# Australia's notifiable diseases status, 2003 Annual report of the National Notifiable Diseases Surveillance System

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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

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## Abstract

**In 2003, 58 diseases and conditions were notifiable at a national level in Australia. States and territories reported a total of 104,956 cases to the National Notifiable Diseases Surveillance System an increase of 3.2 per cent on the total number of notifications in 2002. In 2003, the most frequently notified diseases were sexually acquired infections (38,854, 37% of total notifications), gastrointestinal diseases (24,655 notifications, 24%) and bloodborne viruses (20,825 notifications, 20%). There were 11,113 notifications of vaccine preventable diseases, 6,780 notifications of vectorborne diseases, 1,826 notification of other bacterial infections and 903 notifications of zoonotic diseases. *Commun Dis Intell* 2005;29:1–61.**


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**Abbreviations used in this report**

| | |
|---|---|
| ACIR | Australian Childhood Immunisation Register |
| AFP | Acute flaccid paralysis |
| AIDS | Acquired immune deficiency syndrome |
| 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 fever virus |
| DoHA | Australian Government Department of Health and Ageing |
| DTP | Diphtheria-tetanus-pertussis vaccine |
| Hib | *Haemophilus influenzae* type b |
| HIC | Health Insurance Commission |
| 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 vaccine |
| NCHECR | National Centre in HIV Epidemiology and Clinical Research |
| NEC | Not elsewhere classified |
| NHMRC | National Health and Medical Research Council |
| NN | Not notifiable |
| NNDSS | National Notifiable Diseases Surveillance System |
| OPV | Oral polio vaccine |
| RRV | Ross River virus |
| 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

Surveillance of communicable diseases is vital to the control of communicable diseases, to identify and assess the relative burden of diseases and to monitor trends over time. It is also required for the guidance of policy making.

Communicable disease surveillance in Australia exists at the national, state and local levels. Primary responsibility for public health action lies with the state and territory health departments and with local health authorities.

The role of communicable disease surveillance at a national level includes:

- identifying national trends;
- guidance for policy development at a national level and resource allocation;
- 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 have agreed to forward data on a nationally agreed set of communicable diseases to DoHA for the purposes of national communicable disease surveillance.

Fifty-eight communicable diseases (Table 1) agreed upon nationally through the Communicable Diseases Network Australia (CDNA) were reported to the National Notifiable Diseases Surveillance System (NNDSS) in 2003. The system is complemented by other surveillance systems, which provide information on various diseases, including some that are not reported to NNDSS.

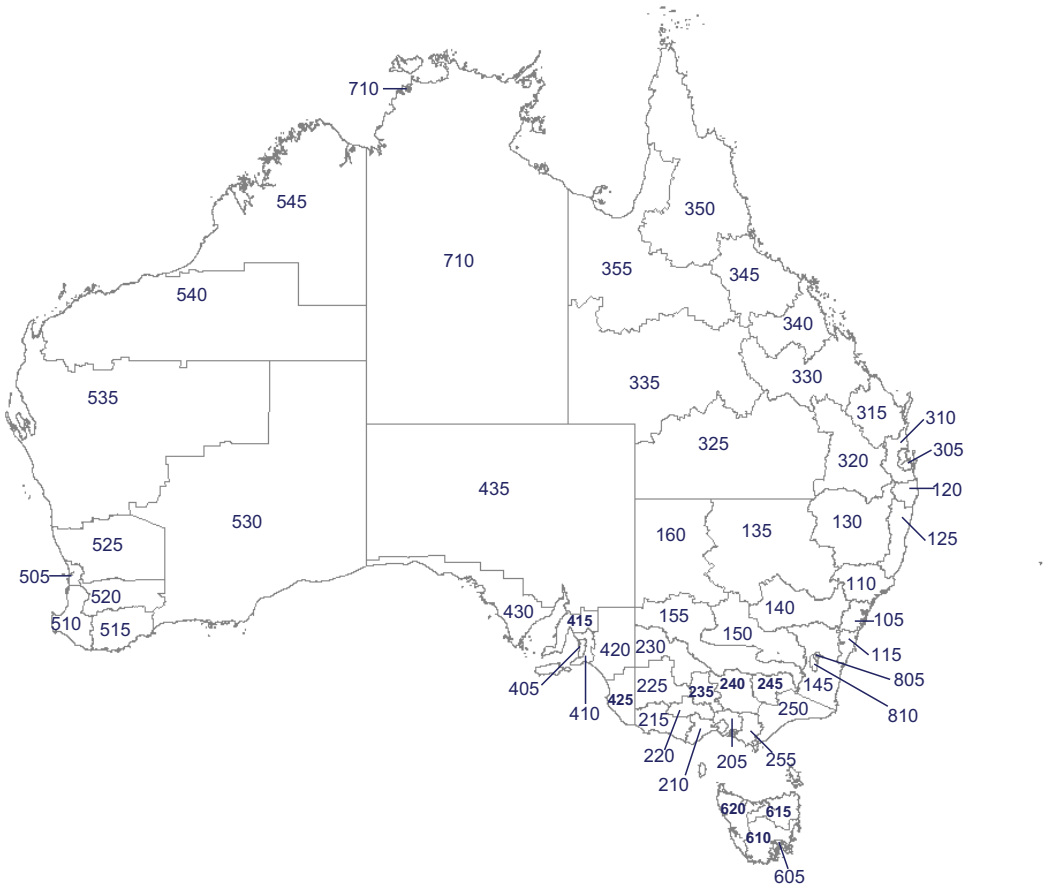
The national dataset included fields for unique record reference number; notifying state or territory; disease code; age; sex; Indigenous status; postcode of residence; date of onset of the disease; and date of report to the state or territory health department. Additional information was available on the species and serogroups isolated in cases of salmonellosis, legionellosis, meningococcal disease and malaria, and on the vaccination status in cases of childhood vaccine preventable diseases. 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. The Australian Institute of Health and Welfare supplied hospital admission data for the financial year 2002–03.

Notification rates for each notifiable disease were calculated using 2003 mid-year resident population supplied by the Australian Bureau of Statistics (Appendix 1). Where diseases were not notifiable in a state or territory, adjusted rates were calculated by excluding the population of that jurisdiction from the denominator.

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 two Statistical Divisions that make up the Australian Capital Territory were combined as were the two Statistical Divisions that make up the Northern Territory, to calculate rates for each territory as a whole.

Information from communicable disease surveillance is disseminated through several avenues of communication. Fortnightly teleconferences of the Communicable Diseases Network Australia provide the most up-to-date information on topics of immediate interest. 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.

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




| Statistical Division | | Population |
|---|---|---|
| *Australian Capital Territory* | | |
| 805 | Canberra* | 322,492 |
| *New South Wales* | | |
| 105 | Sydney | 4,201,493 |
| 110 | Hunter | 599,998 |
| 115 | Illawarra | 408,059 |
| 120 | Richmond-Tweed | 221,549 |
| 125 | Mid North Coast | 288,040 |
| 130 | Northern | 179,734 |
| 135 | North Western | 119,101 |
| 140 | Central West | 178,969 |
| 145 | South Eastern | 198,487 |
| 150 | Murrumbidgee | 153,006 |
| 155 | Murray | 114,312 |
| 160 | Far West | 23,896 |
| *Northern Territory* | | |
| 705 | Darwin† | 198,351 |
| *Queensland* | | |
| 305 | Brisbane | 1,733,227 |
| 310 | Moreton | 774,660 |
| 315 | Wide Bay-Burnett | 244,572 |
| 320 | Darling Downs | 212,942 |
| 325 | South West | 27,005 |

| Statistical Division | | Population |
|---|---|---|
| *Queensland continued* | | |
| 330 | Fitzroy | 185,144 |
| 335 | Central West | 12,364 |
| 340 | Mackay | 141,567 |
| 345 | Northern | 197,389 |
| 350 | Far North | 231,253 |
| 355 | Northwest | 33,978 |
| *South Australia* | | |
| 405 | Adelaide | 1,119,920 |
| 410 | Outer Adelaide | 118,850 |
| 415 | Yorke & Lower North | 44,545 |
| 420 | Murray Lands | 68,504 |
| 425 | South East | 62,997 |
| 430 | Eyre | 34,407 |
| 435 | Northern | 78,198 |
| *Tasmania* | | |
| 605 | Greater Hobart | 199,886 |
| 610 | Southern | 35,017 |
| 615 | Northern | 135,071 |
| 620 | Mersey-Lyell | 107,120 |
| 910 | *Other territories* | 2,660 |

| Statistical Division | | Population |
|---|---|---|
| *Victoria* | | |
| 205 | Melbourne | 3,559,654 |
| 210 | Barwon | 262,473 |
| 215 | Western District | 100,587 |
| 220 | Central Highlands | 144,485 |
| 225 | Wimmera | 50,916 |
| 230 | Mallee | 91,124 |
| 235 | Loddon | 170,855 |
| 240 | Goulburn | 198,743 |
| 245 | Ovens-Murray | 94,912 |
| 250 | East Gippsland | 81,250 |
| 255 | Gippsland | 162,395 |
| *Western Australia* | | |
| 505 | Perth | 1,433,217 |
| 510 | South West | 204,182 |
| 515 | Lower Great Southern | 53,826 |
| 520 | Upper Great Southern | 18,562 |
| 525 | Midlands | 53,320 |
| 530 | South Eastern | 54,951 |
| 535 | Central | 60,324 |
| 540 | Pilbara | 39,529 |
| 545 | Kimberley | 34,369 |
| | Total Australia | 19,881,500 |

* Includes Statistical Division 810 “ACT – balance.”

† Includes Statistical Division 710 “NT – balance.”

## *Notes on interpretation*

The present report is based on 2003 'finalised' annual data from each state and territory. States and territories transmitted data to DoHA each fortnight and the final dataset for the year was agreed upon in July 2004. 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.

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 (report), whichever was earliest, was used. As considerable time may have lapsed between onset and report dates for hepatitis B (unspecified) and hepatitis C (unspecified) notifications, these were analysed by report date.

Under-reporting is an important factor that should be considered when interpreting NNDSS data. Figure 1 shows the steps necessary for an episode of illness in the population to reach the NNDSS. Each step contributes to under-reporting resulting in only a proportion of notifiable diseases reaching the surveillance system. Due to under-reporting, notified cases can only represent a proportion (the 'notified fraction') of the total incidence. Moreover, the notified fraction varies by disease, by jurisdiction and by time.

Methods of surveillance can vary between states and territories, each with different requirements for notification by medical practitioners, laboratories and hospitals. Some diseases were not notifiable in some jurisdictions (Table 1). The case definitions for surveillance vary among jurisdictions. In addition, changes to surveillance practices may be introduced in some jurisdictions and not in others, making comparison of data across jurisdictions difficult. To inform the interpretation of data in this report, states and territories were asked to report any changes in surveillance practices including changes in case definition, screening practices, laboratory practices, and major disease control or prevention initiatives undertaken in 2003.

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 of data in this report is summarised in Appendix 3. The patient's sex was not stated in 0.5 per cent of notifications (n=476) and the patient's age was not stated in 0.1 per cent of notifications (n=57). Indigenous status was reported for 43.1 per cent of notifications nationally. The proportion of reports with missing data in these fields varied by state and territory and by disease.

Discussions and comments of CDNA members and state and territory epidemiologists have informed the present report and their contribution to the accuracy of these data is gratefully acknowledged.

**Figure 1. Communicable diseases notification fraction**

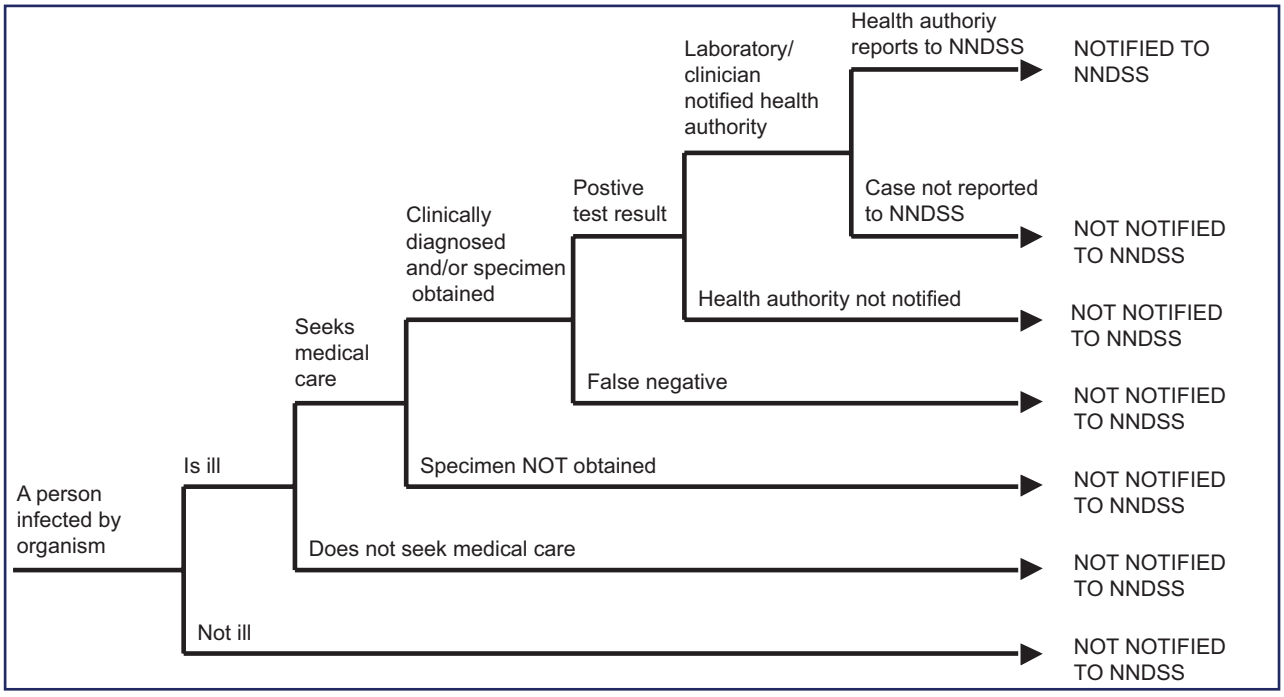


**Table 1. Diseases notified to the National Notifiable Diseases Surveillance System, Australia, 2003***

| 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 |
| Hepatitis C (unspecified) | All jurisdictions |
| Hepatitis D | All jurisdictions |
| Hepatitis (NEC) | All jurisdictions except WA |
| **Gastrointestinal diseases** | |
| Botulism | All jurisdictions |
| Campylobacterosis | 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 |
| Viral haemorrhagic fever (NEC) | All jurisdictions |
| Yellow fever | All jurisdictions |
| **Sexually transmissible infections** | |
| Chlamydial infection (NEC) | All jurisdictions |
| Donovanosis | All jurisdictions |
| Gonococcal infection | All jurisdictions |
| Syphilis | 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 |
| **Vectorborne diseases** | |
| Barmah forest virus infection | All jurisdictions |
| Dengue | All jurisdictions |
| Flavivirus infection (NEC) | All jurisdictions |
| 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 |

**Table 1. Diseases notified to the National Notifiable Diseases Surveillance System, Australia, 2003,* *continued***

| Disease | Data received from |
|---|---|
| **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 |
| **Other bacterial infections** | |
| Legionellosis | All jurisdictions |
| Leprosy | All jurisdictions |
| Meningococcal infection | All jurisdictions |
| Tuberculosis | All jurisdictions |

* Laboratory confirmed influenza was not a notifiable disease in the Australian Capital Territory or South Australia in 2003, but reports were forwarded to the National Notifiable Diseases Surveillance System.

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

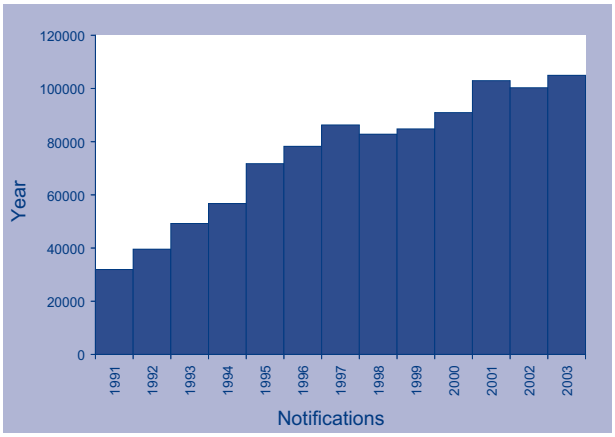
# Results

## *Summary of 2003 data*

There were 104,956 communicable disease notifications received by NNDSS in 2003 (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 1999 to 2003 are shown in Table 4.

In 2003, the total number of notifications was the highest recorded in NNDSS since the system began in 1991 and was an increase over the total in 2002 of 3.2 per cent (Figure 2).

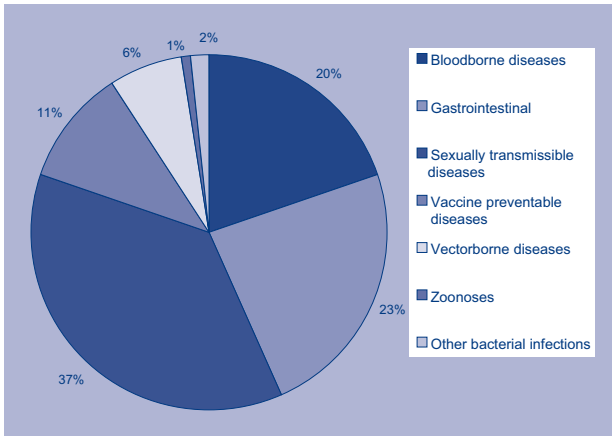
**Figure 2. Trends in notifications received by the National Notifiable Diseases Surveillance System, 1991 to 2003***




* The increase in notifications since 1991 reflects an increase in the number of notifiable diseases, more complete reporting by states and territories, as well as increased numbers of cases.

In 2003, the most frequently notified diseases were sexually acquired infections (38,854, 37% of total notifications), gastrointestinal diseases (24,655 notifications, 24%) and bloodborne viruses (20,825 notifications, 20%). There were 11,113 notifications of vaccine preventable diseases, 6,780 notifications of vectorborne diseases, 1,826 notification of other bacterial infections and 903 notifications of zoonotic diseases (Figure 3).

**Figure 3. Notifications to the National Notifiable Diseases Surveillance System, Australia, 2003, by disease category**



## Table 2. Notifications of communicable diseases, Australia, 2003, by state or territory*

| Disease | State or terriotry | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | ACT | NSW | NT | Qld | SA | Tas | Vic | WA | Aust |
| **Bloodborne diseases** | | | | | | | | | |
| Hepatitis B (incident) | 0 | 70 | 15 | 40 | 10 | 10 | 147 | 45 | 337 |
| Hepatitis B (unspecified)†,‡ | 57 | 2,632 | NN | 805 | 221 | 70 | 1,629 | 419 | 5,833 |
| Hepatitis C (incident) | 12 | 114 | NN | NN | 74 | 13 | 105 | 142 | 460 |
| Hepatitis C (unspecified)†,‡,§ | 241 | 5,172 | 208 | 2,761 | 574 | 342 | 3,705 | 1,166 | 14,169 |
| Hepatitis D | 0 | 12 | 0 | 1 | 0 | 0 | 13 | 0 | 26 |
| Hepatitis (NEC) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Gastrointestinal diseases** | | | | | | | | | |
| Botulism | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| Campylobacteriosis‖ | 406 | NN | 268 | 3,857 | 2,644 | 624 | 5,596 | 1,977 | 15,372 |
| Cryptosporidiosis | 9 | 202 | 94 | 162 | 80 | 26 | 209 | 437 | 1,219 |
| Haemolytic uraemic syndrome | 0 | 5 | 1 | 1 | 3 | 0 | 4 | 1 | 15 |
| Hepatitis A | 5 | 124 | 40 | 48 | 13 | 14 | 89 | 85 | 418 |
| Hepatitis E | 2 | 6 | 0 | 0 | 0 | 0 | 2 | 0 | 10 |
| Listeriosis | 1 | 28 | 0 | 9 | 1 | 2 | 22 | 6 | 69 |
| Salmonellosis (NEC) | 80 | 1,858 | 360 | 2,201 | 445 | 151 | 1,302 | 614 | 7,011 |
| Shigellosis | 3 | 59 | 131 | 52 | 32 | 4 | 49 | 110 | 440 |
| SLTEC, VTEC¶ | 0 | 0 | 0 | 6 | 37 | 0 | 3 | 3 | 49 |
| Typhoid | 0 | 16 | 0 | 4 | 2 | 1 | 18 | 10 | 51 |
| **Quarantinable diseases** | | | | | | | | | |
| Cholera | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 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 |
| 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 infection | 523 | 7,556 | 1,602 | 7,661 | 1,990 | 609 | 6,457 | 3,763 | 30,161 |
| Donovanosis | 0 | 0 | 6 | 9 | 0 | 0 | 0 | 1 | 16 |
| Gonococcal infection | 30 | 1,194 | 1,399 | 1,042 | 297 | 23 | 1,172 | 1,454 | 6,611 |
| Syphilis | 12 | 826 | 316 | 375 | 21 | 14 | 356 | 136 | 2,056 |
| Syphilis – congenital | 0 | 1 | 8 | 1 | 0 | 0 | 0 | 0 | 10 |
| **Vaccine preventable diseases** | | | | | | | | | |
| Diphtheria | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Haemophilus influenzae* type b | 0 | 6 | 2 | 5 | 2 | 2 | 1 | 1 | 19 |
| Influenza (laboratory confirmed) | 7 | 861 | 151 | 975 | 311 | 7 | 659 | 616 | 3,587 |
| Measles | 0 | 18 | 1 | 11 | 24 | 0 | 38 | 0 | 92 |
| Mumps | 2 | 35 | 0 | 10 | 12 | | 4 | 13 | 76 |
| Pertussis | 357 | 2,768 | 5 | 716 | 233 | 132 | 639 | 256 | 5,106 |
| Pneumococcal disease (invasive) | 40 | 784 | 72 | 466 | 176 | 43 | 443 | 150 | 2,174 |
| Poliomyelitis | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rubella | 0 | 24 | 0 | 23 | 1 | 1 | 1 | 3 | 53 |
| Rubella – congenital | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
| Tetanus | 0 | 1 | 0 | 2 | 0 | 0 | 1 | 0 | 4 |

**Table 2. Notifications of communicable diseases, Australia, 2003, by state or territory,* *continued***

| Disease | State or terriotry | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | ACT | NSW | NT | Qld | SA | Tas | Vic | WA | Aust |
| **Vectorborne disease** | | | | | | | | | |
| Barmah Forest virus infection | 1 | 451 | 14 | 872 | 2 | 0 | 8 | 22 | 1,370 |
| Dengue | 7 | 69 | 20 | 727 | 9 | 1 | 18 | 17 | 868 |
| Flavivirus (NEC) | 0 | 10 | 0 | 68 | 0 | 0 | 3 | 0 | 81 |
| Japanese encephalitis virus | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Kunjin virus | 0 | 0 | 0 | 19 | 0 | 0 | 0 | 0 | 19 |
| Malaria | 18 | 120 | 40 | 253 | 28 | 27 | 59 | 56 | 601 |
| Murray Valley encephalitis virus | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Ross River virus infection | 1 | 492 | 120 | 2,517 | 33 | 4 | 13 | 661 | 3,841 |
| **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 | 1 | 0 | 13 | 0 | 0 | 3 | 0 | 17 |
| Leptospirosis | 0 | 37 | 4 | 67 | 2 | 0 | 9 | 6 | 125 |
| Ornithosis | 0 | 87 | 2 | 2 | 1 | 0 | 115 | 4 | 211 |
| Lyssavirus (NEC) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Q fever | 1 | 278 | 1 | 224 | 13 | 1 | 13 | 19 | 550 |
| **Other bacterial infections** | | | | | | | | | |
| Legionellosis | 1 | 60 | 3 | 39 | 65 | 2 | 93 | 65 | 328 |
| Leprosy | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 4 |
| Meningococcal infection | 13 | 199 | 11 | 104 | 32 | 20 | 125 | 46 | 550 |
| Tuberculosis | 18 | 378 | 29 | 96 | 42 | 4 | 309 | 68 | 944 |
| Total | 1,847 | 26,555 | 4,923 | 26,246 | 7,431 | 2,147 | 23,434 | 12,373 | 104,956 |

* Analyses in this report were based on date of onset, (except for hepatitis B and hepatitis C unspecified, where date of report of disease was used). Where date of onset was not available the date of specimen collection or the date of notification, whichever was earliest was used.

† Unspecified hepatitis includes cases with hepatitis in which the duration of infection can not be determined.

‡ The analysis was by report date.

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

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

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

NN Not notifiable.

NEC Not elsewhere classified.

