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Victorian Infectious Diseases Bulletin

# The Use of Dried Blood Spots to Detect Antibodies to Hepatitis C Virus

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*The hepatitis C virus (HCV) is a major public health threat in Australia. The primary health concern with HCV infection is the development of chronic hepatitis C that can lead to cirrhosis and hepatocellular carcinoma. An estimated 190,000 Australians have been exposed to HCV (1 per cent of the population), 134,000 are chronically infected and around 11,000 new infections occur each year.[1] Here, we report a cost-effective method of detecting HCV infection.*

## INTRODUCTION

The cost of hepatitis C virus (HCV) to the public health system and the community is enormous. In 1996–97, estimates of the direct costs (for example, the combined health related and social costs) of HCV amounted to at least $75 million per year, while estimates of indirect costs (for example, production loss) amounted to at least $32.5 million per year.[2] Injecting drug users represent a major risk group for the transmission of HCV. A public health concern is the ongoing high incidence of HCV infection in this group despite effective programs that prevent the spread of blood-borne viruses such as HIV and hepatitis B virus (HBV).[3] There is a need, therefore, for surveillance systems that are able to provide ongoing data on the prevalence of HCV in high-risk injecting drug user groups.

Several studies have highlighted the convenience of collecting dried blood spots rather than venous blood for the detection of HCV antibodies in seroprevalence studies.[4, 5] Blood sampling of injecting drug users via the vein to obtain serum for testing is often difficult as a result of poor peripheral vein access. This method of blood sampling, therefore, is not always practical for hepatitis C serosurveillance, which generally involve a large number of participants. This study evaluated the use of a commercial enzyme immunoassay (EIA) to detect antibodies to HCV in dried blood spots.

## MATERIAL AND METHODS

### COLLECTION OF PAIRED BLOOD SPOTS AND VENOUS BLOOD

Patients attending the Melbourne Sexual Health Centre who requested hepatitis C testing were invited to participate in the study. One hundred and fifty-eight patients volunteered to provide paired samples of blood spots and venous blood. Blood spot samples were obtained by a finger prick, from which the blood drawn was spotted onto absorbent filter paper, filling two circles, each with a diameter of 13 millimetres. Dried blood spot samples were allowed to air dry at room temperature before storage at 4°C in low gas-permeable zip lock bags. Venous blood was also collected from each study participant. The Human Research Ethics Committee, Department of Human Services, Victoria, approved the study.

### ELUTION OF BLOOD SPOTS

A disc with a 5.5-millimetre diameter was punched from each blood spot, placed in a well of a 96-well flat-bottomed micro-titre plate and eluted by the addition of 120 ml of sample diluent provided by the kit manufacturer. The plate was sealed, shaken at room temperature for 30 minutes and left to elute overnight at 4°C.

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State Government Victoria Department of Human Services

The following day, the plate was shaken for a further 30 minutes and the eluted blood of each patient was collected.

### ENZYME IMMUNOASSAY

#### Serum

All serum specimens were screened for antibodies to HCV, using the third-generation Abbott HCV 3.0 EIA (Abbott Diagnostics). If the specimens were reactive, the team tested them by the Murex anti-HCV 4.0 EIA (Abbott Diagnostics). Both assays were used according to the manufacturer's instructions. Serum specimens reactive in both assays were considered to be anti-HCV positive.

#### Dried blood spots

Preliminary testing of eluted blood spots indicated that the Abbott HCV 3.0 EIA had an unacceptable level of non-specific reactivity. The Murex EIA did not have this problem, so only this assay was used for testing dried blood specimens. The dried blood spot procedure is equivalent to using 5ml of serum per test, compared with the 20ml of serum normally used in the Murex assay. The assay was otherwise used without modification of the protocol. Dried blood spots that were positive on the Murex assay were considered to be anti-HCV positive.

### ANALYSIS

The sensitivity and specificity of the EIA results using the dried blood spots was calculated, with the serum results as the reference, together with the exact 95 per cent confidence intervals (95% CI) for sensitivity and specificity using the binomial distribution.

### RESULTS

Table 1 shows the comparison of results from the dried blood spots and the paired serum specimens. Using the serum results as the reference, the dried blood spots demonstrated a specificity of 100 per cent (95% CI 97.2–100) and a sensitivity of 96 per cent (95% CI) 79.6–99.9) for the detection of HCV using the Murex EIA 4.0. A single false negative result was observed with the blood spot testing. The corresponding serum specimen was a low positive reactive in the Abbott and Murex EIAs, and testing by polymerase chain reaction found the specimen to be HCV RNA negative.

**Table 1: Comparison of Serum and Dried Blood Spot Results for Paired HCV Antibody Testing**

| | | Serum | | |
|---|---|---|---|---|
| | | Positive | Negative | Total |
| Dried blood spot | Positive | 24 | 0 | 24 |
| | Negative | 1 | 133 | 134 |
| | Total | 25 | 133 | 158 |

### DISCUSSION

This study demonstrated that the Murex commercial EIA, but not the third-generation Abbott HCV used in diagnostic serological testing for anti-HCV, could be used on dried blood spot eluates. There was only one discordant result in 158 paired serum and dried blood spot specimens tested, and this specimen was low positive on serological testing and HCV RNA negative. The lower volume of serum used in the dried blood spot assay might have accounted for the different result, especially given that the antibody concentration was low.

The dried blood spot samples were easily transported and stored, and were not subject to degradation. Dried blood spots provide a cost-effective means of collecting specimens to measure HCV prevalence in a large general population. In addition, it is easier to guarantee the anonymity of participants through self-collected blood spots. Among some HCV risk groups, assured anonymity facilitates greater participation and a more representative study sample.[6]

### REFERENCES


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# Infectious Diseases News

### PUBLIC FUNDING OF MENINGOCOCCAL VACCINE

The Commonwealth Government has approved a national meningococcal disease vaccination program that will provide free meningococcal vaccines for all Australian children aged 12 months and 15 years. The first year of the national program (2003) will also cover adolescents aged 16–17 years old, to ensure access to free vaccines by the greatest number of children in high-risk age groups for meningococcal disease.

The majority of meningococcal cases seen in Australia are meningococcal type-B disease (62 per cent), for which no vaccine is on the market. About 32 per cent of all meningococcal cases in Australia are the type-C bacteria, against which the new vaccine program will provide protection. However, serogroup C has been increasing in Victoria in recent years and is now more common than serogroup B in all age groups (see surveillance summary).

The national meningococcal vaccination program will cost $41 million to implement in its first year, with the Government committing funds to a national meningococcal vaccination program for the next 14 years. Around 1.1 million doses of vaccine are required for the proposed national program. The vaccine will not protect against all forms of meningococcal disease, so clinicians will need to remain alert for the signs of the disease and to inform patients of the limitations of the vaccine.

## LAUNCH OF THE VICTORIAN HIV STRATEGY

The Minister for Health, Hon John Thwaites MP, launched the Victorian *HIV/AIDS Strategy 2002–2004* and officially opened the Positive Living Centre on Wednesday, 31 July 2002. The strategy was developed to provide a coordinated and strategic response to the rise in HIV notifications since 1999. It provides a framework for minimising the transmission of HIV and reducing the health, personal and social impact of the HIV/AIDS epidemic.

You can download the *Victorian HIV/AIDS Strategy 2002–2004* from the website http://www.dhs.vic.gov.au/phd/publications/hiv_strategy.htm or contact Louise Juracich on (03) 9637 5954 for a hard copy.

## NEW SURVEILLANCE INFORMATION SYSTEM

Following three years of planning, a new notifiable infectious diseases surveillance information system was launched in July. Known as NIDS2002, the comprehensive data and case management system was developed by Database Consultants Australia, Dryden Technologies and the Department of Human Services.

The system will facilitate improved data analysis and reporting. It has increased the potential for detecting outbreaks and changes in the epidemiology of infectious diseases in Victoria. These facilities include the use of geographic information systems, the ability for electronic reporting of notifications by doctors and laboratories, and enhanced reporting capabilities.

## 2001 ANNUAL REPORT SOON AVAILABLE

*Surveillance of Notifiable Infectious Diseases in Victoria 2001* is available on the website http://www.dhs.vic.gov.au/phd/. The report details the results of communicable disease surveillance and control activities in Victoria for 2001. To obtain hard copies of the report, contact the Communicable Diseases Section of the Department of Human Services on (03) 9637 4126.

## OZFOODNET UPDATE

OzFoodNet is an initiative funded by the Commonwealth Department of Health and Ageing to enhance the surveillance of food-borne disease across Australia. In Victoria, the Communicable Diseases Section of the Department of Human Services manages this project.

The OzFoodNet case control study for *Campylobacter* has been completed in Victoria and is close to completion in other States. Planning for the data analysis is underway. The case-control studies for two *Salmonella* serovars continue.

Nationally, OzFoodNet has developed a Gastrointestinal Outbreak Register, into which details of all gastrointestinal outbreaks investigated in 2001 and 2002 in all OzFoodNet sites are being entered.

OzFoodNet Victoria has commenced a study to survey general practitioners throughout the State on the incidence of infectious gastrointestinal illness among their patients, the frequency of and reasons for the collection of faecal specimens, and the treatment of gastroenteritis with antibiotics.

The survey was mailed to 50 randomly selected general practitioners as a pilot study, to assess their understanding of the survey questions, potential problems in completing the survey and response rates. The survey will be amended as necessary and mailed to 400 general practitioners randomly selected from rural Victoria and 600 general practitioners randomly selected from urban areas. All surveys were mailed by the end of August, and analysis and reporting are to be completed by November.

## NEW DIRECTOR OF PUBLIC HEALTH AND CHIEF HEALTH OFFICER

The Department welcomes Dr Robert Hall as the new Director of Public Health and Chief Health Officer. Dr Hall has a long career in public health, most recently as the director of the Communicable Diseases Branch of the Department of Human Services in South Australia.

# An Outbreak of Gastrointestinal Illness in East Gippsland Travellers

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*On 6 May 2002, the Communicable Disease Section (CDS) of the Department of Human Services commenced investigating an outbreak of possible food-borne gastrointestinal illness associated with a bus day tour from an East Gippsland town to Melbourne. The outbreak investigation identified 10 travellers who had become ill in the hours after returning home. Pea and ham soup consumed at Hotel A on the homecoming trip was the only food significantly associated with illness (relative risk of 11.0; 95% CI 2.93–41.43; p < 0001). This report summarises the investigation and highlights the benefits of effective cooperation between the Department and local government agencies.*

## BACKGROUND

In the afternoon of 6 May 2002, City Council A in East Gippsland notified the Department of an outbreak of gastrointestinal illness. A passenger on a bus tour five days earlier made a telephone report to the council's senior environmental officer. A group of 33 people (32 passengers and one driver) had travelled to Melbourne on a return bus tour that originated at an East Gippsland town on Wednesday 1 May 2002. The passenger reported that she and a number of other travellers on the bus had become ill in the hours after returning home.

