



# Review of Porcine Carcass *Salmonella* Testing

MAF Technical Paper No: 2011/99

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ISBN 978-0-478-38758-2 (online)  
ISSN 2230-2794 (online)

25 November 2011



Ministry of Agriculture and Forestry  
Te Manatū Ahuwhenua, Ngāherehere



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## Purpose

The purpose of this paper is to present the results and conclusions of the porcine carcass sampling testing conducted up until the end of September 2011; as required following the NMD Notice 2009 amendment consultation of June 2010.

## Background

Weekly *Salmonella* testing of porcine carcasses commenced on 5 October 2009, for a 12 month period. It was reviewed after eight months by MAF (NZFSA) in June 2010. The MAF view was that the *Salmonella* sampling programme should be continued for at least a second year to gain a more representative picture of the incidence of *Salmonella* in the pork industry. A proposal that the National Microbiological Database (NMD) porcine *Salmonella* sampling be continued rather than ceasing from 4 October 2010 was consulted on in June 2010.

Following this consultation an amendment was made to NMD Notice 2009 to extend the porcine carcass *Salmonella* testing programme for a further 15 months to 2 January 2012. MAF committed to reviewing the data collated up to the end of September 2011 before the end of 2011.

## MAF *SALMONELLA* RISK MANAGEMENT STRATEGY (SRMS)

In July 2008, NZFSA (now MAF) published a *Statement of Intent 2008-2011*<sup>(1)</sup> that detailed the organisation's objectives and targets for the next three years. One of the outcomes was the improved safety and suitability of food to be measured through the performance target 'After five years, 30% decrease in foodborne salmonellosis'. The MAF *Salmonella* Risk Management Strategy is seen as the most appropriate means to co-ordinate work to reduce the incidence of domestically acquired foodborne salmonellosis to meet the performance target.

MAF updated their *Salmonella* Risk Management Strategy to cover the period 2010-2013. The objectives remain unchanged from the previous edition of the Risk Management Strategy covering the period 2009-2012

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

- Quantify the proportion of foodborne salmonellosis cases attributable to specific foods;
- Identify sources of *Salmonella* contamination of specific foods;
- Determine the relative value of different interventions throughout the food chain in reducing the risk of salmonellosis; and
- Make prioritised risk management decisions on appropriate *Salmonella* control measures across the food chain, and according to data availability.

The routine *Salmonella* testing undertaken by pork industry operators provides important data to assist in apportioning likely foodborne sources.

## NMD Notice 2011<sup>(2)</sup> current requirements

The porcine programme involves sampling of:

- Five carcasses per week for standard throughput operators, or
- One carcass per week for Very Low Throughput (VLT) operators (those processing less than 10,000 carcasses per annum).
- Aerobic plate count (APC) and generic *Escherichia coli* (*E. coli*) sampling and testing:
  - Three sites must be taken from one side of each carcass, and tested for APC and generic *E. coli* each week.
- *Salmonella* sampling and testing:
  - Samples from the three sites on the other side of each carcass are composited for a single *Salmonella* test once a week.
  - Five carcasses a week are sampled by standard throughput operators. Samples from the three sites of five carcasses (15 samples altogether) are composited for a single analysis.
  - The three sites of one carcass are composited in the case of the single weekly carcass sampled by VLT operators.
  - The Notice specifies that the above *Salmonella* sampling requirements will cease from 2 January 2012 <sup>(2)</sup>.

In addition to the above, section 6.7.1 Group 1 and porcine Group2 – *Salmonella* performance standard have been upgraded to highlight operator responsibilities. MAF Verification Agency (VA) has developed a *Salmonella* response guidance and checklist for operators to apply in the event of *Salmonella* detection to assist in meeting NMD Notice 2011 requirements. The *Salmonella* response guidance and check sheet was published in September 2011 and can be found at:

<http://www.foodsafety.govt.nz/elibrary/industry/animal-products-national-nmd/nmd-salmonella-detections.pdf>

## Review of results to date

Operators processing the following species are required to participate in the NMD *Salmonella* sampling programme: bovine, bobby calf, caprine, cervine, ostrich/emu, porcine and poultry. The respective sampling programmes vary according to market access and industry requirements therefore are difficult to compare species by species. This report will review the porcine NMD *Salmonella* results without comparison with other NMD *Salmonella* sampling programmes.