**Table 3. Notification rates of communicable diseases, Australia, 2003, by state and territory (per 100,000 population)***

| Disease | State or territory | | | | | | | | Aust |
|---|---|---|---|---|---|---|---|---|---|
| | ACT | NSW | NT | Qld | SA | Tas | Vic | WA | |
| **Bloodborne diseases** | | | | | | | | | |
| Hepatitis B (incident) | 0.0 | 1.0 | 7.6 | 1.1 | 0.7 | 2.1 | 3.0 | 2.3 | 1.7 |
| Hepatitis B (unspecified)†,‡ | 17.7 | 39.4 | NN | 21.2 | 14.5 | 14.7 | 33.1 | 21.5 | 29.3 |
| Hepatitis C (incident) | 3.7 | 1.7 | NN | NN | 4.8 | 2.7 | 2.1 | 7.3 | 2.3 |
| Hepatitis C (unspecified) †,‡,§ | 74.6 | 77.3 | 104.9 | 72.7 | 37.6 | 71.7 | 75.3 | 59.7 | 71.3 |
| Hepatitis D | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.1 |
| Hepatitis (NEC) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Gastrointestinal diseases** | | | | | | | | | |
| Botulism | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| Campylobacteriosis‖ | 125.8 | NN | 135.1 | 101.6 | 173.1 | 130.8 | 113.8 | 101.3 | 116.5 |
| Cryptosporidiosis | 2.8 | 3.0 | 47.4 | 4.3 | 5.2 | 5.4 | 4.3 | 22.4 | 6.1 |
| Haemolytic uraemic syndrome | 0.0 | 0.1 | 0.5 | 0.0 | 0.2 | 0.0 | 0.1 | 0.1 | 0.1 |
| Hepatitis A | 1.5 | 1.9 | 20.2 | 1.3 | 0.9 | 2.9 | 1.8 | 4.4 | 2.1 |
| Hepatitis E | 0.6 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |
| Listeriosis | 0.3 | 0.4 | 0.0 | 0.2 | 0.1 | 0.4 | 0.4 | 0.3 | 0.3 |
| Salmonellosis (NEC) | 24.8 | 27.8 | 181.5 | 58.0 | 29.1 | 31.6 | 26.5 | 31.5 | 35.3 |
| Shigellosis | 0.9 | 0.9 | 66.0 | 1.4 | 2.1 | 0.8 | 1.0 | 5.6 | 2.2 |
| SLTEC, VTEC¶ | 0.0 | 0.0 | 0.0 | 0.2 | 2.4 | 0.0 | 0.1 | 0.2 | 0.2 |
| Typhoid | 0.0 | 0.2 | 0.0 | 0.1 | 0.1 | 0.2 | 0.4 | 0.5 | 0.3 |
| **Quarantinable diseases** | | | | | | | | | |
| Cholera | 0.0 | 0.0 | 0.0 | 0.0 | 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 | 0.0 | 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 |
| 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 infection | 162.0 | 113.0 | 807.7 | 201.8 | 130.3 | 127.6 | 131.3 | 192.7 | 151.7 |
| Donovanosis | 0.0 | 0.0 | 3.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 |
| Gonococcal infection | 9.3 | 17.9 | 705.3 | 27.4 | 19.4 | 4.8 | 23.8 | 74.5 | 33.3 |
| Syphilis | 3.7 | 12.4 | 159.2 | 9.9 | 1.4 | 2.9 | 7.2 | 7.0 | 10.3 |
| Syphilis – congenital | 0.0 | 0.01 | 4.0 | 0.03 | 0.0 | 0.0 | 0.0 | 0.0 | 0.05 |
| **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 | 1.0 | 0.1 | 0.1 | 0.4 | 0.0 | 0.1 | 0.1 |
| Influenza (laboratory confirmed) | 2.2 | 12.9 | 76.1 | 25.7 | 20.4 | 1.5 | 13.4 | 31.6 | 18.0 |
| Measles | 0.0 | 0.3 | 0.5 | 0.3 | 1.6 | 0.0 | 0.8 | 0.0 | 0.5 |
| Mumps | 0.6 | 0.5 | 0.0 | 0.3 | 0.8 | 0.0 | 0.1 | 0.7 | 0.4 |
| Pertussis | 110.6 | 41.4 | 2.5 | 18.9 | 15.3 | 27.7 | 13.0 | 13.1 | 25.7 |
| Pneumococcal disease (invasive) | 12.4 | 11.7 | 36.3 | 12.3 | 11.5 | 9.0 | 9.0 | 7.7 | 10.9 |
| Poliomyelitis | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rubella | 0.0 | 0.4 | 0.0 | 0.7 | 0.1 | 0.2 | 0.0 | 0.2 | 0.3 |
| Rubella – congenital | 0.0 | 0.0 | 0.0 | 0.05 | 0.0 | 0.0 | 0.0 | 0.0 | 0.01 |
| Tetanus | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

**Table 3. Notification rates of communicable diseases, Australia, 2003, 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 | 0.3 | 6.7 | 7.1 | 23.0 | 0.1 | 0.0 | 0.2 | 1.1 | 6.9 |
| Dengue | 2.2 | 1.0 | 10.1 | 19.1 | 0.6 | 0.2 | 0.4 | 0.9 | 4.4 |
| Flavivirus (NEC) | 0.0 | 0.1 | 0.0 | 1.8 | 0.0 | 0.0 | 0.1 | 0.0 | 0.4 |
| 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 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 |
| Malaria | 5.6 | 1.8 | 20.2 | 6.7 | 1.8 | 5.7 | 1.2 | 2.9 | 3.0 |
| Murray Valley encephalitis virus | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ross River virus infection | 0.3 | 7.4 | 60.5 | 66.3 | 2.2 | 0.8 | 0.3 | 33.9 | 19.3 |
| **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 | 0.0 | 0.0 | 0.3 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 |
| Leptospirosis | 0.0 | 0.6 | 2.0 | 1.8 | 0.1 | 0.0 | 0.2 | 0.3 | 0.6 |
| Ornithosis | 0.0 | 1.3 | 1.0 | 0.1 | 0.1 | 0.0 | 2.3 | 0.2 | 1.1 |
| Lyssavirus (NEC) | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Q fever | 0.3 | 4.2 | 0.5 | 5.9 | 0.9 | 0.2 | 0.3 | 1.0 | 2.8 |
| **Other bacterial infections** | | | | | | | | | |
| Legionellosis | 0.3 | 0.9 | 1.5 | 1.0 | 4.3 | 0.4 | 1.9 | 3.3 | 1.6 |
| Leprosy | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 |
| Meningococcal infection | 4.0 | 3.0 | 5.5 | 2.7 | 2.1 | 4.2 | 2.5 | 2.4 | 2.8 |
| Tuberculosis | 5.6 | 5.7 | 14.6 | 2.5 | 2.7 | 0.8 | 6.3 | 3.5 | 4.7 |

* Analyses in this report were based on date of onset, (except for hepatitis B and hepatitis C unspecified, where date of report of disease was used). Where date of onset was not available the date of specimen collection or the date of notification, whichever was earliest was used.

† Unspecified hepatitis includes cases with hepatitis in which the duration of infection can not be determined.

‡ The analysis was by report date.

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

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

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

NN Not notifiable.

NEC Not elsewhere classified.

## Table 4. Notifications and notification rates of communicable diseases, Australia, 1999 to 2003*

| Disease | Notifications | | | | | Rate per 100,000 population | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1999 | 2000 | 2001 | 2002 | 2003 | 1999 | 2000 | 2001 | 2002 | 2003 |
| **Bloodborne diseases** | | | | | | | | | | |
| Hepatitis B (incident) | 301 | 408 | 412 | 406 | 337 | 1.6 | 2.1 | 2.1 | 2.1 | 1.7 |
| Hepatitis B (unspecified)†,‡ | 6,813 | 7,248 | 8,139 | 6,822 | 5,833 | 36.0 | 38.8 | 41.9 | 34.7 | 29.3 |
| Hepatitis C (incident) | 439 | 469 | 678 | 444 | 460 | 2.3 | 2.5 | 3.5 | 2.3 | 2.3 |
| Hepatitis C (unspecified)†,‡,§ | 18,378 | 18,864 | 18,982 | 16,156 | 14,169 | 97.1 | 98.5 | 97.8 | 82.2 | 71.3 |
| Hepatitis D | 19 | 26 | 20 | 19 | 26 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Hepatitis (NEC) | 0 | 1 | 2 | 0 | 0 | 0.0 | <0.1 | <0.1 | 0.0 | 0.0 |
| **Gastrointestinal diseases** | | | | | | | | | | |
| Botulism | 0 | 2 | 2 | 0 | 1 | 0.0 | <0.1 | <0.1 | 0.0 | <0.1 |
| Campylobacteriosis‖ | 12,372 | 13,641 | 16,094 | 14,722 | 15,372 | 100.9 | 107.1 | 125.2 | 112.2 | 116.5 |
| Cryptosporidiosis | NN | NN | 1,619 | 3,268 | 1,219 | NN | NN | 8.3 | 16.6 | 6.1 |
| Haemolytic uraemic syndrome | 24 | 17 | 3 | 13 | 15 | 0.1 | 0.1 | <0.1 | 0.1 | 0.1 |
| Hepatitis A | 1,546 | 813 | 530 | 383 | 418 | 8.2 | 4.2 | 2.7 | 2.0 | 2.1 |
| Hepatitis E | 9 | 10 | 10 | 19 | 10 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| Listeriosis | 62 | 66 | 64 | 61 | 69 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| Salmonellosis (NEC) | 7,017 | 6,225 | 6,977 | 7,863 | 7,011 | 37.1 | 32.5 | 36.0 | 40.0 | 35.3 |
| Shigellosis | 534 | 491 | 565 | 501 | 440 | 2.8 | 2.6 | 2.9 | 2.6 | 2.2 |
| SLTEC, VTEC¶ | 51 | 42 | 45 | 53 | 49 | 0.3 | 0.2 | 0.2 | 0.3 | 0.2 |
| Typhoid | 63 | 56 | 74 | 70 | 51 | 0.3 | 0.3 | 0.4 | 0.4 | 0.3 |
| **Quarantinable diseases** | | | | | | | | | | |
| Cholera | 3 | 2 | 4 | 5 | 0 | <0.1 | <0.1 | <0.1 | <0.1 | 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 |
| 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 infection | 14,082 | 16,927 | 20,213 | 24,294 | 30,161 | 74.4 | 88.4 | 104.1 | 123.6 | 151.7 |
| Donovanosis | 18 | 22 | 33 | 16 | 16 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 |
| Gonococcal infection | 5,587 | 5,901 | 6,238 | 6,308 | 6,611 | 29.5 | 30.8 | 32.1 | 32.1 | 33.3 |
| Syphilis | 2,029 | 2,067 | 1,803 | 2,017 | 2,056 | 10.7 | 10.8 | 9.3 | 10.3 | 10.4 |
| Syphilis – congenital | 0 | 4 | 21 | 13 | 10 | 0.0 | <0.1 | 0.1 | 0.1 | 0.1 |
| **Vaccine preventable diseases** | | | | | | | | | | |
| Diphtheria | 0 | 0 | 1 | 0 | 0 | 0.0 | 0.0 | <0.1 | 0.0 | 0.0 |
| *Haemophilus influenzae* type b | 40 | 27 | 20 | 29 | 19 | 0.2 | 0.1 | 0.1 | 0.2 | 0.1 |
| Influenza (laboratory confirmed) | NN | NN | 1,284 | 3,672 | 3,587 | NN | NN | 6.6 | 18.7 | 18.0 |
| Measles | 238 | 109 | 140 | 31 | 92 | 1.3 | 0.6 | 0.7 | 0.2 | 0.5 |
| Mumps | 183 | 216 | 116 | 68 | 76 | 1.0 | 1.1 | 0.6 | 0.4 | 0.5 |
| Pertussis | 4,355 | 5,988 | 9,309 | 5,569 | 5,106 | 23.0 | 31.3 | 48.0 | 28.3 | 25.7 |
| Pneumococcal disease (invasive) | NN | NN | 1,690 | 2,311 | 2,174 | NN | NN | 8.7 | 11.8 | 10.9 |
| Poliomyelitis | 0 | 0 | 0 | 0 | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rubella | 371 | 323 | 264 | 253 | 55 | 2.0 | 1.7 | 1.4 | 1.3 | 0.3 |
| Rubella – congenital | 0 | 0 | 0 | 1 | 2 | 0.0 | 0.0 | 0.0 | <0.1 | 0.01 |
| Tetanus | 2 | 8 | 3 | 4 | 4 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |

**Table 4. Notifications and notification rates of communicable diseases, Australia, 1999 to 2003,* *continued***

| Disease | Notifications | | | | | Rate per 100,000 population | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1999 | 2000 | 2001 | 2002 | 2003 | 1999 | 2000 | 2001 | 2002 | 2003 |
| **Vectorborne diseases** | | | | | | | | | | |
| Barmah Forest virus infection | 638 | 646 | 1,139 | 903 | 1,370 | 3.4 | 3.4 | 5.9 | 4.6 | 6.9 |
| Dengue | 131 | 217 | 179 | 223 | 868 | 0.7 | 1.1 | 0.9 | 1.1 | 4.4 |
| Flavivirus (NEC) | 51 | 46 | 33 | 21 | 81 | 0.3 | 0.2 | 0.2 | 0.1 | 0.4 |
| Japanese encephalitis virus | NN | NN | 0 | 0 | 0 | NN | NN | 0.0 | 0.0 | 0.0 |
| Kunjin virus | NN | NN | 5 | 0 | 19 | NN | NN | <0.1 | 0.0 | 0.1 |
| Malaria | 717 | 970 | 712 | 466 | 601 | 3.8 | 5.1 | 3.7 | 2.4 | 3.0 |
| Murray Valley encephalitis virus | NN | NN | 5 | 2 | 0 | NN | NN | <0.1 | <0.1 | 0.0 |
| Ross River virus infection | 4,376 | 4,221 | 3,216 | 1,445 | 3,841 | 23.1 | 22.0 | 16.6 | 7.4 | 19.3 |
| **Zoonoses** | | | | | | | | | | |
| Anthrax | NN | NN | 0 | 0 | 0 | NN | NN | 0.0 | 0.0 | 0.0 |
| Australian bat lyssavirus | NN | NN | 0 | 0 | 0 | NN | NN | 0.0 | 0.0 | 0.0 |
| Brucellosis | 52 | 27 | 21 | 39 | 17 | 0.3 | 0.1 | 0.1 | 0.2 | 0.1 |
| Leptospirosis | 319 | 246 | 242 | 160 | 125 | 1.7 | 1.3 | 1.3 | 0.8 | 0.6 |
| Ornithosis | 80 | 102 | 135 | 206 | 211 | 0.4 | 0.5 | 0.7 | 1.0 | 1.1 |
| Lyssavirus (NEC) | NN | NN | 0 | 0 | 0 | NN | NN | 0.0 | 0.0 | 0.0 |
| Q fever | 517 | 578 | 684 | 789 | 550 | 2.7 | 3.0 | 3.5 | 4.0 | 2.8 |
| **Other bacterial infections** | | | | | | | | | | |
| Legionellosis | 250 | 473 | 309 | 687 | 328 | 1.3 | 2.5 | 1.6 | 1.6 | 2.8 |
| Leprosy | 8 | 4 | 7 | 6 | 4 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Meningococcal infection | 588 | 628 | 678 | 689 | 550 | 3.1 | 3.3 | 3.5 | 3.5 | 2.8 |
| Tuberculosis | 1,145 | 1,063 | 948 | 1,007 | 944 | 6.1 | 5.6 | 4.9 | 5.1 | 4.7 |
| Total | 83,408 | 89,194 | 103,668 | 101,664 | 104,989 | | | | | |

* Analyses in this report were based on date of onset, (except for hepatitis B and hepatitis C unspecified, where date of report of disease was used). Where date of onset was not available the date of specimen collection or the date of notification, whichever was earliest was used.

† Unspecified hepatitis includes cases with hepatitis in which the duration of infection can not be determined.

‡ The analysis was by report date.

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

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

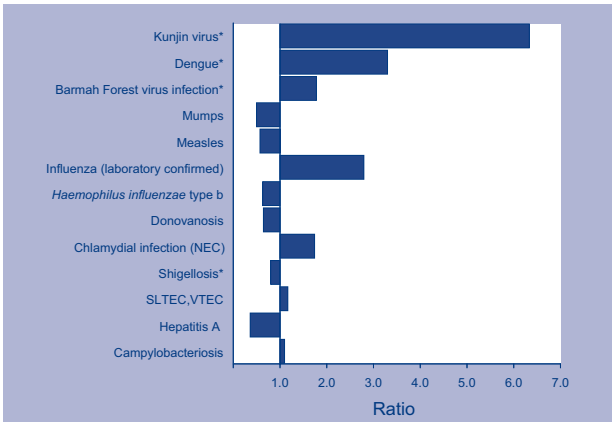
¶ Infections with Shiga-like toxin/verotoxin-producing *Escherichia coli* (SLTEC/VTEC).

NN Not notifiable.

NEC Not elsewhere classified.

The major changes in communicable disease notifications in 2003 are shown in Figure 4, as the ratio of notifications in 2003 to the mean number of notifications for the previous five years. The number of notifications of chlamydial infection, Barmah Forest virus infections, Dengue and Kunjin virus infections in 2003 surpassed the expected range (5-year mean plus two standard deviations). Notifications of hepatitis B (unspecified) and hepatitis C (unspecified), and shigellosis in 2003 were below the expected range (5-year mean minus two standard deviations). Notifications for the remaining diseases were within the historical range.

**Figure 4. Comparison of total notifications of selected diseases reported to the National Notifiable Diseases Surveillance System in 2003, with the previous five-year mean**




* Notifications below the 5-year mean minus two standard deviations or above the 5-year mean plus two standard deviations.

In the financial year 2002–03, there were 92,366 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 65,986 separations were recorded with a principal diagnosis of influenza or pneumonia (ICD10–AM J10–J18).

# *Bloodborne diseases*

In 2003, 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

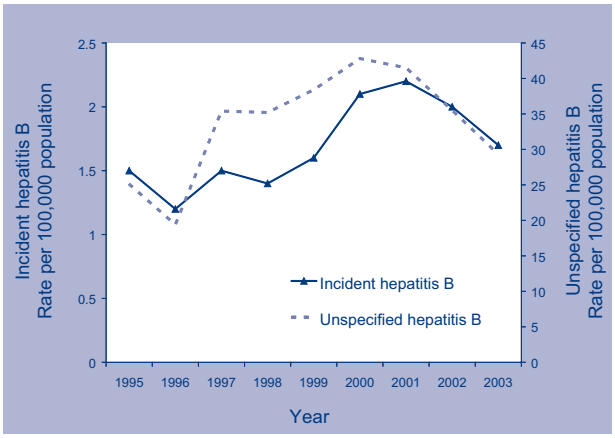
When reported to NNDSS, newly acquired (incident) hepatitis B and hepatitis C infections were differentiated from those where the timing of disease acquisition was unknown (unspecified). As considerable time may have elapsed between onset and report date for unspecified hepatitis infections, the analysis of unspecified hepatitis B and unspecified hepatitis C infections in the following sections is by report date, rather than by onset date.

## Hepatitis B

*Incident hepatitis B notifications*

In 2003, 337 incident hepatitis B infections were reported to the NNDSS, giving a national notification rate of 1.7 cases per 100,000 population. The highest rates were reported from the Northern Territory (7.6 cases per 100,000 population) and Victoria (3.0 cases per 100,000 population). In 1995–2003, the rate of notification of incident hepatitis B infection was around 1–2 cases per 100,000 population (Figure 5).

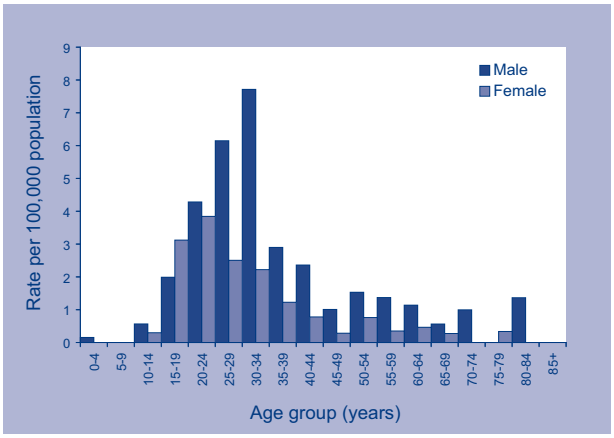
**Figure 5. Trends in notification rates, incident and unspecified hepatitis B infection, Australia, 1995 to 2003***




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

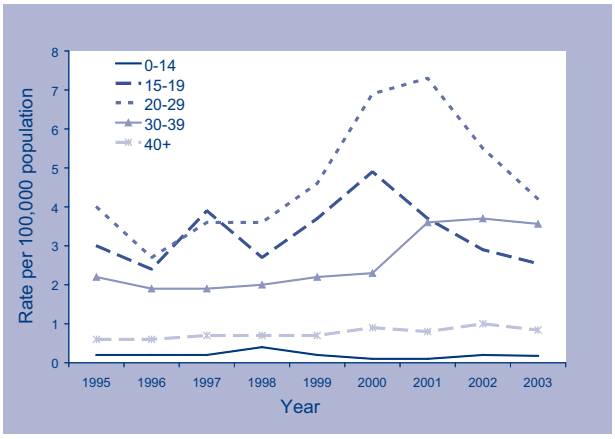
In 2003, the highest rate of incident hepatitis B infection was in the 30–34 year age group among males (7.7 cases per 100,0000 male population) and in the 20–24 year age group among females (3.8 cases per 100,000 female population, Figure 6). Overall, infections in males exceeded those in females, with a male to female ratio of 2:1.

**Figure 6. Notification rate for incident hepatitis B infections, Australia, 2003, by age group and sex**




Trends in incident hepatitis B infection by year and age group are shown in Figure 7. Rates of incident hepatitis B infection among people aged less than 15 years or 40 years and older remained low in 1995–2003. Rates of notification of incident hepatitis B infection in the 15–19 and 20–29 year age groups peaked in 2000 and 2000–2001 respectively. Rates in the 15–19 and 20–29 year age groups declined from 3.7 and 7.3 cases in 2001 to 2.5 and 4.2 cases in 2003, respectively while rates in the 30–39 year age group remained around three cases per 100,000 population in 2001–2003.

**Figure 7. Trends in notification rates of incident hepatitis B infections, Australia, 1995 to 2003, by age group**




The increased rates in these age groups in 2000–2001 was attributed to increased hepatitis B transmission among injecting drug users in Victoria, followed by a decline in the prevalence of infections in 2002 and 2003 during a heroin 'drought' (Greg Dore, personal communication).

Risk factor information for incident hepatitis B infection was available from all states and territories except New South Wales, Western Australia and Queensland (Table 5). No cases of incident hepatitis B infection were reported from the Australian Capital Territory.

**Table 5. Risk exposures associated with incident hepatitis B infection, Australia, 2003, by reporting state or territory***

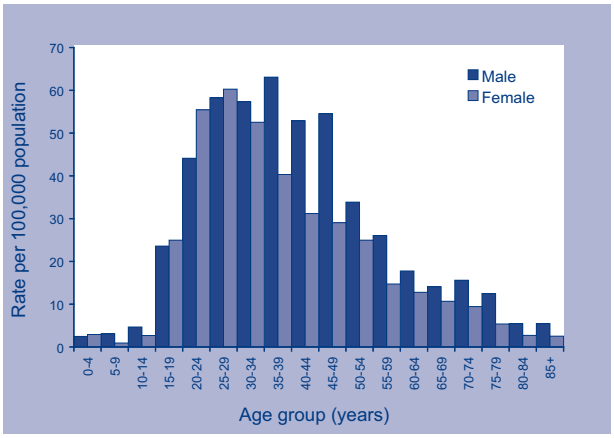
| Risk factor | NT | SA | Tas | Vic |
|---|---|---|---|---|
| Injecting drug use | 5 | 5 | 6 | 80 |
| Sexual contact with hepatitis B case | 1 | 1 | 0 | 66 |
| Household/other contact with hepatitis B | 0 | 0 | 0 | 0 |
| Overseas travel | 1 | 1 | 0 | 0 |
| Other risk factors | 1 | 0 | 0 | 0 |
| No risk factors identified | 7 | 3 | 4 | 1 |
| Total | 15 | 10 | 10 | 147 |

* There were no cases of incident hepatitis B infection notified in the Australian Capital Territory.

*Unspecified hepatitis B notifications*

In 2003, 5,833 cases of unspecified hepatitis B infection were notified to NNDSS, giving a rate of 29.3 cases per 100,000 population. By jurisdiction, New South Wales (39.4 cases per 100,000 population) and Victoria (33.1 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 (63.1 cases per 100,000 population), whereas among females, the highest notification rate was in the 25–29 year age group (60.3 cases per 100,000 population, Figure 8). In 1995–2003, the rate of notification of unspecified hepatitis B infection ranged from 20 to 40 cases per 100,000 population (Figure 5).

**Figure 8. Notification rate for unspecified hepatitis B infections, Australia, 2003, by age group and sex***

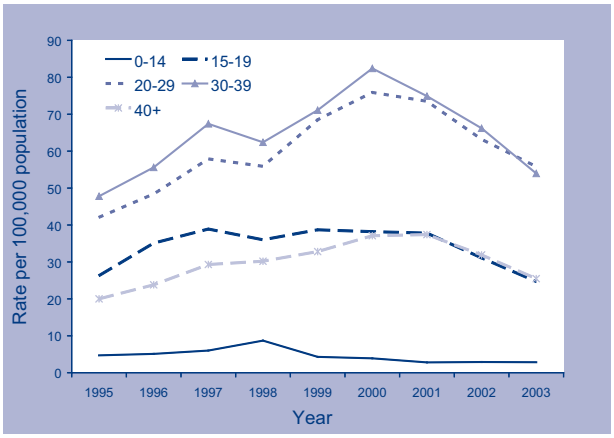



* By report date.

In 2003, 14 cases of unspecified hepatitis B infection in children in the 0–4 year age group were reported. Five children had been vaccinated for hepatitis B infection, one child had not been vaccinated and the vaccination status of the remainder was unknown. Approximately 95 per cent of infants born in 2003 received hepatitis B vaccination in Australia.[1]

Trends in unspecified hepatitis B infection by age group and year are shown in Figure 9. Rates of notification of unspecified hepatitis B infection peaked in 2000–2001 in the age groups 15–19 and 20–29 years. This pattern was similar to that for incident hepatitis B infection (Figure 7). In 2000–2003, the notification rate declined substantially in all age groups except in the 0–14 year age group, which had the lowest notification rate.

**Figure 9. Trends in notification rates of unspecified hepatitis B infections, Australia, 1995 to 2003, by age group***



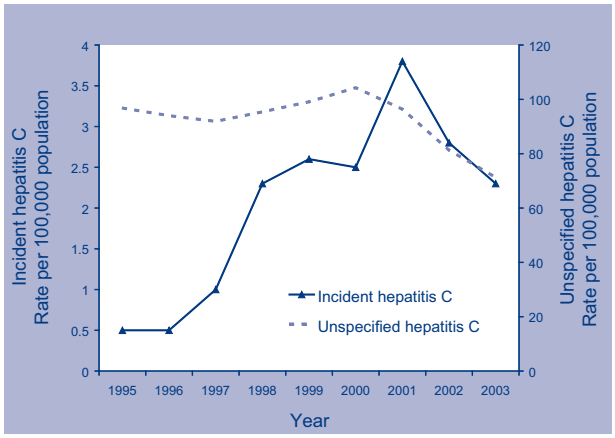

* By report date.

## Hepatitis C

*Incident hepatitis C notifications*

A total of 460 incident cases of hepatitis C with an onset date in 2003 were notified, giving a rate of 2.3 cases per 100,000 population (Figure 10). The proportion of all hepatitis C notifications that were known incident cases was 3.1 per cent in 2003. The highest rate of incident hepatitis C infection was reported from Western Australia (7.3 cases per 100,000 population).

**Figure 10. Trends in notification rates, incident and unspecified hepatitis C infection, Australia, 1995 to 2003**




Incident hepatitis C notification rates fell from 3.8 cases per 100,000 population in 2001 to 2.3 cases per 100,000 population in 2003. The reasons for this decline are not clear, as notifications of incident hepatitis C are a small fraction of the true number of new infections, estimated to be 16,000 in 2001.[2]

In 2003, the highest rate of incident hepatitis C notification was in the 20–24 year age group for males (11.4 cases per 100,000 population) and females (7.1 cases per 100,000 population, Figure 11). Overall, the male to female ratio was 1.6:1.

