Victorian Infectious Diseases Bulletin

ISBN 1 441 0575 Volume 15 Issue 4 December 2012

Contents

Varicella and herpes zoster in Victoria, 2011 130
Ten years of *Escherichia coli* bacteraemia and meningitis in Victoria; reports to the Victorian Hospital Pathogen Surveillance Scheme, 2002–2011 134
Cold chain breach: a chilling experience 139
National vaccine storage guidelines: Strive for 5 141
The global burden of disease study 2010 – information for action 142
Immunisation program report, Victoria, December 2012 143
Communicable disease surveillance, Victoria, July–September 2012 145
Varicella and herpes zoster in Victoria, 2011

Kristina A Grant¹, Lucinda J Franklin², Kylie S Carville¹ and James E Fielding¹

1. Victorian Infectious Diseases Reference Laboratory, Melbourne, Victoria
2. Control and prevention of communicable diseases unit, Department of Health, Victoria

Introduction

Varicella (more commonly known as chickenpox) is caused by infection with varicella-zoster virus (VZV). After primary infection, the virus establishes latency in the dorsal root ganglia. Herpes zoster (also known as shingles) is caused by reactivation of VZV, which may occur years or even decades after primary infection.¹

The varicella vaccine was first licensed in Australia in 2000 and was introduced onto the publicly funded National Immunisation Program in 2005. Modelling studies from a number of countries predicted the widespread use of varicella vaccine would lead to an early decrease in varicella (chickenpox) cases but a transient increase in herpes zoster (shingles) cases.²,³ On the assumption that exposure to varicella boosts immunity to zoster for an average of 20 years, modelling predicted the herpes zoster incidence in Australia would increase for the first 37 years of an infant vaccination program with 90 per cent vaccine coverage.³ Modelling from the United Kingdom (UK) suggests that with 90 per cent vaccination coverage, the varicella vaccine would prevent 600,000 inpatient days due to varicella but increase inpatient days due to zoster by 1.1 million during the initial 65 years of the program.⁵ Another model from the UK found that a two dose schedule would reduce varicella incidence to very low levels with 90 per cent first dose coverage and 70 per cent second dose coverage, but that this would lead to an increase in zoster in the elderly for more than 40 years.⁶

In the United States and Australia, where the varicella vaccine has been available on national immunisation schedules since 1996 and 2005 respectively, studies have shown either no increase in zoster or an increase in zoster (but which was occurring before the introduction of the vaccine). These observations support the need for further analysis over a longer time period to fully determine the effect of vaccine on zoster incidence and potentially inform the introduction of a zoster vaccine for the elderly.⁷–¹⁰

Varicella and herpes zoster became notifiable conditions in Victoria in September 2008 with the objective of enabling assessment of the medium to long-term impact of the vaccine program on disease incidence and to inform education and vaccination programs.¹¹ In this study we descriptively analysed notifiable disease and laboratory VZV detections data, updated to the end of 2011, with the aim of understanding the evolving epidemiology of varicella and herpes zoster in Victoria in the post-vaccine era.

Methods

De-identified records of varicella, herpes zoster and VZV infection (not specified) cases notified to the Victorian Government Department of Health from September 2008 to December 2011 inclusive were extracted from the Notifiable Infectious Diseases Surveillance database into Microsoft Excel. Notification date and age fields were included in the data extraction. Records (including test date and age) of herpes virus polymerase chain reaction (PCR) tests conducted from January 2002 to December 2011 inclusive that were positive for VZV were extracted from the Victorian Infectious Diseases Reference Laboratory (VIDRL) database. Laboratory test requests do not specify the clinical presentation, thus results of VIDRL testing are reported as VZV infection rather than varicella and herpes zoster.

Data were managed in Microsoft Excel and statistical analyses (two sample tests of proportion, Wilcoxon ranksum, chi squared and other non-parametric trend tests) were performed in Stata™ (Version 10) software. Data from 2008 were not compared statistically to other years as they were only collected from September when varicella and herpes zoster became notifiable. A p-value of less than 0.05 was considered statistically significant.

Results

Varicella and herpes zoster cases notified to the department increased in 2011 compared with 2009 (p=0.03 for varicella and p=0.01 for zoster) and 2010 (p<0.01 for varicella and zoster) (Figures 1 and 2). There was no change in age distribution over the same period for either varicella (p=0.35) or herpes zoster (p=0.41). The number of unspecified cases increased from 1,834 in 2009 to 2,398 in 2011 but remained relatively consistent comprising approximately 60 per cent of all notified cases of VZV infection. The median age (interquartile range, IQR) of notified cases of unspecified VZV infection was relatively unchanged at 45 (23–64), 44 (24–64) and 43 (23–64) years in 2009, 2010 and 2011 respectively. The percentage of unspecified cases of VZV...
infection notified to the department that were diagnosed at VIDRL (and not subsequently linked to a corresponding medical practitioner notification) was 25 (n=466), 21 (n=438) and 13 (n=313) per cent in 2009, 2010 and 2011 respectively.

There were 353 VZV infections diagnosed at VIDRL in 2011, compared to an annual average of 449 (range: 294 in 2002 to 533 in 2009) for the period 2002–2011 (Figure 3). Just over half (51 per cent) of these diagnoses were in adults aged 30–69 years with only four per cent of diagnoses in children aged less than 10 years, and 20 per cent in persons aged 10–29 years. There was a significant increase in the median age of diagnosed VZV infections from 2002 to 2011 (p<0.002), from 43 (IQR 24 to 67) years in 2002 to 52 (IQR 32 to 72) years in 2011. Over this period a slight decrease in the proportion of diagnoses in children aged 5–9 years was seen (two per cent in 2011 versus five per cent over 2002 to 2010) with an increase in those aged 80 years or older (15 per cent in 2011 versus 10 per cent over 2002 to 2010). Differences in median age over the period matching notification data were not significant. The median age in 2009 (62 years, IQR 30 to 70 years) was not different to 2010 (49 years, IQR 32 to 73 years) (p=0.259) or 2011 (p=0.961), nor was 2010 different to 2011 (p=0.338).

Discussion

Several discrepant trends were observed in the notifiable disease and laboratory diagnosis surveillance systems in 2011. Whilst the number of varicella and herpes zoster cases notified to the department increased compared to 2009 and 2010, the number and percentage of diagnoses of VZV infection made at VIDRL
decreased. Furthermore, whilst there was no apparent difference in the age distribution of notified cases (of varicella or herpes zoster) in 2011 compared to 2009 and 2010, unspecified VZV infection from VIDRL laboratory diagnoses showed a modest upwards shift in age in 2011.

A number of limitations inherent within the current VZV infection surveillance framework make these apparent contradictory findings difficult to interpret. Firstly, a large proportion (approximately 60 per cent) of total VZV infection cases notified to the department do not have a clinical presentation specified and it is therefore difficult to ascertain whether this might be masking any shifts in the epidemiology (in particular temporal or age distributions) of varicella and/ or herpes zoster. In addition, VZV infection only became a notifiable disease in Victoria in 2008, and observed increases in the number of notified cases since then may also be in part due to increasing awareness of the requirement to notify, which may also in turn be influencing testing practices.

Using diagnostic testing results from VIDRL as a surveillance tool is limited in the same way by the absence of clinical presentation data. However, given the increase in the median age of VZV infection diagnosis—particularly since 2007—and that in 2011 more than three-quarters of diagnoses were in adults aged 30 years or older, it seems possible that over time herpes zoster diagnoses may be accounting for a higher proportion of VZV infection test requests at VIDRL. An alternate—but less likely—explanation is that varicella is shifting to an older age group. There appears to be little change in the median age of unspecified cases notified to the department and over the same period there was also little change at VIDRL. With only three years of notifiable VZV infection data available it is too early to compare findings of the system too closely, however the sharp decrease in number and per centage of notified cases of unspecified VZV infection suggests there may be a shift in testing practices occurring.

Given that a principal measure of the success of a public health vaccination program is its impact on disease incidence, the importance of being able to confidently assess VZV infection epidemiology from surveillance data cannot be underestimated. Whilst the surveillance data from notifiable disease surveillance and laboratory detections of VZV at VIDRL are presently difficult to correlate, there is evidence from other Victorian data sources to suggest that both the incidence of varicella cases is decreasing and the incidence of herpes zoster is beginning to increase.

Using consultation data from the Melbourne Medical Deputising Service (MMDS), an after-hours general practice locum service for metropolitan Melbourne, we found the standardised varicella consultation proportion more than halved from 5.6 per 1,000 in 2000 to 2.8 in 2011 (p<0.001), while the standardised herpes zoster consultation proportion rose from 1.1 to 2.2 in the same period (p<0.001) (unpublished data). In the shorter period from 2005 since the introduction of varicella vaccine onto the National Immunisation Program, the varicella consultation proportion fell from 4.3 to 2.6 in 2011 (p<0.001), while the herpes zoster consultation proportion rose from 1.6 to 2.2 (p<0.001). The decrease in varicella consultations by the MMDS highlights the need to further encourage medical practitioner notification, as laboratory request forms, and thus the result reported, do not indicate this. In the meantime, supplementary surveillance mechanisms such as hospital-based surveillance studies, MMDS and laboratory surveillance—each with their own set of limitations and, at times, discrepant trends—are required to provide a greater understanding of the impact of the vaccine program on the epidemiology of VZV infection in Victoria.

We have previously reported a significant increase in zoster in MMDS patients however this was based on a total population denominator; using patient consultations more accurately accounts for the age distribution of MMDS patients. Such an increase would be consistent with the modeling predictions. These findings should be interpreted with caution because cases of VZV infection identified through MMDS consultations are not laboratory confirmed and we have assumed that an increase or decrease in the proportion of consultations will correspond to an increase or decrease in disease among the source population.

Whilst there is tentative evidence of a shift in temporal trends and age distributions for varicella and herpes zoster in the years following the introduction of vaccine, notifiable disease surveillance for VZV infection in Victoria is still in its infancy and requires more time to stabilise and become established to improve its reliability, particularly with respect to data quality and representativeness. That approximately 60 per cent of notified cases of VZV infection have an unspecified clinical presentation highlights the need for hospital discharge data and reports from other countries.5–7
References

9. Carville KS, Riddell MA, Kelly HA. A decline in varicella but an uncertain impact on zoster following varicella vaccination in Victoria, Australia. Vaccine. 2010;28(13):2532–8 Epub 2010/02/02
Introduction

Bacteraemia and meningitis cause significant morbidity and mortality worldwide. The epidemiology of causative organisms varies over time with Escherichia coli and Staphylococcus aureus being the two most common causes of bacteraemia in developed countries at this time. In addition to reports of increasing numbers of E. coli bacteraemia from a range of countries there is also a growing concern globally of the increasing prevalence of antimicrobial resistance among E. coli isolates. In Victoria the number of E. coli reports to the Victorian Hospital Pathogen Surveillance Scheme (VHPSS) has also increased over time. We reviewed ten years of E. coli reports to VHPSS to investigate any changes in the epidemiology and antimicrobial susceptibilities to commonly reported antimicrobials. We also assessed the prevalence of multi-resistance among isolates reported over the ten year period.

Methods

VHPSS provides passive surveillance of bacterial and fungal agents causing bacteraemia and meningitis in Victoria, encompassing infections acquired in both healthcare and community settings. Data represent voluntarily submitted laboratory reports which include demographic characteristics (anonymous identifier, age and sex), dates of admission to hospital and collection of the diagnostic specimen, and the identity and antimicrobial susceptibilities of the causative organism. We estimate that approximately 60 per cent of Victorian bloodstream and CSF infections are reported to VHPSS. Contributing laboratories service a range of public and private metropolitan and regional healthcare facilities as well as outpatient clinics. VHPSS reports are broadly representative of the Victorian population.