Passengers had organised their own meals at various city venues throughout the day, until stopping on the return trip at Hotel A for an evening meal. At the hotel, the passengers chose from a special 'bus menu' or from the main menu. The reporting passenger and two of her travelling companions (who also had been ill) had chosen pea and ham soup from the special menu. They all had different second courses.

City Council A had assessed Hotel A's catering premises in the months before the incident and found no significant issues with food storage or preparation. CDS made preliminary recommendations to City Council A and initiated an outbreak investigation.

## METHODS

A retrospective cohort study was conducted to identify possible sources of illness among the passengers on the bus tour. A case was defined as a person who had travelled on the bus day tour from East Gippsland to Melbourne and back on Wednesday 1 May 2002 and subsequently had experienced the onset of diarrhoeal illness within 24 hours. Cases were confirmed if a causative organism was detected in a faecal specimen provided by the case. A non-case was defined as anyone who had not been ill before or after travelling.

The senior environmental health officer at City Council A contacted the operator of the bus company that had hosted the day tour to request a passenger list for the trip. To collect contact details missing from the list faxed by the operator, the officer called some of the passengers whose details were complete. A complete passenger list with full address and phone details was compiled and forwarded to CDS on 7 May 2002.

The study team administered a standard food history questionnaire by telephone. The questionnaire contained a comprehensive checklist of possible symptoms of food-borne gastrointestinal illness, foods available at Hotel A on the evening of the bus tour, and medical interventions that had occurred during illness.

Staff of City Council A implemented initial control measures by CDS according to Departmental guidelines. These included an environmental inspection of the premises, the review of food-handling practices at Hotel A, and endeavours to collect samples of food remaining from that served on the relevant evening. Provisions were available for the collection of faecal specimens from any person in the cohort who remained symptomatic up to seven days following the bus tour.

Data were analysed using EpiInfo version 6 software. Univariate analysis included Fisher exact chi-square tests to determine differences between the proportion of passengers who had consumed a specific food and developed gastrointestinal illness and the proportion of passengers who had consumed the same food but did not develop a gastrointestinal illness. Two-tailed p values of less than 0.05 were considered significant. Analysis included the calculation of relative risk with 95 per cent confidence intervals. The incubation period for each case was calculated based on the time of consumption of food and the onset of symptoms.

## RESULTS

Telephone interviews commenced on 7 May 2002—five and a half days after the bus tour. Interviews were conducted with 32 persons (97 per cent) of a possible 33 people who had travelled on the bus tour (including the driver). The remaining person could not be contacted. Ten persons (32 per cent) met the case definition. The median age of cases was 75 years (range 61–84) and the male-to-female ratio was 1:9. The median age among the 22 non-cases was 63.5 years (range 53–87) and the male-to-female ratio was 1:6.

Symptoms included diarrhoea (100 per cent), abdominal pain (90 per cent), anorexia (60 per cent) and nausea (50 per cent). Only one case had experienced vomiting. The median incubation period was eight hours (range 3–15). The median duration of illness was 20 hours (range 6–48). None of the cases had consulted a medical practitioner about their illness and all had recovered when the investigation commenced.

Univariate analysis of the 17 menu items consumed at Hotel A on the evening of the bus tour indicated that only the pea and ham soup from the special menu was significantly associated with illness (attack rate of 83 per cent; relative risk undefined, $p<0.001$). There was no significant association with any other foods or drink consumed by the passengers during the meal at Hotel A.

On Monday night 6 May 2002, City Council A attended Hotel A and supervised a clean up of the premises. No food samples remained from the evening of the bus tour, however council staff obtained details regarding food preparation.

The pea and ham soup was made from pre-soaked yellow and green split peas, onions, leeks and carrots. These ingredients were boiled and simmered for two and a half to three hours, then strained before salt, pepper and chicken booster were added. Ham and croutons were added to the soup as garnish at the time of serving. Approximately 12 litres of soup was prepared in one batch (usually lasting for two to three days). After being made, some of the soup was put into a stainless steel container in the bain marie; the remainder was cooled and refrigerated.

During the investigation, cases reported that a number of bowls of pea and ham soup had been served in anticipation of the arrival of the bus at the hotel. Some reported that their soup was lukewarm. Two interviewees who had eaten pea and ham soup and not become ill reported that their soup was served hot from a pot simmering on the stove just before consumption. All of the travellers affected by gastrointestinal illness had recovered when the investigation commenced and no faecal specimens were collected from the cases.

## DISCUSSION

The control of outbreaks is best achieved when changes in disease incidence are detected early. In this instance, a five and a half day lapse between the event and its notification (coupled with the short duration of illness) hindered the investigation because microbiological investigations could not be conducted. While the descriptive and analytic epidemiology of the outbreak

suggested illness was related to consumption of pea and ham soup from the hotel's special menu, confirmation would have required the detection of a causative pathogen in faecal specimens of the cases and in food samples taken from Hotel A.

Without microbiological confirmation, the Communicable Diseases Section and City Council A deemed the available descriptive evidence strong enough to implement immediate preventative measures at the suspected site. Food-handling and food storage practices at Hotel A were quickly reviewed, and safe practices were implemented to ensure no ongoing risk to patrons. These practices included educating catering staff about hygienic practices and ensuring proper storage of foods.

The pattern of illness described by cases in this outbreak is similar to food-borne illness due to *Clostridium perfringens*. Criteria for confirmation[1] have not been met here, but this organism is one of the most frequent causes of food-borne outbreaks with symptoms (predominately diarrhoea) commencing eight to 22 hours after the ingestion of contaminated food.[2] Most outbreaks where *C. perfringens* is found to be a causative organism are associated with inadequate heating or reheating of food, or improper cooling and storage.[2]

Contamination of the ingredients of the soup (excluding garnishes) before its preparation was unlikely, given the long cooking process at high temperatures. Contamination during food storage before the soup's ingestion (especially the practice of serving the food in anticipation of diners' arrival) was more likely. Cases reported that their soup had been lukewarm when eaten, indicating a failure to maintain the soup at a temperature adequate for preventing the possible multiplication of pathogens.

Another possible source of contamination was the addition of garnishes (ham and croutons) before serving. Two travellers who had eaten pea and ham soup served hot from a pot on the stove, however, had not become unwell despite the addition of garnishes which suggests they were less likely to be the source of infection.

Those affected by this outbreak can be described as a group of elderly people, many of whom were in retirement. Members of the cohort were easily contactable by telephone during the day, with 90 per cent (30 of 33) of the interviews completed within 48 hours of the start of the investigation. The lapse in time between the meal of interest and the interviews taking place (six to nine days) did not appear to affect the ability of travellers to recall where, when and what they had eaten on the day. This high level of recall may be related to the fact that the travellers had been on a tour and dined at venues that were not usual places of eating.

In this investigation of a suspected outbreak of food-borne disease, an appropriate public health intervention provided information and education to the food handlers and consumers. Local and central resources were used effectively and the resources enabled a streamlined response from the time of notification. This demonstration of the multi-disciplinary and cooperative nature of the investigation of food-borne disease outbreaks in Victoria illustrates the importance and effectiveness of established partnerships between the Communicable Diseases Section and local government areas.

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# Conjugate Meningococcal C Vaccines — FAQ


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*Three new conjugate meningococcal serogroup C vaccines are now available in Australia. Here we provide answers to some frequently asked questions about the three vaccines.*


**What does "conjugate" vaccine mean?**

This means that the meningococcal serogroup C antigen is chemically linked to a carrier protein (either diphtheria or tetanus toxoid) to produce a T cell dependant response. The T cell help, results in improved antibody responses especially in young children, and induction of immunological memory resulting in long-term protection.

**What are the trade names for the three vaccines?**

The three vaccines are Meningitec® (Wyeth Lederle), Menjugate® (Chiron) and NeisVac-C (Baxter).

**What is the difference between the vaccines?**

The three brands are similar with regard to their safety, effectiveness and protection. NeisVac-C has been chemically linked to a tetanus toxoid protein to enhance immune response. Meningitec® and Menjugate® are chemically linked to a non toxic mutant diphtheria protein ($CRM_{197}$) to enhance the immune response.

**Is one brand of vaccine better than the other?**

No, each of the vaccines are comparable and are considered safe and effective.

**How long have these vaccines been in use?**
Each of the three conjugate meningococcal vaccines have been used in the UK since the end of 1999 for the mass immunisation of children from 2 months to 18 years of age.

**How many doses need to be given?**
The product information for the three brands state, that for a child under 12 months, three doses are required one to two months apart. From 12 months of age and over, one dose is required.

**Why do some people have two doses at less than 12 months of age?**
The vaccine is licensed as a three-dose course for children under one year, and one dose in people from one year and over.

However, the Royal Children's Hospital in Melbourne advises that between 2 months and 6 months, three doses are given and between 6 months and 12 months two doses are sufficient for the person to develop protective antibodies. A final recommendation from the government will be forthcoming in the near future.

**Are the vaccines interchangeable under 12 months of age?**
Children under 12 months, who have commenced a course of meningococcal serogroup C vaccine should complete the course with the same brand of vaccine, if the brand is known and is available. If the brand is unknown or not available, then another brand of conjugate meningococcal vaccine can be used to complete the course.

**How long will protection last?**
At this point in time, expert opinion is that the vaccine will be long lasting. However, further research will indicate if a booster dose is required in the future.

**Who will be eligible for free vaccine next year?**
The Commonwealth Government has stated they will fund a meningococcal vaccine program for children turning 12 months of age and all 15, 16 and 17 year olds in 2003. After 2003 it will be funded for children turning 12 months old and 15 year olds. Further clarification of when this program will commence and who will be eligible will be forthcoming.

**Who should have the vaccine?**
The vaccine can be given to anybody from six weeks of age and over who wants to be protected against meningococcal serogroup C disease.

