

Surveillance of Notifiable Infectious Diseases in Victoria 1998

A Public Health Division Publication

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Notes

- Data presented in this report relate to notifications received by the Department and do not necessarily reflect the true incidence of the disease.
- 1998 data relating to sexually transmissible diseases (HIV/AIDS, gonorrhoea, syphilis and *Chlamydia*) will be published in a separate report, 'Surveillance of Sexually Transmitted Infections in Victoria, 1998' and is available at Internet address <http://www.dhs.vic.gov.au/phd/9912039/index.htm>.

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Executive Summary

Dr John Carnie, Manager Communicable Diseases Section

The numbers of notified cases of *Campylobacter* infection (over 4000 cases) and of hepatitis C (over 6000 cases) continued to rise in 1998.

In the case of *Campylobacter* infections, except for a small outbreak in a country town (probably water borne), the majority of cases are sporadic. The lack of a good typing system, as exists for *Salmonella* infections, makes it difficult to determine if there is a link between such so-called sporadic cases.

With hepatitis C, only a small minority of cases can be characterised as incident cases. The determination of whether notified cases are incident or prevalent and the possible risk factors in all such cases requires detailed follow-up. This has been recommended in a National Hepatitis C Surveillance Strategy, although there are significant resource implications in doing so.

Salmonella infections declined in 1998 and we did not see the community wide outbreaks that were a feature of the previous year.

The number of measles cases were also significantly less and the value of enhanced measles surveillance undertaken in Victoria has been demonstrated. With determined efforts to obtain laboratory confirmation in all notified cases, it has become clear that the majority of clinically diagnosed measles cases are in fact due to other conditions. There appears to be greatly reduced local transmission of measles in Victoria with a number of clusters being initiated by imported cases from interstate or overseas.

There was a large jump in the numbers of cases of Legionnaires' Disease reported in 1998. There were two community outbreaks of the condition, one in Thomastown (18 cases) and one in Moonee Valley (4 cases). The increase in cases over the year, which has continued in subsequent years, is probably due to the increased use of the *Legionella* urinary antigen test which has made the condition much easier to diagnose and has also led to earlier diagnosis. The test only detects *L. pneumophila* serogroup 1, but as this serogroup is most commonly found in cooling tower related cases, most cases of Legionnaire's Disease can be diagnosed by this means.

Some other outbreaks of note during the year were the cryptosporidiosis outbreak related to swimming pools; hepatitis A infection among injecting drug users; and ciguatera fish poisoning related to the consumption of large reef fish usually imported from Queensland. In response to the ciguatera fish poisoning episodes fact sheets on the condition and its prevention were prepared in English and three Asian languages and distributed to restaurateurs.

The success of immunisation against *Haemophilus influenzae* type b (Hib) infections continues to be demonstrated with only eight cases reported in 1998, and only three cases were children under the age of five years. We hope to see a continued decline in this condition that only a few years before used to cause significant morbidity and mortality.

Summary Tables

Table 1: Summary of Notifications Received, Victoria, 1994–1998

Disease	1994	1995	1996	1997	1998
Amoebiasis	50	72	75	76	84
Anthrax	0	0	0	1	0
Arbovirus infection	90	55	187	1110	173
Brucellosis	3	2	3	2	2
<i>Campylobacter</i> infection	3546	3007	3452	3594	4114
Cholera	1	0	0	1	1
Food or Water borne illness – <i>Cryptosporidium</i>	11	41	17	15	266
Food or Water borne illness – Other	32	34	54	186	161
Giardiasis	975	1031	1085	1065	1007
Haemolytic Uraemic Syndrome	Not notifiable	Not notifiable	Not notifiable	0	2
<i>Haemophilus influenzae</i> type b (Epiglottitis)	19	7	9	1	2
<i>Haemophilus influenzae</i> type b (Meningitis)	17	7	2	5	3
Hepatitis A	159	231	461	364	169
Hepatitis B – Acute	98	97	94	118	92
Hepatitis B – Chronic/Unknown	1935	1893	2089	1744	2181
Hepatitis C – Acute (Incident)	0	5	2	11	53
Hepatitis C – Unspecified	3573	4349	4656	4853	6655
Hepatitis (viral or not elsewhere specified)	20	16	10	5	2
Hydatid disease	18	14	16	31	25
Legionellosis	49	23	37	29	63
Leprosy	3	0	0	2	0
Leptospirosis	47	58	74	23	22
Listeriosis	10	23	19	15	15
Malaria	91	110	110	90	87
Measles	183	155	95	86	36
Meningococcal infection	59	75	93	98	61
Mumps	62	78	50	66	54
Paratyphoid	16	15	9	6	7
Pertussis	506	391	1201	1666	1141
Psittacosis	63	147	62	39	47
Q Fever	76	67	62	19	32
Rubella	223	1165	804	371	188
Salmonellosis	1081	984	909	1677	1124
Shigellosis	90	85	71	79	119
Taeniasis	7	13	7	5	5
Tetanus	1	4	1	1	1
Tuberculosis	352	301	299	286	239
Typhoid	7	13	15	15	11
Typhus	0	6	9	1	3
Vero Toxin producing <i>E. coli</i>	Not notifiable	Not notifiable	Not notifiable	3	9
Yersiniosis	23	27	15	15	25
Total	13496	14601	16154	17774	18281

Table 2(a): Summary of Notifications Received, by Human Services Region, 1998 (including rates per 100,000 population)

Disease	Non-Metropolitan Regions									
	Barwon South Western		Gippsland		Grampians		Hume		Loddon Mallee	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
Blood Borne Diseases										
Hepatitis B — Acute	0	0	3	1.3	2	1	1	0.4	3	1.1
Hepatitis B — Chronic/Unknown	24	5.5	20	8.5	12	5.9	24	10	24	8.5
Hepatitis C — Acute (Incident)	4	0.9	4	1.7	1	0.5	2	0.8	5	1.8
Hepatitis C — Unspecified	298	67.9	238	101.6	113	56	186	77.5	254	89.7
Enteric Diseases										
Amoebiasis	1	0.2	2	0.9	1	0.5	4	1.7	1	0.4
<i>Campylobacter</i> infection	232	52.9	252	107.6	132	65.4	214	89.1	178	62.9
Cholera	0	0	0	0	0	0	1	0.4	0	0
Food/Water/Environmental — <i>Cryptosporidium</i>	1	0.2	26	11.1	2	1	21	8.7	4	1.4
Food/Water/Environmental — Other	5	1.1	4	1.7	4	2	2	0.8	4	1.4
Giardiasis	60	13.7	38	16.2	38	18.8	48	20	45	15.9
Haemolytic Uraemic Syndrome	1	0.2	0	0	0	0	0	0	0	0
Hepatitis A	3	0.7	15	6.4	3	1.5	5	2.1	30	10.6
Paratyphoid	0	0	0	0	0	0	0	0	0	0
Listeriosis	0	0	0	0	1	0.5	0	0	1	0.4
Salmonellosis	77	17.5	56	23.9	37	18.3	42	17.5	65	23
Shigellosis	3	0.7	3	1.3	2	1	2	0.8	2	0.7
Typhoid	0	0	0	0	0	0	0	0	0	0
Vero Toxin producing <i>E. coli</i>	0	0	0	0	0	0	1	0.4	0	0
Yersiniosis	1	0.2	0	0	1	0.5	1	0.4	0	0
Other Infectious Notifiable Diseases										
Hepatitis (viral, unspecified)	0	0	0	0	0	0	0	0	0	0
Legionellosis	3	0.7	1	0.4	0	0	1	0.4	0	0
Meningococcal infection	4	0.9	4	1.7	1	0.5	8	3.3	4	1.4
Tuberculosis	6	1.4	2	0.9	3	1.5	3	1.2	1	0.4
Vaccine Preventable Diseases										
<i>Haemophilus influenzae</i> type b (Epiglottitis)	0	0	0	0	0	0	1	0.4	0	0
<i>Haemophilus influenzae</i> type b (Meningitis)	0	0	0	0	0	0	1	0.4	0	0
Measles	0	0	2	0.9	0	0	2	0.8	1	0.4
Mumps	1	0.2	6	2.6	2	1	2	0.8	3	1.1
Pertussis	42	9.6	228	97.3	30	14.9	68	28.3	99	35
Rubella	7	1.6	11	4.7	4	2	11	4.6	3	1.1
Tetanus	0	0	0	0	0	0	0	0	0	0
Vector Borne Diseases										
Arbovirus — Barmah Forest	1	0.2	9	3.8	0	0	2	0.8	2	0.7
Arbovirus — Flavivirus	0	0	1	0.4	2	1	2	0.8	2	0.7
Arbovirus — Ross River	6	1.4	10	4.3	13	6.4	23	9.6	38	13.4
Arbovirus — Not further specified	0	0	8	3.4	0	0	7	2.9	6	2.1
Malaria	0	0	1	0.4	2	1	8	3.3	1	0.4
Typhus	0	0	0	0	1	0.5	1	0.4	1	0.4
Zoonoses										
Brucellosis	0	0	0	0	0	0	0	0	0	0
Hydatid disease	0	0	1	0.4	2	1	0	0	1	0.4
Leptospirosis	12	2.7	7	3	0	0	3	1.2	0	0
Psittacosis	0	0	0	0	1	0.5	8	3.3	4	1.4
Q Fever	5	1.1	7	3	3	1.5	6	2.5	5	1.8
Taeniasis	0	0	0	0	0	0	0	0	0	0
Region Totals	797	181.6	959	409.4	413	204.6	711	296.1	787	277.9
ABS Population as at July 1998	438795		234221		201835		240092		283152	

Table 2(b): Summary of Notifications Received, by Human Services Region, 1998 (including rates per 100,000 population)

Disease	Metropolitan Regions								Victoria		
	Eastern Metropolitan		Northern Metropolitan		Southern Metropolitan		Western Metropolitan		NES ¹	Total	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Cases	Rate ²
Blood Borne Diseases											
Hepatitis B — Acute	12	1.3	16	2.5	34	3.1	17	2.9	4	92	2
Hepatitis B — Chronic/Unknown	432	45.3	434	68	549	50.8	537	92	125	2181	46.9
Hepatitis C — Acute (Incident)	9	0.9	6	0.9	15	1.4	7	1.2		53	1.1
Hepatitis C — Unspecified	836	87.7	1038	162.6	1467	135.7	843	144.5	1382	6655	143
Enteric Diseases											
Amoebiasis	12	1.3	18	2.8	25	2.3	16	2.7	4	84	1.8
<i>Campylobacter</i> infection	876	91.8	632	99	969	89.6	522	89.5	107	4114	88.4
Cholera	0	0	0	0	0	0	0	0	0	1	0
Food/Water/Environmental — <i>Cryptosporidium</i>	37	3.9	47	7.4	78	7.2	17	2.9	33	266	5.7
Food/Water/Environmental — Other	34	3.6	15	2.3	62	5.7	12	2.1	19	161	3.5
Giardiasis	224	23.5	143	22.4	255	23.6	129	22.1	27	1007	21.6
Haemolytic Uraemic Syndrome	0	0	0	0	1	0.1	0	0	0	2	0
Hepatitis A	34	3.6	22	3.4	30	2.8	19	3.3	8	169	3.6
Listeriosis	3	0.3	2	0.3	7	0.6	1	0.2	0	15	0.3
Paratyphoid	2	0.2	1	0.2	2	0.2	2	0.3	0	7	0.2
Salmonellosis	208	21.8	185	29	267	24.7	130	22.3	57	1124	24.1
Shigellosis	32	3.4	19	3	42	3.9	13	2.2	1	119	2.6
Typhoid	2	0.2	4	0.6	0	0	5	0.9	0	11	0.2
Vero Toxin producing <i>E. coli</i>	1	0.1	4	0.6	1	0.1	1	0.2	1	9	0.2
Yersiniosis	7	0.7	3	0.5	5	0.5	6	1	1	25	0.5
Other Infectious Notifiable Diseases											
Hepatitis (viral, unspecified)	0	0	1	0.2	1	0.1	0	0	0	2	0
Legionellosis	5	0.5	25	3.9	8	0.7	19	3.3	1	63	1.4
Meningococcal infection	11	1.2	7	1.1	14	1.3	5	0.9	3	61	1.3
Tuberculosis	41	4.3	50	7.8	58	5.4	74	12.7	1	239	5.1
Vaccine Preventable Diseases											
<i>Haemophilus influenzae</i> type b (Epiglottitis)	0	0	0	0	1	0.1	0	0	0	2	0
<i>Haemophilus influenzae</i> type b (Meningitis)	0	0	2	0.3	0	0	0	0	0	3	0.1
Measles	10	1	4	0.6	15	1.4	2	0.3	0	36	0.8
Mumps	6	0.6	10	1.6	13	1.2	11	1.9	0	54	1.2
Pertussis	157	16.5	110	17.2	269	24.9	112	19.2	26	1141	24.5
Rubella	42	4.4	32	5	47	4.3	23	3.9	8	188	4
Tetanus	0	0	0	0	0	0	1	0.2	0	1	0
Vector Borne Diseases											
Arbovirus — Barmah Forest	1	0.1	0	0	0	0	0	0	2	17	0.4
Arbovirus — Flavivirus	4	0.4	2	0.3	4	0.4	1	0.2	2	20	0.4
Arbovirus — Ross River	6	0.6	5	0.8	6	0.6	3	0.5	2	112	2.4
Arbovirus — Not further specified	0	0	2	0.3	0	0	0	0	1	24	0.5
Malaria	18	1.9	20	3.1	29	2.7	4	0.7	4	87	1.9
Typhus	0	0	0	0	0	0	0	0	0	3	0.1
Zoonoses											
Brucellosis	2	0.2	0	0	0	0	0	0	0	2	0
Hydatid disease	4	0.4	7	1.1	4	0.4	5	0.9	1	25	0.5
Leptospirosis	0	0	0	0	0	0	0	0	0	22	0.5
Psittacosis	9	0.9	10	1.6	13	1.2	2	0.3	0	47	1
Q Fever	1	0.1	1	0.2	1	0.1	2	0.3	3	32	0.7
Taeniasis	0	0	3	0.5	0	0	2	0.3	0	5	0.1
Region Totals	3078	322.7	2880	451.2	4292	396.9	2543	435.8	1823	18281	392.7
ABS Population as at July 1998	953749		638354		1081257		583482		4654937		

¹ Postcode of residence not specified, unknown, or not Victorian

² Rate for Victoria includes some non-Victorian residents diagnosed in Victoria

Blood Borne Viruses

Marion Moloney, Graham Tallis, Communicable Diseases Section

Hepatitis B

For surveillance purposes, the Department classifies notified cases of hepatitis B as either acute or chronic infections.

Acute hepatitis B is defined as the presence of hepatitis B surface antigen (HBsAg) together with either:

- the presence of IgM antibodies to hepatitis B core antigen (Anti-HBc IgM); or
- demonstration of a clinical illness consistent with acute viral hepatitis (jaundice, elevated serum transaminase).

Chronic hepatitis B infection is defined as the presence of hepatitis B surface antigen (HBsAg) together with:

- the presence of IgG antibodies to hepatitis B core antigen (Anti-HBc IgG) but no Anti-HBc IgM; and
- no clinical illness consistent with acute viral hepatitis.

Some notified cases of hepatitis B are unable to be classified as acute or chronic, due to lack of information. In this report, these cases of unknown status are included with notification of chronic hepatitis B infection.

Table 3: Hepatitis B Notifications, by Year of Notification and Type, Victoria, 1994–1998

	1994	1995	1996	1997	1998
Acute	98	97	94	118	92
Chronic/Unknown	1935	1893	2089	1744	2181
Total	2033	1990	2183	1862	2273

Acute Hepatitis B

There were 92 persons notified with acute hepatitis B in 1998, which was similar to previous years (Table 3 and Figure 1). As in previous years, the majority of notified cases were male (73 per cent). The overall notification rate was 2.0 per 100,000 population. The highest rate of 6.2 per 100,000 population was in persons between 25 and 29 years of age (Figure 2).

Figure 1: Acute Hepatitis B Notifications, by Month of Onset, Victoria, 1994–1998

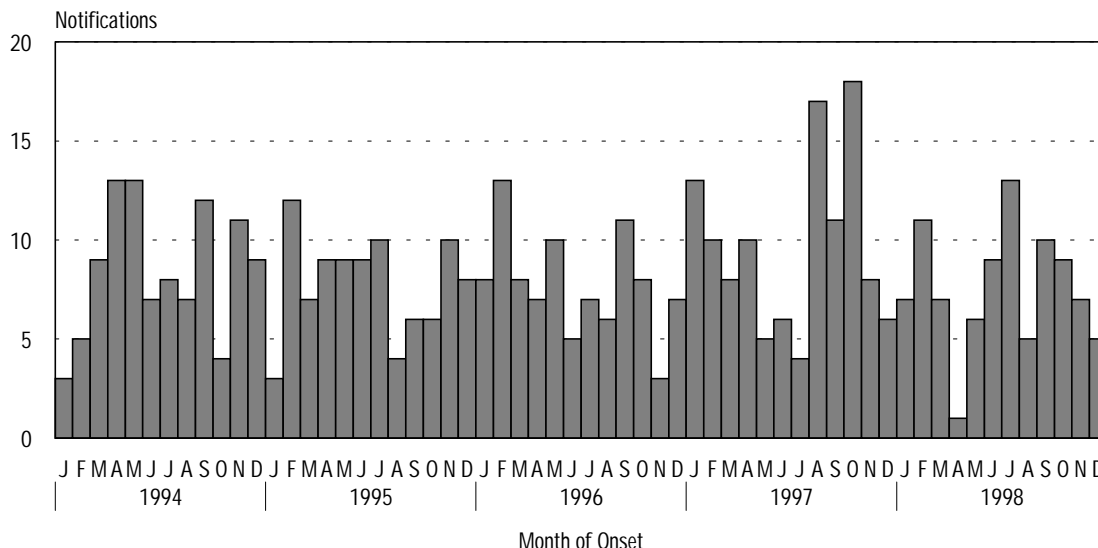
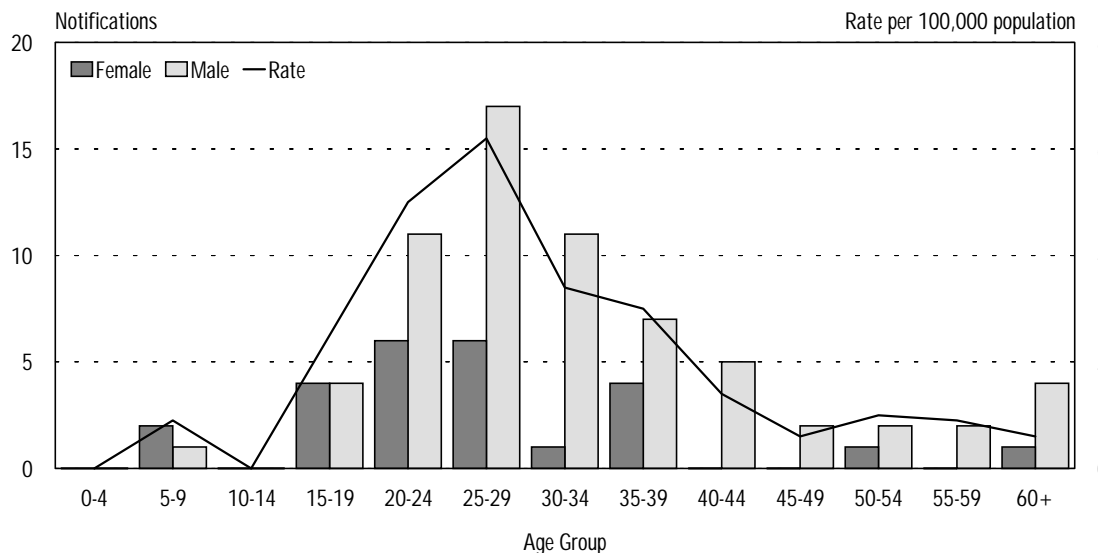


Figure 2: Acute Hepatitis B Notifications, by Age Group and Sex, Victoria, 1998



Source of Infection

With cases of acute hepatitis B, exposure information is ascertained from the reporting doctor and not directly from the patient. Doctors reported that injecting drug use (30 per cent) and sexual contact (41 per cent) were the most common risk factors for infection (Table 4).

There were three children notified who were less than 10 years of age; two females and one male. The two females were from ethnic backgrounds with high prevalence rates and had family members who were reported to be chronic hepatitis B carriers. The risk factors for these two female children were categorised as 'household contact'. The male case had no identified risk factors.

Table 4: Acute Hepatitis B Notifications, by Exposure Category, Victoria, 1998

Exposure category	Female	Male	Total
Injecting drug use	6	22	28
Heterosexual	12	15	27
Homosexual	0	11	11
Household contact	2	0	2
Other blood exposure	2 ¹	0	2
No risk factor identified	1	14	15
Information unavailable	2	5	7
Total	25	67	92

¹Includes one case of exposure to medical procedures in a developing country

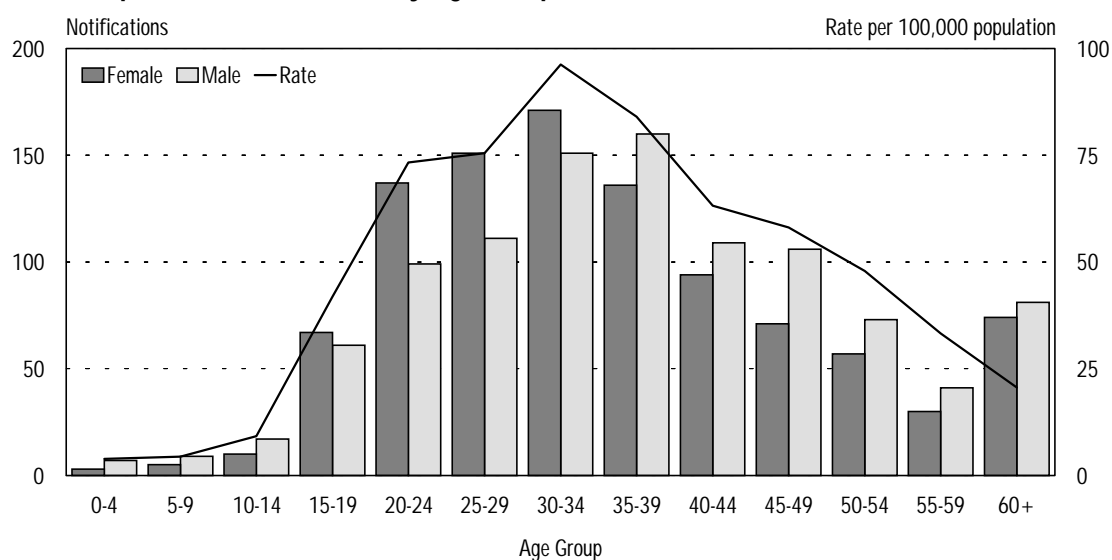
Table 5: Acute Hepatitis B Notifications, by Country of Birth, Victoria, 1998

Country of Birth	Notifications
Australian born	60
Asia	3
Eastern Europe (including Turkey)	3
USA	1
Not known	25
Total	92

Chronic Hepatitis B Infection

There were 2181 persons notified with chronic hepatitis B infection. 1012 (46 per cent) of notified cases were female, 1035 (47 per cent) were male, and 124 (6 per cent) of unknown gender. The higher notification rate in females aged from 20 to 34 years may reflect testing patterns especially antenatal screening, rather than true prevalence rates (Figure 3).

