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Department of Health
Public Health

OzFoodNet – Enhancing Foodborne Disease Surveillance Across Australia

Annual Report 2009 Western Australia

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Summary and recommendations

This report contains a summary of OzFoodNet WA enteric disease surveillance activities in 2009.

The overall notification rate for all notifiable enteric diseases in 2009 was 207 per 100 000 population (4572 notified cases). This was higher than for 2008, and also higher than the mean of the previous five years. *Campylobacter* was the most commonly notified enteric disease in 2009, comprising 57% of enteric notifications. *Salmonella* and rotavirus infections were the 2nd and 3rd most commonly notified enteric infections.

Notification rates for *Campylobacter* and *Salmonella* in 2009 were higher than the mean of the previous five years. The increase in the notification rate for *Salmonella* was largely attributable to an increase in the number of cases who had acquired infection in Bali, Indonesia. For rotavirus, *Cryptosporidium and Shigella,* rates were lower in 2009 than the mean of the previous five years. The notification rate for hepatitis A was lower from 2007 to 2009 than for any of the previous 10 years, and this follows introduction of hepatitis A vaccination for all Aboriginal infants in WA in November 2005.

Notification rates were highest in the 0 to 4 year age group for all of the major enteric infections, with the exception of hepatitis A infection. For most of the enteric infections notification rates were also higher for Aboriginal as compared to non-Aboriginal people. The greatest difference was for *Shigella* infection, with the notification rate for Aboriginal people 38 times that for non-Aboriginal people. For most of the enteric diseases, the Kimberley region had the highest notification rates for both Aboriginal and non-Aboriginal people.

There were 19 outbreaks of foodborne or suspected foodborne disease investigated in WA in 2009. Nine of these outbreaks were caused by *Salmonella* species, six by norovirus, two by hepatitis A, one by *Listeria*, and for one the infectious agent or toxin was unknown. The two largest foodborne outbreaks were caused by *Salmonella* Typhimurium (STM) phage type 170,

pulsed field gel electrophoresis (PFGE) type 0011, with 39 cases connected to each outbreak, associated with a take-away hamburger restaurant, and a café-restaurant, respectively. Eggs were the suspected cause of both these outbreaks, as eggs were sourced from the same supplier and illness was epidemiologically associated with eating food containing eggs. Other significant *Salmonella* outbreaks included one affecting at least 31 people, caused by Vietnamese Pork Rolls contaminated with STM phage type 193, PFGE type 0279; and one caused by WA-grown Pawpaws contaminated with *Salmonella* Saintpaul, which resulted in 17 reported cases.

Two hepatitis A outbreaks were linked to contaminated food. One of these outbreaks affected nine people and was linked to semi-dried tomato consumption. A sample from the batch of the imported semi-dried tomato product consumed by cases tested positive for hepatitis A genetic material. In the other instance, five hepatitis A cases reported frozen berry consumption, with a berry sample taken from the home of one case testing positive for hepatitis A genetic material.

There were 174 non-foodborne gastroenteritis outbreaks reported in WA in 2009, which was 54% higher than for the previous year. The causative agent for 68% (n=118) of these outbreaks was confirmed as norovirus. Other outbreaks for which organisms were identified were caused by rotavirus (n=5) and *Cryptosporidium* (n=1). Non-foodborne outbreaks were predominantly associated with institutional settings, and particularly aged care facilities (77%) and hospitals (17%).

Recommendations*:*

It is recommended that OzFoodNet WA:

- Examine trends in the number of passengers travelling to Bali to evaluate whether the increased number of *Salmonella* cases associated with travel to Bali is related to an increase in the number of WA residents holidaying in Bali, or reflects a real increase in notification rate amongst those travelling.

- Extend the *Salmonella* case follow-up questionnaire with questions that relate to egg consumption, for use in future egg-associated outbreaks.

- Continue regular working group meetings with PathWest Laboratory Medicine and the WA Health Food Unit, to improve surveillance and investigation activities.

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1.0 Introduction

This report describes enteric disease surveillance activities for 2009, as carried out by OzFoodNet WA, which is part of the Communicable Disease Control Directorate (CDCD) of the Western Australian Department of Health (WA Health).

Western Australia (WA) is divided into nine administrative health regions - North Metropolitan, South Metropolitan, Kimberley, Pilbara, Midwest and Gascoyne, Wheatbelt, Goldfields, SouthWest, and Great Southern (

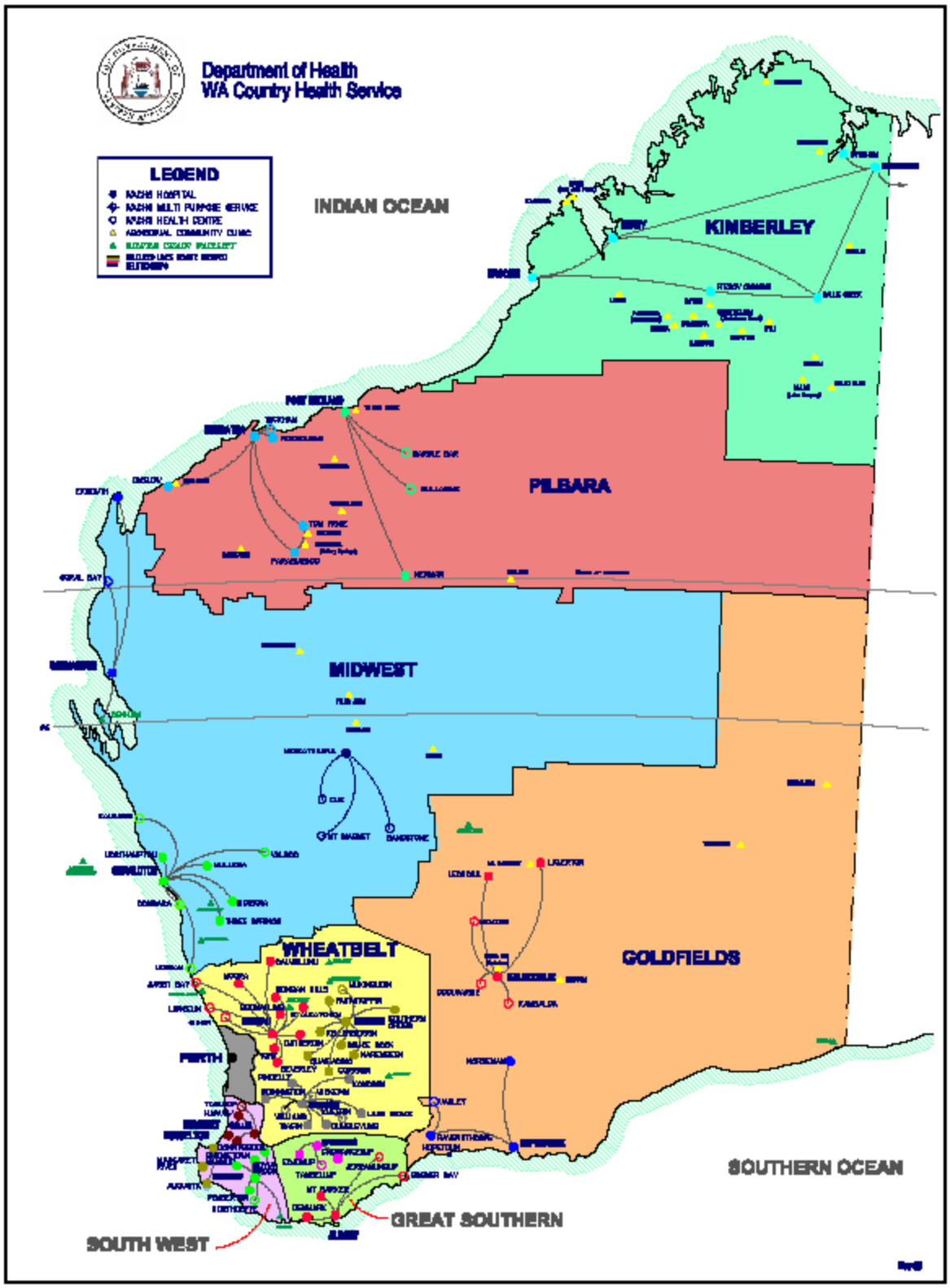

Figure 1). Each region is served by a Public Health Unit (PHU) responsible for public health activities, including communicable disease control. CDCD maintains and coordinates the notifiable disease surveillance system and

provides specialist clinical, public health and epidemiological advice to all PHUs. The West Australian notifiable diseases surveillance system relies on the mandatory reporting by doctors and laboratories of 16 notifiable enteric diseases.

The mission of OzFoodNet is to enhance surveillance of foodborne illness in Australia and to conduct applied research into associated risk factors. The OzFoodNet site based in Perth is responsible for the whole of WA, which has a total population of approximately 2.2 million. Two epidemiologists coordinate activities in WA, which are overseen by a coordinating national epidemiologist. Collaboration between states and territories is facilitated by monthly teleconferences, tri-annual face-to-face meetings and through the informal network. This network also includes communication and consultation with Food Standards Australia New Zealand, the Commonwealth Department of Health and Ageing, the National Centre for Epidemiology and Population Health, the Communicable Diseases Network of Australia and the Public Health Laboratory Network.

The primary objectives of OzFoodNet nationally are to:

- Determine the frequency and burden of foodborne disease in Australia.
- Identify the causes and contributing factors to foodborne disease in Australia.
- Provide epidemiological information to inform prevention efforts.
- Describe the epidemiology of new and emerging foodborne pathogens.

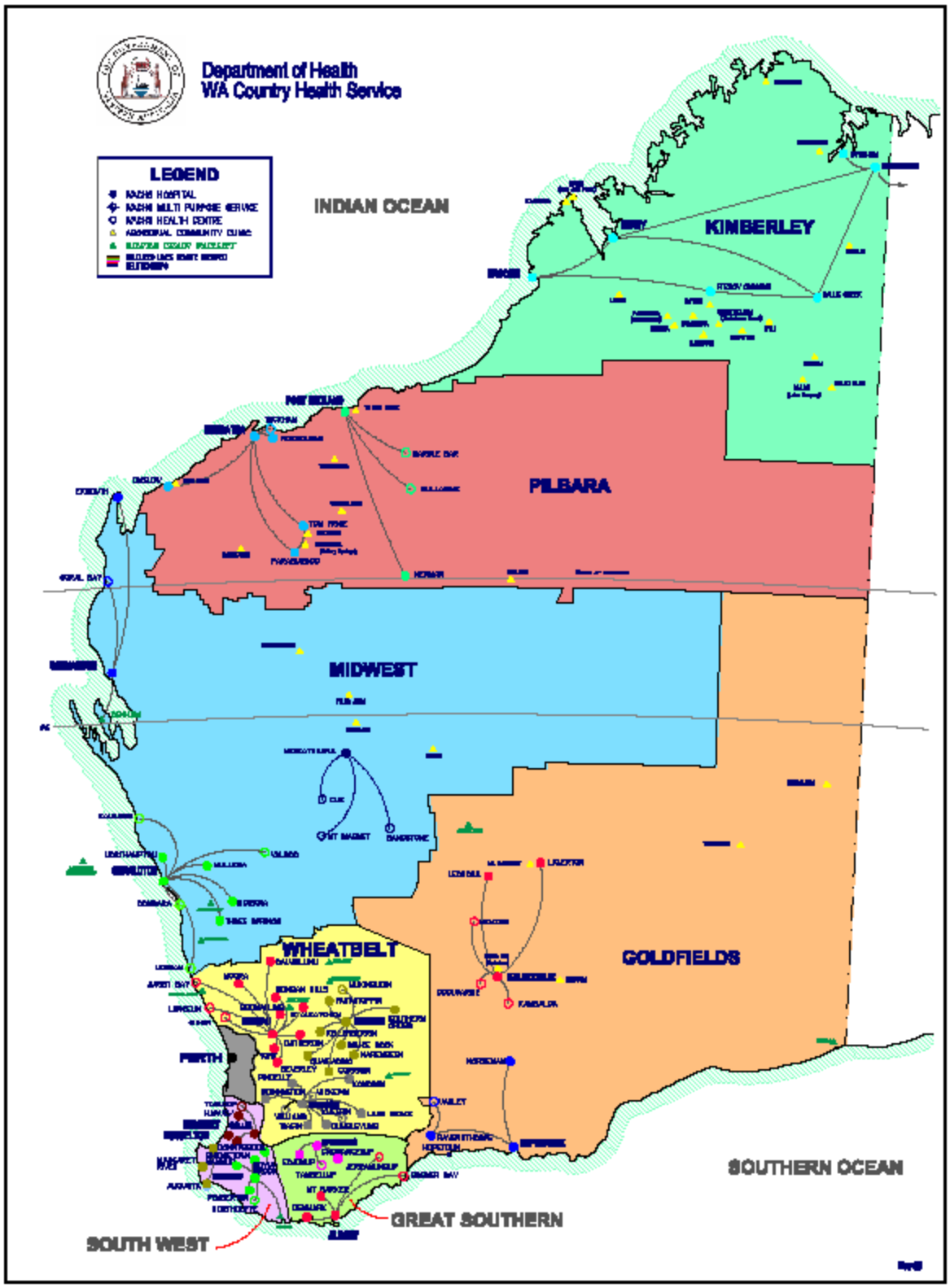

Figure 1. Map of health regions in Western Australia – urban Perth is divided into North and South Metropolitan regions

On a local level, the OzFoodNet epidemiologists regularly liaise with staff of the Food Unit in the Environmental Health Directorate of WA Health; the Food Hygiene, Diagnostic and Molecular Epidemiology laboratories at PathWest Laboratory Medicine WA; and metropolitan and regional PHUs.

1.1 Data sources and methods

Western Australia's estimated resident population figures used for calculation of rates were obtained from Rates Calculator version 9.5.1 (WA Health, Government of Western Australia). The Rates Calculator provides population estimates by age, sex, Aboriginality, year and area of residence, and is based on population figures derived from the 2006 census. The estimated population for WA in 2008 was 2,207,113 persons. Rates calculated for this report have not been adjusted for age.

Notification data for WA were obtained from the Western Australian Notifiable Infectious Diseases Database (WANIDD). Notifications received for campylobacteriosis, salmonellosis, rotavirus infection, cryptosporidiosis, shigellosis, hepatitis A infection, listeriosis, typhoid fever, shiga-toxin producing *E. coli* (STEC) infection, *Vibrio parahaemolyticus* infection, yersiniosis, Hepatitis E infection, paratyphoid fever, cholera, Haemolytic Uraemic Syndrome (HUS) and botulism were exported to Microsoft® Excel 2006 and analysed by optimal date of onset (ODOO). The ODOO is a composite of the 'true' date of onset provided by the notifying doctor or obtained during case follow-up, the date of specimen collection for laboratory notified cases, and when neither of these dates are available, the date of notification by the doctor or laboratory, or the date of receipt of notification, whichever is earliest.

