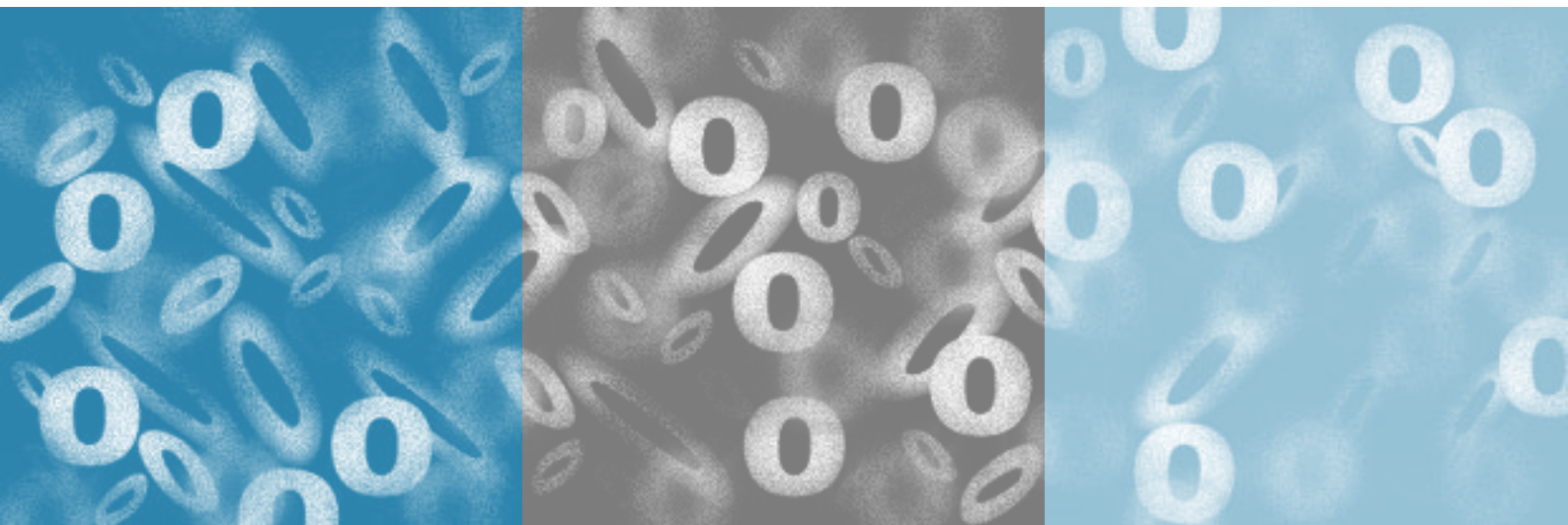


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Modelling the biology and transmission of influenza virus – learning from 1918–19 and other outbreaks

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Introduction

In 1918–19 the world experienced a devastating influenza pandemic. Millions of people suffered as the virus spread rapidly through communities around the globe. Typically, 10 to 40 per cent of the population in an affected region contracted the virus and displayed clinical symptoms. Many more probably experienced a sub-clinical infection. The mortality rate was just a few per cent, but still some 20–50 million people are estimated to have died from primary or secondary infections.¹

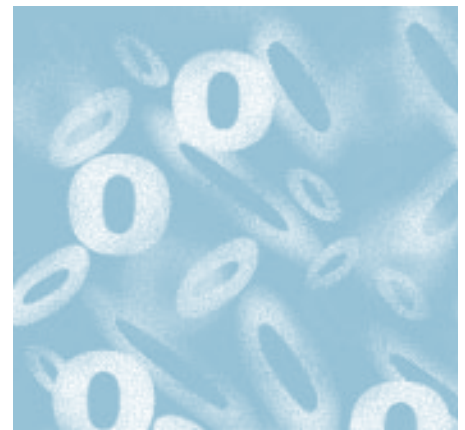
Since its emergence in 1997, the panzootic of H5N1 influenza in wild-bird and poultry populations has spread from South East Asia through Central Asia and Eastern Europe to Russia, Western Europe, Africa and the United Kingdom. While at the present time the probability of transmission to humans is small, the large biomass of influenza virus circulating in poultry poses a significant ongoing threat – the likelihood of a mutation or re-assortment event that leads to a human-to-human transmissible strain remains significant.² Since 2003 there have been 256 laboratory-confirmed infections with H5N1 in humans. Only sustained close contact with infected poultry/products/excreta is sufficient for human infection. Human-to-human transmission is unusual, but has been confirmed in at least one family; at present the probability of human to human transmission is too low to sustain a continuing epidemic or pandemic. However, the mortality rate in humans is currently just over 50 per cent.

We must remain aware of, and plan for, the potential consequences should

the virus become readily transmissible between humans. The SARS outbreak demonstrated that an emergent virus can rapidly spread around the globe – international air travel has changed the way populations interact. SARS highlighted the difficulties in understanding, controlling and combating an unknown, unanticipated viral outbreak.

Now, in the face of ongoing risk from H5N1 and other influenza strains, governments throughout the world are developing and refining pandemic preparedness plans. In Australia, the Australian Government Department of Health and Ageing has engaged public health experts, clinicians and scientists to help in preparing Australia's top level influenza pandemic plan. The National Influenza Preparedness Advisory Committee (NIPAC) has provided expert advice to government on strategy, the likely effectiveness of interventions and the capacity requirements for effectively dealing with an influenza pandemic in Australia.³

A key part of the planning process and advice provided by NIPAC comes in the form of quantitative modelling – using mathematical techniques to produce simulated outbreaks and then to predict the likely impact of various interventions such as border control, use of personal protective equipment, distribution of antiviral drugs, administration of vaccine and closure of schools.⁴ Mathematical models can provide insightful and valuable information for the planning process, but are only as strong as the assumptions they are built upon.⁵ Thus, in preparing for the future, it is important to learn as much as possible from what happened in the past.



FluWeb – an online database of historical influenza records

The historical record of influenza pandemics is extensive, highly relevant and, unfortunately, underutilised due to both the lack of knowledge of its existence (it is not indexed in the academic search engines) and the difficulty of accessing rare documents once they are “discovered”. To help address this issue, we have developed a publicly accessible, searchable archive entitled *FluWeb* of influenza outbreak data from historical and other hard to find documents in a project funded by the National Health and Medical Research Council of Australia.⁶

FluWeb, available online at <http://influenza.sph.unimelb.edu.au> now holds over 150 data sets from more than 20 sources, which describe population experiences of the influenza pandemics of 1889–91, 1918–19 (“Spanish Flu”) and 1957, as well as inter-pandemic or seasonal outbreaks. FluWeb provides search mechanisms to access incidence and mortality data across various time-scales and population sizes, single and multiple wave epidemics (including records of multiple-attacks across different pandemic waves), incubation period and serial interval data, age and gender specific data, data by occupation, crowding and social class, and data from different countries and cities, including isolated populations and ethnic minorities.

We have chosen to make this range of difficult-to-access resources available freely online in the hope that this will encourage researchers to test their models against data from these past

influenza outbreaks. Models that can adequately explain the past behaviour of influenza are likely to be the most reliable in helping us to understand the range of possible behaviours of any future pandemic. The database is also of interest to the wider public health community as the information contained therein provides valuable insight into the global impact of a severe pandemic of respiratory illness.

Insights from the historical record: biological assumptions and inputs for modelling

Mathematical models of influenza transmission must make assumptions on, among other things, risk of exposure to the virus, the presence or otherwise of asymptomatic transmission paths and the level of prior immunity within a population at the beginning of an outbreak. Furthermore, if individuals within a population do not become immune to infection after experiencing an influenza episode, their continuing susceptibility has significant consequences for the future course of the pandemic. To date, many of the most influential models for assessing the likely impact of interventions on influenza containment and spread can be questioned due to the paucity of evidence upon which to base model structure and biological parameters.

Our research has indicated that the following points are key to successfully correlating mathematical models with historical data:

1. *Exposure*: In 1918–19 influenza did not reach some communities because of remoteness and/or quarantine (e.g. American Samoa).⁷ Entry into Australia

was also delayed by quarantine.⁸ In affected countries, some institutions (e.g. Saffron Walden School, UK) escaped infection temporarily. Some households (e.g. in Manchester, UK), affected in several waves, appeared to be more infection-prone than others, possibly because with more children there was a higher probability of introducing the virus.⁹ Thus, there are indications that a lack of exposure is often the driving force behind observations of low attack rates in particular populations.

2. *Immunity*: Immunity to influenza is induced through several arms of the immune response including both innate and acquired components. Specific immune responses to influenza antigens induce humoral immunity, predominately directed at the hemagglutinin (HA) and neuraminidase (NA) components. These antibodies partially prevent acquisition of infection, with variable efficacy against “drifted” strains.¹⁰ Cellular immune responses target the more conserved influenza proteins such as the viral nucleoprotein (NP),¹¹ and as such may provide broad cross-protection against subtypes and strains. The historical record provides evidence for the various forms of immunity playing a role in influenza infection dynamics.

3. *Pre-existing protection*: In 1918–19 many people in urban populations, including those sleeping in the same room with those who became ill, did not become affected, even in the first wave.¹² This suggests a high level of pre-existing protection, most evident in highly urbanised communities,

presumably because of persistent immunity following past exposure to influenza. Molecular evidence suggests that the H1N1 virus responsible for the 1918–19 pandemic had circulated from 1915 onwards in a less virulent form;¹ alternatively, cross-protection could have followed infection with another inter-pandemic virus. In contrast, in remote locations, most people in affected communities became clinically ill, presumably because they lacked recent exposure to influenza of any kind. There are documented cases of extremely high attack rates in such populations. In 1970 on the island of Tristan da Cunha, off the coast of South Africa, 97 per cent of the Islanders experienced a clinical attack of influenza after a ship crew, carrying influenza, disembarked.¹³ The island had not experienced influenza A infection for many years prior. Our modelling indicates that the majority of Islanders were in fact exposed twice, with some individuals experiencing asymptomatic infections and/or multiple clinical attacks.

4. *Protection from pandemic waves*: People affected in the first wave of the 1918–19 pandemic were less likely to be affected in a later attack; typically repeat attacks were less severe,⁹ as were second attacks on Tristan da Cunha.¹³ Nevertheless, as repeat attacks did occur, protection following the first exposure to this novel virus appeared to be short-lived. Waning of antibody titres (over weeks or months), potentially coupled with antigenic drift of the virus, may have accounted for this observation. Such observations are inconsistent with

the usual modelling assumption that infected individuals, once recovered, can be permanently removed from the susceptible pool. The pandemic waves, clearly evident in urban communities, are most simply explained by waning of immunity, making previously protected individuals re-susceptible to infection.

5. *Sub-clinical infection*: Many individuals were clinically unaffected in any of the three waves.⁹ Exposure of temporarily protected persons would likely have induced more permanent protection without causing clinical symptoms. In contrast, in the most susceptible remote populations lacking pre-existing protection the majority of exposures resulted in symptomatic disease.⁷

The future

Pandemic preparedness planning is an ongoing process. Our understanding of influenza, from the basic properties of the virus and its interactions with the human immune system, through to the dynamics of its spread through populations, is always evolving. This knowledge is fed back into the planning process in an ongoing cyclical process.

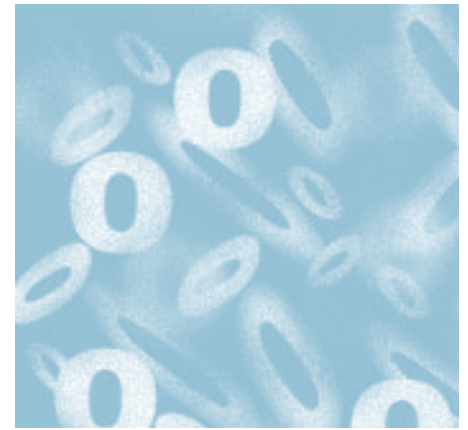
Our research group in Melbourne, in collaboration with colleagues around the world, is continuing to work on consolidating knowledge about how past exposure to non-pandemic influenza could provide populations with partial protection against any new pandemic, and to explore the implications of this for prevention today. Another theme is to explore the severity of influenza during pandemics, and to identify social and medical factors that might reduce the

dose of virus transmitted, or otherwise reduce the severity of infection.

The insights from such modelling exercises will also help to identify gaps in knowledge and understanding about the basic biology of influenza, stimulate new research to fill those gaps, and thus offer the prospect of more effective vaccines and treatments for the future control of influenza. We hope that FluWeb becomes an invaluable resource to the research community in working towards these goals.