**Can children in a household with pregnant women be immunised?**
Yes. The vaccine is "inactive" (ie. it does not contain live microorganisms), so meningococcal bacteria cannot be passed from a vaccinated person to a non vaccinated person. Therefore, there is no risk of a pregnant woman contracting meningococcal disease from her child as a result of the vaccine.

**Can the vaccine be given to pregnant women?**
The product information for all three brands of vaccine state that the vaccine should not be given to pregnant women.

**Is breastfeeding a problem when having the vaccine?**
Breastfeeding is not considered to be a contradiction to the administration of conjugate meningococcal sero-group C vaccine for either the child or the mother.

**What are the side effects of meningococcal vaccine?**
The side effects are similar to other childhood vaccines. These can be redness, pain and swelling at the injection site. A fever, feeling unwell or irritable, or in older children and adults, a headache; side effects usually last one to two days. As with any vaccine there is an extremely rare possibility of a severe allergic reaction.

**Can a person get meningococcal disease from the vaccine?**
No. The vaccine is an "inactivated", so it cannot cause the disease it protects against. Its action is to make the bodies immune cells recognise and memorise the meningococcal bacteria and respond by overwhelming and destroying the foreign bacteria if it should invade the body.

**Does the vaccine protect against all meningococcal disease?**
No. The conjugate meningococcal serogroup C vaccine protects against the C strain only. There are several other strains of meningococcal disease prevalent. In Victoria serogroup B and C are most common. There is no vaccine to protect against the B strain. If travelling to other countries where meningococcal disease is prevalent such as Asia and Africa, then there are specific "travel" meningococcal vaccines for those areas.

**Can the conjugate vaccine be given after the polysaccharide vaccine?**
Polysaccharide meningococcal vaccine has been used for some years in Australia to protect travellers and other high risk groups against strains A, C, W135 and Y. This vaccine cannot be used in children under 2 years and protection may only last for about three years. To receive long lasting protection against meningococcal serogroup C disease, a conjugate vaccine can be given six months after the polysaccharide meningococcal vaccine.

## FURTHER INFORMATION:

http://www.dhs.vic.gov.au/phd/0204017/downloads/0170402.pdf

http://betterhealth.vic.gov.au/bhcv2/bhcarticles.nsf/pages/Meningococcal_disease

## SOURCES:


1. Meningitec® — Product information. Wyeth Lederle
2. Menjugate® — Product information, Chiron
3. NeisVac-C® — Product information, Baxter
4. National Health & Medical Research Council Australian Immunisation Handbook. 8th Edition (Draft). Canberra: Commonwealth of Australia
5. Communicable Diseases Section Department of Human Services
6. Prevention and National Health Priorities Section, Department of Human Services
7. Royal Children's Hospital Melbourne
8. Department of Human Services

# Immunisation Update

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*Data cited in this report are based on the Australian Childhood Immunisation Register (ACIR) Coverage Report. The ACIR report measured immunisation coverage at 30 June 2002 for children aged 12–<15 months and 24–<27 months at 31 March 2002. Only vaccines administered before 12 months of age were included in the coverage calculation for the former age group, and only those vaccines administered before 24 months of age were included in the coverage calculation for the latter age group.*

Table 1 groups immunisation coverage by Local Government Area for the two birth cohorts. For a copy of the ACIR report listing immunisation coverage against individual vaccines for each local government area, contact Michele Sands (michele.sands@dhs.vic.gov.au).

**Table 1: Childhood Immunisation Coverage, by Local Government Area, Victoria, 30 June 2002**

| Age Group | % Fully Immunised | Local Government Area (LGA) | Total LGAs (% LGAs) |
|---|---|---|---|
| 12–<15 months | 95%+ | Buloke (S), Central Goldfields (S), Corangamite (S), Glenelg (S), Pyrenees (S), Southern Grampians (S), West Wimmera (S), Yarriambiack (S) | 8 (10%) |
| | 90–94% | Ararat (RC), Ballarat (C), Banyule (C), Bass Coast (S), Baw Baw (S), Bayside (C), Boroondara (C), Brimbank (C), Campaspe (S), Casey (C), Colac–Otway (S), Gannawarra (S), Golden Plains (S), Greater Bendigo (C), Greater Dandenong (C), Hindmarsh (S), Hobsons Bay (C), Horsham (RC), Knox (C), Macedon Ranges (S), Maribyrnong (S), Maroondah (C), Melton (S), Mildura (RC), Mitchell (S), Moira (S), Monash (C), Moonee Valley (C), Moorabool (S), Moreland (C), Mount Alexander (S), Nillumbik (S), Surf Coast (S), Towong (S), Wangaratta (RC), Warrnambool (C), Wellington (S), Whitehorse (C), Whittlesea (C), Wodonga (RC) | 40 (51%) |
| | 85–89% | Alpine (S), Cardinia (S), Darebin (C), Delatite (S), East Gippsland (S), Frankston (C), Glen Eira (C), Greater Geelong (C), Greater Shepparton (C), Hume (C), Indigo (S), Kingston (C), LaTrobe (C), Loddon (S), Manningham (C), Melbourne (C), Mornington Peninsula (S), Moyne (S), Northern Grampians (S), Port Phillip (C), South Gippsland (S), Stonnington (C), Swan Hill (RC), Wyndham (C), Yarra (C), Yarra Ranges (S) | 26 (33%) |
| | 80–84% | Hepburn (S), Murrindindi (S) | 2 (3%) |
| | <80% | Queenscliffe (B), Strathbogie (S) | 2 (3%) |
| 24–<27 months | 95%+ | Ararat (RC), Buloke (S), Loddon (S), Towong (S), West Wimmera (S), Yarriambiack (S) | 6 (8%) |
| | 90–94% | Ballarat (C), Baw Baw (S), Campaspe (S), Colac–Otway (S), Corangamite (S), Delatite (S), Gannawarra (S), Glenelg (S), Golden Plains (S), Greater Geelong (C), Hindmarsh (S), Horsham (RC), Indigo (S), Knox (C), LaTrobe (C), Melton (S), Queenscliffe (B), South Gippsland (S), Southern Grampians (S), Strathbogie (S), Swan Hill (RC), Wangaratta (RC), Warrnambool (C), Whittlesea (C), Wodonga (RC) | 25 (32%) |
| | 85–89% | Alpine (S), Banyule (C), Bass Coast (S), Boroondara (C), Brimbank (C), Cardinia (S), Casey (C), Darebin (C), East Gippsland (S), Frankston (C), Glen Eira (C), Greater Bendigo (C), Greater Dandenong (C), Greater Shepparton (C), Hobsons Bay (C), Hume (C), Kingston (C), Macedon Ranges (S), Manningham (C), Maribyrnong (C), Maroondah (C), Melbourne (C), Mildura (RC), Mitchell (S), Moira (S), Monash (C), Moonee Valley (C), Moorabool (S), Mornington Peninsula (S), Mount Alexander (S), Moyne (S), Nillumbik (S), Northern Grampians (S), Surf Coast (S), Wellington (S), Whitehorse (C), Wyndham (C), Yarra Ranges (S) | 38 (49% |
| | 80–84% | Bayside (C), Central Goldfields (S), Moreland (C), Murrindindi (S), Pyrenees (S), Stonnington (C), Yarra (C) | 7 (9%) |
| | <80% | Hepburn (S), Port Phillip (C) | 2 (2%) |

# Surveillance Report

*The Department of Human Services receives notifications of infectious diseases from medical practitioners and laboratories. These notifications prompt investigation and action to control infectious diseases in Victoria. For some diseases, investigation is initiated on the basis of clinical suspicion in the absence of laboratory confirmation. Prompt notification of infectious diseases is an integral component of prompt public health action.* ***Please do not delay. To notify, call 1300 651 160 or fax 1300 651 170.***

*This section includes a summary of infectious disease notifications received until 30 June 2002. The Communicable Diseases Section, Department of Human Services, produced the report in cooperation with the Victorian Infectious Diseases Reference Laboratory and the Macfarlane Burnet Institute for Medical Research and Public Health. We gratefully acknowledge the contribution of the Microbiological Diagnostic Unit of the University of Melbourne and the Melbourne Sexual Health Centre.*

*Table 15 includes historical comparisons of selected diseases with 2001 data at both the State and regional levels. Summary data at local government level for the diseases listed are available from Greg Mathews, Communicable Diseases Section (03 9637 4108). There were no notifications of anthrax, Australian arboencephalitis, botulism, cholera, diphtheria, Japanese encephalitis, Kunjin virus, plague, poliomyelitis, rabies, tetanus, viral haemorrhagic fevers or yellow fever in this reporting period.*

*For comments or queries related to data on sexually transmissible diseases, contact the Communicable Diseases Section (03 9637 4126). For HIV/AIDS enquiries, contact Cathy Keenan or Dr Nick Crofts, Epidemiology and Social Research Unit, Macfarlane Burnet Institute for Medical Research and Public Health (03 9282 2290).*

*Fortnightly surveillance data from the Victorian Infectious Diseases Reference Laboratory are available at http://www.dhs.vic.gov.au/vidrl/. All data in this report are provisional and subject to revision as further information becomes available. You can find general information related to the control of infectious diseases (The Blue Book) on line at http://www.dhs.vic.gov.au/phd/hprot/inf_dis/bluebook/index.htm.*

## ENTERIC DISEASES

Between April and June 2002, 31 outbreaks of gastrointestinal illness were reported to the Department of Human Services. Nine were considered to have been food borne (or probable food borne) and 19 were suspected to have been transmitted by person-to-person contact (11 outbreaks of Norwalk-like virus, seven of suspect viral gastroenteritis, one of *Salmonella* Typhimurium 170).

## *SALMONELLA* TYPHIMURIUM 135 OUTBREAK LINKED TO A BAKERY

The Department was notified in June 2002 of 11 cases of ampicillin-resistant *Salmonella* Typhimurium 135 with similar specimen collection dates. Two of the reporting doctors noted that their patients had consumed pork rolls before the onset of illness. An investigation identified a total of 26 confirmed cases, with a further six suspected cases who did not visit a doctor when ill.