Information on *Salmonella* serotypes and *Shigella* species were obtained from PathWest Laboratory Medicine, the reference laboratory for *Salmonell*a isolates in WA. Phage typing data were obtained from the Microbiological Diagnostic Unit (MDU), University of Melbourne; the Institute of Medical and Veterinary Science (Adelaide); the National Enteric Pathogens Surveillance Scheme; and the Australian *Salmonella* Reference Laboratory. Pulsed Field

Gel Electrophoresis (PFGE) testing was carried out at PathWest Laboratory Medicine.

Data changes. Several changes in notification and testing practices need to be considered in interpreting data from the time period covered by this report. Prior to July 2006 laboratory notification was not a statutory requirement in WA so notification data before this date are incomplete. Rotavirus infection became a notifiable disease in July 2006, so there are no data from years prior to this date. *Giardia* infection and amoebiasis were de-gazetted on 22 August 2007, so that after this date, these infections were not notifiable diseases in WA. Prior to July 2007 all *Salmonella* Typhimurium and *Salmonella* Enteritidis isolates were sent to the MDU for phage typing. After July 2007 only a limited number of isolates were sent for phage typing. From July 2007 all *Salmonella* Typhimurium isolates have been typed by PFGE.

2.0 Activity during the year

During 2009 the following activities were conducted at the WA OzFoodNet site:

- Ongoing surveillance and reporting of foodborne and notifiable enteric disease in WA.
- Investigation of three cases of *Yersinia* infection, six cases of STEC infection, and 15 cases of *Listeria* infection.
- Investigation of 19 foodborne or suspected foodborne outbreaks of gastrointestinal disease in WA.
- Five cluster investigations following increased notification rates for two *Salmonella* serotypes, two *Shigella* species and STEC.
- Investigation of 174 non-foodborne gastroenteritis outbreaks, 134 of which were reported by aged care facilities and 29 by hospitals.
- Involvement with national investigations into increased national incidence of hepatitis A, *Listeria*, STEC and *Salmonella* Litchfield.
- Ongoing monthly meetings with the Food Unit within WA Health to improve coordination of foodborne disease surveillance and investigation in WA.
- Modifications and updates to the WA Health OzFoodNet web page.
- Attendance at OzFoodNet face-to-face meetings in Brisbane in February, Canberra in May and hosting the October meeting in Perth.
- Continued involvement in OzFoodNet funded collaborative research projects with PathWest Laboratory Medicine, including a retrospective survey of norovirus genotypes in faecal samples from 2005 to 2008,

and a comparison of culture and PCR methods for testing faecal samples for the presence of Shiga Toxin-producing *Escherichia coli.*

- Collaboration with Associate Professor Una Ryan at Murdoch University on the molecular typing of *Cryptosporidium* strains. Prepared and submitted an ethics application for *Cryptosporidium* Case Control study.
- Membership of a joint WA Health Working Group aimed at improving data sharing within the Department of Health.

3.0 Incidence of foodborne disease

In 2009 there were 4572 notifications of enteric disease in Western Australia. This equated to an annual rate of 207 per 100 000 population. This was higher than the mean rate for the previous four years, of 174 per 100 000 population.

3.1 *Campylobacter* infection

Campylobacter infection was the most commonly notified enteric infection in WA in 2009, comprising 57% of enteric notifications. There were 2597 notified cases, giving a rate of 118 per 100 000 population (Appendix 1). This was 18% higher than the average rate of the previous five years. In previous years, the number of *Campylobacter* notifications has been lowest in the May to July period but in 2009 this decrease did not occur, with notifications increasing throughout the year until November and December, when there was a slight decrease. The upwards trend in notifications commenced around July 2008 (Figure 2). The notification rate for *Campylobacter* infection was slightly higher for males than females in 2009, with rates of 125 and 110 per 100 000 population, respectively. *Campylobacter* notification rates for males were also higher than for females for the previous five years (Figure 3). *Campylobacter* notification rates were highest in the 0 to 4 year age group with a rate of 188 per 100 000, with another peak in rates in the 20-29 year age group, and in cases 70 years and older (Figure 4).

Data on Aboriginality was missing for 21% of *Campylobacter* notifications in 2009. Notification rates for Aboriginal people (91 per 100 000 population), and non-Aboriginal people (94 per 100 000) were similar, which is unusual compared to other enteric infections, for which rates are generally higher in Aboriginal people.

Campylobacter notification rates were also relatively similar across regions, whereas for other enteric infections, rates were commonly higher for the northern and eastern regions. Notification rates in 2009 ranged from a low of 80 per 100 000 population for the Midwest to a high of 125 per 100 000 in the Southwest (Figure 5).

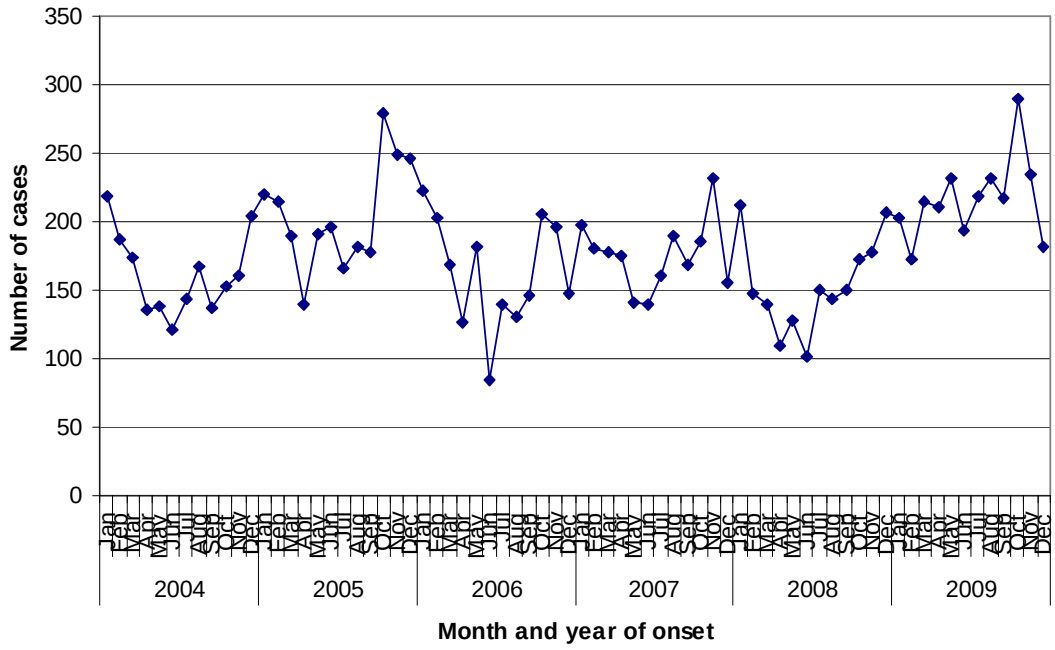

Figure 2: Number of cases of campylobacteriosis by month and year of onset, WA, 2004 to 2009

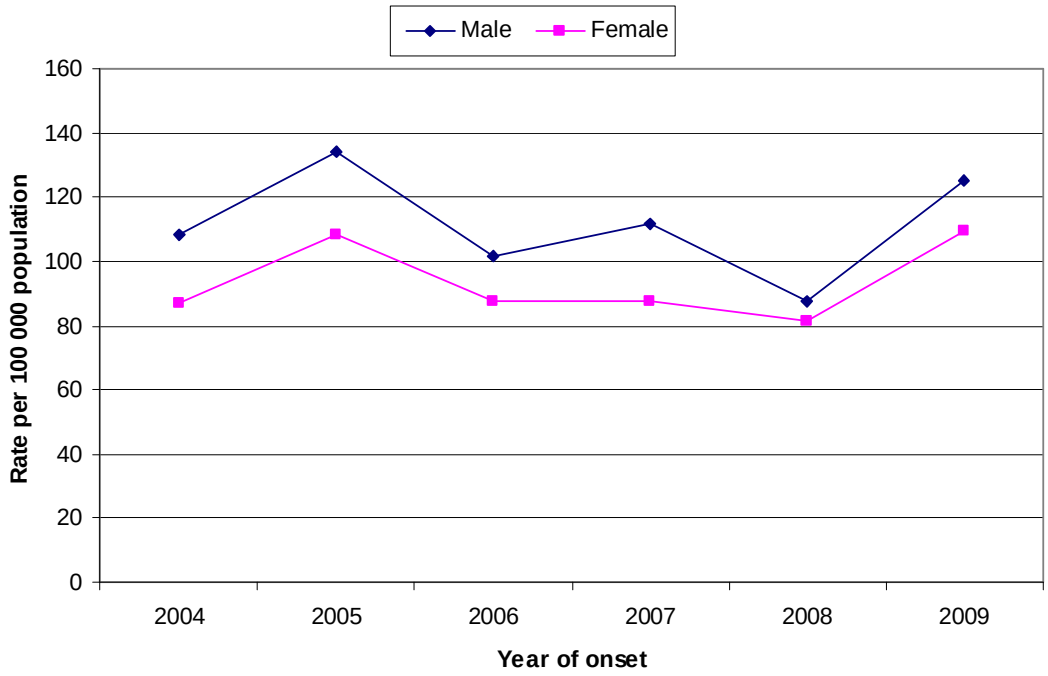

Figure 3. *Campylobacter* notification rates by sex, WA, 2004 to 2009

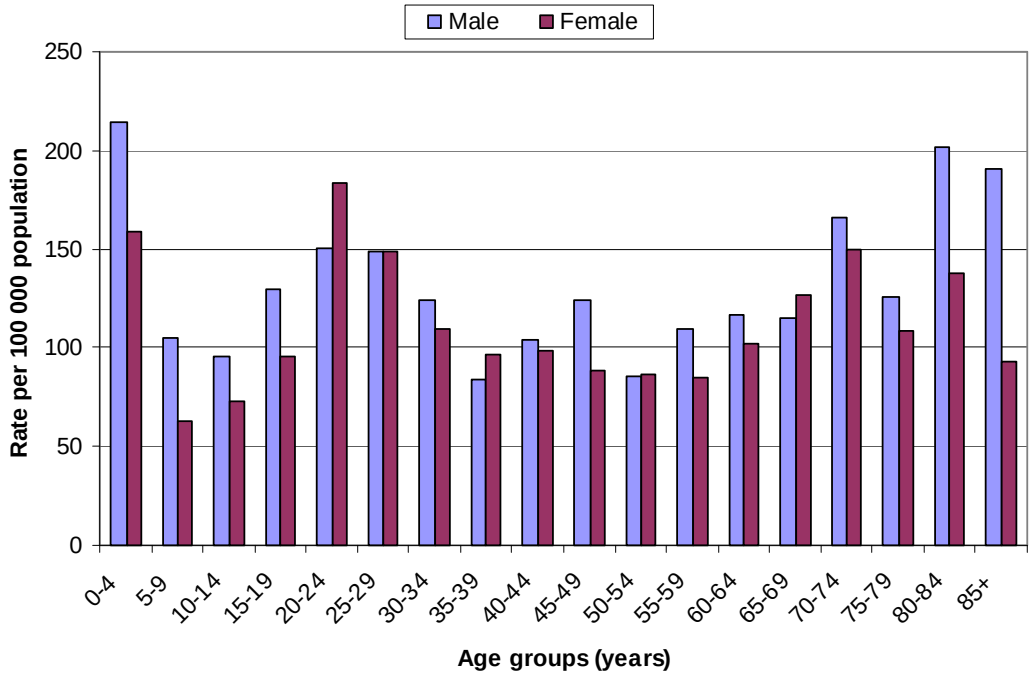

Figure 4. Age-specific notification rates for campylobacteriosis by sex, WA, 2009

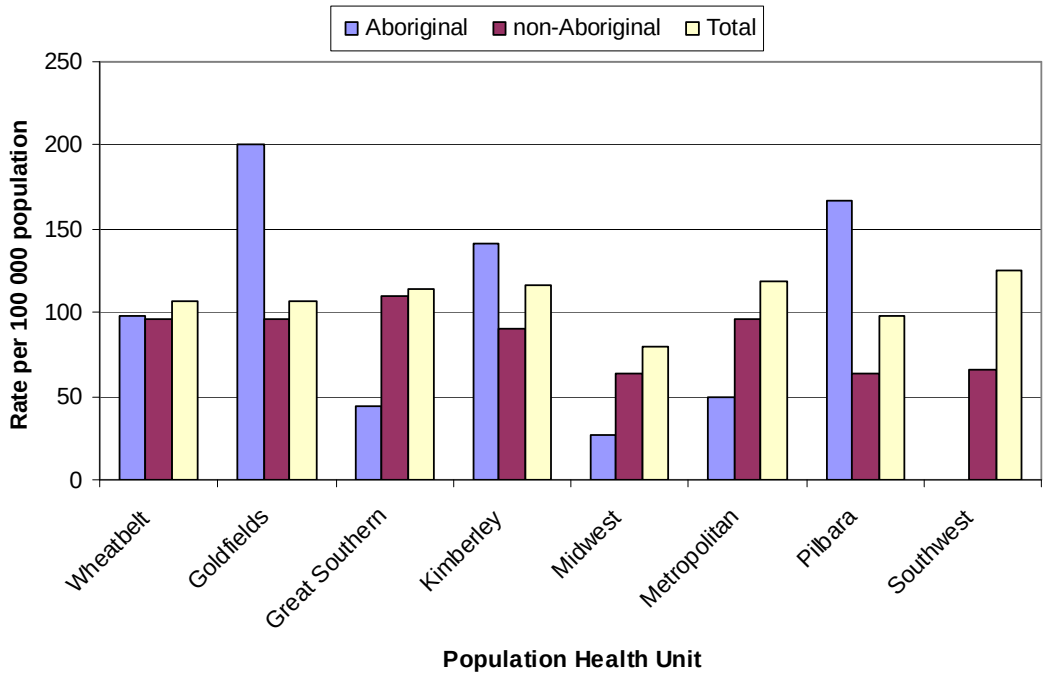

Figure 5. Campylobacteriosis notification rates by region and Aboriginality, WA, 2009

3.2 *Salmonella* infection

Salmonellosis was the second most commonly notified enteric infection in WA in 2009, with 1113 notified cases (Appendix 1). The notification rate for *Salmonella* in 2009 (50.4 cases per 100 000 population), was higher than the previous year (39.7 cases per 100 000) and higher than the previous five year average (39.5 cases per 100 000). In each year the number of *Salmonella* notifications was generally highest in the summer months (Figure 6). In 2009, increases in *Salmonella* notifications were also noted in May, July and October. Three *Salmonella* Typhimurium (STM) outbreaks and one cluster of STM were investigated in May, in July an outbreak of STM associated with consumption of Vietnamese pork rolls was investigated, and in October two outbreaks of STM were investigated (described in Sections 4 & 5).