We reviewed reports of E. coli to the VHPSS from January 2002 to December 2011 and described their epidemiology and antimicrobial susceptibility. Cases were defined as the first isolate of an E. coli from the bloodstream or cerebrospinal fluid (CSF) in a 14-day period. A second isolate from the same person outside of 14 days was counted as a separate episode. When two isolates of E. coli with different antimicrobial susceptibilities were reported from the same episode both were included. We used patient admission dates to calculate the duration of hospitalisation prior to the diagnostic specimen being collected. Isolates from specimens collected before the third day of hospitalisation were classified as community-onset infections (COI), while those isolates from specimens collected three days or more after hospitalisation were classified as healthcare-acquired infections (HAI).

We used patient admission dates to calculate the duration of hospitalisation prior to the diagnostic specimen being collected. Isolates from specimens collected before the third day of hospitalisation were classified as community-onset infections (COI), while those isolates from specimens collected three days or more after hospitalisation were classified as healthcare-acquired infections (HAI).

We used Australian Bureau of Statistics mid-year population data to calculate rates.

Results

There were 12,871 reports of E. coli to the VHPSS from 2002 to 2011; 12,845 from blood cultures and 26 CSF isolates. E. coli accounted for 23 per cent of all isolates reported to VHPSS during this ten year period and was the most commonly reported species each year except for 2002 when it was second to S. aureus. Both the number and proportion of all VHPSS reports that were E. coli increased annually; 945 reports (19 per cent of all) in 2002 and 1,581 reports (27 per cent of all) in 2011. Data in this report are reviewed in five two-year periods for simplicity of presentation. The increase in the number of reports of E. coli between the years 2002–2003 and 2010–2011 (76 per cent) was greater than that of all VHPSS reports (32 per cent). Table one includes the number of reports for the five two year periods and the per centage increase of reports for both E. coli and all VHPSS reports between each period.

Age and sex distribution

The estimated average annual rate of invasive E. coli infection (adjusted for 60 per cent VHPSS contribution) was 41 per 100,000 population; highest among the age groups 80 years or more, 70 to 79 years and less than one year of age (357, 175 and 89 per 100,000 population respectively) (Figure 1).
The annual rate per 100,000 population of *E. coli* reports increased from 2002–2003 to 2010–2011 among all age groups except those aged less than one year of age for which the rate decreased from 99.4 in 2002–2003 to 87.7 in 2010–2011. The greatest increases were among those 10 to 19 years (2.51 to 4.35) and those 30 to 39 years (7.73 to 13.2) although the numbers of reports remain low.

Fifty-five per cent of reports were of females; estimated average annual rate per 100,000 population 44.3 for females and 37.0 for males. The greatest difference in rates between females and males was among those aged 20 to 39 years for which the rates were 13.4 and 4.4 respectively. Over the ten year period the greatest increases in rates were among females aged 30 to 39 years for which the rate doubled from 10.4 in 2002–2003 to 20.9 in 2010–2011, and males aged 10 to 19 years; 70 per cent increase from 4.65 to 7.89 per 100,000 population.

The other 87 per cent of *E. coli* reports were of community-onset infections (COI – diagnostic specimen collected within 48 hours of hospitalisation or during an outpatient visit). Due to the lack of information on prior hospitalisation we were unable to determine if these infections were healthcare-associated or community-acquired.

**Onset of infection**

Ninety per cent of reports included the date of patient admission or outpatient visit which was used to determine the duration of hospitalisation prior to the diagnostic specimen being collected. This proportion remained relatively stable over the five two-year periods.

Overall 13 per cent of *E. coli* reports were of persons hospitalised for more than 48 hours prior to specimen collection, indicating healthcare-acquired infection (HAI). This proportion declined each year from 15 per cent in 2002–2003 to 11 per cent in 2010–2011. The proportion of HAI varied with age. The highest was among those aged less than one (26 per cent HAI) and the lowest among those 80 years or more (nine per cent HAI). Among females 11 per cent of reports indicated a HAI and for males 15 per cent.

The other 87 per cent of *E. coli* reports were of community-onset infections (COI – diagnostic specimen collected within 48 hours of hospitalisation or during an outpatient visit).

**Reported resistance to four antimicrobial classes**

Reports were reviewed for susceptibilities to four antimicrobial classes, aminopenicillins, aminoglycosides, third-generation cephalosporins (3GC) and fluoroquinolones. Reports included data for amoxicillin (aminopenicillins), gentamicin (aminoglycosides), ceftriaxone, cefotaxime and/or ceftazidime (3GC) and ciprofloxacin (fluoroquinolones). The proportion of *E. coli* reports that included susceptibilities varied for each antimicrobial class; amoxicillin 99 per cent, 3GC 84 per cent, ciprofloxacin 88 per cent and gentamicin 99 per cent. These proportions remained relatively stable across the ten year period.

The proportion of isolates reported to be resistant to amoxicillin remained stable over the five two-year periods (Table 2). Prevalence of resistance among reported *E. coli* to the other three antimicrobial classes increased each two-year period. Resistance to 3GC in 2010–2011 was nine times that of 2002–2003, ciprofloxacin resistance was five times more and gentamicin three times greater.

Antimicrobial resistance was more prevalent among HAI isolates for all antimicrobial classes except amoxicillin (Table 2).
Isolates with zero to four antimicrobial resistances

To review the prevalence of isolates that had multiple antimicrobial resistances we included only isolates that had reported antimicrobial susceptibilities for all four classes (9,867 reports; 77 per cent). The proportion of reports that include these data ranged from 64 to 82 per cent over the five two year periods. Half (52 per cent) of the isolates were susceptible to all four antimicrobial classes, 41 per cent were resistant to one antimicrobial class, four per cent to two antimicrobial classes, two per cent to three and one per cent were resistant to all four antimicrobial classes. The proportion of isolates with zero or one resistance decreased from 97 per cent in 2002–2003 to 88 per cent in 2010–2011 (Figure 2). Of the 2931 isolates with one resistance 99 per cent were amoxicillin resistant; 33 isolates were ciprofloxacin resistant, ten gentamicin resistant and five 3GC resistant.

Four hundred and thirty-five isolates were resistant to two antimicrobial classes of which 35 per cent were amoxicillin and ciprofloxacin resistant, 34 per cent amoxicillin and gentamicin resistant and 29 per cent amoxicillin and 3GC resistant. Of the 251 isolates that were resistant to three antimicrobials 45 per cent were resistant to amoxicillin, ciprofloxacin and gentamicin, 40 per cent to amoxicillin, 3GC and ciprofloxacin and 15 per cent to amoxicillin, 3GC and gentamicin. One hundred and eleven isolates were resistant to all four antimicrobial classes.

The proportion of isolates resistant to two, three and four antimicrobial classes increased each two-year period (Figure 3). Overall the proportion of all isolates with two or more resistances increased from three per cent in 2002–2003 to 12 per cent in 2010–2011. The number of reports with two antimicrobial resistances increased from 23 in 2002–2003 to 148 in 2010–2011, three antimicrobial resistances increased from 11 to 97 and four antimicrobial resistances from one to 51.

### Table 2: Proportion of reported *E. coli* isolates that are resistant to four antimicrobial classes, 2002–2011

<table>
<thead>
<tr>
<th>Antimicrobial</th>
<th>02–03 (%R)</th>
<th>04–05 (%R)</th>
<th>06–07 (%R)</th>
<th>08–09 (%R)</th>
<th>10–11 (%R)</th>
<th>Community-onset (%R)</th>
<th>Healthcare-acquired (%R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amoxicillin</td>
<td>45.1</td>
<td>45.9</td>
<td>48.9</td>
<td>47.3</td>
<td>47.6</td>
<td>47.4</td>
<td>47.4</td>
</tr>
<tr>
<td>3GC</td>
<td>0.7</td>
<td>1.8</td>
<td>3.4</td>
<td>4.6</td>
<td>6.4</td>
<td>3.4</td>
<td>5.8</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>1.4</td>
<td>2.7</td>
<td>3.8</td>
<td>6.3</td>
<td>7.3</td>
<td>4.7</td>
<td>7.1</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>1.6</td>
<td>2.0</td>
<td>3.7</td>
<td>4.8</td>
<td>5.4</td>
<td>3.6</td>
<td>5.9</td>
</tr>
</tbody>
</table>

### Figures

**Figure 2:** Proportion of isolates resistant to zero or one antimicrobial class, 2002–2011

**Figure 3:** Proportion of isolates resistant to two, three or four antimicrobial classes, 2002–2011
Of the 22 CSF isolates with data for all four antimicrobial classes 11 had no resistance, nine had one resistance (all to amoxicillin), one had two resistances (amoxicillin and gentamicin) and one three (amoxicillin, ciprofloxacin and 3GC).

**Multi-resistant E. coli**
Multi-resistant E. coli was defined as an isolate with resistances to three or four of the antimicrobial classes described above. The overall proportion of isolates that were multi-resistant was 3.7 per cent. This proportion increased from one per cent in 2002–2003 to six per cent in 2010–2011.

Multi-resistance was more prevalent among HAI isolates (5.8 per cent) than among COI isolates (3.3 per cent). The proportion of isolates that were multi-resistant increased each two year period among both HAI and COI (Figure 4). Among HAI isolates the prevalence of multi-resistant E. coli increased 7.8 times and for COI isolates 6.3 times from 2002–2003 to 2010–2011.

Multi-resistance was more prevalent among males (5.0 per cent) than females (2.5 per cent). This was evident across all age groups except among those aged less than one year (Figure 5). It should be noted that the number of isolates in some of these groups were small.

**Carbapenem susceptibilities**
Over the ten year period 9,201 (71 per cent) E. coli reports included data on either meropenem or imipenem susceptibilities. Nine isolates between 2002 and 2010 were carbapenem resistant.

**Discussion**
E. coli is the most commonly reported organism causing bacteraemia in Victoria, accounting for 23 per cent of all reports to VHPSS from 2002 to 2011, over which time the number of reports increased by 76 per cent. During this same time period, the total number of all reports to VHPSS increased by 32 per cent. An increase in bacteraemic reports and in particular E. coli reports has also been reported from laboratory-based surveillance systems in Europe and England1–2. Between 2004 and 2008 the Health Protection Agency (HPA) in England noted an increase of 15 per cent for all bacteraemias and 32 per cent for E. coli2.

Increasing antimicrobial resistance among Enterobacteriaceae is of global concern. The findings of this review of antimicrobial resistance among E. coli indicate an increasing prevalence to three antimicrobial classes that are commonly used for treatment of Gram-negative infections (third generation cephalosporins, fluoroquinolones and aminoglycosides). The prevalence of 3GC resistance increased by nine times over the ten year period with 6.4 per cent of isolates resistant to either cefotaxime, ceftriaxone or ceftazidime. Surveillance by the European Antimicrobial Resistance Surveillance Network (EARS-Net) from 2002 to 2009 found a similar increase with prevalence increasing from 1.7 per cent to eight per cent for 3GC over the eight years1. In the UK
and Ireland 3GC resistance is more prevalent; surveillance conducted by the HPA reported an increase from two per cent of *E. coli* isolates in 2001 to 12 per cent in 2006. Prevalence of ciprofloxacin and gentamicin resistance was also higher among *E. coli* bacteraemic isolates in the UK and Ireland in 2006; 26 per cent resistance to ciprofloxacin and 11 to gentamicin as compared to 7.3 and 5.4 per cent in Victoria respectively in 2010–2011.

