

4. 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 cholera, 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 *Campylobacter* infection, cryptosporidiosis, giardiasis, and salmonellosis are investigated if the case is reported to be a food handler, health care worker, childcare worker, or a child who attends a childcare centre, is associated with two or more other cases, is a resident of a special care facility or an institution, or if a suspected source of the case's illness has been reported. 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. An additional objective of HUS and VTEC surveillance is to conduct research into risk factors for infection.

Campylobacter infection

Summary of notifications

The department received notifications for 6,106 cases of *Campylobacter* infection in 2005 in 3,303 males (54 per cent) and 2,781 females (46 per cent); sex was not specified for 22 cases (less than one per cent). As observed in previous years, notifications were generally more frequent during the warmer months. The median age of persons notified was 30 years (range: seven days to 104 years) and the five-year age-specific notification rates were highest in children aged less than five years (figure 8).

The largest number of cases was reported among residents of metropolitan Melbourne, although notification rates were highest for the Gippsland region (figure 9).

Risk factors

Risk factor information was not routinely collected.

Outbreak investigations

Two outbreaks of *Campylobacter* were investigated in 2005. In February, the Communicable Disease Control Unit was notified that several children attending a school camp had been ill with gastrointestinal symptoms. Thirty students from a high school were attending the camp for a seven-week rural studies program, during which time they worked on the farm milking cows

and feeding, caring for and cleaning up after pigs, sheep, dogs, chickens and horses. A cohort study was conducted among the camp attendees, with a case defined as a student at the college who attended the school camp and developed symptoms of diarrhoea with or without other gastro symptoms with an onset between 28 January 2005 and 11 February 2005. Twenty-two attendees met the case definition: all cases reported diarrhoea; 91 per cent had abdominal pain; 46 per cent had fever; 41 per cent had nausea; and 36 per cent had vomiting. Eight of ten faecal specimens collected were positive for *Campylobacter*. Data analysis did not show an association between illness and any of the foods consumed or farm activities. Unpasteurised milk and untreated bore water that were consumed at the camp were sampled: all milk samples were negative but *Campylobacter* was found in one of the bore water samples. *E. coli* was also found in samples of natural spring water, bore water and dam water. Staff at the farm were advised to treat all drinking water, cease the consumption of unpasteurised milk and to provide more handwashing facilities for students.

In November, the Communicable Disease Control Unit was notified of five work colleagues who shared a morning tea of custard tarts, vanilla slices and cinnamon doughnuts purchased from a bakery, although not all cases ate the same products. Onset of illness was 1–3 days after consuming the cakes and the median duration of illness was seven days. Samples of custard powder, eggs, custard tarts, jam doughnuts and vanilla slices, and various environmental swabs from the bakery were negative

for bacterial pathogens. A review of case questionnaires revealed that cases had other meals in common and while this outbreak was suspected to have been food-borne, food from the bakery emerged as one of several possible sources.

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 and cooking of raw meats.

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* infection. 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>

Figure 8: Notified cases and notification rates of *Campylobacter* infection by age group, Victoria, 2005

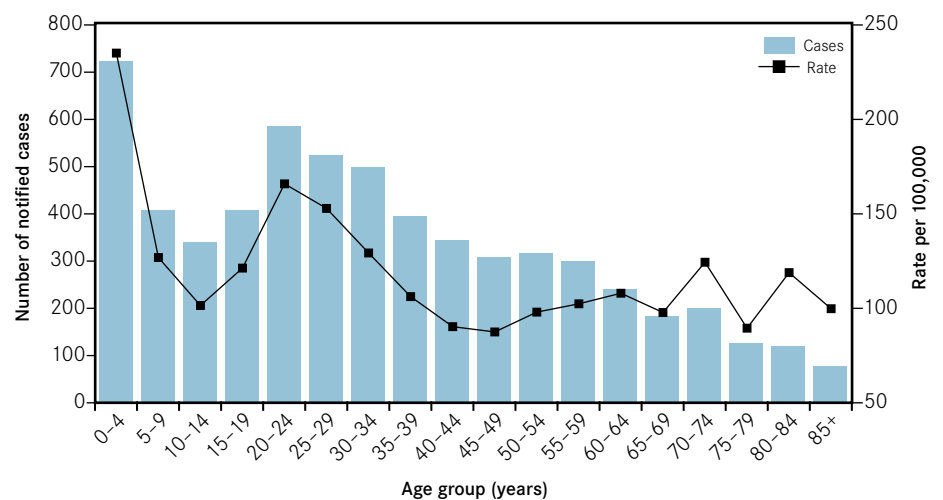
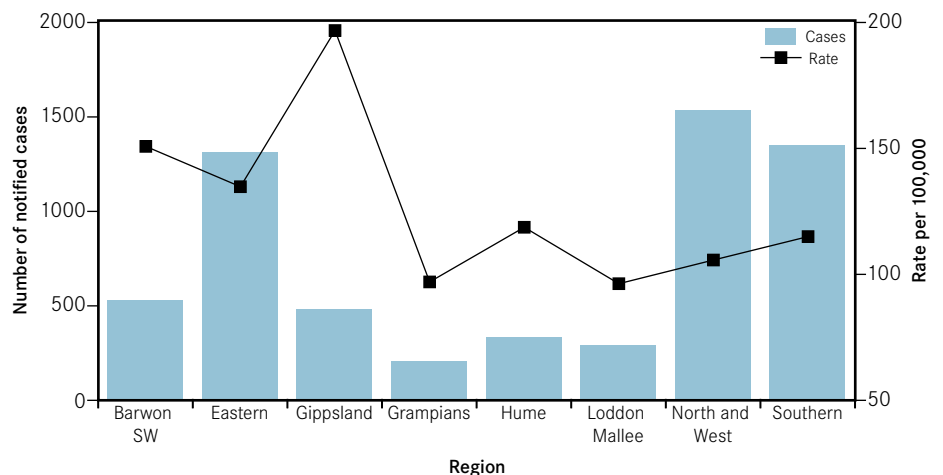


