OzFoodNet – Enhancing Foodborne Disease Surveillance Across Australia

Annual Report 2010
Western Australia

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Summary and recommendations

This report contains a summary of OzFoodNet Western Australia (WA) enteric disease surveillance activities in 2010.

The overall notification rate for all notifiable enteric diseases in 2010 was 198 per 100,000 population (4529 notified cases). This was similar to 2009, but 10% higher than the mean of the previous five years. Campylobacter was the most commonly notified enteric disease in 2010, comprising 52% of enteric notifications. Salmonella and rotavirus infections were the 2nd and 3rd most commonly notified enteric infections, respectively.

The notification rate for Campylobacter for 2010 was similar to the mean of the previous five years but the Salmonella rate was 30% higher than the previous five-year mean. The increase in the notification rate for Salmonella was largely attributable to an increase in the number of cases who had acquired infection in Bali, Indonesia. For Cryptosporidium, Shigella and hepatitis A, rates were lower in 2010 than the mean of the previous five years. The notification rate for rotavirus in 2010 was 10% higher than the mean of the previous three years.

Notification rates were highest in the 0 to 4 year age group for all of the major enteric infections, with the exception of hepatitis A infection. For most of the enteric infections, notification rates were also higher for Aboriginal as compared to non-Aboriginal people. The greatest difference was for Shigella infection, with the notification rate for Aboriginal people 15 times that for non-Aboriginal people. For most of the enteric diseases, the rural regions had the highest notification rates for both Aboriginal and non-Aboriginal people with the Kimberley having the highest rates for Salmonella, Cryptosporidium and Shigella.

There were 12 outbreaks of foodborne or suspected foodborne disease investigated in WA in 2010. Five of these outbreaks were caused by Salmonella species, two by norovirus, one each by Clostridium perfringens
and *Cyclospora*, and for three the infectious agent or toxin was unknown. The largest foodborne outbreak was caused by *Cyclospora* which resulted in 314 passengers and crew on a cruise ship becoming ill. The suspected food vehicle was fresh produce. The next largest foodborne outbreak, with 30 people ill, was due to norovirus, and occurred amongst members of a club who attended a function at a reception centre. *Salmonella* Typhimurium (STM) phage type 170, pulsed field gel electrophoresis (PFGE) type 11, was the cause of five outbreaks, with three to 25 people ill in these outbreaks. For two of these five outbreaks most cases ate food containing eggs, which were scrambled eggs at one restaurant and raw egg aioli at another restaurant. Raw egg aioli from one of these restaurants was positive for STM PFGE 11. Eggs used at both restaurants were from a common egg producer that had previously been implicated in outbreaks due to STM PFGE 11. Another restaurant outbreak due to STM PFGE 11 resulted in three people becoming ill and this restaurant used eggs from two producers, one of which was the producer linked to previous STM PFGE 11 outbreaks.

There were 105 non-foodborne gastroenteritis outbreaks reported in WA in 2010, which was 40% lower than for the previous year. The causative agent for 44% (n=46) of these outbreaks was confirmed as norovirus. Other outbreaks for which organisms were identified were caused by rotavirus (n=14) and *Cryptosporidium* (n=1). Non-foodborne outbreaks were predominantly associated with institutional settings, particularly aged care facilities (79%) and hospitals (10%).

**Recommendations:**

It is recommended that OzFoodNet WA:

Continue to improve enteric disease surveillance and investigation activities including

- Continue regular working group meetings with PathWest Laboratory Medicine and the WA Health Food Unit.
- Develop and/or review related policies.
• Continue to work with Population Health Units for follow up of important enteric infections and outbreaks in aged care facilities.

• Develop procedures for following up *Cryptosporidium* cases.
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1.0 Introduction

This report describes enteric disease surveillance activities for 2010, as carried out by OzFoodNet WA, which is part of the Communicable Disease Control Directorate (CDCD) of the Western Australian Department of Health (WA Health).

Western Australia (WA) is divided into nine administrative health regions - North Metropolitan, South Metropolitan, Kimberley, Pilbara, Midwest and Gascoyne, Wheatbelt, Goldfields, SouthWest, and Great Southern (Figure 1). Each region is served by a Population Health Unit (PHU) responsible for public health activities, including communicable disease control. CDCD maintains and coordinates the WA 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 and syndromes.

The mission of OzFoodNet is to enhance surveillance of foodborne illness in Australia and to conduct applied research into associated risk factors. The OzFoodNet site based in Perth is responsible for the whole of WA, which has a total population of approximately 2.3 million. Three epidemiologists sharing two full time positions coordinate activities in WA, which are overseen by a coordinating national epidemiologist. Collaboration between states and territories is facilitated by circulation of fortnightly jurisdictional enteric surveillance reports, 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.

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

1.1 Data sources and methods

Western Australia’s estimated resident population figures used for calculation of rates were obtained from Rates Calculator version 9.5.3 (WA Health, Government of Western Australia). The Rates Calculator provides population estimates by age, sex, Aboriginality, year and area of residence, and is based on population figures derived from the 2006 census. The estimated population for WA in 2010 was 2 290 075 persons. Rates calculated for this report have not been adjusted for age.

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

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

**Data changes.** Several changes in notification and testing practices need to be considered in interpreting data for the time period covered by this report. Prior to July 2006 laboratory notification was not a statutory requirement in WA so notification data before this date are incomplete. Rotavirus infection became a notifiable disease in July 2006, so there are no data from years prior to this date. *Giardia* infection and amoebiasis were de-gazetted on 22 August 2007, so that after this date, these infections were not notifiable diseases in WA. Prior to July 2007 all *Salmonella* Typhimurium and *Salmonella* Enteritidis isolates were sent to the MDU for phage typing. After July 2007 only a limited number of isolates were sent for phage typing. From July 2007 all *Salmonella* Typhimurium isolates have been typed by PFGE and phage typing is carried out for isolates associated with clusters and outbreaks. Notification data prior to 1 January 2009 includes cases that were diagnosed in WA but had a home address in another Australian jurisdiction, but excluded cases that were diagnosed in another jurisdiction but had a home address in WA. Notification data after 1 January 2009 includes cases that had a home address in WA but were diagnosed in another jurisdiction, but excludes cases diagnosed in WA with a home address in another jurisdiction.
2.0 Activity during the year

During 2010 the following activities were conducted at the WA OzFoodNet site:

- Ongoing surveillance of foodborne disease in WA.
- Investigation of six foodborne outbreaks, six suspected foodborne outbreaks, six *Salmonella* clusters, one STEC cluster and one hepatitis A cluster.
- Investigation of three *Listeria monocytogenes* cases.
- Surveillance of 11 typhoid and 11 paratyphoid cases.
- Investigation of 105 non-foodborne gastroenteritis outbreaks, 83 of which occurred in RCFs, 10 in hospitals, seven in child care centres, three in other institutions, one each in a restaurant and on a cruise ship.
- Initiated the development on WANIDD of a new field to capture PFGE typing information. This has enhanced *S. Typhimurium* surveillance.
- Assisted with a national investigation into thyroid dysfunction due to the consumption of soya milk.
- Ongoing monthly meetings with the Department of Health Food Unit to improve foodborne disease surveillance and investigation in WA.
• Commenced a *Cryptosporidium* Case Control study in the 2\textsuperscript{nd} quarter 2010.

• Conducted a national survey to obtain information on jurisdictional practices for STEC diagnosis and surveillance.

• Participated in national OzFoodNet teleconferences and face to face meetings in Newcastle (February), Melbourne (September) and Canberra (December).
  
  o At the Melbourne meeting, gave a presentation on ‘*Cyclospora* outbreaks on a cruise ship’.

  o At the Canberra meeting gave a presentation on ‘Recurring outbreaks of *Salmonella* Typhimurium Phage type 170, PFGE 11 associated with a single egg producer’.