The two years of porcine NMD *Salmonella* programme results from October 2009 until September 2011 have been reviewed as two seasons from October to end of September over 2009/2010 and 2010/2011.

From October 2009 until the end of September 2010 *Salmonella* was detected in two of the nine participating premises; See Table 1 below. The porcine carcass *Salmonella* composite testing prevalence range was 0.33% -1.63%. One of the two premises had repeated incidences and put procedures in place to reduce the risk. The changes in procedures proved very effective, as this premises had no further detections in the 2010/2011 season.

**Table 1: *Salmonella* serotypes detected in the 2009/2010 season**

2009/2010 season		
6 detections	Premises A	<i>Salmonella Typhimurium</i> phage type 101
	Premises B	<i>Salmonella Brandenburg</i>
	Premises B	<i>Salmonella Brandenburg</i>
	Premises B	<i>Salmonella Derby</i>
	Premises B	<i>Salmonella Brandenburg</i>
	Premises B	<i>Salmonella London</i>

In the following season, from October 2010 until the end of September 2011, there were 4 *Salmonella* detections at three of eight participating premises; see Table 2 below. The porcine carcass *Salmonella* composite testing prevalence range was 0.22% -1.10%.

**Table 2: *Salmonella* serotypes detected in the 2010/2011 season**

2010/2011 season		
4 detections	Premises C	<i>Salmonella Derby</i>
	Premises D	<i>Salmonella Agona</i>
	Premises C	<i>Salmonella Derby</i>
	Premises E	<i>Salmonella Derby</i>

The prevalence range for all porcine carcass *Salmonella* composite testing over both seasons to the end of September 2011 was 0.27% -1.36%.

From the ESR 2011 report<sup>(4)</sup> of salmonellosis in 2010 *Salmonella Typhimurium* DT 101, *Salmonella Brandenburg* and *Salmonella Agona* were isolated from cases of human disease, but these cases were not associated with consumption of pork. *Salmonella Derby* and *Salmonella London* were not identified in humans. Information from MAF Biosecurity Surveillance confirmed that *Salmonella Derby* and *Salmonella Agona* had been detected in poultry finished feed sources and broiler samples during the year 2010<sup>(5)</sup>.

## DISTRIBUTION OF RESULTS

The distribution of the *Salmonella* positive results from NMD porcine carcass sampling is represented in Table 3:

**Table 3: NMD *Salmonella* results across the season**

Month	Oct-	Nov-	Dec-	Jan	Feb	Mar-	Apr-	May-	Jun-	Jul-	Aug-	Sept-
2009/2010	1	1	1	1				1	1			
2010/2011		1								1	1	1

Human salmonellosis notifications<sup>(4)</sup> peaked in February and September in 2010 whereas porcine *Salmonella* detections occurred more intermittently across both 2009/2010 and 2010/2011 seasons. The detections in 2010/2011 season were sourced from three different premises at different locations situated in both the North and South Islands across the year. Not enough information was provided by operators to enable any linkage with farm locations to be determined.

## STATISTICAL SUMMARY

Considering the low prevalence of *Salmonella* detected by routine testing, APC and *E. coli* were deemed to be sufficient for monitoring hygienic slaughter and dressing practices at premises. MAF considers another one year *Salmonella* NMD sampling survey is unlikely to provide much additional information to the *Salmonella* Strategy.

## NMD verification

During the 2009/2010 season it was found that review by operators of their process as intended by the escalating responses required under NMD could be improved. Improvements were made following advice from NZFSA (now MAF). Section 6.7.1 of the NMD Schedule was upgraded accordingly, and NMD Notice 2011 was published in February 2011. This was of benefit to operators of all species under the NMD *Salmonella* sampling programme. A *Salmonella* response guidance and checklist was then developed for operators to apply in the event of a *Salmonella* detection. This is commensurate with the *Salmonella* Strategy of sectors being aware of their *Salmonella* situation, summarising current practice and developing improved responses and control measures.