Figure 9: Notified cases and notification rates of *Campylobacter* infection by region, Victoria, 2005



Cholera

Summary of notifications

Two cases of cholera in females aged 45 and 71 years were notified in 2005. Both cases were from the same family group and travelled together to Australia from a refugee camp in Tanzania where they had lived for approximately 16 years. These cases most likely acquired their infection in a transit camp in Tanzania where they stayed for five days prior to departing for Australia. *Vibrio cholerae* O1 Ogawa was cultured from faecal specimens of both cases. Enhanced surveillance for illness among other refugees who travelled to Australia on the same flight was conducted but no further cases were identified.

Outbreak and other investigations

No outbreaks were identified.

Comment

Travellers to endemic areas should be advised to take special care to avoid potentially contaminated water (including ice) and food prepared with untreated water.

Cryptosporidiosis

Summary of notifications

The department received notifications for 505 cases of cryptosporidiosis in 2005, a 66 per cent increase on the number of notified cases in 2004. There were 231 males (46 per cent) and 273 females (54 per cent) notified; sex was not specified for one case. The median

age was ten years (range: 14 days to 88 years), with notification rates highest for persons aged 0–4 years (figure 10). Notification rates were highest for the Gippsland region (figure 11).

Risk factors

Risk factor information was not routinely collected.

Figure 10: Notified cases and notification rates of cryptosporidiosis by age group, Victoria, 2005

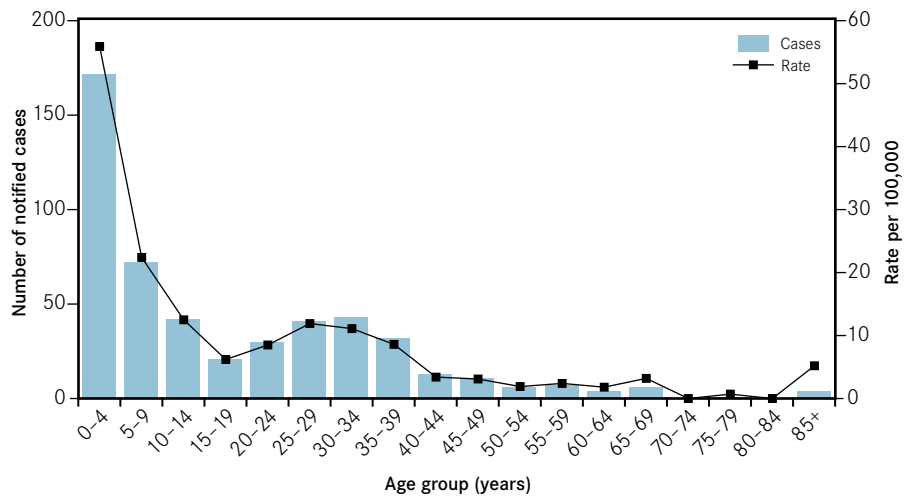
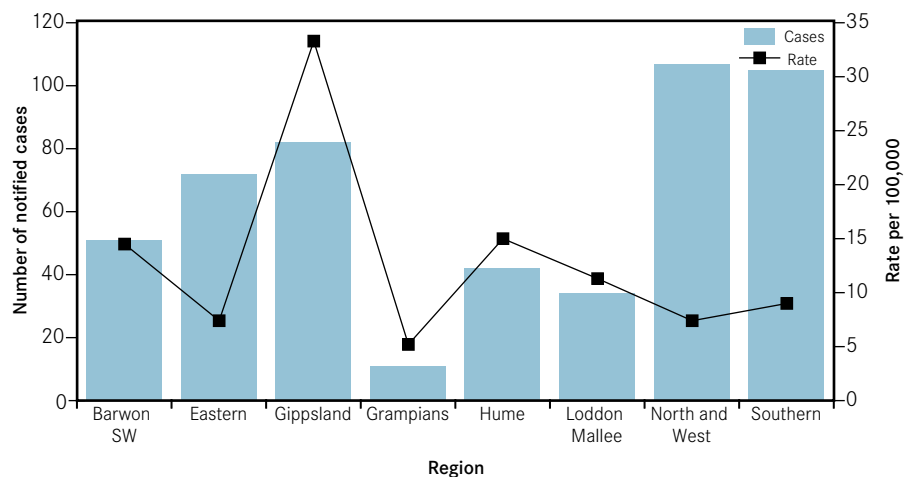


Figure 11: Notified cases and notification rates of cryptosporidiosis by region, Victoria, 2005



Outbreak and other investigations Comment

Nine geographical clusters/outbreaks of cryptosporidiosis were identified in 2005, of which five were linked to different swimming pools and one was associated with visitors to a festival in rural Victoria. A cluster in March linked eight confirmed and two suspected cases to a pool in regional Victoria and three clusters involving three, seven and nine cases respectively were associated with pools located in the Melbourne metropolitan area. An increase in cases in a rural area of Victoria was investigated in July from which it was found that four cases had most likely acquired their infection from handling animals at a local festival and four were associated with two different swimming pools in the same area; an additional two cases reported exposures to both of the swimming pools and animals at the festival in the incubation period. A source for the remaining three clusters/outbreaks was not found.

In all instances where pools were associated with two or more confirmed cases of cryptosporidiosis, the Environmental Health Unit of DHS liaised with Local Governments to enforce control measures at the pools.