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Influenza pandemic planning in Victoria – an update

Elizabeth Birbilis, Rodney Moran and Rosemary Lester, Department of Human Services

Introduction

Influenza pandemics are associated with high morbidity and significant mortality, and involve massive social and economic disruption. Three pandemics occurred in the twentieth century – in 1918, 1957, and 1968. Recent outbreaks of Severe Acute Respiratory Syndrome (SARS) and avian influenza overseas have brought the issues of pandemic preparedness to the forefront as the possibility of a pandemic is real. While it is impossible to predict when a pandemic might occur, Victoria needs to be prepared. Planning and preparedness is the best way to mitigate the potentially serious consequences of an influenza pandemic. It is important that effective strategies for control be activated as early as possible in response to all potential pandemic threats.¹

The Victorian Pandemic Influenza Plan was first released in November 2005. This plan has subsequently been updated (now titled the Victorian Health Management Plan for Pandemic Influenza) and will be released shortly. It aims to provide an effective health response framework to minimise the morbidity and mortality associated with an influenza pandemic and its impact on the Victorian community, health care system and the economy. This plan builds upon the foundation established by the previous plan and plans developed by the Australian Government Department of Health and Ageing and the Australian Government Department of Industry, Tourism and Resources.

The plan takes a phased approach in responding to a pandemic. The phases are aligned with the stages used in the Australian Health Management Plan for Pandemic Influenza – May 2006 and

the World Health Organization (WHO) Phases used in the WHO Global Influenza Preparedness Plan – March 2005. The phases are intended to guide actions rather than be a strict categorisation of the events.

Containment of the virus and maintenance of critical services is the focus of the plan. “Containment” refers to delaying transmission for as long as possible through a range of activities including border control measures, widespread adoption of good hygiene and infection control practices, isolation of cases, quarantine of contacts, and use of antiviral medication. “Maintenance” is when community transmission is established and containment is no longer feasible. Pre-exposure prophylaxis for priority groups will be important to maintain societal functioning until a pandemic vaccine is available or the pandemic subsides.

Summary of the Victorian Health Management Plan for Pandemic Influenza

Surveillance

An effective surveillance system that integrates data on disease occurrence along with virological and clinical data is a vital component of pandemic preparedness and response. An early warning system has been established to identify the first human cases related to the emergence of a potential pandemic influenza strain and signal the first instances of human-to-human transmission. It is critical to signal the transition from limited human-to-human transmission to the efficient and sustainable transmission that marks the start of a pandemic. The

surveillance objectives and activities will vary depending on the phase of the pandemic and are further detailed in the Surveillance appendix within the Victorian Health Management Plan for Pandemic Influenza.

Antivirals

Antiviral drugs play two principal roles in the management of influenza: prophylaxis, aimed at decreasing the likelihood of developing influenza, and treatment, aimed at reducing the severity and duration of influenza. During the containment phase of a pandemic, the health response will be directed at identifying new infections and preventing further spread. During this period antivirals will be used to treat new cases of pandemic influenza, provide post-exposure prophylaxis to contacts of new cases of influenza, and manage new and suspected cases and their contacts.

During the maintenance phase of a pandemic the health response will be directed to maintaining effective social functioning while managing the pandemic. In this period antivirals will be used to provide continuous prophylaxis for health care workers at continuous high risk of infection (for example, workers directly caring for cases) and to provide post-exposure prophylaxis for workers at medium risk of exposure to the virus.

Vaccine

A vaccine that gives good protection against pandemic influenza can only be developed after the virus strain is known. The Australian Government has contracts in place with vaccine manufacturers to expedite the development, supply and provision of a vaccine as soon as the

pandemic strain emerges. This could however take several months. The vaccine will be made available first to people at high risk of exposure to the virus (that is, frontline healthcare workers) and people most vulnerable to severe illness from infection.

It is intended that general practitioners and hospitals will vaccinate staff within their workplace. Local government immunisation teams will vaccinate the identified priority groups within the community, then vaccinate the remainder of the population. Once mass vaccinations are completed using Mass Vaccination Centres (MVCs), general practitioners could assist with “mop up” for persons who are unable to attend a MVC. For community groups unable to attend, it is intended that their existing health care provider would provide the vaccine. These groups would include patients in nursing homes and other long-term care institutions, immobile patients who receive care at home through community healthcare service providers, and inmates of correctional services (jails, prisons, juvenile detention facilities).

The logistics of mass vaccination during a pandemic are further detailed in the Mass Vaccination Guide appendix within the Victorian Health Management Plan for Pandemic Influenza.

General Practice

The Department of Human Services has developed an information kit and work plan for general practitioners. The information kit and work-plan are designed to help them develop and implement a pandemic influenza plan in their practices. It was developed in

collaboration with General Practice Divisions Victoria, the Australian Medical Association (Victoria), the Royal Australian College of General Practitioners, and the Australian Practice Nurse Association. Guidance for primary care providers is also contained in the plan (available at: <http://www.health.vic.gov.au/pandemicinfluenza>).

Health Services

Patients with suspected pandemic influenza may present to any health service in a variety of ways. These services will need to develop a process for identifying, separating, triaging and admitting those with influenza to prevent cross-infection. This may involve setting up a separate area, such as an influenza triage or influenza clinic.

To help prevent the spread of pandemic influenza, while patient numbers are low, confirmed cases of pandemic influenza may be referred to designated hospitals for treatment and admission. These hospitals have been chosen based on locality, ability to implement high-level infection control practices, availability of specialised infectious diseases support and access to negative pressure isolation facilities. As patient numbers increase and the demand for negative pressure isolation rooms exceeds capacity, influenza clinics will be established at these hospitals to reduce the pressure on emergency departments and GP clinics.

Communication

Effective communication during the various stages of a pandemic will be vital to minimise the impact upon social and economic infrastructure. Community education is a preventive measure that

can be used to limit or slow the spread of influenza throughout the pandemic phases.

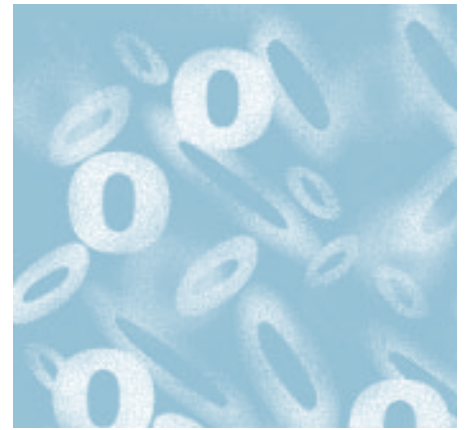
A whole of Victorian Government strategy has been developed to guide the communication efforts across government in preparing for and responding to a human influenza pandemic. The communication strategy maximises stakeholder engagement and existing networks by targeting a distinct but diverse group of key sectors. These include government departments, the health sector, local government, emergency services, infrastructure services, community services and business associations. These audiences require relevant and practical information that will empower them to develop their own pandemic plans as effectively as possible.

The Victorian strategy supports and is consistent with the Australian Government’s communication strategy. The strategy is available at: <http://www.health.vic.gov.au/pandemicinfluenza>. The Victorian Health Management Plan will be available at <http://www.health.vic.gov.au/pandemicinfluenza>.

The plan will continue to be regularly reviewed and updated so as to ensure response activities are evidence based, consistent, appropriate and effective.

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Infectious diseases news

Ten years of the *Bulletin*

This issue of the *Victorian Infectious Diseases Bulletin* marks the tenth anniversary of its inception. The *Bulletin* was initiated in 1997 by staff of the Department of Human Services, the Victorian Infectious Diseases Reference Laboratory, the Microbiological Diagnostic Unit and the Macfarlane Burnet Institute for Public Health Research. Thirty-four issues have now been published: growing from 16 pages to over 30 pages, with over 3500 subscribers and concurrent publication on the internet.

The primary aim of the *Bulletin* at its inception was to provide feedback to clinicians, laboratories, researchers, service providers and the general public on the data generated through surveillance of notifiable diseases in Victoria – this remains the case today. It continues to be an avenue for the publication of the results of locally specific outbreak investigations, infectious diseases research and other initiatives targeting the control of these diseases in Victoria and elsewhere.

The editorial group of the *Bulletin* would like to thank all contributors, past and present, and subscribers for their continuing support, in particular the clinicians and laboratories without whom surveillance of important public health diseases would not be possible.

Immunisation update

Helen Pitcher, Department of Human Services

Data cited in this report are based on the Australian Childhood Immunisation Register (ACIR) coverage report. Table 1 presents immunisation coverage processed at 31 December 2006 for children aged 12-<15 months, 24-<27 months and 72-<75 months of age calculated at 30 September 2006. Only vaccines administered before 12 months of age were included in the coverage calculation for the first age group, and only those vaccines administered before 24 and 72 months of age were included in the coverage calculation for the second and third age groups. For a copy of the ACIR report listing immunisation coverage against individual vaccines for each local government area, contact Catherine McNamara at the Department of Human Services (email catherine.mcnamara@dhs.vic.gov.au).

Complete immunisation coverage for cohort three (six year old milestone) increased to 90.1 per cent, two percentage points higher than the Australian coverage (88 per cent). This was the first time a State or Territory in Australia had achieved over 90 per cent coverage for full vaccination in this age cohort. All immunisation providers in Victoria are congratulated for this excellent achievement.

Immunisation coverage in Victoria continued to remain stable in age cohorts one and two (one year old and two year old milestones). Victoria was similar to the Australian coverage (91.2 per cent) in cohort one at 91.7 per cent fully immunised. Complete immunisation coverage for cohort two remained steady at 93.6 per cent compared to the Australian coverage (92.4 per cent). This means that in the event of a disease outbreak such as measles occurring in Australia, the majority of Victorian children will be protected given these high levels of vaccine coverage.

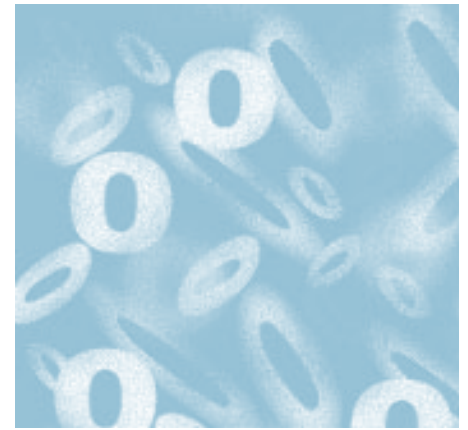
Seventy-seven per cent of local government areas (LGAs) achieved full immunisation coverage greater than or equal to 90 per cent in cohort

one, ninety-one per cent achieved full coverage greater than or equal to 90 per cent in cohort two, and 61 per cent achieved full immunisation coverage greater than or equal to 90 per cent in cohort three.

In 2006, the Victorian Government initiative, "Targeting Low Coverage Bonus Immunisation Incentive Program (TLCBIIP)" for local council immunisation providers was introduced. The aim of the BIIP was to target low immunisation coverage in individual municipalities in order to improve the immunisation status of children through financial incentives. In 2006, 32 councils across Victoria ranging from rural, provincial city and metropolitan were eligible for this incentive. It is an outcome-based program. The BIIP is paid annually on achievement of at least 90 per cent immunisation coverage for each age cohort in each quarter over a calendar year, or, at minimum, for exceeding the state immunisation average for all three cohorts over a calendar year. The three age cohorts relate to the age at which the Australian Childhood Immunisation Register (ACIR) assesses full immunisation coverage.

Table 1: Childhood immunisation coverage, by local government area, Victoria, 31 December 2006.