• Presentation to Population Health Unit nurses on recent enteric disease in Western Australia, November 2010.

• Joint author on three articles published
  


• Supervision of a UWA Masters of Infectious Disease student on a project examining the epidemiology of rotavirus in Western Australia.
• Response to parliamentary question on a gastroenteritis outbreak on a cruise ship.

• Attended a “Writing for the web” training course.

### 3.0 Incidence of foodborne disease

In 2010 there were 4529 notifications of enteric disease in Western Australia. This equated to an annual rate of 198 per 100 000 population. This was similar to the mean rate for the previous five years, of 188 per 100 000 population.

#### 3.1 *Campylobacter* infection

*Campylobacter* infection was the most commonly notified enteric infection in WA in 2010, comprising 51% of enteric notifications. There were 2322 notified cases, giving a rate of 101 per 100 000 population (Appendix 1). This was similar to the average rate for the previous five years. In 2010 the number of notifications was lowest in late autumn and early winter, and highest in early summer, which was a trend commonly observed in previous years (Figure 1).

The notification rate for *Campylobacter* infection was higher for males than females in 2010, with rates of 106 and 97 per 100 000 population, respectively. *Campylobacter* notification rates for males were also higher than for females for the previous five years (Figure 2). *Campylobacter* notification rates were highest in the 0 to 4 year age group with a rate of 188 per 100 000, with another peak in the 20-35 year age groups, and in cases 70 years and older (Figure 3).

Data on Aboriginality was missing for 14% of *Campylobacter* notifications in 2010, which was a decrease from 20% unknown in 2009. Notification rates for Aboriginal people (41 per 100 000 population), were lower than for non-
Aboriginal people (88 per 100 000), which is unusual compared to other enteric infections, for which rates are generally higher in Aboriginal people.

*Campylobacter* notification rates were also relatively similar across regions, whereas for other enteric infections, rates were commonly higher for the northern and eastern regions. Notification rates in 2010 ranged from a low of 68 per 100 000 population for the Pilbara to a high of 130 per 100 000 in the Southwest (Figure 4).

![Figure 1: Number of cases of campylobacteriosis by month and year of onset, WA, 2005 to 2010](image)
Figure 2. *Campylobacter* notification rates by sex, WA, 2005 to 2010

Figure 3. Age-specific notification rates for *campylobacteriosis* by sex, WA, 2010
Figure 4. Campylobacteriosis notification rates by region and Aboriginality, WA, 2010

The proportion of Campylobacter cases acquired overseas increased through the years 2006 to 2010, from 6.6% to 12.6%, with travel to Indonesia reported for 2.1% of cases in 2006 and 8.7% of cases in 2010 (Figure 5). The proportion of cases with unknown travel history also increased, from 25% to 43%.

Figure 5. Proportion of overseas acquired campylobacteriosis cases by year of onset, 2005 to 2010
3.2  *Salmonella* infection

Salmonellosis was the second most commonly notified enteric infection in WA in 2010, with 1264 notified cases (Appendix 1). The notification rate for *Salmonella* in 2010 (55.2 cases per 100 000 population), was higher than the previous year (50.4 cases per 100 000) and higher than the previous five year average (43.3 cases per 100 000), illustrating the increasing incidence of this infection. The number of *Salmonella* notifications was generally highest in the summer months (Figure 6).

The overall notification rate for females (55.1 per 100 000 population) was similar to that for males (55.3 per 100 000). As in previous years the 0 to 4 year age-group had the highest notification rate (169 per 100 000 population) (Figure 7). The young adult age groups of 25 to 29 years, and 20 to 24 years, had the next highest notification rates (71.3 and 69.7 per 100 000, respectively).

![Figure 6. Number of cases of salmonellosis by month and year of onset, WA, 2005 to 2010](image-url)
Figure 7. Age-specific notification rates for salmonellosis by sex, WA, 2010

Data on Aboriginality was missing for 6.7% of *Salmonella* cases in 2010, which was less than half that of the previous year (14.7%). The overall *Salmonella* notification rate for Aboriginal people (102.8 per 100 000 population) was double the notification rate for non-Aboriginal people (49.3 per 100 000 population).

The Kimberley region had the highest notification rate for salmonellosis in 2010 (237.6 per 100 000 population). This was approximately 8 times the rate for the Goldfields region, which had the lowest notification rate (30.1 cases per 100 000). Notification rates in the Kimberley were higher for both Aboriginal and non-Aboriginal people when compared with other regions (Figure 8).
The most commonly notified *Salmonella* serotype in WA in 2010 was S. Typhimurium, with 342 notifications (Table 1). The number of cases was approximately 20% higher than the mean of the previous five years. There were five foodborne and suspected foodborne outbreaks caused by STM PFGE type 11 (described in Section 4.1). The second most commonly notified serotype was S. Enteritidis (335 notifications), with 94% of cases confirmed as travelling overseas during their incubation period. The vast majority of people that contracted a S. Enteritidis infection (82%) had travelled to Indonesia (Bali) during their incubation period. The number of S. Enteritidis cases notified was 2.8 times the mean of the previous five years, reflecting the steady increase in the number of S. Enteritidis notifications (Figure 9). The number of notifications of S. Hadar, S. Stanley, S. Weltevreden and S. Paratyphi B var Java were also substantially higher in 2010 compared to the five year mean. These increases were predominantly the result of overseas acquired infections, particularly resulting from travel to Indonesia. The proportion of overseas acquired *Salmonella* cases has increased steadily between 2005
and 2010 (Figure 10). In 2010 the proportion of overseas acquired cases was higher than locally acquired *Salmonella* cases (45.6% versus 39.2%).

**Table 1. Number and proportion of the top 10 *Salmonella* serotypes notified in WA, 2010, with comparison to 5-year average**

<table>
<thead>
<tr>
<th><em>Salmonella</em> Serotype</th>
<th>2010 N</th>
<th>Proportion %*</th>
<th>Mean Number (2005-2009)</th>
<th>Ratio‡</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typhimurium</td>
<td>342</td>
<td>27</td>
<td>295</td>
<td>1.2</td>
</tr>
<tr>
<td>Enteritidis</td>
<td>335</td>
<td>26</td>
<td>121</td>
<td>2.8</td>
</tr>
<tr>
<td>Paratyphi B var Java</td>
<td>64</td>
<td>5.0</td>
<td>24</td>
<td>2.6</td>
</tr>
<tr>
<td>Saintpaul</td>
<td>35</td>
<td>2.7</td>
<td>48</td>
<td>0.7</td>
</tr>
<tr>
<td>Muenchen</td>
<td>29</td>
<td>2.3</td>
<td>25</td>
<td>1.2</td>
</tr>
<tr>
<td>Stanley</td>
<td>28</td>
<td>2.2</td>
<td>15</td>
<td>1.9</td>
</tr>
<tr>
<td>Hadar</td>
<td>26</td>
<td>2.0</td>
<td>6</td>
<td>4.3</td>
</tr>
<tr>
<td>Weltevreden</td>
<td>25</td>
<td>2.0</td>
<td>7</td>
<td>3.6</td>
</tr>
<tr>
<td>Virchow</td>
<td>20</td>
<td>1.6</td>
<td>16</td>
<td>1.2</td>
</tr>
<tr>
<td>Corvallis</td>
<td>20</td>
<td>1.6</td>
<td>15</td>
<td>1.3</td>
</tr>
<tr>
<td>Chester</td>
<td>18</td>
<td>1.4</td>
<td>25</td>
<td>0.7</td>
</tr>
<tr>
<td>Infantis</td>
<td>18</td>
<td>1.4</td>
<td>11</td>
<td>1.6</td>
</tr>
</tbody>
</table>

*Proportion of total *Salmonella* cases notified in 2010.

