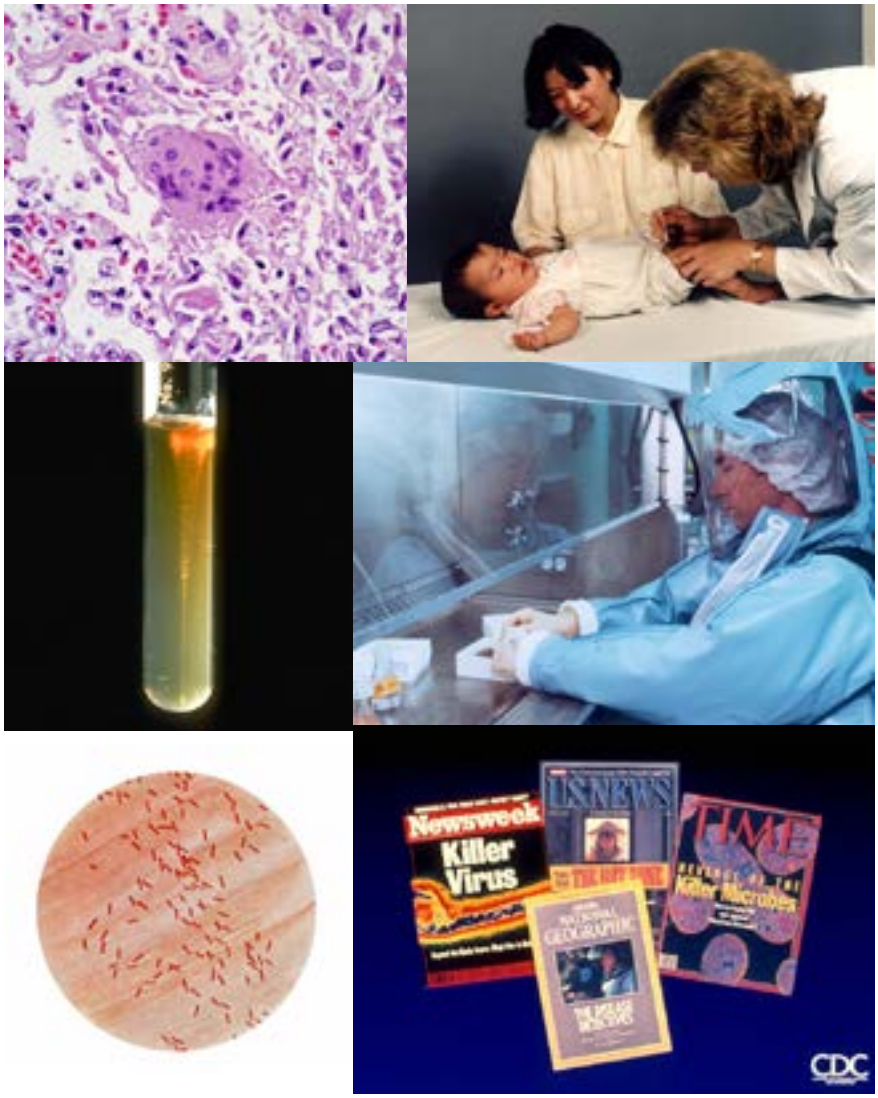
Australian Government
Department of Health and Ageing

Communicable Diseases Intelligence



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Communicable Diseases Intelligence aims to diseminate information on the epidemiology and control of communicable diseases in Australia. *Communicable Diseases Intelligence* invites contributions dealing with any aspect of communicable disease epidemiology, surveillance or prevention and control in Australia. Submissions can be in the form of original articles, short reports, surveillance summaries, reviews or correspondence. Instructions for authors can be found in *Commun Dis Intell* 2004;28:95–97.

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Front cover: Surveillance and Epidemiology Section, Australian Government Department of Health and Ageing.
Images sourced from the Centers for Disease Control and Prevention Public Health Image Library, courtesy of the Centers for Disease Control and Prevention, Atlanata, Georgia.
Clockwise from top left: Lung tissue pathology due to SARS (provided by Dr Sherif Zaki); Childhood immunisation (provided by Barbara Rice); Laboratory research in the Biosecurity Level 4 laboratory, Atlanta, GA (CDC); Reporting of emarging infectious disease threats (CDC/NCHS); Photomicrograph of *Escherichia coli* bacteria using Gram stain technique (CDC); and Stab caulture of *Legionella pnuemophila* (CDC).