The overall notification rate for females (51.5 per 100 000 population) was similar to that for males (49.3 per 100 000). As in previous years the 0 – 4 year age-group had the highest notification rate (195 per 100 000 population) (Figure 7). The young adult age groups of 25 to 29 years, and 20 to 24 years, had the next highest notification rates (73.8 and 67.6 per 100 000, respectively).

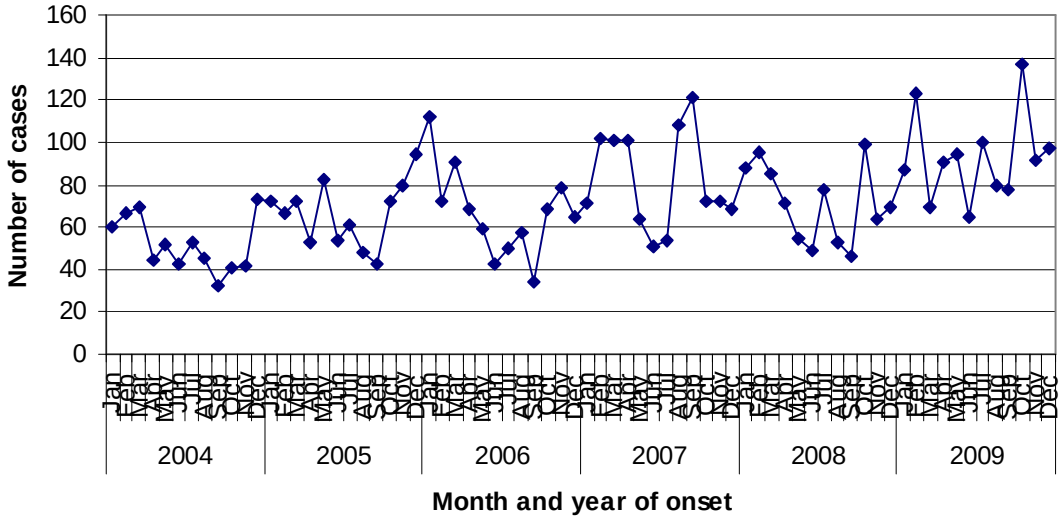

Figure 6. Number of cases of salmonellosis by month and year of onset, WA, 2004 to 2009

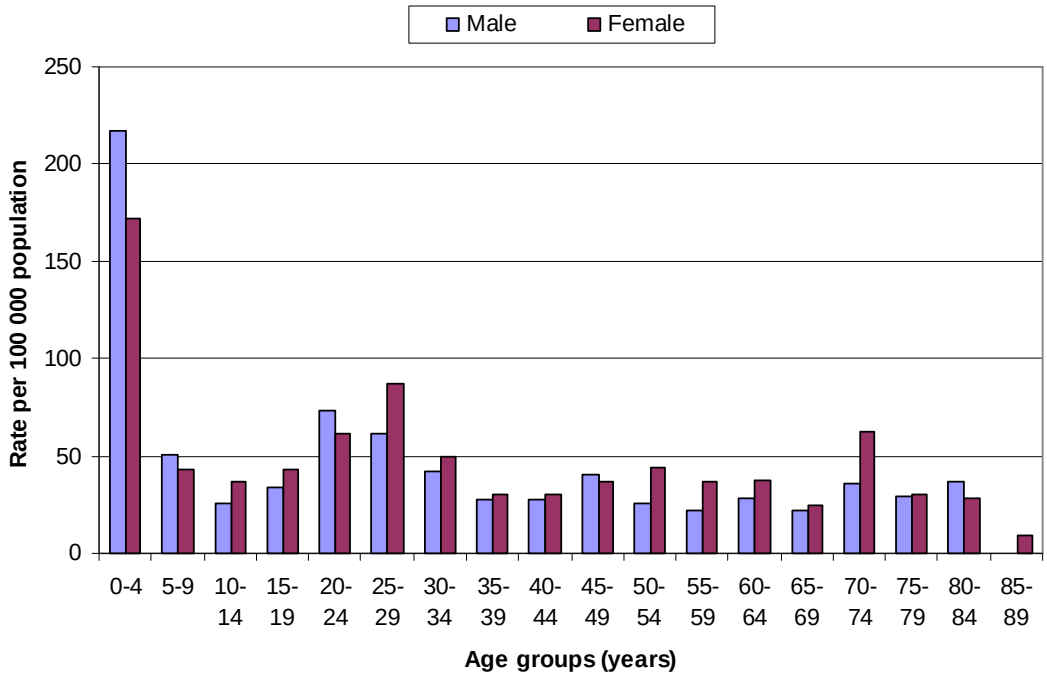

Figure 7. Age-specific notification rates for salmonellosis by sex, WA, 2009

Data on Aboriginality was missing for 14.7% of *Salmonella* cases in 2009, which was similar to the previous year. The overall *Salmonella* notification rate for Aboriginal people (113.8 per 100 000 population) was 2.8 times the notification rate for non-Aboriginal people (40.3 per 100 000 population).

The Kimberley region had the highest notification rate for salmonellosis in 2009 (303 per 100 000 population) (

Figure 8). This was 13 times the rate for the region with the lowest notification rate, the Great Southern, (22.5 cases per 100 000). Notification rates in the Kimberley were higher for both Aboriginal and non-Aboriginal people when compared with other regions.

The most commonly notified *Salmonella* serotype in WA in 2009 was *S*. Typhimurium, with 366 notifications (Table 1). The number of cases was approximately 40% higher than the mean of the previous five years. The

second most commonly notified serotype was *S*. Enteritidis (198 notifications), with 97% of cases confirmed as travelling overseas during their incubation period. The vast majority of people that contracted a *S.* Enteritidis infection (77%) had travelled to Indonesia (Bali) during their incubation period. The number of *S*. Enteritidis cases notified was double the mean of the previous five years, reflecting the steady increase in the number of *S.* Enteritidis notifications in the latter half of 2009 (Figure 9). The number of notifications of *S*. Hadar, *S.* Corvallis and *S.* Paratyphi B var Java were also substantially higher in 2009 compared to the five year mean. These increases were predominantly the result of overseas acquired infections. A cluster investigation into the increase in *S.* Singapore notifications is discussed in Section 5. A cluster investigation was not conducted into the increased number of *S.* Newport notifications in 2009, as cases occurred throughout the year and at least 40% of cases reported overseas travel.

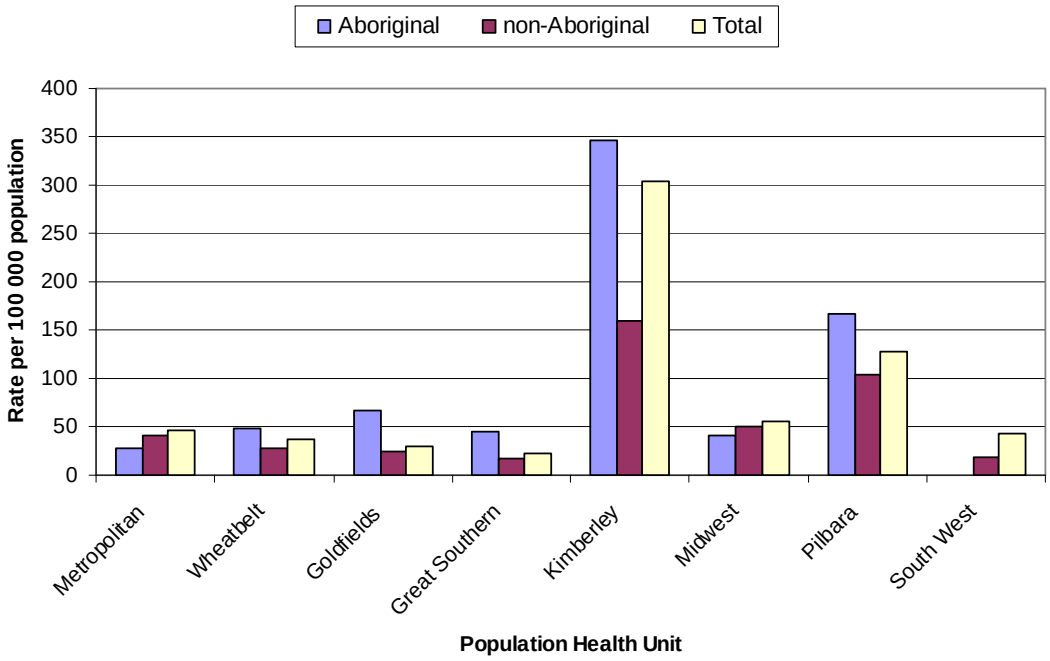

Figure 8. Salmonellosis notification rates by region and Aboriginality, WA, 2009

Table 1. Number and proportion of the top 10 *Salmonella* serotypes notified in WA, 2009, with comparison to 5-year average

***Salmonella* Serotype**	**2009 N**	**Proportion %***	**Mean Number (2004-2008)**	**Ratio‡**
Typhimurium	366	33	252	1.4
Enteritidis	198	18	99	2.0
Saintpaul	71	6.3	42	1.7
Paratyphi B var Java	38	3.4	20	1.9
Singapore	32	2.9	9	3.6
Corvallis	23	2.1	12	1.9
Newport	22	2.0	6.8	3.2
Chester	18	1.6	26	0.7
Hadar	17	1.5	4.4	3.9
Muenchen	17	1.5	26	0.6
Senftenberg	17	1.5	11	1.5
Stanley	16	1.4	14	1.1

*Proportion of total *Salmonella* cases notified in 2009.
‡Ratio of the number of reported cases in 2009 compared to the five year mean of 2004-2008.

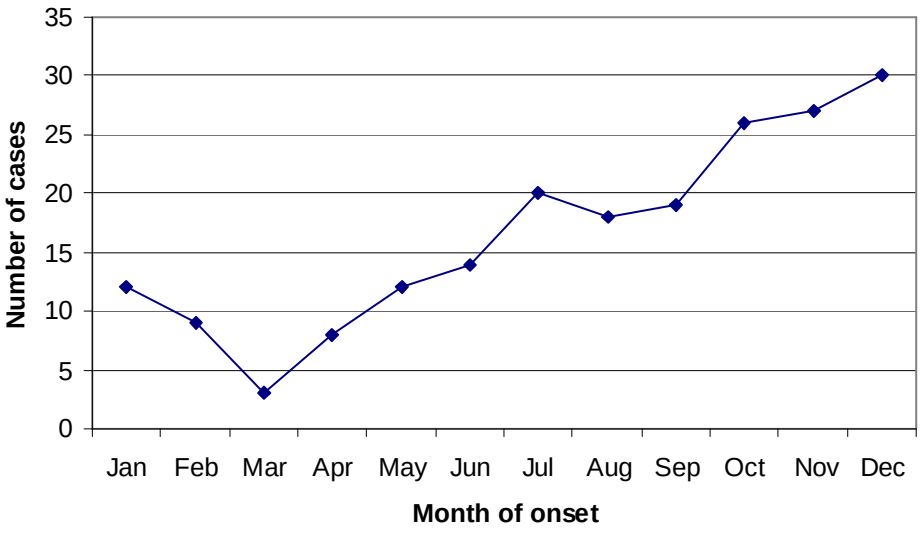

Figure 9. Number of cases of *S.* Enteritidis by month of onset, WA, 2009

3.3 Rotavirus infection

Rotavirus was the third most commonly notified enteric infection in WA In 2009, with 418 cases (18.9 per 100 000 population) (Appendix 1). In the three complete years after rotavirus became a notifiable disease in WA (which occurred in July 2006), monthly notification rates exhibited seasonal peaks. In 2007 there was a large increase in the number of notifications in later winter and spring, and in 2008 and 2009 there were smaller increases at this time of year (Figure 10). In 2007 there appears to have been a large community-wide outbreak of rotavirus. Cases in the peak months of 2007 were similar demographically to cases occurring in other months and years, with most cases occurring in the 0 to 1 age group and living in the Perth metropolitan area. At this time there was an increase in notifications from all public and private laboratories, and a proportional increase in the number of hospitalisations.

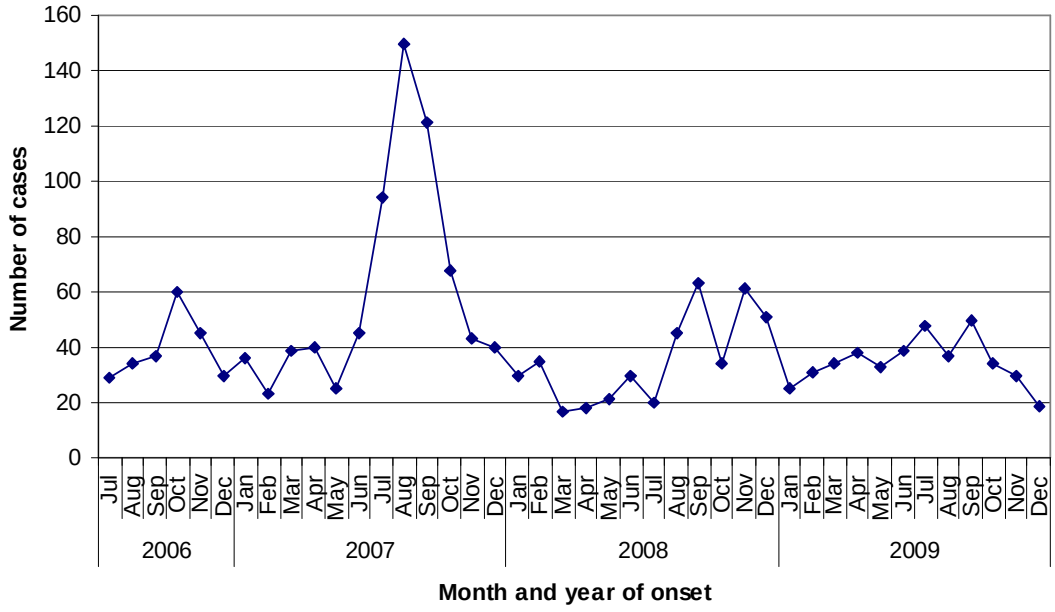

Figure 10. Number of cases of rotavirus infection by month and year of onset, WA, 2006 to 2009

In 2009 the notification rate was higher for females (21.0 per 100 000 population) than for males (16.5 per 100 000 population). As for most other

enteric infections, children aged 0 to 4 years experienced the highest rotavirus notification rate (170.3 per 100 000 population) (Figure 11). The notification rate for people aged over 75 was also elevated compared to other age groups, which may be due to an increased risk of acquiring viral gastroenteritis among people living in residential care facilities.

