Government of **Western Australia**
Department of **Health**
Public Health

OzFoodNet – Enhancing Foodborne Disease Surveillance Across Australia

Annual Report 2008 Western Australia

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Summary and Recommendations

This report contains a summary of OzFoodNet WA enteric disease surveillance activities in 2008.

The overall notification rate for all notifiable enteric diseases in 2008 was 164 per 100 000 population (3502 notified cases). This was lower than for 2007, and also lower than the mean of the previous four years. *Campylobacter* was the most commonly notified enteric disease in 2008, comprising 52% of enteric notifications. *Salmonella* and rotavirus infections were the 2nd and 3rd most commonly notified enteric infections.

Notification rates for a number of enteric diseases were lower in 2008 than in previous years. *Campylobacter*, Rotavirus, *Cryptosporidium* and hepatitis A infection rates were lower in 2008 than the mean of the previous four years. The notification rate for *Salmonella* was similar to the mean of the previous four years, and the *Shigella* rate was higher than the mean of the previous four years. The notification rate for hepatitis A was lower in 2007 and 2008 than for any of the previous 10 years, and this is likely to have resulted from the 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, as there were no hepatitis A notifications for this age group. For most of the enteric infections notification rates were also higher for Aboriginal as compared to non-Aboriginal people. The greatest difference in rate was for *Shigella* infection, with the notification rate for Aboriginal people 34 times that for non-Aboriginal people. Notification rates for Aboriginal children in the 0 to 4 year age group were particularly high. For most of the enteric diseases the Kimberley region had the highest notification rates for both Aboriginal and non-Aboriginal people.

There were four outbreaks of foodborne or suspected foodborne disease investigated in WA in 2008. The largest suspected foodborne outbreak was a norovirus outbreak associated with a restaurant venue, which affected 75 people. Patrons who ate at the restaurant on two consecutive days were affected. Another norovirus outbreak at an aged care facility that affected 42 people was also suspected to be caused by consumption of norovirus contaminated food. A third outbreak was associated with a

BBQ lunch at a mine-site. The most likely source was ingestion of *Clostridium perfringens* toxin associated with BBQ chicken. A fourth outbreak was caused by *Salmonella* Typhimurium phage type 9 and the suspected food vehicle was undercooked chicken.

There were 113 non-foodborne gastroenteritis outbreaks reported in WA in 2008, which was lower than for the previous year. The causative agent for 48% of these outbreaks was confirmed as norovirus. Other outbreaks were caused by rotavirus and *Giardia*. Outbreaks were reported from aged care facilites (81%), hospitals (16%), child care facilites (2%) and ships (2%).

Recommendations:

It is recommended that:

- Further analysis of rates of enteric disease in Aboriginal people should be carried out to provide more detailed information that could guide public health action.
- Geographical clustering of hepatitis A cases in the north metropolitan area, and possible preventative public health measures, should be investigated.

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1.0 Introduction

This report describes enteric disease surveillance activities for 2008, as carried out by OzFoodNet WA, which is part of the Communicable Disease Control Directorate (CDCD) of the Western Australian Department of Health (WA DOH).

Western Australia 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 Population 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 in Perth, Western Australia is responsible for the whole of WA - total population approximately 2.1 million. Two epidemiologists coordinate activities in Western Australia, 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.

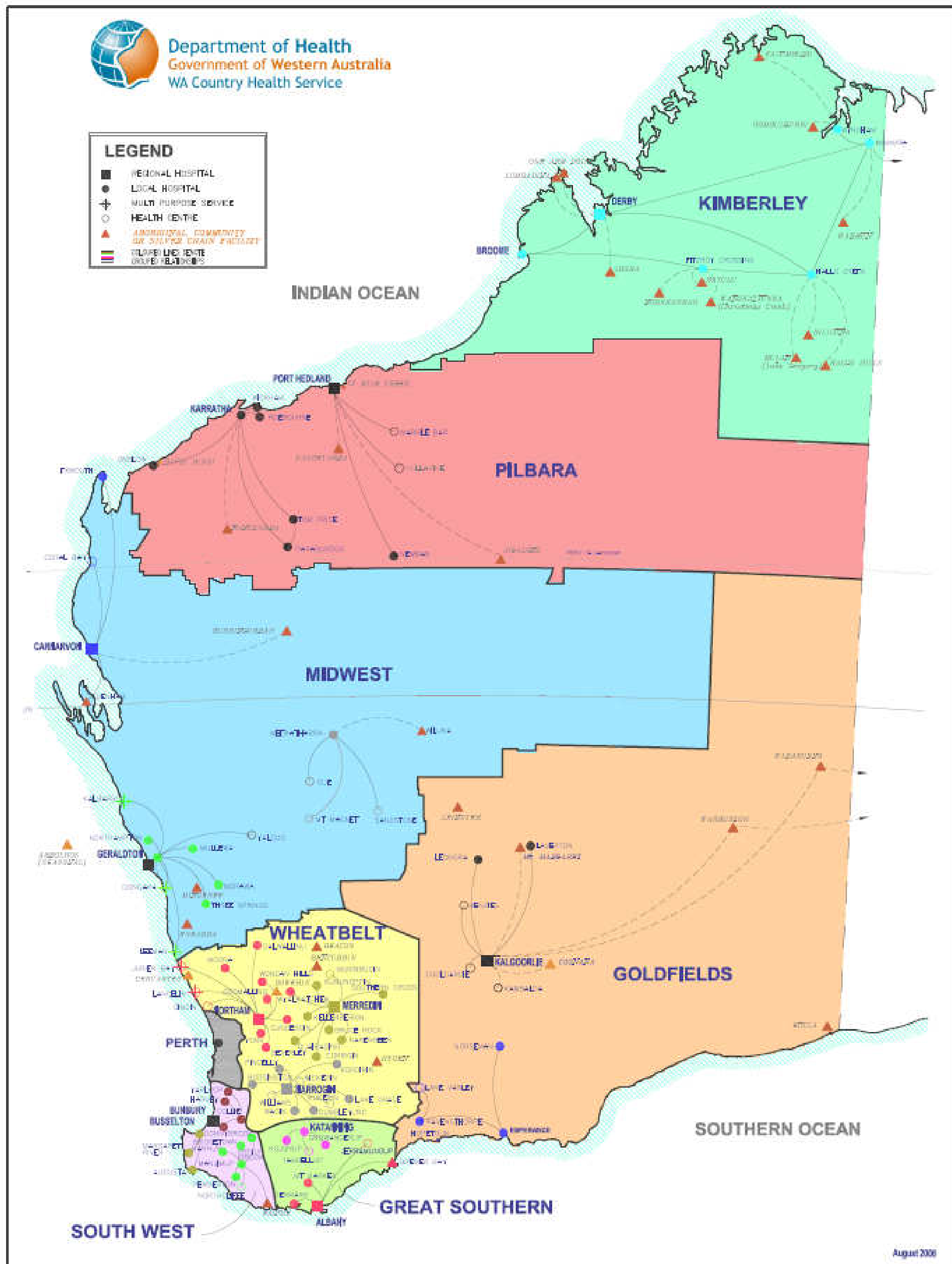

Figure 1. Map of population health regions in Western Australia –urban Perth is divided into North and South Metropolitan regions

On a local level, the OzFoodNet epidemiologists regularly liaise with staff of the Food Unit of the Environmental Health Directorate of the Department of Health; the Food

Hygiene, Diagnostic and Molecular Epidemiology laboratories at PathWest Laboratory Medicine WA; and the regional PHUs.

1.1 Data Sources and Methods

Estimated resident population figures for Western Australia for calculation of rates were obtained from the Rates Calculator version 9.4.1 designed by Dr. Jim Codde of the Department of 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 2,138,491 persons.

Notification data for Western Australia 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 2003 and analysed by optimal date of onset (ODOO) (the ODOO is a composite of the 'true' date of onset provided by the notifying doctor, 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).

Data on *Salmonella* serotypes 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, 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 practice need to be considered in interpreting data. 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. *Giardia* infection and amoebiasis were de-gazetted on 22 August 2007, so after this date were no longer notifiable diseases in Western

Australia. Prior to July 2007 *Salmonella* Typhimurium and *Salmonella* Enteritidis isolates were sent to the Microbiological Diagnostic Unit at the University of Melbourne for phage typing. At the beginning of July 2007 this was discontinued. From July 2007 all *Salmonella* Typhimurium isolates have been typed by PFGE.

2.0 Activity During Year

During 2008 the following activities were conducted at the West Australian OzFoodNet site:

- Ongoing surveillance and reporting of foodborne disease in Western Australia.

- Intensive investigation of seven cases of *Yersinia* infection and eight cases of infection with *Listeria*.

- Four investigations of foodborne or suspected foodborne outbreaks of gastrointestinal disease in WA. These investigations included one cohort and one case-control study.

- Eight cluster investigations of increased notification rates for a variety of *Salmonell*a serotypes / phage types.

- Investigation of 113 non-foodborne gastroenteritis outbreaks, 91 of which were at aged care facilities and 18 that were at hospitals.

- Involvement with national investigations into increased national incidence of *S*. Weltevreden, *Shigella sonnei* biotype G and *S*. Singapore.

- Attendance at OzFoodNet face-to-face meetings in Hobart in February, Adelaide in June and Melbourne in November.

- Involvement with OzFoodNet funded research projects, and in particular a retrospective survey of Norovirus genotypes in faecal samples from 2005 and 2006.

- Membership of a joint Department of Health Working Group aimed at improving data sharing within the Department of Health

3.0 Incidence of Foodborne Disease

In 2008 there were 3502 notifications of enteric disease in Western Australia. This equated to an annual rate of 164 per 100 000 population. This was lower than the mean rate for the previous four years, of 180 per 100 000 population.

3.1 Campylobacter

Campylobacter infection was the most commonly notified enteric infection in WA in 2008, comprising 52% of enteric notifications. There were 1 833 notified cases, giving a rate of 86 per 100 000 population (Appendix 1). This was lower than the rate for any of the previous four years. In 2008 *Campylobacter* notifications showed a similar seasonal pattern to previous years, with the number of notifications lower in the winter months and higher in the summer months (Figure 2).

The notification rate for *Campylobacter* infection was slightly higher for males than females in 2008, with rates of 89 and 83 per 100 000 population, respectively. *Campylobacter* notification rates for males were also higher than for females for the previous four years (Figure 3). *Campylobacter* notification rates were highest in the 0 to 4 year age group with a rate of 141 per 100 000. However, compared to notifications for other enteric infections, *Campylobacter* notifications were relatively evenly spread through the different age groups (Figure 4).

Data on Aboriginality was missing for 29% of *Campylobacter* notifications in 2008. The overall notification rate for Aboriginal people was 74 per 100 000 population, and the rate in non-Aboriginal people was 61 per 100 000 population. *Campylobacter* is unusual when compared to other enteric infections, in that rates were relatively similar for Aboriginal and non-Aboriginal people.

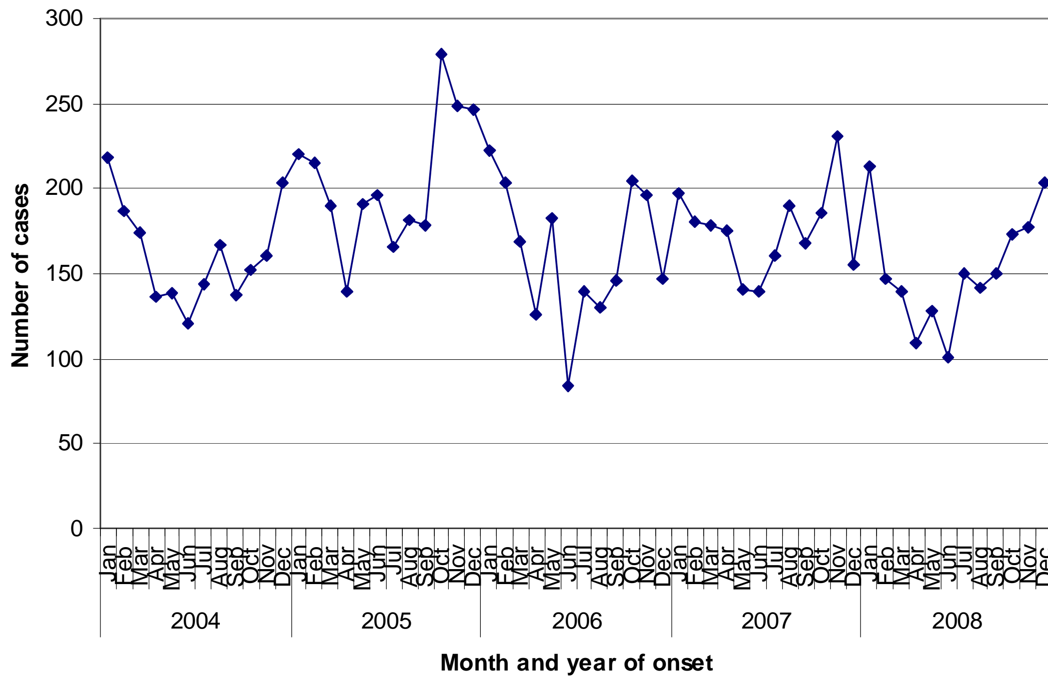

Figure 2: Number of cases of campylobacteriosis by month and year of onset, WA, 2004 to 2008

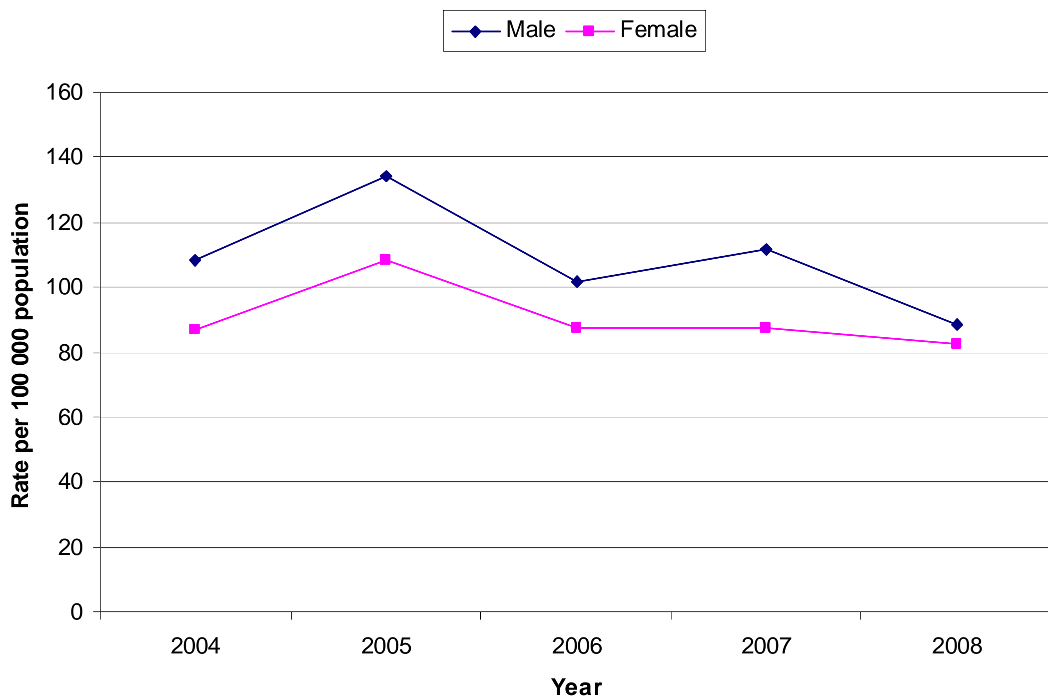

Figure 3. *Campylobacter* notification rates by sex, WA, 2004 to 2008

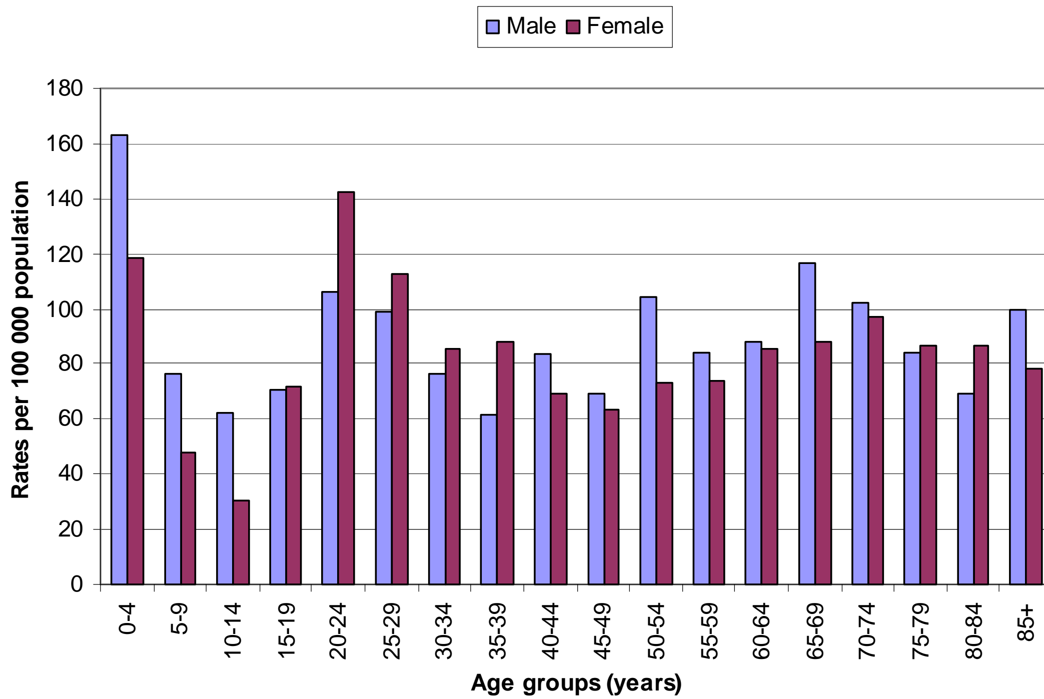

Figure 4. Age-specific notification rates for Campylobacteriosis by sex, WA, 2008

Campylobacter notification rates were also relatively similar in the different regions, where as for other enteric infections, rates are commonly higher for the northern and eastern regions. Notification rates in 2008 ranged from a lowest of 72 per 100 000 population for the Midwest to a highest of 132 per 100 000 population in the Southwest (Figure 5). For six of the eight regions, notification rates were lower for Aboriginal people as compared to non-Aboriginal people.

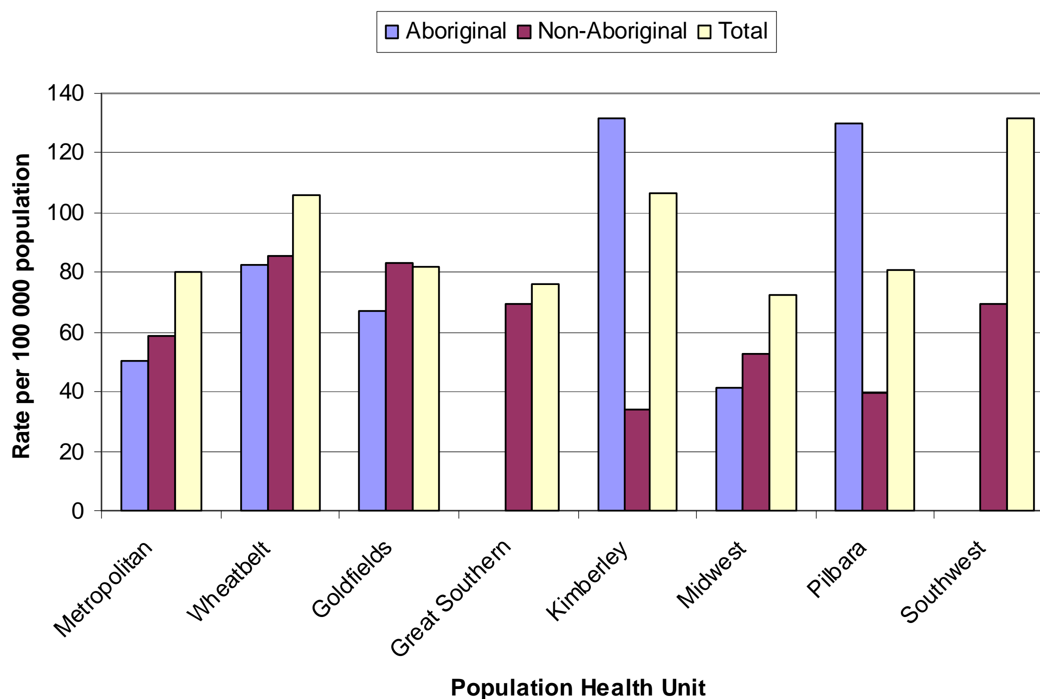

Figure 5. Campylobacteriosis notification rates by region and Aboriginality, WA, 2008

3.2 Salmonella

Salmonellosis was the second most commonly notified enteric infection in WA in 2008, with 849 notified cases (Appendix 1). The notification rate for *Salmonella* in 2008 (39.7 cases per 100 000 population), was lower than the previous year (47.3 cases per 100 000) and consistent with the previous four 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 2008, increases in *Salmonella* notifications were also noted in July and October. The highest number of *S.* Enteritidis notifications in a month was in July (n=21), and three clusters of *S.* Typhimurium were investigated in October (described in Section 5).

The overall notification rate for females (38 per 100 000 population) was similar to that for males (41 per 100 000). As in previous years the age group band with the highest notification rate was 0 – 4 years, with a notification rate of 189 per 100 000 population (Figure 7). The young adult age groups of 20 to 24 years, and 25 to 29 years, had the next highest notification rates (56 and 50 per 100 000 respectively).

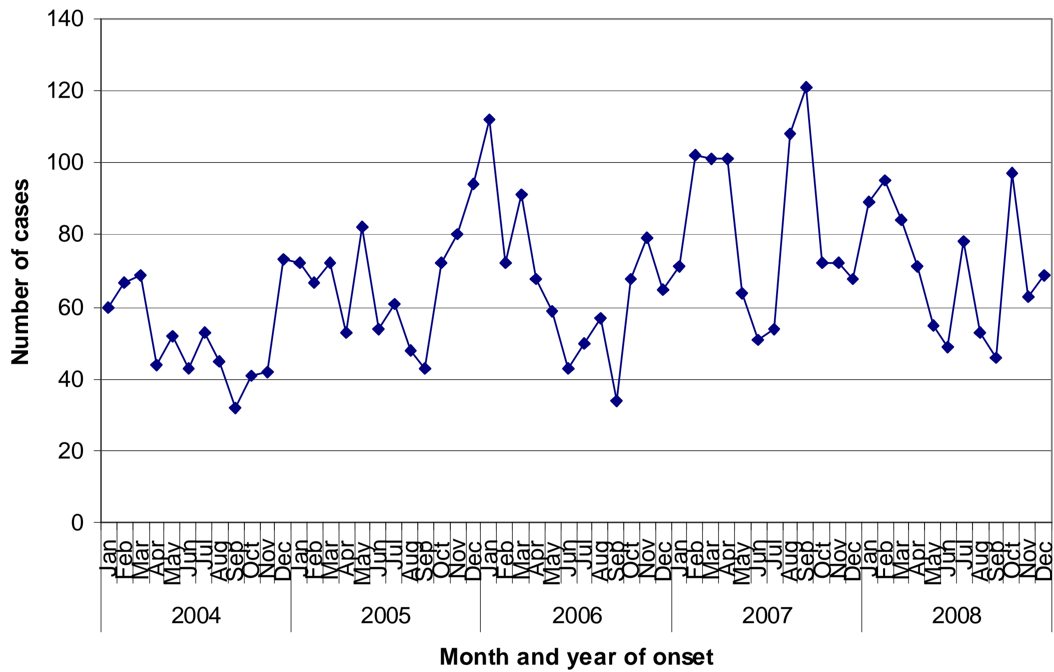

Figure 6. Number of cases of salmonellosis by month and year of onset, WA, 2004 to 2008

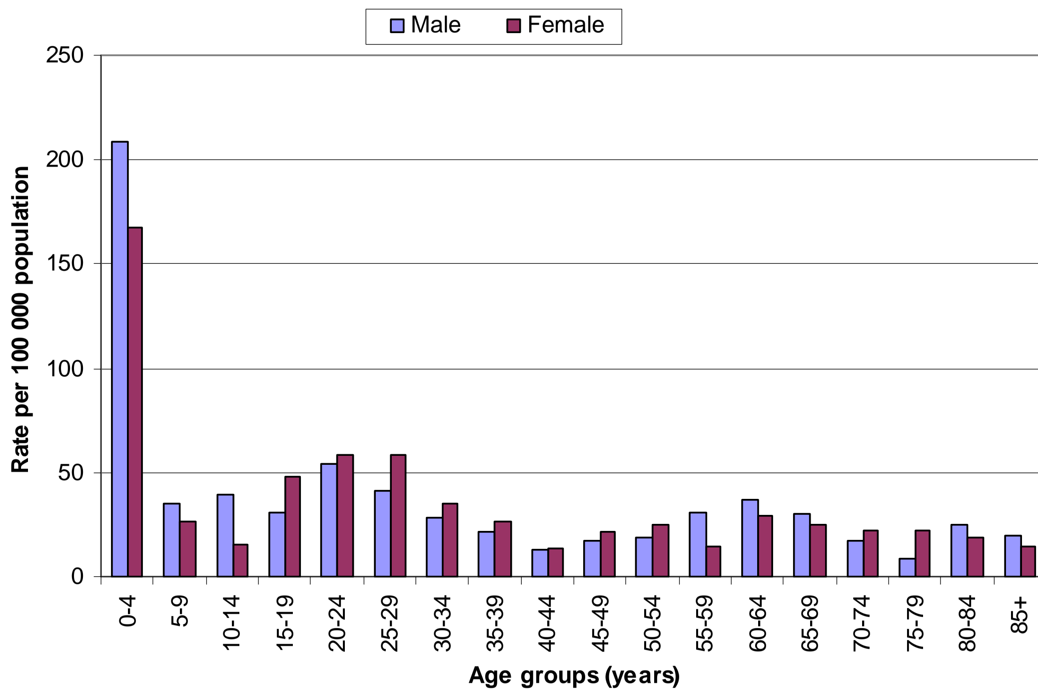

Figure 7. Age-specific notification rates for salmonellosis by sex, WA, 2008

Data on Aboriginality was missing for 16% of *Salmonella* cases in 2008, which was similar to the previous year. The overall *Salmonella* notification rate for Aboriginal people (128 per 100 000 population) was 4.3 times greater than the notification rate for non-Aboriginal people (30 per 100 000 population). For Aboriginal children in the 0 to 4 age group there were 734 cases of salmonellosis per 100 000 population, which was 6 times the notification rate for non-Aboriginal children in this age group (122 per 100 000) (Figure 8).