The prevalence of isolates that were resistant to two or more antimicrobial classes increased annually over the ten year period, however, the prevalence of multiple resistances among *E. coli* in Victoria is still relatively low. Surveillance by EARS-Net found that in 2009 the prevalence of isolates with two resistances was 12.4 per cent, three resistances 6.7 per cent and four resistances 3.4 per cent as compared to 6.0 per cent, 3.9 per cent, and 2.1 per cent in Victoria respectively.

The increase in resistance to antimicrobials commonly used for empiric treatment is of concern. As found in other settings, the increasing use of carbapenems usually reserved for serious infections caused by multi-resistant Gram-negative bacilli may lead to the emergence of carbapenemase-producing *Enterobacteriaceae*. It is important that the trend of increasing antimicrobial resistance among *E. coli* in Victoria does not continue.

Acknowledgements

We gratefully acknowledge the confidential contribution of Victorian laboratories to VHPSS, the support of the Department of Health Victoria and data management by Annie Beattie, Artemesia Green, Wendy Siryj, Juvelee Marzan and Eleanor Latomanski.

References

Cold chain breach: a chilling experience

Rosemary Morey1, Michael Batchelor1, Jenny Royle2, Angela Ouroumis3, Mirander Pellissier1, Tanya Perrin4

1 Immunisation Section, Department of Health, Victoria
2 Department of Paediatrics, Royal Children’s Hospital, Melbourne
3 Northern Division of General Practice
4 City of Whittlesea

Background

We describe a community cold chain breach and its management.

In June 2011 a single general practitioner practice (GP) in metropolitan Melbourne received a small delivery of Boostrix® vaccine. The vaccine was placed in the food bar fridge as there was inadequate space in the domestic fridge routinely used to store vaccine. That evening the door was inadvertently left open.

Vaccines that have not been stored correctly may not offer protection. Vaccines are delicate biological substances that may become less effective or destroyed if frozen or exposed to heat or light. Vaccines should be stored at between 2–8 degrees Celsius from manufacture to administration.1

A cold chain breach occurs when a temperature excursion causes freezing (zero degrees or less) or heating (over eight degrees), lasting longer than 15 minutes. Excursions up to 12 degrees Celsius for less than 15 minutes, for example when restocking the fridge, are excluded.

Recognising a temperature breach, the receptionist completed the departments cold chain breach (CCB) form and faxed it to the Immunisation Section. Despite the efforts of the Northern Division the practice previously chose not to access support.

The GP treats approximately 12,000 patients annually and was away for nine weeks during the investigation period.

Investigation

A multidisciplinary response team was established.

Immediate actions were implemented according to Department of Health standard cold chain management procedures2 and included:

- Practice requested to not use any vaccine and/or to discard any vaccine
- Vaccine supply stopped
- Permission gained to data log domestic fridge

Temperature monitoring

Records of temperature data and details of the breach temperature excursion were sought by the department but none were available as there was no temperature monitoring in either fridge.

The division placed data loggers in the overstocked domestic fridge for five days revealing a consistent freeze on all shelves. The department advised the practice to discard all vaccine.3

Identifying affected patients

The domestic fridge had been used to store vaccine since November 2009. The GP’s paper records could not provide an efficient way to identify immunised patients. Patient information was gathered from the Australian Childhood Immunisation Register (ACIR)a, the National Human Papillomavirus Registerb, Surveillance of Adverse Events Following Vaccination in the Community (SAEFVIC)c, the Victorian Registry of Births, Deaths and Marriagesd and the Notifiable Infectious Diseases Surveillance System (NIDSS)e.

These were used to check:

- Vaccination histories
- Notified cases of vaccine preventable diseases
- Adverse events following immunisation
- Errors in vaccine intervals
- Subsequent death prior to patient contact

Planning and communication

Revaccination plans were developed for the patients identified. Registered letters, signed by the GP, plus an information sheet were sent to affected patients in October 2011. The Department set up a phone line and clinic booking system for revaccination.

The local council arranged three dedicated revaccination clinics and offered home visits for revaccination.

---

c. Surveillance of Adverse Events Following Vaccination In the Community (SAEFVIC) www.saevic.org.au
d. The Victorian Registry of Births, Deaths and Marriages (BD&M) www.bdm.vic.gov.au
Table 1: Summary of vaccination requirements and outcomes

<table>
<thead>
<tr>
<th>Vaccine administered during the cold chain breach period</th>
<th>Number patients identified</th>
<th>Number of visits required to complete re-vaccination schedule</th>
<th>Outcome</th>
<th>No response/no revaccination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children</td>
<td>76</td>
<td>56 18 2 61 3</td>
<td>Completed Incomplete</td>
<td>12</td>
</tr>
<tr>
<td>Women</td>
<td>3</td>
<td>3 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaccination administration errors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inadequate interval between Gardasil® doses</td>
<td>15</td>
<td>15 7 6</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Incomplete Gardasil® course</td>
<td>13</td>
<td>7 6</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>107</td>
<td>81 24 2 65 3</td>
<td>39</td>
<td></td>
</tr>
</tbody>
</table>

Attempts to identify any further affected persons were made through advertisement in local newspaper; posters and flyers displayed in the practice and an immunisation nurse stationed at the practice for three weeks to assist with advice.

Results

A total of 79 vaccinees, 76 children and three women were identified as having received vaccines from November 2009 to June 2011 requiring follow-up and recommended re-vaccination. An additional 28 Gardasil® vaccine administration errors were identified.

Children revaccinated

Parents of all 76 children were advised of the recommended recall by registered mail. Fifty-six required one visit to complete re-vaccination; 18 required two visits and two required three visits to complete re-vaccination.

Revaccination was completed by 61 (80 per cent) of children identified; three were incompletely revaccinated and 12 (16 per cent) could not be contacted.

The local council conducted three dedicated revaccination clinics and offered community sessions plus home visits to revaccinate 53 children. Four

Re-vaccination following administration of HPV vaccine outside recommended dose intervals

Summary advice

Every effort should be made to adhere to the recommended dose intervals as efficacy data for the HPV vaccines are based on them. However where receipt of three doses of bivalent or quadrivalent HPV vaccine is documented, the risk of a suboptimal immune response with clinically significant reduction in protection against HPV infection is low.

The highest risk of suboptimal response would be where there was a shorter than minimum recommended interval between both Dose 1 and 2 and Dose 2 and 3.

In the event that HPV vaccine has been administered outside the recommended intervals, the following is recommended:

<table>
<thead>
<tr>
<th>Total interval between Dose 1 and Dose 3</th>
<th>Age of vaccine recipient</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>111 days or longer</td>
<td>All ages</td>
<td>No further dose</td>
</tr>
<tr>
<td>74 to 110 days</td>
<td>15 years or less at the time of the 2nd dose.</td>
<td>No further dose</td>
</tr>
<tr>
<td></td>
<td>Older than 15 years at the time of the 2nd dose.</td>
<td>Give Dose 4 at least 6 months after Dose 3</td>
</tr>
<tr>
<td>Less than 74 days</td>
<td>All ages</td>
<td>Give Dose 4 at least 6 months after Dose 3</td>
</tr>
</tbody>
</table>

Advice for informed consent

When the minimum recommended intervals between doses of HPV vaccine have not been followed, the clinician needs to discuss the potential risks and benefits to the client. This should include the limitations of the available data and the potential for increased risk of reaction to a fourth dose.

If the course can not be completed within 12 months

If the duration between doses has been longer than 12 months, there is no need to repeat the earlier doses. Give the missing dose(s) as soon as is practicable.

This advice was developed in consultation with the National Centre for Immunisation Research and Surveillance and other immunisation experts. More detailed information is available in the document Guidance on revaccination where HPV vaccine doses have been given at less than recommended intervals on the Immunise Australia website.
other councils and two GP practices, one regional and one interstate, revaccinated a further 11 children. Three children commenced but did not complete all the recommended visits. Ten parents accessed specialist paediatrician consultations offered at the vaccination clinics.

**Outcomes**

Searches of NIDSS did not identify any vaccine preventable diseases notified for children who had received vaccine during the breach period. Likewise no reports of adverse events had been reported to SAEFVIC.

GP education and support was provided by the Northern Division. The practice was advised to purchase a purpose-built vaccine fridge and a supported immunisation service may gradually re-commence in 2012.

Management of the cold chain breach incurred significant costs. These costs included dedicated personnel, time and resources including loss of $5,000 worth of government supplied vaccine. The costs were met by the department and Northern Division.

There was no public backlash or negative media.

**Conclusion**

Managing a cold chain breach that goes undetected with no immediate action is a ‘chilling experience’. It presents a public health risk to vaccine recipients, has the potential to undermine consumer confidence, is costly to conduct a mass recall and may create negative media attention.

Collaboration with a local division of general practice, a local council and expert medical practitioners was invaluable in managing this community cold chain breach.

**References**


For assistance with management of a cold chain breach, contact the Immunisation Section, Victorian Government Department of Health, on 1300 882 008

**National vaccine storage guidelines**: Strive for 5°C

Document outlining the basic principles for safe vaccine management. A concise, practical, user-friendly guide to vaccine storage, it is aimed at Australian vaccination service providers. www.health.vic.gov.au/immunisation
The Global Burden of Disease Study 2010 – Information for action

Benjamin Cowie*  
Infectious Diseases Physician, Victorian Infectious Diseases Service at the Royal Melbourne Hospital and Epidemiologist, Victorian Infectious Diseases Reference Laboratory and Department of Health, Victoria

On the 13 December 2012, for the first time The Lancet devoted an entire issue to a single study – the Global Burden of Disease Study 2010 (GBD 2010).

Supported by the Bill and Melinda Gates Foundation, GBD 2010 was a collaboration of 486 researchers from 50 countries, lead by a consortium of institutional partners coordinated by the Institute for Health Metrics and Evaluation (IHME) at the University of Washington, and including the University of Queensland School of Population Health.

The aim of GBD 2010 is to provide better estimates of human disease, injury, disability and risk factors globally and therefore to inform the setting of new priorities in allocation of public health efforts and resources. It has been a huge undertaking, with estimation of the impact of 291 diseases and injuries and 67 risk factors, and assessing trends from 1990 to 2010, for the entire global population.

GBD 2010 shows that global life expectancy has been increasing, and in particular that the burden of childhood mortality has dropped significantly. The burden of many infectious diseases has reduced, particularly diarrhoeal disease, lower respiratory tract infections, measles and tetanus; but huge challenges remain in many parts of the world, particularly in Africa.

HIV/AIDS remains a leading cause of human mortality, having moved from 35th position in 1990 (0.3 million deaths) to sixth position in 2010 (1.5 million deaths). The last 20 years have also seen a 20 per cent rise in malaria mortality, with 1.2 million people dying as a result; a similarly large burden of human death resulted from tuberculosis in 2010.

One of the major changes in methodology for GBD 2010 was to include diseases as risk factors for a number of conditions, including viral hepatitis. Earlier GBD studies had not accounted the disease and death attributable to consequences of viral hepatitis (cirrhosis and liver cancer) under their viral causes, arguably leading to a significant lack of priority given to viral hepatitis – the World Health Organization only established a Global Hepatitis Program in the last two years.

In GBD 2010, the total number of deaths attributable to hepatitis B was estimated to be 786,000 and for hepatitis C 499,000. If these chronic viral infections were represented in the main causes of death listing, they would respectively be the 15th and 25th ranked causes of human death.

A real strength of many of the GBD papers is the use of innovative ways of graphically presenting large amounts of data. Furthermore, interactive visualisations of GBD 2010 findings can be explored on the Institute of Health Metrics and Evaluation (IHME) GBD website, in addition to webcasts of the study launch in London in December and other resources.

