Australia's notifiable diseases status, 2004, Annual report of the National Notifiable Diseases Surveillance System

Keflemariam Yohannes,[1] Paul W Roche,[1] April Roberts,[1] Conan Liu,[1] Simon M Firestone,[1] Mark Bartlett,[2] Iain East,[3] Brynley P Hull,[4] Martyn D Kirk,[5] Glenda L Lawrence,[4] Ann McDonald,[6] Peter B McIntyre,[4] Robert I Menzies,[4] Helen E Quinn,[4] Claire Vadjic[6]

With contributions from:

National organisations

Communicable Diseases Network Australia and subcommittees

Australian Childhood Immunisation Register

Australian Gonococcal Surveillance Programme

Australian Meningococcal Surveillance Programme

Australian Sentinel Practice Research Network

Australian Quarantine Inspection Service

National Centre in HIV Epidemiology and Clinical Research

National Centre for Immunisation Research and Surveillance of Vaccine Preventable Diseases

National Enteric Pathogens Surveillance Scheme

Sentinel Chicken Surveillance Program

World Health Organization Collaborating Centre for Reference and Research on Influenza

State and Territory health departments

Communicable Diseases Control Unit, Australian Capital Territory Department of Health and Community Care, Australian Capital Territory

Communicable Diseases Surveillance and Control Unit, NSW Health Department, New South Wales

Centre for Disease Control, Northern Territory Department of Health and Community Services, Northern Territory

Communicable Diseases Unit, Queensland Health, Queensland

Communicable Diseases Control Branch, South Australian Department of Human Services, South Australia

Communicable Diseases Surveillance, Department of Health and Human Services, Tasmania

Communicable Diseases Section, Department of Human Services, Victoria,

Communicable Diseases Control Directorate, Department of Health, Western Australia

Abstract

In 2004, 60 diseases and conditions were nationally notifiable in Australia. States and Territories reported a total of 110,929 cases of communicable diseases to the National Notifiable Diseases Surveillance System (NNDSS): an increase of 4 per cent on the number of notifications in 2003. In 2004, the most frequently notified diseases were sexually transmissible infections (46,762 cases; 42% of total notifications), gastrointestinal diseases (25,247 cases; 23% of total notifications) and bloodborne diseases (19,191 cases; 17% of total notifications). There were 13,206 notifications of vaccine preventable diseases, 6,000 notifications of vectorborne diseases, 1,799 notifications of other bacterial infections (includes, legionellosis, leprosy, meningococcal infections and tuberculosis) and 877 notifications of zoonotic diseases. *Commun Dis Intell* 2006;30:1–79.

Keywords: Australia, communicable diseases, epidemiology, surveillance

1. Surveillance Branch, Office of Health Protection, Australian Government Department of Health and Ageing, Canberra, Australian Capital Territory
2. Manager, Surveillance, Communicable Diseases Branch, NSW Health Department, North Sydney, New South Wales
3. Epidemiology and Modelling Section, Office of the Chief Veterinary Officer, Australian Government Department of Agriculture, Fisheries and Forestry, Canberra, Australian Capital Territory
4. National Centre for Immunisation Research and Surveillance of Vaccine Preventable Diseases, Westmead, New South Wales
5. Coordinating Epidemiologist, OzFoodNet, Food Standards Australia New Zealand and Australian Government Department of Health and Ageing, Canberra, Australian Capital Territory
6. National Centre in HIV Epidemiology and Clinical Research, University of New South Wales, Sydney, New South Wales

Corresponding author: Mr Keflemariam Yohannes, Surveillance Branch, Office of Health Protection, Australian Government Department of Health and Ageing, PO Box 9848 (MDP 6), CANBERRA ACT 2601. Telephone: +61 2 6289 4415. Facsimile: +61 2 6289 7791. Email: Kefle.yohannes@health.gov.au

Annual report contents

Cont'd next page

Annual report contents, *continued*

Tables

Figures

Cont'd next page

Figures, *continued*

Cont'd next page

Figures, *continued*

Maps

Abbreviations used in this report

AFP	Acute flaccid paralysis
AIDS	Acquired immune deficiency syndrome
AGSP	Australian Gonococcal Surveillance Programme
ASPREN	Australian Sentinel Practice Research Network
ASVS	Australian Standard Vaccination Schedule
BFV	Barmah Forest virus
CDI	*Communicable Diseases Intelligence*
CDNA	Communicable Diseases Network Australia
DENV	Dengue
DSS	Dengue Shock Syndrome
DoHA	Australian Government Department of Health and Ageing
Hib	*Haemophilus influenzae* type b
HIV	Human immunodeficiency virus
HUS	Haemolytic uraemic syndrome
ICD10-AM	International Classification of Diseases, version 10, Australian Modification
IPD	Invasive pneumococcal disease
JEV	Japanese encephalitis virus
KUNV	Kunjin virus
LabVISE	Laboratory Virology and Serology Reporting Scheme
MMR	Measles-mumps-rubella
MVEV	Murray Valley encephalitis virus
NAQS	Northern Australia Quarantine Strategy
NCHECR	National Centre in HIV Epidemiology and Clinical Research
NEC	Not elsewhere classified
NN	Not notifiable
NNDSS	National Notifiable Diseases Surveillance System
NPA	Northern peninsula area
PCR	Polymerase chain reaction
RRV	Ross River virus
SARS	Severe acute-respiratory syndrome
SLTEC	Shiga-like toxin-producing *Escherichia coli*
STI(s)	Sexually transmissible infection(s)
TB	Tuberculosis
VPD(s)	Vaccine preventable disease(s)
VTEC	Verotoxigenic *Escherichia coli*
WHO	World Health Organization

Introduction

Australia's notifiable diseases status, 2004, is an annual surveillance report of nationally notifiable communicable diseases. Communicable disease surveillance in Australia operates at the national, state and local levels. Primary responsibility for public health action lies with the state and territory health departments. The role of communicable disease surveillance at a national level includes:

- identifying national trends;
- guidance for policy development and resource allocation at a national level;
- monitoring the need for and impact of national disease control programs;
- coordination of response to national or multi-jurisdictional outbreaks;
- description of the epidemiology of rare diseases, that occur infrequently at state and territory levels;
- meeting various international reporting requirements, such as providing disease statistics to the World Health Organization (WHO), and;
- support for quarantine activities, which are the responsibility of the national government.

Methods

Australia is a federation of six states (New South Wales, Queensland, South Australia, Tasmania, Victoria and Western Australia) and two territories (the Australian Capital Territory and the Northern Territory). State and Territory health departments collect notifications of communicable diseases under their public health legislation. The Australian Government Department of Health and Ageing (DoHA) does not have any legislated responsibility for public health apart from human quarantine. States and territories voluntarily forward data on a nationally agreed set of communicable diseases to DoHA for the purposes of national communicable disease surveillance.

Sixty communicable diseases (Table 1) agreed upon nationally through the Communicable Diseases Network Australia (CDNA) are reported to the National Notifiable Diseases Surveillance System (NNDSS). The system is complemented by other surveillance systems, which provide information on various diseases, including some that are not reported to NNDSS.

The national dataset included fields for unique record reference number; notifying state or territory; disease code; age; sex; Indigenous status; postcode of residence; date of onset of the disease; death, date of report to the state or territory health department and outbreak reference (to identify cases linked to an outbreak). Where relevant, information on the species, serogroups/subtypes and phage types of organisms isolated, and on the vaccination status of the case was collected. While not included in the national dataset, additional information concerning mortality and specific health risk factors for some diseases was obtained from states and territories.

Notification rates for each notifiable disease were calculated using 2004 mid-year resident population supplied by the Australian Bureau of Statistics (Appendix 1). Where diseases were not notifiable in a state or territory, national rates were adjusted by excluding the population of that jurisdiction from the denominator. For some diseases age adjusted rates were calculated using the indirect method of standardisation, with 2001 census data as the standard population.

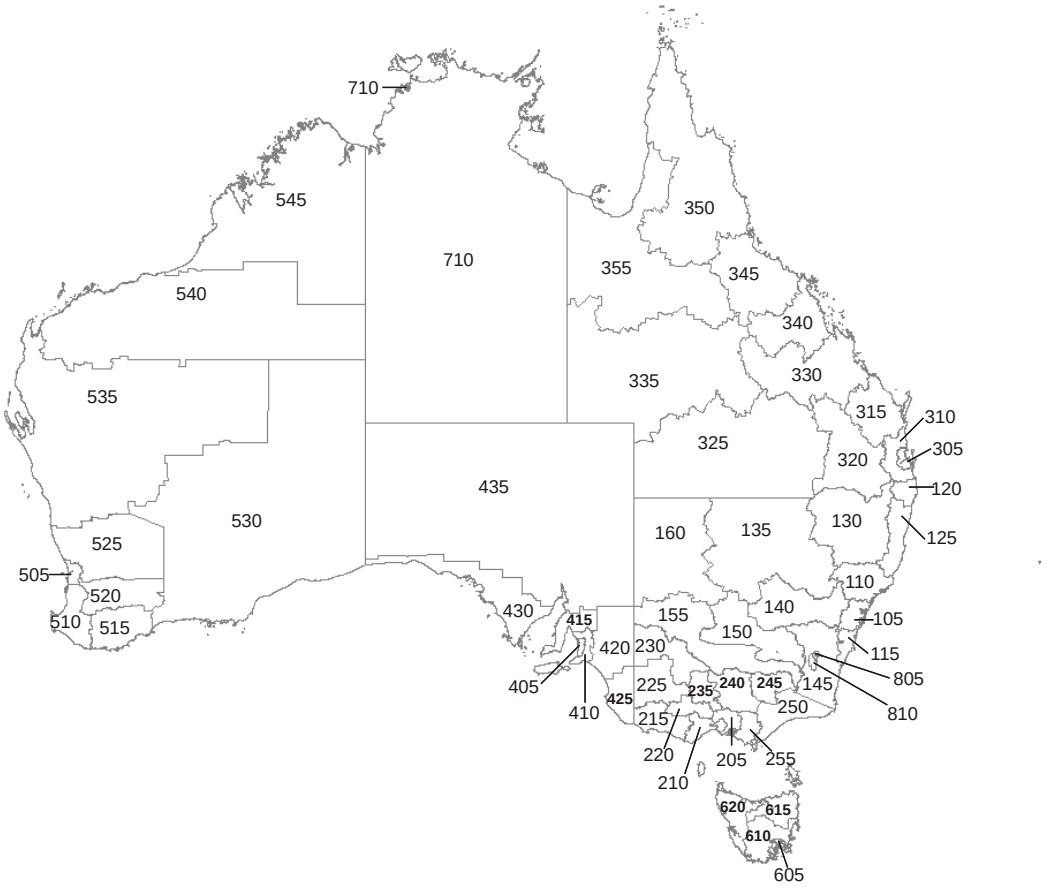
The geographical distribution of selected diseases was mapped using MapInfo software. Maps were based on the postcode of residence of each patient aggregated to the appropriate Statistical Division (Map 1). Rates for the different Statistical Divisions were ordered into six groups — the highest value, the lowest value above zero, those equal to zero, and the intermediate values sorted into three equal-sized groups. The Statistical Divisions in each of the two territories, the Australian Capital Territory and the Northern Territory were combined to calculate rates for each territory as a whole.

Information from communicable disease surveillance is disseminated through several avenues of communication. At the fortnightly teleconferences of the Communicable Diseases Network Australia the most up-to-date information on topics of interest to the network is provided. The *Communicable Diseases Intelligence* (*CDI*) quarterly journal publishes surveillance data and reports of research studies on the epidemiology and control of various communicable diseases. The Communicable Diseases Australia website publishes disease surveillance summaries from the NNDSS. The annual report of the NNDSS, *Australia's notifiable diseases status*, provides yearly summaries of notifications.

Notes on interpretation

The present report is based on 2004 'finalised' data from each state and territory. States and territories transmitted data to NNDSS on average every other day, and the final dataset for the year was agreed upon in July 2005. The finalised annual dataset represents a snap shot of the year after duplicate records and incorrect or incomplete data have been removed. Therefore, totals in this report may vary slightly from the totals reported in *CDI* quarterly publications.

Map 1. Australian Bureau of Statistics Statistical Divisions, and population by Statistical Division, 2004



Statistical Division		Population
Australian Capital Territory		
805	Canberra*	324,021
New South Wales		
105	Sydney	4,232,078
110	Hunter	604,420
115	Illawarra	410,148
120	Richmond-Tweed	223,875
125	Mid-North Coast	291,865
130	Northern	179,121
135	North Western	118,733
140	Central West	179,232
145	South Eastern	200,530
150	Murrumbidgee	153,143
155	Murray	114,644
160	Far West	23,686
Northern Territory		
705	Darwin	109,478
710	NT - balance	90,435
Queensland		
305	Brisbane	1,774,890
310	Moreton	797,696
315	Wide Bay-Burnett	250,253

Statistical Division		Population
Queensland, continued		
320	Darling Downs	218,484
325	South West	26,952
330	Fitzroy	187,916
335	Central West	12,239
340	Mackay	143,699
345	Northern	200,909
350	Far North	234,849
355	North West	33,900
South Australia		
405	Adelaide	1,124,315
410	Outer Adelaide	121,448
415	Yorke & Lower North	44,682
420	Murray Lands	68,571
425	South East	63,040
430	Eyre	34,560
435	Northern	77,634
Tasmania		
605	Greater Hobart	202,138
610	Southern	35,459
615	Northern	136,638
620	Mersey-Lyell	107,893
910	*Other territories*	2,670

Statistical Division		Population
Victoria		
205	Melbourne	3,600,080
210	Barwon	266,112
215	Western District	101,008
220	Central Highlands	146,185
225	Wimmera	50,812
230	Mallee	91,619
235	Loddon	173,231
240	Goulburn	201,042
245	Ovens-Murray	96.098
250	East Gippsland	82,276
255	Gippsland	164,316
Western Australia		
505	Perth	1,457,639
510	South West	211,918
515	Lower Great Southern	53,656
520	Upper Great Southern	18,068
525	Midlands	52,659
530	South Eastern	54,289
535	Central	59,663
540	Pilbara	39,311
545	Kimberley	35,001
Total Australia		20,111,227

* Includes Statistical Division 810 “ACT – balance.”

Analyses in this report were based on the date of disease onset in an attempt to estimate disease activity within the reporting period. Where the date of onset was not known however, the date of specimen collection or date of notification, whichever was earliest, was used. As considerable time may have lapsed between onset and diagnosis dates for hepatitis B (unspecified) and hepatitis C (unspecified), for these conditions the date of diagnosis, which is the earliest of specimen, notification or notification received dates supplied, was used.

Notified cases can only represent a proportion (the 'notified fraction') of the total incidence (Figure 1) and this has to be taken into account when interpreting NNDSS data. Moreover, the notified fraction varies by disease, by jurisdiction and by time.

Methods of surveillance vary between states and territories, each having different requirements for notification by medical practitioners, laboratories and hospitals. Although there is a list of national notifiable diseases, some diseases are not yet notifiable in some jurisdictions (Table 1).

Changes in surveillance practices introduced in some jurisdictions and not in others are additional factors that make comparison of data across jurisdictions difficult. In this report, information obtained from states and territories on any changes in surveillance practices including screening practices, laboratory practices, and major disease control or prevention initiatives undertaken in 2004, was used to interpret data.

Postcode information usually reflects the residential location of the case, but this does not necessarily represent the place where the disease was acquired. As no personal identifiers are collected in NNDSS, duplication in reporting may occur if patients move from one jurisdiction to another and were notified in both.

The completeness[1] of data in this report is summarised in Appendix 3. The case's sex was complete in 99.7 per cent of notifications and date of birth in 99.8 per cent of notifications. In 2004, nationally, Indigenous status[2] was complete in 46 per cent of notifications, and varied by jurisdiction. Indigenous status was complete for 92 per cent of data reported in the Northern Territory, 89 per cent in South Australia, 66 per cent in Western Australia and 52 per cent in Victoria. In the remaining jurisdictions, less than 50 per cent of data were complete for Indigenous status.

Data completeness on Indigenous status also varied by disease; in notifications of tuberculosis (TB), *Haemophilus influenzae* type b, meningococcal disease, infectious syphilis and hepatitis A were more than 90 per cent complete for Indigenous status, while in notifications of other diseases such as chlamydial infection and salmonellosis, data completeness was 41 per cent.

1 Definition of completeness = (Number with valid data/total notifications x 100

2 Data completeness = (Total notifications – Indigenous status 'Not stated or missing')/total notifications x 100

'Indigenous status' is a variable defined by the following values:

1=Indigenous – (Aboriginal but not Torres Strait Islander origin)

2=Indigenous – (Torres Strait Islander but not Aboriginal origin)

3=Indigenous – (Aboriginal and Torres Strait Islander origin)

4=Not indigenous – (not Aboriginal or Torres Strait Islander origin)

9=Not stated

Blank/missing/null=No information provided

Figure 1. Communicable diseases notification fraction

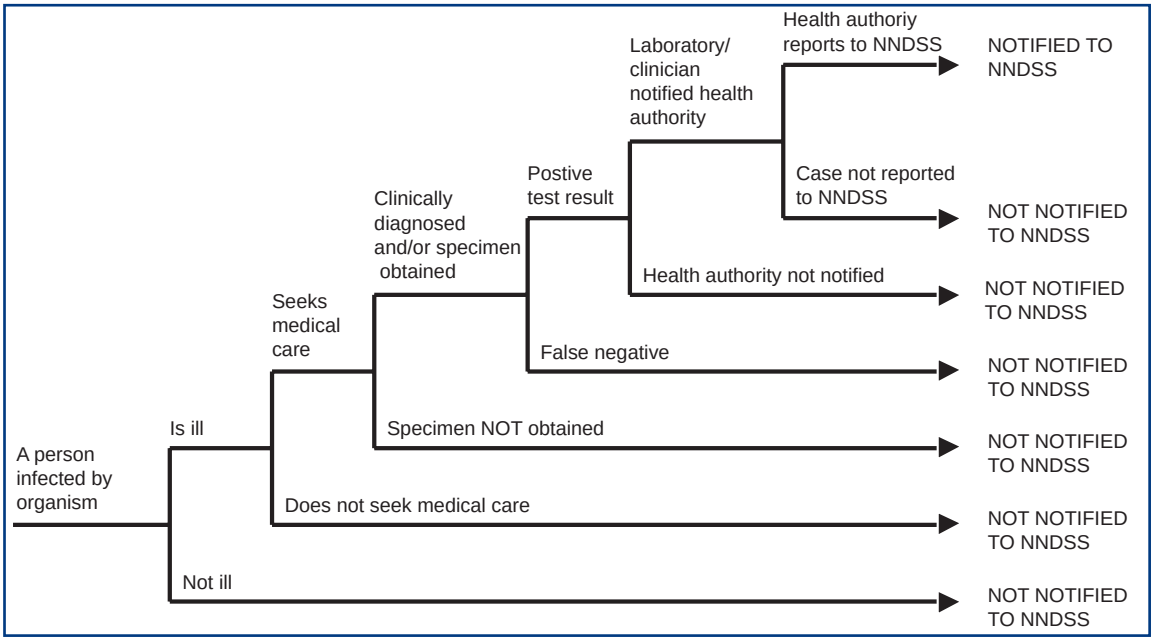


Table 1. Diseases notified to the National Notifiable Diseases Surveillance System, Australia, 2004

Disease	Data received from
Bloodborne diseases	
Hepatitis B (incident)	All jurisdictions
Hepatitis B (unspecified)*	All jurisdictions except NT
Hepatitis C (incident)	All jurisdictions except Qld and NT
Hepatitis C (unspecified)*,†	All jurisdictions
Hepatitis D	All jurisdictions
Gastrointestinal diseases	
Botulism	All jurisdictions
Campylobacteriosis‡	All jurisdictions except NSW
Cryptosporidiosis	All jurisdictions
Haemolytic uraemic syndrome	All jurisdictions
Hepatitis A	All jurisdictions
Hepatitis E	All jurisdictions
Listeriosis	All jurisdictions
Salmonellosis (NEC)	All jurisdictions
Shigellosis	All jurisdictions
SLTEC, VTEC§	All jurisdictions
Typhoid	All jurisdictions
Quarantinable diseases	
Cholera	All jurisdictions
Plague	All jurisdictions
Rabies	All jurisdictions
Severe acute respiratory syndrome	All jurisdictions
Smallpox	All jurisdictions
Tularaemia	All jurisdictions except ACT
Viral haemorrhagic fever	All jurisdictions
Yellow fever	All jurisdictions
Sexually transmissible infections	
Chlamydial infections (NEC)‖	All jurisdictions
Donovanosis	All jurisdictions
Gonococcal infection	All jurisdictions
Syphilis (all categories)	All jurisdictions
Syphilis < 2 years duration	All jurisdictions
Syphilis > 2 years or unknown duration	All jurisdictions
Syphilis – congenital	All jurisdictions
Vaccine preventable diseases	
Diphtheria	All jurisdictions
Haemophilus influenzae type b	All jurisdictions
Influenza (laboratory confirmed)¶	All jurisdictions
Measles	All jurisdictions
Mumps	All jurisdictions
Pertussis	All jurisdictions
Pneumococcal disease (invasive)	All jurisdictions
Poliomyelitis	All jurisdictions
Rubella	All jurisdictions
Rubella – congenital	All jurisdictions
Tetanus	All jurisdictions

Table 1. Diseases notified to the National Notifiable Diseases Surveillance System, Australia, 2004, *continued*

Disease	Data received from
Vectorborne diseases	
Barmah Forest virus infection	All jurisdictions
Dengue	All jurisdictions
Flavivirus (NEC)**	All jurisdictions except ACT
Japanese encephalitis virus	All jurisdictions
Kunjin virus††	All jurisdictions except ACT
Malaria	All jurisdictions
Murray Valley encephalitis virus	All jurisdictions except ACT
Ross River virus infection	All jurisdictions
Zoonoses	
Anthrax	All jurisdictions
Australian bat lyssavirus	All jurisdictions
Brucellosis	All jurisdictions
Leptospirosis	All jurisdictions
Lyssavirus (NEC)	All jurisdictions
Ornithosis‡‡	All jurisdictions
Q fever	All jurisdictions except ACT
Other bacterial infections	
Legionellosis	All jurisdictions
Leprosy	All jurisdictions
Meningococcal infection§§	All jurisdictions
Tuberculosis	All jurisdictions

* Unspecified hepatitis includes cases in whom the duration of infection could not be determined.

† In the Northern Territory and Queensland, includes incident hepatitis cases.

‡ Notified as 'foodborne disease' or 'gastroenteritis in an institution' in New South Wales.

§ Infection with Shiga-like toxin/verotoxin-producing *Escherichia coli* (SLTEC/VTEC).

|| Includes *Chlamydia trachomatis* identified from cervical, rectal, urine, urethral, throat and eye samples, except for South Australia which reports only genital tract specimens, the Northern Territory which excludes ocular specimens, and Western Australia which excludes ocular and perinatal infections.

¶ Laboratory confirmed influenza is not a notifiable disease in South Australia but reports are forwarded to NNDSS.

** Flavivirus (NEC) replaces Arbovirus (NEC) from 1 January 2004.

†† In the Australian Capital Territory, Murray Valley encephalitis virus and Kunjin are combined under Murray Valley encephalitis virus.

‡‡ In the Australian Capital Territory ornithosis is reported as *Chlamydia* not elsewhere classified.

§§ Only invasive meningococcal disease is nationally notifiable. However, New South Wales, the Australian Capital Territory and South Australia also report conjunctival cases.

NEC Not elsewhere classified.

Notes on case definitions

In this report each notifiable disease is introduced with a case definition, the 'CDNA case definition'. These case definitions were agreed upon by CDNA to be implemented nationally by January 2004.

CDNA case definitions are only intended for reporting to NNDSS. States and territories may have case definitions which reflect their local public health needs. These may be the same as or more comprehensive than the CDNA case definitions.

In 2004, not all jurisdictions implemented the CDNA case definitions (Queensland did not implement the CDNA case definitions in 2004 and New South Wales introduced it in August 2004). This has to be kept in mind when comparing data across time and between jurisdictions.

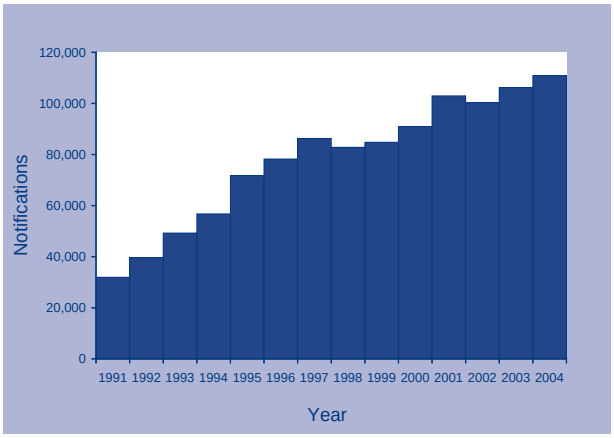
Results

Summary of 2004 data

There were 110,929 communicable disease notifications received by NNDSS in 2004 (Table 2). Notification rates per 100,000 population for each disease by state or territory are shown in Table 3. Trends in notifications and rates per 100,000 population for the period 2000 to 2004 are shown in Table 4.

In 2004, the total number of notifications was the highest recorded in NNDSS since the system began in 1991. There was an increase of 4 per cent compared to the total number of notifications in 2003 (Figure 2).

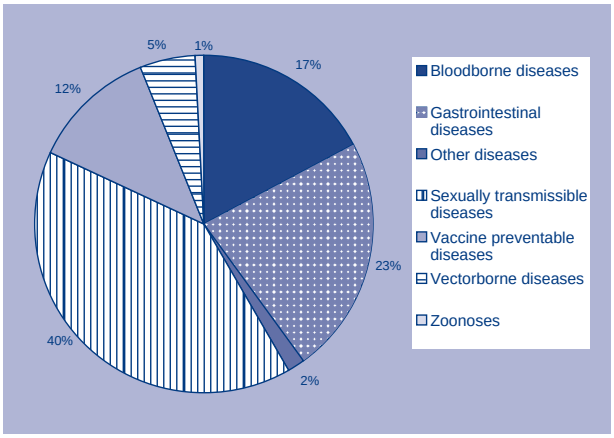
Figure 2. Trends in notifications received by the National Notifiable Diseases Surveillance System, Australia, 1991 to 2004



In 2004, the most frequently notified diseases were sexually transmissible infections (44,604 notifications, 40 per cent of total notifications), gastrointestinal diseases (25,247 notifications, 23%) and bloodborne diseases (19,191 notifications, 17%). There were 13,206 notifications of vaccine preventable diseases; 6,000 notifications of vectorborne diseases; 1,799 notification of other bacterial infections and 877 notifications of zoonotic diseases (Figure 3).

The major changes in communicable disease notifications in 2004 are shown in Figure 4 as the ratio of notifications in 2004 to the mean number of notifications for the previous five years. The number of notifications of chlamydial infections and hepatitis E

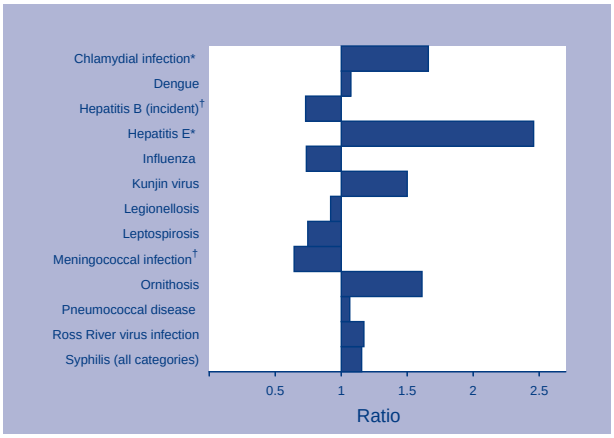
Figure 3. Notifications to the National Notifiable Diseases Surveillance System, Australia, 2004, by disease category



infections surpassed the expected range (5-year mean plus two standard deviations). Notifications of hepatitis B (incident) and meningococcal infections were below the expected range (5-year mean minus two standard deviations). Notifications for the remaining diseases were within the historical range.

In the financial year 2003–04, there were 92,892 hospital separations in Australian hospitals with a primary diagnosis of infectious diseases (International Classification of Diseases, version 10, Australian Modification (ICD10–AM) codes A01–B99, Australian Institute of Health and Welfare). This represents 1.4 per cent of all hospital separations in that period. A further 56,675 separations were recorded with a principal diagnosis of influenza or pneumonia (ICD10–AM J10–J18).[1]

Figure 4. Comparison of total notifications of selected diseases reported to the National Notifiable Diseases Surveillance System in 2004, with the previous five-year mean



* Number of notifications surpassed the expected range (i.e. 5 year mean +2 standard deviations).

† Number of notifications was less than the expected range (i.e. 5 year mean –2 standard deviations)..

Table 2. Notifications of communicable diseases, Australia, 2004, by state or territory

Disease	State or territory								
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Aust
Bloodborne diseases									
Hepatitis B (incident)	9	53	8	44	8	18	106	29	275
Hepatitis B (unspecified)*	47	2,851	2	761	260	59	1,482	399	5,861
Hepatitis C (incident)	7	60	NN	NN	60	24	89	121	361
Hepatitis C (unspecified)*,†	209	4,906	271	2,480	555	287	2,898	1,061	12,667
Hepatitis D	0	14	0	10	0	0	3	0	27
Gastrointestinal diseases									
Botulism	0	1	0	0	0	0	0	0	1
Campylobacteriosis‡	371	NN	219	3,715	1,844	609	6,317	1,933	15,008
Cryptosporidiosis	6	327	113	602	74	18	309	124	1,573
Haemolytic uraemic syndrome	0	9	1	1	2	0	1	1	15
Hepatitis A	1	139	13	22	11	1	71	57	315
Hepatitis E	0	8	0	4	0	1	12	3	28
Listeriosis	1	30	1	7	2	1	14	9	65
Salmonellosis (NEC)	97	2,153	393	2,580	496	119	1,134	635	7,607
Shigellosis	2	96	119	61	54	3	70	113	518
SLTEC, VTEC‡,§	0	3	0	9	28	0	4	0	44
Typhoid	1	39	0	9	1	0	18	5	73
Quarantinable diseases									
Cholera	0	1	0	1	0	0	2	1	5
Plague	0	0	0	0	0	0	0	0	0
Rabies	0	0	0	0	0	0	0	0	0
Severe acute respiratory syndrome	0	0	0	0	0	0	0	0	0
Smallpox	0	0	0	0	0	0	0	0	0
Tularaemia	0	0	0	0	0	0	0	0	0
Viral haemorrhagic fever	0	0	0	0	0	0	0	0	0
Yellow fever	0	0	0	0	0	0	0	0	0
Sexually transmissible infections									
Chlamydial infections (NEC)‖	619	10,020	1,640	8,121	2,241	620	7,609	4,319	35,189
Donovanosis	0	0	6	3	0	0	0	1	10
Gonococcal infection	35	1,446	1,588	1,096	357	28	1,129	1,419	7,098
Syphilis (all categories)	12	1,039	284	290	23	14	427	207	2,296
Syphilis < 2 years duration	4	294	57	92	8	2	89	50	596
Syphilis > 2 years or unknown duration	7	744	104	198	1	12	338	157	1,561
Syphilis – congenital	0	0	6	4	0	0	1	0	11
Vaccine preventable diseases									
Diphtheria	0	0	0	0	0	0	0	0	0
Haemophilus influenzae type b	0	5	3	3	2	1	1	0	15
Influenza (laboratory confirmed)¶	1	1,012	41	561	69	3	203	183	2,073
Measles	0	12	3	0	6	0	15	9	45
Mumps	3	67	0	16	4	0	2	10	102
Pertussis	122	3,549	29	942	928	37	853	2,097	8,557
Pneumococcal disease (invasive)	55	908	93	477	198	56	389	199	2,375
Rubella	0	17	0	10	2	0	1	3	33
Rubella – congenital	0	1	0	0	0	0	0	0	1
Tetanus	0	0	0	3	2	0	0	0	5

Table 2. Notifications of communicable diseases, Australia, 2004, by state or territory, *continued*

Disease	State or territory ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Aust
Vectorborne diseases									
Barmah Forest virus infection	2	402	22	535	6	0	16	69	1,052
Dengue	6	31	19	249	4	1	9	7	326
Flavivirus (NEC)**	0	1	0	45	0	0	3	0	49
Japanese encephalitis virus	0	0	0	1	0	0	0	0	1
Kunjin virus††	NN	0	0	11	0	0	1	0	12
Malaria	16	101	41	263	20	15	67	36	559
Murray Valley encephalitis virus	0	0	1	0	0	0	0	0	1
Ross River virus infection	6	700	235	1,795	53	20	92	1,099	4,000
Zoonoses									
Anthrax	0	0	0	0	0	0	0	0	0
Australian bat lyssavirus	0	0	0	0	0	0	0	0	0
Brucellosis	0	7	0	26	0	0	3	0	36
Leptospirosis	0	40	2	110	1	0	8	5	166
Ornithosis‡‡	0	81	0	3	5	0	146	0	235
Lyssavirus (NEC)	0	0	0	0	0	0	0	0	0
Q fever	2	223	3	137	38	0	28	9	440
Other bacterial infections									
Legionellosis	1	82	2	31	45	1	98	50	310
Leprosy	0	3	1	1	0	0	0	0	5
Meningococcal infection§§	11	153	12	81	13	18	79	41	408
Tuberculosis	14	431	28	129	60	11	322	81	1,076
Total	1,656	31,021	5,199	25,249	7,472	1,965	24,032	14,335	110,929

* Unspecified hepatitis include cases in whom the duration of infection could not be determined.

† In the Northern Territory and Queensland, includes incident hepatitis cases.

‡ Notified as 'foodborne disease' or 'gastroenteritis in an institution' in New South Wales.

§ Infection with Shiga-like toxin/verotoxin-producing *Escherichia coli* (SLTEC/VTEC).

|| Includes *Chlamydia trachomatis* identified from cervical, rectal, urine, urethral, throat and eye samples, except for South Australia which reports only genital tract specimens, the Northern Territory which excludes ocular specimens, and Western Australia which excludes ocular and perinatal infections.

¶ Laboratory confirmed influenza is not a notifiable disease in South Australia but reports are forwarded to NNDSS.

** Flavivirus (NEC) replaces Arbovirus (NEC) from 1 January 2004.

†† In the Australian Capital Territory, Murray Valley encephalitis virus and Kunjin virus are combined under Murray Valley encephalitis virus.

‡‡ In the Australian Capital Territory ornithosis is reported as *Chlamydia* not elsewhere classified.

§§ Only invasive meningococcal disease is nationally notifiable. However, New South Wales, the Australian Capital Territory and South Australia also report conjunctival cases.

NN Not notifiable.

NEC Not elsewhere classified.