Figure 3: Chronic Hepatitis B Notifications, by Age Group and Sex, Victoria, 1998



Hepatitis C

For surveillance purposes, the Department classifies cases of hepatitis C infection as either acute (incident) hepatitis C, or hepatitis C unspecified. The case definitions for these are:

Acute hepatitis C is defined as:

- demonstration of seroconversion to hepatitis C virus (HCV) where the most recent negative specimen was within the last 12 months; or
- demonstration of a positive HCV antibody test or a positive polymerase chain reaction (PCR) test for HCV, and a clinical illness consistent with acute hepatitis within the last 12 months where other possible causes of acute hepatitis are excluded.

Hepatitis C unspecified is defined as:

- demonstration of a positive HCV antibody test or a positive PCR test for HCV, but not fulfilling the above criteria for acute disease.

During 1998, the Department received 6708 notifications of hepatitis C. There were more males than females in every age group (Figure 4 and Figure 5). There was a steady increase in the number of hepatitis C notifications during the years 1994 to 1997, with a dramatic increase in 1998 (Table 1).

Acute Hepatitis C

The majority of acute (incident) hepatitis C infections are asymptomatic and in the absence of serological assays that distinguish between acute and chronic cases, identification of incident infections is difficult. All notifications from doctors that indicated possible acute hepatitis C were followed up to ascertain if they met the case definition. This follow-up identified 53 cases of acute hepatitis C.

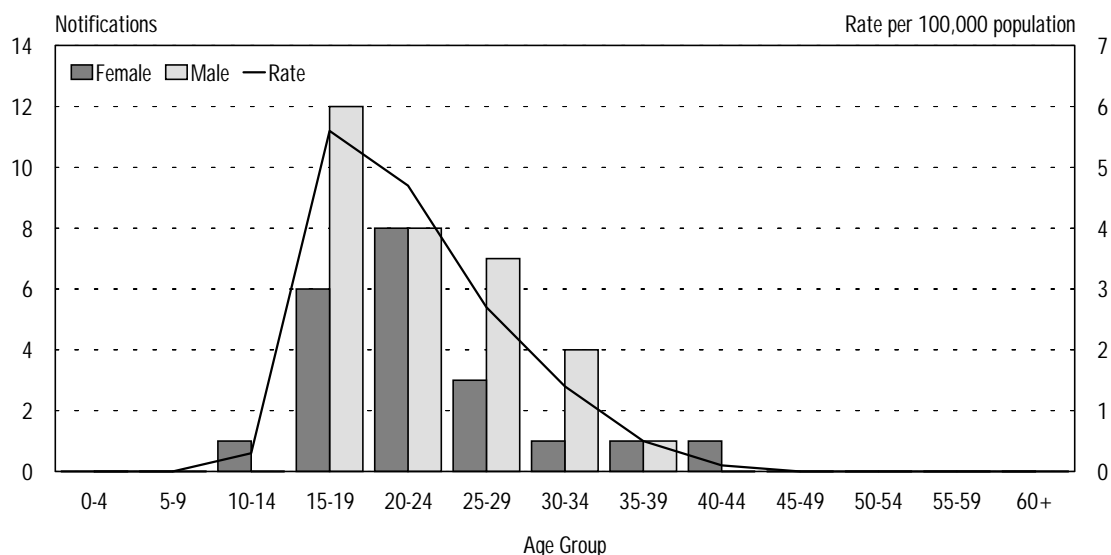
Of the 53 acute cases of HCV infection notified in 1998:

- ten cases (19 per cent) had documented seroconversion and a clinical illness consistent with acute hepatitis where other possible causes of acute hepatitis were excluded;
- thirty cases (56 per cent) had documented seroconversion only; and
- thirteen cases (24 per cent) had an acute hepatitis where other possible causes of acute hepatitis were excluded.

Thirty-two cases were males (60 per cent) and 21 females (40 per cent).

The majority were in the 15 to 24 year age group, accounting for 34 cases (64 per cent). Figure 4 indicates the age and sex distribution of notifications of acute hepatitis C.

Figure 4: Acute Hepatitis C Notifications, by Age Group and Sex, Victoria, 1998



Source of infection

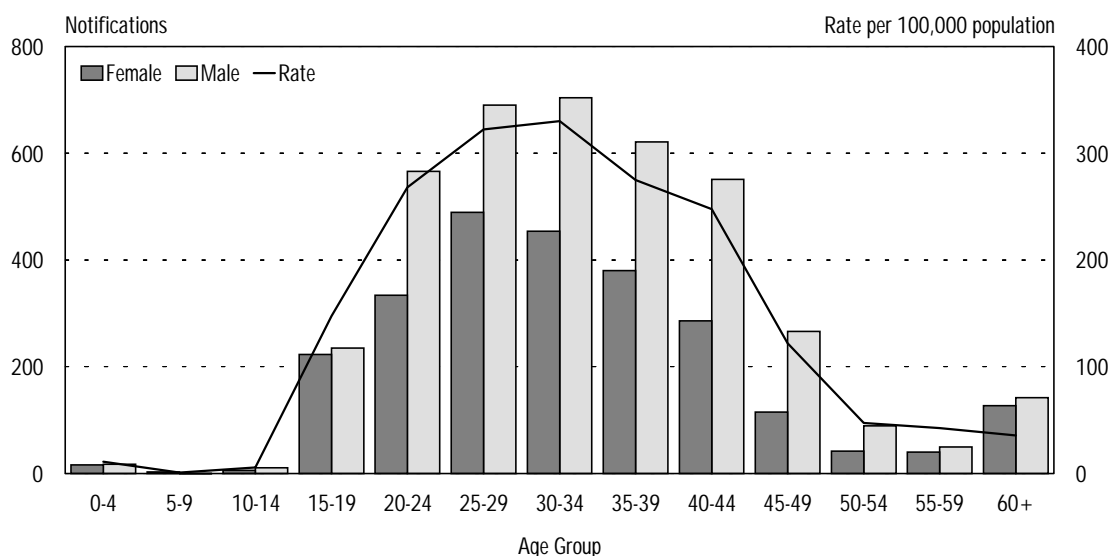
With cases of acute hepatitis C exposure data is ascertained from the reporting doctor and not directly from the patient. Injecting drug use was the major risk factor for transmission and was identified for 47 (89 per cent) of the 53 cases. In the remaining six cases, the only identified risk factors were heterosexual contact with a known hepatitis C positive partner (five cases) and non-occupational accidental blood exposure (one case).

The small number of incident cases identified is likely to be an underestimate of the true incidence.

Hepatitis C Unspecified

During 1998, there were 6655 notifications of hepatitis C unspecified. The vast majority are prevalent cases, having been infected at some indeterminate time in the past. The age and sex analysis may reflect testing patterns as well as prevalence. Of the 6512 notifications for which gender was known, 3973 (61 per cent) were male, and 2539 (39 per cent) were female. The age distribution is given in Figure 5.

Figure 5: Hepatitis C Unspecified Notifications, by Age Group and Sex, Victoria, 1998



Enteric Diseases

Joy Gregory, Ross Andrews, Anne Murphy, Pauline Lynch, Communicable Diseases Section

Amoebiasis

There were 84 cases of Amoebiasis notified in 1998. These were all sporadic cases, most commonly males aged 20 to 49 years. Twenty-seven cases (32 per cent) were identified as having acquired their infection overseas, with India being the most commonly reported country of acquisition.

Figure 6: Amoebiasis Notifications, by Month of Onset, Victoria, 1994–1998

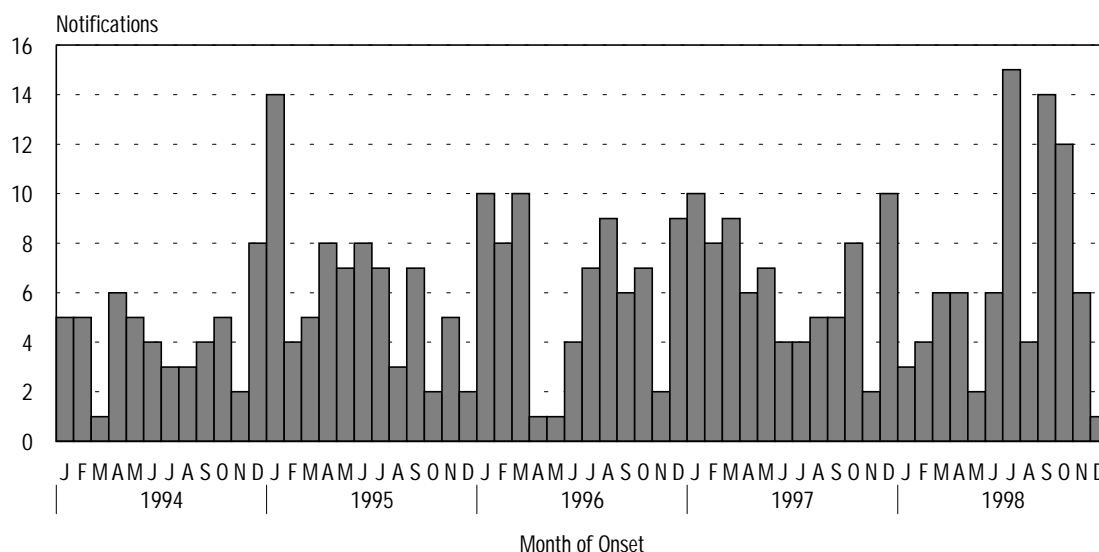
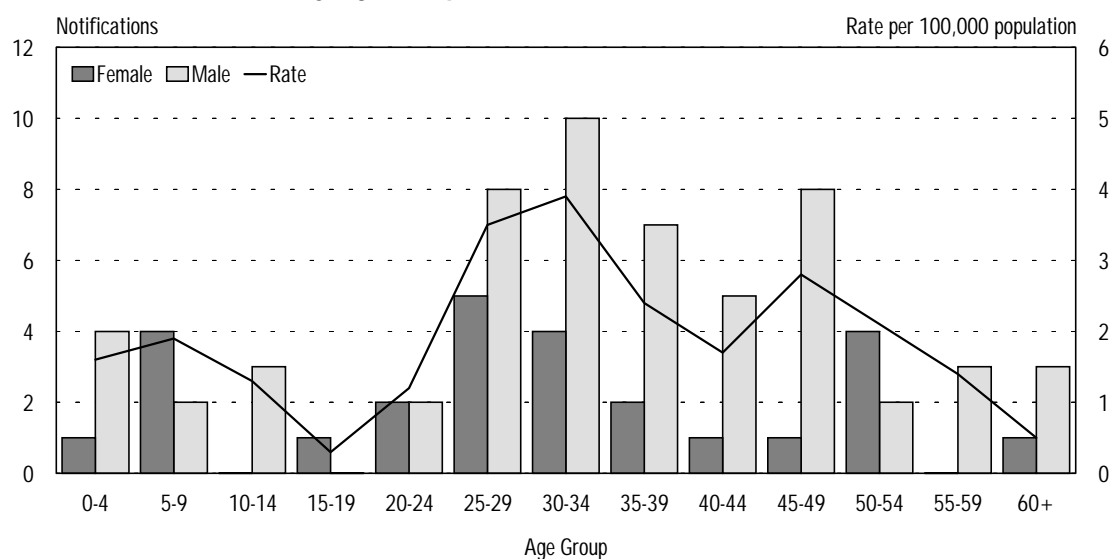


Figure 7: Amoebiasis Notifications, by Age Group and Sex, Victoria, 1998



Campylobacteriosis

There were 4114 notifications of *Campylobacter* infection in 1998, which was an increase of 14 per cent on the number received in 1997. As in previous years, notifications occurred most commonly during the warmer months (Figure 8). The highest age-specific rate was 294.7 per 100,000 population, which occurred in children under five years of age (Figure 9).

Figure 8: Notifications of *Campylobacter* Infection, by Month of Onset, Victoria, 1994–1998

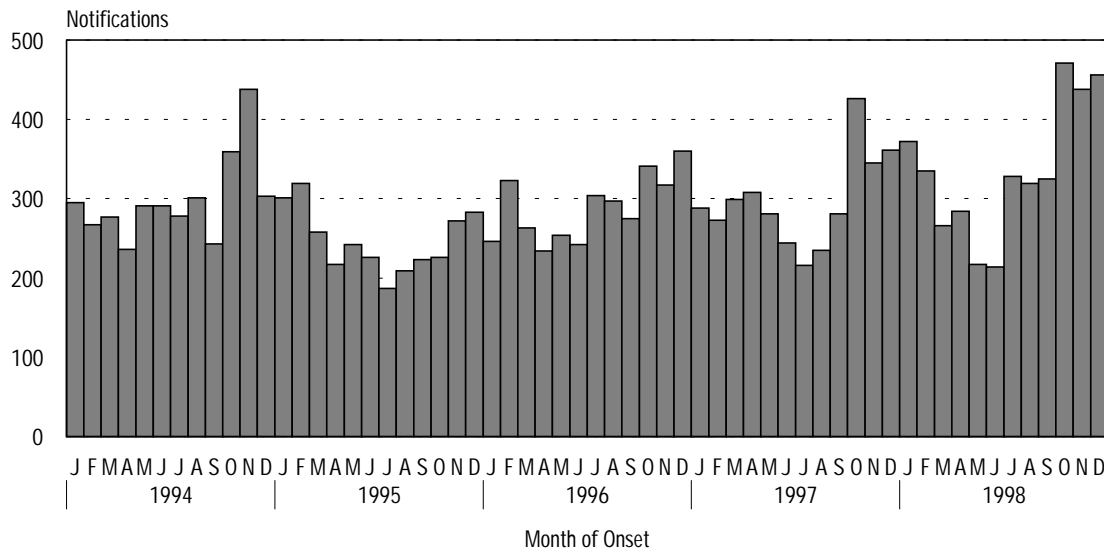
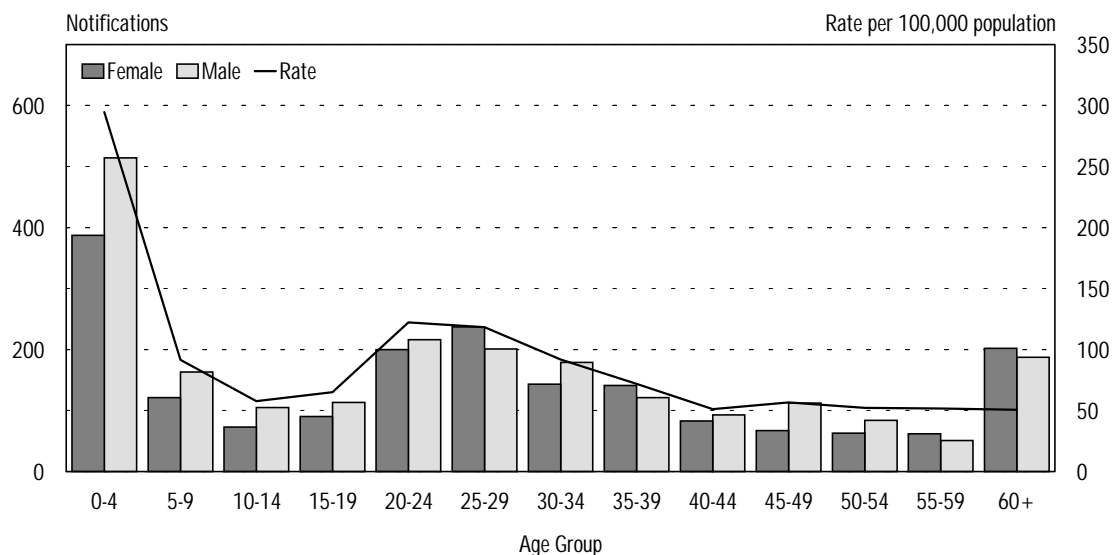


Figure 9: Notifications of *Campylobacter* Infection, by Age Group and Sex, Victoria, 1998



Outbreaks

***Campylobacter* outbreak in a country town**

In early February 1998, the Communicable Diseases Section was notified by a pathology laboratory in central Victoria, of an unusually high number of *Campylobacter* isolations from residents of a country town or its near vicinity. Fifteen cases were reported for the month of January 1998, compared with three cases for the same period in 1997.

All cases were interviewed to obtain demographic data, details of illness, environmental factors and food histories. Contact was also made with all local doctors, hospitals and nursing homes in the area to ascertain any additional cases of gastroenteritis in the community which may have been observed. Initial inquiries indicated a possible problem associated with the town water supply. Investigations with the local water authority revealed reticulated water supply pump failures on two instances in January, followed by low residual chlorine levels within the reticulation system.

Departmental and local government officers conducted a field investigation and collected food and water samples. One of the water samples taken from the town water supply was positive for *Campylobacter*, despite the presence of low concentrations of free chlorine. A case control study was undertaken to test the hypothesis that this outbreak was due to the reticulated water supply, but the results were inconclusive. The identification of this outbreak is an example of the value of the notification system.

Cholera

Notifications of cholera in Victoria are rare and have been limited to imported cases among travellers returning from overseas.

In 1998, there was one notification of cholera in a 41 year old male, who had visited Bali in April. The man developed watery diarrhoea after returning to Australia. A faecal specimen confirmed that his illness was due to *Vibrio cholerae* O1 serogroup Ogawa. The diarrhoeal illness lasted for three days and he did not require any treatment except fluid replacement.

Food and Water Borne Illness

The Health (Infectious Diseases) Regulations 1990 requires medical practitioners to notify the Department of cases or outbreaks of 'food- and water-borne illness', regardless of the aetiology. This allows for the early investigation of outbreaks, which is very important to protect the community from serious illness. These notifications are classified as 'Group A' notifications and must be notified within 24 hours. Although originally intended for situations where there are two or more related cases, single notifications are often received for rare diseases, or when a medical practitioner suspects a particular food or water source was associated with the illness. These sporadic cases are followed up by council environmental health officers. Pathogens that are not notifiable under the regulations (for example *Cryptosporidium*) are also recorded under this category.

There were 427 notifications of food or water-borne illness in 1998. Two hundred and sixty-six of these (62 per cent) were cases of cryptosporidiosis. Cryptosporidiosis is not a notifiable disease in Victoria. However, following outbreaks reported in other Australian States, the Department of Human Services initiated active surveillance for cryptosporidiosis in Victoria in 1998. We identified several clusters, some of which were associated with swimming pools (see Cryptosporidiosis Outbreak, page 18).

Table 6: Food or Water Borne Illness Notifications, by causative Organism/Agent, Victoria, 1998

Organism/Agent	Notifications
<i>Bacillus cereus</i>	1
Blastocystis hominis	2
Ciguatera Fish Poisoning	9
<i>Clostridium perfringens</i>	9
<i>Cryptosporidium</i>	266
<i>Dientamoeba fragilis</i>	3
Outbreak <i>Clostridium perfringens</i> (school)	18
Outbreak <i>Bacillus cereus</i> (restaurant)	8
Suspected scombroid poisoning	18
Norwalk-like virus	28
Rotavirus	10
No organism identified	55
Total	427

Outbreaks Investigated

In 1998, the Department investigated 59 outbreaks of gastrointestinal illness (Table 7). As in previous years, a large number of the outbreaks investigated 24 (41 per cent) were identified as viral or suspected viral.

Table 7: Food or Water Borne Illness Outbreaks, by Setting and Causative Agent, Victoria, 1998

Outbreak Setting	Causative Agent	Total
Food premises / Specific food	<i>Salmonella</i> infection (7); suspected Scombroid poisoning (3); Ciguatera fish poisoning (2); <i>Bacillus cereus</i> (1); viral (2); suspected viral (5); no organism identified (6)	26
Nursing homes /hostels /health care facilities	<i>Salmonella</i> infection (2); <i>Clostridium perfringens</i> (1); viral (2); suspected viral (8)	13
Family/social gatherings	<i>Salmonella</i> infection (1); viral (1); suspected viral (1); no organism identified (3)	6
Child Care/School	Hepatitis A (3); <i>Clostridium perfringens</i> (1); Cryptosporidiosis (1) viral (1); suspected viral (1)	7
Recreation/sport	Cryptosporidiosis (3); suspect viral (2)	5
Community	<i>Campylobacter</i> infection (1)	1
Holiday/Resort	Suspected viral (1); no organism identified (1)	1
Total	Viral/suspected viral (24); <i>Salmonella</i> infection (10); Suspected scombroid poisoning (3); Ciguatera fish poisoning (2); <i>Clostridium perfringens</i> (2); <i>Bacillus cereus</i> (1); Cryptosporidiosis (4); <i>Campylobacter</i> infection (1); Hepatitis A (3); no organism identified (9)	59

Salmonella and *Campylobacter* outbreaks are discussed further in the respective sections of this report.

Viral and Suspected Viral Outbreaks

Of the 24 outbreaks of viral and suspected viral gastroenteritis outbreaks investigated, 13 (54 per cent) were reported in nursing homes, hostels or other health care settings. The transmission of viral pathogens in nursing homes, hostels and other health care settings appear to be due to person-to-person spread and this highlights the importance of monitoring and instituting early control strategies.

Two large outbreaks investigated were suspected to be caused by a viral pathogen and are discussed in more detail below.