Trends in the age distribution of incident hepatitis C infection are shown in Figure 12. In 1997–2003, the highest rates of notification of incident hepatitis C infection were in the age group 20–29 years and 15–19 years.

Hepatitis C transmission in Australia continued to occur predominately among people with a recent history of injecting drug use.[2] More than 75 per cent of people with incident hepatitis C infection reported a history of injecting drug use. Modelling of hepatitis has estimated that in 2003, an estimated 181,000 people were living with hepatitis C infection in

**Figure 11. Notification rate for incident hepatitis C infections, Australia, 2003, by age group and sex**

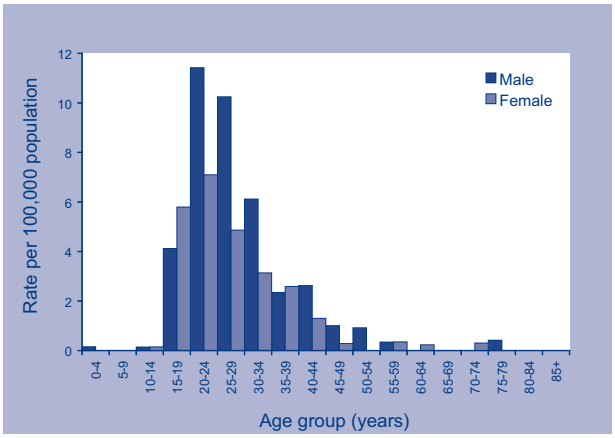
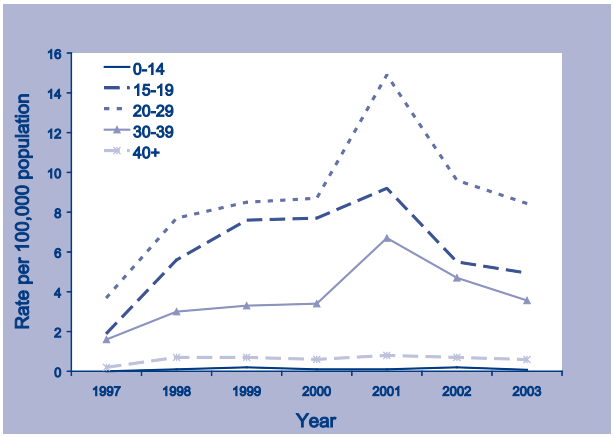



**Figure 12. Trends in notification rates of incident hepatitis C infections, Australia, 1997 to 2003, by age group**



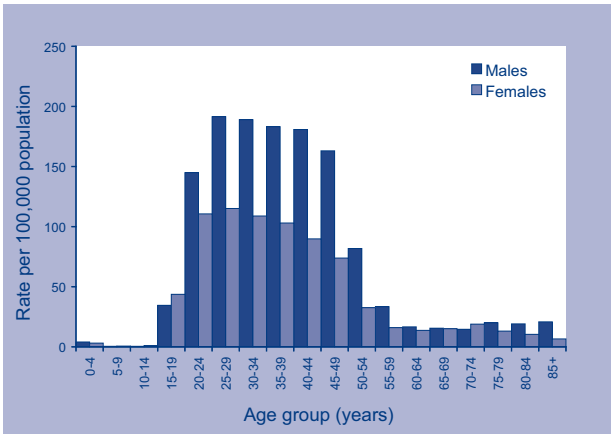

Australia, including 143,000 with chronic hepatitis C infection and early liver disease (stage 0/1), 31,000 with chronic hepatitis C and moderate liver disease (stage 2/3) and 7,500 with hepatitis C related cirrhosis. A further 61,000 had hepatitis C antibodies without chronic infection.[2]

*Unspecified hepatitis C notifications*

National notification rates of unspecified hepatitis C 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 71.3 per 100,000 in 2003 (Figure 10). Improved surveillance practice, such as better classification of incident cases and increased duplicate checking may account for some of the decrease in unspecified hepatitis C notifications.

In 2003, 14,169 unspecified hepatitis C infections were notified to NNDSS, giving a notification rate of 71.3 cases per 100,000 population. Of the total notifications of unspecified hepatitis C, 36 per cent were from New South Wales, but the Northern Territory had the highest notification rate (104.9 cases per 100,000 population). The male to female ratio was 1.7:1. The highest reporting rates were in the 25–29 year age group for both males (191.5 cases per 100,000 population), and females (115.1 cases per 100,000 population, Figure 13).

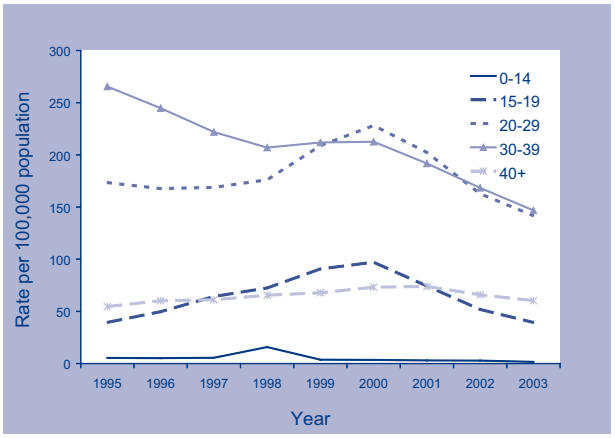
**Figure 13. Notification rate for unspecified hepatitis C infections, Australia, 2003, by age group and sex***




* By report date.

Trends in the age distribution of unspecified hepatitis C infections are shown in Figure 14. Overall, the highest rates were in the 20–29 and 30–39 year age groups. In the age group 30–39 years, the rate of diagnosis of unspecified hepatitis C infection declined steadily in 1995–2003 whereas in the age groups, 15–19 years and 20–29 years, a steady decline occurred from 2000 to 2003.

**Figure 14. Trends in notification rates of unspecified hepatitis C infections, Australia, 1995–2003, by age group***




* By report date.

## Hepatitis D

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 26 notifications of hepatitis D to the NNDSS in 2003 giving a notification rate of 0.1 per 100,000 population. Of the 26 notifications, 12 were reported from New South Wales, 13 from Victoria, and one from Queensland. The majority (22/26, 85%) of cases were males, with the highest rate reported in 40–44 and 45–49 year olds (0.6 cases per 100,000 population).

# *Gastrointestinal diseases*

Gastrointestinal diseases that were notified to NNDSS in 2003 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 decreased by 9 per cent, from 26,953 in 2002 to 24,655 in 2003 (Table 4). Compared with 2002, there was a decrease in the number of notifications of cryptosporidiosis (63%), hepatitis E (47%), salmonellosis (11%), shigellosis (12%), SLTEC/VTEC (8%) and typhoid (27%) in 2003. On the other hand, there were increases in the notifications of campylobacteriosis (4%), HUS (15%), hepatitis A (9%) and listeriosis (13%).

In this section reference will be made to the OzFoodNet 2003 annual report of foodborne diseases in Australia.[3] This report was used as a resource for additional information on foodborne gastrointestinal disease outbreaks in Australia in 2003.

## Botulism

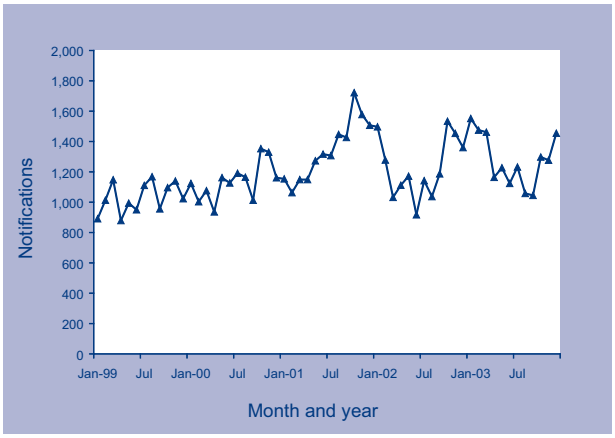
One case of infant botulism in a female, less than 12 months old was reported to NNDSS in 2003. While no classic foodborne botulism has been reported in Australia since the commencement of notifications in 1992, there have been five cases of infant botulism reported between 1998 and 2003.

## Campylobacteriosis

There were 15,372 notifications of campylobacteriosis in Australia in 2003. Campylobacteriosis is notifiable in all jurisdictions, except New South Wales. The national rate of notifications in 2003 was 116.5 cases per 100,000 population; a marginal increase compared with the rate reported in 2002 (112 cases per 100,000 population). South Australia continues to have the highest notification rate (173 cases per 100,000 population) for the second consecutive year (Table 3).

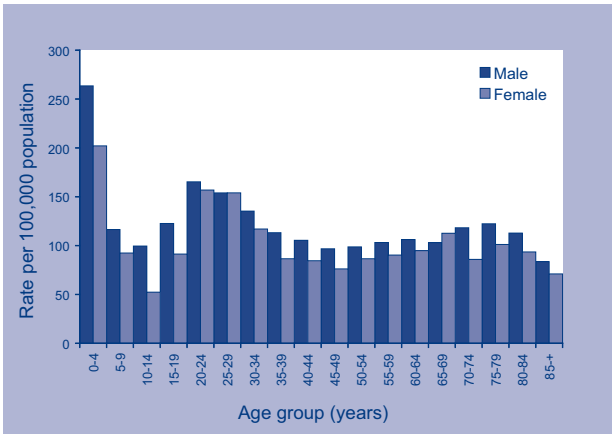
Monthly notifications of campylobacteriosis in 2003 were consistent with previous years (1998 to 2002), with the number of notifications peaking in the third quarter of the year (Figure 15). In 2003 four campylobacter related outbreaks were identified, two of which were associated with the consumption of un-pasteurised milk and close contact with animals.[3]

**Figure 15. Trends in notifications of campylobacteriosis, Australia, 1999 to 2003, by month of onset**




The highest notification rate of campylobacteriosis was among children aged 0–4 years (Figure 16). In this age group notification rates were higher in males (263 cases per 100,000 population) than in females (202 cases per 100,000 population). The overall female to male ratio, as in previous years, was 1.2:1.

**Figure 16. Notification rates of campylobacteriosis, Australia, 2003, by age group and sex**



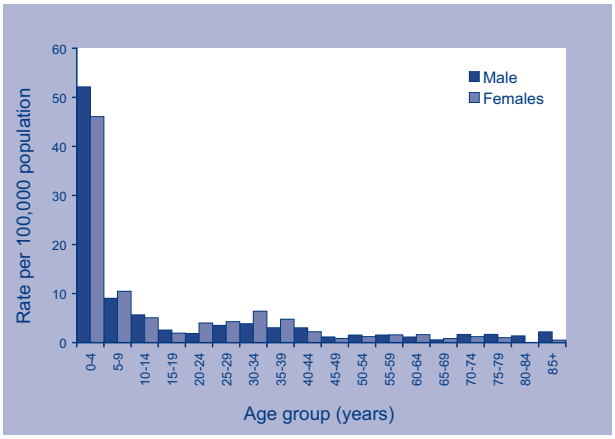

## Cryptosporidiosis

In 2003, 1,219 cases of cryptosporidiosis were reported to NNDSS, a notification rate of six cases per 100,000 population and fall of 63 per cent on the 3,268 cases reported in 2002.

All states and territories reported decreases in cryptosporidiosis notifications. The Northern Territory and Western Australia had a notification rate above the national average at 47 and 22 cases per 100,000 population, respectively.

Children under the age of four continue to have the highest notification rate of cryptosporidiosis (49 cases per 100,000 population, (Figure 17). However, compared to 2002, the notification rate in this age group has dropped from 129 cases per 100,000 population.

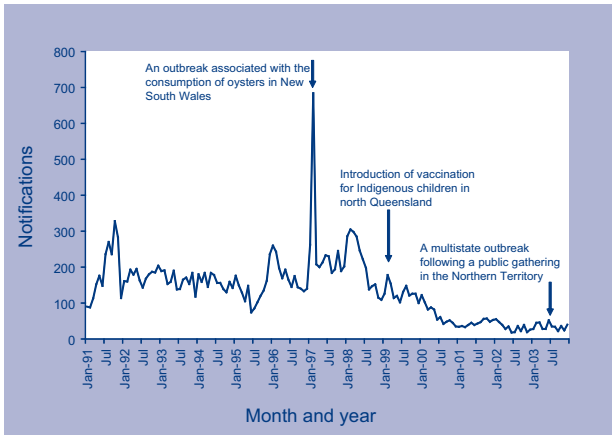
**Figure 17. Notification rates of cryptosporidiosis, Australia, 2003, by age group and sex**




## Hepatitis A

There were 418 cases of hepatitis A reported to NNDSS in 2003, a notification rate of two cases per 100,000 population. The notification rate of hepatitis A has been steadily decreasing for the last decade, but remained stable compared to 2002 (Figure 18).

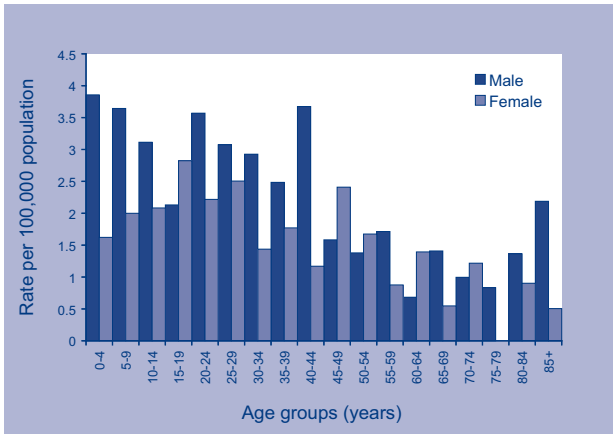
**Figure 18. Trends in notifications of hepatitis A, Australia, 1991 to 2003, by month of notification**




Compared to 2002, hepatitis A notification rates decreased in all jurisdictions except in Tasmania, Victoria and Western Australia. The largest increase was recorded in Western Australia (1.6 to 4.4 cases per 100,000 population in 2002 and 2003, respectively). The Northern Territory continues to have the highest notification rate (20.2 cases per 100,000 population).

Males had a higher notification rate of hepatitis A (2.5 cases per 100,000 population) than females (1.7 cases per 100,000 population). The highest age specific rate of hepatitis A notifications among males was in the 0–4 year age group (3.9 cases

**Figure 19. Notification rates of hepatitis A, Australia, 2003, by age group and sex**



per 100,000 population) and among females in the 15–19 year age group (2.8 cases per 100,000 population) (Figure 19).

Hepatitis A is commonly spread from person to person or from contaminated food or water. Among 101 cases of hepatitis A infection in 2003 (24% of all notifications) three frequently reported risk factors for hepatitis A infection were, overseas travel (51%), household or close contact with confirmed cases (23%) and childcare attendees, staff and their contacts (20%, Table 6).

## Hepatitis E

There were 10 cases of hepatitis E reported to NNDSS in 2003. Six cases were reported in New South Wales and two cases each in the Australian Capital Territory and Victoria. There were four males and six females, all aged between 15 and 60 years. Data on travel history were available for three cases and showed that all had travelled overseas.

## Listeriosis

In 2003, 69 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 2003, 75 per cent of listeriosis cases were aged over 60 years, with the highest notification rate in the 80–84 year age group in males and the 75–79 age group in females (Figure 20).

In 2003, 12 per cent (8/69) of listeriosis cases were of materno-foetal origin and one death in a neonate was reported. OzFoodNet reported that in 2003, there were 16 deaths in non-pregnancy related listeriosis cases. No common-source outbreaks of listeriosis were investigated during 2003.[3]

**Figure 20. Notification rates of listeriosis, Australia, 2003, by age group and sex**

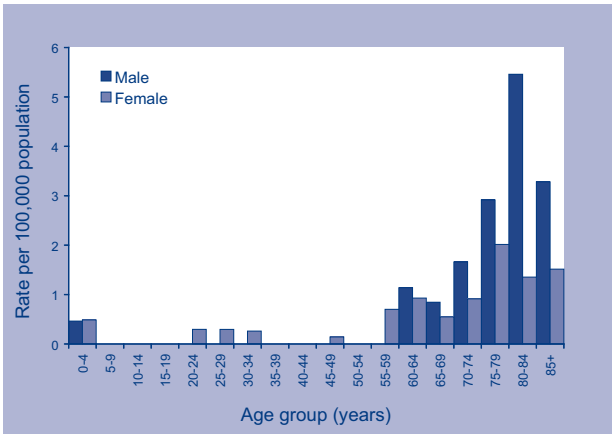



**Table 6. Risk exposures associated with hepatitis A virus infection, Australia, 2003, by state or territory***

| | State or territory | | | | | |
|---|---|---|---|---|---|---|
| | ACT | NT | Qld | SA | Tas | Vic |
| Total | 5 | 40 | 48 | 13 | 14 | 89 |
| Injecting drug use | – | 0 | 0 | 1 | 0 | 0 |
| – User | – | – | 0 | – | – | – |
| – Contact with | – | – | 9 | – | – | – |
| Household /close contact of case | – | 4 | 9 | – | 0 | 10 |
| Overseas travel | 3 | 9 | 13 | 1 | 2 | 23 |
| Childcare | – | 3 | 9 | – | 0 | 8 |
| – Attendee | – | – | 3 | – | – | – |
| – Staff | – | – | 1 | – | – | – |
| – Household contact | – | – | 5 | – | – | – |
| Homosexual contact | – | 0 | 1 | – | 0 | 0 |
| Sex worker | – | 0 | – | – | 0 | 0 |
| Interstate travel | – | – | – | – | – | 2 |
| Occupational exposure | – | – | – | – | – | 1 |
| Outbreak (source unknown) | – | – | – | – | – | 4 |
| Unknown | 2 | 24 | 26 | 12 | 3 | 42 |

* New South Wales and Western Australia did not report risk exposures associated with hepatitis A. The number of cases notified were 124 in New South Wales and 85 in Western Australia. Exposures are not mutually exclusive hence more than one exposure per person is possible.

– Risk factor not sought.

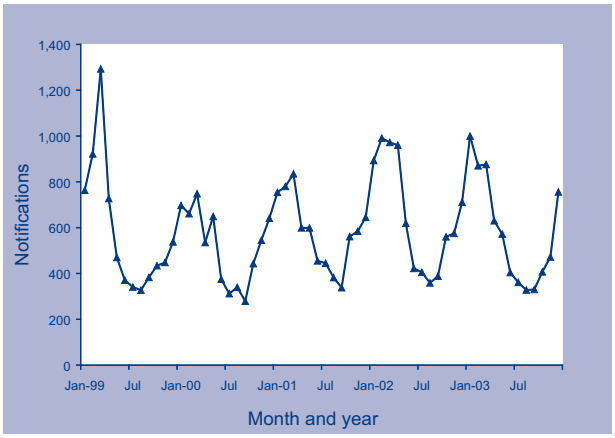
## Salmonellosis (non-typhoidal)

A total of 7,011 salmonellosis cases were reported to NNDSS in 2003, a rate of 35.3 cases per 100,000 population and a 12 per cent decrease from the rate reported in 2002 (40 cases per 100,000 population). During the five year period 1998 to 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 notification rates of salmonellosis were reported in the northern part of the country (Map 2), with the Kimberley Statistical Division of Western Australia having the highest notification rate at 323 cases per 100,000 population in 2003.

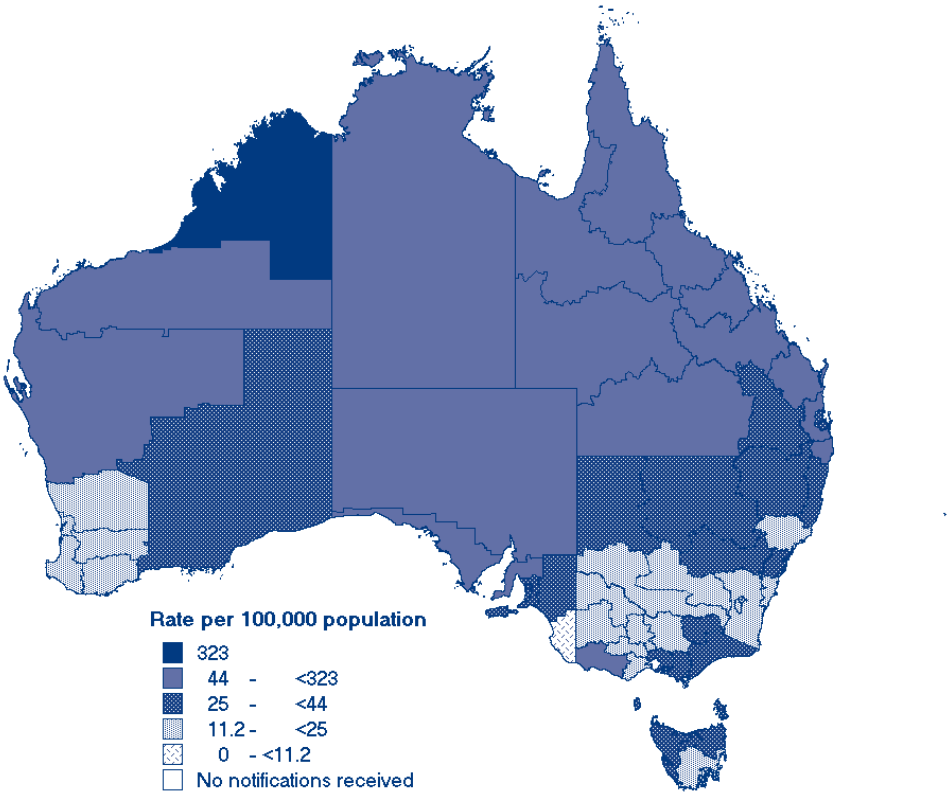
As in previous years, reports of salmonellosis peaked during summer (January to March). Thirty-nine per cent of salmonellosis cases in 2003 had dates of onset during this period (Figure 21).

**Figure 21. Trends in notifications of salmonellosis, Australia, 1999 to 2003, by month of onset**



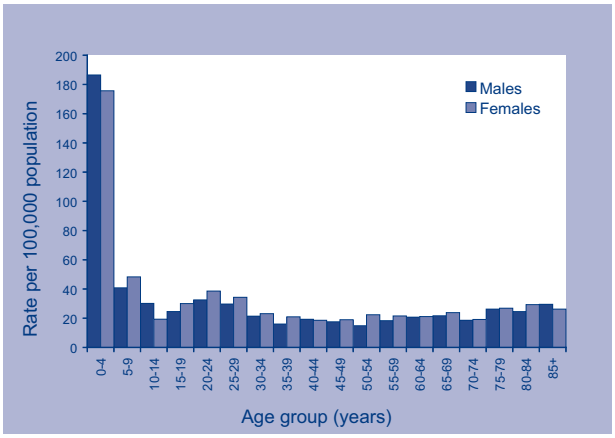

Similar to previous years, the highest rate was in children aged between 0–4 years: 32 per cent of salmonellosis notifications were in this age group (Figure 22). However, in 2003, the notification rate in children aged 0–4 years, dropped 14 per cent from 211 cases per 100,000 population in 2002 to 182 cases per 100,000 population in 2003.

**Map 2. Notification rates of salmonellosis, Australia, 2003, by Statistical Division of residence**



The National Enteric Pathogens Surveillance Scheme reported serovars for 6,808 isolates,[4] representing 97 per cent of notified cases of salmonellosis (n=7,011) in 2003. The 10 most frequently isolated serovars and phage types of *Salmonella,* which accounted for 44 per cent of all isolates, are shown in Table 7. Nationally, as in the previous year, the three most commonly reported *Salmonella* serovar or phage types were *Salmonella* Typhimurium 135, *Salmonella* Typhimurium 170 and *Salmonella* Typhimurium 9. Three *Salmonella* types: *S.* Infantis, *Salmonella* Typhimurium 197 and *Salmonella* Typhimurium 290 were not among the top 10 serovars reported in 2002. These have replaced *S.* Hvittingfoss, *S.* Muenchen, and *S.* Typhimurium 126 from top 10 serovars reported in 2002.

**Figure 22. Notification rates of salmonellosis, Australia, 2003, by age group and sex**




The distribution of *Salmonella* serovars varied across jurisdictions. The most commonly reported serovars in Queensland, Tasmania, and the Northern Territory were *S.* Virchow (8% of salmonellosis notifications), *S.* Mississippi (49% of salmonellosis notifications) and *S.* Ball (13% of salmonellosis notifications), respectively. *Salmonella* Typhimurium was the most commonly reported serovar in the rest of the jurisdictions. *Salmonella* Typhimurium 135 accounted for 33 per cent of cases in the Australian Capital Territory, 18 per cent in Victoria, and 12 per cent in Western Australia. In New South Wales the most commonly notified phage type was *Salmonella* Typhimurium 170 (12% of salmonellosis notifications) and in South Australia the most common notified phage type was *Salmonella* Typhimurium 9.

*Outbreaks and clusters of salmonellosis*

In 2003, OzFoodNet investigated 99 foodborne disease outbreaks of which 25 were attributable to S. Typhimurium infection. These outbreaks affected 672 persons with 78 hospitalisations and five deaths. Of the five significant foodborne outbreaks (affecting 50 or more persons each) in 2003, three were due to *Salmonella* Typhimurium. Of these, one occurred in a restaurant and was associated with dishes containing eggs, another was associated with the consumption of Vietnamese rolls from a bakery and the third was associated with pigeon meat. There were several others due to other serotypes of *Salmonella.*[3]

**Table 7. Top ten isolates of *Salmonella*, Australia, 2003**

| Organism | Number of human isolates, by state or territory | | | | | | | | | Total % |
|---|---|---|---|---|---|---|---|---|---|---|
| | ACT | NSW | NT | Qld | SA | Tas | Vic | WA | Aust | |
| *S.* Typhimurium 135 | 27 | 174 | 16 | 155 | 17 | 6 | 229 | 70 | 694 | 10 |
| *S.* Typhimurium 170 | 4 | 232 | 0 | 66 | 1 | 5 | 129 | 4 | 441 | 7 |
| *S.* Typhimurium 9 | 4 | 139 | 6 | 45 | 29 | 7 | 168 | 20 | 418 | 6 |
| *S.* Saintpaul | 2 | 41 | 26 | 163 | 13 | 5 | 18 | 30 | 298 | 4 |
| *S.* Chester | 1 | 43 | 17 | 94 | 23 | 0 | 7 | 34 | 219 | 3 |
| *S.* Virchow 8 | 0 | 32 | 3 | 166 | 0 | 1 | 5 | 1 | 208 | 3 |
| *S.* Infantis | 3 | 95 | 5 | 16 | 18 | 3 | 50 | 11 | 201 | 3 |
| *S.* Birkenhead | 0 | 68 | 0 | 103 | 0 | 0 | 1 | 3 | 175 | 3 |
| *S.* Typhimurium 197 | 0 | 63 | 0 | 86 | 1 | 0 | 17 | 3 | 170 | 3 |
| *S.* Typhimurium 290 | 6 | 33 | 0 | 9 | 2 | 5 | 85 | 6 | 146 | 2 |
| Other | 35 | 927 | 274 | 1,205 | 327 | 110 | 551 | 409 | 3,838 | 56 |
| Total | 82 | 1,847 | 347 | 2,108 | 431 | 142 | 1,260 | 591 | 6,808 | |

Source: National Enteric Pathogens Surveillance Scheme.

