pathway established in New Zealand. Information gathering from a wide range of food sectors and from imported food will be a key factor in the initial stages of this Strategy in order to focus its future direction.

NZFSA has three strategic goals in relation to non-typhoid *Salmonella*:

1. to achieve a 30% reduction in reported annual incidence of foodborne salmonellosis after five years)
2. to detect and control exotic genotypes that are known to be more virulent and/or have multiple antibiotic resistance, and that require specific risk management strategies
3. to support market access.

This document describes the NZFSA *Salmonella* risk management strategy for the next three years and, specifically, outlines the work programme that will be achieved over the next twelve months.

## 3 Background

### 3.1 What is *Salmonella*?

There are more than 2500 different types of *Salmonella* bacteria. These can be further subdivided into genotypes which often have different virulence and pathogenic characteristics such as antibiotic resistance. A small proportion of these types are endemic in New Zealand; novel types can enter via imported foods, animal feeds or as a result of overseas travel.

Whether or not *Salmonellae* will infect a narrow or wide range of animals varies considerably. For example there are two types *S. Typhi* and *S. Paratyphi* which only infect humans. There are parallels among livestock and wild animals. However, some have low host specificity and may survive outside an animal host for long periods, and are thus potential foodborne pathogens.

*S. Typhi* and *Paratyphi* have been excluded from the strategy. The NZFSA public health goal refers to salmonellosis, a clinical syndrome which differs from typhoid and paratyphoid diseases. The reservoir is humans; rarely domestic animals for *S. Paratyphi*. Transmission of these organisms can result from ingestion of water contaminated by faeces from a human case or occasionally by an asymptomatic carrier, including fruit or vegetables washed in water contaminated by sewage and shellfish. In New Zealand the vast majority of cases are associated with overseas travel; the very occasional cases being associated with a food worker who is a carrier. The public health management of cases of typhoidal disease is a responsibility under the Health Act 1956.

### 3.2 Human Salmonellosis

The *Salmonellae* cause an acute gastroenteritis which is generally self-limiting and uncomplicated. The acute symptoms are diarrhoea, abdominal pain, vomiting, nausea and fever lasting 1-7 days. The hospitalisation rate is estimated at 10-15% of notified cases and the case fatality incidence 0.8%. The young, old, and immunocompromised are particularly at risk for more severe disease. In a small proportion of cases longer term effects occur. Septicaemia and subsequent non-intestinal infections can occur. Reactive arthritis or Reiter's syndrome may occur 3-4 weeks after gastrointestinal symptoms. Approximately 2% of a population exposed to a triggering infection will develop reactive arthritis, which may last for up to a year or longer.

Fluid replacement may be required, especially in the elderly or young children. Less than 2% of clinical cases require antibiotic treatment. The site of infection and the immune status of the case determine the choice of treatment. The genotype of *Salmonella* involved may affect the outcome. For example, cases due to *S. Typhimurium* DT104 are of increasing concern in the UK due to the organism's virulence and resistance to many antibiotics. The result is that the disease, due to some strains, are becoming more difficult to treat.

The cost of illness attributed to foodborne salmonellosis in New Zealand has been estimated at 2.8 million dollars<sup>1</sup>.

### 3.3 Pathways to Humans

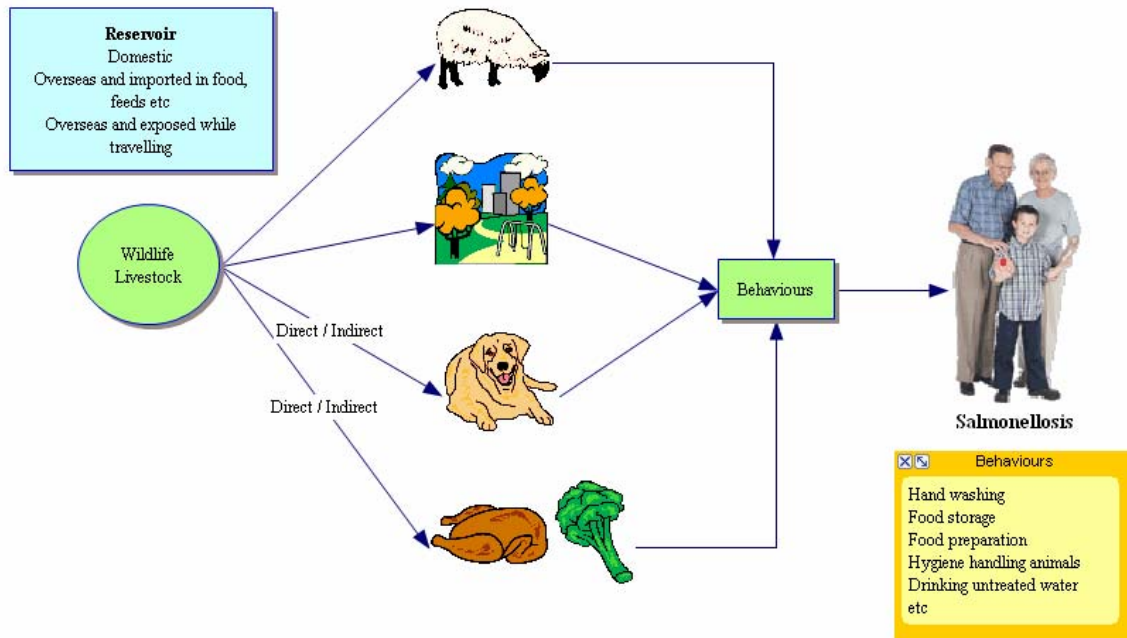
There are many possible foodborne pathways, and once a significant pathway has been identified, its relative significance in prioritising areas for control, must be established using attribution techniques. Available scientific evidence shows that the pathways shown in Figure 1 may have significant public health impacts.

---

<sup>1</sup> 95% confidence interval of 1.9 – 4.0. This does not include any industry, regulatory or public health investigation cost. Located in: *Risk Ranking: Estimates Of The Cost Of Foodborne Disease For New Zealand (2008)*

[http://www.nzfsa.govt.nz/science/research-projects/FW07102\\_COI\\_estimates\\_final.pdf](http://www.nzfsa.govt.nz/science/research-projects/FW07102_COI_estimates_final.pdf)

**Figure 1: Possible pathways for pathogenic *Salmonella* from a wildlife or domestic animal reservoir to humans**



Foodborne infection is one such pathway; food may be contaminated directly from the host or indirectly via water or fomites. Humans may be the source of *Salmonella*, e.g. for shellfish growing areas.

### 3.3.1 Specific sources of *Salmonella*

#### Large animals and large birds

Hazard identification has shown that for slaughtered animals, food-borne risks to human health are almost entirely due to asymptomatic carriage of enteric pathogens, of which *Salmonella* is one. Reducing contamination of the carcass and viscera during dressing and subsequent handling to the lowest level practicable is now recognized as being the most important meat hygiene activity.

Operators slaughtering large animals (including wild mammals) and large birds have been required to have RMPs since inception in 1999 that control hazards to human health, including *Salmonella*. There also is mandatory testing under the NMD programme for *Salmonella* in cattle, young calves, goats, farmed deer, ostrich and emus. Sheep are currently not included within this programme. There is a proposal to include pigs in the programme from 2009.

## Poultry

New Zealand is fortunate in having a poultry industry in which types of *Salmonella* that have caused major human health problems overseas (*S. Enteritidis* PT4 and *S. Typhimurium* DT104) are not endemic). The current low prevalence of contamination by *Salmonella* in poultry is evidence of good risk management. The poultry meat processing sector has been subject to mandatory risk management programmes (RMP) under the Animal Products Act 1999 designed to control hazards to human health including *Salmonella* since July 2004. There has also been mandatory testing under the National Microbiological Database (NMD) programme for *Salmonella* in broilers at the end of primary processing (slaughter and dressing) for several years. This has resulted in a significant reduction in the prevalence of *Salmonella* from approximately 3.6% in the first quarter of 2005 to approximately 0.6% in the second quarter of 2008. This was achieved through understanding transmission, taking responsibility for the issue, effective action and monitoring systems and rapid response to problems. There continues to be occasional increases in *Salmonella* detections that anecdotally are being attributed to contaminated feed.