Age group	% fully immunised	Local Government Area (LGA)	Total LGAs (% LGAs)
12<15 months	100	Horsham, Northern Grampians, Strathbogie, West Wimmera	4 (5)
	95+	Baw Baw, Corangamite, Loddon, South Gippsland, Southern Grampians, Wodonga,	6 (8)
	90<95	Alpine, Ararat, Ballarat, Banyule, Bayside, Boroondara, Brimbank, Cardinia, Colac-Otway, Darebin, East Gippsland, Gannawarra, Glen Eira, Glenelg, Golden Plains, Greater Dandenong Greater Geelong, Greater Shepparton, Hindmarsh, Hume, Kingston, Knox, Latrobe, Macedon Ranges, Manningham, Maribyrnong, Melton, Mitchell, Moira, Monash, Moonee Valley, Moorabool, Moreland, Mornington Peninsula, Mount Alexander, Moyne, Port Phillip, Pyrenees Stonnington, Surf Coast, Swan Hill, Towong, Wangaratta, Warrnambool, Wellington, Whitehorse, Whittlesea, Wyndham, Yarra, Yarriambiack	50 (64)
	85<90	Bass Coast, Buloke, Campaspe, Casey, Frankston, Greater Bendigo, Hobsons Bay, Maroondah, Melbourne, Mildura, Nillumbik, Yarra Ranges,	12 (16)
	80<85	Central Goldfields, Delatite, Hepburn, Indigo, Murrindindi,	5 (6)
	75<80	Queenscliffe	1 (1)
24<27 months	100	Golden Plains, Hindmarsh, Pyrenees, Towong, West Wimmera, Yarriambiack,	6 (8)
	95+	Ararat, Ballarat, Bass Coast, Baw Baw, Buloke, Campaspe, Corangamite, Delatite, Glen Eira, Glenelg, Greater Geelong, Greater Shepparton, Horsham, Indigo, Latrobe, Melton, Mitchell, Moorabool, South Gippsland, Strathbogie, Surf Coast, Wangaratta, Wellington, Wodonga	24 (31)
	90<95	Alpine, Banyule, Bayside, Boroondara, Brimbank, Cardinia, Casey, Central Goldfields, Colac-Otway, Darebin, East Gippsland, Frankston, Greater Bendigo, Greater Dandenong, Hobsons Bay, Hume, Kingston, Knox, Macedon Ranges, Manningham, Maribyrnong, Maroondah, Mildura Moira, Monash, Moonee Valley, Moreland, Mornington Peninsula, Moyne, Nillumbik, Northern Grampians, Port Phillip, Southern Grampians, Stonnington, Swan Hill, Warrnambool, Whitehorse, Whittlesea, Wyndham, Yarra, Yarra Ranges,	41 (52)
	85<90	Melbourne, Murrindindi, Queenscliffe,	3 (4)
	80<85	Gannawarra, Hepburn, Loddon, Mount Alexander,	4 (5)
72<75 months	100	Hindmarsh, Queenscliffe, West Wimmera	3 (3)
	95+	Bass Coast, Buloke, East Gippsland, Gannawarra, Horsham, Mitchell, Moorabool, Moyne, South Gippsland, Strathbogie, Wellington, Wodonga, Yarriambiack	13 (18)
	90<95	Ballarat, Banyule, Baw Baw, Boroondara, Central Goldfields, Colac-Otway, Corangamite, Golden Plains, Greater Bendigo, Greater Geelong, Hume, Indigo, Kingston, Knox, Latrobe, Maroondah, Melton, Moira, Moonee Valley, Mornington Peninsula, Nillumbik, Northern Grampians, Southern Grampians, Surf Coast, Swan Hill, Towong, Wangaratta, Warrnambool, Whitehorse, Whittlesea, Wyndham	31 (40)
	85<90	Alpine, Ararat, Bayside, Brimbank, Campaspe, Cardinia, Casey, Darebin, Frankston Glen Eira, Glenelg, Greater Shepparton, Hobsons Bay, Loddon, Macedon Ranges, Manningham, Maribyrnong, Mildura, Monash, Moreland, Murrindindi, Port Phillip, Stonnington, Yarra Ranges,	24 (31)
	80<85	Delatite, Greater Dandenong, Melbourne, Pyrenees, Yarra,	5 (6)
	75<80	Mount Alexander	1 (1)
	70<75	**	*
	65<70	Hepburn (S)	1 (1)



Surveillance report

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

This section includes a summary of infectious disease notifications received until 31 December 2006. The Communicable Diseases Control Unit, Department of Human Services, produced the report in cooperation with the Victorian Infectious Diseases Reference Laboratory and the Macfarlane Burnet Institute for Medical Research and Public Health. We gratefully acknowledge the contribution of the Microbiological Diagnostic Unit of the University of Melbourne and the Melbourne Sexual Health Centre.

Table 15 includes historical comparisons of selected diseases for the period 1 January – 31 December 2006 at both the State and regional levels. Summary data at local government level for the diseases listed are available from the Communicable Diseases Control Unit (telephone 1300 651 160) or on the website at <http://www.health.vic.gov.au/ideas/>. There were no notifications of anthrax, Australian arboencephalitis, diphtheria, Japanese encephalitis, Kunjin virus, plague, poliomyelitis, rabies, viral haemorrhagic fevers or yellow fever in this reporting period.

For comments or queries related to data on sexually transmissible diseases, contact the Communicable Diseases Control Unit. For HIV/AIDS enquiries, contact Kylemarian Yohannes, Epidemiology and Social Research Unit, Macfarlane Burnet Institute for Medical Research and Public Health (telephone 61 3 9282 2290).

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

Outbreaks of gastrointestinal illness

Joy Gregory, OzFoodNet Victoria & Department of Human Services & Leah Gullan, Department of Human Services

In the fourth quarter of 2006, there were 180 outbreaks of gastrointestinal illness reported to the department's Communicable Disease Control Unit (CDCU) (table 1).

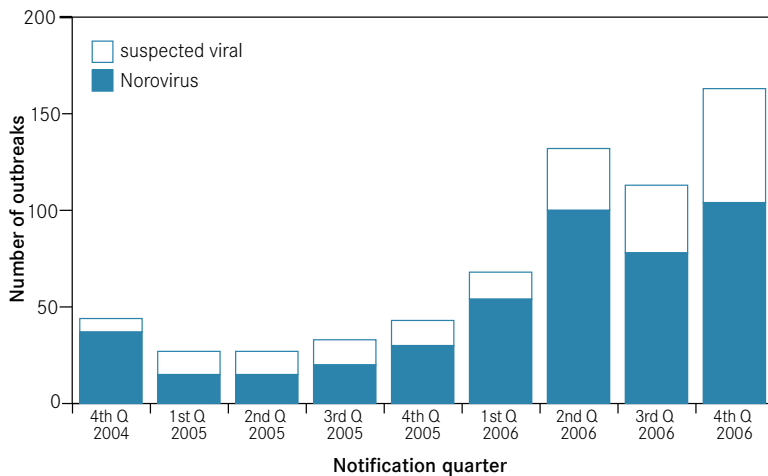
Of these, six outbreaks were considered to be foodborne or probable foodborne.

For the remaining 174 outbreaks, person to person transmission was suspected in 165 (Norovirus (101); rotavirus (5) and suspected viral gastroenteritis (59)). The mode of transmission was unknown in nine outbreaks.

Table 1: Outbreaks of gastrointestinal illness, Victoria, October–December 2006.

Setting	Outbreaks	Persons affected	Pathogen/toxin (number of outbreaks)
Restaurant/reception/other food premises/specific food	11	174	Norovirus (5) Suspected Viral (2) Ciguatoxin (1) Unknown (3)
Aged disability/health care institution	152	3425	Norovirus (95) Suspected Viral (45) Rotavirus (5) <i>Clostridium perfringens</i> (1) Unknown (6)
Recreation/holiday/camp	4	168	Norovirus (3) Suspected Viral (1)
Children's service/school	9	217	Suspected viral (9)
Other residential institution	3	51	Norovirus (1) Suspected viral (2)
Family/social gathering	1	10	<i>Salmonella</i> Typhimurium 44 (1)
TOTAL	180	4045	Norovirus (104) Suspected Viral (59) <i>Salmonella</i> Typhimurium 44 (1) Rotavirus (5) Ciguatoxin (1) <i>Clostridium perfringens</i> (1) Unknown (9)

Figure 1: Norovirus outbreak activity by quarter, Victoria, October 2004–December 2006



Norovirus activity

Norovirus activity remained very high this quarter with 104 outbreaks notified (figure 1), and was higher than at any time over the previous two years. Ninety-one per cent of these outbreaks were in aged care and health care settings. A further 59 outbreaks were suspected to have been caused by a viral pathogen.

Salmonella Typhimurium 44 outbreak at an office birthday party.

In late November 2006, the CDCU was notified of an outbreak of gastrointestinal illness amongst a group of work colleagues. Initial information obtained revealed that one employee had been admitted to hospital and a faecal specimen was positive for *Salmonella*. An investigation was initiated to identify other cases and a source.

A case was defined as a person who worked at the company and developed an onset of diarrhoea between 23 and 26 November 2006. Ten people met the case definition and food histories were completed. Symptoms experienced by

the cases were predominantly diarrhoea, abdominal pain, fever and nausea and the median duration of illness was seven days. The median incubation period was 26 hours, with a range of 12 to 75 hours.

The only commonly consumed food was a hazelnut gâteau, prepared by one of the cases and brought to work to celebrate a birthday on the morning of 23 November. Leftover cake obtained from the refrigerator at the workplace was submitted to the Microbiological Diagnostic Unit (MDU) for analysis. Additional faecal samples were collected from cases and also submitted to MDU. The person who made the cake was interviewed about the method of preparation – the cake had a mousse filling made with raw eggs. *Salmonella* Typhimurium 44 (STm44) was isolated from the faecal specimens of four cases and also from the sample of leftover gâteau. This outbreak highlights the risks associated with consuming foods containing raw eggs.

Due to a dramatic increase in notifications of STm44 in December

2006, an investigation was commenced and has continued into 2007. A more comprehensive report of this investigation will be provided in the next edition of the *Victorian Infectious Diseases Bulletin*.

Blood borne viruses

Nasra Higgins, Department of Human Services

Hepatitis B – newly acquired infections

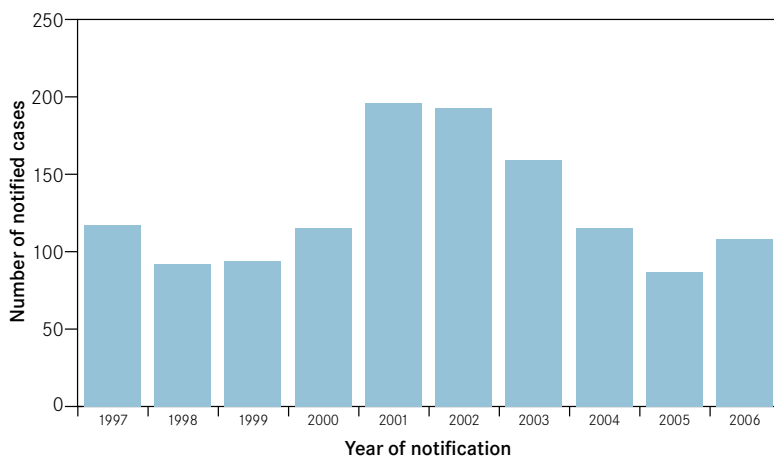
Between October and December 2006, the department received 439 notifications of hepatitis B, of which 28 (six per cent) were newly acquired infections. This was similar to the number of newly acquired cases notified in the previous quarter, although the yearly total for 2006 (n=108) was 24 per cent higher than that for 2005 (n=87) (figure 2).

Among the newly acquired hepatitis B cases notified, 16 (57 per cent) were in males and 12 (43 per cent) were in females. Those notified were aged between 23 and 68 years with a median age of 35 years. Infections were most commonly reported for the 25 to 29 year age group.

Twenty-three infections (82 per cent) were in Australian born persons; one was reported as being of Aboriginal and/or Torres Strait Islander origin. Seventy-five per cent of all cases were from metropolitan Melbourne and the remainder from regional Victoria. Co-infection with hepatitis C was reported in nine cases (32 per cent).

Enhanced data were collected for all cases although in some cases risk factors were unable to be determined. In 50 per cent of newly acquired infections, having symptomatic hepatitis was reported as the reason for testing for hepatitis B.

Figure 2: Notified cases of newly acquired hepatitis B infection, Victoria, 1997-2006



Other reasons reported included having elevated liver function tests (n=9), having a medical condition (n=3), having an asymptomatic sexual contact (n=2), drug and alcohol screening (n=2), screened upon patient request (n=2), prison screening (n=1), screened for sexually transmissible infections (n=1), and screening for refugee health assessment (n=1).

Injecting drug use was reported as the main risk factor (n=14, 50 per cent) followed by having a hepatitis B positive heterosexual contact (n=8, 29 per cent), needle injury in a non-healthcare worker (n=1, four per cent), and other risk factors (n=2, seven per cent). In three cases risk factors were unable to be determined.

Hepatitis C – newly acquired infections

During the fourth quarter of 2006, the department was notified of 691 cases of hepatitis C infections; 45 cases (seven per cent) were newly acquired. This was compared to 54 cases in the same period in 2005. A total of 207 newly acquired hepatitis C cases were notified in 2006, an increase of 20 per cent on

2005 (n=173). The overall increase for 2006 was likely to, at least in part, be due to changes in surveillance. Although the number of newly acquired hepatitis C infections reported has increased, the total number of hepatitis C cases reported has decreased (figure 3).