Table 3. Notification rates of communicable diseases, Australia, 2004, by state and territory (per 100,000 population)

Disease	State or territory								
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Aust
Bloodborne diseases									
Hepatitis B (incident)	2.8	0.8	4.0	1.1	0.5	3.7	2.1	1.5	1.4
Hepatitis B (unspecified)*	14.5	42.4	1.0	19.6	16.9	12.2	29.8	20.1	29.1
Hepatitis C (incident)	2.2	0.9	NN	NN	3.9	5.0	1.8	6.1	2.3
Hepatitis C (unspecified)*,†	64.5	72.9	135.6	63.9	36.2	59.5	58.3	53.5	63.0
Hepatitis D	0.0	0.2	0.0	0.3	0.0	0.0	0.1	0.0	0.1
Gastrointestinal diseases									
Botulism	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Campylobacteriosis‡	114.5	NN	109.5	95.7	120.2	126.3	127.0	97.5	112.2
Cryptosporidiosis	1.9	4.9	56.5	15.5	4.8	3.7	6.2	6.3	7.8
Haemolytic uraemic syndrome	0.0	0.1	0.5	0.0	0.1	0.0	0.0	0.1	0.1
Hepatitis A	0.3	2.1	6.5	0.6	0.7	0.2	1.4	2.9	1.6
Hepatitis E	0.0	0.1	0.0	0.1	0.0	0.2	0.3	0.2	0.1
Listeriosis	0.3	0.4	0.5	0.2	0.1	0.2	0.3	0.5	0.3
Salmonellosis (NEC)	29.9	32.0	196.6	66.5	32.3	24.7	22.8	32.0	37.8
Shigellosis	0.6	1.4	59.5	1.6	3.5	0.6	1.4	5.7	2.6
SLTEC, VTEC§	0.0	0.0	0.0	0.2	1.8	0.0	0.1	0.0	0.2
Typhoid	0.3	0.6	0.0	0.2	0.1	0.0	0.4	0.3	0.4
Quarantinable diseases									
Cholera	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Plague	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rabies	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Severe acute respiratory syndrome	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Smallpox	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tularaemia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Viral haemorrhagic fever	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow fever	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sexually transmissible infections									
Chlamydial infections (NEC)‖	191.0	148.9	820.4	209.2	146.1	128.6	153.0	217.9	175.0
Donovanosis	0.0	0.0	3.0	0.1	0.0	0.0	0.0	0.1	0.1
Gonococcal infection	10.8	21.5	794.3	28.2	23.3	5.8	22.7	71.6	35.3
Syphilis (all categories)	3.7	15.4	142.1	7.5	1.5	2.9	8.6	10.4	11.4
Syphilis < 2 years duration	1.2	4.4	28.5	2.4	0.5	0.4	1.8	2.5	3.0
Syphilis > 2 years or unknown duration	2.2	11.1	52.0	5.1	0.1	2.5	6.8	7.9	7.8
Syphilis – congenital	0.0	0.0	3.0	0.1	0.0	0.0	0.0	0.0	0.1
Vaccine preventable diseases									
Diphtheria	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Haemophilus influenzae type b	0.0	0.1	1.5	0.1	0.1	0.2	0.0	0.0	0.1
Influenza (laboratory confirmed)¶	0.3	15.0	20.5	14.5	4.5	0.6	4.1	9.2	10.3
Measles	0.0	0.2	1.5	0.0	0.4	0.0	0.3	0.5	0.2
Mumps	0.9	1.0	0.0	0.4	0.3	0.0	0.0	0.5	0.5
Pertussis	37.7	52.7	14.5	24.3	60.5	7.7	17.2	105.8	42.5
Pneumococcal disease (invasive)	17.0	13.4	46.5	12.3	12.9	11.6	7.8	10.0	11.5
Rubella	0.0	0.3	0.0	0.3	0.1	0.0	0.0	0.2	0.2
Rubella – congenital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tetanus	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0

Table 3. Notification rates of communicable diseases, Australia, 2004, by state and territory (per 100,000 population), *continued*

Disease	State or territory ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Aust
Vectorborne diseases									
Barmah Forest virus infection	0.6	6.0	11.0	13.8	0.4	0.0	0.3	3.5	5.2
Dengue	1.9	0.5	9.5	6.4	0.3	0.2	0.2	0.4	1.6
Flavivirus (NEC)**	0.0	0.3	0.0	1.2	0.0	0.0	0.1	0.0	0.3
Japanese encephalitis virus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kunjin virus††	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.1
Malaria	4.9	1.5	20.5	6.8	1.3	3.1	1.3	1.8	2.8
Murray Valley encephalitis virus	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0
Ross River virus infection	1.9	10.4	117.6	46.2	3.5	4.1	1.9	55.4	19.9
Zoonoses									
Anthrax	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Australian bat lyssavirus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Brucellosis	0.0	0.1	0.0	0.7	0.0	0.0	0.1	0.0	0.2
Leptospirosis	0.0	0.6	1.0	2.8	0.1	0.0	0.2	0.3	0.8
Ornithosis‡‡	0.0	1.2	0.0	0.1	0.3	0.0	2.9	0.0	1.2
Lyssavirus (NEC)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Q fever	0.6	3.3	1.5	3.5	2.5	0.0	0.6	0.5	2.2
Other bacterial infections									
Legionellosis	0.3	1.2	1.0	0.8	2.9	0.2	2.0	2.5	1.5
Leprosy	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0
Meningococcal infection§§	3.4	2.3	6.0	2.1	0.8	3.7	1.6	2.1	2.0
Tuberculosis	4.3	6.4	14.0	3.3	3.9	2.3	6.5	4.1	5.4

* Unspecified hepatitis include cases in whom the duration of infection could not be determined.

† In the Northern Territory and Queensland, includes incident hepatitis cases.

‡ Notified as 'foodborne disease' or 'gastroenteritis in an institution' in New South Wales.

§ Infection with Shiga-like toxin/verotoxin-producing *Escherichia coli* (SLTEC/VTEC).

|| Includes *Chlamydia trachomatis* identified from cervical, rectal, urine, urethral, throat and eye samples, except for South Australia which reports only genital tract specimens, the Northern Territory which excludes ocular specimens, and Western Australia which excludes ocular and perinatal infections.

¶ Laboratory confirmed influenza is not a notifiable disease in South Australia but reports are forwarded to NNDSS.

** Flavivirus (NEC) replaces Arbovirus (NEC) from 1 January 2004.

†† In the Australian Capital Territory, Murray Valley encephalitis virus and Kunjin virus are combined under Murray Valley encephalitis virus.

‡‡ In the Australian Capital Territory ornithosis is reported as *Chlamydia* not elsewhere classified.

§§ Only invasive meningococcal disease is nationally notifiable. However, New South Wales, the Australian Capital Territory and South Australia also report conjunctival cases.

NN Not notifiable.

NEC Not elsewhere classified.

Table 4. Notifications and notification rates (per 100,000 population), of communicable diseases, Australia, 2000 to 2004

Disease	Notifications					Rate per 100,000 population				
	2000	2001	2002	2003	2004	2000	2001	2002	2003	2004
Bloodborne diseases										
Hepatitis B (incident)	410	418	392	349	275	2.1	2.2	2.0	1.8	1.4
Hepatitis B (unspecified)*	7,321	8,747	6,677	6,637	5,861	38.2	45.1	34.0	33.4	29.1
Hepatitis C (incident)	504	703	448	477	361	3.3	4.5	2.8	3.0	2.3
Hepatitis C (unspecified)*,†	19,110	19,792	15,906	13,911	12,667	99.8	102.0	81.0	70.0	63.0
Hepatitis D	26	20	23	28	27	0.1	0.1	0.1	0.1	0.1
Gastrointestinal diseases										
Botulism	2	2	0	1	1	0.0	0.0	0.0	0.0	0.0
Campylobacteriosis‡	13,661	16,134	14,736	15,323	15,008	107.8	125.7	113.3	116.2	112.2
Cryptosporidiosis	1,144	1,621	3,272	1,225	1,573	6.0	8.3	16.7	6.2	7.8
Haemolytic uraemic syndrome	14	4	11	15	15	0.1	0.0	0.1	0.1	0.1
Hepatitis A	806	538	392	439	315	4.2	2.8	2.0	2.2	1.6
Hepatitis E	9	14	12	14	28	0.0	0.1	0.1	0.1	0.1
Listeriosis	66	64	62	70	65	0.3	0.3	0.3	0.4	0.3
Salmonellosis (NEC)	6,099	7,036	7,848	7,042	7,607	31.8	36.2	40.0	35.4	37.8
Shigellosis	490	567	507	444	518	2.6	2.9	2.6	2.2	2.6
SLTEC, VTEC§	43	45	59	52	44	0.2	0.2	0.3	0.3	0.2
Typhoid	56	81	70	51	73	0.3	0.4	0.4	0.3	0.4
Quarantinable diseases										
Cholera	2	4	5	2	5	0.0	0.0	0.0	0.0	0.0
Plague	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Rabies	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Severe acute respiratory syndrome	–	–	–	0	0	–	–	–	0.0	0.0
Smallpox	–	–	–	–	0	–	–	–	–	0.0
Tularaemia	–	–	–	–	0	–	–	–	–	0.0
Viral haemorrhagic fever	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Yellow fever	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Sexually transmissible infections										
Chlamydial infections (NEC)‖	16,809	20,265	24,426	30,437	35,189	87.8	104.4	124.4	153.2	175.0
Donovanosis	22	32	16	16	10	0.1	0.2	0.1	0.1	0.1
Gonococcal infection	5,862	6,254	6,433	6,828	7,098	30.6	32.2	32.8	34.4	35.3
Syphilis (all categories)	2,028	1,846	2,015	2,012	2,296	10.6	9.5	10.3	10.1	11.4
Syphilis < 2 years duration	235	203	374	480	596	1.2	1.0	1.9	2.4	3.0
Syphilis > 2 years or unknown duration	1497	711	1115	1180	1561	7.8	3.7	5.7	5.9	7.8
Syphilis – congenital	4	21	18	15	11	0.0	0.1	0.1	0.1	0.1
Vaccine preventable diseases										
Diphtheria	0	1	0	0	0	0.0	0.0	0.0	0.0	0.0
Haemophilus influenzae type b	26	20	31	23	15	0.1	0.1	0.2	0.1	0.1
Influenza (laboratory confirmed)¶	–	1,291	3,674	3,491	2,073	–	6.7	18.7	17.6	10.3
Measles	108	140	32	98	45	0.6	0.7	0.2	0.5	0.2
Mumps	212	117	69	82	102	1.1	0.6	0.4	0.4	0.5
Pertussis	5,711	9,325	5,570	5,159	8,557	29.8	48.0	28.4	26.0	42.5
Pneumococcal disease (invasive)	–	1,795	2,430	2,303	2,375	–	9.2	12.4	11.6	11.8
Rubella	313	266	254	55	33	1.6	1.4	1.3	0.3	0.2
Rubella – congenital	0	0	1	3	1	0.0	0.0	0.0	0.0	0.0
Tetanus	8	3	4	4	5	0.0	0.0	0.0	0.0	0.0

Table 4. Notifications and notification rates (per 100,000 population), of communicable diseases, Australia, 2000 to 2004, *continued*

Disease	Notifications					Rate per 100,000 population				
	2000	2001	2002	2003	2004	2000	2001	2002	2003	2004
Vectorborne diseases										
Barmah Forest virus infection	616	1,148	896	1,369	1,052	3.2	5.9	4.6	6.9	5.2
Dengue	197	180	169	854	326	1.0	0.9	0.9	4.3	1.6
Flavivirus (NEC)**	65	38	73	61	49	0.3	0.2	0.4	0.3	0.3
Japanese encephalitis virus	–	0	0	1	1	–	0.0	0.0	0.0	0.0
Kunjin virus††	–	5	0	19	12	–	0.0	0.0	0.1	0.1
Malaria	967	717	469	598	559	5.0	3.7	2.4	3.0	2.8
Murray Valley encephalitis virus	16	6	2	0	1	0.1	0.0	0.0	0.0	0.0
Ross River virus infection	4,160	3,256	1,458	3,832	4,000	21.7	16.8	7.4	19.3	19.9
Zoonoses										
Anthrax	–	0	0	0	0	–	0.0	0.0	0.0	0.0
Australian bat lyssavirus	–	0	0	0	0	–	0.0	0.0	0.0	0.0
Brucellosis	28	21	39	19	36	0.1	0.1	0.2	0.1	0.2
Leptospirosis	249	249	163	132	166	1.3	1.3	0.8	0.7	0.8
Ornithosis‡‡	99	136	212	201	235	0.5	0.7	1.1	1.0	1.2
Lyssavirus (NEC)	–	0	0	0	0	–	0.0	0.0	0.0	0.0
Q fever	548	685	784	583	440	2.9	3.5	4.0	2.9	2.2
Other bacterial infections										
Legionellosis	470	309	317	340	310	2.5	1.6	1.6	1.7	1.5
Leprosy	4	9	6	5	5	0.0	0.0	0.0	0.0	0.0
Meningococcal infection§§	622	700	686	578	408	3.2	3.6	3.5	2.9	2.0
Tuberculosis	581	963	1,051	993	1,076	3.0	5.0	5.4	5.0	5.4
Total	90,143	105,588	101,718	106,193	110,929					

* Unspecified hepatitis include cases in whom the duration of infection could not be determined.

† In the Northern Territory and Queensland, includes incident hepatitis cases.

‡ Notified as 'foodborne disease' or 'gastroenteritis in an institution' in New South Wales.

§ Infection with Shiga-like toxin/verotoxin-producing *Escherichia coli* (SLTEC/VTEC).

|| Includes *Chlamydia trachomatis* identified from cervical, rectal, urine, urethral, throat and eye samples, except for South Australia which reports only genital tract specimens, the Northern Territory which excludes ocular specimens, and Western Australia which excludes ocular and perinatal infections.

¶ Laboratory confirmed influenza is not a notifiable disease in South Australia but reports are forwarded to NNDSS.

** Flavivirus (NEC) replaces Arbovirus (NEC) from 1 January 2004.

†† In the Australian Capital Territory, Murray Valley encephalitis virus and Kunjin virus are combined under Murray Valley encephalitis virus.

‡‡ In the Australian Capital Territory ornithosis is reported as *Chlamydia* not elsewhere classified.

§§ Only invasive meningococcal disease is nationally notifiable. However, New South Wales, the Australian Capital Territory and South Australia also report conjunctival cases.

NN Not notifiable.

NEC Not elsewhere classified.

– The condition was not nationally notifiable in that year.

Bloodborne diseases

In 2004, bloodborne viruses reported to the NNDSS included hepatitis B, C and D. HIV and AIDS diagnoses are reported directly to the National Centre in HIV Epidemiology and Clinical Research (NCHECR). Information on national HIV/AIDS surveillance can be obtained through the NCHECR website at: http://www.med.unsw.edu.au/nchecr

When reported to NNDSS, newly acquired (incident) hepatitis B and hepatitis C infections were differentiated from those where the timing of disease acquisition was unknown (unspecified). As considerable time may have elapsed between the date of disease acquisition and the date an unspecified hepatitis infection is first diagnosed, the analysis of hepatitis B (unspecified) and hepatitis C (unspecified) infections is by date of diagnosis, which is the earliest of specimen, notification or notification received dates supplied.

Hepatitis B

Incident hepatitis B notifications

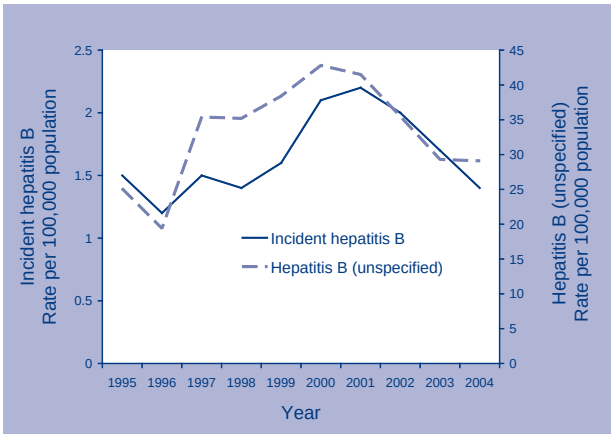
Case definition – Hepatitis B (incident)

*Only **confirmed cases** are reported.*

***Confirmed case:** Detection of hepatitis B surface antigen (HBsAg) in a case shown to be negative within the last 24 months, OR detection of hepatitis HBsAg and IgM to hepatitis B core antigen in the absence of prior evidence of hepatitis B infection OR detection of hepatitis B virus by nucleic acid testing and IgM to hepatitis B core antigen in the absence of evidence of prior hepatitis B infection.*

In 2004, 275 incident hepatitis B infections were reported to the NNDSS, giving a national notification rate of 1.4 cases per 100,000 population. The highest rates were reported from the Northern Territory (4 cases per 100,000 population) and Tasmania (3.7 cases per 100,000 population). The rate of notification of incident hepatitis B infection increased from 1.5 in 1995 to 2.2 in 2002 and declined to 1.4 per 100,000 population in 2004 (Figure 5).

Figure 5. Trends in notification rates incident hepatitis B and hepatitis B (unspecified), Australia, 1995 to 2004*

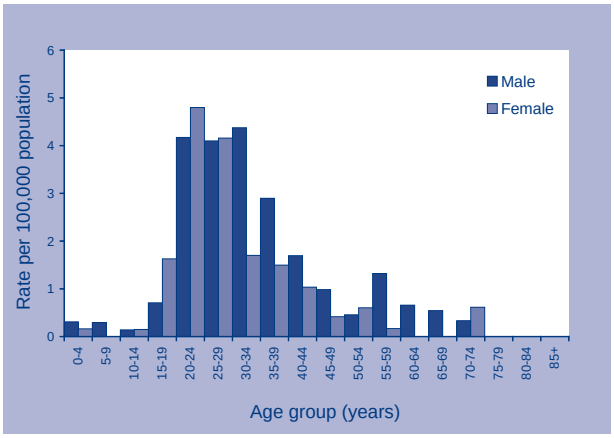


* Year of onset for incident hepatitis B and year of report for hepatitis B (unspecified) notifications.

The increased rates of newly acquired hepatitis B infection in 2000–2002 were attributed to increased transmission among injecting drug users in Victoria, followed by a decline in transmission between 2002 and 2004 during a heroin 'drought' (Greg Dore, personal communication).

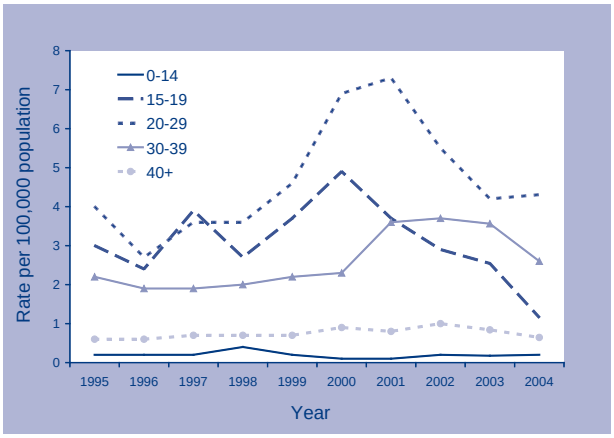
In 2004, the highest rate of incident hepatitis B infection was in the 20–24 year age group for females (4.8 cases per 100,000 population) and in the 30–34 year age group for males (4.2 cases per 100,000 population, Figure 6). Overall, infections in males exceeded those in females, with a male to female ratio of 1.4:1.

Figure 6. Notification rate for incident hepatitis B infections, Australia, 2004, by age group and sex



Trends in incident hepatitis B infection by year and age group are shown in Figure 7.

Figure 7. Trends in notification rates of incident hepatitis B infections, Australia, 1995 to 2004, by age group



In the past five years, rates of incident hepatitis B notifications fell by 75 per cent among cases in the 15–19 year age group and by 38 per cent among cases in the 20–24 year age group. The reported source of exposure for cases of incident hepatitis B infection in 2004 was reported from South Australia, Tasmania and Victoria (Table 5).

The proportion of newly acquired hepatitis B infections associated with injecting drug use increased from 44 per cent in 2002 to 53 per cent in 2004. By contrast, the proportion of newly acquired hepatitis B infections associated with sexual contact declined from 26 per cent in 2002 to 22 per cent in 2004.[2]

Table 5. Incident hepatitis B infection, Australia,* 2004, by exposure category

Exposure category	Number	Percentage
Injecting drug use	74	52.8
Sexual contact	31	22.2
Male homosexual contact	*1*	
Heterosexual contact	*30*	
Blood/tissue recipient	0	
Skin penetration procedure	0	
Healthcare exposure	0	
Household contact	1	0.7
Other	1	0.7
Undetermined	33	23.6
Total	140	100.0

* Data from South Australia, Tasmania and Victoria only, (National Centre in HIV Epidemiology and Clinical Research, 2005[2]).

Hepatitis B (unspecified) notifications

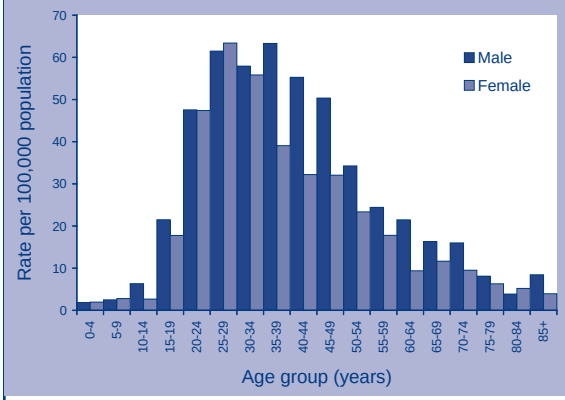
Case definition – Hepatitis B – unspecified

*Only **confirmed cases** are reported.*

***Confirmed case:** Detection of hepatitis B surface antigen or hepatitis B virus by nucleic acid testing in a case who does not meet any of the criteria for a newly acquired case.*

In 2004, 5,861 cases of hepatitis B (unspecified) infection were notified to NNDSS, giving a rate of 29.1 cases per 100,000 population. New South Wales (42.4 cases per 100,000 population) and Victoria (29.8 cases per 100,000 population) recorded the highest notification rates. The male to female ratio was 1.3:1. Among males, the highest notification rate was in the 35–39 year age group (63.3 cases per 100,000 population), whereas among females, the highest notification rate was in the 25–29 year age group (63.4 cases per 100,000 population, (Figure 8). The rate of notification of hepatitis B (unspecified) infection increased from 19.4 in 1996 to 42.8 in 2000 and declined to 29.1 cases per 100,000 population in 2004 (Figure 8).

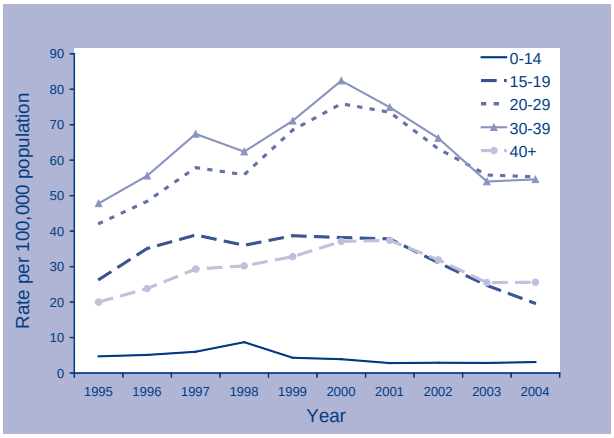
Figure 8. Notification rate for hepatitis B (unspecified) infections, Australia, 2004, by age group and sex*



Trends in hepatitis B (unspecified) infection by age group and year are shown in Figure 9.

Rates of hepatitis B (unspecified) notifications in 2000–2004 fell by 49 per cent among cases in the 15–19 year age group, 27 per cent in the 20–29 year age range and 22 per cent in the 30–39 year age range. Rates in other age groups remained relatively stable.

Figure 9. Trends in notification rates of hepatitis B (unspecified) infections, Australia, 1995 to 2004, by age group*



In 2004, 28 cases of HBV infection (3 incident and 25 unspecified) in children in the 0–4 year age group were reported. Approximately 95 per cent of infants born in 2004 received hepatitis B vaccination in Australia.[3]

Hepatitis C

Incident hepatitis C notifications

Case definition – Hepatitis C (newly acquired - incident)

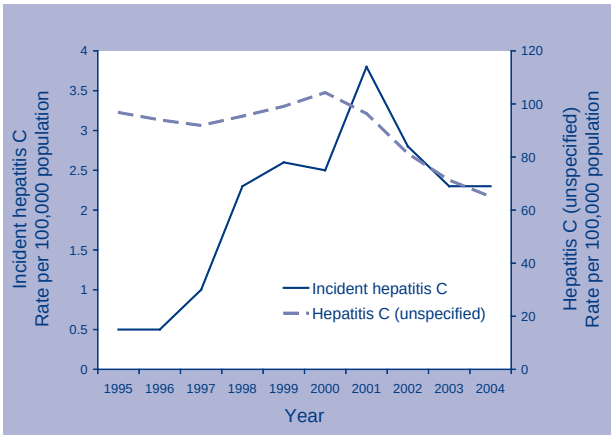
*Only **confirmed cases** are reported.*

***Confirmed case:** Requires detection of anti-hepatitis C antibody or detection of hepatitis C virus in a case with a negative test recorded in the last 24 months OR Detection of anti-hepatitis C antibody in a case aged 18 to 24 months or detection of hepatitis C virus in a case aged 1 to 24 months OR detection of anti-hepatitis C antibody or hepatitis C virus AND clinical hepatitis within the last 24 months (defined as jaundice, urine bilirubin or ALT seven times the upper limit of normal) where other causes of acute hepatitis have been excluded.*

The number of incident hepatitis C notifications as a reflection of the incidence of hepatitis C in Australia should be interpreted with caution. It is known that the notification rate vastly underestimates the true incidence of hepatitis C.

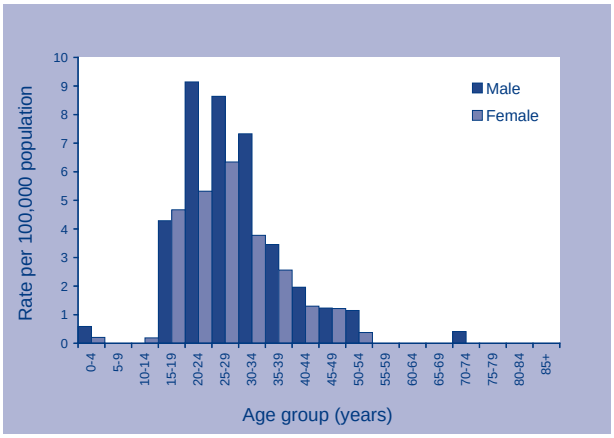
A total of 361 incident cases of hepatitis C with an onset date in 2004 were notified, giving a rate of 2.3 cases per 100,000 population (Figure 10). The proportion of all hepatitis C notifications in 2004 that were documented as incident cases was 2.7 per cent. The highest rate of incident hepatitis C infection was reported from Western Australia (6.1 cases per 100,000 population).

Figure 10. Trends in notification rates, incident and hepatitis C (unspecified) infection, Australia, 1995 to 2004



In 2004, the highest rate of incident hepatitis C notification was in the 20–24 year age group for males (9.1 cases per 100,000 population) and the 25–29 year age group for females (6.3 cases per 100,000 population, Figure 11). Overall, the male to female ratio was 1.5:1.

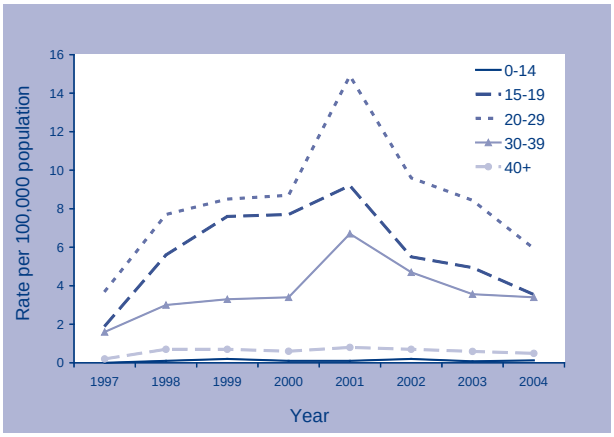
Figure 11. Notification rate for incident hepatitis C infections, Australia, 2004, by age group and sex



Trends in the age distribution of incident hepatitis C infection are shown in Figure 12.

The notification rates for incident hepatitis C declined from 2001 to 2004 by 62 per cent in the 15–19 year age group, 60 per cent in the 20–29 year age group and 50 per cent in the 30–39 year age group (Figure 12).

Figure 12. Trends in notification rates of incident hepatitis C infections, Australia, 1997 to 2004, by age group



The exposure history of cases of incident hepatitis C was collected in the Australian Capital Territory, South Australia, Tasmania, Victoria and Western Australia in 2004 (Table 6). At least 70 per cent of incident hepatitis C infections in 2004 were among injecting drug users.

In 2004, an estimated 259,570 people were living with hepatitis C in Australia. Of these 65,300 people cleared their infection, 153,300 had chronic hepatitis C and early liver disease (stage 0/1), 32,800 had chronic hepatitis C infection and moderate liver disease (stage 2/3) and 8,160 were living with hepatitis C related cirrhosis.[2]

Table 6. Incident hepatitis C infection, Australia,* 2004, by exposure category

Exposure category	Number	Percentage
Injecting drug use	210	70.0
Sexual contact	13	4.3
Blood/tissue recipient	4	1.3
Skin penetration procedure	7	2.3
Healthcare exposure	2	0.6
Household contact	1	0.3
Other	9	3.0
Undetermined	54	18.0
Total	300	100.0

* Data from the Australian Capital Territory, South Australia, Tasmania, Victoria and Western Australia only, (National Centre in HIV Epidemiology and Clinical Research, 2005[2])

Hepatitis C (unspecified) notifications

Case definition – Hepatitis C (unspecified)

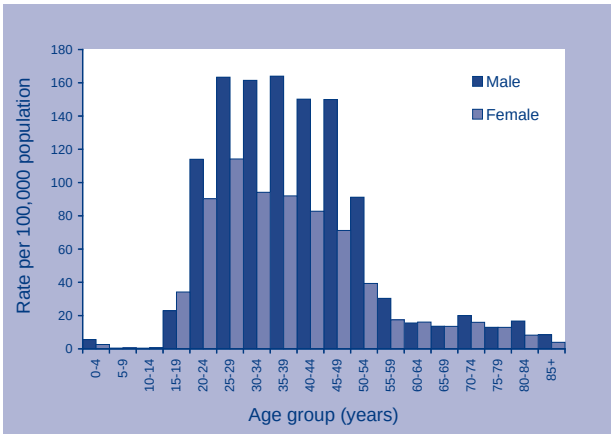
*Only **confirmed cases** are reported.*

***Confirmed case:** Requires detection of anti-hepatitis C antibody or detection of hepatitis C virus in a case who does not meet any of the criteria for a newly acquired case and is aged more than 24 months.*

National notification rates of hepatitis C (unspecified) infection ranged between 96 and 104 cases per 100,000 population in 1995–2001. The national rate declined to 81.3 in 2002 and to 63.7 cases per 100,000 population in 2004 (Figure 10). Improved surveillance practice, such as better classification of incident cases and increased duplicate checking may account for some of the decrease in hepatitis C (unspecified) notifications.

In 2004, 12,667 hepatitis C (unspecified) infections were notified to NNDSS, giving a notification rate of 63 cases per 100,000 population. Of the total notifications of hepatitis C (unspecified), 39 per cent were from New South Wales, but the Northern Territory had the highest notification rate (135.6 cases per 100,000 population). The male to female ratio was 1.6:1. The highest reporting rates were in the 35–39 year age group for males (164 cases per 100,000 population), and in the 25–29 year age group for females (114.2 cases per 100,000 population, Figure 13).

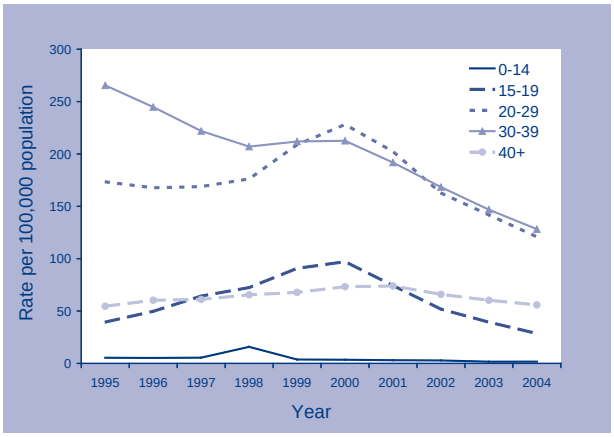
Figure 13. Notification rate for hepatitis C (unspecified) infections, Australia, 2004, by age group and sex



Trends in the age distribution of hepatitis C (unspecified) infections are shown in Figure 14.

Between 2000 and 2004, the notification rates of hepatitis C (unspecified) fell by 71 per cent among cases in the 15–19 year age group, suggesting declining hepatitis C incidence among young people with a history of injecting drug use. Notification rates of hepatitis C (unspecified) also fell in the same period by 47 per cent among cases in the 20–29 year age range and by 40 per cent in the 30–39 year age range. Rates in the other age groups have remained relatively stable during this period.

Figure 14. Trends in notification rates of hepatitis C (unspecified) infections, Australia, 1995 to 2004, by age group



Hepatitis D

Case definition – Hepatitis D

*Only **confirmed cases** are reported.*

***Confirmed case:** Detection of IgM or IgG antibodies to hepatitis D virus or detection of hepatitis D on liver biopsy in a case known to be hepatitis B surface antigen positive.*

Hepatitis D is a defective single-stranded RNA virus that requires the hepatitis B virus to replicate. Hepatitis D infection can be acquired either as a co-infection with hepatitis B or as a superinfection with chronic hepatitis B infection. People co-infected with hepatitis B and hepatitis D may have more severe acute disease and a higher risk of fulminant hepatitis compared with those with hepatitis B alone. The modes of hepatitis D transmission are similar to those for hepatitis B, and in countries with low hepatitis B prevalence, injecting drug users are the main risk group for hepatitis D.

There were 27 notifications of hepatitis D to the NNDSS in 2004 giving a notification rate of 0.1 cases per 100,000 population. Of the 27 notifications, 14 were reported from New South Wales, 10 from Queensland and 3 from Victoria. The majority (19/27, 70%) of cases were males, with the highest number of cases reported in 40–44 and 45–49 year age groups.

Gastrointestinal diseases

In 2004, gastrointestinal diseases that were notified to NNDSS were: botulism, campylobacteriosis, cryptosporidiosis, haemolytic uraemic syndrome (HUS), hepatitis A, hepatitis E, listeriosis, salmonellosis, shigellosis, Shiga toxin-producing *Escherichia coli*/verotoxigenic *E. coli* (STEC/VTEC) infections and typhoid.

Notifications of gastrointestinal diseases increased by 2 per cent; from 24,676 in 2003 to 25,248 in 2004 (Table 4). Compared with 2003, there was a decrease in the number of notifications of campylobacteriosis (2%), hepatitis A (28%), listeriosis (7%) and STEC (15%) in 2004. On the other hand, increases were reported for cryptosporidiosis (28%), hepatitis E (107%), salmonellosis (8%), shigellosis (17%) and typhoid (43%). The reported changes in the number of notifications were within the expected range (i.e. within the five year mean and two standard deviations) except for hepatitis E which had an excess of 13 cases above the upper historical range.

Botulism

Case definition – Botulism

*Only **confirmed cases** are reported.*

***Confirmed case:** Requires isolation of* Clostridium botulinum *OR detection of* Clostridium botulinum *toxin in blood or faeces AND a clinically compatible illness (e.g. diplopia, blurred vision, muscle weakness, paralysis, death).*

One case of infant botulism in a female, less than 12 months old was reported to NNDSS in 2004 (Table 2). Since the commencement of the surveillance of botulism in 1992 there have been six cases of infant botulism reported, but no classic foodborne botulism has been reported in Australia since NNDSS commenced collecting data on botulism in 1992.