## Shigellosis

In 2003, 440 cases of shigellosis were reported to NNDSS, a notification rate of 2.2 cases per 100,000 population and a marginal decrease from the 2.5 cases per 100,000 population reported in 2002 (Table 4). The Northern Territory continues to have the highest notification rate at 66 cases per 100,000 population, which represents an increase of 27 per cent in notification rates compared to 2002. However, nationally, notifications of the disease continue to decline (Figure 23).

Children under the age of four continue to represent 33 per cent of shigellosis notifications. In 2003, this age group had the highest notification rate at 11 cases per 100,000 population (Figure 24), but compared to 2002 rates (14.1 cases per 100,000 population) notification rates in this age group have decreased by 17 per cent.

**Figure 23. Trends in notifications of shigellosis, Australia, 1991 to 2003, by month of onset**

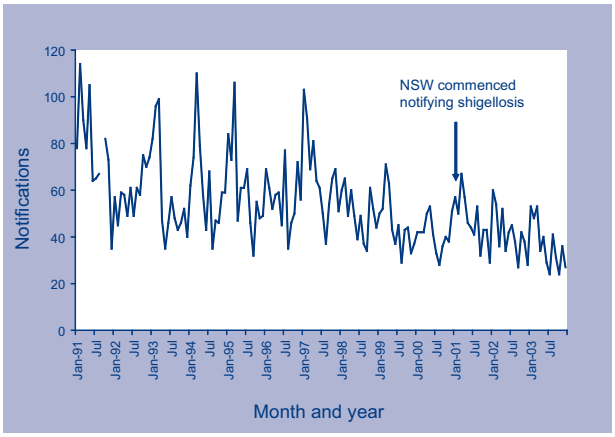
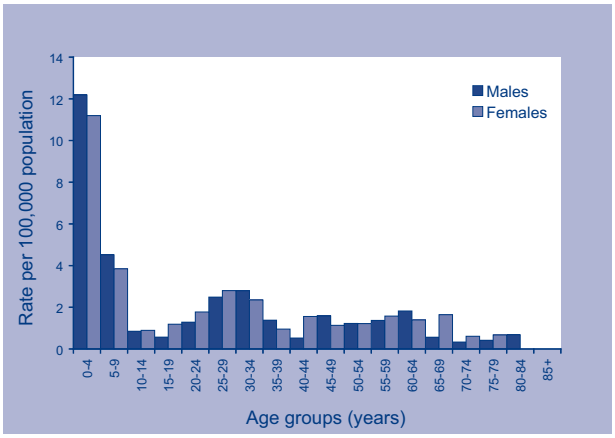



**Figure 24. Notification rates of shigellosis, Australia, 2003, by age group and sex**




Indigenous people carry the highest burden of shigellosis. In 2003, of the total national notifications of shigellosis, 67 per cent of cases with known Indigenous status (indigenous status was unknown in 33% of cases) were identified as Indigenous. In the Northern Territory (where in 98% of notifications the Indigenous status is known), 81 per cent of shigellosis cases notified were Indigenous.

## Shiga-like toxin producing/verotoxigenic *Escherichia coli* (SLTEC/VTEC)

There were 49 cases of SLTEC/VTEC reported to NNDSS in 2003. With a notification rate of 0.2 cases per 100,000 population, the rate of SLTEC/VTEC notifications remained stable relative to the previous year. Seventy-six per cent of cases were notified in South Australia (2.4 cases per 100,000 population), where bloody stools are routinely tested by polymerase chain reaction for genes coding for shiga toxin. No cases were notified from the Australian Capital Territory, New South Wales, the Northern Territory or Tasmania. OzFoodNet reported that among typed *E. coli,* 25 per cent were subtype O157 and 15 per cent were subtype O111.[3]

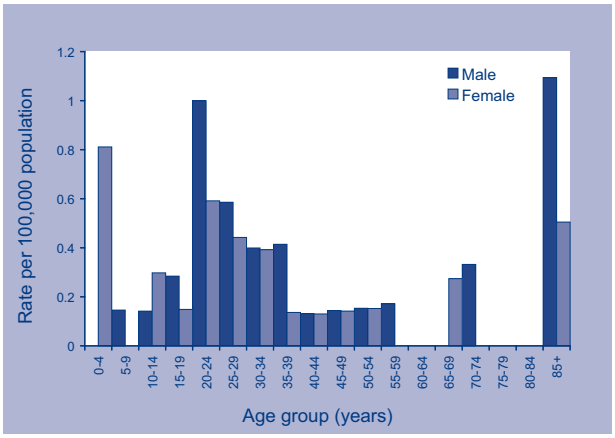
## Haemolytic uraemic syndrome

In 2003, 15 cases of HUS were reported to NNDSS, a rate of 0.1 case per 100,000 population, comparable to the 13 cases reported in 2002. No HUS cases were notified in the Australian Capital Territory or Tasmania. Among the 15 cases of HUS notified in 2003, five were males. The median age among males was 9 years (range 0–80 years) and among females the median age was 7 years (range 1–51 years). OzFoodNet reported that STEC was isolated in three cases of HUS of which one was *E. coli* O157.[3]

## Typhoid

The notification rate of typhoid has been relatively stable for the last five years. In 2003, there were 51 notifications of typhoid, a rate of 0.3 cases per 100,000 population. In 2002, 70 cases were notified. The male to female ratio was 1:1, with the highest notification rates in males aged 20–24 years and 85+ years (1.0 cases per 100,000 population) and in females aged 0–4 years (0.8 cases per 100,000 population) (Figure 25). The National Enteric Pathogen Surveillance Scheme identified 49 *Salmonella Typhi* isolates, 46 of which were from Australian residents and three cases from overseas visitors, including students. Of the 46 Australian residents, 29 had travelled to South and South East Asia and the Middle East, but 17 had no travel history recorded.[4]

**Figure 25. Notification rates of typhoid, Australia, 2003, by age group and sex**




## *Quarantinable diseases*

Human diseases covered by the *Quarantine Act 1908,* and notifiable in 2003 were cholera, plague, rabies, yellow fever, and four viral haemorrhagic fevers (Ebola, Marburg, Lassa and Crimean-Congo). In 2003, there were no cases of a quarantinable disease notified in Australia.

Cholera, plague, rabies, yellow fever, 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. Information on quarantinable diseases can be found on the DoHA website at: http://www.health.gov.au/internet/wcms/publishing.nsf/Content/Quarantine+and+Travel+Health-2

### Severe acute respiratory syndrome

Between November 2002 and July 2003, a clinical syndrome termed severe acute respiratory syndrome (SARS) emerged in Southern China and infected more than 8,000 people causing 774 deaths in 26 countries. In response to this new disease, caused by a novel coronavirus, SARS-CoV, the World Health Organization issued a global alert.

The Australian Government declared SARS a quarantinable disease under the Quarantine Act and placed health personnel at all Australian international airports to screen incoming passengers for symptoms associated with SARS. International travellers were provided with information about SARS and travel advisories were issued through the Department of Foreign Affairs and Trade. The Australian Government in collaboration with the Communicable Disease Network Australia issued infection control guidelines and advice about SARS to hospitals, health care workers, general practitioners, border control and airline staff and staff at Australian seaports.

More than 100 people were investigated for possible SARS infection of whom five were reported to the WHO as probable cases. A sixth probable case identified by laboratory testing overseas, but who was not under investigation when in Australia, was also reported to WHO.

## *Sexually transmissible infections*

Sexually transmissible infections (STI) reported to the NNDSS in 2003 were chlamydial infection, donovanosis, gonococcal infections and syphilis including 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 number of notifications and notification rates of STI reported to the NNDSS between 1999 and 2003 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.

As far as the data allowed, efforts were made to compare notifications rates among population subgroups. Again these data have to be interpreted cautiously, as STI screening occurs predominantly in specific high risk groups. For example, comparisons of STI notification rates between males and females and between Indigenous and non-Indigenous peoples must be interpreted in light of differences in rates of testing between these sub-groups.

### Chlamydial infection

Chlamydial infection was the most commonly notified disease in 2003. In this year, a total of 30,161 notifications of chlamydial infection were received by the NNDSS, a rate of 152 cases per 100,000 population. This rate represents an increase of 23 per cent compared with that reported in 2002 (122 cases per 100,000 population). Between 1999 and 2003, Chlamydia notification rates increased from 74 to 152 cases per 100,000 population, an increase of 103 per cent (Table 4).

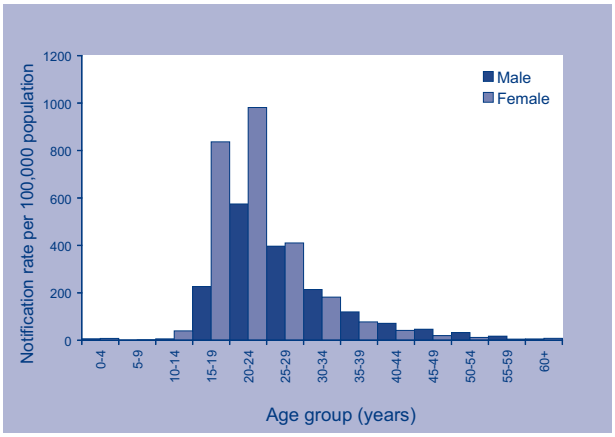
Chlamydial infection notification rates were higher than the national average in the Northern Territory (807 cases per 100,000 population), Queensland (202 cases per 100,000 population), Western Australia (193 cases per 100,000 population) and the Australian Capital Territory (162 cases per 100,000 population) (Table 3). The largest percentage increase in 2003 compared to 2002 was observed in New South Wales (32% increase). At the regional level, the Kimberley region of Western Australia had the highest chlamydial infection notification rate at 1,365 cases per 100,000 population (Map 3).

In 2003, notification rates of chlamydial infection in females and males were 179 and 123 cases per 100,000 population respectively. Compared to 2002, notification rates increased by 22 per cent in males and by 23 per cent in females. The female to male ratio remained at 1.5:1, with rates in females exceeding those of males in the 10–14,15–19 and 20–24 age groups. In all other age groups the sex-specific rates were comparable (Figure 26).

Trends in age and sex specific notification rates between 1999 and 2003 show increases in each of the 5-year age groups between 15 and 34 years in both males and females (Figure 27). Since 1999 the highest average annual percentage increase in notification rates occurred in males aged 20–24 years (23% increase per year) and females aged 15–19 and 20–24 years (20–21% increase per year).

In 2003, Indigenous status was reported in 43 per cent of chlamydial infection notifications. The notification of *Chlamydia* in the three jurisdictions with high completeness of reporting of Indigenous status (Northern Territory, South Australia and Western Australia) shows that in 2003, the crude notification rates of chlamydial infection increased in both Indigenous and non-Indigenous peoples. Western Australia reported the highest increase among

**Figure 26. Notification rates of chlamydial infections, Australia, 2003, by age group and sex**




**Map 3. Notification rates of chlamydial infection, Australia, 2003, by Statistical Division of residence**

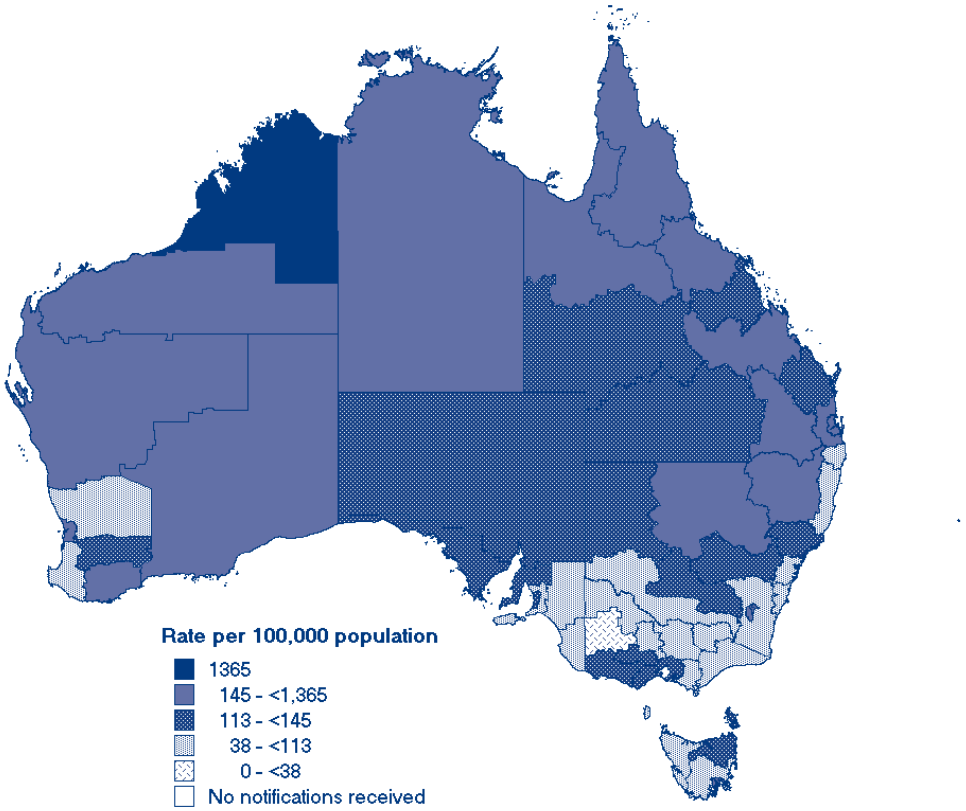
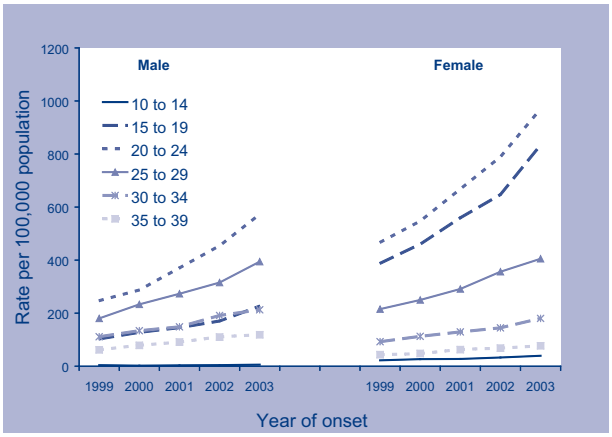


**Figure 27. Trends in notification rates of chlamydial infection in persons aged 10–39 years, Australia, 1999 to 2003, by age group and sex**

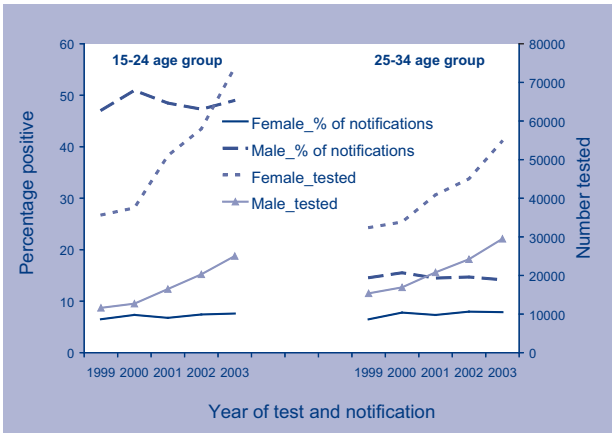



Indigenous (28% increase) and non-indigenous (19% increase) peoples compared to 2002 (Table 8). Indigenous people have the highest burden of chlamydial infection notifications. The Indigenous to non-Indigenous age adjusted rate ratio was 5:1, 4:1 and 8:1 for the Northern Territory, South Australia and Western Australia, respectively.[2]

Surveillance data continues to indicate substantial increases in chlamydial infection notifications over time by gender, age and jurisdiction. The impact on the number of notifications of factors such as new public health initiatives, changes in surveillance practices, changes in diagnostic tests and increases in testing for *Chlamydia*, is unknown.

Data from the Australian Health Insurance Commission (HIC) suggests that parallel to the increase in chlamydial infection notifications between 1999 and 2003 there has been an increase in the number of diagnostic tests for *Chlamydia trachomatis* (Figure 28). An ecological analysis, using the number of notifications as the numerator and the number of diagnostic tests (HIC data, http://www.hic.gov.au/statistics/dyn_mbs/forms/mbs_tab4.shtml) as the denominator, shows that from 1999 through 2003, the percentage positives (i.e., the proportion notified of the number tested for *Chlamydia*) within the 15–24 and 25–34 year age groups remained stable for both males and females (Figure 28). Subject to the limitations of an ecological analysis and the inherent limitations of each data set, this analysis suggests that an increase in the number of tests for *Chlamydia* may account for at least part of the increase in notifications. The surveillance of chlamydial infection via routine surveillance systems is problematic and the true extent of the disease burden in the Australian community is not known. It is therefore advisable to consider routine surveillance of chlamydial infection in conjunction with other sources of data such as population-based surveys and systematic sentinel site surveys.

**Figure 28. Annual number of diagnostic tests for *Chlamydia trachomatis* and the proportion notified among persons aged 15–24 and 25–34 years, Australia, 1999 to 2003, by sex**




Data source: National Notifiable Diseases Surveillance System and Australian Health Insurance Commission data.

**Table 8. Trends in crude notification rates* (cases per 100,000 population) of chlamydial infection in the Northern Territory, South Australia and Western Australia, 1999 to 2003, by Indigenous status**

| Year | NT | | SA | | WA | |
|---|---|---|---|---|---|---|
| | Indigenous | Non Indigenous | Indigenous | Non Indigenous | Indigenous | Non Indigenous |
| 1999 | 965.4 | 235.4 | 572.5 | 59.1 | 853.8 | 77.4 |
| 2000 | 1,198.6 | 240.8 | 700.0 | 56.1 | 1,101.9 | 105.8 |
| 2001 | 1,433.5 | 315.7 | 559.4 | 88.5 | 1,152.8 | 108.9 |
| 2002 | 1,518.3 | 386.3 | 666.1 | 109.3 | 1,035.5 | 128.5 |
| 2003 | 1,793.6 | 398.3 | 642.1 | 121.4 | 1,327.4 | 153.1 |

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

## Donovanosis

Donovanosis is a sexually transmitted 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.[5,6] In 2001, donovanosis was targeted for elimination from Australia within three years through the donovanosis elimination project.

In 2003, 16 cases of donovanosis, six male and ten female, were reported to the NNDSS (Figure 29). An equivalent number were notified in 2002 (Figure 30). All cases were Indigenous, three male and six female cases were from Queensland, three male and three female cases were from the Northern Territory, and one female was from Western Australia. The case distribution by sex and age group is shown in Figure 29; cases ranged in age from 15–19 years to 50–54 years and the majority were aged 15–39 years.

The surveillance data indicate that the donovanosis elimination project has been successful to date but requires ongoing support to achieve its target of complete eradication of donovanosis in Australia.

## Gonococcal infection

In 2003, 6,611 notifications of gonococcal infection were received by the NNDSS (Table 2). This represents a rate of 33 cases per 100,000 population, an increase of 4 per cent from the rate reported in 2002 (32 cases per 100,000 population). Nationally, this increase was attributed solely to an increase in the number of notifications in males (5%), as the rate in females was unchanged from that in 2002. The female to male ratio in 2003 was 0.4:1, compared to 0.5:1 in the previous two years.

The highest notification rate in 2003 was in the Northern Territory at 705 cases per 100,000 population (Table 3), while the highest increase in notification rate in 2003, compared to 2002, occurred in the Australian Capital Territory (99% increase overall; 107% in males and 66% in females). Victoria and South Australia each reported an increase of 41 per cent. In South Australia, there was a marked difference by gender, with rates increasing for males (70%) and decreasing for females (16%). New South Wales and Tasmania reported overall decreases in notification rates, 19 per cent and 6 per cent respectively.

**Figure 29. Notifications of donovanosis, Australia, 2003, by age group and sex**

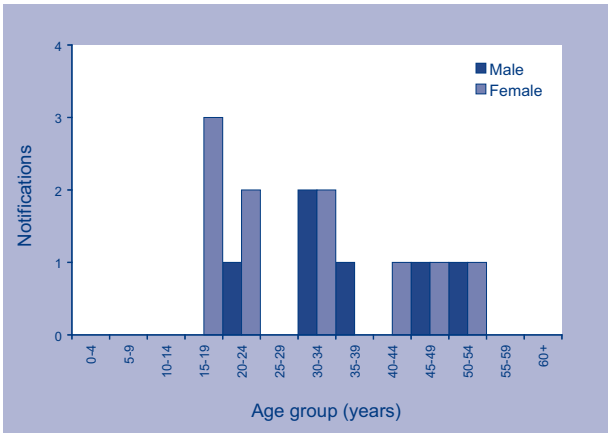
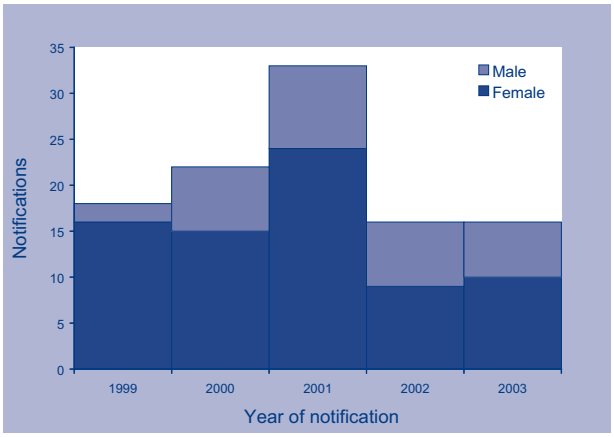


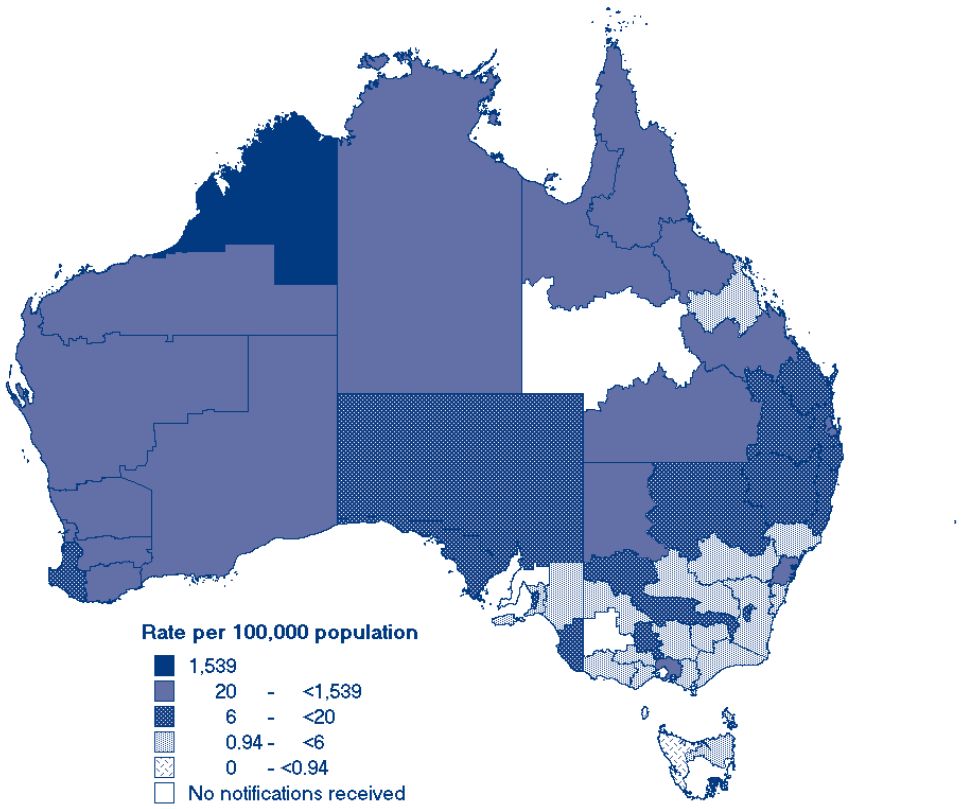

**Figure 30. Number of notifications of donovanosis, Australia 1999 to 2003, by sex**




In 2003, the national gonococcal infection notification rates for males and females were 46 and 21 cases per 100,000 population, respectively. The exception to this pattern was the Northern Territory, where females had higher notification rates than males (618 and 801 per 100,000 population respectively).

The regional distribution of gonococcal infection notifications shows that, as for chlamydial infection, the highest notification rate occurred in the Kimberley Statistical Division at 1,539 cases per 100,000 population (Map 4).

**Map 4. Notification rates of gonococcal infection, Australia, 2003, by Statistical Division of residence**




Notification rates for gonococcal infection in males exceeded those in females in all age groups except for the 10–14 and 15–19 year age groups (Figure 31). Trends in age and sex specific notification rates show that compared to 2002, increases in notification rates occurred in the 15–19, 20–24, 25–29, 40–44 and 40–45 year age groups in males and only in the 15–19 and 20–24 year age groups in females (Figure 32).

