OzFoodNet: enhancing foodborne disease surveillance across Australia: Quarterly report, 1 October to 31 December 2005

The OzFoodNet Working Group

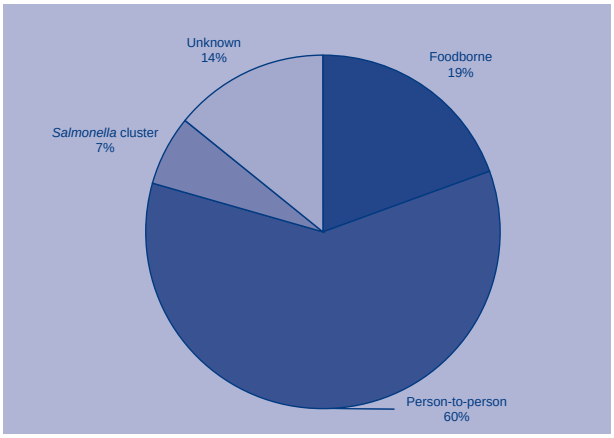
Introduction

The Australian Government Department of Health and Ageing established the OzFoodNet network in 2000 to collaborate nationally to investigate foodborne disease. OzFoodNet conducts studies on the burden of illness and coordinates national investigations into outbreaks of foodborne disease. This quarterly report documents investigation of outbreaks of gastrointestinal illness and clusters of disease potentially related to food occurring around the country between 1 October and 31 December 2005.

Data were received from OzFoodNet representatives in all Australian states and territories and a sentinel site in the Hunter/New England region of New South Wales. The data in this report are provisional and subject to change, as results of outbreak investigations can take months to finalise. We would like to thank the investigators in the public health units and state and territory departments of health, as well as public health laboratories and local government environmental health officers who provided data used in this report.

During the fourth quarter of 2005, OzFoodNet sites reported 185 outbreaks of enteric illness (including foodborne outbreaks). Outbreaks of gastroenteritis are often not reported to health agencies or the reports are delayed, meaning that these figures significantly under-represent the true burden of these infections. In total, these outbreaks affected more than 3,692 people and resulted in 142 persons being admitted to hospital. Five deaths were reported. As has been the case in previous reports, the majority (60%, n=111) of outbreaks resulted from infections suspected to be spread by person-to-person transmission (Figure 1). Fifty-three per cent of these person-to-person outbreaks occurred in aged care facilities, 16 per cent in hospitals and 16 per cent in child-care centres.

Figure 1. Mode of transmission for outbreaks of gastrointestinal illness reported, Australia, 1 October to 31 December 2005



Foodborne disease outbreaks

There were 36 outbreaks of illness where consumption of contaminated food was suspected or proven to be the primary mode of transmission. These outbreaks affected 571 people. This compares with 26 outbreaks for the fourth quarter of 2004 and 30 outbreaks in the third quarter of 2005.

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All data are reported using the date the report was received by the health agency.

Salmonella was responsible for 13 outbreaks during the quarter, with *Salmonella* Typhimurium being the most common serovar. *S.* Typhimurium 44 and *S.* Typhimurium 135a were responsible for four outbreaks each; *S.* Typhimurium 197 and *S.* Typhimurium 170/108 were each responsible for one outbreak. Other *Salmonella* serovars causing single outbreaks were *S.* Potsdam, *S.* Birkenhead and a combined outbreak of *S.* Saintpaul and *S.* Chester. *Campylobacter* was responsible for five outbreaks. *Clostridium perfringens*, ciguatera fish poisoning and norovirus were each responsible for two outbreaks. Scombroid poisoning and *Listeria monocytogenes* serotype O1 also each caused an outbreak during the fourth quarter of 2005. No aetiological agent was identified for the remaining 28 per cent (10/36) of outbreaks.

Eleven of the outbreaks reported in the quarter were associated with meals served in restaurants, five from food prepared in private residences (including two instances that can be attributed to contaminated fish), three in bakeries and two each in aged care facilities, takeaway outlets, nationally franchised fast food outlets, commercial caterers and at camps. Single outbreaks were associated with food prepared in a child-care centre, an institution, a hospital, a school and a grocery store/deli and an unknown setting. One outbreak was caused by contaminated town drinking water. Eleven of the outbreaks occurred in October, seventeen in November and eight in December.

To investigate these outbreaks, sites conducted 10 cohort studies and two case control studies. For 20 outbreaks, only descriptive data were collected. Individual patient data was not collected for four outbreaks. Investigators obtained microbiological evidence linking a food vehicle to illness in three outbreaks, microbiological evidence and analytical epidemiological evidence in three outbreaks and analytical epidemiological evidence alone in four outbreaks. For the remaining outbreaks, investigators obtained descriptive epidemiological evidence implicating the food vehicle or suggesting foodborne transmission.

