5. Enteric diseases

Surveillance objectives

In general, the objectives of enteric disease surveillance are to:

- Monitor the epidemiology of enteric diseases in terms of time, person and place;
- Detect and investigate outbreaks of enteric disease to identify a source, implement appropriate public health interventions and prevent further transmission;
- Communicate the patterns, risks and trends about infectious enteric diseases to the public, government and other key stakeholders.

The extent to which, and how many, cases are investigated is dependent on the disease and additional information provided in the notification of a case. All notified cases of botulism, cholera, two or more cases of food- and water-borne illness, haemolytic uraemic syndrome (HUS) and verotoxin-producing E. coli (VTEC), hepatitis A, hepatitis E, listeriosis, shigellosis, typhoid and paratyphoid are investigated because of their high public health importance.

Notified cases of campylobacteriosis, cryptosporidiosis, giardiasis, salmonellosis are investigated if the case is reported to be a food handler, health care worker, child care worker, a child who attends a child care centre, associated with one or more other cases, a resident of a special care facility or an institution, or if a suspected source of the case’s illness has been reported by the notifying doctor. Cases of salmonellosis aged six months or less are also investigated. The principal objective of this case-based surveillance and investigation is to identify a source, implement appropriate public health interventions and prevent further transmission for these cases.

Campylobacteriosis

Summary of notifications

The department received 5,912 notifications of campylobacteriosis in 2008, for 3,212 males (54 per cent) and 2,688 females (45 per cent); sex was not specified in 12 notifications (less than one per cent). As observed in previous years, notifications were generally more frequent during the warmer months. The median age of notified cases was 29 years (range: 21 days to 97 years) and notification rates were highest for children aged under five years (figure 12).

A majority of cases (70 per cent) were residents of metropolitan regions but notification rates were highest among residents of Barwon-South Western Region (figure 13).

Risk factors

Risk factor data were not routinely collected.

Outbreak investigations

There were two point source outbreaks of campylobacteriosis identified in 2008. The first of these outbreaks was investigated in April and involved illness in a military facility (four cases) where the mode of transmission was unknown. The other was a foodborne outbreak at a commercially catered function. A cohort study was conducted and consumption of chicken and pasta salad was significantly associated with illness (Relative risk undefined; p<0.0004).
Comment

Campylobacter is a major cause of enteric disease and is thought to be responsible for the majority of food-borne disease in developed countries. Prevention of infection depends on good personal and food hygiene, particularly the adequate washing of vegetables, thorough cooking of raw meats (especially chicken) and the prevention of cross contamination.

Drinking unpasteurised milk and not washing hands after handling farm animals have been documented as causing outbreaks of Campylobacter infection and other enteric diseases with more serious complications, such as verotoxin-producing E. coli infections. The department’s brochure ‘Reducing the risk of gastroenteritis at open farms, petting zoos and animal exhibits’ is available at [http://www.health.vic.gov.au/ideas/regulations/animal.htm](http://www.health.vic.gov.au/ideas/regulations/animal.htm)
Cryptosporidiosis

Summary of notifications

The department received notifications for 474 cases of cryptosporidiosis in 2008, a 22 per cent decrease on the total for 2007. There were 239 (50 per cent) males and 235 (50 per cent) females notified. The median age was 11 years (range: 1 month to 83 years) and notification rates were highest for persons aged 0 to 4 years (figure 14).

Residents of North and West Metropolitan Region and Southern Metropolitan Region comprised the largest number of cases but notification rates were highest for the Barwon-South Western Region (figure 15).

Risk factors

Risk factor data were not routinely collected.

Outbreak investigations

Five separate investigations identified two swimming pools in the Gippsland Region, two pools in the Southern Metropolitan Region and one pool in the North and West Metropolitan Region that were associated with three, four, five, two and four cases respectively, who indicated that they had swum in the same pool during their respective incubation periods.