Community Bike Ride

The Department was notified in early December 1998 of a large number of cases of gastrointestinal illness in participants on an annual bike riding event in northern Victoria. Six of the cases had required admission to the local hospital. A total of 2,241 people took part in the ride which occurred over a period of nine days.

Staff from the Communicable Diseases Section, the Regional and local government environmental health officers, conducted a field investigation of the bike ride camp. Food was provided to all participants by the ride organiser and a number of food vans travelled with the ride. Accommodation was mostly camping although some people stayed in local motels. Portable showers and toilets were provided at the camping sites.

Water for drinking was supplied in large collapsible rubber containers ('bladders') which were placed inside the main camp entrance and also at designated sites along the cycle route each day. These containers were emptied and transported between campsites. Participants could fill their drink bottles from these containers or buy bottled water.

Preliminary interviews suggested water consumption as a possible source of the outbreak. A random sample of 226 participants were interviewed by telephone. Seventy five respondents (33 per cent) had suffered a gastrointestinal illness. If this figure is extrapolated, this suggests approximately 725 of 2241 participants were ill during the course of the ride (95 per cent CI 595–863). Participants who consumed water from a bladder at a particular campsite were 15 times more likely to be ill than those who did not. No food or recreational exposures were associated with illness.

The bladders at the campsite had been filled by tanker with mains water from a nearby town. Water collected from the town's water supply contained 17 coliforms and eight *E. coli* per 100 mL, and water from bladders at a campsite later during the ride contained 17 coliforms and three *E. coli* per 100 mL. Water samples from the water tanker did not contain coliforms or *E. coli*. Viral testing was negative on all samples. Testing of food specimens did not identify any pathogens. It is likely that a viral agent was responsible for this outbreak, despite the fact that no pathogens were detected in faecal specimens. The suspected source of the outbreak was the poor quality water collected from the town water supply, or contamination of the bladder by an infected rider. However, there was no reported increase in the incidence of gastrointestinal illness among local residents.

The Communicable Disease Section discussed the findings of this outbreak investigation with the event organiser and steps were taken to minimise the risks for future bike rides.

Volleyball Tournament

In early December, the Department was notified of an outbreak of gastrointestinal illness amongst players, team officials and referees at a national schools volleyball tournament. It was initially reported that 114 persons out of a total 2500 were ill, with one student being hospitalised.

Participants and organisers suspected that consumption of water through drinking fountains or taps was associated with illness. The Communicable Diseases Section conducted 135 interviews with people who were ill (cases) and not ill (controls). Epidemiological analysis of these data did not identify any association between consumption of food or water at the tournament and illness. No pathogens were detected in faecal, food and water samples. It is likely that this outbreak was viral, which was transmitted from person-to-person in this crowded indoor sporting event. In this particular setting, sharing equipment such as drink bottles and whistles may have contributed to the spread of infection.

Other Outbreaks

Ciguatera Fish Poisoning

Ciguatera is a distinctive type of food poisoning caused by the consumption of certain tropical or subtropical fish species. These fish can accumulate naturally-occurring toxins produced by marine dinoflagellates (algae). The toxins are concentrated in the food chain and the larger the fish the greater the chance of it becoming toxic.

There were two separate outbreaks of ciguatera fish poisoning reported in 1998.

On 15 December, an emergency department doctor reported two patients with symptoms consistent with ciguatera fish poisoning. These patients reported eating a fish meal together prior to developing symptoms. Three other people also ate the meal and had developed similar symptoms. Interviews with the five cases, revealed that they had shared a meal of Vietnamese sour fish soup prepared by one of the cases. The soup was prepared from a very large fish head purchased from a local fish shop. All cases developed gastrointestinal symptoms within 24 hours and all developed neurological symptoms. Investigation of the fish shop revealed that the supplier had travelled to Queensland and purchased the fish directly from a wholesaler. No other cases were reported in relation to this retailer or supplier.

On 18 December, an emergency department doctor reported three cases of suspected ciguatera fish poisoning. The cases had shared a soup prepared using fish head by one of the cases. The onset of symptoms for all three cases was about three hours after consumption. Symptoms were typically gastrointestinal followed by neurological symptoms such as tingling and numbness around the mouth and reversal of hot and cold temperature perception. The source of the implicated fish could not be identified.

These two outbreaks did not appear to be related. In response to these and other ciguatera outbreaks, the Communicable Diseases Section developed a fact sheet on ciguatera poisoning in English and three Asian languages.

Suspected Scombroid Poisoning

Scombroid poisoning is caused by the ingestion of certain fish that contain high levels of histamine. Histamines are formed by the growth of certain bacteria and the subsequent action of their enzymes on histidines and other amino acids. This formation of histamines occurs during the spoilage phase of certain fish, such as tuna and mackerel. Symptoms include tingling or burning of the mouth, facial flushing, sweating, drop in blood pressure, nausea, vomiting and headache. The onset of symptoms is rapid (within a half an hour in some cases) and the duration of illness is usually short.

In 1998 there were three outbreaks suspected to be caused by scombroid poisoning.

In July, a group of 11 diners at a city restaurant, reported that six members of their group developed histamine-like poisoning following a meal of tuna steaks. Cases developed symptoms of hot flushes, prickling skin and headaches followed by gastrointestinal symptoms of vomiting and diarrhoea in some of the cases. The onset of symptoms was while the guests were still at the restaurant. Most cases had recovered by the next day.

In September, a group of three people reported symptoms of facial flushing, tachycardia and mild abdominal cramps approximately two hours after eating a seafood risotto containing tuna, at a local restaurant.

In December, a person who attended a cocktail party reported an outbreak of suspected scombroid poisoning. A variety of finger food was served at the function and approximately nine people out of 100 developed symptoms of rash, facial flushing and abdominal cramps soon after eating Thai fish cakes.

Unfortunately in none of these outbreaks was there any leftover fish available for testing. However, suppliers were investigated in all instances and in two cases, it was determined that the wholesaler was not adequately controlling and recording the temperature of seafood during preparation and delivery.

Cryptosporidiosis Outbreak

In the early part of 1998, health authorities along the eastern seaboard identified outbreaks of cryptosporidiosis that were associated with swimming pools. In response to these outbreaks, the Communicable Disease Section contacted major pathology providers in March to ascertain if there had been an increase in isolation of *Cryptosporidium* from faeces.

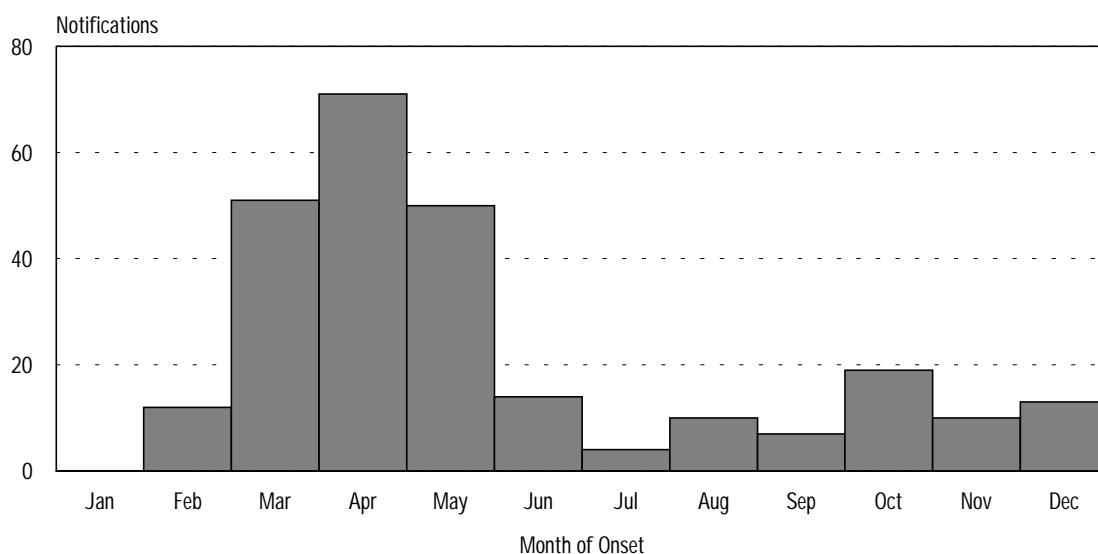
Shortly after this, a large community intervention trial—the Water Quality Study conducted by the Cooperative Research Centre for Water Quality and Treatment—reported a suspected outbreak of cryptosporidiosis. The Study identified nine cases from six families in the previous month compared with one case for the four months previous to that. Seven of the nine cases reported using a particular swimming pool in the incubation period of their illness.

All reported cases were contacted by telephone to ascertain personal details, clinical history, recent exposure to various sources of drinking water, attendance at child care centres and use of swimming pools. Where two or more cases had used the same swimming pool facility within the incubation period of their illness, local council environmental health officers and swimming pool managers were contacted. Pool managers were advised to institute a series of precautionary actions. These included hyperchlorination of the pool water, provide signs at pools advising patrons to shower before using the pool and not to swim if suffering from diarrhoea or a gastrointestinal illness in the last week. Pool managers were also advised to formulate a written policy for faecal accidents in the pool.

Active surveillance was also initiated in swimming pools linked to clusters of cases. Random sampling of the pool's swim school enrolment list was undertaken, and respondents were asked if they had experienced gastrointestinal symptoms in the previous month and if they had swum in the pool. Those with diarrhoea were asked to supply a faecal specimen. *Cryptosporidium* oocysts were identified in 13 (32 per cent) of 41 faecal specimens collected from the patrons who reported gastroenteritis.

Following this, all Victorian pathology services were asked to report identification of *Cryptosporidium* from patient faeces as part of a voluntary surveillance scheme. The Cooperative Research Centre for Water Quality and Treatment is conducting a case control study of cryptosporidiosis using cases reported through this voluntary scheme. The Department also sent a letter to general practitioners and local council environmental health officers informing them about cryptosporidiosis and its association with swimming pools. During 1998 the Department identified seven clusters associated with swimming pools, and one cluster of four cases that was associated with a childcare centre.

Figure 10: Cryptosporidiosis Notifications, by Month of Onset, Victoria, 1998



Haemolytic Uraemic Syndrome and Verotoxin-producing *E. coli*

E. coli are common bacteria normally found in the gut of warm blooded animals. There are many types of *E. coli* most of which are harmless. However, some types can produce toxins which are pathogenic in humans. One type is known as verotoxin producing *E. coli* (VTEC). 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 the bloodstream which can be caused by VTEC. The condition leads to kidney failure and anaemia. Children under five years of age are at the greatest risk of developing HUS. Onset of illness is marked by abdominal pains and bloody diarrhoea. Typically, the diarrhoea lasts about a week, after which time the child becomes lethargic and passes decreased amounts of urine, due to kidney damage. Outbreaks of HUS have occurred associated with consumption of food contaminated with VTEC.

In October 1998, the Health (Infectious Diseases) Regulations 1990 were amended to require both medical practitioners and laboratories to notify the Department of Human Services of patients with HUS or with VTEC infection.

There were two cases of HUS in 1998. One case was a five year old female, the other a seven year old male. These cases were not linked. There were nine cases of VTEC reported in 1998. One case of VTEC was an asymptomatic family contact of a case of HUS.

Table 8: HUS/VTEC Notifications, by *E.coli* phage type, Victoria, 1998

<i>E. coli</i> type	HUS	VTEC
<i>E. coli</i> O113:H2	1	
<i>E. coli</i> O111:H	1	1
<i>E. coli</i> O157:H		1
<i>E. coli</i> O157:H phage type 4		2
<i>E. coli</i> O26:H11		5
Total	2	9

Giardiasis

There were 1007 notifications of giardiasis in 1998. More cases were reported in the first quarter of 1998 (Figure 11), and notification rates were highest amongst children under five years of age (95 notifications per 100,000 population). As seen in previous years, there was a secondary peak amongst adults 30 to 39 years of age. This may indicate the occurrence of household transmission from infants to parents and other carers. Many cases also report a history of recent travel.

Figure 11: Giardiasis Notifications, by Month of Onset, Victoria, 1994–1998

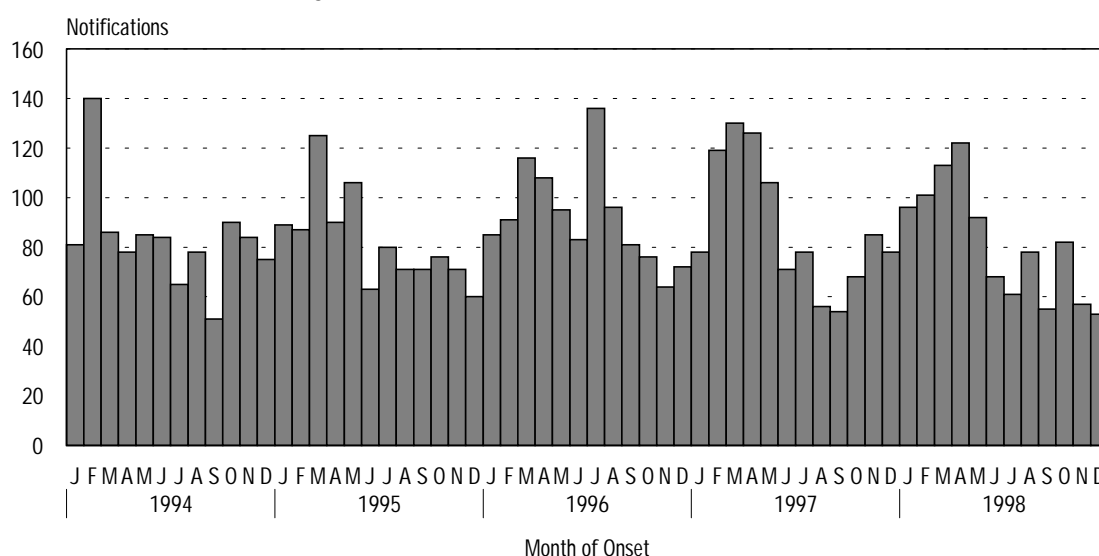
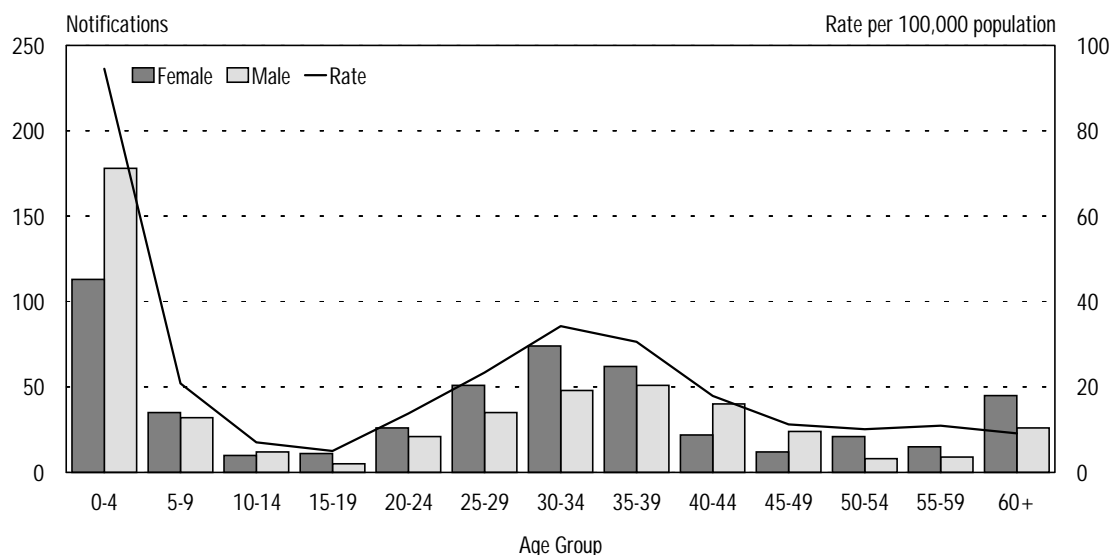


Figure 12: Giardiasis Notifications, by Age Group and Sex, Victoria, 1998



Hepatitis A

There were 169 notifications of hepatitis A in 1998 which was the lowest annual figure since 1994. There were 78 females (45 per cent) and 93 males (54 per cent), with sex not specified for one case. Notification rates were highest among those under 35 years (Figure 14).

In late 1998, Communicable Diseases were notified of cases of hepatitis A amongst injecting drug users. By the end of the year, a total of 11 cases had been identified as having injecting drug use as a risk factor or were sexual partners (2 cases) of injecting drug users who were previously notified as cases. Most cases were resident in the South Eastern suburbs of Melbourne. A 'Hepatitis A Fact Sheet' was sent to all needle and syringe exchanges in these suburbs to alert injecting drug users of how to prevent hepatitis A infection. The incidence of hepatitis A amongst this group has continued to increase in 1999.

Figure 13: Hepatitis A Notifications, by Month of Onset, Victoria, 1994–1998

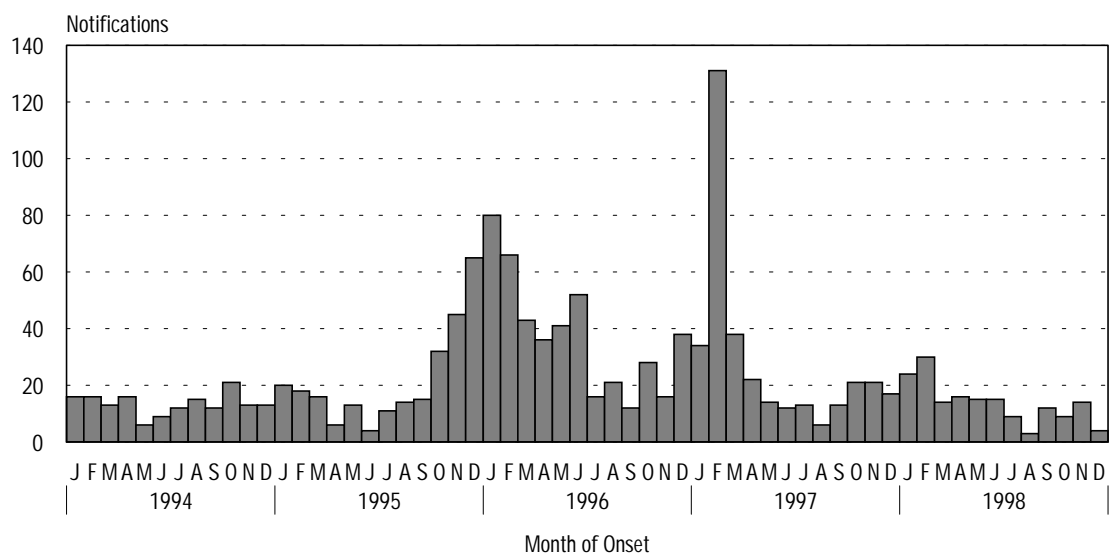
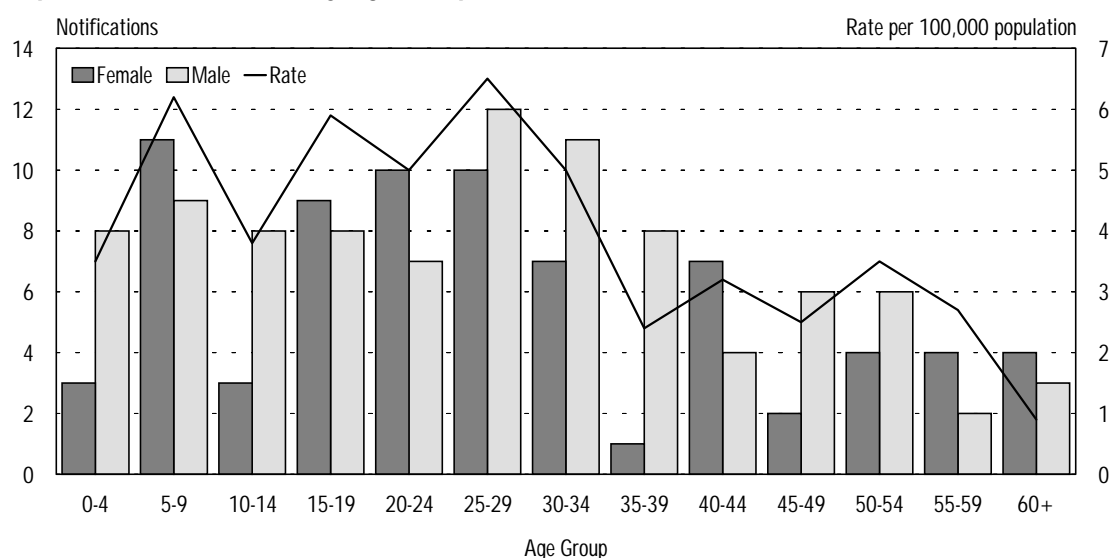


Figure 14: Hepatitis A Notifications, by Age Group and Sex, Victoria, 1998



Listeriosis

For surveillance purposes, the Department defines a case of listeriosis, as a patient who has had *Listeria monocytogenes* isolated from a site which is normally sterile, including foetal gastrointestinal contents.

During 1998, there were 15 notifications of listeriosis consisting of five materno-foetal cases and ten notifications in other at risk persons. A materno-foetal case is one in which *L. monocytogenes* is isolated either from a pregnant woman, her foetus or neonate. A pair consisting of a mother and neonate is counted as one case.

No clusters were identified in 1998, and notifications were received throughout the year.

Table 9: Listeriosis Notifications and Deaths, by Category, Victoria, 1997–1998

Year	1997		1998	
	Notifications	Percentage	Notifications	Percentage
Materno-Foetal Notifications	4		5	
Stillbirths, neonatal deaths and miscarriages	1	25	4	80
General Notifications	11		10	
Case fatalities — general notifications	3	27	3	30
Total Notifications	15		15	
<i>Case fatality rate of total notifications</i>	4	27	7	47

Materno-foetal Cases

Of the five materno-foetal cases notified the outcomes were three miscarriages, one premature birth resulting in neonatal death, and one neonate born at 35 weeks gestation who survived (Table 10). There were no maternal deaths. All five materno-foetal cases lived in the metropolitan area but were unrelated.