‡Ratio of the number of reported cases in 2010 compared to the five year mean of 2005-2009.
Figure 9. Number of cases of S. Enteritidis by year of onset, WA, 2005 to 2010

Figure 10. Proportion of overseas acquired salmonellosis by year of onset, 2005 to 2010
3.3 Rotavirus infection

Rotavirus was the third most commonly notified enteric infection in WA in 2010, with 609 cases (26.6 per 100,000 population) (Appendix 1). In the four complete years after rotavirus became a notifiable disease in WA (which occurred in July 2006), monthly notification rates exhibited seasonal peaks. In 2010 there was an increase in notifications in late winter and spring, and this was also observed in previous years (Figure 11). The increase in notifications in 2010 was larger than in the previous two years, but smaller than a seasonal peak in 2007. When comparing the distribution of cases between the population health regions, there was an increase in the percentage of cases from the south metropolitan region, from 25% of cases in the earlier months of the year to 41% of cases in July to October, and decrease in the percentage of cases from the north metropolitan and country population health regions. The increase in the percentage of cases in the south metropolitan region was particularly marked for cases aged over 70 years, which comprised 2% of south metropolitan cases in the earlier months of the year and 19% of cases in July to October. A large percentage of the south metropolitan rotavirus cases aged over 70 years were part of rotavirus outbreaks in aged care facilities (20 of 29 notified cases, 69%).

![Figure 11. Number of cases of rotavirus infection by month and year of onset, WA, 2006 to 2010](image-url)
In 2010 the notification rate was higher for females (28 per 100 000 population) than for males (25 per 100 000 population). As for most other enteric infections, children aged 0 to 4 years experienced the highest rotavirus notification rate (204 per 100 000 population) (Figure 12). The notification rate for people aged over 75 was also elevated compared to other age groups, and as described above this was partially due to rotavirus outbreaks in age care facilities.

![Age-specific notification rates for rotavirus by sex, WA, 2010](image)

**Figure 12. Age-specific notification rates for rotavirus by sex, WA, 2010**

Aboriginality status information was missing for 9% of rotavirus notifications in 2010, which is similar to 2009 (10%). The notification rate for the Aboriginal population (58 per 100 000 population), was over twice that of the non-Aboriginal population (23 per 100 000). Notification rates were highest in the Pilbara (54 per 100 000) and lowest in the Great Southern (15 per 100 000) (Figure 13).

Rotavirus vaccination was introduced in July 2007, with a two dose schedule at 2 and 4 months of age. In February 2009 this was changed to a three dose schedule at 2, 4 and 6 months of age. There appears to have been no overall reduction in notification rates following vaccination (an average of 37 notifications per month in the year July 2006 to June 2007, before vaccination,
and 35, 35, and 50 notifications per month for the calendar years 2008 to 2010 respectively). There has also been no marked decrease in notification rates for the 0 to 3 year old age groups, which are the age groups that would be expected to show decreased notifications through time, as each year a greater proportion would have been vaccinated (Figure 14).

![Figure 13. Rotavirus notification rates by region and Aboriginality, WA, 2010](image)
Figure 14. Quarterly rotavirus notifications for age groups 0 to 3 years, 2006 to 2010

There has been a small increase in the number of rotavirus cases thought to have acquired their infection overseas, from 1 case in 2006 to 18 cases in 2010 (Figure 15).

Figure 15. Proportion of overseas acquired rotavirus cases by year of onset, 2006 to 2010
3.4 *Cryptosporidium* infection

There were 140 cases of cryptosporidiosis notified in 2010, a rate of 6.1 cases per 100 000 population (Appendix 1). The 2010 rate represented a 55% reduction compared to the mean five year rate. In each of the years from 2005 to 2010 the number of notifications was generally lower from May to October and higher in the months with warmer temperatures (Figure 16).

![Figure 16. Number of cases of cryptosporidiosis by month and year of onset, WA, 2005 to 2010](image)

The notification rate for *Cryptosporidium* infection was higher for females than males in 2010, with rates of 7.6 and 4.6 per 100 000 population, respectively (Figure 17). This is in contrast to the previous five years, where *Cryptosporidium* notification rates for males and females were similar. The notification rate was highest in the 0 to 4 year age-group, accounting for 48% of notifications (Figure 17). The overall cryptosporidiosis rate for the Aboriginal population was 50.7 cases per 100 000, 12 times the rate for non-Aboriginal people (4 cases per 100 000). Indigenous status information was missing for 9.3% of cases, a vast improvement from the previous year (24% unknown).
While the Kimberley region had the highest cryptosporidiosis notification rate, with 55.9 cases per 100 000 population, this represented a 58% reduction compared with 2009 (134 cases per 100 000 population) (Figure 18). Notifications for Aboriginal people were higher than for non-Aboriginal people in all regions except for the Metropolitan area and the Great Southern.

**Figure 17. Age-specific notification rates for cryptosporidiosis by sex, WA, 2010**
Figure 18. Cryptosporidiosis notification rates by region and Aboriginality, WA, 2010

3.5 Shigella infection

There were 114 Shigella notifications in 2010, a rate of 5 cases per 100 000 population, a 20% reduction compared to the previous five year average (6.4 cases per 100 000) (Appendix 1). There was no clear seasonal pattern observed (Figure 19).
The notification rate for Shigella infection was higher for females than males in 2010, with rates of 6.2 and 3.8 per 100 000 population, respectively. Children aged 0 to 4 years had the highest notification rate (14.3 per 100 000), accounting for 20% of notifications (Figure 20). The notification rate for Aboriginal people (49.4 per 100 000) was 15 times the rate for non-Aboriginal people (3.3 per 100 000). Aboriginality information was missing for 2.6% of Shigella notifications. The Kimberley region had the highest Shigella notification rate (75.5 per 100 000 population), followed by the Pilbara (12.4 per 100 000), while the rate in the Perth metropolitan region was only 3 per 100 000 (Figure 21).

The majority of Shigella isolates from clinical cases in 2010 were Shigella sonnei (70%). The most frequent biotype of Shigella sonnei was biotype G (54%), which was predominantly acquired overseas (72% of cases), particularly following travel to Indonesia. The remaining Shigella cases comprised of Shigella flexneri (26%), with two cases of Shigella dysenteriae which were acquired in Nepal and the Sudan; and one case of Shigella boydii which was acquired in Indonesia. The proportion of overseas acquired Shigella cases in 2010 was double that of the previous year (40.4% versus
20.8%); with 67.4% of overseas acquired cases travelling to Indonesia. In 2010 the proportion of overseas acquired cases was higher than locally acquired *Shigella* cases (40.4% versus 36.8%) (Figure 22).

**Figure 20. Age-specific notification rates for shigellosis by sex, WA, 2010**
Figure 21. Shigellosis notification rates by region and Aboriginality, WA, 2010

Figure 22. Proportion of overseas acquired shigellosis by year of onset, 2005 to 2010

3.6 Hepatitis A virus infection

There were 32 hepatitis A cases with a date of onset in 2010 (1.4 cases per 100,000 population), a 30% decrease in notification rate compared to the mean of the previous five years (Appendix 1). Notifications did not show distinct seasonal patterns through the years 2005 to 2010 (Figure 23).