In New South Wales there were 10 outbreaks of foodborne illness reported during the quarter. The aetiological agent was identified in seven of these outbreaks. *S.* Typhimurium 197 affected 33 children and staff at a child-care centre. The food vehicle was suspected to be contaminated fruit and sandwiches prepared at the centre. Twenty-three people were ill in a community outbreak of *Clostridium perfringens* infection following a meal of fried rice. Eight people were infected with *S.* Typhimurium 44 from Caesar salad dressing made with raw eggs and served alone or on chicken wraps at a restaurant. *Campylobacter* affected five people after they had eaten takeaway food such as sandwiches and salads prepared at a hospital kiosk by an ill food handler. A second outbreak of *Campylobacter*, in which three people were ill, was thought to have been caused by the consumption of takeaway chicken from a nationally franchised food company. Four people were ill with symptoms consistent with histamine poisoning after eating tuna steaks prepared at home. One sample of tuna from the retailer showed high levels of histamines. Three residents of a residential facility were infected with *Salmonella* Birkenhead, one of whom died. Pureed food was thought to be the source of infection. An aetiological agent was not identified in the remaining three outbreaks.

Queensland reported 11 outbreaks of foodborne illness for the fourth quarter. Twenty-six people were affected in an outbreak of *Salmonella* Chester and *Salmonella* Saintpaul associated with contaminated drinking water. A case control study showed that cases were more likely to have consumed unboiled or filtered tap water (Odds Ratio 11.1, 95 per cent Confidence Interval 1.4–90, p=0.007). *Salmonella* Chester was isolated from unchlorinated drinking water and *Salmonella* Chester and *Salmonella* Saintpaul were isolated from effluent samples collected from a nearby abattoir. Two outbreaks in Queensland were caused by ciguatera fish poisoning following meals of barracuda bought at a retail outlet and then cooked at home and yellowtail kingfish caught off Fraser Island by a camping group. There were three outbreaks caused by *S.* Typhimurium 44, two of which occurred in private homes. The first affected 23 people and was caused by cold prawn soup prepared by ill food handlers. The second outbreak affected three people after eating rolls containing bacon and runny eggs. The third outbreak involved two children at a camp, with anecdotal evidence of further cases, although no food vehicle was identified. An outbreak of *Clostridium perfringens* infection affected 14 people after a restaurant meal of lamb or chicken guvec (Turkish casserole). Low to moderate counts of *C. perfringens* were detected in leftover chicken guvec from a different night and low counts were detected in cooked chicken meat and lamb meat. Six residents from four aged care facilities with a common supplier of meals were ill in an outbreak of *Salmonella* Potsdam. No food source was identified and two cases died. Raw chicken kebabs purchased from a grocery store and cooked at a picnic were thought to be the source of a *Campylobacter* outbreak affecting four people. An aetiological agent was not identified in the remaining two outbreaks, but both were suspected to be caused by toxins.

Victoria reported six outbreaks of foodborne disease for the quarter. Roast baby pigs supplied to a function by two separate restaurants was suspected as the cause of an outbreak of *S.* Typhimurium 170 affecting 20 people. A cohort study of 120 people

was unable to identify the food vehicle, as only 50 per cent of the cohort was interviewed and most interviewees were unable to identify which pig they had consumed. Vanilla slices purchased from a bakery were the cause of an outbreak of norovirus in a workplace. The proprietor of the cake shop prepared the cakes while ill with gastroenteritis, which was later confirmed as norovirus. No food vehicle was identified in an outbreak of *Campylobacter* affecting five people in one work place. An aetiological agent was not identified in the remaining three Victorian outbreaks.

Tasmania reported four outbreaks of foodborne disease for the quarter, all of which were part of a larger state-wide outbreak of *S.* Typhimurium 135a. Two of these outbreaks followed the consumption of food from bakeries and affected 107 and 6 people, respectively. The other two outbreaks involved food prepared in restaurant settings and affected 77 and 11 people respectively. The outbreaks were all thought to be related to foods containing raw or undercooked eggs or foods cross contaminated by eggs. *S.* Typhimurium 135a was isolated from the cream in cakes and piping bags from one bakery and raw egg mayonnaise and raw egg tartare sauce from a restaurant. Several epidemiological studies of the state-wide *S.* Typhimurium 135a outbreak were conducted and traceback revealed that eggs purchased by the bakeries and restaurants had a common supplier. *S.* Typhimurium 135a was isolated from drag swabs taken from laying sheds on the egg farm.