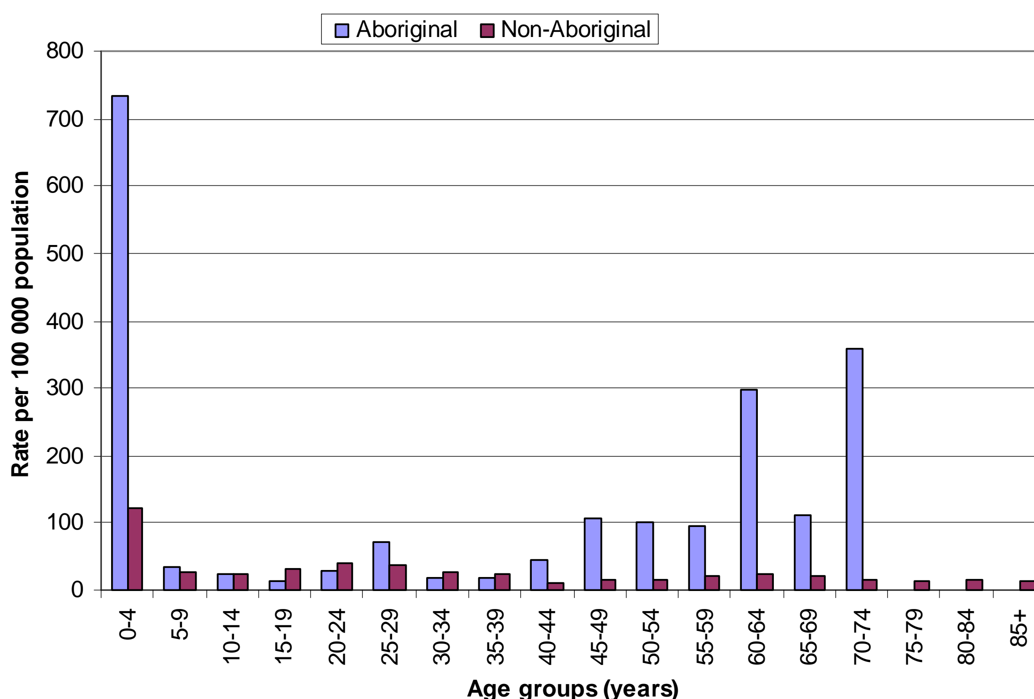

Figure 8. Age specific notification rates for salmonellosis for Aboriginal and non-Aboriginal people, WA, 2008

The region with the highest notification rate for salmonellosis in 2008 was the Kimberley region of WA with a notification rate of 286 per 100 000 population (Figure 9). This rate was 15 times greater than for the region with the lowest notification rate, the Wheatbelt region, which had 19 notified cases per 100 000 population. Notification rates in the Kimberley were higher for both Aboriginal and non-Aboriginal people compared with other regions.

The most commonly notified *Salmonella* serotype in WA in 2008 was *S.* Typhimurium, with 304 notifications (Table 1). The notification rate was approximately 30% higher than the mean of the previous four years. The second most commonly notified *Salmonella* serotype was *S.* Enteritidis (137 notifications),

with 91% of cases confirmed as travelling overseas during their incubation period. The number of notifications for *S.* Kiambu and *S.* Singapore were 3.1 times and 2.6 times greater respectively in 2008 than the four yearly mean. Cluster investigations into these increases are detailed in Section 5.

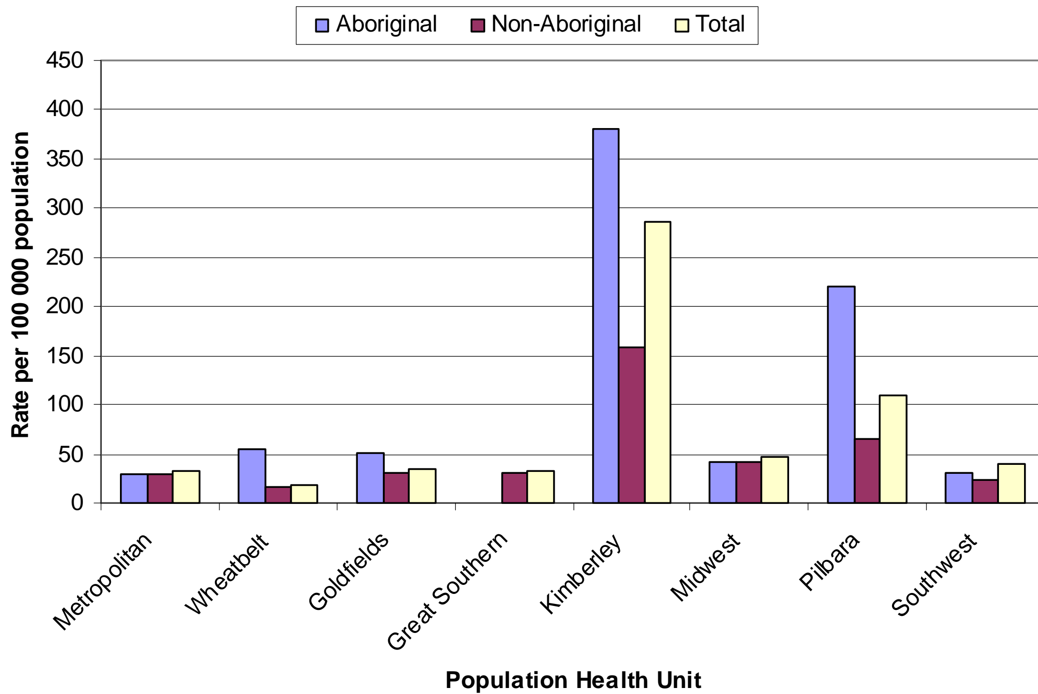

Figure 9. Salmonellosis notification rates by Aboriginality and by region, WA, 2008

Table 1. Number and proportion of the top 10 *Salmonella* serotypes notified in WA, 2008

Salmonella Serotype	2008 N	Proportion %*	Mean Number (2004-2007)	Ratio‡
Typhimurium	304	36	238	1.3
Enteritidis	137	16	88	1.6
Saintpaul	25	2.9	36	0.7
Chester	24	2.8	27	0.9
Muenchen	21	2.5	27	0.8
Kiambu	20	2.4	6.5	3.1
Stanley	19	2.2	13	1.5
Singapore	18	2.1	6.8	2.6
Salmonella species#	17	2.0	10	1.7
Paratyphi B var Java	17	2.0	21	0.8
Corvallis	16	1.9	10	1.6

*Proportion of total Salmonella cases notified in 2008.
‡Ratio of the number of reported cases in 2008 compared to the four year mean of 2004-2007.
#*Salmonella* serotyping information not available

3.3 Rotavirus

In 2008 rotavirus infection was the third most commonly notified enteric infection in WA, with 424 cases (19.8 per 100 000 population) (Appendix 1). In the two complete years following the introduction of rotavirus as a notifiable infection (which commenced in July 2006), monthly notification rates exhibited seasonal peaks. In 2007 there was a large increase in notifications in July to October, where as in 2008 there was a smaller increase in August to December (Figure 10). Cases in the peak months of 2007 were similar demographically to cases occurring in other months, with most cases occurring in the 0 to 4 age group and living in the Perth metropolitan area.

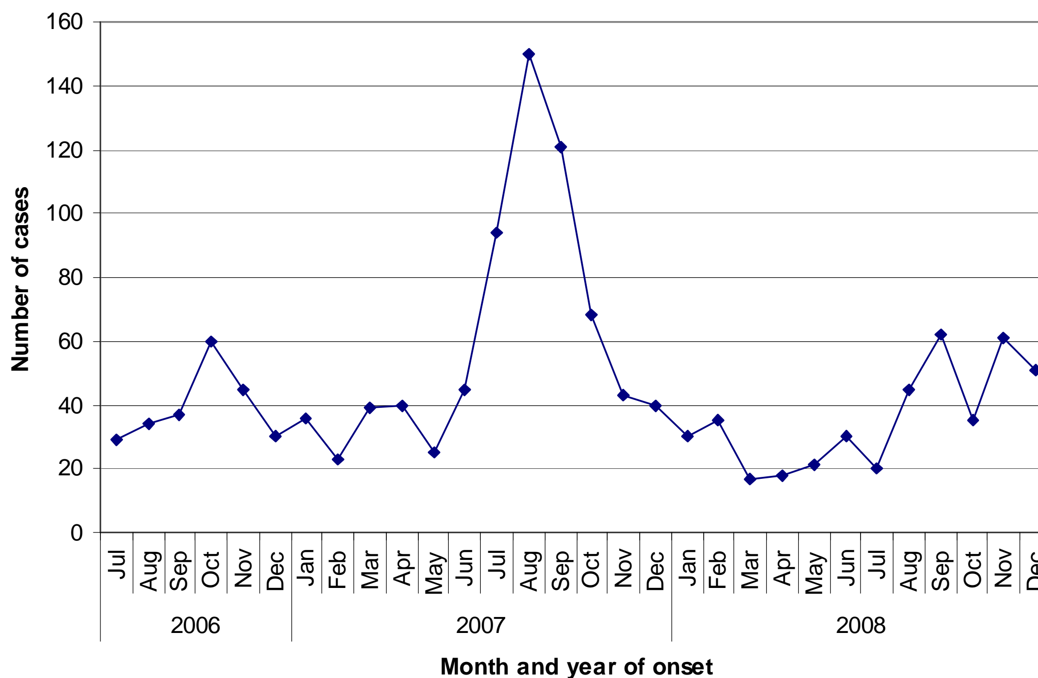

Figure 10. Number of cases of rotavirus infection by month of onset, WA, 2006 to 2008

In 2008 the notification rate was higher for females (21.4 per 100 000 population) than for males (18.2 per 100 000 population). As for most other enteric infections, the highest rotavirus notification rate was for children aged 0 to 4, with 278 (65%) of notifications falling within this age group (Figure 11). Rotavirus vaccination was introduced in July 2007, with a two dose schedule at 2 and 4 months of age. There were 111 rotavirus notifications in 2008 for children with a date of birth between 01/05/2007 and 30/08/2008, which is the cohort of children who should have been fully vaccinated (children born after that date in 2008 would have been less than 4 months old, so not expected to be fully vaccinated). Of these 111 cases, 62 (56%) were fully vaccinated, 16 were partially vaccinated, 15 were not vaccinated, 12 were ineligible for vaccination because they were less than 2 months old, and for 6 the vaccine status was unknown.

Indigenous status information was missing for 22% of rotavirus notifications. The notification rate for the Aboriginal population was 37 per 100 000 population, which was over twice that of the non-Aboriginal population (15 per 100 000 population).

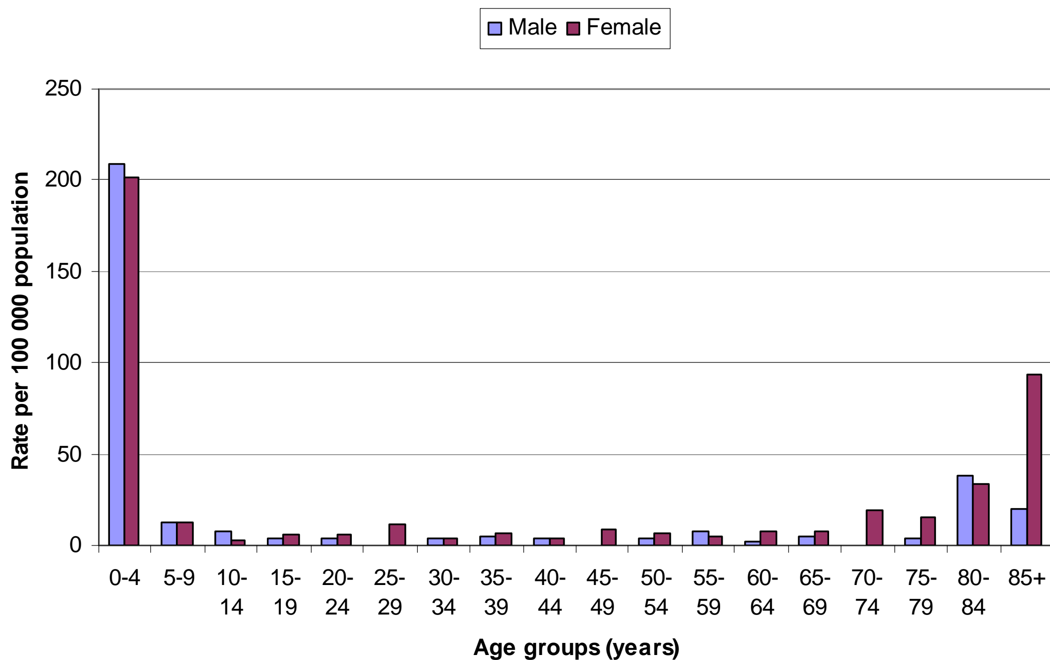

Figure 11. Age-specific notification rates for rotavirus by sex, WA, 2008

Rotavirus notifications were spread throughout the regions of WA, with total rates ranging from 5 per 100 000 in the Goldfields to 27 per 100 000 in the Kimberley (Figure 12). For the five regions with notifications for Aboriginal people, rates were higher for Aboriginal as compared to non-Aboriginal people.

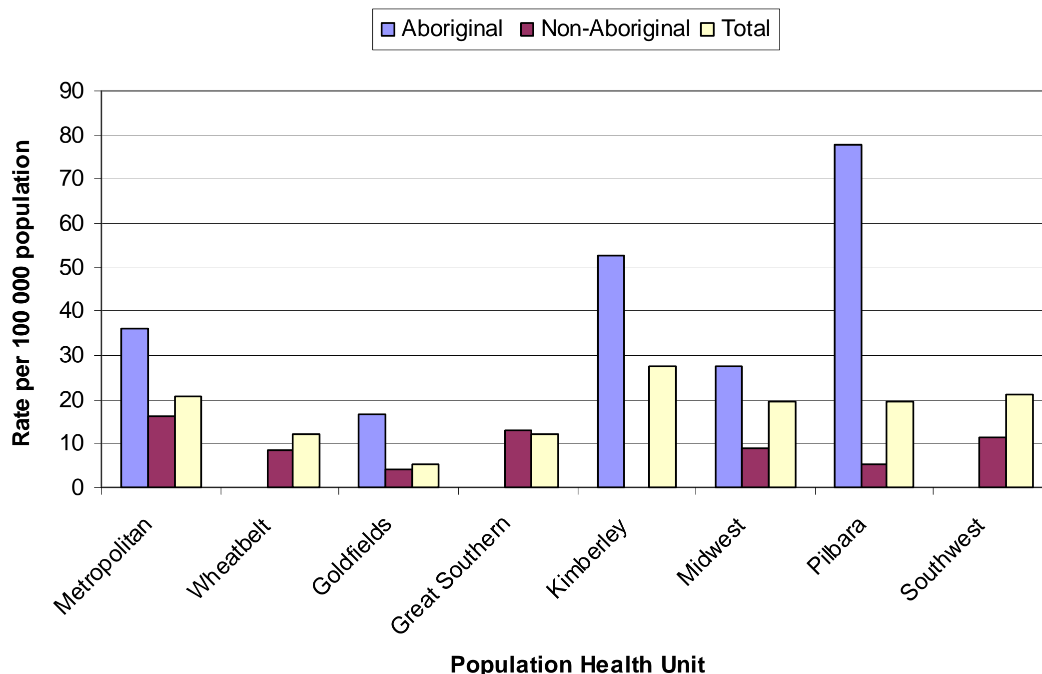

Figure 12. Rotavirus notifications by region and Aboriginality, WA, 2008

3.4 Cryptosporidium

There were 164 cases of cryptosporidiosis notified in 2008, which was a rate of 7.7 cases per 100 000 population (Appendix 1). The number of cases in 2008 was similar to that recorded in the previous four 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 2008 the number of notifications was generally lower through the winter and higher in the summer months.

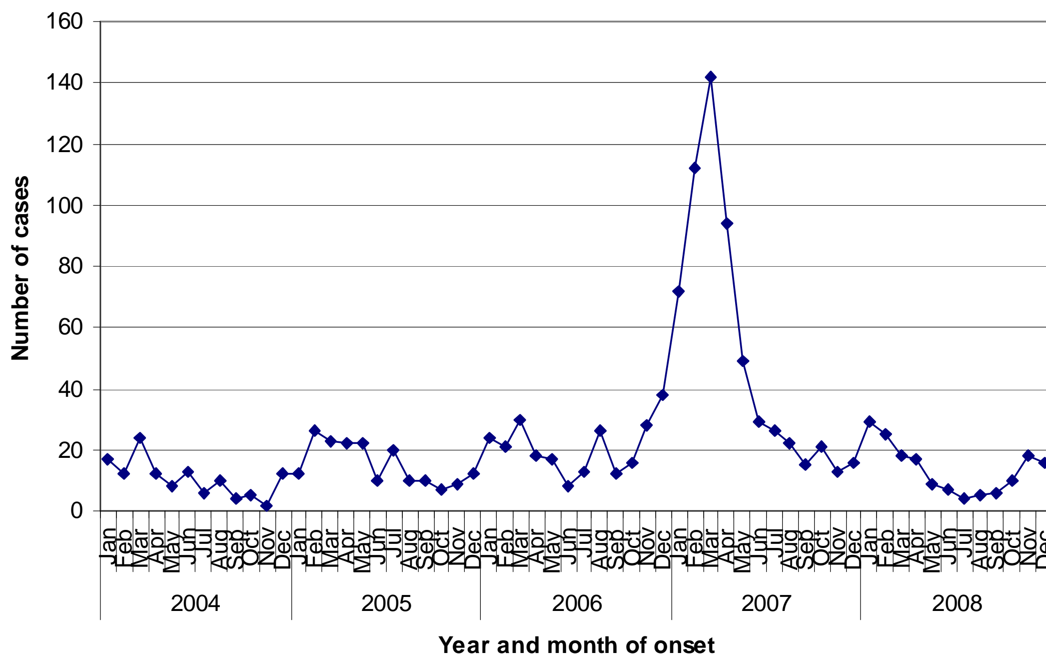

Figure 13. Number of cases of cryptosporidiosis by month and year of onset, WA, 2004 to 2008

The notification rate was slightly higher for females (8.2 per 100 000) than for males (7.1 per 100 000). The age group with the highest notification rate was the 0 to 4 year old group, accounting for 52% of notifications (Figure 14). Aboriginal children in the 0 to 4 age group appeared to be particularly vulnerable to *Cryptosporidium* infection, with an infection rate of 698 cases per 100 000 population. This was 41 times the rate for non-Aboriginal children in this age group, of 17 per 100 000 population. The overall cryptosporidiosis rate for the Aboriginal population was 84 cases per 100 000 population, which was 21 times the rate for the non-Aboriginal population of 4 cases per 100 000 population. Indigenous status information was missing for 12% of cases.

The Kimberley region had the highest notification rate for cryptosporidiosis, with 161 cases per 100 000 population (Figure 15). Notifications for both Aboriginal and non-Aboriginal people were highest in this region.

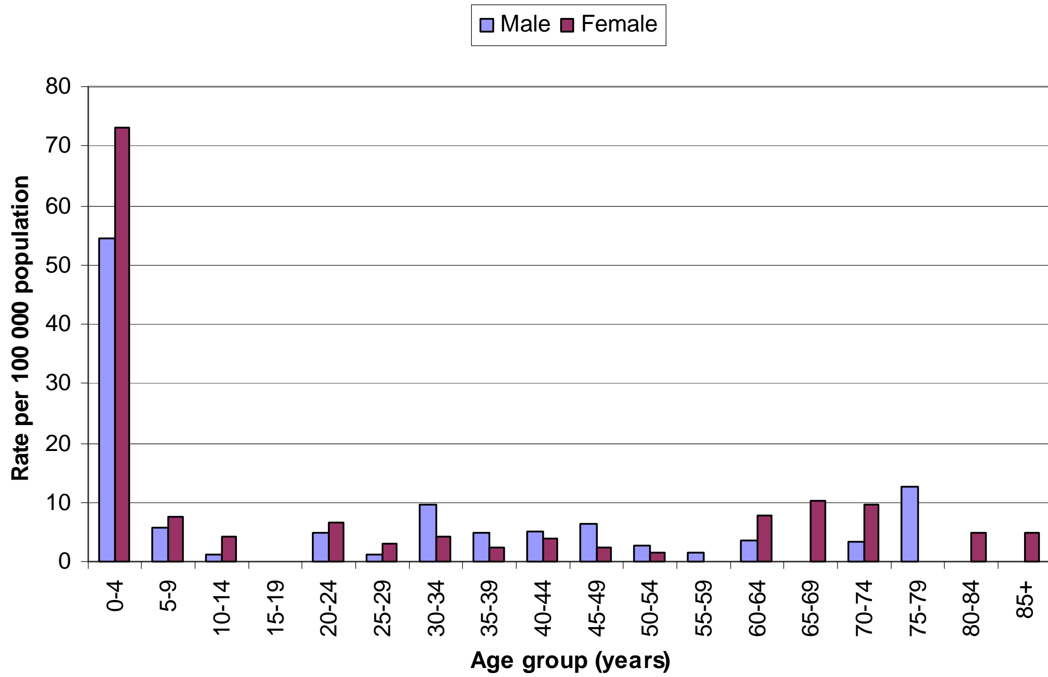

Figure 14. Age-specific notification rates for cryptosporidiosis by sex, WA, 2008

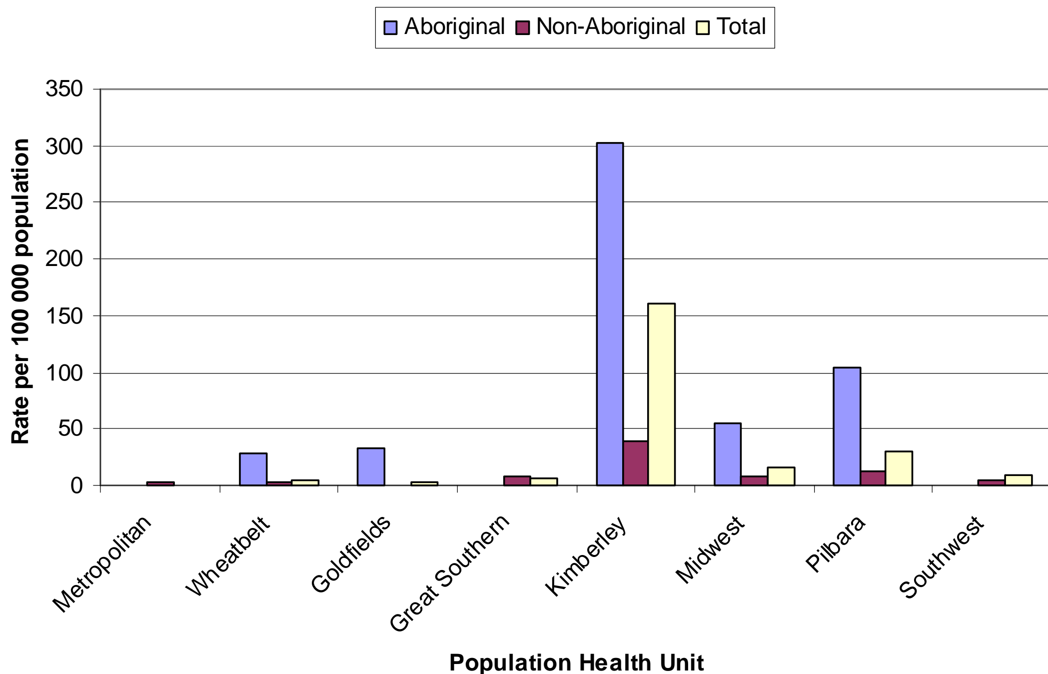

Figure 15. Cryptosporidiosis notification rates by region and Aboriginality, WA, 2008

3.5 *Shigella*

The *Shigella* notification rate in 2008 was higher than for both the previous year (5.0 cases per 100 000), and the previous four year average (6.2 cases per 100 000). There were 169 *Shigella* notifications in 2008, which was a notification rate of 7.9 per 100 000 population (Appendix 1). The number of *Shigella* notifications per month varied from a minimum of 4 to maximum of 22, with no distinct seasonal patterns (Figure 16).