Major outbreaks of cryptosporidiosis have been attributed to both contaminated drinking water and recreational water use. *Cryptosporidium* oocysts can be excreted for extended periods and the department advises that adults should not swim in public pools for a period of seven days and children for a period of four weeks 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 of Human Services' 'Pool operators Handbook' available from: <http://www.health.vic.gov.au/environment>

There are numerous other risk factors for cryptosporidiosis. These include overseas travel, person-to-person transmission and handling animals (especially farm animals). Infection in rural areas is frequently associated with farm animal contact, particularly during the calving season. Cases should be reminded about the importance of good personal hygiene to prevent further cases within households and close contacts. Further information about cryptosporidiosis can be found in the Department of Human Services' *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 2005, the department received notifications for 449 cases of specific organisms/agents (not reported elsewhere) associated with gastrointestinal illnesses potentially linked to food or water (table 7).

Table 7: Notified cases of food- and water-borne illness by causative organism/agent, Victoria, 2005

Organism/agent	Cases
Norovirus	425
Ciguatera fish poisoning	3
Rotavirus	12
Scombrotoxin	4
Vibrio parahaemolyticus	1
Astrovirus	4
Total	449

Outbreak and other investigations

Notifications for 202 outbreaks of gastrointestinal illness affecting at least 4,000 people were made to the department in 2005. Of these outbreaks, 27 were considered to be food-borne or probable food-borne, with the majority of the remainder thought to have been spread by person-to-person transmission. Settings in which outbreaks were reported included aged care facilities (n=90), hospitals (n=31), childcare facilities (n=18), commercial caterers (n=12), restaurants/hotels (n=12), private residences (n=12), other food premises (n=5), overnight camps (n=5), disability/rehabilitation centres (n=4), swimming pools (n=4), schools (n=3), play centres (n=2), a recreational facility, a festival, a community and a military institution.

Organisms/agents responsible for the 202 outbreaks were norovirus (n=80), *Salmonella* (n=9), *Cryptosporidium* (n=5), rotavirus (n=4), *Campylobacter* (n=2), scombrototoxin (n=2), hepatitis A (n=2), ciguatera toxin (n=1) and astrovirus (n=1). The organism/agent responsible for 96 outbreaks was unknown, but – based on symptoms, duration of illness and transmission patterns – 50 of these outbreaks had a suspected viral aetiology and six were thought to have been caused by *Clostridium perfringens*.

The number of notified norovirus outbreaks was 49 per cent lower in 2005 compared to 2004 (156 outbreaks). Among the 2005 outbreaks, 63 occurred in hospitals, disability or aged care facilities, with over 1,696 people affected.

The outbreaks of scombroid fish poisoning and ciguatera poisoning are described in the *Victorian Infectious Diseases Bulletin*, Volume 8 Issue 3. A food-borne norovirus outbreak and two outbreaks of suspected *Clostridium perfringens* in aged care facilities are described in the *Victorian Infectious Diseases Bulletin*, Volume 9 Issue 1. The outbreaks of *Salmonella*, Hepatitis A, *Cryptosporidium* and *Campylobacter* are discussed in the respective sections of this report.

Giardiasis

Summary of notifications

The department received 928 notifications of giardiasis in 2005, compared with 783 cases notified in 2004. There were 503 male cases (54 per cent) and 415 females (45 per cent); sex was not specified for ten cases. The median age of cases was 31 years (range: three weeks to 104 years). Notification rates were highest

among those aged 0–4 years, with a secondary peak in adults aged 35–39 years (figure 12).

The number of notified cases and notification rates were highest among residents of the Southern Metropolitan and North and West Metropolitan regions, although a similarly high notification rate was also observed for the Barwon South-Western region (figure 13).

Figure 12: Notified cases and notification rates of giardiasis by age group, Victoria, 2005

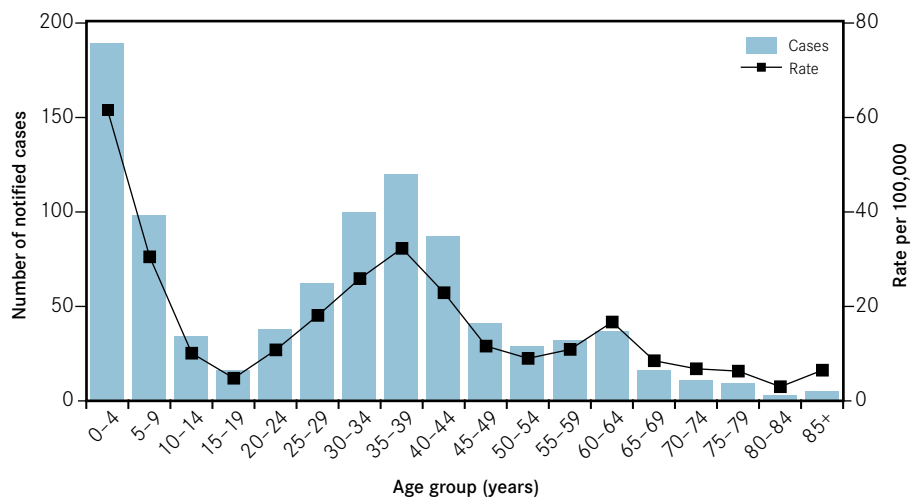
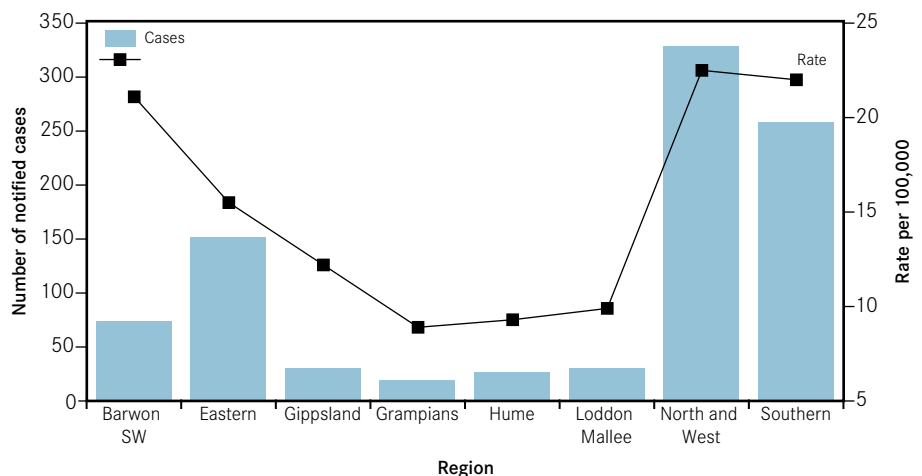