**Table 1: Outbreaks of Gastrointestinal Illness, 1 April – 30 June 2002**

| Setting | Outbreaks | Persons Affected | Pathogen/Toxin (No. of Outbreaks) |
|---|---|---|---|
| Restaurant / reception / other food premises / specific food | 8 | 285 | Norwalk-like virus (2)<br>*Salmonella* Typhimurium 135 (1)<br>*Salmonella* Typhimurium U290 (1)<br>Suspect viral (1)<br>Unknown (3) |
| Aged / disability / health care Institution | 16 | 530 | Norwalk-like virus (9)<br>*Salmonella* Typhimurium 9 (1)<br>Suspect viral (6) |
| Recreation / holiday / camp | 3 | 111 | Cryptosporidiosis (1)<br>Norwalk-like virus (1)<br>Suspect viral (1) |
| Children's service / school | 1 | 7 | Staphylococcal enterotoxin (1) |
| Family / social gathering | 2 | 15 | *Salmonella* Typhimurium 135 (1)<br>*Salmonella* Typhimurium 170 (1) |
| Other Institution | 1 | 13 | *Salmonella* Typhimurium 170 (1) |
| Total | 31 | 961 | Norwalk-like virus (12)<br>*Salmonella* Typhimurium 135 (2)<br>*Salmonella* Typhimurium 170 (2)<br>*Salmonella* Typhimurium 9 (1)<br>Cryptosporidiosis (1)<br>*Salmonella* Typhimurium U290 (1)<br>Staphylococcal enterotoxin (1)<br>Suspect viral (8)<br>Unknown (3) |

Nineteen of the cases interviewed were linked directly to a small bakery and all cases had consumed pork rolls on the same day in June. The pork rolls were made in the bakery and contained chicken liver pâté (made at the bakery from chicken livers), egg butter made with raw eggs and oil, sliced pork loaf, cucumber, carrot and coriander. Local government authorities inspected the premises, suspended the production of pork rolls, collected food samples and environmental swabs, and supervised a clean-up. All food samples collected from the bakery were negative for bacterial pathogens and the primary source of the outbreak is unknown.

### *SALMONELLA* TYPHIMURIUM U290 OUTBREAK LINKED TO A BAKERY

An outbreak of *Salmonella* Typhimurium U290 was investigated in north-eastern Victoria in June. Ten cases were identified and all but one had eaten cream products from a specific bakery over the same weekend one to two days before the onset of illness. A case-control study supported an association between illness and the consumption of cream and custard products from the bakery (Odds Ratio indeterminate; 95% CI 13.3–∞). Departmental staff visited the site and collected samples of cream products, raw eggs, raw meat and a piping bag. They identified some problems with food preparation. Food handlers were interviewed and three reported gastrointestinal illness: one with onset approximately three to four weeks before the confirmed cases and two with onsets within one to two days after the confirmed cases. All had continued to work while symptomatic. No *Salmonellae* were isolated from any of the samples collected and the primary source of the outbreak is unknown. Clean-up procedures were undertaken at the premises and advice was given on safe food handling and preparation.

### *SALMONELLA* TYPHIMURIUM 9 OUTBREAK IN AN AGED CARE FACILITY

Thirteen residents of an aged care hostel in Melbourne were reported to the Department with a gastrointestinal illness. *Salmonella* Typhimurium 9 was isolated in 10 faecal specimens. Departmental and local government staff visited the premises and identified problems with food handling and processing. Local government environmental health officers collected food samples and environmental swabs, and supervised a clean-up. No bacterial pathogens were isolated from any samples. The source of the outbreak was not identified.

### NORWALK VIRUS IN AN AGED CARE FACILITY

A family member of a resident at an aged care facility contacted the Department of Human Services in May 2002, advising of cases of gastrointestinal illness at the site. Residents were of varying degrees of dependency, in either hostel or nursing home-type accommodation. An affiliated day care facility for dementia patients was adjacent. Approximately 200 residents and 200 staff live and work on site.

Preliminary investigations suggested a viral pathogen had caused the illness, with cases of illness occurring over several days. Environmental health officers from local government and the region visited the site, implemented a clean-up of the premises, and collected case information, including the location of residence. Admissions to the facility were ceased, carpeted areas were steam cleaned, and ill staff were excluded for at least 48 hours after their symptoms were resolved. Staff who were identified as having taken sick leave during the outbreak period were contacted and interviewed. No questionnaires were completed with the residents, given that poor recall was likely..

Over a four-week period, 116 people (both residents and staff) reported illness. Analysis of faecal specimens confirmed 17 cases of Norwalk-like virus infection. Analysis of temporal relationships between onset dates and cases demonstrated that the illness commenced in one hostel and then spread via person-to-person contact, firstly through that hostel and then throughout the whole facility. The age range of cases was 20–102 years, with 27 males and 89 females affected. The median incubation period was one day, with a range of one to seven days. Table 1 shows that person-to-person transmission of the pathogen caused 92 per cent of the outbreaks of Norwalk-like virus for this quarter. Norwalk-like virus is a virulent pathogen with a low infectious dose.

### *SALMONELLA* TYPHIUMURIUM 170 LINKED TO A HOMEMADE SLICE

An outbreak of gastrointestinal illness was reported among two families who had consumed a common meal at a private residence in April 2002. Four people had eaten a hedgehog slice made at the home, with all four cases being hospitalised the following day and experiencing fever, abdominal pain, vomiting and diarrhoea. A further two cases within the family became ill two days later and were also hospitalised. *Salmonella* Typhimurium 170 was isolated from faecal specimens from the six cases. The median incubation period was 22 hours, with symptoms lasting a median of 6.5 days. *Salmonella* Typhimurium 170 was isolated from a sample of leftover hedgehog slice. The slice had been prepared using an egg from a neighbour's property. Ingredients had been mixed together and then refrigerated, undergoing no cooking process. Further sampling of chicken manure, chicken feed and eggs failed to isolate *Salmonella*.

A further three secondary cases were later identified, with onsets of illness at least 11 days after the initial cases. They were all hospitalised and confirmed as having *Salmonella* Typhimurium 170 infection. Their illness was thought to be due to person-to-person transmission within households.

## BLOOD-BORNE VIRUSES

### HEPATITIS B—ACUTE

The Department of Human Services received 62 notifications of acute hepatitis B between April and June 2002—a 55 per cent increase on the number for the first quarter of 2002 and a nine per cent increase on the number for the same period in 2001. Of the 62

notifications, 41 (66 per cent) were for males with a median age of 26 years (range 17–70 years). Injecting drug use was reported as a risk factor in 58 per cent of cases. Fourteen persons (23 per cent) were hospitalised and there was one death.

### NEWLY ACQUIRED HEPATITIS C

Of the 1123 notifications of hepatitis C in the second quarter of 2002, 23 (2 per cent) were classified as being newly acquired. Twelve (52 per cent) of the newly acquired cases were male, with a median age of 27 years (range 00–58). For the 11 (48 per cent) females, the median age was 21 years (range 17–35). Injecting drug use was reported as a risk factor for 70 per cent of cases. Twenty cases (87 per cent) were diagnosed on the basis of seroconversion to hepatitis C virus in the previous 24 months.

## VACCINE-PREVENTABLE DISEASES

### INFLUENZA

The Victorian Infectious Diseases Reference Laboratory conducts sentinel surveillance for influenza-like illness (ILI). Fifty-two general practitioners from 27 metropolitan practices and 47 general practitioners from 21 rural and regional practices are participating in the scheme in 2002. Weekly data return rates from these practices average about 73 per cent, with significant variation among practices.

As shown in Figure 1, the season had an early start, with metropolitan general practitioners reporting ILI rates above 1.5 per 100 patients seen in the first weeks of surveillance by early June (week 22 of the year). The ILI rate continues at about this level in metropolitan areas, but has been consistently less in rural and regional practices.

Influenza thresholds for surveillance were recently determined by comparing ILI rates with the number of hospital discharges for influenza and pneumonia over a number of years. The background rate of ILI appears to be about 0.25 per 100 patients seen. Normal seasonal activity varies between the background rate and 1.5 per 100 patients. Activity of 1.5–3.5 patients with ILI per 100 patients is considered higher than average. If the activity rate is above 3.5, we consider the influenza season to be epidemic. The last epidemic year was 1997. For 2002, in the metropolitan area at least, the influenza season has varied between the high end of normal seasonal activity and the low end of above-normal activity.

Figure 2 demonstrates the proportion of all sentinel cases from whom a respiratory virus was detected. The detection rate was lower at the start of the season, but increased to 70 per cent in week 30. As the season has progressed, ILI appears more likely to have been caused by influenza viruses rather than other respiratory viruses that were prevalent earlier in the season. Influenza B viruses were more prominent in the early weeks of the season, but influenza A H3N2 has been the predominant circulating influenza virus in later weeks.

The circulating influenza B viruses have been predominantly influenza B Hong Kong-like, which is a strain that is not included in the vaccine. The influenza A H3N2 viruses, on the other hand, have been almost all Moscow-like, which is one of the vaccine strains.

It is generally accepted that influenza B is more likely to affect younger people. This observation was supported by the detection of two outbreaks caused by influenza B in school groups during May 2002.

In early May the Department of Human Services received a report of an outbreak of respiratory illness among students at a Melbourne primary school following a residential camp. A total of 36 persons (31 students, one teacher, one parent and three siblings) were affected, with onset of disease over 10 days. The clinical attack rate in students was 51 per cent. No cases were hospitalised. Polymerase chain reaction testing detected two influenza B Hong Kong-like viruses (both in siblings) and one picornavirus from a small sample of students tested.