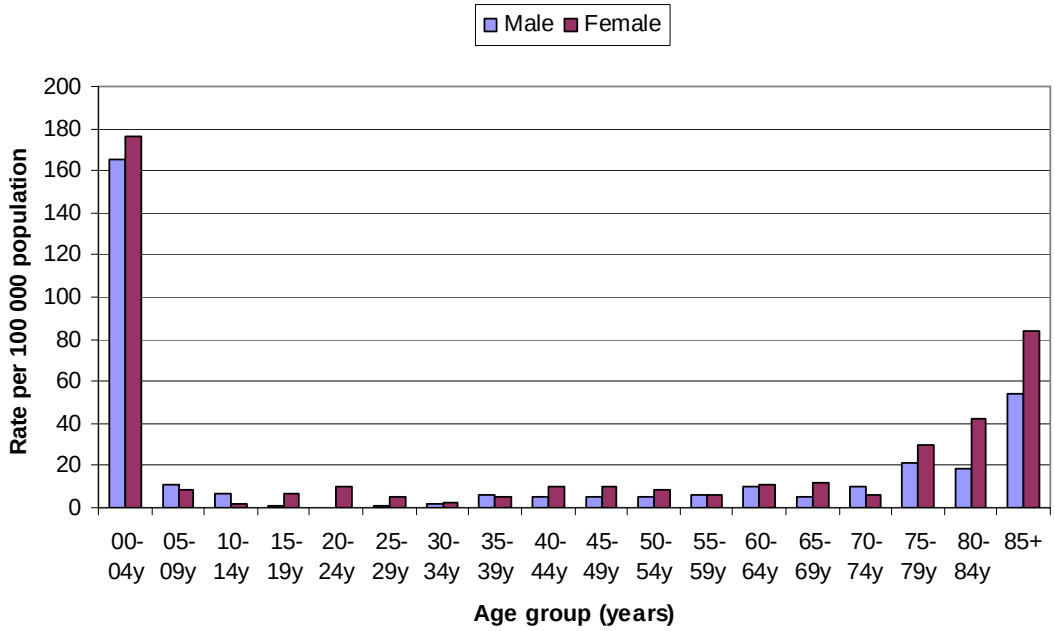

Figure 11. Age-specific notification rates for rotavirus by sex, WA, 2009

Indigenous status information was missing for 14% of rotavirus notifications. The notification rate for the Aboriginal population (37 per 100 000 population), was over twice that of the non-Aboriginal population (15 per 100 000). Notification rates were highest in the Kimberley (35 per 100 000) and Pilbara (30 per 100 000) regions, and lowest in the Midwest (3.1 per 100 000) and Wheatbelt (4.0 per 100 000) regions (Figure 12).

Rotavirus vaccination was introduced in July 2007, with a two dose schedule at 2 and 4 months of age. In February 2009 this was changed to a three dose schedule at 2, 4 and 6 months of age. The number of rotavirus notifications in the year before and years after the vaccine was introduced are similar (Figure 10). In the year from July 2006 to June 2007, after rotavirus became a

notifiable infection and before vaccination was introduced, there were a total of 443 notifications, with an average of 37 notifications per month. In the two full years of 2008 and 2009, there were 425 and 418 notifications respectively, with an average of 35 notifications per month for both years. However there has been a reduction in the number of rotavirus notifications for young children. A reduction would be expected in the age group targeted for vaccination, as the vaccine should prevent gastroenteritis in approximately 70% of recipients (Australian Government 2008). There were 320 notifications for the 0 to 2 year age-group in the year before vaccination was introduced, compared with 247 notifications in 2008 and 224 notifications in 2009 for this age group.

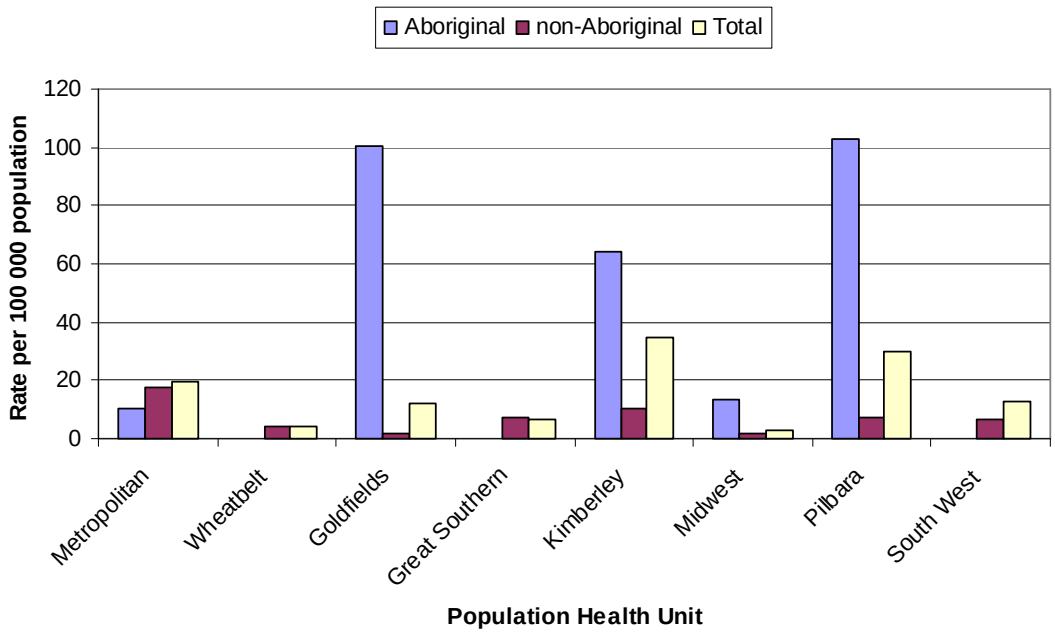

Figure 12. Rotavirus notification rates by region and Aboriginality, WA, 2009

3.4 *Cryptosporidium* infection

There were 235 cases of cryptosporidiosis notified in 2009, a rate of 10.6 cases per 100 000 population (Appendix 1). The number of cases in 2009 was similar to that recorded in the previous five years, with the exception of 2007

when there was a large peak in the summer (Figure 13). In each of the years from 2004 to 2009 the number of notifications was generally lower from May to October and higher in months with warmer temperatures.

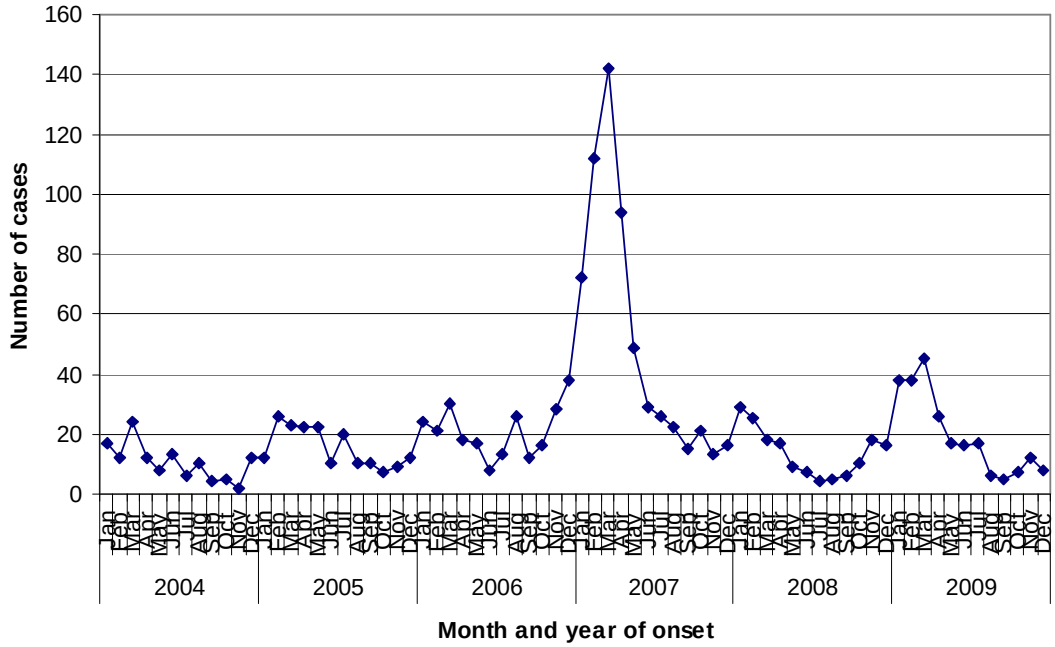

Figure 13. Number of cases of cryptosporidiosis by month and year of onset, WA, 2004 to 2009

Notification rates were similar for females (10.8 per 100 000) and males (10.5 per 100 000). The notification rate was highest in the 0 to 4 year age-group, accounting for 44% of notifications (Figure 14). Aboriginal children in the 0 to 4 year age-group appeared to be particularly vulnerable to *Cryptosporidium* infection, with a notification rate of 702 cases per 100 000 population, 37 times the rate for non-Aboriginal children (19 per 100 000). The overall cryptosporidiosis rate for the Aboriginal population was 88 cases per 100 000, 18 times the rate for non-Aboriginal people (5 cases per 100 000). Indigenous status information was missing for 24% of cases.

The Kimberley region had the highest cryptosporidiosis notification rate, with 134 cases per 100 000 population (Figure 15). Notifications for both Aboriginal and non-Aboriginal people were highest in this region.

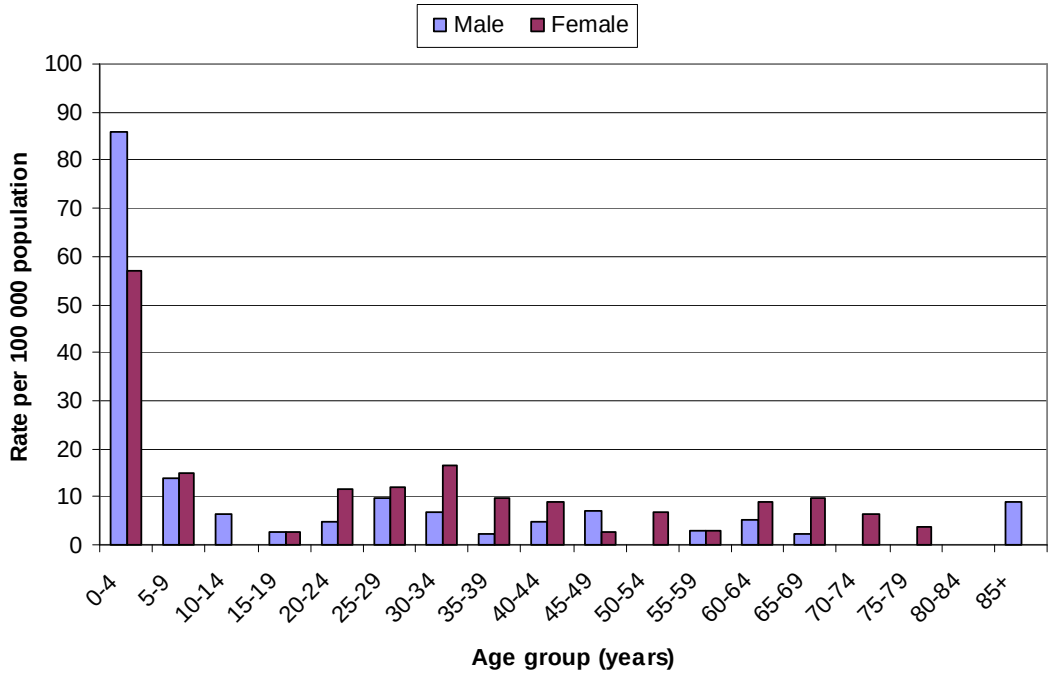

Figure 14. Age-specific notification rates for cryptosporidiosis by sex, WA, 2009

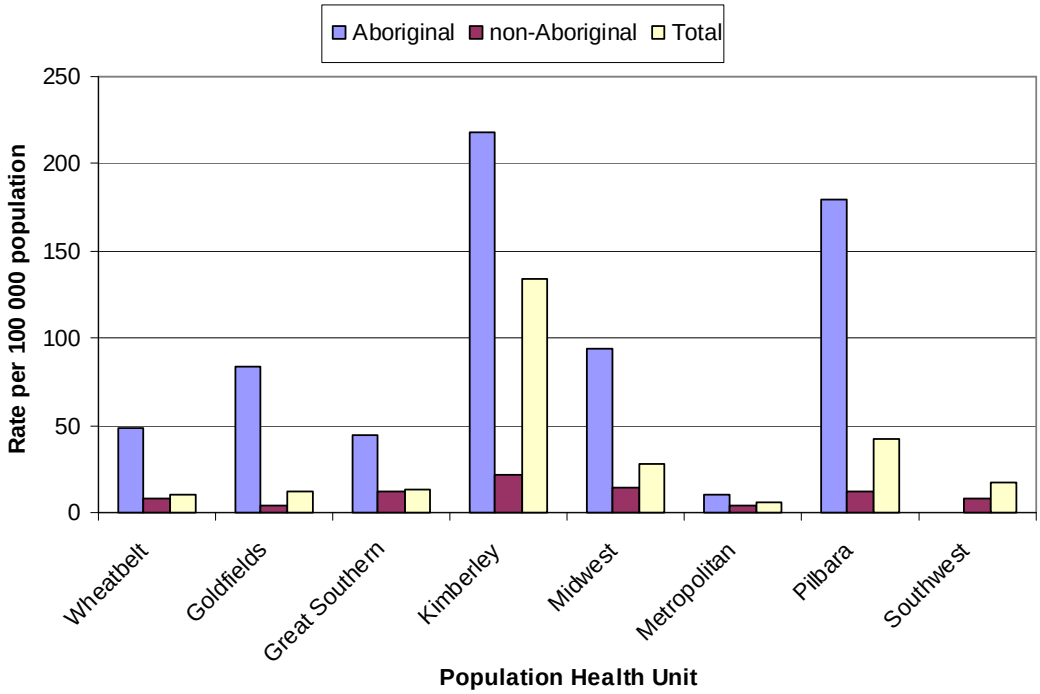

Figure 15. Cryptosporidiosis notification rates by region and Aboriginality, WA, 2009

3.5 *Shigella* infection

There were 122 *Shigella* notifications in 2009, a rate of 5.5 cases per 100 000 population, which was lower than for both the previous year (7.8 cases per 100 000), and the previous five year average (6.4 cases per 100 000) (Appendix 1). The highest number of *Shigella* notifications occurred in January to May, with 12 to 24 cases per month. As seen in previous years, notifications are generally elevated in the summer months (Figure 16).