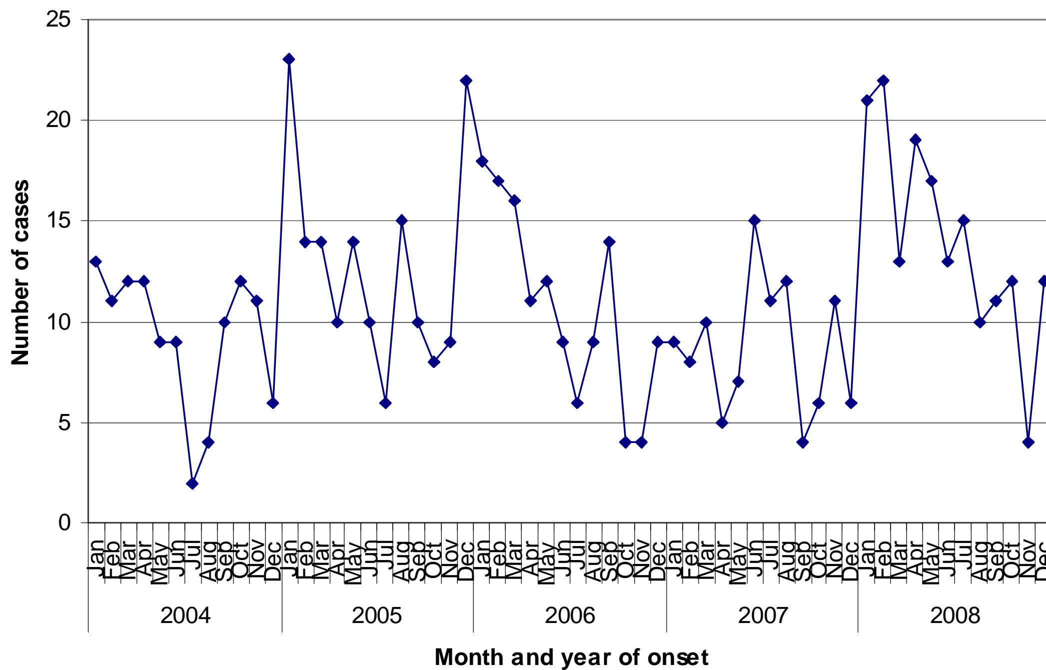

Figure 16: Number of cases of shigellosis by month and year of onset, WA, 2004 to 2008

The notification rate for males was lower than females (6 and 9 cases per 100 000 population) respectively. The highest notification rate was for the 0 to 4 age group, with a rate of 34 per 100 000 and accounting for 27% of notifications (Figure 17). The overall notification rate of 103 per 100 000 for Aboriginal people was 34 times the rate for non-Aboriginal people, which was 3 per 100 000 population. Aboriginality information was missing for 13.6% of *Shigella* notifications. The Kimberley region had the highest notification rate for *Shigella*, with a rate of 116 per 100 000 population. The Pilbara had the second highest notification rate, with 41.3 per 100 000 population. The rate in the Metropolitan region was 4.16 per 100 000 population (Figure 18).

The majority of *Shigella* isolates from clinical cases in 2008 were *Shigella sonnei* (64%). The most frequent biotype of *Shigella sonnei* was biotype A (71%). The remainder of the *Shigella* cases were predominantly *Shigella flexneri* (30%), and there were two cases of *Shigella boydii*. There were no cases of *Shigella dysenteriae* notified in 2008.

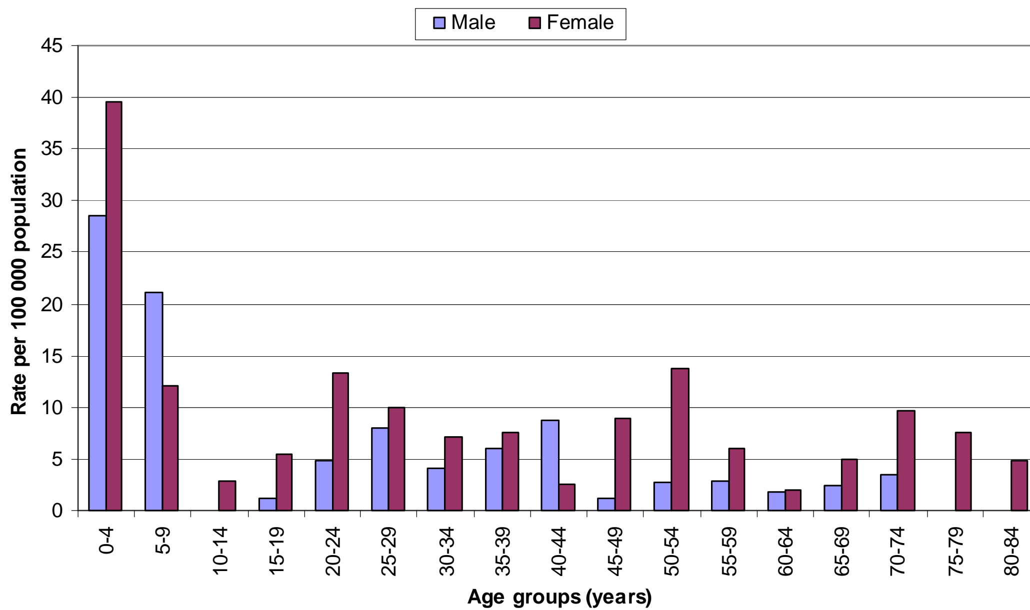

Figure 17. Age-specific notification rates for shigellosis by sex, WA, 2008

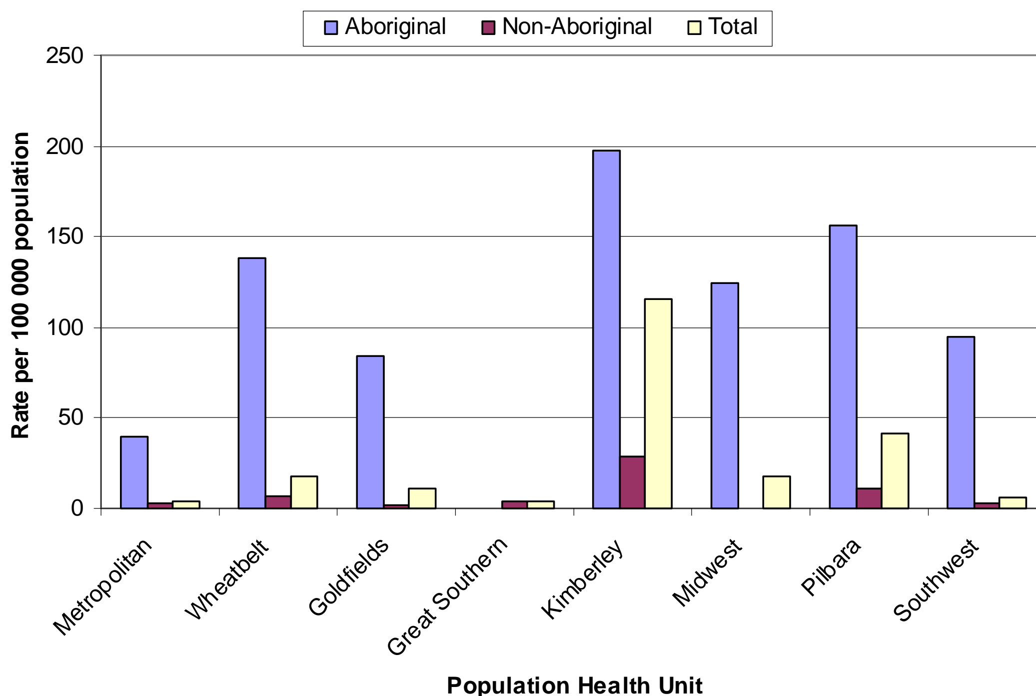

Figure 18. Shigellosis notification rates by region and Aboriginality, WA, 2008

3.6 Hepatitis A

There were 22 hepatitis A cases notified in 2008 (1.0 case per 100 000 population), which was similar to the number of notifications from the previous year (Appendix 1). In 2007 and 2008 the number of notifications was highest in the autumn months, although this pattern was not consistently observed in previous years (Figure 19).

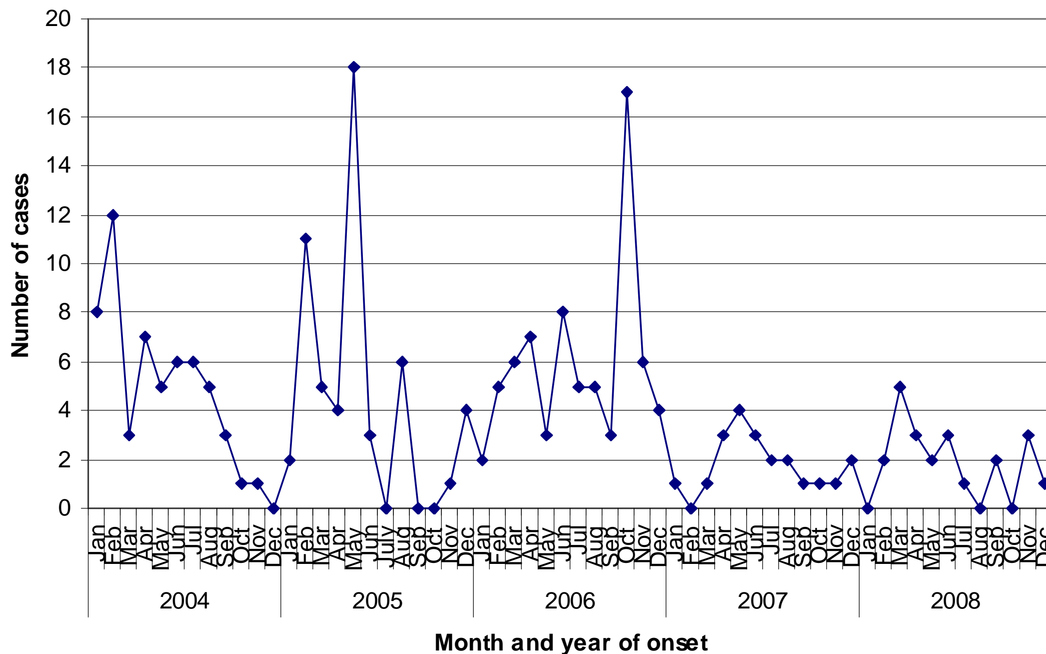

Figure 19. Number of cases of hepatitis A infection by month and year of onset, WA, 2004 to 2008

The number of hepatitis A notifications in 2007 and 2008 was lower than for any of the previous 10 years (Figure 20). In 2007 and 2008 there were no hepatitis A notifications for Aboriginal people. This was unusual compared to previous years, as prior to 2007 notification rates had been higher for Aboriginal as compared to non-Aboriginal people (the annual mean for the 10 years prior to 2007 was 40 cases per 100 000 for Aboriginal people and 4 cases per 100 000 for non-Aboriginal people).

When the number of notifications for 2007 and 2008 were compared to the previous 10 years, there was also a reduction in the proportion of hepatitis A notifications from regional areas (Figure 21). The number of overseas acquired infections in 2007 and 2008 (7 and 8 respectively) was similar to the average for the previous 10 years (8 cases/year).

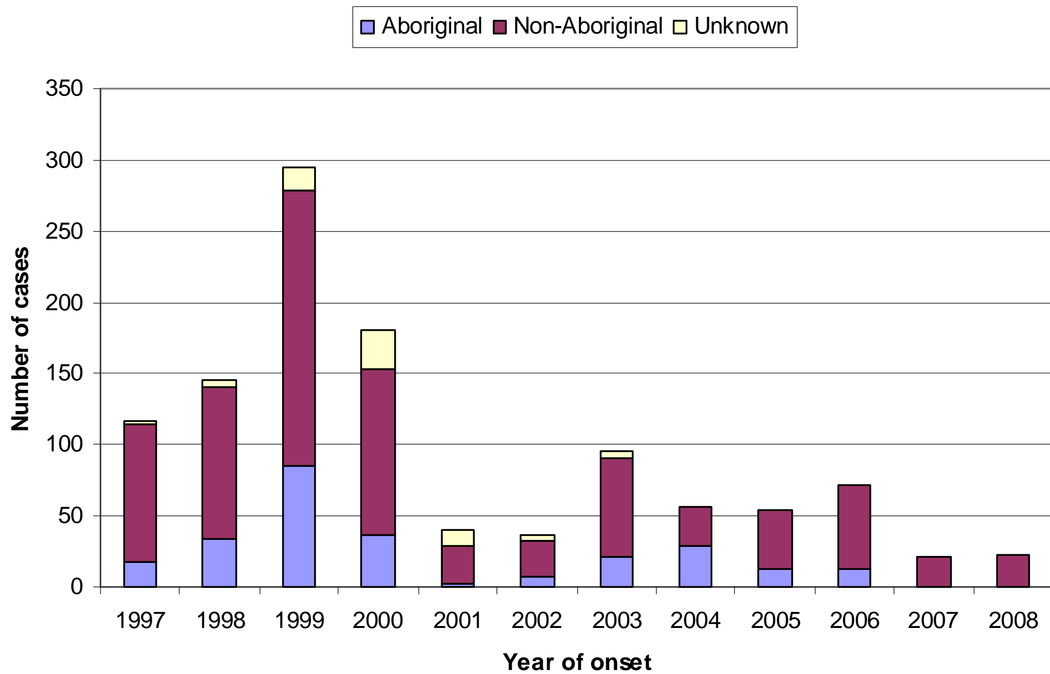

Figure 20. Number of hepatitis A cases by Aboriginality and year of onset, WA, 1997 to 2008

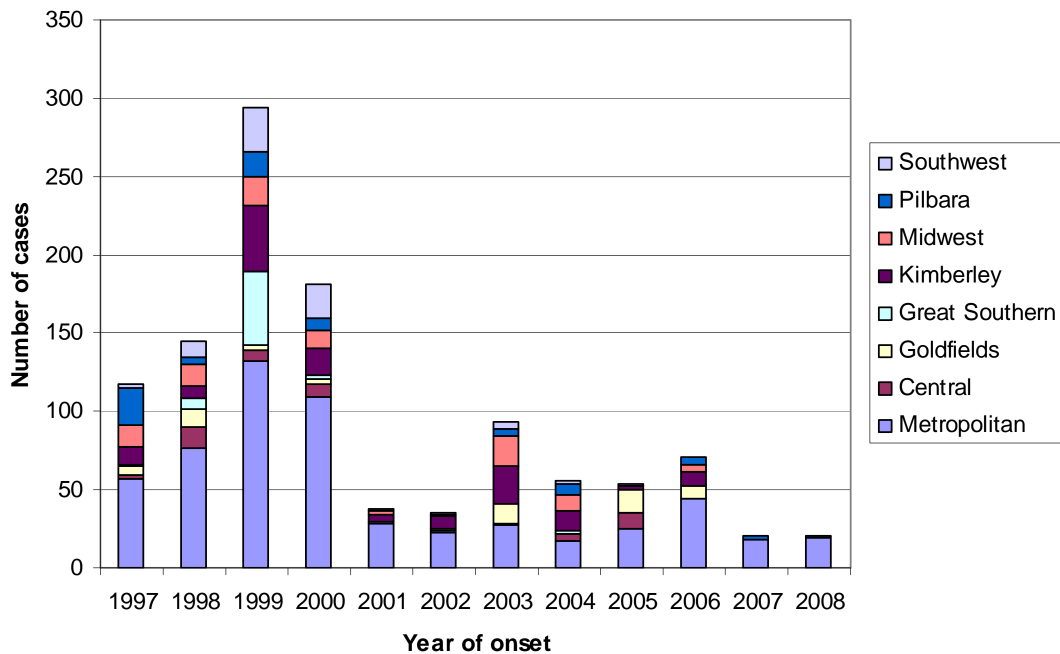

Figure 21. Number of hepatitis A notifications by region and year of onset, WA, 1997 to 2008

In November 2005 a hepatitis A immunisation programme for Aboriginal children was introduced in WA (as well as in the Northern Territory, Queensland and South Australia), with vaccination at 12 and 18 months of age, and a catch up programme for children aged up to 5 years old. The first cohort of Aboriginal children would have been fully vaccinated part way through 2006. This vaccination program appears to have resulted in a reduction in hepatitis A case numbers in 2007 and 2008. A similar reduction in hepatitis A notification rates followed the introduction of hepatitis A vaccination in Indigenous children in Queensland in 1999, and this was attributed to the vaccination programme (1).

Hepatitis A cases in 2008 ranged in age from 5 years to 81 years, with the age groups 5 to 9 years and 20 to 24 years having the highest number of notifications. There were 14 male and 8 female cases in 2008. Seven cases had travelled overseas during their incubation period, three to Indonesia, two to the Czech Republic and the others to Burma and the Sudan. Cases in 2008 showed geographical clustering, with 11 of the 22 cases in 2008 residing in adjacent suburbs in a north metropolitan area of Perth (Figure 22). Cases not in this cluster were more likely to have traveled overseas during their incubation period. Of the 11 geographically clustered cases, 2 had traveled overseas during their incubation period. Of the remaining 8 metro cases, 5 had traveled overseas during the incubation period.

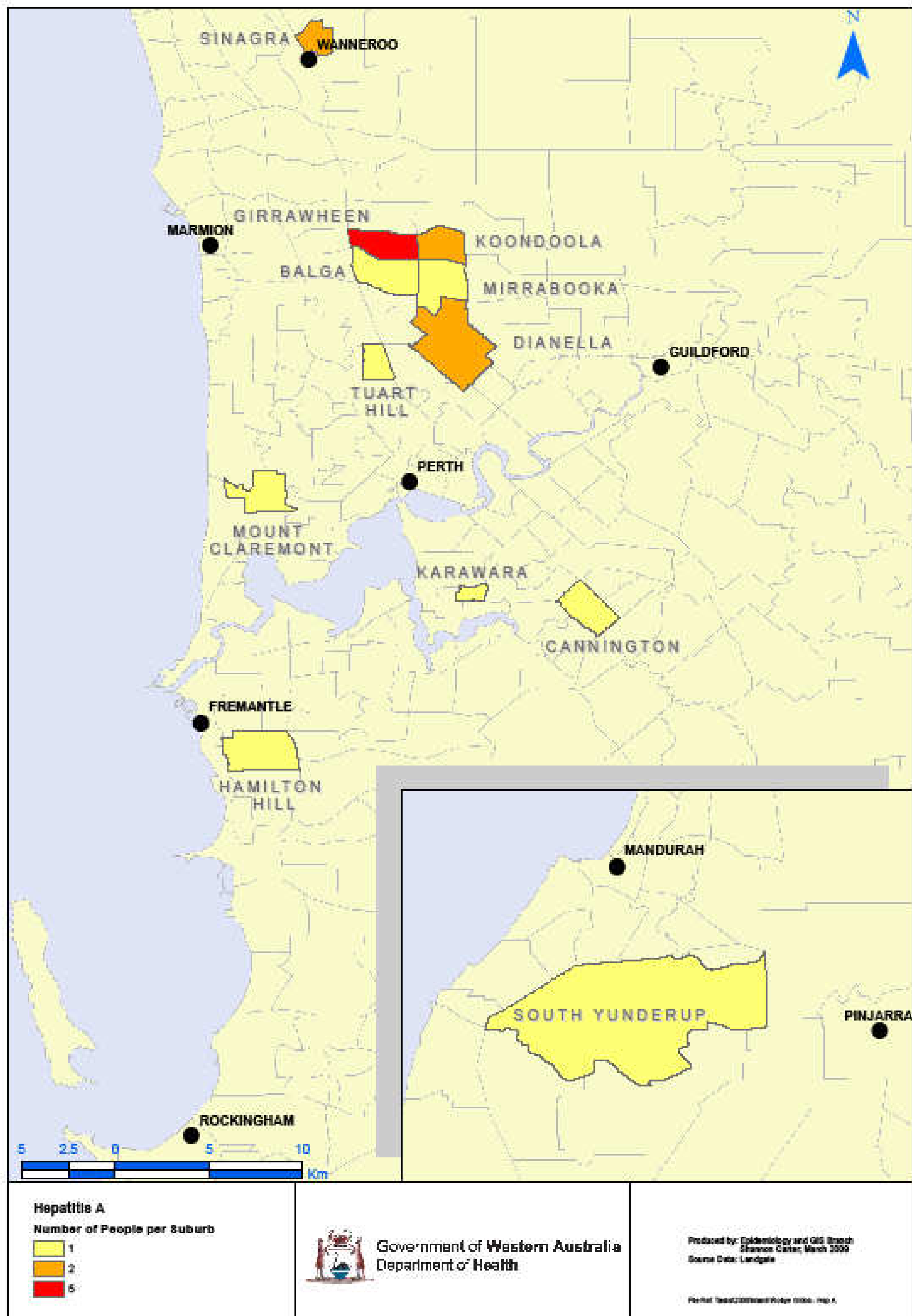

Figure 22. Hepatitis A notifications per suburb, Perth metropolitan area, 2008

3.7 Typhoid and Paratyphoid fever

There were eight cases of typhoid fever in WA in 2008. Two typhoid cases had no history of recent overseas travel. Two of the other cases had travelled to India, two had travelled to Indonesia and one case each had travelled to Malaysia and Nepal. Three cases of paratyphoid fever were notified in WA in 2008. Two of the cases had travelled to India and one had travelled to Turkey.

3.8 Listeria

There were eight cases of *Listeria monocytogenes* infection in 2008, which was similar to the mean number of cases for the previous four years (Figure 23). There were three pregnancy related cases, with two cases a materno-foetal pair where the mother reported consumption of high risk foods throughout pregnancy. When interviewed, the mother said that she was aware of listeria, but because she had not had any issues with her first two pregnancies, decided to eat high risk foods. The mother of the third pregnancy related case did not have any obvious risk factors for infection. Both babies survived. The five non-pregnancy related cases (four females, one male, aged 39 – 81 years) were all immunocompromised and were taking immunosuppressive drugs prior to infection. All cases reported eating foods considered to be high risk for listeria

3.9 Vibrio parahaemolyticus Infection

There were seven cases of infection with *Vibrio parahaemolyticus* in 2008. There were six males and one female aged between 24 and 64 years of age. Two people had a history of recent travel to the Philippines, while other cases had travelled to Thailand, India and Vietnam. *V. parahaemolyticus* was isolated from a wound infection in one case.

3.10 Yersinia

The seven cases of *Yersinia* infection with onset dates in 2008 ranged in age from 1 to 78 years old, with two males and five females. One case had a history of recent travel to Malaysia, with the other cases reporting no recent overseas travel. Five cases resided in the metropolitan area of Perth with one case each in the Wheatbelt and Southwest regions. Five cases had a *Yersinia enterocolitica* infection, while the isolate was not speciated in the other two cases.

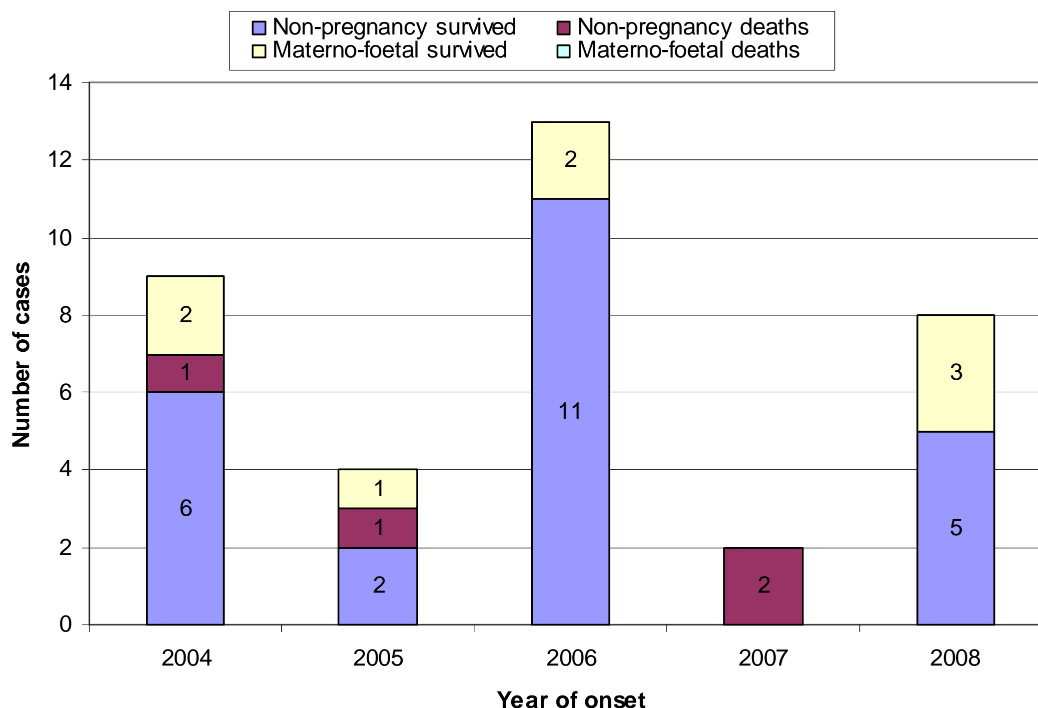

Figure 23. Notifications of listeriosis showing non-pregnancy related infections and deaths, and materno-foetal infections and deaths, WA, 2004 to 2008

3.11 Hepatitis E

In 2008 there were six cases of hepatitis E infection in WA. There was one female and five male cases. Cases ranged in age from 19 to 58 years old. Cases reported that they had travelled to Nepal, Mozambique, Bangladesh, India, United Arab Emirates and Indonesia during the incubation period.

3.11 Cholera

In 2008 there were two cases of *Vibrio cholerae* infection in WA. Both cases were 58 year old females. One case reported travel to India and the other reported travel to the Philippines prior to onset. Isolates from both cases were identified as the *V. cholerae* 01 Ogawa var El Tor strain of cholera.

