NSW Food Authority

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Vulnerable Persons Food Safety Scheme

Phase II evaluation

Benchmarking the microbiological quality of food served by Vulnerable Persons businesses

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About this document

This document has been prepared to report benchmark microbiological findings of the NSW Food Authority's evaluation study of the Vulnerable Persons Food Safety Scheme (phase II) that was undertaken in 2009.

It is one of three reports and should be read in conjunction with the *Onsite study of practices observed at first audit* (2010)[1] report and the *Phase II evaluation- summary report* (2010)[2].

If you have any questions about this document, please contact the NSW Food Authority Consumer and Industry Helpline on 1 300 552 406 or contact@foodauthority.nsw.gov.au.

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Executive summary

Mandatory audits for businesses licensed under the Vulnerable Persons Food Safety Scheme (Scheme) started in March 2009. At that time, the NSW Food Authority (the Authority) undertook an assessment of the microbiological quality of food prepared and served by 60 vulnerable persons businesses licensed by the Authority under the Regulation.

The assessment focused on collecting food samples at first mandatory audit and testing the samples for a range of microbiological indicators of food hygiene and safety.

The data collected from this study provides a benchmark against which changes can be measured over time.

Key findings were:

- 99% of samples tested were classified microbiologically acceptable[i] when assessed against the Authority's *Microbiological quality guide for ready-to-eat (RTE) foods*[3]
- Microbiologically, fresh-cut-fruit and salad were rated as the safest food category tested
- One commercially produced cooked dessert sample was classified as potentially hazardous
- Extra attention is needed when preparing and serving sliced RTE meats
- After pureeing, food safety and hygiene decreases
- Hygiene and safety of food served appears to be unrelated to type, size or location of the vulnerable person business

Vulnerable people are more susceptible to foodborne illness than the general population, reinforcing the importance of adhering to the requirements of the Scheme, and producing hygienic and safe food. Where samples were classified as unsatisfactory or potentially hazardous, the Authority immediately took appropriate enforcement action.

There is a continual need to improve food safety controls in food service; hence results of this evaluation have been used to contribute to recent changes made to the *Vulnerable Persons Food Safety Scheme Manual*[4].

[i] Samples are considered microbiologically acceptable when they are classified either 'good' or 'acceptable' when assessed against the Authority's *Microbiological quality guide for ready-to-eat (RTE) foods*[3]. See Appendix 2.

1. Assessing the hygiene and safety of food served by vulnerable persons businesses

1.1 Objective

The objective of the phase II evaluation was:

1. to collect benchmark microbiological data of food prepared and served by vulnerable persons businesses at their first mandatory audit.

2. Samples were collected at first mandatory audits

2.1 A variety of food categories were analysed

Over a seven month sampling period (1 May 2009 to 30 November 2009) the Authority's food safety auditors collected microbiological samples from vulnerable persons businesses undergoing their first mandatory audit.

Food categories were selected based on the safety risk of the food types or the processes used to prepare the food.

Samples were collected from ten food categories:

- sandwiches
- fresh cut fruit
- salad
- pureed meat
- pureed vegetable
- cooked dessert
- cooked meat
- cooked vegetables
- sliced ready-to-eat (RTE) meat
- other

2.2 Food samples were collected at lunch time

Samples from plated meals were collected in the kitchen, during the lunch time meal service (approximately 11am-1pm). Product name, date produced, description of ingredients and processes, and use-by date (when appropriate) were documented on the sample information sheet. Temperatures were recorded at the time of sampling and also at the time of delivery to the laboratory.

2.3 Microbiological quality of food produced by businesses was benchmarked

The Authority's food safety auditors collected a total of 347 microbiological samples from 60 vulnerable persons businesses receiving a first mandatory audit during the sampling period. This represents 5% of the total number of vulnerable persons businesses licensed with the Authority at the time of the evaluation (n=1228).

Businesses included in the evaluation were selected at random from facilities receiving a first audit during the sampling period and represented both Sydney/metropolitan (n=26) and rural/regional (n=34) areas of NSW.

On average, six samples were aseptically taken from each business and analysed for a range of pathogens and indicator organisms (Appendix 1).

Results have been based on the Authority's *Microbiological quality guide for ready-to-eat foods* [3], which classifies results into four categories (Appendix 2):

- good
- acceptable
- unsatisfactory, and
- potentially hazardous.

Businesses were informed of their results in writing and advised to take corrective action when required. When samples are classified 'good' or 'acceptable' they are considered microbiologically acceptable and no further action is required. Samples classified 'unsatisfactory' are considered microbiologically unacceptable, and although do not present a food safety concern businesses were informed that it may indicate poor food handling practices.