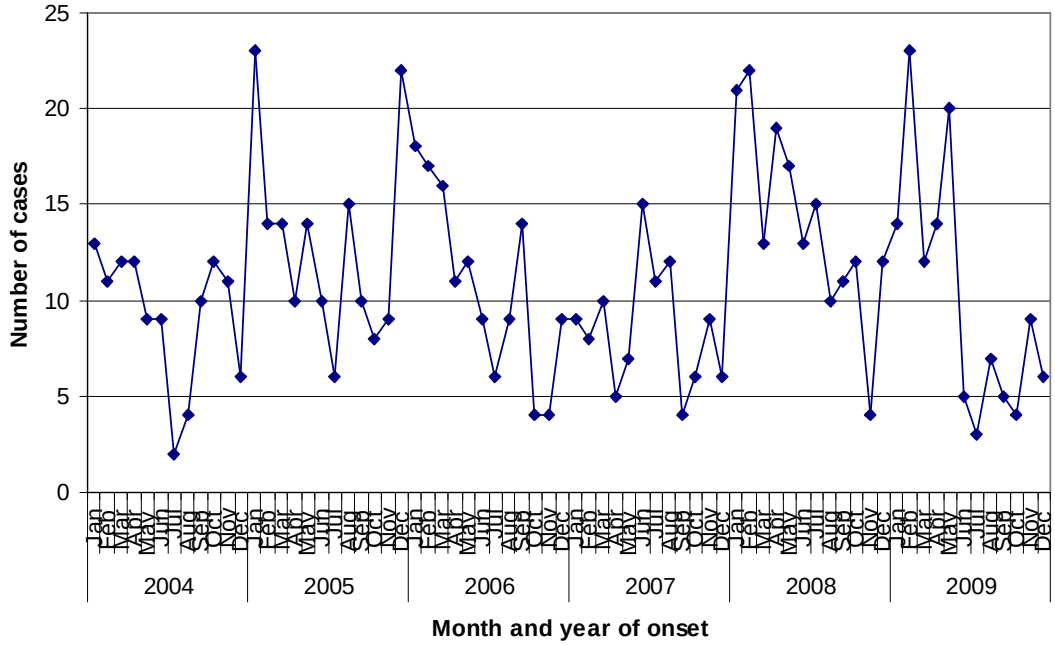

Figure 16. Number of cases of shigellosis by month and year of onset, WA, 2004 to 2009

Notification rates were similar for males and females (5 and 6 cases per 100 000 population) respectively. Children ages 0 to 4 years had the highest notification rate (26 per 100 000), accounting for 30% of notifications (Figure 17). The notification rate for Aboriginal people (87 per 100 000) was 38 times the rate for non-Aboriginal people (2 per 100 000). Aboriginality information was missing for 5% of *Shigella* notifications. The Kimberley region had the highest *Shigella* notification rate , (134 per 100 000 population), followed by the Pilbara (19 per 100 000), while the rate in the Perth metropolitan region was only 2 per 100 000 (Figure 18).

The majority of *Shigella* isolates from clinical cases in 2009 were *Shigella sonnei* (60%). The most frequent biotypes of *Shigella sonnei* were biotype A (36%) and biotype G (27%). The remaining *Shigella* cases were predominantly *Shigella flexneri* (35%), and there was one case of *Shigella dysenteriae* which was acquired in Indonesia

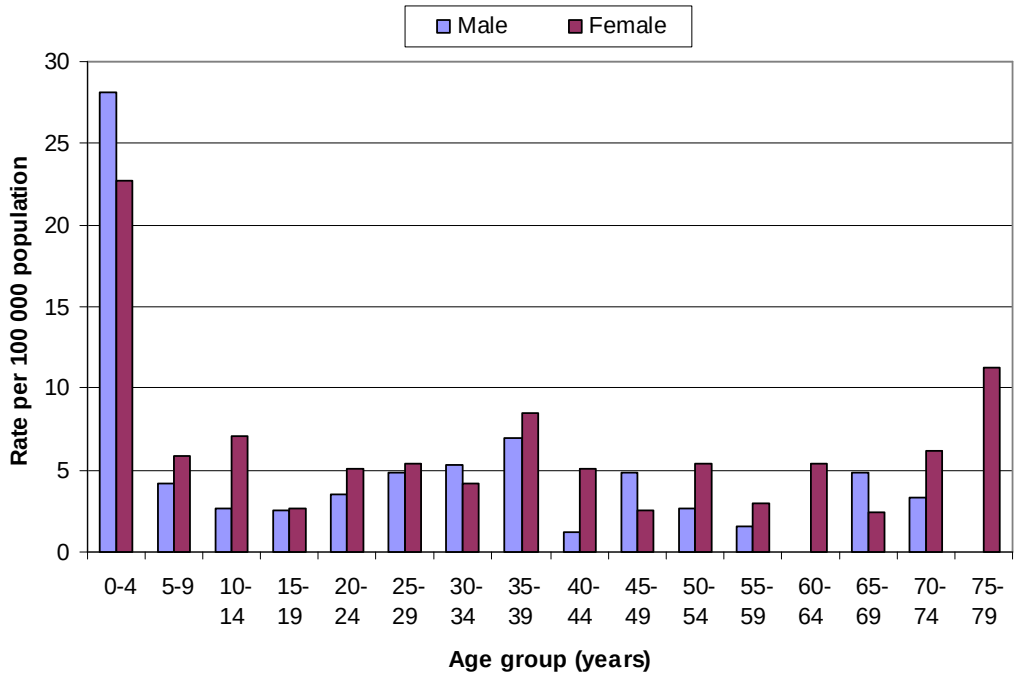

Figure 17. Age-specific notification rates for shigellosis by sex, WA, 2009

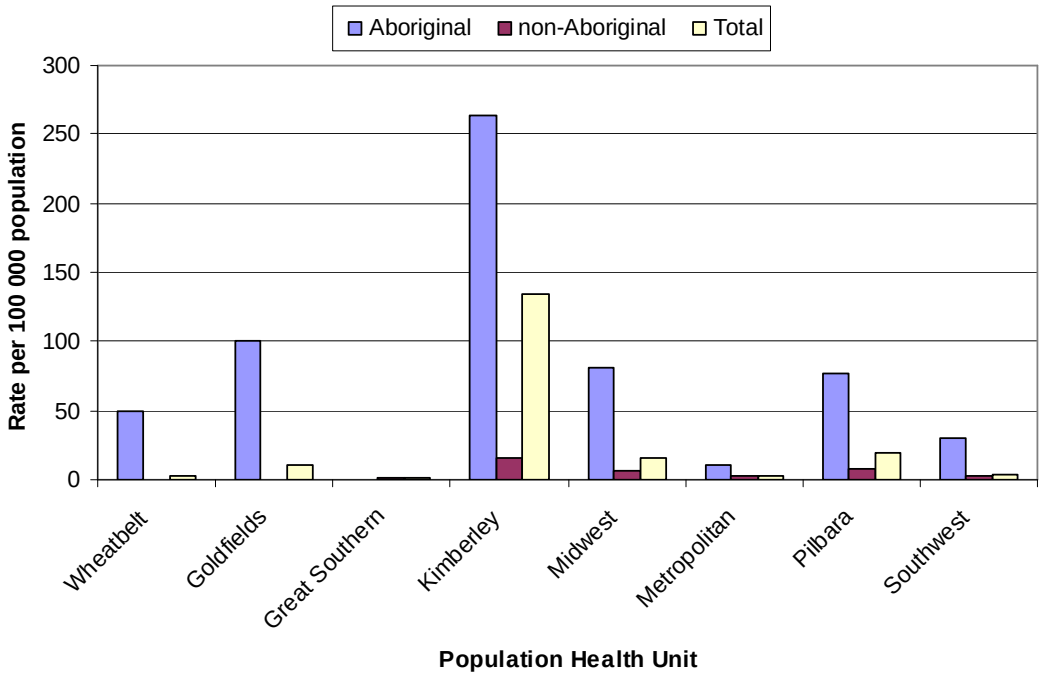

Figure 18. Shigellosis notification rates by region and Aboriginality, WA, 2009

3.6 Hepatitis A virus infection

There were 36 hepatitis A cases with a date of onset in 2009 (1.6 cases per 100 000 population), a 67% increase in notification rate compared to the mean of the previous two years (Appendix 1). This increase was related both to two foodborne outbreaks that occurred in the spring and autumn of 2009 (described in Section 4.1) and an increase in the number of overseas-acquired cases (described below). Notifications did not show distinct seasonal patterns through the years 2004 to 2009 (Figure 19).

Hepatitis A vaccine was introduced for Indigenous children in November 2005, and the overall number of notifications of hepatitis A in both 2007 and 2008 were lower than in earlier years There were no hepatitis A notifications in Aboriginal people during the three year period 2007 to 2009 (Figure 20). This was unusual compared to previous experience: the mean annual notification rate for the 10 years prior to 2007 was ten times higher in Aboriginal (40 cases per 100 000 population) than non-Aboriginal (4 cases per 100 000) people. These data suggest that the vaccination program has been effective

in reducing hepatitis A incidence amongst all age groups of Aboriginal people, not just the target age of young children.

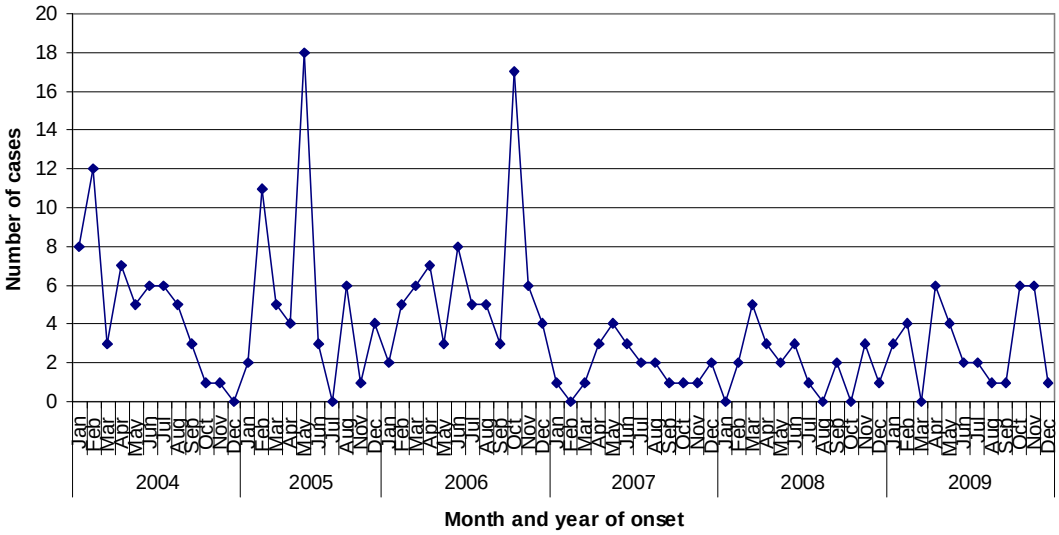

Figure 19. Number of cases of hepatitis A infection notified by month and year of onset, WA, 2004 to 2009

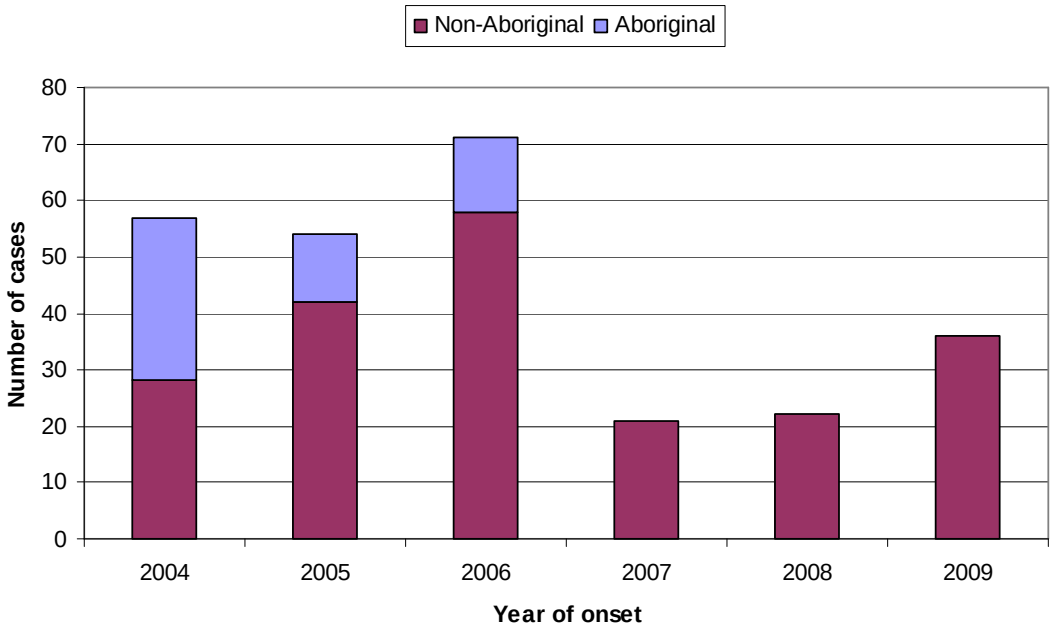

Figure 20. Number of hepatitis A cases by Aboriginality and year of onset, WA, 2004 to 2009

In 2007 and 2008, following complete implementation of the indigenous hepatitis A vaccination program, there was a reduction in notifications in all remote (Kimberley, Pilbara and Goldfields) and rural (Great Southern, South West, Wheatbelt and Midwest) regions (Figure 21). In 2009 there was an increase in notifications in Perth (North and South metropolitan regions) and rural regions, associated largely with the foodborne outbreaks described in Section 4.1.

Hepatitis A cases in 2009 ranged in age from 2 to 61 years, with the greatest number of notifications (6) in the 25 to 29 years age-group. There were 18 male and 18 female cases in 2009. Fifty percent of cases (n=18) were acquired overseas, an increase from 7 cases in 2008. Cases were thought to have acquired infection in Indonesia (7), Ethiopia (2), India (2), Egypt (1), Fiji (1), Iraq (1), Korea (1), Pakistan (1), South Africa (1) and Thailand (1).