Hepatitis A vaccine was introduced for Aboriginal children in November 2005. There were no hepatitis A notifications in Aboriginal people during the four year period 2007 to 2010 (Figure 24). This was unusual compared to previous experience: the mean annual notification rate for the 10 years prior to 2007 was ten times higher in Aboriginal (40 cases per 100,000 population) than non-Aboriginal (4 cases per 100,000) people. These data suggest that the vaccination program has been effective in reducing hepatitis A incidence amongst all age groups of Aboriginal people, not just the target age of young children.
Hepatitis A cases in 2010 ranged in age from 2 to 80 years (median 33 years), with 15 male and 17 female cases. The majority of cases (n=24, 75%) were
acquired overseas, an increase from 18 cases in 2009. Cases were thought to have acquired infection in Thailand (7), Indonesia (4), India (2), Pakistan (2), Fiji (1), Iraq (1), Kenya (1), Philippines (1), Somalia (1), Sudan (1), Uganda (1), Zambia (1) and South-East Asia (1).

3.7 Typhoid and Paratyphoid fever

There were 11 cases of typhoid fever notified in WA in 2010 and 10 cases had a history of recent overseas travel: India (4), Indonesia (3), Bangladesh (1), South Africa (1) and Thailand (1). Six of these cases were born in countries where typhoid is endemic. The one typhoid case that was not acquired overseas lived by himself and one contact was negative for typhoid. The source of infection was unknown. Eleven cases of paratyphoid fever were notified in 2010, all with overseas acquisition: Indonesia (5), Nepal (2), India (1), Bangladesh (1), South America (1), and Ghana (1). Five of these cases were born in countries where paratyphoid is endemic.

3.8 Listeria infection

There were three cases of Listeria monocytogenes infection notified in 2010, compared to the previous five year average of five cases per year. All the cases were non-pregnancy related (1 female and 2 males) and ranged in age from 39 – 76 years. All cases had immunocompromising illnesses and reported eating foods considered to be high risk for Listeria.

3.9 Vibrio parahaemolyticus infection

There were ten cases of infection with Vibrio parahaemolyticus in 2010, comprising nine males and one female, aged between 19 and 66 years. One case had a locally acquired wound infection, and the other nine cases developed gastroenteritis after travelling overseas (four to Thailand, three to Indonesia, one to Cambodia and one to China).
3.10 STEC infection

There were eight cases (three males and five females) of STEC infection in WA in 2010. Cases ranged in age from 4 to 66 years. None of the cases reported overseas travel. Four of the cases lived in rural areas and three of these cases had contact with farm animals. Four cases were infected with *E. coli* O157 (H typing not specified), three cases with *E. coli* O157:H7 and one case with *E. coli* O157:H-. Four cases with onset dates in February were investigated as a cluster (see Section 5).

3.11 Hepatitis E virus infection

In 2010, there was one case of hepatitis E infection notified in WA in a 22 year old male who had travelled to India during his incubation period.

3.12 *Yersinia* infection

There were three cases of *Yersinia* infection notified in 2010, two male cases and one female case, ranging in age from 19 to 86 years. Two of the cases resided in the Perth metropolitan area, and one in a rural town. Two cases reported local acquisition and one case was lost to follow up. Two of the cases had *Yersinia enterocolitica* infection, while the isolate was not speciated for the third case.

3.13 Cholera

There was one case of *Vibrio cholerae* O1 notified in 2010 in a 73 year old female who had travelled to Bali during her incubation period.

3.14 Botulism and HUS

There were no cases of botulism or HUS notified in WA in 2010.
4.0 Gastrointestinal disease outbreaks

4.1 Foodborne/suspected foodborne outbreaks

There were 12 foodborne or suspected foodborne gastroenteritis outbreaks investigated in WA in 2010 (Table 2). Five of the outbreaks were caused by STM PFGE 11, two by norovirus, one by Cyclospora, one by Clostridium perfringens and three by unknown pathogens.

Foodborne outbreaks

4.1.1 Restaurant, *Salmonella* Typhimurium PFGE 11 (phage type 170)
(Outbreak code: 042-2009-010)

In January, seven cases of gastroenteritis with onset dates from 2/12/09 to 20/12/09, who had eaten food from a metropolitan restaurant were investigated. Six cases were diagnosed with *S. Typhimurium* (STM), PFGE type 11, phage type (PT) 170. The other case had an illness consistent with *Salmonella* infection. Four cases had eaten scrambled eggs, two had pan fried fish and the last case could not recall what they had eaten. In October 2009, this restaurant was associated with an outbreak due to the same *Salmonella* strain, with 39 people ill with gastroenteritis. In the October outbreak a statistical association between illness and consumption of scrambled eggs was found and food handlers were found to have added raw egg to cooked scrambled egg prior to serving. This practice was subsequently stopped (Combs et al. 2010). The eggs used by the restaurant in October were from the same WA farm as those used in December. Environmental swabs from the restaurant, and eggs and drag swabs from the farm taken during the October outbreak were negative for *Salmonella*. No further foods were collected during the second outbreak and environmental swabs from the
food business were negative for *Salmonella*. In response to this second outbreak the restaurant changed to a different egg supplier.

4.1.2 Restaurant, *Salmonella Typhimurium* PFGE 11 (PT 170), (Outbreak code: 042-2010-001)

In February, 25 cases of gastroenteritis with onset dates from 13/01/10 to 02/02/10, who had eaten food from a metropolitan restaurant were investigated. Eighteen were diagnosed with STM PFGE type 11 (PT 170) and the remaining seven cases had an illness consistent with *Salmonella* infection. There were 22 cases that had eaten aioli with a variety of foods, two cases that had eaten Caesar salad and one case that had eaten chips and tomato sauce. The common ingredient in the aioli and Caesar salad was raw eggs. While samples of aioli and red curry mayonnaise were positive for the *Salmonella* outbreak strain, eggs and other sauces including Caesar salad dressing were negative for *Salmonella*. The environmental investigation showed that raw egg products were not stored adequately and batches were used over a long period of time. The eggs used by this restaurant were from the same egg farm which was implicated in two previous outbreaks in 2009 (Combs et al. 2010) and one outbreak investigated in January 2010 (see 4.1.1). All these outbreaks were caused by the same *Salmonella* strain. Further sampling of eggs and drag swabs from this farm were negative for *Salmonella*. It is thought that eggs contaminated with *Salmonella* were used to produce foods containing raw eggs and these foods were stored inadequately, allowing the *Salmonella* to grow. In response to the outbreak the restaurant started using pasteurised eggs for sauces and changed its egg supplier. Information on the risks of using raw eggs in mayonnaise and other products has been posted by the Food Unit on the Department of Health website and distributed to local government officers.
4.1.3 *Cyclospora* outbreak on a cruise ship (Outbreak code: 05/10/CYC)

A *Cyclospora* outbreak affected passengers and crew on two successive cruises of the same ship that departed from and returned to WA in May and June 2010, and visited south-east Asian destinations. Follow up of laboratory confirmed cases and passenger enquiries identified 34 ill passengers associated with the first cruise, with 26 of these cases laboratory confirmed. From the second cruise 232 passengers and 48 crew members were reported to be affected, with 46 passengers and one crew member laboratory confirmed. The duration of illness ranged from 1 to 33 days, with a median of 6.5 days. The most common symptom for confirmed cases was diarrhoea, which was reported by 45 of the 47 cases for whom symptom information was recorded. A case-control study was conducted among crew members, with questions focusing on fresh produce and water consumed on board, and on-shore visits. There were 31 cases and 97 controls recruited into the study. Of the 117 exposure variables included in univariate analysis, six were significant at a p value of <0.01, with lettuce having the strongest association with illness (OR=4.7, 95% CI 1.7-14.1, p=0.0005). Drinking water on-board was not associated with illness. Nineteen variables with p values <0.1 were included in a backward stepwise logistic regression analysis. Eating in a speciality dining area, eating cantaloupe, chives and lettuce were significant in the logistic regression model (p<0.05). It was concluded that illness was most likely related to eating fresh produce items taken on board in a South-east Asian port during the first cruise, but the case-control study did not provide enough evidence to definitively determine which fresh produce item was the likely cause of illness.