When results are classified 'potentially hazardous' the sample is outside the expected microbiological levels and presents a potential food safety concern. Where a sample was rated potentially hazardous, the Authority returned to the business, took appropriate enforcement action including further sampling and recommending that the business recall the food.

When classifying pureed foods, category B for Standard Plate Count (SPC) has been used as additional processing and ingredients (e.g. water, gravy) are involved.

3. Almost all (99%) samples rated as hygienic and safe

3.1 Results were assessed against the Authority's microbiological guidelines

Based on the Authority's *Microbiological quality guide for ready-to-eat foods*[3] (Appendix 2), 99% of samples collected from vulnerable persons businesses (n=347) were considered microbiologically acceptable[ii]. Overall, 95% of samples tested were classified 'good', 4% 'acceptable', 1% 'unsatisfactory' and 0.3% 'potentially hazardous' (Table 1).

Table 1. Benchmark microbiological results

good		acceptable		unsatisfactory		potentially hazardous	
n	%	n	%	n	%	n	%
329	94.8	13	3.7	4	1.2	1	0.3

[ii] Classified 'good' or 'acceptable' when assessed against the Authority's microbiological guidelines (Appendix 2).

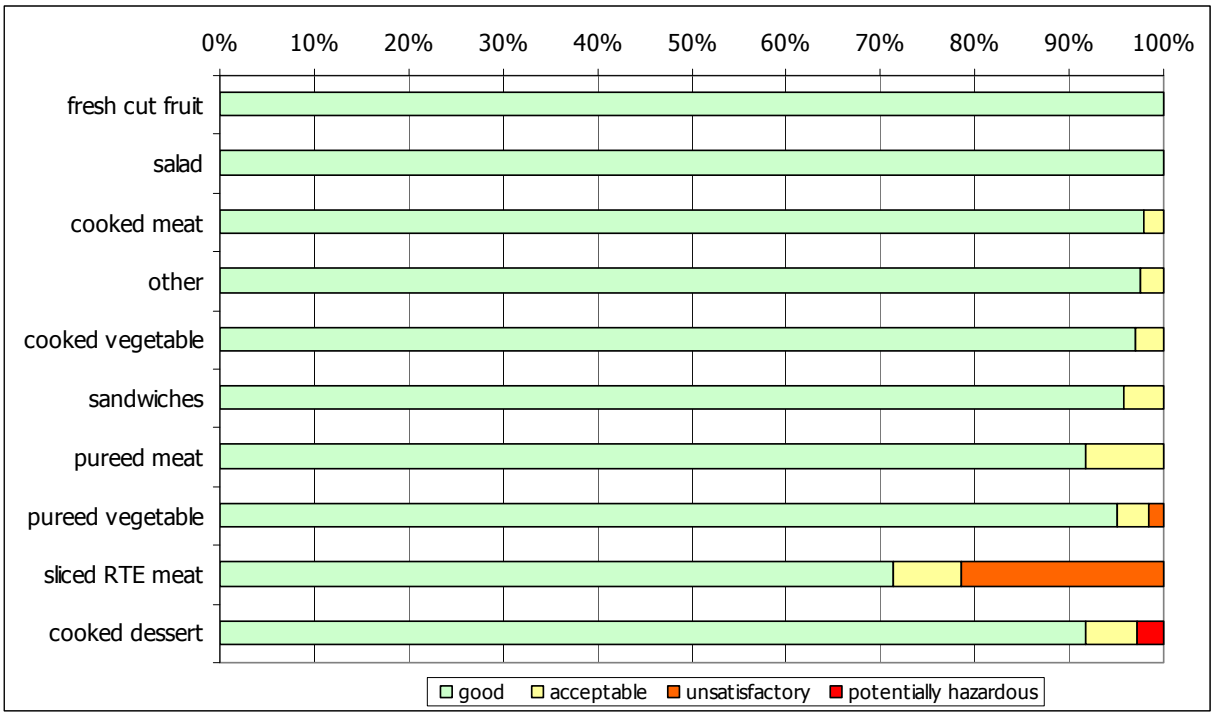
3.2 Fresh cut fruit and salad samples are the cleanest

All fresh cut fruit (n=16) and salad samples (n=15) tested were classified 'good' when assessed against the Authority's *Microbiological quality guide for ready-to-eat foods*[3] (Appendix 2). When samples are classified 'good' they are classified microbiologically acceptable and are within the lower range of expected microbiological levels for food safety.

Figure 1 and Appendix 3 present the results of all food samples tested by food category.