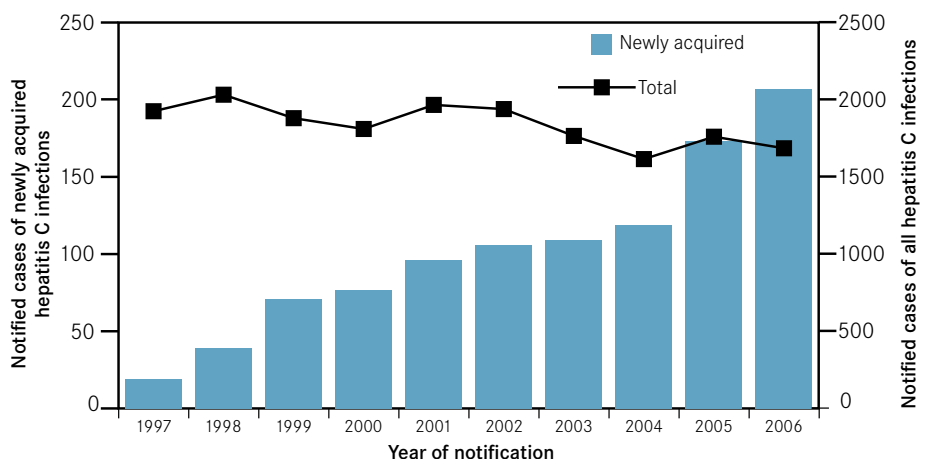
Among the newly acquired hepatitis C cases, 78 per cent (n=35) were in males and 22 per cent (n=10) in females. Ages ranged from 0 to 46 years with a median age of 26 years. Infections were most commonly reported for the 25–29 years

age group. Eighty per cent (n=36) were Australian born and three persons were reported as being of Aboriginal and/or Torres Strait Islander origin. Over 70 per cent (n=32) were from metropolitan Melbourne and 22 per cent (n=10) were from regional Victoria.

Enhanced data were collected for all newly acquired hepatitis C infections. Multiple reasons for testing were reported; drug and alcohol screening and patient request were the two most common (13 and 12 cases respectively). Other reasons reported included prisoner screening (n=8), having elevated liver function tests (n=6), having symptomatic hepatitis (n=6), screening for sexually transmissible infections (n=3), having an asymptomatic household contact (n=1), having a medical condition (n=1), postnatal screening (n=1) and antenatal screening (n=1).

Injecting drug use was reported as the main risk factor for 42 of the 45 newly acquired infections. In the remaining three cases, one acquired the infection vertically, one reported a dental procedure as the risk factor and in the third case, a risk factor was unable to be determined.

Figure 3: Notified cases of hepatitis C infections, Victoria, 1997-2006



Hepatitis D

One case of hepatitis D was notified during the fourth quarter in a 33-year-old Australian-born female. A total of seven cases of hepatitis D were notified in 2006 compared to two cases in 2005.

Vaccine preventable diseases

James Fielding, Department of Human Services

Haemophilus influenzae type b (Hib)

There was one case of Hib notified in the fourth quarter in a five-year-old female. She had received three validated doses of vaccine and was therefore classified as a vaccine failure. The child was given antibiotics to clear carriage of the bacterium; no contacts were eligible for chemoprophylaxis. Two cases of Hib were notified in 2006 – consistent with the average of two cases notified annually for the previous five years.

Influenza

Influenza activity returned to baseline levels in the fourth quarter with 29 cases notified, of which all except one were type A virus infections; one case was a type B virus infection. No outbreaks or links between cases notified in the fourth quarter were identified. The 2006 influenza season peaked between June and August in which time 323 cases (76 per cent) of the total for the year (n=423) were notified. This compares with 2005 in which 593 cases were notified, a reduction in 2006 of 29 per cent.

Invasive pneumococcal disease (IPD)

There were 74 cases of IPD notified in the fourth quarter of 2006 compared to 53 cases during the same period in 2005, an

increase of 40 per cent. This increase was exclusively in persons aged 65 years or older. Nearly half the cases (n=36) were in adults aged 65 years or older. There were nine cases in children aged less than five years of whom four were aged less than one year. Consistent with previous quarters, a majority of cases (64 per cent) were in males. Seven persons (nine per cent) died as result of their infections. These included a six-month-old infant and adults aged 47 to 86 years. No cases in people of Aboriginal and/or Torres Strait Islander origin were reported.

Serotype data were available for all but one case (99 per cent). Among the eight cases in those eligible for free conjugate vaccine, only one was infected with a serotype contained within the vaccine; this child was fully vaccinated and therefore a vaccine failure. Twenty-seven of the 36 cases aged 65 years or older were infected with a serotype contained within the polysaccharide vaccine. Of these 14 were vaccine failures, eight were not vaccinated and vaccination status was unknown for the remainder.

In 2006, a total of 280 cases were notified compared to 303 in 2005. The annual numbers of cases notified have declined every year since 2002. Despite the overall decrease in 2006, the number of cases in those aged 65 years or older rose slightly to 118 from 107 in 2005, and the proportion of cases caused by serotypes not contained within the polysaccharide vaccine doubled from seven per cent (n=7) in 2005 to 16 per cent (n=19) in 2006. There were 30 and 27 cases in children eligible for conjugate vaccine in 2005 and 2006 respectively, although the proportion of cases caused by serotypes contained within the

vaccine reduced from 43 per cent (n=13) in 2005 to 30 per cent (n=8) in 2006.

Measles

Three cases of measles were notified during the fourth quarter in two females and one male aged 25, 27 and 28 years; none were vaccinated. Two infections were acquired during travel in South-East Asia; the third case was the sister and a household contact of one of the returned travellers.

Twelve cases of measles were notified in 2006, compared to two in 2005. Of these, five were acquired overseas and seven were acquired locally. Of the locally acquired cases, four were epidemiologically linked to cases in which the infection was acquired overseas or from overseas visitors. Nine cases occurred in unvaccinated persons and the vaccination status of three was unknown.

Mumps

There were two cases of mumps notified in the fourth quarter of 2006 in a male and female aged nine and 20 years respectively; the latter infection was acquired in Polynesia. Neither person had evidence of ever receiving MMR vaccine.

A total of 16 confirmed cases of mumps were notified in 2006, compared to 20 cases in 2005. Those notified were aged from seven to 63 years (median = 27 years) and none were reported as vaccinated. Five (31 per cent) had travelled overseas during their incubation period and two were epidemiologically linked.

Rubella

One case of rubella was notified in the fourth quarter in a 31-year-old, the brother of a case reported in the previous quarter who also transmitted the infection to his

unvaccinated nine-month-old daughter; the vaccination statuses of the men were unknown. Six cases of rubella were notified in 2006, one fewer than in 2005. The three other cases were in females aged 21 and 33 years with no documented history of vaccination and a 13-year-old male who had received one dose of MMR vaccine.

Pertussis

There were 184 cases of pertussis notified in the fourth quarter, a decrease of 48 per cent on the 355 cases in the same period in 2005. Cases were in persons aged from one month to 87 years (median = 48 years). Five were aged less than six months, three were not vaccinated and two had only received one dose of vaccine. Another child aged ten months had received two doses of vaccine. A majority of cases (86 per cent) were in persons aged 18 years or older. No deaths were reported during the quarter.

A total of 1,080 cases of pertussis were notified in 2006, a decrease of seven per cent on the 1,166 cases notified in 2005. The number of cases in children aged less than one year more than halved from 26 in 2005 to 12 in 2006 (figure 4). The

number of cases in adults aged 18 years or older remained steady but increased as a proportion of total cases from 84 to 92 per cent; the five-year age-specific notification rates were highest in the 50 to 79 years age groups. No deaths were reported. Notification rates in the Gippsland region continued to be significantly higher than other regions. Although the reasons for this are likely to be multifactorial, a problem with the specificity of a serology test kit used by several Victorian laboratories in the third quarter (particularly among notified cases from the Gippsland region) artificially inflated the notification rate.

Other notifiable diseases

James Fielding, Department of Human Services

Legionellosis

There were 18 cases of legionellosis notified in the fourth quarter of 2006, compared to 21 for the same period in 2005. A majority (13 cases, 72 per cent) were males and all were residents of metropolitan Melbourne. Those notified were aged from 19 to 79 years (median = 62 years); all but two were aged 50

years or older. Eight cases each were due to infection with *L. pneumophila* (seven confirmed as serogroup 1) and *L. longbeachae*; there was one case of *L. micdadei* and one *Legionella* not otherwise specified. No links between cases were identified.

A total of 69 legionellosis cases were notified in 2006 compared to 65 in 2005. There was a higher number of *L. pneumophila* serogroup 1 infections in 2006 (n=46) compared to 2005 (n=37) although 11 cases were associated with a single outbreak in February and March 2006. Three deaths in 2006 were attributable to *Legionella* infection, one fewer than in 2005.

Invasive meningococcal disease

In the fourth quarter of 2006, 20 cases of invasive meningococcal disease were notified compared to 29 for the same period in 2005 and 26 in the previous quarter. Sixteen cases (80 per cent) were the result of serogroup B infections, two were probable cases and there was one case each of serogroup W135 and untypable *Neisseria meningitidis* infection. Cases were in those aged from six months to 81 years (median 17 years); five (25 per cent) were in children aged less than two years. Twelve cases (60 per cent) were in males and the remainder were in females. No deaths or links between cases were reported.

A total of 86 confirmed and probable cases of invasive meningococcal disease were notified in 2006, compared with 89 in 2005. In general, the numbers of cases in each serogroup were similar in 2005 and 2006, although a higher proportion of cases in 2006 were classified on the basis of clinical evidence only as probable

Figure 4: Notified cases of pertussis by age group, Victoria, 2000–2006.

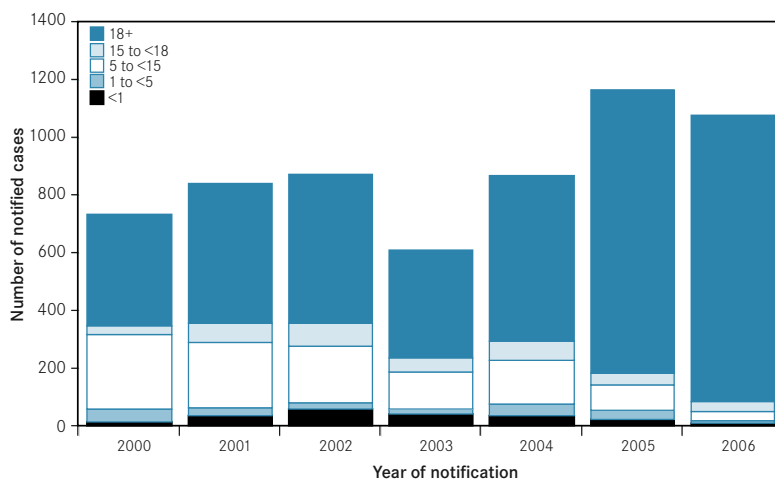
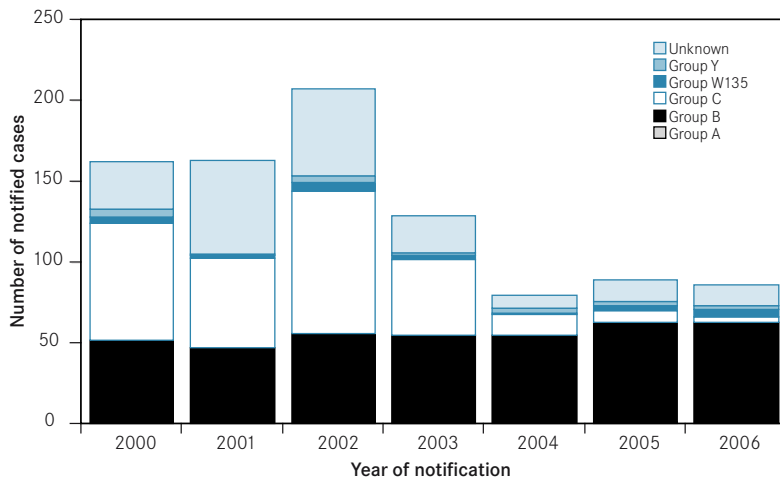


Figure 5: Notified cases of invasive meningococcal disease by serogroup, Victoria, 2000–2006 by age group, Victoria, 2000 to 2006.



(11 cases, 13 per cent compared to eight cases, nine per cent) and there were fewer cases of serogroup C disease notified (seven and three cases in 2005 and 2006 respectively). The number of annually notified cases of serogroup C disease has been decreasing since the introduction of the conjugate vaccine into the National Immunisation Program in 2003, while the number of serogroup B cases has remained relatively constant (figure 5). There were four deaths in 2006 compared to six deaths in 2005. There have been no deaths due to serogroup C disease since 2004.