Case definition – Campylobacteriosis

*Only **confirmed cases** are reported.*

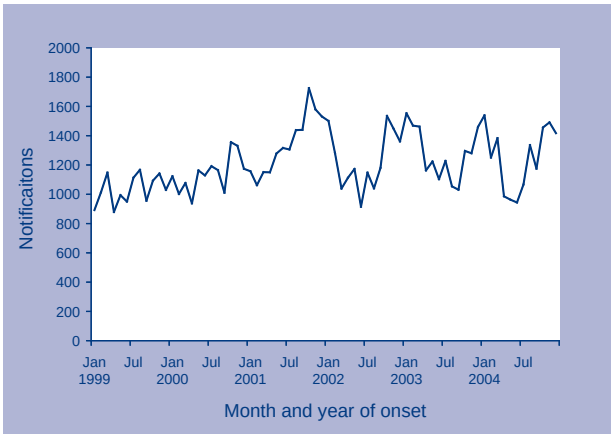
***Confirmed case:** Requires isolation or detection of* Campylobacter *species.*

Campylobacteriosis

There were 15,008 notifications of campylobacteriosis in Australia in 2004. Campylobacteriosis is notifiable in all jurisdictions, except New South Wales. The national rate of notifications in 2004 was 112 cases per 100,000 population; a marginal decrease compared with the rate reported in 2003 (116 cases per 100,000 population). All jurisdictions with the exception of Victoria reported decreases in notifications, with South Australia reporting the largest decrease (30%). Victoria reported a 12 per cent increase in notifications, and had the highest notification rate in 2004 (127 cases per 100,000 population).

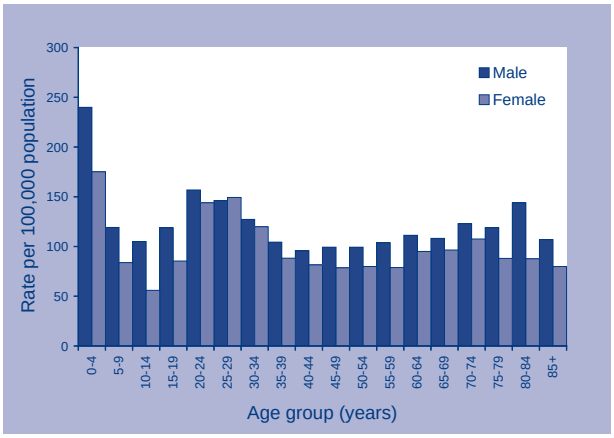
Monthly notifications of campylobacteriosis in 2004, consistent with previous years (1999 to 2003), peaked in the third quarter of the year in late winter/early spring (Figure 15). In 2004, seven *Campylobacter* related outbreaks were identified, of which four were suspected to be foodborne.[4] These suspected foodborne outbreaks occurred in an aged care facility, restaurant and food takeaway settings.

Figure 15. Trends in notifications of campylobacteriosis, Australia, 1999 to 2004, by month of onset



Children aged 0–4 years had the highest notification rate of campylobacteriosis (Figure 16). In this age group notification rates were higher in males (243 cases per 100,000 population) than in females (175 cases per 100,000 population). The overall male to female ratio, as in previous years, was 1.2:1.

Figure 16. Notification rates of campylobacteriosis, Australia, 2004, by age group and sex



Cryptosporidiosis

Case definitions – Cryptosporidiosis

*Only **confirmed cases** are reported.*

Confirmed case: Requires detection of Cryptosporidium *oocytes.*

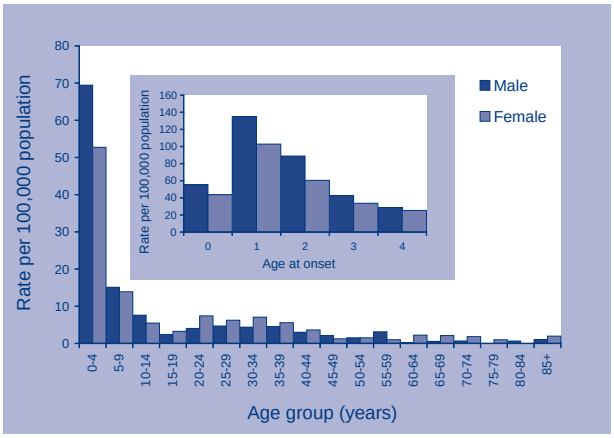
In 2004, a total of 1,573 cases of cryptosporidiosis were reported to NNDSS, a notification rate of 8 cases per 100,000 population, which represents an increase of 28 per cent on the 1,225 cases reported in 2003.

New South Wales, the Northern Territory, Queensland, and Victoria reported increases in cryptosporidiosis notifications, with the largest increase in Queensland (276%). The Northern Territory and Queensland had notification rates above the national average at 57 and 16 cases per 100,000 population, respectively.

Fifty per cent of cryptosporidiosis cases notified in 2004 were under the age of five years. Compared to 2003, the notification rate in this age group increased by 24 per cent in 2004. With a notification rate of 61 cases per 100,000 population, children under the age of four years continue to have the highest notification rate of cryptosporidiosis. Within

this age group one-year-old males had the highest notification rate at 130 cases per 100,000 population (Figure 17).

Figure 17. Notification rates of cryptosporidiosis, Australia, 2004, by age group and sex



Hepatitis A

Case definition – Hepatitis A

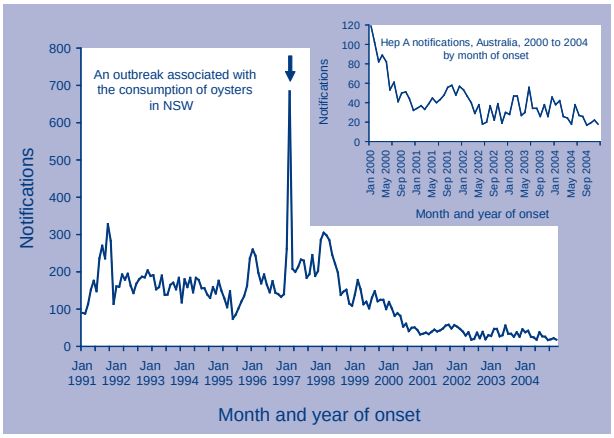
*Both **confirmed cases** and **probable cases** are reported.*

***Confirmed case:** Requires detection of anti-hepatitis A IgM, in the absence of recent vaccination, OR detection of hepatitis A virus by nucleic acid testing.*

***Probable case:** Requires clinical hepatitis (jaundice and/or bilirubin in urine) without a non-infectious cause AND contact between two people involving a plausible mode of transmission at a time when: (a) one of them is likely to be infectious (from two weeks before the onset of jaundice to a week after onset of jaundice), AND (b) the other has an illness that starts within 15 to 50 (average 28–30) days after this contact, AND at least one case in the chain of epidemiologically-linked cases (which may involve many cases) is laboratory confirmed.*

There were 315 cases of hepatitis A reported to NNDSS in 2004, a notification rate of 2 cases per 100,000 population. The notifications of hepatitis A have steadily decreased over the last decade, but remained stable in the period 2002 through 2004 (Figure 18).

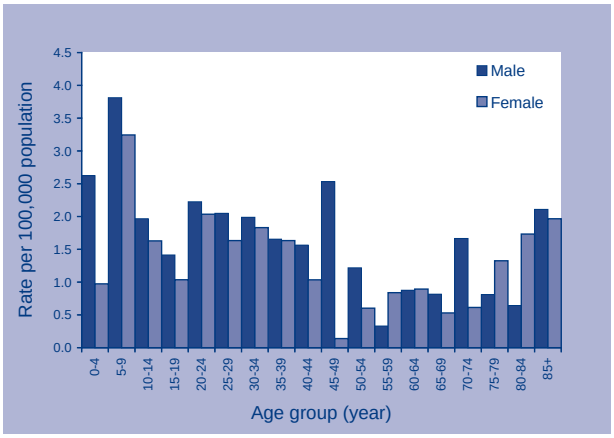
Figure 18. Trends in notifications of hepatitis A, Australia, 1991 to 2004, by month of notification



Compared to 2003, hepatitis A notification rates decreased in all jurisdictions (ranging from 15% in South Australia to 92% in Tasmania) except in New South Wales where an increase of 9 per cent was reported. The Northern Territory had the highest notification rate (7 cases per 100,000 population) followed by New South Wales (3 cases per 100,000 population).

Males, with a rate of 1.8 cases per 100,000 population had a higher notification rate of hepatitis A than females (1.3 cases per 100,000 population). The highest age specific rate of hepatitis A notifications among males and females was in the 5–9 year age group (3.8 cases and 2.8 cases per 100,000 population, respectively) (Figure 19).

Figure 19. Notification rates of hepatitis A, Australia, 2004, by age group and sex



In 2004, Indigenous Australians had the highest burden of hepatitis A. In 2004, Indigenous status of 90 per cent of cases was complete and 11 per cent of cases were Indigenous (Table 7).

Hepatitis A is commonly spread from person to person or from contaminated food or water. Where information on risk factors was known (in 22% of all notifications), overseas travel and household contact with a case were the main risk factors for hepatitis A infection (Table 8).

Hepatitis E

Case definition – Hepatitis E

*Only **confirmed cases** are reported.*

***Confirmed case:** Requires detection of hepatitis E virus by nucleic acid testing OR, detection of hepatitis E virus in faeces by electron microscopy OR, detection of IgM or IgG to hepatitis E virus. If the person has not travelled outside Australia in the preceding 3 months, the antibody result must be confirmed by specific immunoblot.*

Table 7. Hepatitis A notifications, Australia, 2004, by Indigenous status

State or territory	Indigenous	Non-Indigenous	Unknown	Total	% Indigenous (of total)
ACT	0	0	1	1	–
NSW	1	113	25	139	0.7
NT	5	8	0	13	38.5
Qld	0	20	2	22	–
SA	1	10	0	11	9.1
Tas	0	0	1	1	–
Vic	0	67	4	71	–
WA	28	28	1	57	49.1
Total	35	246	34	315	11.1

Table 8. Risk exposures associated with hepatitis A virus infection, Australia, 2004, by state or territory

	State or territory								
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Aust
Total	1	139	13	22	11	1	71	57	315
Number of case with known risk factors*	0	57	6	11	6	0	41	21	142
Injecting drug use	–	0	0	0	1	0	4	–	7
Household/close contact of case	–	14	2	2	1	0	11	9	39
Overseas travel	–	41	1	12	3	0	28	9	94
Childcare	–	2	3	0	0	0	0	1	6
Homosexual contact	–	–	0	0	0	0	1	0	1
Sex worker	–	–	0	0	0	0	0	0	0
Other†	–	–	0	0	2	0	0	0	2

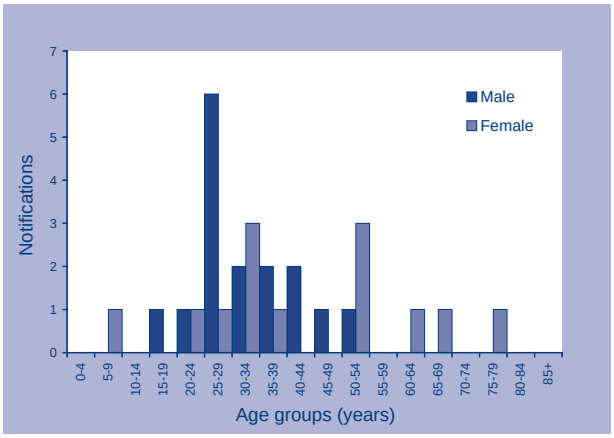
* Number of risk factors may not add up to the totals as exposures are not mutually exclusive hence more than one exposure per person is possible.

† Includes association with persons from country where hepatitis A is endemic and, living in areas where hepatitis A is endemic.

– Not assessed.

There were 28 cases of hepatitis E reported to NNDSS in 2004, an increase of 100 per cent on the number of cases reported in 2003. Twelve cases were reported in Victoria, eight in New South Wales, four in Queensland, three in Western Australia and one in Tasmania. The male to female ratio was 1.2:1. Cases were aged between 5 and 79 years (Figure 20). Data on countries visited were available for 26/28 cases with overseas travel and showed that 18 had travelled to India, two to Bangladesh and one each to China, Indonesia, Peru, Vietnam, Thailand and New Zealand.

Figure 20. Notification rates of hepatitis E, Australia, 2004, by age group and sex



Hepatitis E virus is transmitted enterically. In non-industrialised countries, where sanitation is poor water-borne transmission of hepatitis E occurs, while in industrialised countries zoonotic transmission (from pigs to humans) has been recorded. In Australia, locally acquired hepatitis E was reported in the early 1990s.[5]

Listeriosis

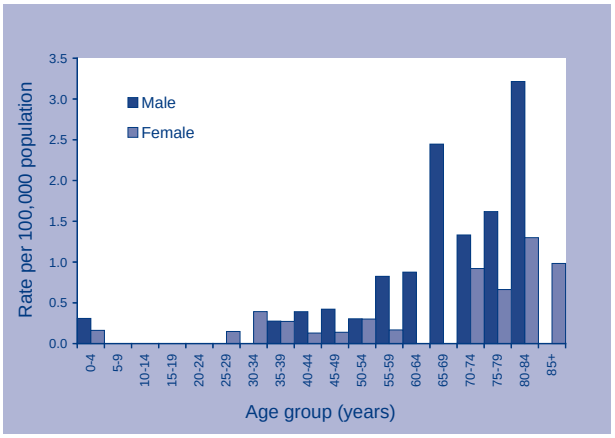
Case definitions – Listeriosis

*Only **confirmed cases** are reported. Where a mother and foetus/neonate are both confirmed, both cases are reported.*

***Confirmed case:** Requires isolation or detection of* Listeria monocytogenes *from a site that is normally sterile, including foetal gastrointestinal contents.*

In 2004, 65 cases of listeriosis were reported to NNDSS, a notification rate of 0.3 cases per 100,000 population. Listeriosis notifications have been stable at this rate since 1998. In 2004, 71 per cent of listeriosis cases were aged over 50 years, with the highest notification rate in the 80–84 year age group in males and females (Figure 21).

Figure 21. Notification rates of listeriosis, Australia, 2004, by age group and sex



In 2004, there were seven listeriosis cases of materno-foetal origin and one foetal death was reported.[6] Health outcome for 29 cases was known, and of these, four cases all aged over 66 died. No common-source outbreaks of listeriosis were identified during 2004.[6]

Salmonellosis (non-typhoidal)

Case definitions: – Salmonellosis

*Only **confirmed cases** are reported.*

***Confirmed case:** Requires isolation or detection of* Salmonella *species (excluding* S. *Typhi which is notified separately under typhoid).*

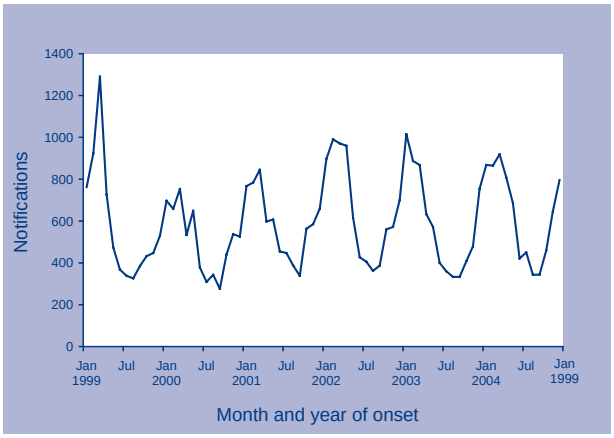
A total of 7,607 salmonellosis cases were reported to NNDSS in 2004, a rate of 37.8 cases per 100,000 population and a 7 per cent increase from the rate reported in 2003 (35.4 cases per 100,000 population). During the five year period, 1998–2003, the highest national notification rate was 40 cases per 100,000 population in 2002.

The Northern Territory and Queensland had notification rates 5 and 1.6 times the national notification rate, respectively (Table 3). The highest rates of notification of salmonellosis were reported in the northern part of

the country (Map 2). In 2004, the Kimberley Statistical Division of Western Australia had the highest notification rate at 309 cases per 100,000 population. The same Statistical Division had a notification rate of 323 cases per 100,000 population in 2003.

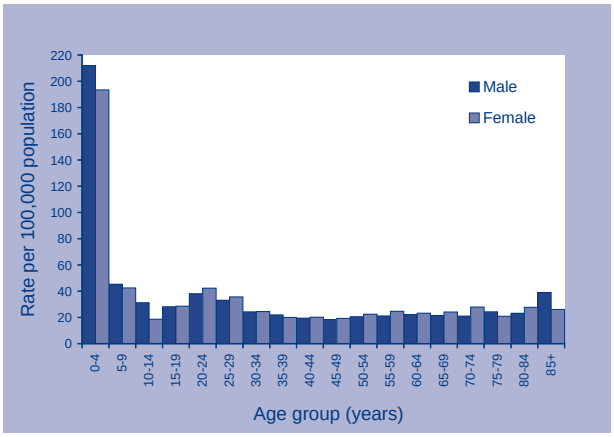
As in previous years, reports of salmonellosis peaked during summer (January to March) (Figure 22). Thirty-five per cent of salmonellosis cases in 2004 had dates of onset during the first quarter of the year.

Figure 22. Trends in notifications of salmonellosis, Australia, 1999 to 2004, by month of onset

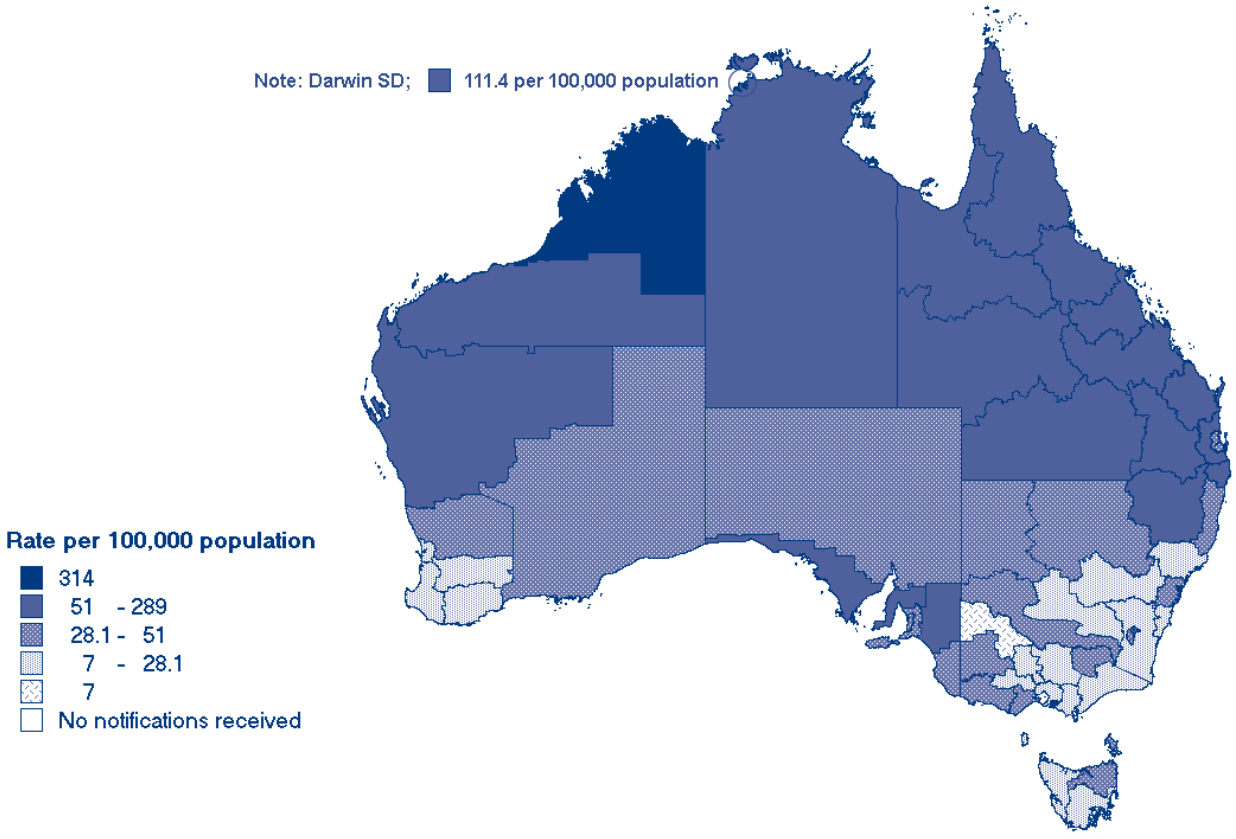


As in 2003, the highest rate of notification was in children aged between 0–4 years: 32 per cent of salmonellosis notifications were in this age group (Figure 23).

Figure 23. Notification rates of salmonellosis, Australia, 2004, by age group and sex



Map 2. Notification rates of salmonellosis, Australia, 2004, by Statistical Division of residence



The National Enteric Pathogens Surveillance Scheme reported serovars for 7,771 isolates in 2004.[7] The 10 most frequently isolated serovars and phage types of *Salmonella,* which accounted for 43 per cent of all isolates, are shown in Table 9. Nationally, *Salmonella* Typhimurium 135, *Salmonella* Typhimurium 170 and *S.* Saintpaul were the three most frequently isolated serovars/phage types. In 2003, *S*. Saintpaul was ranked fourth among the most notified serovars. *S.* Typhimurium 12 was for the first time, in the top 10 serovars in 2004, replacing *Salmonella* Typhimurium 290.

In 2004, there was little change to the distribution of *Salmonella* serovars reported in 2003. The most commonly reported serovars in Queensland, Tasmania, and the Northern Territory were *S*. Virchow 8 (9% of salmonellosis notifications), *S*. Mississippi (52% of salmonellosis notifications) and *S*. Ball (15% of salmonellosis notifications), respectively. Typhimurium was the most commonly reported serovar in the rest of the jurisdictions. Typhimurium 170 accounted for 55 per cent of cases in the Australian Capital Territory, 17 per cent in New South Wales, 11 per cent in Victoria, and 13 per cent in South Australia. In Western Australia, Typhimurium 135 was the most commonly notified phage type, making 12 per cent of salmonellosis notifications.

Outbreaks and clusters of salmonellosis

In 2004, OzFoodNet reported 118 foodborne disease outbreaks of which 29 were attributable to *S*. Typhimurium infection. These outbreaks affected 599 persons and resulted in 74 hospitalisations. Of the six significant foodborne outbreaks (affecting 50 or more persons each) in 2004, two were due to Typhimurium: phage types 12 in New South Wales and phage type 9 in Victoria. The outbreak that occurred in New South Wales was a community-wide outbreak. In this outbreak, investigators found that the consumption of home prepared chicken was the main risk factor for *S*. Typhimurium 12 infection. The outbreak in Victoria was associated with the consumption of food from a pizza restaurant. *S*. Typhimurium 9 was isolated from several foods, suggesting that there had been cross contamination of foods.[8]

Shigellosis

Case definitions – Shigellosis

Only ***confirmed cases*** *are reported.*

Confirmed case: *Isolation or detection of* Shigella *species.*

In 2004, a total of 518 cases of shigellosis were reported to NNDSS, a notification rate of 2.6 cases per 100,000 population. This rate was 18 per cent higher than the rate reported in 2003 (2.2 cases per 100,000 population), but it was within the five year average (Table 4). The Northern Territory continued to have the highest notification rate at 59.5 cases per 100,000 population, but this was a decrease by 10 per cent in notification rates compared to 2003.

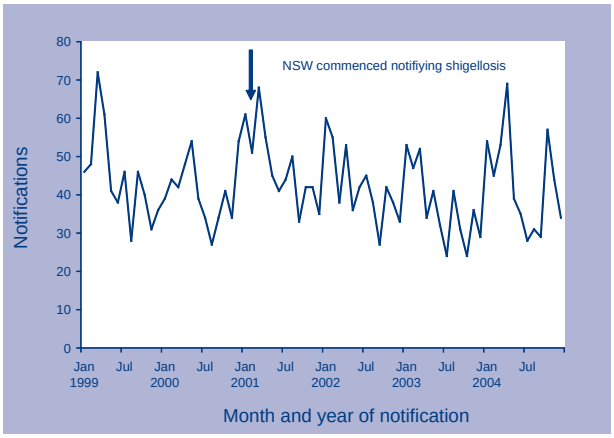
Table 9. Top 10 human isolates of *Salmonella,* Australia, 2004

Organism	State or territory									
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Aust	Total (%)
S. Typhimurium 170	33	357	2	50	0	4	129	2	577	7.4
S. Typhimurium 135	5	189	3	180	18	1	92	75	563	7.2
S. Saintpaul	1	41	49	226	13	2	20	42	394	5.1
S. Typhimurium 9	6	119	0	43	44	4	130	14	360	4.6
S. Virchow 8	4	43	1	248	9	2	26	0	333	4.3
S. Typhimurium 197	9	48	0	147	2	0	61	1	268	3.4
S. Birkenhead	1	80	1	167	1	1	11	1	263	3.4
S. Typhimurium 12	3	172	0	30	8	0	18	2	233	3.0
S. Chester	2	34	12	87	20	1	11	23	190	2.4
S. Infantis	6	59	7	11	21	1	43	10	158	2.0
Sub Total	70	1,142	75	1,189	136	16	541	170	3,339	43.0
Other isolates	37	1,005	296	1,559	392	104	598	441	4,432	57.0
Total	107	2,147	371	2,748	528	120	1139	611	7,771	100

Source: National Enteric Pathogens Surveillance System.

Nationally, notifications of the disease remained stable over the last five years (Figure 24). The male to female ratio remained at 0.8:1.

Figure 24. Trends in notifications of shigellosis, Australia, 1999 to 2004, by month of onset

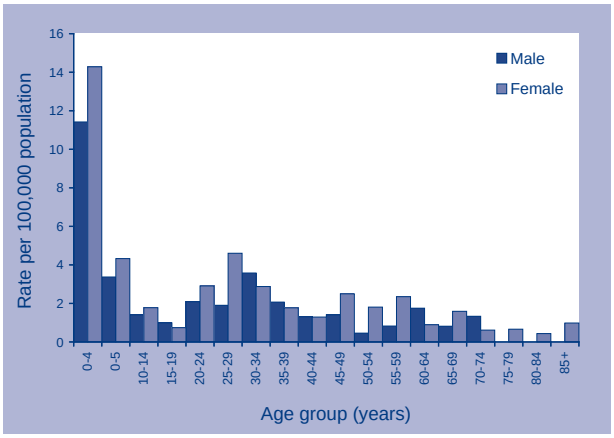


Children under the age of four years represented 31 per cent of shigellosis notifications (Figure 25). This age group had a notification rate of 13 cases per 100,000 population, which is five times the national rate and an increase of 18 per cent compared to the rate reported in 2003 (11 cases per 100,000 population).

Indigenous populations continue to have the highest burden of shigellosis. In 2004, of the notifications of shigellosis where Indigenous status of cases was complete (64% of all cases) 37 per cent were identified as Indigenous. In the Northern Territory (where 98% of notifications had the Indigenous status of the case recorded), 82 per cent of shigellosis cases were Indigenous people.

Shigella flexneri and *Shigella sonnei* infections accounted for about 50 per cent and 48 per cent of shigellosis, respectively in 2004 (Table 10).

Figure 25. Notification rates of shigellosis, Australia, 2004, by age group and sex



Shiga-like toxin-producing/verotoxigenic *Escherichia coli*

Case definitions – Shiga toxin-producing/ verotoxin-producing Escherichia coli *(STEC/VTEC)*

*Only **confirmed cases** are reported.*

***Confirmed case:** Requires isolation of Shiga-toxigenic/verotoxigenic* Escherichia coli *from faeces, OR, isolation of Shiga toxin or verotoxin from a clinical isolate of* E. coli *OR, identification of the gene associated with the production of Shiga toxin or vero toxin in* E. coli *by nucleic acid testing on isolate or raw bloody diarrhoea.*

Note: Where STEC/VTEC is isolated in the context of haemolytic uraemic syndrome (HUS), it should be notified as STEC/VTEC and HUS.

Table 10. *Shigella* infections, Australia, 2004, by serogroup and state or territory

Organism	State or territory								Total	Per cent
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA		
S. boydii		2		1	1		2	1	7	1.9
S. dysenteriae		1		1				1	3	0.8
S. flexneri		32		16	39	2	28	67	184	49.5
S. sonnei	2	59		30	13	1	37	36	178	47.8
Sub Total	2	94	0	48	53	3	67	105	372	100.0
Unknown	0	2	119	13	1	0	3	8	146	–
Total	2	96	119	61	54	3	70	113	518	–

There were 44 cases of SLTEC/VTEC reported to NNDSS in 2004. With a notification rate of 0.2 cases per 100,000 population, the rate of SLTEC/VTEC notifications remained stable compared to 2003. Seventy-three per cent of cases were notified in South Australia (1.8 cases per 100,000 population), where bloody stools are routinely tested by polymerase chain reaction (PCR) for genes coding for Shiga toxin. New South Wales, Queensland, and Victoria were the only other jurisdictions that notified SLTEC/VTEC. OzFoodNet reported that among typed *E. coli* (67% of all notifications) 15 per cent were subtype O157, 16 per cent were subtype O11 and 13 per cent were O26.[6]

Haemolytic uraemic syndrome

Case definitions – Haemolytic uraemic syndrome (HUS)

*Only **confirmed cases** are reported.*

***Confirmed case:** Requires acute microangiopathic anaemia on peripheral blood smear (schistocytes, burr cells or helmet cells) AND AT LEAST ONE OF THE FOLLOWING: acute renal impairment (haematuria, proteinuria or elevated creatinine level), OR, thrombocytopaenia, particularly during the first seven days of illness.*

Note: Where STEC/VTEC is isolated in the context of HUS, it should be notified as both STEC/VTEC and HUS.

In 2004, 15 cases of HUS were reported to NNDSS, a rate of 0.1 cases per 100,000 population, the same rate as in 2003. No HUS cases were notified in the Australian Capital Territory, Tasmania, the Northern Territory or Western Australia. Among the 15 cases of HUS notified in 2004, six were males. The median age among males was 19 years (range 2–54 years) and among females was 34 years (range 0–82 years). STEC was isolated in three cases of HUS.

Typhoid

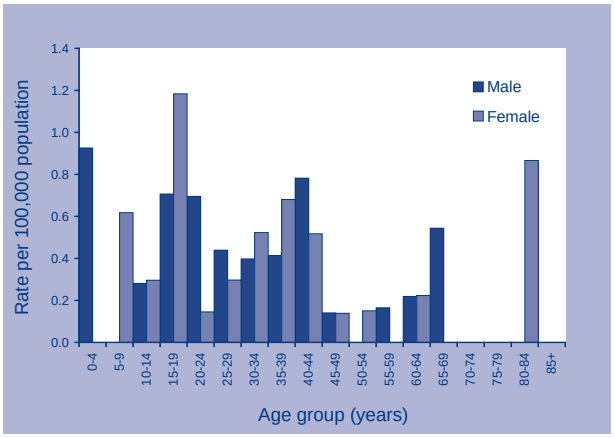
Case definitions – Typhoid fever

*Only **confirmed cases** are reported.*

***Confirmed case:** Requires isolation or detection of* Salmonella *Typhi.*

In 2004, there were 73 notifications of typhoid, a rate of 0.4 cases per 100,000 population, representing an increase of 43 per cent compared to 2003. The largest increase, compared to 2003, occurred in New South Wales (increase of 143%). Nationally, the male to female ratio was 1:1, with the highest notification rates in males aged 0–4 years (0.9 cases per 100,000 population) and in females aged 15–19 years (1.2 cases per 100,000 population) (Figure 26). The National Enteric Pathogen Surveillance Scheme identified 71 *Salmonella* Typhi isolates, 68 of which were from Australian residents. Of the 68 Australian residents, 17 had no travel history recorded, two had not travelled, and the remaining 49 cases had travelled outside Australia in South East Asia, Africa, Europe, Pacific Islands, and South America.[7]

Figure 26. Notification rates of typhoid, Australia, 2004, by age group and sex



Quarantinable diseases

Human diseases covered by the Quarantine Act 1908, and notifiable in 2004 were cholera, plague, rabies, yellow fever, smallpox, highly pathogenic avian influenza in humans (HPAIH), severe acute respiratory syndrome (SARS) and four viral haemorrhagic fevers (Ebola, Marburg, Lassa and Crimean-Congo).

HPAIH was declared a quarantinable disease on 23 March 2004 and consequently became subject to the routine quarantine powers available under the Quarantine Act 1908. SARS was declared a quarantinable disease under the Quarantine Act 1908 on 7 April 2003.

Cholera

Case definition – Cholera

*Only **confirmed cases** are reported.*

***Confirmed case:** Requires isolation of toxigenic* Vibrio cholerae *O1 or O139.*

In 2004, there were five cases of cholera notified in Australia, two from Victoria, and one each from New South Wales, Queensland and Western Australia. Four of these cases acquired their disease overseas: one in Indonesia, one in the Philippines, and two in India. The place of acquisition of the fifth case was unknown.

All five notifications were *Vibrio cholerae* serogroup O1. There were two El Tor biotype notifications and two Ogawa serotypes reported. Table 11 summarises the serogroups, biotypes, serotypes and toxin producing status of these notifications.

In 2004, there were several suspected cases of SARS reported by jurisdictions. Enhanced surveillance by general practitioners and hospitals in Australia resulted in the testing of five people with fever, respiratory symptoms and history of travel to China. All tests for SARS were negative.

Cholera, plague, rabies, yellow fever, SARS, HPAIH and viral haemorrhagic fevers are of international public health importance and are notified to the World Health Organization. Although no local transmission had been reported in Australia, these diseases continue to occur around the world. Travellers are advised to seek information on the risk of contracting these diseases in their destinations and take appropriate measures. More information on quarantinable diseases and travel health can be found on the Australian Government Department of Health and Ageing Website at: http://www.health.gov.au/internet/wcms/Publishing.nsf/Content/health-pubhlth-strateg-quaranti-index.htm

Sexually transmissible infections

In 2004, sexually transmissible infections (STIs) reported to NNDSS were chlamydial infection, donovanosis, gonococcal infections and for the first time two categories of syphilis: syphilis – infectious (primary, secondary and early latent) less than 2 years duration and syphilis – of greater than 2 years or unknown duration. The NNDSS also received reports on congenital syphilis. These conditions were notifiable in all states and territories.

Other national surveillance systems that monitor STI in Australia include the Australian Gonococcal Surveillance Programme, which is a network of specialist laboratories, and the National Centre in HIV Epidemiology and Clinical Research.

The national trends in the number and rates of STI notifications reported to the NNDSS between 2000 and 2004 are shown in Table 4. In interpreting these data it is important to note that changes in notifications over time may not solely reflect changes in disease prevalence. Increases in screening rates, more targeted screening, the use of more sensitive diagnostic tests, as well as periodic public awareness campaigns may contribute to changes in the number of notifications over time.

Age adjusted notification rates were calculated for Indigenous and non-Indigenous populations for jurisdictions that had Indigenous status data completed in more than 50 per cent of notifications. These data however, have to be interpreted cautiously as STI screening occurs predominantly in specific high-risk groups including Indigenous populations. Similarly, rates between males and females need to be interpreted cautiously as rates of testing for STI differ between the sexes.

Table 11. Cholera notifications 2004, Australia, by notifying jurisdiction and case details

Notifying jurisdiction	Sex	Age at onset	*Vibrio cholerae* serogroup/biotype/ serotype	Toxin production	Country of acquisition
NSW	Male	45	*Vibrio cholerae* O1 El Tor	Unknown	Philippines
Qld	Female	50	*Vibrio cholerae* O1	Unknown	Unknown
Vic	Female	23	*Vibrio cholerae* O1 Ogawa	Not reported	India
Vic	Female	34	*Vibrio cholerae* O1 El Tor Ogawa	Not reported	India
WA	Male	33	*Vibrio cholerae* O1	Unknown	Indonesia

Chlamydial infection

Case definition – Chlamydial infection

*Only **confirmed cases** are reported.*

***Confirmed case:** Isolation of* Chlamydia trachomatis *or detection of* Chlamydia trachomatis *by nucleic acid testing or detection of* Chlamydia trachomatis *antigen.*

Chlamydial infection continues to be the most commonly notified disease in 2004. A total of 35,189 notifications of chlamydial infection were received by the NNDSS; a rate of 175 cases per 100,000 population. This was the highest rate since surveillance of the condition commenced in 1991, and represents an increase of 14 per cent on the rate reported in 2003 (153 cases per 100,000 population). Between 2000 and 2004, chlamydial infection notification rates increased from 88 to 175 cases per 100,000 population, an increase of 99 per cent (Table 4).