## Eggs

Most of the egg production and packing sector has also been required to have RMPs from 2003-2004 to control hazards to human health, including *Salmonella*. Three retail egg surveys (South Island in 1994, Auckland in 2001 and Auckland/Christchurch 2007) have shown an absence of internal contamination of eggs by *Salmonellae*. One survey (South Island, 1994) also showed an absence of external contamination of eggs by *Salmonellae*. The Auckland Survey in 2001 found moderate levels of contamination on egg shell (14% of samples). In the 2007 investigation, 1.8% had shell contamination; all of which were *Salmonella* *Infantis*. Most isolates from eggs are not those associated with human illness.



## Rendered animal product

Rendered animal product is an important ingredient in animal feeds for non-ruminant food-producing animals. All rendering and blood-drying businesses producing animal product intended for animal consumption are required to operate under an RMP that documents procedures to ensure that mandatory requirements are met. Two key requirements are:

- subjecting medium risk raw material<sup>2</sup> to a thermal process to destroy all vegetative bacteria, viruses and protozoa, and inactivate chemical substances that are potentially harmful if consumed by animals;
- protecting post-treatment rendered animal product from recontamination and deterioration.

While achieving an acceptable thermal process is relatively straightforward, experience has shown that issues arise with the recontamination of rendered animal products after thermal processing. This may result in the presence of *Salmonella* in the final meal. While this should be avoided, discussions are still ongoing as to whether the meal is still fit for its intended purpose where *Salmonella* exists in the final product. Work-in-progress on the Rendering Code of Practice includes *Salmonella* absence in final meals as a Procedure (for Compliance) along with actions when any sample is positive for *Salmonella*.

## Other animal feed

Animal feed is a complex group of products ranging from bulk animal feeds to specific nutritional supplement preparations. Compounded feed can be made of animal material, plant material or both produced either in NZ or imported.

All products are currently exempt from registration under the ACVM Regulations 2001 if they meet the conditions associated with the exemption. These Regulations are to be amended to include minimum manufacturing requirements. One of the key manufacturing requirements is to ensure the product manufactured is fit for purpose and one of the considerations is the risks to public health. This follows amendment of the ACVM Act in 2008 to include protection of public health in the objectives of the Act.

---

<sup>2</sup> A class of animal material or product, defined in the Animal Products (Products Intended for Animal Consumption) Notice 2006, which requires further processing prior to being fit for animal consumption.

## Other foods

*Salmonella* contamination of other foods such as fresh produce, shellfish, flour and peanut products may occur from time to time and foods may be implicated in human cases of salmonellosis including notified outbreaks. This may result in specific foods being investigated further under this Strategy.

## Imported food

The Imported Food Review 2004 recommended cost effective ways to improve the regime that regulates the importation of food into New Zealand with the focus on reducing illness and the other costs associated with unsafe food while taking into account demands of the future trading environment. The response to this review has resulted in categorisation of food/hazard combinations, including *Salmonella* as an important hazard, based on their food safety risk and making further risk management decisions based on this risk.

### 3.4 Market access implications

The United States and the European Union have accepted the *Salmonella* sampling regime within the current NMD programme, as equivalent. This means that any changes to the NMD programme must be assessed for impact on these equivalence agreements.

Other countries may require different *Salmonella* sampling programmes stipulated in the NZFSA overseas market access requirements. In addition to centralised NZFSA coordinated programmes, there is a significant amount of *Salmonella* testing done by New Zealand's export industries from which the results may not be captured centrally.

Regardless of any specified overseas market access requirements, effective control of and an absence of detectable *Salmonella* is an expectation of most markets for most produce, dairy products, shellfish and animal feeds. Some markets also operate a zero detectable tolerance for raw meats and other animal products regardless of them normally being subject to a further cooking process prior to consumption.

*Salmonella* detected in New Zealand product at the border or in overseas markets by foreign authorities results in market rejections and also puts New Zealand's wider market access and reputation at risk. There is similar risk from an outbreak of human or animal salmonellosis associated with product originated from New Zealand, or if there is a perceived 'uncontrolled' outbreak of human or animal salmonellosis in New Zealand that may have a link to human food or animal feed. Outbreaks of salmonellosis in overseas markets,

especially related to imported foods, where there may be no association with New Zealand product, can heighten the sensitivity of foreign governments who may apply restrictions on access to their market.

Restrictions to market access could be a closure of borders to New Zealand product, point of entry or foreign in-market testing, an increased requirement for in-process testing prior to export, and statements of *Salmonella* freedom required on export certificates. Each increase adds costs to New Zealand processors and exporters without necessarily improving the protection of consumers. Damage to reputation can impair the ability to negotiate access to markets based on the New Zealand standard.

### 3.5 Research

NZFSA's research programme on *Salmonella* has been primarily directed at defining the foods that are contaminated. A focus has been the prevalence of *Salmonella* in raw foods (e.g. meats and eggs) offered for sale at retail outlets. *Salmonella* was also included in a risk assessment of bacterial pathogens on fruit and vegetables.

Reviews of reports on human salmonellosis in New Zealand have been conducted, to ascertain whether foodborne transmission has occurred and, if so, which foods are the most likely source.

Some studies of *Salmonella* in the food chain have been done, e.g. following a specific genotype from poultry feed to poultry and eventually to humans. The survival of *Salmonella* during animal feed manufacture has been investigated, as have factors that contribute to control in poultry flocks.

As the prevalence of *Salmonella* infection in livestock and wild animals may directly or indirectly affect foodborne contamination, a project aimed at giving a more comprehensive picture of animal salmonellosis is currently underway. The development of models to investigate the likely impact of changes in *Salmonella* in reservoir hosts is also planned.

There is likely to be a significant body of *Salmonella* monitoring and research data currently held by other industries such as the dairy and seafood sectors. This data needs to be accessed and assessed to inform the direction of the strategy.

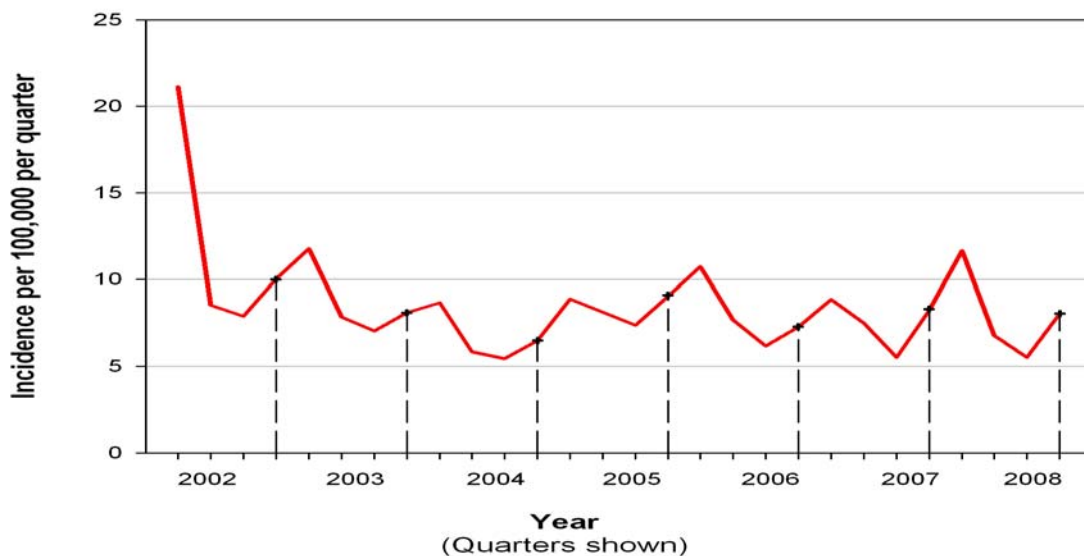
### 3.6 Current status of information on *Salmonella*

NZFSA has built up information on *Salmonella* contamination in some of the foods and on some food pathways from a variety of science projects and reviews. However there are gaps in this knowledge and this section summarises the current status.

#### 3.6.1 Current human health status

All human cases of salmonellosis are reported to the Ministry of Health and in Figure 2 the incidence per 100,000 for each quarter from 2002 is shown. Over the last 10 to 15 years the incidence of human salmonellosis has decreased considerably. The reduction over the last 5 to 6 years has been more modest, dropping from 1, 401 in 2003 to 1,274 in 2007. In most areas, the highest incidence is seen in the first quarter (Jan/Mar/Apr).