Comment

Major outbreaks of cryptosporidiosis have been attributed to both contaminated drinking water and recreational water use. As Cryptosporidium oocysts can be excreted for extended periods, the department advises that cases should not swim in public pools for a period of 14 days after their diarrhoea has ceased. Showering before swimming is recommended at all times. Further information about specific measures to prevent and control outbreaks of pool-associated cryptosporidiosis can be obtained from the department’s Pool operators’ handbook available from: http://www.health.vic.gov.au/environment

Infection in rural areas appears to be predominantly associated with contact with farm animals and is more frequent during the calving season. Other risk factors identified during cluster investigations include overseas travel, handling animals (especially farm animals) and person-to-person transmission. Cases should be reminded about the importance of good personal hygiene to prevent further cases within households and close contacts. For further information about cryptosporidiosis refer to the department’s The Blue Book: Guidelines for the control of infectious diseases available from: http://www.health.vic.gov.au/ideas/bluebook/index.htm
Food- and water-borne illness

Summary of notifications

In 2008, the department received notifications for 1,127 cases of specific organisms/agents (not reported elsewhere) associated with gastrointestinal illnesses potentially linked to food or water, of which the majority (97 per cent) were due to Norovirus (table 7).

Table 7: Notified cases of food- and water-borne illness by causative organism/agent, Victoria, 2008

<table>
<thead>
<tr>
<th>Organism/agent</th>
<th>Cases (per cent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norovirus</td>
<td>1,097 (97)</td>
</tr>
<tr>
<td>Rotavirus</td>
<td>13 (1)</td>
</tr>
<tr>
<td>Clostridium perfringens</td>
<td>5 (&lt;1)</td>
</tr>
<tr>
<td>Adenovirus</td>
<td>5 (&lt;1)</td>
</tr>
<tr>
<td>Astrovirus</td>
<td>5 (&lt;1)</td>
</tr>
<tr>
<td>Scombrotoxin</td>
<td>1 (&lt;1)</td>
</tr>
<tr>
<td>Vibrio parahaemolyticus</td>
<td>1 (&lt;1)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,127</strong></td>
</tr>
</tbody>
</table>

Outbreak investigations

In 2008, the department was notified of 461 outbreaks of gastrointestinal illness affecting at least 7,499 people. Of these outbreaks, 21 were considered to be food-borne or probable food-borne outbreaks. The majority of the non-food-borne outbreaks were likely to have been due to person-to-person transmission. The highest number of non-foodborne outbreaks was reported in October (figure 16).

The 21 food-borne or probable food-borne outbreaks affected over 328 people, of which 27 people were hospitalised as a result. These outbreaks were spread throughout the year. Settings where food was prepared in these outbreaks included restaurants (8 outbreaks), commercial caterers (n=5), private residences (n=4), aged care facilities (n=2), a residential school and a residential institution. Agents responsible for 17 of these outbreaks included Salmonella (11 outbreaks), Norovirus (n=2), Clostridium perfringens (n=2), hepatitis A (n=1) and Campylobacter (n=1). Of the four outbreaks for which the causative pathogen was unknown, one was suspected to have been of (unspecified) viral aetiology and two were suspected to have been caused by Clostridium perfringens.

A food vehicle was implicated in 15 of the 21 food-borne outbreaks. An infectious food handler was suspected to have contaminated food/s in a further two outbreaks and a specific food source was unable to be identified in the remaining four outbreaks. Among the 15 outbreaks where a food source was implicated, foods containing raw or lightly cooked eggs were responsible for six outbreaks, all of which were caused by Salmonella. Foods implicated in the remaining nine outbreaks included chicken dishes (two outbreaks), mixed foods (two outbreaks), continental custard cake, pork, vitamised foods, savoury mince, and salads and/or sandwiches.

The mode of transmission for the remaining 440 outbreaks were either confirmed or suspected to have not been food- or water-borne in nature. There were 374 confirmed Norovirus or suspected viral outbreaks in 2008, accounting for 85 per cent of the non-food-borne outbreaks for the year. The number of non-food-borne outbreaks was highest in the months of September and October. Settings where these outbreaks occurred included aged care facilities (259 outbreaks), hospitals (n=77), childcare centres (n=36), other institutions (n=31), restaurants/hotels (n=12), private residences (n=5), camps (n=4), swimming pools (n=4), schools (n=3), commercially catered functions (n=2), play centres (n=2), correctional facilities (n=2), military institutions...
(n=2), and a community event. Agents responsible for these 440 outbreaks were Norovirus (n=211), Rotavirus (n=6), Cryptosporidium (n=4), Listeria (n=1), Adenovirus (n=1), Astrovirus (n=1), hepatitis A virus (n=1), Salmonella (n=1), Clostridium difficile toxin (n=1), and Campylobacter (n=1). For the remaining 212 outbreaks the agent responsible was unknown, although 163 were suspected to have been viral.