To echo Lancet Editor-in-Chief Dr Richard Horton, everyone working in health care research, planning and delivery should use this study to generate national and international discussions on what the findings mean for policy and for prioritisation. We must hold each other accountable for progress towards agreed evidence-based goals, and commit to our collective responsibility to turn GBD 2010 into a unique public health opportunity on a global scale.

References


This commentary is an excerpt from a paper entitled “Mortality due to viral hepatitis in the Global Burden of Disease Study 2010: new evidence of an urgent global public health priority demanding action”, which was originally published in Antiviral Therapy (doi: 10.3851/IMP2654).
Immunisation program report, Victoria, December 2012
Helen Pitcher, Department of Health, Victoria

Immunisation report
The local government area immunisation coverage table for children at the three measured cohorts for children up to five years of age and a comparison of interstate and national coverage will be able to be provided from March 2013.

Vaccination program updates

Pertussis vaccine
The free pertussis vaccine program for all parents of newborn babies ceased on 30 June 2012. This is as a result of the incidence of whooping cough decreasing and the uncertain effectiveness of the cocooning strategy. The Victorian Health Department continues to review the evidence on the effectiveness of cocooning in preventing severe whooping cough infections in new babies. Pertussis containing vaccine is available on prescription for parents or people planning pregnancy and for people who work with or care for infants.

Prevenar 13® supplementary dose
The free single supplementary dose of Prevenar 13® a 13 valent pneumococcal conjugate vaccine (13vPCV) for children aged between 12 and 35 months inclusive ended 30 September 2012. From 1 October 2011, the Commonwealth Government provided the time-limited supplementary dose of Prevenar 13® to eligible children who had routinely received a course or partial course of the seven valent pneumococcal conjugate vaccine (7vPCV) Prevenar®. Children who receive the additional six strains in the Prevenar 13® vaccine will benefit from the extra protection against pneumococcal bacteria.

Prevenar® was replaced with Prevenar 13® in July 2011 on the National Immunisation Program schedule. Prevenar 13® is routinely scheduled for an infant at two (which can start from six weeks of age), four and six months of age. The pneumococcal bacteria strains in Prevenar 13® are 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F and 23F.

Gardasil® for boys
A human papillomavirus vaccine (HPV) secondary school program for boys commenced from January 2013. On 12 July 2012, the Minister for Health, the Hon Tanya Plibersek MP announced funding for the HPV vaccine Gardasil® for Year 7 boys in addition to Year 7 girls through ongoing school-based programs under the National Immunisation Program from 2013.

Year 9 boys will be offered the vaccine at school under a time-limited catch-up program for the next two years from 2013 to 2014.

Boys who do not attend school but who are age equivalent to the funded years can receive a course of Gardasil® vaccine for free via their doctor or local council immunisation service. A Year 7 student is around 12 to 13 years of age and a Year 9 student is around 14 to 15 years of age.

The ongoing and time-limited HPV vaccine program will target all boys between 12 and 15 years of age. Adolescents who are not sexually active will gain the greatest protection from the four HPV genotypes 6, 11 and 16 and 18 for which the vaccine protects against. HPV types 6 and 11 cause 90 per cent of genital warts, type 16 approximately 90 per cent of penile, anal, and oropharyngeal cancers caused by HPV in males and HPV types 16 and 18 are responsible for approximately 70 to 80 per cent of cervical cancers in females. For more information, please visit the Immunise Australia web site at http://immunise.health.gov.au/ or the Cancer Council web site at www.hpvvaccine.org.au
Workplace immunisation

Certain occupations, particularly those related to healthcare are associated with an increased risk of vaccine preventable diseases. Other occupations such as plumbers, emergency and essential services, and those working with children, animals or specific communities are recommended to be protected against certain vaccine preventable diseases. Workplace immunisations are valuable to protect staff from illness, will protect people in their care and reduce absenteeism from the workplace. Immunisation should be offered as part of a workplace prevention program which will also include encouraging staff to practise good hygiene, seek appropriate treatment and stay home when unwell.

Influenza can seriously impact the workplace—the close proximity and impact of people coming into work unwell makes it the ideal place to share such a highly contagious disease. Workers with influenza take an average of two weeks to recover and because they can be contagious before any symptoms show, it is easy to spread. It is estimated that 2,800 Australians die each year from the complications of influenza, including pneumonia, so it makes sense to protect staff and those in their care.

The Department of Health is encouraging all workplaces to take influenza seriously and offer free workplace vaccinations to staff. This kit contains all the information required to arrange and promote a workplace vaccination program, whether you offer a clinic in your office, a mobile clinic to reach workers off-site or arrange vaccinations for staff at your local GP clinic.

The Workplace Influenza kit contains the following tools:

- Tips for providing a workplace influenza vaccination program
- Workplace influenza vaccination provider checklist
- Flu facts – addressing common myths about influenza pre-vaccination
- Sample email/newsletter text to promote your vaccination program
- Influenza information for staff after vaccination – Congratulations on getting your flu shot!
- Influenza vaccination poster template
- Hygiene posters – Wash your hands regularly and Cover your cough and sneeze

Information and resources are available from Workplace immunisation at: http://www.health.vic.gov.au/immunisation/

- Influenza immunisation for workplaces
- Immunisation for people working with children
- Workplace vaccination resources
  - Influenza immunisation for workplaces
  - Keep your workers healthy!
Enteric diseases

Joy Gregory, Department of Health and OzFoodNet Victoria

Outbreaks of gastrointestinal illness

There were 137 outbreaks of gastrointestinal illness reported to Communicable Disease Prevention and Control unit (CDPC) during the third quarter of 2012 (Table 1). Four outbreaks were considered to be foodborne or suspected foodborne. For the remaining 133 outbreaks, person to person transmission was suspected in 116 outbreaks, one was suspected to have been caused by ingestion of contaminated water during swimming and mode of transmission was not determined for the remaining 16 outbreaks.

Foodborne and waterborne disease outbreaks

Four outbreaks were considered to be foodborne or suspected foodborne, affecting at least 57 people. These outbreaks are summarised below:

In early July, a doctor reported that his patient and several other family members had become ill after eating a shared dinner. Investigation revealed that seven people attended a dinner held in late June. The meal consisted of roast beef and vegetables followed by a chocolate mousse containing raw eggs for dessert. All seven attendees ate the mousse and all became ill approximately 24 hours later. The mousse contained free range eggs purchased on-line and home delivered. No leftover eggs were available for testing and no batch code details were available to enable trace back to farm.

In early August, an outbreak of gastroenteritis affecting people who ate dinner at a restaurant on the same evening was notified to CDPC. The restaurant served the same main course and dessert to all patrons with the only option being a vegetarian meal. Nine groups (total 33 patrons) attended the restaurant of which four groups (11 patrons) were interviewed. Five people from

<table>
<thead>
<tr>
<th>Setting</th>
<th>Outbreaks</th>
<th>Persons affected</th>
<th>Pathogen/toxin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aged care</td>
<td>70</td>
<td>1,611</td>
<td>Norovirus (35)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Suspected viral (27)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Unknown (8)</td>
</tr>
<tr>
<td>Camp</td>
<td>1</td>
<td>7</td>
<td>Norovirus (1)</td>
</tr>
<tr>
<td>Child care/play centre</td>
<td>22</td>
<td>255</td>
<td>Norovirus (2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Suspected viral (19)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Unknown (1)</td>
</tr>
<tr>
<td>Commercial caterer</td>
<td>1</td>
<td>32</td>
<td>Norovirus (1)</td>
</tr>
<tr>
<td>Health spa/resort</td>
<td>1</td>
<td>11</td>
<td>Suspected viral (1)</td>
</tr>
<tr>
<td>Hospital</td>
<td>18</td>
<td>305</td>
<td>Norovirus (12)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Suspected viral (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Clostridium difficile (2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Unknown (1)</td>
</tr>
<tr>
<td>Private residence</td>
<td>2</td>
<td>14</td>
<td>Salmonella Typhimurium 135a (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Unknown (1)</td>
</tr>
<tr>
<td>*Residential facility (other)</td>
<td>17</td>
<td>114</td>
<td>Norovirus (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Suspected viral (12)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Unknown (2)</td>
</tr>
<tr>
<td>Restaurant</td>
<td>3</td>
<td>56</td>
<td>Norovirus (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Unknown (2)</td>
</tr>
<tr>
<td>Swimming pool</td>
<td>1</td>
<td>5</td>
<td>Cryptosporidium (1)</td>
</tr>
<tr>
<td>Unknown</td>
<td>1</td>
<td>2</td>
<td>Unknown (1)</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>137</strong></td>
<td><strong>2,412</strong></td>
<td>Norovirus (55)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Suspected Viral (62)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Salmonella Typhimurium 135a (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Clostridium difficile (2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Cryptosporidium (1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Unknown (16)</td>
</tr>
</tbody>
</table>

* other residential facility includes: supported services accommodation or supported residential services (12) and disability services (5)
three separate groups (n=8) reported onset of vomiting between four and six hours after eating. No illness was reported from the fourth group of three patrons. Environmental and epidemiological investigations did not identify any meal preparation process or meal component as the likely outbreak source. However, the incubation period and the symptoms were consistent with bacterial foodborne intoxication, such as Staphylococcus aureus or Bacillus cereus as the cause of this outbreak.

A NSW resident with confirmed Salmonella Typhimurium 9 (STm 9) complained directly to a local council in Victoria alleging illness as a result of eating at a food premises whilst in Melbourne on a holiday. The case had shared a pizza with a friend two days prior to illness onset: the friend had also become unwell with a similar illness. An environmental investigation at the pizza premises identified several food safety issues including inadequate cooking of pizzas and chicken kebabs. However, as the case ate out extensively during her stay in Melbourne and despite repeated attempts, the case’s friend was unable to be contacted it was not known whether there were any other meals in common during the case’s incubation period.

An outbreak of gastroenteritis affecting six people from a group of 12 who dined at a hotel in early September was reported in regional Victoria. A second complaint of illness affecting a large group of 38 who had dined at the hotel restaurant a week later was subsequently received. Active case finding was conducted using the restaurant booking list: 10 groups were contacted and five groups reported gastrointestinal illness in some members of their respective groups. Interviews were conducted with three of the affected groups in addition to the food handlers. In total, 62 interviews were conducted and 43 people reported having gastroenteritis consistent with the case definition. There was no association with consumption of any specific food or drink items and illness among any of the interviewed groups. Six of the eight food handlers interviewed reported having a gastrointestinal illness (vomiting and/or diarrhoea) but reported that they had remained away from work for the recommended time, being 48 hours after recovery. However, one food handler became ill whilst at work and was known to have prepared some food just prior to his onset. This food was then served over subsequent days. It is possible this food handler may have contaminated food and/or the kitchen environment which may have subsequently been the cause of the outbreak in the two groups who ate a few days after the onset of illness in this food handler. Norovirus was detected in the one faecal sample submitted. The hotel bore water supply showed no evidence of faecal contamination at the time of the investigation. The water was not tested for norovirus. In summary, seven separate groups reported illness after attending the hotel for a meal and the incubation periods for cases who were interviewed were consistent with an exposure at the hotel being the source of their illness. There was no evidence to suggest transmission by an ill restaurant patron was the source of illness for any of the interviewed groups. Despite being unable to definitively identify the mode of transmission for this “cluster of related outbreaks”, the incubation period for each of the affected groups and the high attack rate (74 per cent) for the large group of 38 suggests that cases were exposed to a common source such as food which may have been intermittently contaminated by an infectious food handler or a contaminated environment. Findings which support this hypothesis include: the absence of adequate handwashing facilities in the kitchen; and no clean up in accordance with the Guidelines for the Investigation of Gastroenteritis after the first outbreak report to council.