**Figure 2: Officially notified human salmonellosis cases per 100,000 per quarter**



### 3.6.2 Current food chain status

#### Attribution studies

Three human salmonellosis ‘risk attribution’ studies have been undertaken or commissioned by NZFSA. The first<sup>3</sup> of these was based on a review of reported investigations of salmonellosis cases conducted by regional public health personnel. The second study<sup>4</sup> involved an analysis of the incidence of *Salmonella* serotypes in humans, the prevalence of these organisms in meat and eggs, and consumption of these foods. The third<sup>5</sup> was an in depth analysis of field data derived from human salmonellosis outbreaks in New Zealand between September 1997 and December 2006.

Prior to these studies, an expert elicitation estimated that 63% of notified cases of salmonellosis were the result of “exposure” to contaminated foods, i.e. foodborne (see Figure 3).

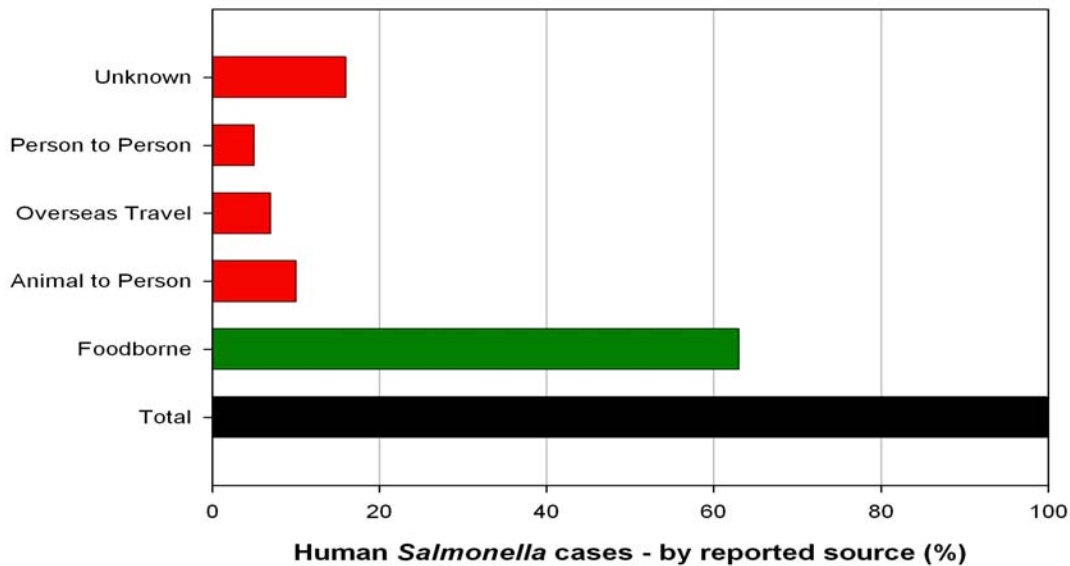
---

<sup>3</sup> Anonymous (2005). Analysis of Foodborne and Other Pathways for the Exposure of New Zealanders to Salmonella. NZFSA Science Group.

<sup>4</sup> Terry Ryan, Stuart MacDiamid, Steve Hathaway, Petra Müllner, Neil Cox, Andrew Hill (2006). A Quantitative Analysis of Foodborne Salmonellosis Exposure Pathways in New Zealand. Proceedings of the International Conference on "Priority Setting of Foodborne and Zoonotic Pathogens", MedVetNet and the US Food Safety Research Consortium, 19-21 July, Berlin, Germany.

<sup>5</sup> Nicola King and Rob Lake (2007) Review of notified salmonellosis outbreak data as a source of information for attribution. Institute of Environmental Science & Research Limited, Christchurch Science Centre.

**Figure 3: Reported human *Salmonella* cases by exposure pathway**

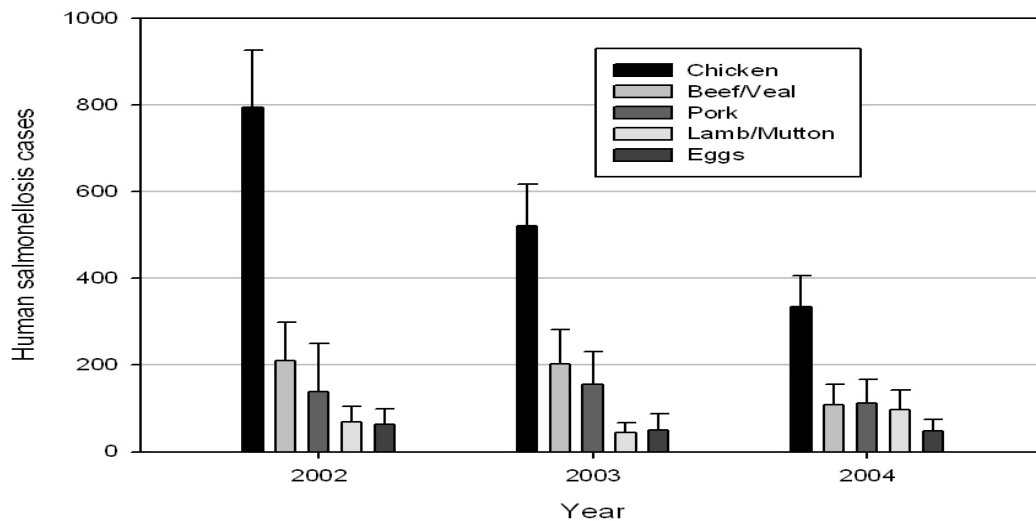


The first study<sup>3</sup> then suggested that poultry meat was responsible for 16.5% of foodborne salmonellosis, eggs for 10.5% and ready to eat meat products 5.9%. Some foods previously considered to be 'high risk,' e.g. ice cream, desiccated coconut and spices, appeared to make a very small contribution to the human burden or did not register at all (e.g. peanut butter). A moderate number of cases (around 80 per year) were due to imported foods; e.g. tahini and sesame seeds. The study also concluded that potentially, 'antibiotic multi-resistant *Salmonella*' (AMRS) might be found contaminating almost any imported food but the reported rate of such infections in New Zealand is low. (Sporadic AMRS infection also arises from other pathways identified in the study, especially overseas travel.)

It should be noted that 49% of cases were attributed to "miscellaneous other food". Further, that the high number of cases reported as being due to contaminated eggs is not in keeping with recent microbiological surveys of *Salmonella* on the surface of and inside retail eggs. Egg-borne exposure is very common in many countries and it appears that this well known issue may have influenced field investigators.

The second study<sup>4</sup> estimated risk for eggs and various meats in New Zealand.

**Figure 4: Risk attribution of human salmonellosis, by chicken, beef/veal, pork, lamb/mutton and eggs - 2002 to 2004**



However the risk attributed to eggs was the least of all, and this was in line with recent surveys. Cases attributed to chicken steadily declined over the years 2002 to 2004. The poultry industry had intensified controls of *Salmonella* over this period, and results suggested this had been effective.

The third study<sup>5</sup> on outbreak data reported that the numbers of people involved in outbreaks are generally small (average of 6 confirmed or probable cases per outbreak). The most commonly reported setting is the household, followed by food vendors and events. Foodborne is the most commonly reported mode of transmission, and the available evidence is most often “strong” for outbreaks associated with foodborne transmission. Despite the data indicating that foodborne transmission is important, the wide variety of suspected foods makes attributing risk very difficult. This is also the case for the outbreaks in which a vehicle has been identified from “strong” evidence.

For risk attribution and management, the most useful signal from this analysis appears to be the importance of infected food handlers. These were identified in 12 of the 28 outbreaks in which there was reasonable evidence to indicate a source. All but one of these 12 outbreaks occurred in a food vendor or event setting.

Overall, the picture that emerges for salmonellosis outbreaks is that the aetiology is hugely varied, although foodborne transmission is suggested for 40% of outbreaks, amongst which infected food handlers account for perhaps half of these.

## National Microbiological Database

Table 1 shows the current status of the NMD<sup>6</sup> for animal species of interest to the *Salmonella* Strategy.