Figure 13: Notified cases and notification rates of giardiasis by region, Victoria, 2005



Risk factors

Risk factor information was not routinely collected.

Outbreak and other investigations

No point source outbreaks were identified in 2005; a cluster of 20 cases residing in the same geographical area was investigated in April although no common source or link between any of the cases was established.

Comment

Giardia spread rapidly in childcare centres and institutions. Personal hygiene – particularly hand washing before eating and handling food, and after toilet use and changing nappies – is critical to prevent its spread. Travel to developing countries is commonly identified as a risk factor for cases.

Haemolytic uraemic syndrome and verotoxin-producing *E. coli*

Escherichia coli are common bacteria normally found in the gut of warm-blooded animals. There are many strains of *E. coli*, most of which are harmless. However, some strains can produce toxins that are pathogenic in humans, one type of which is known as verotoxin-producing *E. coli* (VTEC). VTEC is also referred to as shiga-like toxinogenic *E. coli* (STEC). The most common symptom 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.

Haemolytic uraemic syndrome (HUS) is a rare condition affecting the kidneys and bloodstream that can be caused by VTEC. Abdominal pains and bloody diarrhoea mark the onset of a prodromal illness, which progresses to kidney failure and anaemia. In Victoria, a case of HUS that also meets the VTEC case definition is counted only once as a case of HUS.

Verotoxin-producing *E. coli* Summary of notifications

The department received notifications for eight cases of VTEC in 2005, of which five were male and three were female. Cases ranged in age from three to 65 years with a median age of 20 years. Notified cases of VTEC and HUS by strain are shown in table 8.

Table 8: Notified cases of verotoxin-producing *E. coli* (VTEC) and haemolytic uraemic syndrome (HUS) by strain, Victoria, 2005

<i>E. coli</i> strain	VTEC	HUS
<i>E. coli</i> O26:H11	2	0
<i>E. coli</i> O77:H28	1	0
<i>E. coli</i> O157:H-	4	0
<i>E. coli</i> OR:H-	0	1
<i>E. coli</i> O111:H-	0	1
Shiga toxin genes <i>stx1</i> and <i>stx2</i>	1	0
No <i>E. coli</i> isolated (clinical diagnosis)	0	1
Total	8	3

Risk factors

Two cases had contact with farm animals during their incubation period. A likely source for the remaining cases could not be positively identified.

Outbreak and other investigations

No outbreaks or links between cases were identified.

Comment

Enhanced screening of bloody diarrhoea and a case-control study for VTEC infection in Victoria commenced on 1 January 2005. Three Victorian pathology laboratories agreed to send all stool specimens in which blood was detected macroscopically to the Microbiological Diagnostic Unit (MDU) at The University of Melbourne for VTEC screening. All cases were contacted for recruitment into the case control study. In 2005, five cases and eleven controls were recruited into the study.

Cases must be excluded from food and beverage preparation and educated about careful personal hygiene to prevent person-to-person transmission. Infection from foods can be prevented by adequately cooking meat products (particularly minced beef) and not consuming unpasteurised milk and dairy products.

Haemolytic uraemic syndrome

Summary of notifications

The department received notifications for three cases of HUS in 2005. Cases ranged in age from one to three years and were in two females and one male. VTEC was isolated from faecal specimens of two cases (table 8).

Risk factors

Two cases lived on rural properties but had no direct contact with farm animals. No risk factors were identified for the third case.

Outbreak and other investigations

No outbreaks were identified.

Comment

Children under five years of age are at the greatest risk of developing HUS, and outbreaks have been associated with the consumption of food contaminated with VTEC.

Hepatitis A

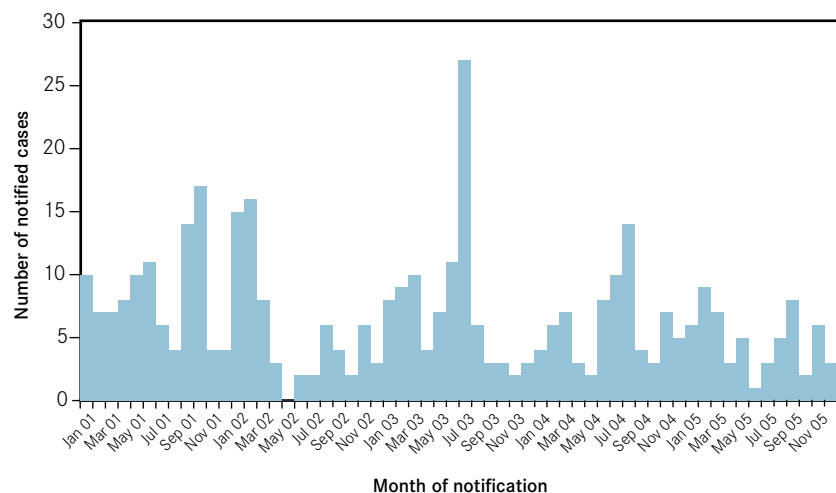
Summary of notifications

In 2005, there were 58 notified cases of hepatitis A (56 confirmed and two probable) a decrease of 21 per cent on the 73 cases in 2004 (figure 14). Thirty cases (52 per cent) were in males and 28 (48 per cent) in females. The number of cases and notification rates were highest for those aged 20–24 years, followed by the 5–9 years age group (figure 15). Sixteen cases were hospitalised.