**Figure 31. Notification rates of gonococcal infection, Australia, 2003, by age group and sex**

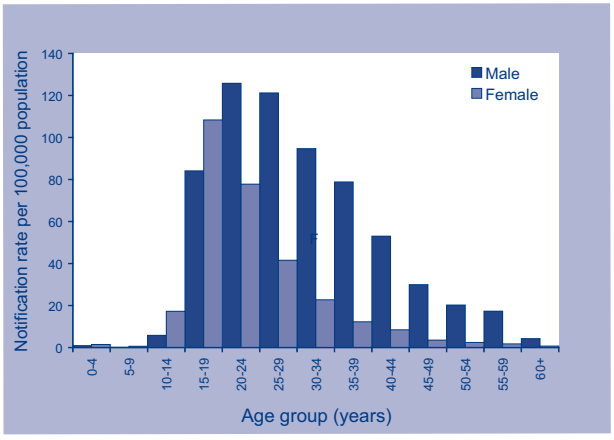
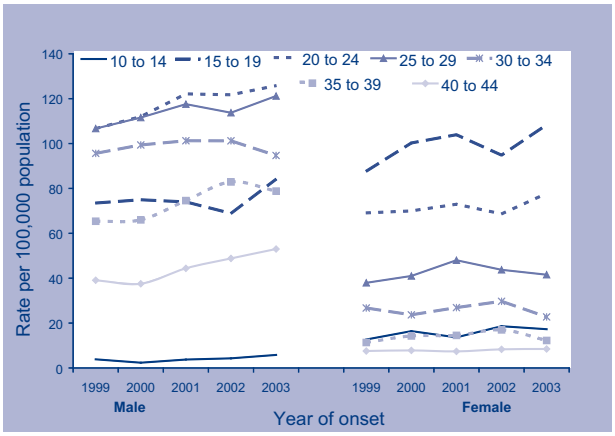



**Figure 32. Trends in notification rates of gonococcal infection in persons aged 15–39 years, Australia, 1999 to 2003, by age group and sex**



Indigenous status was reported for 66 per cent of gonococcal infection notifications in 2003. The notifications for the three jurisdictions with high completeness of reporting of Indigenous status (the Northern Territory, South Australia and Western Australia) shows that compared to 2002, the crude notification rate increased in both the Northern Territory and Western Australia, while in South Australia, there was a marginal decrease in Indigenous and an increase in non-Indigenous people (Table 9). Nevertheless, gonococcal infection notification rates in Indigenous people are many times the magnitude of the notification rates in non-Indigenous people. The age adjusted rate ratio of Indigenous to non-Indigenous in 2003, was 13:1, 28:1 and 43:1 for the Northern Territory, South Australia and Western Australia, respectively.[2]

*Other surveillance activities for gonococcal infections*

The Australian Gonococcal Surveillance Programme (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 the organism to a core group of antibiotics using a standard methodology.

In 2003, a total of 3,772 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 and 13 per cent from the rectum. In females, 90 per cent of isolates were obtained from the cervix.[7]

Trends in the proportion of isolates resistant to penicillin, quinolines and tetracycline are shown in Table 10.

In 2003, the proportion of isolates resistant to penicillin by chromosomally-mediated resistance decreased by 17 per cent, but, the proportion of isolates resistant by plasmid-mediated resistance increased by 27 per cent. In 2003, quinolone resistance also increased by 44 per cent, compared to 2002. The level of quinolone resistance is of special concern in Australia. Until 1999 quinolone resistance was observed at a lower 'minimal inhibitory concentration' (MIC) range (0.06–0.5 mg/L) and was mainly in homosexually active males. In 2000 through to 2002 most of the quinolone resistance was at a high MIC (1 mg/L or more) and was widely spread among heterosexuals. This trend continued in 2003. Available data on countries were quinolone resistant strains were acquired shows that 63 per cent (69/110) were acquired from overseas. The AGSP advises that quinolones (including recently available groups) as unsuitable for treatment of overseas-acquired gonorrhoea.[7]

**Table 9. Trends in crude notification rates* of gonococcal infection, Northern Territory, South Australia and Western Australia, 1999 to 2003, by Indigenous status**

| Year | NT | | SA | | WA | |
|---|---|---|---|---|---|---|
| | Indigenous | Non-Indigenous | Indigenous | Non-Indigenous | Indigenous | Non-Indigenous |
| 1999 | 1,674.4 | 161.7 | 628.1 | 5.6 | 1,185.5 | 16.3 |
| 2000 | 1,811.5 | 135.0 | 729.3 | 6.2 | 1,374.9 | 28.2 |
| 2001 | 2,059.8 | 198.4 | 481.2 | 6.8 | 1,697.4 | 16.3 |
| 2002 | 2,002.2 | 238.6 | 387.6 | 7.5 | 1,372.7 | 27.1 |
| 2003 | 2,013.9 | 162.9 | 376.6 | 13.4 | 1,391.8 | 29.8 |

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

**Table 10. Proportion of gonococcal isolates showing antibiotic resistance, Australia, 1998 to 2003**

| Year | (% resistance) | | | |
|---|---|---|---|---|
| | Penicillin Plasmid mediated | Chromosomally mediated | Quinolone | High level tetracycline |
| 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 |

Source: Australian Gonococcal Surveillance Programme, annual report 2003.

NR Not reported.

## Syphilis

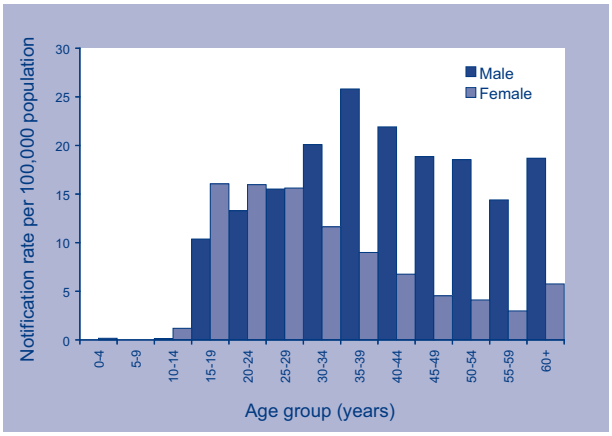
The notification of syphilis includes both new infections and newly diagnosis cases that may not be newly acquired. During 2003, a total of 2,056 cases of syphilis infection were reported, giving a notification rate of 10.3 per 100,000 population, similar to that in 2002 (Table 2 and 3). In 2003, increases in notification rates occurred in New South Wales (29% increase) and Queensland (8% increase) but these were offset in the national data by decreases in notification rates in the other jurisdictions, ranging from 19 per cent in the Northern Territory to 35 per cent in South Australia.

The Northern Territory had the highest notification rate of syphilis in 2003 (159 cases per 100,000 population; Table 3). At the regional level, the highest notification rate was in the Kimberley Statistical Division of Western Australia and the Northern Territory at 204 cases per 100,000 population (Map 5).

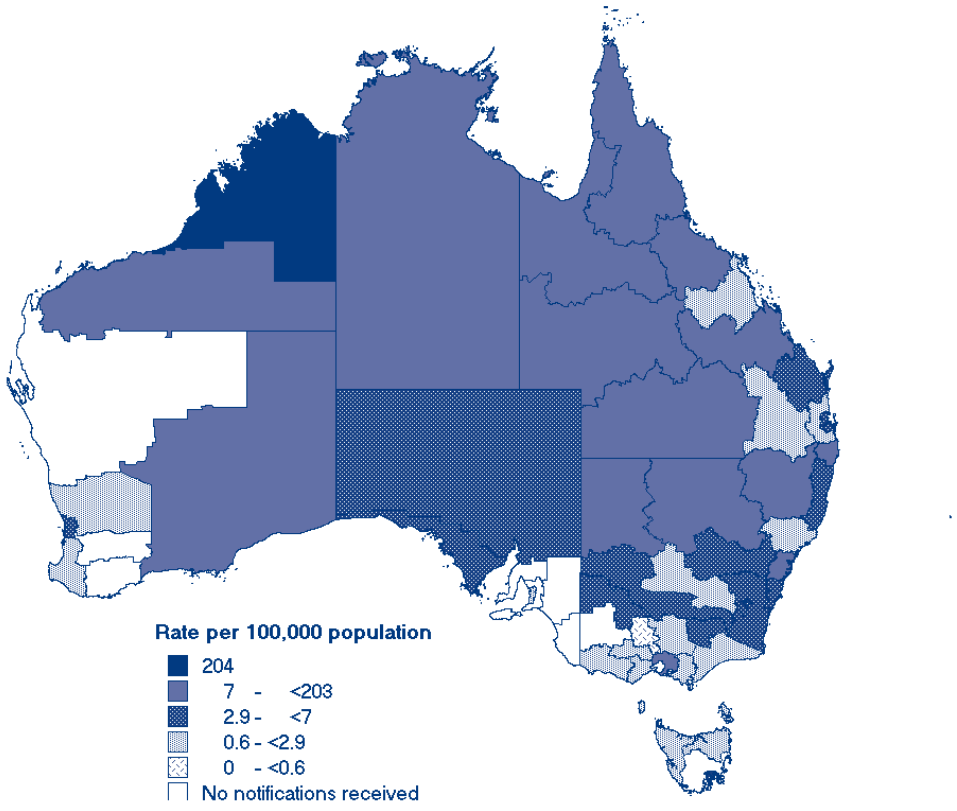
In 2003, syphilis infection notification rates in males and females were 13 and 7 cases per 100,000 population, respectively. Notification rates were higher in males than in females in all jurisdictions except in the Northern Territory, where females had a higher notification rate than males (164 and 156 cases per 100,000 population respectively). Nationally, compared to 2002, the notification rate of syphilis infection increased by 10 per cent in males but decreased by 12 per cent in females. In New South Wales, one of the two jurisdictions where notification rates increased in 2003, increases occurred in both males (36%) and females (15%).

Nationally, the female to male ratio in 2003 was 0.5:1, compared to 0.7:1 in the previous two years. The notification rates of syphilis infection in males peaked in the 35–39 year age group, while in females the rates in the 15–19, 20–24 and 25–29 year age groups were very similar (Figure 33). The peak age specific notification rate for males was 20–24 years in 2001 and 30–34 years in 2002.

**Figure 33. Notification rates of syphilis, Australia, 2003, by age group and sex**

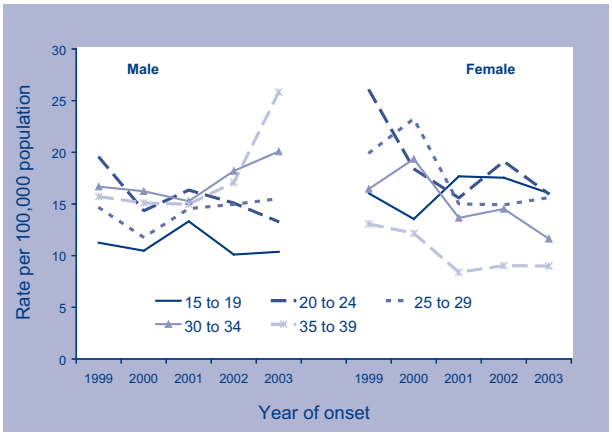



**Map 5. Notification rates of syphilis infection, Australia, 2003, by Statistical Division of residence**



Trends in age and sex specific notification rates for persons aged between 15 and 39 years show a steady increase in rates in males aged 30–34 and 35–39 years since 2001, and a general downward trend for all age categories in females (Figure 34).

**Figure 34. Trends in notification rates of syphilis in persons aged 15–39 years, Australia, 1999 to 2003, by age group and sex**




Indigenous status was reported for 77 per cent of syphilis infection notifications in 2003. The crude rate of syphilis for the three jurisdictions with high completeness of reporting of Indigenous status (the Northern Territory, South Australia and Western Australia) in 2003 is shown in Table 11. There was decrease in notification rates in 2003 compared to 2002 in both Indigenous and non-Indigenous populations. However, syphilis continues to have a high notification rate among Indigenous people. The Indigenous to non-Indigenous age adjusted rate ratio was 23:1, 45:1 and 63:1 in the Northern Territory, South Australia and Western Australia, respectively.[2]

The surveillance data indicate unacceptably high levels of syphilis in Indigenous Australians. Men who have sex with men are another sub-population at high risk of syphilis and increases in rates in males in New South Wales and Queensland in 2003 may reflect increases in infection in men who have sex with men in these jurisdictions. Enhanced reporting of syphilis notifications would allow inferences about trends in relation to sexual behaviour.

## Syphilis – congenital

There were 10 cases of congenital syphilis notified in 2003, one less than in 2002 (Figure 35). Six of the cases were male and four were female, and all reported cases were under one year of age. Eight of the cases were from the Northern Territory, one case was from New South Wales and one case was from Queensland.

**Figure 35. Trends in notifications of congenital syphilis, Australia, 1999 to 2003**

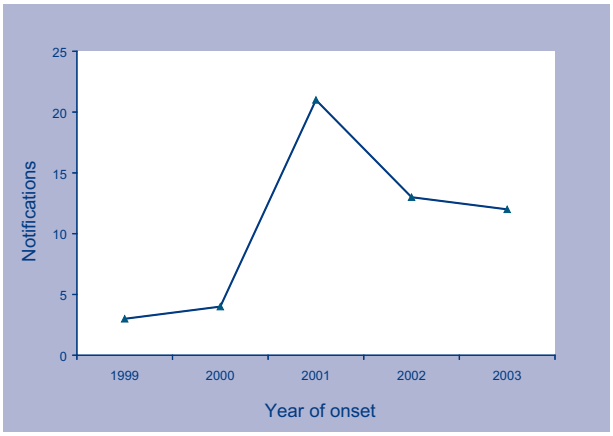



**Table 11. Trends in crude notification rates of syphilis,* the Northern Territory, South Australia and Western Australia, 1999 to 2003, by Indigenous status**

| Year | NT | | SA | | WA | |
|---|---|---|---|---|---|---|
| | Indigenous | Non-Indigenous | Indigenous | Non-Indigenous | Indigenous | Non-Indigenous |
| 1999 | 544.1 | 22.2 | 55.5 | 0.5 | 79.1 | 4.1 |
| 2000 | 414.6 | 27.7 | 54.5 | 0.1 | 120.8 | 3.3 |
| 2001 | 663.5 | 39.5 | 98.7 | 0.1 | 196.7 | 4.6 |
| 2002 | 576.6 | 42.6 | 109.0 | 0.3 | 210.9 | 3.6 |
| 2003 | 483.7 | 24.9 | 47.6 | 0.6 | 125.7 | 2.9 |

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

# *Vaccine preventable diseases*

This section summarises the national notification data for influenza and diseases targeted by the Australian Standard Vaccination Schedule (ASVS) in 2003. 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.' Varicella-zoster infection is not a nationally notifiable disease.)

A number of changes to the Australian Standard Vaccination Schedule occurred during the time period of this report. Firstly, meningococcal C conjugate vaccine was funded for all children aged 1–18 years in 2003, with a routine dose incorporated into the ASVS at 12 months of age and a catch-up program for older ages (implementation of which varied by jurisdiction). Secondly, in September 2003, the National Health and Medical Research Council (NHMRC) endorsed the recommended changes to the ASVS. Two new vaccines were added to the ASVS – conjugate pneumococcal vaccine at 2, 4 and 6 months of age and varicella (chickenpox) vaccine at 18 months of age. Neither of these recommended vaccines was funded for the National Immunisation Program (NIP) in 2003.

The NHMRC also endorsed two further modifications to the ASVS. Firstly, inactivated poliomyelitis vaccine was recommended to replace oral polio vaccine (OPV) at 2, 4 and 6 months and at 4 years of age, due to the extremely rare but real risk of vaccine associated paralysis with OPV. However, OPV was recognised as being an acceptable alternative and remained on the NIP in 2003. Secondly, the timing of the pertussis vaccination schedule was changed by the removal of the 18 month booster and the addition of a booster at 15–17 years of age, resulting in a new schedule of administration at 2,4, 6 months, 4 years and 15–17 years. Removal of the 18 month dose was implemented immediately from September 2003, with the dose at 15–17 years replacing diphtheria-tetanus vaccine in the NIP from January 2004. The dose at 18 months was removed due to evidence suggesting that the primary schedule provides protection for at least 6 years and the emerging problem of local reactions to the fourth dose at 18 months.[8]

There were 11,113 notifications of vaccine preventable diseases (VPDs) with onset dates in 2003; 10.6 per cent of the total notifications to NNDSS. Pertussis was the most commonly notified Vaccine Preventable Disease (5,106 cases or 46% of all VPD notifications). Numbers of notifications and notification rates for VPDs in Australia are shown in Tables 2 and 3.

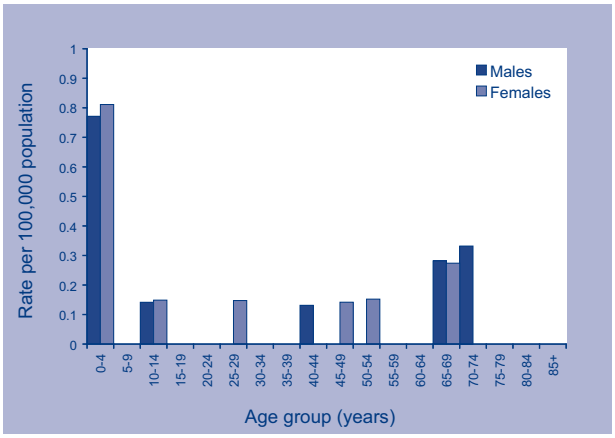
## Diphtheria

There were no cases of diphtheria reported in 2003. A single case of cutaneous diphtheria in 2001 was the first case reported since 1993.[9]

## *Haemophilus influenzae* type b disease

Notifications of *Haemophilus influenzae* type b (Hib) have fallen more than 30-fold since 1991 due to the impact of Hib conjugate vaccines.[5] There were 19 notifications of Hib disease in 2003, a rate of 0.1 case per 100,000 population. This is 10 (35%) fewer cases than reported in 2002, and is the lowest number of notifications recorded since national surveillance began in 1991. Ten cases (53% of the total) were in children aged less than 5 years and four were infants aged less than one year (Figure 36). There were nine cases in males and 10 cases in females, (male:female ratio 0.9:1).

**Figure 36. Notification rate of *Haemophilus influenzae* type b infection, Australia, 2003, by age group and sex**




The Northern Territory had the highest notification rate (1.0 per 100,000 population, 2 cases) although most cases were from New South Wales (n=6) and Queensland (n=5).

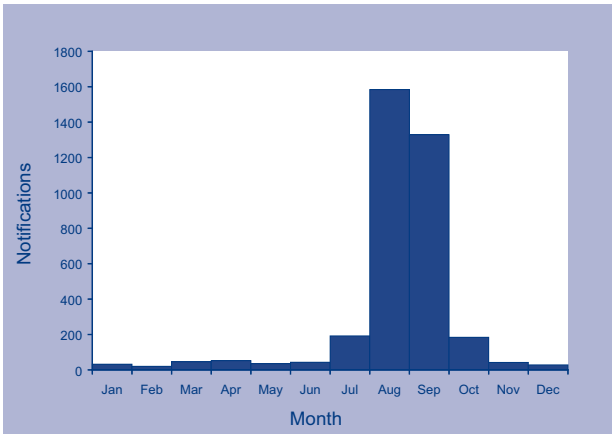
Of the 11 cases with a known Indigenous status, three were Indigenous and eight were non-Indigenous. Two of the three Indigenous cases occurred in children aged less than 5 years, compared with one of the eight cases in non-Indigenous people. Following the significant overall decline in Hib disease, Indigenous children now make up a greater proportion of cases than in the pre-immunisation era.[5]

The vaccination status of 11 of 19 cases was known – seven were unvaccinated, two were partially vaccinated and two were fully vaccinated.

## Influenza (laboratory confirmed)

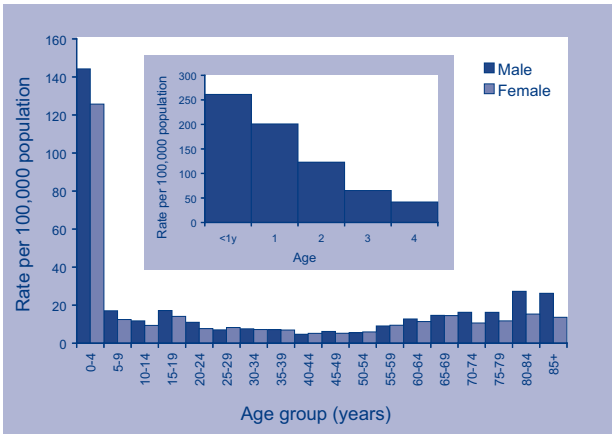
There were 3,587 reports of laboratory-confirmed influenza in 2003, a rate of 18 cases per 100,000 population. Notifications of influenza showed a peak in August (late winter, Figure 37).

**Figure 37. Notifications of laboratory-confirmed influenza, Australia, 2003, by month of onset**




Children aged less than 5 years made up 48 per cent of all notifications and had the highest rates of disease (136.6 cases per 100,000 population, Figure 38). This may reflect not only the high incidence of influenza in children, but also that children are more likely to undergo virological testing for respiratory viruses on presentation to hospital. The male to female ratio was 1.2:1.

**Figure 38. Notification rate of laboratory-confirmed influenza, Australia, 2003, by age group and sex**

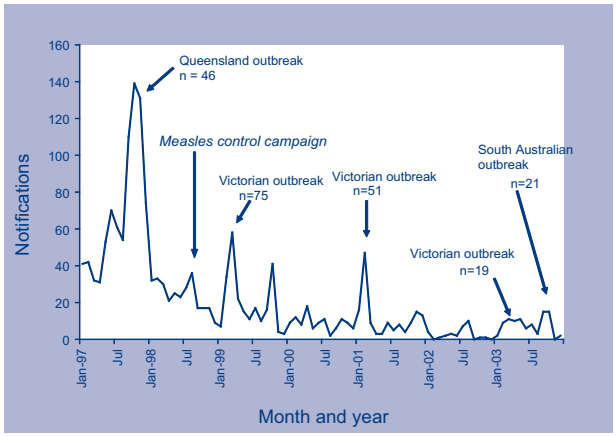



In 2003, 94 per cent of circulating viruses were influenza A. Of isolates analysed, 938 were A(H3), two were A(H1) strains and five were influenza B. The majority (98%) of A(H3) viruses were A/Fujian/411/2002 (H3N2)-like with significant antigenic drift. The 2003 Australian influenza vaccine strain, which contained the A/Panama/2007/99 virus, induced two to fourfold lower antibody responses to the Fujian strain. In 2003, 77 per cent of those aged 65 years or over in Australia received influenza vaccination.[6]

## Measles

There were 92 confirmed measles cases in 2003, a national rate of 0.5 cases per 100,000 population. This is a threefold increase compared with 2002 when only 31 cases were notified, but is still the second lowest annual rate for Australia since national surveillance began in 1991 (Figure 39). The highest rate was in South Australia with 1.6 cases per 100,000 population (24 cases), where most cases were attributable to a single outbreak. In 2003, there were no cases reported from the Australian Capital Territory, Tasmania or Western Australia, and only a single case reported from the Northern Territory—the first case from this jurisdiction since 1999 (Tables 1 and 2).

**Figure 39. Notifications of measles including major outbreaks, Australia, 1997 to 2003, by month of onset**




Rates were highest in the 20–24 year age group (1.7 cases per 100,000 population), followed by the 0–4 year age group (1.3 cases per 100,000 population) and the 25–29 year age group (1.3 cases per 100,000 population; Figure 40). Of the 16 cases in the under 5 year age group, seven were aged less than one year.

Of the 92 cases reported in 2003, 75 (81%) occurred in seven outbreaks in four States (Table 12). The index case in five of the seven outbreaks acquired their infection outside Australia.

**Figure 40. Notification rate of measles, Australia, 2003, by age group and sex**

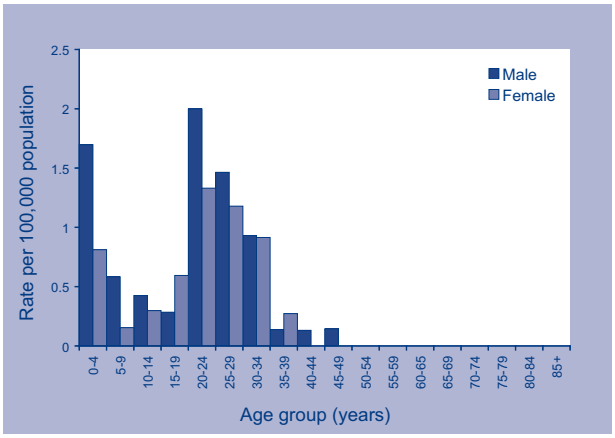
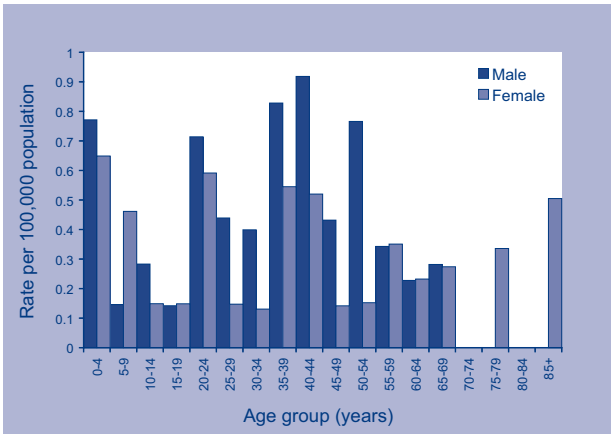



**Figure 41. Notification rate for mumps, Australia, 2003, by age group and sex**




The vaccination status was recorded for 30 cases: none were fully vaccinated for age, 13 were partially vaccinated and 17 were unvaccinated.

Studies of measles virus circulating in Australia between 1999 and 2001 provide evidence of the absence of a strain indigenous to Australia and the reintroduction of measles virus mainly from South East Asia causing limited outbreaks in susceptible populations in Australia.[10]

## Mumps

In 2003, there were 76 notifications of mumps, a rate of 0.4 cases per 100,000 population. This is a 10 per cent increase on the 69 cases reported in 2002, but is still the second lowest rate since all states and territories began notifying the disease in 1996.

Compared with 2002, most of the increase in 2003 was in adult age groups, specifically the 20–24, 35–39 and 40–44 year age groups. The rate for the 0–4 year age group (0.7 cases per 100,000 population; Figure 41) was similar to that seen in 2002, when it was the lowest on record. Rates in the 5–19 year age group continued to decline to new record lows in 2003. This is presumably due to the ongoing impact of the Measles Control Campaign (which targeted primary school aged children with the MMR vaccine in 1998) and coverage with a two-dose schedule prior to school entry. As in previous years, there was a preponderance of cases in males (male: female ratio 1.5:1).

A study of mumps and rubella notifications in Victoria concluded that there was a low positive predictive value of clinical diagnoses for these infections and that notification rates in 2001–02 in Victoria for mumps were an over-estimate of the number of true cases.[11] New national surveillance case definitions for NNDSS, introduced in January 2004, will exclude clinical diagnoses of mumps without laboratory confirmation or a confirmed epidemiological link.

## *Pertussis*

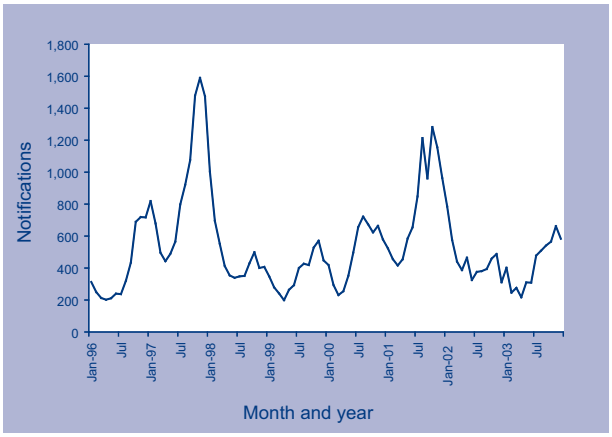
Pertussis continues to be the most common vaccine preventable illness in Australia, with periodic epidemics occurring at intervals of 3 to 5 years on a background of endemic circulation (Figure 42). In 2003 there were 5,106 cases notified (25.7 cases per 100,000 population).