Chlamydial infection notification rates were higher than the national average in the Northern Territory (820 cases per 100,000 population), Western Australia (218 cases per 100,000 population), Queensland (209 cases per 100,000 population) and the Australian Capital Territory (191 cases per 100,000 population) (Table 3). New South Wales had the largest percentage increase in 2004 compared to 2003 (27% increase). At the regional level, the Northern Territory excluding Darwin had the highest chlamydial infection notification rate at 1,691 cases per 100,000 population (Map 3).

In 2004, notification rates of chlamydial infection in males and females were 142 and 206 cases per 100,000 population respectively. In 2004, notification rates increased by 14 per cent in males and by 15 per cent in females compared to 2003. The male to female ratio remained at 0.7:1 as in the previous year. Rates in females markedly exceeded those in males in the 15–19 and 20–24 age groups with ratios of 1:4 and 1:2 respectively (Figure 27).

Trends in age and sex specific notification rates between 2000 and 2004 show increases in all age groups between 15 and 34 years in both males and females (Figure 28). Since 2000, the highest average annual percentage increase occurred in the 20–24 age group (23% in males and 21% in females). However, in 2004 the annual rate of increase declined relative to 2003, for all age groups. In the 20–24 age

Map 3. Notification rates of chlamydial infection, Australia, 2004, by Statistical Division

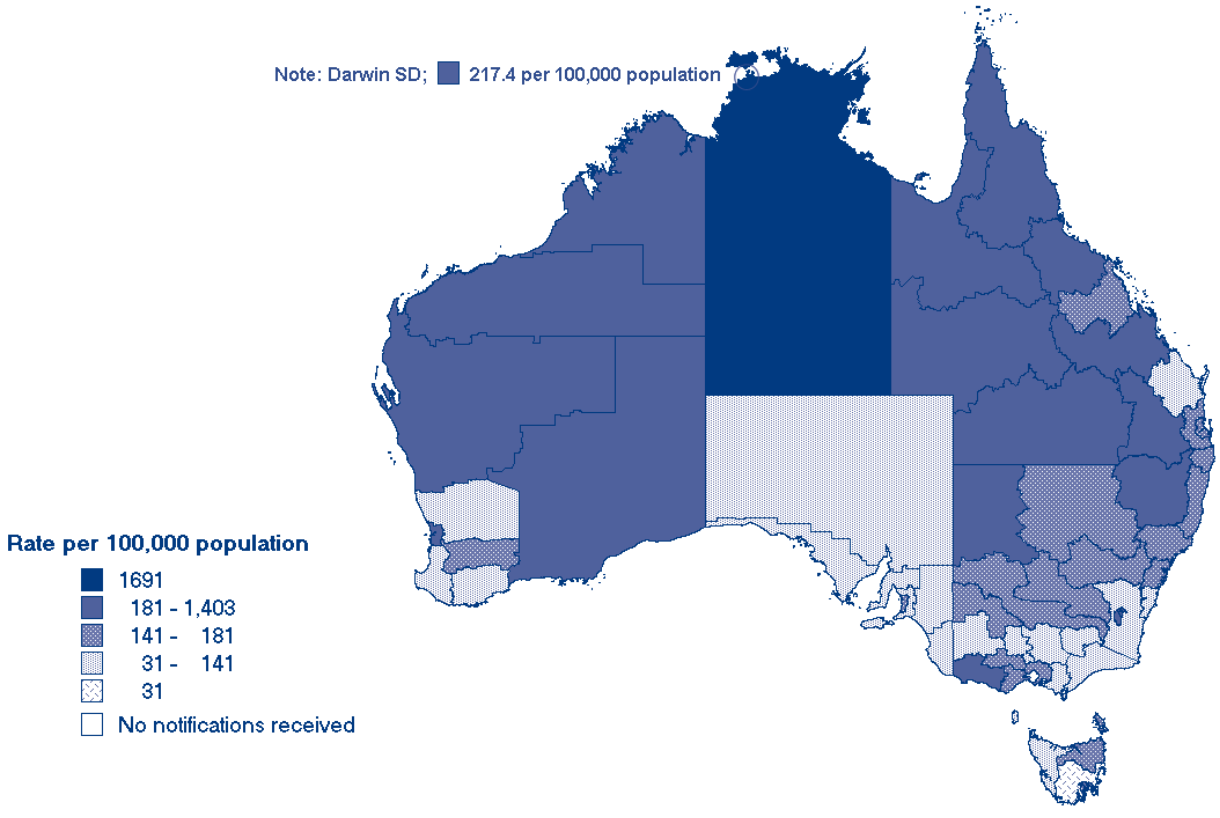


Figure 27. Notification rates of chlamydial infections, Australia, 2004, by age group and sex

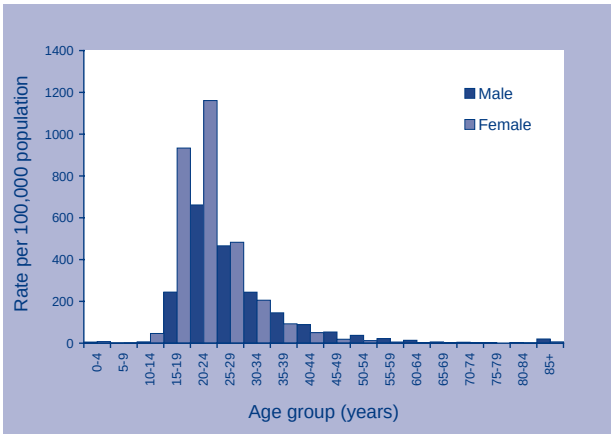
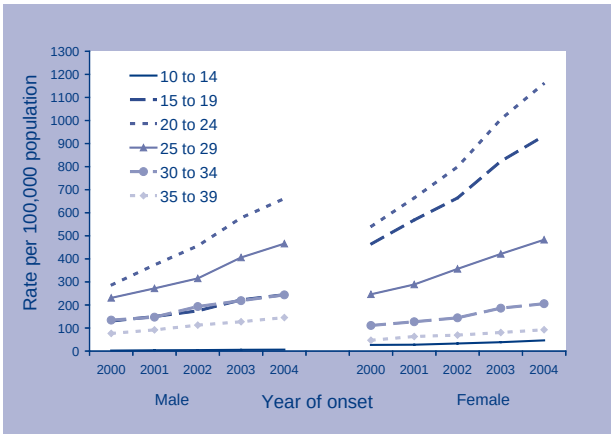


Figure 28. Trends in notification rates of chlamydial infection in persons aged 10–39 years, Australia, 2000 to 2004, by age group and sex



group the annual rate increase dropped from 27 per cent to 14 per cent in males and from 26 per cent to 15 per cent in females.

In 2004, data on Indigenous status was complete in 59 per cent of cases of chlamydial infection, higher than the 43 per cent reported in 2003. The combined chlamydial infection notifications in four jurisdictions with greater than 50 per cent completeness of Indigenous status (the Northern Territory, South Australia, Western Australia, and Victoria) show that in 2004, the age adjusted notification rate was 1,159 cases per 100,000 Indigenous population, and 178 cases per 100,000 non-Indigenous population (Table 12). The age adjusted rate ratio of Indigenous to non-Indigenous was 7:1.

Although surveillance data continues to show substantial increases in chlamydial infection notifications nationally, 2004 data suggests that the rate of increase has declined. As a large proportion of cases with genital chlamydial infection are asymptomatic, notification rates for this disease are particularly

Table 12. Trends in age adjusted notification rates of chlamydial infections, the Northern Territory, South Australia, Western Australia, and Victoria, 2000 to 2004, by Indigenous status*

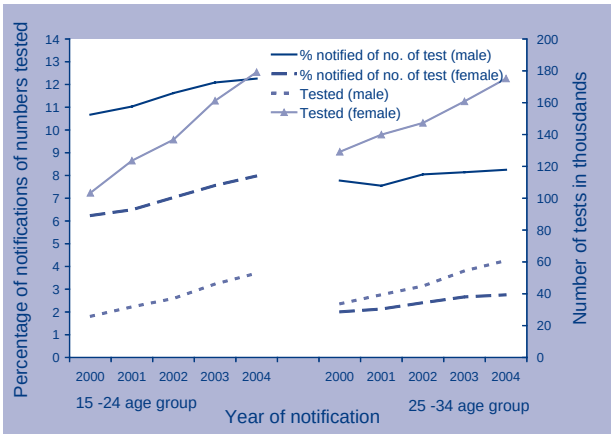
Year	NT			SA			Vic			WA			All		
	Indigenous	Non-Indigenous	Ratio†	Indigenous	Non-Indigenous	Ratio†	Indigenous	Non-Indigenous	Ratio†	Indigenous	Non-Indigenous	Ratio†	Indigenous	Non-Indigenous	Ratio†
	Rate	Rate		Rate	Rate		Rate	Rate		Rate	Rate		Rate	Rate	
2000	1,177.5	271.1	4.3	556.6	60.4	9.2	–	–	–	974.6	115.5	8.4	905.5	98.1	9.2
2001	1,412.2	348.9	4.0	452.3	95.6	4.7	–	–	–	1,028.8	119.1	8.6	994.9	118.3	8.4
2002	1,511.4	435.4	3.5	548.3	117.1	4.7	–	–	–	930.4	145.7	6.4	1,014.6	145.0	7.0
2003	1,796.1	449.8	4.0	568.3	130.6	4.4	135.1	145.3	0.9	1,211.7	171.6	7.1	1,102.1	153.4	7.2
2004	1,793.0	444.8	4.0	294.7	111.9	2.6	205.2	170.6	1.2	1,280.3	202.4	6.3	1,158.5	177.8	6.5

* The rates in non-Indigenous peoples include diagnoses in people whose Indigenous status was not reported.

† Ratio of Indigenous to non-Indigenous.

susceptible to the overall rate of testing as well as the targeted testing of certain population sub-groups. Thus this apparent abatement therefore may reflect changes in surveillance practices and public health interventions such as targeted health promotion. Data from Medicare Australia (http://www.medicare-australia.gov.au/statistics/) show that the number of diagnostic tests performed for *Chlamydia trachomatis* continued to increase in 2004, but relative to 2003, the rate of increase in testing declined: 24 to 17 per cent in the 15–24 age group, 24 to 15 per cent in males in the 25–34 age group, but remained unchanged in females in this age group (Figure 29). Using the number of tests as the denominator and the number of notifications as the numerator, from 2000 through 2004 the percentage notified of the number tested in the 15–24 and in the 25–34 year age groups remained stable in both males and females (Figure 29).

Figure 29. Number of diagnostic tests for *Chlamydia trachomatis* and the proportion notified among 15–24 and 25–34 year age groups, Australia, 2000 to 2004, by sex



Data source: National Notifiable Diseases Surveillance System and Medicare Australia data.

Subject to the limitations of this ecological analysis and the inherent limitations of Medicare Australia data sets (which do not include tests from public laboratories), this analysis suggests that an increase in the number of tests for *Chlamydia* may in part account for the increase in notifications. Similarly, the data also suggests that slight decline in the rate of increase in testing may in part account for the decline in the rate of increase observed in notifications.

Donovanosis

Case definition – Donovanosis

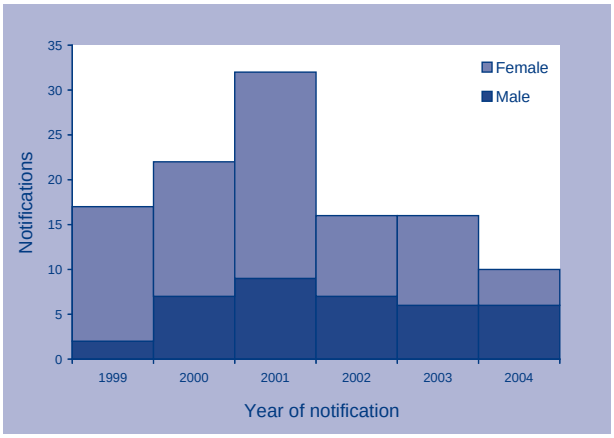
*Both **confirmed cases** and **probable cases** are reported.*

***Confirmed case:** Requires demonstration of intracellular Donovan bodies on smears or biopsy specimens taken from a lesion or detection of* Calymmatobacterium granulomatis *by nucleic acid testing of a specimen taken from a lesion AND clinically compatible illness involving genital ulceration.*

***Probable case:** Requires compatible sexual risk history in a person from an endemic area or a compatible sexual risk history involving sexual contact with someone from an endemic area.*

Donovanosis is a sexually transmissible infection characterised by a chronic ulcerative genital disease. Although relatively uncommon, it is a disease of public health importance in Australia because it predominantly occurs in Indigenous communities. It has been identified as a potential co-factor in HIV transmission, and it is preventable.[9,10] Donovanosis is targeted for elimination from Australia through the donovanosis elimination project. In 2004, 10 cases of donovanosis, six male and four female, were reported to the NNDSS. Nine cases of the total were Indigenous: five in the Northern Territory, three in Queensland and one in Western Australia. One non-Indigenous case was reported in the Northern Territory. In 2003, a total of 16 cases, all Indigenous, six males and 10 females, were notified (Figure 30). Cases ranged in age from 18 years to 74 years and the majority were aged 15–39 years.

Figure 30. Number of notifications of donovanosis, Australia, 1999 to 2004, by sex



Gonococcal infections

Case definition – Gonococcal infection

*Only **confirmed cases** are reported.*

***Confirmed case:** Requires isolation of* Neisseria gonorrhoeae, *or detection of* Neisseria gonorrhoeae *by nucleic acid testing or detection of typical Gram-negative intracellular diplococci in a smear from a genital tract specimen.*

In 2004, 7,098 notifications of gonococcal infection were received by NNDSS. This represents a rate of 35 cases per 100,000 population, an increase of 3 per cent from the rate reported in 2003 (33 cases per 100,000 population). Nationally, there were increases in the notification rates in males (by 8%) and females (by 5%). The male to female ratio in 2004 was 2:1, unchanged in the previous three years (2001 to 2003).

The highest notification rate in 2004 was in the Northern Territory at 794 cases per 100,000 population (Table 3), while the largest increase in the notification rate in 2004 (compared to 2003) occurred in Tasmania. In Tasmania a 21 per cent overall increase in notification rates was reported: 44 per cent increase in males and 1 per cent increase in females. In 2004 nationally, gonococcal infection rates for males and females were 47 and 22 cases per 100,000 population, respectively. The exception to this pattern was the Northern Territory, where females had higher notification rates than males (621 versus 882 cases per 100,000 population). The regional distribution of gonococcal infection notifications shows that the highest notification rate occurred in the Northern Territory (excluding Darwin) at 1,821 cases per 100,000 population (Map 4).

Notification rates for gonococcal infection in males exceeded those in females in all age groups except in the 10–14 and 15–19 year age groups (Figure 31). Trends in sex specific notification rates show that the increase in rates in males in the 15–19 and 20–24 age groups has continued, although there was some abatement in the increase in the male 25–29 year age group. In females, there were no marked changes in rates, with only a slight increase in rates in the 35–39 year age group (Figure 32).

Map 4. Notification rates of gonococcal infection, Australia, 2004, by Statistical Division of residence

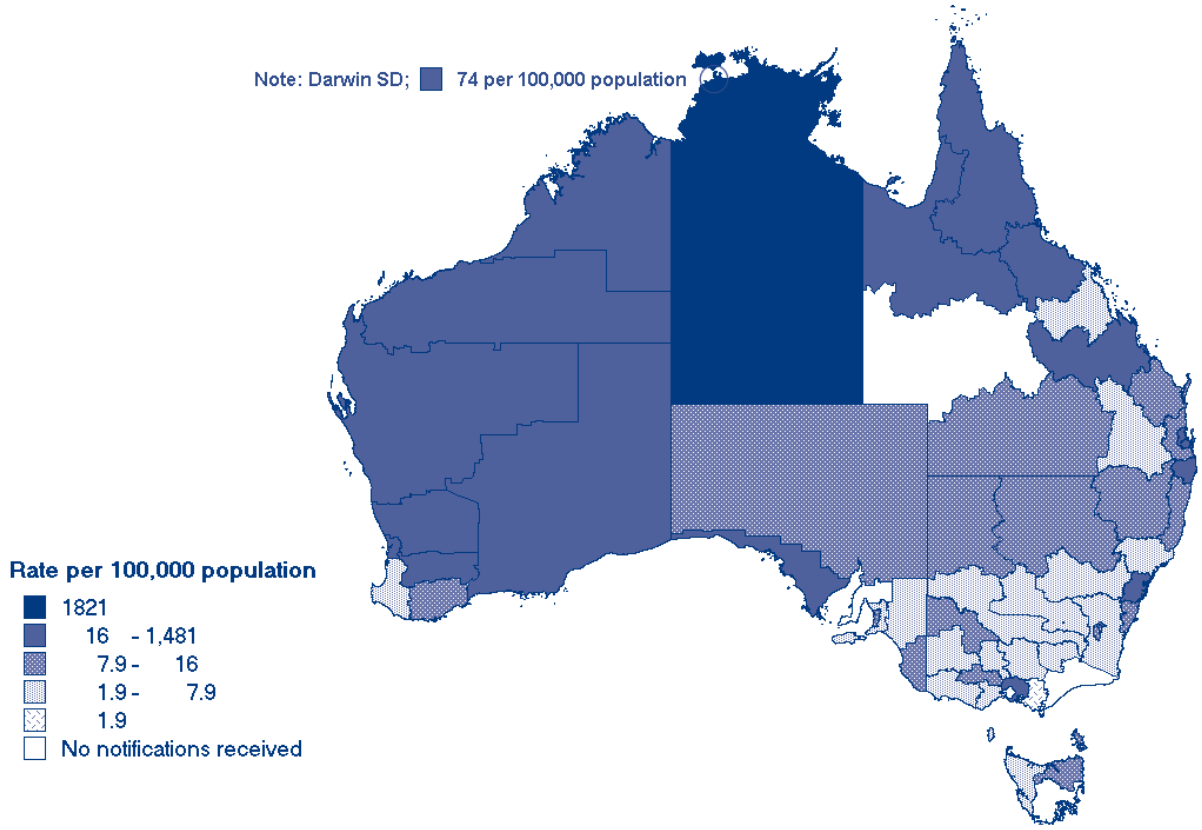


Figure 31. Notification rates of gonococcal infection, Australia, 2004, by age group and sex

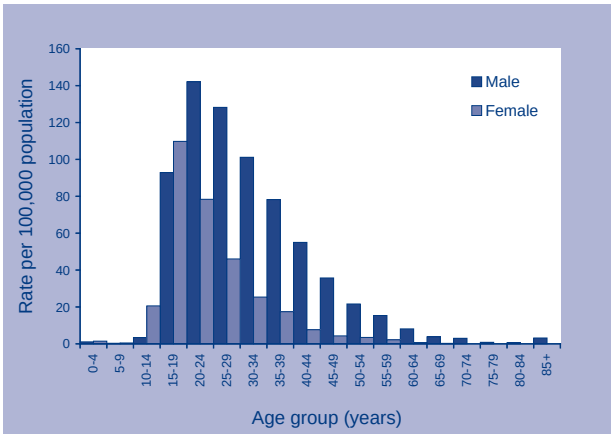
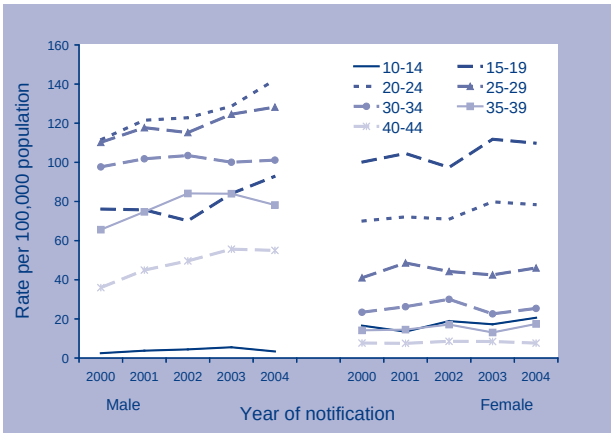


Figure 32. Trends in notification rates of gonococcal infection in persons aged 15–39 years, Australia, 2000 to 2004, by age group and sex



In 2004, the data completeness (66%) of Indigenous status of gonococcal infection notifications was similar to that in 2003. The combined gonococcal infection notifications of four jurisdictions with more than 50 per cent data completeness of Indigenous status (the Northern Territory, South Australia, Western Australia and Victoria) shows that in 2004, the age adjusted notification rate was 1,351 cases per 100,000 Indigenous population and 26 cases per 100,000 non-Indigenous population: a ratio of Indigenous to non-Indigenous of 52:1 (Table 13).

Other surveillance of gonococcal infections

The Australian Gonococcal Surveillance Program (AGSP) is the national surveillance system of antibiotic susceptibility of gonococcal isolates. In each state and territory, a network of reference laboratories determine susceptibility of isolates to a core group of antibiotics using a standard methodology. The following is the summary of their 2004 report.

Table 13. Trends in age adjusted notification rates of gonococcal infection, the Northern Territory, South Australia, Western Australia, and Victoria, 2000 to 2004, by Indigenous status*

Year	NT			SA			Vic			WA			All		
	Indigenous Rate	Non-Indigenous Rate	Ratio†	Indigenous Rate	Non-Indigenous Rate	Ratio†	Indigenous Rate	Non-Indigenous Rate	Ratio†	Indigenous Rate	Non-Indigenous Rate	Ratio†	Indigenous Rate	Non-Indigenous Rate	Ratio†
2000	1,777.1	147.2	12.1	616.1	6.5	94.6	8.5	19.0	0.5	1,249.5	30.8	40.6	1,244.3	24.9	50.0
2001	2,091.8	213.3	9.8	411.2	7.2	57.1	0.0	17.6	0.0	1,557.8	17.7	87.9	1,449.2	21.0	68.9
2002	2,057.2	258.5	8.0	356.1	8.1	44.0	42.3	18.1	2.3	1,262.5	31.8	39.7	1,313.2	30.6	42.9
2003	2,019.8	181.7	11.1	371.0	14.4	25.8	25.2	26.6	0.9	1,295.0	33.2	39.0	1,191.1	28.3	42.0
2004	2,339.0	170.3	13.7	291.7	8.5	34.3	33.8	25.2	1.3	1,320.9	29.2	45.2	1,351.1	25.9	52.1

* The rates in non-Indigenous peoples include diagnoses in people whose Indigenous status was not reported.

† Ratio of Indigenous to non-Indigenous.

In 2004, a total of 3,640 isolates of gonococci were tested for antibiotic susceptibility. Eighty-five per cent of isolates were from men, of which 76 per cent were obtained from the urethra, 13 per cent from the rectum and 8 per cent from the larynx. In females, 92 per cent of isolates were obtained from the cervix.

Trends in the proportion of isolates resistant to penicillin, quinolones and tetracycline are shown in Table 14. In 2004, the proportion of isolates resistant to penicillin by plasmid mediated resistance and chromosomally mediated resistance increased by 23 and 17 per cent, respectively. Quinolone resistance also increased by 61 per cent, 92 per cent of which were resistant at a higher 'minimal inhibitory concentration' (MIC) (1 mg/L or more). This is of concern as quinolones (e.g. 500 mg of ciprofloxacin), still used for treatment in Australia, will not be effective in high level quinolone resistant isolates.

In 27 per cent of infections by strains with plasmid mediated resistance to penicillin and in 64 per cent of infections by strains resistant to quinolone, information on country where resistant strains were acquired were available. This showed that 48 per cent (51/106) of plasmid mediated resistance were locally acquired with the rest acquired from South or South East Asia. Sixty per cent of quinolone resistant strains were acquired locally and the remaining from overseas.

The distribution of infections with strains resistant to different antibiotic agents varies from jurisdiction to jurisdiction and urban to rural areas within each jurisdiction. The AGSP recommends that treatment regimes should be tailored to the local patterns of susceptibility. Nationally, the AGSP recommends the use of alternative treatments to quinolones for infections acquired.

Syphilis (all categories)

In 2004, all jurisdictions began reporting to NNDSS syphilis infections categorised as: infectious syphilis of less than two years duration; and syphilis of more than two years or unknown duration. Detailed analysis will be reported for the two categories, as well as for syphilis of *all categories* for the purpose of showing trends in keeping with reports in previous years.

In 2004, a total of 2,296 cases of syphilis infection of all categories were reported, representing a notification rate of 11.4 cases per 100,000 population, an increase of 13 per cent on the 10.1 cases per 100,000 reported in 2003 (Table 3). The Northern Territory continues to have the highest notification rate of syphilis (142 cases per 100,000 population), although in 2004 the rate was lower by 13 per cent from the previous year. In 2004, there were increases in notification rates only in New South Wales (by 24%), in Western Australia (by 43%) and in Victoria (by 18%). At the regional level, the highest notification rate was in the Kimberley Statistical Division of Western Australia at 344 cases per 100,000 population (Map 5).

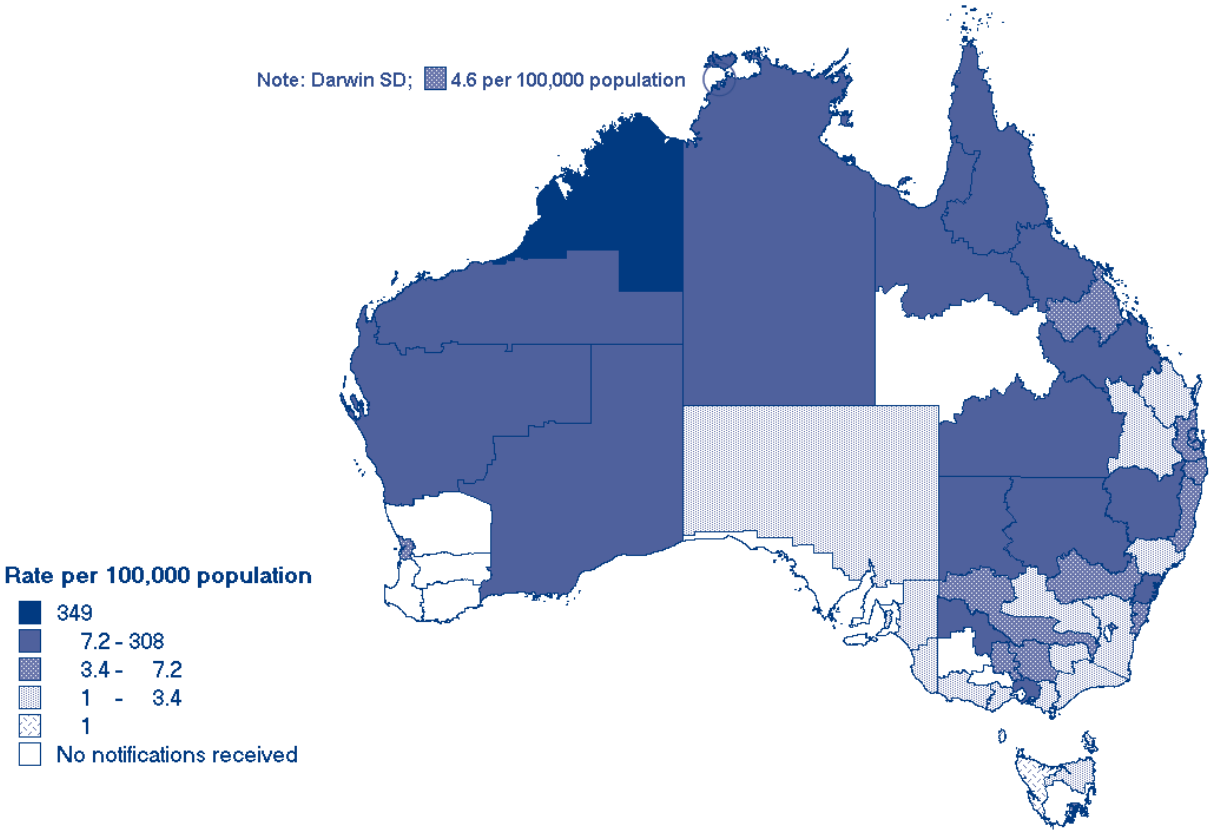
Table 14. Proportion of gonococcal isolates showing antibiotic resistance, Australia, 1998 to 2004

Year	Penicillin resistance (% resistant)		Quinolone resistance (% resistant)	High level tetracycline (% resistant)
	Plasmid mediated	Chromosomally mediated		
1998	5.3	21.8	5.2	NR
1999	7.4	14.3	17.2	7.9
2000	8.7	10.6	17.8	9.1
2001	7.5	15.3	17.5	9.4
2002	7.1	10.9	10.0	11.4
2003	9.0	9.0	14.4	11.2
2004	11.1	10.6	23.3	13.8

Source: Australian Gonococcal Surveillance Programme.

NR Not reported.

Map 5. Notification rates of syphilis infection, Australia, 2004, by Statistical Division of residence



Syphilis – infectious (primary, secondary and early latent), less than 2 years duration

Case definition – Syphilis – infectious (primary, secondary and early latent), less than 2 years duration

Only ***confirmed cases*** *are reported.*

Confirmed case: *Requires seroconversion in past two years (specific treponemal test (e.g. IgG enzyme immunoassay,* Treponema pallidum *haemagglutination assay,* Treponema palladium *particle agglutination,* Treponema pallidum *immobilisation assay), or fluorescent treponemal antibody absorption reactive when previous treponemal test non-reactive within past two years*

OR a fourfold or greater rise in non-specific treponemal antibody titre (e.g. Venereal Diseases Research Laboratory, Rapid Plasma Reagin) in the past two years, and a reactive specific treponemal test (e.g. IgG enzyme immunoassay, Treponema pallidum *haemagglutination assay,* Treponema pallidum *particle agglutination,* Treponema pallidum *immobilisation assay, or fluorescent treponemal antibody absorption)*

OR demonstration of Treponema pallidum *by darkfield microscopy (not oral lesions), direct fluorescent antibody tests, equivalent microscopic methods (e.g. silver stains), or nucleic acid testing or non-specific treponemal test (e.g. Venereal Diseases Research Laboratory, Rapid Plasma Reagin) reagin titre of greater than or equal to 1:8 AND presence of a primary chancre (or ulcer) or clinical signs of secondary syphilis.*

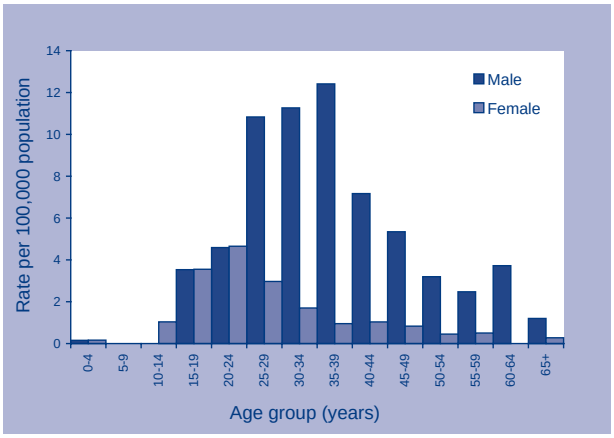
In 2004, a total of 596 cases of syphilis of less than two years duration were reported. This represents a notification rate of 3 cases per 100,000 population. The Northern Territory had the highest notification rate at 28.5 cases per 100,000 population in 2004 (Table 15).

Table 15. Number and rates of notifications of syphilis of less than two years duration Australia, 2004, by state or territory and sex

	Male		Female		Total	
	n	Rate	n	Rate	n	Rate
ACT	3	1.9	1	0.6	4	1.2
NSW	257	7.7	37	1.1	294	4.4
NT	27	25.7	30	31.7	57	28.5
Qld	69	3.6	23	1.2	92	2.4
SA	4	0.5	4	0.5	8	0.5
Tas	2	0.8	2	0.8	4	0.8
Vic	81	3.3	8	0.3	89	1.8
WA	25	2.5	25	2.5	50	2.5
Total	468	4.7	128	1.3	596	3.0

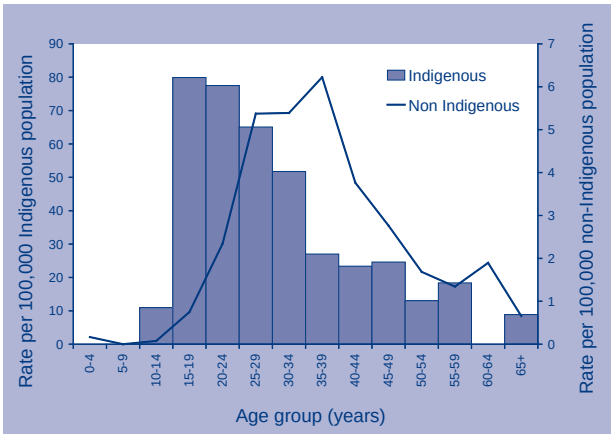
The notification rates of syphilis of less than two years duration for males and females were 4.7 and 1.3 cases per 100,000 population respectively. Notification rates were higher in males than in females in all jurisdictions except in the Northern Territory, where females had higher rates (26 versus 32 cases per 100,000 population). Nationally, the male to female ratio was 4:1. Notification rates in males peaked in the 35–39 year age group and in females in the 20–24 year age group (Figure 33).

Figure 33. Notification rates of syphilis of less than two years duration, Australia, 2004, by age group and sex



Data on Indigenous status was complete in 92 per cent of cases of syphilis of less than two years duration. The age adjusted notification rate was 37 cases per 100,000 Indigenous population, and 3 cases per 100,000 non-Indigenous population: a ratio of Indigenous to non-Indigenous of 14:1. Age specific notification rates show that compared to the non-Indigenous population, rates of syphilis of less than two years duration in the Indigenous population are in an order of magnitude higher and peak in a younger age group (Figure 34).

Figure 34. Notification rates of syphilis of less than two years duration, Australia, 2004, by Indigenous status



Syphilis of more than two years or unknown duration

Case definition – Syphilis of more than two years or unknown duration

*Only **confirmed cases** are reported.*

***Confirmed case:** Does not meet the criteria for a case of less than 2 years duration AND either a reactive specific treponemal test (e.g. IgG enzyme immunoassay,* Treponema pallidum *haemagglutination assay,* Treponema pallidum *particle agglutination,* Treponema pallidum *immobilisation assay, or fluorescent treponemal antibody absorption) which is confirmed either by a reactive non-specific treponemal test (e.g. Venereal Diseases Research Laboratory, Rapid Plasma Reagin) OR a different specific treponemal test if the non-specific treponemal test is nonreactive AND the absence of a history of documented previous adequate treatment of syphilis, or endemic treponemal disease (e.g. Yaws).*

In 2004, a total of 1,561 cases of syphilis of more than two years or unknown duration were reported: a notification rate of 7.7 cases per 100,000 population. The Northern Territory had the highest notification rate at 52 cases per 100,000 population (Table 3).

In 2004, notification rates of syphilis of more than two years or unknown duration in males and females were 9.4 and 6.1 cases per 100,000 populations, respectively (Table 16). Notification rates were higher in males in all jurisdictions except in the Northern Territory, where both sexes had equivalent notification rates (51.3 and 52.8 cases per 100,000 population for females and males, respectively. Nationally, the male to female ratio was 1.8:1. Notification rates in males and females were similar in the younger age groups up to 30–34 years (Figure 35). In females, the rate peaked in the 30–34 age group while in males it remained high from 35 years (Figure 35).

Data on Indigenous status was complete in 53 per cent of cases of syphilis of more than two years or unknown duration. The combined age adjusted rate for the jurisdictions with greater than 50 per cent data completeness of Indigenous status (all jurisdictions except New South Wales and the Australian Capital Territory) was 136 cases per 100,000 Indigenous population, and 5 cases per 100,000 non-Indigenous population: a ratio of Indigenous to non- Indigenous of 27:1. Age specific notification rates showed a similar pattern with age and no single distinct peak for either Indigenous or non-Indigenous groups. Overall, rates in the Indigenous population were higher than those in the non-Indigenous by an order of magnitude (Figure 36).