Risk factors

Overseas travel was the most frequently reported risk factor, with 22 cases (38 per cent) indicating it as the most likely source of infection (table 9). All cases were followed up for risk factor information but for nearly one third the source of the infection could not be identified.

Figure 14: Notified cases of hepatitis A by month, Victoria, 2001–2005



Outbreak and other investigations

Two outbreaks of hepatitis A were investigated in February and April 2005. The first outbreak was associated with a childcare centre in which a childcare worker with onset of illness on 10 January (the centre's first day of business for the year) was the first case notified. A second case (illness onset on 28 January) in a mother of two children who attended the childcare centre was notified on 8 February. Her two children were subsequently tested for hepatitis A and found to be total antibody positive (IgM testing not done). The children were therefore classified as probable cases on the basis of clinical and epidemiological evidence. A fifth case with an onset of illness of 15 February was also a parent of a child at the centre. The child of this case had no symptoms and was not tested for IgM. As this outbreak was not identified until more than three weeks after the first case's illness onset and transmission among family members of childcare attendees had already occurred, immunoglobulin was offered to all

household members of current childcare attendees in addition to staff members and other children at the centre. Children under five years of age are often asymptomatic and it was possible that transmission from an asymptomatic child to the childcare worker had occurred prior to the centre closing for Christmas on 16 December 2004. Therefore children who had attended the centre between 1 November and 16 December 2004 were also contacted and offered immunoglobulin. A medical team from the department ran two clinics at the centre where 234 doses of immunoglobulin were administered to children, staff and parents.

The second outbreak involved seven confirmed cases and began with a seven-year-old child with an onset of illness of 12 March 2005. The second case – with illness onset of 6 April – was the index case's five-year-old sibling. A week later, a seven-year-old classmate of the index case with illness onset on 12 April was notified. Given the likely school exposure, a departmental medical officer administered immunoglobulin

to 20 children and two staff members in the affected class. Approximately two weeks later another case from the same class was notified with hepatitis A, although her illness onset of 26 April indicated she was already incubating the illness when she received the immunoglobulin on 22 April. The fifth case (illness onset on 1 May) acquired his illness from his sibling (case three) and the sixth case (illness onset on 30 May) was the mother of case four; she became ill despite receiving immunoglobulin when her daughter was diagnosed. The seventh case acquired her illness when she visited case five during the infectious period.

Comment

Notified cases of hepatitis A continued to decline in 2005. The reasons for this are unclear and may reflect a greater awareness amongst travellers and other at-risk groups, and improved uptake of the vaccine. Vaccination of people intending to travel overseas and those in high-risk occupations such as childcare workers and health care professionals should continue to be encouraged.

Figure 15: Notified cases and notification rates of hepatitis A by age group, Victoria, 2005

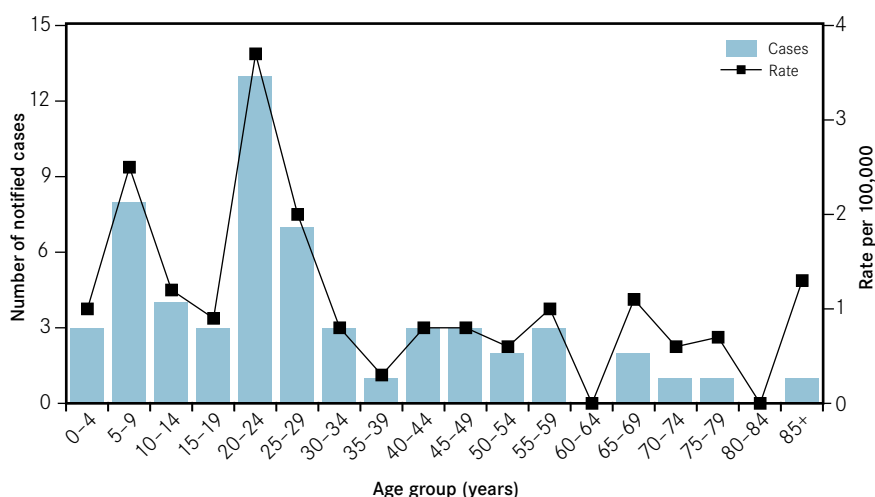


Table 9: Notified cases of hepatitis A by likely source of infection, Victoria, 2005

Likely source of infection	Cases (per cent)
Overseas	22 (38)
Interstate	2 (3)
Contact with case (household)	6 (10)
Contact with case (non-household)	6 (10)
Men who have sex with men	1 (2)
Childcare centre	5 (9)
Unknown	16 (28)
Total	58 (100)

Hepatitis E

Summary of notifications

The department received notifications for 12 cases of hepatitis E in 2005 in nine males and three females aged between 19 and 73 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

Eleven cases reported that their infections were acquired in Asia: eight in India, two in Vietnam and one in China. One case could not be contacted but the treating doctor confirmed that the infection was acquired in India.

Outbreak and other investigations

No links among the cases were identified.

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 for hepatitis E.