**Table 12. Outbreaks and clusters of measles, Australia, 2003***

| Jurisdiction | Month of onset | Number of linked cases (including index case) | Place of acquisition of infection in index case |
|---|---|---|---|
| NSW | June | 8 | Overseas |
| Qld | Jan–Feb | 4 | Australia |
| | Aug–Oct | 5 | Overseas |
| SA | May | 2 | Overseas |
| | Aug–Oct | 21 | Overseas |
| Vic | Feb | 20 | Unknown |
| | Apr | 15 | Overseas |

* There were no measles cases reported in 2003 from the Australian Capital Territory, Tasmania or Western Australia and only a single case reported from the Northern Territory.

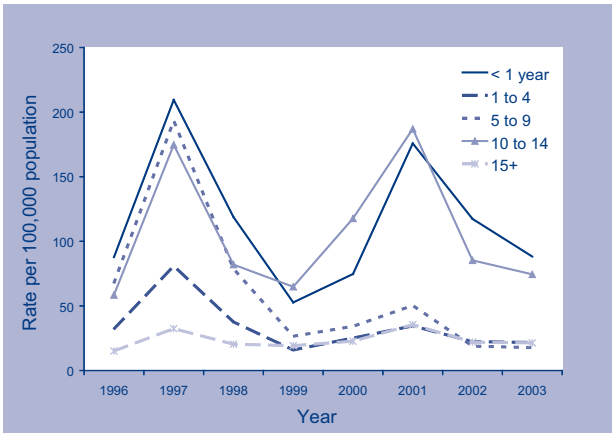
**Figure 42. Notifications of pertussis, Australia, 1996 to 2003, by month of onset**




The highest notification rates were among children aged <1 year (88.2 cases per 100,000 population) and those aged 10–14 years (74.4 cases per 100,000 population) (Figure 43). The overall male to female ratio was 0.8:1.

Torvaldsen and McIntyre examined the notification rates of pertussis in children aged 5–9 years in Australia after the introduction of the fifth dose of pertussis vaccine in 1994.[12] As evident in Figure 43, the rates of pertussis in this age group have fallen dramatically, from 193 cases per 100,000 population in 1997 to 17.7 cases per 100,000 population in 2003. Pertussis rates were highest in the 10–14 year age group between 1999 and 2001, but in the last two years, rates in this age group have fallen below those in the 0-4 year age group. A study of 140 infants hospitalised for pertussis in 2001 showed that 45 per cent were less than eight weeks of age (before the first scheduled dose of DTPa vaccine). Sixty-eight per cent of infants had contact with an adult, usually a parent with a cough. This study highlights the need for alternate strategies, which could include accelerated pertussis vaccine schedules for infants, the subject of ongoing research, and/or adult-formulated booster pertussis vaccines for adolescents and recent parents, as recently recommended in Australia.[13,14]

**Figure 43. Notification rate for pertussis, Australia, 2003, by age group and sex**

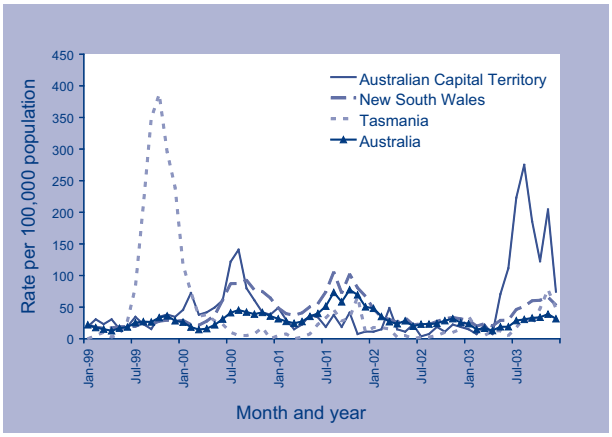



Notification rates of pertussis varied considerably by geographic location. The highest rates were in the Australian Capital Territory (110 cases per 100,000 population) and the lowest in the Northern Territory (2.5 cases per 100,000 population). Tasmania and New South Wales also recorded rates of pertussis above the national average in 2003 (Figure 44).

There was an outbreak of pertussis in the Australian Capital Territory in 2003, where a total of 339 cases were reported to the Australian Capital Territory health department from May to December 2003. Each case reported to the Australian Capital Territory health department was followed up individually and advice and education were given. Prophylactic antibiotics were recommended for household contacts if the index case had been coughing for less than three weeks. If a child was assessed to be at risk of contracting pertussis it was recommended that they be seen by a medical practitioner. Workplaces and schools where cases had occurred were notified and sent pertussis fact sheets. Information was also sent to general practitioners, schools, preschools, childcare centres and emergency services.

## Pneumococcal disease (invasive)

**Figure 44. Notification rates of pertussis, the Australian Capital Territory, New South Wales, Tasmania and Australia, 1999 to 2003 by month of notification**



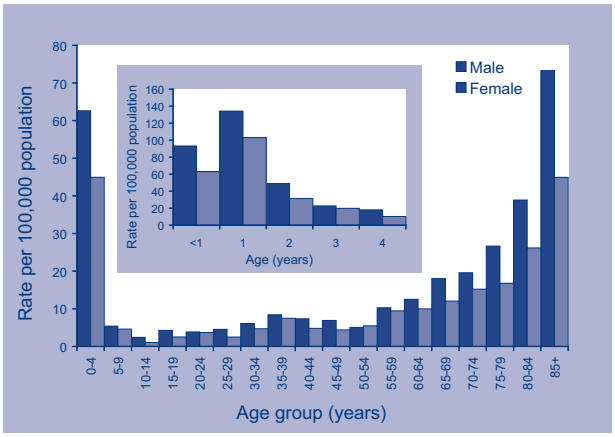

There were 2,174 notifications of invasive pneumococcal disease (IPD) in Australia in 2003 giving a rate of 10.9 cases per 100,000 population. While the largest numbers of cases were reported from New South Wales, Queensland and Victoria (Table 1), the highest rates were in the Northern Territory (36.3 cases per 100,000 population). The

geographical distribution of IPD varied within states and territories, with the highest rates in central and northern Australia.

IPD is largely a disease of the very young and very old. The highest rates of disease in 2003, were among children aged less than 5 years (54 cases per 100,000 population, with peak rates in those aged less than 2 years) and adults aged more than 85 years (53.9 cases per 100,000 population, Figure 45). There were more cases among males, with a male to female ratio of 1.3:1. IPD notifications peaked in late winter and early spring with the largest number of notifications in August.

Additional data were collected on cases of invasive pneumococcal disease in all Australian jurisdictions during 2003. Analyses of these data have recently been published.[15]

**Figure 45. Notification rate for invasive pneumococcal disease, Australia, 2003, by age and sex**




## Poliomyelitis

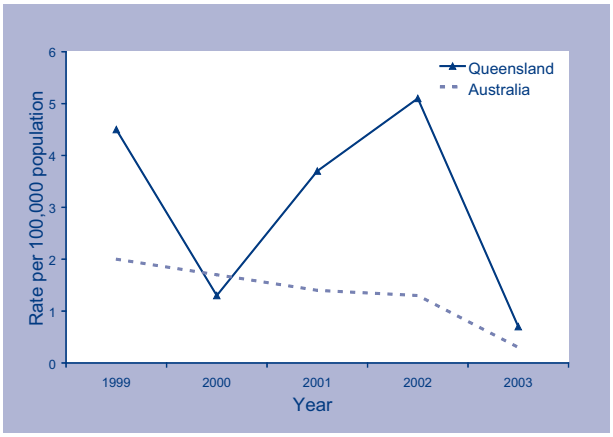
No cases of poliomyelitis were reported in Australia in 2003.

There were 44 notifications of acute flaccid paralysis (AFP) reported in 2003. Of these, 33 occurred in children aged less than 15 years. This number represents 83 per cent of the indicator target for AFP set by WHO as consistent with adequate AFP reporting. No poliovirus was isolated from any AFP case.[16]

## Rubella

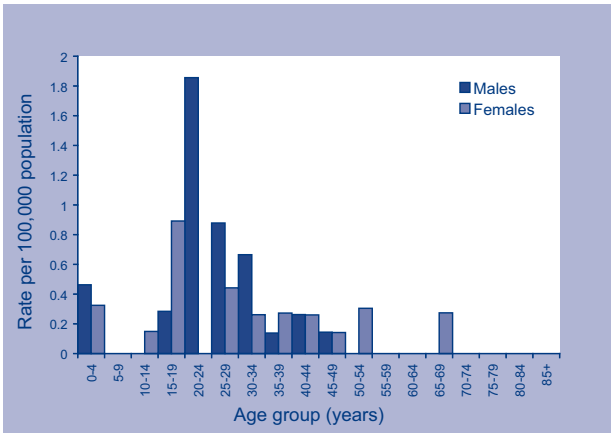
In 2003, there were 55 notifications for rubella, a notification rate of 0.3 cases per 100,000 population. This is the lowest rate on record and markedly lower than in 2002 (253 notifications, 1.3 per 100,000 population, Table 4). Unlike trends in the rest of Australia, rates in Queensland increased in 2001 to 2002. However, in 2003 the rate for Queensland fell to be close to rates for other jurisdictions (Figure 46).

**Figure 46. Notifications of rubella, Queensland and Australia, 1999 to 2003**




As in the past three years, notification rates were highest in males aged 20–24 years (1.9 cases per 100,000 population; Figure 47). Rates for this age group increased between 1999 and 2002, but were much lower in 2003. The male to female ratio of notified cases has been driven by these trends; increasing between 1999 (M:F ratio: 1.4:1) and 2002 (M:F ratio: 3.0:1) but declining in 2003 (M:F ratio: 1.6:1).

**Figure 47. Notification rate for rubella, Australia, 2003, by age group and sex**




In 2003, Queensland accounted for 43 per cent of all notified cases of rubella (notification rate 0.7 cases per 100,000 population). Ongoing transmission of rubella in Queensland, especially the high rates in 2002, resulted in two locally acquired cases of congenital rubella syndrome in 2003.[17,18] Altogether there were 16 cases of rubella notified from women

of child bearing age (15–49 years) in 2003. This number was 40 fewer than in 2002 and the lowest number on record.

## Tetanus

Since 1999, two to eight cases of tetanus have been notified each year (Table 4). In 2003, there were four reported cases (one female, three male). One case was in the age range 65–69 years and the other three were all aged more than 85 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 2003 are shown in Table 13, Table 14 and Table 15 respectively.

**Table 13. Percentage of Australian children born in 2002 vaccinated according to data available on the Australian Childhood Immunisation Register, estimate at one year of age**

| | Percentage vaccinated | | | |
|---|---|---|---|---|
| Vaccine | 1 Jan–31 Mar 2002 | 1 Apr–30 Jun 2002 | 1 Jul–30 Sep 2002 | 1 Oct–31 Dec 2002 |
| DTP | 92.2 | 92.9 | 92.5 | 92.4 |
| OPV | 92.1 | 92.8 | 92.3 | 92.3 |
| Hib | 94.9 | 94.8 | 94.4 | 94.5 |
| Hepatitis B | 94.6 | 95.3 | 94.8 | 94.7 |
| Fully vaccinated | 91.2 | 91.7 | 91.0 | 91.1 |

DTP Diphtheria-tetanus-pertussis

OPV Oral polio vaccine

**Table 14. Percentage of Australian children born in 2001 vaccinated according to data available on the Australian Childhood Immunisation Register, estimate at two years of age**

| | Percentage vaccinated | | | |
|---|---|---|---|---|
| Vaccine | 1 Jan–31 Mar 2001 | 1 Apr–30 Jun 2001 | 1 Jul–30 Sep 2001 | 1 Oct–31 Dec 2001 |
| DTP | 91.3 | 91.3 | 95.8 | 95.6 |
| OPV | 95.0 | 95.1 | 94.7 | 94.7 |
| Hib | 93.8 | 94.0 | 93.2 | 93.3 |
| MMR | 94.1 | 94.1 | 93.4 | 93.4 |
| Hepatitis B | 95.7 | 95.8 | 95.6 | 95.5 |
| Fully vaccinated | 89.3 | 89.2 | 91.6 | 91.5 |

DTP Diphtheria-tetanus-pertussis

OPV Oral polio vaccine

Hib *Haemophilus influenzae* type b

MMR Measles-mumps-rubella

**Table 15. Percentage of Australian children born in 1997 vaccinated according to data available on the Australian Childhood Immunisation Register, estimate at six years of age**

| | Percentage vaccinated | | | |
|---|---|---|---|---|
| Vaccine | 1 Jan–31 Mar 1997 | 1 Apr–30 Jun 1997 | 1 Jul–30 Sep 1997 | 1 Oct–31 Dec 1997 |
| DTP | 84.4 | 85.0 | 85.4 | 85.2 |
| OPV | 84.6 | 85.1 | 85.6 | 85.3 |
| MMR | 83.7 | 84.4 | 84.9 | 84.7 |
| Fully vaccinated | 82.3 | 83.1 | 83.7 | 83.5 |

DTP Diphtheria-tetanus-pertussis

OPV Oral polio vaccine

MMR Measles-mumps-rubella

## *Vectorborne diseases*

A total of 6,780 notifications of mosquito-borne disease and malaria were reported to NNDSS during 2003 (6.5% of all notifications to NNDSS). The viral diseases notified include those caused by alphaviruses (Barmah Forest and Ross River virus) and flaviviruses (the viruses causing dengue, Murray Valley encephalitis, Kunjin and Japanese encephalitis). Aspects of the ecology of these viruses and the clinical features of the disease they cause have previously been described.[9] This section also reports on malaria notifications.

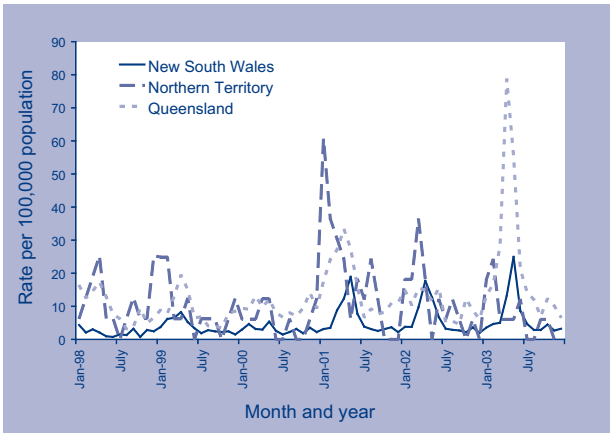
### *Alphaviruses*

Alphaviruses are RNA viruses which cause disease epidemics characterised by fever, rash and arthropathy. In Australia, Barmah Forest virus and Ross River virus are the alphaviruses of major public health significance.

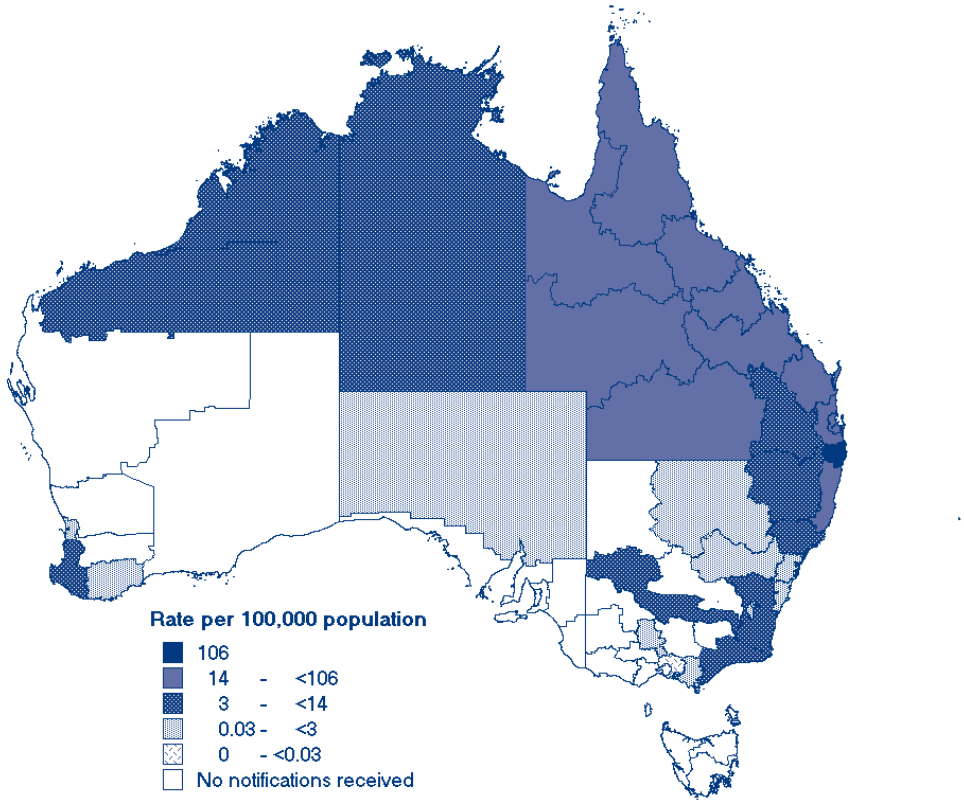
### Barmah Forest virus infection

There were 1,370 cases of Barmah Forest virus (BFV) infection notified to NNDSS in 2003. Ninety-seven per cent of these were reported from Queensland (872 cases) and New South Wales (451 cases). The highest rate of notification occurred in Queensland (23 cases per 100,000 population). The national notification rate was 6.9 cases per 100,000 population, which is the highest since reporting began in 1995. There was a peak in notifications of BFV infection in Queensland in April 2003 (78.7 cases per 100,000 population) and in New South Wales (24.9 cases per 100,000 population, Figure 48) which were the highest recorded in these jurisdiction in the last five years.

**Figure 48. Notification rates of Barmah Forest virus infections, Queensland, the Northern Territory and Australia, January 1998 to December 2003**



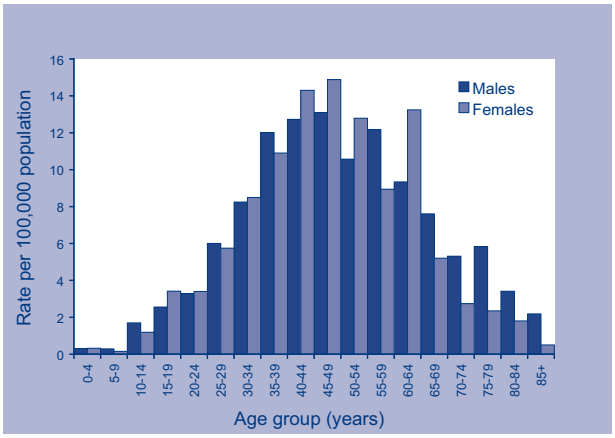

**Map 6. Notification rates of Barmah Forest virus infection, Australia, 2003, by Statistical Division of residence**



The highest rate of BFV infection in 2003, was in the Richmond Tweed area of New South Wales (106.1 cases per 100,000 population, Map 6). Rates of BFV infection were also high (>15.9 cases per 100,000 population) in most of Queensland.

The age and sex distribution of BFV notifications are shown in Figure 49. The notification rate was highest in the 45–49 year age group (14.1 cases per 100,000 population) and the male to female ratio was 1:1.

**Figure 49. Notification rates of Barmah Forest virus infections, Australia, 2003, by age group and sex**




## Ross River virus infection

A total of 3,841 cases of Ross River virus (RRV) infection were notified to the NNDSS in 2003. There were 2,517 cases reported in Queensland and 661 cases reported in Western Australia. The highest rates were reported in Queensland (66.3 cases per 100,000 population) and the Northern Territory (60.5 cases per 100,000 population). The national rate for RRV notifications was higher than in 2002 but within the range of rates in previous years.

RRV infection notifications in Queensland peaked in April 2003 at 30 cases per 100,000 population (Figure 50). This was the highest rate since 1999. During the last quarter of 2003, the number of notifications of RRV infection increased largely due to an outbreak in the south-west of Western Australia (Map 7). During the summer of 1988–89 and again in 1995–96, the same region in Western Australia experienced a large outbreak of RRV infections.[19,20] The latest outbreak commenced in September 2003 and tapered off in April 2004, with a total of some 1,570 cases from throughout Western Australia (805 from the south-west and great southern, 485 from Perth, the remainder from elsewhere in the State). This was the largest ever outbreak of RRV in Western Australia.

**Map 7. Notification rates of Ross River virus infection, Australia, 2003, by Statistical Division of residence**

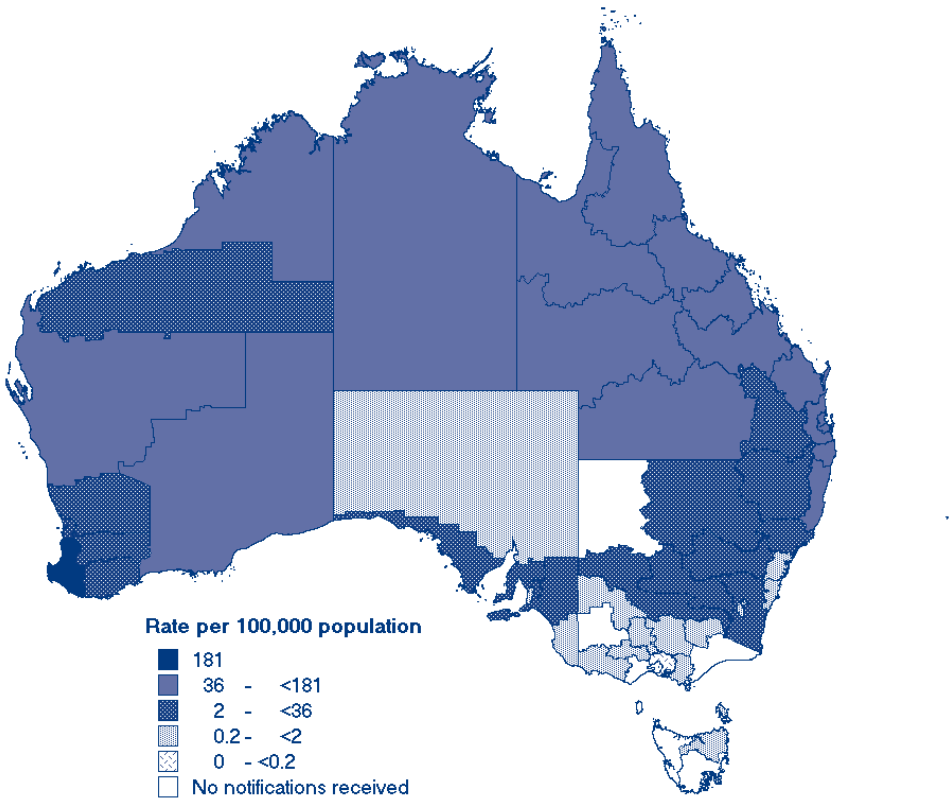
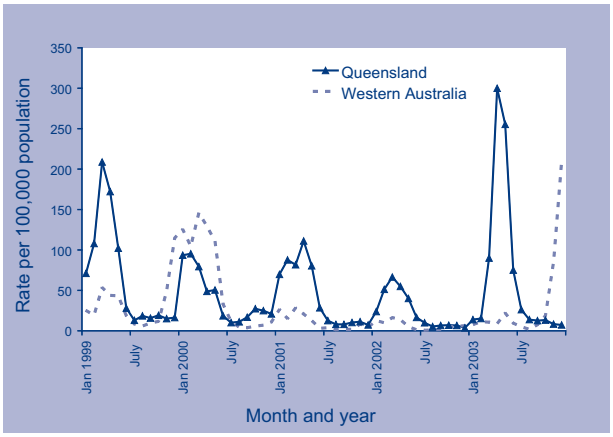
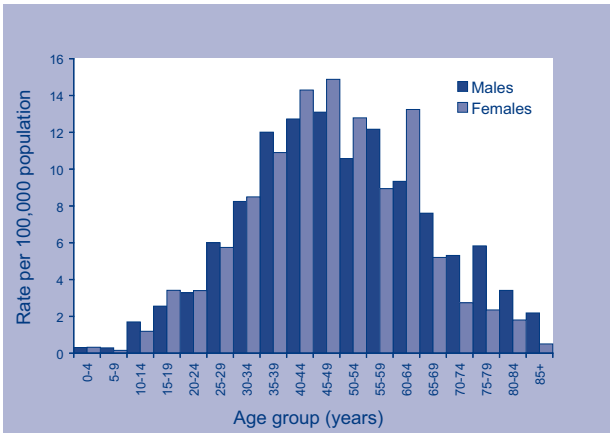


**Figure 50. Notification rates of Ross River virus infection, Queensland, Western Australia and Australia, January 1998 to July 2004**




The age and sex distribution of RRV notifications are shown in Figure 51. The notification rates were highest in the 45–49 year age group (37.1 cases per 100,000 population) and the female to male ratio was 1.1:1.

**Figure 51. Notification rates of Ross River virus infection, Australia, 2003, 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, flaviviruses of public health importance are Murray Valley encephalitis (MVEV), Kunjin (KUNV), Japanese encephalitis and dengue viruses.

Early warning of increased MVEV and KUNV activity in Australia is provided by the Sentinel Chicken Surveillance Program. Antibodies to MVEV and KUNV are detected in flocks located in four Australian States. Reports of the 2002/3 and 2003/4 seasons have been published,[21] with the most recent report by Broom and Whelan, 2004, included in this issue.

## Murray Valley encephalitis virus and Kunjin virus

MVEV and KUNV activity is normally restricted to northern Australia. Incursions of MVEV into south-eastern Australia, under appropriate weather conditions, are rare but have in the past resulted in epidemics of Murray Valley encephalitis virus.

During 2003 no cases of MVEV infection were notified.

There were 19 cases of Kunjin virus infection in 2003, all of which were reported from Queensland. The cases of KUNV infection were symptomatic cases with mild febrile disease and without encephalitis, detected in the enhanced surveillance in Queensland during the outbreak of dengue in 2003. There are no sentinel chicken sites located in Queensland, thus making it difficult to determine if there was elevated circulation of KUNV at the same time as the dengue outbreak.