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Contents

Editorial: Notifiable diseases, Australia, 2004

CDNA Surveillance Case Definitions Working Group

Revised case definitions for nationally notifiable diseases

A working group of CDNA was convened in 2001 to revise or develop standard case definitions for all nationally notifiable diseases for reporting to the Commonwealth. The new case definitions will be implemented nationally from January 2004. The Surveillance Case Definitions have been developed through a consensus approach in a series of teleconferences undertaken progressively over the last two years. The Working Group comprised members representing all State and Territory jurisdictions, the Commonwealth Department of Health and Ageing, the Public Health Laboratory Network (PHLN), OzFoodNet, the National Centre in HIV Epidemiology and Clinical Research (NCHECR), and the National Centre for Immunisation Research and Surveillance. Laboratory definitions previously developed by the PHLN formed the basis for the Surveillance Case Definitions, with clinical and epidemiologic elements added, as appropriate.

In the revised Surveillance Case Definitions, clinical, laboratory and epidemiological evidence is specified separately for each definition, where relevant, to provide a consistent format. A number of diseases are now notified as either 'confirmed' or 'probable' according to the certainty of the diagnosis. Descriptions for both confirmed and probable cases are provided within relevant case definitions.

In November 2002, CDNA decided to add a further two new diseases to the national list: tularemia, and smallpox. There are now 64 diseases or syndromes that are nationally notifiable. The disease code for each disease or syndrome reported to the National Notifiable Diseases Surveillance System (NNDSS) is provided in the Table 1. During the process of formulating case definitions the names of some listed diseases or syndromes were modified, to more accurately reflect cases collected in the category.

The disease list includes HIV and AIDS, which are not reported via NNDSS, but are sent directly to NCHECR from state and territory health departments.

In the new list, syphilis (formerly disease code 032) has been segregated into two new categories. Two new disease codes have been assigned:

- 'Syphilis — infectious (primary, secondary and early latent), less than 2 years duration' (code 066) and;
- 'Syphilis — more than 2 years or unknown duration' (code 067).

Cases of HIV reported to the NCHECR are categorised as either:

- HIV — newly acquired;
- HIV — unspecified — individuals 18 months of age or older; or
- HIV — unspecified — children less than 18 months of age

Implementation

While acknowledging that public health legislation in individual jurisdictions may have to be revised to cover the collection of the new diseases added to the list, the new case definitions will be implemented for all diseases from 1 January 2004, for reporting to the Commonwealth. Details of the interim case definitions are available from the Communicable Diseases Australia website: http://www.cda.gov.au/surveil/nndss/casedefs.htm.

Other notifiable conditions

In addition to the diseases that are reported to NNDSS at the Department of Health and Ageing, each jurisdiction may have other diseases/syndromes/conditions that are required by public health legislation to be notified to the state or territory health department. Diseases, syndromes and conditions that are notifiable in each state or territory, in addition to the national list, are listed in Table 2.

Table 1. List of nationally notifiable diseases, Australia, 2004

Number	Disease/syndrome name	Disease code
1	Acquired immunodeficiency syndrome (AIDS)	Sent to NCHECR
2	Anthrax	058
3	Ross River virus	002
4	Barmah Forest virus	048
5	Dengue	003
6	Japanese encephalitis	059
7	Kunjin virus	060
8	Murray Valley encephalitis	049
9	Flavivirus infection — unspecified or not otherwise classified	001
10	Botulism	045
11	Brucellosis	004
12	Campylobacteriosis	005
13	Chlamydia	007
14	Cholera	008
15	Cryptosporidiosis	061
16	Diphtheria†	009
17	Donovanosis†	010
18	Gonococcal infection	011
19	Haemolytic uraemic syndrome	055
20	*Haemophilus influenzae* serotype B (Hib) infection (invasive)	012
21	Viral haemorrhagic fevers†	036
22	Hepatitis A†	038
23	Hepatitis B — newly acquired	039
24	Hepatitis B — unspecified	052
25	Hepatitis C — newly acquired	040
26	Hepatitis C — unspecified	053
27	Hepatitis D	050
28	Hepatitis E	051
29	Viral hepatitis (not otherwise specified)	037
30	HIV — newly acquired†	Sent to NCHECR
31	HIV — unspecified — individuals 18 months of age or older†	Sent to NCHECR
32	HIV — unspecified —children less than 18 months of age†	Sent to NCHECR
33	Influenza — laboratory-confirmed	062
34	Legionellosis†	015
35	Leprosy (Hansen's disease)	016
36	Leptospirosis	017
37	Listeriosis	018
38	Lyssavirus — Australian bat lyssavirus (ABL)	063
39	Lyssavirus — rabies	028
40	Lyssavirus — unspecified	064
41	Malaria	020
42	Measles†	021
43	Invasive meningococcal disease†	022
44	Mumps	043
45	Psittacosis (ornithosis)†	023
46	Pertussis†	024
47	Plague	025
48	Poliomyelitis (wild type and vaccine associated)†	026