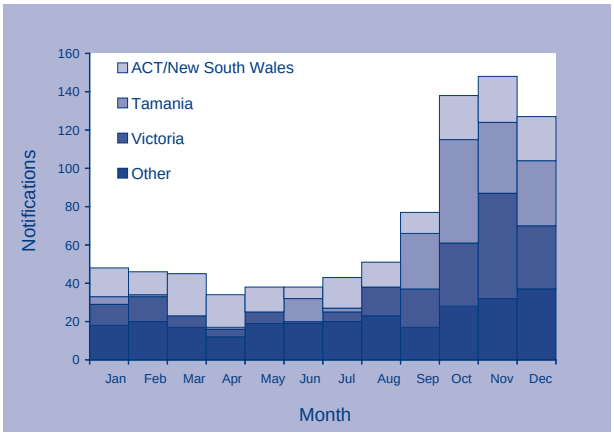
South Australia reported three foodborne outbreaks for the fourth quarter. Cold meats were responsible for an outbreak of *Listeria monocytogenes* O1 in a hospital. Two of the cases had admissions at a common hospital and had identical *Listeria* isolates by pulsed field gel electrophoresis (PFGE). One of the cases who had complications from diabetes, died. Cold cooked corned beef slices and mixed meat and salad sandwiches from the hospital kitchen were positive for *Listeria monocytogenes* serotype O1 and had the same PFGE as the patients' sample isolate. Food samples from the meat manufacturer that supplied cold meat to the hospital was also positive for *Listeria monocytogenes*. Two other cases each had isolates of *L. monocytogenes* with unique PFGE patterns that were different from the other cases and to isolates from food samples. A smallgoods company issued a consumer level recall for a range of ready-to-eat products. Dips were believed responsible for an outbreak of norovirus which affected 21 people from five different groups who ate at, or purchased dips from a restaurant over a period of three days. No food vehicle was identified in an outbreak of *Campylobacter* at a college boarding house where 36 people were ill.

Western Australia reported two foodborne outbreaks for the quarter. Both occurred in restaurant settings, were of unknown aetiology and no food vehicles were identified. The Australian Capital Territory and the Northern Territory did not report any foodborne outbreaks for the fourth quarter of 2005.

Clusters and multi-state investigations

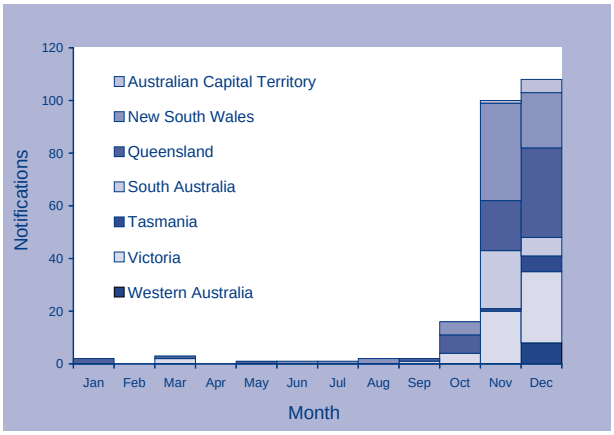
During the quarter, OzFoodNet investigated a multi-state outbreak of two phage types of *S.* Typhimurium: 44 and 135a (Figures 2 and 3). The outbreak of *S.* Typhimurium 44 affected all jurisdictions, except the Northern Territory. *S.* Typhimurium 44 cases commonly reported eating raw or undercooked eggs and 62 per cent (8/13) of *S.* Typhimurium 44 clusters that were part of the larger investigation

Figure 2. *Salmonella* Typhimurium 135/135a notifications in Australian states and territories, 2005, by month of diagnosis



Source: National Notifiable Diseases Surveillance System. Analysed on 9 February 2006.

Figure 3. *Salmonella* Typhimurium 44 notifications, Australia, 2005, by month of diagnosis and state or territory



Source: National Notifiable Diseases Surveillance System. Analysed on 9 February 2006.

were due to raw or undercooked eggs. The outbreak of *S.* Typhimurium 135a centred on Victoria, with increased numbers of cases in Tasmania and New South Wales. *S.* Typhimurium 135a is a very common phage type and cases were reported from all jurisdictions. Hypothesis generating interviews suggested that cases of *S.* Typhimurium 135a commonly purchased foods from a major retail chain, and ate chicken, meat and some fresh produce. To explore sources of both phage types, the outbreak investigation team instituted a multi-state case control study, which is currently being analysed.