Listeriosis

Summary of notifications

The department received notifications for 11 cases of listeriosis in 2005, of which seven were male and four were female. The median age of cases was 76 years (range: 37–89 years). There was one materno-foetal case, which resulted in foetal death at 14.5 weeks gestation. Two of the ten non-materno-foetal cases died, corresponding to a case fatality rate of 20 per cent in this group. Five cases presented with septicaemia, one case presented with meningitis and three cases presented with both meningitis and septicaemia. *Listeria monocytogenes* was isolated from synovial fluid around a knee replacement in the other case.

Risk factors

High-risk foods consumed identified in follow up of cases included pre-prepared salads, dips, sliced cold meats, cold seafood and soft cheese. Chronic illness and/or immunocompromising risk factors were identified for five of the ten non-materno-foetal cases. These included one case each of cancer, leukaemia, diabetes and liver transplant recipient, renal disease and diabetes.

Outbreak and other investigations

MDU conducts pulse-field gel electrophoresis (PFGE) on all isolates from notified cases to identify molecular epidemiological links between cases. PFGE is also routinely conducted on *L. monocytogenes* isolated from

food samples taken as part of the investigation into the source of cases' illnesses. All eleven human isolates were forwarded to MDU in 2005; all PFGE patterns were different indicating that no cases were linked. No source of illness was identified for any of these cases.

Comment

Advice on food hygiene and appropriate diet should be given to susceptible groups, particularly pregnant women, the elderly and those who are immunocompromised. Information sources include the National Health and Medical Research Council's statement on *Listeria* for medical practitioners, the Food Standards Australia New Zealand pamphlet 'Important health message, *Listeria* and pregnancy' and the department's *Listeria* poster and pamphlet that is available in seven languages. The department's pamphlet is available online at: http://www.health.vic.gov.au/ideas/diseases/listeria_facts.htm

In recent years, the annual numbers of materno-foetal listeriosis cases have fallen, probably as a result of the increase in information provided to pregnant women about the risk of *Listeria* infection and foods to be avoided during pregnancy. In 2005, the department continued the *Listeria* awareness and education program for carers of patients at high risk of acquiring listeriosis, which commenced in 2004.

Salmonellosis

Summary of notifications

The department received notifications for 1,421 cases of salmonellosis in 2005, an increase of 26 per cent on the 2004 total. The male to female ratio was 1:1.1 with a median age of cases of 26 years (range: 1 month to 96 years). Notification rates were highest among those aged 0–4 years, who accounted for 17 per cent of the total cases (figure 16).

The largest numbers of cases were residents of metropolitan Melbourne, although the notification rate was highest for the Gippsland region (figure 17).

MDU conducts serotyping and phage typing of *Salmonella* isolates in Victoria. In 2005, *S. Typhimurium* 197 was the most commonly notified serotype/phage type, comprising 20 per cent of the total *Salmonella* cases during the

year, although a large outbreak involving 251 cases accounted for most of these (table 10).

Salmonella Enteritidis

With the exception of phage type 26 which occurs in Queensland, *S. Enteritidis* is not endemic in Australia. It is a *Salmonella* serovar of particular public health importance as it is vertically transmitted from the chicken to the egg. It is common overseas and undercooked eggs and products containing eggs have been associated with large outbreaks of disease. In Victoria, the department follows up all cases of *S. Enteritidis* to ascertain whether the infection was acquired overseas.

There were 76 cases of *S. Enteritidis* notified in 2005 compared to 86 in 2004, a decrease of 12 per cent. As observed in previous years, Indonesia was most frequently reported country of acquisition, accounting for 32 per cent of cases (table 11).

Table 10: Ten most frequently notified *Salmonella* serovars/phage types, Victoria, 2005

<i>Salmonella</i> serovar/phage type	Cases (per cent)
<i>S. Typhimurium</i> 197	279 (20)
<i>S. Typhimurium</i> 135	191 (13)
<i>S. Typhimurium</i> 9	118 (8)
<i>S. Typhimurium</i> 170	63 (4)
<i>S. Typhimurium</i> 44	50 (3)
<i>S. Infantis</i>	41 (3)
<i>S. Typhimurium</i> 12	24 (2)
<i>S. Saintpaul</i>	22 (2)
<i>S. Typhimurium</i> RDNC	22 (2)
<i>S. Hvitvingfoss</i>	19 (1)
Other	592 (42)
Total	1,421 (100)

Figure 16: Notified cases and notification rates of salmonellosis by age group, Victoria, 2005

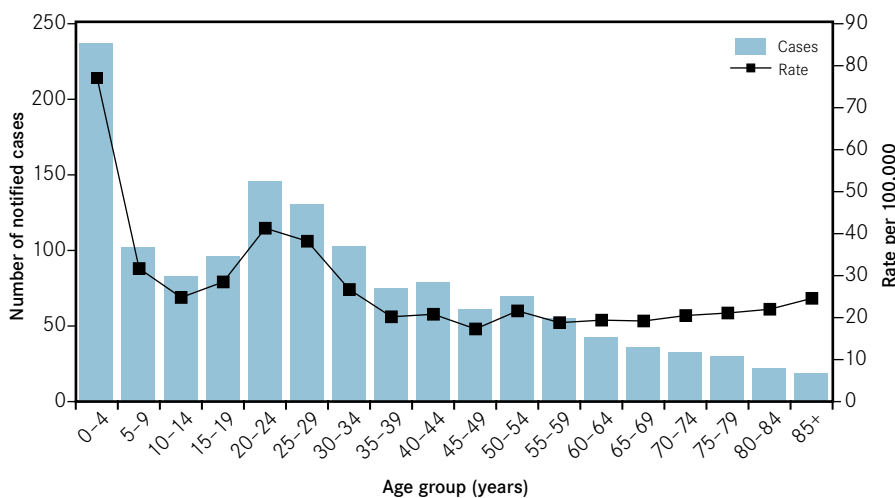


Figure 17: Notified cases and notification rates of salmonellosis by region, Victoria, 2005