Table 1. List of nationally notifiable diseases, Australia, 2004, *continued*

Number	Disease/syndrome name	Disease code
49	Pneumococcal disease (invasive)	065
50	Q fever	027
51	Rubella†	029
52	Congenital rubella syndrome†	046
53	Salmonellosis	030
54	Shigellosis	031
55	Shiga-toxin producing *Escherichia coli* — VTEC/STEC	054
56	Syphilis — infectious (primary, secondary and early latent), less than 2 years duration	066
57	Syphilis — more than 2 years or unknown duration	067
58	Congenital syphilis†	047
59	Tetanus	033
60	Tuberculosis	034
61	Typhoid	035
62	Yellow fever	041
64	Smallpox	069
65	Tularemia	070

* Reported to NNDSS via ANCJDR, or State or Territory health departments

† Probable and confirmed cases defined

Disease codes in bold indicate a new code number

Table 2. Additional conditions required to be notified in each state or territory

Australian Capital Territory
Chancroid
Equine morbillivirus (Hendra virus) infection
Giardiasis
Lymphogranuloma venereum
Yersiniosis
New South Wales
Adverse event following immunisation
Chancroid
Foodborne illness in 2 or more related cases
Gastroenteritis among people of any age, in an institution (e.g. among persons in educational or residential institutions)
Lymphogranuloma venereum
Typhus (epidemic)
Northern Territory
Acute post-streptococcal glomerulonephritis
Acute rheumatic fever
Adverse event following immunisation
Amoebiasis
Atypical mycobacterial disease or non-tuberculous mycobacteria (NTM)
Chancroid
Chlamydial conjunctivitis
Echinococcosis (hydatid disease)
Gastroenteritis (with potential for outbreak): water or foodborne diseases in:
- two or more related cases
- in an institution
- in a foodhandler

Table 2. Additional conditions required to be notified in each State or Territory, *continued*

Northern Territory , *continued*
Human T-cell lymphotropic virus
Lymphogranuloma venereum
Melioidosis
Rotavirus infection
Thrombotic thrombocytopaenia purpura
Trichomoniasis
Typhus (all forms)
Vibrio food poisoning
Yersiniosis
Queensland
Acute flaccid paralysis
Acute rheumatic fever
Adverse event following immunisation
Atypical mycobacterial disease
Bunyavirus infections (not included in arbovirus NEC)
Chancroid
Ciguatera poisoning
Cryptococcus
Echinococcosis (hydatid disease)
Elevated lead levels
Equine morbillivirus (Hendra virus) infection
Foodborne or waterborne disease in 2 or more related cases
Hendra virus infection
Lymphogranuloma venereum
Melioidosis
Yersiniosis
South Australia (*Available at http://www.dhs.sa.gov.au/pehs/topics/topic-notifiable-diseases.htm*)
Atypical mycobacterial disease
Echinococcosis (hydatid disease)
Varicella-zoster infection (chickenpox and shingles)
Yersiniosis
Tasmania (*Available at http://www.dhhs.tas.gov.au/publichealth/communicablediseases/*)
Amoebiasis
Chancroid
Echinococcosis (hydatid disease)
Elevated lead levels
Gastroenteritis in an institution i.e. residential, educational or child care facility
Giardiasis
Lymphogranuloma venereum
Mycobacterial infection (including atypical *Mycobacterium* spp.)
Rickettsial infection (including Flinders Island spotted fever and others)
Suspected cases of food and waterborne illnesses
Taeniasis
Typhus epidemic (*Rickettsia prowazekii*)
Vancomycin resistant enterococci
Vibrio infection

Table 2. Additional conditions required to be notified in each State or Territory, *continued*