**Norovirus activity**

Norovirus and suspected viral activity (117 outbreaks) was the lowest third quarter since 2008 and lower than the five-year mean for the same period (160 outbreaks 2007–2011) (Figure 1). Ninety-one per cent of the norovirus outbreaks and sixty-eight per cent of the suspected viral outbreaks occurred in aged care and health care settings.

**Figure 1: Norovirus outbreak activity in Victoria, by quarter, January 2005–September 2012**

<table>
<thead>
<tr>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>50</td>
<td>100</td>
<td>150</td>
<td>200</td>
<td>250</td>
<td>300</td>
<td>350</td>
</tr>
</tbody>
</table>

Quarter and month of notification
Blood borne viruses

Nasra Higgins, Department of Health, Victoria

Hepatitis B—newly acquired infections

In the third quarter of 2012 there were 531 cases of hepatitis B notified of which 15 (three per cent) were classified as newly acquired infections (Figure 2). This was similar compared with the previous quarter but three more compared to the same time in 2011.

The 15 newly acquired cases were in eight males and seven females. All were adults aged from 22 to 67 years, with a median age of 39 years.

Twelve of the 15 cases were Australian born, two were born overseas and country of birth was unknown or not reported for one case. Indigenous status was reported for all cases with one case reported as being Aboriginal and/or Torres Strait Islander. Eight cases resided in metropolitan Melbourne with the remaining seven reported as residents of regional Victoria.

Four cases were reported with hepatitis C co-infection.

Among the 15 newly acquired cases, nine reported having symptomatic hepatitis as a reason for testing, seven were tested for hepatitis B due to elevated liver function test results, two tested upon patient request, two tested for sexually transmissible infections, one tested for prison screening, and two were tested for other reasons.

Injecting drug use was reported for seven cases and six reported having a hepatitis B positive sexual partner (one MSM and five heterosexual contacts). One case was a non-health care worker with a needle stick injury and for one case a risk was not identified.

Hepatitis C – newly acquired infections

A total of 552 cases of hepatitis C were notified during the third quarter of 2012, of which 36 cases (seven per cent) were classified as newly acquired infections. This was similar compared to the previous quarter and the same time in 2011 (Figure 3).

Of the 36 newly acquired hepatitis C cases reported in the third quarter of 2012, 56 per cent (n=20) had a previous negative hepatitis C antibody testing history within the past 24 months.

Twenty-nine cases (81 per cent) were in males and seven (19 per cent) were in females. The age range of persons reported was 17 to 52 years, with a median age of 28 years. Fifty per cent (n=18) resided in metropolitan Melbourne, 36 per cent (n=14) were from regional Victoria and for the remaining four cases postcode of residence was not reported.

Twenty-two (61 per cent) of the cases (n=22) were Australian born, five were overseas born and country of birth was unknown or not reported for remaining nine cases. Indigenous status was reported for 26 cases (72 per cent), with none reported as being of Aboriginal and/or Torres Strait Islander origin.

Of the 36 newly acquired cases, the most common reason for testing due to elevated liver function test results (n=12) followed by drug and alcohol screening (n=6), patient request for screening (n=6), prisoner screening
(n=5), having symptoms of acute hepatitis (n=3), routine monitoring of HIV positive cases (n=2), screening for sexually transmissible infections (n=1), monitoring of hepatitis C (n=1), tested as part of a study (n=1), and other reasons (n=5).

Injecting drug use (IDU) was the main risk factor reported for 28 cases (78 per cent). Risk factors reported for the remaining cases included being HIV positive MSM (n=2), blood contact with a hepatitis C positive partner and other (n=2). For one case a risk was not determined and two cases were lost to follow up. Note that multiple risk factors may be reported for cases with no risk of IDU.

**Hepatitis D**

One case of hepatitis D was notified during the third quarter of 2012 in a 44 year old male refugee from Pakistan with no other risk factors reported.

**Vaccine-preventable diseases**

**Haemophilus influenzae type b (Hib)**

Two cases of Hib were notified in the third quarter of 2012, bringing the year-to-date total to three cases compared with one case for the same time in 2011. The cases were in females aged three months and 49 years. The three month-old infant was fully vaccinated for age, with one dose of Hib-containing vaccine at the time of onset, whilst vaccination status for the 49 year-old was unknown. Neither case had a history of a previous Hib illness and both recovered.

**Influenza**

There were 4,616 confirmed cases of influenza notified in the third quarter, compared with 645 for the previous quarter, and 1,918 cases for the same time in 2011. The age range of cases was from four days to 105 years (median age 38 years). Age was not reported for nine cases. There were 1,129 cases in children under the age of 18 years, 501 of whom were aged less than five years, and 1,051 cases were in persons aged 65 years or older. Fifty-two per cent of cases (n=2,451) were in females. Sex was not stated for ten cases. A majority of cases were influenza type A infections (n=3,702) of which 315 were further subtyped; 232 cases were identified as A/H3, 16 were A/H3N2 infections, and 64 cases were identified as H1N1(09) pandemic strain. Five hundred and sixty-nine cases were identified as type B infections, 20 were type A and B mixed infections, six type C infections, and no typing was available for four cases. Four cases were reported to have died due to influenza infection during the quarter. A total of 57 respiratory outbreaks were notified during the quarter, 47 of which were laboratory-confirmed as influenza. Of the 47 outbreaks identified as influenza, 40 were in aged care facilities, five in a hospital setting, and one each in a boarding school and a supported residential service.

**Invasive pneumococcal disease (IPD)**

A total of 149 cases of IPD were notified in the third quarter of 2012, compared with 171 for the same time in 2011. Cases were in persons aged from one month to 101 years with a median age of 59 years. Twelve cases were in children aged less than five years, of which three were aged less than 12 months. Sixty-four cases (43 per cent) were in persons aged 65 years and older. Seventy-eight cases (52 per cent) were in females (Figure 4). Information relating to Aboriginal and/or Torres Strait Islander status were available for 121 cases (81 per cent) with one case identifying as Aboriginal. Twelve cases were reported to have died due to IPD: one was in a one-month-old female with meningitis who was too young to be vaccinated and whose risk history was largely unknown and the remainder were adults aged from 45 to 101 years of age (median 87 years).

Serotyping was completed for 146 cases (98 per cent). The most common was 7F (22 per cent) followed by 19A (20 per cent). Two isolates diagnosed by PCR only had serotypes that were unable to be distinguished: one was identified as a 22F or 22A and the other was identified as a 7F or 7A. Two cases

**Figure 4: Notified cases of IPD by sex and age group, July–September 2012, Victoria**

![Graph showing notified cases of IPD by sex and age group, July–September 2012, Victoria](image-url)
Cases were in one female and two males, with an age range of 28 to 76 years (median age 34 years). All three cases were not vaccinated for mumps. No epidemiological links were identified; however, two cases had a history of recent overseas travel, to India and Sri Lanka.

Rubella
Two confirmed cases of rubella were notified to the department in the third quarter of 2012, the same as for the previous quarter and compared to four cases notified for the corresponding period in 2011. The cases were in one female and one male aged 27 and 35, respectively. The male was not vaccinated for rubella, and the 27 year-old female claimed to have had one dose of vaccine as a child, however vaccination status was unvalidated. The male reported a history of overseas travel (India) in the weeks prior to illness, and the female was notified as a result of antenatal screening.

No epidemiological links between the cases were identified.

Pertussis
A total of 1,035 confirmed and probable cases of pertussis were notified to the department in the third quarter of 2012; a slight increase on the 955 cases notified in the previous quarter, but a 54 per cent decrease on the 2,244 cases notified in the corresponding period in 2011 (Figure 5). Of the 18 cases in infants aged less than 12 months, two were aged less than two months and were too young to be vaccinated. Of the remaining 16 cases, eight were fully vaccinated for age, one was partially vaccinated, and seven were not vaccinated.

No deaths were reported in the third quarter.

Tetanus
One case of tetanus was notified in the third quarter of 2012, the first case since 2010. The case, in an 86 year-old male, developed symptoms after receiving a splinter injury to his thumb while gardening. The case presented to a GP but was not offered vaccination or immunoglobulin. Five days later, he developed jaw pain, difficulty opening his mouth and difficulty swallowing. The case was not vaccinated for tetanus.

Varicella zoster virus
There were 1,049 cases of varicella zoster virus notified in the third quarter of 2012, compared with 1,077 cases in the previous quarter, and 1,105 cases for the same period in 2011 (Figure 6). Of these, 213 (20 per cent) were probable or confirmed cases of chickenpox and 257 (24 per cent) were probable or confirmed cases of herpes zoster (shingles). Clinical manifestation was unspecified for the remaining 579 cases (55 per cent).

Chickenpox
Of the 213 chickenpox cases, 121 (57 per cent) were in males. The age range of cases was eight days to 87
years (median age eight years), and age was not reported for eight cases. Region of residence was available for 212 cases (99 per cent), with Northern and Western Metropolitan Region reporting the highest number of cases (32 per cent) which represents a decrease on the previous reporting period.

Herpes zoster (shingles)
Of the 257 shingles cases, 153 (59 per cent) were in females. The age range of cases was one to 93 years (median age 53 years). Age was not reported for five cases. Region of residence was available for all cases. A majority of shingles cases resided in the metropolitan regions (24 per cent), with Northern and Western Metropolitan Region reporting the highest number of cases (n=68, 33 per cent).

Other notifiable diseases

Invasive meningococcal disease
Lucinda Franklin, Department of Health
A total of 11 confirmed or probable cases of invasive meningococcal disease were notified in the third quarter of 2012, three more than the previous quarter and four fewer than were notified in the corresponding period in 2011. Cases were in persons aged from three months to 82 years (median age five years). One was an infant aged less than 12 months (three-month-old female), and five cases were in children aged from two to five years. Five cases were in adults aged over 50 years; three aged 53 to 56 years, and two aged 70 and 82 years. Six of the 11 cases (55 per cent) were in females. Of the six cases in children, the three-month-old infant was too young to be vaccinated, vaccination status was unknown for the two year-old, and the children aged three, four, and five years were fully vaccinated for age. No cases of serogroup C disease were reported. Four of the six cases in children were identified as serogroup B, one was serogroup Y, and the remaining case was not able to serogrouped. Of the five cases in adults, four were identified as serogroup B infections and one was a serogroup Y infection. No deaths were reported during the quarter. Two siblings aged four and five years were epidemiologically linked. The first case, in the older sibling, presented to a hospital emergency department with fever, photophobia, neck pain and rash following a four-day history of myalgia, lethargy and conjunctivitis. The younger sibling presented to the same emergency department 12 hours later with vomiting and rigors. Both cases were identified as serogroup B.

Legionellosis
Lucinda Franklin, Department of Health
A total of 19 confirmed and probable cases of legionellosis were notified in the third quarter of 2012, two more than were notified in the previous period, and 12 more than were notified in the corresponding period in 2011. Cases notified were in adults aged 31 to 93 years (median age 71 years) and twelve of the 19 cases (63 per cent) were in males. Fifteen cases were identified as Legionella pneumophila infections, of which 12 were serogroup 1 infections and three cases could not be further serogrouped. Three cases were identified as Legionella longbeachae infections, of which two were identified as serogroup 1 infections, and one could not be further serogrouped. The remaining case was identified as a probable case of legionellosis and could not be further speciated (Table 2). None died as a result of their infection. No outbreaks were reported during the third quarter.