3.13 Botulism, STEC (Shiga toxin producing E. coli*) and Haemolytic Uraemic Syndrome (HUS)*

There were no cases of botulism, STEC infection or HUS in WA in 2008.

4.0 Gastrointestinal Disease Outbreaks

4.1 Foodborne Outbreaks

In 2008 there were four foodborne or suspected foodborne gastroenteritis outbreaks investigated by WA DOH (Table 2). Two of the outbreaks were caused by Norovirus, one by *Salmonella* Typhimurium and one by *Clostridium perfringens.* Two outbreaks appeared to be related to infected food handlers. For the other two outbreaks the suspected vehicle was chicken.

***Salmonella* Typhimurium Phage Type 9 Outbreak**. In January, three members of a family from a regional town were admitted to hospital with bloody diarrhoea, vomiting and fever. Two faecal specimens were positive for *Salmonella* Typhimurium (STM) phage type 9 (PFGE profile STYMAV.0108). An interview with the mother revealed that partly frozen chicken had been oven roasted. It is suspected that undercooked chicken was the source of the infection. There were no other recent reports of either this phage type or PFGE profile in WA at the time of this family outbreak.

Norovirus Restaurant Outbreak. In April, patrons who had eaten a buffet meal at a restaurant on a Saturday evening dinner or a Sunday lunch became ill with symptoms of vomiting and/or diarrhoea. A total of 366 people were reported to have eaten at these buffet meals, and 92 of these were interviewed in a cohort study. Analysis of the results demonstrated an attack rate of 82% (75 people affected). The only food with a 95% CI greater than one and p value less than 0.05 was Thai fish curry (relative risk 1.30). However, as this food was consumed by only 28% of cases it would not account for all the cases of disease associated with the outbreak. Each of the faecal specimens obtained from six affected attendees was positive for norovirus. An inspection of the premises did not identify any major deficiencies. There were no reports of staff illness and consequently faecal specimens were not collected from staff members. Whilst the route of transmission and source was not established, it seems likely that one or more foods served at the buffet during the two affected meal sittings were contaminated.

Table 2. Outbreaks of foodborne illness in WA by month, setting and agent, 2008

Month	Setting	Agent Responsible	Exposed	Interviewed	Affected	Hospitalised	Deaths	Epidemiological Study	Responsible Vehicles
Jan	private residence	*Salmonella* Typhimurium PT9	3	1	3	3	0	D	chicken
Apr	restaurant	Norovirus	366	92	75	0	0	C	unknown
Apr	aged care facility	Norovirus	108	0	42	0	0	D	unknown
Jul	other	*Clostridium perfringens*	662	88	30	0	0	CCS	BBQ asian chicken
Total					150	3	0		

† D = descriptive case series, C = cohort study, CCS = case control study

Norovirus Aged Care Facility Outbreak. In April, residents and staff at an aged care facility were ill with diarrhoea and/or vomiting. Examination of case onset dates identified that the index case was a chef who had prepared food while he was ill with gastroenteritis. Other staff and residents subsequently became ill over a 24 hour period. Faecal specimens from eight residents were positive for norovirus. The epidemiological picture was consistent with foodborne transmission, although a non-foodborne mechanism of spread was also possible.

***Clostridium perfringens* Mine Site Outbreak.** In July, at least 30 mine workers were ill with diarrhoea and abdominal pain following a company BBQ meal. The pattern of illness was consistent with *Clostridium perfringens* toxin contamination. A total of 662 people were reported to have eaten at this meal, and 88 were interviewed in a case control study (30 cases, 58 controls). Analysis of the results demonstrated a minimum attack rate of 34% (30/88). Although consumption of chicken and steak displayed some association with illness, with odds ratios of 3.28 and 2.93 respectively, these associations were not statistically significant. Faecal specimens from four of the five mine workers were positive for *Clostridium perfringens,* with two of the samples demonstrating an indistinguishable PFGE pattern, suggesting that the *C. perfringens* present in both samples may have come from the same source. Available food samples were negative for *C. perfringens* and a food source could not be clearly identified. However, BBQ chicken was the most likely source, as chicken was the food item consumed by the highest proportion of cases and was associated with possible temperature control issues.

4.2 Non Foodborne Outbreaks

There were 113 outbreaks of gastroenteritis in 2008 that appeared to be non-foodborne, 91 of which occurred in aged care facilities, 18 in hospitals, two in child care centres and two on ships (Table 3). The causative agent for 54 (48%) of the outbreaks was confirmed as norovirus, for nine 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 *Giardia.* In the remainder of the outbreaks (42%) 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 were a total of 2269 people affected by these outbreaks. The number of non-foodborne gastroenteritis outbreaks in 2008 (113) was lower than in 2007 (124) and there was a 28.4% decrease in the number of people affected by these outbreaks in 2008 compared with 2007. The number of gastroenteritis outbreaks reported each month varied through the year (Figure 24). In 2008 the month with the highest number of reported outbreaks was August. In previous years peak months had been June and October.

Table 3. Outbreaks of non-foodborne gastrointestinal illness in WA by month, setting and agent, 2008

Month	*Setting exposed*	*Agent Responsible*	*Affected*	*Hospitalised*	*Deaths*	*Epidemiological Study*
January	aged care facility	Norovirus	22	0	0	D[†]
January	aged care facility	Norovirus	30	0	0	D
January	aged care facility	Unknown	16	1	0	D
January	aged care facility	Unknown	3	0	0	D
January	aged care facility	Norovirus and Rotavirus	14	0	0	D
February	aged care facility	Unknown	5	0	0	D
February	hospital	Norovirus	49	NA*	0	D
February	aged care facility	Norovirus	16	0	0	D
February	aged care facility	Unknown	2	0	0	D
February	aged care facility	Norovirus	44	3	2	D
February	aged care facility	Unknown	6	0	0	D
February	child care	Rotavirus	26	1	0	D
March	aged care facility	Norovirus	31	0	0	D
March	aged care facility	Rotavirus	23	0	0	D
March	aged care facility	Unknown	9	0	0	D
March	aged care facility	Norovirus	20	0	0	D
April	aged care facility	Unknown	19	0	0	D
April	aged care facility	Unknown	20	0	0	D
April	aged care facility	Norovirus	32	0	0	D
April	hospital	Norovirus	67	N/A	0	D
May	aged care facility	Unknown	13	0	0	D
May	aged care facility	Norovirus	11	1	0	D
May	aged care facility	Norovirus	28	1	0	D
May	hospital	Unknown	5	0	0	D
May	hospital	Unknown	9	N/A	0	D
May	aged care facility	Unknown	13	0	0	D
May	aged care facility	Unknown	3	0	0	D
May	aged care facility	Unknown	4	0	1	D
May	aged care facility	Norovirus	13	0	0	D
May	aged care facility	Unknown	11	2	0	D
May	aged care facility	Unknown	8	0	0	D
May	hospital	Unknown	6	0	0	D
June	aged care facility	Unknown	8	0	0	D
June	cruise ship	Norovirus	191	0	0	D
June	child care	*Giardia*	4	0	0	D
June	aged care facility	Norovirus	35	0	0	D
June	aged care facility	Unknown	7	0	0	D
June	hospital	Rotavirus	6	0	1	D
June	aged care facility	Unknown	3	0	0	D
June	aged care facility	Unknown	5	0	0	D
June	aged care facility	Norovirus	13	0	0	D
June	aged care facility	Norovirus	26	0	0	D
June	aged care facility	Norovirus	43	0	0	D
June	aged care facility	Unknown	66	0	0	D
July	aged care facility	Norovirus	31	0	0	D
July	aged care facility	Unknown	9	0	0	D
July	aged care facility	Rotavirus	20	0	0	D

Month	*Setting exposed*	*Agent Responsible*	*Affected*	*Hospitalised*	*Deaths*	*Epidemiological Study*
July	aged care facility	Norovirus	51	1	1	D
July	aged care facility	Norovirus	15	0	0	D
July	aged care facility	Unknown	4	0	0	D
July	aged care facility	Unknown	9	0	0	D
July	hospital	Norovirus	11	0	0	D
July	aged care facility	unknown	12	1	0	D
July	aged care facility	Unknown	28	1	0	D
July	aged care facility	Norovirus	18	0	0	D
August	aged care facility	Norovirus	51	3	2	D
August	aged care facility	Unknown	6	0	0	D
August	aged care facility	Norovirus	36	2	0	D
August	aged care facility	Rotavirus	22	0	0	D
August	aged care facility	Norovirus	10	0	0	D
August	aged care facility	Norovirus	15	1	0	D
August	hospital	Norovirus	47	0	0	D
August	aged care facility	Norovirus	15	0	0	D
August	aged care facility	Unknown	11	0	0	D
August	aged care facility	Unknown	13	0	0	D
August	aged care facility	Norovirus	16	2	0	D
August	aged care facility	Norovirus	34	0	0	D
August	aged care facility	Norovirus	62	2	0	D
August	aged care facility	Norovirus	38	0	1	D
August	hospital	Norovirus	23	0	0	D
August	aged care facility	Unknown	8	0	0	D
August	hospital	Norovirus	12	0	3	D
August	hospital	Norovirus	16	0	0	D
August	aged care facility	Norovirus	13	0	0	D
August	aged care facility	Norovirus	9	1	0	D
September	aged care facility	Norovirus	11	0	0	D
September	hospital	Norovirus	19	0	0	D
September	aged care facility	Unknown	22	0	0	D
September	aged care facility	Rotavirus	14	0	0	D
September	aged care facility	Norovirus	37	0	0	D
September	hospital	Unknown	4	0	0	D
September	aged care facility	Norovirus	16	0	0	D
September	aged care facility	Rotavirus	10	0	0	D
September	aged care facility	Norovirus	9	1	0	D
September	aged care facility	Unknown	19	0	0	D
September	aged care facility	Unknown	8	0	0	D
September	aged care facility	Unknown	13	0	1	D
September	aged care facility	Unknown	17	0	1	D
September	hospital	Norovirus	18	0	0	D
September	aged care facility	Rotavirus and Norovirus	19	1	0	D
September	hospital	Norovirus	4	0	0	D
October	aged care facility	Norovirus	12	0	0	D
October	hospital	Norovirus	15	0	0	D
October	hospital	Norovirus	13	0	0	D
October	aged care facility	Unknown	4	0	0	D
October	aged care facility	Norovirus	13	0	0	D
October	aged care facility	Norovirus	30	0	0	D
November	aged care facility	Unknown	14	0	0	D
November	aged care facility	Unknown	4	0	0	D

Month	*Setting exposed*	*Agent Responsible*	*Affected*	*Hospitalised*	*Deaths*	*Epidemiological Study*
November	aged care facility	Norovirus	54	0	0	D
November	aged care facility	Unknown	15	0	0	D
November	hospital	Rotavirus	2	0	0	D
November	aged care facility	Unknown	8	0	1	D
November	aged care facility	Unknown	7	0	0	D
November	aged care facility	Norovirus	16	1	0	D
November	aged care facility	Norovirus	37	1	0	D
November	ship	Norovirus	34	0	0	D
December	aged care facility	Rotavirus	27	0	0	D
December	aged care facility	Unknown	2	0	0	D
December	aged care facility	Unknown	12	0	0	D
December	aged care facility	Norovirus	46	1	0	D
December	aged care facility	Unknown	9	0	0	D
December	aged care facility	Unknown	5	0	0	D
Total			**2269**	**28**	**14**	

† D = descriptive case series, * NA = not applicable

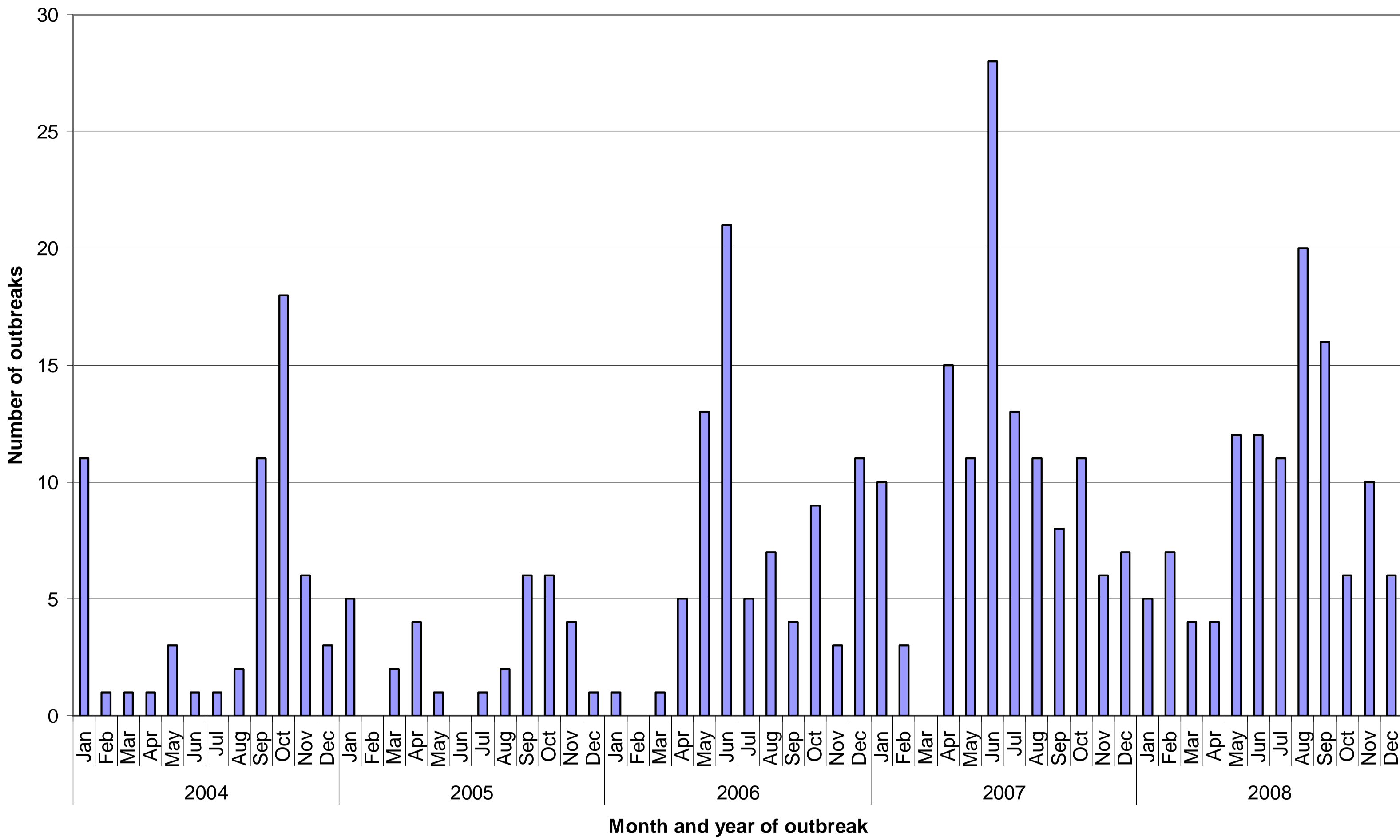

Figure 24. Number of non-foodborne gastroenteritis outbreaks reported in WA, 2004 to 2008

5.0 Cluster Investigations

***Salmonella* Typhimurium Phage Type 135/135A cluster.** In January six cases of *Salmonella* Typhimurium PFGE profile STYMAV.0003 were notified within a four week period. Cases ranged in age from six months to 81 years, with three males and three females. There was no geographical clustering. Three cases were interviewed; one case was a sheep farmer and two cases reported lamb consumption prior to illness. This PFGE profile has previously been seen from ovine sources. Phage typing identified a combination of STM 135 and STM 135a isolates.

***Salmonella* Kiambu cluster.** A cluster of 14 cases of *Salmonella* Kiambu was investigated with notification dates between November and February. Cases ranged in age from 11 months to 79 years, with 10 males and 4 females. There was no geographical clustering. Two cases were interviewed, with no common links established. PFGE typing revealed that isolates from five cases had a PFGE profile indistinguishable from isolates connected to a 2006 *S.* Kiambu outbreak. A further three isolates had a PFGE profile two bands different to the previous outbreak, meaning these isolates were very closely related. Four additional isolates from cases were tested and found to have a PFGE pattern different to the outbreak pattern and different to each other. Antibiotic susceptibility testing was performed on three isolates; all were found to be susceptible to the range of antibiotics tested.

***Salmonella* Havana cluster.** Five *Salmonella* Havana cases were notified in a two week period in February/March. All cases were infants aged one year or less, with three males and two females. Four cases were from the north of the state with one case from the metropolitan area. PFGE typing of the five isolates identified four different PFGE profiles, suggesting cases in this cluster were not linked and there was not a common source of infection.

Table 4. Cluster investigations in WA by month, setting and agent, 2008

Month	*Setting*	*Agent responsible*	*Affected*	*Hospitalised*	*Deaths*	*Epidemiolgical Study*[†]
Jan	community	*Salmonella* Typhimurium PT 135/135a	6	2	0	D
Feb	community	*Salmonella* Kiambu	14	1	0	D
Mar	community	*Salmonella* Singapore	12	2	0	D
Mar	community	*Salmonella* Havana	5	0	0	D
Sept	community	*Salmonella* Typhimurium PT 6 var 1	8	1	0	D
Nov	community	*Salmonella* Typhimurium PT U302 and UNTY	20	1	0	D
Nov	community	*Salmonella* Typhimurium PT 135a	6	0	0	D
Nov	community	*Salmonella* Newport	4	0	0	D
Total			75	7	0	

[†] D = descriptive case series

***Salmonella* Singapore cluster.** A cluster of 12 cases of *Salmonella* Singapore infection with notification dates from late January to the end of March were investigated. Cases ranged in age from 15 to 81 years, with six males and six females, who predominantly resided in the metropolitan area. The PFGE profile of isolates from the seven initial cases was indistinguishable from each other and distinct from historical isolates indicating a common source for the cluster. Six cases were interviewed and commonly consumed foods were grapes (6/6), bananas (5/6), potatoes (5/6) and pasteurised milk (5/6). Other states of Australia also had an increase in *S*. Singapore notifications during this time, but a common cause was not found.

***Salmonella* Typhimurium PT 6 var 1 cluster.** A cluster of eight cases of *S*. Typhimurium PFGE type STYMAV.0018 was investigated. Isolates from six cases were confirmed as phage type 6 var 1 and were tetracycline and kanamycin resistant. There were five cases of this PFGE type reported in August, compared to an average of 1.6 per month for the previous year. Cases ranged in age from 0 to 50 years. There were four males and four females. Two of the cases were from regional areas (1 Goldfields and 1 Midwest) and the others were from the Perth metropolitan area. Three of the cases were co-infected with *Campylobacter*. Three cases were interviewed and there were no venues or events in common. *S*. Typhimurium with this PFGE type was isolated from six raw chicken samples collected in July and August.

***Salmonella* Typhimurium Phage Type U302 and UNTY cluster.** From early October to mid December there were 14 cases of *S*. Typhimurium with PFGE type STYMAV.0057 (phage type untypeable on three isolates) and six cases of *S*. Typhimurium with PFGE type STYMAV.0092 (phage type U302 on three isolates) notified. There were eight males cases and 12 female cases with ages ranging from 11 months to 64 years (median age 9 years). In the initial cluster investigation seven cases (3 x STYMAV.0057, 4 x STYMAV.0092) were of Ethiopian or Sudanese background and of the six cases interviewed, all had attended an Ethiopian wedding on 27/9/2008. Due to a lack of recall, further information on the wedding was not obtained. Fourteen further cases (11 x STYMAV.0057, 3 x STYMAV.0092) had dates

of onset from 17/10/08 to 16/12/2008. Of the 10 additional cases interviewed, none had attended the wedding and three cases were from Afghanistan, one case was from the Sudan, one case was of Eritrean descent and five cases were of European descent. Six cases purchased food at Asian/Middle Eastern shops or takeaway but no common foods were identified. Food and spices from the residence of one case were sampled but were negative for *Salmonella*.

***Salmonella* Newport cluster.** A cluster of four cases of *S*. Newport were notified with onset dates ranging from 23/10/08 to 5/11/08. All cases were interviewed but no common exposures were identified. The isolates also had different PFGE profiles indicating the cases were not exposed to a common source of infection.

***Salmonella* Typhimurium 135a cluster.** There were six cases of *S*. Typhimurium notified with PFGE type STYMAV.0058 (phage type 135a on three isolates) with dates of onset ranging from 8/10/08 to 3/11/08. Three of the cases were male and three were female, with ages ranging from 23 to 29 years for five cases, including a 58 year old. Five cases were interviewed but no common exposure was identified.

6.0 OzFoodNet WA 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. The project is approximately half way towards completion. Results to date were reported in the 2007 OzFoodNet WA report (2). There were no further results in 2008. This project is continuing.

7.0 Prevention Measures

The following actions were undertaken during 2008 to prevent foodborne and gastrointestinal disease:

Publications

- A paper co-authored by OzFoodNet WA epidemiologists, and titled 'An Outbreak of *Salmonella enterica* Serotype Litchfield Infection in Australia Linked to Consumption of Contaminated Papaya' was accepted for publication by the Journal of Food Protection.
- An article co-authored by OzFoodNet WA epidemiologists, and titled "Two Cases of Anticholinergic Syndrome Associated with Consumption of Bitter Lupin Flour" was submitted as a "Letter from Practice" for publication to the Medical Journal of Australia.

Presentations

- A training session on residential care facility outbreaks and sporadic enteric notification follow-up was conducted in April 2008 with regional Public Health Unit nurses.
- A training session on recognising potential foodborne outbreaks in residential care facilities was conducted in October 2008 with regional Public Health Unit nurses.
- One of the OzFoodNet epidemiologists presented talks on the Norovirus genotyping project and the *Salmonella* Singapore outbreak investigation at an OzFoodNet face-to-face meeting in Adelaide in June 2008.

Policy Documents

- The OzFoodNet team launched the 'Guidelines for Management of Gastroenteritis Outbreaks in Residential Care Facilities' to aged care and other residential care facilities in January 2008. This also involved a training

session with the state public health nurses. The guidelines were distributed to all Aged Care Facilities in WA.

- The WA Operational Directive, Public Health Intervention for Sporadic Enteric Notifications came into effect in January 2008.
- The WA Operational Directive, Exclusion Guidelines for Patients with Enteric Infections and Their Contacts, came into effect in January 2008.

Committee membership

- The epidemiologists are members of the steering group of the WA Food Monitoring Program, which provides strategic monitoring, research and reporting on food safety.
- The epidemiologists are members 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.

Research

- The epidemiologists continued to be involved in an OzFoodNet funded research project - a retrospective survey of norovirus genotypes in faecal samples from 2005, 2006 and 2007.
- The epidemiologists have continued collaboration with Associate Professor Una Ryan at Murdoch University on the molecular typing of *Cryptosporidium* strains.

8.0 References

1. Hanna JN, Hills SL and Humphreys JL 2004, Impact of hepatitis A vaccination in Indigenous children on notifications of hepatitis A in north Queensland, *MJA*, 181: 482-485..

2. Gibbs R, Pingault N, Barker M, Morgan D and Arthur S 2008. OzFoodNet – Enhancing Foodborne Disease Surveillance Across Australia, Annual Report 2007, Western Australia, Department of Health Western Australia, Perth.

9.0 Acknowledgements

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Appendix 1: Number of notifications, notification rate and ratio of current to historical mean by pathogen/condition, 2004 to 2008, WA

Pathogen/ Condition	Year										Mean rate 2004-2007[4]	Rate ratio 2008 to mean[5]
	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)			
	No.	Rate[3]	No.	Rate	No.	Rate	No.	Rate	No.	Rate		
Campylobacter	1939	98.2	2450	122.5	1949	95.7	2101	101	1833	86	104	0.83
Salmonella	621	31.5	798	39.9	798	39.2	985	47.3	849	39.7	39.5	1.00
Rotavirus[2]	-	-	-	-	235[6]		724	34.8	424	19.8	34.8	0.57
Cryptosporidiosis[2]	125	6.3	183	9.1	251	12.3	611	29.4	164	7.7	14.3	0.54
Shigella	111	5.6	155	7.7	129	6.3	104	5.0	169	7.9	6.2	1.27
Hepatitis A	57	2.9	54	2.7	71	3.5	21	1.0	22	1.0	2.5	0.4
Typhoid fever	5	0.3	8	0.4	11	0.54	9	0.43	8	0.37	0.4	-
Listeria	9	0.5	4	0.2	13	0.64	2	0.1	8	0.37	0.4	-
Vibrio parahaemolyticus	3	0.15	0	0	3	0.15	9	0.43	7	0.34	0.2	-
Yersinia	1	0.05	2	0.1	3	0.15	5	0.2	7	0.34	0.1	-
Hepatitis E	3	0.15	2	0.1	1	0.05	0	0	6	0.28	0.1	-
Paratyphoid fever	13	0.7	4	0.2	1	0.05	3	0.1	3	0.14	0.3	-
Cholera	1	0.05	1	0.05	0	0	0	0	2	0.09	0.02	-
STEC[1]	0	0	12	0.6	3	0.15	2	0.1	0	0	0.2	-
HUS[1]	1	0.05	1	0.05	0	0	0	0	0	0	0.02	-
Total	2889	146	3674	184	3468	170	4576	220	3502	164	180	0.9

[1]Abbreviations: STEC: Shiga-toxin producing *E. coli*; HUS: Haemolytic Uraemic Syndrome [2]Rotavirus was made notifiable in July 2006 [3]Rate per 100 000 population [4]Mean of rates between 2004 and 2007 where applicable [5]Ratio has not been calculated for diseases with a small number of cases

Government of **Western Australia**
Department of **Health**
Public Health

OzFoodNet – Enhancing Foodborne Disease Surveillance Across Australia

Annual Report 2008 Western Australia

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Summary and Recommendations

This report contains a summary of OzFoodNet WA enteric disease surveillance activities in 2008.