4.1.4 Reception centre outbreak, norovirus (Outbreak code: 07/10/TAW)

A foodborne norovirus outbreak was investigated in July, with 30 of 45 people from a club becoming ill after attending a dinner at a reception centre. One specimen was collected and was positive for norovirus. The dinner was a buffet with 38 cold and hot food and drink exposures. Of the 45 people who attended, 29 were enrolled in a case control study and there was a significant
association between illness and consumption of lasagne (OR 7.2, CI 1.2-42.6, p=0.041). It was reported that the lasagne was hot when served. Diners reported that the plates used for main meals were dirty underneath. The median incubation period was 47 hours (range 11-60 hours). No staff at the reception centre reported illness and an environmental investigation found that staff had good general knowledge about safe food handling practices.

4.1.5 Restaurant outbreak, *Salmonella Typhimurium* PFGE 11 (PT 170) (Outbreak code: 042-2010-003)

A foodborne outbreak was investigated in August, with three people ill due to STM PFGE type 11 (PT 170), after eating dinner independently of each other at an Italian restaurant in July. Duration of illness was 6 to 8 days. One case could not recall what food was eaten, two cases ate squid and one of these cases ate raw egg aioli with the squid. The median incubation period was 14.5 hours. An environmental investigation did not detect any food handling malpractices and the raw egg aioli was made fresh each day. The eggs used at the restaurant were from two egg producers, one of which has been linked previously to other raw egg outbreaks due to STM PFGE type 11 (PT 170).

4.1.6 Aged care facility, *Salmonella Typhimurium* PFGE 11 (PT 170) (Outbreak code: 042-2010-002)

In August, a foodborne outbreak was investigated at an aged care facility. Of the 63 residents, seven had diarrhoea with onsets on 7/8/2010 (1 case), 10/08/10 (4 cases) and 11/8/2010 (2 cases). Of the seven cases, four were diagnosed with STM PFGE type 11 (PT 170). One case with an onset on the 7/8/10, was symptomatic with gastroenteritis when they died on the 10/08/10 from myocardial infarction (cause of death as reported on the death certificate). This type of STM was identified in egg-associated outbreaks linked to food premises in 2009 and 2010 which had been supplied with eggs by one WA producer (see above). However, in this instance the eggs used in the aged care facility were from a different supplier. From the information obtained, residents did not consume any raw egg food products. The ill
residents lived in three different wings of the facility and it was reported that these residents would not have had contact with each other. The environmental investigation found that the head chef had unsatisfactory hand hygiene and food handling practices. No swabs of the food preparation area were positive for *Salmonella*.

**Suspected foodborne outbreaks**

4.1.7 **Tourist group outbreak, unknown aetiology (Outbreak code: 03/10/DOA)**

A gastroenteritis outbreak of unknown aetiology in a tour group in Perth was investigated in March. The group consisted of 12 tourists and a guide who arrived from Japan at 12.40 am on 19/3/10, a local guide and a driver. Eleven tourists and the local guide developed diarrhoea and/or vomiting on the afternoon of 19/3/10 and all had recovered by 21/3/10. There were no reports of prior illness among tourists or guides. Food eaten by the group included karaage chicken, rice balls and pickles purchased hot from a Japanese restaurant at 1.00 am, 19/3/10 and stored in a polystyrene box with ice bricks until served for lunch at 1.00 pm on 19/3/10. Meals were not reheated. Information could only be obtained from the tour organisers as the group had returned to Japan prior to the commencement of the investigation. No left over food was available for testing and no stool samples were collected. There were no other reports of illness associated with the restaurant. Inspection of the premises did not find any deficiencies. This outbreak was a suspected toxin mediated illness resulting from inappropriate storage of food.

4.1.8 **Aged care facility outbreak, *Clostridium perfringens* (Outbreak code: 06/10/HIL)**

There was a suspected foodborne outbreak notified in June, with 9 of 135 residents of an aged care facility ill with diarrhoea, and onset of illness over a
four day period. The duration of diarrhoea for most cases was ≤ 2 days. One staff member was also ill with diarrhoea and vomiting. Of the nine ill residents, six consumed vitamised food. Three faecal samples were negative for common bacterial and viral pathogens, and stool toxin testing was not carried out. Two specimens were positive for *Clostridium perfringens*, with indistinguishable PFGE profiles, which suggested that infection had come from a common source, suspected to be a common food. There were no remaining food samples from the period prior to onset of illness, and more recent food samples were negative for common bacterial pathogens and *C. perfringens*. Food was prepared on site and an environmental investigation found satisfactory food handling practices and hand hygiene standards.

4.1.9 Aged care facility outbreak, unknown aetiology (Outbreak code: 07/10/BAL)

In July, a suspected foodborne outbreak was investigated at an aged care facility. There were 6 of 109 residents with diarrhoea only, with onset of illness over a 24 hour period and the duration of diarrhoea was ≤ 1 day. Cases resided in three different wings of the facility. Two faecal samples were negative for common bacterial and viral pathogens and *C. perfringens*. Stool toxin testing was not done. Food was prepared on site and an environmental investigation found satisfactory food handling practices and hand hygiene standards.

4.1.10 Aged care facility outbreak, unknown aetiology (Outbreak code: 09/10/KOL)

In September, a suspected foodborne outbreak was investigated at an aged care facility. There were 10 of 41 residents with diarrhoea only with onset of illness over a 12 hour period and a duration of diarrhoea reported as ≤ 1 day. Ill residents lived on four different floors and ate a range of food consistencies (vitamised, soft and normal). Four of the 10 residents had meals in the dining room and the others had meals in their rooms. Food was prepared on site and an environmental investigation found satisfactory food handling practices and hand hygiene standards. Two faecal samples were negative for common
bacterial and viral pathogens and *C. perfringens*. Stool toxin testing was not done.

### 4.1.11 Defence force base outbreak, norovirus (Outbreak code: 09/10/STI)

A suspected foodborne norovirus outbreak in September affected 21 out of 2000 people who worked at a defence force base. Two specimens were positive for norovirus. Of the 21 cases, 17 were interviewed, and the common exposure was salad sandwiches prepared in a central mess, and consumed during one lunch time at different venues. Onset times for cases ranged from 7.5 to 35 hours after consuming the sandwiches. It was suspected that a salad ingredient contaminated by an infected food handler was the source of illness, although this was not investigated further. After the outbreak an education session on safe food handling practices was conducted with all food handlers who worked at the base.

### 4.1.12 Restaurant, *Salmonella* Typhimurium, PFGE 11 (PT 170) (Outbreak code: 042-2010-005)

In December, 10 cases of gastroenteritis were associated with a café. Six of the ten cases were laboratory confirmed as STM PFGE 11. One case was a chef at the café who became ill on 09/12/2010, and did not work at the café after becoming ill. Three cases ate Eggs Benedict at the café on 10/12/2010, and all became ill on 11/12/2010. One case ate a roast beef sandwich at the café on 16/12/2010 and became ill on 17/12/2010. Five other cases (one of whom was laboratory confirmed) ate a buffet lunch supplied by the café on 10/12/2010. Foods consumed in common for these cases were beetroot dip, Turkish bread, roast vegetable salad and potato salad. The brand of eggs implicated in other outbreaks in 2009 and 2010 was available at the store where the café occasionally purchased eggs, although there was no conclusive evidence that the café had used this brand at the time of the outbreak. Swabs and samples from the café were negative for *Salmonella*. 
The source and mechanism of contamination leading to this outbreak was not determined by this investigation.