Table 2: Notified confirmed and probable cases of Legionella, Victoria, July–September 2012

<table>
<thead>
<tr>
<th>Legionella species</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>L. pneumophila</td>
<td>15</td>
</tr>
<tr>
<td>L. longbeachae</td>
<td>3</td>
</tr>
<tr>
<td>Legionella other species</td>
<td>0</td>
</tr>
<tr>
<td>Legionella laboratory confirmed (NOS)</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>19</strong></td>
</tr>
</tbody>
</table>

1. NOS = not further speciated or serogrouped
Creutzfeldt-Jakob disease (CJD)
Genevieve Klug, Australian National CJD Registry

Due to the nature of the disease, months or years may elapse between the notification date of suspected CJD cases and their subsequent confirmation (or rejection) by the Australian National Creutzfeldt-Jakob disease Registry (ANCJDR). Thus the figures reported here will differ from those in Table 11, which counts confirmed and probable cases by their notification date.

Two new suspect CJD cases were notified to the ANCJDR between July and September 2012 and both remain under investigation. For the same period, one previously notified case was classified as confirmed CJD, while a further five cases were classified as non-CJD (Table 3). As observed in the previous quarter, CJD case confirmations were 4-fold lower than the long-term average (four cases confirmed per quarter) and the two-fold increase in non-CJD case confirmations observed in the first two quarters of 2012 was sustained during the September quarter. As discussed previously, this later finding is the outcome of focused evaluation of non-autopsied cases.

Blood lead level notifications
Jason Issa, Department of Health

Sixty-two elevated blood lead level cases were notified in the third quarter of 2012 the department comprising 51 occupational and 11 non-occupational cases. These cases were associated with 71 (55 and 16) blood lead test results.

Table 3: Notification of suspect and confirmed, definite and probable CJD cases by quarter, Victoria, 2004–September 2012

<table>
<thead>
<tr>
<th>Qtr</th>
<th>Suspect notified CJD</th>
<th>* Confirmed</th>
<th>Not CJD</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>5</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>20</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>2006</td>
<td>11</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>2007</td>
<td>17</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>2008</td>
<td>23</td>
<td>13</td>
<td>6</td>
</tr>
<tr>
<td>2009</td>
<td>20</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2010</td>
<td>18</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>2011</td>
<td>22</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>Mar-12</td>
<td>4</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>Jun-12</td>
<td>5</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Sep-12</td>
<td>2</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>147</td>
<td>76</td>
<td>50</td>
</tr>
</tbody>
</table>

* cases confirmed as definite or probable reclassified within the year or quarter
** suspect cases notified within the year or quarter

Save the Dates
29 October – 01 November 2013
Make sure you put a visit to Melbourne, Victoria in October 2013 in your diary now!

The 8th International Conference on Legionella
Melbourne Conference and Exhibition Centre
http://www.legionella2013.com/

Who should attend?
The goal of the meeting is to bring together researchers and professionals with an interest in the biology, epidemiology, clinical and environmental management and prevention of Legionella infections. We greatly encourage participation by students and scientists in the early stages of their careers.

To register your interest and receive the latest information as it becomes available click here.

Conference Program
The Local Organising Committee together with the International Scientific Program Committee of the 8th International Conference on Legionella is looking forward to presenting you with a wide range of scientific symposia which will highlight current issues around Legionella and a full social program which will provide invaluable opportunities for international networking and the exchange of information.
Occupational cases were identified as working in metal manufacturing (n=19), the mining industry (n=10), an automotive trade (n=8), painting (n=5), cable joining (n=3), recycling (n=3), and one each in chemical plant operation, glass trade and as a police officer. Risk factors included breathing dust and/or fumes containing lead, poor hygiene and inadequate personal protective equipment when handling lead.

Mycobacterial infections
Eelaine Tay, Department of Health
Tuberculosis
Owing to the slow growing nature of Mycobacterium tuberculosis, data are preliminary and subject to change.

There were 97 notifications of tuberculosis to the Department in third quarter of 2012; fewer than in the same period in 2011 (n=110) but 41 per cent greater than the second quarter of 2012 (n=69).

Of the 97 cases notified 43 were in females (44 per cent) and 54 in males (56 per cent) giving a male to female ratio of 1.3. The median age of persons reported was 31 years (range <1 to 85 years) with half being aged 20–34 years (n=48) and the highest proportion in patients aged 20–24 years who contributed 18 per cent to the total notifications (n=17) (Figure 8). One case was in aged a child aged less than 15 years (one year-old) compared to four in the previous quarter and six in the same period in 2011. The child, born in Australia to parents who migrated from a high-risk country, was identified through contact tracing and had pulmonary disease confirmed by culture.

Eighty-six cases (89 per cent) were in overseas born patients. The most common country of birth were India (n=28, 33 per cent), Vietnam (n=10, 12 per cent) and China (n=8, 9 per cent). Arrival year was known for all except three patients (97 per cent). Of these, 50 patients (60 per cent) developed active disease within five years of arrival to Australia, of which eight arrived in the same year and seven within one year. Eleven cases were in overseas students, four in patients who had recently arrived under Australia’s refugee and humanitarian entry program and one overseas visitor.

Of the overseas-born patients, 80 per cent (n=69) were identified through clinical presentation. A further 16 patients were notified as a result of investigation of a Tuberculosis Undertaking (TBU) and one by contact investigation. Of the nine Australian-born cases, eight were identified through clinical presentation and one by contact investigation. There was one notification in an Indigenous Victorian during this quarter. For all patients, information about HIV testing was available for 82 per cent of notifications (n=80).

Site of disease
Pulmonary disease accounted for 56 per cent of all notifications (n=54) (Table 4). Additional sites, other than the lungs, were noted in 14 notifications with pulmonary tuberculosis; the most common being the lymph nodes (n=6) and pleural (n=4). Extra pulmonary disease was reported in 44 per cent of notifications.

Figure 8: Notified tuberculosis cases, by age group and sex, Victoria, July–September 2012
Laboratory confirmation of diagnosis based on microscopy, culture, antigen detection or histology was obtained in 93 per cent of cases (Table 5). Seventy-nine per cent of cases were confirmed by culture, similar to the previous quarter (75 per cent) and the same period in 2011 (83 per cent).

Of the 54 cases with pulmonary involvement, 63 per cent received culture confirmation (Table 6).

One case of MDRTB was notified in this quarter, a new Australian-born patient who was found on clinical presentation with extra-pulmonary disease. The case reported travel to a high risk country two months prior to illness onset but could not recall close contact with anyone coughing. Four cases demonstrated resistance to at least one first line drug: two cases had mono-resistance to isoniazid and two had resistance to two drugs – isoniazid and streptomycin or ethionamide.

Vector borne diseases

Stacey Rowe, Department of Health

Alphavirus infection

Ros River virus infection

Thirty-nine cases of Ross River virus infection were notified during the third quarter of 2012 – comparable to the equivalent period in 2011 (41 cases). Fifteen cases (38 per cent) were in females and 24 (62 per cent) were in males. Cases were in persons aged 14 to 84 years with a median of 43 years.

Ninety per cent of cases resided in rural regions in Victoria, with the highest number from the Loddon Mallee region (14 cases), followed by Grampians region (10 cases) and Gippsland region (six cases). Of the four cases resident in metropolitan regions, one reported travel to Northern Territory, and one reported no travel within Victoria or interstate and for the remaining two cases,
data relating to travel history was not ascertained.

**Barmah Forest virus infection**

Five confirmed cases of Barmah Forest virus infection were notified during the third quarter of 2012, compared to 13 cases for the equivalent period in 2011. There were two females and three males with an age range of 26 to 75 years (median 51 years). Four of the five cases resided in rural regions of Victoria (two in Gippsland and one each in Barwon South Western and Hume). The remaining case was in a resident of North and West metropolitan region who reported no travel to rural regions of Victoria.

**Chikungunya**

One case of chikungunya was notified in the third quarter of 2012: a 44 year-old female who reported recent travel to Indonesia. This compared with three cases notified in the third quarter of both 2011 and 2010. Travel to Asia is a common risk factor for Victorians with chikungunya. It has been documented in popular travel locations such as Cambodia, India, Indonesia, Laos, Malaysia, Maldives, Philippines, Singapore, Thailand and Vietnam.

**Flavivirus infection**

Forty-three cases of Flavivirus infection were notified in the third quarter of 2012, of which all were dengue virus. This compared to 23 cases notified for the equivalent period in 2011. Cases were in equal numbers of males and females. Their ages ranged from one year to 79 years, with a median age of 36 years. Cases of dengue have increased markedly since 2010 with record numbers of cases being notified in 2012 (Figure 10).

Travel histories were ascertained in all but one case. A majority reported travel to Thailand (19) followed by Indonesia (6), Cambodia (4), multiple South-East Asian countries (3), India (3), Philippines (2), and one case each that reported travel to Fiji, Pakistan, Samoa, Sri Lanka and South America (not further specified).

**Malaria**

Twenty-nine cases of Malaria were notified during the third quarter of 2012 – comparable with the 31 cases notified in 2011. A majority of cases were in males (23 cases) and for one case sex was not reported. Cases were in persons aged from eight to 65 years, with a median age of 27 years. Infection with *Plasmodium vivax* accounted for 16 cases (55 per cent) followed by infection with *Plasmodium falciparum* (38 per cent).

Travel histories were ascertained in all but one case. The most common reported country of travel was India (n=9) followed by Sudan and Pakistan (six each) and one case each that reported travel to Ghana, Malawi, Papua New Guinea, Tanzania, South East Asia (travel to both Cambodia and Laos), South Africa, and Africa (travel to both South Africa and Uganda).

**Zoonoses**

Lucinda Franklin, Department of Health

**Brucellosis**

No cases of brucellosis were notified to the department in the third quarter of 2012.

**Leptospirosis**

Three confirmed cases of leptospirosis were notified to the department in the third quarter of 2012, one fewer than was notified in the previous quarter, and two fewer than were notified in the corresponding quarter in 2011. The cases were all in males aged between 32 and 62 years (median age 47 years). This brought the year-to-date total for leptospirosis to ten cases, compared with ten cases for the same time in 2011. All three cases notified in the third quarter were identified as species Hardjo.

Two cases resided in Barwon South West region and one resided in Southern Metropolitan region. Two cases were occupationally-acquired infections, in a 33 year-old and a 62 year-old, both of whom were dairy farmers. The third case had recently returned from holidaying in Thailand, with multiple exposures to fresh water.
Psittacosis
Four confirmed and five probable cases of psittacosis were notified to the department in the third quarter of 2012, one fewer than were notified both in the previous quarter, and for the corresponding period in 2011, bringing the year-to-date total to 22 cases (Figure 11). Cases were in adults aged 34 to 77 years (median 47 years) and six of the nine cases (67 per cent) were in males. Cases were notified from three of the eight Victorian regions during the quarter, all of which were metropolitan regions. Five were residents of Northern and Western Metropolitan region, three were residents of Eastern Metropolitan region, and one resided in Southern Metropolitan region. Four of the nine cases (44 per cent) had reported exposure to domestic birds, three of which (75 per cent) owned psittacine birds. While four cases (44 per cent) also had reported exposure to wild birds, only one had direct contact. No cases were occupationally-acquired.

Q fever
Three cases of Q fever were notified to the department in the third quarter of 2012, compared with three cases in the previous quarter, and five cases for the corresponding period in 2011, bringing the year-to-date total to nine cases. Cases were in males aged 24 to 77 years (median age 28 years) and all were residents of rural regions (one each from Gippsland region, Loddon Mallee region and Barwon South West region). Two cases were occupationally-acquired, in a dairy farmer and a livestock transport driver. One case, in a 77 year-old retiree, was acquired whilst on a driving holiday in Queensland where the case was reported to have camped out in cattle farming areas, including camping at a country showgrounds.

Sexually transmissible infections (STIs)
Nasra Higgins, Department of Health

Chlamydia
A total of 4,938 cases of chlamydia were notified in the third quarter of 2012. This was similar to the previous quarter and the same period in 2011, however a seven per cent increase on the number of notified cases from January to September 2012 compared to the same period in 2011 (Figure 12).