Fresh cut fruit and salad samples performed best, with cooked meat (n=47) and 'other' (n=40) samples performing next best with 98% classified as 'good'.

Figure 1. Microbiological quality of all food categories



3.3 After pureeing food hygiene and safety decreases

Overall, 97% of cooked vegetables (n=33) and 98% of cooked meat (n=47) were classified 'good' when assessed against the Authority's guidelines. After pureeing, these figures dropped to 95% (n=63) and 92% (n=36) respectively. See Table 2 below.

Table 2. Microbiological results of pureed and non-pureed foods

Microbiological result	cooked meat (n=47)	pureed meat (n=36)	cooked vegetables (n=33)	pureed vegetables (n=63)
good	98%	92%	97%	95%
acceptable	2%	8%	3%	3%
unsatisfactory	0%	0%	0%	2%
potentially hazardous	0%	0%	0%	0%

Of all pureed meat samples tested, 8% (n=3) were 'acceptable'. When samples are 'acceptable' they are within expected microbiological levels and present no food safety concern, however are considered to be on the upper range of the acceptable scale. Two of the three 'acceptable' samples were due to *Bacillus cereus* detected greater than 100cfu/g and one due to *E.coli* detected greater than 3cfu/g.

One pureed vegetable sample was classified 'unsatisfactory' due to a *Bacillus cereus* level greater than 1000cfu/g and two samples were 'acceptable' due to *Bacillus cereus* levels greater than 100cfu/g[iii], indicating potential issues with equipment sanitation and product temperature abuse. When samples are classified 'unsatisfactory' they are outside the expected level of microbiological safety for that type of product, as a result enforcement action was undertaken by the Authority.

Pureed foods require closer attention as additional processing occurs after the cooking step. The results indicate that there is a need for vulnerable persons businesses to ensure that their food safety programs adequately manage the hazards associated with processing puree foods. Businesses should ensure adequate:

- cleaning and sanitation of equipment used to puree food thus preventing cross contamination, and
- temperature control of food preventing the growth of bacteria before and after the food is pureed. This involves minimising the amount of time taken to puree before chilling or ensuring that foods are reheated to an internal temperature of 70°C for 2 minutes once pureed.

[iii] These three samples were collected from separate facilities

3.4 Two in ten sliced RTE meat samples were classified unsatisfactory

Three (21%) sliced RTE meat samples tested were considered microbiologically 'unsatisfactory' due to elevated levels of Total Plate Count (TPC) (greater than 10^7 cfu/g). See Table 3.

Although the sample size was small (n=14), it is noteworthy that the three unsatisfactory samples were collected from three separate businesses, two of which sliced the meat onsite after cooking and one purchased pre-sliced RTE meat.

These results may indicate one or more of the following:

- poor food handling practices,
- poor cleaning and sanitation of slicing equipment,
- inadequate refrigerated storage temperatures[iv], and/or
- prolonged storage of sliced meats[v]

Table 3. Microbiological results of sliced RTE meats

Microbiological result	Sliced RTE meat (n=14)
good	71%
acceptable	7%
unsatisfactory	21%
potentially hazardous	0%

[iv] Potentially hazardous foods, including RTE meats must be stored at 5°C or below in accordance with *Food Standards Australia New Zealand (FSANZ) Food Standards Code Standard 3.2.2 Food Safety Practices and General Requirements* [5].

[v] The Authority recommends that sliced RTE meats have a maximum shelf life of 7 days, including the day of packaging. It is also recommended that they be consumed within its use-by date and any leftover meat should be used within 48 hours of opening.

3.5 One cooked dessert sample was classified 'potentially hazardous'

Ninety-eight percent (98%) of cooked dessert samples[vi] tested were classified microbiologically acceptable. One sample of commercially produced custard was classified 'potentially hazardous' (3%) due to the detection of *Listeria monocytogenes*. The Authority undertook appropriate action which identified the source of the pathogen to be from the commercial supplier of the product. After a thorough investigation, a product recall was conducted in NSW and QLD.

This result highlights the importance of vulnerable persons businesses maintaining supplier approval programs that manage the hazards associated with purchasing commercially prepared food.

Two samples (6%) were classified 'acceptable', due to *Bacillus cereus* detected at greater than 100cfu/g, and/or an SPC count greater than 10^7cfu/g.

Table 4. Microbiological results of cooked dessert

Microbiological result	Cooked dessert (n=36)
good	92%
acceptable	6%
unsatisfactory	0%
potentially hazardous	3%

3.6 *Clostridium perfringens* not detected in any cook-chill sample

Recently in NSW, *Clostridium perfringens* has proven to be an organism of concern in aged care facilities. Since January 2008 to July 2010, half of the *C. perfringens* outbreaks reported in Australia occurred in aged care facilities[6].