Creutzfeldt-Jakob Disease (CJD)

Genevieve Klug, Australian National CJD Registry

During the last quarter of 2006, four new suspect CJD cases were notified to the Australian National CJD Registry (table 2). Post-mortem examinations were performed for three of these cases and they were subsequently classified as confirmed, definite CJD (2 cases) and not CJD (1 case). Cases notified to the Registry prior to the December quarter were classified from suspect

to confirmed, definite CJD (2 cases), probable CJD (1 case) and not CJD (2 cases). Of the definite and probable CJD cases, two were in males and three in females, with a median age at death of 64 years. For the total number of confirmed and probable CJD cases notified in Victoria since June 2004 (22 cases), the median age at death was 67 years and median duration of disease was 6.75 months. All notified suspect cases remain under investigation.

Table 2: Notifications of Creutzfeldt-Jakob Disease (CJD) to the Australian National CJD registry, by reporting period, April 2004–December 2006

Reporting period	Suspected cases notified	Cases confirmed as CJD		Rejected: not CJD
		Definite CJD	Probable CJD	
April–June 2004	1	1		
July–September 2004	3			
October–December 2004	1	1		
January–March 2005	5	1		
April–June 2005	2	1		
July–September 2005	10	2		
October–December 2005	2	4		2
January–March 2006	2	3		1
April–June 2006	2	2		
July–September 2006	3			
October–December 2006	4	4	1	3
Total	35	21	1	6

Mycobacterial infections

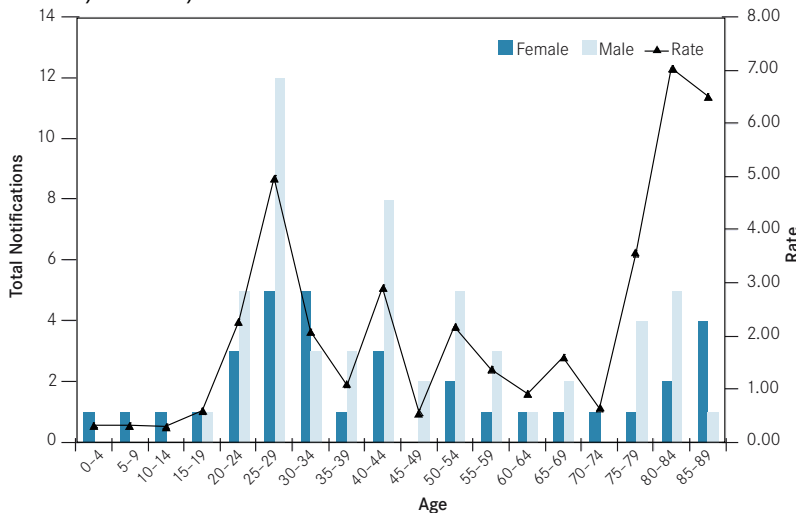
Lynne Brown, Department of Human Services

Owing to the slow growing nature of *Mycobacterium tuberculosis*, data are preliminary and subject to change. This report relates to notifications for the fourth quarter, 1 October 2006 to 31 December 2006

Overview

There were 89 notifications of tuberculosis (TB) to the department in the fourth quarter of 2006, taking the total number of notifications in 2006 to 355. This represented a 20 per cent reduction in notifications from the previous quarter, however the total for the year was similar to 2005 (n=352), and the annual incidence rate of 7/100,000 population remained unchanged. Of the fourth quarter notifications, 34 were for females (38 per cent) and 55 (62 per cent) were for males. Notification rates per 100,000 population were highest in those aged 80 years and over (figure 6).

Figure 6: Notifications of tuberculosis, by age group, sex and per 100,000 population, Victoria, October–December 2006



Three children aged younger than 15 years were notified with primary disease compared to 10 in the previous quarter. Two children were siblings who were identified by contact tracing following notification of TB in a person from a refugee background. The third child was found to have primary disease as a result of a Tuberculosis Undertaking (TBU) assessment.

Eighty-four per cent (n=75) of fourth quarter notifications were for overseas

born persons. Of these, 18 per cent were born in India and countries in the West or Horn of Africa (n=11), Vietnam (n=13) or the Philippines (n=5) accounted for an additional 33 per cent. There were no notifications of Indigenous Australians. Information about HIV testing was available in 54 cases – two had HIV/TB co-morbidity. Five cases were notified as a result of TBU assessments and three (including two children) were notified with TB disease as a result of contact screening.

Table 3: Notifications of tuberculosis, by site of disease, Victoria, October–December 2006

Site	Number
Pulmonary	41
Pulmonary and other sites	8
Lymph nodes	20
Bone / joint	4
Pleural	11
Meningeal	1
Genitourinary	1
Other	3
Total	89

Table 4: Confirmation of tuberculosis notifications, by diagnostic method, Victoria, October–December 2006

Diagnostic Method	Extra pulmonary	Pulmonary only	Pulmonary other sites	Total
Culture	27	34	8	69
PCR/NAT*	4	2	–	6
Radiological	1	4	–	5
Histology	4	–	–	4
Microscopic examination	3	1	–	4
Clinical signs	1	–	–	1
Grand Total	40	41	8	89

* PCR/NAT: polymerase chain reaction/nucleic acid testing

Site of disease

Pulmonary disease accounted for only 55 per cent of all notifications (n=49). Additional sites other than the lungs were noted in eight notifications of pulmonary TB (table 3). The most common additional sites were lymph nodes (n=4) and the pleura (n=2). Extra pulmonary disease was reported in 45 per cent of notifications—the most common sites being lymphatic (50 per cent) and pleura (28 per cent).

Laboratory confirmation of diagnosis was obtained in 93 per cent of notifications (table 4). Seventy-six per cent of all notifications were confirmed by culture, which was a three per cent decrease from the previous quarter. The diagnosis was confirmed by culture in 85.7 per cent of pulmonary notifications. This result was a slight improvement on the previous quarter, however the overall confirmation by culture rate has fallen by six per cent since 2004 – a concern in the face of the increasing risk of multi-drug resistant TB (MDRTB) and more recently extremely drug resistant TB (XDRTB). There was one case of MDRTB in the last quarter, taking the total for Victoria in 2006 to seven cases.

Zoonoses

James Fielding, Department of Human Services

Psittacosis

There were 23 cases of psittacosis notified in the fourth quarter, compared to 16 cases in the previous quarter and 12 during the same period in 2005. Cases were restricted to residents of the Melbourne metropolitan and Gippsland regions, although no outbreaks or links between cases were identified. The 2006 total of 60 cases was an increase of 50 per cent on the 40 cases notified in 2005 although the mean and median numbers of cases for the previous five years were 78 and 74 cases respectively. The age range was 22 to 79 years (median = 59 years) and a slight majority (58 per cent) were males. The highest numbers of cases (22, 37 per cent) were in residents of the North and West Metropolitan region followed by Gippsland with 14 cases (23 per cent). Contact with wild birds was reported in 40 cases – 24 had domestic bird contact (of which 22 were psittacines) and six cases had an occupation involving bird contact. Eight cases reported no risk factors and data were not available in four cases.

Sexually transmissible infections

Chlamydia, gonorrhoea & infectious syphilis

Nasra Higgins, Department of Human Services

Chlamydia

There were 2,447 cases of chlamydia notified to the department during the fourth quarter of 2006 taking the total for 2006 to 10,016, the highest annual number reported since chlamydia became notifiable in 1990.

Fifty-six per cent (n=1,381) of the cases were in females and 43 per cent (n=1,051) were in males. Sex was not reported in 15 cases. The female to male ratio has remained relatively constant over the last 10 years with an average of 60 per cent of cases reported in females (table 5).

The age range of females was 0 to 54 years with a median of 22 years. The age range of males was 0 to 73 years with a median of 26 years. Infections were most commonly reported in the 20 to 24 year age group for both males and females. A majority of the cases (n= 1,762, 72 per cent) reported had a metropolitan postcode of residence. Region of residence was not reported in 98 cases and the remaining cases were from regional Victoria. Indigenous status was reported in 53 per cent, of which 11 were reported as being of Aboriginal and/ or Torres Strait Islander origin.

Enhanced data were available in 752 cases (31 per cent), which was lower than the previous quarter (n=1,046, 41 per cent). Screening was reported as the main reason for testing (49 per cent),

followed by clinical presentation and contact tracing (30 per cent and 15 per cent respectively). Other reasons were reported in 39 cases: this information was unknown in nine.

Males

Of the 379 males for whom enhanced surveillance data were available, 60 per cent (n=228) reported a female sexual partner and 32 per cent (n=122) reported a male sexual partner. Sexual orientation was unknown or not reported in 29 cases.

Among the males reporting a female sexual partner, 52 per cent (n=119) reported having a casual sexual partner, 37 per cent (n=85) reported having a regular sexual partner and one male reported a sex worker as the source of their infection. Sexual partner type was unknown or not reported in 22 cases. For those reporting a male sexual partner, 75 per cent (n=92) reported having a casual sexual partner and 19 per cent (n=23) reported having a regular sexual partner. One male identified as a sex worker and in the remaining six cases this information was unknown or not reported.

Table 5: Notified cases of chlamydia by sex, Victoria, 1997–2006

Year of notification	Female		Male		Unknown	Total
	n	per cent	n	per cent	n	
1997	1272	62	790	38	–	2062
1998	1544	62	950	38	2	2496
1999	1763	60	1186	40	3	2952
2000	1920	59	1335	41	9	3264
2001	2423	59	1686	41	1	4110
2002	2789	58	2055	42	1	4845
2003	3782	58	2640	41	53	6475
2004	4426	58	3161	41	63	7650
2005	5232	58	3658	41	60	8950
2006	5765	59	4167	41	84	10016

Nearly 80 per cent (n=300) of males reported Victoria as the place of infection: eight per cent (n=30) reported overseas and five reported interstate. This information was not reported or unknown in 44 cases.

Females

Of the 367 females for whom enhanced surveillance data were available, 92 per cent (n=337) reported a male sexual partner and four per cent reported a female sexual partner. Sex of sexual partner was unknown or not reported in the remaining 26 cases. Fifty-eight per cent of females (n=211) reported having a regular sexual partner, 28 per cent (n=104) reported a casual sexual partner and one reported a sex worker as the source of the infection. One female also identified as being a sex worker, while in 48 cases this information was not reported or unknown.

A majority of females (n=323, 88 per cent) reported that their infection was acquired in Victoria. The remainder reported overseas acquisition (n=12, three per cent), interstate acquisition (n=3, one per cent) and unknown or not reported (n=29, eight per cent).

Gonorrhoea

During the fourth quarter of 2006, the department received notifications for 292 cases of gonorrhoea. The number of cases notified increased slightly compared to the previous quarter (n=279), but decreased compared to the same period in 2005 (n=364). A total of 1,308 cases were notified in 2006, an increase of 10 per cent compared to 2005 (n=1,193). Eighty-eight per cent of the cases (n=256) were in males (age range: 17 to 61 years) and 12

per cent (n=34) were in females (age range: 17 to 59 years). Sex was not reported in one case. The median age for males and females was 33 and 31 years respectively. Infections were most commonly reported in the 30 to 34 year age group for both males and females.

Seventy-seven per cent of cases (n=226) reported had a metropolitan postcode of residence. Postcode of residence was not reported in 50 cases and the remainder were from regional Victoria. Indigenous status was reported in 70 per cent (n=204), of which two persons were reported as being of Aboriginal and/or Torres Strait Islander origin.

Enhanced surveillance data were received for 68 per cent (n=199). The main reason for testing reported was presenting with signs or symptoms of a sexually transmitted infection (n=130) followed by screening (n=59), contact tracing (n=5), other (n=3) and unknown or not reported (n=2).

Males

Among the 181 males for whom enhanced surveillance data were available, 67 per cent (n=122) reported a male sexual partner, 25 per cent (n=45) reported a female sexual partner and sexual orientation was not reported in the remaining 14 cases.

Of the 122 males reporting a male sexual partner, 80 per cent (n=97) reported acquiring their infection from a casual partner, 19 per cent (n=23) reported acquiring it from a regular partner and in two cases the source of infection was unknown.

For those reporting a female sexual partner, 80 per cent (n=36) reported acquiring the infection from a casual

partner, 18 per cent (n=8) reported acquiring it from a regular partner and this information was unknown in one case.

Eighty-eight per cent (n=145) reported that they had acquired their infection in Victoria followed by overseas (n=19, 11 per cent) and one case reported interstate as the place of acquisition. This information was not reported or unknown in 16 cases.