**Table 1: Current status of NMD for animal species of interest to the *Salmonella* Strategy**

Species	Current status	Percentage positive to-date <sup>7</sup>
<p>Sheep and lamb</p> <p>Commenced 1997, seasonal 16 or 6 week window; weekly testing of carcasses cuts and bulk product. Reviewed in 2004. Ceased in 2005 for domestic only premises with the introduction of the NMD specifications and then in 2006 for export listed premises following recognition of equivalence by US.</p>	Stopped <sup>8</sup>	<p>Carcasses post-slaughter: 0.19-0.93*</p> <p>Carcasses post-chilling: 0.00-0.17*</p> <p>Primal cuts: 0.00-0.02*</p> <p>Bulk product: 0.03- 0.14*</p>
<p>Beef cattle</p> <p>Commenced 1997, seasonal 16 or 6 week window; weekly testing of carcasses cuts and bulk product.</p>	Active	<p>Carcasses post-slaughter: 0.01-0.03*</p> <p>Carcasses post-chilling: 0.00-0.49*</p> <p>Primal cuts: 0.00-0.02*</p> <p>Bulk product: 0.00-0.01*</p>
<p>Young calf</p> <p>Commenced 1998, seasonal 16 or 6 week window; weekly testing of carcasses cuts and bulk product.</p>	Active	<p>Carcasses post-slaughter: 0.99-4.95*</p> <p>Carcasses post-chilling: 0.00-5.52*</p> <p>Primal cuts: 0.14-0.72*</p> <p>Bulk product: 0.28-1.41*</p>
<p>Goat</p> <p>Commenced 1999, seasonal 16 or 6 week window;</p>	Active	<p>Carcasses post slaughter: 0.15 – 0.75*</p>

<sup>6</sup> NMD information and results can be found at:

<http://www.nzfsa.govt.nz/animalproducts/publications/manualsguides/nmd/index.htm>

<sup>7</sup> 95% confidence limits for data taken from start of programme to end of 4<sup>th</sup> Quarter 2008

<sup>8</sup> Statistical analysis of data in 2004, *Salmonella* sampling removed from NMD programme in May 2006



Species	Current status	Percentage positive to-date <sup>†</sup>
weekly testing of carcasses cuts and bulk product.		Carcasses post-chilling: 0.00 – 7.87* Primal cuts: 0.00 – 0.30* Bulk product: 0.00 – 0.284*
Farmed deer  Commenced 2001, seasonal 16 or 6 week window; weekly testing of carcasses and cuts.	Active	Carcass post slaughter: 0.00-0.10*
Ostrich/emu  Commenced in 2001; weekly testing every processing week of carcasses.	Active	Carcass post slaughter: 0.00-0.68*
Broiler chicken  Commenced in 2001 with daily testing of birds for standard throughput premises and weekly for very low throughput premises. The number of birds tested each day/week increased in 2008 with the first review of the NMD <i>Campylobacter</i> programme.	Active	1.69
Pigs  No NMD information.	Under consultation	

\* Compositing of five samples

### 3.6.3 Data Gaps

New Zealand needs to have robust domestic data on *Salmonella* to inform strategic direction. This is also needed when considering options for imported product. Currently, regulatory data sources on *Salmonella* exist but are not integrated sufficiently to provide meaningful and timely information to assist risk management of this pathogen.

Non regulatory data sources of information on *Salmonella* also exist. For example, the dairy and shellfish industries hold a significant amount of data on *Salmonella* testing as do the supermarkets and secondary food processors. This data could assist NZFSA in focusing the strategic direction for control of *Salmonella*.

## 4 Objectives

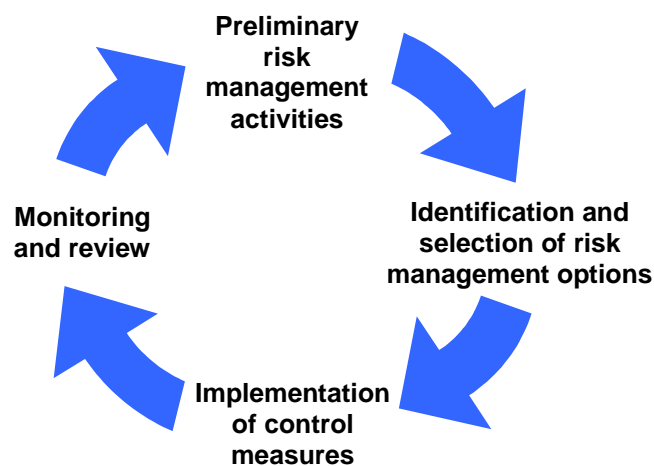
The objectives of the *Salmonella* Risk Management Strategy are to:

1. quantify the proportion of foodborne salmonellosis cases attributable to:
  - specific foods
  - animal feeds
  - domestically produced versus imported foods
  - multi-resistant and virulent *Salmonella* genotypes associated with foods
2. identify sources of *Salmonella* contamination of specific foods and animal feeds;
3. determine the relative value of different interventions throughout the food chain in reducing the risk of salmonellosis;
4. make prioritised risk management decisions on appropriate *Salmonella* control measures across the food chain, and according to data availability;
5. design and implement an effective monitoring and review programme to support strategic goals

## 5 Strategic Application

### 5.1 Risk Management Framework

The *Salmonella* Risk Management Strategy applies the NZFSA risk management framework (RMF). The RMF provides a systematic process whereby knowledge on risk and evaluation of other factors relevant to control of hazards are used to choose and implement regulatory standards or other measures. The four generic steps involved in applying a RMF are shown in Figure 1. Effective risk management incorporates appropriate risk communication and stakeholder representation at all steps.



### 5.2 *Salmonella* Risk Management Strategy Working Group

NZFSA has a dedicated *Salmonella* risk management strategy working group to co-ordinate all work relating to foodborne zoonotic *Salmonella*. The working group represents expertise from several business groups within NZFSA.

### 5.3 Stakeholders

NZFSA works closely with a variety of stakeholders in New Zealand in order to ensure understanding of the comprehensive risk management strategy and to share and obtain feedback on results from the work programme on an ongoing basis. The stakeholder base includes the following

- District Health Boards and Territorial Authorities
- Enteric Zoonotic Disease Research Steering Committee (administered by NZFSA)
- FSANZ
- Importers
- Industry and industry associations, e.g. covering feed manufacturers, growers, processors, animal pharmaceuticals, retail and food service
- NZFSA Academy
- NZFSA Consumers Forum
- Science organisations, e.g. Crown Research Institutes, Universities

#### **5.4 Strategy Update and Reporting**

The Strategy update process will occur annually, taking into account outputs from the current work programme. This also includes consideration of any other relevant sources of information. The update process guides the choice of further scientific work and the future direction of the Strategy. The Strategy will be reported on quarterly.

## 6 Work Programme

Implementation of the Strategy will be via a work programme aligned to the RMF. It includes the following parts:

- Preliminary Risk Management Activities
- Risk Management Options
- Implementation of Control Measures
- Monitoring and Review
- Risk Communication; and
- International Collaboration.

For each part, a short overview is given and the key objectives where applicable, are set out. Current work for 2009-2010 is listed. This work programme will focus on data collection and filling knowledge gaps in relation to exposure pathways for *Salmonella*.

**Annex 1** provides background for all completed work underpinning the Strategy.

**Annex 2** outlines the timetable for deliverables for the next twelve months.

**Annex 3** details the completed work and current work programme by sector

## 6.1 Preliminary Risk Management Activities

The identification of salmonellosis as a food safety issue has been well established and risk profiles on *Salmonella* (non-typhoid) in and on eggs, and *Salmonella* (non-typhoid) in poultry (whole and pieces) have been completed. Preliminary risk management activities currently focus on gathering data about various sources, including attribution data, and risk assessment so that a good knowledge of science, emerging *Salmonella* serotypes and risks to human health can be ascertained.

### 6.1.1 Key Objectives

- To accurately determine the incidence of foodborne human salmonellosis from specific food types: e.g. animal products, plant products, wildlife reservoirs, domestically produced versus imported foods and multi-resistant and virulent *Salmonella* genotypes;
- To apply genotyping of strains to assist with food source attribution and other epidemiological studies;
- To develop the infrastructure for data collection and collation;
- To provide data to support prioritised areas of work and to protect market access.