Outbreaks caused by Salmonella, Cryptosporidium and Campylobacter are discussed further in the respective sections of this report.

Comment

The number of notified and identified outbreaks in 2008, both food-borne and non-food-borne, was considerably lower when compared to 2007. In contrast, the number of food-borne and non-food-borne outbreaks in 2007 was dramatically higher than in 2006. It is not possible to assess the reasons behind these fluctuations with surveillance data alone, and there may be complex microbiological, environmental and behavioural interactions that are playing a role. Despite and because of this, infection control vigilance in high-risk settings is required, particularly aged care facilities, hospitals and child care centres.
Giardiasis

Summary of notifications
There were 1,434 cases of giardiasis notified in 2008, a four per cent increase on the 1,382 cases notified in 2007. There were 707 males (49 per cent) and 724 females (51 per cent); sex was not specified for three notifications. The median age of cases was 31 years (range: one month to 97 years). Notification rates were highest among those aged zero to four years, with a secondary peak in adults aged 35 to 39 years (figure 17).

Residents of Southern Metropolitan Region and North and West Metropolitan Region comprised the largest number of cases. These two regions, as well as Hume Region, had the highest notification rates (figure 18).

Risk factors
Risk factor data were not routinely collected.

Outbreak investigations
No point source outbreaks were identified.

Comment
Giardiasis spreads rapidly in child care centres and institutions. Personal hygiene—particularly hand washing before eating and handling food, and after toilet use and changing nappies—is critical to the control of this disease. Travel to developing countries is commonly identified as a risk factor for acquisition of giardiasis.
Haemolytic uraemic syndrome and verotoxin-producing *E. coli*

**Summary of notifications**

Verotoxin-producing *Escherichia coli* (VTEC) are a subset of *E. coli* that is pathogenic in humans. Haemolytic uraemic syndrome (HUS) is a rare condition affecting the kidneys and bloodstream that can be caused by VTEC. In Victoria, if a case of HUS also meets the case definition of VTEC it is counted only once as a case of HUS.

There were 11 cases of VTEC and five cases of HUS notified in 2008 (table 8). There was a male to female ratio of 1.2:1 and an age range of one to 85 years (median = 19 years) for the VTEC cases. For the HUS cases, the male to female ratio was 4:1 and cases ranged in age from 2 to 82 years.

**Table 8: Notified cases of verotoxin-producing *E. coli* and haemolytic uraemic syndrome by serotype, Victoria, 2008**

<table>
<thead>
<tr>
<th><em>E. coli</em> serotype</th>
<th>VTEC*</th>
<th>HUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>O130:H11</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>O111:H-</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>O157:H-</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>stx 1 and stx 2 genes detected</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>stx 2 gene detected</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>No <em>E. coli</em> isolated (clinical diagnosis)</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>11</strong></td>
<td><strong>5</strong></td>
</tr>
</tbody>
</table>

* Shigatoxin genes stx1 and/or stx2 were detected by PCR in all VTEC cases.

**Risk factors**

Two of the VTEC cases reported contact with farm animals during their incubation period and two reported consuming lamb’s fry. Samples of lamb’s fry collected during the investigation were positive for a combination of *stx1* and *stx2* genes by polymerase chain reaction (PCR). Two cases were incidental findings in asymptomatic individuals who were tested as household contacts of HUS cases. A further case lived in a rural area with tank water at home but reported boiling the water prior to consumption. The remaining four VTEC cases had no obvious risk factors identified. Two of the HUS cases reported contact with farm animals during their incubation period and another case lived in a rural area but reported no recent farm animal contact. Samples of mince and lamb chops were collected during the investigation of another HUS case and both meat samples were positive for *stx1* and *stx2* genes by PCR. No obvious risk factors were identified for the remaining HUS case.

**Outbreak and other investigations**

No outbreaks were identified.

**Comment**

The most common symptom of VTEC is diarrhoea, which can range from mild to severe, and may be bloody and accompanied by stomach cramps. Symptoms can be severe in children and people with reduced immunity. Once a case is identified, person-to-person transmission must be prevented through careful personal hygiene and excluding cases from food and beverage preparation. Infection can be prevented by adequately cooking meat products (particularly minced beef) and not consuming unpasteurised milk and dairy products.

Children under five years of age are at the greatest risk of developing HUS and outbreaks have been associated with visitors to petting zoos and farms and also with the consumption of food contaminated with VTEC.
Hepatitis A

Summary of notifications
In 2008, there were 84 notified cases of hepatitis A, an increase of 133 per cent on the 36 cases in 2007 (figure 19).