The overall notification rate for all notifiable enteric diseases in 2008 was 164 per 100 000 population (3502 notified cases). This was lower than for 2007, and also lower than the mean of the previous four years. *Campylobacter* was the most commonly notified enteric disease in 2008, comprising 52% of enteric notifications. *Salmonella* and rotavirus infections were the 2nd and 3rd most commonly notified enteric infections.

Notification rates for a number of enteric diseases were lower in 2008 than in previous years. *Campylobacter*, Rotavirus, *Cryptosporidium* and hepatitis A infection rates were lower in 2008 than the mean of the previous four years. The notification rate for *Salmonella* was similar to the mean of the previous four years, and the *Shigella* rate was higher than the mean of the previous four years. The notification rate for hepatitis A was lower in 2007 and 2008 than for any of the previous 10 years, and this is likely to have resulted from the 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, as there were no hepatitis A notifications for this age group. For most of the enteric infections notification rates were also higher for Aboriginal as compared to non-Aboriginal people. The greatest difference in rate was for *Shigella* infection, with the notification rate for Aboriginal people 34 times that for non-Aboriginal people. Notification rates for Aboriginal children in the 0 to 4 year age group were particularly high. For most of the enteric diseases the Kimberley region had the highest notification rates for both Aboriginal and non-Aboriginal people.

There were four outbreaks of foodborne or suspected foodborne disease investigated in WA in 2008. The largest suspected foodborne outbreak was a norovirus outbreak associated with a restaurant venue, which affected 75 people. Patrons who ate at the restaurant on two consecutive days were affected. Another norovirus outbreak at an aged care facility that affected 42 people was also suspected to be caused by consumption of norovirus contaminated food. A third outbreak was associated with a

BBQ lunch at a mine-site. The most likely source was ingestion of *Clostridium perfringens* toxin associated with BBQ chicken. A fourth outbreak was caused by *Salmonella* Typhimurium phage type 9 and the suspected food vehicle was undercooked chicken.

There were 113 non-foodborne gastroenteritis outbreaks reported in WA in 2008, which was lower than for the previous year. The causative agent for 48% of these outbreaks was confirmed as norovirus. Other outbreaks were caused by rotavirus and *Giardia*. Outbreaks were reported from aged care facilites (81%), hospitals (16%), child care facilites (2%) and ships (2%).

Recommendations:

It is recommended that:

- Further analysis of rates of enteric disease in Aboriginal people should be carried out to provide more detailed information that could guide public health action.
- Geographical clustering of hepatitis A cases in the north metropolitan area, and possible preventative public health measures, should be investigated.

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1.0 Introduction

This report describes enteric disease surveillance activities for 2008, as carried out by OzFoodNet WA, which is part of the Communicable Disease Control Directorate (CDCD) of the Western Australian Department of Health (WA DOH).

Western Australia 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 Population 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 in Perth, Western Australia is responsible for the whole of WA - total population approximately 2.1 million. Two epidemiologists coordinate activities in Western Australia, 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.

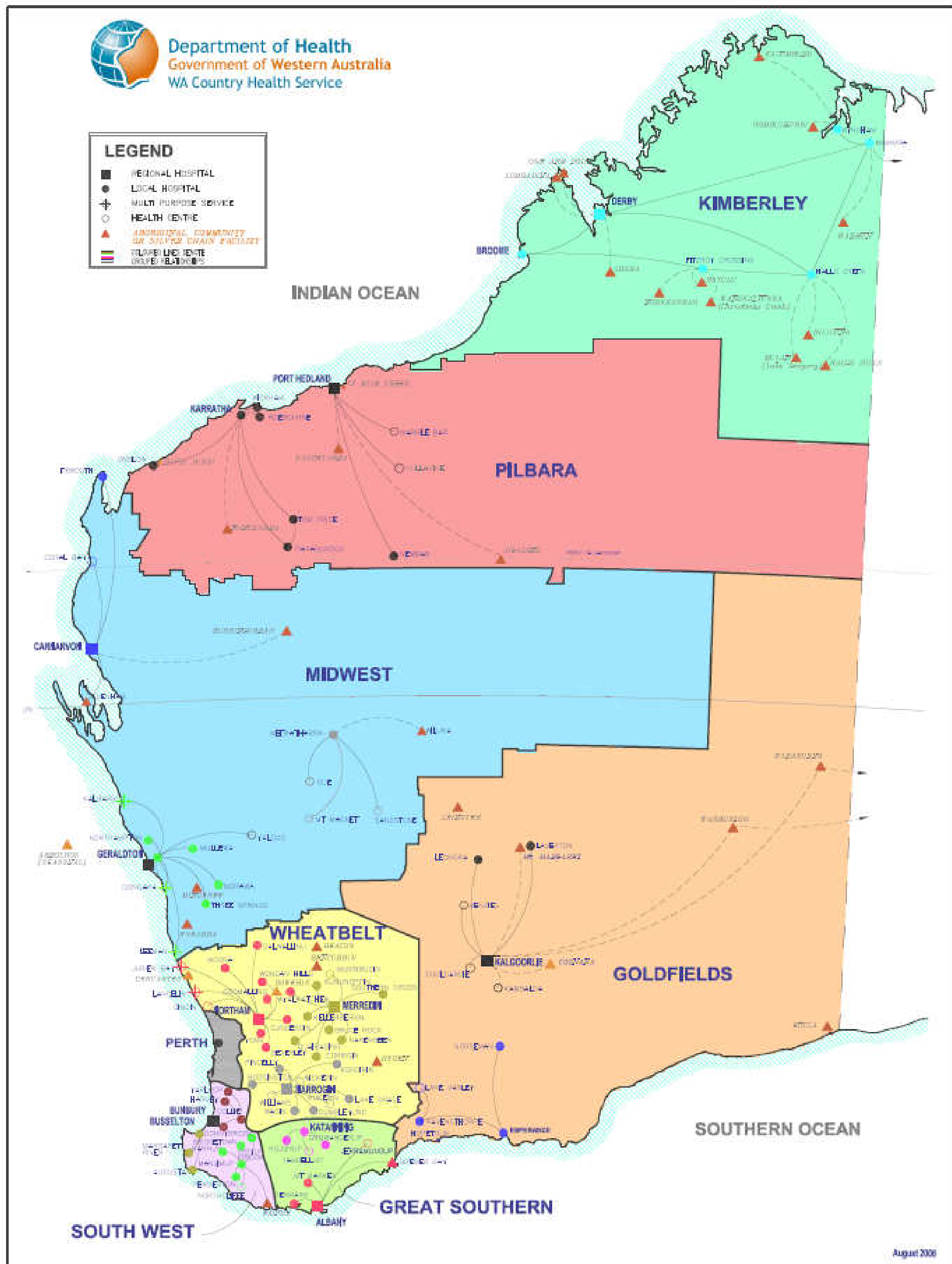

Figure 1. Map of population health regions in Western Australia –urban Perth is divided into North and South Metropolitan regions

On a local level, the OzFoodNet epidemiologists regularly liaise with staff of the Food Unit of the Environmental Health Directorate of the Department of Health; the Food

Hygiene, Diagnostic and Molecular Epidemiology laboratories at PathWest Laboratory Medicine WA; and the regional PHUs.

1.1 Data Sources and Methods

Estimated resident population figures for Western Australia for calculation of rates were obtained from the Rates Calculator version 9.4.1 designed by Dr. Jim Codde of the Department of 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 2,138,491 persons.

Notification data for Western Australia 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 2003 and analysed by optimal date of onset (ODOO) (the ODOO is a composite of the 'true' date of onset provided by the notifying doctor, 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).

Data on *Salmonella* serotypes 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, 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 practice need to be considered in interpreting data. 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. *Giardia* infection and amoebiasis were de-gazetted on 22 August 2007, so after this date were no longer notifiable diseases in Western

Australia. Prior to July 2007 *Salmonella* Typhimurium and *Salmonella* Enteritidis isolates were sent to the Microbiological Diagnostic Unit at the University of Melbourne for phage typing. At the beginning of July 2007 this was discontinued. From July 2007 all *Salmonella* Typhimurium isolates have been typed by PFGE.

2.0 Activity During Year

During 2008 the following activities were conducted at the West Australian OzFoodNet site:

- Ongoing surveillance and reporting of foodborne disease in Western Australia.
- Intensive investigation of seven cases of *Yersinia* infection and eight cases of infection with *Listeria*.
- Four investigations of foodborne or suspected foodborne outbreaks of gastrointestinal disease in WA. These investigations included one cohort and one case-control study.
- Eight cluster investigations of increased notification rates for a variety of *Salmonell*a serotypes / phage types.
- Investigation of 113 non-foodborne gastroenteritis outbreaks, 91 of which were at aged care facilities and 18 that were at hospitals.
- Involvement with national investigations into increased national incidence of *S*. Weltevreden, *Shigella sonnei* biotype G and *S*. Singapore.
- Attendance at OzFoodNet face-to-face meetings in Hobart in February, Adelaide in June and Melbourne in November.
- Involvement with OzFoodNet funded research projects, and in particular a retrospective survey of Norovirus genotypes in faecal samples from 2005 and 2006.
- Membership of a joint Department of Health Working Group aimed at improving data sharing within the Department of Health

3.0 Incidence of Foodborne Disease

In 2008 there were 3502 notifications of enteric disease in Western Australia. This equated to an annual rate of 164 per 100 000 population. This was lower than the mean rate for the previous four years, of 180 per 100 000 population.

3.1 Campylobacter

Campylobacter infection was the most commonly notified enteric infection in WA in 2008, comprising 52% of enteric notifications. There were 1 833 notified cases, giving a rate of 86 per 100 000 population (Appendix 1). This was lower than the rate for any of the previous four years. In 2008 *Campylobacter* notifications showed a similar seasonal pattern to previous years, with the number of notifications lower in the winter months and higher in the summer months (Figure 2).

The notification rate for *Campylobacter* infection was slightly higher for males than females in 2008, with rates of 89 and 83 per 100 000 population, respectively. *Campylobacter* notification rates for males were also higher than for females for the previous four years (Figure 3). *Campylobacter* notification rates were highest in the 0 to 4 year age group with a rate of 141 per 100 000. However, compared to notifications for other enteric infections, *Campylobacter* notifications were relatively evenly spread through the different age groups (Figure 4).

Data on Aboriginality was missing for 29% of *Campylobacter* notifications in 2008. The overall notification rate for Aboriginal people was 74 per 100 000 population, and the rate in non-Aboriginal people was 61 per 100 000 population. *Campylobacter* is unusual when compared to other enteric infections, in that rates were relatively similar for Aboriginal and non-Aboriginal people.

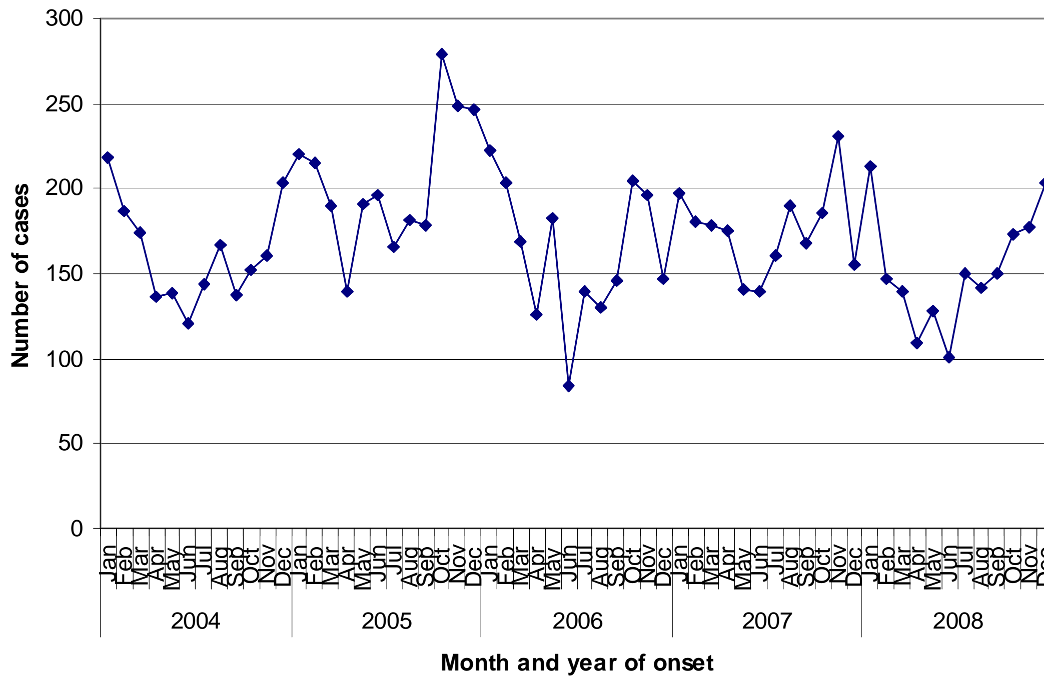

Figure 2: Number of cases of campylobacteriosis by month and year of onset, WA, 2004 to 2008

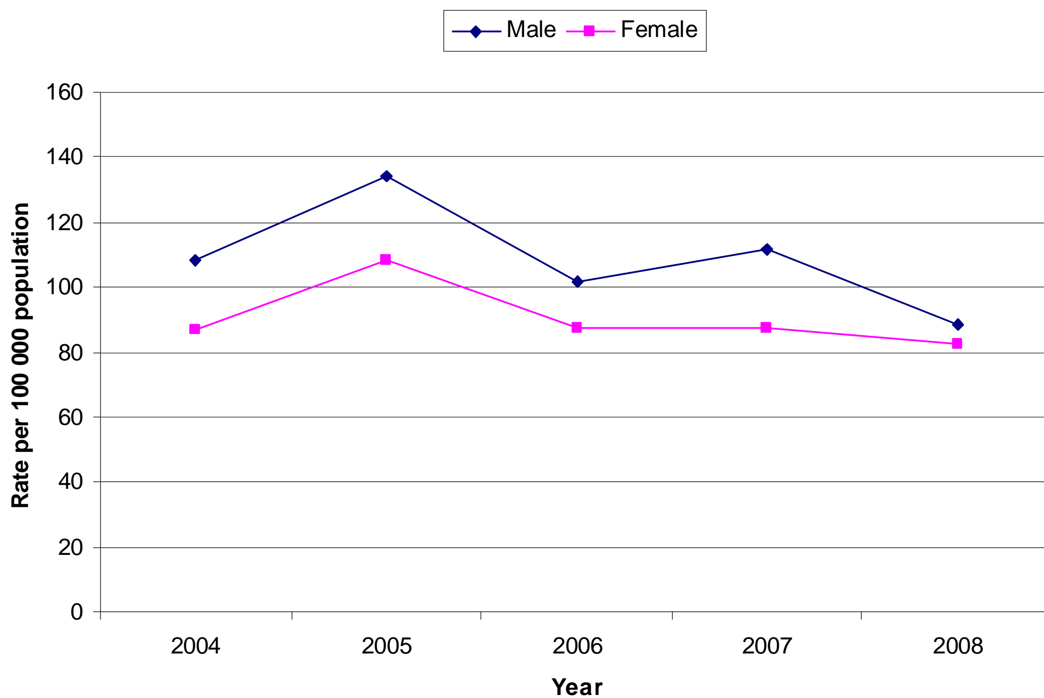

Figure 3. *Campylobacter* notification rates by sex, WA, 2004 to 2008

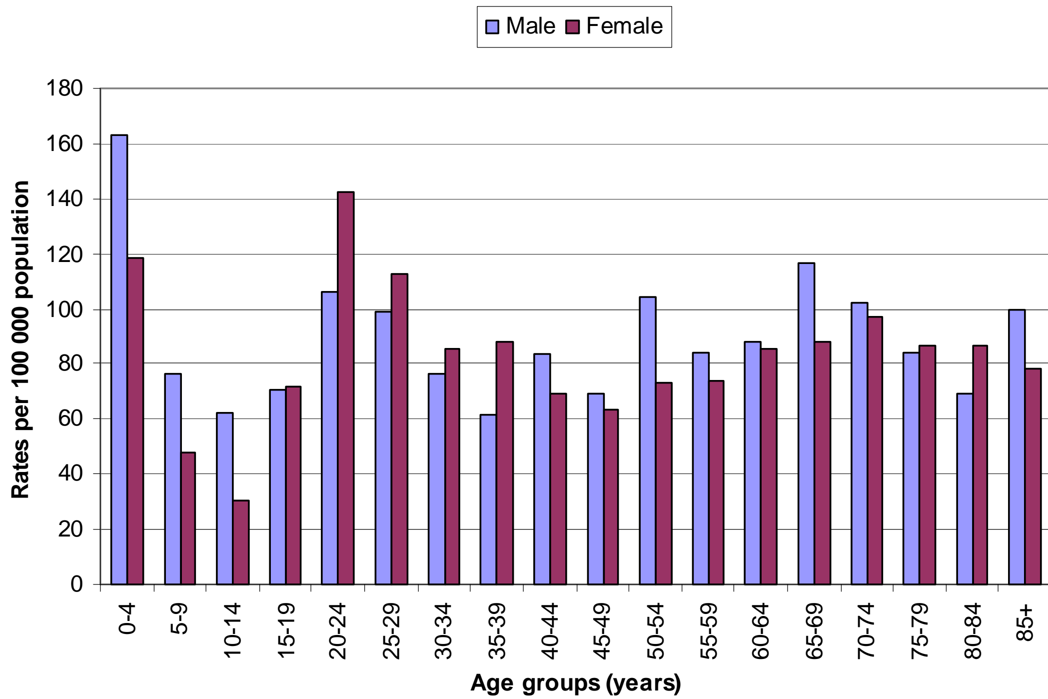

Figure 4. Age-specific notification rates for Campylobacteriosis by sex, WA, 2008

Campylobacter notification rates were also relatively similar in the different regions, where as for other enteric infections, rates are commonly higher for the northern and eastern regions. Notification rates in 2008 ranged from a lowest of 72 per 100 000 population for the Midwest to a highest of 132 per 100 000 population in the Southwest (Figure 5). For six of the eight regions, notification rates were lower for Aboriginal people as compared to non-Aboriginal people.

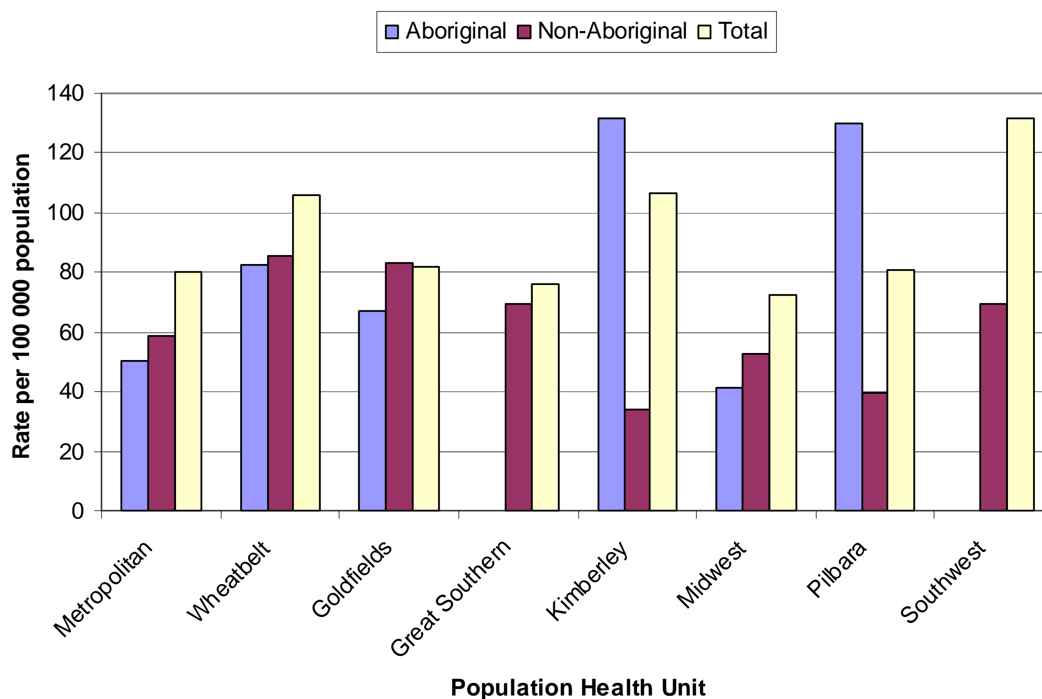

Figure 5. Campylobacteriosis notification rates by region and Aboriginality, WA, 2008

3.2 Salmonella

Salmonellosis was the second most commonly notified enteric infection in WA in 2008, with 849 notified cases (Appendix 1). The notification rate for *Salmonella* in 2008 (39.7 cases per 100 000 population), was lower than the previous year (47.3 cases per 100 000) and consistent with the previous four 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 2008, increases in *Salmonella* notifications were also noted in July and October. The highest number of *S.* Enteritidis notifications in a month was in July (n=21), and three clusters of *S.* Typhimurium were investigated in October (described in Section 5).

The overall notification rate for females (38 per 100 000 population) was similar to that for males (41 per 100 000). As in previous years the age group band with the highest notification rate was 0 – 4 years, with a notification rate of 189 per 100 000 population (Figure 7). The young adult age groups of 20 to 24 years, and 25 to 29 years, had the next highest notification rates (56 and 50 per 100 000 respectively).

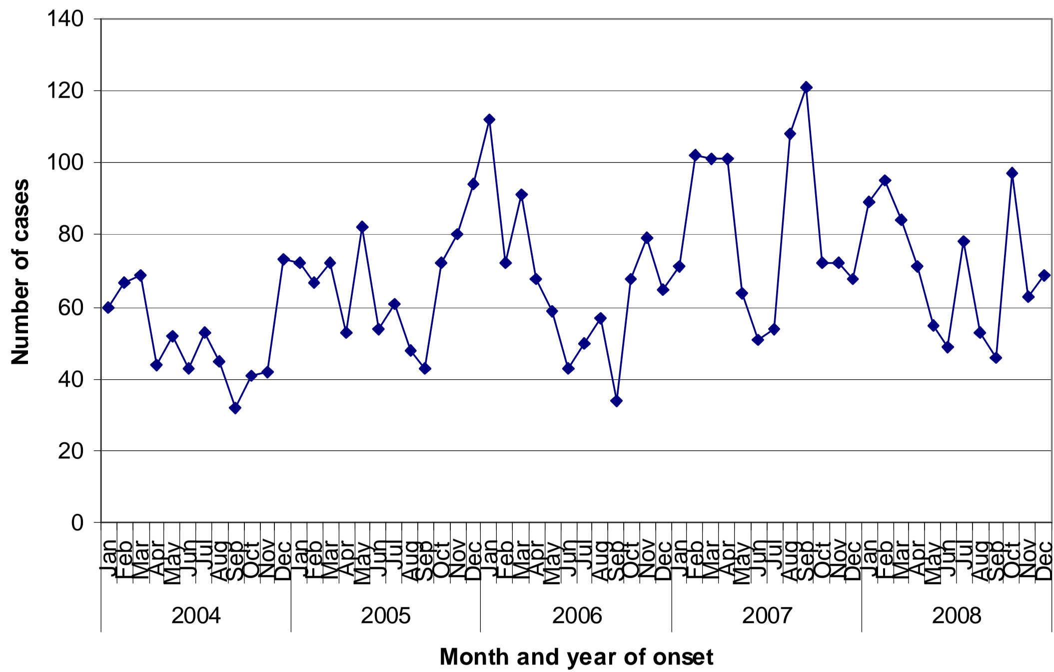

Figure 6. Number of cases of salmonellosis by month and year of onset, WA, 2004 to 2008

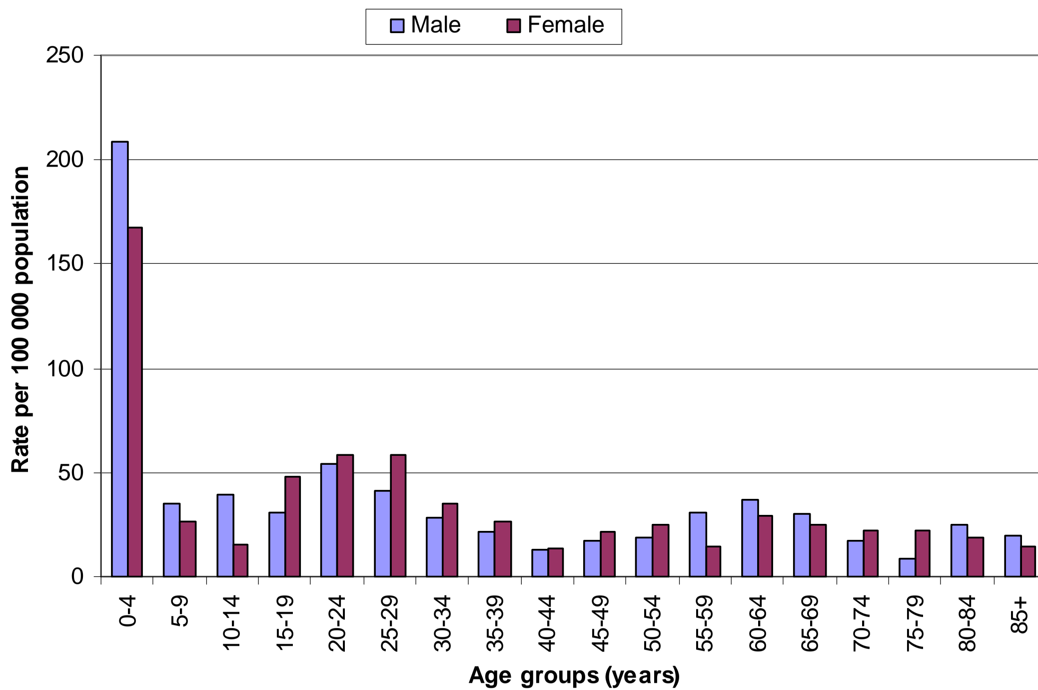

Figure 7. Age-specific notification rates for salmonellosis by sex, WA, 2008

Data on Aboriginality was missing for 16% of *Salmonella* cases in 2008, which was similar to the previous year. The overall *Salmonella* notification rate for Aboriginal people (128 per 100 000 population) was 4.3 times greater than the notification rate for non-Aboriginal people (30 per 100 000 population). For Aboriginal children in the 0 to 4 age group there were 734 cases of salmonellosis per 100 000 population, which was 6 times the notification rate for non-Aboriginal children in this age group (122 per 100 000) (Figure 8).