Figure 35. Notification rate of syphilis of more than two years or unknown duration, Australia, 2004, by age group and sex

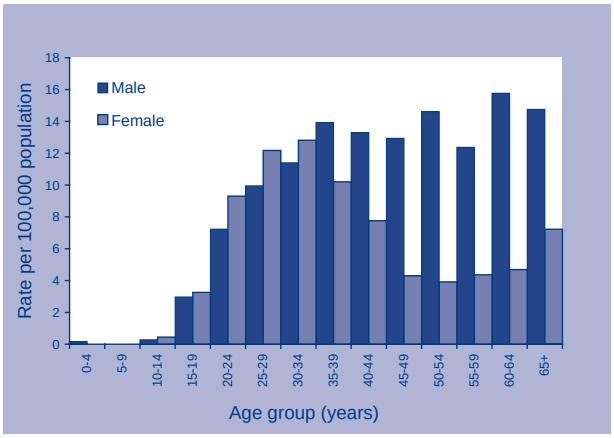


Figure 36. Notification rate of syphilis of more than two years or unknown duration, Australia, 2004, by Indigenous status

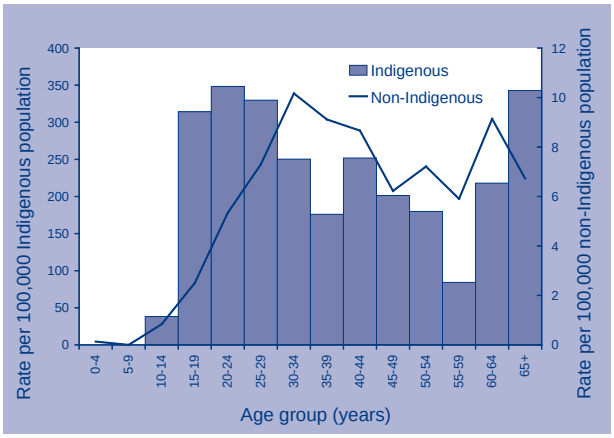


Table 16. Number and rate of notifications of syphilis of more than two years or unknown duration, Australia, 2004, by state or territory and sex

State or territory	Male		Female		Total	
	n	Rate	n	Rate	n	Rate
ACT	7	4.4	0	0	7	2.2
NSW	459	13.7	283	8.4	742	11.0
NT	54	51.3	50	52.8	104	52.0
Qld	109	5.6	89	4.6	198	5.1
SA	1	0.1	0	0.0	1	0.1
Tas	6	2.5	6	2.5	12	2.5
Vic	204	8.3	128	5.1	332	6.7
WA	101	10.2	56	5.7	157	7.9
Total	941	9.4	612	6.1	1,553	7.7

Congenital syphilis

Case definition – Congenital syphilis

*Both **confirmed cases** and **probable cases** are reported.*

***Confirmed case:** Requires treponemal-specific antibody titres (e.g.* Treponema pallidum *haemagglutination assay, pallidum particle agglutination, fluorescent treponemal antibody absorption in infant serum greater than fourfold higher than in maternal serum OR treponemal specific antibody titres in infant serum comparable with those in maternal serum and specific treponemal IgM enzyme-linked immunosorbent assay or immunofluorescence assay positive OR* T. pallidum *DNA in normally sterile specimen from infant (CSF, tissue) by nucleic acid testing.*

OR Dark field microscopy of infant lesion exudate or node aspirate smears (not oral lesions) to demonstrate characteristic morphology and motility of T. pallidum *OR demonstration of* T. pallidum *in infant tissues by special (e.g. silver) stains OR detection of* T. pallidum *DNA from an infant non-sterile site by nucleic acid testing OR reactive fluorescent treponemal absorbed-19S-IgM antibody test or IgM enzyme linked immunosorbent assay and treponemal-non specific antibody titre (e.g. RPR) in infant serum greater than fourfold higher than in maternal serum AND asymptomatic infection (in the infant of an infected mother) OR foetal death in utero OR stillbirth, which is a foetal death that occurs after a 20-week gestation or in which the foetus weighs greater than 500 g and the mother is untreated or inadequately treated for syphilis at delivery. Inadequate treatment is a non-penicillin regimen or penicillin treatment given less than 30 days prior to delivery OR clinical evidence of congenital syphilis on examination on:*

a. *Age <2years: Hepatosplenomegaly, rash, condyloma lata, snuffles, jaundice (non-viral hepatitis), pseudoparalysis, anaemia, oedema*

b. *Age >2 years: Interstitial keratitis, nerve deafness, anterior bowing of shins, frontal bossing, mulberry molar, Hutchinson teeth, saddle nose, rhagades or Clutton joints*

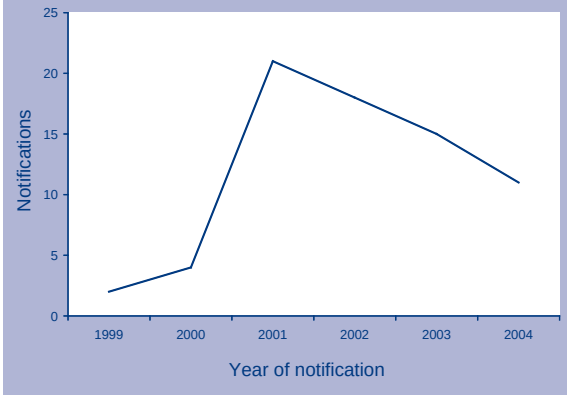
c. *Evidence of congenital syphilis on long bone X-ray*

d. *Evidence of congenital syphilis on cerebrospinal fluid (CSF) examination*

***Probable case:** An infant (regardless of clinical signs) whose mother has been inadequately treated for syphilis during pregnancy or an infant or child who has a reactive treponemal antibody test for syphilis and any one of the following: (1) any evidence of congenital syphilis on physical examination, (2) any evidence of congenital syphilis on radiographs of long bones, (3) a reactive cerebrospinal fluid Venereal Disease Research Laboratory Titre, (4) an elevated CSF cell count or protein (without other cause), (5) reactive fluorescent treponemal antibody absorbed assay –19S-IgM antibody test or IgM enzyme-linked immunosorbent assay*

There were 11 cases of congenital syphilis notified in 2004, 10 males and one female. Six of the cases were reported in the Northern Territory, four in Queensland and one in Victoria. All but two cases were Indigenous. There has been a gradual decline in the number of congenital syphilis notified since the peak in 2001 (Figure 37). In the Northern Territory where the rates of infectious syphilis of less than 2 years duration are highest, the highest numbers of cases of congenital syphilis continue to be reported. The occurrence of congenital syphilis could be reduced by improving access to early prenatal care.

Figure 37. Trends in notifications of congenital syphilis, Australia, 1999 to 2004



Vaccine preventable diseases

Introduction

This section summarises the national notification data for influenza and diseases targeted by the Australian Standard Vaccination Schedule (ASVS) except varicella in 2004. These include diphtheria, *Haemophilus influenzae* type b infection, measles, mumps, pertussis, invasive pneumococcal disease, poliomyelitis, rubella and tetanus. Notifications for hepatitis B and meningococcal disease, which are also targeted by the ASVS, can be found in this report under 'bloodborne diseases' and 'other bacterial infections' respectively. Other vaccine preventable diseases presented in this report include hepatitis A and Q fever.

The main change to the ASVS relevant to this reporting period was the removal of the fourth dose of the DTPa vaccine, due at 18 months of age, which occurred in September 2003. In 2004, Western Australia and New South Wales ran school-based programs to deliver dTpA vaccine to adolescents.

There were 13,206 notifications of vaccine preventable diseases (VPDs) with onset dates in 2004; 11.9 per cent of the total notifications to NNDSS. Pertussis was the most commonly notified VPD (8,557 or 65% of all VPD notifications). Numbers of notifications and notification rates for VPDs in Australia are shown in Tables 2 and 3.

Diphtheria

Case definition – Diphtheria

*Both **confirmed cases** and **probable cases** are reported.*

***Confirmed case:** Requires isolations of toxigenic* Corynebacterium diphtheriae *or toxigenic* C. ulcerans.

***Probable case:** Requires isolation of* Corynebacterium diphtheriae *or* C. ulcerans *(toxin production unknown) and pharyngitis/laryngitis or toxic symptoms OR clinical symptoms and epidemiological links with laboratory confirmed case.*

There were no cases of diphtheria reported in 2004. The last case of diphtheria reported in Australia was a case of cutaneous diphtheria in 2001.

Haemophilus influenzae type b

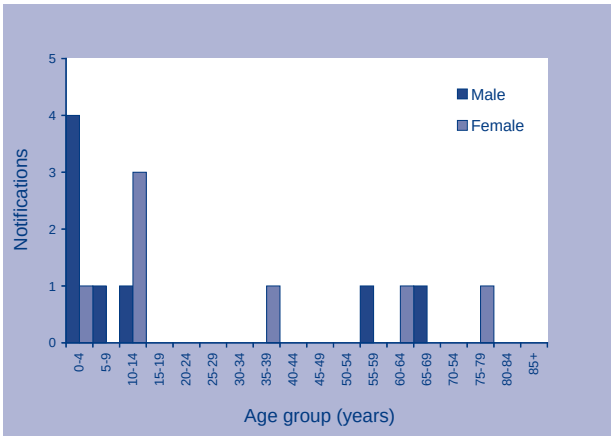
Case definition – Haemophilus influenzae type b

*Only **confirmed cases** are reported.*

***Confirmed case:** Requires isolation of* Haemophilus influenzae *type b (Hib) from a sterile site OR detection of Hib antigen in cerebrospinal fluid consistent with meningitis.*

Notifications of *Haemophilus influenzae* type b (Hib) have fallen more than 30-fold since 1991 due to the impact of Hib conjugate vaccines.[11] There were 15 notifications of Hib disease in 2004, a rate of 0.1 cases per 100,000 population. This is eight (35%) fewer cases than reported in 2003, and is the lowest number of notifications recorded since national surveillance began in 1991. Five cases (33% of total cases) were in children aged less than five years and two were infants aged less than one year (Figure 38). There were eight cases in males and seven in females, (male: female ratio 1.1:1).

Figure 38. Notifications of *Haemophilus influenzae* type b infection, Australia, 2004 by age group and sex



The Northern Territory had the highest notification rate (1.5 cases per 100,000 population, 3 cases) although most cases were from New South Wales (n=5).

Of the 14 cases with a known Indigenous status, two were Indigenous and 12 were non-Indigenous. Indigenous children now make up a greater proportion of cases than in the pre-immunisation era.[11] In a review of vaccine preventable disease in Indigenous people, 2000 to 2002, Menzies, *et al* observed a notification rate of Hib in Indigenous which was 9.7 times that in non-Indigenous people.[12] In 2004,

the Hib notification rate was 0.4 per 100,000 in Indigenous people and 0.06 per 100,000 in non-Indigenous people—a ratio of 6.7:1.

Cases under the age of 15 years were eligible for vaccination. The vaccination status of 9 of these 10 cases was known—two were unvaccinated, one partially vaccinated and six met the definition for vaccine failure, having received at least 2 doses under the age of 12 months. Of the vaccine failures, 3 (50%) were aged under 5 years.

A recent evaluation of the impact of Hib vaccination on Hib meningitis in Far North Queensland shows a dramatic decline in the incidence of this disease. In the four years prior to the addition of Hib vaccines to the ASVS, there were 28 cases of Hib meningitis in Far North Queensland and the rate of disease was 3.5 times greater in Indigenous children compared with non-Indigenous children. Since 1993, there has only been a single case of Hib meningitis, which was in a non-Indigenous child. The authors of this study estimated that in their region, Hib vaccination had prevented 70 cases of disease, five deaths and 12 cases with neurological sequelae.[13]

Influenza (laboratory confirmed)

Case definition – Influenza

*Only **confirmed cases** are notified.*

***Confirmed case:** Requires isolation of influenza virus by culture OR detection of influenza virus by nucleic acid testing OR detection of influenza virus antigen from an appropriate respiratory tract specimen OR a significant increase in antibody levels, or IgG seroconversion or fourfold or greater rise in antibody titre or a single high titre antibody.*

There were 2,073 reports of laboratory-confirmed influenza in 2004, a rate of 10.3 cases per 100,000 population. Notifications of influenza showed a peak in September 2004 (Figure 39).

Children aged less than 5 years made up 21 per cent of all notifications and had a notification rate of 34.8 cases per 100,000 population (Figure 40). Children aged less than 1 year had the highest rates (63.1 cases per 100,000 population). The overall male to female ratio was 1:1.

There were 72 notifications of influenza in Indigenous people in 2004. This gives a notification rate for influenza of 14.8 per 100,000 compared with 10 per 100,000 in non-Indigenous people—a rate ratio of 1.5:1. A higher rate of hospitalisation for influenza in Indigenous people was noted between 2000 and 2002.[12]

Figure 39. Notifications of laboratory-confirmed influenza, Australia, 2004, by month of onset

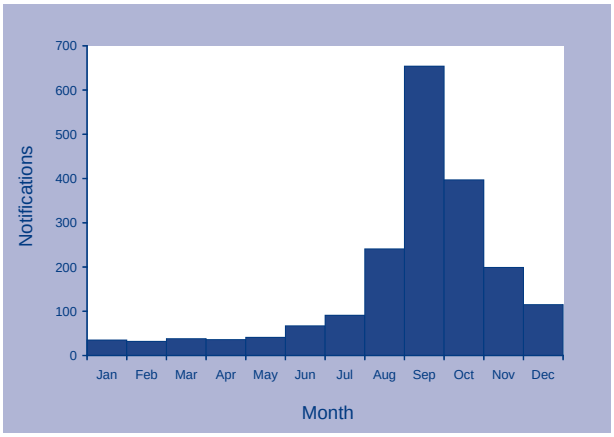
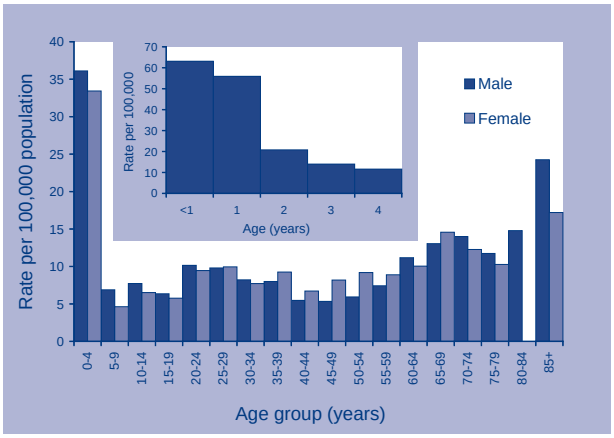


Figure 40. Notification rate of laboratory-confirmed influenza, Australia, 2004, by age group and sex



In 2004, 1,896 (91%) of notifications had serotype data. Of these 79 per cent (1,493) were influenza A and 21 per cent (403) were influenza B.

Of 454 isolates analysed at the WHO Collaborating Centre for Reference and Research on Influenza in 2004, 342 were A(H3N2), 3 were A(H1N1) strains and 108 were influenza B. The majority of A(H3N2) viruses were A/Fujian/411/2002(H3N2)-like with significant antigenic drift and were similar to the recent A/Wellington/1/2004 isolate.

In 2004, 79 per cent of those aged 65 years and over in Australia received influenza vaccination.[14]

There were a number of outbreaks of influenza in 2004. Two outbreaks occurred in army barracks, one in Victoria and another in Queensland. There were 13 outbreaks of influenza-like illness in 12 aged care facilities in New South Wales, marked by high attack rates (76% in residents and 42% in staff) and a case fatality rate of 14 per cent.

Measles

Case definition – Measles

*Both **confirmed cases** and **probable cases** are notified.*

***Confirmed case:** Requires isolation of measles virus or detection of measles virus by nucleic acid testing OR detection of measles virus antigen OR IgG seroconversion or significant increase in antibody level or fourfold or greater rise in titre or detection of measles specific IgM antibody in a reference laboratory (except when vaccinated 8 days to 8 weeks prior to testing) OR clinical illness characterised by a maculopapular rash and fever and cough, coryza, conjunctivitis or koplik spots and epidemiological link to a laboratory confirmed case.*

***Probable case:** Requires detection of measles IgM antibody in other than an approved reference laboratory and clinical illness.*

There were 45 measles cases in 2004, including 43 confirmed and 2 probable cases; a national rate of 0.2 cases per 100,000 population. This was a 54 per cent decrease compared with 2003 when 98 cases were notified, and is the second lowest annual rate for Australia since national surveillance began in 1991 (Figure 41). The highest rate was in the Northern Territory with 1.5 cases per 100,000 population (3 cases), while the largest number of cases were reported from Victoria (15 cases, 0.3 cases per 100,000 population). In 2004 there were no cases reported from the Australian Capital Territory, Queensland or Tasmania (Tables 2 and 3).

Notification rates were highest in the 25–29 year age group (1.2 cases per 100,000 population), followed by the 0–4 and 30–34 year age groups (0.5 cases per 100,000 population, Figure 42). There were only six cases in the under 5 year age group and three were aged less than 1 year (0.8 cases per 100,000 population).

Figure 41. Notifications of measles, Australia, 1997 to 2004, by month of onset

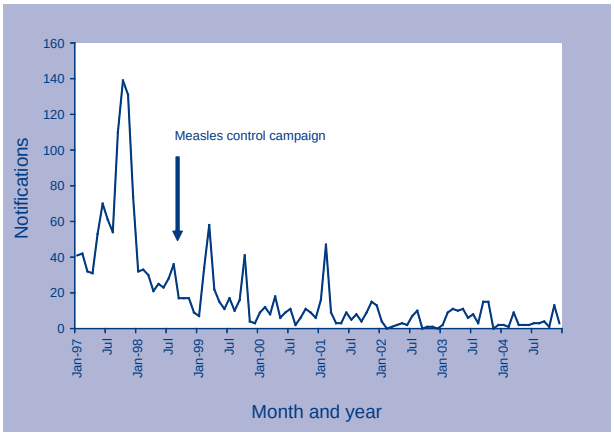
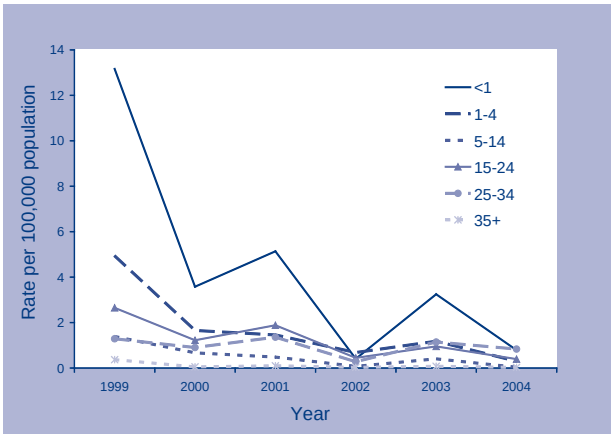


Figure 42 shows trends in measles notification rates by age group. In 2004 the largest proportion of measles cases occurred in adults, which reflects the success of measles vaccination programs in children and adolescents. A recent review suggests that indigenous transmission of measles has been interrupted and that Australia is making good progress toward measles elimination.[15]

Figure 42. Trends in notification rates of measles, Australia, 1999 to 2004, by age group



Of the 45 measles cases reported in 2004, 21 (46%) occurred in six outbreaks in three states (Table 17). The index case in four of the six outbreaks acquired their infection outside Australia.

The outbreak in Western Australia is significant because all six cases were in Indigenous people and there was no link to a confirmed imported index case. These were the only measles notification in Indigenous people in 2004, giving a rate of 1.2 per 100,000 population compared with 0.2 per 100,000 in non-Indigenous people (a rate ratio of 6:1).

Table 17. Outbreaks and clusters of measles, Australia,* 2004

State or territory	Month of onset	Number of linked cases (including index case)	Place of acquisition of infection in index case
New South Wales	Mar	2	Overseas
New South Wales	Mar	4	Overseas
Victoria	Apr	2	Overseas
Victoria	July	4	Victoria
Victoria	Nov	3	Overseas
Western Australia	Nov	6	Not identified

* There were no cases of measles reported in 2004 in the Australian Capital Territory, Queensland or Tasmania

The vaccination status was recorded for 25 of the 42 cases born after the introduction of measles vaccination in 1970: 19 were unvaccinated, four were partially vaccinated and two were fully vaccinated for age. Both 'fully vaccinated for age' cases had only received a single dose of measles-mumps-rubella (MMR) vaccine: one was a 1-year-old child who was fully vaccinated for age and the other was a 16-year-old who should be regarded as partially vaccinated.

Mumps

Case definition – Mumps

*Only **confirmed cases** are notified.*

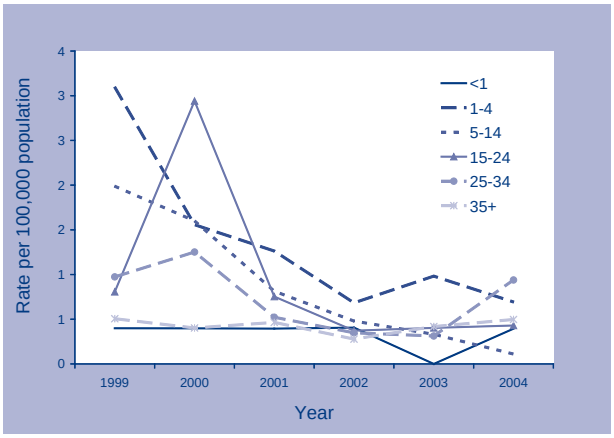
***Confirmed case:** Requires isolation of mumps virus or detection of mumps virus by nucleic acid testing or IgG seroconversion or significant increase in antibodies or a significant increase in antibody level, or a fourfold or greater rise in titre to mumps virus (except where there has been recent mumps vaccination) OR detection of mumps specific IgM antibody (in the absence of recent mumps vaccination) AND a clinically compatible illness characterised by swelling of the parotid or other salivary glands lasting two days or more without other apparent cause OR a clinically compatible illness AND an epidemiological link to a laboratory confirmed case.*

In 2004, there were 102 notifications of mumps, a rate of 0.5 cases per 100,000 population. This was a 24 per cent increase on the 82 cases reported in 2003. Unlike 2003 when there was a preponderance of cases in males (male:female ratio 1.5:1), the male:female ratio in 2004 was 1:1.

The highest rates were in the 25–29 year age group (1.3 cases per 100,000 population). The rate for the 0–4 year age group (0.6 cases per 100,000 population) was similar to that seen in 2003.

Trends in age group notification rates for mumps (Figure 43) show an increase in the rates in the 25–34 year age group since 2003. Increases in mumps in England and Wales, predominately among older teenagers and young adults who had not received two doses of MMR vaccine, have also been observed.[16]

Figure 43. Trends in notification rates for mumps, Australia, 2004, by age group



Pertussis

Case definition – Pertussis

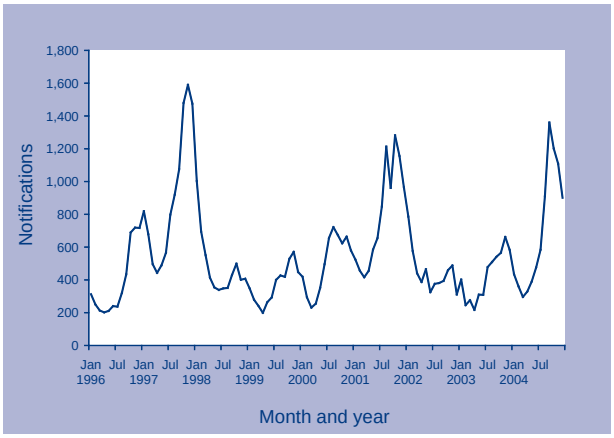
*Both **confirmed cases** and **probable cases** are notified.*

***Confirmed case:** Requires isolation of* Bordetella pertussis *or detection of* B. pertussis *by nucleic acid testing OR seroconversion or significant increase in antibody level or fourfold or greater rise in titre (in the absence of pertussis vaccination) or a single high-titre IgA to whole cells or detection of B. pertussis by immunofluorescence AND **clinical evidence** (a coughing illness lasting 2 weeks or more or paroxysms of coughing or inspiratory whoop or post-tussive vomiting) OR **clinical evidence** AND epidemiological link to a confirmed case.*

***Probable case:** Requires clinically compatible illness.*

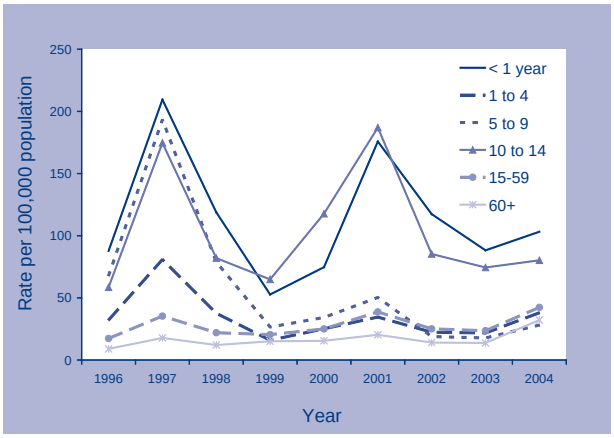
Pertussis continues to be the most common vaccine preventable illness in Australia, with periodic epidemics occurring at intervals of 3 to 5 years on a background of endemic circulation (Figure 44). In 2004, there were 8,557 cases (42.5 cases per 100,000 population) notified to NNDSS. Of these, 7,638 were confirmed and 649 were probable cases, while the status of the remaining 270 cases was unknown.

Figure 44. Notifications of pertussis, Australia, 1996 to 2004, by month of onset



The highest notification rates were among children aged <1 year (262 cases, 103.1 cases per 100,000 population) and those in the 10–14 year age group (1,112 cases, 80.2 cases per 100,000 population) (Figure 45). The notification rate in persons aged 60 years and over rose dramatically between 2003 and 2004 (13.8 versus 33.6 cases per 100,000 population). This is in contrast to the relatively steady annual rates previously seen in this age group. In 2004, 74 per cent of pertussis cases were aged 15 years or over. Although severe morbidity and mortality are less likely in these age groups, they are an important pertussis reservoir, facilitating transmission to children too young to be fully vaccinated. The overall male to female ratio was 0.8:1.

Figure 45. Trends in notification rates for pertussis, Australia, 1996 to 2004 by age group



Notification rates of pertussis varied considerably by geographic location (Map 6). At the State/Territory level, rates were highest in Western Australia (105.8 cases per 100,000 population) and lowest in Tasmania (7.7 cases per 100,000 population).

There was an outbreak of pertussis in the Western Australia in 2004, where the notification rate was the highest since 1997. A relatively large proportion of notifications were in secondary school students, so a mass vaccination campaign with dTpa was instituted in secondary schools. New South Wales also had a school-based dTpa campaign in 2004. New South Wales and South Australia recorded rates of pertussis for all ages above the national average in 2004 (Figure 46).

Map 6. Notification rates of pertussis, Australia, 2004, by Statistical Division of residence

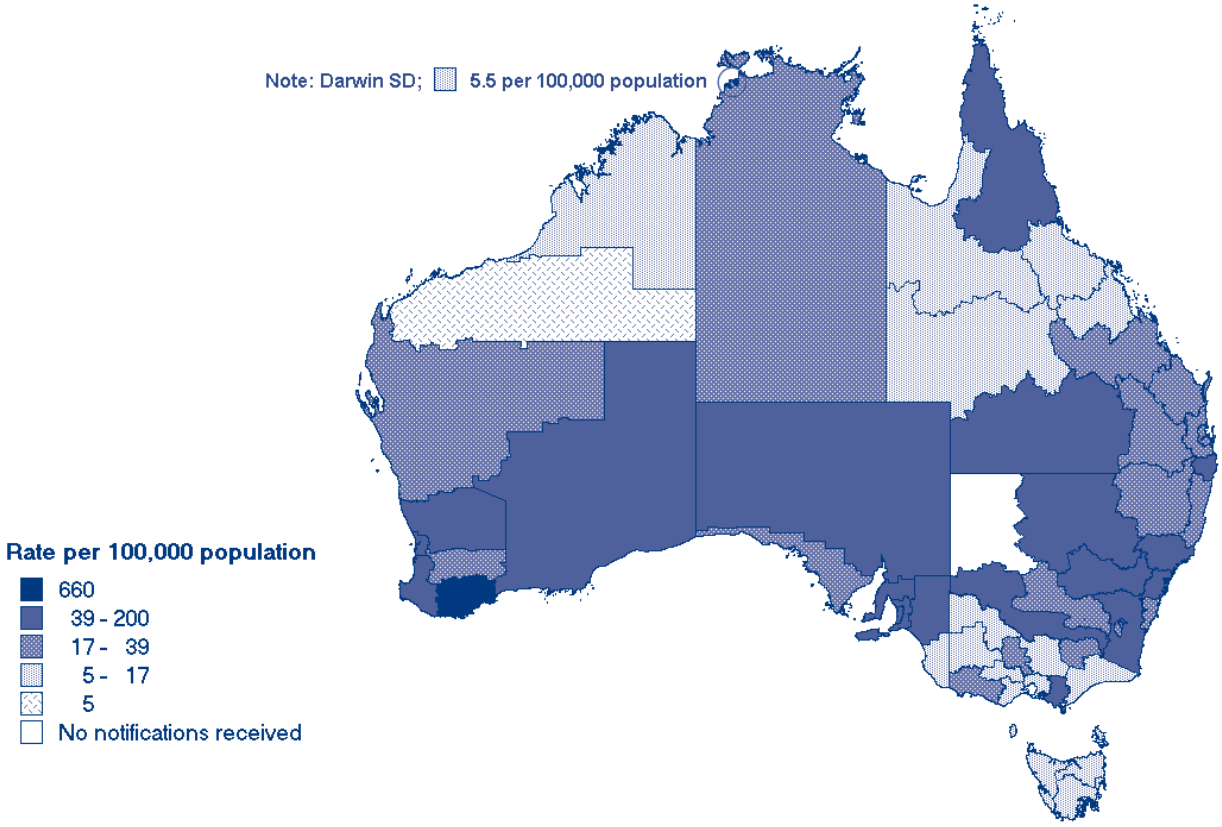
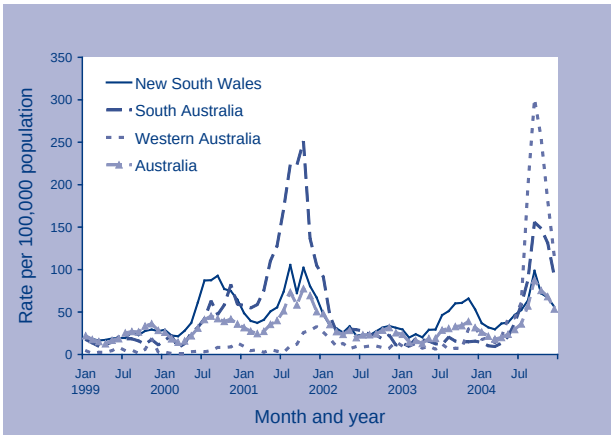


Figure 46. Notification rates of pertussis, New South Wales, South Australia, Western Australia and Australia, 1999 to 2004, by month of notification



There were 153 cases who were identified as Indigenous (31.6 cases per 100,000 population) and 8,227 who were identified as non-Indigenous (41.9 cases per 100,000 population). The Indigenous pertussis notification rate ratio for all ages was therefore 0.75, but it is important to note that previous analyses have shown that, in the age groups where the disease is most severe, there were higher rates in Indigenous compared to non-Indigenous populations. For example, in 2000–2002 the notification rate ratio for children aged 0–4 years was 1.7, and 2.6 for those aged less than one year.[12]

A review of cough symptoms in children in Sydney has provided evidence of cases of pertussis which are not notified. Clinically diagnosed pertussis was estimated to be between 5 and 20 times the notification rates.[17]

Invasive pneumococcal disease

Case definition – Invasive pneumococcal disease

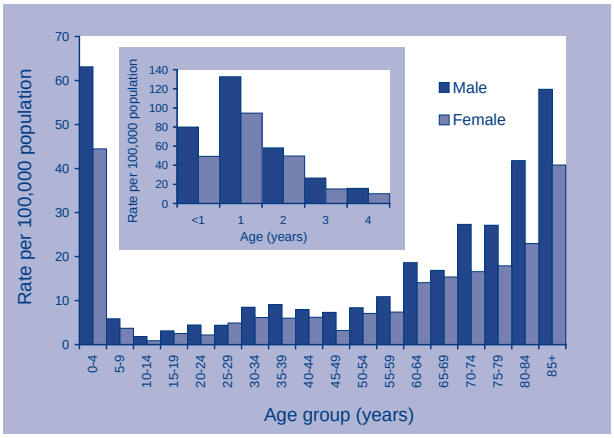
*Only **confirmed cases** are notified.*

***Confirmed case:** Requires isolation of* Streptococcus pneumoniae *from a normally sterile site by culture or detection by nucleic acid testing.*

There were 2,375 notifications of invasive pneumococcal disease (IPD) in Australia in 2004 giving a rate of 11.8 cases per 100,000 population. While the largest number of cases were reported from New South Wales, Queensland and Victoria (Table 1), the highest rate was in the Northern Territory (47 cases per 100,000 population). The geographical distribution of IPD varied within states and territories, with the highest rates in Central and northern Australia.

In 2004, IPD remained largely a disease of the very young and very old. The highest rates of disease were among children aged less than 5 years (54.3 cases per 100,000 population, with peak rates in 1-year-olds, 114 cases per 100,000 population) and adults aged more than 85 years (46.3 cases per 100,000 population) (Figure 47). There were more cases among males, with a male to female ratio of 1.4:1.

Figure 47. Notification rate for invasive pneumococcal disease, Australia, 2004, by age group and sex



There were 174 cases of IPD in Indigenous people (35.9 cases per 100,000 population) and 2,201 in non-Indigenous people (11.2 cases per 100,000 population), an Indigenous:non-Indigenous ratio of 3.2:1.

Additional data were collected on cases of invasive pneumococcal disease in all Australian jurisdictions during 2004. Analyses of these data can be found in the IPD annual report in this issue.[18]

Poliomyelitis

Case definition – Poliomyelitis

*Both **confirmed cases** and **probable cases** are notified.*

***Confirmed case:** Requires isolation of wild-type poliovirus or detection of wild-type poliovirus by nucleic acid testing (confirmed in reference laboratory) and acute flaccid paralysis.*

***Probable case:** Requires acute flaccid paralysis not due to other causes as determined by the Polio Expert Committee.*

No cases of poliomyelitis were reported in Australia in 2004.

There were 62 notifications of acute flaccid paralysis (AFP) reported in 2004. Of these 49 occurred in children aged less than 15 years. This represents an AFP notification rate of 1.2 cases per 100,000 children aged less than 15 years and meets the WHO indicator target for adequate AFP reporting. One infant AFP case had Sabin-like polioviruses 1 and 2 isolated from stool. The Polio Expert Committee classified this case as infant botulism based on the detection of *Clostridium botulinum* serotype B toxin and isolation of *C. botulinum* serotype B organism from a faecal sample.[19]

Rubella

Case definition – Rubella

*Both **confirmed cases** and **probable cases** are notified.*

***Confirmed case:** Requires isolation of rubella virus OR detection of rubella virus by nucleic acid testing OR IgG seroconversion or significant increase in antibody level or fourfold or greater rise in titre to rubella virus in the absence of recent rubella vaccination, OR detection of rubella specific IgM in the absence of recent rubella vaccination and confirmed in a reference laboratory.*

Probable case:** Requires **clinical evidence** AND **laboratory suggestive evidence** OR **epidemiological evidence.