Table 10: Listeriosis Notifications (Materno-foetal Cases), by Age, Outcome and Maternal Ethnic Origin, Victoria, 1998

Maternal Age (years)	Gestational Age (Weeks)	Outcome	Maternal Ethnicity
34	24	Neonatal death at 2 days	Australian
33	17	Miscarriage	Australian
26	16	Miscarriage	Italian/Australian
30	23	Miscarriage	Vietnamese
26	35	Survived	Cambodian

Materno-foetal Cases of Interest

A woman at 35 weeks gestation presented with contractions, foetal distress and a history of fever for four days. An emergency caesarean was performed resulting in a live birth. The baby had convulsions and required ventilation, but responded to antibiotic treatment and made a full recovery. *L. monocytogenes* was isolated from the placenta, vaginal swabs and baby's blood culture.

A woman at 24 weeks gestation presented with uterine contractions and ruptured membranes. A live baby was delivered but the baby had severe sepsis, respiratory complications, brain haemorrhage and jaundice and died two days later. *L. monocytogenes* was isolated from the blood cultures of both mother and baby.

Other Cases

The ten remaining cases occurred in three females and seven males. All but one—an 18 month old child—were adults with age ranging from 49 to 85 years (median 64 years). All ten were immunocompromised and had varying risk factors for listeriosis including heart transplant, kidney transplant, primary amyloidosis, leukaemia, disseminated carcinoma and chronic steroid administration. Three of the ten cases (30 per cent) died.

Subtyping

As part of the epidemiological investigations, the Microbiological Diagnostic Unit (MDU), University of Melbourne routinely conducts molecular typing using pulsed-field gel electrophoresis (PFGE), on all isolates from notified cases. The MDU identified 12 different patterns from the 15 cases for the year. Of the cases with similar patterns, all lived in different suburbs or towns and no common food source was identified.

Salmonellosis

There were 1124 notifications of salmonellosis received in 1998, which is a 33 per cent reduction on the number received the previous year. As seen in previous years, notifications peaked over the summer months (Figure 15). The highest age-specific notification rate was in those aged less than five years (85 per 100,000 population).

Figure 15: Salmonellosis Notifications, by Month of Onset, Victoria, 1994–1998

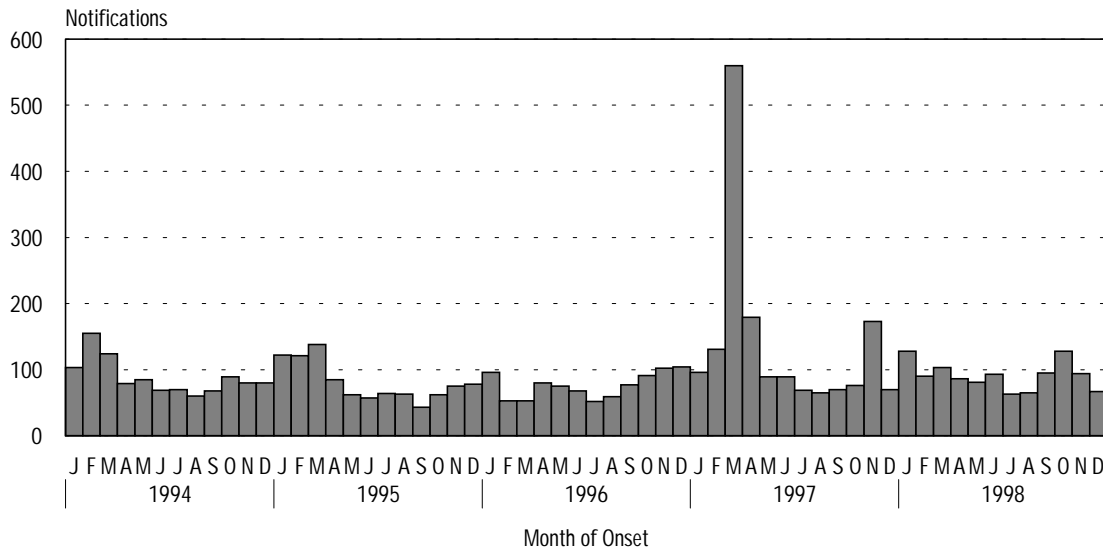
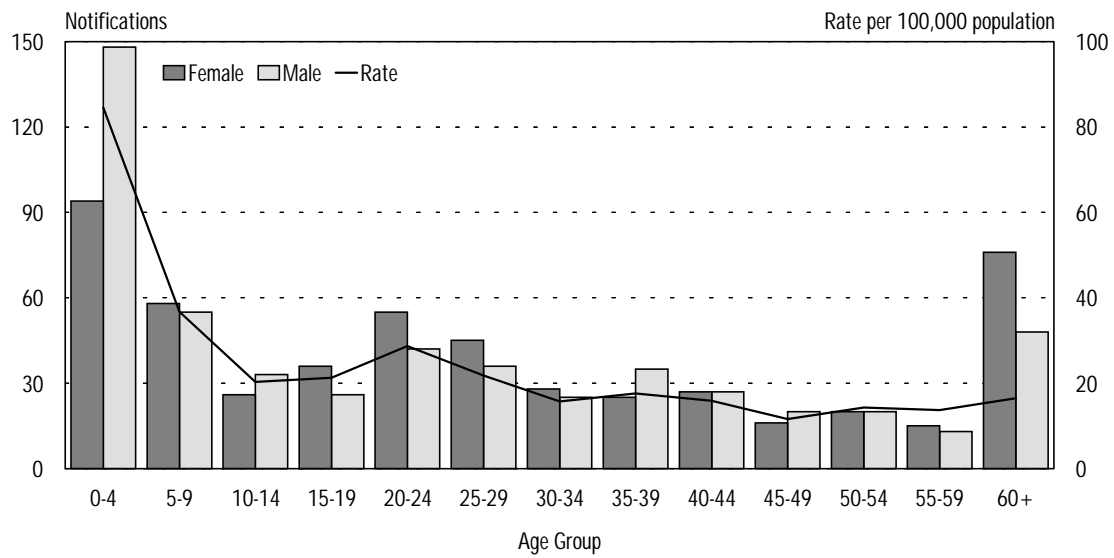


Figure 16: Salmonellosis Notifications, by Age Group and Sex, Victoria, 1998



Salmonella Outbreaks

Reception Centre Outbreak

In September 1998, the Communicable Diseases Section was informed of an outbreak of gastroenteritis following a wedding reception at a reception centre. The person reporting the outbreak had been diagnosed with a *Salmonella* infection. Approximately 40 guests attended the wedding. Of those who were interviewed, five had become ill and three were confirmed with *Salmonella* Virchow 34. *Salmonella* Virchow 34 was also isolated from food samples and environmental swabs taken at the premises prior to a clean up.

Follow-up samples taken after the premises was cleaned by a contracted cleaning company also returned positive *Salmonella* results. The premises was again cleaned and sanitised and food preparation was supervised by local government environmental health officers. Further samples were taken at this time and these once more returned positive *Salmonella* results. A further cleaning and sanitation procedure was undertaken under supervision of Departmental and Council staff in early October. Samples taken afterwards returned negative results.

Three cases of *Salmonella* Virchow 34 were notified to the Department in the second week of November. It was found that they had eaten at this reception centre immediately after the first clean up procedures had been undertaken. More than 100 people attended the function on that date. The premises were again visited and when further samples and swabs returned positive *Salmonella* results, a food premises closing order was issued in November.

School break up function

In late October, an outbreak of gastrointestinal illness was reported amongst a group of year 12 students celebrating an end of year break up held at a restaurant. Meals were ordered from a set menu and each person had the choice of two dishes for entree and main course.

There were 172 students who attended the function and 32 became ill. Ten cases were subsequently diagnosed with *Salmonella* Typhimurium 135 infection. Cases had a median incubation period of two days. Illness was associated with the consumption of one or both of the chicken meals provided on the night. Environmental investigations showed that the cause of the outbreak was probably due to the inadequate cooking of the chicken meals.

21st Birthday Party

In October, an outbreak of gastrointestinal illness was reported amongst attendees at a 21st birthday party. Forty-six of 93 (49 per cent) people who attended the party became ill, and there were 21 confirmed cases of *Salmonella* Typhimurium 64. The median incubation period for the illness was one day. Most of the food at the party was prepared at home by the host however, cooked chickens were purchased from a local outlet. Epidemiological investigations implicated the chicken as the source of the outbreak. Contamination of the chickens probably occurred either from undercooking or cross-contamination after the cooking process.

Nursing Home

The Department was notified in March of an outbreak of gastroenteritis amongst residents of a nursing home. Investigations revealed that 12 out of 22 residents (55 per cent) had become ill and one food handler had also been ill. The onset of illness ranged over a three day period. Four faecal specimens were positive for *Salmonella* Virchow 34. The cause of the outbreak was most likely due to poor food handling. There were no left over foods available for sampling, but raw ingredients such as eggs and chickens were investigated. *Salmonella* Virchow 34 was subsequently isolated from a sample of chicken faeces from the farm that supplied the nursing home with eggs.

Other Investigations of Interest

***Salmonella* Enteritidis**

Salmonella Enteritidis is not endemic in Australia, with the exception of phage type 26 which occurs in Queensland and phage type 8 which occurs in Tasmania. Enteritidis is a significant *Salmonella* serovar in that there is vertical transmission of the organism from chicken to the egg. It is very common overseas and has been responsible for large outbreaks of disease. Most notifications of *S. Enteritidis* in Victoria are phage type 4. All cases of *S. Enteritidis* are followed up to ascertain whether the infection was acquired overseas.

Table 11: *S. Enteritidis* Notifications, by Country of Source of Infection and Phage Types, Victoria, 1998

Region	Notifications	Phage types (number of notifications)
Indonesia (excluding Bali)	1	1 (1)
Bali	27	1 (1), 4 (25); 8 (1)
Malaysia	3	4 (3)
Thailand	6	4 (6)
Singapore	3	4 (2); 17 (1)
India	1	4 (1)
Philippines	2	4 (1); 1 (1)
Hong Kong	1	4 (1)
Asia not further specified	1	4 (1)
Pacific Islands	2	26 (1); RDNC (1)
Europe	9	4 (4); 6 (1); 8 (2) 21 (1); RDNC (1)
Middle East	1	4 (1)
Contact of overseas case	1	4 (1)
No overseas source identified	4	1 (1); 4 (2); 13 (1)
Not Known	5	4 (4); Untypable (1)
Total	67	

Typhoid and Paratyphoid

For surveillance purposes, the Department defines a case of typhoid or paratyphoid infection, as someone who has had *Salmonella typhi* isolated from any clinical specimen **or** *Salmonella paratyphi* serotype A, B or C isolated from any clinical specimen.

During 1998, there were 11 notifications of typhoid and seven of paratyphoid. Of the 18 notifications of typhoid and paratyphoid, nine were males and nine were females (Table 12). The age of cases ranged from a 19 month male infected by his overseas born carrier mother, to a 75 year old man with typhoid who migrated to Australia 20 years ago.

Most notifications occur in the early months of the year as people return from overseas holidays. The majority of cases reported were associated with a history of overseas travel. Four notifications were in persons with no history of recent travel outside of Australia (Table 13):

- three cases were long-time residents who had been born overseas;
- one case was an Australian-born infant of one of these overseas born residents (see Table 13).

None of the 11 typhoid cases had received typhoid immunisation. Medical practitioners should advise intending travellers of the importance of exercising care in what they eat and drink irrespective of whether they have been immunised.

All but one of the cases were laboratory confirmed. One case of typhoid was in a male returned from Bangladesh, who gave a history strongly suggestive of typhoid, but cultures were negative.

Table 12: Typhoid and Paratyphoid Notifications, by Age Group, Sex and Type, Victoria, 1998

Age Group (years)	Paratyphoid			Typhoid		
	Female	Male	Total	Female	Male	Total
0-19	3	0	3	1	1	2
20-29	0	2	2	3	2	5
30-39	0	1	1	1	1	2
40-49	0	0	0	0	1	1
50-59	1	0	1	0	0	0
60+	0	0	0	0	1	1
Total	4	3	7	5	6	11

Table 13: Typhoid and Paratyphoid Notifications, by Category and Residential Status, Victoria, 1998

Category/Residential Status	Notifications
Australian born, returned traveller	3
Australian born, no recent travel	1
New migrant	4
Visitor to Australia	1
Returning migrant	6
Overseas born, no recent travel	3

Table 14: Typhoid and Paratyphoid Notifications, by Country of Acquisition and Phage Type, Victoria, 1998

Country	Typhoid	Phage type	Paratyphoid	Phage type
Australia	1	0		
Bangladesh	1	no culture		
Cambodia			1*	2
India	1	E1a		
Indonesia	2	A, not typable	3*	11, 11, 5var
Kiribati	1	E1a		
Lebanon	2	40, 51	2*	11, 11
Macedonia			1**	3a var
Pakistan	1	E1a		
Somalia	1	0		
Vietnam	1	37		
Total	11		7	

* *S. paratyphi* A ; ** *S. paratyphi* B

Cases of Interest

A 19 month old male who had no recent history of overseas travel, presented moderately unwell with a five day history of fevers and cough. Blood and urine cultures showed the presence of *S. typhi*. The family had arrived from Somalia seven years previously and had no past history of typhoid. Routine contact tracing revealed the probable source was the infant's mother who was asymptomatic. Mother was treated with a four week course of oral ciprofloxacin. Subsequent follow-up faecal samples of both cases were negative.

A 12 year old female who returned to Australia with her family after a five year stay in Lebanon, presented 24 hours later with fevers, diarrhoea and vomiting. A faecal sample showed *S. paratyphi* A and *Giardia*. Screening of her nine family members revealed an asymptomatic sibling, a female (2 years) with *S. paratyphi* A. Both were successfully treated and were negative on follow-up faecal tests.

A 67 year old male who arrived in Australia in 1979 as a refugee from Vietnam presented to a general practitioner with a history of mild gastrointestinal symptoms over a six week period. *S. typhi* was isolated from a faecal sample. Investigations revealed that in 1979 typhoid was detected on routine faecal screening following arrival in Australia. He received treatment and follow-up over a one year period and was subsequently discharged. Following his more recent diagnosis he received a 14 day course of ampicillin. Subsequent faecal samples tested continued to remain positive for *S. typhi*. He was given repeat treatment of ciprofloxacin for 14 days. A series of follow-up faecal samples collected after the repeat treatment and again three months later were negative. His carrier state was to be monitored with repeat faecal sampling after one year.

A 23 year old female, who was 24 weeks pregnant, presented with fevers, sweats, dry cough, neck stiffness and sore throat, after returning from Lebanon. *S. typhi* was isolated from blood and faecal cultures. Treatment included intravenous cephazolin followed by a 14 day course of amoxicillin. Faecal samples taken after treatment at the second and third weeks remained positive. Repeat treatment was delayed because of her pregnancy. The baby, born at term was breast fed and remained asymptomatic. Following repeat treatment with ciprofloxacin, subsequent follow-up samples were negative.

Shigellosis

For surveillance purposes, the Department defines a case of shigellosis as someone who has had *Shigella* species isolated from any clinical specimen.

In 1998, the Department received 119 notifications of *Shigella*. Even though this represented a 51 per cent increase in the notifications from the previous year, there were no clusters identified when follow-up was initiated. The highest age-specific notification rates were among the 20 to 29 year old age group, which probably represents the age group which travels the most. Sixty four cases (54 per cent) were identified as having acquired their infection overseas.

Figure 17: Shigellosis Notifications, by Month of Onset, Victoria, 1994–1998

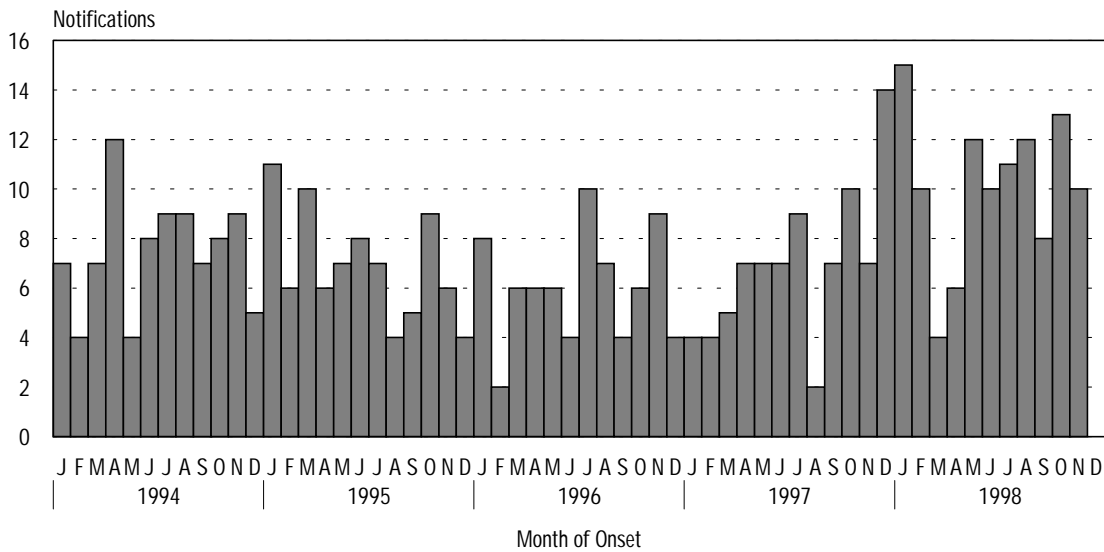


Figure 18: Shigellosis Notifications, by Age Group and Sex, Victoria, 1998

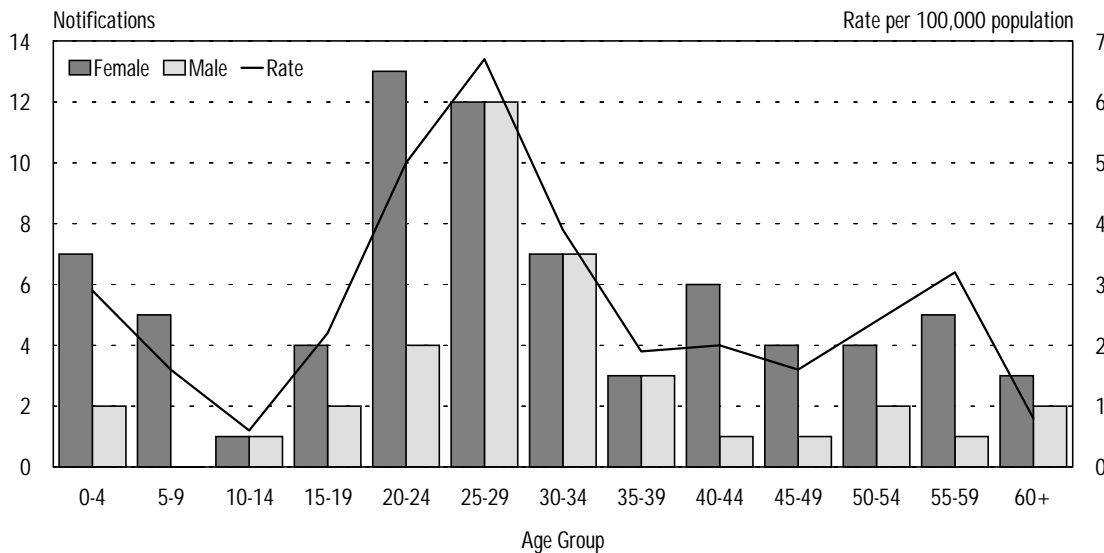


Table 15: Shigellosis Notifications, by Country/State of Source of Infection, Victoria, 1998

Region	Notifications
Indonesia (excluding Bali)	8
Bali	20
Thailand	2
Vietnam	2
India	8
Hong Kong	1
Laos	1
Korea	1
Asia (not further specified)	3
Pacific Islands	3
Guatemala	1
Africa	3
Europe	1
Lebanon	2
Turkey	3
Russia	2
Egypt	1
Overseas Travel (Country not specified)	2
Australia/Northern Territory	4
Australia/Victoria*	5
Not known	46
Total	119

* Includes 2 cases in laboratory workers and 2 cases where contact was identified with an overseas acquired case

Table 16: Shigellosis Notifications – By Species and Types, Victoria, 1998

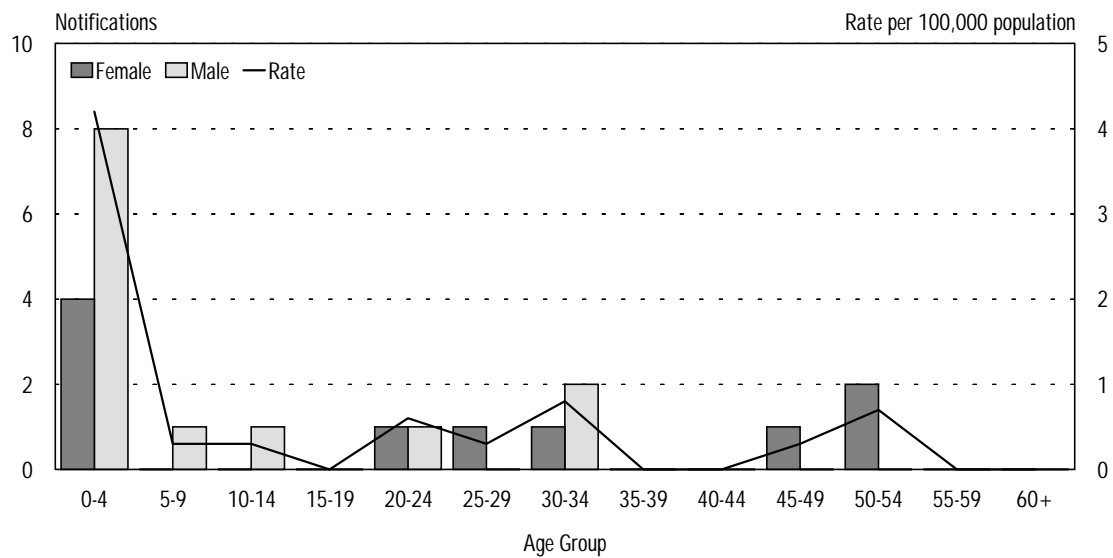
Species	Notifications
<i>Shigella boydii</i> 1	2
<i>Shigella boydii</i> 11	1
<i>Shigella boydii</i> 2	1
<i>Shigella boydii</i> 4	2
<i>Shigella dysenteriae</i>	1
<i>Shigella flexneri</i>	1
<i>Shigella flexneri</i> 1a	1
<i>Shigella flexneri</i> 1b	2
<i>Shigella flexneri</i> 2a	21
<i>Shigella flexneri</i> 2b	3
<i>Shigella flexneri</i> 3a	3
<i>Shigella flexneri</i> 6	6
<i>Shigella sonnei</i> biotype a	17
<i>Shigella sonnei</i> biotype g	46
<i>Shigella</i> not further specified	11
Total	119

Yersiniosis

For surveillance purposes, the Department defines a case of yersiniosis as someone who has had *Yersinia enterocolitica* isolated from faeces or blood.