Fifty-seven per cent of cases (n=2,824) were in females and 42 per cent (n=2,097) in males. Sex was not reported for 17 cases. The age range of female cases was 22 days to 71 years, with a median age of 22 years. The age range of male cases was 17 days to 79 years, with a median age of 25 years. Infections were most commonly reported in the 20–24 year age group (38 per cent), which has remained consistent with the previous quarters. Seventy-seven per cent of cases notified were aged 15 to 29 years (n=3,826).

Indigenous status was reported for 53 per cent of cases, of which 39 (less than one per cent) were reported as being of Aboriginal and/or Torres Strait Islander origin.

A majority of the cases (n=3,489, 71 per cent) reported had a metropolitan postcode of residence. Postcode of residence was not reported for 201 cases and the remaining cases (n=915, 19 per cent) were residents of rural Victoria.

Enhanced surveillance data were available for 1,122 cases (23 per cent). Of the cases where enhanced surveillance data were available, 40 (four per cent) were reported as being HIV positive; 38 of these were male of whom 34 reported a male sexual partner (MSM) and this information was unknown for the remaining four cases. There were two females reported as HIV positive, both acquired from a male sexual partner.

Among the 1,122 cases, STI screening was reported as the main reason for testing for 53 per cent of cases. For twenty-five per cent of cases, having clinical signs and symptoms was reported as the reason for testing, followed by contact tracing (14 per cent) and other reasons for testing (four per cent), and for the remaining four per cent this information was unknown or not reported.

Figure 11: Confirmed and probable notified cases of psittacosis, Victoria, January 2003–September 2012
Males
Of the 545 male cases for whom enhanced surveillance data were available, 54 per cent (n=293) reported a female sexual partner and 37 per cent (n=204) reported a male sexual partner. Two cases reported both a female and male sexual partner as the source of infection and for the remaining cases source of infection was unknown or not reported (n=46, eight per cent).

Among the males reporting a female sexual partner, 56 per cent (n=164) reported having a casual sexual partner, 34 per cent (n=99) a regular sexual partner, two per cent (n=6) reported a sex worker as the likely source of infection and sexual partner type was unknown or not reported for the remaining 24 cases (8 per cent).

For those reporting a male sexual partner, 78 per cent (n=160) reported having a casual sexual partner, 18 per cent (n=36) a regular sexual partner and one case reported a sex worker as the likely source of infection. This information was unknown or not reported for the remaining eight cases.

Eighty-one per cent (n=441) of cases reported Victoria as the likely place of infection; nine per cent (n=49) reported overseas and six cases reported interstate acquisition. This information was unknown or not reported for nine per cent of cases (n=49).

Females
Of the 573 female cases for whom enhanced surveillance data were available, 88 per cent reported a male sexual partner (n=503), less than one per cent (n=4) reported a female sexual partner and source of infection was unknown or not reported for the remaining 12 per cent of cases (n=66).

Forty-six per cent of cases in females (n=264) reported a regular sexual partner and 34 per cent (n=192) reported a casual sexual partner as the likely source of infection. Twelve cases identified as sex workers with likely acquisition from a client and one case reported neonatal transmission. For the remaining 104 cases (18 per cent) this information was unknown or not reported.

A majority of cases (n=494, 86 per cent) reported that the infection was acquired in Victoria and the remainder reported overseas acquisition (n=18, three per cent), interstate (n=5, one per cent) and unknown or not reported (n=56, 10 per cent).

Gonorrhoea
There were 522 cases of gonorrhoea notified in the third quarter of 2012; a 20 per cent reduction compared to the previous quarter, but a 24 per cent increase compared to the same period in 2011 (Figure 13).

Eighty-one per cent of cases were in males (n=422) with an age range of 16 to 69 years (median age: 30 years). Nineteen per cent of cases were in females (n=98) with an age range of 14 to 62 years (median age: 29 years). Sex was not reported for two cases. The median age for all cases was 29 years. Infections were most frequently notified in the 20 to 29 year age group comprising 44 per cent of cases.

Seventy-eight per cent of the cases (n=407) reported had a metropolitan postcode of residence. Postcode of residence was not reported for 75 cases (14 per cent) and the remaining
eight per cent of cases were from regional Victoria (n=40). Indigenous status was reported for 71 per cent of cases (n=369), with eight reported as being of Aboriginal and/or Torres Strait Islander origin.

Enhanced surveillance data were received for 67 per cent of cases (n=349).

Of the 349 cases for whom enhanced surveillance data were available, 28 cases (eight per cent) were reported as being HIV positive; all males, 27 reported as MSM and information unknown or not reported for the remaining case.

Among the 349 cases, the main reason for testing was reported as presence of clinical signs and symptoms of STIs (45 per cent of cases), screening test (38 per cent of cases), contact tracing (10 per cent); six cases reported other reasons and for four cases reason for testing was unknown or not reported.

Males

Among the 288 males for whom enhanced surveillance data were available, 68 per cent (n=195) reported a male sexual partner and 26 per cent (n=74) reported a female sexual partner. For the remaining seven per cent (n=19) this information was unknown or not reported.

Of the 195 males reporting a male sexual partner, 85 per cent (n=165) reported acquiring their infection from a casual sexual partner, 12 per cent (n=23) reported acquiring it from a regular partner and partner type was unknown or not reported for seven cases.

For the males reporting a female sexual partner, 61 per cent (n=45) reported acquiring the infection from a casual partner, 12 per cent (n=9) from a regular partner, 14 per cent of cases (n=10) from a sex worker and partner type was unknown for the 10 remaining cases.

Seventy-nine per cent of males (n=227) reported that they acquired their infection in Victoria, 11 per cent reported overseas acquisition (n=33) and one per cent reported infection acquired from interstate (n=4). This information was unknown or not reported for 24 cases.

Females

Of the 61 females for whom enhanced surveillance data were available, 52 cases reported acquiring their infection from a male sexual partner; 26 of these reported acquiring the infection from a regular partner; 19 from a casual partner; one reported sex worker as the source of infection and four cases identified as being sex workers likely to have acquired the infection from a client. This information was unknown or not reported for the remaining two cases.

One case reported casual contact with a female sexual partner as the source of infection.

Forty-eight females reported that they acquired their infection in Victoria, three reported acquisition as overseas, two reported interstate and for the remaining eight cases place of infection was unknown or not reported.

Antibiotic resistance

Testing for susceptibility to ceftriaxone and ciprofloxacin was conducted by the Microbiological Diagnostic Unit. Of the 296 isolates tested for resistance to ceftriaxone, 86 per cent (n=256) were sensitive and the remaining 40 isolates had decreased susceptibility. Of the 296 isolates tested for ciprofloxacin resistance, 56 per cent (n=167) were sensitive, 43 per cent were resistant (n=128) to ciprofloxacin and one isolate had decreased susceptibility.

Syphilis—infectious (less than two years duration)

A total of 240 cases of syphilis were notified during the third quarter of 2012 of which 119 cases (50 per cent) were classified as infectious syphilis. This was similar to the number of notified cases for the previous quarter but an increase of 37 on the number of cases notified in the same period of 2011(Figure 14).

Of the 119 cases notified with infectious syphilis, 37 were classified as primary infections, 32 cases as secondary infections and the remaining 50 cases were classified as early latent infections.

Ninety per cent of cases (n=107) were in males, with an age range of 18 to 80 years and a median age of 35 years. There were 11 cases in females notified this quarter, an increase compared to the previous quarter (n=3). The age range of both males and females was 21 to 37 years with a median of 28 years.

Seventy-six per cent of the cases were from metropolitan regions (n=91), five per cent were from regional Victoria (n=5) and postcode of residence was unknown or not reported for 23 cases. Indigenous status was reported for 106 cases (89 per cent) with no cases reported as being of Aboriginal and/or Torres Strait Islander origin.

Enhanced surveillance data were collected for 112 of the 119 cases (100 males, 11 females and one sex not reported). Of these, 29 were HIV positive (26 per cent); all males, 26 MSM, unknown or not reported for two cases and the remaining case reported a female sexual partner. Re-infection in those who have had previous episode/s of syphilis infection was reported for 16 cases, of which 12 were HIV positive.
The most commonly reported reason for testing was STI screening (46 per cent) followed by presenting with signs and symptoms of an STI (39 per cent). Four cases were tested because of asymptomatic contact with an infected individual and for reason for testing was unknown or not reported for the remaining four cases.

**Males**

Of the 100 males, 81 (81 per cent) indicated likely acquiring the infection from a male sexual partner, nine (nine per cent) indicated a female sexual partner, one reported acquiring it from and male and female partner and for the remaining nine cases this information was unknown or not reported.

Among the males reporting a male sexual partner, 79 per cent (n=64) reported acquiring their infection from a casual sexual partner, 16 per cent (n=13) from a regular sexual partner and for the remaining four cases sexual partner type was unknown or not reported.

Of the nine males reporting a female sexual partner, two reported acquiring the infection from a casual sexual partner and partner type was unknown or not reported for the remaining seven cases.

Ninety-three per cent of the cases in males (n=75) reported acquisition of infection in Victoria, 10 overseas acquisition, two reported interstate acquisition and this information was unknown or not reported for the remaining 13 cases.

**Females**

Of the 11 females, seven reported acquiring their infection from a male sexual partner and this information was unknown or not reported for the remaining 13 cases.

Of the 11 females reporting a female sexual partner, five reported regular sexual partners and one reported casual sexual partners as the source of infection. Five of the 11 females reported that they acquired their infection in Victoria, three reported overseas acquisition and place of acquisition was unknown or not reported for the remaining three cases.

---

1 “New HIV diagnoses” refers to cases whose first ever HIV diagnosis was in Victoria.

---

**Human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS)**

Carol El-Hayek and Alyce Vella, Burnet Institute

Numbers are subject to change as a result of ongoing case investigations and the annual audit of retrospective records.

There were 61 new HIV diagnoses during the third quarter of 2012. This was similar to the total number of diagnoses in the previous quarter and brought the year-to-date total to 192 (Figure 15).

**Age, sex and exposure categories**

Of the 61 new HIV diagnoses\(^1\) in the third quarter of 2012, 95 per cent (n=58) were male and 33 per cent of the males diagnosed were aged 20–29 years (Table 7). The median age of men and women diagnosed this quarter was 34 years and 39 years respectively.

**Male-to-male sexual contact**

In the third quarter of 2012, 79 per cent (n=46) of all men newly diagnosed with HIV reported an exposure of male-to-male sex (Table 8). The median age at HIV diagnosis of these men was 33.6 years. In this quarter there was one diagnosis of HIV in a male who reported injecting drug use in addition to male-to-male sex as possible exposures to HIV; only one in total for the year-to-date.

In the third quarter of 2012, consistent with previous data, a majority of those who reported acquiring their infection through male-to-male sex also reported acquiring their infection in Victoria (74 per cent, n=34) and 61 per cent (n=28) reported acquiring their HIV infection from a casual or anonymous partner (Figure 16 and 17).
Heterosexual exposure

Eleven HIV notifications (three females) in the third quarter of 2012 were associated with heterosexual sex (Table 9); one of which was from a female born in a high HIV prevalence country (HPC)² (Table 9).

The median age at diagnosis of people with heterosexually acquired HIV infection in the third quarter of 2012 was 46.4 years; 47.6 years among males and 39.1 years among females.

Newly acquired infections³

Twenty-eight per cent (n=17) of all new HIV diagnoses notified were classified as newly acquired infections in the third quarter of 2012, compared to 43 per cent in 2011 and 45 per cent in the previous quarter and 44 per cent in 2011 overall (Table 10). All of the newly acquired infections in this quarter were among men reporting male-to-male sex.