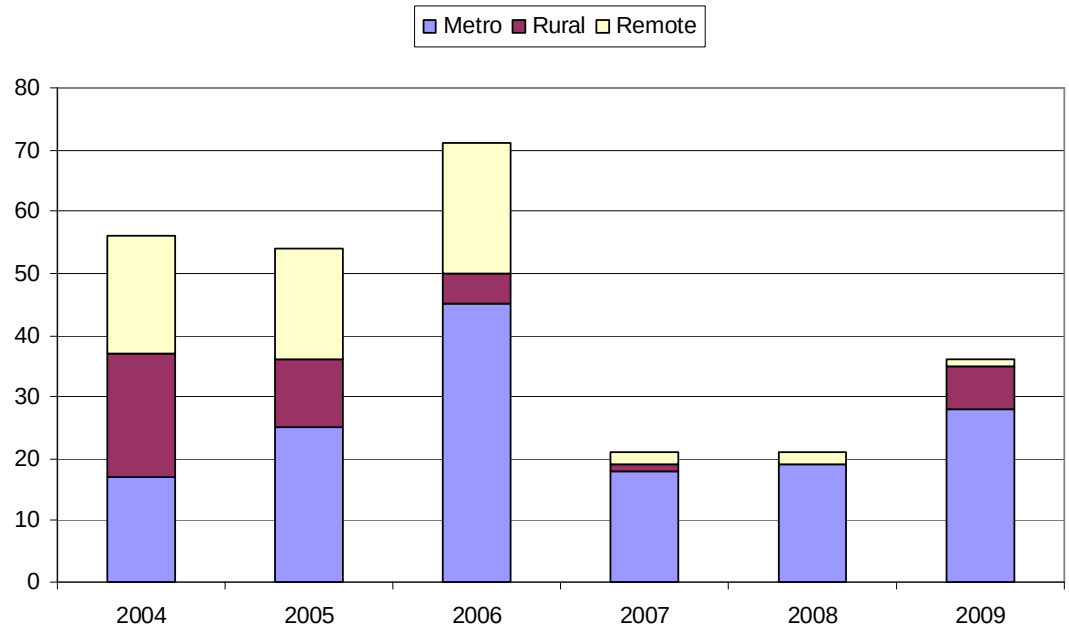

Figure 21. Number of hepatitis A notifications by region and year of onset, WA, 2004 to 2009

3.7 Typhoid and Paratyphoid fever

There were eight cases of typhoid fever notified in WA in 2009 and all had a history of recent overseas travel: six in India and two in Indonesia. Five cases of paratyphoid fever were notified in 2009, all with overseas acquisition: in India (2), Bangladesh (2) and Indonesia (1).

3.8 *Listeria* infection

There were 15 cases of *Listeria monocytogenes* infection notified in 2009, around double the mean number of cases for the previous five years (Figure 22). There were four pregnancy related cases, comprising two materno-foetal pairs. In both pairs the mothers had reported consumption of high risk foods throughout pregnancy. One pair was part of a national outbreak linked to the consumption of chicken wraps served on a domestic airline, with isolates from both mother and foetus genetically indistinguishable from the outbreak strain. The 15 week old foetus died as a result of infection. The eleven non-pregnancy related cases (8 females and 3 males) ranged in age from 54 – 91 years.. Ten of these eleven cases had either an immunocompromising illness or were taking immunosuppressive medications. One non-pregnancy related case (aged 62 years) did not have any identified underlying risk conditions. All cases reported eating foods considered to be high risk for listeria. Two non-pregnancy related cases died.

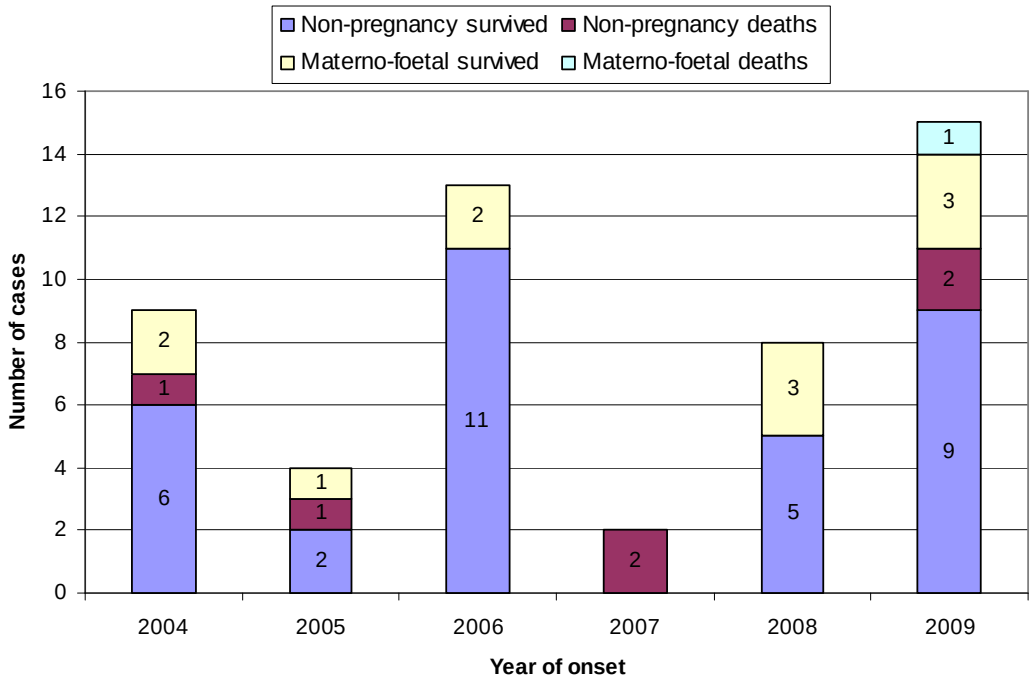

Figure 22. Notifications of listeriosis showing non-pregnancy related infections and deaths, and materno-foetal infections and deaths, WA, 2004 to 2009

3.9 *Vibrio parahaemolyticus* infection

There were nine cases of infection with *Vibrio parahaemolyticus* in 2009, comprising seven males and two females, aged between 23 and 62 years. Follow-up information was available for eight cases: one had a wound infection after scraping an ankle in a local river, and the other seven cases developed gastroenteritis after travelling overseas (four to Thailand, one to The Philippines, one to Singapore and one to China).

3.10 Shiga toxin producing *E. coli* (STEC) infection

There were six cases (four males and two females) of STEC infection in WA in 2009.. Cases ranged in age from 15 to 75 years. None of the cases reported overseas travel. Two of the cases lived and worked on rural properties, but there was no apparent risk factor or source for the other four

cases. Three cases were infected with *E. coli* O157 (H typing not specified), the other three with *E. coli* O157:H-.

3.11 Hepatitis E virus infection

There were five cases (three females and two males) of hepatitis E infection notified in WA in 2009.. Cases ranged in age from 22 to 37 years old. One case was lost to follow-up, but the other cases reported travel to Hong Kong, Cambodia, Thailand and India, respectively, during their incubation periods.

3.12 *Yersinia* infection

There were three cases of *Yersinia* infection notified in 2009, ranging in age from 0 to 9 years. Two of the cases resided in the Perth metropolitan area, and one in a rural town, and none had travelled overseas recently. Two of the cases had *Yersinia enterocolitica* infection, while the isolate was not speciated for the third case. Two of the cases were male and had recent exposure to animals; the single female case had no identified high risk exposures.

3.13 Botulism, cholera and Haemolytic Uraemic Syndrome (HUS)

There were no cases of botulism, cholera or HUS notified in WA in 2009.

4.0 Gastrointestinal disease outbreaks

4.1 Foodborne/suspected foodborne outbreaks

There were 19 foodborne or suspected foodborne gastroenteritis outbreaks investigated by WA Health in 2009 (Table 2). Nine of the outbreaks were caused by *Salmonella*, six by norovirus, two by hepatitis A virus, one by *Listeria* and one by an unknown pathogen.

Foodborne outbreaks

4.1.1 Fried icecream *Salmonella* Saintpaul outbreak

There were seven cases of *S*. Saintpaul associated with an Asian restaurant. The outbreak was identified following the notification of five *S*. Saintpaul cases (1 male and 4 female), all of whom had attended the restaurant as a single party on the 30/01/09. The remaining two cases attended the restaurant independently on the 30/1/09 and 01/02/09 respectively. The incubation period ranged between 3.5 hrs to 10 days. Six of the seven cases had eaten fried ice cream, and one case had eaten a red bean dessert with no ice cream. Other people who attended the restaurant during this period were contacted but no further cases were identified. Restaurant foods based on dishes eaten by the first five cases were microbiologically tested, and fried ice cream was positive for *S*. Saintpaul. The isolates from human cases and fried ice cream had an indistinguishable PFGE profile. The cause of the *S*. Saintpaul contamination of the fried ice-cream was not identified.

4.1.2 Pork roll Outbreak, *Salmonella* Typhimurium phage type 193, PFGE type 0279

From 9/7/09 to 21/7/09, there were 28 cases of STM with PFGE type 0279 (phage type 193) notified, plus an additional three cases with gastroenteritis (not diagnosed) linked to these cases. This PFGE type had not previously

been seen in WA. Of these 31 cases, 16 reported eating Vietnamese pork rolls, one was a secondary case, 5 cases had poor recall of food eaten, 4 cases were lost to follow-up and 5 cases reported eating at a restaurant. A single lunch bar had prepared the pork rolls for distribution to the identified food outlets. The rolls consisted of cooked pork, raw egg mayonnaise, cucumber, carrots and coriander. A STM with PFGE pattern 0279 was isolated from pork rolls sampled from one of the retail outlets. The source of the *Salmonella* contamination of the pork rolls was not identified. No epidemiologic link or common foods were identified between the cases who ate the pork rolls and the five cases who ate at a restaurant. The pork rolls were recalled. Information on the risks of using raw eggs in mayonnaise and other products was prepared by the WA Health's Food Unit.

4.1.3 Pawpaw outbreak, *Salmonella* Saintpaul

In September, an outbreak investigation was commenced after identification of an increase in the number of *S*. Saintpaul cases notified. Cases were interviewed and the frequency of pawpaw consumption (4 of 5 locally acquired cases in August) was above expectation, Pawpaw from one WA grower was found to be contaminated with *S*. Saintpaul. Pawpaw from this grower was withdrawn from sale and the on-farm processing investigated. The likely source of contamination was the washing process used to treat the pawpaw with fungicide. A total of 17 *S*. Saintpaul cases were eventually associated with this outbreak, with onset dates ranging from 11/08/09 to 5/10/09. The median age of cases was 18 years and 53% were male. Three of the cases were hospitalised.

4.1.4 Wake function outbreak, Norovirus

In September, approximately 35 out of 200 people who attended a wake at a private home subsequently became ill with gastroenteritis. The incubation period, symptoms and duration of illness were consistent with norovirus infection, and norovirus was detected in one specimen from an affected person. A second specimen collected from the same person was positive for

both norovirus and rotavirus. A case-control study was conducted, with 15 cases and 15 controls. Illness was found to be significantly associated with the consumption of rice paper rolls (odds ratio 12.0, 95% confidence intervals 1.9 – 76). Food was supplied by a catering company, and no staff illness was reported from this company. It was concluded that the likely cause of the outbreak was contaminated rice paper rolls, although the means of contamination was unclear..

4.1.5 Hamburger takeaway, *Salmonella* Typhimurium phage type 170, PFGE 0011

A STM phage type 170 outbreak in October was associated with eating food from a hamburger take-away restaurant. Following investigation of food poisoning complaints and interviews with notified cases, it was found that there were 39 cases of gastroenteritis linked to the take-away restaurant, with onset dates ranging from 12/10/09 to 25/10/09. Of these 39 cases, 21 were diagnosed with STM phage type 170 (PFGE type 0011) and the remaining 18 cases had illness consistent with *Salmonella* infection. Cases had eaten a variety of burgers and 10 had also eaten aioli with hot chips. The common ingredients in all the burgers were salad ingredients and raw egg mayonnaise. The aioli was also made using raw eggs and one case who was gluten intolerant had a burger without the bun and mayonnaise but did have aioli. Food samples and swabs including mayonnaise (but not the same batch as was eaten) and eggs were negative for *Salmonella*. At the same time as this investigation other STM PFGE type 0011 cases were linked to eating food at another restaurant (described in Section 4.1.6). Both restaurants used eggs from the same WA egg farm. Eggs and drag swabs from this farm were negative for *Salmonella*. In response to the outbreak the hamburger takeaway premises changed to using pasteurised eggs for preparing mayonnaise and aioli. Information for food premises and caterers on the risks of using raw eggs in mayonnaise and other products was developed and disseminated by WA Health's Food Unit.

4.1.6 Restaurant, *Salmonella* Typhimurium phage type 170, PFGE 0011

Two further STM phage type 170 outbreaks were associated with eating at a single Perth restaurant. There were 32 cases of gastroenteritis with onset dates from 10/10/09 to 31/10/09, and 7 further cases with onset dates from 2/12/09 to 20/12/09.. Of these 39 cases, 27 were diagnosed with STM phage type 170 with PFGE type 0011. The other 12 cases were people who had illness consistent with *Salmonella* infection, and were interviewed as part of the investigations, but did not submit faecal specimens. A case-control study of people with onset dates in October, and who had eaten from the breakfast menu at this restaurant, found a significant (OR=not defined, p <0.01) association between illness and eating scrambled eggs. Raw egg mixture was added to the scrambled eggs just before serving. Other cases with onset dates in October had eaten other dishes containing raw or under-cooked eggs, including aioli and poached eggs. Food samples and swabs including aioli (not the same batch as eaten) and eggs were negative for *Salmonella*. Eggs and drag swabs from the farm that supplied eggs were negative for *Salmonella*. In response to the October outbreak the restaurant stopped adding raw eggs to the scrambled eggs prior to serving. The seven cases with onset dates in December had also eaten at the restaurant and four of these cases had eaten scrambled eggs. In response, the restaurant then changed to a different egg supplier.

4.1.7 Melbourne cup luncheon, norovirus

In November, 11 dental staff attended a private lunch function catered by two food businesses. Of the 11 attendees, 8 staff became ill with diarrhoea, vomiting and fever, and two were diagnosed with norovirus. There were no reports of gastroenteritis among dental staff prior to the lunch. The median incubation period and duration of illness was 36 hrs. Food served included sandwiches, foccacias, meatballs and roast chicken. No staff from the food businesses reported gastroenteritis prior to the function. One of the food businesses had supplied food to another group of people on the same day, and people from this group also developed gastroenteritis. A cohort study of

those attending the dental function was conducted but no specific food item was associated with illness. This outbreak was considered foodborne as the outbreak was point source, food was prepared by a food business off-site and there was also reports of illness among another group which was catered for by this business.