There were 49 (58 per cent) cases in males and 35 (42 per cent) cases in females. Notification rates were highest for those aged 5 to 9 years (figure 20). Twenty-eight (33 per cent) cases were hospitalised.

Risk factors
Overseas travel was the most frequently identified risk factor, accounting for 45 cases (54 per cent) (table 9). Risk factor information was available for 38 of the remaining cases but in most instances the source of the infection could not be identified.

Outbreak investigations
There were two outbreaks of hepatitis A investigated in 2008. The first was a family outbreak involving two related families that comprised four adults and 15 children living in separate households. There were eight confirmed cases, all children ranging in age from 5 to 18 years, that had onsets of illness that ranged over a nine-day period. Five other siblings were tested and found to be hepatitis A virus IgM negative but the two youngest children, aged two years and eight months, were not tested and were asymptomatic. A source for this outbreak was unable to be identified.

The second outbreak was traced to an infected food handler who worked at a café during his infectious period. Nine confirmed cases that ate at this café subsequently became ill and were confirmed with hepatitis A. An additional case was notified in a household contact of one of these cases. A report of this outbreak was published in Volume 33 Issue 1 of Communicable Disease Intelligence.

<table>
<thead>
<tr>
<th>Likely source of infection</th>
<th>Cases (per cent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overseas travel</td>
<td>45 (54)</td>
</tr>
<tr>
<td>Source unknown</td>
<td>14 (17)</td>
</tr>
<tr>
<td>Café outbreak</td>
<td>9 (11)</td>
</tr>
<tr>
<td>Family outbreak (source unknown)</td>
<td>8 (9)</td>
</tr>
<tr>
<td>Household contact with a case</td>
<td>6 (7)</td>
</tr>
<tr>
<td>Marijuana user</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Injecting drug user</td>
<td>1 (1)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>84 (100)</strong></td>
</tr>
</tbody>
</table>
Comment
Notifications of hepatitis A steadily declined between the years 2003 to 2007. The increase in cases was largely due to the two outbreaks (17 cases) and a 73 per cent increase in infections acquired overseas (45 cases in 2008 compared to 26 cases in 2007). Vaccination should be encouraged for people intending to travel overseas, especially those visiting relatives and friends who may be less likely to seek travel health information prior to departure. Those in high-risk occupations such as child care workers, health care professionals and food handlers should also be encouraged to be vaccinated.

Hepatitis E

Summary of notifications
The department received notifications for 13 cases of hepatitis E in 2008 in 10 males and three females aged between 19 and 34 years. All diagnoses were confirmed by the detection of IgG in serum by enzyme immunoassay in the presence of a clinically compatible illness.

Risk factors
All infections were acquired overseas: seven in India, three in Nepal, two in Pakistan and one in Bangladesh.

Outbreak investigations
No links were identified among the cases.

Comment
Hepatitis E is an acute enteric illness with a clinical course similar to that of hepatitis A. Infection should be considered in persons with acute hepatitis and a history of travel to endemic areas. Persons intending to travel to endemic regions should be advised to take care with personal hygiene and avoid the consumption of undercooked foods and untreated water. There is no vaccine currently available for hepatitis E.
Listeriosis

Summary of notifications
Ten cases of listeriosis were notified in 2008 in three males and seven females. The median age of cases was 56 years (range: 2 days to 87 years). There were three neonatal cases notified. Of the remaining seven cases, six presented with septicaemia and one had both septicaemia and meningitis. One case died, corresponding to a case fatality rate of 10 per cent.

Risk factors
Of the 10 cases notified, risk factors were identified for six of the cases and four cases were unable to be interviewed. High-risk foods identified during interview with cases included sliced cold meats and soft cheeses. One case reported overseas travel in her incubation period as well as contact with sheep manure whilst gardening. Comorbidity risk factors for the seven non-perinatal cases included various cancers (n=2), leukaemia (n=2), chronic liver disease (n=1), arthritis (n=1) and a chronic *C. difficile* infection (n=1). One neonatal case was likely to have acquired the infection through nosocomial transmission after birth.