During the quarter, OzFoodNet also investigated a small multi-state cluster of *Salmonella* Havana, although no source was identified. Western Australia investigated a large increase in *Salmonella* Oranienberg affecting approximately 78 people in the fourth quarter 2005. Cases continued to occur in the first months of 2006. Cases were predominantly women. Western Australia is conducting a case control study to examine potential sources of infection for the outbreak. There were several other state-based investigations into various *Salmonella*, including: *S.* Paratyphi B Java and *S.* Typhimurium 12a in the Northern Territory; *S.* Typhimurium 9 in Queensland; *S.* Typhimurium u307, *S.* Typhimurium 186, *S.* Typhimurium 12, and *S.* Typhimurium 6 var 1 in Victoria; *S.* Chester and *S.* Infantis in South Australia; and *S.* Bovismorbicans and *S.* Virchow in Western Australia.

There were also State-based investigations into increases of various other pathogens, including Shiga toxin-producing *Escherichia coli* infections in South Australia, hepatitis A in the Northern Territory, and *Shigella sonnei* biotype G in New South Wales. Cryptosporidiosis reports were elevated in several jurisdictions during the quarter.

Discussion

During the fourth quarter of 2005, there were several outbreaks linked to eggs. The outbreak of *S.* Typhimurium 135a in Tasmania was the largest outbreak of foodborne illness in the State for several years. The outbreak highlighted the relationship between bakery-associated outbreaks and raw eggs.[1,2,3] As a result of the outbreaks, in November 2005 the implementation sub-committee of the Food Regulation Standing Committee discussed the safety of bakery products. Foods prepared in bakeries are at higher risk of contamination due to the nature and handling of bakery products, as they are:

- commonly handled following cooking;
- made of ingredients facilitating bacterial growth;
- commonly filled using single use piping bags that are re-used;
- left unrefrigerated for long periods of time; and
- prepared in premises where *Salmonella* contaminated raw meat and eggs are not properly separated from ready-to-eat products.

Between 2001 and September 2005, OzFoodNet recorded 11 outbreaks associated with the consumption of food from bakeries (OzFoodNet Unpublished).[1] These 11 outbreaks affected at least 243 people with 23 (9%) people hospitalised. One death occurred in association with these outbreaks. The median size of the outbreaks was 16 cases (range 5–70). *Salmonella* Typhimurium caused 82 per cent (9/11) of outbreaks, with norovirus and *Clostridium perfringens* each causing one outbreak. Seventy-three per cent (8/11) of outbreaks involved cream or custard filled cakes or tarts.

There were several *Salmonella* outbreaks with significant links to eggs during the quarter. In particular, the outbreaks in Tasmania resulted in public warnings about the safety of raw and undercooked eggs. Several outbreaks of *S.* Typhimurium 44 implicated foods containing raw or undercooked eggs. This phage type of *S.* Typhimurium is relatively uncommon, but had been reported from the environment of chicken layer flocks in 2005 (personal communication, D Davos, December 2005). In Australia, the commonly held belief is that it is safe to eat eggs that haven't been cooked properly. This results in outbreaks of gastroenteritis despite a low overall prevalence of *Salmonella* on eggs.[4] Food Standards Australia New Zealand is currently assessing the need for a Primary Production Standard for egg production.

Outbreaks of *Listeria* in Australia are rare, although small clusters occasionally occur in hospitals.[4,5] The importance of molecular typing to compare the relatedness of strains of *L. monocytogenes* was highlighted in the recent outbreak in South Australia. In the outbreak, investigators, using PFGE, were able to identify a common strain infecting two patients which was associated with cold meats served at the hospital. Some jurisdictions are increasingly using molecular testing to compare relatedness of strains for a variety of pathogens, but usually only test isolates within the particular State. In this report, Western Australia was able to rapidly identify clusters of *S.* Bovismorbificans and *S.* Virchow using PFGE (personal communication, Minda Sarna, January 2006). Ideally, laboratories across Australia could compare molecular patterns of *Listeria* and other organisms to complement existing subtyping

1 Excluding outbreaks associated with Vietnamese pork rolls, which are prepared in bakeries. Outbreaks associated with these products were excluded as they are ethnic speciality foods.

schemes and improve detection of multi-state outbreaks, which has proven very successful in other countries.[6]

References

1. *Salmonella enteritidis* outbreak linked to a local bakery, British Columbia, Canada. *Can Commun Dis Rep* 2005;31:73–82.

2. Tomaska NA, Lalor K, Gregory JE, O'Donnell HJ, Dawood F, Williams CM. *Salmonella* Typhimurium U290 outbreak linked to a bakery. *Commun Dis Intell* 2003;27:514–516.