Table 2. Outbreaks of foodborne/suspected foodborne illness in WA by month, setting and agent, 2010

<table>
<thead>
<tr>
<th>Suspected mode of transmission</th>
<th>Outbreak number</th>
<th>Month</th>
<th>Setting</th>
<th>¹Agent responsible</th>
<th>Affected</th>
<th>²Evidence</th>
<th>Responsible vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foodborne</td>
<td>042-2009-010</td>
<td>Jan</td>
<td>restaurant</td>
<td>S. Typhimurium PFGE 11</td>
<td>7</td>
<td>D</td>
<td>scrambled eggs</td>
</tr>
<tr>
<td>Foodborne</td>
<td>042-2010-001</td>
<td>Feb</td>
<td>restaurant</td>
<td>S. Typhimurium PFGE 11</td>
<td>25</td>
<td>M</td>
<td>aoili and caesar salad canteloupe, mint, lettuce</td>
</tr>
<tr>
<td>Foodborne</td>
<td>05/10/CYC</td>
<td>May</td>
<td>cruise/airline</td>
<td>Cyclospora norovirus</td>
<td>314</td>
<td>A</td>
<td>Unknown</td>
</tr>
<tr>
<td>Foodborne</td>
<td>07/10/TAW</td>
<td>Jul</td>
<td>restaurant</td>
<td>S. Typhimurium PFGE 11</td>
<td>30</td>
<td>A</td>
<td>Lasagne</td>
</tr>
<tr>
<td>Foodborne</td>
<td>042-2010-003</td>
<td>Aug</td>
<td>restaurant</td>
<td>S. Typhimurium PFGE 11</td>
<td>3</td>
<td>D</td>
<td>unknown</td>
</tr>
<tr>
<td>Foodborne</td>
<td>042-2010-002</td>
<td>Aug</td>
<td>aged care</td>
<td>S. Typhimurium PFGE 11</td>
<td>7</td>
<td>D</td>
<td>Unknown karage chicken and rice</td>
</tr>
<tr>
<td>Suspected foodborne</td>
<td>03/10/DOA</td>
<td>Mar</td>
<td>community</td>
<td>Unknown</td>
<td>12</td>
<td>D</td>
<td>karage chicken and rice</td>
</tr>
<tr>
<td>Suspected foodborne</td>
<td>06/10/HIL</td>
<td>Jun</td>
<td>aged care</td>
<td>Clostridium perfringens</td>
<td>9</td>
<td>D</td>
<td>unknown</td>
</tr>
<tr>
<td>Suspected foodborne</td>
<td>07/10/BAL</td>
<td>Jul</td>
<td>aged care</td>
<td>Unknown</td>
<td>6</td>
<td>D</td>
<td>unknown</td>
</tr>
<tr>
<td>Suspected foodborne</td>
<td>09/10/STI</td>
<td>Sept</td>
<td>military</td>
<td>norovirus</td>
<td>21</td>
<td>D</td>
<td>unknown</td>
</tr>
<tr>
<td>Suspected foodborne</td>
<td>09/10/KOH</td>
<td>Sept</td>
<td>aged care</td>
<td>Unknown</td>
<td>10</td>
<td>D</td>
<td>unknown</td>
</tr>
<tr>
<td>Suspected foodborne</td>
<td>042-2010-005</td>
<td>Dec</td>
<td>restaurant</td>
<td>S. Typhimurium PFGE 11</td>
<td>10</td>
<td>D</td>
<td>unknown</td>
</tr>
</tbody>
</table>

1 PFGE=Pulsed field gel electrophoresis
2 D = descriptive, M= microbiological, A=Analytical
4.2 Non Foodborne Outbreaks

There were 105 outbreaks of gastroenteritis reported in 2010 that appeared to be non-foodborne, 83 (79%) of which occurred in aged care facilities, 10 (10%) in hospitals, seven (7%) in child care centres, three (2%) in schools and one each at a restaurant, a hospice, a health care centre, a dialysis clinic and on a cruise ship (Table 3). The causative agent for 46 (44%) of the outbreaks was confirmed as norovirus, for 14 (13%) of the outbreaks the causative agent was rotavirus, one outbreak had specimens positive for norovirus and rotavirus, one childcare centre had specimens positive for norovirus and S. Saintpaul, and one outbreak was caused by Cryptosporidium. In the remainder of the outbreaks (40%) the causative agent was unknown either because a pathogen was not identified during testing, specimens were not collected, or viral testing was not requested. A total of 2128 people were affected by these outbreaks. The number of non-foodborne gastroenteritis outbreaks in 2010 (n=105) was 40% less than the number of outbreaks in 2009 (174). The number of gastroenteritis outbreaks reported varied by month (Figure 25), with an increase in the number of outbreaks first occurring in August compared to the previous four years when an increase in the number of outbreaks began in the April/May period. In 2010, as in previous years, the highest number of outbreaks were seen in the winter and spring months.

In 91% of these outbreaks, transmission was thought to be person-to-person (96/105). There was also a suspected animal-to-person outbreak in kindergarten children who had visited an animal farm. Subsequently 10 children had gastroenteritis, with two children diagnosed with Cryptosporidium.

In addition, there were eight outbreaks of gastroenteritis at aged care facilities where the likely mode of transmission was unclear or unknown.

- For three outbreaks, one in February, March and December, one facility had 16 residents with diarrhoea, another had 9 residents with
diarrhoea and 2 vomited and the third had 4 cases with diarrhoea only. As there cases had predominantly diarrhoea, the mode of transmission was not norovirus-like and therefore described as unknown rather than person-to-person. For the February and March outbreaks there were also delays in reporting these outbreaks to the Department of Health and no investigation was conducted. All three specimens from the December outbreak were negative for routine bacterial and viral pathogens.

- For a June outbreak, 11 residents were ill with diarrhoea only, with an average duration of 1.5 days. While one of the two specimens collected was positive for *Clostridium perfringens*, there was insufficient evidence to suggest this was a foodborne outbreak, as a proportion of people carry this organism in the bowel.

- For an August outbreak, there were two cases on consecutive days with diarrhoea and vomiting followed by seven cases with diarrhoea only on the third day. No specimens were collected.

- For a September outbreak, there were 12 cases with diarrhoea and only one case vomited, with onset of illness over a four day period. Five specimens were negative for routine bacterial and viral pathogens, including *Clostridium perfringens* culture.

- For another outbreak in September, six residents had diarrhoea only with onset of illness over two days but three staff were also ill with diarrhoea and/or vomiting. No specimens were collected.

- There was one outbreak in October with only three staff with symptoms of gastroenteritis and no specimens were collected.
Table 3. Outbreaks of non-foodborne gastrointestinal illness in WA by setting and agent, 2010