Outbreak investigations
Isolates from all cases were forwarded to the MDU for molecular typing using pulse-field gel electrophoresis (PFGE), of which all but two were microbiologically distinct. These two cases were neonates delivered in the same hospital one day apart. The index case was delivered at 32 weeks in respiratory distress and was a materno-foetal infection. The second case was a full term delivery of a healthy baby who became septic at seven days of age, and was likely to have acquired the infection through nosocomial transmission at some stage after birth. A complete review of infection control procedures was undertaken at the hospital.

Comment
Advice on food hygiene and appropriate diet should be given to susceptible groups, particularly pregnant women, the elderly and the immunocompromised. Current information available includes the National Health and Medical Research Council statement on *Listeria* for medical practitioners. Pamphlets available include ‘Listeria and Food: Advice for people at risk’ by Food Standards Australia New Zealand and the department’s *Listeria* information pamphlet which is available online at: http://www.health.vic.gov.au/ideas/diseases/listeria_facts.htm

In recent years, notifications of materno-foetal cases of listeriosis have fallen, likely as a result of the increase in information provided to pregnant women about the risk of *Listeria* infection and the foods to be avoided during pregnancy.
Salmonellosis

Summary of notifications

There were 1,691 notified cases of salmonellosis in 2008, a decrease of seven per cent on the total in 2007. There was a male-to-female ratio of 1:1.2 and the median age was 25 years (range: three days to 98 years). The number of cases and notification rate were highest among those aged 0 to 4 years and accounted for 19 per cent of the total cases for the year (figure 21).

Seventy-two per cent of cases were residents of metropolitan regions but notification rates were highest for the Barwon-South Western Region and the Hume Region (figure 22).

In Victoria, Salmonella typing is conducted by the Microbiological Diagnostic Unit (MDU). In 2008, S. Typhimurium 135 was the most common serotype/phage type identified, accounting for 15 per cent of the total salmonellosis cases notified during the year (table 10).

S. Enteritidis is not endemic in Australia, except for phage type 26 which occurs in Queensland. It is a Salmonella serovar of significant public health importance because it is able to be vertically transmitted from the chicken to the egg and has been responsible for large outbreaks overseas associated with undercooked eggs and products containing eggs. In Victoria, the department follows up all cases of S. Enteritidis to ascertain whether the infection was acquired overseas.

The department received notifications for 96 cases of S. Enteritidis in 2008 compared with 69 notifications in

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**Figure 21: Notified cases and notification rates of salmonellosis by age group, Victoria, 2008**

**Figure 22: Notified cases and notification rates of salmonellosis by region, Victoria, 2008**

**Table 10: Ten most frequently notified Salmonella serovars/phage types, Victoria, 2008**

<table>
<thead>
<tr>
<th>Salmonella serovar/phage type</th>
<th>Cases (per cent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S. Typhimurium 135a</td>
<td>254 (15)</td>
</tr>
<tr>
<td>S. Typhimurium 44</td>
<td>203 (12)</td>
</tr>
<tr>
<td>S. Typhimurium 9</td>
<td>159 (9)</td>
</tr>
<tr>
<td>S. Typhimurium 170</td>
<td>135 (8)</td>
</tr>
<tr>
<td>S. Typhimurium 135</td>
<td>47 (3)</td>
</tr>
<tr>
<td>S. Stanley</td>
<td>40 (2)</td>
</tr>
<tr>
<td>S. Typhimurium 126</td>
<td>39 (2)</td>
</tr>
<tr>
<td>S. Newport</td>
<td>33 (2)</td>
</tr>
<tr>
<td>S. Infantis</td>
<td>29 (2)</td>
</tr>
<tr>
<td>S. Enteritidis 6A</td>
<td>28 (2)</td>
</tr>
<tr>
<td>Other</td>
<td>724 (43)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,691 (100)</strong></td>
</tr>
</tbody>
</table>

**Table 11: Notified cases of S. Enteritidis by country of acquisition, Victoria, 2008**

<table>
<thead>
<tr>
<th>Country/region</th>
<th>Cases (per cent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>34 (36)</td>
</tr>
<tr>
<td>Thailand</td>
<td>18 (19)</td>
</tr>
<tr>
<td>Asia – other</td>
<td>26 (27)</td>
</tr>
<tr>
<td>Europe</td>
<td>3 (3)</td>
</tr>
<tr>
<td>Africa</td>
<td>2 (2)</td>
</tr>
<tr>
<td>Middle East</td>
<td>2 (2)</td>
</tr>
<tr>
<td>Pacific Islands</td>
<td>4 (4)</td>
</tr>
<tr>
<td>Overseas unspecified country</td>
<td>1 (1)</td>
</tr>
<tr>
<td>No overseas travel identified</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Unknown (not interviewed)</td>
<td>5 (5)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>96 (100)</strong></td>
</tr>
</tbody>
</table>
2007, an increase of 39 per cent. Indonesia returned to being the top ranked country for reported acquisition of S. Enteritidis infection, after Thailand was in this position for the previous two years. (Table 11).