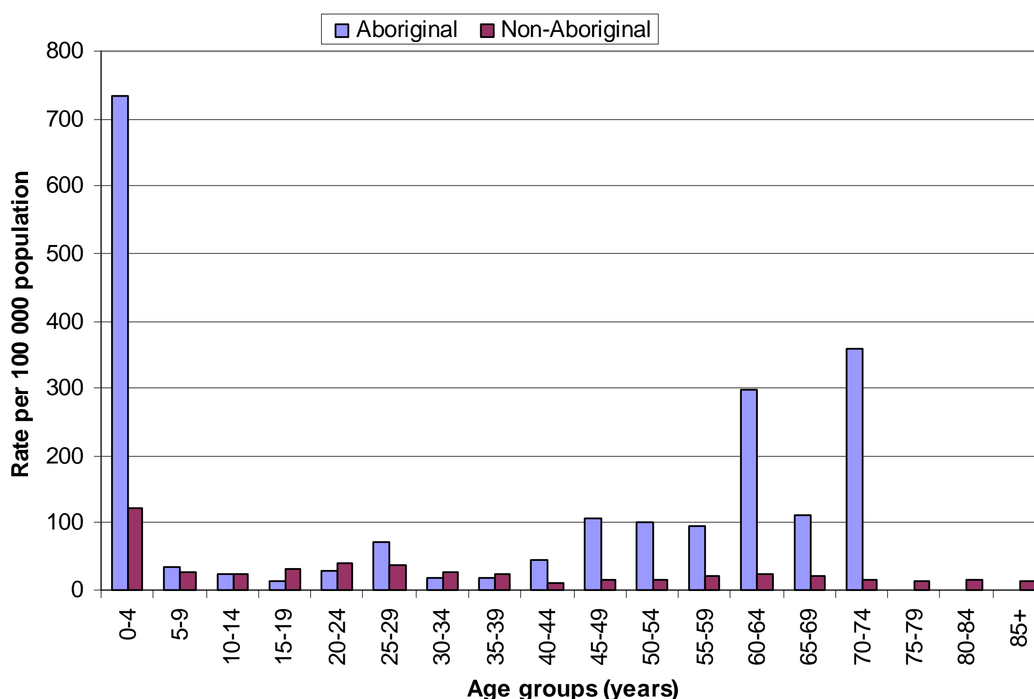

Figure 8. Age specific notification rates for salmonellosis for Aboriginal and non-Aboriginal people, WA, 2008

The region with the highest notification rate for salmonellosis in 2008 was the Kimberley region of WA with a notification rate of 286 per 100 000 population (Figure 9). This rate was 15 times greater than for the region with the lowest notification rate, the Wheatbelt region, which had 19 notified cases per 100 000 population. Notification rates in the Kimberley were higher for both Aboriginal and non-Aboriginal people compared with other regions.

The most commonly notified *Salmonella* serotype in WA in 2008 was *S.* Typhimurium, with 304 notifications (Table 1). The notification rate was approximately 30% higher than the mean of the previous four years. The second most commonly notified *Salmonella* serotype was *S.* Enteritidis (137 notifications),

with 91% of cases confirmed as travelling overseas during their incubation period. The number of notifications for *S.* Kiambu and *S.* Singapore were 3.1 times and 2.6 times greater respectively in 2008 than the four yearly mean. Cluster investigations into these increases are detailed in Section 5.

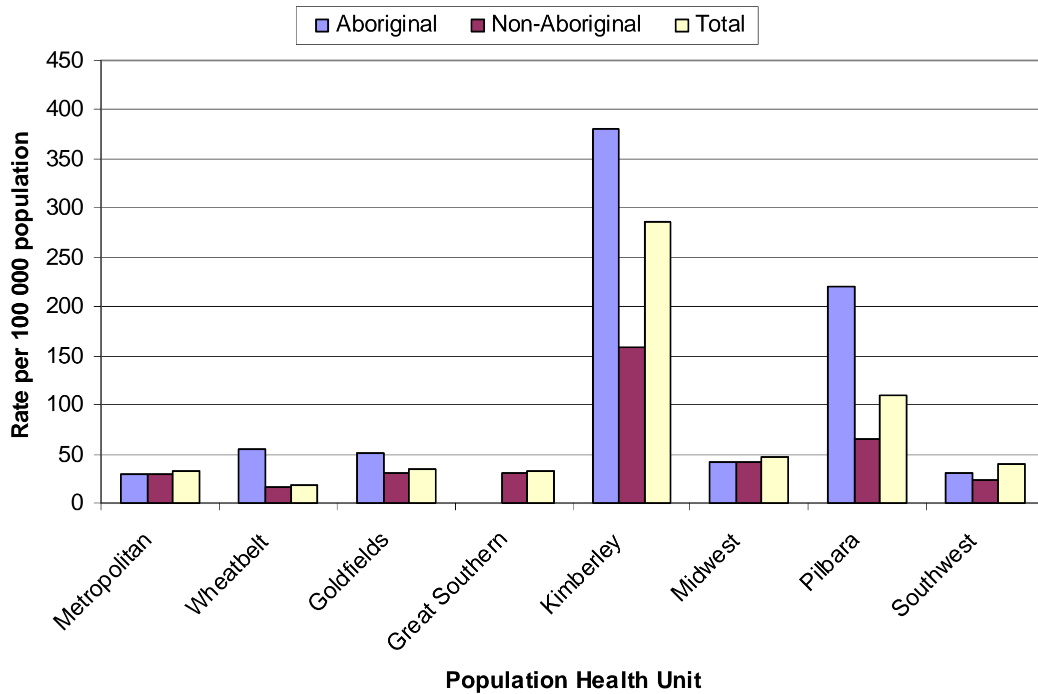

Figure 9. Salmonellosis notification rates by Aboriginality and by region, WA, 2008

Table 1. Number and proportion of the top 10 *Salmonella* serotypes notified in WA, 2008

Salmonella Serotype	2008 N	Proportion %*	Mean Number (2004-2007)	Ratio‡
Typhimurium	304	36	238	1.3
Enteritidis	137	16	88	1.6
Saintpaul	25	2.9	36	0.7
Chester	24	2.8	27	0.9
Muenchen	21	2.5	27	0.8
Kiambu	20	2.4	6.5	3.1
Stanley	19	2.2	13	1.5
Singapore	18	2.1	6.8	2.6
Salmonella species#	17	2.0	10	1.7
Paratyphi B var Java	17	2.0	21	0.8
Corvallis	16	1.9	10	1.6

*Proportion of total Salmonella cases notified in 2008.
‡Ratio of the number of reported cases in 2008 compared to the four year mean of 2004-2007.
#*Salmonella* serotyping information not available

3.3 Rotavirus

In 2008 rotavirus infection was the third most commonly notified enteric infection in WA, with 424 cases (19.8 per 100 000 population) (Appendix 1). In the two complete years following the introduction of rotavirus as a notifiable infection (which commenced in July 2006), monthly notification rates exhibited seasonal peaks. In 2007 there was a large increase in notifications in July to October, where as in 2008 there was a smaller increase in August to December (Figure 10). Cases in the peak months of 2007 were similar demographically to cases occurring in other months, with most cases occurring in the 0 to 4 age group and living in the Perth metropolitan area.

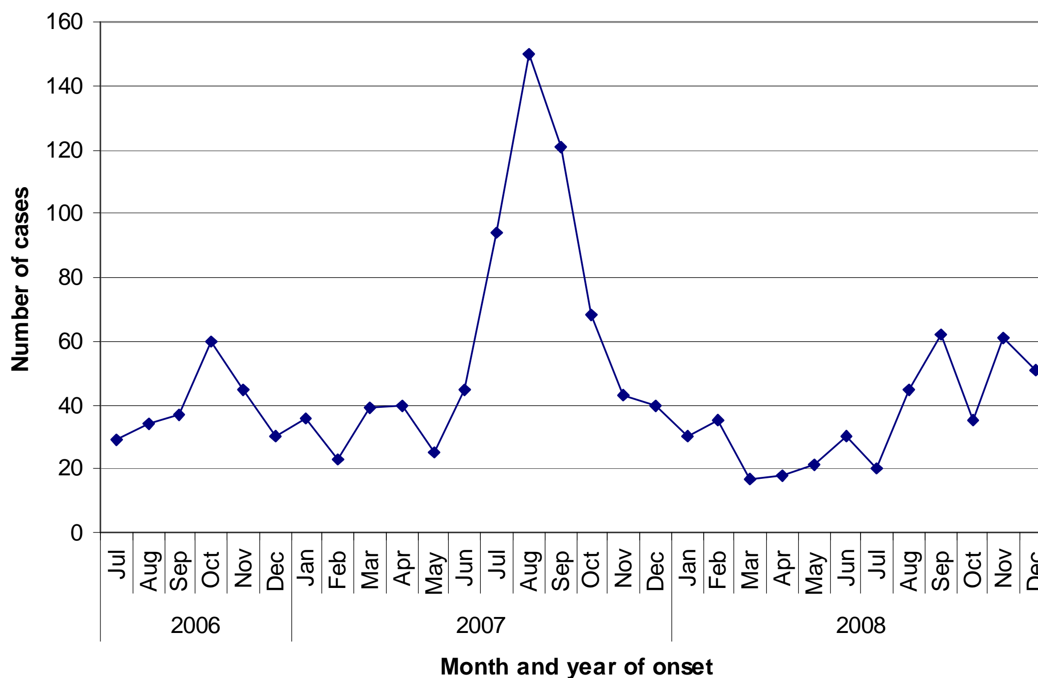

Figure 10. Number of cases of rotavirus infection by month of onset, WA, 2006 to 2008

In 2008 the notification rate was higher for females (21.4 per 100 000 population) than for males (18.2 per 100 000 population). As for most other enteric infections, the highest rotavirus notification rate was for children aged 0 to 4, with 278 (65%) of notifications falling within this age group (Figure 11). Rotavirus vaccination was introduced in July 2007, with a two dose schedule at 2 and 4 months of age. There were 111 rotavirus notifications in 2008 for children with a date of birth between 01/05/2007 and 30/08/2008, which is the cohort of children who should have been fully vaccinated (children born after that date in 2008 would have been less than 4 months old, so not expected to be fully vaccinated). Of these 111 cases, 62 (56%) were fully vaccinated, 16 were partially vaccinated, 15 were not vaccinated, 12 were ineligible for vaccination because they were less than 2 months old, and for 6 the vaccine status was unknown.

Indigenous status information was missing for 22% of rotavirus notifications. The notification rate for the Aboriginal population was 37 per 100 000 population, which was over twice that of the non-Aboriginal population (15 per 100 000 population).

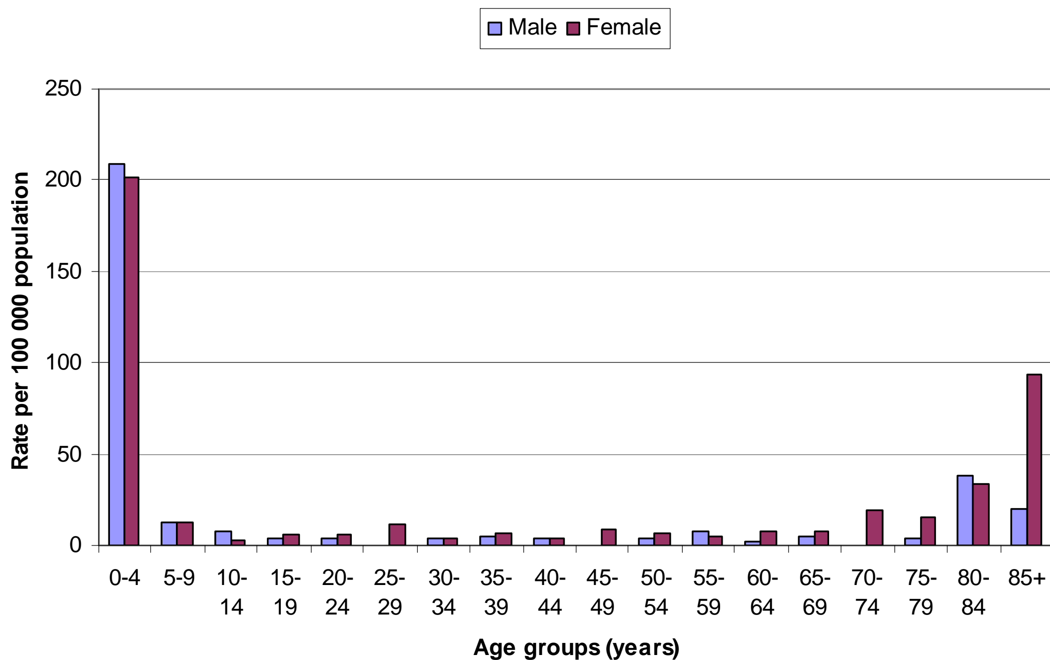

Figure 11. Age-specific notification rates for rotavirus by sex, WA, 2008

Rotavirus notifications were spread throughout the regions of WA, with total rates ranging from 5 per 100 000 in the Goldfields to 27 per 100 000 in the Kimberley (Figure 12). For the five regions with notifications for Aboriginal people, rates were higher for Aboriginal as compared to non-Aboriginal people.

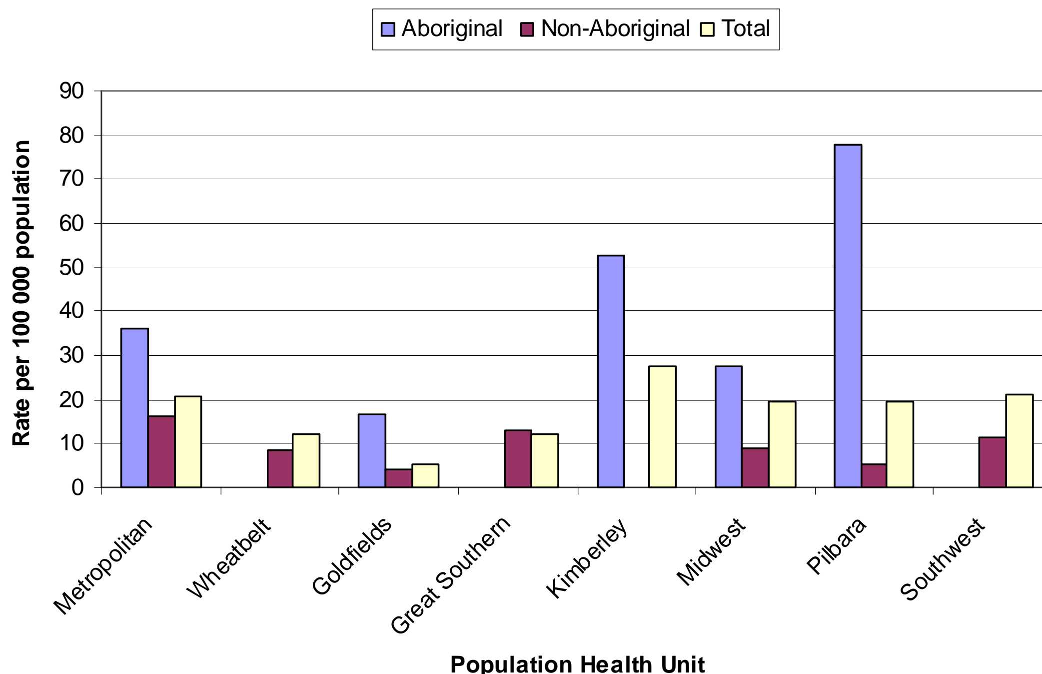

Figure 12. Rotavirus notifications by region and Aboriginality, WA, 2008

3.4 Cryptosporidium

There were 164 cases of cryptosporidiosis notified in 2008, which was a rate of 7.7 cases per 100 000 population (Appendix 1). The number of cases in 2008 was similar to that recorded in the previous four 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 2008 the number of notifications was generally lower through the winter and higher in the summer months.

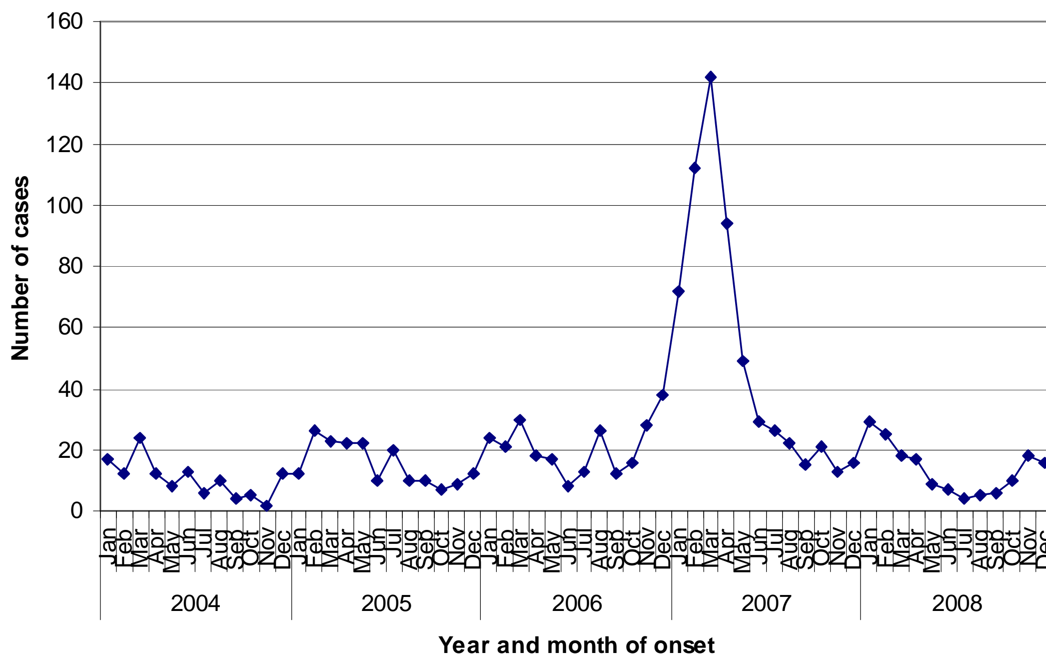

Figure 13. Number of cases of cryptosporidiosis by month and year of onset, WA, 2004 to 2008

The notification rate was slightly higher for females (8.2 per 100 000) than for males (7.1 per 100 000). The age group with the highest notification rate was the 0 to 4 year old group, accounting for 52% of notifications (Figure 14). Aboriginal children in the 0 to 4 age group appeared to be particularly vulnerable to *Cryptosporidium* infection, with an infection rate of 698 cases per 100 000 population. This was 41 times the rate for non-Aboriginal children in this age group, of 17 per 100 000 population. The overall cryptosporidiosis rate for the Aboriginal population was 84 cases per 100 000 population, which was 21 times the rate for the non-Aboriginal population of 4 cases per 100 000 population. Indigenous status information was missing for 12% of cases.

The Kimberley region had the highest notification rate for cryptosporidiosis, with 161 cases per 100 000 population (Figure 15). Notifications for both Aboriginal and non-Aboriginal people were highest in this region.

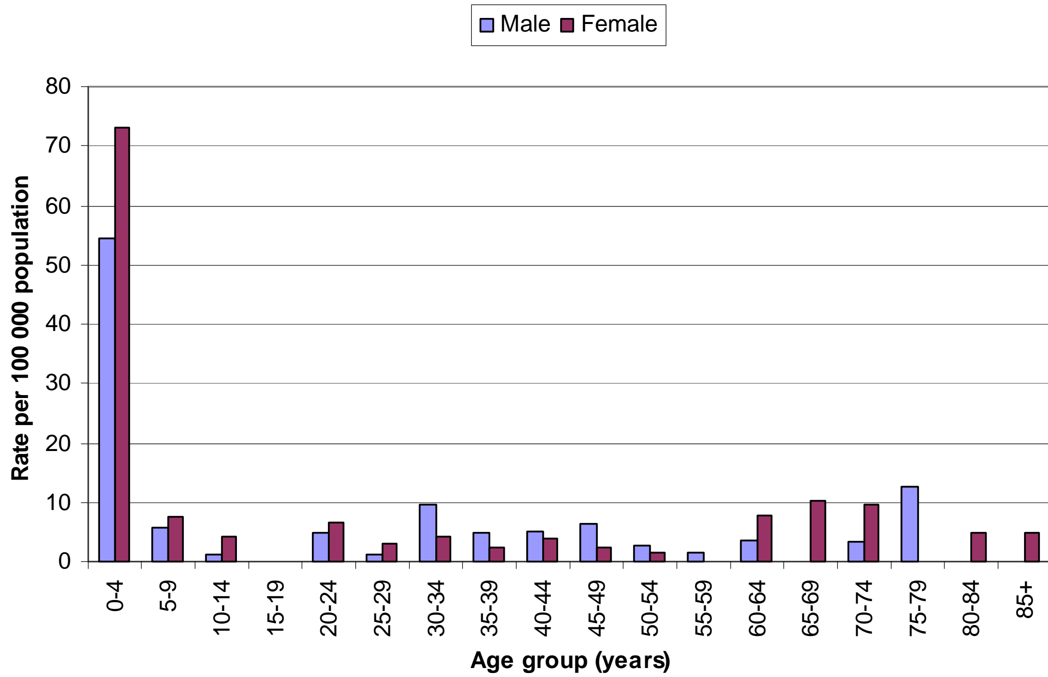

Figure 14. Age-specific notification rates for cryptosporidiosis by sex, WA, 2008

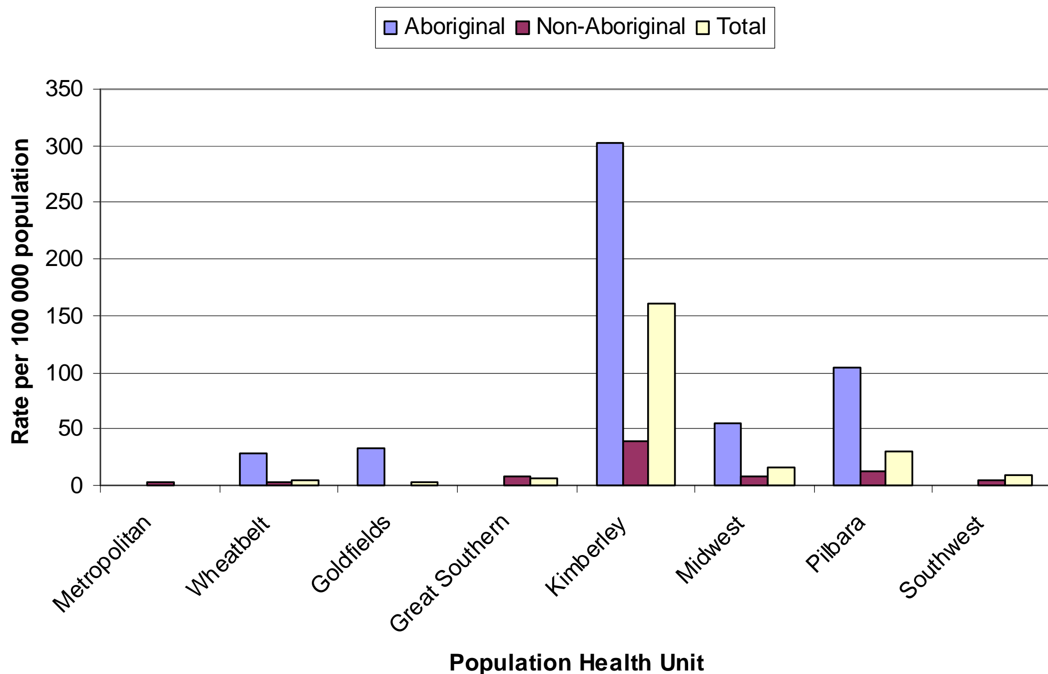

Figure 15. Cryptosporidiosis notification rates by region and Aboriginality, WA, 2008

3.5 *Shigella*

The *Shigella* notification rate in 2008 was higher than for both the previous year (5.0 cases per 100 000), and the previous four year average (6.2 cases per 100 000). There were 169 *Shigella* notifications in 2008, which was a notification rate of 7.9 per 100 000 population (Appendix 1). The number of *Shigella* notifications per month varied from a minimum of 4 to maximum of 22, with no distinct seasonal patterns (Figure 16).