Females

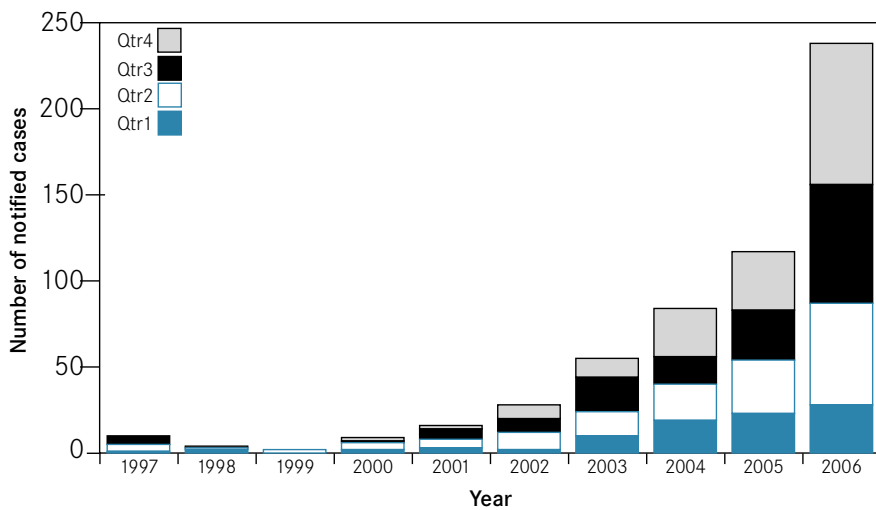
Of the 17 females for whom enhanced surveillance data were available, seven reported acquiring their infection from a regular male sexual partner, five reported acquiring the infection from a casual male sexual partner, one identified as being a sex worker and in four cases this information was unknown or not reported. Thirteen of the seventeen females reported Victoria as the place of acquisition, one reported overseas as the place of infection and in the remaining three cases this information was unknown.

Antibiotic resistance

Testing for susceptibility to ceftriaxone and ciprofloxacin was conducted on 190 and 200 isolates respectively. All of the isolates tested for ceftriaxone were sensitive. Of the isolates tested for ciprofloxacin, 40 per cent (n=80) were sensitive, 56 per cent (n=113) were resistant, and seven isolates were 'less sensitive'.

Infectious syphilis

The department received notifications for 182 cases of syphilis between October and December 2006, of which 82 (45 per cent) were infectious syphilis taking the total for 2006 to 238 cases. This was more than double the number of cases notified in 2005 (n=117); much of this has occurred since the second quarter of 2006 (figure 7).

Figure 7: Notified cases of infectious syphilis by quarter, Victoria 1997–2006

Of the 82 infectious syphilis cases, 40 were primary infections, 25 were secondary infections and 17 were early latent infections. Eighty-seven per cent of the cases (n=71) were in males and 13 per cent (n=11) were in females; ages ranged from 13 to 75 years, with a median age of 39 years. Infections were most common in the 35–39 year age group. A majority of the cases were from metropolitan regions (n=53) and five cases were from regional Victoria. Postcode of residence was not reported in 24 cases. Eighty per cent of the cases (n=66) were in Australian born persons. Indigenous status was reported in all but one case, with four persons identified as of being of Aboriginal and/or Torres Strait Islander origin.

Enhanced data were collected in all of the infectious syphilis cases. Screening was the most commonly reported reason for testing (36 cases), followed by presenting with clinical signs or symptoms (33 cases), contact tracing (five cases) and other reasons were reported in eight cases.

Males

Of the 71 males, 65 (92 per cent) indicated having a male sexual partner, five (seven per cent) indicated having a female sexual partner, and in the remaining case, sexual orientation was unknown. Among the males reporting a male sexual partner, 88 per cent (n= 57) reported acquiring their infection from a casual partner, nine per cent (n=6) reported a regular sexual partner and this information was unknown in the remaining two cases.

Eighty-three per cent of the males (n=59) reported that they acquired their infection in Victoria, followed by overseas (n=5) and interstate (n=2). This information was unknown or not reported in the remaining five cases.

Females

Among the 11 females, five reported acquiring their infection from a regular male sexual partner and five reported acquiring the infection from a casual partner. Sexual orientation and source of

infection was unknown in the remaining case. Five of the 11 females acquired their infections in Victoria, three from interstate and two from overseas. This information was unknown in the remaining case.

Human immunodeficiency virus (HIV) and Acquired immunodeficiency syndrome (AIDS)

Keflemariam Yohannes and Darshini Ayton, Burnet Institute

Human Immunodeficiency Virus (HIV)

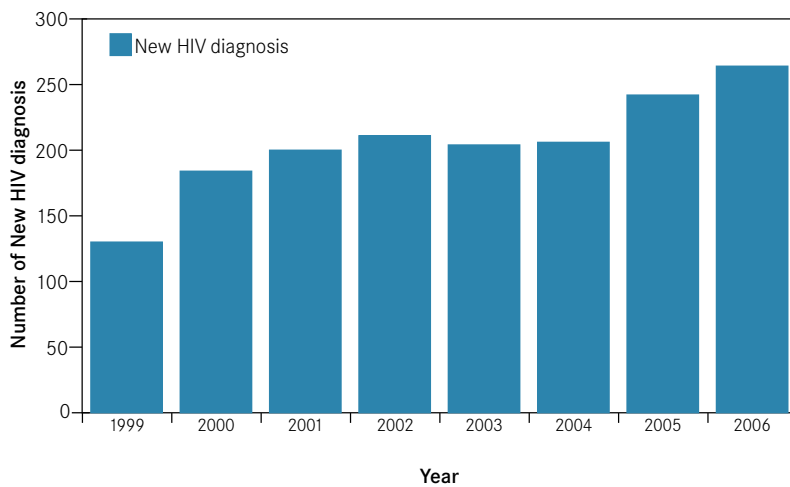
In this report, the term “new HIV diagnoses” is used to describe cases whose **first ever HIV diagnosis was in Victoria** and the following results focus on these cases.

New HIV diagnoses

There were 67 new HIV diagnoses during the fourth quarter of 2006, an eight per cent increase on the 62 new HIV diagnoses reported in the previous quarter. There were a total of 264 new HIV diagnoses in Victoria in 2006 (figure 8) compared to 242 in 2005. This represented a nine per cent annual increase, compared to a 17 per cent increase observed between 2004 and 2005.

Of the 67 new HIV diagnoses in the fourth quarter, 58 (87 per cent) were in males and nine (13 per cent) were in females. This was similar to the previous quarter where 56 (90 per cent) males, five (8 per cent) females, and one (2 per cent) transgender individual was diagnosed with HIV. Of the 58 males diagnosed in the fourth quarter of 2006, 47 (81 per cent) reported homosexual/bisexual contact as their exposure category and six (10 per cent)

Figure 8: HIV diagnoses by year and place first diagnosed, Victoria, January 1999–December 2006.



reported heterosexual contact (table 6).

Of the 264 new HIV diagnoses in 2006 overall, 242 (92 per cent) were in males, 21 (6 per cent) were in females and one was in a transgender individual. This compared to the previous year (2005), where 220

males, 22 females, and two transgender persons were diagnosed. This equated to a 10 per cent increase in diagnoses among males between 2005 and 2006. In 2006, the highest proportion of new diagnoses in both males and females were among

those aged 30–39 years, similar to 2005 (table 7).

Of the 243 males (including one transgender individual), 83 per cent (n=202) reported homosexual/bisexual contact and 10 per cent (n=24) reported heterosexual contact as their exposure category. Of the 21 females newly diagnosed with HIV in 2006, 86 per cent (n=18), reported heterosexual contact as their HIV exposure; six of these 18 females were born in a high HIV prevalence country. These exposure breakdowns for both males and females were similar to 2005 (table 6).

Male homosexual/bisexual contact

Of the 58 males newly diagnosed with HIV in the fourth quarter of 2006, 47 (81 per cent) reported homosexual/bisexual contact as their exposure category (table 6) compare to 43 (80 per cent) in the third quarter.

Table 6: New HIV diagnoses in Victoria by exposure category, October–December 2006, January–December 2006 and January–December 2005

Exposure Category	October–December 2006						January –December 2006						January –December 2005					
	Males		Females		Total		Males		Females		Total		Males		Females		Total	
	n	per cent	n	per cent	n	per cent	n	per cent	n	per cent	n	per cent	n	per cent	n	per cent	n	per cent
Male homosexual/bisexual	47	81.0	0	0.0	47	70.1	202	83.1	0	0.0	202*	76.5	178#	80.8	0	0.0	178	73.6
Male homosexual/ bisexual and injecting drug use	0	0.0	0	0.0	0	0.0	5	2.1	0	0.0	5	1.9	12	5.5	0	0.0	12	5.0
Injecting drug use	4	6.9	0	0.0	4	6.0	7	2.9	1	4.8	8	3.0	7	3.2	2	9.1	9	3.7
Heterosexual contact	5	8.6	7	77.8	12	17.9	17	7.0	12	57.1	29	11.0	7	3.2	11	50.0	18	7.4
Heterosexual contact – person from a HPC ^Ø	1	1.7	1	11.1	2	3.0	7	2.9	6	28.6	13	4.9	8	3.7	9	40.9	17	7.0
Other /unknown	1	1.7	1	11.1	2	3.0	5	2.1	2	9.5	7	2.7	8	3.7	0	0.0	8	3.3
Total	58	100	9	100	67	100	243	100	21	100	264	100	220	100	22	100	242	100

* Includes 1 person for whom sex was reported as transgender

Includes 2 people for whom sex was reported as transgender

Ø Persons from countries with a high prevalence (>1 per cent) of HIV

Table 7: New HIV diagnoses in Victoria by age group, October–December 2006, January–December 2006 and January–December 2005

Age group (years)	October–December 2006						January –December 2006						January –December 2005					
	Males		Females		Total		Males		Females		Total		Males		Females		Total	
	n	per cent	n	per cent	n	per cent	n	per cent	n	per cent	n	per cent	n	per cent	n	per cent	n	per cent
0–12	0	0.0	1	11.1	1	1.5	0	0.0	1	4.8	1	0.4	1	0.5	0	0.0	1	0.4
13–19	0	0.0	1	11.1	1	1.5	2	0.8	2	9.5	4	1.5	1	0.5	1	4.5	2	0.8
20–29	10	17.2	1	11.1	11	16.4	50	20.6	5	23.8	55	20.8	46	20.9	5	22.7	51	21.1
30–39	19	32.8	1	11.1	20	29.9	82	33.7	7	33.3	89	33.7	81	36.8	12	54.5	93	38.4
40–49	16	27.6	3	33.3	19	28.4	63	25.9	4	19.0	67	25.4	59	26.8	3	13.6	62	25.6
50–59	8	13.8	1	11.1	9	13.4	31	12.8	1	4.8	32	12.1	23	10.5	1	4.5	24	9.9
60+	5	8.6	1	11.1	6	9.0	15*	6.2	1	4.8	16	6.1	9	4.1	0	0.0	9	3.7
Total	58	100	9	100	67	100	243	100	21	100	264	100	220	100	22	100	242	100

*Includes 1 person for whom sex was reported as transgender

Of the 47 males reporting homosexual/bisexual contact, 41 (87 per cent) reported they acquired their HIV infection in Victoria (table 8), 37 (78.7 per cent) reported their HIV infection was acquired from a casual or anonymous partner and seven (14.9 per cent) from a regular partner (table 9). For three males (6.4 per cent) the source partner was unknown or the information was unavailable.

There was a total of 202 males reporting homosexual/bisexual contact as their exposure category in 2006—a 14 per cent increase on the 177 cases reported in 2005. The median age of males reporting homosexual/bisexual contact was 37 years (range: 19 to 80 years), the same as the median age in 2005.

Of these 202 males, 84 per cent (n=170) reported they acquired their infection in Victoria and six per cent while interstate. Seventy-two per cent reported their infection was acquired from a casual partner, and 19 per cent from a regular

Table 8: New HIV diagnoses in males reporting homosexual/bisexual contact by place infection acquired, October–December 2006, January–December 2006 and January–December 2005

Probable place infection acquired	October–December 2006		January–December 2006		January–December 2005	
	n	per cent	n	per cent	n	per cent
Victoria	41	87.2	170	84.2	148	83.1
Interstate	2	4.3	12	5.9	8	4.5
Overseas	3	6.4	16	7.9	11	6.2
Unknown	1	2.1	4	2.0	11	6.2
Total	47	100	202	100	178	100

Table 9: New HIV diagnoses in males reporting male homosexual/bisexual contact by source partner type, October–December 2006, January–December 2006 and January–December 2005

Source partner type	October–December 2006		January–December 2006		January–December 2005	
	n	per cent	n	per cent	n	per cent
Regular partner	7	14.9	39	19.3	33	18.5
Casual /anonymous partner	37	78.7	145	71.8	129	72.5
Unknown	3	6.4	18	8.9	16	9.0
Total	47	100	202	100	178	100

partner. Both findings were similar to the pattern observed in 2005.