**Outbreak investigations**

In 2008 there were five point source outbreaks of S. Typhimurium 44 (38 cases), three outbreaks of S. Typhimurium 135a (14 cases), two outbreaks of S. Typhimurium 170 (23 cases) and one outbreak of S. Johannesburg (12 cases), (table 12).

A further eight separate Salmonella cluster investigations (defined as an unusual number of notifications of a particular serovar either in time and/ or place that are not, at the outset of the investigation, clearly associated with a point source) were conducted in 2008. The responsible serovars included S. Typhimurium phage types 8, 9, 135a, 44, 170 and 126, as well as S. Singapore and S. Mbandaka.

A definitive source of infection was not identified for these cluster investigations.

**Comment**

Even though there was a decrease in the number of notified salmonellosis cases in 2008, outbreak data indicated that the association with consumption of raw egg foods and salmonellosis remains. The distribution of *Salmonella* serovars causing illness over time is dynamic, and 2008 was marked by the increase in cases of S. Typhimurium 135a and the continued presence of S. Typhimurium 44, which a mounting body of evidence indicates is associated with egg consumption. Consumption of raw or incompletely cooked eggs and use of dirty or cracked eggs should be avoided. However, in addition to eggs and foods containing eggs, all food derived from animal sources should be thoroughly cooked, particularly poultry, pork and other meat dishes. Care should be taken to avoid contaminating cooked or ready-to-eat foods by carefully separating them from raw foods during storage and preparation.

In response to the continuing problem of egg related salmonellosis, a communication strategy was developed by a team comprising OzFoodNet, Department of Human Services, Department of Primary Industries and Victorian Farmers Federation, aiming to raise awareness of the health risks associated with eggs and how to avoid these risks. The strategy primarily targets egg consumers and the food service industry in Victoria, with efforts also made to promote key safety messages relevant to wholesalers, retailers, distributors and producers of eggs. The strategy was launched at the OzFoodNet face-to-face meeting held in Williamstown, Victoria in November 2008.

The keys messages of the campaign were “Eggs need TLC – Buy clean – Keep cool – Cook well”, and “Always treat eggs safely, as you would chicken, meat, seafood and dairy products”. Brochures and leaflets were produced for consumers, food service businesses, egg wholesalers, retailers, distributors and producers, and are available at www.health.vic.gov.au/eggs/. A summary of the campaign was published in Volume 11 Issue 4 of the Victorian Infectious Diseases Bulletin.

**Table 12: Salmonellosis outbreaks by *Salmonella* serovar/phage type, setting and source, Victoria, 2008**

<table>
<thead>
<tr>
<th>Salmonella serovar/phage type</th>
<th>Setting</th>
<th>Source</th>
<th>Published</th>
</tr>
</thead>
<tbody>
<tr>
<td>S. Typhimurium 44</td>
<td>Private residence</td>
<td>Lemon dessert (raw eggs)</td>
<td>VIDB^ Volume 11 (2)</td>
</tr>
<tr>
<td>S. Typhimurium 44</td>
<td>Commercial caterer</td>
<td>Unknown</td>
<td>VIDB^ Volume 11 (2)</td>
</tr>
<tr>
<td>S. Typhimurium 44</td>
<td>Restaurant</td>
<td>Variety of desserts</td>
<td>VIDB^ Volume 11 (3)</td>
</tr>
<tr>
<td>S. Typhimurium 44</td>
<td>Residential school</td>
<td>Unknown</td>
<td>VIDB^ Volume 11 (3)</td>
</tr>
<tr>
<td>S. Typhimurium 44</td>
<td>Aged care</td>
<td>Vitamised foods</td>
<td>VIDB^ Volume 11 (4)</td>
</tr>
<tr>
<td>S. Typhimurium 135a</td>
<td>Private residence</td>
<td>Multiple foods</td>
<td>VIDB^ Volume 11 (2)</td>
</tr>
<tr>
<td>S. Typhimurium 135a</td>
<td>Private residence</td>
<td>Ice cream (raw eggs)</td>
<td>VIDB^ Volume 11 (2)</td>
</tr>
<tr>
<td>S. Typhimurium 135a</td>
<td>Private residence</td>
<td>Egg custard dessert</td>
<td>VIDB^ Volume 11 (3)</td>
</tr>
<tr>
<td>S. Typhimurium 170</td>
<td>Commercial caterer</td>
<td>Chicken/pasta salad/ham</td>
<td>VIDB^ Volume 11 (2)</td>
</tr>
<tr>
<td>S. Typhimurium 170</td>
<td>Restaurant</td>
<td>Tiramisu (raw eggs)</td>
<td>VIDB^ Volume 12 (1)</td>
</tr>
<tr>
<td>S. Typhimurium Johannesburg</td>
<td>Restaurant</td>
<td>Roast Pork</td>
<td>VIDB^ Volume 11 (3)</td>
</tr>
</tbody>
</table>