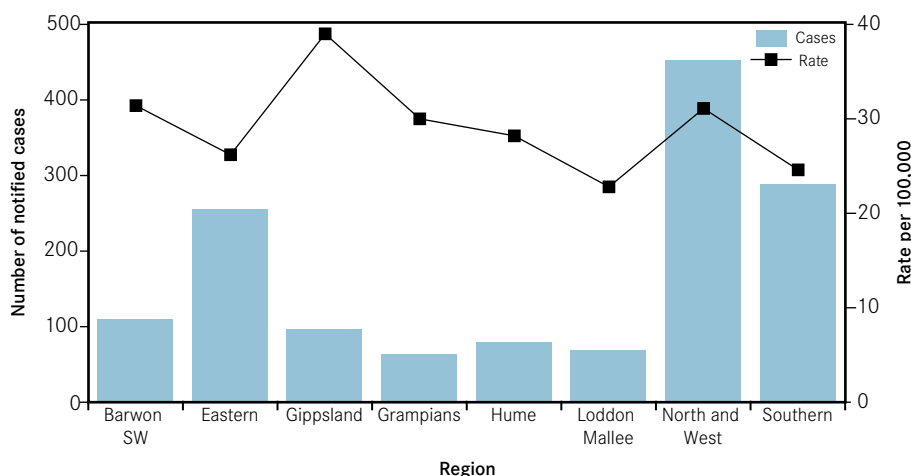


Table 11: Notified cases of *S. Enteritidis* by country of acquisition, Victoria, 2005

Country/region	Cases (per cent)
Indonesia	24 (32)
Asia (elsewhere)	30 (39)
Europe	8 (11)
Africa	1 (1)
Middle East	7 (9)
South America	1 (1)
No travel specified	3 (4)
Unknown	2 (3)
Total	76 (100)

Outbreak and other investigations

Nine point source *Salmonella* outbreaks were investigated in 2005, of which seven were confirmed suspected as food-borne and two were thought to have been the result of person-to-person transmission (table 12). The number of confirmed cases ranged from two to 251 cases (median of five cases) although most investigations identified other ill people that were not tested for or confirmed with *Salmonella* infection. Eight outbreaks involved *S. Typhimurium* phage types and the other was *S. Enteritidis*. The largest outbreak

of 2005, caused by *S. Typhimurium* phage type 197 and associated with dips, is described in the *Victorian Infectious Diseases Bulletin* online at: <http://www.health.vic.gov.au/ideas/surveillance/bulletin.htm>

Cluster investigations are initiated in response to a generalised increase in notified cases but are not clearly associated with a point source at their commencement. Thirty *Salmonella* cluster investigations were conducted in 2005 for the following serovars and phage types: Virchow 8; Mississippi (two clusters); Oranienburg (two clusters); Waycross; Johannesburg; Reading; Zanzibar; London; Hvittingfoss; Mbandaka; Muenchen; Poona; Bovismorbificans 24; Saintpaul; Anatum; Newport; Typhimurium phage types 9, 170, 126 var 4, 17 var 2, u302, 195, 135, u307, 186, 6 var 1, 12 and 44. The *S. Hvittingfoss*, *S. Typhimurium* 135 and *S. Typhimurium* 44 clusters involved other states and territories, and OzFoodNet coordinated their investigations and case control studies. Suspected sources included chicken for the *S. Typhimurium* 135 cluster and oysters for two cases in one of the *Salmonella* Mississippi clusters. Investigations did not identify sources of infection for the remainder of the clusters.

Table 12: Salmonellosis outbreaks by *Salmonella* serovar/phage type, setting and source, Victoria, 2005

<i>Salmonella</i> serovar/phage type	Setting	Confirmed cases	Source	Published
<i>S. Typhimurium</i> 9	Restaurant	12	Hollandaise sauce	No
<i>S. Typhimurium</i> 9	Commercial caterer	7	Chocolate mousse	No
<i>S. Enteritidis</i> 26 var	Aged care facility	2	Eggs (suspected)	No
<i>S. Typhimurium</i> 126 var 4	Private residence	5	Chocolate mousse	No
<i>S. Typhimurium</i> 197	Restaurant	251	Dips	VIDB* Vol. 8(2)
<i>S. Typhimurium</i> 12	Private residence	3	Unknown	No
<i>S. Typhimurium</i> 170	Restaurant	4	Pork (suspected)	No
<i>S. Typhimurium</i> 170/12	Childcare	4	Infectious person	No
<i>S. Typhimurium</i> u307	Hospital	7	Infectious person	No