Heterosexual contact

Of the 67 persons newly diagnosed in the fourth quarter of 2006, 14 (11 per cent) reported heterosexual contact as their exposure category (table 10), similar

to the 13 (21 per cent) persons in the previous quarter.

Of 264 new diagnoses in 2006, 42 (16 per cent) were in individuals reporting heterosexual contact as their primary exposure (24 males, 18 females), compared to 35 (15 males, 20 females) reported in 2005. Of these 42

individuals, 21 (50 per cent) were born in a high prevalence country or reported heterosexual contact with a person from a high prevalence country (table 10). The median age of individuals reporting heterosexual contact in 2006 was 41 years (range: 16 to 67 years), compared to 36 years (range: 17 to 64 years) in 2005.

Table 10: New HIV diagnoses in individuals reporting heterosexual exposure, October–December 2006, January–December 2006 and January–December 2005

Exposure Category	October–December 2006						January –December 2006						January –December 2005					
	Males		Females		Total		Males		Females		Total		Males		Females		Total	
	n	per cent	n	per cent	n	per cent	n	per cent	n	per cent	n	per cent	n	per cent	n	per cent	n	per cent
Person from a HPC	1	17	1	13	2	14.3	7	29	6	33	13	31.0	8	53	9	45	17	48.6
Heterosexual contact with person from a HPC	1	17	2	25	3	21.4	6	25	2	11	8	19.0	1	6.7	1	5	2	5.7
Heterosexual contact with bisexual man	0	0	1	13	1	7.1	–	–	2	11	2	4.8	–	–	2	10	2	5.7
Heterosexual contact with an injecting drug user	0	0	0	0	0	0.0	0	0	1	5.6	1	2.4	0	0	3	15	3	8.6
Heterosexual contact with person with HIV	1	17	1	13	2	14.3	1	4.2	2	11	3	7.1	3	20	4	20	7	20.0
Heterosexual contact not otherwise specified	3	50	3	38	6	42.9	10	42	5	28	15	35.7	3	20	1	5	4	11.4
Total	6	100	8	100	14	100	24	100	18	100	42	100	15	100	20	100	35	100

Table 11: New HIV diagnoses in Victoria, by time since last negative test or seroconversion illness, October–December 2006, January–December 2006 and January–December 2005

Time between HIV diagnosis and negative test and/or seroconversion illness	October–December 2006						January–December 2006						January–December 2005					
	Males		Females		Total		Males		Females		Total		Males		Females		Total	
	n	per cent	n	per cent	n	per cent	n	per cent	n	per cent	n	per cent	n	per cent	n	per cent	n	per cent
Less than 1 year (incident infection)	27	46.6	5	55.6	32	47.8	91	37.4	9	42.9	100	37.9	77	35.2	2	9.1	79	32.6
1 year to less than 3 years	8	13.8	0	0.0	8	11.9	45	18.5	0	0.0	45	17.0	41	18.7	4	18.2	45	18.6
3 or more years	13	22.4	1	11.1	14	20.9	52	21.4	3	14.3	55	20.8	46	21.0	4	18.2	50	20.7
No previous negative test or seroconversion illness	8	13.8	3	33.3	11	16.4	42	17.3	6	28.6	48	18.2	42*	19.2	9	40.9	51	21.1
History unknown	2	3.4	0	0.0	2	3.0	13	5.3	3	14.3	16	6.1	14	6.4	3	13.6	17	7.0
Total	58	100	9	100	67	100	243	100	21	100	264	100	220	100	22	100	242	100

*Includes 1 person for whom sex was reported as transgender

Injecting drug use (IDU)

In the fourth quarter of 2006 there were four individuals diagnosed (all males) with HIV with a history of IDU, compared to one in the previous quarter. In 2006, eight of the 264 new diagnoses (3 per cent) reported a history of IDU only (seven males, one female). There were an additional five individuals with a history of homosexual/bisexual contact and injecting drug use. Of the eight cases with a history of IDU only; five were in Australian born individuals, the remaining three were from other countries.

Sex workers

There were two males diagnosed with HIV in the fourth quarter of 2006 who reported sex work in Victoria; all reported homosexual contact. In 2006 overall, there were five individuals who reported sex work in Victoria, four were male and reported homosexual contact as their exposure category and the other was female and reported injecting drug use as the source of exposure.

Incident infections

Newly acquired infections (i.e. incident infections) are identified on the basis of a previous negative HIV test and/or a seroconversion illness within the 12 months preceding HIV diagnosis. During the fourth quarter of 2006, 32 individuals were classified as newly acquired HIV infections: 27 males and five female (table 11). In 2006 overall, there were 100 (38 per cent of the 264 total new diagnoses) individuals classified as newly acquired HIV infections compared to 79 (33 per cent of total new diagnoses in 2005): an increase of 27 per cent in incident cases.

Acquired Immunodeficiency Syndrome

There were 14 diagnoses of AIDS during the fourth quarter of 2006 in 11 males and three females. Of these, six reported a history of homosexual/bisexual contact and eight reported heterosexual contact as their exposure.

In 2006, there were 99 notifications of AIDS (88 males, eight females, three transgender individuals); 72 were diagnosed with AIDS within this time frame. The other 27 diagnoses were among individuals diagnosed prior to 2006 and identified as part of the annual active AIDS count performed by the Burnet Institute or as part of the ongoing audit of medical records conducted by the Alfred Hospital.

Deaths

There were ten deaths following HIV or AIDS diagnosis notified during the fourth quarter of 2006 (eight males, two females), compared to the 14 deaths reported in the third quarter of 2006. The total number of deaths reported for 2006 following HIV or AIDS diagnosis was 38 compared to 19 in 2005.

Reports of blood stream infections and meningitis to the Victorian Hospital Pathogen Surveillance Scheme, July to December 2006

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We present reports of blood stream infections and meningitis to the Victorian Hospital Pathogen Surveillance Scheme (VHPSS) for the second half of 2006, and provide a brief summary of 2006 data and comparison with recent years. The VHPSS provides voluntary, laboratory-based surveillance of bacterial and fungal agents of blood stream infections and meningitis in Victoria. Although not all laboratories participate in the VHPSS, the data are broadly representative and readily interpretable to provide insights into the wider population.

Surveillance case definitions

Data presented in this report are based on a case definition in which an episode of bacteraemia or meningitis is defined as the first isolation of a clinically significant bacterium or fungus from the blood or cerebrospinal fluid of a person in a 14-day period. Cases with more than one species of bacteria/fungi isolated are counted as separate episodes. We include recent historical counts for comparison. Data before mid-2003 are based on a slightly different case definition and so serve only as a general guide to trends. An

Table 12: Twenty most common isolates reported to VHPSS, July–December 2006.

Organism name	Total July –December 2006	Mean July –December (2001– 2005)	Total 2006	Annual mean (2001– 2005)
<i>Escherichia coli</i>	589	506	1198	1029
<i>Staphylococcus aureus</i>	424	471	878	956
<i>Staphylococcus coagulase negative</i>	201	117	397	251
<i>Streptococcus pneumoniae</i>	160	235	276	414
<i>Klebsiella pneumoniae</i>	95	101	228	210
<i>Enterococcus faecalis</i>	78	77	161	144
<i>Pseudomonas aeruginosa</i>	77	76	174	154
<i>Staphylococcus epidermidis</i>	61	68	127	150
<i>Candida albicans</i>	48	32	77	62
Group A <i>Streptococcus</i>	45	44	71	81
<i>Klebsiella oxytoca</i>	43	39	83	78
<i>Enterococcus faecium</i>	36	30	60	52
<i>Enterobacter cloacae</i>	32	48	97	92
<i>Haemophilus influenzae</i>	31	20	42	29
Group B <i>Streptococcus</i>	29	39	71	73
<i>Streptococcus mitis</i>	28	23	55	47
<i>Proteus mirabilis</i>	27	34	61	70
Group G <i>Streptococcus</i>	22	26	54	50
<i>Neisseria meningitidis</i>	19	44	44	73
<i>Streptococcus salivarius</i>	18	11	36	23
Total of top 20: July–December 2006	2063	–	–	–
Total of other isolate types	433	–	–	–
Total	2496	2566	5176	5029
Total isolate types	193	–	262	–

organism may sometimes be identified and reported by the diagnostic laboratory only to the level of genus or may be incomplete (where definitive identification is unnecessary for patient care). Therefore some organism categories, such as coagulase-negative *Staphylococcus* and *Staphylococcus epidermidis*, overlap. Variable reporting of suspected contaminants may also affect counts.

Summary of the important agents of bloodstream infection and meningitis, July to December 2006

Cases reported to the VHPSS during this six month period were diagnosed by 26 laboratories and were associated with 87 Victorian hospitals. There were 2496 reports (2459 bloodstream isolates, 37 from cerebrospinal fluid (CSF)) of 193 species/ types of bacteria and fungi. The twenty

most common organisms accounted for 83 per cent of reports (table 12).

E. coli and *S. aureus* comprised 41 per cent of the reports from July to December 2006. The predominance of these isolates and the ranking of the 20 most common isolate types remained relatively stable.

Reported antimicrobial resistance of some invasive bacterial pathogens, July – December 2006

The proportion of *S. aureus* isolates demonstrating methicillin resistance (table 13) was slightly lower than in the first half of 2006 (24 per cent). The prevalence of methicillin resistance varied with the duration of hospitalisation before the diagnostic specimen, from 15 per cent among specimens collected before the third day of hospitalisation, to 24 per cent among isolates collected on the third through seventh day, and 44 per cent among specimens collected after the seventh day. There were no *S. aureus* isolates with reduced susceptibility to vancomycin reported to VHPSS during this period. The proportion of penicillin non-susceptible *S. pneumoniae* isolates (PNSP) remained stable. Eighteen isolates of *S. pneumoniae* were reported to demonstrate intermediate susceptibility to penicillin. There were no *S. pneumoniae* isolates with resistance to penicillin (MIC \geq 2 μ g/ml) reported during this period. Seven PNSP cases were children aged less than five years including two less than one year. Three PNSP cases were adults between the ages of 23 and 58 years and eight were adults aged over 64 years. Two PNSP isolates from children aged less

than five were included in the 7-valent conjugate vaccine applicable to their age group (serotype 9V). The other five PNSP isolates involving cases less than five were all serotype 19A which is not included in the 7-valent conjugate vaccine. The eight PNSP isolates from adults aged 65 or more were serotypes included in the 23-valent polysaccharide vaccine applicable to their age group. Most *S. pneumoniae* reports (93 per cent) included susceptibilities for either cefotaxime or ceftriaxone. Two PNSP isolates had reduced sensitivity to cefotaxime and one to ceftriaxone. There were no *S. pneumoniae* isolates reported to be cefotaxime or ceftriaxone-resistant. Erythromycin susceptibilities were included in 96 *S. pneumoniae* reports, with six (6 per cent) reporting resistance.

Invasive infections due to *E. faecalis* are more common than those due to *E. faecium*, but *E. faecium* is more commonly vancomycin-resistant. In the second half of 2006 no vancomycin-resistant *E. faecalis* were reported. The number of reports of both vancomycin-sensitive and vancomycin-resistant *E. faecium* was relatively stable. The vanB gene was detected by polymerase chain reaction (PCR) in all of the six vancomycin-resistant *E. faecium* isolates reported in this period.

Reports of the susceptibility of *E. coli* to amoxicillin, ceftazidime, gentamicin and ciprofloxacin were available for 99 per cent, 68 per cent, 97 per cent and 92 per cent of isolates respectively. Among *E. coli* isolates with susceptibility data, 52 per cent were

resistant to amoxicillin, four per cent to ceftazidime, three per cent to ciprofloxacin and three per cent to gentamicin. Seventeen isolates were resistant to both amoxicillin and gentamicin, three were resistant to amoxicillin, ceftazidime and ciprofloxacin, and one was resistant to all four of these antimicrobial agents.

Summary of the important agents of bloodstream infection and meningitis in 2006

Cases reported to the VHPSS during 2006 were diagnosed by 26 laboratories and were associated with 102 Victorian hospitals. In 2006 there were 5176 reports (5120 bloodstream isolates, 56 from CSF) of 262 species/types of bacteria and fungi.