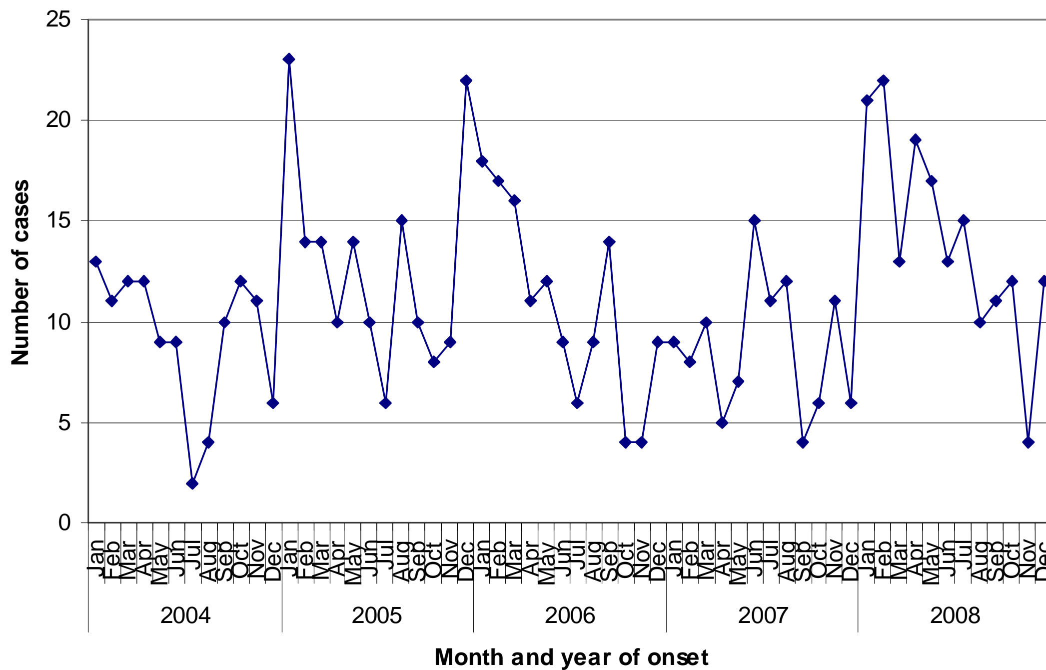

Figure 16: Number of cases of shigellosis by month and year of onset, WA, 2004 to 2008

The notification rate for males was lower than females (6 and 9 cases per 100 000 population) respectively. The highest notification rate was for the 0 to 4 age group, with a rate of 34 per 100 000 and accounting for 27% of notifications (Figure 17). The overall notification rate of 103 per 100 000 for Aboriginal people was 34 times the rate for non-Aboriginal people, which was 3 per 100 000 population. Aboriginality information was missing for 13.6% of *Shigella* notifications. The Kimberley region had the highest notification rate for *Shigella*, with a rate of 116 per 100 000 population. The Pilbara had the second highest notification rate, with 41.3 per 100 000 population. The rate in the Metropolitan region was 4.16 per 100 000 population (Figure 18).

The majority of *Shigella* isolates from clinical cases in 2008 were *Shigella sonnei* (64%). The most frequent biotype of *Shigella sonnei* was biotype A (71%). The remainder of the *Shigella* cases were predominantly *Shigella flexneri* (30%), and there were two cases of *Shigella boydii*. There were no cases of *Shigella dysenteriae* notified in 2008.

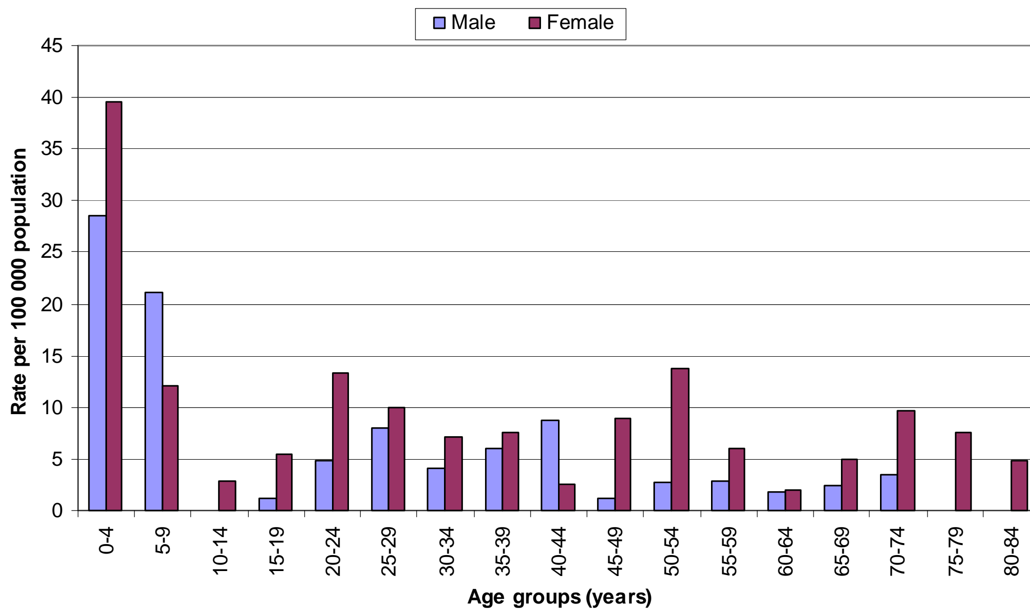

Figure 17. Age-specific notification rates for shigellosis by sex, WA, 2008

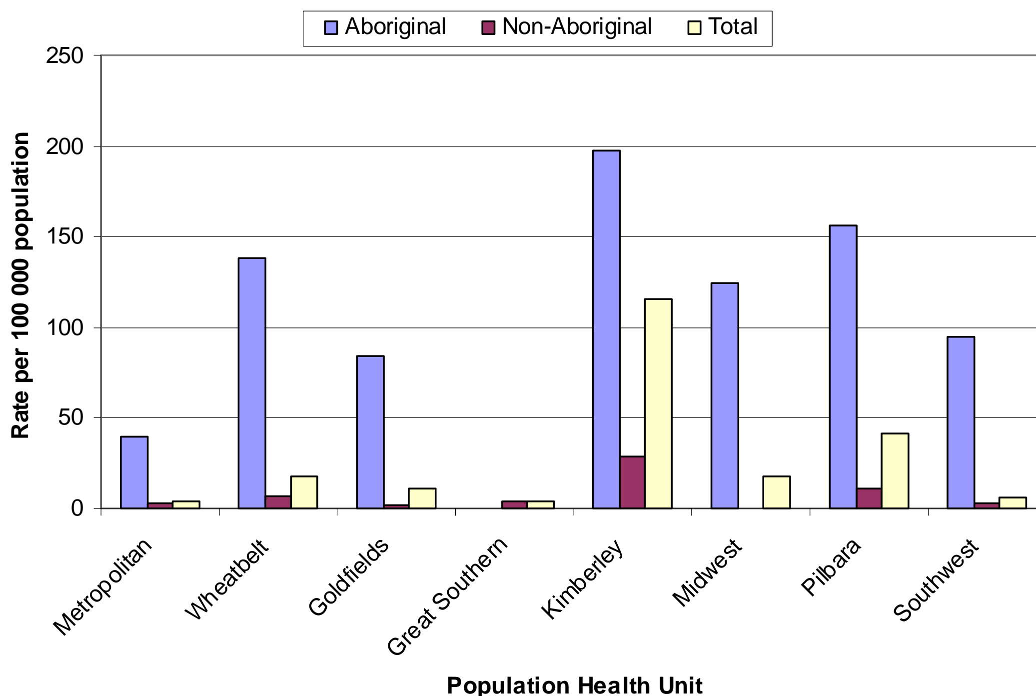

Figure 18. Shigellosis notification rates by region and Aboriginality, WA, 2008

3.6 Hepatitis A

There were 22 hepatitis A cases notified in 2008 (1.0 case per 100 000 population), which was similar to the number of notifications from the previous year (Appendix 1). In 2007 and 2008 the number of notifications was highest in the autumn months, although this pattern was not consistently observed in previous years (Figure 19).

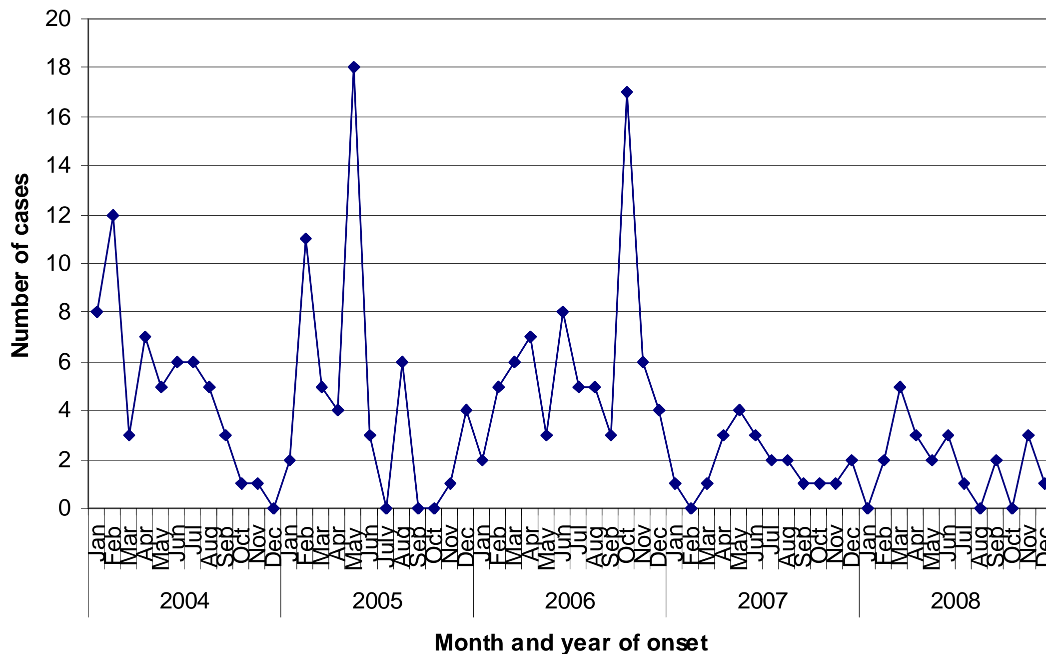

Figure 19. Number of cases of hepatitis A infection by month and year of onset, WA, 2004 to 2008

The number of hepatitis A notifications in 2007 and 2008 was lower than for any of the previous 10 years (Figure 20). In 2007 and 2008 there were no hepatitis A notifications for Aboriginal people. This was unusual compared to previous years, as prior to 2007 notification rates had been higher for Aboriginal as compared to non-Aboriginal people (the annual mean for the 10 years prior to 2007 was 40 cases per 100 000 for Aboriginal people and 4 cases per 100 000 for non-Aboriginal people).

When the number of notifications for 2007 and 2008 were compared to the previous 10 years, there was also a reduction in the proportion of hepatitis A notifications from regional areas (Figure 21). The number of overseas acquired infections in 2007 and 2008 (7 and 8 respectively) was similar to the average for the previous 10 years (8 cases/year).

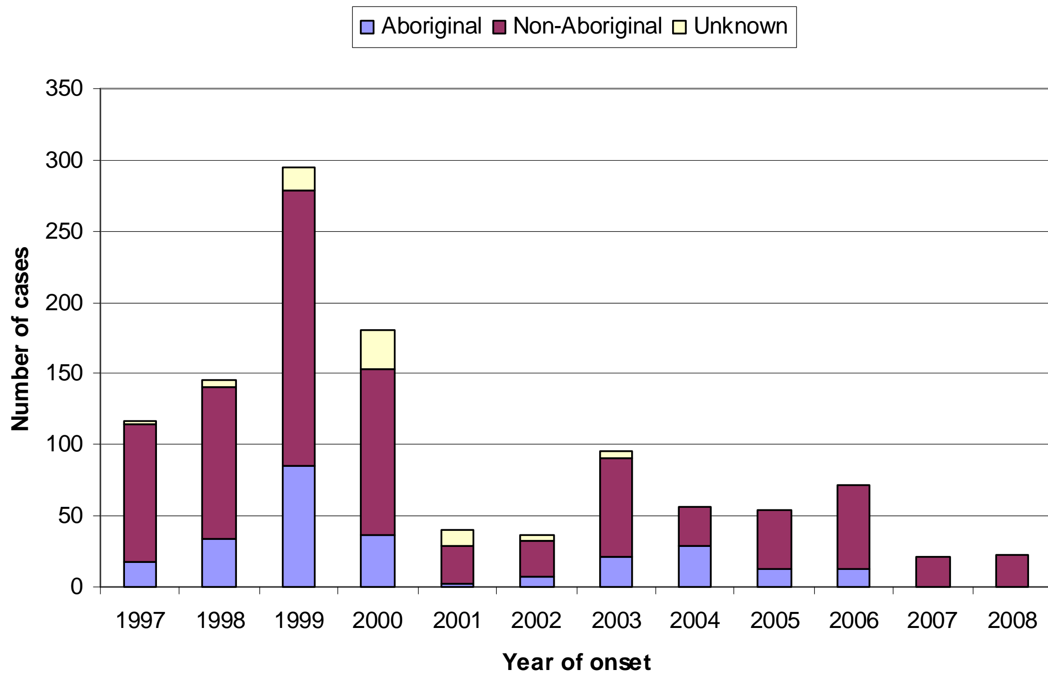

Figure 20. Number of hepatitis A cases by Aboriginality and year of onset, WA, 1997 to 2008

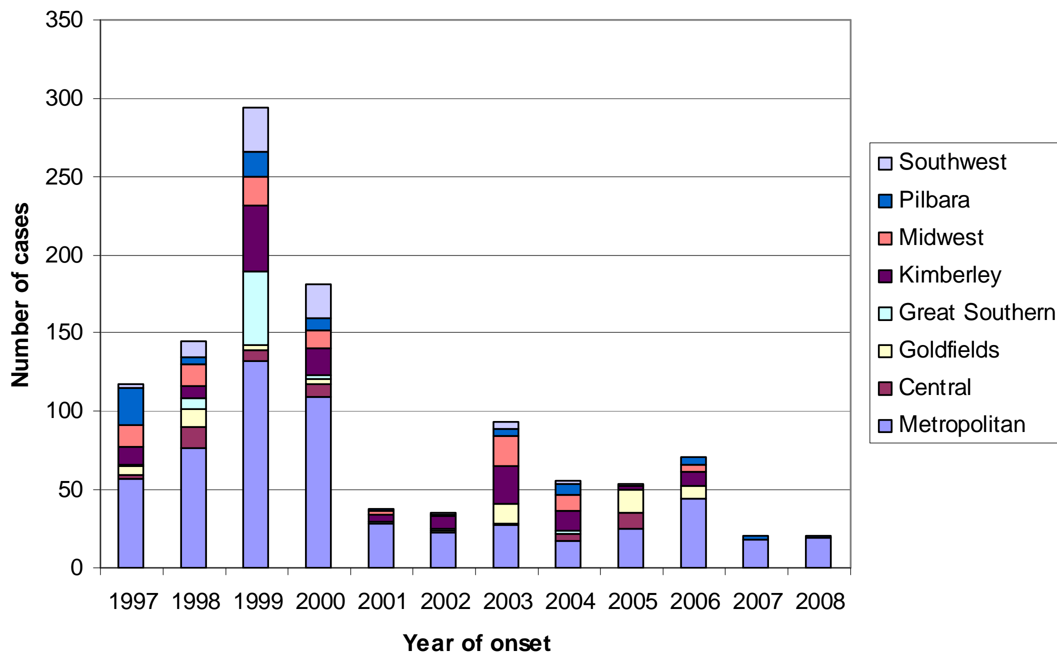

Figure 21. Number of hepatitis A notifications by region and year of onset, WA, 1997 to 2008

In November 2005 a hepatitis A immunisation programme for Aboriginal children was introduced in WA (as well as in the Northern Territory, Queensland and South Australia), with vaccination at 12 and 18 months of age, and a catch up programme for children aged up to 5 years old. The first cohort of Aboriginal children would have been fully vaccinated part way through 2006. This vaccination program appears to have resulted in a reduction in hepatitis A case numbers in 2007 and 2008. A similar reduction in hepatitis A notification rates followed the introduction of hepatitis A vaccination in Indigenous children in Queensland in 1999, and this was attributed to the vaccination programme (1).

Hepatitis A cases in 2008 ranged in age from 5 years to 81 years, with the age groups 5 to 9 years and 20 to 24 years having the highest number of notifications. There were 14 male and 8 female cases in 2008. Seven cases had travelled overseas during their incubation period, three to Indonesia, two to the Czech Republic and the others to Burma and the Sudan. Cases in 2008 showed geographical clustering, with 11 of the 22 cases in 2008 residing in adjacent suburbs in a north metropolitan area of Perth (Figure 22). Cases not in this cluster were more likely to have traveled overseas during their incubation period. Of the 11 geographically clustered cases, 2 had traveled overseas during their incubation period. Of the remaining 8 metro cases, 5 had traveled overseas during the incubation period.

Hepatitis A in the Perth Metropolitan Area 2008

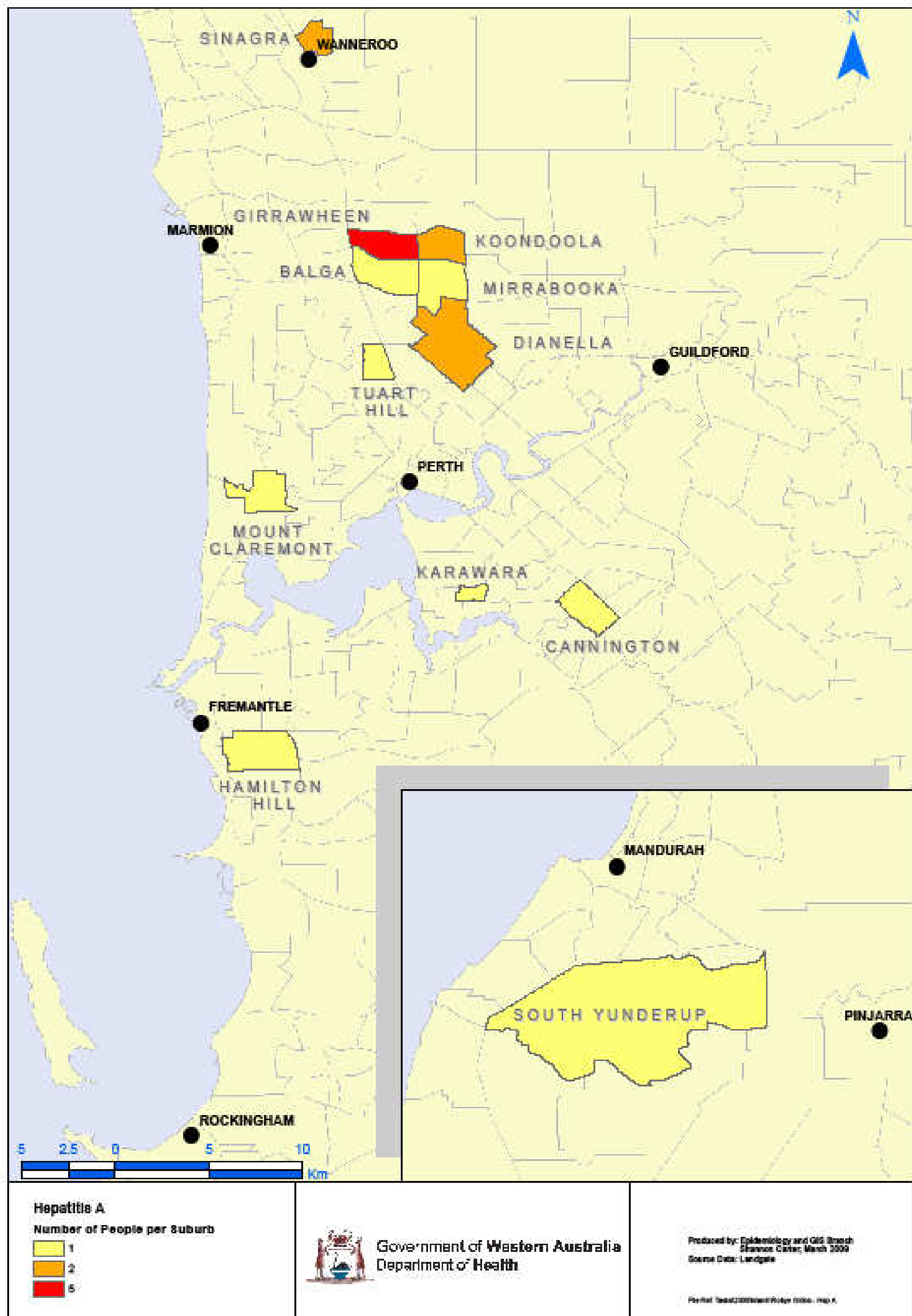

Figure 22. Hepatitis A notifications per suburb, Perth metropolitan area, 2008

3.7 Typhoid and Paratyphoid fever

There were eight cases of typhoid fever in WA in 2008. Two typhoid cases had no history of recent overseas travel. Two of the other cases had travelled to India, two had travelled to Indonesia and one case each had travelled to Malaysia and Nepal. Three cases of paratyphoid fever were notified in WA in 2008. Two of the cases had travelled to India and one had travelled to Turkey.

3.8 Listeria

There were eight cases of *Listeria monocytogenes* infection in 2008, which was similar to the mean number of cases for the previous four years (Figure 23). There were three pregnancy related cases, with two cases a materno-foetal pair where the mother reported consumption of high risk foods throughout pregnancy. When interviewed, the mother said that she was aware of listeria, but because she had not had any issues with her first two pregnancies, decided to eat high risk foods. The mother of the third pregnancy related case did not have any obvious risk factors for infection. Both babies survived. The five non-pregnancy related cases (four females, one male, aged 39 – 81 years) were all immunocompromised and were taking immunosuppressive drugs prior to infection. All cases reported eating foods considered to be high risk for listeria

3.9 Vibrio parahaemolyticus Infection

There were seven cases of infection with *Vibrio parahaemolyticus* in 2008. There were six males and one female aged between 24 and 64 years of age. Two people had a history of recent travel to the Philippines, while other cases had travelled to Thailand, India and Vietnam. *V. parahaemolyticus* was isolated from a wound infection in one case.

3.10 Yersinia

The seven cases of *Yersinia* infection with onset dates in 2008 ranged in age from 1 to 78 years old, with two males and five females. One case had a history of recent travel to Malaysia, with the other cases reporting no recent overseas travel. Five cases resided in the metropolitan area of Perth with one case each in the Wheatbelt and Southwest regions. Five cases had a *Yersinia enterocolitica* infection, while the isolate was not speciated in the other two cases.

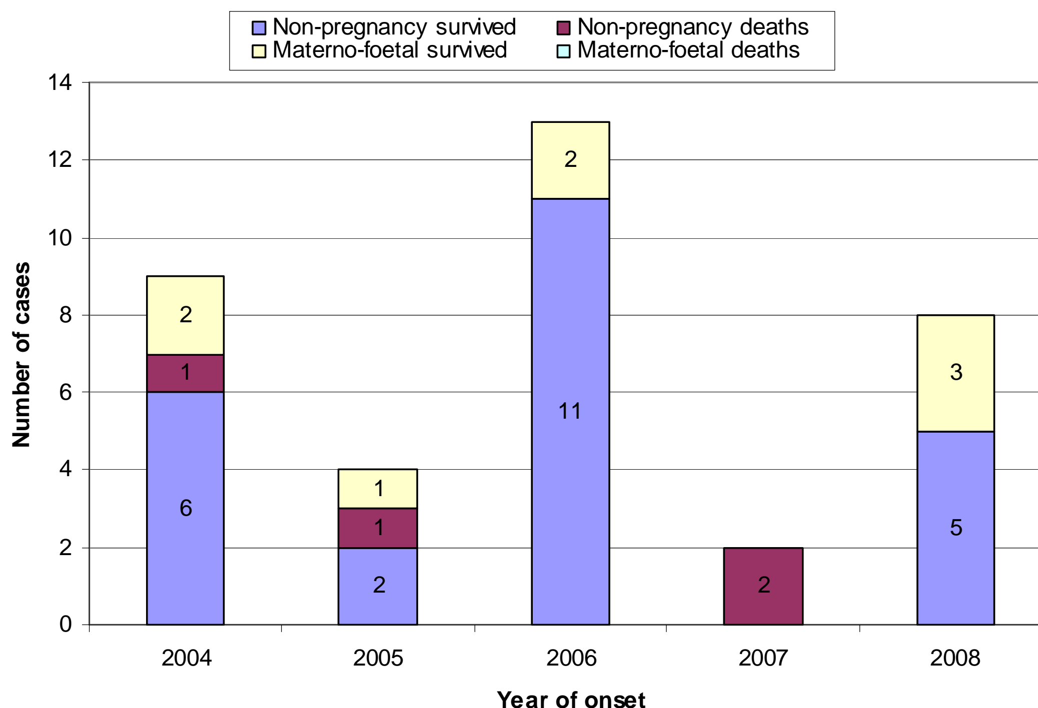

Figure 23. Notifications of listeriosis showing non-pregnancy related infections and deaths, and materno-foetal infections and deaths, WA, 2004 to 2008

3.11 Hepatitis E

In 2008 there were six cases of hepatitis E infection in WA. There was one female and five male cases. Cases ranged in age from 19 to 58 years old. Cases reported that they had travelled to Nepal, Mozambique, Bangladesh, India, United Arab Emirates and Indonesia during the incubation period.

3.11 Cholera

In 2008 there were two cases of *Vibrio cholerae* infection in WA. Both cases were 58 year old females. One case reported travel to India and the other reported travel to the Philippines prior to onset. Isolates from both cases were identified as the *V. cholerae* 01 Ogawa var El Tor strain of cholera.