4.1.8 Semi-dried tomatoes, hepatitis A

From October to December 2009 there were nine hepatitis A cases notified in WA that were confirmed or suspected to be part of a national outbreak associated with consumption of contaminated semi-dried tomatoes, and which was subject to a multi-jurisdictional investigation. Seven of these cases were confirmed to have the hepatitis A virus 1b genotype associated with the outbreak, while the genotype could not be determined for the other two cases. Of the nine cases, eight were also epidemiologically linked to one brand of semi-dried tomatoes. These cases either reported eating this particular brand of semi-dried tomatoes, or ate at one of two outlets of a large entertainment complex where this same brand of semi-dried tomatoes was served in a variety of dishes. Hepatitis A genetic material was detected in a sample of this brand of semi-dried tomatoes collected from the entertainment complex, with a use by date of 2/10/09. Product from this batch was also consumed by another case at another food outlet. Two further samples of this brand of semi-dried tomato collected from the entertainment complex, but with later use-by dates, were negative for hepatitis A virus.

Table 2. Outbreaks of foodborne/suspected foodborne illness in WA by month, setting and agent, 2009

Suspected mode of transmission	Outbreak Code	Month of Outbreak	Setting Exposed	Agent responsible*	Number affected	Evidence †	Responsible vehicles
suspected foodborne	02/09/RAF	Feb	aged care facility	Unknown	16	D	unknown
foodborne	042-2009-001	Feb	restaurant	*S*. Saintpaul	7	M	fried icecream
suspected foodborne	042-2009-002	Mar	restaurant	*S*. Singapore	6	D	unknown
suspected foodborne	042-2009-007	May	restaurant	*S*. Typhimurium PT 135, PFGE 0003	8	D	Unknown
suspected foodborne	042-2009-003	May	commercial caterer	*S*. Typhimurium PT 6, PFGE 0018	5	D	Unknown
foodborne	019-2009-003	May	community	Hepatitis A	5	M	raspberries
suspected foodborne	042-2009-004	Jun	restaurant	*S*. Typhimurium PT135a, PFGE 0200	7	D	Unknown
foodborne	042-2009-005	Jul	community	0279	31	M	Vietnamese Pork Roll
foodborne	042-2009-008	Aug	community	*S*. Saintpaul	17	M	pawpaw
foodborne	09/09/WAK	Sept	private residence	Norovirus	15	A	Rice paper rolls
suspected foodborne	021-2009-001	Oct	restaurant	Listeria	2	M	cooked chicken cross contamination
foodborne	042-2009-009	Oct	restaurant	*S*. Typhimurium PT170, PFGE 0011	32	D	raw egg mayonnaise
foodborne	042-2009-006	Oct	restaurant	*S*. Typhimurium PT170, PFGE 0011	39	A	scrambled eggs
foodborne	019-2009-002	Nov	community	Hepatitis A	9	M	semi-dried tomatoes
foodborne	11/09/MEL	Nov	private residence	Norovirus	8	D	unknown
Foodborne	042-2009-010	Dec	restaurant	*S*. Typhimurium PT170, PFGE 0011	7	D	scrambled eggs
suspected foodborne	12/09/AMA	Dec	restaurant	Norovirus	22	D	unknown
Suspected	12/09/BLU	Dec	restaurant	Norovirus	11	D	unknown
Suspected	12/09/ESP	Dec	restaurant	Norovirus	18	D	unknown
Suspected	12/09/BIC	Dec	camp	Norovirus	14	D	unknown

* PT= Phage type, PFGE=Pulsed field gel electrophoresis

† D = descriptive, M= microbiological, A=Analytical

Suspected foodborne outbreaks

4.1.9 Residential care facility (RCF) outbreak

There was a suspected foodborne outbreak at a metropolitan RCF notified in Febuary 2009, with 16 of 48 residents of a high care unit having diarrhoea (one case vomited) with onset of illness over a two day period and a median duration of 1.5 days. Two members of staff were also ill with diarrhoea and vomiting. Consuming vitamised food was strongly associated with illness (OR 11.5, CI 1.9-116.6) and consuming non-vitamised food was protective. Thirteen faecal samples were negative for common bacterial and viral pathogens and bacterial toxins. Two stools were positive for *Clostridium perfringens* but had different PFGE profiles. There was no food remaining from the period prior to onset of illness, and samples of more recent food that had been vitamised were negative for common bacterial pathogens and toxin. The aetiological agent and mode of transmission were not identified, but the clinical and epidemiological picture was consistent with that of a *C. perfringens* outbreak.

4.1.10 Asian restaurant *Salmonella* Singapore outbreak

Ten cases of *S*. Singapore were notified in the period from 23/2/09 to 12/03/09, of which seven were female and three male, with ages ranging from 21 to 60 years. Five cases had eaten at the same outlet of an Asian franchise restaurant between 14/2 and 16/2. One other case ate at a different outlet of the same restaurant franchise on 21/2. Of the six cases who had eaten at the same franchise, 4 had eaten chicken dishes and 3 had eaten fish dishes. There were no reports of staff illness, and chicken meat samples were negative for *Salmonella*. The mode of *Salmonella* transmission at the restaurant franchise was not identified. Isolates of the 10 cases had an indistinguishable PFGE pattern. For the four cases who had not been to the restaurant franchise, no common foods or exposures were identified, although three cases had eaten Asian food at different premises.

4.1.11 Chinese food outlet, *Salmonella* Typhimurium phage type 135, PFGE type 0003

There were 17 cases of STM PFGE type 0003 cases (phage type 135) notified in the period from April to early June. Of these cases, eight reported eating or attending the same Chinese food outlet located at a metropolitan food hall. Onset of illness for these cases ranged from the 3/4/09 to 18/05/09, with a median incubation period of 2 days. Four males and four females were affected, with a median age of 39 years. The cases ate a range of food from the food outlet including noodles, honey chicken, satay beef, chicken on a stick and omelettes. An environmental investigation found the premises to have satisfactory food preparation and hand hygiene practices. Food samples and swabs were negative for *Salmonella*. Although this outbreak was suspected to be foodborne, the mode of *Salmonella* transmission was not identified. No common exposure could be identified for the nine cases who had not eaten at the food outlet.

4.1.12 Mother's day lunch, *Salmonella* Typhimurium phage type 6, PFGE type 0018

Two cases of STM PFGE type 0018 (phage type 6) were part of an extended family party of 10 who attended a catered mother's day lunch on 10/5/09 at a European community function centre. Three other members of this party were also ill. The party of 10 included three family groups, none of which shared common food in the weeks prior to or following the lunch. One male and four females were affected, with a median age of 43 years. The median incubation period was 2 days. Food at the luncheon was served as a buffet and included lamb, pasta, pork, chicken, salads and cakes. As there was no booking list other cases could not be identified. No further cases of this PFGE type were notified in June or July. An environmental investigation found that the premises were not registered for food preparation, although the premises were clean and well organised, and food preparation practices were satisfactory. Although this outbreak was suspected to be foodborne, the mode of *Salmonella* transmission was not identified.

4.1.13 Frozen berries, hepatitis A

There were five WA-acquired hepatitis A cases notified in May - a higher than expected number - comprising two males and three females, ranging in age from 3 to 50 years. These five cases were from one regional area of WA, and genetic sequencing of hepatitis A virus from three cases showed that they shared the same genetic strain. The other two cases were not genotyped. Four of the five cases reported that they had eaten frozen berries during the incubation period. Frozen raspberries were sampled from the home of one case and were positive for hepatitis A genetic material. Traceback could not identify a common supplier for the frozen berries consumed by the cases.

4.1.14 Function centre, *Salmonella* Typhimurium phage type 135a, PFGE type 0200

Seven cases of STM PFGE 0200 notified between 22/5/09 and 29/06/09 included three males and four females, with a median age of 17 years. Five cases had attended a wedding reception on 3/05/2009 and two cases had attended a christening on 17/05/2009 at the same function centre. The incubation period ranged from 1-7 days. An Italian buffet with similar foods was served at both functions. There were no further reports of illness. Foods eaten by cases from both functions were prosciutto (4/7), pizza (3/7), icecream (3/7), and squid (2/7) and food garnished with parsley and snow pea sprouts. An environmental investigation found that the premises had satisfactory food storage, preparation and hand hygiene practices. A range of food samples were negative for *Salmonella*. Although this outbreak was suspected to be foodborne, the mode of *Salmonella* transmission was not identified.

4.1.15 *Listeria*

Two listeria cases with isolates with an indistinguishable PFGE pattern had visited the same café during their exposure period. An 82 year old female with diabetes had eaten bacon and eggs on toast at a café in a rural town during

her exposure period. Her onset date was approximately 13/9/09. A materno-foetal pair with listeria infection had an onset date of 1/10/09. The mother had also eaten bacon, eggs, sausage and salad at the same café. During an environmental investigation an unopened packed of cooked chicken meat from the café was sampled, and *Listeria* was isolated which had a PFGE type indistinguishable from the cases, indicating possible cross-contamination of chicken meat with foods eaten by cases.

4.1.16 Restaurant outbreak, norovirus

In December 2009 a suspected foodborne outbreak was associated with a Thai Restaurant. At least 22 people who ate at the restaurant from 9/12 to 11/12 became ill with gastrointestinal symptoms. Four specimens were positive for norovirus. Affected people ate from three different banquet menus and also from an a la carte menu. An environmental health investigation of the restaurant identified a number of food handling deficiencies, including inadequate temperature control and inadequate storage of foods, which may have resulted in cross-contamination. The restaurant owners reported that no staff had been ill with gastroenteritis in the prior month. A cohort study was conducted with 15 members from one group, 9 of whom developed illness, but there were no significant associations between illness and any of the foods consumed. This was a suspected foodborne outbreak as the outbreak was point source, the restaurant was the only common exposure among the ill people, and there was no history suggesting an environmental exposure (e.g. vomitus) at the restaurant.

4.1.17 Restaurant outbreak, norovirus

A group of 22 people attended a set menu lunch at a café on 11/12/09. Of the 19 people interviewed, eight were ill with diarrhoea and/or vomiting, with onset of illness beginning on the 12/12/09, with median incubation period of 37 hr. The median duration of illness was 2 days. One stool specimen was positive for norovirus. In the four days prior to the lunch, there were no reports of other functions, food shared or gastroenteritis among attendees. Two of the ill

people had no prior contact with other members of the group in the week before attending the lunch. One of the ill people did not visit the café toilet, which can be a potential norovirus exposure. A case-control study was conducted but illness was not associated with a particular food. Three café staff were also reportedly ill on the 12/12/09 and one staff member was diagnosed with norovirus. It was reported that restaurant staff did not eat the café food. A booking list was not provided by the restaurant, so it was difficult to determine the extent of the outbreak. This was a suspected foodborne outbreak as it was point source, the café was the only common exposure among the ill people and there were no reports of environmental contamination.

4.1.18 Restaurant outbreak, norovirus

A group of 42 people attended a buffet lunch at a restaurant on 8/12/09. Of the 22 people interviewed with a structured questionnaire, 11 were ill with diarrhoea and/or vomiting, with a median incubation of 19 hours and a median duration of 2 days. Prior to the lunch, the ill people had no recent contact with each other. Two people were diagnosed with norovirus. Data analysis found no association between illness and a specific food. Other people who attended the restaurant during the period 7/12/09 to 9/12/09 were contacted and,a further seven people from four groups reported gastroenteritis symptoms and duration consistent with norovirus infection following restaurant attendance. No gastroenteritis illness was reported by restaurant staff in the four weeks prior to the 8/12/09. This was a suspected foodborne outbreak as the pattern was point source, the restaurant was the only common exposure among the ill people from the group of 42 people and also among another group of three people.

4.1.19 Camp outbreak, norovirus

A group of 25 campers arrived at a campsite at 5 pm on 4/12/09 and departed in the afternoon of the 6/12/09. This campsite had dormitory style accommodation. The food for this group was catered by campsite staff. Of 24 campers interviewed with a structured questionnaire, 12 were ill with

diarrhoea and/or vomiting, with onset dates from 5/12/09 to 8/12/09. The median duration of illness was 1 day. Prior to attending the campsite, five of the ill people had no recent contact with each other. Camp staff, including food handlers, completed an illness questionnaire and two staff (not food handlers) were ill on 5/12/09. One camper and one staff member were diagnosed with norovirus. There were no confirmed reports of gastroenteritis among groups who attended the campsite in the week prior to the 4/12/09. An analysis of data from campers found no association between illness and a specific food. Drinking Milo® on Friday night was associated with illness, although this does not explain all the illness (3/10 ill people interviewed did not drink Milo®). The norovirus transmission at the camp was suspected to be foodborne as it was a point source outbreak, the camp was the only common exposure among the ill people and there were no reports of environmental contamination.

4.2 Non Foodborne Outbreaks

There were 174 outbreaks of gastroenteritis reported in 2009 that appeared to be non-foodborne, 134 (77%) of which occurred in aged care facilities, 29 (17%) in hospitals, four (2%) in child care centres, three (2%) in schools and one each at a camp, military institution, on a train and on a cruise ship (Table 3). The causative agent for 118 (68%) of the outbreaks was confirmed as norovirus, for three of the outbreaks the causative agent was rotavirus, for two of the outbreaks both norovirus and rotavirus were detected and one outbreak was caused by *Cryptosporidium.* In the remainder of the outbreaks (29%) the causative agent was unknown either because a pathogen was not identified during testing, specimens were not collected, or viral testing was not requested. There was a total of 4737 people affected by these outbreaks. The number of non-foodborne gastroenteritis outbreaks in 2009 (174) was 54% higher than in 2008 (113) and there was approximately double the number of people affected by these outbreaks in 2009 compared with 2008. The number of gastroenteritis outbreaks reported varied by month (Figure 23), peaking in December, following a relatively sustained high number of outbreaks

beginning in June. In previous years the highest number of outbreaks were seen in the winter or spring months.