3. OzFoodNet Working Group. Reported foodborne illness and gastroenteritis in Australia: annual report of the OzFoodNet network, 2004. *Commun Dis Intell* 2005;29:165–192.

4. Dalton CB, Gregory J, Kirk MD, Stafford RJ, Givney R, Kraa E, *et al*. Foodborne disease outbreaks in Australia, 1995 to 2000. *Commun Dis Intell* 2004;28:211–224.

5. Hall R, Shaw D, Lim I, Murphy F, Davos D, Lanser J, *et al*. A cluster of listeriosis cases in South Australia. *Commun Dis Intell* 1996;20:465.

6. Mead PS, Dunne EF, Graves L, Wiedmann M, Patrick M, Hunter S, *et al*. Nationwide outbreak of listeriosis due to contaminated meat. [Epub ahead of print.] *Epidemiol Infect* 2005;1–8.

Table. Outbreaks of foodborne disease reported by OzFoodNet sites,* 1 October to 31 December 2005

State	Month of outbreak	Setting prepared	Infection	Number affected	Evidence	Responsible vehicle
NSW	October	Institution	*Salmonella* Birkenhead	3	D	Suspected pureed food
		Child care	*Salmonella* Typhimurium 197	33	A	Suspected hand cut fruit and sandwiches
		Takeaway	*Campylobacter*	5	D	Ready to eat food such as sandwiches & salads
		Takeaway	Unknown	4	D	Roast beef and gravy
	November	Restaurant	Unknown	2	D	Suspected freshly squeezed blood orange juice crush
		Home	Histamine poisoning	4	D	Tuna steak
		Caterer	*Clostridium perfringens*	23	A	Suspected fried rice
		Takeaway	*Campylobacter*	3	D	Suspected chicken
		Restaurant	*Salmonella* Typhimurium 44	8	D	Caesar salad dressing made with raw eggs
	December	Takeaway	Unknown	2	D	Suspected chicken and bacon burgers
Qld	October	Caterer	*Salmonella* Potsdam	6	D	Unknown
		Other	*Salmonella* Saintpaul/ *Salmonella* Chester	26	AM	Town drinking water
	November	Restaurant	Unknown	5	D	Unknown
		Restaurant	Unknown	18	A	Seafood mornay & rice
		Restaurant	*Clostridium perfringens*	14	M	Chicken and/or lamb guvec
		Home	*Salmonella* Typhimurium 44	3	D	Egg and bacon roll
		Camp	*Salmonella* Typhimurium 44	2	D	Unknown
	December	Camp	Ciguatoxin	8	D	Yellowtail kingfish
		Home	*Salmonella* Typhimurium 44	23	D	Prawn soup
		Grocery store/deli	*Campylobacter*	4	D	Chicken kebabs
		Home	Ciguatoxin	10	D	Barracuda

Table. Outbreaks of foodborne disease reported by OzFoodNet sites,* 1 October to 31 December 2005, *continued*

State	Month of outbreak	Setting prepared	Infection	Number affected	Evidence	Responsible vehicle
SA	November	Hospital	*Listeria monocytogenes* serotype O1	3	M	Cold meats
		School	*Campylobacter*	36	A	Unknown
	December	Restaurant	Norovirus	21	D	Dips
Tas	October	Bakery	*Salmonella* Typhimurium 135a	107	AM	Cream cake and icing (piping bags)
		Restaurant	*Salmonella* Typhimurium 135a	11	D	Suspect sauces/dressings containing raw egg, undercooked hamburger patties with raw egg binder
	November	Bakery	*Salmonella* Typhimurium 135a	6	D	Salad rolls/sandwiches
	December	Restaurant	*Salmonella* Typhimurium 135a	77	AM	Mustard seed mayonnaise containing raw egg, tartare sauce containing raw egg, avocado spread (softened with raw egg)
Vic	October	Aged care facility	Unknown	6	D	Suspect roast pork and meat pie
	November	Unknown	*Campylobacter*	5	D	Unknown
		Bakery	Norovirus	9	D	Vanilla slices
		Home	Unknown	16	D	Chicken, cashew and mayonnaise sandwiches
		Aged care facility	Unknown	12	D	Unknown
	December	Restaurant	*Salmonella* Typhimurium 170	20	D	Suspected roast pork
WA	October	Restaurant	Unknown	21	D	Unknown
		Restaurant	Unknown	15	D	Unknown

* No foodborne outbreaks reported in the Northern Territory during the quarter.

D = Descriptive evidence implicating the suspected vehicle or suggesting foodborne transmission.

A = Analytical epidemiological association between illness and one or more foods.

M = Microbiological confirmation of agent in the suspect vehicle and cases.