<table>
<thead>
<tr>
<th>Setting Exposed</th>
<th>Agent responsible</th>
<th>Number of outbreaks</th>
<th>Total number of cases</th>
<th>Total number of cases hospitalised</th>
<th>Total number of cases died</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aged Care</td>
<td>Norovirus</td>
<td>35</td>
<td>962</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Rotavirus</td>
<td>11</td>
<td>131</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Unknown</td>
<td>37</td>
<td>416</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Aged Care Total</td>
<td></td>
<td>83</td>
<td>1509</td>
<td>24</td>
<td>9</td>
</tr>
<tr>
<td>Child Care Centres</td>
<td>Cryptosporidium</td>
<td>1</td>
<td>10</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Norovirus</td>
<td>1</td>
<td>14</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Rotavirus</td>
<td>1</td>
<td>10</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Norovirus and</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>S. Saintpaul</td>
<td>1</td>
<td>21</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Unknown</td>
<td>3</td>
<td>44</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Child Care Centres Total</td>
<td></td>
<td>7</td>
<td>99</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Cruise/airline</td>
<td>Norovirus</td>
<td>1</td>
<td>329</td>
<td>NA</td>
<td>NA</td>
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<tr>
<td>Hospital</td>
<td>Norovirus</td>
<td>7</td>
<td>130</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>Rotavirus</td>
<td>2</td>
<td>9</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>Norovirus and</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>rotavirus</td>
<td>1</td>
<td>15</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Hospital Total</td>
<td></td>
<td>10</td>
<td>154</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Institution</td>
<td>Norovirus</td>
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<td>18</td>
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<td>0</td>
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<td></td>
<td>Unknown</td>
<td>1</td>
<td>5</td>
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<td>0</td>
</tr>
<tr>
<td>Institution Total</td>
<td></td>
<td>3</td>
<td>23</td>
<td>0</td>
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<tr>
<td>Restaurant</td>
<td>Unknown</td>
<td>1</td>
<td>14</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Grand Total</td>
<td></td>
<td>105</td>
<td>2128</td>
<td>26</td>
<td>9</td>
</tr>
</tbody>
</table>

1. NA=Data not available
2. Deaths temporally associated with gastroenteritis, but contribution to death not specified
Figure 25. Number of non-foodborne gastroenteritis outbreaks reported in WA, 2005 to 2010.
5.0 Cluster investigations

S. Hvittingfoss cluster
Nine cases were notified between 5/2/10 and 20/2/10, with six females and three males, aged 17-68 years, compared to a five year average of three cases per year. Eight cases lived in the metropolitan area, with seven cases residing in the northern suburbs; while one case lived in the Midwest region. PFGE of isolates showed seven cases with an indistinguishable pattern, while the Midwest case had a closely related pattern to the main cluster. A case with a different pattern reported travel to Zimbabwe prior to onset. No common venues were identified, however six cases reported eating fried rice or pad Thai at Chinese or Thai restaurants prior to onset of illness.

Salmonella Typhimurium PFGE type 1, PT 9
Twelve cases of STM PT 9, PFGE type 1 with onset dates from 15/1/2010 to 3/2/2010 were investigated. Seven females and five males aged 6 to 52 years were affected. Of the ten metropolitan cases, eight had eaten eggs and of these, five had eaten raw or runny free range eggs. Two cases lived in the same rural area and visited the same restaurant during their incubation period and a common food was fried rice. There were no further cases in February to help formulate a hypothesis for the cause of illness.

Shiga toxin producing E. coli (STEC) serotype O157
There were four cases of STEC investigated with onset dates from 17/2/10 to 21/2/10. Cases were aged between 24 and 66 years, and included one male in a rural area and three females in the metropolitan area. No common food or food premises were identified. STEC isolates from cases had different PFGE types indicating a common source of infection was not likely.

Salmonella Typhimurium PFGE type 104 (likely PT 193)
Seven cases with notification dates from 08/6/2010 to 13/08/2010 were interviewed. Six of the cases were aged from 3 to 6 years, the other case was aged 58 years. Six of the cases were male. Five of the cases lived in
metropolitan Perth, and the other two lived in rural towns. No common exposures were identified.

**Salmonella Typhimurium PFGE type 138**
Seven cases with notification dates from 25/5/2010 to 07/07/2010 were interviewed. Six cases lived in metropolitan Perth and one in a rural area. Three cases were male and four female, aged from 1 to 68 years. Four isolates were PT 170 and one isolate was PT 12. No common exposures were identified.

**Hepatitis A**
There were six cases investigated with onsets of illness from 25/10/10 to 11/11/10 who visited Phuket, Thailand during their incubation period. Five of the cases were part of a travelling group of 39 people. The sixth case had travelled as part of a second group to Thailand. The Thai Government was informed about the hepatitis A cases via OzFoodNet Central.

**Salmonella Virchow**
Four cases, with illness onsets from 25/10/2010 to 04/11/2010, and all aged less than two years, were investigated. The cases resided in different areas of metropolitan Perth. Two cases with one PFGE pattern were PT 25 var 1. The other two cases had a second PFGE pattern and were PT 8. No hypothesis for the cause of illness was established.

**Salmonella Typhimurium PFGE type 1, PT 9**
Five cases with onsets from 19/11/2010 to 05/12/2010 were interviewed, comprising 3 females and 2 males, with ages ranging from 14 to 63 years. Three cases lived in rural areas and two in metropolitan Perth. Two cases reported eating at the same hotel one day apart from each other, but no other commonalities were identified, and no hypothesis for the cause of illness was determined.
Table 4. Cluster investigations in WA by month, setting and agent, 2010

<table>
<thead>
<tr>
<th>Month</th>
<th>Setting</th>
<th>Agent responsible</th>
<th>Affected</th>
<th>Hospitalised</th>
<th>Deaths</th>
<th>*Epidemiological Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>February</td>
<td>community</td>
<td><em>Salmonella</em> Hvittingfoss</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>D</td>
</tr>
<tr>
<td>February</td>
<td>community</td>
<td><em>Salmonella</em> Typhimurium PFGE 1</td>
<td>12</td>
<td>4</td>
<td>0</td>
<td>D</td>
</tr>
<tr>
<td>February</td>
<td>community</td>
<td>STEC serotype 0157</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>D</td>
</tr>
<tr>
<td>July</td>
<td>community</td>
<td><em>Salmonella</em> Typhimurium PFGE 104</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>D</td>
</tr>
<tr>
<td>July</td>
<td>community</td>
<td><em>Salmonella</em> Typhimurium PFGE 138</td>
<td>7</td>
<td>1</td>
<td>0</td>
<td>D</td>
</tr>
<tr>
<td>October</td>
<td>unknown</td>
<td>Hepatitis A</td>
<td>6</td>
<td>1</td>
<td>0</td>
<td>D</td>
</tr>
<tr>
<td>November</td>
<td>community</td>
<td><em>Salmonella</em> Virchow</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>D</td>
</tr>
<tr>
<td>December</td>
<td>community</td>
<td><em>Salmonella</em> Typhimurium PFGE 1</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>D</td>
</tr>
</tbody>
</table>

*D= descriptive case series*
6.0 OzFoodNet WA research projects

6.1 Cryptosporidium project

A case-control study of sporadic cases of Cryptosporidium was started in June 2010 to determine risk factors for infection and by the end of 2010, 19 cases and 57 controls were enrolled. It is anticipated that 200 cases and 400 controls will be enrolled and it may take two years to complete the enrolment. Molecular typing of Cryptosporidium positive specimens is also being conducted by Murdoch University, and depending on the results, sub-analysis may be conducted by molecular type.

6.2 Burden of gastrointestinal illness in Aboriginal people

In February 2008 a national OFN project to quantify the burden of gastrointestinal infections in the Indigenous population of Australia compared with the non-Indigenous population was proposed. The first stage of the project examined National Notifiable Disease Surveillance Scheme (NNDSS) Indigenous status data completeness for Campylobacter, Salmonella, Shigella, Cryptosporidium and hepatitis A notifications between 1999 and 2008. Differences in Indigenous status data completeness between states/territories and between diseases, and trends in data completeness through time were analysed.

These NNDSS notification data were compared to the Menzies et al. (2004) criterion, which used a benchmark of 60% known Indigenous status in the analysis of vaccine preventable disease. Only South Australia and the Northern Territory (NT) consistently met this criterion for Indigenous status reporting. As other states/territories had high levels of unknown Indigenous status, the overall data set did not appear suitable for a national study of the burden of gastroenteritis in Indigenous populations. In addition, the lack of population specific data in some states/territories means that rates of disease in sub-populations could not be estimated nationally.
A modified project is now proposed, including data only from WA and NT, as these jurisdictions have low levels of unknown Indigenous status and have population specific data. Age and gender specific rates and disease rates for regions/PHUs will be calculated for Indigenous and non-Indigenous populations.