***Laboratory suggestive evidence:** In a pregnant patient, detection of rubella-specific IgM that has not been confirmed in a reference laboratory, in the absence of recent rubella vaccination.*

***Clinical evidence:** A generalised maculopapular rash AND fever AND arthralgia/arthritis OR lymphadenopathy OR conjunctivitis*

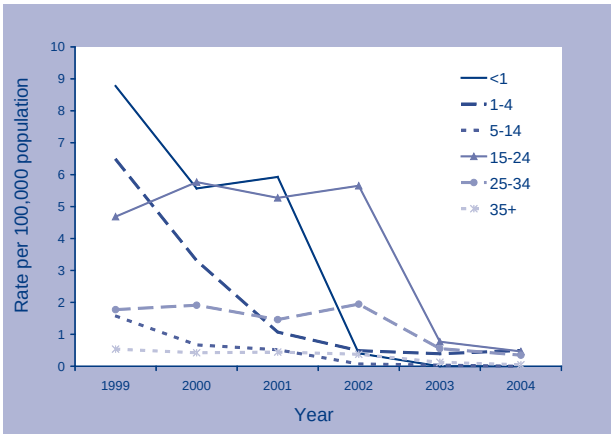
***Epidemiological evidence:** An epidemiological link is established when there is: 1. Contact between two people involving a plausible mode of transmission at a time when: a) one of them is likely to be infectious (about one week before to at least four days after appearance of rash) AND b) the other has an illness which starts within 14 and 23 days after this contact AND 2. At least one case in the chain of epidemiologically linked cases (which may involve many cases) is laboratory confirmed.*

In 2004, there were 33 notifications for rubella: 32 confirmed and one probable case; a notification rate of 0.2 cases per 100,000 population. This is the lowest rate on record and a 40 per cent reduction on 2003 (55 notifications, 0.3 cases per 100,000 population). In 2004, New South Wales accounted for 52 per cent of all notified cases of rubella (17 cases, notification rate 0.3 cases per 100,000 population) and Queensland 30 per cent (10 cases, 0.3 cases per 100,000 population).

The male to female ratio of notified cases in 2004 was 1:1 in contrast to the male predominance seen in 1999 (male:female ratio 1.4:1), 2002 (male:female ratio 3.0:1) and 2003 (male:female ratio 1.6:1).

Figure 48 shows trends in rubella notification rates in different age groups. The rates in older teenagers and young adults continued to decline in 2004.

Figure 48. Trends in notification rates for rubella, Australia, 2004, by age group and sex



There was a single case of congenital rubella reported from New South Wales in 2004. The child was born to an unvaccinated overseas-born mother. Altogether there were 14 cases of rubella notified from women of child-bearing age (15–49 years) in 2004.

Tetanus

Case definition – Tetanus

*Only **confirmed cases** are notified.*

***Confirmed case:** Requires isolation of* Clostridium tetani *from a wound in a compatible clinical setting and prevention of positive tetanospasm in mouse test using a specific tetanus antitoxin OR a clinically compatible illness without other apparent cause.*

In 2004, there were five notifications of tetanus. Four were female and one was male and all were aged over 60 years.

Childhood vaccination coverage reports

Estimates of vaccination coverage both overall and for individual vaccines for children at 12 months, 24 months and 6 years of age in 2004 are shown in Table 18, Table 19, and Table 20, respectively. Over the four quarters, there were no significant changes in coverage for all three age groups. Coverage of all vaccines used to assess 'fully immunised' status at 24 months of age was higher than for the other two age groups. Coverage for all vaccines at 6 years of age remains significantly lower (8–9 percentage points) than at 12 and 24 months and still is of concern.

Vectorborne diseases

During 2004, there were 6,000 notifications of mosquito-borne diseases reported to NNDSS. The notifiable mosquito-borne diseases include those caused by the alphaviruses (Barmah Forest virus and Ross River virus), flaviviruses (the viruses causing dengue, Murray Valley encephalitis, Kunjin and Japanese encephalitis) and malaria.

Alphavirues

Alphaviruses are RNA viruses which cause disease epidemics characterised by fever, rash and polyarthritis. In Australia, Barmah Forest virus and Ross River virus are the alphaviruses of major public health significance. There are a variety of mosquito vectors for Barmah Forest virus and Ross River virus, which facilitate the transmission of these viruses in diverse environments (freshwater habitats, coastal regions, salt marshes, floodwaters, established wetlands and urban areas).[20]

Table 18. Percentage of Australian children born in 2003 immunised according to data available on the Australian Childhood Immunisation Register, estimate at one year of age

Vaccine	Birth cohort			
	1 Jan–31 Mar 2003	1 Apr– 30 Jun 2003	1 Jul–30 Sep 2003	1 Oct–31 Dec 2003
DTP	92.3	92.7	92.6	92.2
OPV	92.2	92.6	92.5	92.0
Hib	94.5	94.8	94.8	94.4
Hepatitis B	94.7	94.9	95.0	94.7
Fully immunised	90.9	91.3	91.2	90.7

Table 19. Percentage of Australian children born in 2002 immunised according to data available on the Australian Childhood Immunisation Register, estimate at two years of age

Vaccine	Birth cohort			
	1 Jan–31 Mar 2002	1 Apr–30 Jun 2002	1 Jul–30 Sep 2002	1 Oct–31 Dec 2002
DTP	95.5	95.3	95.0	94.9
OPV	94.9	95.2	95.0	94.8
Hib	93.4	93.8	93.4	93.2
MMR	93.5	93.9	93.6	93.4
Hepatitis B	95.7	95.9	95.4	95.5
Fully immunised	91.7	92.3	91.7	91.7

Table 20. Percentage of Australian children born in 1998 immunised according to data available on the Australian Childhood Immunisation Register, estimate at six years of age

Vaccine	Birth cohort			
	1 Jan–31 Mar 1998	1 Apr–30 Jun 1998	1 Jul–30 Sep 1998	1 Oct–31 Dec 1998
DTP	85.2	85.4	85.2	84.7
OPV	85.2	85.3	85.2	84.8
MMR	84.8	84.8	84.8	84.6
Fully immunised	83.5	83.6	83.6	83.3

Barmah Forest virus infection

Case definition – Barmah Forest virus infection

*Only **confirmed cases** are reported.*

***Confirmed case:** Requires isolation of Barmah Forest virus, OR detection of Barmah Forest virus by nucleic acid testing, OR IgG seroconversion or a significant increase in antibody level or a fourfold or greater rise in titre to Barmah Forest virus, OR detection of Barmah Forest virus-specific IgM.*

There were 1,052 notifications of Barmah Forest virus (BFV) infection notified to NNDSS in 2004, which accounts for 18 per cent of the total mosquito-borne disease notifications for the reporting period. Eighty-nine per cent of BFV notifications were reported from Queensland (n=535) and New South Wales (n=402).

The highest rates of BFV notifications were reported by Queensland (13.8 cases per 100,000 population), the Northern Territory (11 cases per 100,000 population) and New South Wales (6 cases per 100,000 population). The national BFV notification rate was 5.2 cases per 100,000 population which was the third highest since 1999. Figure 49 shows that there was a peak in the BFV notification rate in Queensland in March 2004 (26.6 cases per 100,000 population). The Northern Territory reported a peak

BFV notification rate in May 2004 (24.4 cases per 100,000 population), whereas New South Wales reported a peak BFV notification rate in April 2004 (9.8 cases per 100,000 population). The peak BFV notification rates in 2004 for Queensland and New South Wales represent a 60–66 per cent reduction from the previous peak notification rates in 2003.

The highest rate of BFV infection in 2004, was in the mid-North Coast area of New South Wales (67.5 cases per 100,000 population, Map 7).

Figure 50 shows the age and sex distribution of BFV notifications. The national rate of notifications for BFV was highest amongst the 50–54 year age group (10.4 cases per 100,000 population), and the male to female ratio was 1:1. Males in the 50–54 year age group had the highest age-specific rates (12.4 cases per 100,000 population). The highest age-specific BFV notification rate in females was recorded in the 45–49 year age group (9 cases per 100,000 population).

Figure 49. Notification rates for Barmah Forest virus infection, select jurisdictions, January 1999 to December 2004, by month and year of onset

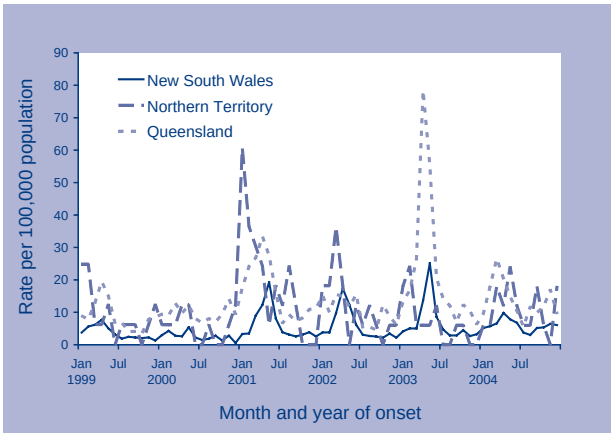
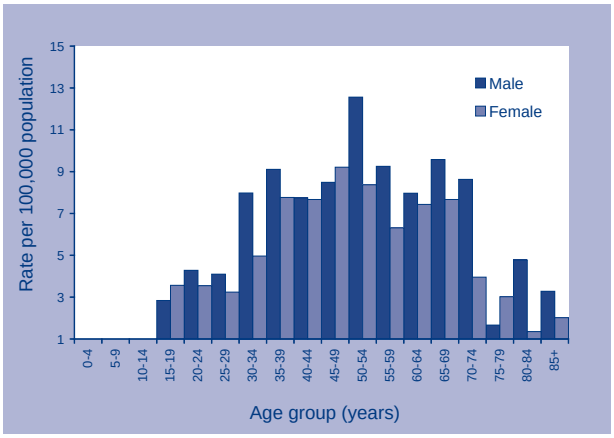
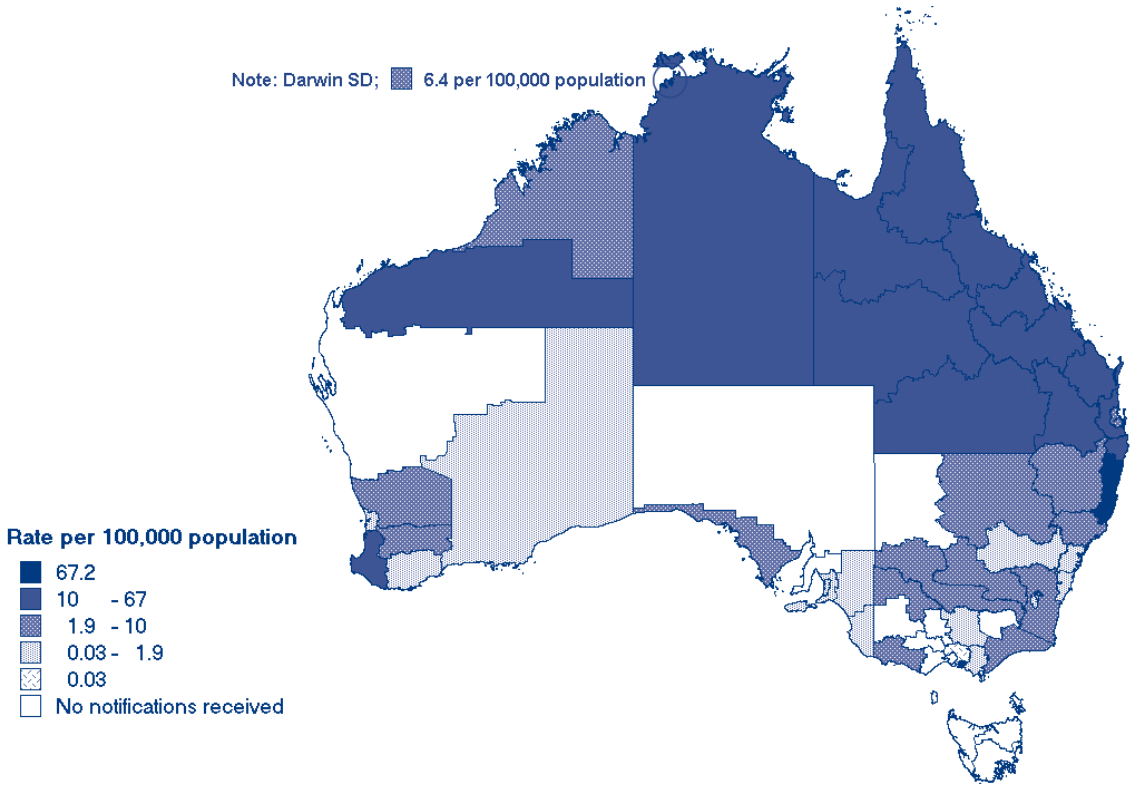


Figure 50. Notification rates for Barmah Forest virus infections, Australia, 2004, by age group and sex



Map 7. Notification rates for Barmah Forest virus infection, Australia, 2004, by Statistical Division of residence



Ross River virus infection

Case definition – Ross River virus infection

*Only **confirmed cases** are reported.*

***Confirmed case:** Requires isolation of Ross River virus, OR detection of Ross River virus by nucleic acid testing, OR IgG seroconversion or a significant increase in antibody level or a four-fold or greater rise in titre to Ross River virus, OR detection of Ross River virus-specific IgM.*

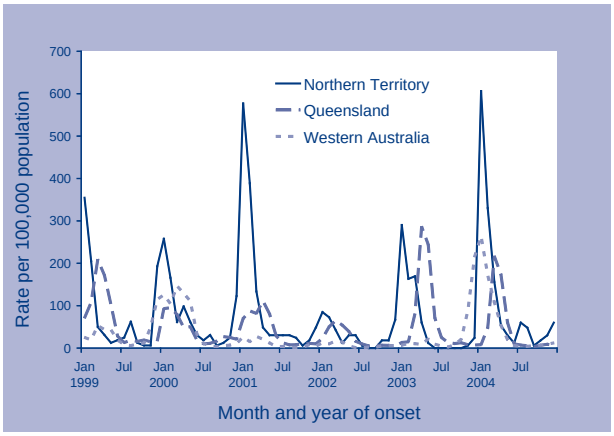
There were 4,000 notifications of Ross River virus (RRV) infection reported to NNDSS in 2004, which accounts for two-thirds (67%) of the total mosquito-borne disease notifications received in 2004.

The highest contributors to RRV notifications in 2004 were Queensland (45%, n=1,795), Western Australia (27%, n=1,099), and New South Wales (18%, n=700). The highest rates of infection were reported by the Northern Territory (117.6 cases per 100,000 population), Western Australia (55.4 cases per 100,000), and Queensland (46.2 cases per 100,000 population). The 2004 national RRV notification rate (19.9 cases per 100,000) was the third highest RRV notification rate reported to NNDSS since 1999.

Map 8 shows that the highest rate of RRV infection in 2004, was in the Kimberley region area of Western Australia (202.8 cases per 100,000 population).

RRV infection notifications in the Northern Territory peaked in January 2004 at 606.3 cases per 100,000 population (Figure 51). This was the highest rate since 1999, closely resembling the RRV peak notification rate and profile in the Northern Territory in January 2001. Queensland reported the peak notification rate for RRV in March 2004 at 216.7 cases per 100,000 population, and this was a 24 per cent reduction from the peak notification rate for April 2003 (286.3 cases per 100,000 population).

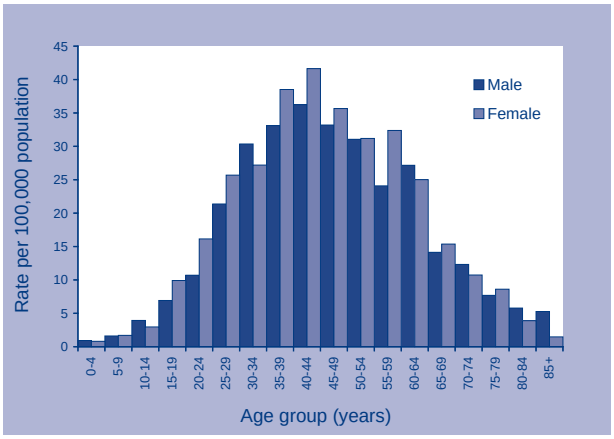
Figure 51. Notification rates for Ross River virus infection, select jurisdictions, 1999 to 2004, by month and season of onset



In Western Australia, a state-wide outbreak of RRV peaked in January 2004 at 263.9 cases per 100,000 population which was the largest recorded outbreak of RRV in Western Australia[21,22] despite early warning through media and publicity channels. The predisposing environmental, entomological and virological aspects of the outbreak have been described elsewhere.[22,23]

The age and sex distribution of RRV notifications are shown in Figure 52. The notification rates were highest in the 40–44 age group (38.9 cases per 100,000 population) and the female to male ratio was 1:0.9.

Figure 52. Notification rates for Ross River virus infection, Australia, 2004, by age group and sex

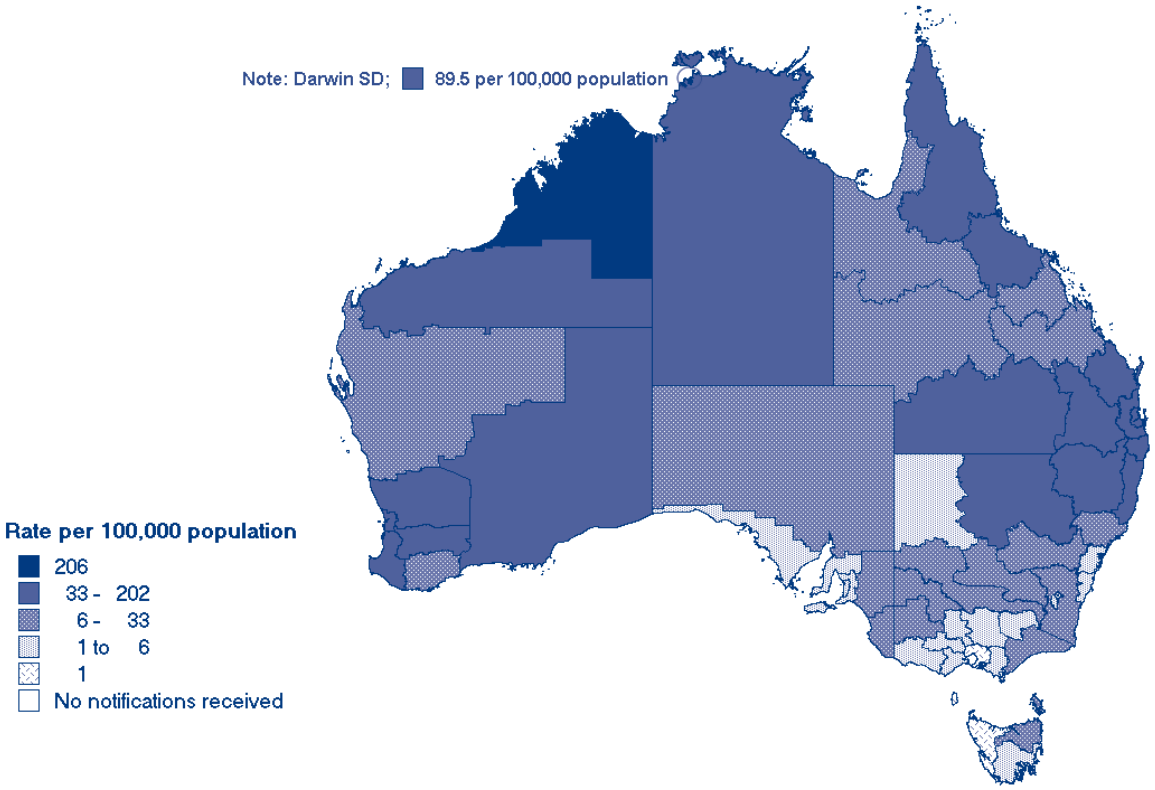


Flaviviruses

Flaviviruses are single-stranded RNA viruses, some of which are associated with epidemic encephalitis in various regions of the world. In Australia, the flaviviruses of public health importance are Murray Valley encephalitis virus (MVEV), Kunjin virus (KUNV), Japanese encephalitis and dengue viruses.

The Sentinel Chicken Programme is a surveillance network involving New South Wales, the Northern Territory, Victoria and Western Australia, and is designed to provide early warning of increased flavivirus activity.[24] Antibodies to MVEV and KUNV are detected in sentinel flocks located in four Australian states. Sentinel chicken surveillance reports from previous seasons have been published,[25–27] and the latest report was published in *CDI* in 2005 as part of the National Arbovirus and Malaria Advisory Committee annual report, 2004–05.[28]

Map 8. Notification rates for Ross River virus infections, Australia, 2004, by Statistical Division of residence



Murray Valley encephalitis virus

Case definition – Murray Valley encephalitis virus

*Only **confirmed cases** are reported.*

***Confirmed case:** Requires isolation of Murray Valley encephalitis virus, OR detection of Murray Valley encephalitis virus by nucleic acid testing, OR IgG seroconversion or a significant increase in antibody level or a fourfold or greater rise in titre to Murray Valley encephalitis virus, OR detection of Murray Valley encephalitis virus-specific IgM in cerebrospinal fluid in the absence of IgM to Kunjin, Japanese encephalitis or dengue viruses, OR detection of Murray Valley encephalitis virus-specific IgM in serum in the absence of IgM to Kunjin, Japanese encephalitis or dengue viruses. This is only accepted as laboratory evidence for encephalitic illnesses.*

AND Non-encephalitic disease: acute febrile illness with headache, myalgia and/or rash, OR encephalitic disease: acute febrile meningo-encephalitis characterised by one or more of the following: 1. focal neurological disease or clearly impaired level of consciousness, 2. an abnormal computerised tomograph or magnetic resonance image or electrocardiograph, 3. presence of pleocytosis in cerebrospinal fluid, OR asymptomatic disease: Case detected as part of a serosurvey should not be notified.

Confirmation of laboratory result by a second arbovirus reference laboratory is required if the case occurs in areas of Australia not known to have established enzootic/endemic activity or regular epidemic activity.

In April 2004, there was one notification of MVEV from Central Australia, when an 11-month-old infant with an onset of symptoms in March 2004 was hospitalised in Alice Springs for one week, and then transferred to South Australia. The infant developed serious neurological sequelae and after a long and debilitating illness, died from complications from MVEV. The Health Department of the Northern Territory government issued a general seasonal warning for

MVEV and KUNV for the Alice Springs region and other regions in January 2004, and for the Top End in March 2004 after sentinel chicken seroconversions in the Leanyer swamp area near Darwin, and in April for the whole of the Northern Territory after notification of the MVEV case.

Kunjin virus

Case definition – Kunjin virus

*Only **confirmed cases** are reported.*

***Confirmed case:** Requires isolation of Kunjin virus, OR detection of Kunjin virus by nucleic acid testing, OR IgG seroconversion or a significant increase in antibody level or a fourfold or greater rise in titre to Kunjin virus, OR detection of Kunjin virus-specific IgM in cerebrospinal fluid, OR detection of Kunjin virus-specific IgM in serum in the absence of IgM to Murray Valley encephalitis, Japanese encephalitis or dengue viruses. This is only accepted as laboratory evidence for encephalitic illnesses.*

AND Non-encephalitic disease: acute febrile illness with headache, myalgia and/or rash, OR encephalitic disease: acute febrile meningoencephalitis characterised by one or more of the following: 1. focal neurological disease or clearly impaired level of consciousness, 2. an abnormal computerised tomograph or magnetic resonance image or electrocardiograph, 3. presence of pleocytosis in cerebrospinal fluid, OR asymptomatic disease: case detected as part of a serosurvey should not be notified.

Confirmation of laboratory result by a second arbovirus reference laboratory is required if the case occurs in areas of Australia not known to have established enzootic/endemic activity or regular epidemic activity.

There were 12 notifications of KUNV during 2004, with 11 of the cases reported from Queensland. These 11 cases were symptomatic with a mild febrile illness but without encephalitis. Of the 11 cases, nine were reported in January and February 2004 and it is likely that these cases were identified because of increased testing undertaken in north Queensland due to the major dengue outbreak (Jeffrey Hanna, personal communication). There is nothing to indicate any genuine increase in human health risk from Kunjin virus activity during that time.

The other jurisdiction to report a KUNV notification in 2004 was Victoria. In October 2004, a 35-year-old female was notified as having acquired KUNV infection. The person lived in metropolitan Melbourne, but a detailed investigation did not reveal any likely exposure within Victoria, nor was there any other evidence of KUNV activity. She had travelled extensively overseas and it is assumed that she acquired KUNV or a closely-related virus while overseas.

Dengue virus infection

Case definition – dengue virus

*Only **confirmed cases** are reported.*

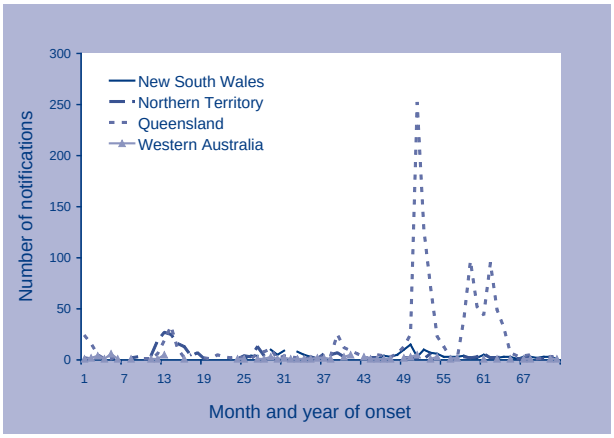
***Confirmed case:** Requires isolation of dengue virus, OR detection of dengue virus by nucleic acid testing, OR IgG seroconversion or a significant increase in antibody level or a fourfold or greater rise in titre to dengue virus, proven by neutralisation or another specific test, OR detection of dengue virus-specific IgM in cerebrospinal fluid, in the absence of IgM to Murray Valley encephalitis, Kunjin, or Japanese encephalitis viruses, OR detection of dengue virus-specific IgM in serum, except in North Queensland. In North Queensland, dengue virus-specific IgM in serum is acceptable evidence ONLY when this occurs during a proven outbreak.*

AND A clinically compatible illness (e.g. fever, headache, arthralgia, myalgia, rash, nausea, and vomiting, with a possible progression to dengue haemorrhagic fever, dengue shock syndrome or meningoencephalitis).

Confirmation of laboratory result by a second arbovirus reference laboratory is required if the case occurs in previously unaffected areas of Australia. Currently North Queensland is the only area with the potential for indigenous (epidemic) dengue virus in Australia.

During 2004, there were 326 notifications of dengue (DENV) reported to NNDSS, of which Queensland reported 249 notifications (76%). The only locally acquired notifications were reported by Queensland (n=181), while other jurisdictions reported imported cases from overseas (n=70), or from unknown sources (n=74). Queensland reported a peak in DENV notifications in November 2003 and February 2004 (95–97 cases). These were much lower than the previous peak of 252 notifications in March 2003 (Figure 53).

Figure 53. Notifications of dengue (locally acquired and imported cases), select jurisdictions, January 1998 to June 2005, by month and year of onset



The Queensland notifications resulted from outbreaks that began in late 2003 in Cairns, Townsville and the Torres Strait islands. A summary of identified outbreaks of locally acquired cases is shown in Table 21.

Dengue serotype 2 was the major serogroup circulating in Queensland during these outbreaks. A 40-year-old Torres Strait Islander woman and 70-year-old man died from dengue shock syndrome (DSS) in February and March 2004, respectively, and it has been suggested that the primary infection for these two cases occurred in 1981,[29] when there was a dengue serotype 1 epidemic. The deaths from DSS were the first from locally acquired dengue in Australia for 100 years.

An incursion of the mosquito vector for DENV, *Aedes aegypti*, occurred in Tennant Creek in the Northern Territory in February 2004.[30,31] This species of mosquito has not been endemic in the Northern Territory since 1955.[32] Mosquito control activities including fogging in residential and public places, distribution of surface sprays, removal of water-filled receptacles and residual insecticide spraying were initiated along with public awareness campaigns.[33] No human cases of dengue were reported in Tennant Creek.

The age and sex distribution of DENV notifications is shown in Figure 54. Most cases in males occurred in the 30–34 year age group (25 cases), and in females in the 25–29 year age group (24 cases).

Figure 54. Notifications of dengue (locally acquired and imported cases), Australia, 2004, by age group and sex

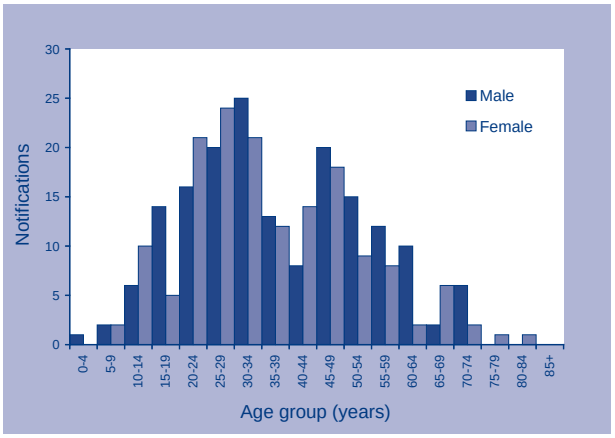


Table 21. Outbreaks of locally acquired cases of dengue, Queensland, 2003 to 2004

Year	Location	Reported cases	Duration (weeks)	Type
2003–04	Cairns, Townsville, Torres	536	69	Dengue 2
2003–04	Torres, Cairns	356	41	Dengue 2
2004	Torres	1	1	Dengue 2

Data provided by Dr Jeffrey Hanna, Tropical Public Health Unit, Cairns, November 2005.

Japanese encephalitis virus

Case definition – Japanese encephalitis virus

*Only **confirmed cases** are reported.*

***Confirmed case:** Requires isolation of Japanese encephalitis virus, OR detection of Japanese encephalitis virus by nucleic acid testing, OR IgG seroconversion or a significant increase in antibody level or a fourfold or greater rise in titre of Japanese encephalitis virus-specific IgG proven by neutralisation or another specific test, with no history of recent Japanese encephalitis or yellow fever vaccination, OR detection of Japanese encephalitis virus-specific IgM in cerebrospinal fluid, in the absence of IgM to Murray Valley encephalitis, Kunjin and dengue viruses, OR detection of Japanese encephalitis virus-specific IgM in serum in the absence of IgM to Murray Valley encephalitis, Kunjin and dengue viruses, with no history of recent Japanese encephalitis or yellow fever vaccination.*

AND A clinically compatible febrile illness of variable severity associated with neurological symptoms ranging from headache to meningitis or encephalitis. Symptoms may include headache, fever, meningeal signs, stupor, disorientation, coma, tremors, generalised paresis, hypertonia, and loss of coordination. The encephalitis cannot be distinguished clinically from other central nervous system infections.

Confirmation of laboratory result by a second arbovirus reference laboratory is required if the case appears to have been acquired in Australia.

There was one case of Japanese encephalitis virus (JEV) notified in February 2004, when Queensland reported that a 66-year-old male acquired JEV from Papua New Guinea. There have been nine other cases of JEV reported to NNDSS since 1995, although JEV was not nationally notifiable until 2001. Four of these nine notifications were reported in Torres Strait Islanders from the Badu Island community. The other locally acquired JEV case was reported in a resident from the Cape York Peninsula, Queensland. The remaining four cases were reported as acquired from overseas countries.

The Australian Quarantine and Inspection Service, through the Northern Australia Quarantine Strategy (NAQS) program, conducted monitoring for JEV for the 2004 wet season using sentinel pigs at sites on Badu Island in Torres Strait and its northern peninsula area (NPA) site at Injinoo airport in Cape York Peninsula. The five sentinel pigs on Badu Island all seroconverted (based on results of testing at Queensland Health Scientific Services and the CSIRO Australian Animal Health Laboratory). JEV was also identified through the detection of RNA by TaqMan polymerase chain reaction in a pool of culicine mosquitoes collected in a Banks trap on Badu Island. This was collaborative mosquito trapping performed by NAQS for Queensland Health.

The five NPA sentinel pigs located at Injinoo Airport, all seroconverted to JEV (based on results of testing at Queensland Health Scientific Services and the CSIRO Australian Animal Health Laboratory). This is the second time that JEV has been detected on the mainland; the first detection was in 1998. As a follow up to this mainland detection, the Queensland Health Tropical Public Health Unit conducted mosquito trapping at various sites in the NPA. A total of 147 pools, comprising 23,144 mosquitoes, were processed using the JEV-specific TaqMan RT-PCR. Pools were comprised of up to 200 mosquitoes. There was one positive pool of 200 mosquitoes obtained from a trap set at Bamaga rubbish tip. There was inconclusive serological evidence of exposure to JEV in feral pigs sampled by NAQS on the west coast of Cape York Peninsula in July 2004. The time of exposure could not be determined, but it is unlikely to be linked to the 1998 incursion.

Flavivirus infections (NEC)

Case definition – Flavivirus infection (not elsewhere specified)

*Only **confirmed cases** are reported.*

***Confirmed case:** Requires isolation of a flavivirus that cannot be identified in Australian reference laboratories or which is identified as one of the flaviviruses not otherwise classified, OR detection of a flavivirus, by nucleic acid testing, that cannot be identified in Australian reference laboratories or which is identified as one of the flaviviruses not otherwise classified, OR IgG seroconversion or a significant increase in antibody level or a fourfold or greater rise in titre of flavivirus specific IgG that cannot be identified or which is identified as being specific for one of the flaviviruses not otherwise classified. There must be no history of recent Japanese encephalitis or yellow fever vaccination, OR detection of flavivirus IgM in cerebrospinal fluid, with reactivity to more than one flavivirus antigen (Murray Valley encephalitis, Kunjin, Japanese encephalitis and/or dengue) or with reactivity only to one or more of the flaviviruses not otherwise classified, OR detection of flavivirus IgM in the serum, with reactivity to more than one flavivirus antigen (Murray Valley encephalitis, Kunjin, Japanese Encephalitis and/or dengue) or with reactivity only to one or more of the flaviviruses not otherwise classified. This is only accepted as laboratory evidence for encephalitic illnesses. There must be no history of recent Japanese encephalitis or yellow fever vaccination.*

AND Non-encephalitic disease: acute febrile illness with headache, myalgia and/or rash, OR encephalitic disease: acute febrile meningoencephalitis characterised by one or more of the following: 1. focal neurological disease or clearly impaired level of consciousness, 2. an abnormal computerised tomograph or magnetic resonance image or electrocardiograph, 3. presence of pleocytosis in cerebrospinal fluid.

Confirmation by a second arbovirus reference laboratory is required if the case cannot be attributed to known flaviviruses.

There were 49 flavivirus (NEC) notifications during 2004. These include flavivirus infections (e.g. MVEV and KUNV) where serology was unable to differentiate between the different viruses.

Queensland reported 46 of the 49 flavivirus (NEC) notifications, of which there were six each of Kokobera and Stratford viruses, one KUNV notification and the remaining 33 notifications were of unknown flavivirus type.

Malaria

Case definition – Malaria

*Only **confirmed cases** are reported.*

***Confirmed case:** Requires detection and specific identification of malaria parasites by microscopy on blood films with confirmation of species in a laboratory with appropriate expertise, OR detection of* Plasmodium *species by nucleic acid testing.*

There were 559 notifications of malaria in Australia in 2004. The majority of cases were reported by Queensland (47%, n=263), New South Wales (18%, n=101), and Victoria (12%, n=67). There were no reports of locally acquired malaria during the reporting period.

The largest number of malaria notifications was reported amongst males in the 20–24 year age group, and in females in the 25–29 year age group (Figure 55). The male to female ratio was 2:1.