A second outbreak was reported among students at a Melbourne secondary school. Polymerase chain

**Figure 1: Influenza-like Illness Rates in Sentinel General Practices, May–August 2002, Victoria**

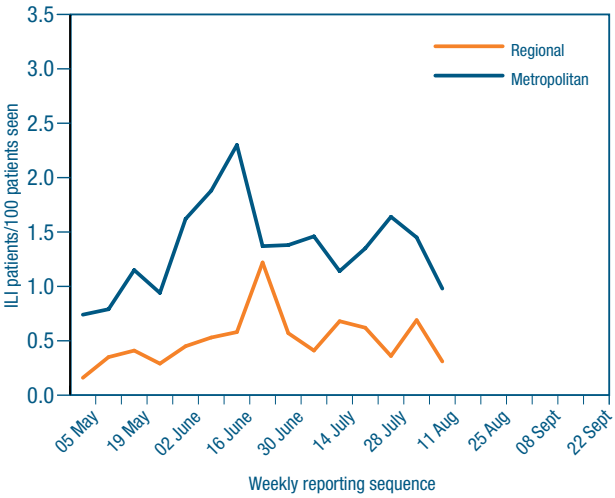



**Figure 2: Respiratory Viruses Identified in Patients From Sentinel Surveillance, By Surveillance Week, Victoria, 2002**

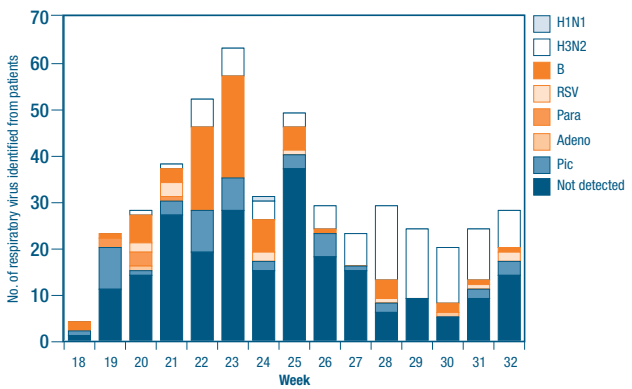
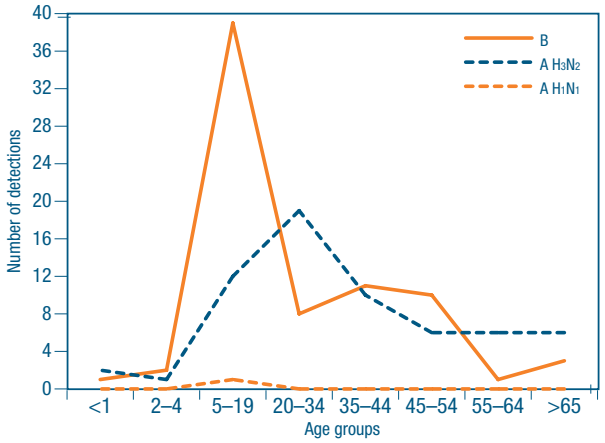


**Figure 3: Detection of Influenza from Sentinel Surveillance Program, by Age Group, Victoria, May – August 2002**




reaction testing confirmed influenza B Hong Kong-like infections from a small sample of students tested. A health advisory letter was circulated to all parents. No deaths or hospitalisations were reported.

Figure 3 indicates that the age range of people with proven influenza B infection has been quite broad, although 56 per cent of all people with proven influenza B infection have been aged 19 years or younger.

## INVASIVE PNEUMOCOCCAL DISEASE

The Department of Human Services received 101 notifications of invasive pneumococcal disease between 1 April and 30 June 2002—a 55 per cent increase on the number for the first quarter of 2002. Thirty-three (33 per cent) of the cases were children younger than 5 years and 36 (36 per cent) were persons aged 50 years and over.

Nine deaths were reported, of which six were due to invasive pneumococcal disease (case fatality rate: 6 per cent). One death was a two year old with no known risk factors for the disease. Two deaths were persons aged 45 years old and 57 years old, and three were persons aged 81 years and over. All adults who died had known risk factors for the disease and all deaths were due to serotypes contained in both the polysaccharide and conjugate vaccines. Two persons who died had received one dose of the polysaccharide vaccine within the previous five years.

Serotype information was available for 90 per cent of notifications: 97 per cent were serotypes contained in the 23-valent polysaccharide vaccine and 82 per cent were contained in the 7-valent conjugate vaccine. Eight suspected vaccine failures were identified, including four cases of serotype 14, two cases of 19F, one case of 19A and one case of serotype 4.

## MEASLES

A cluster of three cases of measles was identified in May and June 2002. The first case was a 29-year-old man with no identified measles contacts or overseas travel in the incubation period, and an unclear vaccination history. The second case, a 28-year-old unvaccinated man, was notified three weeks later with no direct contact with the first case. Further investigation revealed that the second case's 19-year-old unvaccinated sister reported a measles-like illness before her brother, which was later confirmed as being measles. The sister worked in a retail shop on the same street as the first case's residence. No further cases were identified.

# OTHER NOTIFIABLE DISEASES

## LEGIONELLOSIS

Eight cases of legionellosis (*Legionella pneumophila* sg 1) were notified during a three-week period in April 2002. The cases (age range 29–85 years) reported a recent history of exposure to a specific area within the Melbourne central business district. Three persons worked in the central business district, two visited as part of their work duties and the remainder were casual visitors. A total of 32 nearby cooling towers were investigated. Only one tower tested positive for *L. pneumophila* sg 1. . No cases worked in or adjacent to the building. Further matching of clinical and environmental specimens was not possible, as none of the cases were confirmed by culture.

A further eight cases of legionellosis (*L. pneumophila* sg 1) were notified during a two-week period in May 2002, with a recent history of exposure to a shopping district in the inner west of Melbourne. The age range of the cases (six males and two females) was 51–84 years. Four cases were local residents and another three were regular visitors. The last case made only a single trip to the area. Two fountains and all premises with cooling tower systems in the area were investigated. One cooling tower tested positive for *Legionella spiritensis*. No source of the infection was identified.

## MENINGOCOCCAL DISEASE

The Department of Human Services received 81 notifications of meningococcal disease (39 females and 42 males) in the six months to the end of June 2002 (Table 2).

**Table 2: Invasive Meningococcal Disease, by Serogroup and Age Group, Victoria, January–June 2002**

| Age Group | Serogroup B | Serogroup C | Other Serogroup | Clinical | Lab Confirmed – NOS* | Total | Deaths |
|---|---|---|---|---|---|---|---|
| 0–4 yrs | 4 | 5 | W135 (1) | 7 | 4 | 21 | 1 |
| 5–14 yrs | 2 | 4 | 0 | 4 | 1 | 11 | 0 |
| 15–29 yrs | 9 | 18 | W135 (1) | 4 | 1 | 33 | 2 |
| ≥30 yrs | 4 | 6 | Y (1) | 4 | 1 | 16 | 1 |
| Total | 19 | 31 | 3 | 19 | 9 | 81 | 4 |

* Detection of gram negative diplococci in a clinical specimen from a sterile site and a clinically compatible illness

**Table 3: Invasive Meningococcal Disease, by Serogroup and Department Region, Victoria, January–June 2002**

| Region | Serogroup B | Serogroup C | Other Serogroup | Clinical | Lab Confirmed – NOS* | Total | Deaths |
|---|---|---|---|---|---|---|---|
| Barwon south west | 3 | 3 | 0 | 1 | 0 | 7 | 0 |
| Grampians | 1 | 1 | 0 | 1 | 0 | 3 | 0 |
| Loddon–Mallee | | 1 | 0 | 0 | 0 | 1 | 0 |
| Hume | 3 | 1 | 0 | 0 | 0 | 4 | 0 |
| Gippsland | 1 | 2 | 0 | 0 | 0 | 3 | 0 |
| **All rural regions** | **8** | **8** | **0** | **2** | **0** | **18** | **0** |
| Western metropolitan | 4 | 4 | W135 | 6 | 2 | 17 | 2 |
| Northern metropolitan | 4 | 5 | 0 | 4 | 2 | 15 | 1 |
| Eastern metropolitan | 1 | 4 | W135 | 2 | 3 | 11 | 1 |
| Southern metropolitan | 2 | 12 | Y | 5 | 0 | 20 | 0 |
| **All metropolitan regions** | **11** | **25** | **3** | **17** | **7** | **63** | **4** |

* Detection of gram negative diplococci in a clinical specimen from a sterile site and a clinically compatible illness

Serogroup C is now more common than serogroup B in all age groups, including children younger than 5 years old (who until now have been more likely to have serogroup B). Teenagers and young adults remain the age group most at risk of serogroup C disease.

The difference in clinical cases between rural regions (11 per cent) and metropolitan regions (26 per cent) is striking. Before diagnosis by polymerase chain reaction was possible, the proportion of clinical cases was about one third. It is possible that cases are not being notified unless they are culture confirmed. The department can assist in ensuring appropriate specimens are sent to the reference laboratory for polymerase chain reaction testing. Suspected cases should be notified as soon as possible.

Two serogroup C outbreaks, associated with a university (two cases) and a child care centre (two cases), resulted in the widespread use of clearance antibiotics and conjugate vaccine.

## VECTOR-BORNE DISEASES

### BRUCELLOSIS

One notification of brucellosis was received in June 2002: an overseas-born elderly male with severe cardiac disease. He had returned from a one-month holiday in Southern Europe eight weeks before hospital admission and was apparently symptomatic on return. He reported no local animal contact. *Brucella melitensis* biotype 1 was isolated from blood cultures.

### Q FEVER

Nine cases of Q fever were notified during June 2002, with onsets from the middle of May. The cases were related to occupational exposure at an abattoir in south-western Victoria. Mass screening of the workforce had occurred during the previous year, but the abattoir had subsequently taken on a large number of new employees and was receiving increased numbers of animals from Q fever-endemic areas of New South Wales. A mass screening of new employees was organised and a total of 28 cases were detected. There were no reports of clinical illness in previously vaccinated workers.

## SEXUALLY TRANSMISSIBLE INFECTIONS

### ACQUIRED IMMUNE DEFICIENCY SYNDROME (AIDS)

Four cases of AIDS (all male) were notified during the second quarter of 2002. One man attributed his infection to heterosexual exposure alone, one reported a history of male-to-male sex and injecting drug use, one reported injecting drug use as his primary exposure and one reported male-to-male sexual contact.

From 1983 to the end of June 2002, 1952 people were notified with AIDS: 1858 males, 85 females and nine transgender individuals. Over 90 per cent of all notified males reported male-to-male sexual contact.

Three people (all males) who had been diagnosed with either HIV or AIDS were notified as having died during the second quarter of 2002. Between July 2001 and June 2002, 29 deaths were notified; in total since 1983, 1627 deaths have been recorded. Of the total individuals who have died, 1471 (91 per cent) had been previously diagnosed with AIDS whereas 150 had not been notified as having progressed to AIDS.