During 1998, there were 25 notifications received. Cases were most commonly reported in children under the age of five years (Figure 19).

Figure 19: Yersiniosis Notifications – By Age Group and Sex, Victoria, 1998



Legionellosis

Graham Tallis, Communicable Diseases Section

For surveillance purposes, the Department defines cases of legionellosis as someone who has a clinically compatible illness (fever, cough, or pneumonia) AND at least one of the following:

- isolation of *Legionella* species from lung tissue, respiratory secretions, pleural fluid, blood or other tissues; or
- demonstration of *Legionella* species antigens in lung tissue, respiratory secretions, pleural fluid, urine; or
- a four-fold or greater rise in titre against *Legionella* species, to at least 128, between acute and convalescent phase sera; or
- a stable high titre *Legionella* (at least 512) in convalescent phase serum.

During 1998, the Department received 63 notifications of legionellosis, of which 51 were male and 12 female. The ages ranged from 27 years to 77 years with a median age of 55 years (Figure 20). There were eight deaths reported; a case fatality rate of 12.7 per cent. The median age of fatal cases was 71 years. The peak seen in October 1998 (Figure 21) was a result of the Thomastown outbreak (page 32). Smoking was the most common risk factor, present in 24 (38 per cent) cases and 29 cases had no risk factor identified or information was not available. Of the 44 cases for whom country of birth was known, 16 (36 per cent) were Australian born, eight (18 per cent) were born in the former Yugoslavia, and six (14 per cent) each in Italy or Greece. Thirty-six cases (57 per cent) were employed, while 21 cases (33 per cent) were retired or pensioners.

As in previous years, *Legionella pneumophila* serogroup 1 continued to be by far the most common species and serogroup implicated, (60 cases or 95 per cent). For the 60 cases of serogroup 1, there were 52 cases (86 per cent) in which the urinary antigen test was positive (Table 25), compared to 32 (53 per cent) which were culture positive. The availability in recent years of the test for urinary antigen has provided clinicians with a rapid diagnostic tool which has become especially useful in an outbreak situation. It is however limited to infections by *L. pneumophila* sg 1.

One case of *L. longbeachae* infection was confirmed by culture, the other by serology. The *L. micdadei* infection was confirmed by serology.

Figure 20: Legionellosis Notifications, by Age Group and Sex, Victoria, 1998

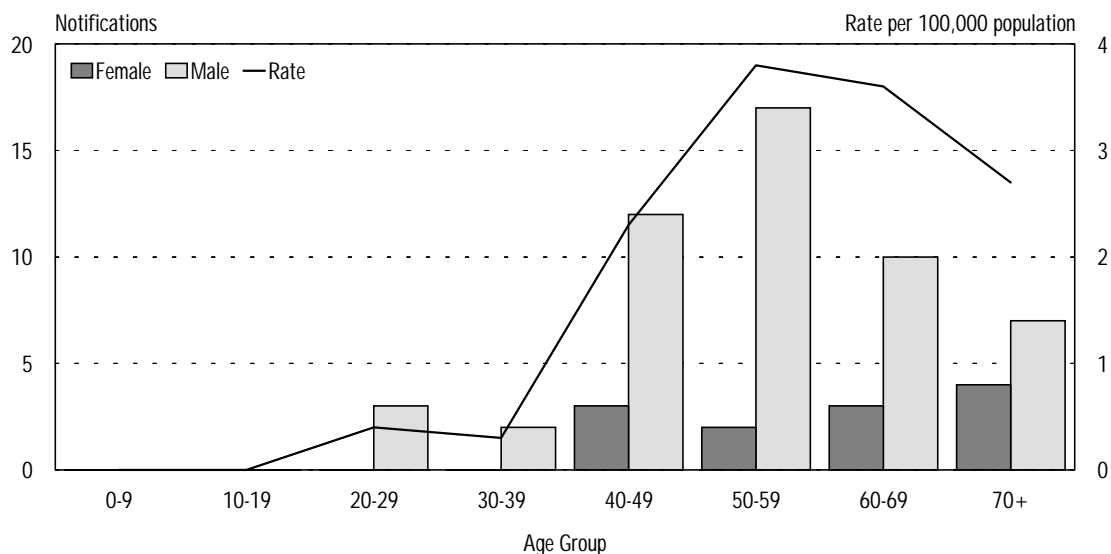


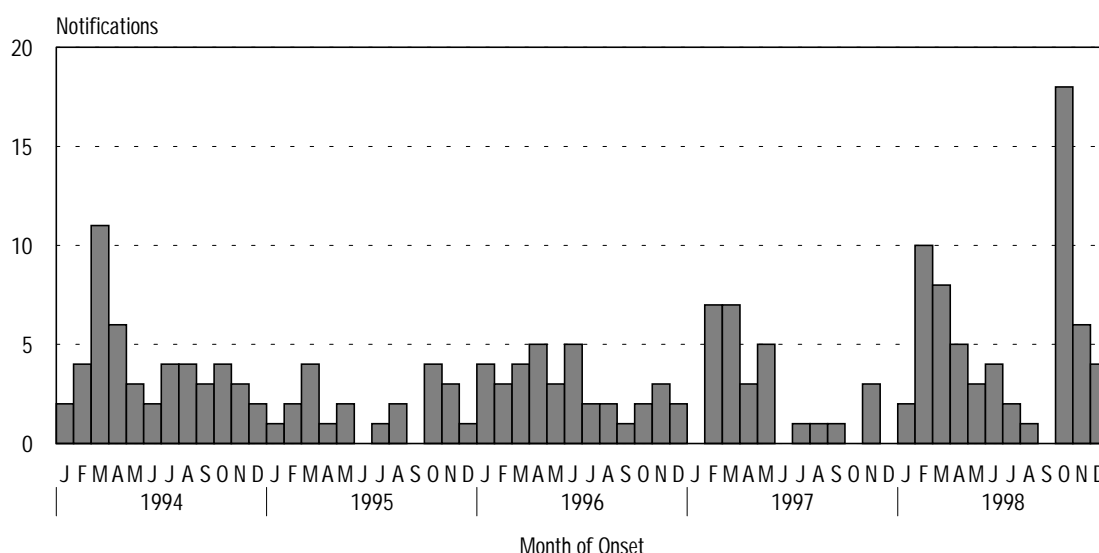
Table 17 : Legionellosis Notifications, by Species/Serogroup, Victoria, 1998

Species/Serogroup	Number of Cases
<i>L. pneumophila</i> sg 1	60
<i>L. longbeachae</i>	2
<i>L. micdadei</i>	1
Total	63

Table 18: *Legionella pneumophila* serogroup1 Notifications, by Diagnostic Test, Victoria, 1998

Method of Diagnosis	Number of Cases of Serogroup 1
Antigen alone	26
Culture + antigen	25
Culture alone	6
Culture + antigen + serology	1
Antigen + serology	1
Serology alone	1
Total	60

Figure 21: Legionellosis Notifications, by Month of Onset, Victoria, 1994–1998



Source of Infection

There were four outbreaks of Legionnaires’ disease in 1998, accounting for 26 cases, of which 18 were associated with the Thomastown outbreak. (An outbreak defined here broadly as two or more cases linked in time, person or place.) The number of outbreak cases was unusual, as most cases in Victoria in the past have been sporadic.

Thomastown outbreak — 18 cases

This was the largest ever outbreak of Legionnaires’ disease in Victoria at the time. The Communicable Diseases Section received a total of 18 notifications of confirmed cases of Legionnaires’ disease due to *L. pneumophila* sg 1. There were no fatal cases, but two persons were admitted to intensive care. Three cases were identified in non-hospitalized persons. All but one of the cases had a history of contact with an industrial area in Thomastown, or a neighbouring area.

Samples were taken from 66 cooling towers in the area to trace the source of the outbreak. After extensive testing of numerous cooling towers, three towers in the area tested positive for the *L. pneumophila* sg 1.

Of the eighteen notified cases, eight were confirmed through culture. All isolates of *L. pneumophila* sg 1 were sub-typed by pulsed field gel electrophoresis (PFGE). This testing indicated that isolates from all eight cases where an isolate was available exhibited a pattern that was indistinguishable from the pattern found in the isolate from a cold storage business' cooling tower. Isolates from the cooling towers at other premises exhibited different patterns, while the isolate from one premises was not able to be sub-typed.

Eight cases not confirmed by culture were epidemiologically linked to the outbreak in time and place, in that they identified having visited premises in the implicated area during their incubation periods.

Two further cases were epidemiologically linked in time to the outbreak. One case did not give a history of going to the specific area in Thomastown implicated, but lived in a neighbouring suburb. However, the onset date of his illness was concurrent with the other cases. He may have had contact with the area that he did not recall, or simply have been a sporadic case unconnected to this outbreak. The other case did not recall contact with the near vicinity of the cooling tower, but did work in a neighbouring area in Thomastown.

Moonee Valley Outbreak — Four cases

A full report on this outbreak appeared in the *Victorian Infectious Diseases Bulletin* 1998 1(2):24-25.

The Communicable Diseases Section received three notifications of Legionnaires' disease due to *L. pneumophila* sg 1 over two days (30 June to 1 July) in women who worked or lived in the City of Moonee Valley. This was an unusual event, especially during winter. Most cases of Legionnaires' disease in Victoria occur in summer and autumn.

Initial information indicated that it was possible that there was a common source of infection for at least two cases, who frequented the same suburban shopping and business district.

All cooling towers in the area were inspected and sampled for microbiological testing. Two of these towers tested positive for *L. pneumophila* sg 1. Both towers were immediately decontaminated.

The microbiological and epidemiological evidence was suggestive of a common source outbreak. A media release was issued to alert the public to symptoms of Legionnaires' disease. Subsequently, a 'Health Alert' was delivered to all general practitioners and hospitals in the region to advise them of the outbreak, and the appropriate diagnostic tests and management. Active surveillance was also undertaken in the two work forces where positive towers had been identified.

As a result of the enhanced community and hospital surveillance, a further two cases were subsequently identified. Both additional cases identified exposure to the same shopping centre in Moonee Ponds, strengthening the hypothesis that the source was one of the positive cooling towers identified. The incubation period of both cases indicated infection prior to the effective decontamination of each tower.

All isolates of *L. pneumophila* sg 1 were sub-typed by pulsed field gel electrophoresis (PFGE). This testing indicated that isolates from two cases were indistinguishable from those obtained from the second tower.

On the basis of the epidemiological and microbiological results, it is highly likely that two of the cases were infected through exposure to one of the contaminated cooling towers. One of the cases did not give a history of exposure to the shopping centre, which may indicate that this case was probably coincidental. Two cases were epidemiologically linked to the outbreak, and it is likely that the source of their infection was also the second tower. However, as these cases were not confirmed by culture of the organism, molecular sub-typing techniques were not available to confirm this.

Caution must be employed in interpreting these results. The frequency of the many different subtypes of *L. pneumophila* sg1 in the environment remains unknown. Urinary antigen testing is used increasingly for the diagnosis of Legionnaires' disease. While this has important benefits for both patient care and rapid detection of outbreaks, culture of the organism remains the gold standard, and should be sought wherever possible, to assist in determining the source through the sub-typing methods illustrated here.

A Small Nosocomial Outbreak — two cases

The Communicable Diseases Section was notified of a case of Legionnaires' Disease in a 64 year old male, who had visited a hospital daily during his incubation period. Three cooling towers were identified at the hospital and sampled for *Legionella* testing.

Before results of this testing was available, a second case was notified of Legionnaires' Disease in a 69 year old male who was a long term resident of a nursing home ward within the hospital. This man suffered from cerebellar ataxia and dementia as a result of alcoholism. He deteriorated rapidly and died. The diagnosis was based on the detection of antigen in urine of *L. pneumophila* sg 1.

L. pneumophila sg 1 was subsequently isolated from a water sample taken from one of the hospital cooling towers.

Prospective and retrospective surveillance was initiated for further cases in staff and patients, but no further cases of Legionnaires' disease were found.

The temporal and geographical clustering of the two cases raised the possibility of a common source for the two cases at the hospital. This was further supported by the fact that the nursing home patient never left the vicinity of the ward during his incubation period. However, as *L. pneumophila* 1 was not cultured from either case, a comparison with the environmental isolate using pulsed field gel electrophoresis was not possible.

A Supported Accommodation Hostel — two cases

The Communicable Diseases Section was notified of a case of Legionnaires' Disease in a 74 year old male, who lived at a supported accommodation hostel. He was independently mobile, and had moved around many different sites in the vicinity of the hostel, with multiple possible exposures to cooling towers during his incubation period. Water samples were taken from the water systems and bathrooms at the hostel. There was no cooling tower or spa pool present at the hostel.

The Communicable Diseases Section was later notified of a second case of Legionnaires' Disease in a 75 year old male who was also a resident of the hostel. The patient deteriorated rapidly and died. The diagnosis was based on the detection of antigen in urine of *L. pneumophila* 1. He had remained within the vicinity of the hostel throughout his incubation period. A second investigation was conducted at the hostel, including a further audit of cooling towers or other potential sources in the vicinity of the hostel.

To minimise the risk of *Legionella* contamination of the plumbing system, particularly through static water present in dead-legs, the hostel was advised that on a weekly basis, all hot water taps and outlets, especially those that have not been used regularly, must be thoroughly flushed for at least 15 seconds at full flow.

Active surveillance was initiated through health care workers involved in the management of any residents, such as general practitioners and visiting nurses, but no further cases were identified.

The temporal and geographical clustering of the two cases raised the possibility of a common source for the two cases at the hostel, or in its vicinity. This is further supported by the fact that the second case rarely left the vicinity of the hostel during his incubation period. However, as *L. pneumophila* 1 was not cultured from any potential source, the cause of the outbreak remained unknown.

Meningococcal Infection

Kath Taylor, Communicable Diseases Section

There were 61 notifications of meningococcal disease in 1998. The majority, 29 cases, were due to serogroup B organisms. Those at greatest risk of the infection include children less than 5 years of age, persons with asplenia or immune suppression, those with complement deficiency and teenagers and young adults. Suggested environmental co-factors are cigarette smoking, mental and physical stress, preceding Influenza A and other upper respiratory infections.

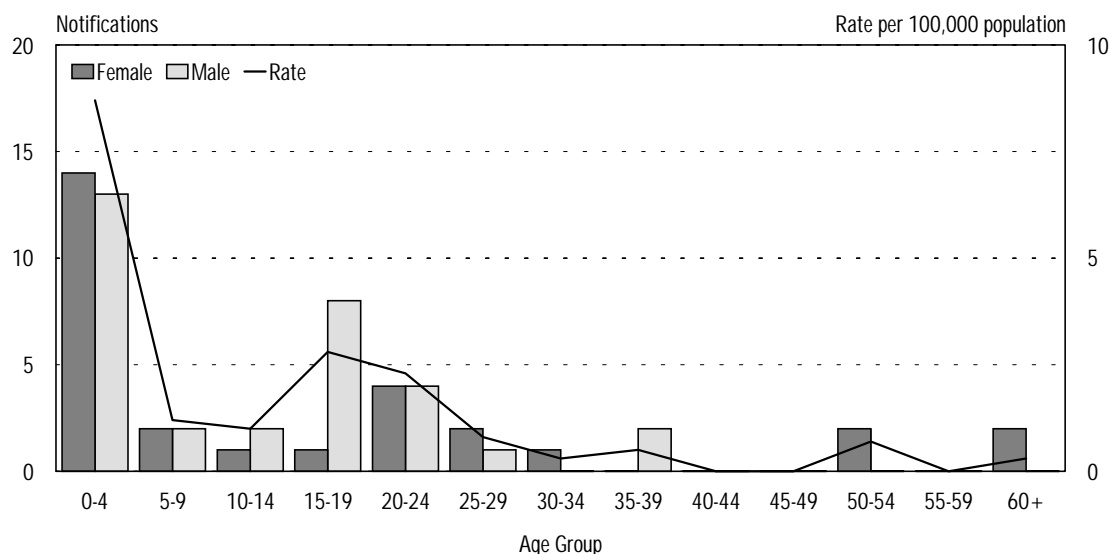
The number of notifications of meningococcal disease fell in 1998, although with four deaths (case fatality rate was 7 per cent) it continues to be an important cause of morbidity and mortality. There were 32 males and 29 females notified (Table 19).

Table 19: Meningococcal Infection Notifications, by Year and Sex, Victoria, 1994–1998

Year	1994	1995	1996	1997	1998
Female	32	36	46	47	29
Male	27	39	47	51	32
Total	59	75	93	98	61

Half of the 1998 cases were 5 years old or younger. Thirteen children were aged less than one year, the youngest one week old. There were four deaths; two in children aged less than one year, one in a toddler of 16 months, and one in an adult. Three of the fatal cases were female.

Figure 22: Meningococcal Infection Notifications, by Age Group and Sex, Victoria, 1998



The typical pattern of a winter peak continued, with over half of all 1998 cases notified during the four months June to September (Figure 23).

Figure 23: Meningococcal Infection Notifications, by Month of Onset, Victoria, 1994–1998

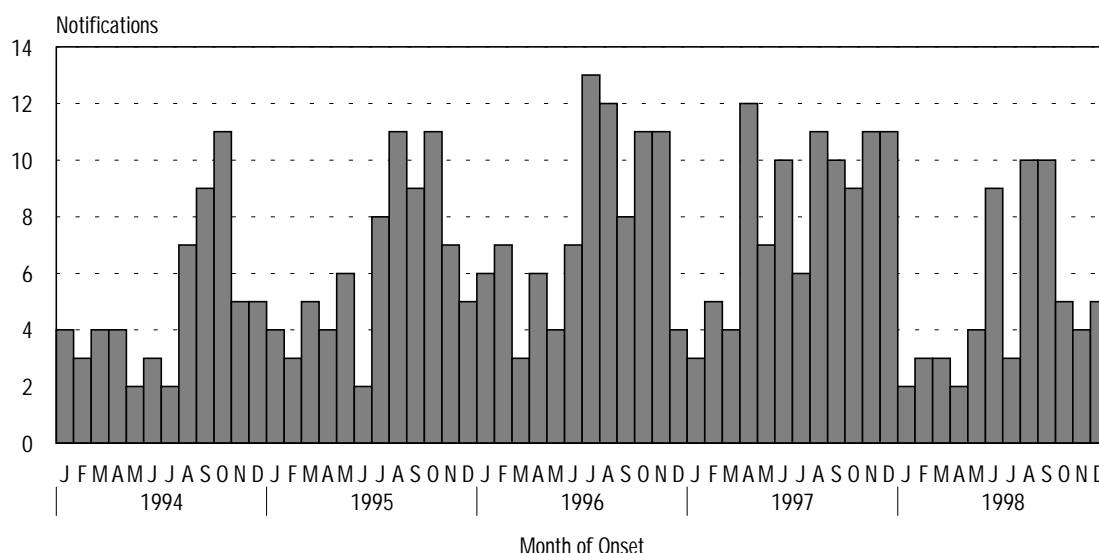


Table 20: Meningococcal Infection Notifications, by Serogroup of Meningococcal Isolates, Victoria, 1994–1998

Group	1994	1995	1996	1997	1998
B	28	38	51	48	29
C	17	17	11	9	8
W 135	0	0	0	0	0
Y	0	0	0	0	0
29E	1	1	0	0	0
Not typable	0	0	3	0	5
No isolate	13	19	28	41	19
Total	59	75	93	98	61

Note—Of the 19 isolates which could not be typed (culture negative), four were meningococcal antigen positive for Group B.

Three cases were normally resident interstate, one in New South Wales and two in Tasmania. Of the remaining 58 cases, the majority of cases were notified from the metropolitan region, however the highest population attack rate was in the Hume region at 2.9 per 100,000 population, followed by Gippsland and Southern Metropolitan at 1.9 per 100,000 population.

There were no clusters or outbreaks of meningococcal disease in 1998. There was one pair of co-primary cases in primary school-aged children. One interesting case of chronic meningococcaemia was also notified, in a child who had presented with intermittent fever, joint and muscle pain and petechial rash. This case was finally diagnosed following a positive Polymerase Chain Reaction (PCR) test from a biopsy of a skin lesion.

The PCR tests being undertaken are proving successful particularly when CSF or blood specimens are forwarded to the State Neisseria Reference Laboratory at the Microbiological Diagnostic Unit (MDU), University of Melbourne. Although being currently used in a research capacity, PCR is proving a useful diagnostic tool when specimens have been culture-negative.

When a case of meningococcal infection is suspected administration of benzyl penicillin should be undertaken prior to hospital admission. Immediate notification by phone or facsimile should be made to the Department of Human Services even on suspicion. This will also encourage early tracing of close contacts so that antibiotic prophylaxis can be given within 24 to 48 hours.

Clinical Summaries of Fatal Cases

There were four deaths reported in 1998, summarised here.