Table 3. Outbreaks of non-foodborne gastrointestinal illness in WA by month, setting and agent, 2009

Month	*Setting exposed*	*Agent Responsible*	*Affected*	*Hospitalised*	*Deaths* *
January	Aged Care (2) † Hospital (1)	Norovirus (2) Unknown (1)	72	4	1
February	Aged Care (5)	Norovirus and Rotavirus (1) Unknown (4)	65	1	0
March	Aged Care (3) Hospital (1) School (1) Child Care (1)	Norovirus (3) Cryptosporidium (1) Unknown (2)	125	0	0
April	Aged Care (2) Hospital (1) Child Care (2) Cruise (1)	Norovirus (2) Rotavirus (1) Unknown (3)	234	1	2
May	Aged Care (9) Hospital (1) Child Care (1)	Norovirus (7) Unknown (4)	297	9	7
June	Aged Care (16) Hospital (1)	Norovirus (14) Unknown (3)	544	16	8
July	Aged Care (14) Hospital (3)	Norovirus (11) Rotavirus (1) Unknown (5)	445	11	4
August	Aged Care (13) Hospital (2) Camp (1) Train (1)	Norovirus (13) Rotavirus (1) Norovirus and Rotavirus (1) Unknown (2)	465	11	2
September	Aged Care (15) Hospital (4) School (1)	Norovirus (16) Unknown (4)	612	12	8
October	Aged Care (13) Hospital (3) Military (1)	Norovirus (13) Unknown (4)	364	3	2
November	Aged Care (17) Hospital (5) School (1)	Norovirus (15) Unknown (8)	787	10	3
December	Aged Care (25) Hospital (7)	Norovirus (22) Unknown (10)	727	32	7
Total			**4737**	**110**	**44**

† (n) = number of outbreaks

* Deaths temporally associated with gastroenteritis, but contribution to death not specified

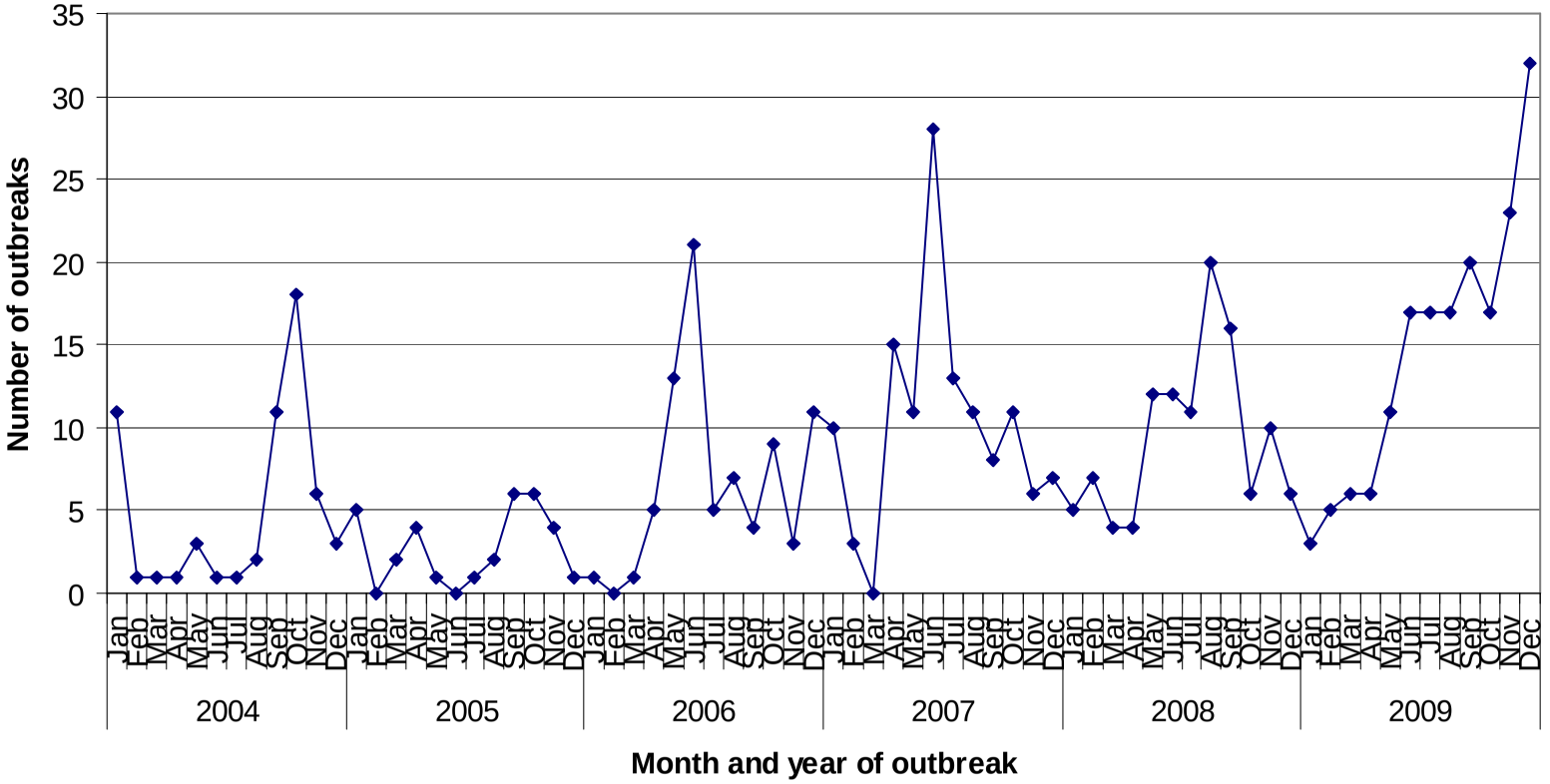

Figure 23. Number of non-foodborne gastroenteritis outbreaks reported in WA, 2004 to 2009

5.0 Cluster investigations

5.1 *Shigella sonnei* biotype A

Two cases of *S. sonnei* biotype A residing in the same Kimberley regional town were notified on successive days in early January 2009. A child fostered by one case regularly had gastroenteritis and had onset of diarrhoea on 19/12/08. A faecal specimen collected from the child 14 days after onset was negative for *Shigella* but positive for *Cryptosporidium*. The foster carer had hosted a dinner party on the 20/12/08, and 5 of 8 people attending became ill with gastroenteritis 1-2 days after the meal. Two of the 3 faecal specimens from people who attended the dinner party were positive for *S. sonnei* biotype A. The mode of *Shigella* transmission at the residence was not identified.

5.2 *Shigella flexneri* 3B

There were five residents of a remote Kimberley Aboriginal community notified with *Shigella flexneri* 3B between 16/1/09 and 3/3/09. This *Shigella flexneri* type is uncommon in WA, with only three previous cases reported (two in 2002 and one in 2003). All cases were from different households within the community. Gastroenteritis is common in this community and person-to-person transmission was suspected. However, problems with drinking water quality and sewerage were also identified.

5.3 Shiga toxin *E. coli* serotype O157

There were three cases of STEC serotype O157:H- notified in March, two males and one female, with dates of onset ranging from 2/3/09 to 18/03/09. Two cases were from metropolitan Perth and one case from South-West WA. Several common food types had been consumed by cases, but no source was identified. Isolates had different PFGE and MLVA types from each other, and these were distinct from types identified from isolates from a concurrent multistate outbreak investigation.

5.4 *Salmonella* Singapore

A *S*. Singapore cluster of seven cases with onset dates from 8/4/09 to 28/4/09 was investigated. There were four males and three females, with ages ranging from <1 to 74 years, median age 17 years. Five cases resided in metropolitan Perth, and two resided in rural areas. Cases were interviewed and no common exposure was identified. Isolates from these cases had three different PFGE types, indicating a common exposure was unlikely.

5.5 *Salmonella* Typhimurium PFGE Type 0039

A cluster of four cases of STM PFGE type 0039 (not phage typed) in an extended family was investigated. The age of cases ranged from 26 to 82 years, with three males and one female. Onset dates for two of the cases were 1/5/09 and 2/5/09, and onset dates for the other two cases were 5/5/09 and 6/5/09, indicating transmission may have been person to person.

Table 4. Cluster investigations in WA by month, setting and agent, 2009

Month	*Setting*	*Agent responsible*	*Affected*	*Hospitalised*	*Deaths*	*Epidemiolgical Study*[†]
January	private residence	*Shigella sonnei* biotype A	5	0	0	D
February	community	*Shigella flexneri* biotype 3B	5	3	0	D
March	community	Shiga toxin producing *E. coli* serotype O157	3	1	0	D
April	unknown	*Salmonella* Singapore	8	2	0	D
June	unknown	*Salmonella* Typhimurium	4	2	0	D
Total			75	7	0	

[†] D = descriptive case series

6.0 OzFoodNet WA research projects

6.1 Norovirus genotyping project

The norovirus genotyping project is a joint project between OzFoodNet WA and PathWest Laboratory Medicine. The objectives of the project are to investigate whether norovirus genotypes vary seasonally and between community and outbreak cases in WA. PathWest provided final laboratory testing results to OzFoodNet in late 2009. A final report for this project is being prepared.

6.2 STEC methods project

A final report was drafted for the project 'Comparison of Culture and PCR Methods for Testing Faecal Samples for the Presence of Shiga Toxin-producing *Escherichia coli'.* This was a joint project between OzFoodNet WA and PathWest Laboratory Medicine. It was concluded that PCR was a more sensitive method for detecting STEC, particularly for non-O157 *E. coli*. Recommendations of the report were that:

- WA should adopt a PCR method for STEC screening to improve the likelihood of detecting STEC outbreaks and potential HUS cases caused by non-O157 *E. coli*.
- Private laboratories in WA should be asked to forward faecal specimens with macroscopic blood or a history of bloody diarrhoea to PathWest for STEC testing by PCR??.

6.3 *Cryptosporidium* project

There was continued collaboration with Associate Professor Una Ryan at Murdoch University on the molecular typing of *Cryptosporidium* strains. A case-control study of sporadic cases has been approved by Department of

Health Ethics Committee. This project will match *Crytosporidium* molecular types to exposure data determined by interview of cases or their carers.

7.0 Prevention measures

The following actions were undertaken during 2009 to prevent foodborne and gastrointestinal disease:

Publications

- An article co-authored by OzFoodNet epidemiologists was published in 'The Journal of Food Protection' in May 2009. The paper is titled 'An Outbreak of *Salmonella enterica* Serotype Litchfield Infection Linked to Consumption of Contaminated Papaya.'
- An article co-authored by OzFoodNet epidemiologists was published in 'Clinical Infectious Diseases' in July 2009. The paper was titled 'Serogroup specific risk factors for shiga toxin producing *Escherichia coli* infection in Australia.'
- An article co-authored by OzFoodNet epidemiologists was published in 'The Medical Journal of Australia' in August 2009. The paper was titled 'Two Cases of Anticholinergic Syndrome Associated with Consumption of Bitter Lupin Flour'.

Presentations

- Presentation to Public Health Unit nurses on gastroenteritis outbreaks in Aged Care Facilities, February 2009.
- Training session conducted for staff from a RCF Organisation on management of gastroenteritis outbreaks in Aged Care Facilities, February 2009.

- Presentation on ‘Hepatitis A Vaccination in WA’ at OzFoodNet Meeting Brisbane, February 2009.
- Presentation of an outbreak training exercise at a Disaster Preparedness Training Workshop, April 2009.
- Presentation on ‘Preventing Gastroenteritis’ at Department of Mines and Petroleum, June 2009.
- Presentation on ‘Burden of gastrointestinal infections in Indigenous populations’ at OzFoodNet meeting Perth, October 2009.
- Presentation on ‘Investigation of *Salmonella* Saintpaul outbreak due to pawpaws’ at OzFoodNet meeting Perth, October 2009.
- Presentation on *S*. Saintpaul outbreak associated with pawpaw consumption to PathWest staff, November 2009.
- Presentations on hepatitis A and gastroenteritis in Aged Care Facilities at Population Health Unit Nurses Update, December 2009.

Policy Documents

- Ongoing review of Western Australian exclusion guidelines for enteric disease.

Committee membership

- Membership of an on-going working group with membership from PathWest Clinical Microbiologists, Food & Environmental Laboratory Microbiologists and Environmental Health Food Unit, which aims to enhance foodborne surveillance, including the improvement of data sharing, in WA.

Meetings Attended

- One epidemiologist attended the February OzFoodNet Face-to-Face meeting in Brisbane.

- One epidemiologist attended the May OzFoodNet Face-to-Face meeting and WHO Global Salm-Serv steering committee meeting in Canberra.
- WA OzFoodNet Epidemiologists hosted and attended the October OzFoodNet Face-to-Face meeting in Perth.

8.0 References

1. Australian Government, 2008. *The Australian Immunisation Handbook 9th Edition*, Australian Government Canberra.

9.0 Acknowledgements

Acknowledgement is given to the following people for their assistance with the activities described in this report: Dr Gerry Harnett, Mr Brian MacKenzie, Ms Lyn O'Reilly, Ms Jennifer Green, Mr Ray Mogyorosy and the staff from the enteric, PCR and food laboratories at PathWest Laboratory Medicine WA; Mr Bill Calder and Food Unit staff from WA Health; Public Health Nurses from the metropolitan and regional Population Health Units; Environmental Health Officers from Local Government organisations throughout WA.

Appendix 1: Number of notifications, notification rate and ratio of current to historical mean by pathogen/condition, 2004 to 2009, WA

Pathogen/Condition	Year													
	2004 (n=1,973,671)		2005 (n=2,000,459)		2006 (n=2,036,426)		2007 (n=2,080,539)		2008 (n=2,138,491)		2009 (n=2,207,113)		Mean Rate 2004-2008[4]	Rate Ratio 2009 to mean[5]
	No.	Rate[3]	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate		
Campylobacter	1939	97.8	2450	121.5	1949	94.6	2102	99.8	1836	84.6	2597	117.7	99.6	1.18
Salmonella	621	31.5	798	39.9	798	39.2	985	47.3	849	39.7	1113	50.4	39.5	1.28
Rotavirus[2]	-		-				724	34.8	424	19.8	418	18.9	27.3	0.69
Cryptosporidiosis	125	6.3	183	9.1	251	12.2	611	29	164	7.6	235	10.6	12.8	0.82
Shigella	111	5.6	155	7.7	129	6.3	102	4.8	169	7.8	122	5.5	6.4	0.85
Hepatitis A	57	2.9	54	2.7	71	3.5	21	1.0	22	1.0	36	1.6	2.2	0.73
Listeria	9	0.46	4	0.20	13	0.64	2	0.10	8	0.37	15	0.67	0.4	1.92
Vibrio parahaemolyticus	3	0.15	0	0	3	0.15	9	0.43	7	0.33	9	0.41	0.2	2.05
Typhoid fever	5	0.25	8	0.40	11	0.53	9	0.43	8	0.37	8	0.36	0.4	0.9
STEC[1]	0	0	12	0.60	3	0.15	2	0.10	0	0	6	0.27	0.2	1.35
Hepatitis E	3	0.15	2	0.10	1	0.05	0	0	6	0.28	5	0.23	0.1	2.3
Paratyphoid fever	13	0.65	4	0.20	1	0.05	3	0.14	3	0.14	5	0.23	0.2	1.15
Yersinia	1	0.05	2	0.10	3	0.15	5	0.24	7	0.33	3	0.14	0.2	0.7
Cholera	1	0.05	1	0.05	0	0	0	0	2	0.09	0	0	0.04	-
HUS[1]	1	0.05	1	0.05	0	0	0	0	0	0	0	0	0.02	-
Total	2889	146	3674	184	3233	159	4575	220	3505	164	4572	207	174	1.19

[1]Abbreviations: STEC: Shiga-toxin producing *E. coli*; HUS: Haemolytic Uraemic Syndrome [2]Rotavirus was made notifiable in July 2006 [3]Rate is cases per 100 000 population
[4]Mean of rates between 2004 and 2008 where applicable [5]Ratio has not been calculated for diseases with a small number of cases