Table 13: Prevalence of key antimicrobial resistances in *S. aureus*, *S. pneumoniae* and enterococci, July–December 2006

Period	<i>Staphylococcus aureus</i>		<i>Streptococcus pneumoniae</i>		<i>Enterococcus faecalis</i>		<i>Enterococcus faecium</i>	
	Methicillin resistant (per cent)	Isolates tested (n)	Penicillin non-susceptible (per cent)	Isolates tested (n)	Vancomycin resistant (per cent)	Isolates tested (n)	Vancomycin resistant (per cent)	Isolates tested (n)
July–December 2006	21	424	11	159	0	78	17	36
Mean July–December (2001–2005)	30	469	11	217	0	72	21	29

Table 14: Prevalence of key antimicrobial resistances in *S. aureus*, *S. pneumoniae* and enterococci, 2002–2006

Period	<i>Staphylococcus aureus</i>		<i>Streptococcus pneumoniae</i>		<i>Enterococcus faecalis</i>		<i>Enterococcus faecium</i>	
	Methicillin resistant (per cent)	Isolates tested (n)	Penicillin non-susceptible (per cent)	Isolates tested (n)	Vancomycin resistant (per cent)	Isolates tested (n)	Vancomycin resistant (per cent)	Isolates tested (n)
2002	30	990	10	441	1	127	9	45
2003	32	922	13	420	0	140	24	58
2004	27	985	8	353	1	164	25	61
2005	27	892	13	295	1	139	17	63
2006	23	876	10	275	0	151	19	59

The 20 most common organisms reported for 2006 were the same as those reported in the second half of the year (see table 12 above) with the exception of *S. marcescens* which was the eighteenth most common isolate reported in 2006 (50 in 2006, mean of 48 from 2001 to 2005). The 20 most common organisms accounted for 81 per cent of all reports to VHPSS in 2006. The contribution that most major pathogens made to the overall burden of blood stream infections and meningitis remained relatively stable, with *E. coli* comprising 23 per cent of reports and *S. aureus* 17 per cent. Counts of some of the moderately common, typically healthcare-associated, Gram-negative isolates fluctuate; these may reflect clusters of cases in particular settings.

There has been a continued decline in the number of *S. pneumoniae* isolates reported to VHPSS in 2006. The significant reduction in reported cases from 2004 to 2005 (354 to 296) corresponded with the introduction of the 7-valent conjugate pneumococcal vaccine to the childhood vaccine schedule in January 2005. The number of cases reported among children aged less than five declined from an average of 130 isolates a year from 2000 to 2004, to 39 cases in 2005. Thirty-five cases of invasive pneumococcal disease

were reported from young children in 2006. Fifteen (43 per cent) isolates in children less than 5 years of age in 2006 were serotypes included in the 7-valent vaccine.

The number of reports of *H. influenzae* increased slightly in 2006 (42, mean of 29 from 2001 to 2005). Of the 38 isolates with serotyping data 29 were non-typeable strains (half of the cases aged 60 years or more). Two isolates were *H. influenzae* type b (cases aged 4 and 5 years) and one was a type f (case aged 80 years).

The proportion of isolates of *S. aureus* manifesting methicillin resistance declined in 2006 (table 14). The number of reports of methicillin-resistant *S. aureus* (MRSA) declined from an average of 276 from 2001 to 2005, to 199 reports in 2006. The number of reports of methicillin-sensitive *S. aureus* remained stable from 2001 to 2006 (table 14). The decline in MRSA occurred to varying degrees in most but not all contributing institutions that have typically reported ten or more MRSA isolates each year. The decline in methicillin resistance was greater among *S. aureus* isolated from specimens collected after hospital duration of seven days than from specimens collected earlier in hospitalisation.

The prevalence of penicillin non-susceptible pneumococci (PNSP) has fluctuated in recent years. The number of PNSP isolates reported from both of the most affected age groups (infants and the elderly) remains stable, however the proportion of isolates that are PNSP has increased in children less than five years of age due to the decline in the overall incidence of invasive pneumococcal disease in this age group. There were no reports to VHPSS of bloodstream isolates of vancomycin-resistant *E. faecalis* in 2006. Reports of bloodstream isolates of vancomycin-resistant *E. faecium* average around one per month. In 2006, all 11 vancomycin-resistant *E. faecium* were VanB isolates. Six of the seven *E. faecium* VRE with admission dates reported were isolated seven or more days into hospitalisation.

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Table 15: Notifications of notifiable infectious diseases, by Department of Human Services' region, 1 January–31 December 2006

Notifiable Disease	Barwon South Western		Grampians		Loddon Mallee		Hume	
	2006 ytd	2005 ytd	2006 ytd	2005 ytd	2006 ytd	2005 ytd	2006 ytd	2005 ytd
Blood Borne Diseases								
Hepatitis B – Acute	13	10	10	5	5	1	2	3
Hepatitis B – Chronic/Unknown	12	31	13	8	22	17	17	15
Hepatitis C – Newly acquired	17	13	14	9	10	12	8	4
Hepatitis C – Not further specified	162	190	70	85	126	138	111	140
Hepatitis D	0	0	0	0	0	0	0	1
Enteric Diseases								
Botulism	0	0	0	0	0	1	0	0
<i>Campylobacter</i> infection	527	529	191	208	281	291	265	334
Cholera	0	0	0	0	0	0	0	0
Cryptosporidiosis	43	51	20	11	35	34	55	42
Food/Water/Environmental – Other	50	56	30	59	65	15	37	45
Giardiasis	57	74	36	19	44	30	72	26
Haemolytic Uraemic Syndrome	0	0	0	0	0	1	0	0
Hepatitis A	2	2	1	0	1	1	1	1
Hepatitis E	0	0	0	0	0	0	0	1
Listeriosis	1	0	1	0	1	0	1	1
Paratyphoid	0	0	0	0	1	0	1	0
Salmonellosis	121	110	72	64	69	69	82	79
Shigellosis	5	12	0	0	1	3	2	2
Typhoid	0	0	0	0	0	0	1	0
Vero Toxin producing <i>E.coli</i>	0	3	0	0	0	1	0	0
Other Infectious Notifiable Diseases								
Creutzfeldt-Jakob Disease	0	0	0	2	0	1	0	3
Invasive Meningococcal Disease – Group B	10	9	3	1	9	4	1	2
Invasive Meningococcal Disease – Group C	0	0	0	1	1	0	0	1
Invasive Meningococcal Disease – Other	2	3	1	0	1	1	2	4
Legionella – Other	0	0	0	1	0	0	0	1
<i>Legionella longbeachae</i>	0	0	0	0	0	0	0	0
<i>Legionella pneumophila</i> – indeterminate serotype	0	1	0	0	0	0	0	0
<i>Legionella pneumophila</i> 1	0	2	0	0	0	0	1	1
<i>Mycobacterium</i> infection (non-TB)	0	1	0	0	0	2	5	0
<i>Mycobacterium tuberculosis</i>	5	6	2	1	9	3	1	2
<i>Mycobacterium ulcerans</i>	36	20	2	2	0	0	0	0
Sexually Transmitted Infections								
Chlamydia	700	635	332	275	475	338	412	322
Gonococcal Infection	33	30	14	13	12	8	11	18
Syphilis – infectious	3	4	3	0	3	2	6	4
Syphilis – other	16	7	2	3	5	6	6	10
Vaccine Preventable Diseases								
<i>Haemophilus influenzae</i> non B	0	0	0	0	0	0	0	0
<i>Haemophilus influenzae</i> type b	0	0	0	0	0	0	1	0
Influenza	12	29	2	8	12	22	14	7
Invasive Pneumococcal Disease	25	36	13	23	24	11	12	9
Measles	0	0	0	0	1	0	1	0
Mumps	1	0	2	0	0	1	0	0
Pertussis	40	57	20	24	53	42	53	40
Rubella	0	0	0	0	0	0	0	0
Tetanus	0	0	0	0	0	0	0	0
Vector Borne Diseases								
Barmah Forest	0	0	1	0	5	3	2	1
Chikungunya	0	0	0	0	0	0	0	0
Dengue	0	0	0	0	0	0	0	0
Flavivirus	0	0	0	0	0	0	0	0
Malaria	1	1	3	2	4	2	6	3
Ross River	10	2	16	1	82	13	59	4
Zoonoses								
Brucellosis	0	0	0	0	0	0	0	0
Leptospirosis	4	5	0	1	0	0	1	0
Psittacosis	0	1	3	3	3	5	0	9
Q Fever	0	7	0	1	5	8	6	6
ABS Est. resident population 30/06/2004	350,801		213,316		302,043		259,947	

Note: The 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>)

Gippsland		North and West Metropolitan		Eastern Metropolitan		Southern Metropolitan		Unknown		Victoria		2005 total
2006 ytd	2005 ytd	2006 ytd	2005 ytd	2006 ytd	2005 ytd	2006 ytd	2005 ytd	2006 ytd	2005 ytd	2006 ytd	2005 ytd	
4	6	21	29	15	13	37	20	1	0	108	87	87
9	24	733	837	321	326	409	359	39	55	1575	1672	1672
11	12	69	62	23	24	47	31	10	6	209	173	173
126	124	963	1049	312	365	568	600	130	152	2568	2843	2843
0	0	4	1	1	0	1	0	1	0	7	2	2
0	0	0	0	0	0	0	0	0	0	0	1	1
349	484	1357	1541	1347	1311	1369	1349	43	59	5729	6106	6106
0	0	0	0	0	0	0	2	0	0	0	2	2
89	82	277	107	296	72	275	105	21	1	1111	505	505
107	24	255	409	145	185	235	94	1099	486	2023	1373	1373
38	30	400	328	206	151	323	258	20	12	1196	928	928
0	0	0	1	1	1	0	0	0	0	1	3	3
5	6	19	27	7	10	9	10	1	1	46	58	58
0	0	4	2	1	3	2	6	0	0	7	12	12
0	1	2	2	4	2	2	5	1	0	13	11	11
0	1	8	2	3	4	1	5	1	0	15	12	12
77	96	395	452	257	255	308	288	11	8	1392	1421	1421
0	2	30	42	13	13	26	28	1	1	78	103	103
0	0	11	8	3	2	2	1	1	1	18	12	12
0	0	2	4	0	0	1	0	0	0	3	8	8
0	0	1	3	0	1	1	1	0	0	2	11	11
3	2	10	20	14	6	13	18	0	0	63	62	62
0	0	1	2	0	1	1	2	0	0	3	7	7
1	0	2	6	5	1	6	4	0	1	20	20	20
0	1	2	5	3	2	0	0	0	0	5	10	10
0	1	4	4	5	1	4	6	0	0	13	12	12
0	0	1	3	1	2	3	0	0	0	5	6	6
0	0	29	13	11	10	5	11	0	0	46	37	37
2	1	11	2	7	5	5	6	1	1	31	18	18
5	4	161	188	62	59	110	85	0	7	355	355	355
2	3	3	4	4	3	13	9	1	0	61	41	41
341	334	3229	2945	1540	1364	2565	2356	423	387	10017	8956	8956
11	8	516	434	152	156	347	337	211	189	1307	1193	1193
0	0	87	37	10	11	69	28	57	31	238	117	117
3	0	115	137	45	33	116	115	51	61	359	372	372
0	0	0	0	0	0	0	0	1	0	1	0	0
0	0	1	2	0	1	0	0	0	0	2	3	3
2	16	155	222	86	135	122	127	18	27	423	593	593
18	16	81	67	40	63	61	72	6	6	280	303	303
0	0	2	2	6	0	2	0	0	0	12	2	2
0	0	3	6	7	5	3	8	0	0	16	20	20
504	359	155	250	111	186	134	203	10	5	1080	1166	1166
0	0	0	3	4	1	2	2	0	1	6	7	7
0	0	1	0	0	0	0	0	0	0	1	0	0
6	11	4	2	3	1	0	0	2	1	23	19	19
0	0	2	0	0	0	0	0	1	0	3	0	0
0	0	2	6	0	3	4	5	0	0	6	14	14
0	0	6	1	0	0	3	0	1	1	10	2	2
3	4	49	53	12	15	27	23	12	5	117	108	108
16	10	26	12	19	6	11	5	4	4	243	57	57
0	0	0	1	0	0	0	0	0	0	0	1	1
1	3	0	0	0	0	1	0	0	0	7	9	9
14	3	22	12	9	5	9	2	0	0	60	40	40
6	3	11	6	2	0	1	0	1	0	32	31	31
245,931		1,455,283		972,904		1,172,463				4,972,779		

Victorian Infectious Diseases Bulletin

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. Submissions should be in Microsoft Word IBM-compatible format with Vancouver-style references. We encourage submissions in electronic format. Original data from which graphs and figures have been prepared should be included. Submissions will be edited to conform with the style of the bulletin.

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

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