3.13 Botulism, STEC (Shiga toxin producing E. coli) and Haemolytic Uraemic Syndrome (HUS)

There were no cases of botulism, STEC infection or HUS in WA in 2008.

4.0 Gastrointestinal Disease Outbreaks

4.1 Foodborne Outbreaks

In 2008 there were four foodborne or suspected foodborne gastroenteritis outbreaks investigated by WA DOH (Table 2). Two of the outbreaks were caused by Norovirus, one by *Salmonella* Typhimurium and one by *Clostridium perfringens.* Two outbreaks appeared to be related to infected food handlers. For the other two outbreaks the suspected vehicle was chicken.

***Salmonella* Typhimurium Phage Type 9 Outbreak**. In January, three members of a family from a regional town were admitted to hospital with bloody diarrhoea, vomiting and fever. Two faecal specimens were positive for *Salmonella* Typhimurium (STM) phage type 9 (PFGE profile STYMAV.0108). An interview with the mother revealed that partly frozen chicken had been oven roasted. It is suspected that undercooked chicken was the source of the infection. There were no other recent reports of either this phage type or PFGE profile in WA at the time of this family outbreak.

Norovirus Restaurant Outbreak. In April, patrons who had eaten a buffet meal at a restaurant on a Saturday evening dinner or a Sunday lunch became ill with symptoms of vomiting and/or diarrhoea. A total of 366 people were reported to have eaten at these buffet meals, and 92 of these were interviewed in a cohort study. Analysis of the results demonstrated an attack rate of 82% (75 people affected). The only food with a 95% CI greater than one and p value less than 0.05 was Thai fish curry (relative risk 1.30). However, as this food was consumed by only 28% of cases it would not account for all the cases of disease associated with the outbreak. Each of the faecal specimens obtained from six affected attendees was positive for norovirus. An inspection of the premises did not identify any major deficiencies. There were no reports of staff illness and consequently faecal specimens were not collected from staff members. Whilst the route of transmission and source was not established, it seems likely that one or more foods served at the buffet during the two affected meal sittings were contaminated.

Table 2. Outbreaks of foodborne illness in WA by month, setting and agent, 2008

Month	*Setting*	*Agent Responsible*	*Exposed*	*Interviewed*	*Affected*	*Hospitalised*	*Deaths*	*Epidemiological Study*	*Responsible Vehicles*
Jan	private residence	*Salmonella* Typhimurium PT9	3	1	3	3	0	D	chicken
Apr	restaurant	Norovirus	366	92	75	0	0	C	unknown
Apr	aged care facility	Norovirus	108	0	42	0	0	D	unknown
Jul	other	*Clostridium perfringens*	662	88	30	0	0	CCS	BBQ asian chicken
Total					150	3	0		

† D = descriptive case series, C = cohort study, CCS = case control study

Norovirus Aged Care Facility Outbreak. In April, residents and staff at an aged care facility were ill with diarrhoea and/or vomiting. Examination of case onset dates identified that the index case was a chef who had prepared food while he was ill with gastroenteritis. Other staff and residents subsequently became ill over a 24 hour period. Faecal specimens from eight residents were positive for norovirus. The epidemiological picture was consistent with foodborne transmission, although a non-foodborne mechanism of spread was also possible.

***Clostridium perfringens* Mine Site Outbreak.** In July, at least 30 mine workers were ill with diarrhoea and abdominal pain following a company BBQ meal. The pattern of illness was consistent with *Clostridium perfringens* toxin contamination. A total of 662 people were reported to have eaten at this meal, and 88 were interviewed in a case control study (30 cases, 58 controls). Analysis of the results demonstrated a minimum attack rate of 34% (30/88). Although consumption of chicken and steak displayed some association with illness, with odds ratios of 3.28 and 2.93 respectively, these associations were not statistically significant. Faecal specimens from four of the five mine workers were positive for *Clostridium perfringens,* with two of the samples demonstrating an indistinguishable PFGE pattern, suggesting that the *C. perfringens* present in both samples may have come from the same source. Available food samples were negative for *C. perfringens* and a food source could not be clearly identified. However, BBQ chicken was the most likely source, as chicken was the food item consumed by the highest proportion of cases and was associated with possible temperature control issues.

4.2 Non Foodborne Outbreaks

There were 113 outbreaks of gastroenteritis in 2008 that appeared to be non-foodborne, 91 of which occurred in aged care facilities, 18 in hospitals, two in child care centres and two on ships (Table 3). The causative agent for 54 (48%) of the outbreaks was confirmed as norovirus, for nine 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 *Giardia.* In the remainder of the outbreaks (42%) 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 were a total of 2269 people affected by these outbreaks. The number of non-foodborne gastroenteritis outbreaks in 2008 (113) was lower than in 2007 (124) and there was a 28.4% decrease in the number of people affected by these outbreaks in 2008 compared with 2007. The number of gastroenteritis outbreaks reported each month varied through the year (Figure 24). In 2008 the month with the highest number of reported outbreaks was August. In previous years peak months had been June and October.

Table 3. Outbreaks of non-foodborne gastrointestinal illness in WA by month, setting and agent, 2008

Month	*Setting exposed*	*Agent Responsible*	*Affected*	*Hospitalised*	*Deaths*	*Epidemiological Study*
January	aged care facility	Norovirus	22	0	0	D[†]
January	aged care facility	Norovirus	30	0	0	D
January	aged care facility	Unknown	16	1	0	D
January	aged care facility	Unknown	3	0	0	D
January	aged care facility	Norovirus and Rotavirus	14	0	0	D
February	aged care facility	Unknown	5	0	0	D
February	hospital	Norovirus	49	NA*	0	D
February	aged care facility	Norovirus	16	0	0	D
February	aged care facility	Unknown	2	0	0	D
February	aged care facility	Norovirus	44	3	2	D
February	aged care facility	Unknown	6	0	0	D
February	child care	Rotavirus	26	1	0	D
March	aged care facility	Norovirus	31	0	0	D
March	aged care facility	Rotavirus	23	0	0	D
March	aged care facility	Unknown	9	0	0	D
March	aged care facility	Norovirus	20	0	0	D
April	aged care facility	Unknown	19	0	0	D
April	aged care facility	Unknown	20	0	0	D
April	aged care facility	Norovirus	32	0	0	D
April	hospital	Norovirus	67	N/A	0	D
May	aged care facility	Unknown	13	0	0	D
May	aged care facility	Norovirus	11	1	0	D
May	aged care facility	Norovirus	28	1	0	D
May	hospital	Unknown	5	0	0	D
May	hospital	Unknown	9	N/A	0	D
May	aged care facility	Unknown	13	0	0	D
May	aged care facility	Unknown	3	0	0	D
May	aged care facility	Unknown	4	0	1	D
May	aged care facility	Norovirus	13	0	0	D
May	aged care facility	Unknown	11	2	0	D
May	aged care facility	Unknown	8	0	0	D
May	hospital	Unknown	6	0	0	D
June	aged care facility	Unknown	8	0	0	D
June	cruise ship	Norovirus	191	0	0	D
June	child care	*Giardia*	4	0	0	D
June	aged care facility	Norovirus	35	0	0	D
June	aged care facility	Unknown	7	0	0	D
June	hospital	Rotavirus	6	0	1	D
June	aged care facility	Unknown	3	0	0	D
June	aged care facility	Unknown	5	0	0	D
June	aged care facility	Norovirus	13	0	0	D
June	aged care facility	Norovirus	26	0	0	D
June	aged care facility	Norovirus	43	0	0	D
June	aged care facility	Unknown	66	0	0	D
July	aged care facility	Norovirus	31	0	0	D
July	aged care facility	Unknown	9	0	0	D
July	aged care facility	Rotavirus	20	0	0	D

Month	*Setting exposed*	*Agent Responsible*	*Affected*	*Hospitalised*	*Deaths*	*Epidemiological Study*
July	aged care facility	Norovirus	51	1	1	D
July	aged care facility	Norovirus	15	0	0	D
July	aged care facility	Unknown	4	0	0	D
July	aged care facility	Unknown	9	0	0	D
July	hospital	Norovirus	11	0	0	D
July	aged care facility	unknown	12	1	0	D
July	aged care facility	Unknown	28	1	0	D
July	aged care facility	Norovirus	18	0	0	D
August	aged care facility	Norovirus	51	3	2	D
August	aged care facility	Unknown	6	0	0	D
August	aged care facility	Norovirus	36	2	0	D
August	aged care facility	Rotavirus	22	0	0	D
August	aged care facility	Norovirus	10	0	0	D
August	aged care facility	Norovirus	15	1	0	D
August	hospital	Norovirus	47	0	0	D
August	aged care facility	Norovirus	15	0	0	D
August	aged care facility	Unknown	11	0	0	D
August	aged care facility	Unknown	13	0	0	D
August	aged care facility	Norovirus	16	2	0	D
August	aged care facility	Norovirus	34	0	0	D
August	aged care facility	Norovirus	62	2	0	D
August	aged care facility	Norovirus	38	0	1	D
August	hospital	Norovirus	23	0	0	D
August	aged care facility	Unknown	8	0	0	D
August	hospital	Norovirus	12	0	3	D
August	hospital	Norovirus	16	0	0	D
August	aged care facility	Norovirus	13	0	0	D
August	aged care facility	Norovirus	9	1	0	D
September	aged care facility	Norovirus	11	0	0	D
September	hospital	Norovirus	19	0	0	D
September	aged care facility	Unknown	22	0	0	D
September	aged care facility	Rotavirus	14	0	0	D
September	aged care facility	Norovirus	37	0	0	D
September	hospital	Unknown	4	0	0	D
September	aged care facility	Norovirus	16	0	0	D
September	aged care facility	Rotavirus	10	0	0	D
September	aged care facility	Norovirus	9	1	0	D
September	aged care facility	Unknown	19	0	0	D
September	aged care facility	Unknown	8	0	0	D
September	aged care facility	Unknown	13	0	1	D
September	aged care facility	Unknown	17	0	1	D
September	hospital	Norovirus	18	0	0	D
September	aged care facility	Rotavirus and Norovirus	19	1	0	D
September	hospital	Norovirus	4	0	0	D
October	aged care facility	Norovirus	12	0	0	D
October	hospital	Norovirus	15	0	0	D
October	hospital	Norovirus	13	0	0	D
October	aged care facility	Unknown	4	0	0	D
October	aged care facility	Norovirus	13	0	0	D
October	aged care facility	Norovirus	30	0	0	D
November	aged care facility	Unknown	14	0	0	D
November	aged care facility	Unknown	4	0	0	D

Month	*Setting exposed*	*Agent Responsible*	*Affected*	*Hospitalised*	*Deaths*	*Epidemiological Study*
November	aged care facility	Norovirus	54	0	0	D
November	aged care facility	Unknown	15	0	0	D
November	hospital	Rotavirus	2	0	0	D
November	aged care facility	Unknown	8	0	1	D
November	aged care facility	Unknown	7	0	0	D
November	aged care facility	Norovirus	16	1	0	D
November	aged care facility	Norovirus	37	1	0	D
November	ship	Norovirus	34	0	0	D
December	aged care facility	Rotavirus	27	0	0	D
December	aged care facility	Unknown	2	0	0	D
December	aged care facility	Unknown	12	0	0	D
December	aged care facility	Norovirus	46	1	0	D
December	aged care facility	Unknown	9	0	0	D
December	aged care facility	Unknown	5	0	0	D
Total			**2269**	**28**	**14**	

† D = descriptive case series, * NA = not applicable

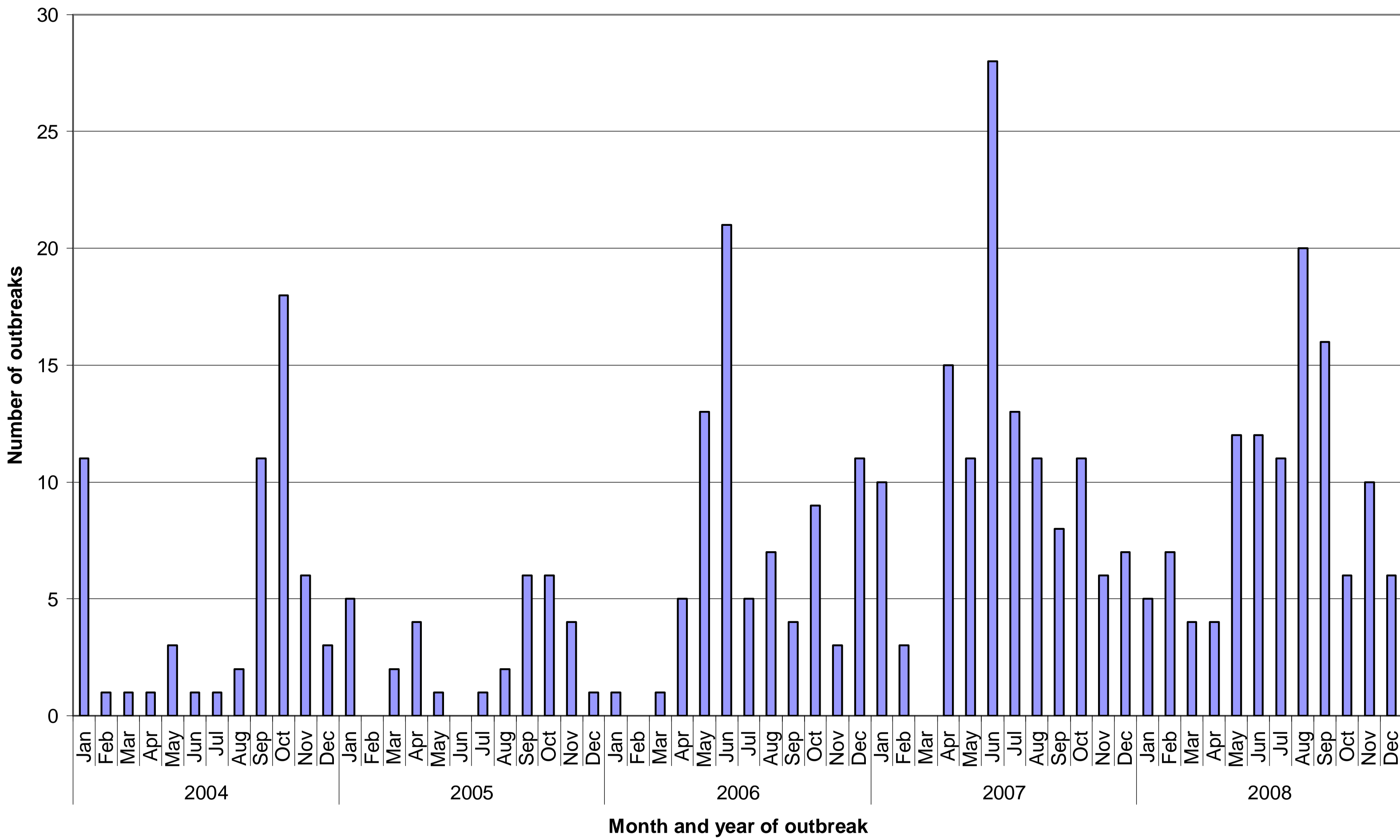

Figure 24. Number of non-foodborne gastroenteritis outbreaks reported in WA, 2004 to 2008

5.0 Cluster Investigations

***Salmonella* Typhimurium Phage Type 135/135A cluster.** In January six cases of *Salmonella* Typhimurium PFGE profile STYMAV.0003 were notified within a four week period. Cases ranged in age from six months to 81 years, with three males and three females. There was no geographical clustering. Three cases were interviewed; one case was a sheep farmer and two cases reported lamb consumption prior to illness. This PFGE profile has previously been seen from ovine sources. Phage typing identified a combination of STM 135 and STM 135a isolates.

***Salmonella* Kiambu cluster.** A cluster of 14 cases of *Salmonella* Kiambu was investigated with notification dates between November and February. Cases ranged in age from 11 months to 79 years, with 10 males and 4 females. There was no geographical clustering. Two cases were interviewed, with no common links established. PFGE typing revealed that isolates from five cases had a PFGE profile indistinguishable from isolates connected to a 2006 *S.* Kiambu outbreak. A further three isolates had a PFGE profile two bands different to the previous outbreak, meaning these isolates were very closely related. Four additional isolates from cases were tested and found to have a PFGE pattern different to the outbreak pattern and different to each other. Antibiotic susceptibility testing was performed on three isolates; all were found to be susceptible to the range of antibiotics tested.

***Salmonella* Havana cluster.** Five *Salmonella* Havana cases were notified in a two week period in February/March. All cases were infants aged one year or less, with three males and two females. Four cases were from the north of the state with one case from the metropolitan area. PFGE typing of the five isolates identified four different PFGE profiles, suggesting cases in this cluster were not linked and there was not a common source of infection.

Table 4. Cluster investigations in WA by month, setting and agent, 2008

Month	*Setting*	*Agent responsible*	*Affected*	*Hospitalised*	*Deaths*	*Epidemiolgical Study*[†]
Jan	community	*Salmonella* Typhimurium PT 135/135a	6	2	0	D
Feb	community	*Salmonella* Kiambu	14	1	0	D
Mar	community	*Salmonella* Singapore	12	2	0	D
Mar	community	*Salmonella* Havana	5	0	0	D
Sept	community	*Salmonella* Typhimurium PT 6 var 1	8	1	0	D
Nov	community	*Salmonella* Typhimurium PT U302 and UNTY	20	1	0	D
Nov	community	*Salmonella* Typhimurium PT 135a	6	0	0	D
Nov	community	*Salmonella* Newport	4	0	0	D
Total			75	7	0	

[†] D = descriptive case series

***Salmonella* Singapore cluster.** A cluster of 12 cases of *Salmonella* Singapore infection with notification dates from late January to the end of March were investigated. Cases ranged in age from 15 to 81 years, with six males and six females, who predominantly resided in the metropolitan area. The PFGE profile of isolates from the seven initial cases was indistinguishable from each other and distinct from historical isolates indicating a common source for the cluster. Six cases were interviewed and commonly consumed foods were grapes (6/6), bananas (5/6), potatoes (5/6) and pasteurised milk (5/6). Other states of Australia also had an increase in *S*. Singapore notifications during this time, but a common cause was not found.

***Salmonella* Typhimurium PT 6 var 1 cluster.** A cluster of eight cases of *S*. Typhimurium PFGE type STYMAV.0018 was investigated. Isolates from six cases were confirmed as phage type 6 var 1 and were tetracycline and kanamycin resistant. There were five cases of this PFGE type reported in August, compared to an average of 1.6 per month for the previous year. Cases ranged in age from 0 to 50 years. There were four males and four females. Two of the cases were from regional areas (1 Goldfields and 1 Midwest) and the others were from the Perth metropolitan area. Three of the cases were co-infected with *Campylobacter*. Three cases were interviewed and there were no venues or events in common. *S*. Typhimurium with this PFGE type was isolated from six raw chicken samples collected in July and August.

***Salmonella* Typhimurium Phage Type U302 and UNTY cluster.** From early October to mid December there were 14 cases of *S*. Typhimurium with PFGE type STYMAV.0057 (phage type untypeable on three isolates) and six cases of *S*. Typhimurium with PFGE type STYMAV.0092 (phage type U302 on three isolates) notified. There were eight males cases and 12 female cases with ages ranging from 11 months to 64 years (median age 9 years). In the initial cluster investigation seven cases (3 x STYMAV.0057, 4 x STYMAV.0092) were of Ethiopian or Sudanese background and of the six cases interviewed, all had attended an Ethiopian wedding on 27/9/2008. Due to a lack of recall, further information on the wedding was not obtained. Fourteen further cases (11 x STYMAV.0057, 3 x STYMAV.0092) had dates

of onset from 17/10/08 to 16/12/2008. Of the 10 additional cases interviewed, none had attended the wedding and three cases were from Afghanistan, one case was from the Sudan, one case was of Eritrean descent and five cases were of European descent. Six cases purchased food at Asian/Middle Eastern shops or takeaway but no common foods were identified. Food and spices from the residence of one case were sampled but were negative for *Salmonella*.

***Salmonella* Newport cluster.** A cluster of four cases of *S*. Newport were notified with onset dates ranging from 23/10/08 to 5/11/08. All cases were interviewed but no common exposures were identified. The isolates also had different PFGE profiles indicating the cases were not exposed to a common source of infection.

***Salmonella* Typhimurium 135a cluster.** There were six cases of *S*. Typhimurium notified with PFGE type STYMAV.0058 (phage type 135a on three isolates) with dates of onset ranging from 8/10/08 to 3/11/08. Three of the cases were male and three were female, with ages ranging from 23 to 29 years for five cases, including a 58 year old. Five cases were interviewed but no common exposure was identified.

6.0 OzFoodNet WA 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. The project is approximately half way towards completion. Results to date were reported in the 2007 OzFoodNet WA report (2). There were no further results in 2008. This project is continuing.

7.0 Prevention Measures

The following actions were undertaken during 2008 to prevent foodborne and gastrointestinal disease:

Publications

- A paper co-authored by OzFoodNet WA epidemiologists, and titled 'An Outbreak of *Salmonella enterica* Serotype Litchfield Infection in Australia Linked to Consumption of Contaminated Papaya' was accepted for publication by the Journal of Food Protection.
- An article co-authored by OzFoodNet WA epidemiologists, and titled "Two Cases of Anticholinergic Syndrome Associated with Consumption of Bitter Lupin Flour" was submitted as a "Letter from Practice" for publication to the Medical Journal of Australia.

Presentations

- A training session on residential care facility outbreaks and sporadic enteric notification follow-up was conducted in April 2008 with regional Public Health Unit nurses.
- A training session on recognising potential foodborne outbreaks in residential care facilities was conducted in October 2008 with regional Public Health Unit nurses.
- One of the OzFoodNet epidemiologists presented talks on the Norovirus genotyping project and the *Salmonella* Singapore outbreak investigation at an OzFoodNet face-to-face meeting in Adelaide in June 2008.

Policy Documents

- The OzFoodNet team launched the 'Guidelines for Management of Gastroenteritis Outbreaks in Residential Care Facilities' to aged care and other residential care facilities in January 2008. This also involved a training

session with the state public health nurses. The guidelines were distributed to all Aged Care Facilities in WA.

- The WA Operational Directive, Public Health Intervention for Sporadic Enteric Notifications came into effect in January 2008.
- The WA Operational Directive, Exclusion Guidelines for Patients with Enteric Infections and Their Contacts, came into effect in January 2008.

Committee membership

- The epidemiologists are members of the steering group of the WA Food Monitoring Program, which provides strategic monitoring, research and reporting on food safety.
- The epidemiologists are members 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.

Research

- The epidemiologists continued to be involved in an OzFoodNet funded research project - a retrospective survey of norovirus genotypes in faecal samples from 2005, 2006 and 2007.
- The epidemiologists have continued collaboration with Associate Professor Una Ryan at Murdoch University on the molecular typing of *Cryptosporidium* strains.

8.0 References

1. Hanna JN, Hills SL and Humphreys JL 2004, Impact of hepatitis A vaccination in Indigenous children on notifications of hepatitis A in north Queensland, *MJA*, 181: 482-485..

2. Gibbs R, Pingault N, Barker M, Morgan D and Arthur S 2008. OzFoodNet – Enhancing Foodborne Disease Surveillance Across Australia, Annual Report 2007, Western Australia, Department of Health Western Australia, Perth.

9.0 Acknowledgements

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Appendix 1: Number of notifications, notification rate and ratio of current to historical mean by pathogen/condition, 2004 to 2008, WA

Pathogen/ Condition	Year										Mean rate 2004-2007[4]	Rate ratio 2008 to mean[5]
	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)			
	No.	Rate[3]	No.	Rate	No.	Rate	No.	Rate	No.	Rate		
Campylobacter	1939	98.2	2450	122.5	1949	95.7	2101	101	1833	86	104	0.83
Salmonella	621	31.5	798	39.9	798	39.2	985	47.3	849	39.7	39.5	1.00
Rotavirus[2]	-	-	-	-	235[6]		724	34.8	424	19.8	34.8	0.57
Cryptosporidiosis[2]	125	6.3	183	9.1	251	12.3	611	29.4	164	7.7	14.3	0.54
Shigella	111	5.6	155	7.7	129	6.3	104	5.0	169	7.9	6.2	1.27
Hepatitis A	57	2.9	54	2.7	71	3.5	21	1.0	22	1.0	2.5	0.4
Typhoid fever	5	0.3	8	0.4	11	0.54	9	0.43	8	0.37	0.4	-
Listeria	9	0.5	4	0.2	13	0.64	2	0.1	8	0.37	0.4	-
Vibrio parahaemolyticus	3	0.15	0	0	3	0.15	9	0.43	7	0.34	0.2	-
Yersinia	1	0.05	2	0.1	3	0.15	5	0.2	7	0.34	0.1	-
Hepatitis E	3	0.15	2	0.1	1	0.05	0	0	6	0.28	0.1	-
Paratyphoid fever	13	0.7	4	0.2	1	0.05	3	0.1	3	0.14	0.3	-
Cholera	1	0.05	1	0.05	0	0	0	0	2	0.09	0.02	-
STEC[1]	0	0	12	0.6	3	0.15	2	0.1	0	0	0.2	-
HUS[1]	1	0.05	1	0.05	0	0	0	0	0	0	0.02	-
Total	2889	146	3674	184	3468	170	4576	220	3502	164	180	0.9

[1]Abbreviations: STEC: Shiga-toxin producing *E. coli*; HUS: Haemolytic Uraemic Syndrome [2]Rotavirus was made notifiable in July 2006 [3]Rate per 100 000 population [4]Mean of rates between 2004 and 2007 where applicable [5]Ratio has not been calculated for diseases with a small number of cases