Yersiniosis
Victoria
Food and waterborne illness in two or more related cases
Giardiasis
Western Australia
Adverse events following immunisation
Amoebiasis
Amoebic meningitis
Chancroid
Echinococcosis (hydatid disease)
Giardiasis
Melioidosis
Methicillin-resistant *Staphyloccocus aureus* infection
Paratyphoid fever
Relapsing fever
Scarlet fever
Schistosomiasis (Bilharzia)
Typhus (Rickettsial infection)
Vibrio parahaemolyticus
Yersiniosis

Acknowledgments

The revision of the case definitions commenced in early 2001. The Surveillance Case Definitions working group was chaired by Robert Hall until August 2002, after which Gary Dowse took the lead. During this time contributors included:

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Peter Lindenmayer played a vital role in the planning and co-ordination of this complex process. Thanks also go to others in the CDNA secretariat, including Robyn Leader, Andrea Symons and Jane Tussup.

Australia's notifiable diseases status, 2002

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

National Rotavirus Research Centre

Sentinel Chicken Surveillance Programme

World Health Organization Collaborating Centre for Reference and Research on Influenza

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

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

Communicable Diseases Section, Department of Human Services, Victoria

Communicable Diseases Control Branch, Health Department of Western Australia, Western Australia

Abstract

There were 57 infectious diseases notifiable at the national level in Australia in 2002. States and territories reported 100,278 cases of infectious diseases to the National Notifiable Diseases Surveillance System (NNDSS), a fall of 4 per cent compared to the number of notifications in 2001. In 2002, the most frequently notified diseases were, sexually transmitted infections (31,929 reports, 32% of total notifications), gastrointestinal infections (26,708 reports, 27% of total notifications) and bloodborne infections (23,741, 24%). There were 11,711 (12% of total) cases of vaccine preventable diseases, 3,052 (3% of total) cases of vectorborne diseases, 1,155 (1% of total) cases of zoonotic infections, two cases of quarantinable diseases (*Vibrio cholerae* O1) and 1,980 cases of other bacterial diseases, notified to NNDSS. Compared to 2001, notifications of sexually transmitted infections increased by 16 per cent and gastrointestinal infections by 2 per cent while bloodborne infections fell by 18 per cent. The number of notifications of chlamydial infection and Q fever were the highest since 1991 and 1995 respectively. By contrast, the number of notification for hepatitis A and measles were the lowest since 1991. For other notifiable diseases, the number of notifications was within the range of the five years between 1997 and 2002 (range = five-year mean plus or minus two standard deviations). This report also includes 2002 summary data on communicable diseases from other surveillance systems including the Laboratory Virology and Serology Reporting Scheme and sentinel general practitioner schemes. *Commun Dis Intell* 2004;28:6–68.

Keywords: communicable diseases, epidemiology, surveillance

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Maps

Abbreviations used in this report

ABL	Australian bat lyssavirus
ACIR	Australian Childhood Immunisation Register
AIDS	Acquired immune deficiency syndrome
ASPREN	Australian Sentinel Practice Research Network
BF	Barmah Forest virus
CDI	Communicable Diseases Intelligence
CDNA	Communicable Diseases Network Australia
DoHA	Australian Government Department of Health and Ageing
Hib	*Haemophilus influenzae* type b
HIV	Human immunodeficiency virus
HUS	Haemolytic uraemic syndrome
ICD10-AM	International Classification of Diseases, version 10, Australian Modification
IPD	Invasive pneumococcal disease
JE	Japanese encephalitis virus
LabVISE	Laboratory Virology and Serology Reporting Scheme
MVE	Murray Valley encephalitis virus
NNDSS	National Notifiable Diseases Surveillance System
NCHECR	National Centre in HIV Epidemiology and Clinical Research
NCIRS	National Centre for Immunisation Research and Surveillance of Vaccine Preventable Diseases
NEC	Not elsewhere classified
NHMRC	National Health and Medical Research Council
NN	Not notifiable
PCR	Polymerase chain reaction
RR	Ross River virus
SD(s)	Statistical Division(s)
SLTEC	Shiga-like toxin producing *Escherichia coli*
STI(s)	Sexually transmitted 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-five communicable diseases (Table 1) agreed upon nationally through the Communicable Diseases Network Australia (CDNA) are reported to the National Notifiable Diseases Surveillance System (NNDSS). The system is complemented by other surveillance systems, which provide information on various diseases, including some that are not reported to NNDSS.