Figure 55. Notifications of malaria, Australia, 2004, by age group and sex

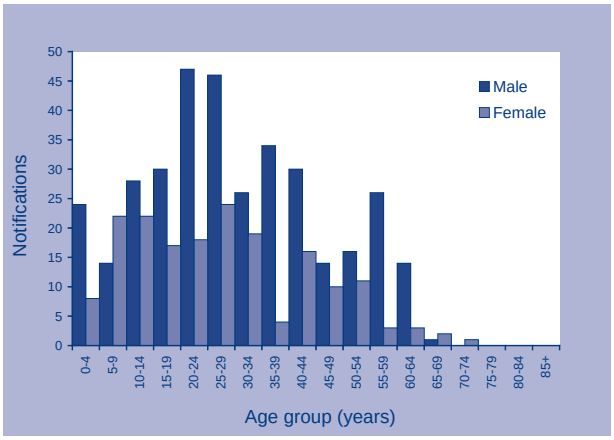


Table 22 shows that the infecting *Plasmodium* species were reported for 91 per cent of malaria notifications in 2004. Of these 559 notifications, *P. falciparum* (48%, n=270) and *P. vivax* (44%, n=248) were the predominant species while untyped *Plasmodium* species accounted for 2 per cent (n=9). The remaining cases were *P. ovale* (4%, n=20) and *P. malariae* (1%, n=7). It should be noted that mixed infections (<1%, n=5) are underestimated due to the variation in reporting practice in different states and territories.

Zoonoses

Zoonoses are diseases and infections naturally transmitted between non-human vertebrate animals and humans.[34] Animal hosts play an essential role in maintaining the infection in nature, and humans are only accidental hosts.[35] Strikingly, 75 per cent of emerging infectious diseases have been identified as zoonotic in origin.[36] In 2004, zoonotic diseases notifiable to the NNDSS were anthrax, Australian bat lyssaviral or lyssaviral (unspecified) infection, brucellosis, leptospirosis, ornithosis and Q fever. During 2004, a total of 877 notifications of zoonotic disease (0.8% of total notifications) were made to the NNDSS.

Anthrax

Case definition – Anthrax

*Only **confirmed cases** are reported.*

***Confirmed case:** Requires isolation of* Bacillus anthracis*-like organisms or spores confirmed by a reference laboratory*

OR Detection of Bacillus anthracis *by microscopic examination of stained smears, OR detection of* Bacillus anthracis *by nucleic acid testing AND Cutaneous: skin lesion evolving over 1–6 days from a papular through a vesicular stage, to a depressed black eschar invariably accompanied by oedema that may be mild to extensive, OR gastrointestinal: abdominal distress characterised by nausea, vomiting, anorexia and followed by fever, OR rapid onset of hypoxia, dyspnoea and high temperature, with radiological evidence of mediastinal widening, OR meningeal: acute onset of high fever, convulsions, loss of consciousness and meningeal signs and symptoms.*

Table 22. Malaria notifications in Australia, 2004, by parasite type and jurisdiction

Parasite type	Type (%)	State or territory								Australia
		ACT	NSW	NT	Qld	SA	Tas	Vic	WA	
Plasmodium species	2.0	0	0	0	1	0	1	0	7	9
Plasmodium falciparum	48.0	2	44	31	137	14	9	13	20	270
Plasmodium malariae	1.0	1	0	2	3	0	0	0	1	7
Plasmodium ovale	4.0	1	5	0	4	1	0	4	5	20
Plasmodium vivax	44.0	12	50	8	118	3	5	50	2	248
Mixed infection (unspecified)*	0.2	–	0	–	–	0	0	0	1	1
Mixed *P. falciparum* and *P. vivax**	0.7	–	2	–	–	2	0	0	0	4
Mixed *P. falciparum* and *P. ovale**	0.0	–	0	–	–	0	0	0	0	0
Mixed *P. falciparum* and *P. malariae**	0.0	–	0	–	–	0	0	0	0	0
Total	100	16	101	41	263	20	15	67	36	559

* New South Wales, South Australia, Tasmania, Victoria, Western Australia report mixed species infections per notified case. Queensland, the Northern Territory and the Australian Capital Territory report one notification for each species in a mixed infection.

– Unknown.

Following the deliberate release of anthrax spores in the United States of America in 2001, anthrax became a nationally notifiable disease in Australia. In 2004, no cases of anthrax were notified. The last reported human cases of anthrax in Australia (both cutaneous anthrax) occurred in July 1998 and February 1997.

Anthrax is a notifiable animal disease subject to compulsory government control strategies including: vaccination of susceptible livestock located on sites with a known history of anthrax; epidemiological investigation of outbreaks; quarantine and decontamination of affected premises; and safe disposal of carcases. Certain rural areas in central New South Wales and northern and north-eastern Victoria are associated with recurring cases of anthrax in cattle and sheep. In these endemic areas, anthrax has a low and decreasing prevalence. Cases only occur sporadically, mostly in partially vaccinated animals.

In 2004, 15 outbreaks of anthrax were reported in livestock (13 from New South Wales and 2 from Victoria). Only one of these outbreaks was from outside the known anthrax endemic areas, on a farm that was part of an old stock route leading to the endemic zone in New South Wales. In all instances the usual protocols of quarantine, disinfection of contaminated ground, carcass incineration, and vaccination of the herd and neighbouring herds were implemented. All animal movements from affected properties were traced and there was no risk of further spread of disease.

Australian bat lyssaviral and lyssaviral (unspecified) infections

Case definition – Lyssavirus (unspecified)

*Only **confirmed cases** are reported AND only where there is insufficient evidence to meet a case definition for Australian bat lyssavirus or rabies.*

***Confirmed case:** Requires positive fluorescent antibody test result for lyssaviral antigen on fresh brain smears, OR specific immunostaining for lyssaviral antigen on formalin fixed paraffin sections of central nervous system tissue, OR presence of antibody to serotype 1 lyssavirus in the cerebrospinal fluid, OR detection of lyssavirus-specific RNA (other than to Australian bat lyssavirus or rabies).*

AND Acute encephalomyelitis with or without altered sensorium or focal neurological signs.

Case definition – Australian bat lyssavirus

*Only **confirmed cases** are reported.*

***Confirmed case:** Requires isolation of Australian bat lyssavirus confirmed by sequence analysis, OR detection of Australian bat lyssavirus by nucleic acid testing.*

No new cases of either Australian bat lyssaviral or lyssaviral (unspecified) infections were notified during 2004. Two cases of human infection with Australian bat lyssavirus, in 1996 and 1998, occurred following close contact between bat-handlers and infected bats. Both resulted in the death of the infected person.

There are two strains of Australian bat lyssavirus known: one circulates in frugivorous bats, sub-order *Megachiroptera,* and the other circulates in the smaller, mainly insectivorous bats, sub-order *Microchiroptera.* Each strain has been associated with one human fatality. Surveillance indicates infected bats are widespread at a low frequency on the Australian mainland.[37] Research into the genetic sequences of lyssaviruses isolated from different groups of bats using molecular methods suggests that the virus has been associated with bats in Australia for more than 1,500 years.[38] That is, the virus was well established before European colonisation, and its recent 'emergence' is in all likelihood due to changes in human behaviour and encroachment on bat habitats.

Brucellosis

Case definition – Brucellosis

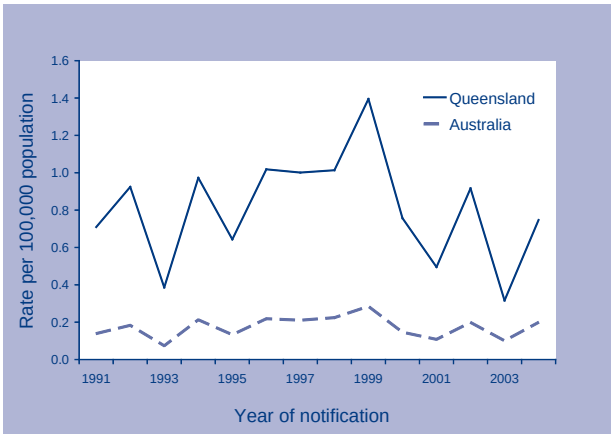
*Only **confirmed cases** are reported.*

***Confirmed case:** Requires isolation of* Brucella *species, OR IgG seroconversion or a significant increase in antibody level or a fourfold or greater rise in titre in* Brucella *agglutination titres or complement fixation titres between acute and convalescent phase serum samples. (Where possible both tests should be conducted at the same laboratory), OR a single high* Brucella *agglutination titre.*

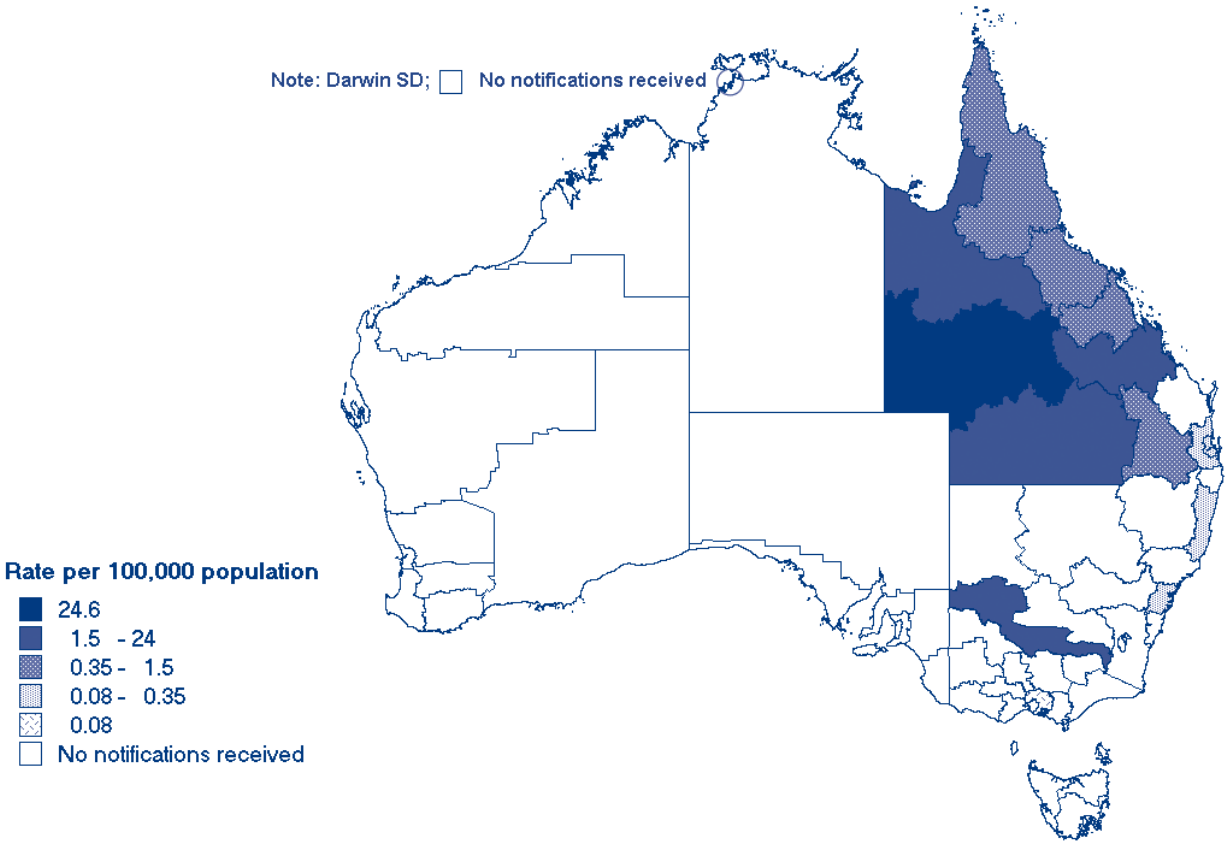
In 2004, 36 cases of brucellosis were reported to the NNDSS, giving a national notification rate of 0.2 cases per 100,000 population. This number of notifications lies in the middle of the range observed over the previous 13 years (13–54 notifications). Most cases were reported from Queensland (26 cases; 72 per cent; Map 9), with a further 19 per cent of cases reported from New South Wales (7 cases), and 8 per cent of cases reported from Victoria (3 cases). There is little evidence of a trend in the national or Queensland notification rates of brucellosis over the last 13 years (Figure 56). Most cases were male (n=32, male to female ratio 6.4:1), and of these, 22 were aged between 20 and 39 years.

Among the nine reported cases for whom species data were available, four cases (all from Queensland) were identified as *Br. suis* which is endemic in feral pigs in Australia. Four cases were identified as *Br. Melitensis* (all overseas acquired). Ovine and caprine brucellosis (*Brucella melitensis*) has never been reported in Australian sheep or goats.[39] One case was identified as *Br. abortus* ('undulant fever'); which was presumably acquired overseas. Bovine brucellosis (*Brucella abortus*) was eradicated from the Australian cattle herd in 1989[39] and is presently considered an exotic animal disease in Australia.

Figure 56. Trends in notification rates of brucellosis, Australia and Queensland, 1991 to 2004



Map 9. Notification rates of brucellosis, Australia 2004, by Statistical Division of residence



Leptospirosis

Case definition – Leptospirosis

*Only **confirmed cases** are reported.*

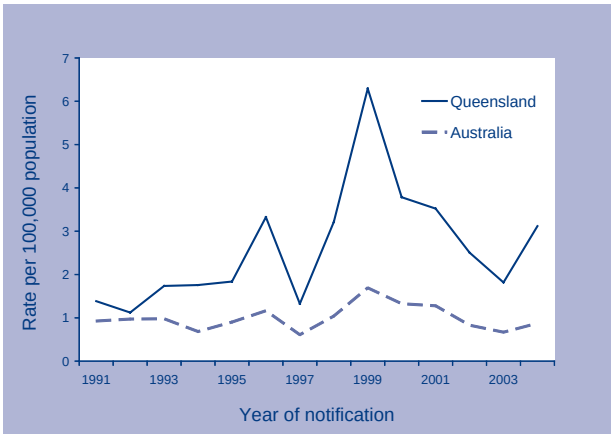
***Confirmed case:** Requires isolation of pathogenic* Leptospira *species, OR a fourfold or greater rise in* Leptospira *agglutination titre between acute and convalescent phase sera obtained at least two weeks apart and preferably conducted at the same laboratory, OR a single* Leptospira *micro agglutination titre greater than or equal to 400 supported by a positive enzyme-linked immunosorbent assay IgM result.*

Leptospirosis is caused by the spirochaete, *Leptospira*. Nationally, 166 notifications of leptospirosis were received during 2004 (0.9 cases per 100,000 population). This rate is relatively low compared to the previous years but is 31 per cent higher than the national rate in 2003 (Figure 57).

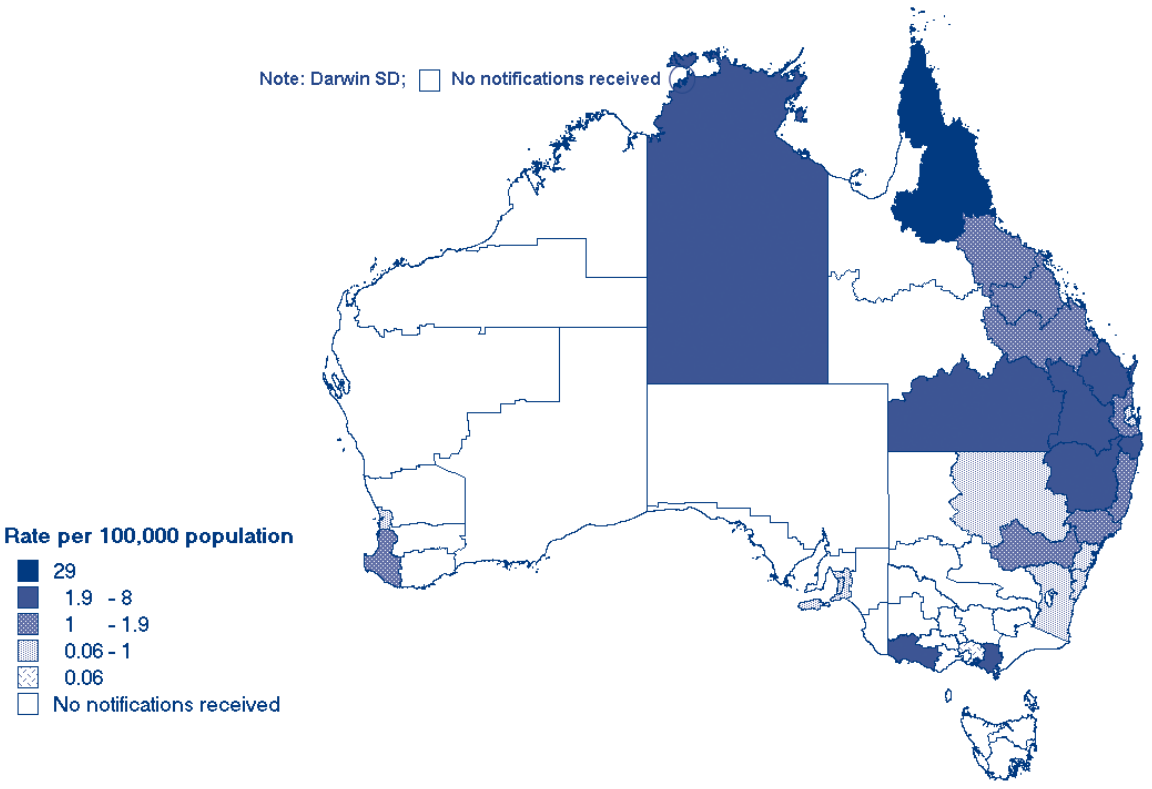
In 2004, the notification rate was highest in Queensland (110 notifications, 2.8 cases per 100,000 population), the Northern Territory (1 notification, 1.0 cases per 100,000 population) and New South Wales (40 notifications, 0.6 cases per 100,000 population). Forty per cent of all notifications were from Far North Queensland (Map 10); the notification rate in this Statistical Division of residence was 28.8 cases per 100,000 population.

Most cases were male (n=151, male to female ratio 10.1:1). There was little evidence that rates of notification varied between age groups.

Figure 57. Trends in notification rates of leptospirosis, Australia and Queensland, 1991 to 2004



Map 10. Notification rates of leptospirosis, Australia, 2004, by Statistical Division of residence



Ornithosis

Case definition – Ornithosis

*Both **confirmed cases** AND **probable cases** are reported.*

***Confirmed case:** Requires A fourfold rise or greater in antibody titre against* Chlamydia psittaci *as demonstrated by micro-immunofluorescence (MIF) on acute and convalescent sera (collected at least two weeks later) tested in parallel, OR detection of* C. psittaci *by nucleic acid testing or culture.*

AND Pneumonia, OR AT LEAST TWO of the following: fever, headache, myalgia, rigors, dry cough or dyspnoea.

AND Exposure to birds or bird products, or proximity to an outbreak of ornithosis.

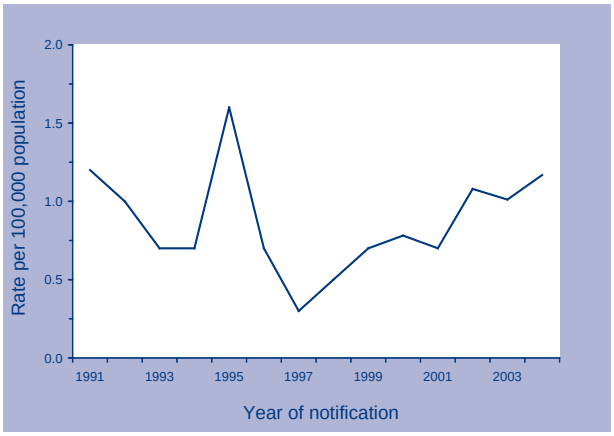
***Probable case:** Requires a single high total antibody level or detection of IgM antibody to* C. psittaci *by MIF, OR a single high total antibody titre to* Chlamydia *species demonstrated by complement fixation (CF) in at least one sample obtained at least two weeks after onset of symptoms, OR a fourfold or greater rise in antibody titre against* Chlamydia *species as demonstrated by CF.*

AND Pneumonia, OR AT LEAST TWO of the following: fever, headache, myalgia, rigors, dry cough or dyspnoea.

AND Exposure to birds or bird products, or proximity to an outbreak of ornithosis.

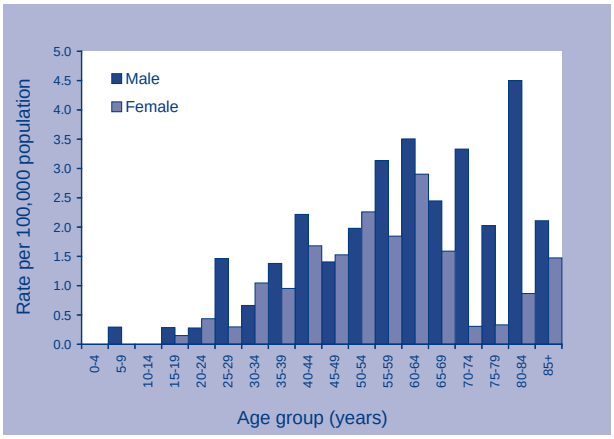
In 2004, there were 235 ornithosis infections notified to NNDSS, giving a national rate of 1.2 cases per 100,000 population. This represents the highest number of notifications in a 12 month period since NNDSS records began in 1991. The national rate of notifications has steadily increased since 1997 (Figure 58).

Figure 58. Trends in notification rates of ornithosis, Australia, 1991 to 2004



Victoria had the highest number of notifications (146 notifications, 2.9 cases per 100,000 population). Notifications also occurred in New South Wales (81 notifications), South Australia (5 notifications) and Queensland (3 notifications). The majority of cases were male (n=138, male to female ratio 1.4:1). The highest reporting rates were in the 80–84 year age group for males (7 notifications, 4.5 cases per 100,000 population) and in the 60–64 year age group for females (13 notifications, 2.9 cases per 100,000 population) (Figure 59).

Figure 59. Notification rates of ornithosis, Australia, 2004, by age group and sex



During 2004, three outbreaks of ornithosis and one death were reported. The first outbreak occurred at a Victorian poultry farm in February. There were 26 cases (14 confirmed and 12 probable) notified, nearly all of whom had worked in the on-site abattoir. In this outbreak, the ratio of males to females was 2:1, and the median age was 43 years (range 17 to 69 years). The second outbreak involving four poultry processing workers occurred at a game processing plant. The three males and one female were aged from 37 to 56 years (median 53 years), two were hospitalised. The other identified outbreak was in New South Wales where eight cases were linked to a pet shop. The one death was reported from South Australia in a female in the 45–49 year age group.

Infection of parrots with *Chlamydia psittaci* has been traditionally known as psittacosis, whereas infection in domestic poultry, waterfowl, pigeons and finches has been called ornithosis. In the past human cases of *C. psittaci* infection have been described as psittacosis, which has led to the common misconception that this disease is associated only with exposure to diseased psittacine birds (i.e. parrots). Subclinical infection with *C. psittaci* is common in numerous wild and domesticated bird species in Australia.[40] Epizootics of clinical disease in commercial flocks and domestic bird collections can be initiated through stresses such as poor animal husbandry.[40] Furthermore, poor biosecurity of commercial poultry flocks can lead to contact with infected native birds (or their excretions) leading to establishment of latent infection within the flock. The two reported outbreaks involving poultry production workers emphasise the need for increased awareness within animal production industries of appropriate animal husbandry and occupational health and safety. Spillovers of a commonly subclinical avian disease from poultry into human populations, possibly emanating from wild bird reservoirs, is concerning given the present highly pathogenic avian influenza (HPAI) epidemic in South East Asia.

Reported rates of ornithosis have repeatedly been highest in the older age groups, which may reflect increased investigation, and laboratory testing for atypical community acquired pneumonia in this group. Previously reported outbreaks have been associated with aviaries, pet shops and poultry processing plants, although an outbreak investigation in rural Victoria in 1995 showed no association with direct bird handling but rather lawn mowing and gardening in areas with high numbers of native birds.[41] Shedding of *C. psittaci* into the environment by native birds and subsequent inhalation of aerosolised dust and bird excreta was postulated as the mechanism of human infection.

Q fever

Case definition – Q fever

*Only **confirmed cases** are reported.*

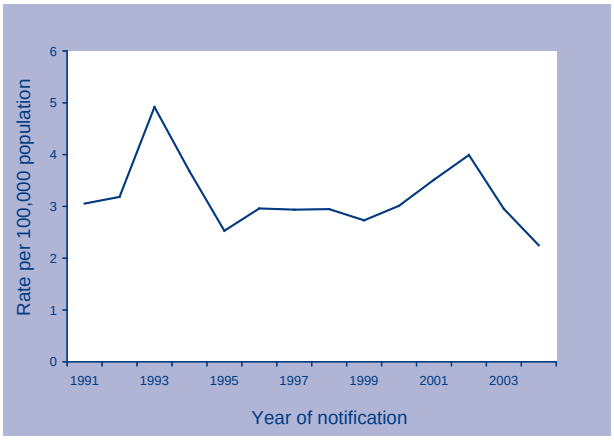
***Confirmed case:** Requires detection of* Coxiella burnetii *by nucleic acid testing, OR seroconversion or significant increase in antibody level to Phase II antigen in paired sera tested in parallel in absence of recent Q fever vaccination, OR detection of* C. burnetii *by culture (note this practice should be strongly discouraged except where appropriate facilities and training exist).*

OR Detection of specific IgM in the absence of recent Q fever vaccination.

AND A clinically compatible disease.

In 2004, 440 cases of Q fever were notified to the NNDSS, a decrease of 24.5 per cent on 2003. This number of cases is relatively low compared to the count of previous years and the national rate (2.2 cases per 100,000 population) is the lowest recorded since 1991 (Figure 60). The highest rates of notifications were from Queensland (137 notifications, 3.5 cases per 100,000 population), New South Wales (223 notifications, 3.3 cases per 100,000 population) and South Australia (38 notifications, 2.5 cases per 100,000 population). The highest reporting rates were in the 40–44 year age group for males (6.8 cases per 100,000 population), and in the 55–59 year age group for females (2.3 cases per 100,000 population). Few cases were reported from children or the elderly. The male to female ratio was 3.3:1.

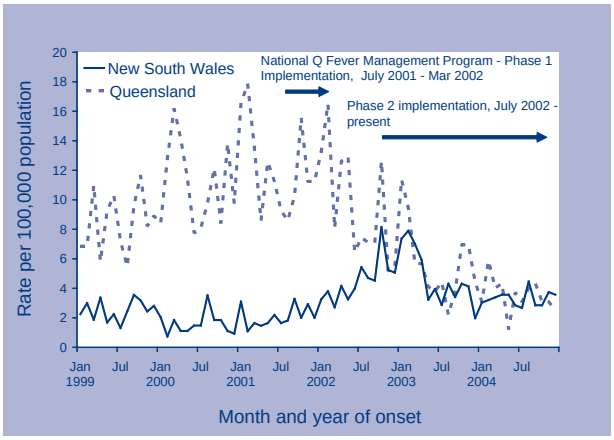
Figure 60. Trends in notification rates of Q fever, Australia, 1991 to 2004



An outbreak of Q fever occurred among persons attending sheep saleyards in rural South Australia during October and November 2004. In total, 25 persons were linked to this outbreak. A case-control study identified a statistically significant association between human illness and attendance at the saleyard. Intervention strategies including vaccination and dust control were implemented. Many of the cases were unvaccinated sheep and grain farmers.

Q fever has long been associated with work in the Australian stock industry and abattoir workers are an occupational group at high risk of infection. Since October 2000, abattoir workers and shearers have been eligible for free vaccination under the National Q Fever Management Program (Figure 61). The second phase of the Q fever vaccination program began in October 2001 to include workers in the beef, sheep and dairy industries and was due for completion on 30 June 2004. Several jurisdictions have completed the Program, however, Victoria and South Australia have extended the Program until 30 June 2006 and Queensland has extended it until 30 June 2007.

Figure 61. Notification rates of Q fever, Queensland and New South Wales, January 1999 to December 2004, by month of onset*



Other emerging zoonotic disease in 2004

Bat-associated emerging zoonoses (Hendra and Nipah virus activity 2004)

Surveillance of flying foxes (*Pteropus* spp.) and associated research continued to focus on henipaviruses in 2004. Hendra virus is a viral infection associated with flying foxes. Sporadic infections may occur in horses that come in close contact with infected flying foxes or their body fluids. A horse from Cairns examined by a veterinarian in early December 2004 and subsequently euthanised, tested positive to Hendra virus.[39] The veterinary doctor involved in autopsy of the horse developed a Hendra-related illness soon after and recovered. This was an isolated case. Hendra was also suspected in a horse that died south of Cairns in October 2004. These cases are consistent with previous findings and do not reflect a change in the known distribution or epidemiology of Hendra virus in Australia.[39] The timing of incidents suggests a seasonal pattern of outbreaks possibly related to the seasonality of fruit bat birthing, as Hendra virus has been isolated from foetal tissues and fluids.[42]

This report of the re-emergence of Hendra virus, and repeated outbreaks of Nipah virus-associated encephalitis in humans in Bangladesh underline our still-limited understanding of the ecology of these agents, and the need to maintain surveillance and research efforts.[39]

Other bacterial infections

Legionellosis, leprosy, meningococcal infection and tuberculosis were notifiable in all states and territories in 2004 and classified as 'other bacterial infections' in NNDSS. A total of 1,799 notifications were included in this group in 2004, which accounted for 1.6 per cent of all the notifications to NNDSS, a similar total and proportion as in 2003 (1,826 notifications and 1.7% of total).

Legionellosis

Case definition – Legionellosis

*Both **confirmed cases** and **probable cases** are notified.*

***Confirmed case:** Requires isolation of* Legionella, *OR the presence of* Legionella *urinary antigen OR seroconversion or a significant increase in antibody level or a fourfold or greater rise in titre to* Legionella.

AND Fever or cough or pneumonia.

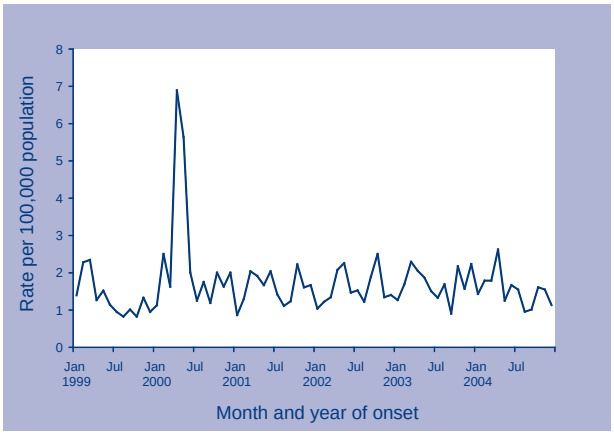
***Probable case:** Single high titre antibody titre to Legionella, OR detection of Legionella by nucleic acid testing, OR detection of Legionella by direct fluorescence assay.*

AND Fever or cough or pneumonia.

Legionellosis includes notifications of infections caused by all *Legionella* species. There were 310 notifications of legionellosis reported in 2004, giving a national rate of 1.6 cases per 100,000 population. Two hundred and thirty-four (75%) cases were confirmed, and 74 (24%) had a probable diagnosis.

In 2004, the highest rates of legionellosis were reported in South Australia (2.9 cases per 100,000 population, 45 cases) and Western Australia (2.5 cases per 100,000 population, 50 cases). Legionellosis notifications showed a peak in autumn and spring (Figure 62).

Figure 62. Trends in notification rate of legionellosis, Australia, 1999 to 2004, by month of onset



Rates of legionellosis have ranged between 0.8 and 2.6 cases per 100,000 population between 1999 and 2004, except in 2000, when rates reached 6.9 cases per 100,000 population as a result of the Melbourne aquarium outbreak, with 125 cases.[43]

In 2004, men accounted for 73.5 per cent of all cases of legionellosis resulting in a male to female ratio of 2.8:1. Cases occurred in all age groups except 5–14 years, with the highest rates in the 75–79 year age group for men (13.4 cases per 100,000 population) and the 75–84 year age groups for women (3.0 cases per 100,000 population) (Figure 63).

Data on the causative species were available for 294 (95%) of the legionellosis cases. Of these, 149 (51%) cases were identified as *L. pneumophilia*, 141 (45 %) were *L. longbeachae* and 4 cases (1 %) were *L. micdadei* (Table 23).

Data on the death of legionellosis cases was available in 112 (36%) notifications. There were 16 deaths due to legionellosis in Australia in 2004, giving a case fatality rate of 5 per cent. The break down of deaths by jurisdiction and infecting *Legionella* species is shown in Table 24. The case fatality rate for infections with *L. longbeachae* infections (5%) was higher than for *L. pneumophila* (4%) but this difference did not reach statistical significance.

There was an outbreak of *Legionella pneumophila* in New South Wales, involving 12 cases. In June, four cases of *Legionella pneumophila* serogroup 1 were discovered in Victoria, with links to a town in north-eastern Victoria where an outbreak of six cases occurred in 2000.

Figure 63. Notification rates of legionellosis, Australia, 2004, by age group and sex

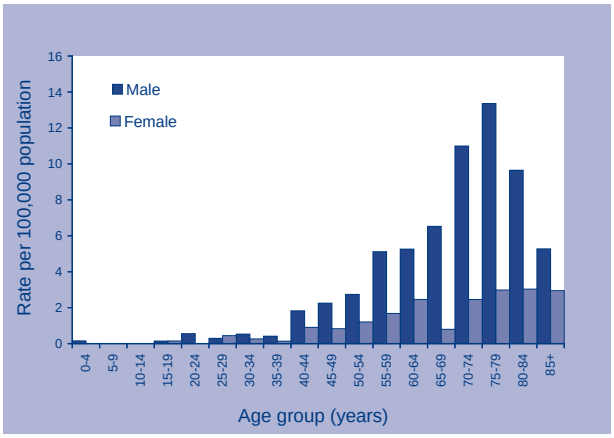


Table 23. Notifications of legionellosis, Australia, 2004, by state or territory and species

Species	State or territory								Total
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	
Legionella longbeachae	0	29	2	7	36	1	23	43	141
Legionella pneumophila	1	51	0	18	9	0	65	5	149
Legionella micdadei	0	1	0	0	0	0	3	0	4
Unknown species	0	1	0	6	0	0	7	2	16
Total	1	82	2	31	45	1	98	50	310

Table 24. Deaths due to legionellosis, Australia, 2004, by state or territory and species

Species	State or territory								Total
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	
Legionella longbeachae	0	2	0	0	1	0	2	2	7
Legionella pneumophila	0	2	0	0	1	0	2	1	6
Legionella micdadei	0	0	0	0	0	0	1	0	1
Unknown species	0	0	0	0	0	0	2	0	2
Total	0	4	0	0	2	0	7	3	16

Leprosy

Case definition – Leprosy

*Only **confirmed cases** are notified.*

***Confirmed case:** Requires demonstration of acid fast bacilli in split skin smears and biopsies prepared from ear lobe or other relevant sites or histopathological report from skin or nerve biopsy compatible with leprosy (Hansen's disease) examined by an anatomical pathologist or specialist microbiologist AND compatible nerve conduction studies or peripheral nerve enlargement or loss of neurological function not attributable to trauma or other disease process, or hypopigmented or reddish skin lesions with definite loss of sensation.*

Leprosy is a chronic infection of the skin and peripheral nerves with the bacterium *Mycobacterium leprae*. Leprosy is a rare disease in Australia, with the majority of cases occurring among Indigenous communities and migrants to Australia from leprosy-endemic countries.