### 6.1.2 Current Work – Attribution studies

1. Development of alternative risk attribution methods (NZFSA/AgResearch/ Biometric Ruakura 2009)  
This work will develop probabilistic methods that could be used to link human serotype incidence, prevalence of serotypes in food and consumption.
2. A systematic review of the epidemiological evidence available within New Zealand of the aetiology of human *Salmonella* infection  
This work will weigh and present the evidence available from the published New Zealand literature, ESR outbreak reports and any other sources as to the aetiology of human salmonellosis cases in New Zealand, with emphasis on potentially foodborne transmission routes.

### 6.1.3 Current Work – Scientific evaluation

#### 1. Risk categorisation ranking tool – imported foods

The risk categorisation tool will be completed and used to categorise imported foods into high, medium and low risk. *Salmonella* is one of the important food pathogens associated with some imported foods and will contribute to the hazard/food combinations of high interest.

#### 2. Intelligence gathering and survey of animal feed sources<sup>9</sup>, particularly plant-based, and feeding practices for food producing animals<sup>10</sup>

This work consists of two parts:

Part I – an information gathering exercise on current and changing animal feed sources and feeding practices in New Zealand, limited to ruminants, pigs, poultry and fish (food producing animals that are likely to be fed plant based animal feeds), and any significant food safety, trade and animal health and welfare incidents relating to animal feeds that have occurred in New Zealand and internationally, over the past five years;

Part II – pilot studies and a survey based on the findings from the intelligence gathering exercise, to confirm the New Zealand situation (allowing for regional variability and the scale and type of farming practice). The decision whether to progress Part II will be dependent on the outcomes of the information gathering report in Part I.

#### 3. Microbiological hazards in conventional and organic fresh produce (NZFSA/ESR 2008-2009)

This work will survey domestic fresh produce and imported produce for foodborne pathogens and indicator organisms, compare the microbiological profile of conventional and organically grown fresh produce and if possible, compare the microbiological profile of certified and non-certified organically grown fresh produce. Potential risks to consumers from detected hazards in fresh produce marketed in New Zealand, will be assessed.

---

<sup>9</sup> Excludes feeds manufactured and formulated as trade name products, and refined nutritional components.

<sup>10</sup> limited to ruminants, pigs, poultry and fish (food producing animals that are likely to be fed plant based animal feeds)

4. Microbiological survey in uncooked retail meats (NZFSA/ESR 2008 -2009)  
This work will repeat the survey of retail meats in order to compare current prevalence with that in the previous survey of 2003-2004.
5. Risk Profile: *Salmonella* in Pork and Pork products (NZFSA/ESR 2007-2008)
6. Risk Profile: *Salmonella* in animal feed (NZFSA/ESR 2008-2009)
7. Risk Profile: *Salmonella* in ethnic foods and high lipid foods (NZFSA/ESR 2008-2009)
8. Survey of imported feed ingredients  
NZFSA conducts sampling of selected imported feeds and feed ingredients for *Salmonella* in the first half of 2009. The nature of the products will depend on a prior exercise that is gathering data from industry on the range and extent of bulk feed ingredients being imported and whether or not assurances and or testing are routinely undertaken. Based on the knowledge of testing and assurances, a targeted survey will be undertaken to address any apparent gaps in the available data on rates of contamination.
9. Information gathering on rendered product  
Information will be collected from NZ renderers to obtain an understanding of the prevalence/incidence of *Salmonella* in NZ rendered product. This will include: rate of *Salmonella* detection, sampling and testing procedures, and corrective actions when positive samples are detected.
10. *Salmonella* data capture  
There are a number of business groups within NZFSA that gather information on *Salmonella* related to animal and plant products in addition to NMD. It is important that as much data as possible is accessed by the *Salmonella* Risk Management Strategy working group. This needs to be captured in a meaningful way to ensure that any emerging issues or trends can be determined. NZFSA also should actively seek data from other targeted sectors<sup>11</sup> that do not report routinely to NZFSA.

Sources of *Salmonella* data currently available to NZFSA are:

- NMD;
- public health data;

---

<sup>11</sup> Where evidence suggests that a *Salmonella* problem exists within a sector



- livestock data;
- sectors providing data to support export assurances, e.g. meat and bone meal, shellfish;
- industry process failures (for those operating under the Animal Products Act 1999);
- dairy non compliance information;
- information from foreign authorities (including rapid alert)
- imported food results
- salmonellosis outbreak data.

A pilot system will be developed and trialled to integrate data more effectively.

#### **6.1.4 Current work – Risk Assessment**

1. Quantitative Risk Assessment to estimate the risk to New Zealand consumers from the consumption of unpasteurised milk and cheese produced from unpasteurised milk

This work will establish the current level of protection afforded to New Zealand consumers by the pasteurisation of milk and provide a scientific basis for establishing an appropriate level of protection (ALOP) for milk and cheese products by the development of a Quantitative Risk Assessment (QRA). It also will provide a scientific process for evaluating the safety of milk that has undergone an “equivalent” pasteurisation process. Salmonella is one of the range of food pathogens under study.

## 6.2 Risk Management Options

Potential risk management options are identified and then selected according to appropriate criteria. Stakeholders are involved to the extent possible, and a clear rationale must be presented for the final decisions taken. All parts of the food chain should be taken into account when selecting control measures.

### 6.2.1 Key Objectives

- To quantify the influence of specific controls at different steps in the food chain on risk estimates in NZ, and create a “menu” of such controls and the resulting risk estimates;
- To model “what if” scenarios for new controls that become available;
- To identify and prioritise the most effective and practical intervention(s) and other (e.g. non-regulatory) measures at relevant points in the food chain and ensure their implementation; and
- To establish a quantitative link between implementation of hazard-based controls and achievement of any performance targets that may be established.

### 6.2.2 Current work

1. Modelling the effect of *Salmonella* contaminated feed on broiler contamination at slaughter

This work will validate the inputs and outputs of the feed production model for *Salmonella* control in poultry feed using industry monitoring data (contingent on access to these data from the poultry industry). This will assess the impact (i.e. the prevalence of *Salmonella* in broilers at slaughter over time) of contaminated feed being fed for a minimum of one to two weeks, deriving from delays in the introduction of additional controls, breakdowns in the feed production and distribution process, primary infection introduced by contaminated feed to sheds and secondary spread to other sheds and farms.

2. Completing further chapters for the Poultry Processors Code of Practice on: secondary processing including packaging, and cleaning and sanitation
3. Evaluating current standards for retail/food service, and developing changes as required

4. Updated guidance material on safe handling of poultry meat and relevant time temperature applications
5. Completing the Code of Practice – Renderers
6. Completing seven chapters of the Meat Code of Practice
7. Regulatory Controls for animal feeds (ACVM Act)  
The ACVM Act was amended in 2007 and includes a further risk area relating to public health. All agricultural compounds for sale in New Zealand will be subject to minimum manufacturing regulations which are currently being developed. One of the manufacturing requirements is that due care is taken to avoid hazards that will have a negative effect on the health of people, such as the spread of human pathogens or contamination with substances harmful to humans.
8. Young calf processing  
This work will evaluate carcass contamination pathways for young calves from lairage to entry into carcass chiller. Recommendations will be provided to change meat hygiene practices where appropriate.
9. Young calf decontamination  
This work will evaluate international validation protocols for antimicrobial decontamination procedures for red meat, and development and validation of decontamination procedures, specifically of ozone for young calves.
10. New risk-based controls for imported foods  
Prioritisation of the development of risk-based controls for high regulatory interest foods will follow scientific evaluation work and review of current imported food standards. New risk-based controls will be developed and implemented for high regulatory interest foods.
11. Generic RMP model for the slaughter, dressing, cooling and boning of pigs

### **6.3 Implementation of Control Measures**

Sectors throughout the food chain have the primary role in implementation of control measures. Verification of control measures implemented by the food sector will be necessary. The Compliance Group of NZFSA carries out independent audit of regulatory functions and applies sanctions where control measures have not been properly implemented.