Even though *C. perfringens* outbreaks are usually associated with cook-chill foods where the food has been inadequately cooled or reheated, *C. perfringens* was not detected (<100cfu/g) in any of the samples tested[vii] (n=229). However, of the total samples tested for *C. perfringens*, one quarter (26%) of the samples were prepared using cook-chill, with the majority being prepared by a cook-fresh process (74%). Even so, all (n=60) cook-chill samples did not test positive for *C. perfringens.*

[vi] Samples tested include cook chill desserts such as custard, pudding and dairy based desserts (e.g. mousse).

[vii] Samples tested for *C.perfringens* include cooked vegetables, cooked meat, pureed vegetables, pureed meat and cooked desserts

3.7 Business size, type and location - no apparent impact on the safety of the food served

Microbiological results (n=347) were analysed to determine if a group of licence holders could be identified that may require additional implementation assistance. See Figure 2 below.

No observable trend was seen between facility types

Hospitals, aged care facilities and delivered meal organisations (DMO), had 98%, 99% and 100% of samples respectively classified microbiologically acceptable.

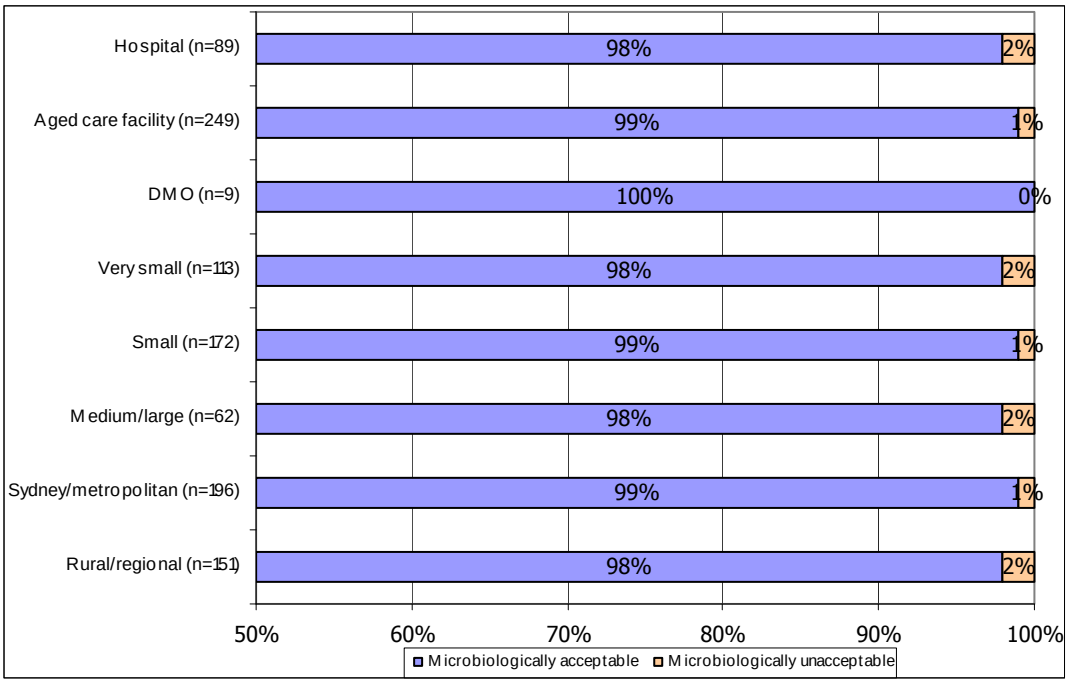
Microbiological results compare favourably regardless of business size[viii]

Ninety-eight percent (98%) of samples tested from very small and medium/large businesses were classified microbiologically acceptable, compared to 99% of samples from small businesses.

Sydney/metropolitan and rural/regional businesses perform equally

The number of samples classified microbiologically acceptable for businesses located in the Sydney/metropolitan region was 99%, compared to regional and rural areas where 98% were classified microbiologically acceptable.

Figure 2. Hygiene and safety of food by licence group



[viii] Very small businesses (0-3 FTE staff), small (4-10 FTE), and medium/large (greater than 11 FTE staff)

4. Overall, good food hygiene and safety

Almost all (99%) samples tested were considered to be microbiologically acceptable. Where samples were classified microbiologically unacceptable or potentially hazardous, the Authority took appropriate enforcement action.