**Table 4: Notifications of AIDS, April – June 2002, July 2001 – June 2002 and Cumulative Total since 1983, Victoria**

| Exposure Category | April–June 2002 | | July 2001–June 2002 | | Cumulative Total to June 2002 from 1983 | | |
|---|---|---|---|---|---|---|---|
| | Males (n) | Females (n) | Males (n) | Females (n) | Males (n) | Females (n) | Total* (n) |
| Male homosexual / bisexual | 1 | – | 17 | – | 1572 | – | 1577 |
| Male homosexual / bisexual and injecting drug user | 1 | – | 2 | – | 100 | – | 104 |
| Injecting drug user | 1 | 0 | 2 | 0 | 24 | 12 | 36 |
| Heterosexual | 1 | 0 | 6 | 2 | 69 | 51 | 120 |
| Person from specified country# | 0 | 0 | 2 | 2 | 18 | 10 | 28 |
| Haemophilia / related disorder | 0 | 0 | 0 | 0 | 39 | 1 | 40 |
| Transfusion recipient | 0 | 0 | 0 | 0 | 8 | 5 | 13 |
| Other | 0 | 0 | 0 | 1 | 1 | 2 | 3 |
| Unavailable | 0 | 0 | 0 | 1 | 27 | 4 | 31 |
| Total | 4 | 0 | 29 | 6 | 1858 | 85 | 1952 |

* Includes persons for whom sex is reported as transgender.
\# Persons from countries with a high prevalence (greater than 1 per cent) of HIV.

**Table 5: Notifications of Deaths Following HIV/AIDS Diagnosis, Victoria**

| Exposure Category | April–June 2002 | | July 2001–June 2002 | | Cumulative Total to June 2002 from 1983 | | |
|---|---|---|---|---|---|---|---|
| | Males (n) | Females (n) | Males (n) | Females (n) | Males (n) | Females (n) | Total* (n) |
| Male homosexual / bisexual | 2 | – | 11 | – | 1306 | – | 1328 |
| Male homosexual / bisexual and injecting drug user | 1 | – | 2 | – | 78 | – | 94 |
| Injecting drug user | 0 | 0 | 1 | 0 | 24 | 9 | 33 |
| Heterosexual | 0 | 0 | 0 | 0 | 35 | 40 | 75 |
| Person from specified country# | 0 | 0 | 0 | 0 | 7 | 5 | 12 |
| Haemophilia / related disorder | 0 | 0 | 1 | 0 | 40 | 1 | 41 |
| Transfusion recipient | 0 | 0 | 0 | 0 | 7 | 4 | 11 |
| Other | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| Unavailable | 0 | 0 | 14 | 0 | 29 | 2 | 31 |
| Total | 3 | 0 | 29 | 0 | 1531 | 63 | 1627 |

* Includes transgender individuals and individuals for whom gender is not specified.
\# Persons from countries with a high prevalence (greater than 1 per cent) of HIV.

## HUMAN IMMUNODEFICIENCY VIRUS (HIV) INFECTION

There were 50 new HIV diagnoses in Victoria during the second quarter of 2002—45 males and five females—compared with a total of 48 cases notified during the same quarter in 2001. The median age of those notified was 35 years (range 18–70 years), with males being younger on average than females (34 years compared with 37 years). The majority (80 per cent) of males notified during this quarter reported male-to-male sexual contact.

There were 233 HIV notifications in Victoria during the 12 months from July 2001 to June 2002: 204 males (88 per cent), 28 females (12 per cent) and one transgender individual. This was a 19 per cent increase on the 196 notifications reported during the same period in the previous year.

**Table 6: Notifications of HIV, by Age Group and Sex, Victoria**

| Age Group | April–June 2002 | | July 2001–June 2002 | | Cumulative Total to June 2002 from 1983 | | |
|---|---|---|---|---|---|---|---|
| | Males | Females | Males | Females | Males | Females | Total* |
| 0–12 years | 0 | 0 | 1 | 2 | 30 | 11 | 41 |
| 13–19 years | 0 | 0 | 5 | 1 | 81 | 8 | 90 |
| 20–29 years | 6 | 1 | 42 | 5 | 1503 | 106 | 1624 |
| 30–39 years | 26 | 2 | 97 | 16 | 1632 | 85 | 1727 |
| 40–49 years | 6 | 0 | 34 | 2 | 721 | 31 | 754 |
| 50–59 years | 2 | 0 | 15 | 0 | 273 | 16 | 290 |
| 60+years | 1 | 0 | 6 | 0 | 102 | 1 | 118 |
| Unavailable | 4 | 2 | 4 | 2 | 93 | 12 | 104 |
| Total | 45 | 5 | 204 | 28 | 4435 | 270 | 4748 |

* Includes 17 persons for whom sex is reported as transgender and 26 persons for whom sex is not specified.

**Table 7: Notifications of HIV, by Exposure Category, Victoria**

| Exposure Category | April–June 2002 | | July 2001–June 2002 | | Cumulative Total to June 2002 from 1983 | | |
|---|---|---|---|---|---|---|---|
| | Males (n) | Females (n) | Males (n) | Females (n) | Males (n) | Females (n) | Total* (n) |
| Male homosexual / bisexual | 33 | – | 148 | – | 3581 | – | 3597 |
| Male homosexual / bisexual and injecting drug user | 2 | – | 4 | – | 209 | – | 212 |
| Injecting drug user | 1 | 0 | 6 | 2 | 125 | 38 | 166 |
| Heterosexual | 3 | 2 | 23 | 15 | 191 | 153 | 344 |
| Person from specified country# | 2 | 1 | 12 | 6 | 82 | 46 | 132 |
| Haemophilia / related disorder | 0 | 0 | 1 | 0 | 101 | 1 | 102 |
| Transfusion recipient | 0 | 0 | 0 | 0 | 20 | 15 | 35 |
| Other | 0 | 0 | 0 | 2 | 4 | 11 | 15 |
| Unavailable | 4 | 2 | 10 | 3 | 120 | 6 | 144 |
| Total | 45 | 5 | 204 | 28 | 4435 | 270 | 4748 |

* Includes 17 persons for whom sex is reported as transgender and 26 persons for whom sex is not specified.
\# Persons from countries with a high prevalence (greater than 1 per cent) of HIV.

Those with newly acquired HIV or incident infection provide a picture of who is presently affected by the HIV epidemic. Such individuals are identified on the basis of a previous negative HIV test and/or a seroconversion illness within the 12 months preceding HIV diagnosis. Twenty-one individuals were notified with incident HIV infection during the second quarter of 2002: 20 males and one female. In the period 1 July 2001 to 30 June 2002, 78 individuals fulfilled the criteria of incident infection—a rise of 24 per cent from the 62 individuals reported with incident HIV infection during the preceding 12 months.

**Table 8: Notifications of HIV, by Time since Last Negative Test or Seroconversion Illness, Victoria**

| Time between HIV Diagnosis and Negative Test and/or Seroconversion Illness | April–June 2002 | | | July 2001–June 2002 | | |
|---|---|---|---|---|---|---|
| | Males | Females | Total* | Males | Females | Total* |
| Less than 1 year | 20 | 4 | 24 | 66 | 3 | 69 |
| Less than one year | 20 | 1 | 21 | 74 | 4 | 78 |
| One year to less than three years | 5 | 0 | 5 | 21 | 3 | 24 |
| Three or more years | 5 | 0 | 5 | 32 | 7 | 39 |
| No previous negative test or seroconversion illness | 11 | 2 | 13 | 73 | 11 | 84 |
| Unavailable | 4 | 2 | 6 | 4 | 3 | 8 |
| Total | 45 | 5 | 50 | 204 | 28 | 233 |

\# Includes one person for whom sex was reported as transgender.

**Table 9: Notifications of Chlamydia, by Age Group and Sex, Victoria**

| | April–June 2002 | | | July 2001–June 2002 | | |
|---|---|---|---|---|---|---|
| Age group | Male | Female | Total | Male | Female | Total |
| 0–4 years | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–9 years | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–14 years | 0 | 5 | 5 | 3 | 13 | 16 |
| 15–19 years | 39 | 175 | 214 | 165 | 767 | 932 |
| 20–24 years | 159 | 305 | 464 | 634 | 1233 | 1867 |
| 25–29 years | 117 | 151 | 268 | 540 | 637 | 1177 |
| 30–34 years | 91 | 64 | 155 | 359 | 296 | 655 |
| 35–39 years | 42 | 36 | 78 | 212 | 158 | 370 |
| 40–44 years | 31 | 16 | 47 | 140 | 72 | 212 |
| 45–49 years | 23 | 12 | 35 | 87 | 36 | 123 |
| 50–54 years | 9 | 0 | 9 | 45 | 16 | 61 |
| 55–59 years | 4 | 2 | 6 | 22 | 8 | 30 |
| 60–64 years | 2 | 0 | 2 | 8 | 0 | 8 |
| 65–69 years | 1 | 0 | 1 | 3 | 1 | 4 |
| 70–74 years | 0 | 0 | 0 | 1 | 0 | 1 |
| 75–79 years | 0 | 0 | 0 | 1 | 0 | 1 |
| 80–84 | 1 | 0 | 1 | 1 | 2 | 3 |
| Unknown | 0 | 0 | 0 | 2 | 1 | 3 |
| Total | 519 | 766 | 1285 | 2223 | 3240 | 5463 |

## CHLAMYDIA INFECTIONS

The Department received 1285 notifications of *Chlamydia trachomatis* in the second quarter of 2002, representing a 38 per cent increase on the number of notifications from the same period last year (n=928). The age and sex distributions remain unchanged, with the greatest burden of disease conferred in the age group of 20–24 year olds (Table 9). In this same age group, the rate of notified chlamydia infections is 180 per 100,000 per year for females and 94 per 100,000 per year for males. Polymerase chain reaction was the most common reported method of diagnosis of *C. trachomatis* infection (Table 10)

The passive notification system is enhanced by the collection of risk factor information from clinicians. There were 724 (56 per cent) questionnaires returned for the second quarter 2002, as compared with 503 (54 per cent) for the same period last year.

In males, the sex of the partner from whom the infection was acquired was unknown or not stated for 13 per cent (41/313), nominated as a female partner for 66 per cent (207/313) and as a male for 21 per cent (65/313) of notifications. The majority (43 per cent, 135/313) were reported as having acquired their infection from a casual partner, 38 per cent (119/313) reported their regular partner, 2 per cent (9/411) reported sex workers or the clients of sex workers as the source of the infection and 16 per cent (50/313) were unknown or not stated.

In females, the sex of the partner was nominated as male for 84 per cent (346/411), was unknown or not stated for 12 percent (48/411), and female in 4 per cent (17/411) of notifications. The majority (56 per cent, 231/411) were reported as having acquired their infection from their regular partner, 26 per cent (107/411) reported a casual partner, 2 per cent (8/411) reported a sex worker or their client as the source of the infection and 16 per cent (65/411) were unknown or not stated.

The vast majority of infections (84 per cent, 608/724) were nominated as having been acquired in Victoria from Australian born people.