#### **6.3.1 Key Objectives**

- To effectively implement regulated and non-regulated measures at relevant points in the food chain

#### **6.3.2 Current work**

1. Audit of broiler growing farms to assess the application and effectiveness of the Poultry Industry Broiler Growing Biosecurity Manual
2. Compliance audit of primary processing plants to assess the application and effectiveness of the Poultry Processors Code of Practice – chapter on primary processing
3. Compliance audit of egg processors

## 6.4 Monitoring and Review

Monitoring and Review encompasses human health surveillance associated with foodborne illness caused by *Salmonella*.

Data on the level of control of *Salmonella* throughout the food chain is gathered and analysed, and reviewed in conjunction with audit reports and human health surveillance data to determine the effectiveness of regulatory activities. Where monitoring indicates that food safety goals are not being achieved, decisions and/or control measures will need to be reviewed and future research/improvement may be requested.

### 6.4.1 Key Objectives

- Surveillance - in cooperation with ESR and MoH, to contribute to an effective surveillance programme that will enable demonstration of mid- and long term trends;
- Monitoring and surveillance - to ensure appropriate monitoring and surveillance is undertaken to pick up emerging issues such as new strains, new pathways and or changed risk profiles associated with new technologies, processes or consumer behaviour;.
- Monitoring - to identify data gaps and produce credible data for NZFSA to promote equivalence determinations;
- Monitoring - to accurately determine the prevalence of *Salmonella* in any specific source in New Zealand considering the relevant stage of the food chain;
- Monitoring – to collaborate with industry, consumers and the research institutes of New Zealand;
- Monitoring - to collaborate with the international science community on all aspects of risk assessment and risk management relevant to foodborne *Salmonella* control;
- Review - to review effectiveness of strategy outputs in contributing to the achievement of a reduction in food-borne salmonellosis;
- Review - to identify and prioritise areas for future research / improvement under this strategy.

#### 6.4.2 Current Work - Surveillance (NZFSA/ESR 2008-2009)

##### 1. Modification of current *Salmonella* data

This work will establish a national *Salmonella* surveillance programme that brings together, in a timely manner, information on salmonellosis in humans, farmed animals, pets and wild animals, and on *Salmonellae* isolated from human food, non-human animals, animal feeds and the environment.

#### 6.4.3 Current work - Monitoring

##### 1. NMD monitoring:

- Cattle
- Young calves
- Goats
- Farmed Deer
- Large birds
- Poultry
- Pigs - proposed inclusion during 2009

#### 6.4.4 Current work – Review

##### 1. Participation in the NMD review project to ensure that applications and systems are effective for the needs of monitoring the *Salmonella* Risk Management Strategy

##### 2. Review spikes in NMD *Salmonella* results

##### 3. Review ovine *Salmonella* status for market access

A scoping exercise will be undertaken to determine the extent of *Salmonella* in ovines. This will be based on data gathered from sources such as rejections, industry data, reports and sampling results. Options will then be assessed and further work defined as necessary.

## 6.5 Risk Communication

Risk communication encompasses a continuous and interactive exchange of information between all parties involved in food safety. It describes the work done by NZFSA to bridge the gap between the evaluation of risk by experts and the views of other stakeholders. NZFSA takes into account knowledge, attitudes, values, practices and perceptions of stakeholders when communicating risk management options and decisions.

Further information including press releases, reports, research and resources can be found at <http://www.nzfsa.govt.nz/>

Details of various NZFSA funded risk profiles and research can be found at: <http://www.nzfsa.govt.nz/science>

### 6.5.1 Key Objectives:

- To proactively inform interested parties (both public and industry) of major developments, milestones and decisions (and the reasons for those decisions); and
- To communicate via multiple methods, where appropriate, to ensure that interested parties have every opportunity to get the information they need, in the way they need it, and in a timely manner.

### 6.5.2 Current Work

1. Ensuring that the NZFSA website is the key repository of all information relating to the *Salmonella* Risk Management Strategy, that it is updated as required and that the information can be easily accessed from a dedicated web page
2. Developing a specific communication strategy around elaboration of the strategic goal of 30% reduction in foodborne salmonellosis cases after five years.

## 6.6 International Standards

NZFSA works closely with international counterparts to coordinate research, and to share and discuss scientific approaches and results in order to maximize the benefits of scientific knowledge on *Salmonella* for inclusion into New Zealand's risk management strategy.

### 1. Codex International standards

The Codex Alimentarius Commission is regarded as a key body for international food related standard setting activities. The Codex Committee on Food Hygiene has tasked Sweden and New Zealand with leading the development of an international risk-based standard for *Salmonella* and *Campylobacter* control in chicken meat. This is a five year project and two years of drafting work has taken place with two international working groups held since May 2007. Sweden leads the *Salmonella* workstream and New Zealand has the opportunity to access the latest international thinking on *Salmonella* while co-leading the *Campylobacter* work. This project is due to conclude in 2011.

2. FSANZ – development of primary production and processing standards and implementation guides for red meat, poultry meat, eggs and egg products, and sprouts.
3. FSANZ – review of micro criteria in the Australia NZ Joint Food Standards Code, including *Salmonella* criteria



# Annex 1: Completed Work

## A. Completed Science work

### 1. Preliminary Risk Management Activities

#### 1.1 Attribution

##### **Acute gastro-intestinal studies**

A series of studies occurred to estimate the burden of disease associated with acute gastro-intestinal illness in New Zealand and associated under-ascertainment in the surveillance process.

##### **National Typing Database**

A standardised, national, pulsed-field gel electrophoresis (PFGE) microbial sub-typing database is being implemented to allow more effectively detection of clonal linkages between human case isolates and food/environmental isolates of *Campylobacter*, *Salmonella*, shiga-toxigenic *E. coli* (STEC) and *Listeria*.

#### 1.2 Scientific Evaluation

##### **Risk profile – *Salmonella* (non typhoid) in and on eggs**

Non-typhoid *Salmonellae* cause salmonellosis, the second most frequently notified enteric disease in New Zealand. A diverse range of foods may carry the organism. New Zealand is fortunate in having a poultry industry and egg supply in which types of *Salmonella* that have caused major problems overseas (*S. Enteritidis* PT4 and *S. Typhimurium* DT104) are not endemic. Although eggs and egg dishes have been regularly implicated in reported outbreaks of salmonellosis in New Zealand, this has rarely been supported by laboratory evidence.

##### **Risk profile - *Salmonella* (non-typhoid) in poultry (whole and pieces)**

Non-typhoid *Salmonellae* cause salmonellosis; the second most frequently notified enteric disease in New Zealand. A diverse range of foods may carry the organism. The organism survives drying well, and is less sensitive to heat treatment when present in dry foods. While foods such as poultry

and pig meat are regarded as important sources of infection, contact with animals is a major route of infection

### **Survey of Retail Eggs for *Salmonella***

This survey assessed the presence of *Salmonella* in and on eggs available through retail outlets in Auckland and Christchurch. A total of 514 sample units of eggs were tested over a twelve-month period.

### ***Salmonella* in uncooked retail meats in New Zealand**

A national quantitative survey of *Salmonella* in five types of uncooked retail meats in New Zealand was undertaken from August 2003 to May 2005 to establish baseline proportionality data

### ***Salmonella* in chicken nuggets**

This study assessed the risk from *Salmonella* in chicken nuggets. Chicken nuggets are a partially cooked retail product that may be perceived by consumers as fully cooked and therefore be handled in an unsafe manner in domestic environments.

### **Vertical chain survey**

This study compared the prevalence and levels of *Salmonella* through the production chain to retail. This should assist in identifying the most appropriate location in the supply chain to implement risk management options.

### **Pathogen loading on freshly slaughtered chickens**

This study provided data on the prevalence and numbers of *Salmonella* on freshly slaughtered chickens immediately after exsanguination and prior to scalding.

### **Salmonella on the surface of eggs**

This study carried out a pilot quantitative survey of *Salmonella* on the surface of battery eggs produced in New Zealand for retail sale in Auckland and Christchurch to enable a more accurate estimate of exposure to *Salmonella* from this source, and to identify the serotypes that predominate in New Zealand.