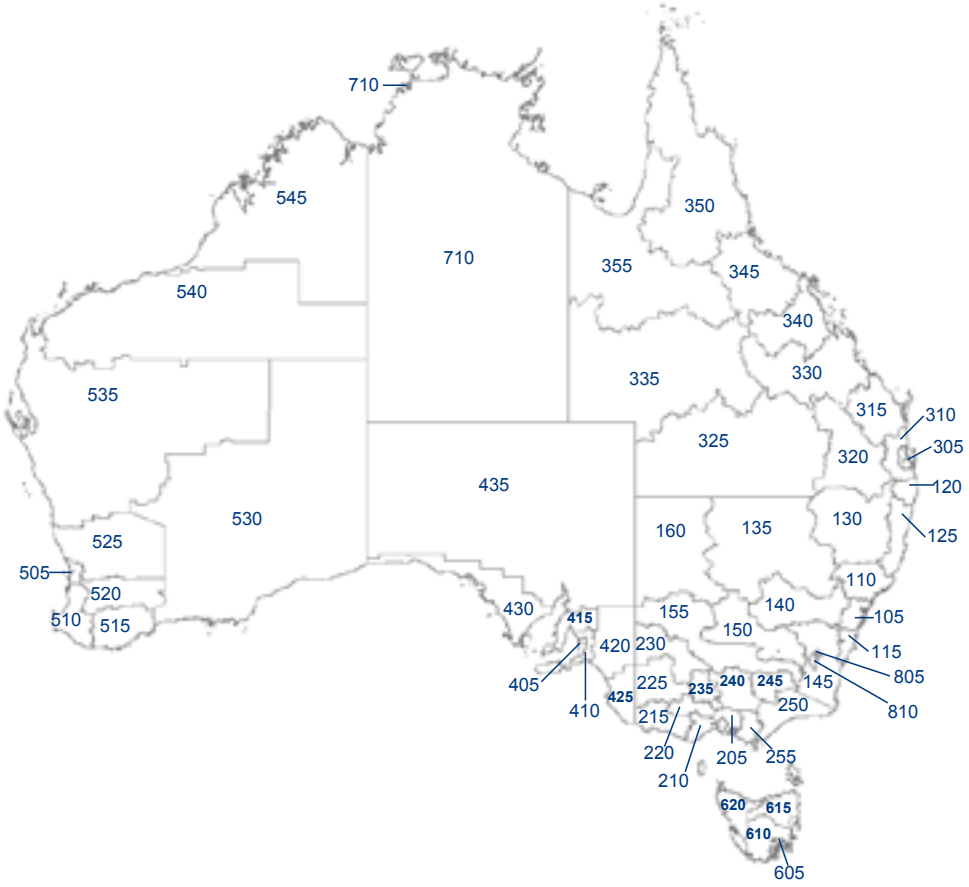
The national dataset included fields for unique record reference number; notifying state or territory; disease code; age; sex; Indigenous status; postcode of residence; date of onset of the disease; and date of report to the state or territory health department. Additional information was available on 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 2001–02.

Notification rates for each notifiable disease were calculated using 2002 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. As in previous years, we report age-standardised notification rates of sexually transmitted infections (STIs) in Indigenous and non-Indigenous Australians based on data from the Northern Territory, South Australia and Western Australia.

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 and the Northern Territory were combined to calculate rates for each territory as a whole.

Information from communicable disease surveillance is disseminated through several avenues of communication. 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	321,441
810	ACT – balance	378
New South Wales		
105	Sydney	4,170,927
110	Hunter	595,030
115	Illawarra	405,007
120	Richmond-Tweed	219,034
125	Mid-North Coast	284,513
130	Northern	180,449
135	North Western	119,624
140	Central West	178,586
145	South Eastern	195,898
150	Murrumbidgee	153,045
155	Murray	114,064
160	Far West	24,178
Northern Territory		
705	Darwin	107,373
710	NT – balance	90,640
Queensland		
305	Brisbane	1,689,100
310	Moreton	747,364
315	Wide Bay-Burnett	239,746

Statistical Division		Population
Queensland continued		
320	Darling Downs	212,942
325	South West	26,987
330	Fitzroy	183,515
335	Central West	12,550
340	Mackay	139,647
345	Northern	193,964
350	Far North	227,309
355	North West	34,051
South Australia		
405	Adelaide	1,114,285
410	Outer Adelaide	116,312
415	York & Lower North	44,542
420	Murray Lands	68,634
425	South East	62,780
430	Eyre	34,215
435	Northern	79,474
Tasmania		
605	Greater Hobart	198,026
610	Southern	34,687
615	Northern	133,595
620	Mersey-Lyell	106,417
910	*Other Territories*	2,592