6.3 National survey on jurisdictional practices for STEC diagnosis and surveillance.

STEC notification rates differ substantially between states and territories and this is thought to be due to different diagnostic testing practices. To help understand the difference in STEC notification rates, reference laboratories and other laboratories that conduct STEC testing were asked to fill in a survey describing when stool samples were tested for STEC, how many were tested and what methods were used to test samples. Jurisdictional surveillance practices were also surveyed. The results of this survey will be written up as a report in 2011.

7.0 Prevention measures

The following actions were undertaken during 2010 to prevent foodborne and gastrointestinal disease:

Presentations

- Presentation on investigating outbreaks and a foodborne outbreak exercise at an Emergency Management Course held in Port Hedland in October

- Presentation of a talk “Management of gastroenteritis outbreaks in an Aged Care Facility (ACF)” at a workshop titled “Infectious diseases in
ACFs” in May 2010, which was attended by ACF staff from the Western Australian South West region.

- Presentation of a talk “Management of gastroenteritis outbreaks in an ACF” at a workshop titled “Infection Control update for ACF Staff” in May 2010, which was attended by ACF staff from the Perth metropolitan region.

- Conducting a tutorial for Public Health Registrars on the investigation of foodborne outbreaks in August.

Policy Documents


- Commenced a review of the “Guidelines for the management of gastroenteritis outbreaks in residential care facilities”

- Media statement on egg related outbreaks.

- Responded to a media query on *Listeria* infections in WA.

Committee membership

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

- Membership of National OzFoodNet working group on “Developing exclusion guidelines for foodhandlers”
Meetings Attended

- Two epidemiologists attended an advanced outbreak training workshop and STATA training workshop in Adelaide in June.

8.0 References


9.0 Acknowledgements

Acknowledgement is given to the following people for their assistance with the activities described in this report: Dr Gerry Harnett, Mr Brian MacKenzie, Ms Lyn O’Reilly, Ms Jennifer Green, Mr Ray Mogyorosy and the staff from the enteric, PCR and food laboratories at PathWest Laboratory Medicine WA; Mr Bill Calder and Food Unit staff from WA Health; Public Health Nurses from the metropolitan and regional Population Health Units; Environmental Health Officers from Local Government organisations throughout WA.
## Appendix 1: Number of notifications, notification rate and ratio of current to historical mean by pathogen/condition, 2005 to 2010, WA

<table>
<thead>
<tr>
<th>Pathogen/ Syndrome</th>
<th>2005 (n=2,000,459)</th>
<th>2006 (n=2,036,426)</th>
<th>2007 (n=2,080,539)</th>
<th>2008 (n=2,138,491)</th>
<th>2009 (n=2,207,113)</th>
<th>2010 (n=2,290,075)</th>
<th>Mean Rate</th>
<th>Rate Ratio 2010 to 2005-2009 mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Campylobacter</td>
<td>2450 121.5</td>
<td>1949 94.6</td>
<td>2102 99.8</td>
<td>1836 84.6</td>
<td>2597 117.7</td>
<td>2322 101.4</td>
<td>103.6</td>
<td>1.0</td>
</tr>
<tr>
<td>Salmonella</td>
<td>798 39.9</td>
<td>798 39.2</td>
<td>985 47.3</td>
<td>849 39.7</td>
<td>1113 50.4</td>
<td>1264 55.2</td>
<td>43.3</td>
<td>1.3</td>
</tr>
<tr>
<td>Rotavirus(^1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cryptosporidiosis(^2)</td>
<td>183 9.1</td>
<td>251 12.2</td>
<td>611 29.0</td>
<td>164 7.6</td>
<td>235 10.6</td>
<td>140 6.1</td>
<td>13.7</td>
<td>0.4</td>
</tr>
<tr>
<td>Shigella</td>
<td>155 7.7</td>
<td>129 6.3</td>
<td>102 4.8</td>
<td>169 7.8</td>
<td>122 5.5</td>
<td>114 5.0</td>
<td>6.4</td>
<td>0.8</td>
</tr>
<tr>
<td>Hepatitis A</td>
<td>54 2.7</td>
<td>71 3.5</td>
<td>21 1.0</td>
<td>22 1.0</td>
<td>36 1.6</td>
<td>32 1.4</td>
<td>2.0</td>
<td>0.7</td>
</tr>
<tr>
<td>Typhoid fever</td>
<td>8 0.4</td>
<td>11 0.5</td>
<td>9 0.4</td>
<td>8 0.4</td>
<td>8 0.4</td>
<td>11 0.5</td>
<td>0.4</td>
<td>1.1</td>
</tr>
<tr>
<td>Listeria</td>
<td>4 0.2</td>
<td>13 0.6</td>
<td>2 0.1</td>
<td>8 0.4</td>
<td>15 0.7</td>
<td>3 0.1</td>
<td>0.4</td>
<td>0.3</td>
</tr>
<tr>
<td>Vibrio parahaemolyticus</td>
<td>0 0.0</td>
<td>3 0.1</td>
<td>9 0.4</td>
<td>7 0.3</td>
<td>9 0.4</td>
<td>10 0.4</td>
<td>0.3</td>
<td>1.7</td>
</tr>
<tr>
<td>STEC(^1)</td>
<td>12 0.6</td>
<td>3 0.1</td>
<td>2 0.1</td>
<td>0 0.0</td>
<td>6 0.3</td>
<td>8 0.3</td>
<td>0.2</td>
<td>1.6</td>
</tr>
<tr>
<td>Hepatitis E</td>
<td>2 0.1</td>
<td>1 0.0</td>
<td>0 0.0</td>
<td>6 0.3</td>
<td>5 0.2</td>
<td>1 0.0</td>
<td>0.1</td>
<td>0.3</td>
</tr>
<tr>
<td>Paratyphoid fever</td>
<td>4 0.2</td>
<td>1 0.0</td>
<td>3 0.1</td>
<td>3 0.1</td>
<td>5 0.2</td>
<td>11 0.5</td>
<td>0.2</td>
<td>3.2</td>
</tr>
<tr>
<td>Yersinia</td>
<td>2 0.1</td>
<td>3 0.1</td>
<td>5 0.2</td>
<td>7 0.3</td>
<td>3 0.1</td>
<td>3 0.1</td>
<td>0.2</td>
<td>0.7</td>
</tr>
<tr>
<td>Cholera</td>
<td>1 0.0</td>
<td>0 0.0</td>
<td>0 0.0</td>
<td>2 0.1</td>
<td>0 0.0</td>
<td>1 0.0</td>
<td>0.0</td>
<td>1.5</td>
</tr>
<tr>
<td>HUS(^1)</td>
<td>1 0.0</td>
<td>0 0.0</td>
<td>0 0.0</td>
<td>0 0.0</td>
<td>0 0.0</td>
<td>0 0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Botulism</td>
<td>0 0.0</td>
<td>0 0.0</td>
<td>0 0.0</td>
<td>0 0.0</td>
<td>0 0.0</td>
<td>0 0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>3674 183.7</td>
<td>3233 158.8</td>
<td>4575 219.9</td>
<td>3505 163.9</td>
<td>4572 207.1</td>
<td>4529 197.8</td>
<td>186.7</td>
<td>1.1</td>
</tr>
</tbody>
</table>

\(^1\) Abbreviations: STEC: Shiga-toxin producing *E. coli*; HUS: Haemolytic Uraemic Syndrome  
\(^2\) Rotavirus was made notifiable in July 2006  
\(^3\) Rate is cases per 100,000 population  
\(^4\) Mean of rates between 2005 and 2009 where applicable