### **Microbiological survey of imported and domestic pork**

New Zealand imports approximately a third of its pig meat requirements. Salmonellosis is the second most frequently reported bacterial gastrointestinal illness in New Zealand. Overseas pig meat is considered a significant source of *Salmonella* exposure for consumers. This study carried out a pilot survey of uncooked imported and domestic pig meat prior to secondary processing for the presence of *Salmonella* and other pathogens to answer questions of proportionality of exposure; to assess the likelihood of introducing novel and pathogenic serotypes into New Zealand; to provide a guide for evaluation of food safety programmes (FSP) for uncooked comminuted fermented meats (UCFM); and to provide a guide for development of the pork National Microbiological Database (NMD).

### **Assessment of domestic food handling practices**

This study collated information on consumer food handling via direct measurements in homes and interviews with the public. Information gathered included the temperature during transport from the retail outlet to the home, the temperature of domestic refrigerators, and room temperatures with respect to defrosting and handling. The potential for cross-contamination was assessed through observation of the layout of food stored in refrigerators with particular emphasis on the storage of raw meat and poultry in relation to ready-to-eat foods, and microbiological analysis of food contact surfaces.

### **Investigation of a *Salmonella* Saintpaul outbreak in the Auckland and Waikato regions**

In this investigation, the mode of contamination for the *Salmonella* outbreak (2005) was not conclusively identified. However, rinsing the carrots with stream water that was contaminated with *E. coli* and considered unsuitable for drinking was noted as a likely, although not exclusive, source of the contamination. The outbreak report recommends review of water quality standards for

produce processing and label of raw produce to indicate the need for further washing and peeling by the consumer prior to consumption.

### **Risks associated with bacterial pathogens in exported fruit and vegetables**

This qualitative risk assessment and ranking for microbiological hazards in conventional and organic fresh produce exported from New Zealand identified *Salmonella* and apples, or tomatoes, as the hazard food combination of choice to survey given the risk the pathogen poses to human health in New Zealand, the likelihood of the pathogen occurring on a product, and the export value of the produce product.

### **Levels of Escherichia coli O157 in lettuces and Salmonella in apples**

In this survey, 239 apples (eight varieties) grown under the Integrated Fruit Production programme (IFP) tested negative for *Salmonella*. In contrast, of 230 organic apples tested, only a single batch of 5 samples from a single orchard tested positive for *Salmonella* Typhimurium DT12a, albeit at very low concentration. Nevertheless, the report concluded that the introduction and effective implementation of HACCP based food control programmes in the edible fruit and plant product industries had been beneficial.

### **Microbiological Survey of Imported and Domestic Pet Chews: Salmonella**

This study concluded that while there was no significant difference in prevalence of *Salmonella* in imported and domestic products, novel pathogenic and antimicrobial-resistant *Salmonella* are being introduced into New Zealand through the importation of pet chews. The significance of this exposure pathway has yet to be determined. Pet chews are a potential source of exposure to *Salmonella* in the domestic home environment and humans are at risk of exposure either directly, through handling, or inadvertently by cross-contamination of food contact surfaces and food in the home environment

### **Raw poultry survey**

This survey assessed the presence of *Salmonella* in raw poultry samples available for retail supply over a four-week period. Where *Salmonella* organisms were detected, they were counted and their phage type determined. This project was initiated at the request of the NZFSA following notification

that broilers fed contaminated wheat had resulted in an increase in *Salmonella* Typhimurium (STM) DT1 in flocks.

### 1.3 Risk Assessment

#### ***Salmonella* risk model**

Salmonellosis is the second most frequently reported bacterial gastrointestinal illness in New Zealand, and because of the common perception as "foodborne" of origin, in particular through poultry meat, ranks high for NZFSA risk management action. By elucidating the main pathways by which consumers are exposed to *Salmonella*, this study assists the risk management of *Salmonella* in poultry by creating a preliminary draft risk model.

#### **Modelling of Exposure of New Zealand consumers to *Salmonella***

This study evaluated:

- The relative likelihood of New Zealanders becoming ill from *Salmonella* transmitted via food compared with *Salmonella* being transmitted via other pathways such as direct contact with animals and overseas travel
- Changes in relative likelihood of foodborne salmonellosis that may eventuate from importation of poultry products from overseas according to specific import scenarios.

### 2. Risk Management Options

#### **Temperature control at Retail Level**

This study acquired a better understanding of the adequacy of temperature control of meat (sheep and poultry) during transport between the slaughterhouse and retail outlet, and during retail processing and display

## **Effect of *Salmonella* in poultry meats of removal of Antibiotics from poultry feed in New Zealand**

This report represents the results of an investigation of antibiotic use by the poultry industry with respect to the effect on *Salmonella* spp. The effects of any in-feed antibiotics use in the poultry industry were evaluated to gauge their direct effects on *Salmonella* in poultry.

### **B. Completed non-science work**

#### **1. Risk management options**

- a. Generic HACCP plans for fresh produce, poultry and large animals (slaughter and dressing; further processing)
- b. Generic RMP template for eggs
- c. Generic RMP model (poultry)
- d. Generic RMP model (rendering)
- e. Mandated RMPs for large animals and large birds, poultry, eggs, renderers, dairy processors
- f. Broiler Growing Biosecurity Manual
- g. Code of Practice – Poultry Processing: primary processing
- h. Changes to young calf post mortem examination requirements
- i. Generic RMP Models for the slaughter, dressing, cooling and boning of cattle, sheep, farmed deer and young calves

#### **2. Implementation of control measures**

- a. Regulated: RMP implemented for primary processing of animal products, e.g. large animals and large birds, seafood, poultry, eggs, renderers, dairy processors.
- b. Non-regulated: Broiler Grower Biosecurity Manual
- c. Regulated: Code of Practice – Processing of Poultry – chapter 5 - primary processing

#### **3. Monitoring and Review**

- a. National Typing Database
- b. NMD – sheep and lamb

## Annex 2: Key milestones for current work -2009

<b>Preliminary Risk Management Activities</b>	
<b>Attribution studies</b>	
<b>Activity</b>	<b>Expected Completion Date</b>
Development of alternative risk attribution methods	30 June 2009
Systematic review of aetiology of human <i>Salmonella</i> infection	30 June 2009
<b>Scientific Evaluation</b>	
<b>Activity</b>	<b>Expected completion date</b>
Risk Profile: <i>Salmonella</i> in Pork and Pork products	31 March 2009
Risk Profile: <i>Salmonella</i> in animal feedstuff	30 June 2009
Risk Profile: <i>Salmonella</i> in ethnic foods and high lipid foods	30 June 2009
Completion of risk categorisation ranking tool – imported foods	30 June 2009
Microbiological hazards in conventional and organic fresh produce	30 June 2009
Information gathering on rendered product	30 June 2009
Survey of imported feed ingredients	30 June 2009
Salmonella data capture	30 June 2009
Intelligence gathering animal feed sources and feeding practices for food producing animals	1 August 2009
Pilot studies and surveys of animal feed sources and feeding practices for food producing animals	TBC (dependent on Intelligence Gathering outcomes)
Microbiological survey of uncooked retail meats	30 September 2009
<b>Risk Assessment</b>	
Quantitative Risk Assessment to estimate the risk to New Zealand consumers from the consumption	31 December 2009

of unpasteurised milk and cheese produced from unpasteurised milk.	
Risk Management Options	
Activity	Expected completion date
Young calf process hygiene	31 January 2009
Code of Practice – Poultry Processors: secondary processing	31 March 2009
Code of Practice – Renderers	31 March 2009
Modelling the effect of Salmonella contaminated feed on broiler contamination at slaughter.	30 June 2009
Updated guidance for safe cooking of poultry meat – time temp applications	30 June 2009
Evaluating current standards for retail/food service, and developing changes as required	30 June 2009
Code of Practice – Poultry Processors: cleaning and sanitation	30 June 2009
Regulatory controls for animal feeds (ACVM Act)	30 June 2009
New risk-based controls for imported foods	30 June 2009
Generic RMP model for the slaughter, dressing, cooling and boning of pigs	30 June 2009
Young calf decontamination	31 August 2009
Code of Practice - Meat	31 December 2009
Implementation of Control Measures	
Activity	Expected completion date
Audit of broiler growing farms to assess the application and effectiveness of the Poultry Industry Broiler Growing Biosecurity Manual	31 January 2009
Compliance audit of primary processing plants to assess the application and effectiveness of the Poultry Processors Code of Practice – chapter on	31 January 2009



primary processing	
Compliance audit of egg processors	31 December 2009
<b>Monitoring and Review</b>	
<b>Activity</b>	<b>Expected completion date</b>
<b>Surveillance</b>	
Modification of current Salmonella data	28 February 2009
<b>NMD</b>	
NMD monitoring: Cattle, Young calves, Goats, Deer, Large birds, Poultry	Ongoing
NMD monitoring: pigs	2009
<b>Review</b>	
Participation in the NMD review project to ensure that applications are effective for the needs of the Salmonella Strategy	As required
Review spikes in NMD Salmonella results	As necessary
Review of ovine Salmonella status for market access	30 June 2009
<b>Risk Communication</b>	
<b>Activity</b>	<b>Expected completion date</b>
Ensuring that the NZFSA website is the key repository of all information relating to this strategy, that it is updated as required and that the information can be easily accessed from the home page. This includes improvements to Salmonella information on website	30 April 2009
Specific communications strategy around strategic goals	30 April 2009
<b>International Collaboration</b>	
<b>Activity</b>	<b>Expected completion date</b>