Statistical Division		Population
Victoria		
205	Melbourne	3,524,103
210	Barwon	259,549
215	Western District	100,894
220	Central Highlands	143,179
225	Wimmera	51,364
230	Mallee	91,170
235	Loddon-Campaspe	169,088
240	Goulburn	196,545
245	Ovens-Murray	94,264
250	East Gippsland	81,178
255	Gippsland	161,204
Western Australia		
505	Perth	1,413,651
510	South West	198,968
515	Lower Great Southern	53,794
520	Upper Great Southern	18,723
525	Midlands	53,559
530	South Eastern	54,855
535	Central	60,626
540	Pilbara	39,441
545	Kimberley	33,705
Total Australia		19,662,781

Notes on interpretation

The present report is based on 2002 '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 2003. 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 presentation to a medical practitioner or date of specimen collection, 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 2002.

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 2. The patient's sex was not stated in 0.5 per cent of notifications (n=468) and patient's age was not stated in 2.3 per cent of notifications (n=3,268). Indigenous status was reported for 41.9 per cent (n=54,243) of notifications nationally. The proportion of reports with missing data in these fields varied by state and territory and by disease.

Figure 1. Communicable diseases notification fraction

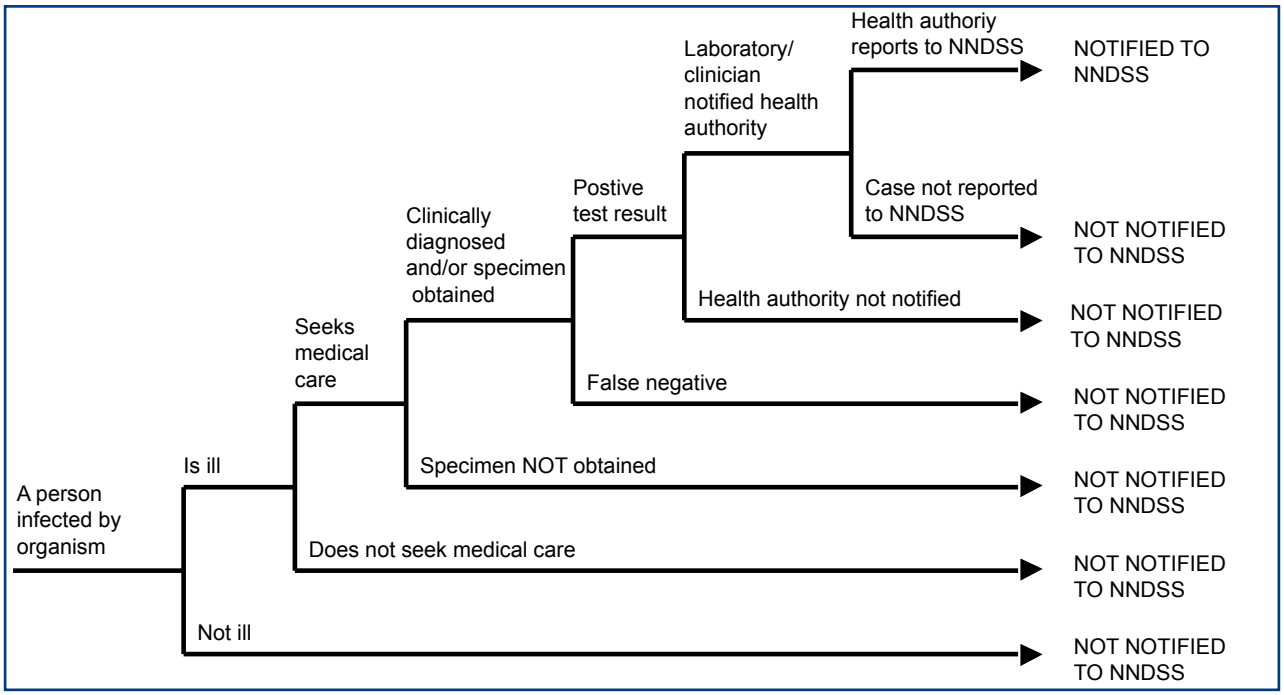


Table 1. Diseases notified to the National Notifiable Diseases Surveillance System, Australia, 2002*