The results highlighted that there is a need for vulnerable persons businesses to ensure their food safety programs manage the hazards associated with:

- pureeing foods,
- preparing and serving RTE meats, and
- purchasing foods from commercial suppliers (e.g. cooked desserts)

The Authority intends to enhance the current data set by continuing to conduct targeted product surveys monitoring high-risk food categories. Recently, findings have been used to inform a review of the *Vulnerable Persons Food Safety Scheme Manual* [4].

Appendix 1. Sample types and microbiological tests completed

	SPC	*E.coli*	CPS	*Listeria*	*Salmonella*	*B.cereus*	*C. perfringens*
sandwiches		√	√	√	√		
fresh cut fruit		√	√	√	√		
salad		√	√	√	√		
pureed meat	√	√	√	√	√	√	√
pureed vegetables	√	√	√	√	√	√	√
cooked dessert	√	√	√	√	√	√	
cooked meat	√	√	√	√	√	√	√
cooked vegetable	√	√	√	√	√	√	√
sliced ready-to-eat meat	√	√	√	√	√	√	√

Appendix 2. Guideline levels for determining the microbiological quality of ready-to-eat foods[ix]

Test	Microbiological result (cfu/g unless otherwise stated)			
	Good[x]	**Acceptable[x]**	**Unsatisfactory[xi]**	**Potentially hazardous[xi]**
Standard Plate Count				
Category A[xii]	$<10^4$	$<10^5$	$\geq 10^5$	N/A
Category B[xiii]	$<10^6$	$<10^7$	$\geq 10^7$	N/A
Category C	N/A	N/A	N/A	N/A
Indicators				
Enterobacteriaceae	$<10^2$	10^2 to $<10^4$	$\geq 10^4$	N/A
E. coli	<3	3 to $<10^2$	$\geq 10^2$	N/A
Pathogens				
Coagulase +ve staphylococci	$<10^2$	10^2 to $<10^3$	10^3 to $<10^4$	$\geq 10^4$
C. perfringens	$<10^2$	10^2 to $<10^3$	10^3 to $<10^4$	$\geq 10^4$
B. cereus	$<10^2$	10^2 to $<10^3$	10^3 to $<10^4$	$\geq 10^4$
V. parahaemolyticus	not detected in 25 g	If detected then as per below		
	<3	3 to $<10^2$	10^2 to $<10^4$	$\geq 10^4$
Campylobacter spp	not detected in 25 g			detected in 25 g
Salmonella spp.	not detected in 25 g			detected in 25 g
L. monocytogenes				
Food Group 1	not detected in 25 g			detected in 25 g
Food Group 2	not detected in 25 g	detected but $<10^2$		$\geq 10^2$
Food Group 3	not detected in 25 g	detected but $<10^2$		$\geq 10^2$

[ix] The criteria used to develop the guideline levels are based on interpretive guides published by the United Kingdom's Health Protection Agency and by Food Standards Australia New Zealand (FSANZ).

[x] 'Good' and 'acceptable' results are considered to be microbiologically acceptable and no further action is required.

[xi] 'Unsatisfactory' and 'potentially hazardous' results are considered to be microbiologically unacceptable and further action and activities are needed.

[xii] Category A applies to ready-to-eat food that in which all components are fully cooked for immediate sale or consumption (e.g. cooked vegetables).

[xiii] Category B applies to ready-to-eat foods that are fully cooked with further handling or processing before consumption (e.g. texture modified foods).

Appendix 3. Summary of microbiological results

	sandwiches	fresh- cut fruit	salad	pureed meat	pureed vegetables	cooked dessert	cooked meat	cooked vegetables	sliced ready-to-eat meat	other
number of samples	47	16	15	36	63	36	47	33	14	40
good	96%	100%	100%	92%	95%	92%	98%	97%	71%	98%
acceptable	4%	0%	0%	8%	3%	6%	2%	3%	7%	3%
unsatisfactory	0%	0%	0%	0%	2%	0%	0%	0%	21%	0%
potentially hazardous	0%	0%	0%	0%	0%	3%	0%	0%	0%	0%

References

[1] NSW Food Authority. (2010). *Vulnerable Persons Food Safety Scheme Phase II evaluation- Onsite study of practices observed at first audit.* Retrieved October 22 2010, from NSW Food Authority website: http://www.foodauthority.nsw.gov.au/_Documents/corporate_pdf/onsite_study.pdf

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[6] OzFoodNet Annual Reports and OzFoodNet Quarterly Reports (2002 to 2010). Retrieved October 7, 2010 from OzfoodNet website: http://www.ozfoodnet.gov.au/.