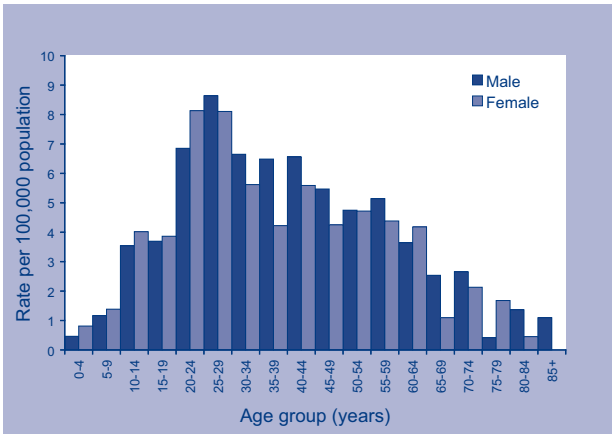
## Dengue

Dengue viruses (DENV) were transmitted within Australia only in northern Queensland, where the vector mosquito *Aedes aegypti* is endemic. Cases notified in other parts of Australia and not acquiring their infection in Queensland were therefore all acquired overseas.

There were 868 cases of DENV infection notified to NNDSS during 2003. Most cases were reported from Queensland (727 cases, 19.1 cases per 100,000 population) where there was an outbreak of DENV serotype 2.

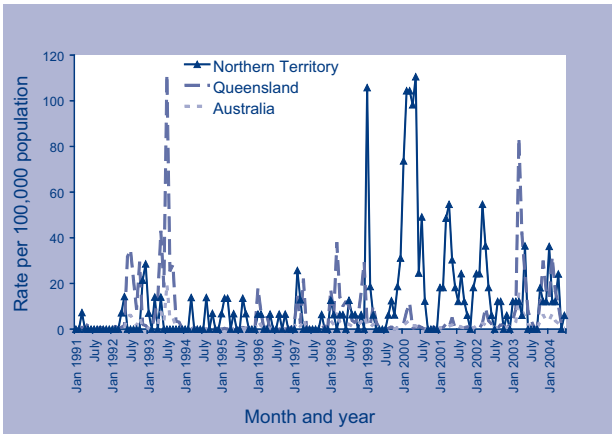
The age and sex distribution of DENV notifications is shown in Figure 52. The female to male ratio was 0.9:1. Most cases in males occurred in the 25–29 year age group (8.6 cases per 100,000 population), and in females in the 20–24 and 25–29 year age groups (8.1 cases per 100,000 population).

**Figure 52. Notification rates of dengue, Australia, 2003, by age group and sex**



An outbreak of DENV serotype 2 began in Cairns in January 2003. The index case was a woman who had been in Papua New Guinea and became ill with symptoms in Cairns on 22 January. Two smaller outbreaks of DENV serotype 2 were also identified in Townsville and Mareeba. In October, an outbreak of DENV type 2 that affected 98 persons, occurred on Yam Island. By November the outbreak had spread to Thursday Island where 71 cases were reported in the latter months of 2003 (Table 16, Figure 53). Mosquito control and community education were conducted continuously until the outbreak ended in 2004.

**Figure 53. Notification rate of dengue by month, January 1991 to December 2003, the Northern Territory, Queensland and Australia**




## Japanese encephalitis virus

Incursions of Japanese encephalitis virus (JEV) into the Torres Strait Islands in 1995 and mainland Australia in 1998 have earlier been described.[22] Since 1998 no further infections in mainland Australia have been identified, and there were no cases reported in 2003. A number of sentinel pig herds in northern Queensland and the Northern Territory are serologically tested at regular intervals to identify any new incursion of JEV into mainland Australia.

Seroconversions in the sentinel pig herds on the Torres Strait islands have detected the presence of JEV each year from 1995 to 2003, with the exception of 1999. Evidence for the presence of the virus from sentinel pigs on the mainland has only occurred in 1998, the same year in which the human infections occurred.

Outside Australia, there is a strong likelihood that JEV is now endemic on the island of Papua New Guinea. Ritchie and Rochester[23] have found that the incursions of JEV into Australia in 1995 and 1998 were associated with low pressure systems that led to strong northerly winds blowing from New Guinea to Cape York Peninsula. A review of the emergence of JEV in the Australasian region describes the potential for JEV to be introduced to Australia and how any incursion should be controlled.[24]

## Flavivirus (NEC)

There were 81 notifications of 'Flavivirus – not elsewhere classified' in 2003. These include flavivirus infections (e.g. MVEV and KUNV), where serology was unable to differentiate the different viruses.

Sixty-eight of these notifications were from Queensland, where serological evidence of previous infection with flaviviruses was detected in cases under investigation in the dengue outbreaks in Queensland during 2003.

## Malaria

In 2003 there were 601 notifications of malaria, which is comparable with 699 cases in 2001, but higher than the number of malaria cases notified in 2002 (increase of 32 per cent). All notified cases

**Table 16. Outbreaks and locally acquired cases of dengue, Queensland, 2003 to 2004**

| Period | Location | Total number of cases | Dengue serotype | Comments |
|---|---|---|---|---|
| Jan–July 2003 | Cairns area | 451 | Type 2 | First case was imported from Papua New Guinea |
| | Cairns area | 3 | Type 1 | Unknown source |
| March 2003 | Mareeba | 1 | Type 1 | No link to Cairns |
| March–July 2003 | Townsville area | 20 | Type 2 | Source likely to be Cairns |
| Sept–Nov 2003 | Yam Island | 98 | Type 2 | Unknown source |
| Nov 2003–April 2004 | Thursday Island | 71 in 2003 (171 cases total outbreak) | Type 2 | Imported from Yam Island |
| Nov 2003–May 2004 | Townsville area | 14 in 2003 (55 cases total outbreak) | Type 2 | Carry-over from previous outbreak |

Source: Queensland Health.

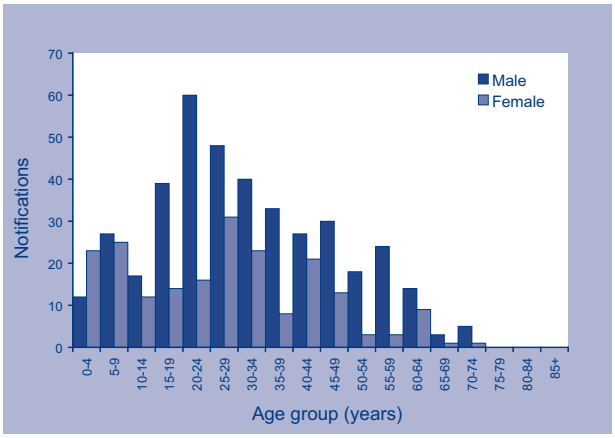
were acquired overseas. The majority of notifications were from Queensland (n=253) and New South Wales (n=120).

Tasmania reported 27 cases of malaria, 19 of which were found during screening at a refugee clinic. Of the 19 cases, 18 had *Plasmodium falciparum* and one had *P. malariae.* None of the cases had symptomatic disease but met the national case definition. Most of the cases (17/19) were paediatric with ages ranging from 3 to 13 years (David Coleman, Tasmanian Department of Health and Human Services, personal communication).

The largest number of notifications of malaria was amongst males in the 20–24 year age group, and in females in the 25–29 year age group (Figure 54). The male to female ratio was 2:1.

The infecting *Plasmodium* species were reported in 567 of 601 (94%) notifications (Table 17).

**Figure 54. Notifications of malaria, Australia, 2003, by age group and sex**




# *Zoonoses*

Zoonoses are diseases transmitted between vertebrate animals and people.[27] The zoonotic diseases that were nationally notifiable in 2003 were anthrax, Australian bat lyssaviral or lyssaviral (unspecified) infection, brucellosis, leptospirosis, ornithosis and Q fever. A total of 903 notifications (0.9% of total notifications) were made during 2003. More detailed descriptions of these diseases were provided in the 2001 NNDSS annual report.[9]

## Anthrax

Following the deliberate release of anthrax spores in the United States of America in 2001, anthrax became a notifiable disease in Australia. During 2003, no cases of anthrax were notified. The last human case of cutaneous anthrax in Australia, which occurred in a knackery worker, was reported in 1997.[26]

Certain rural areas in New South Wales and Victoria are associated with recurring cases of anthrax in cattle and sheep. In these areas stock can be protected with vaccination. Despite this, a number of incidents of anthrax in livestock were reported during 2003. Six incidents of anthrax were reported in New South Wales, where 74 sheep died in three separate incidents and 20 cattle deaths were recorded in the remaining three separate incidents. Victoria reported two cattle deaths on a dairy farm in northern Victoria. Action taken in response to the deaths included quarantine and vaccination of the remaining stock and stock on neighbouring farms.[27]

**Table 17. Infecting *Plasmodium* species reported in notified cases of malaria, Australia, 2003, by state or territory**

| | State or territory | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Malaria species | ACT | NSW | NT | Qld | SA | Tas | Vic | WA | Aust |
| *P. falciparum* | 7 | 41 | 19 | 60 | 15 | 19 | 20 | 38 | 219 |
| *P. vivax* | 11 | 71 | 19 | 136 | 11 | 7 | 36 | 7 | 298 |
| *P. ovale* | 0 | 2 | 0 | 12 | 0 | 0 | 1 | 2 | 17 |
| *P. malariae* | 0 | 3 | 0 | 3 | 1 | 1 | 0 | 1 | 9 |
| *P. falciparum* and *P. vivax* | 0 | 0 | 1 | 20 | 0 | 0 | 2 | 0 | 23 |
| *P. malariae* and *P. vivax* | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Unknown | 0 | 2 | 1 | 22 | 1 | 0 | 0 | 8 | 34 |
| Total number of cases | 18 | 120 | 40 | 253 | 28 | 27 | 59 | 56 | 601 |

## Australian bat lyssaviral and lyssaviral (unspecified) infections

No cases of either Australian bat lyssaviral or lyssaviral (unspecified) infections were notified during 2003. Two cases of 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.

Molecular biological research into the genetic sequences of lyssaviruses isolated from different groups of bats suggests that the virus has been associated with bats in Australia for more than 1,500 years.[28] That is, the virus was well established before European colonisation, and its recent 'emergence' is more to do with changes in human behaviour and encroachment on bat habitats.

### *Brucellosis*

There were 17 cases of brucellosis notified during 2003, a rate of 0.1 cases per 100,000 population. This number of notifications lies within the lower end of the range observed (13–52 notifications) over the previous 11 years and was a decrease compared to the number in 2002, when 40 cases were notified. In 2003, most cases were notified from Queensland (13 notifications, 76%), with one case in New South Wales and three cases reported from Victoria (Map 8).

Most cases were male (n=15, male:female ratio 7.5:1), and of these, nine were aged between 25 and 34 years. Bovine brucellosis (*Brucella abortus*) was eradicated from Australia in 1989, and most human cases occurring now are due to other *Brucella* species. Among notified cases for whom species data were available, five were identified as *Br. melitensis*, and four as *Br. suis*.

## Leptospirosis

Leptospirosis is caused by the spirochaete, *Leptospira*. Nationally, 125 notifications of leptospirosis were received during 2003. This is relatively low compared to the previous years (Figure 55) and represents a continuation of the downward trend since a peak in 1999.

In 2003, the notification rate was highest in the Northern Territory (4 notifications, 2.0 cases per 100,000 population). The next highest rates occurred in Queensland (67 notifications, 1.8 cases per 100,000 population) and New South Wales (37 notifications, 0.6 cases per 100,000 population). More males were affected than females (male:

**Map 8. Notification rates of brucellosis infection, Australia, 2003, by Statistical Division of residence**

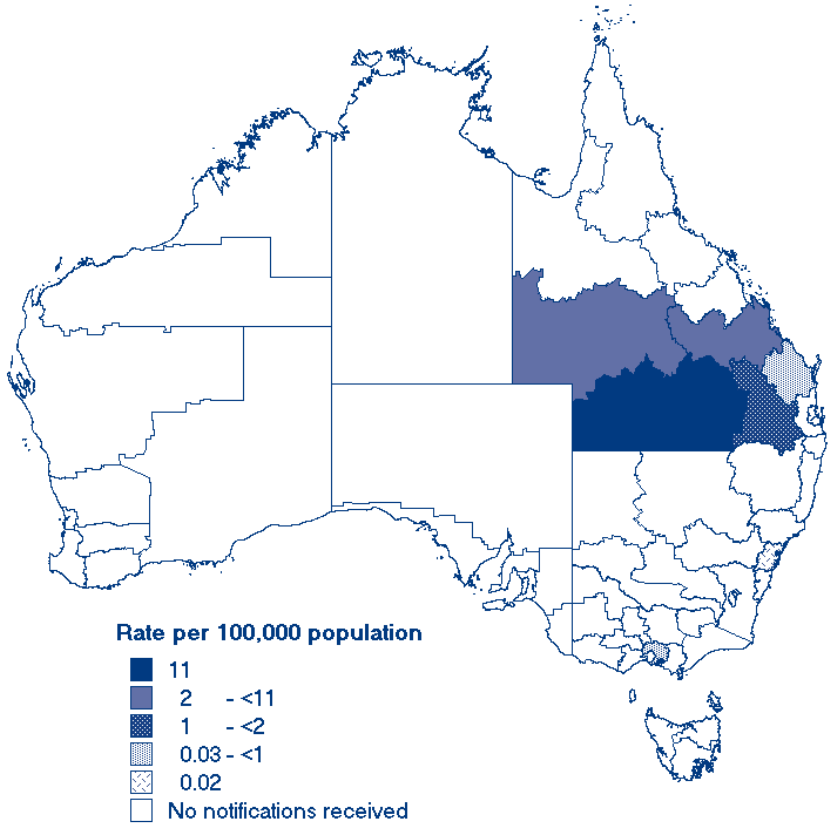
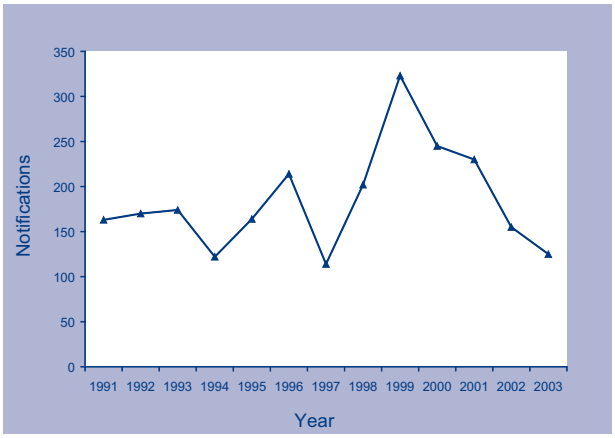


**Figure 55. Trends in notifications of leptospirosis, Australia, 1991 to 2003**

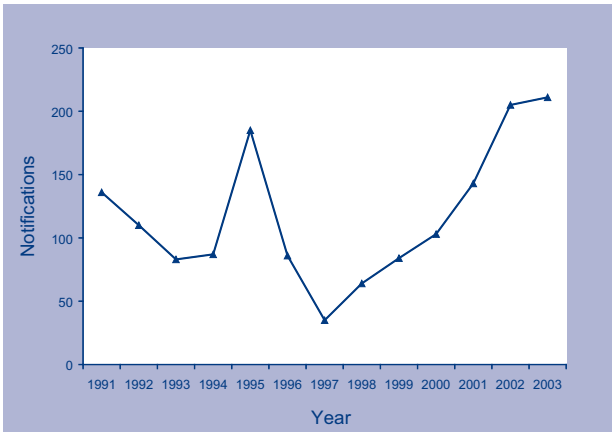



female 5.6:1). The highest rates of notifications were in 30–39 year age group for males and the 35–59 year age group for females. The distribution of leptospirosis notifications by Statistical Division is shown in Map 9.

## Ornithosis

During 2003, 211 notifications of ornithosis were received (1.1 cases per 100,000 population), compared with 205 notifications in 2002. Victoria had the highest number of notifications (115 notifications, 2.3 cases per 100,000 population). The total number of notifications has continued to increase each year since 1997 (Figure 56). Most notifications were males in the 60–64 year age group (18 notifications, 4.1 cases per 100,000 population), and females in the 45–49 year age group (13 notifications, 1.8 cases per 100,000 population, Figure 57).

**Figure 56. Trends in notifications of ornithosis, Australia, 1991 to 2003**




**Map 9. Notifications rates of leptospirosis infection, Australia, 2003, by Statistical Division of residence**

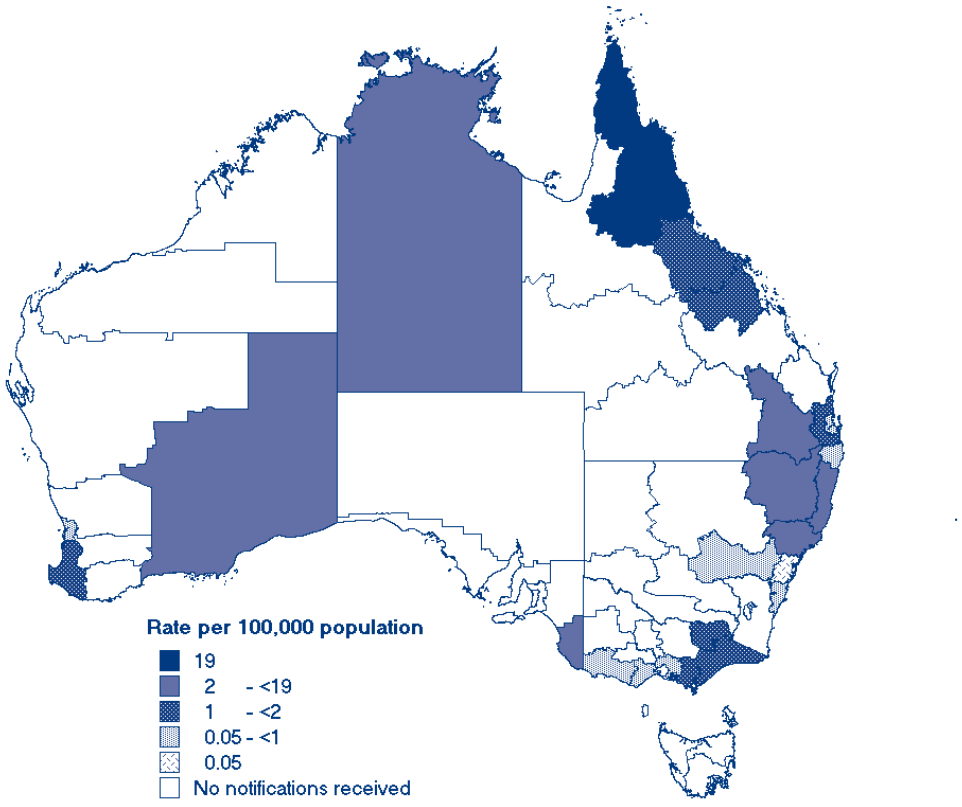
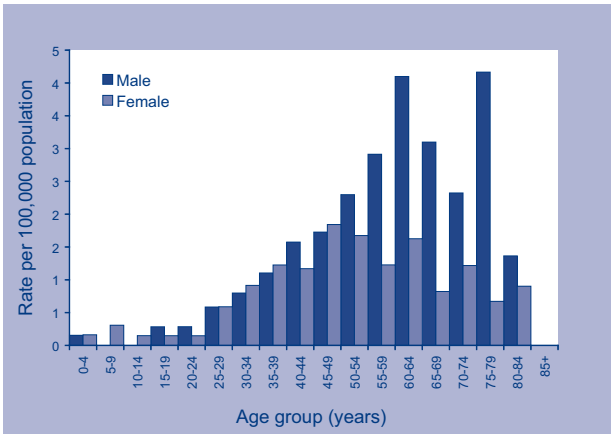


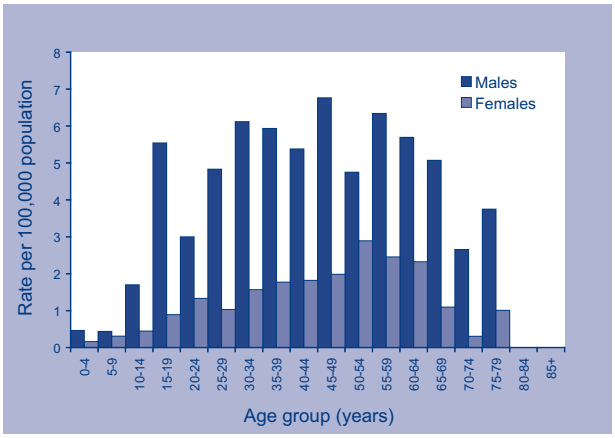
**Figure 57. Notification rates of ornithosis, Australia, 2003, by age group and sex**




## Q fever

There were 550 cases of Q fever notified during 2003, a decrease of 27 per cent on 2002. The number of cases notified had increased each year between 1999 and 2002. In 2003, the largest number of notifications were from New South Wales (278 notifications, 4.2 cases per 100,000 population) and Queensland (224 notifications, 5.9 cases per 100,000 population). The highest rate observed for males was 6.8 cases per 100,000 population, in the 45–49 year age group, and for females, 2.9 cases per 100,000 population, in the 50–54 year age group (Figure 58). The male to female ratio was 3.2:1, which is the same as the previous year.

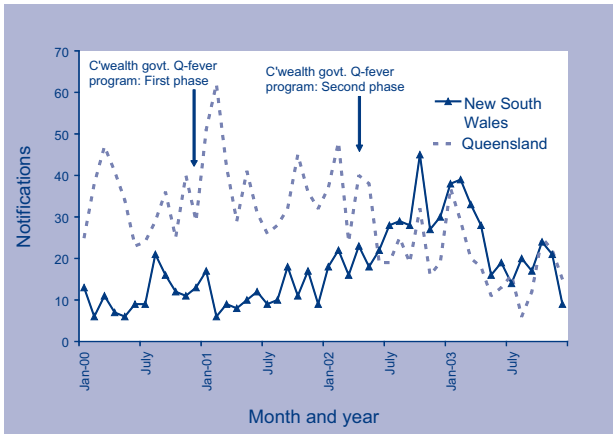
**Figure 58. Notification rates of Q fever, Australia, 2003, by age group and sex**




There were six clusters of Q fever reported in 2003. Five occurred in Queensland, four of which were in families (2–3 cases in each cluster) and one was a cluster of five cases associated with a goat farm. South Australia recorded a cluster of three cases also associated with occupational exposure.

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 against Q fever, under an Australian Government funded program. The second phase of the Q fever vaccination program began in October 2001 to include workers in the beef, sheep and dairy industries (Figure 59). The initial increase in notifications in 2002 is likely to be due to identification of cases through screening from the program. The decline in notifications in 2003 may be the result of a combination of control program activities and the natural variability in the prevalence of Q fever in Australia.

**Figure 59. Notifications of Q fever, New South Wales and Queensland, January 2000 to December 2003, by month of onset**




# *Other bacterial infections*

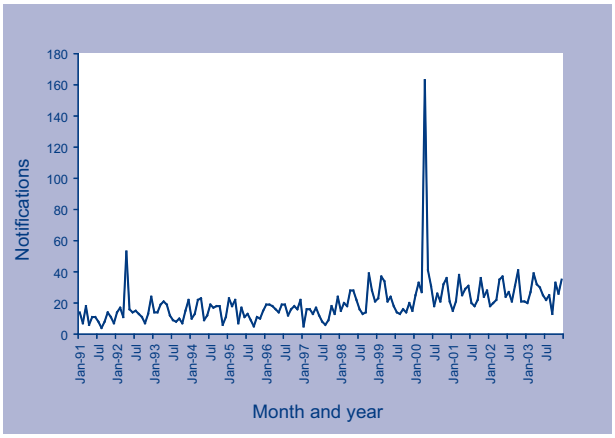
Legionellosis, leprosy, meningococcal infection and tuberculosis (TB) were notifiable in all states and territories in 2003 and classified as 'other bacterial infections' in NNDSS. A total of 1,826 notifications were included in this group in 2003, which accounted for 1.7 per cent of all the notifications to NNDSS, a similar total and proportion as in 2002 (1,980 notifications and 1.9% of total).

## Legionellosis

Legionellosis includes notifications of infections caused by all *Legionella* species. There were 328 notifications of legionellosis reported in 2003 giving a national rate of 1.6 cases per 100,000 population.

The annual trend since 1991 (Figure 60) shows a marked increase in notifications in 2000, which included the Melbourne aquarium outbreak.[29] Between 1991 and 2000, there was a significant increase in the national legionellosis notification rate, even after excluding cases related to outbreaks.[30]

**Figure 60. Trends in notifications of legionellosis, Australia, 1991 to 2003, by month of onset**




In 2003, the highest rates of legionellosis were reported in South Australia (4.3 cases per 100,000 population) and Western Australia (3.3 cases per 100,000 population). Legionellosis notifications showed a peak in reports in autumn and spring.

Men accounted for 214/328 (65%) of all cases of legionellosis resulting in a male to female ratio of 1.9:1. Cases occurred in all age groups above 14 years, with the highest rates in the 70–74 year age group for men (12 cases per 100,000 population) and the 75–79 year age group for women (5.7 cases per 100,000 population; Figure 61).

Data on the causative species were available for 320 (98%) of the legionellosis cases. Of these, 131 (41%) cases were identified as *L. pneumophilia*, 185 (58%) were *L. longbeachae* and 4 (1%) were other species (*L. micdadei* and *L. bozemannii*, Table 18).

Data on the death or survival of legionellosis cases were available for 224 (68%) notifications. In all there were 13 deaths identified as due to legionellosis in Australia in 2003, giving a case fatality rate of 4 per cent. The break down of deaths by jurisdiction and infecting *Legionella* species is shown in Table 19. The

**Figure 61. Notification rates of legionellosis, Australia, 2003, by age group and sex**

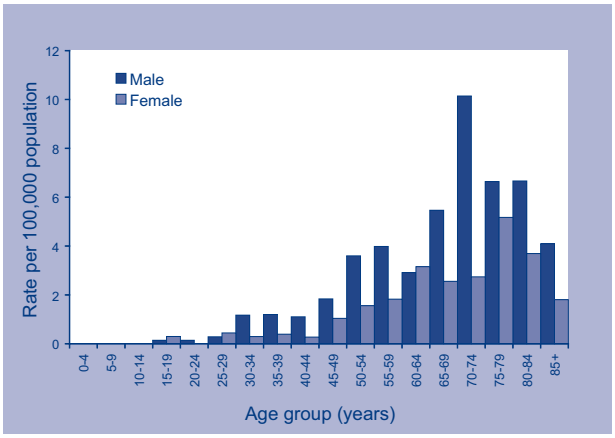



**Table 18. Notifications of legionellosis, Australia, 2003, by species and state or territory**

| Species | State or territory | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | ACT | NSW | NT | Qld | SA | Tas | Vic | WA | |
| *Legionella longbeachae* | 1 | 37 | 2 | 12 | 54 | 0 | 25 | 54 | 185 |
| *Legionella pneumophila* | 0 | 23 | 1 | 25 | 10 | 2 | 63 | 7 | 131 |
| Other species* | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 4 |
| Unknown species | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 4 | 8 |
| Total | 1 | 60 | 3 | 39 | 65 | 2 | 93 | 65 | 328 |

* Other includes species of *Legionella micdadei* and *Legionella bozemannii*.