- A ten month old female child who had previously been well, and who was breast fed, was reported as having had a cold during the previous week. The child awoke at 7pm and vomited. She was noted to have a fever, was given paracetamol, but vomited again and had a convulsion. She was taken by ambulance to a country hospital and was observed for two hours, and then returned home. At 1.30 am the child awoke with a high temperature and was settled in her parents bed, and then returned to her cot. She was found at 7.30am with an extensive purpuric rash, and deceased. The cause of death was fulminant septicemia, the causative organism being *Neisseria meningitidis* serogroup B.
- A female aged 16 months who was previously well developed a fever in the evening followed by a convulsion at 2am. After a tepid bath she settled, although she had a restless sleep. The next morning she was taken to a day care centre at the mother's workplace. She was noted to be lethargic and was put into a cot where she was checked regularly. She was found deceased at 11.30am. At post-mortem, gram-negative diplococci were noted in the spleen, adrenal glands and cerebrospinal fluid. The organism was not cultured from any specimens.
- A three month old boy who was born at 34 weeks gestation, was given a bottle at 8pm and fell asleep afterwards. He was still asleep at 9am the following morning. When his mother was changing his nappy shortly afterwards she noticed a purpuric rash, and called a relative, but the baby stopped breathing and did not respond to resuscitation. No organism was cultured from this case.
- A 32 year old female who had returned from Queensland four days previously complained of a sore throat in the morning, developing muscle pains, fever and shivers in the afternoon. She was seen by a doctor at 7.30pm, noted to have a urinary tract infection and was prescribed Triprin, two tablets only being taken. After a restless sleep, she was up at 5am because of a headache. She was taken to a hospital emergency department where, at about 7am, she developed a purpuric rash. Blood was taken and antibiotics given, but she had a convulsion at 1pm. She was intubated and moved into the intensive care unit. Despite treatment with inotropes, she became hypotensive, and developed renal failure and gastrointestinal bleeding. She died two days after admission. *Neisseria meningitidis* group C was cultured from an early blood specimen.

Tuberculosis

Mary Randall, Communicable Diseases Section

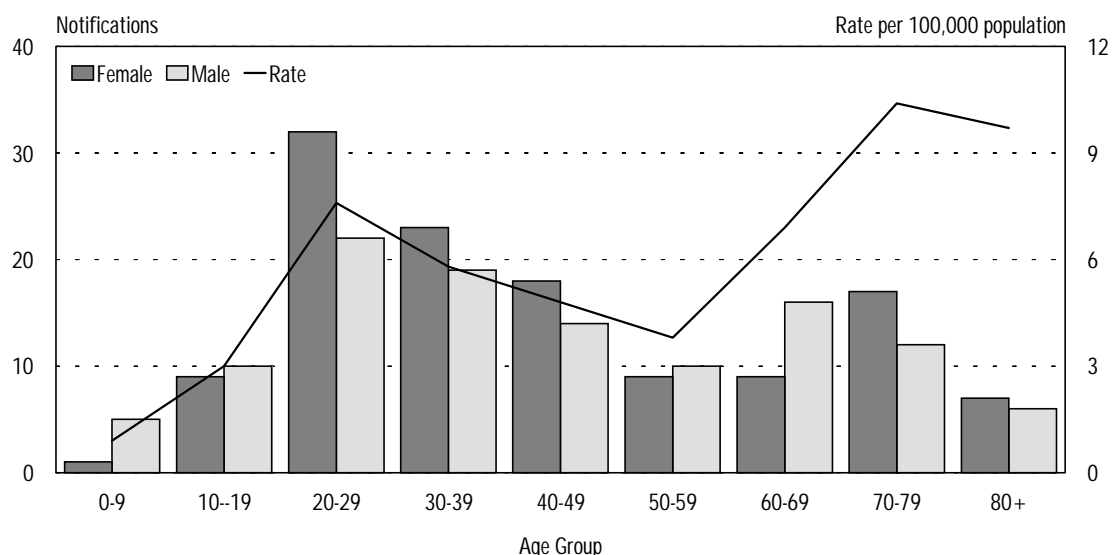
In Victoria the number and rate of notified cases of tuberculosis has remained stable over the past five years. The reasons for this are continuing surveillance for active cases and monitoring treatment compliance, prompt contact tracing, and pre-migration screening and post-migration follow up for people who enter the state on a health (tuberculosis) undertaking.

In 1998 there were 239 new cases of tuberculosis (TB) notified to the Department (Figure 24). This figure represents a 16 per cent reduction in the 1997 figure (286 cases). The age group of cases continues to show a bimodal pattern with peaks in those aged in their twenties and thirties, consisting largely of overseas born individuals, and people aged 60 years and over, with a higher proportion of older Australian born individuals.

There have been some newly emerging trends in the epidemiology of TB in Australia during recent years. In Victoria during 1998 there was an increase in the number of overseas students notified with active tuberculosis. Fifteen overseas students (6.3 per cent of total tuberculosis cases) were notified with active tuberculosis: eleven had pulmonary disease and seven were smear positive. This increase has resulted in a change to the requirements for an extension of an existing student visa. All students applying for an extension must undergo medical and radiological examination to exclude active tuberculosis before the visa can be extended.

Early detection and effective treatment is still the key strategy in the control of tuberculosis. Doctors should have a high index of suspicion for pulmonary TB when patients present with a history of persistent cough, particularly for overseas born people, people who have spent a prolonged period of time in a country with endemic TB, and people who are immunosuppressed, such as the elderly or those with HIV infection.

Figure 24: Tuberculosis Notifications, by Age Group and Sex, Victoria, 1998



The most common site for infection remains the lungs, accounting for 45.2 per cent of notifications. The next major site was lymphatic glands with 33.1 per cent of notifications (Figure 25).

In 1998, 201 (84 per cent) cases of TB were in overseas born individuals and 38 (16 per cent) cases in Australian born people (Figure 26). Countries of birth represented among the overseas born included Vietnam with 52 (21.8 per cent) cases, India with 22 (9.2 per cent) cases, Somalia with 20 (8.4 per cent) cases, the Philippines with 16 (6.7 per cent) cases, and China with 13 (5.4 per cent) cases.

The Department has issued guidelines on Tuberculosis for the information of health care providers and this document '*Guidelines for Management, Control and Prevention of Tuberculosis*' is available from the Communicable Diseases Section, Department of Human Services, telephone (03) 9637 4110.

Figure 25: Tuberculosis Notifications, by Site of Infection, Victoria, 1998

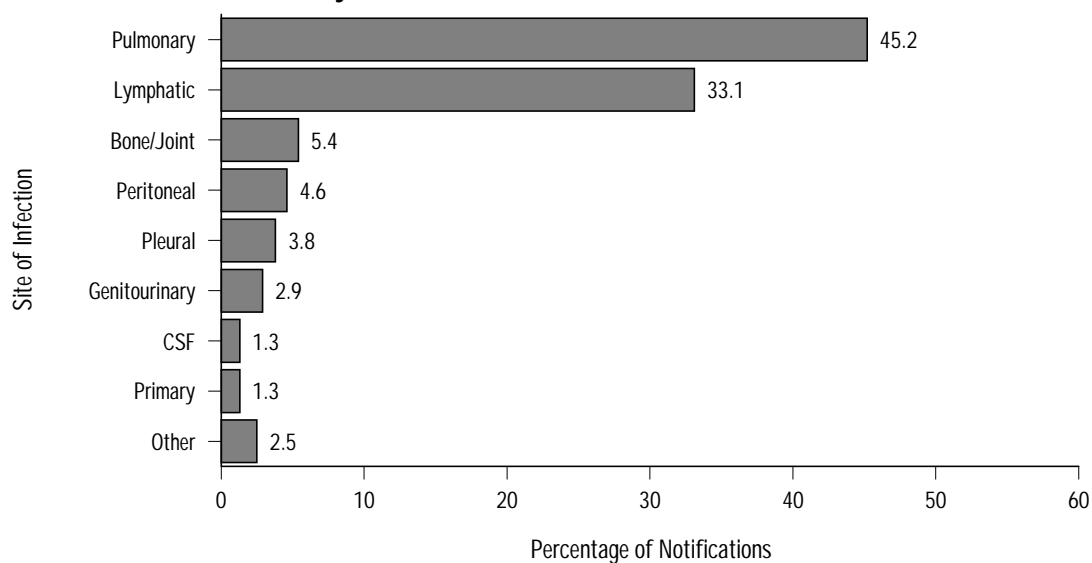
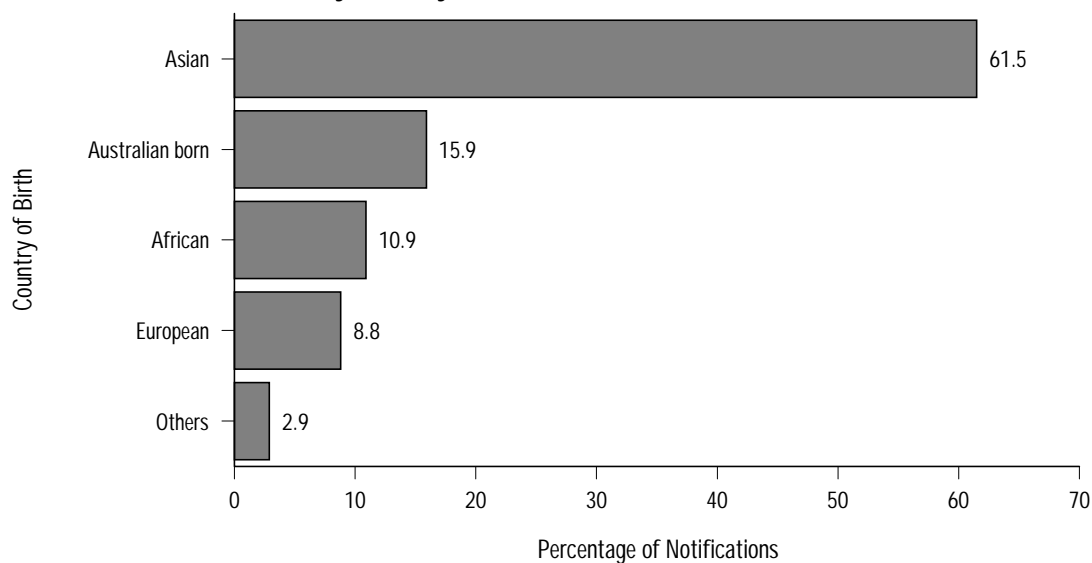


Figure 26: Tuberculosis Notifications, by Country of Birth, Victoria, 1998



Vaccine Preventable Diseases

Rosemary Lester and Melissa Morgan, Child Health and Prevention Section; Stephen Lambert, Anne Murphy, Graham Tallis, Communicable Diseases Section

Haemophilus influenzae type b (Hib) Infection

During 1998 the Department received eight notifications of *Haemophilus influenzae* type b (Hib) infection; of which two were epiglottitis, three were meningitis and three were 'other' infections (Table 21).

Table 21: *Haemophilus influenzae* type b Notifications, by Year and Type, Victoria, 1994–1998

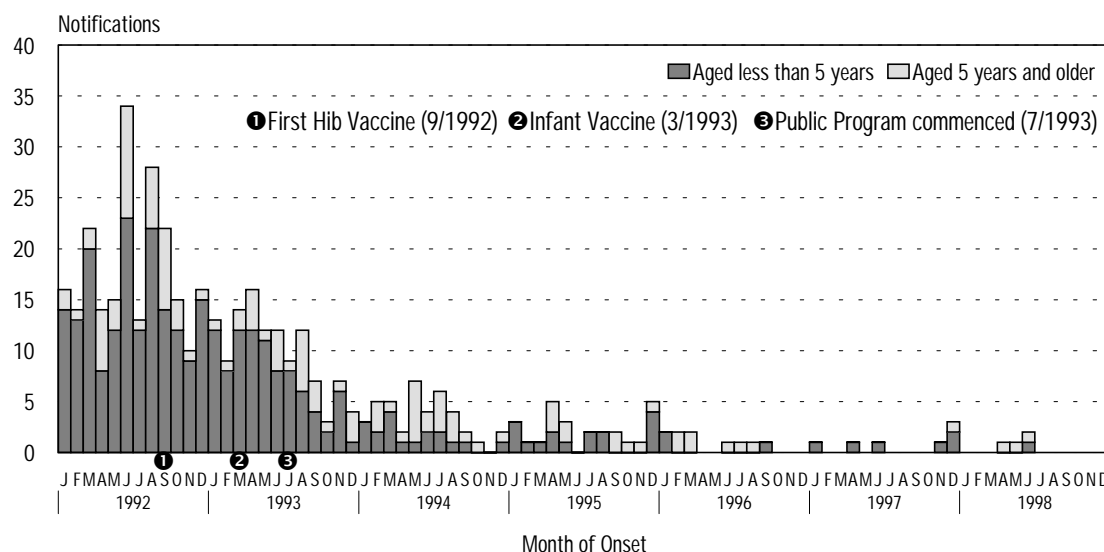
Year	1994	1995	1996	1997	1998
Epiglottitis	20	7	8	1	2
Meningitis	14	7	2	6	3
Septicemia	13	12	3	2	3
Total	47	26	13	9	8

Of the notifications received in 1998, five were males and three were females. Three were under the age of five years. One was an immunised male (five years) and the other four were adults over 40 years. Table 19 shows the continuing decrease in the notification rate for Hib infections in children less than five years old. Figure 20 shows this trend in relation to the introduction of Hib vaccination for children.

Table 22: *Haemophilus influenzae* type b (Hib) Notifications and Incidence Rates for Children Less Than Five Years of Age, Victoria, 1994–1998

	1994	1995	1996	1997	1998
Notifications in children less than 5 years	21	17	6	6	3
Rate per 100,000 children less than 5 years	6.6	5.3	1.9	1.9	1.0

Figure 27: *Haemophilus influenzae* type b (Hib) Notifications, by Age Group, Victoria, 1994–1998



Hib Epiglottitis

There were two notifications of epiglottitis received in 1998, both in adult males (aged 45 and 76 years). Both cases presented with severe painful sore throats and respiratory distress and required intubation. Following antibiotic treatment both made a full recovery. Both cases were diagnosed clinically with no laboratory confirmation obtained.

Hib Meningitis

There were three notifications received in 1998. Of these, two were female (aged 19 months and 16 months) and one was male (aged five years). These constitute vaccine failures, although one case was overdue for her eighteen month booster dose. The two female cases recovered.

The male had received two doses of HibTITER; one at 13 months and another at 15 months. He presented with a history of rapidly deteriorating conscious state over four hours and a clinical picture of meningitis. Despite intensive treatment, he continued to deteriorate and died four days later. The CSF and blood cultures were negative but a latex agglutination test in urine was strongly positive for Hib infection. Following post mortem the cause of death was considered to be due to Hib meningitis.

Other Hib Infections

Three other Hib infections were reported.

- A female (44 years) with septicaemia.
- A male (73 years) with terminal carcinoma who developed septicaemia.
- A male (six months), partially immunised with two doses of HibTITER, who developed pneumonia and septicaemia.

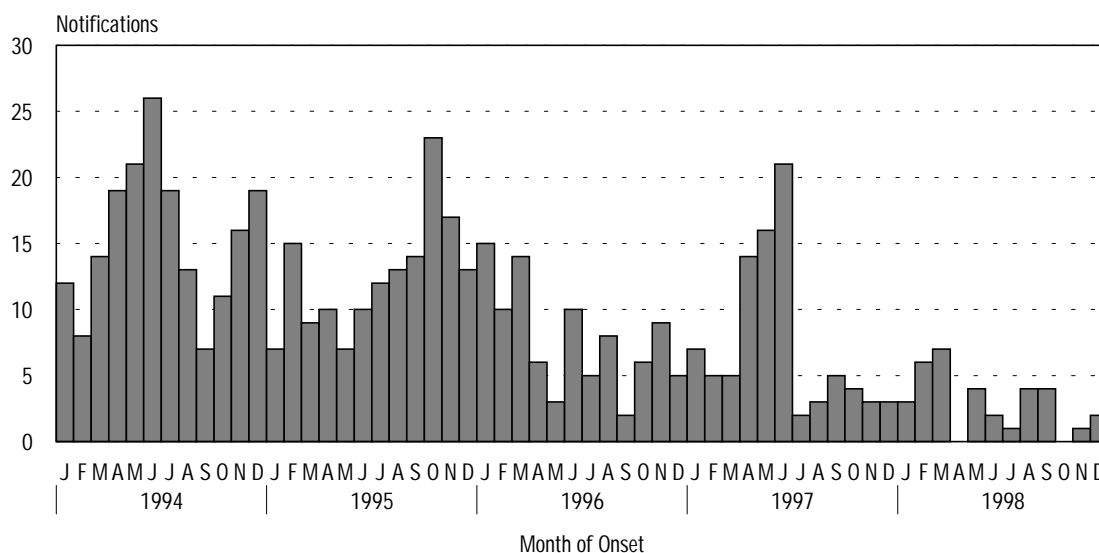
Measles

The Communicable Diseases Section and the Victorian Infectious Diseases Reference Laboratory (VIDRL) introduced a system of enhanced measles surveillance at the beginning of 1997. A public health nurse conducts structured interviews with both the diagnosing clinician and all notified cases or their carers. The nurse collects a range of information including demographic details, clinical symptoms, exposure to others with a similar illness, and vaccination history. The major objective of this program is to encourage serological confirmation of clinically diagnosed measles, and to this end, a free phlebotomy service was added to the system in July 1997. A paediatric phlebotomist conducts home visits to collect specimens for measles, human parvovirus, and rubella, with serological testing performed at VIDRL. 1998 was the first full year of operation of this system including the phlebotomy service.

The national Measles Control Campaign was conducted between August and November 1998. This campaign was run jointly by the Commonwealth and each of the States and Territories, and consisted of three components: a primary school, a preschool, and a high school intervention. The major component was the primary school intervention in which every primary school child was offered a dose of measles/mumps/rubella (MMR) vaccine. This was necessary to allow for the movement of the second MMR dose on the vaccination schedule from a high school dose (10 to 16 years) to a preschool dose (4 to 5 years). The preschool intervention involved identifying children who were overdue for their first dose of MMR according to the Australian Childhood Immunisation Register (ACIR). The parents of these children were sent a letter encouraging them to have their child immunised. The high school intervention consisted of encouraging, by means of distributed information material, all high school students who had not received two doses of MMR to do so. In Victoria, 83.6 per cent of the eligible cohort were immunised at school, with an estimated 14.2 per cent immunised by another provider (from the NCIRS post campaign survey), giving a total coverage of 97.8 per cent, the highest of any State or Territory.

During 1998, the Department received 214 notifications of measles (116 female, 98 male; Table 23). Clinical symptoms were obtained for 207 (97 per cent) of the notified cases. Only 72 (35 per cent) of these 207 met the NHMRC clinical case definition for suspected measles (that is, a morbilliform rash, cough, and fever at rash onset).

Figure 28: Measles Notifications, by Month Of Onset, Victoria, 1994–1998



The method of classifying notified measles cases in Victoria has been described elsewhere (see <http://www.health.gov.au/pubhlth/cdi/cdi2302/cdi2302b.pdf>). Of the 214 notified cases, 36 remained in the notification data set as they were:

- laboratory confirmed; or
- neither laboratory confirmed or rejected but met the NHMRC clinical case definition for suspected measles (clinically compatible); or
- there was insufficient symptomatology and laboratory information to accept or reject them as being measles (not classifiable) (Table 23).

Table 23: Classification of Measles Notifications, 1998

Classification	Total
Laboratory confirmed	15
Clinically compatible	14
Not classifiable	7
Sub-total	36
Laboratory rejected	149
Not clinically compatible	29
Total	214

Results from serological testing were available for 87 per cent (187 out of 214) of cases, a marked increase from 48 per cent in 1997 (when the phlebotomy service was only available for the last six months). There were 18 cases whose serum was positive for measles specific IgM, however, three of these were due to recent vaccination (within 45 days) leaving 15 laboratory confirmed cases of measles (8 per cent of those tested).

There were 18 cases notified as having measles (10 per cent of those tested) who were positive for either rubella specific IgM (4 cases) or human parvovirus B19 IgM (14 cases).

Those under the age of one year continued to be over-represented in notified cases (61 out of 214). Serological testing was performed on 50 (82 per cent) of these infants, with two being positive for measles specific IgM.

There were three clusters of measles identified in 1998 (a cluster is defined as 2 or more epidemiologically linked cases of measles) accounting for 11 of the 15 laboratory confirmed cases.

The first cluster involved a 19 year old male visiting Melbourne (onset 10/01/1998) from New South Wales. He was the index case in a cluster that went on to involve three other people—his brother (age 22 years, onset 18/01/1998), his nephew (age 6 months, onset 01/02/1998), and a male house guest (age 23 years, onset 03/02/1998). None of the cases in this cluster reported immunisation with a measles containing vaccine.

The second cluster is likely to be linked to the first cluster, but no clear epidemiological link could be established. The index case in this cluster, a 2 year old female (onset 01/02/1998) lived less than a kilometre of the household that was the site of the first cluster. This cluster went on to involve four other people who attended the same church group as the index case—a three year old female (onset 12/02/1998), a one year old female (onset 26/02/1998), an 18 year old female (onset 02/03/1998) and a 10 month old male (onset 13/03/1998). None of the cases in this cluster reported immunisation with a measles containing vaccine.

The index case in the third cluster was an 18 year old female (onset 16/12/1998) who had returned from a holiday in Bali on 04/12/1998. The final case in this cluster was the index case's 21 year old brother (onset 23/12/1998). Neither of these cases in this cluster reported immunisation with a measles containing vaccine.

The remaining four laboratory confirmed cases of measles in 1998 were not related to any other case. They were one, two, four, and 15 years of age, with two of these cases reporting immunisation with a measles containing vaccine.

The enhanced surveillance system has allowed collection of important information about the changing epidemiology of measles in Victoria. With an enhanced system of surveillance in place, the number of laboratory confirmed cases of measles fell. Those clusters of disease that were identified are likely to have resulted from importation, either interstate or international. Given this, clinicians who suspect the diagnosis of measles should try to identify a source of infection, particularly a history of recent travel (within 18 days of rash onset), and should consider whether the case meets the NHMRC definition for suspected measles, that is, morbilliform rash, fever at rash onset, and cough. This information provides strong support for the likelihood that the indigenous transmission of measles in Victoria has been interrupted. The national Measles Control Campaign has meant almost all the Victorian primary school cohort are now immune to measles. The high levels of immunity, particularly in school based age groups, and the enhanced surveillance system allow Victoria to be well placed to eliminate the local transmission of measles, and to identify when this has occurred.

Mumps

For surveillance purposes, the department considers a case of mumps, is someone who has had:

- mumps virus isolated from a clinical specimen; or
- a significant rise in mumps antibody level by any standard serological assay, except following immunisation; or
- a clinically compatible illness (unilateral or bilateral swelling of the parotid or other salivary glands lasting two days or more without other apparent cause).

During 1999, 54 notifications of mumps were received, of which 22 were female and 32 male. No laboratory notifications were received, and notifications are not actively followed up, so the cases notified were presumed to have been made by clinical diagnosis.