**Table 10: Testing Method Reported by Laboratories for Chlamydia Notifications, Victoria, April– June 2002**

| Testing method | Number | (%) |
|---|---|---|
| Polymerase chain reaction / DNA/ LCR | 1190 | 92.5 |
| Not stated | 50 | 3.9 |
| IF/ DFA / DF | 23 | 1.8 |
| Enzyme immunoassay / ELISA | 22 | 1.7 |
| Serology | 1 | 0.1 |
| Total | 1286 | 100.0 |

## GONORRHOEA INFECTIONS

There were 229 cases of *Neisseria gonorrhoeae* notified during the second quarter of 2002. This represented a 60 per cent increase from the 138 cases notified during the second quarter of 2001. The number of cases reported for the second quarter of 2001 differs from the number previously reported by the Microbiological Diagnostic Unit (MDU) because the recording methods of MDU and the Department of Human Services differ. Direct comparison of the quarterly counts should be made with caution.

Of the second quarter notifications, 215 (94 per cent) were for males and 14 (6 per cent) were for females. The age and sex distributions are described in Table 11. The median age of males was 33 years (range 17–90 years) and the median age for females was 27 years (range 20–59 years). There was a single notification from the 85-year-plus age group.

In males, the urethra was the most common site for a positive test. If it is assumed that rectal specimens are an indicator of screening activity, then there is evidence of increased screening activity. The proportion of rectal cultures in the second quarter of 2001 was 13 per cent, compared with 17 per cent in the same period in 2002; this screening activity, however, is unlikely to account for the increase in notifications (Table 13).

Twenty per cent of cases (n=46) reported were diagnosed solely by the detection of *N. gonorrhoeae* by nucleic acid amplification (such as polymerase chain reaction).

The notifying clinician provides the Department with risk factor information on the case. Enhanced surveillance information was obtained for 94 per cent (n=215) of notifications. For males, infections were most commonly acquired in Victoria (85 per cent, n=183) from casual sexual partners (61 per cent, n=114). For females, half of all infections were acquired from regular partners and the majority were acquired in Victoria (57 per cent, n=8) (Table 12).

Testing for antibiotic susceptibility is currently only possible if *N. gonorrhoeae* is isolated by culture. In the second quarter of 2002, sensitivity-testing results were received on 186 (91 per cent) of cultures. Resistance to ciprofloxacin was identified in nineteen notifications (1 female, 18 males) (Table 14). No resistance to ceftriaxone was reported.

The Department of Human Services follows up all cases of ciprofloxacin-resistant gonorrhoea, to limit transmission and to remain alert about changes to the epidemiological profile of ciprofloxacin resistance in Victoria.

**Table 11: Gonorrhoea Notifications, by Age Group and Sex, Victoria**

| | April–June 2002 | | | July 2001–30 June 2002 | | |
|---|---|---|---|---|---|---|
| Age group | Male | Female | Total | Male | Female | Total |
| 0–4 years | 0 | 0 | 0 | 0 | 0 | 0 |
| 5–9 years | 0 | 0 | 0 | 0 | 0 | 0 |
| 10–14 years | 0 | 0 | 0 | 0 | 0 | 0 |
| 15–19 years | 10 | 0 | 10 | 29 | 2 | 31 |
| 20–24 years | 31 | 4 | 35 | 98 | 13 | 111 |
| 25–29 years | 38 | 3 | 41 | 144 | 10 | 154 |
| 30–34 years | 47 | 1 | 48 | 157 | 12 | 169 |
| 35–39 years | 46 | 1 | 47 | 122 | 11 | 133 |
| 40–44 years | 20 | 1 | 21 | 71 | 1 | 72 |
| 45–49 years | 10 | 2 | 12 | 36 | 2 | 38 |
| 50–54 years | 4 | 0 | 4 | 25 | 3 | 28 |
| 55–59 years | 6 | 1 | 7 | 14 | 3 | 17 |
| 60–64 years | 2 | 0 | 2 | 6 | 0 | 6 |
| 65–69 years | 1 | 0 | 1 | 5 | 1 | 6 |
| 70–74 years | 0 | 0 | 0 | 0 | 0 | 0 |
| 75–79 years | 0 | 0 | 0 | 0 | 0 | 0 |
| 85+ | 1 | 0 | 1 | 1 | 0 | 1 |
| Unknown | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 216 | 13 | 229 | 708 | 58 | 766 |

**Table 12: Notifications of Gonorrhoea, by Gender, Source Partner and Reported Place of Acquisition, April–June 2002**

| Gender | Sexual Partner | Victoria | Interstate | Overseas | Not stated | Total |
|---|---|---|---|---|---|---|
| Male | Casual partner | 113 | 4 | 12 | 2 | 131 |
| | Regular partner | 34 | 2 | 2 | 1 | 39 |
| | Sex worker | 6 | 0 | 2 | 0 | 8 |
| | Client (pt is sex worker) | 1 | 0 | 0 | 0 | 1 |
| | Unknown | 20 | 0 | 1 | 15 | 36 |
| Total | | 174 | 6 | 17 | 17 | 215 |
| Female | Casual partner | 2 | 1 | 2 | 0 | 5 |
| | Regular partner | 5 | 0 | 1 | 0 | 6 |
| | Sex worker | 1 | 0 | 0 | 0 | 1 |
| | Client (case is sex worker) | 0 | 0 | 0 | 0 | 0 |
| | Unknown | 0 | 0 | 0 | 2 | 2 |
| Total | | 8 | 1 | 3 | 2 | 14 |

In early March 2002, the Department was notified of a case of gonorrhoea that had resulted in an intrauterine death. Contact tracing found six additional cases from the same region with similar ciprofloxacin-resistance patterns, suggesting ongoing transmission. The outbreak investigation could not identify an index case or a direct link between each cluster. Alert letters were sent to all general practitioners in the area, informing them about the increase of cases and the recommendations regarding treatment. No further cases were identified.

The Communicable Diseases Section recently developed an updated gonorrhoea fact sheet for clinicians. It includes an algorithm for treatment in Victoria and has been distributed to all laboratories, which in turn send it to clinicians.

**Table 13: Positive *N. gonorrhoeae* Tests, by Sex and Site of Infection, Victoria, April–June 2002**

| Site of infection | Male | Female |
|---|---|---|
| Urethral | 152 | 1 |
| Rectal | 39 | 0 |
| Urine | 31 | 3 |
| Pharynx | 28 | 1 |
| Not stated | 15 | 1 |
| Other | 1 | 0 |
| Cervix / vagina | 0 | 12 |
| Total | 266 | 18 |

**Table 14: Isolates of *N. gonorrhoeae*, by Gender, Gender of Partner, Place of Acquisition and Ciprofloxacin-Restistance, Victoria, April–June 2002**

| Sex | Sexual Partner | Where acquired | Ciprofloxacin resistant | Ciprofloxacin less sensitive | Ciprofloxacin sensitive | Total |
|---|---|---|---|---|---|---|
| Male | Female | Overseas | 2 | 0 | 0 | 2 |
| | | Victoria | 5 | 2 | 14 | 21 |
| | | Interstate | 0 | 0 | 0 | 0 |
| | | Unknown | 0 | 0 | 1 | 1 |
| | Male | Overseas | 0 | 0 | 5 | 5 |
| | | Victoria | 1 | 0 | 60 | 61 |
| | | Interstate | 0 | 0 | 2 | 2 |
| | | Unknown | 0 | 0 | 0 | 0 |
| | Unknown | Overseas | 4 | 0 | 6 | 10 |
| | | Victoria | 5 | 1 | 50 | 56 |
| | | Interstate | 0 | 0 | 5 | 5 |
| | | Unknown | 1 | 0 | 12 | 13 |
| Female | Male | Overseas | 0 | 0 | 0 | 0 |
| | | Victoria | 0 | 0 | 3 | 3 |
| | | Interstate | 0 | 0 | 0 | 0 |
| | | Unknown | 0 | 0 | 0 | 0 |
| | Unknown | Overseas | 1 | 0 | 1 | 2 |
| | | Victoria | 0 | 0 | 5 | 5 |
| | | Interstate | 0 | 0 | 0 | 0 |
| | | Unknown | 0 | 0 | 0 | 0 |
| Total | | | 19 | 3 | 164 | 186 |

## SYPHILIS

There were 11 cases of infectious syphilis for the year to 30 June, compared with eight cases for the same period in 2001. In the second quarter of 2002, nine cases were reported for seven males and two females, compared with four cases for the same period last year. Of the nine cases, three were primary infections, three were secondary infections and three were early latent infections.

Departmental staff conducted contact tracing and follow-up on all cases, finding a known link between two cases. Eight of the nine (89 per cent) cases were from metropolitan regions. The median age was 32 years (range 20–46 years). The sexual orientation was known for eight of the notifications, of whom 63 per cent (n=5) were reported as heterosexual and 37 per cent (n=3) were reported as homosexual.

The infection was most commonly acquired overseas (44 per cent, n=4), followed by interstate (22 per cent, n=2). Only one person was reported to have acquired their infection in Victoria. For the remaining two cases, the place of acquisition of the infection was unknown.

Fifty-five per cent (n=5) of notifications were reported to have acquired their infection from a casual partner, while 22 per cent (n=2) reported acquiring infection from a regular partner. One case reported infection from a sex worker (overseas). For the remaining case, it was unknown from whom he had acquired the infection. This increase in the cases of infectious syphilis in Victoria highlights the need to promote safe sex messages in the community.