In 2004, five leprosy cases were notified. This is the same number of cases as were notified in 2003. Three cases in occurred in New South Wales and one case occurred in both the Northern Territory and Queensland. Four of the five cases were female, and two cases were Indigenous Australians (one male and one female). Cases ranged in age from 30–79 years. Four cases had multibacillary leprosy and one had paucibacillary leprosy. One case had evidence of Grade 2 disability at presentation, with visible deformity or damage to hands/feet and visual impairment.[44]

The WHO has established the goal of eliminating leprosy by 2005, which is defined as a reduction in the prevalence of leprosy to less than 1 case per 10,000 population. By the end of 2001, 36 of the 37 countries and areas that make up the Western Pacific Region, including Australia, reached this target.[45]

Invasive meningococcal disease

Case definition – Invasive meningococcal disease

*Both **confirmed cases** and **probable cases** are notified.*

***Confirmed case:** Defined as isolation of* Neisseria meningitidis *from a normally sterile site. Alternatively, detection of meningococcus by nucleic acid testing, or Gram negative diplococci in Gram stain in specimens from a normally sterile site or from a suspicious skin lesion, OR high titre IgM or a significant rise in IgM or IgG titres to outer membrane protein antigens, OR positive polysaccharide antigen test in cerebrospinal fluid AND disease compatible with invasive meningococcal disease.*

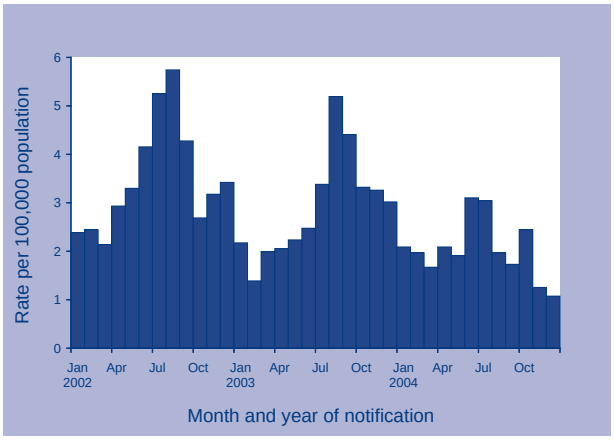
***Probable case:** Defined as the absence of evidence for other causes of clinical symptoms AND EITHER clinically compatible disease including haemorrhagic rash OR clinically compatible disease and close contact with a confirmed case within the previous 60 days.*

In Australia, serogroups B and C are the major cause of invasive meningococcal disease. In response to community concerns about increases in meningococcal disease in Australia, the Australian Government approved the National Meningococcal C Vaccination Program, which commenced in January 2003.[46]

In 2004, there were 408 notifications of invasive meningococcal disease in Australia, 170 cases fewer than in 2003 and a decrease of 29 per cent. The total in 2004 was the lowest since 1996 and is below the historical range (the 5 year mean by minus two standard deviations.) The national notification rate in 2004 was 2.2 cases per 100,000 population. Three hundred and seventy-three cases (91%) were confirmed, and 35 (8%) had a probable diagnosis.

The highest rates were reported from the Northern Territory (6.0 cases per 100,000 population, 12 cases), Tasmania (3.7 cases per 100,000 population, 18 cases) and the Australian Capital Territory (3.4 cases per 100,000 population, 11 cases). There was a small excess of cases among males (male to female ratio 1.2:1). The largest number of cases occurred in winter and spring (Figure 64).

Figure 64. Trends in notification rates of meningococcal infection, Australia, 2002 to 2004, by month of notification

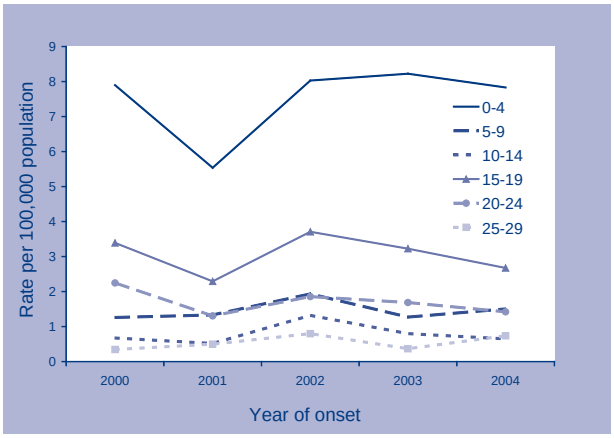


Of the 408 meningococcal notifications in 2004, 342 (84%) were serogrouped. Of these 248 (73%) were serogroup B, 75 (22%) were serogroup C, and 19 (6%) were infections with serogroup Y, serogroup W135 or serogroup A (Table 25). In 2003, of 465 serogrouped notifications, 289 (62%) were serogroup B, and 158 (34%) were serogroup C.

Overall, the highest age specific rate was in children aged 0–4 years with a rate of 10.4 cases per 100,000 population. Of these cases, 99 (75%), were serogroup B infection. In the 15–19 year age group, the overall rate of meningococcal infection was 4.8 cases per 100,000 population, 56 per cent (37 cases) of which were serogroup C.

The highest age-specific rates for serogroup B infection have persisted in the 0–4 years age group since 2000. In 2004, the rate for this age group was 6.5 cases per 100,000 population, (82 cases), while in the 15–19 years age group, the rate was 2.7 cases per 100,000 infections (37 cases) (Figure 65).

Figure 65. Notification rates of meningococcal B infection, Australia, 2000 to 2004, by age group



Between 2002 and 2004, rates of meningococcal serogroup C infection decreased in all age groups. There was a marked decrease in infection rates during 2003, the year the National Meningococcal C Vaccination Program was introduced. General practitioner based vaccination of 1–5-year-olds was completed at the end of 2004 in all jurisdictions. School based vaccination programs, first targeting 15–19-year-olds, then 6–14-year-olds, were complete in all jurisdictions, except South Australia by December 2004.

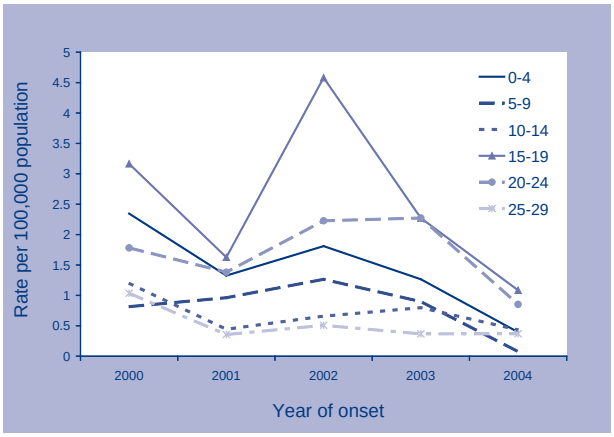
The decrease in rates of serogroup C infection was greatest in the 15–19 year age group. In 2002, the serogroup C infection rate in the 15–19 year age group, was 4.6 cases per 100,000 population (63 cases). The rate in this age group decreased to 1.1 cases per 100,000 population (15 cases) in 2004. In the 0–4 year age group, the rate decreased from 1.8 to 0.4 cases per 100,000 population from 2002 to 2004. There were similar declines in the 5–9 and 20–24 year age groups (Figure 66).

Table 25. Notifications of meningococcal infection Australia, 2004, by state or territory and serogroup

Species	State or territory								Total
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	
Serogroup B	4	82	8	49	11	7	55	32	248
Serogroup C	7	24	1	19	1	5	12	6	75
Other serogroups*	0	8	1	4	0	1	4	1	19
Unknown serogroup	0	39	2	9	1	5	8	2	66
Total	11	153	12	81	13	18	79	41	408

* Other includes serogroups A, Y and W135.

Figure 66. Notification rates of meningococcal C infection, Australia, 2000 to 2004, by age group



Data on deaths from meningococcal infection were available for 172 (42%) cases. There were 20 deaths due to meningococcal infection in 2004 giving a crude case fatality rate of 5 per cent. The breakdown of deaths by jurisdiction and serogroup are shown in Table 26. The case fatality rate of 5.4 per cent for infections with meningococcal group C was the same as that for meningococcal group B infections. In 2003, the case fatality rate for infections with meningococcal group C was more than three times higher than for meningococcal group B infections.[47]

Laboratory based meningococcal surveillance

The Australian Meningococcal Surveillance Programme was established in 1994 for the purpose of monitoring and analysing isolates of *Neisseria meningitidis* from cases of invasive meningococcal disease in Australia. The program is undertaken by a network of reference laboratories in each state and territory, using agreed standard methodology to determine the phenotype (serogroup, serotype and serosubtype) and the susceptibility of *N. meningitidis* to a core group of antibiotics. The results of the surveillance in 2004 have recently been published.[48]

In 2004, a total of 361 isolates of *N. meningitidis* were analysed by the program, a 27 per cent decrease from the 494 isolates analysed in the previous year.

Consistent with routine surveillance data, serogroup B continued to be the predominant strain for the disease (243 isolates, 67%) nationally, followed by serogroup C (71 isolates, 20%). Serogroup B strains predominated in all jurisdictions except the Australian Capital Territory where 8 of 11 isolates were serogroup C.

The pattern of age distribution for meningococcal infection varied by phenotype. Serogroup B was more frequently reported in the 5–9 year (90.5%) and 0–4 year (87.4%) age groups, while the largest proportions of serogroup C occurred in the 25–44 year (35.7%), and 20–24 year (31.4%) age groups. This represents a shift in the age distribution of both serogroups from 2003 when most infections with serogroup B occurred in the 0–4 year age group, and serogroup C infections were reported most frequently in the 15–19 year age group.

In 2004, 147 of the 238 isolates (62%) tested showed decreased susceptibility to the penicillin group of antibiotics (MIC 0.06–0.5 mg/L). All isolates tested were susceptible to third generation cephalosporins and the prophylactic antibiotics, ciprofloxacin and rifampicin.

Tuberculosis

Case definition – Tuberculosis

*Only **confirmed cases** are notified.*

***Confirmed case:** Defined as of* Mycobacterium tuberculosis *complex by culture, OR detection of* M. tuberculosis *complex by nucleic acid testing except which it is likely to be due to previously treated or inactive disease OR clinical diagnosis of tuberculosis including clinical follow-up assessment to ensure a consistent clinical course.*

Table 26. Deaths due to meningococcal infection, Australia, 2004, by state or territory and serogroup

Species	State or territory								Total
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	
Serogroup B	0	4	0	1	1	1	5	1	13
Serogroup C	0	1	0	1	0	1	1	0	4
Other serogroups*	0	0	0	1	0	0	0	1	2
Unknown serogroup	0	1	0	0	0	0	0	0	1
Total	0	6	0	3	1	2	6	2	20

* Other includes serogroups A, Y and W135.

While Australia has one of the lowest rates of tuberculosis (TB) in the world, the disease remains a public health problem in the overseas-born and Indigenous communities. In 2004, 1,076 TB notifications were received by NNDSS, a rate of 5.4 cases per 100,000 population. There was an 8 per cent increase in the number of notifications in 2004 compared to 2003. The notification rates of TB were higher than the national average in the Northern Territory (14 cases per 100,000 population), and the lowest rate occurred in Tasmania (2.3 cases per 100,000 population).

The highest incidence was reported in people born overseas (21.7 cases per 100,000 population) and Indigenous Australians (8.1 cases per 100,000 population). By contrast the rate in the non-Indigenous Australian-born population was 1.2 cases per 100,000 population. For more details see the tuberculosis 2004 annual report in this issue of *Communicable Diseases Intelligence.*[49]

Other communicable disease surveillance

Laboratory Virology and Serology Reporting Scheme

The Laboratory Virology and Serology Reporting Scheme (LabVISE) is a passive surveillance scheme based on voluntary reports of infectious agents from sentinel virology and serology laboratories around Australia. LabVISE provides data on diagnoses of a number of infectious viruses, parasites and fungi. Interpretation of data from LabVISE is limited by uncertainties regarding its representativeness, lack of denominator data to calculate positivity rates, variable reporting coverage over time and lack of consistent case definitions. LabVISE has an important role in supplementing information of diseases under surveillance in NNDSS and in monitoring infectious agents that are not reported by other surveillance systems.

In 2004, a total of 12 laboratories reported 26,218 infectious agents to LabVISE. This represents a 14 per cent increase in the number of reports received in 2004 compared to 2003 (Table 27). Most of the reports were from South Australia (30%), Queensland (27%) and Western Australia (16%) (Table 27).

Sixty per cent (n=15,608) of all reports received by LabVISE were viral infectious agents, and the remaining 40 per cent (n=10,610) were bacterial or other infectious agents. Among viruses, herpes viruses (33.5%; 5,268) were the most commonly reported followed by ortho/paramyxoviruses (27%; 4,124) which includes influenza, parainfluenza and respiratory syncytial viruses (Figure 67). Among non-viral infectious agents, *Chlamydia trachomatis*

Figure 67. Reports of viral infections to the Laboratory Virology and Serology Reporting Scheme, 2004, by viral group

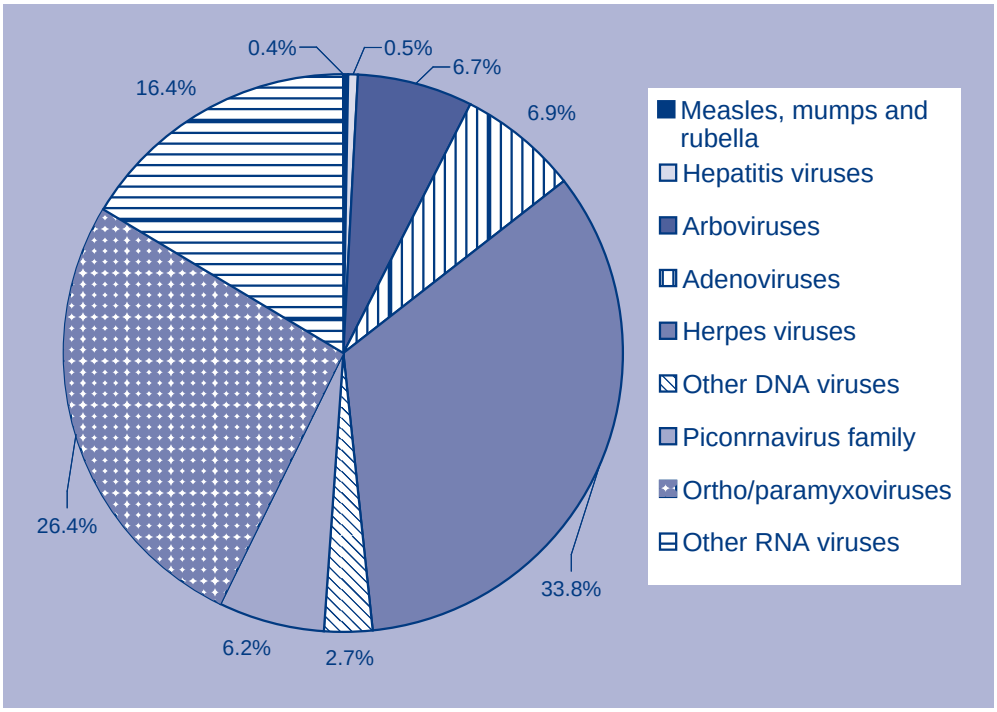


Table 27. Infectious agents reported to the Laboratory Virology and Serology Reporting Scheme, 2004, by state or territory

Organism	State or territory								Total 2004	Total 2003
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA		
Measles virus	0	3	1	5	6	0	12	8	35	71
Mumps virus	0	0	0	1	2	0	1	2	6	10
Rubella virus	0	3	0	8	2	0	2	5	20	26
Hepatitis A virus	0	7	3	16	6	0	5	14	51	87
Hepatitis D virus	0	1	0	2	2	0	1	2	8	19
Hepatitis E virus	0	0	0	0	0	0	12	2	14	–
Ross River virus	0	19	16	608	44	3	19	34	743	1,239
Barmah Forest virus	1	14	2	153	14	0	2	9	195	408
Alphavirus (unspecified)	0	0	1	0	0	0	0	0	1	–
Dengue	0	0	5	0	1	0	0	6	12	35
Flavivirus (unspecified)	0	1	7	81	0	0	12	1	102	122
Adenovirus type 40	0	0	1	0	0	0	0	30	31	32
Adenovirus not typed/pending	10	247	3	78	438	5	165	105	1,051	928
Herpes virus type 6	0	2	0	0	0	0	4	0	6	5
Cytomegalovirus	8	374	6	108	226	17	94	1	834	859
Varicella-zoster virus	1	161	23	928	469	9	73	397	2,061	1715
Epstein-Barr virus	0	93	60	771	1,119	3	41	280	2,367	1,719
Other DNA viruses	0	15	0	111	33	3	67	194	423	279
Picornavirus family	7	502	5	21	105	3	83	238	964	805
Ortho/paramyxoviruses	5	1,329	13	330	1,255	60	403	729	4,124	4,568
Other RNA viruses	0	294	29	2	457	119	855	804	2,560	1,801
Chlamydia trachomatis	39	691	13	1,929	1,689	36	61	801	5,259	4,298
Chlamydia pneumoniae	0	1	0	0	1	0	5	2	9	15
Chlamydia psittaci	2	3	0	2	6	0	159	1	173	118
Chlamydia species (untyped)	0	3	0	0	0	0	1	1	5	2
Mycoplasma pneumoniae	1	111	23	475	381	15	321	47	1,374	1,146
Mycoplasma hominis	0	4	0	0	1	0	0	0	5	9
Coxiella burnetii (Q fever)	1	3	3	30	115	0	17	4	173	178
Rickettsia prowazeki	0	0	0	0	102	0	0	1	103	3
Rickettsia tsutsugamushi	0	0	0	0	64	0	1	2	67	4
Rickettsia – spotted fever group	0	0	0	0	136	3	0	0	139	2
Streptococcus group A	0	7	1	320	0	0	139	0	467	490
Yersinia enterocolitica	0	8	0	0	0	0	0	0	8	12
Brucella abortus	0	0	0	0	2	0	4	0	6	5
Brucella species	0	4	0	5	0	0	0	0	9	7
Bordetella pertussis	6	68	0	170	549	2	270	293	1,358	520
Bordetella parapertussis	0	0	0	0	0	0	1	0	1	–
Legionella pneumophila	0	9	0	0	8	0	59	1	77	132
Legionella longbeachae	0	3	0	0	26	1	25	21	76	84
Legionella species	0	4	0	1	0	0	10	0	15	18
Cryptococcus species	0	2	0	7	29	0	0	0	38	26
Leptospira species	0	0	0	20	3	0	0	0	23	24
Borrelia burgdorferi	0	0	0	0	0	0	0	1	1	–
Treponema pallidum	1	159	0	535	447	0	3	9	1,154	1,168
Entamoeba histolytica	0	0	0	2	0	1	10	1	14	14
Toxoplasma gondii	0	11	0	4	11	2	10	3	41	41
Echinococcus granulosus	0	0	0	0	13	0	2	0	15	21
Total	82	4,156	215	6,723	7,762	282	2,949	4,049	26,218	23,065

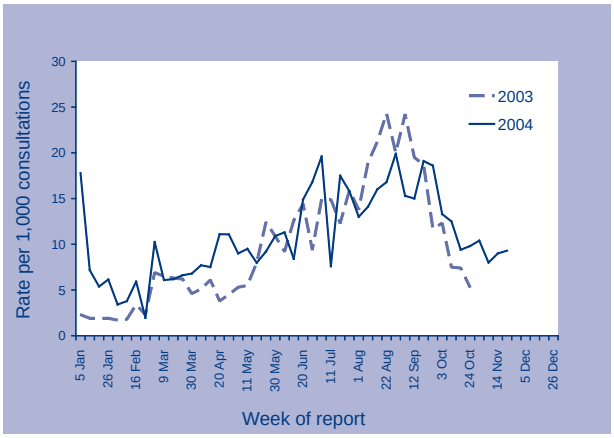
(52%; 5,259), *Mycoplasma pneumoniae* (13%; 1,374) and *Bordetella pertussis* (13%; 1,358) were the most commonly reported pathogens.

Australian Sentinel Practice Research Network

The Research and Health Promotion Unit of the Royal Australian College of General Practitioners operates the Australian Sentinel Practice Research Network (ASPREN). ASPREN is a national network of general practitioners that report each week on a number of conditions selected annually. The data provide an indicator of the burden of disease in the primary care setting and allows trends in consultation rates to be detected.

In 2004, influenza-like illnesses (ILI), gastroenteritis, and varicella infections (chickenpox and shingles) were the communicable diseases reported to ASPREN. Each week an average of 28 general practitioners (range 10 to 40) provided information from an average of 2,913 (range 1,047–4,219) consultations per week.

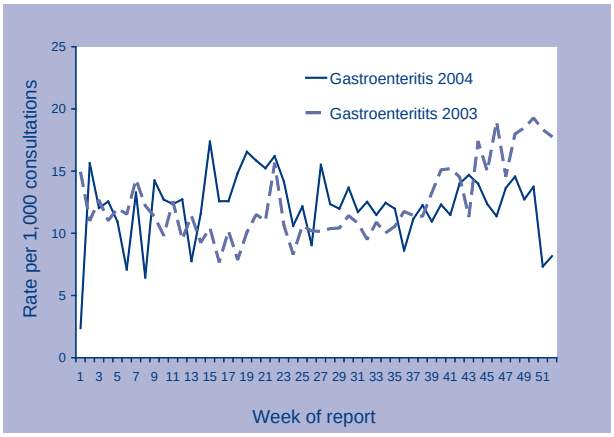
Figure 68. Consultation rates for influenza-like illness, ASPREN 2004 compared with 2003, by week of report



Influenza-like illness reports (Figure 68) showed atypical seasonal pattern with two peaks, in mid-July (20.3 ILI per 1,000 consultations), and in mid-September (18.3 ILI per 1,000 consultations). This may reflect the different peak times of ILI in different jurisdictions (Figure 68).

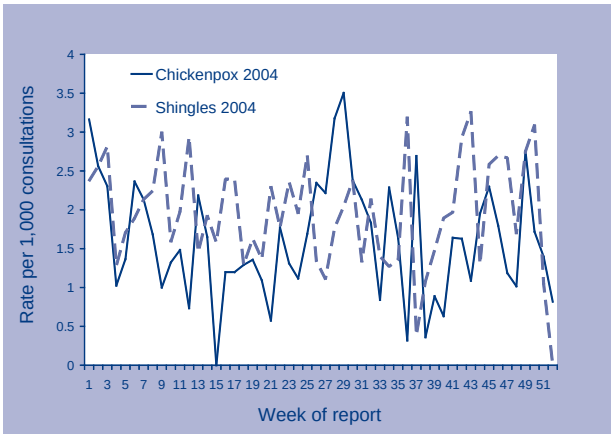
Consultations for gastroenteritis were not stable to show seasonality, they fluctuated between 6 to 17 cases per consultations. (Figure 69).

Figure 69. Consultation rates for gastroenteritis, ASPREN, 2004 compared with 2003, by week of report



Reports of varicella infections continue to be reported at a lower rate by ASPREN. Rates of shingles exceeded those for chickenpox in most weeks but there was no recognisable seasonal pattern (Figure 70).

Figure 70. Consultation rates for varicella infections, ASPREN, 2004, by week of report



Appendices

Appendix 1. Mid-year estimate of Australian population 2004, by state or territory

	State or territory								
	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Aus*
Male	3,346,616	2,453,147	1,937,822	759,773	992,452	237,918	105,173	160,253	9,994,541
Female	3,384,679	2,519,632	1,944,215	774,477	989,752	244,210	94,740	163,768	101,16,756
Total	6,731,295	4,972,779	3,882,037	1,534,250	1,982,204	482,128	199,913	324,021	20,111,297

* Includes other territories.

Appendix 2. Mid-year estimate of Australian population 2004, by state or territory and age group

	State or territory								
Age	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Aus*
0–4	425,944	306,301	250,159	88,793	124,789	30,187	17,608	20,238	1,264,281
5–9	441,816	320,014	267,610	96,154	133,574	32,477	16,640	20,973	1,329,497
10–14	458,629	333,257	280,137	100,885	141,273	34,438	16,312	21,976	1,387,173
15–19	453,556	334,947	273,665	103,547	144,666	34,291	14,652	23,849	1,383,383
20–24	459,158	352,290	277,286	102,512	141,180	30,279	15,875	28,299	1,407,023
25–29	458,261	342,422	259,821	94,003	133,213	26,614	16,756	25,423	1,356,644
30–34	513,433	384,853	291,434	106,109	147,840	31,210	18,390	25,663	1,519,131
35–39	483,197	370,477	278,701	107,976	146,408	32,182	16,670	24,075	1,459,880
40–44	515,181	378,256	296,364	117,404	155,199	36,895	16,202	24,828	1,540,561
45–49	475,223	351,708	274,081	111,200	146,141	35,685	13,823	23,647	1,431,734
50–54	435,991	321,813	254,906	104,905	134,095	33,651	12,540	22,610	1,320,721
55–59	399,113	291,829	236,244	97,358	117,462	31,060	9,424	19,509	1,202,129
60–64	304,469	221,047	176,404	72,637	86,307	24,373	6,216	12,701	904,255
65–69	255,300	186,285	139,010	61,792	69,772	20,023	3,583	9,420	745,247
70–74	217,986	159,775	112,285	53,877	56,105	16,647	2,218	7,198	626,124
75–79	192,815	141,151	95,601	50,597	46,619	14,275	1,530	6,238	548,837
80–84	136,137	99,585	66,824	36,171	32,354	10,084	847	4,363	386,374
85–89	68,889	49,048	33,922	18,224	15,819	5,180	375	2,001	193,465
90–94	27,841	21,174	13,675	7,798	7,099	2,019	151	788	80,549
95–99	6,864	5,380	3,245	1,889	1,863	465	63	191	19,960
100+	1,492	1,167	663	419	426	93	38	31	4,329
Total	6,731,295	4,972,779	3,882,037	1,534,250	1,982,204	482,128	199,913	324,021	20,111,297

* Includes other territories.

Appendix 3. Completeness of National Notifiable Diseases Surveillance System data, received from states and territories, 2004

	State or territory								
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Aus
Total notifications	1,656	31,021	5,199	25,249	7,472	1,965	24,032	14,336	110,929
Sex									
Unknown/missing	1	97	1	5	0	1	168	7	280
Per cent complete*	99.9	99.7	100.0	100.0	100.0	99.9	99.3	100.0	99.7
Age									
Unknown/missing	1	63	22		2	7	108	11	214
Per cent complete*	99.9	99.8	99.6	100.0	100.0	99.6	99.6	99.9	99.8
Indigenous status†									
Not stated/missing	1,603	23,163	404	16,475	804	1,471	11,648	4,829	60,397
Per cent complete*	3.2	25.3	92.2	34.7	89.2	25.1	51.5	66.3	45.6

* Data completeness = (Total – Unknown or missing)/Total x 100.

† 'Indigenous status' is a variable defined by the following values:

1=Indigenous – (Aboriginal but not Torres Strait Islander origin);

2=Indigenous – (Torres Strait Islander but not Aboriginal origin);

3=Indigenous – (Aboriginal and Torres Strait Islander origin);

4=Not indigenous – (not Aboriginal or Torres Strait Islander origin);

9=Not stated;

Blank/missing/null=No information provided.

References

1. Australian Institute of Health and Welfare. Australian Hospital Statistics 2003–04. http://www.aihw.gov.au/publications/hse/ahs03-04/Supplementary_Chapter_9.xls Australian Institute of Health and Welfare, 2005.

2. National Centre in HIV Epidemiology and Clinical Research. Annual Surveillance Report. Sydney: University of New South Wales, 2005:132.

3. National Centre for Immunisation Research and Surveillance of Vaccine Preventable Diseases. Childhood immunisation coverage. *Commun Dis Intell* 2005;29:220–221.

4. OzFoodNet Working Group. Reported foodborne illness and gastroenteritis in Australia: annual report of the OzFoodNet network, 2004. *Commun Dis Intell* 2005;29:165–192.

5. Heath TC, Burrow JN, Currie BJ, Bowden FJ, Fisher DA, Demediuk BH, *et al*. Locally acquired hepatitis E in the Northern Territory of Australia. *Med J Aust* 1995;162:318–319.

6. OzFoodNet Working Group. Foodborne disease investigation across Australia: annual report of the OzFoodNet network. *Commun Dis Intell* 2004;28:359–389.

7. National Enteric Pathogens Surveillance System. Microbiological Diagnostic Unit, University of Melbourne, 2005:40.

8. Carter K WJ. *Salmonella* Typhimurium 9 outbreak linked to a Melbourne pizza restaurant. *Victorian Infectious Diseases Bulletin* 2004;7:30–32.

9. Bowden FJ, Savage J. Is the eradication of donovanosis possible in Australia? *Aust N Z J Public Health* 1998;22:7–9.

10. Mein JK, Anstey NM, Bowden FJ. Missing the diagnosis of donovanosis in northern Australia. *Med J Aust* 1999;170:48.

11. Horby P, Gilmour R, Wang H, McIntyre P. Progress towards eliminating Hib in Australia: an evaluation of *Haemophilus influenzae* type b prevention in Australia, 1 July 1993 to 30 June 2000. *Commun Dis Intell* 2003;27:324–341.

12. Menzies R, McIntyre P, Beard F. Vaccine Preventable Diseases and Vaccination Coverage in Aboriginal and Torres Strait Islander People, Australia, 1999 to 2002. *Commun Dis Intell* 2004;28 Suppl 1:S17–S19.

13. Hanna J. Impact of *Haemophilus influenzae* type b (Hib) vaccination in Far North Queensland, 1989 to 2003. *Commun Dis Intell* 2004;28:255–257.

14. Li J, Hampson A, Roche PW, Yohannes K, Spencer JD. Annual report of the National Influenza Surveillance Scheme, 2004. *Commun Dis Intell* 2005;29:125–136.

15. Gidding HF. The impact of Australia's measles control programme over the past decade. *Epidemiol Infect* 2005;133:99–105.

16. Savage E, Ramsey M, White J, Beard S, Lawson H, Hunjan R, *et al*. Mumps outbreaks across England and Wales in 2004: observational study. *BMJ* 2005;330:1119–1120.

17. Cagney M, MacIntyre CR, McIntyre P, Torvaldsen S, Melot V. Cough symptoms in children 5–14 years in Sydney, Australia: non-specific cough or unrecognized pertussis. *Respirology* 2005;10:359–364.

18. Roche PW, Krause V, Bartlett M, Coleman D, Cook H, Davis, *et al.* Invasive pneumococcal disease in Australia, 2004. *Commun Dis Intell* 2006;30:80–92.

19. Stambos V, Brussen KA, Thorley B. Annual report of the Australian National Poliovirus Reference Laboratory, 2004. *Commun Dis Intell* 2005;29:263–268.

20. Russell RC, Dwyer DE. Arboviruses associated with human disease in Australia. *Microbes Infect* 2000;2:1693–1704.

21. Lindsay MDA, Breeze AL, Johansen CA, Gordon CJ, Maley FM, Harrington SA. Ross River virus in Western Australia in 2003–2004: epidemiology of another major outbreak. *Disease WAtch*: *Western Australian Communicable Diseases Bulletin* 2004;9:15–18.

22. Lindsay MDA, Breeze AL, Harrington SA, Johansen CA, Broom AK, Gordon C, *et al*. Ross River and Barmah Forest viruses in Western Australia, 2001/01–2003/04: contrasting patterns of virus activity. *Arbovirus Res in Aust* 2005;9:194–201.

23. Johansen CA, Broom AK, Lindsay MDA, Maley FM, Power SL, Gordon CJ, *et al*. Surveillance of arboviruses in mosquitoes from the southwest of Western Australia between 2000 and 2004. *Arbovirus Res Aust* 2005;9:159–163.

24. Broom AK, Azuolas J, Hueston L, Mackenzie JS, Melville L, Smith DW, *et al*. Australian encephalitis: Sentinel Chicken Surveillance Programme. *Commun Dis Intell* 2001;25:157–160.

25. Broom AK, Whelan PI, Azuolas J, Dwyer D, Hueston L, Mackenzie JS, *et al*. Sentinel Chicken Surveillance Programme in Australia, 1 July 2001 to 30 June 2002. *Commun Dis Intell* 2002;26:428–429.

26. Broom AK. Sentinel Chicken Surveillance Program in Australia, July 2002 to June 2003. *Commun Dis Intell* 2003;27:367–369.

27. Broom AK, Whelan PI. Sentinel Chicken Surveillance Program in Australia, July 2003 to June 2004. *Commun Dis Intell* 2005;29:65–70.

28. Liu C, Broom A, Kurucz N, Whelan P. Communicable Diseases Network Australia National Arbovirus and Malaria Advisory Committee annual report 2004–05. *Commun Dis Intell* 2005;29:341–357.

29. McBride WJ. Deaths associated with dengue haemorrhagic fever: the first in Australia in over a century. *Med J Aust* 2005;183:35–37.

30. Whelan P, Krause V, Lamche G, Kurucz N. *Aedes aegypti* mosquitoes, vectors for dengue, found in Tennant Creek—elimination program in progress. *Northern Territory Disease Control Bulletin* 2004;11:1–3.

31. Beebe NW, Whelan PI, van den Hurk A, Ritchie S, Cooper RD. Genetic diversity of the dengue vector *Aedes aegypti* in Australia and implications for future surveillance and mainland incursion monitoring. *Commun Dis Intell* 2005;29:299–304.

32. Krause V. Northern Territory is dengue virus and dengue fever free—and has been since the 1950s! *Northern Territory Disease Control Bulletin* 2005;12:29.

33. Whelan PB, Krause V. Dengue mosquito eradication project Tennant Creek. End of January 2005 progress report. *Northern Territory Disease Control Bulletin* 2005;12:24–29.

34. World Health Organization. Zoonoses. Technical report series no. 169. Geneva, 1959.

35. World Health Organization. Report of the WHO/FAO/OIE joint consultation on emerging zoonotic diseases. Geneva, 2004.

36. Taylor LH, Latham SM, Woolhouse ME. Risk factors for human disease emergence. *Philos Trans R Soc Lond B Biol Sci* 2001;356:983–989.

37. Warrilow D. Australian bat lyssavirus: a recently discovered new rhabdovirus. *Curr Top Microbiol Immunol* 2005;292:25–44.

38. Warrilow D, Smith IL, Harrower B, Smith GA. Sequence analysis of an isolate from a fatal human infection of Australian bat lyssavirus. *Virology* 2002;297:109–119.

39. Animal Health Australia. Animal Health in Australia 2004. Canberra, Australia: Animal Health Australia, Australian Government Department of Agriculture, Fisheries and Forestry, 2005.

40. Hughes K L. Chlamydial infections in birds and mammals and their zoonotic potential. Zoonoses: Australian Veterinarians in Public Health (Proceedings 194) Post Graduate Committee in Veterinary Science University of Sydney, 1992.

41. Williams J, Tallis G, Dalton C, Ng S, Beaton S, Catton M, *et al*. Community outbreak of psittacosis in a rural Australian town. *Lancet* 1998;351:1697–1699.

42. Halpin K, Young PL, Field HE, Mackenzie JS. Isolation of Hendra virus from pteropid bats: a natural reservoir of Hendra virus. *J Gen Virol* 2000;81:1927–32.

43. Li J, O'Brien ED, Guest C. A review of national legionellosis surveillance in Australia, 1991 to 2000. *Commun Dis Intell* 2002;26:461–468.

44. World Health Organization. World Health Organization Expert Committee on Leprosy. Seventh report. Geneva: World Health Organization, 1998.

45. World Health Organization. Regional Office for the Western Pacific. *Leprosy* 2005.

46. Cohen N. Editorial: Introduction of the National Meningococcal C Vaccination Program. *Commun Dis Intell* 2003;27:161–162.

47. Miller M, Roche P, Yohannes K, Spencer J, Bartlett M, Brotherton J, *et al*. Australia's Notifiable Diseases Status, 2003: annual report of the National Notifiable Diseases Surveillance System. *Commun Dis Intell* 2005;29:1–61.

48. Tapert L. Annual report of the Australian Meningococcal Surveillance Programme, 2004. *Can Commun Dis Rep* 2005;29:150, 159.

49. Roche P, Lum G. Tuberculosis in Australia, annual report, 2004. *Commun Dis Intell* 2006;30:93–102.