* Indicates where the food was prepared
^ Victorian Infectious Diseases Bulletin
Shigellosis

Summary of notifications

There were 132 notified cases of shigellosis in 2008, an increase of 33 per cent on the 99 cases notified in 2007. Cases were notified sporadically throughout the year with no apparent seasonality. Of the cases, 87 (65 per cent) were male and 45 (35 per cent) were female. The median age of notified cases was 35 years (range: one to 94 years) and notification rates were highest among those aged 25 to 29 years and 35 to 39 years (figure 23). Nineteen cases were reported to be hospitalised.

Shigella sonnei biotype g was the most common species and subtype notified, accounting for more than half of the cases (table 13). The next most common type, for 10 per cent of the notified cases, was S. flexneri 2a.

Risk factors

Fifty-four cases (41 per cent) acquired their infections overseas and a further case most likely acquired their infection from close contact with a returned overseas traveller (table 14). The next most commonly reported risk factor for 30 per cent of cases was male-to-male sexual contact; a further two cases had close contact with a suspected case of Shigella infection. One case was a laboratory worker who most likely acquired her infection through occupational exposure. Twelve cases were associated with a community wide outbreak (described below) and of the 22 cases with an unknown source of infection, 11 could not be contacted and the remainder reported no obvious risk factors.
Outbreak investigations

Twelve cases were part of a community cluster in the inner southern suburbs of Melbourne. All cases were S. sonnei biotype g with the same antibiotic resistance profile (resistant to ampicillin, spectinomycin, streptomycin, sulphonamide and trimethoprim).

A source was not identified for the majority of the cases in this cluster although person to person transmission was likely for three cases, all of whom had household contact with a confirmed case.

An additional two cases with the same biotype and antibiotic resistance profile and who lived in the same geographical area had travelled overseas during their incubation period.

Forty infections were in men who identified sex with other men as a risk factor. Thirty-three of these cases were S. sonnei biotype g, 29 of which had the same antibiotic resistance profile (resistant to streptomycin, tetracycline, sulphonamide, trimethoprim and naladixic acid and a reduced susceptibility to ciprofloxacin).

Comment

Shigella spp. have a low infectious dose. Infection spreads when a person ingests bacteria through direct or indirect contact with the faeces of a human case. Awareness of the need for increased personal hygiene while travelling and at home will help prevent shigellosis.

Typhoid and paratyphoid

Summary of notifications

The department received 33 notifications of typhoid in 2008 with an age range of two to 59 years and a male-to-female ratio of 2:1. There were 24 cases of paratyphoid notified in 2008 with an age range of six to 69 years and a male-to-female ratio of 1:1.2.

Risk factors

Thirty-one cases of typhoid acquired their infections overseas with the majority of cases (68 per cent) having acquired their infection in India (table 15). One case of typhoid was infected from his mother who was likely to have been a long term carrier of Salmonella Typhi and no source was identified for the remaining case who had no recent history of overseas travel. All cases of paratyphoid acquired their infection overseas, with more than half of the cases reported to have acquired their infections in India (table 15).

Outbreak investigations

No outbreaks were identified.

Comment

Effective immunisation against typhoid is available for travellers intending to travel to high-risk areas. However, medical practitioners should remind patients to exercise care when eating and drinking in endemic areas, regardless of their immunisation status.

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Typhoid</th>
<th>Paratyphoid</th>
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<tr>
<td>Overseas travel</td>
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