## Table 15: Notifications of Infectious Diseases, by Department of Human Services Region, Victoria, 1 January to 30 June 2002 and Historical Comparisons

| Disease | Barwon South Western | | Grampians | | Loddon Mallee | | Hume | | Gippsland | | Western Metropolitan | | Northern Metropolitan | | Eastern Metropolitan | | Southern Metropolitan | | Unknown | | Victoria | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2002ytd | 2001ytd | 2002ytd | 2001ytd | 2002ytd | 2001ytd | 2002ytd | 2001ytd | 2002ytd | 2001ytd | 2002ytd | 2001ytd | 2002ytd | 2001ytd | 2002ytd | 2001ytd | 2002ytd | 2001ytd | 2002ytd | 2001ytd | 2002ytd | 2001ytd | 2001 |
| **Blood Borne Diseases** | | | | | | | | | | | | | | | | | | | | | | | |
| Hepatitis B – Acute | **0** | *1* | **5** | *0* | **5** | *3* | **2** | *1* | **11** | *8* | **20** | *19* | **16** | *10* | **14** | *14* | **30** | *31* | **0** | *1* | **103** | *88* | ***196*** |
| Hepatitis B – Chronic/Unknown | **5** | *6* | **5** | *3* | **17** | *14* | **12** | *5* | **6** | *10* | **257** | *253* | **197** | *156* | **202** | *177* | **198** | *206* | **70** | *54* | **969** | *884* | ***1918*** |
| Hepatitis C – INewly Acquired | **4** | *1* | **2** | *0* | **3** | *1* | **3** | *2* | **0** | *3* | **9** | *3* | **6** | *14* | **7** | *7* | **10** | *10* | **4** | *0* | **48** | *41* | ***88*** |
| Hepatitis C – Unspecified | **68** | *133* | **63** | *67* | **116** | *113* | **70** | *79* | **109** | *105* | **467** | *380* | **373** | *369* | **261** | *294* | **531** | *539* | **208** | *278* | **2266** | *2357* | ***4954*** |
| Hepatitis D | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | **1** | *1* | **1** | *0* | **0** | *0* | **1** | *0* | **0** | *0* | **3** | *1* | ***7*** |
| **Enteric Diseases** | | | | | | | | | | | | | | | | | | | | | | | |
| Botulism | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *1* | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *1* | ***1*** |
| *Campylobacter* infection | **204** | *132* | **76** | *70* | **139** | *98* | **156** | *146* | **197** | *150* | **220** | *321* | **355** | *360* | **498** | *554* | **558** | *661* | **77** | *69* | **2480** | *2561* | ***5457*** |
| Cholera | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | ***1*** |
| Cryptosporidiosis | **12** | *5* | **6** | *2* | **13** | *3* | **16** | *15* | **22** | *12* | **16** | *52* | **27** | *42* | **26** | *79* | **27** | *57* | **4** | *6* | **169** | *273* | ***445*** |
| Food/Water/Environmental - Other | **22** | *12* | **46** | *0* | **14** | *33* | **16** | *0* | **11** | *0* | **58** | *8* | **104** | *25* | **158** | *46* | **75** | *47* | **133** | *12* | **637** | *183* | ***394*** |
| Giardiasis | **29** | *47* | **14** | *15* | **10** | *22* | **17** | *23* | **36** | *22* | **39** | *74* | **62** | *82* | **86** | *99* | **105** | *112* | **13** | *3* | **411** | *499* | ***857*** |
| Haemolytic Uraemic Syndrome | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *1* | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | **1** | *0* | **0** | *0* | **1** | *1* | ***1*** |
| Hepatitis A | **14** | *2* | **0** | *0* | **1** | *2* | **1** | *2* | **0** | *1* | **6** | *7* | **3** | *12* | **9** | *6* | **11** | *20* | **0** | *2* | **45** | *54* | ***103*** |
| Hepatitis E | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *1* | **0** | *0* | **0** | *0* | **1** | *0* | **0** | *0* | **0** | *1* | **1** | *0* | **2** | *2* | ***3*** |
| Listeriosis | **1** | *2* | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | **1** | *2* | **3** | *0* | **1** | *0* | **1** | *1* | **0** | *1* | **7** | *6* | ***9*** |
| Paratyphoid | **0** | *0* | **0** | *1* | **0** | *0* | **0** | *0* | **0** | *1* | **3** | *1* | **1** | *0* | **1** | *1* | **3** | *1* | **0** | *0* | **8** | *5* | ***9*** |
| Salmonellosis | **60** | *53* | **33** | *31* | **64** | *46* | **56** | *40* | **36** | *33* | **84** | *52* | **101** | *95* | **136** | *104* | **182** | *140* | **24** | *19* | **776** | *613* | ***1091*** |
| Shigellosis | **1** | *1* | **0** | *1* | **0** | *3* | **1** | *1* | **0** | *1* | **10** | *7* | **7** | *17* | **5** | *6* | **12** | *14* | **1** | *2* | **37** | *53* | ***98*** |
| Typhoid | **0** | *1* | **0** | *0* | **0** | *0* | **0** | *1* | **0** | *0* | **0** | *1* | **3** | *2* | **5** | *3* | **7** | *0* | **0** | *1* | **15** | *9* | ***14*** |
| Vero Toxin producing E.coli | **1** | *1* | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | **1** | *2* | **0** | *1* | **0** | *0* | **0** | *0* | **2** | *4* | ***4*** |
| **Other Infectious Notifiable Diseases** | | | | | | | | | | | | | | | | | | | | | | | |
| Invasive Meningococcal Disease | **7** | *8* | **3** | *3* | **1** | *0* | **4** | *2* | **3** | *4* | **17** | *8* | **15** | *10* | **11** | *16* | **20** | *18* | **0** | *0* | **81** | *69* | ***163*** |
| Legionellosis | **2** | *0* | **3** | *1* | **1** | *1* | **3** | *2* | **1** | *1* | **21** | *17* | **11** | *16* | **10** | *13* | **7** | *25* | **2** | *1* | **61** | *77* | ***121*** |
| Leprosy | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | **1** | *0* | **0** | *0* | **1** | *0* | ***0*** |
| Tuberculosis | **2** | *2* | **0** | *0* | **0** | *3* | **3** | *1* | **4** | *1* | **32** | *38* | **33** | *22* | **32** | *29* | **36** | *45* | **1** | *4* | **143** | *145* | ***305*** |
| **Vaccine Preventable Diseases** | | | | | | | | | | | | | | | | | | | | | | | |
| Haemophilus influenzae type b | **0** | *0* | **0** | *0* | **0** | *1* | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *1* | **1** | *0* | **0** | *0* | **0** | *0* | **1** | *2* | ***2*** |
| Influenza | **0** | *0* | **0** | *0* | **9** | *0* | **2** | *0* | **5** | *0* | **49** | *0* | **37** | *0* | **34** | *0* | **57** | *1* | **2** | *0* | **195** | *1* | ***176*** |
| Invasive Pneumococcal Disease | **15** | *3* | **1** | *3* | **12** | *10* | **5** | *0* | **13** | *4* | **13** | *2* | **30** | *2* | **26** | *16* | **34** | *6* | **16** | *42* | **165** | *88* | ***322*** |
| Measles | **2** | *0* | **0** | *2* | **0** | *1* | **0** | *1* | **0** | *0* | **0** | *8* | **0** | *9* | **3** | *17* | **3** | *17* | **0** | *1* | **8** | *56* | ***82*** |
| Mumps | **0** | *2* | **0** | *2* | **0** | *0* | **0** | *0* | **0** | *0* | **2** | *8* | **0** | *4* | **1** | *6* | **2** | *10* | **0** | *0* | **5** | *32* | ***35*** |
| Pertussis | **29** | *11* | **19** | *8* | **71** | *23* | **32** | *19* | **47** | *23* | **61** | *21* | **58** | *38* | **78** | *61* | **79** | *56* | **10** | *3* | **484** | *263* | ***845*** |
| Rubella | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *3* | **0** | *0* | **3** | *0* | **1** | *2* | **4** | *0* | **5** | *3* | **0** | *0* | **13** | *8* | ***26*** |
| Tetanus | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | ***1*** |
| **Vector Borne Diseases** | | | | | | | | | | | | | | | | | | | | | | | |
| Arbovirus – Flavivirus | **0** | *0* | **0** | *0* | **0** | *0* | **1** | *0* | **0** | *0* | **1** | *0* | **1** | *1* | **0** | *1* | **3** | *2* | **0** | *0* | **6** | *4* | ***7*** |
| Arbovirus – Not further Specified | **0** | *10* | **0** | *16* | **9** | *130* | **3** | *64* | **53** | *48* | **0** | *12* | **3** | *16* | **4** | *20* | **7** | *30* | **2** | *19* | **81** | *365* | ***391*** |
| Malaria | **0** | *0* | **0** | *2* | **0** | *1* | **5** | *1* | **3** | *2* | **4** | *8* | **6** | *2* | **9** | *12* | **8** | *23* | **3** | *4* | **38** | *56* | ***89*** |
| **Zoonoses** | | | | | | | | | | | | | | | | | | | | | | | |
| Brucellosis | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | **0** | *1* | **0** | *0* | **1** | *0* | **0** | *0* | **0** | *0* | **1** | *1* | ***1*** |
| Leptospirosis | **2** | *6* | **0** | *0* | **0** | *3* | **2** | *1* | **3** | *8* | **0** | *1* | **1** | *0* | **0** | *0* | **0** | *0* | **0** | *0* | **8** | *19* | ***38*** |
| Psittacosis | **0** | *2* | **1** | *4* | **2** | *4* | **0** | *2* | **0** | *2* | **0** | *9* | **1** | *10* | **5** | *8* | **4** | *6* | **0** | *0* | **13** | *47* | ***74*** |
| Q Fever | **7** | *3* | **0** | *1* | **6** | *3* | **5** | *20* | **6** | *6* | **0** | *1* | **1** | *1* | **4** | *1* | **1** | *1* | **2** | *2* | **32** | *39* | ***62*** |
| **Total** | **487** | *444* | **277** | *232* | **493** | *519* | **415** | *433* | **566** | *445* | **1396** | *1317* | **1459** | *1322* | **1632** | *1592* | **2019** | *2082* | **573** | *526* | **9317** | *8910* | ***18489*** |
| Population | | *340,496* | | *208,226* | | *293,516* | | *250,878* | | *240,114* | | *619,377* | | *769,360* | | *974,374* | | *1,126,223* | | | | | 4,822,663 |

Notes

1 The data are preliminary only and may be subject to revision

2 ABS estimated resident population data—June 2001 (Victorian total includes Victoria Unincorporated = 99)

3 Reporting of invasive pneumococcal disease (IPD) commenced in December 2000 under a voluntary laboratory based scheme. Cryptosporidiosis, influenza, hepatitis D and E became notifiable on 16 May 2001.

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# Victorian Infectious Diseases Bulletin

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Contributions are invited on any topic dealing with the control of infectious diseases. These may be in the form of articles, short reports or letters. Submissions should be in Microsoft Word IBM-compatible format with Vancouver-style references. We encourage submissions in electronic format. Original data from which graphs and figures have been prepared should be included. Submissions will be edited to conform with the style of the bulletin.

The editors recognise and thank the individuals and organisations who contribute to the surveillance and management of infectious diseases. We remind authors of their responsibility to cite appropriate persons as authors and to acknowledge separately those whose work contributed significantly but did not justify authorship.

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