The following points have been highlighted by porcine operators in the *Salmonella* responses guidance and checklists received by MAF since the very recent publication in September 2011 of the guidance and checklists.

- It would be valuable to have information on the stock transporters cleaning policies
- Addition of soda ash to the tub lowers microbiological counts
- Keeping tubs at a temperature of greater than 62°C is important
- Dressing procedures in Industry standard/Industry agreed standard 5 slaughter and dressing (IS5) <sup>(6)</sup> are not optimum for there is no provision for adequate drying between scraping and singeing. IS5 only allows a 2m gap between scraping and flaming. If this distance could be extended more pigs could be hung on a drop rail to allow drying time before singeing. A drying step is common practice in porcine slaughter and dressing overseas.
- It is crucial to ensure scrubbing brushes are sterilised regularly during processing and sanitised following processing with the correct dose of chemical sanitizer.
- Extra sterilisers on the slaughter board may be necessary to permit easier access for all staff.
- Consistency of staff hygienic practices need to be reinforced.
- Scraping and trimming practices afterASUREQuality inspection need to be discontinued or much more carefully monitored.

The above highlights the effort porcine operators have made to improve hygienic practices (GHP) to minimise the risk of *Salmonella* contamination. MAF will continue to work with pork industry primary processors to address the issues raised above.

## Conclusion

The purpose of the porcine NMD is to monitor microbiological process control. *Salmonella* results have contributed to the *Salmonella* Risk Management Strategy, Antimicrobial Resistance project, and UCFM standard and generated a baseline of New Zealand product to compare against imported product. Review of the NMD data over 2 years has revealed a low prevalence range in porcine carcasses. MAF concludes that sufficient data has been collected to determine that further routine testing under the NMD programme is unnecessary. The porcine NMD *Salmonella* programme is to be ceased on 2 January 2012 as per NMD Notice 2011 section 2.5.2<sup>(2)</sup>. Sampling and testing for APC and *E. coli* must continue. Responses by operators to the trends evident from APC and *E. coli* results are required as per NMD Notice 2011.

Savings to the industry of the discontinuation of the *Salmonella* component of NMD sampling/analysis from 2 January 2012 are estimated to be approximately 50% of the current costs. From 2 January 2012 only one side of the carcass will need to be sampled, and only APC and *E. coli* analyses will be required.

In keeping with the *Salmonella* Risk Management Strategy to enhance further understanding on attribution and pathways, monitoring and surveillance sampling of porcine carcasses for *Salmonella* may need to be undertaken in the future. The pork industry will be consulted if such a need should arise.

## References

(1) NZFSA Statement of Intent

<http://www.nzfsa.govt.nz/about-us/accountability-documents/statement-of-intent/2008/soi-2008-2011.htm>

(2) *Animal Products (National Microbiological Database Specifications) Notice 2011*

<http://www.foodsafety.govt.nz/elibrary/industry/animal-products-national-nmd/schedule-2011.pdf>

(3) *National Profiles, MAF NMD website.*

<http://www.foodsafety.govt.nz/password-protected/nmd/natprofiles/index.htm>

(4) *ESR Annual Report Concerning Foodborne Disease in New Zealand 2010*, Lim, Lopez, Cressey and Pirie

<http://www.foodsafety.govt.nz/elibrary/industry/FBI-report-2011.pdf>

(5) *Ministry of Agriculture and Forestry Reporting on New Zealand's Biosecurity Health Status Surveillance, Volume 38, No. 3, September 2011, Annual Report*

(6) *Industry standard/Industry agreed standard 5 slaughter and dressing*

<http://www.foodsafety.govt.nz/industry/sectors/meat-ostrich-emu-game/meatman/is5/>