Acquired immunodeficiency syndrome (AIDS)

Eleven notifications of AIDS were received in the third quarter of 2012; for 10 males and one female. Among the males, five were men who reported male-to-male sex as their exposure to HIV and four reported heterosexual exposure. The one female reporting heterosexual exposure to HIV was from an HPC. The total number of AIDS cases, year-to-date was 34.

Deaths

There were four deaths following HIV diagnosis in the third quarter of 2012; all male. Three were men who reported male-to-male sexual exposure. One of the deaths was attributed to AIDS. The total number of deaths year-to-date in 2012 was nine.

---

2. High prevalence country (HPC): defined as a country where the adult HIV prevalence is greater than one per cent and HIV is transmitted predominantly by heterosexual contact. This includes countries in sub-Saharan Africa, Cambodia, Thailand, Myanmar, and some Caribbean countries.

3. Newly acquired infections defined as having a previous negative HIV test and/or a seroconversion illness within the 12 months preceding HIV diagnosis.
Table 7: New HIV diagnoses by age group, Jul–Sep 2012, Jan–Sep 2012 and Jan–Dec 2011

<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>Third quarter 2012</th>
<th>Year-to-date 2012</th>
<th>Annual total 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
<td>Total</td>
</tr>
<tr>
<td>0–12</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>13–19</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>20–29</td>
<td>19</td>
<td>32.8</td>
<td>1</td>
</tr>
<tr>
<td>30–39</td>
<td>15</td>
<td>25.9</td>
<td>1</td>
</tr>
<tr>
<td>40–49</td>
<td>13</td>
<td>22.4</td>
<td>1</td>
</tr>
<tr>
<td>50–59</td>
<td>8</td>
<td>13.8</td>
<td>0</td>
</tr>
<tr>
<td>60+</td>
<td>3</td>
<td>5.2</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>58</td>
<td>100</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 8: New HIV diagnoses by exposure category, Jul–Sep 2012, Jan–Sep 2012 and Jan–Dec 2011

<table>
<thead>
<tr>
<th>Exposure category</th>
<th>Third quarter 2012</th>
<th>Year-to-date 2012</th>
<th>Annual total 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
<td>Total</td>
</tr>
<tr>
<td>Male to male sex</td>
<td>46</td>
<td>79.3</td>
<td>0</td>
</tr>
<tr>
<td>Male to male sex and IDU</td>
<td>1</td>
<td>1.7</td>
<td>0</td>
</tr>
<tr>
<td>IDU</td>
<td>1</td>
<td>1.7</td>
<td>0</td>
</tr>
<tr>
<td>Heterosexual sex</td>
<td>8</td>
<td>13.8</td>
<td>3</td>
</tr>
<tr>
<td>Transfusion</td>
<td>1</td>
<td>1.7</td>
<td>0</td>
</tr>
<tr>
<td>Other/unknown</td>
<td>1</td>
<td>1.7</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>58</td>
<td>100</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 9: New HIV diagnoses associated with heterosexual contact, Jul–Sep 2012, Jan–Sep 2012 and Jan–Dec 2011

<table>
<thead>
<tr>
<th>Exposure Category</th>
<th>Third quarter 2012</th>
<th>Year-to-date 2012</th>
<th>Annual total 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
<td>Total</td>
</tr>
<tr>
<td>Person from an HPC1</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
</tr>
<tr>
<td>Hetero contact with person from an HPC1</td>
<td>2</td>
<td>25.0</td>
<td>0</td>
</tr>
<tr>
<td>Hetero contact with bisexual male</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
</tr>
<tr>
<td>Hetero contact with an IDU</td>
<td>1</td>
<td>12.5</td>
<td>1</td>
</tr>
<tr>
<td>Hetero contact with person with HIV</td>
<td>1</td>
<td>12.5</td>
<td>1</td>
</tr>
<tr>
<td>Hetero contact, not otherwise specified</td>
<td>4</td>
<td>50.0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>8</td>
<td>100</td>
<td>3</td>
</tr>
</tbody>
</table>

1 High prevalence country (HPC): defined as a country where the adult HIV prevalence is greater than one per cent and HIV is transmitted predominantly by heterosexual contact. This includes countries in sub-Saharan Africa, Cambodia, Thailand, Myanmar, and some Caribbean countries.
Table 10: New HIV diagnoses in Victoria, by time since last negative test and/or seroconversion illness, Jul–Sep 2012, Jan–Sep 2012 and Jan–Dec 2011

<table>
<thead>
<tr>
<th>Time between HIV diagnosis and negative test and/or seroconversion illness</th>
<th>Third quarter 2012 July–September 2012</th>
<th>Year-to-date January–September 2012</th>
<th>Annual total 2011 January–December 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
<td>Total</td>
</tr>
<tr>
<td>Less than 1 year (Newly acquired)</td>
<td>17</td>
<td>0</td>
<td>17</td>
</tr>
<tr>
<td>1 year to less than 3 years</td>
<td>14</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>3 or more years</td>
<td>9</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>No previous negative test or seroconversion illness</td>
<td>11</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>History unknown</td>
<td>7</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>58</td>
<td>3</td>
<td>61</td>
</tr>
</tbody>
</table>

Victorian Infectious Diseases Bulletin Volume 15 Issue 4 December 2012 161
Table 11. Notifications of infectious diseases, by Department of Health region, 1 January–30 September 2012 and historical comparisons

Note—These data are preliminary figures only and may be subject to revision (daily surveillance reports are available online at http://www.health.vic.gov.au/ideas)

<table>
<thead>
<tr>
<th>Notifiable disease</th>
<th>Barwon South</th>
<th>Western</th>
<th>Grampians</th>
<th>Loddon Mallee</th>
<th>Hume</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Blood borne diseases</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis B – newly acquired</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Hepatitis B – unspecified</td>
<td>21</td>
<td>24</td>
<td>13</td>
<td>6</td>
<td>49</td>
</tr>
<tr>
<td>Hepatitis C – newly acquired</td>
<td>12</td>
<td>14</td>
<td>4</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Hepatitis C – unspecified</td>
<td>83</td>
<td>115</td>
<td>56</td>
<td>70</td>
<td>104</td>
</tr>
<tr>
<td>Hepatitis D</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Enteric diseases</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Campylobacter infection</td>
<td>396</td>
<td>437</td>
<td>173</td>
<td>210</td>
<td>235</td>
</tr>
<tr>
<td>Cryptosporidiosis</td>
<td>27</td>
<td>19</td>
<td>10</td>
<td>4</td>
<td>19</td>
</tr>
<tr>
<td>Food/water/environmental – other</td>
<td>37</td>
<td>11</td>
<td>6</td>
<td>32</td>
<td>9</td>
</tr>
<tr>
<td>Haemolytic uraemic syndrome</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Hepatitis A</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Hepatitis E</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Listeriosis</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Paratyphoid</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Salmonellosis</td>
<td>127</td>
<td>169</td>
<td>107</td>
<td>104</td>
<td>122</td>
</tr>
<tr>
<td>Shigellosis</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Typhoid</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Vero toxin producing E.coli</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Other notifiable conditions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood lead greater than 10µg/dL</td>
<td>13</td>
<td>8</td>
<td>5</td>
<td>6</td>
<td>17</td>
</tr>
<tr>
<td>Creutzfeldt-Jakob disease</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Invasive meningococcal disease – Group B</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Invasive meningococcal disease – Group C</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Invasive meningococcal disease – Other</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Legionella – other</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Legionella longbeachae</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Legionella pneumophila – indeterminate serotype</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Legionella pneumophila 1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Leprosy</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Mycobacterium infection (non-TB)</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Mycobacterium ulcerans</td>
<td>33</td>
<td>35</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Mycobacterium infection (TB complex)</td>
<td>10</td>
<td>10</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td><strong>Sexually transmissible infections</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chlamydia</td>
<td>1011</td>
<td>1089</td>
<td>640</td>
<td>505</td>
<td>771</td>
</tr>
<tr>
<td>Gonococcal infection</td>
<td>42</td>
<td>33</td>
<td>28</td>
<td>21</td>
<td>24</td>
</tr>
<tr>
<td>Syphilis – less than two years duration</td>
<td>4</td>
<td>7</td>
<td>3</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Syphilis – greater than two years duration</td>
<td>8</td>
<td>13</td>
<td>8</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td><strong>Vaccine preventable diseases</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haemophilus influenzae type b</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Influenza</td>
<td>482</td>
<td>122</td>
<td>136</td>
<td>46</td>
<td>160</td>
</tr>
<tr>
<td>Invasive pneumococcal disease</td>
<td>17</td>
<td>22</td>
<td>9</td>
<td>14</td>
<td>29</td>
</tr>
<tr>
<td>Measles</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Mumps</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Pertussis</td>
<td>224</td>
<td>333</td>
<td>93</td>
<td>210</td>
<td>175</td>
</tr>
<tr>
<td>Rubella</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Tetanus</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Varicella-zoster virus – Chickenpox</td>
<td>23</td>
<td>34</td>
<td>28</td>
<td>13</td>
<td>50</td>
</tr>
<tr>
<td>Varicella-zoster virus – Shingles</td>
<td>17</td>
<td>28</td>
<td>34</td>
<td>27</td>
<td>29</td>
</tr>
<tr>
<td>Varicella-zoster virus – unspecified</td>
<td>116</td>
<td>129</td>
<td>53</td>
<td>41</td>
<td>54</td>
</tr>
<tr>
<td><strong>Vector borne diseases</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barmah Forest</td>
<td>1</td>
<td>7</td>
<td>0</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>Chikungunya</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dengue</td>
<td>11</td>
<td>8</td>
<td>6</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Flavivirus</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Malaria</td>
<td>3</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Ross River</td>
<td>18</td>
<td>103</td>
<td>37</td>
<td>488</td>
<td>79</td>
</tr>
<tr>
<td><strong>Zoonoses</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brucellosis</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Leptospirosis</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Pseudotaxis</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Q Fever</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>2007 ABS est. resident population</strong></td>
<td>359,560</td>
<td>216,779</td>
<td>307,450</td>
<td>263,674</td>
<td></td>
</tr>
</tbody>
</table>
The Victorian Infectious Diseases Bulletin is published quarterly and provides summaries of infectious diseases surveillance data, local news, outbreak investigations, infection control procedures, clinical cases of general interest and brief reports on original clinical or laboratory based research. The bulletin is distributed free of charge to persons with an interest in the control and treatment of infectious diseases in Victoria.

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. Lead articles will be subject to peer review. As a guide, lead articles should be no more than 2500 words with a 200 word abstract, non-peer reviewed articles 2000 words and short reports and letters 800 words. 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.

Any material included in the Victorian Infectious Diseases Bulletin may be reproduced in whole or part if appropriately acknowledged. Opinions expressed in the bulletin are those of the authors and not necessarily those of the Department of Health. Data are subject to revision.

Editorial correspondence and subscription enquiries should be directed to:
The Editor
Victorian Infectious Diseases Bulletin
Communicable Disease Prevention and Control Unit
Department of Health
50 Lonsdale Street
Melbourne Victoria 3000
Email vidb@health.vic.gov.au
Phone: 1300 651 160

Editorial group: Hazel Clothier, Nicola Stephens, Marion Easton, James Fielding and Benjamin Cowie
Production editor: Judy Bennett
Coordinating editor: Hazel Clothier
To receive this document in an accessible format phone 1300 651 160.
Authorised and published by the Victorian Government, 50 Lonsdale St, Melbourne.
Except where otherwise indicated, the images in this publication show models and illustrative settings only, and do not necessarily depict actual services, facilities or recipients of services.
© Department of Health, December 2012
Print managed by Finsbury Green.