Two thirds of notifications were in children aged under 10 (Figure 30). Notifications occurred throughout the year.

Figure 29: Mumps Notifications, by Month of Onset, Victoria, 1994–1998

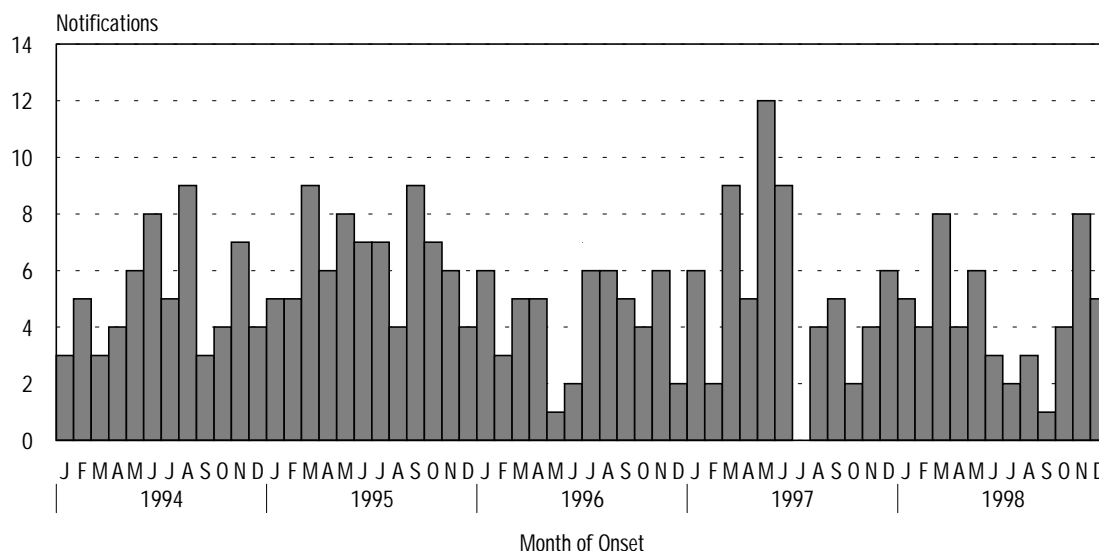
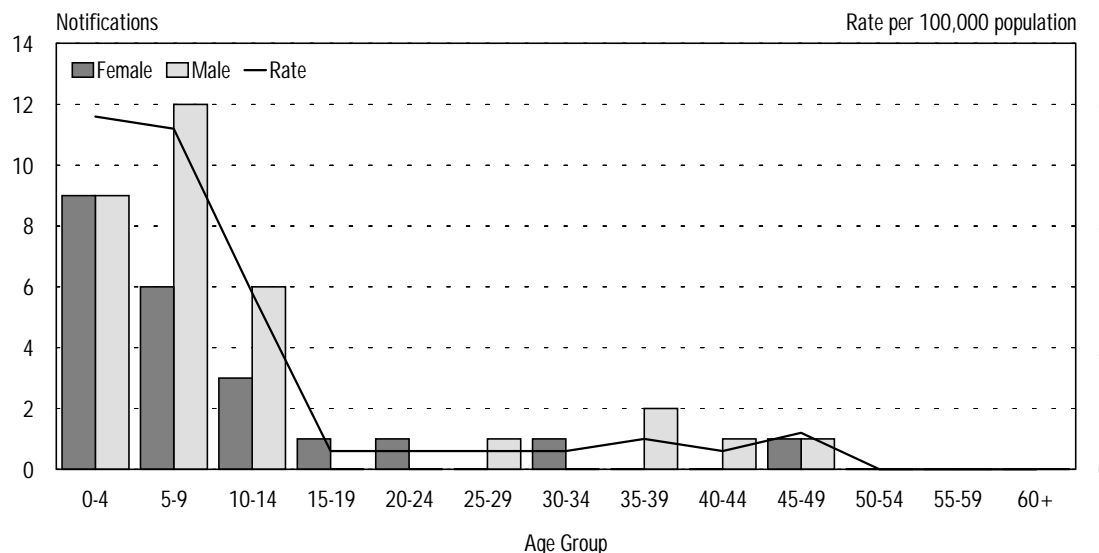


Figure 30: Mumps Notifications, by Age Group and Sex, Victoria, 1998



Pertussis

For surveillance purposes, the Department considers a case of pertussis as a person who has had:

- *Bordetella pertussis* isolated from a clinical specimen; or
- elevated *pertussis* specific IgA in serum or *B pertussis* antigen in a nasopharyngeal specimen using immunofluorescence with a history of clinically compatible illness; or
- an illness lasting two weeks or more with one of the following:
 - paroxysms of coughing, or
 - inspiratory ‘whoop’ without apparent cause, or
 - post-tussive vomiting; or
- an illness characterised by a cough lasting at least two weeks in a patient who is epidemiologically related to a laboratory confirmed case.

During 1998, 1141 notifications of pertussis were received, of which 578 (50.7 per cent) were female and 538 (47.2 per cent) were male. Gender was not specified in 25 (0.8 per cent) of notifications. The median age was 18 years (females 22 years, males 15 years). There were 60 (5.3 per cent) notifications from children less than one year of age. The highest rates were in the 10 to 14 year old age group (Figure 32).

Figure 31: Pertussis Notifications, by Month of Onset, Victoria, 1994–1998

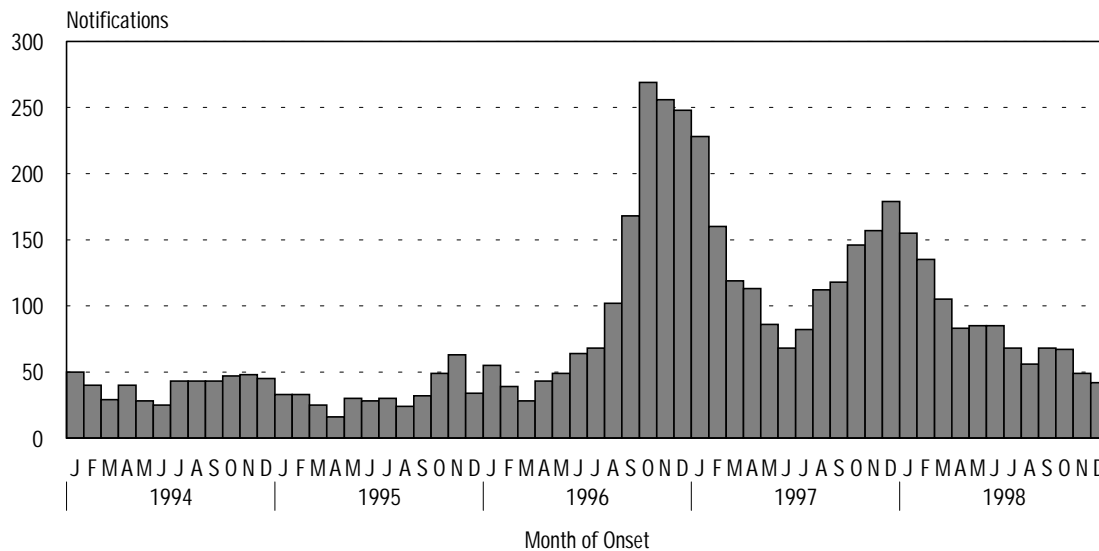
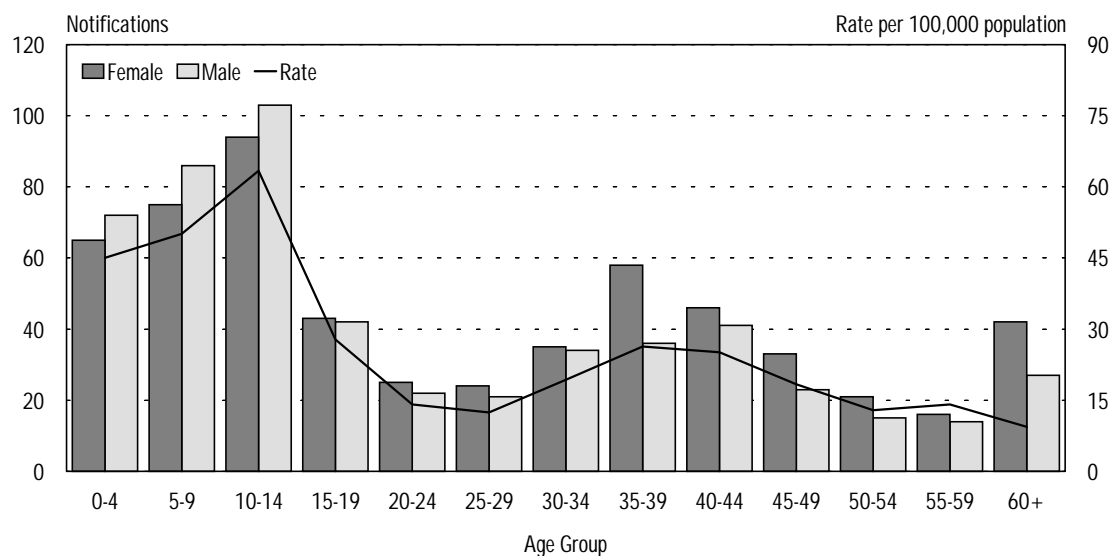


Figure 32: Pertussis Notifications, by Age Group and Sex, Victoria, 1998



Rubella

For surveillance purposes, the Department considers a case of rubella infection as someone who has had:

- a generalised maculopapular rash and a fever,
 - AND one or more of:
 - arthralgia/arthritis; or
 - lymphadenopathy; or
 - conjunctivitis
 - AND an epidemiological link to a confirmed case,

OR

- demonstration of rubella specific IgM antibody, except following immunisation; OR
- a fourfold or greater change in rubella antibody titre between acute and convalescent phase sera obtained at least two weeks apart; OR
- rubella virus isolated from a clinical specimen.

There were 188 notifications received, of which 58 (31 percent) were female and 130 (69 per cent) male. The ratio of males to females was thus 2.2:1. Cases were most commonly notified in males under the age of 10, but with a secondary peak in males aged 15 to 24, reflecting the previous practice of not immunising adolescent boys against rubella (Figure 34).

Notifications of rubella have continued to decline since the last outbreak in 1995 and 1996 (Figure 33). There were 27 laboratory confirmed cases, the remainder being based on a clinical diagnosis only.

Figure 33: Rubella Notifications, by Month of Onset, Victoria, 1994–1998

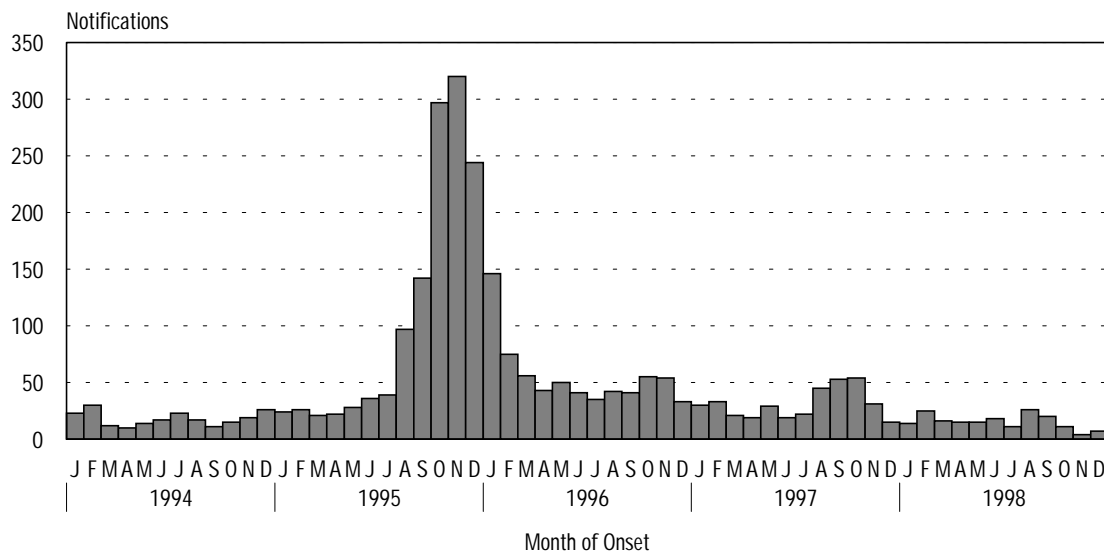
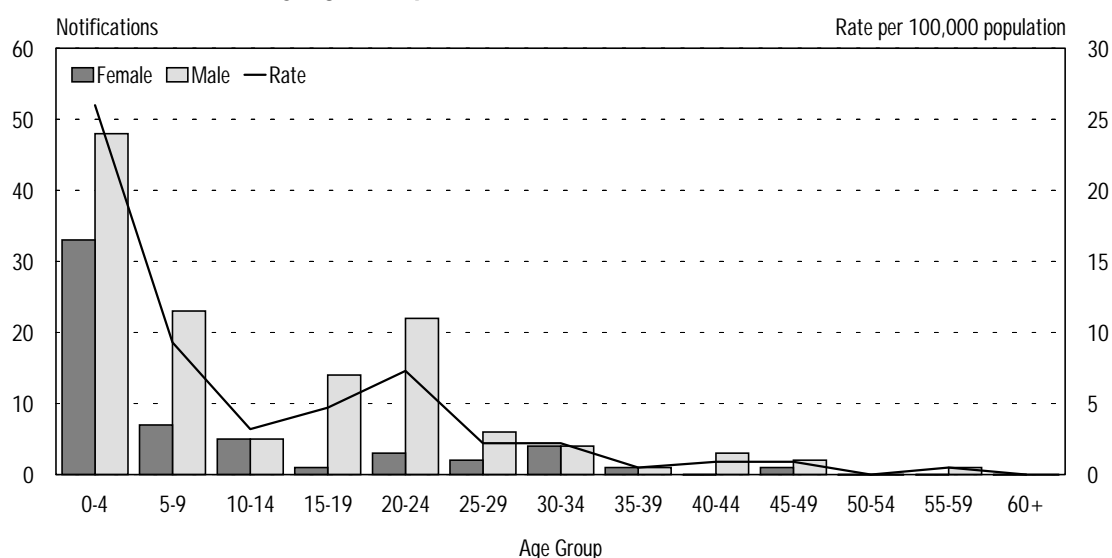


Figure 34: Rubella Notifications, by Age Group and Sex, Victoria, 1998



Tetanus

The Department received one notification of tetanus in 1998. The 72 year old lady, born in Eastern Europe, did not appear to have been ever immunised against tetanus. She was admitted to hospital with a history of jaw pain and muscle stiffness. She was transferred to intensive care with increasing signs of tetany and hyperreflexia, and required intubation. She was treated with tetanus immunoglobulin and metronidazole, and gradually improved over six weeks and was discharged. She gave a history of gardening barefooted.

In each of the three years 1996 to 1998, there has been a single case of tetanus notified, all cases being elderly females (Table 24). This underlines the importance of ensuring this group has been adequately immunised.

Table 24: Tetanus Notifications, by Year and Sex, Victoria 1994–1998

Year	1994	1995	1996	1997	1998
Female	1	2	1	1	1
Male	0	2	0	0	0
Total	1	4	1	1	1

Vector Borne Diseases

Rodney Moran and Kath Taylor, Communicable Diseases Section

Arbovirus Infections

Arbovirus infections (mosquito-borne diseases) are transmitted by mosquitoes to humans. Victoria has two such conditions commonly reported; Ross River Virus disease (Epidemic Polyarthritis) and Barmah Forest Virus disease. Australian Arboencephalitis is a serious arbovirus disease which has not been reported in Victoria since 1974.

Ross River Virus disease (RRVd) and Barmah Forest Virus disease (BFVd) are endemic alphaviruses which occur throughout most parts of rural Victoria.

Traditionally, the risk of infection from RRVd and BFVd is greater throughout the warmer months of the year (that is, summer) when conditions are more conducive for mosquito breeding and human activity places greater exposure risks. The risks however, increase and decrease each year depending on local conditions encountered.

There were 173 arbovirus infections notified in 1998 of which 112 (65 per cent) were Ross River Virus disease, 17 (10 per cent) Barmah Forest Virus disease, 20 (12 per cent) flavivirus infections (all imported Dengue Fever), 24 were unspecified (14 per cent).

Table 25: Arbovirus Notifications, by Year and Type, Victoria, 1994–1998

Year	1994	1995	1996	1997	1998
Ross River	64	25	138	1062	112
Barmah Forest	12	7	41	42	17
Flavivirus	10	19	6	6	20
Unspecified	5	4	2	-	24
Total	91	55	187	1110	173

Ross River Virus disease

Traditionally in Victoria, cases are acquired near major inland waterways such as the Murray Valley region and in eastern Victoria around the Gippsland Lakes system. Excess water levels caused by either river flooding or high tides coupled with above average rainfall create ideal breeding sites for vector mosquitoes.

Following a substantial increase in the reported incidence of RRVd in 1997 (1062 cases) there was relatively low activity in 1998 (112 cases). It is likely that the majority of notifications of unspecified arboviral infection (24 cases) were also due to RRVd. A contributing factor to this relatively low rate was the continued dry weather conditions throughout most parts of the state thus a reduction in amount of water available for mosquitoes to breed in. Aggressive surveillance and control programs against the known vector species and education programs implemented within various local government areas during the summer of 1997–1998 would also have contributed to the reduction in the number of human cases notified.

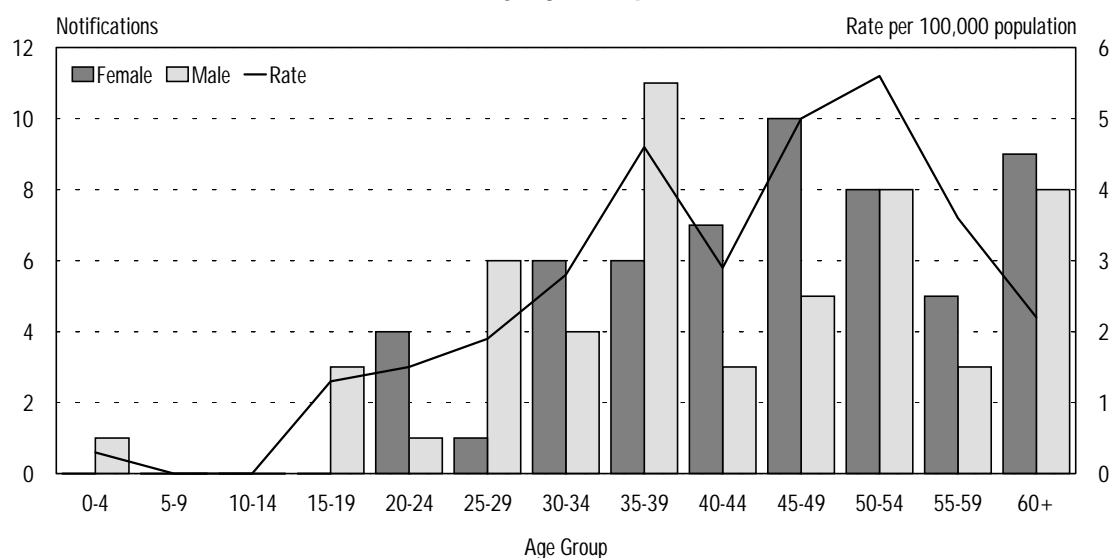
Barmah Forest Virus disease

17 cases of BFVd were notified in 1998. The Department encourages medical practitioners to look for BFVd in patients with classic arbovirus symptoms but negative serology for RRVd. A blood test is commercially available to confirm infection for BFVd.

Flavivirus Infections

The 20 cases of flavivirus notified were Dengue Fever, all of which were acquired overseas. Dengue fever is an acute viral disease occurring throughout the tropics and cases are reported sporadically from far north Queensland.

Figure 35: Ross River Virus Infection Notifications, by Age Group and Sex, Victoria, 1998



Malaria

During 1998, the Department received 87 notifications of malaria, of which 22 (25 per cent) were females and 65 (75 per cent) males.

Three men aged 19, 37 and 58 years had recrudescence episodes of *Plasmodium vivax* malaria, one eight weeks after the first episode, and two after five months.

Table 26: Malaria Notifications, by Species, Victoria, 1994–1998

Malaria Species	1994	1995	1996	1997	1998
<i>Plasmodium vivax</i>	53	78	70	63	58
<i>Plasmodium falciparum</i>	26	24	29	16	17
<i>Plasmodium ovale</i>	4	6	8	7	9
<i>Plasmodium malariae</i>	1				
<i>Plasmodium falciparum</i> / <i>Plasmodium vivax</i>	2	1	1	1	1
<i>Plasmodium falciparum</i> / <i>Plasmodium ovale</i>	2	0	1	0	2
Indeterminate	3	1	1	3	0
Total	91	110	110	90	87

The majority (67 per cent) of cases of malaria were due to *Plasmodium vivax* (Table 26). Of these *P. vivax* infections, 26 (45 per cent) were acquired in Asia (Table 27). Indonesia, including Bali, was the country of origin of 22 per cent of cases of *P. vivax* malaria.

Cases of *P. falciparum* malaria were reported as acquired in Africa, Oceania, and Asia. Mixed infections were acquired in Africa and south east Asia. All cases of *P. ovale* malaria were acquired in Africa.

This year there were three cases reported as having visited Bali, where two of these had shared a house. Neither of them had taken antimalarial prophylaxis.

In 1998, no cases of *Plasmodium malariae* malaria were reported.