**Table 19. Deaths due to legionellosis by species, Australia, 2003, by species and state or territory**

| Species | State or territory | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | ACT | NSW | NT | Qld | SA | Tas | Vic | WA | |
| *Legionella longbeachae* | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 4 |
| *Legionella pneumophila* | 0 | 2 | 0 | 1 | 1 | 1 | 3 | 1 | 9 |
| Other species* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Unknown species | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 2 | 0 | 1 | 3 | 1 | 3 | 3 | 13 |

* Other includes species of *Legionella micdadei* and *Legionella bozemannii*.

case fatality rate for infections with *L. pneumophila* (9/131, 6.9%) was higher than for *L. longbeachae* infections (4/185, 2.2%) but this difference did not reach statistical significance.

There was an outbreak of legionellosis in South Australia in December 2003. Five cases and two deaths were reported in cases infected with *L. longbeachae* and four of the cases had exposure to potting mix.[31] Potting mixes in Australia have been identified as a source of infection with *L. longbeachae* for some years.[32]

The largest outbreak of legionellosis in Australia was in Melbourne in April 2000. A report into the investigation was recently published.[33] Risk factors for acquiring legionellosis in this outbreak identified current smoking as a dose-dependent risk, while underlying chronic illness and duration of exposure were not significant risks. The number of cases identified in this outbreak was possibly inflated by the large proportion of mild cases detected by the urinary antigen test.

## Leprosy

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 2003, four leprosy cases were notified compared with three in 2002. The cases in 2003 occurred in New South Wales, Victoria and Western Australia. Two were male and two female and the age range was 21 to 42 years. Two cases were multibacillary (lepromatous, more than 5 skin lesions), two were paucibacillary (tuberculoid, less than 5 skin lesions) leprosy and one had evidence of neuritis at presentation.

The WHO has established the goal of eliminating leprosy from every country by 2005, which is defined as a reduction in the prevalence of leprosy to less than one case per 10,000 population. The Western Pacific Region, comprising 37 countries including Australia, reached this target in all but two countries in 2003.[34]

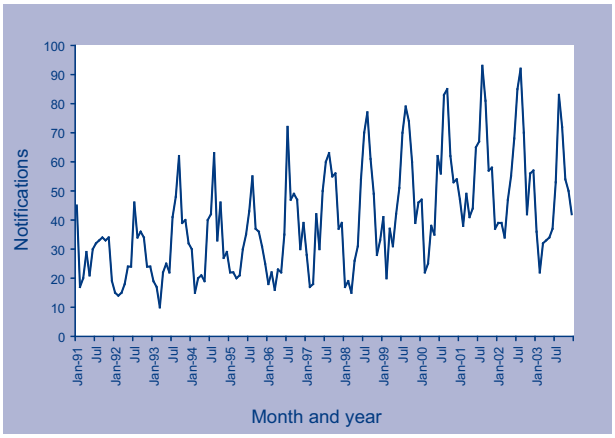
Leprosy transmission continues to occur in parts of Australia (such as the Kimberley region of Western Australia), despite the fact that Australia has a prevalence of leprosy well below the WHO elimination goal. Leprosy in Australia is most prevalent amongst Indigenous people[35] and among migrants to Australia from leprosy-endemic countries.

## Invasive meningococcal disease

Meningococcal serogroups A, B, C, Y and W–135 are major human pathogens. In Australia, serogroups B and C are the major cause of invasive meningococcal disease.

In 2003, there were 550 notifications of invasive meningococcal disease in Australia: a decrease of 20 per cent on the 684 cases reported in 2002. The national notification rate was 2.8 cases per 100,000 population. The highest rates were reported from the Northern Territory (5.5 cases per 100,000 population). The largest number of cases occurred in winter and spring (Figure 62).

**Figure 62. Trends in notification rates of meningococcal infection, Australia, 1991 to 2003, by month of onset**




The highest age specific rate was in children aged 0–4 years (12.7 cases per 100,000 population) and in the 15–19 year age group (7.3 cases per 100,000 population). There was a small excess of cases among males (male to female ratio 1.1:1, Figure 63).

Of the 550 meningococcal notifications, 465 (84.5%) were serogrouped. Of these 289 (62%) were serogroup B, 158 (34%) were serogroup C, 18 (4%) were serogroup W135 or serogroup Y and there was a single case of serogroup A (Table 20).

In 2003 there were 35 deaths due to meningococcal disease giving a crude case fatality rate of 6.4 per cent. The breakdown of deaths by jurisdiction and serogroup are shown in Table 21. The case fatality rate for infections with meningococcal group C (21/158, 13.3%) was more than three times higher than for meningococcal group B infections (11/289, 3.8%, Chi = 12.4, $p<0.001$).

**Table 20. Notifications of meningococcal infection, Australia, 2003, by serogroup, and state or territory**

| Species | State or territory | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | ACT | NSW | NT | Qld | SA | Tas | Vic | WA | |
| Serogroup B | 3 | 100 | 10 | 54 | 26 | 9 | 54 | 33 | 289 |
| Serogroup C | 9 | 46 | 0 | 39 | 3 | 10 | 45 | 6 | 158 |
| Other serogroups* | 1 | 7 | 1 | 2 | 2 | 0 | 4 | 1 | 18 |
| Unknown serogroup | 0 | 45 | 0 | 10 | 1 | 1 | 22 | 6 | 85 |
| Total | 13 | 198 | 11 | 105 | 32 | 20 | 125 | 46 | 550 |

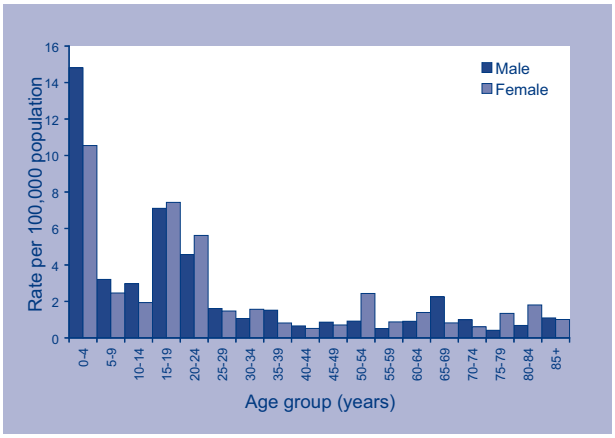
* Other includes serogroups A, Y and W135.

**Table 21. Deaths due to meningococcal infection by serogroups, Australia, 2003, by serogroup, and state or territory**

| Species | State or territory | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | ACT | NSW | NT | Qld | SA | Tas | Vic | WA | |
| Serogroup B | 0 | 6 | 1 | 0 | 4 | 0 | 0 | 0 | 11 |
| Serogroup C | 0 | 6 | 0 | 9 | 0 | 0 | 6 | 0 | 21 |
| Other serogroups* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Unknown serogroup | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 3 |
| Total | 0 | 14 | 1 | 10 | 4 | 0 | 6 | 0 | 35 |

* Other includes serogroups A, Y and W135.

**Figure 63. Notification rates of meningococcal infection, Australia, 2003, by age and sex**




In response to community concerns about increases in meningococcal disease in Australia, the Commonwealth Government approved the National Meningococcal C vaccination program, which commenced in January 2003.[36]

In 2003, examination of *Neisseria meningitidis* carriage in nasopharyngeal and tonsil swabs and saliva found a low prevalence of the meningococci in saliva and concluded that salivary contact is unlikely to transmit meningococcal disease.[37] The Communicable Diseases Network Australia is revising the *Guidelines for the early clinical and public health management of meningococcal disease in Australia* to take into account these new findings.

## 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 2003 have recently been published.[38]

In 2003, a total of 303 isolates of *N. meningitidis* were analysed by the program, a decrease from the 393 isolates analysed in the previous year. Consistent with routine surveillance data, Serogroup B continues to be the predominant strain for the disease (183 isolates, 60.4%) nationally, followed by serogroup C (102 isolates, 33.6%). However, there was mix in the phenotypes circulating in the different states and territories. Serogroup B strains predominated in all jurisdictions except the Australian Capital Territory where all isolates were serogroup C, and Tasmania and Victoria where equal numbers of serogroup B and C were isolated.

The pattern of age distribution for meningococcal infection varied by the phenotype. Serogroup B was more frequently reported in the 0–4 age group (42.5%), while the largest proportion of serogroup C occurred in the 15–19 age group (20.6%).

In 2003, about two-thirds of all the isolates showed decreased susceptibility to the penicillin group of antibiotics (MIC 0.06 to 0.5 mg/L). All isolates tested were susceptible to third generation cephalosporins and ciprofloxacin. Two isolates were resistant to the prophylactic antibiotic, rifampicin.

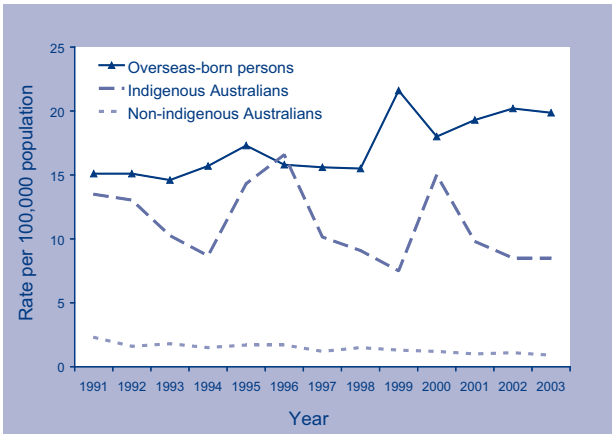
## Tuberculosis

While Australia has one of the lowest rates of tuberculosis in the world, the disease remains a public health problem in the overseas-born and Indigenous communities. In 2003, 944 tuberculosis (TB) notifications were received by NNDSS, a rate of 4.7 cases per 100,000 population; a similar number and rate to 2002. The notification rates of TB were lower than the national average in Queensland, South Australia, Tasmania and Western Australia, as in previous years. The highest rate was reported in the Northern Territory (14.6 cases per 100,000 population).

In 2003, the male to female ratio was 1.1:1. TB cases occurred in all age groups, with the highest age-specific rates reported in the 80–84 year age group (12.0 cases per 100,000 population). The highest incidence was reported in people born overseas (19.9 cases per 100,000 population) and Indigenous Australians (8.5 cases per 100,000 population). By contrast the rate in the non-Indigenous Australian-born population was 0.9 cases per 100,000 population (Figure 64).

Detailed analyses of tuberculosis in Australia have recently been published.[39]

**Figure 64. Trends in tuberculosis notification rates, Australia, 1991 to 2003, by Indigenous status and country of birth.**




# *Other communicable disease surveillance*

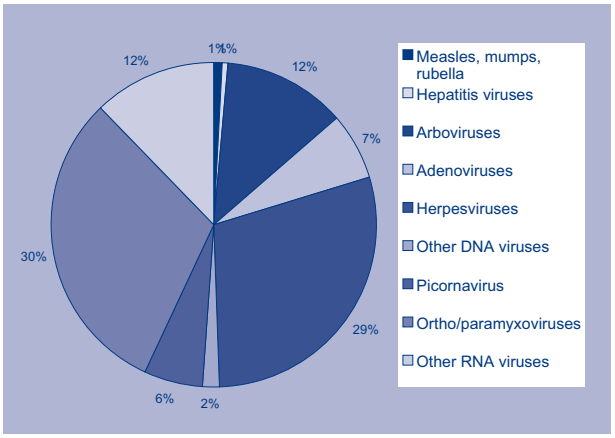
## Laboratory Virology and Serology Reporting Scheme

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 2003, a total of 13 laboratories reported 23,160 infectious agents to LabVISE. This represents a 12 per cent decline in the number of reports received in 2002 (Table 22). The largest number of reports were from Queensland (28%), South Australia (26%) and New South Wales (17%, Table 22).

Sixty-four per cent of the 14,755 reports received by LabVISE were viral infectious agents, and the remaining 36 per cent (8,405) were bacterial or other infectious agents. Among viruses, ortho/paramyxoviruses (influenza, parainfluenza and respiratory syncytial virus) were the most commonly reported (30%; 4,570) followed by herpesviruses (29%; 4,295) (Figure 65). Among non-viral infectious agents, *Chlamydia trachomatis* (4,296, 51%), *Treponema pallidum* (1,165, 14%) and *Mycoplasma pneumoniae* (1,146, 13%) were the most commonly reported pathogens.

**Figure 65. Reports of viral infections to the Laboratory Virology and Serology Reporting Scheme, 2003, by viral group**



## Table 22. Infectious agents reported to the Laboratory Virology and Serology Reporting Scheme, 2003, by state or territory

| Organism | State or territory | | | | | | | | Total 2003 | Total 2002 |
|---|---|---|---|---|---|---|---|---|---|---|
| | ACT | NSW | NT | Qld | SA | Tas | Vic | WA | | |
| Measles virus | – | 7 | 1 | 5 | 24 | – | 33 | 1 | 71 | 16 |
| Mumps virus | – | 1 | – | 2 | 2 | – | 1 | 4 | 10 | 16 |
| Rubella virus | – | 2 | – | 13 | 4 | – | 4 | 3 | 26 | 92 |
| Hepatitis A virus | 1 | 2 | 6 | 17 | 12 | – | 4 | 45 | 87 | 71 |
| Hepatitis D virus | – | – | – | – | 2 | – | 10 | 7 | 19 | 7 |
| Ross River virus | 2 | 56 | 48 | 1,016 | 19 | – | 7 | 90 | 1,238 | 423 |
| Barmah Forest virus | – | 52 | 8 | 336 | 2 | – | 1 | 9 | 408 | 203 |
| Sindbis virus | – | – | – | – | – | – | 1 | – | 1 | – |
| Dengue | – | 3 | 6 | – | 1 | – | 1 | 28 | 39 | 168 |
| Murray Valley encephalitis virus | – | – | 1 | – | – | – | – | – | 1 | 7 |
| Flavivirus (unspecified) | – | – | 1 | 110 | – | – | 11 | – | 122 | 43 |
| Adenoviruses | 1 | 192 | 13 | 72 | 412 | 2 | 111 | 159 | 962 | 1,069 |
| Herpesviruses | 51 | 444 | 97 | 1,540 | 1,313 | 9 | 220 | 621 | 4,295 | 4,650 |
| Other DNA viruses | 1 | 8 | – | 77 | 9 | – | 84 | 100 | 279 | – |
| Picornaviruses | 2 | 441 | 10 | 17 | 21 | 5 | 30 | 304 | 830 | 1,372 |
| Ortho/paramyxoviruses | 4 | 1,371 | 39 | 399 | 1,594 | 47 | 472 | 644 | 4,570 | 6,289 |
| Other RNA viruses | 3 | 425 | 15 | 2 | 508 | 16 | 486 | 342 | 1,797 | 2,555 |
| *Chlamydia trachomatis* | 20 | 585 | 55 | 1,528 | 1,025 | 47 | 46 | 991 | 4,296 | 3,874 |
| *Chlamydia pneumoniae* | 3 | 6 | 1 | – | – | – | – | 5 | 15 | 32 |
| *Chlamydia psittaci* | – | 2 | – | 1 | 3 | – | 110 | 2 | 118 | 62 |
| *Mycoplasma pneumoniae* | 5 | 170 | 9 | 376 | 281 | 28 | 239 | 38 | 1,146 | 1,234 |
| *Mycoplasma hominis* | – | 9 | – | – | – | – | – | – | 9 | 2 |
| *Coxiella burnetii* | 4 | 11 | 2 | 53 | 82 | – | 16 | 10 | 178 | 251 |
| *Rickettsia* spp | – | – | 1 | – | – | – | 3 | 6 | 10 | 2 |
| *Streptococcus* group A | 22 | 12 | 6 | 315 | – | – | 135 | – | 490 | 526 |
| *Streptococcus* group B | 72 | 3 | – | – | – | – | – | – | 75 | 129 |
| *Yersinia enterocolitica* | – | 11 | – | 1 | – | – | – | – | 12 | 9 |
| *Brucella abortus* | – | 1 | – | – | 2 | – | 2 | – | 5 | 2 |
| *Brucella* species | – | 3 | – | 4 | – | – | – | – | 7 | 5 |
| *Bordetella pertussis* | 15 | 82 | 2 | 75 | 146 | 12 | 174 | 13 | 519 | 944 |
| *Legionella pneumophila* | 1 | 3 | – | – | 8 | – | 115 | 3 | 130 | 120 |
| *Legionella longbeachae* | 1 | 2 | 1 | – | 18 | – | 22 | 40 | 84 | 78 |
| *Legionella* species | – | – | – | – | – | – | 18 | – | 18 | 15 |
| *Cryptococcus* species | – | 1 | – | 9 | 16 | – | – | – | 26 | 30 |
| *Leptospira* species | – | 1 | – | 15 | 8 | – | – | 2 | 26 | 18 |
| *Treponema pallidum* | – | 125 | 95 | 478 | 448 | – | 11 | 8 | 1,165 | 1,400 |
| *Entamoeba histolytica* | – | 1 | – | 2 | – | – | 4 | 7 | 14 | 28 |
| *Toxoplasma gondii* | 1 | 14 | – | 6 | 9 | – | 8 | 3 | 41 | 28 |
| *Echinococcus granulosus* | – | – | – | – | 19 | – | 2 | – | 21 | 30 |
| Total | 209 | 4,046 | 417 | 6,469 | 5,988 | 166 | 2,381 | 3,485 | 23,160 | 25,800 |

– No reports received.

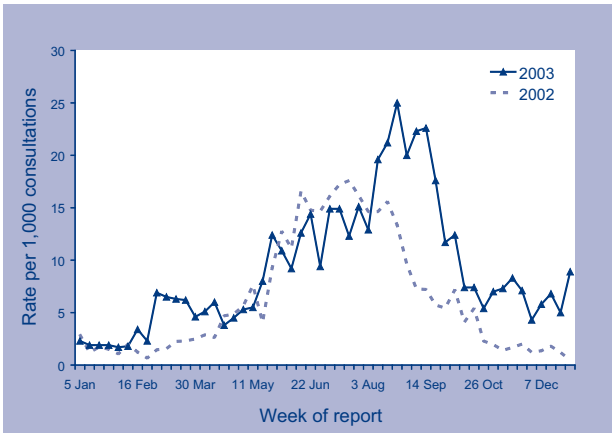
## *Australian Sentinel Practice Research Network*

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 2003, influenza-like illnesses (ILI), gastroenteritis, and varicella infections (chickenpox and shingles) were the communicable diseases reported to ASPREN. Each week an average of 47 general practitioner practices (range 32 to 62 practices) provided information on an average of 4,962 consultations per week.

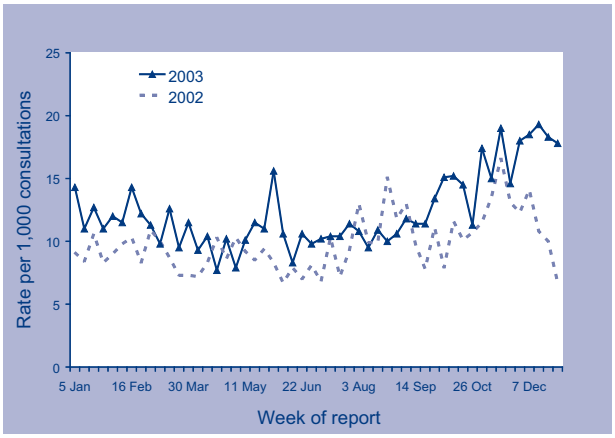
Influenza-like illness reports showed a typical seasonal pattern with a peak in mid-August at 24 cases per 1,000 consultations. This was a higher peak rate than in 2002 (18 cases per 1,000 consultations) and occurred later in the year. Unlike other years however, reports of ILI continued to be reported at above base-line levels through the remainder of the year (Figure 66).

**Figure 66. Consultation rates for influenza-like illness, ASPREN, 2003, by week of report**



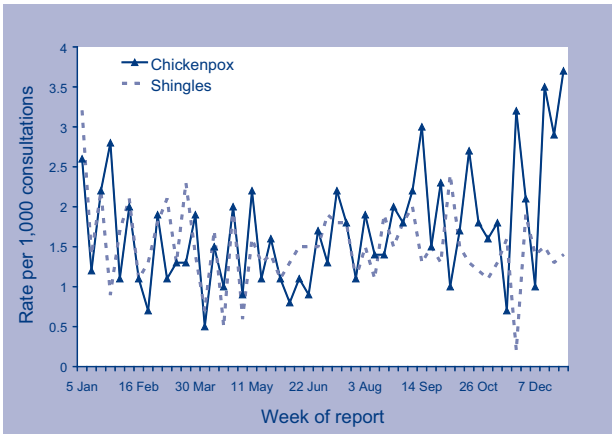

Consultations for gastroenteritis peaked as in previous years in the summer months (December, Figure 67).

**Figure 67. Consultation rates for gastroenteritis, ASPREN, 2003, by week of report**




Reports of varicella infections were recorded at a lower rate than in 2002. Rates of chickenpox exceeded those for shingles in most weeks and there was a suggestion of higher rates of chickenpox in spring and early summer (Figure 68).

**Figure 68. Consultation rates for varicella infections, ASPREN, 2003, by week of report**



# Appendices

## Appendix 1. Mid-year estimate of Australian population, 2003, by state or territory

| | ACT | NT | NSW | Qld | SA | Tas | Vic | WA | Aust |
|---|---|---|---|---|---|---|---|---|---|
| Male | 159,401 | 104,177 | 3,321,964 | 1,893,287 | 755,870 | 235,268 | 2,423,399 | 976,872 | 9,871,642 |
| Female | 163,449 | 94,174 | 3,364,680 | 1,903,488 | 771,551 | 241,826 | 2,493,995 | 975,408 | 10,009,827 |
| Total | 322,850 | 198,351 | 6,686,644 | 3,796,775 | 1,527,421 | 477,094 | 4,917,394 | 1,952,280 | 19,881,469 |

## Appendix 2. Mid-year estimate of Australian population, 2003, by state or territory and age group

| Age | ACT | NT | NSW | Qld | SA | Tas | Vic | WA | Aust |
|---|---|---|---|---|---|---|---|---|---|
| 0–4 | 20,361 | 17,440 | 429,509 | 248,364 | 89,709 | 30,677 | 304,023 | 124,316 | 1,264,661 |
| 5–9 | 21,233 | 16,900 | 445,635 | 266,215 | 97,049 | 32,394 | 323,272 | 133,352 | 1,336,305 |
| 10–14 | 22,242 | 16,106 | 458,254 | 274,665 | 100,930 | 34,251 | 331,038 | 140,681 | 1,378,444 |
| 15–19 | 24,370 | 14,615 | 452,486 | 269,467 | 104,012 | 34,200 | 333,999 | 143,466 | 1,376,787 |
| 20–24 | 27,899 | 15,778 | 452,155 | 267,319 | 99,968 | 29,551 | 345,463 | 138,550 | 1,376,836 |
| 25–29 | 25,426 | 17,185 | 462,199 | 259,140 | 94,939 | 26,764 | 343,352 | 132,638 | 1,361,783 |
| 30–34 | 25,760 | 18,485 | 512,932 | 286,097 | 108,059 | 31,707 | 385,882 | 148,098 | 1,517,217 |
| 35–39 | 24,325 | 16,610 | 488,096 | 274,851 | 109,451 | 32,278 | 367,164 | 145,536 | 1,458,527 |
| 40–44 | 24,958 | 16,010 | 514,449 | 290,981 | 117,809 | 36,899 | 376,499 | 153,634 | 1,531,460 |
| 45–49 | 23,493 | 13,707 | 467,224 | 265,400 | 109,522 | 34,745 | 343,322 | 142,846 | 1,400,484 |
| 50–54 | 22,589 | 12,367 | 433,829 | 251,310 | 104,649 | 33,024 | 319,154 | 132,641 | 1,309,774 |
| 55–59 | 18,668 | 8,943 | 386,390 | 224,801 | 93,587 | 29,771 | 280,277 | 111,389 | 1,153,945 |
| 60–64 | 12,206 | 5,895 | 293,787 | 167,114 | 70,438 | 23,302 | 214,176 | 82,590 | 869,605 |
| 65–69 | 8,997 | 3,310 | 248,318 | 132,302 | 60,154 | 19,241 | 181,219 | 66,473 | 720,072 |
| 70–74 | 7,179 | 2,197 | 220,674 | 111,858 | 54,846 | 16,756 | 160,702 | 55,637 | 629,877 |
| 75–79 | 6,149 | 1,409 | 189,108 | 93,163 | 49,863 | 14,107 | 138,859 | 45,312 | 537,980 |
| 80–84 | 4,109 | 769 | 130,060 | 64,109 | 34,776 | 9,708 | 94,062 | 30,587 | 368,189 |
| 85–89 | 1,960 | 375 | 67,470 | 33,216 | 18,172 | 5,230 | 48,766 | 15,756 | 190,953 |
| 90–94 | 713 | 166 | 26,289 | 12,762 | 7,390 | 1,935 | 20,027 | 6,697 | 75,981 |
| 95–99 | 183 | 49 | 6,459 | 3,045 | 1,736 | 476 | 5,116 | 1,759 | 18,823 |
| 100 and over | 30 | 35 | 1,321 | 596 | 362 | 78 | 1,022 | 322 | 3,766 |
| Total | 322,850 | 198,351 | 6,686,644 | 3,796,775 | 1,527,421 | 477,094 | 4,917,394 | 1,952,280 | 19,881,469 |

## Appendix 3. Completeness of National Notifiable Diseases Surveillance System data, received from states and territories, 2003

| | ACT | NSW | NT | Qld | SA | Tas | Vic | WA | Aust |
|---|---|---|---|---|---|---|---|---|---|
| Total notifications | 1,847 | 26,555 | 4,923 | 26,246 | 7,431 | 2,147 | 23,434 | 12,373 | 104,956 |
| **Sex** | | | | | | | | | |
| Number unknown | 2 | 54 | 2 | 21 | 0 | 2 | 379 | 16 | 476 |
| % complete | 99.9 | 99.8 | 100.0 | 99.9 | 100.0 | 99.9 | 98.4 | 99.9 | 99.5 |
| **Age** | | | | | | | | | |
| Number missing | 0 | 0 | 0 | 0 | 0 | 8 | 33 | 16 | 57 |
| % complete | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 99.6 | 99.9 | 99.9 | 99.9 |
| **Indigenous status** | | | | | | | | | |
| Number unknown | 1,805 | 19,158 | 421 | 17,923 | 1,157 | 2,138 | 12,224 | 5,137 | 59,963 |
| % complete | 3.4 | 27.9 | 91.5 | 32.7 | 84.5 | 1.4 | 47.9 | 58.5 | 43.1 |

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