Disease group	Disease	Reported by
Bloodborne diseases	Hepatitis B (incident)	All jurisdictions
	Hepatitis B (unspecified)	All jurisdiction, except NT
	Hepatitis C (incident)	All jurisdictions except Qld
	Hepatitis C (unspecified)	All jurisdictions
	Hepatitis D	All jurisdictions
	Hepatitis (NEC)	All jurisdictions
Gastrointestinal diseases	Botulism	All jurisdictions
	Campylobacteriosis	All jurisdictions except NSW
	Cryptosporidiosis	All jurisdictions
	Haemolytic uraemic syndrome	All jurisdictions
	Hepatitis A	All jurisdictions
	Hepatitis E	All jurisdictions
	Listeriosis	All jurisdictions
	Salmonellosis	All jurisdictions
	Shigellosis	All jurisdictions
	SLTEC, VTEC	All jurisdictions
	Typhoid	All jurisdictions
Quarantinable diseases	Cholera	All jurisdictions
	Plague	All jurisdictions
	Rabies	All jurisdictions
	Viral haemorrhagic fever	All jurisdictions
	Yellow fever	All jurisdictions
Sexually transmitted infections	Chlamydial infection	All jurisdictions
	Donovanosis	All jurisdictions
	Gonococcal infection	All jurisdictions
	Syphilis	All jurisdictions
Vaccine preventable diseases	Diphtheria	All jurisdictions
	Haemophilus influenzae type b	All jurisdictions
	Invasive pneumococcal disease	All jurisdictions
	Laboratory-confirmed influenza	All jurisdictions
	Measles	All jurisdictions
	Mumps	All jurisdictions
	Pertussis	All jurisdictions
	Poliomyelitis	All jurisdictions
	Rubella	All jurisdictions
	Tetanus	All jurisdictions
Vectorborne diseases	Arbovirus infection NEC	All jurisdictions
	Barmah Forest virus infection	All jurisdictions
	Dengue	All jurisdictions
	Japanese encephalitis	All jurisdictions
	Kunjin virus infection	All jurisdictions except ACT†
	Malaria	All jurisdictions
	Murray Valley encephalitis	All jurisdictions†
	Ross River virus infection	All jurisdictions

Table 1. Diseases notified to the National Notifiable Diseases Surveillance System, Australia, 2002,* continued

Disease group	Disease	Reported by
Zoonoses	Anthrax	All jurisdictions
	Australian bat lyssavirus	All jurisdictions
	Brucellosis	All jurisdictions
	Leptospirosis	All jurisdictions
	Ornithosis	All jurisdictions
	Other lyssaviruses (NEC)	All jurisdictions
	Q fever	All jurisdictions
Other bacterial infections	Invasive meningococcal infection	All jurisdictions
	Legionellosis	All jurisdictions
	Leprosy	All jurisdictions
	Tuberculosis	All jurisdictions

* Jurisdictions may not yet have been reporting a disease either because legislation had not yet made that disease notifiable in that jurisdiction, or because notification data for that disease were not yet being reported.

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

NEC Not elsewhere classified.

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.

Results

Summary of 2002 data

There were 100,278 communicable disease notifications received by NNDSS in 2002 (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 1998 to 2002 are shown in Table 4.

During 2001 nine diseases were added to the list of nationally notifiable diseases while four were removed. Although the first full-year of notifications of the newly added diseases was received in 2002, the total number of notifications was lower by 4 per cent than in 2001 (Figure 2).

In 2002, sexually transmitted infections were the most frequently notified diseases (31,929 reports, 32% of total notifications) followed by gastrointestinal diseases (26,708 reports, 27% of total notifications) and bloodborne diseases (23,741, 24%) (Figure 3). By contrast, in 2001, bloodborne diseases were the most frequently notified diseases.

Figure 2. Trends in notifications received by the National Notifiable Diseases Surveillance System, Australia, 1991 to 2002