Figure 36: Malaria Notifications, by Month of Onset, Victoria, 1994–1998

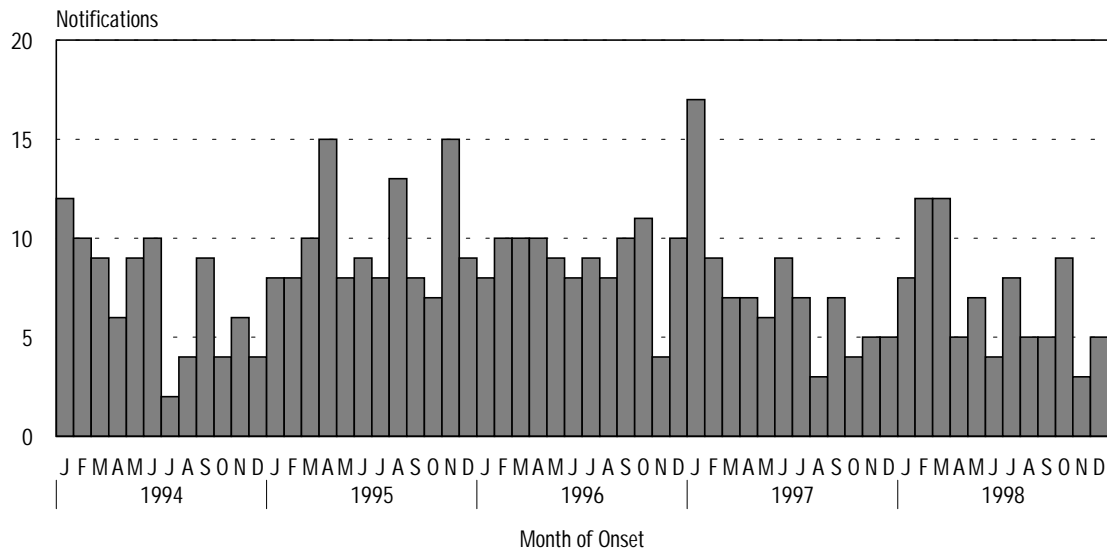


Figure 37: Malaria Notifications, by Age Group and Sex, Victoria, 1998

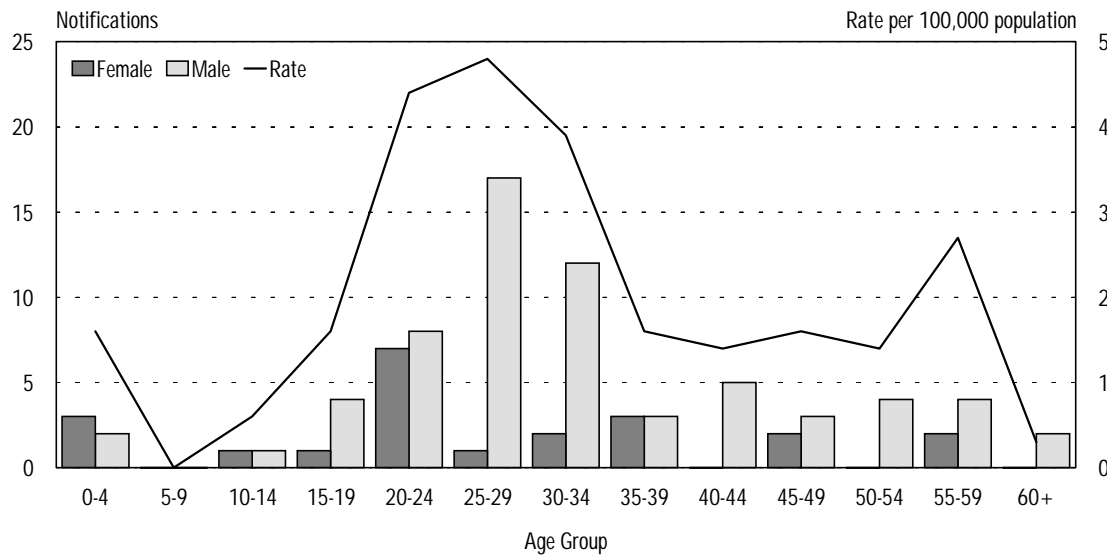


Table 27: Malaria Notifications, by Country Acquired, Victoria, 1998

	Countries visited	Notifications
(I) Plasmodium vivax		
Oceania	Papua New Guinea	25
	Solomon Islands	1
	Vanuatu	1
Asia	Afghanistan	4
	India	4
	Indonesia (excluding Bali)	10
	Bali	3
	Pakistan	2
	Vietnam	1
	Thailand	1
	Iran	1
Africa	Africa not otherwise specified, multiple	2
	Ethiopia	1
	Somalia	1
	Uganda	1
Sub-total		58
(II) Plasmodium falciparum		
Oceania	Papua New Guinea	5
	Solomon Islands	1
Asia	India	2
	Indonesia	3
Africa	Africa not otherwise specified, multiple	2
	Angola	1
	Nigeria	2
	Zimbabwe, Tanzania	1
Sub-total		17
(III) Plasmodium ovale		
Africa	Africa not otherwise specified, multiple	3
	Ghana	1
	Kenya	2
	Malawi	1
	Uganda	1
	Zimbabwe	1
Sub-total		9
(V) Pl. vivax / Pl. Falciparum		
Asia	Indonesia	1
Sub-total		1
(IV) Pl. ovale / Pl. Falciparum		
Asia	Vietnam	1
Africa	Africa not otherwise specified, multiple	1
Sub-total		2
Total		87

Rickettsial Infections (Tick borne)

There were three cases of rickettsial infections notified in 1998.

- A 26 year old woman presented with fever on return from a trip to India. *Rickettsia australis* infection was diagnosed on serology.
- A 22 year old man was bitten by a tick on the neck while in Northern NSW. He developed tiredness and lumps in his axilla, wrist and elbow ten days later. He was treated with oral doxycycline.
- A 48 year old man was notified with *Rickettsia australis* infection diagnosed on serology. He gave a history of having developed a rash some months earlier after a tick bite while in Queensland. He was treated with oral doxycycline.

Zoonoses

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Brucellosis

Two cases of brucellosis were notified in 1998, both imported. One was a 39 year old man from Asia, the other a 38 year old male visitor from Greece.

Hydatid Disease

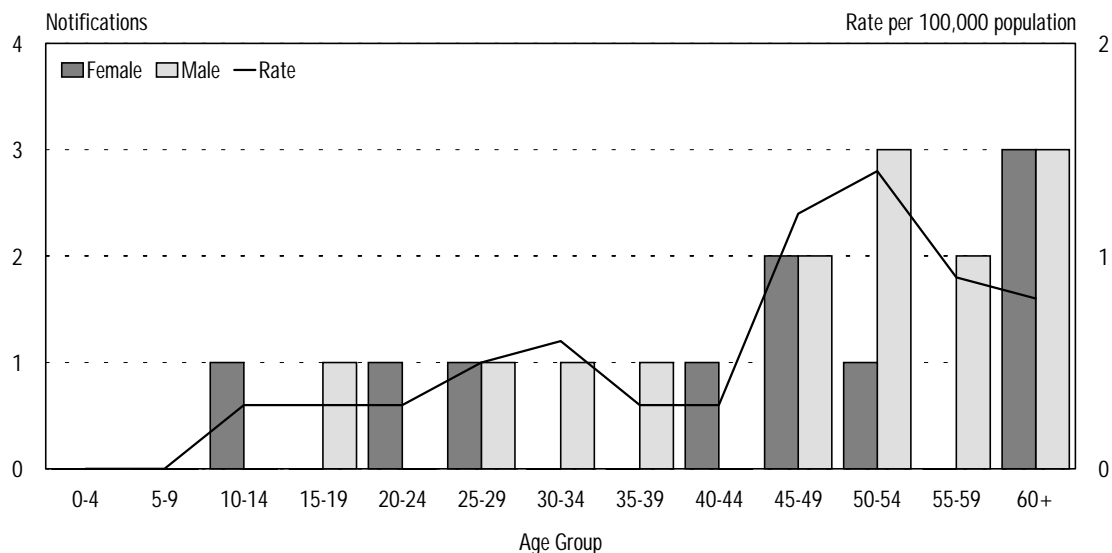
In 1998 there were 25 cases of hydatid disease notified, 14 males and 10 females (one sex unknown).

Three of these, all males, were notified after hydatid liver cysts were found incidentally at autopsy.

The youngest person was a female aged 13 years from Eastern Europe who had her first operation for removal of liver cysts at 11 years of age.

Ten of the cases are thought to have acquired the infection in Australia, others from Italy, Iraq, Greece, Macedonia, Cyprus, Lebanon and Yugoslavia. The majority had long standing hydatid disease, with a history of past surgery. Some were treated with albendazole only, others being booked for surgery. All had liver cysts, and one had an abscess requiring draining.

Figure 38: Hydatid Disease Notifications, by Age Group and Sex, Victoria, 1998



Leptospirosis

Twenty two cases of leptospirosis were notified in 1998 compared with 23 cases in 1997. The majority of cases were 30 to 50 year old males (Figure 40). There was only one notification of a female in 1998. As in previous years, dairy farmers and other workers exposed to cattle appear to be at greatest risk of acquiring leptospirosis (Table 28). Cases occurred most commonly in spring (Figure 39). As in previous years, the commonest serovar was *Leptospira borgpetersenii* var hardjo (Table 29).

Table 28: Leptospirosis Notifications, by Occupation, Victoria, 1998

Occupation	Cases
Dairy Farmer	18
Other Cattle Farmer	2
Abattoir Worker	2
Total	22

Figure 39: Leptospirosis Notifications, by Month of Onset, Victoria, 1994–1998

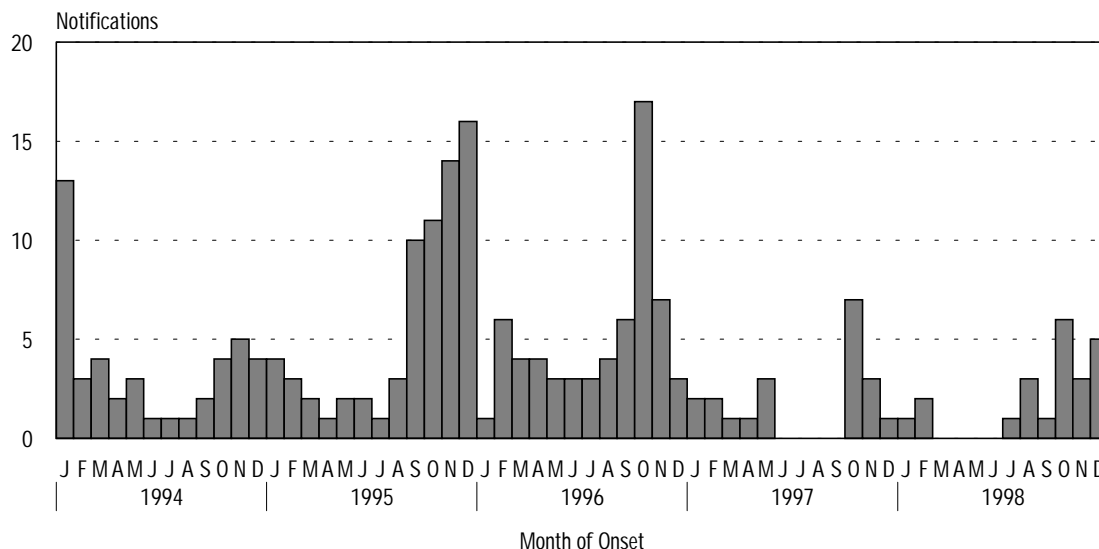


Figure 40: Leptospirosis Notifications, by Age Group and Sex, Victoria, 1998

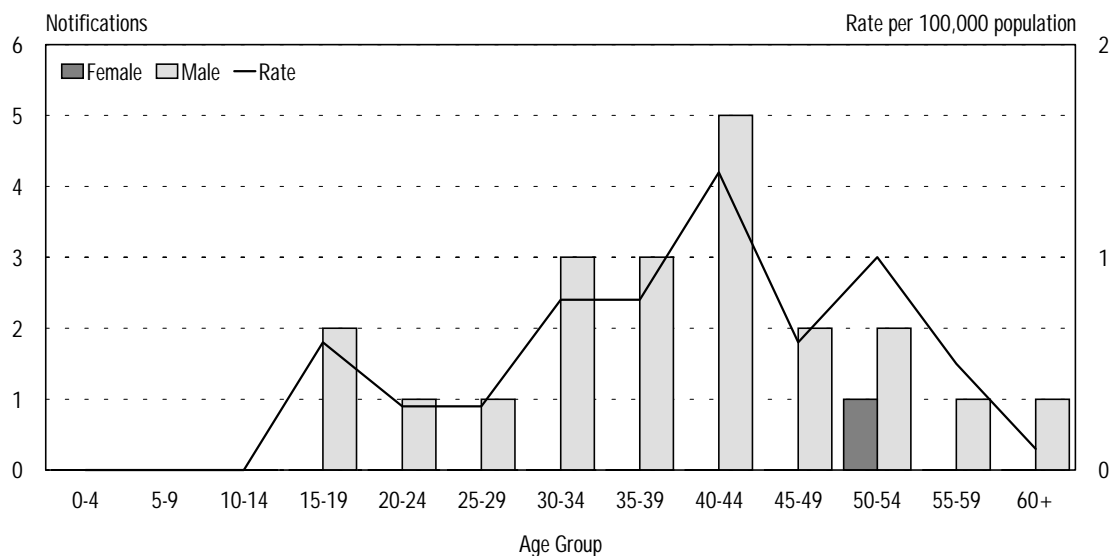


Table 29: Leptospirosis Notifications, by Serovars, Victoria, 1998

Serovar	Cases
<i>L. hardjo</i>	16
<i>L. hardjo</i> / <i>L. ballum</i>	4
<i>L. australis</i>	1
Leptospira NOS	1
Total	22

Psittacosis

During 1998, 47 notifications of psittacosis were received of which 34 were male and 13 were female. There were no outbreaks identified and all cases were sporadic. There was the usual increase in notifications during the spring (Figure 41).

Figure 41: Psittacosis Notifications, by Month of Onset, Victoria, 1994–1998

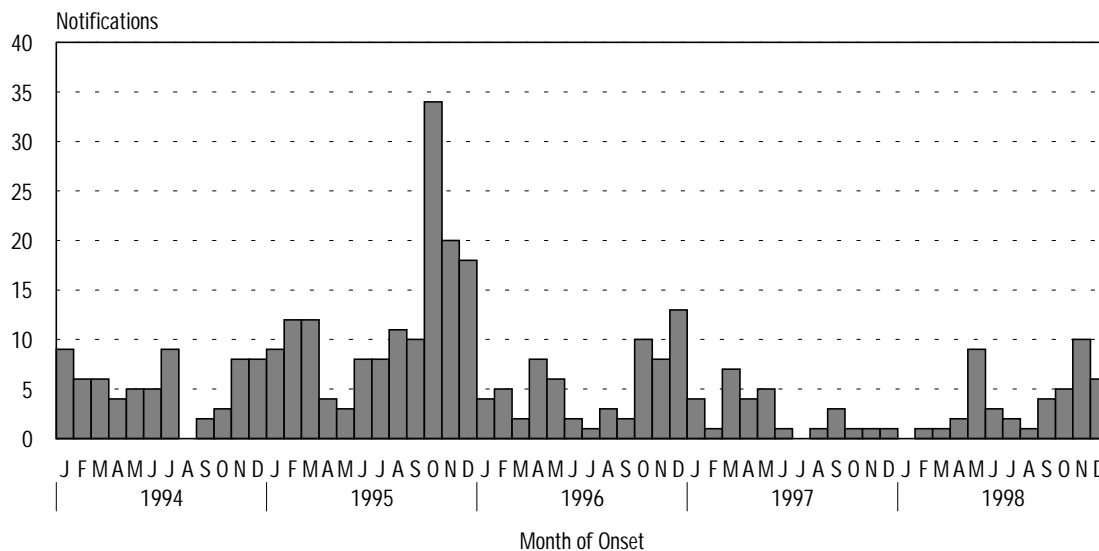
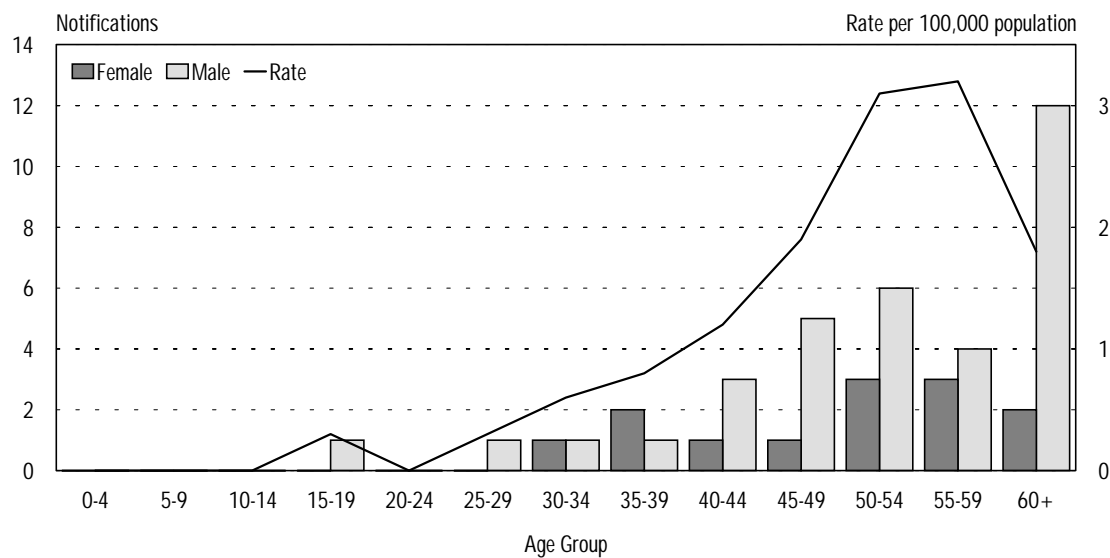


Figure 42: Psittacosis Notifications, by Age Group and Sex, Victoria, 1998



Q Fever

Thirty-four cases of Q fever were notified in 1998 compared with 19 cases in 1997. The majority of cases were males (29 cases).

As in previous years, abattoir workers and other workers exposed to cattle were at greatest risk of acquiring Q fever. Of note, five farmers were notified with Q fever following exposure to dead cattle during flooding in Gippsland. Ideally, workers in the meat industry including any abattoir worker and transport drivers should be tested and vaccinated prior to starting work in that area.

Table 30: Q Fever Notifications – By Occupation, Victoria, 1998

Occupation	Cases
Abattoir worker	11
Farmer	6
Shearer	4
Cattle truck driver	5
Other / unknown	6
Total	32

Figure 43: Q Fever Notifications, by Month of Onset, Victoria, 1994–1998

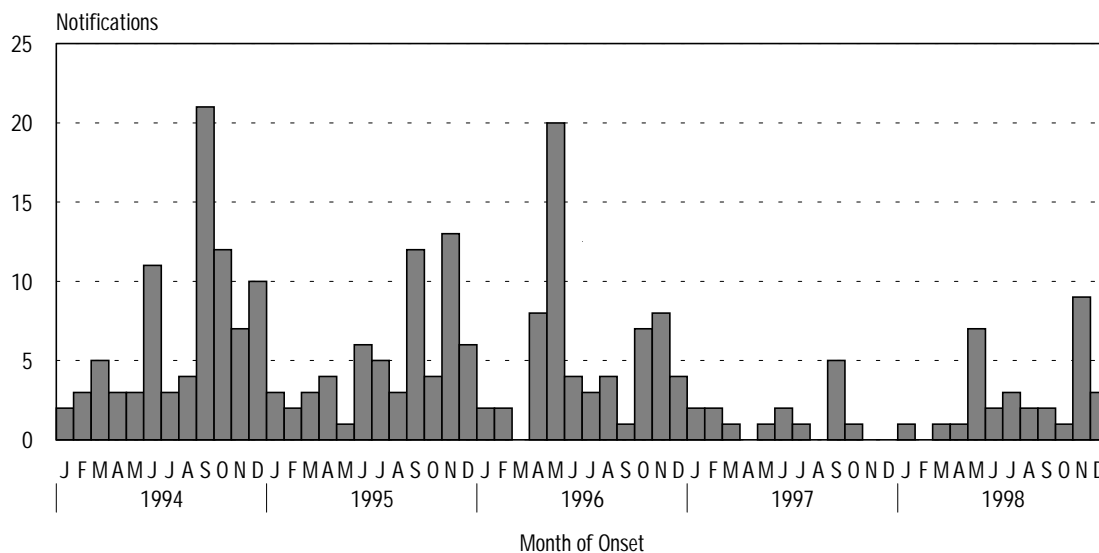
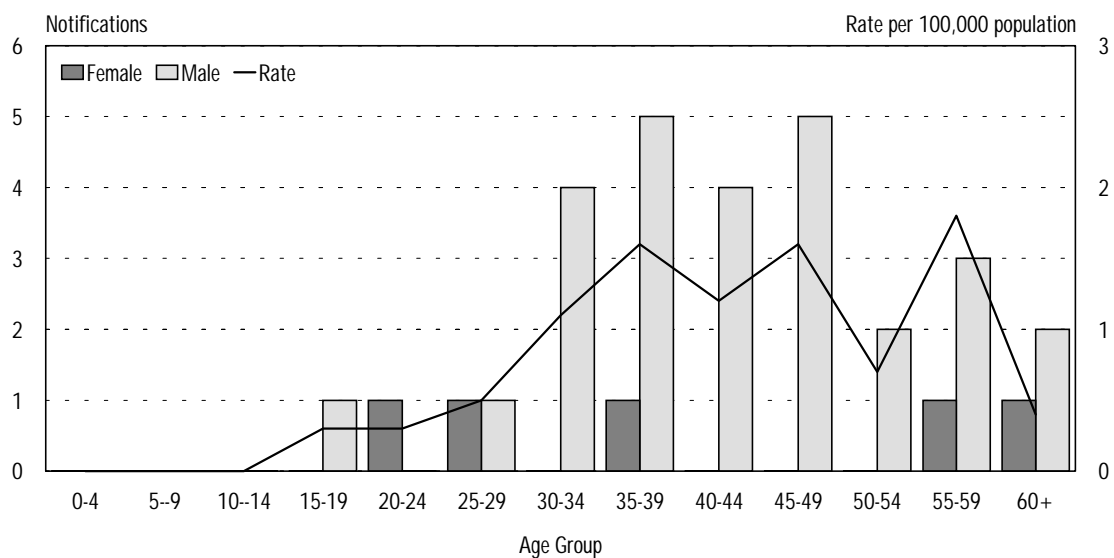


Figure 44: Q Fever Notifications, by Age Group and Sex, Victoria, 1998



Taeniasis

There were five cases of taeniasis in 1998. The median age was 21 years and three cases were male. Three cases were due to *T. saginata*. One 21 year old male presented with focal facial fitting, due to multiple cerebral lesions caused by *T. solium* (neurocysticercosis).