---

Participate in CCFH International Working Group, Brazil	September 2009
FSANZ work a) Standards and guides – red meat, poultry, eggs and egg products, sprouts b) Review of microbiological criteria	Ongoing

## Annex 3: Sector Activity under the Risk Management Framework

This Annex clearly shows where work either directly (e.g. risk profile) or indirectly (e.g. RMP) related to *Salmonella* has already been completed for a sector, or is in the current work programme.

<b>Key</b>
Completed Work
Current Work 2008 - 2009

Sector	Prelims	RM Options	Implementation	Monitoring & Review
General	<ul style="list-style-type: none"> <li>Acute Gastrointestinal Illness studies</li> <li><i>Salmonella</i> risk model</li> <li>Modelling of exposure of NZ consumers to salmonellosis</li> <li>Risk ranking</li> </ul>			<ul style="list-style-type: none"> <li>National Typing Database</li> </ul>
	<ul style="list-style-type: none"> <li>Development of alternative risk attribution methods</li> <li>Systematic review of epi- evidence</li> <li><i>Salmonella</i> data capture</li> </ul>			<ul style="list-style-type: none"> <li>Modification of current <i>Salmonella</i> data – national surveillance programme</li> <li>Review of NMD including supporting lab systems</li> <li>Review spikes in NMD results</li> </ul>
Produce	<ul style="list-style-type: none"> <li><i>Salmonella</i> Saintpaul outbreak 2005</li> <li>Risks associated with bacterial pathogens in exported fruit and vegetables</li> </ul>	<ul style="list-style-type: none"> <li>Generic HACCP plans</li> </ul>		

	<ul style="list-style-type: none"> <li>Levels of <i>Escherichia coli</i> O157 in lettuces and <i>Salmonella</i> in apples</li> </ul>			
	<ul style="list-style-type: none"> <li>Microbiological survey of fresh produce in NZ</li> </ul>			
Poultry	<ul style="list-style-type: none"> <li>Raw poultry survey</li> <li>Risk profile – <i>Salmonella</i> (non-typhoid) in poultry (whole and pieces)</li> <li>Assessment of domestic food handling practices</li> <li>Pathogen loading on freshly slaughtered chickens</li> <li>Vertical chain survey</li> <li><i>Salmonella</i> in chicken nuggets</li> </ul>	<ul style="list-style-type: none"> <li>Effect of <i>Salmonella</i> in poultry meats of removal of antibiotics from poultry feed in NZ</li> <li>Generic HACCP plan</li> <li>Temperature control at retail level</li> <li>Generic RMP Model (poultry)</li> <li>RMP mandated</li> <li>Broiler Growing Biosecurity Manual (voluntary)</li> <li>COP – primary processing</li> </ul>	<ul style="list-style-type: none"> <li>RMP</li> <li>Biosecurity Manual</li> <li>COP – primary processing</li> </ul>	<ul style="list-style-type: none"> <li>NMD</li> </ul>
	<ul style="list-style-type: none"> <li>Microbiological survey of uncooked retail meats</li> </ul>	<ul style="list-style-type: none"> <li>Modelling the effect of <i>Salmonella</i> contaminated feed on broiler contamination at slaughter</li> <li>COP – secondary processing</li> <li>COP – cleaning and sanitation</li> <li>Updated guidance material on safe handling of poultry</li> </ul>	<ul style="list-style-type: none"> <li>Audit of Broiler Growing Biosecurity Manual use</li> <li>Compliance audit of COP – primary processing</li> </ul>	

		meat, time/temp applications		
		<ul style="list-style-type: none"> <li>Standards for retail/food service</li> </ul>		
Eggs	<ul style="list-style-type: none"> <li>Risk profile – <i>Salmonella</i> (non typhoid) in and on eggs</li> <li>Survey of retail eggs for <i>Salmonella</i></li> <li><i>Salmonella</i> on the surface of eggs</li> </ul>	<ul style="list-style-type: none"> <li>Code of Practice</li> <li>Generic RMP template</li> <li>RMP mandated</li> </ul>	<ul style="list-style-type: none"> <li>RMP</li> </ul>	
			<ul style="list-style-type: none"> <li>Compliance audit of egg processors</li> </ul>	
Large animals and large birds:	<ul style="list-style-type: none"> <li><i>Salmonella</i> in uncooked retail meats in NZ</li> <li>Microbiological survey of imported and domestic pork</li> <li>Microbiological survey of imported and domestic pet chews: <i>Salmonella</i></li> </ul>	<ul style="list-style-type: none"> <li>Generic HACCP plans</li> <li>RMP mandated</li> <li>Changes to young calf PM examination requirements</li> <li>Generic RMP Models for slaughter, dressing, cooling and boning of cattle, sheep, young calves and farmed deer</li> </ul>	<ul style="list-style-type: none"> <li>RMP</li> </ul>	<ul style="list-style-type: none"> <li>NMD sheep/lamb</li> </ul>
	<ul style="list-style-type: none"> <li>Microbiological survey of uncooked retail meats</li> <li>Risk profile – <i>Salmonella</i> in Pork and Pork products</li> </ul>	<ul style="list-style-type: none"> <li>COP - Young calf process hygiene</li> <li>COP – Young calf decontamination</li> <li>COP – chapters 3, 5, 6, 7, 8, 9, 10</li> <li>Generic RMP Model</li> </ul>		<ul style="list-style-type: none"> <li>NMD: <ul style="list-style-type: none"> <li>cattle</li> <li>young calves</li> <li>goats</li> <li>deer</li> </ul> </li> </ul>

		for pigs		<ul style="list-style-type: none"> <li>○ ostrich</li> <li>○ pigs (under development)</li> </ul>
Rendered animal product	<ul style="list-style-type: none"> <li>• Information gathering on rendered product</li> </ul>	<ul style="list-style-type: none"> <li>• Generic RMP model - Rendering</li> <li>• RMP-rendering mandated</li> </ul>	<ul style="list-style-type: none"> <li>• RMP - rendering</li> </ul>	
		<ul style="list-style-type: none"> <li>• Rendering Code of Practice</li> </ul>		
Animal feeds	<ul style="list-style-type: none"> <li>• Intelligence gathering exercise, pilot studies and survey of animal feed sources and feeding practices for food producing animals</li> <li>• Risk profile – <i>Salmonella</i> in animal feed</li> <li>• Survey of imported animal feed ingredients</li> </ul>	<ul style="list-style-type: none"> <li>• Regulatory controls (ACVM Act)</li> </ul>		
Imported foods	<ul style="list-style-type: none"> <li>• Completion of risk categorisation tool followed by application</li> </ul>	<ul style="list-style-type: none"> <li>• New risk-based controls</li> </ul>		
Milk	<ul style="list-style-type: none"> <li>• Quantitative Risk Assessment – unpasteurised milk/cheeses</li> </ul>	<ul style="list-style-type: none"> <li>• RMP mandated</li> </ul>	<ul style="list-style-type: none"> <li>• RMP</li> </ul>	
Ethic and high lipid food	<ul style="list-style-type: none"> <li>• Risk profile – <i>Salmonella</i> in ethnic foods and high lipid foods</li> </ul>			
Market Access support				<ul style="list-style-type: none"> <li>• Review of ovine <i>Salmonella</i> status</li> </ul>