* Victorian Infectious Diseases Bulletin

Shigellosis

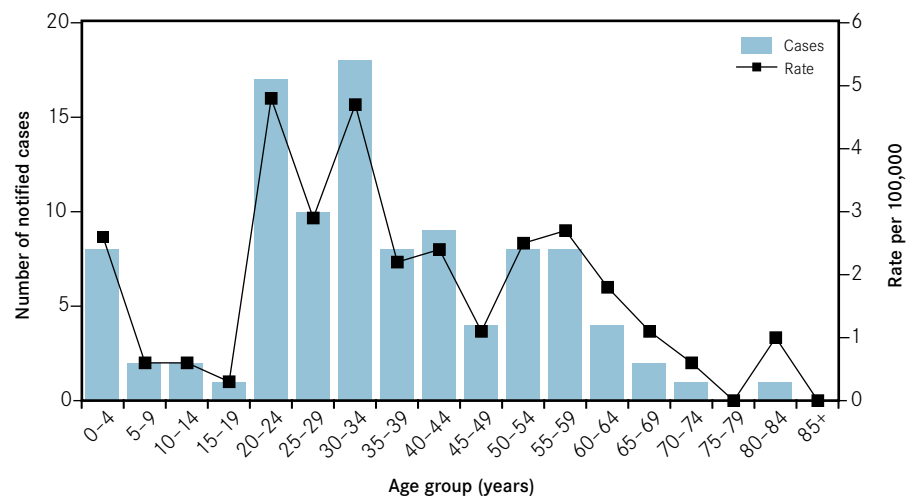
Summary of notifications

There were 103 cases of shigellosis notified in 2005, an increase of 61 per cent compared to 2004 and the highest annual total since 2000. Notifications occurred sporadically throughout the year, and no seasonal patterns were identified. Infection with *Shigella sonnei* biotype g infection accounted for more than half the cases, with *S. sonnei* biotype a and *S. flexneri* 2a each comprising approximately ten per cent (table 13).

Table 13: Notified cases of shigellosis by species and subtype, Victoria, 2005

Species and subtype	Number (per cent)
<i>S. sonnei</i> biotype g	59 (57)
<i>S. sonnei</i> biotype a	9 (9)
<i>S. sonnei</i> biotype f	2 (2)
<i>S. sonnei</i> not further typed	1 (1)
<i>S. flexneri</i> 2a	10 (10)
<i>S. flexneri</i> 6	4 (4)
<i>S. flexneri</i> 3a	3 (3)
<i>S. flexneri</i> 1b	2 (2)
<i>S. flexneri</i> var y	2 (2)
<i>S. flexneri</i> var x	1 (1)
<i>S. flexneri</i> 4a (mannitol negative)	1 (1)
<i>S. flexneri</i> 2b	1 (1)
<i>S. flexneri</i> not further typed	1 (1)
<i>S. boydii</i> 1	1 (1)
<i>S. boydii</i> 4	1 (1)
<i>Shigella</i> not further typed	2 (2)
<i>Shigella</i> untypable	3 (3)
Total	103 (100)

Figure 18: Notified cases and notification rates of shigellosis by age group, Victoria, 2005



Of the 103 cases, 49 (48 per cent) were males and 54 (52 per cent) were females. The median age of persons notified was 32 years (range: 10 months to 82 years). Notification rates were highest among those aged 20 to 24 years and 30 to 34 years (figure 18).

Risk factors

Fifty-nine cases (57 per cent) acquired their infections overseas; a further three cases most likely acquired their infections from close contact with returned overseas travellers who had been ill (table 14). Of the remainder, 16 infections were in men who reported sex with other men and three cases had close contact with known *Shigella* cases. One case was a laboratory worker who most likely acquired her infection through occupational exposure and one case reported contact with a recently returned overseas traveller although this person had not been unwell. For the remaining 20 cases, the source of infection was unknown; five could not be contacted and fifteen

had no obvious risk factors although the notifying doctor advised that one case who could not be contacted was a recently arrived refugee.

Table 14: Notified cases of shigellosis by risk factor, Victoria, 2005

Risk factor	Cases (per cent)
Overseas travel	
South/South East Asia	29 (28)
Pacific	8 (8)
Middle East	5 (5)
Central/South America	5 (5)
Africa	11 (11)
Country not specified	1 (1)
Other risk factors	
Unknown	20 (19)
Men who have sex with men	16 (16)
Contact with confirmed case	3 (3)
Contact with ill overseas traveller	3 (3)
Contact with not ill overseas traveller	1 (1)
Laboratory worker	1 (1)
Total	103 (100)

Outbreak and other investigations

A cluster of 22 cases of *Shigella sonnei* biotype g with a specific antibiotic resistance profile (resistant to ampicillin, streptomycin, tetracycline, sulphamide, trimethoprim and spectinomycin) was detected in 2005. Cases ranged in age from 4 to 74 years and onsets ranged from 11 January to 23 October 2005. Twenty cases were interviewed and 13 of the 17 adult male cases (76 per cent) reported male-to-male sex as a risk factor. No source was identified for the remaining four adult male cases. Both female cases acquired their infections within their households through person-to-person transmission. The source for the only child in the cluster was unknown.

A review of *Shigella sonnei* biotype g cases notified in 2004 identified a further four cases – all males – with the same antibiotic resistance profile. Two cases reported male-to-male sex as a risk factor; one of these cases and the two remaining cases reported overseas travel in the incubation period.

Comment

Shigellae 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 notifications for 12 cases of typhoid in 2005. The age range of cases was six to 44 years and the male: female ratio was 1:1. Twelve cases of paratyphoid were notified in 2005. The age range of cases was 12 to 64 years, and the male to female ratio was 1:1.4.

Risk factors

All cases of typhoid and eleven cases of paratyphoid acquired their infections overseas, with the majority acquiring their infections in India or Indonesia (table 15). A country of acquisition for a paratyphoid case could not be determined.

Table 15: Notified cases of typhoid and paratyphoid by country of acquisition, Victoria, 2005

Country of acquisition	Typhoid	Paratyphoid
India	4	8
Indonesia	4	2
Pakistan	2	0
Bolivia	1	0
Sri Lanka	1	1
Unknown	0	1
Total	12	12

Outbreak and other investigations

No outbreaks were identified.

Comment

An effective typhoid vaccine is available for people intending to travel to high-risk areas. However, all travellers – regardless of vaccination status – should be reminded by medical practitioners to exercise care in eating and drinking in endemic areas.