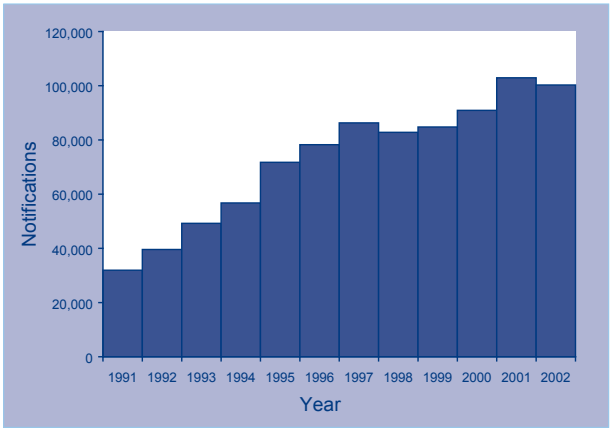
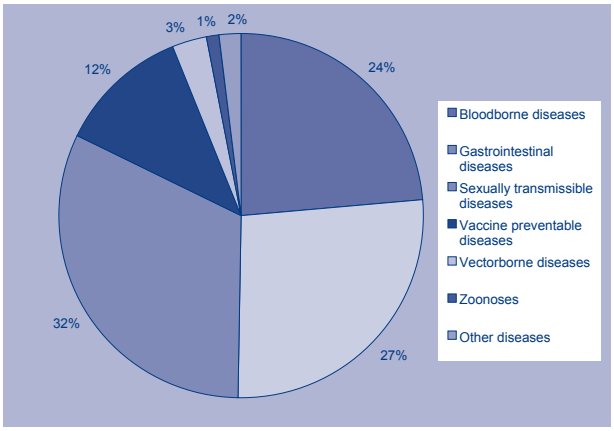


Figure 3. Notifications to the National Notifiable Diseases Surveillance System, Australia, 2002, by disease category*



* Excluding quarantinable diseases (n=5)

Table 2. Notifications of communicable diseases, Australia, 2002, by state or territory

Disease	State or territory								Aust
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	
Bloodborne diseases									
Hepatitis B (incident)	0	84	10	54	11	19	175	35	390
Hepatitis B (unspecified)†,‡	82	3,492	NN	742	267	40	1,891	402	6,916
Hepatitis C (incident)	6	149	NN	NN	42	15	87	135	434
Hepatitis C (unspecified)†,‡,§	226	6,675	193	2,699	641	381	4,092	1,074	15,981
Hepatitis D	0	10	0	1	0	0	9	0	20
Hepatitis (NEC)	0	0	0	0	0	0	0	0	0
Gastrointestinal diseases									
Botulism	0	0	0	0	0	0	0	0	0
Campylobacteriosis‖	356	NN	208	3,885	2,441	606	5,020	2,089	14,605
Cryptosporidiosis	36	303	217	2,026	121	47	290	215	3,255
Haemolytic uraemic syndrome	0	7	1	1	0	0	4	0	13
Hepatitis A	4	146	47	68	15	4	74	30	388
Hepatitis E	1	6	0	1	0	2	2	0	12
Listeriosis	0	11	0	20	2	2	13	11	59
Salmonellosis (NEC)	92	2,036	330	2,673	504	165	1,251	705	7,756
Shigellosis	0	83	103	93	25	1	67	124	496
SLTEC, VTEC¶	0	0	0	5	37	0	5	4	51
Typhoid	1	24	0	12	4	0	22	10	73
Quarantinable diseases									
Cholera	0	1	0	0	0	0	1	0	2
Plague	0	0	0	0	0	0	0	0	0
Rabies	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 diseases									
Chlamydial infection (NEC)	460	5,527	1,451	6,449	1,741	478	4,972	2,961	24,039
Donovanosis	0	0	9	5	0	0	0	2	16
Gonococcal infection**	15	1,400	1,530	935	192	14	820	1,341	6,247
Syphilis††	12	625	414	341	31	16	27	161	1,627
Vaccine preventable diseases									
Diphtheria	0	0	0	0	0	0	0	0	0
Haemophilus influenzae type b	0	10	3	6	2	0	2	6	29
Invasive pneumococcal disease	30	841	65	437	174	63	454	207	2,271
Laboratory-confirmed influenza	19	1,002	56	1,153	289	5	598	543	3,665
Measles	0	8	0	8	1	0	14	0	31
Mumps	0	29	1	6	10	0	10	13	69
Pertussis	50	1,863	37	1,852	453	41	884	208	5,388
Poliomyelitis	0	0	0	0	0	0	0	0	0
Rubella‡‡	3	35	1	190	5	1	16	4	255
Tetanus	0	0	0	2	0	0	0	1	3

Table 2. Notifications of communicable diseases, Australia, 2002, by state or territory, *continued*

Disease	State or territory								Aust
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	
Vectorborne diseases									
Arbovirus infection (NEC)	0	15	0	5	0	0	2	0	22
Barmah Forest virus infection	0	389	23	388	3	0	57	36	896
Dengue	3	66	32	81	7	1	11	18	219
Japanese encephalitis	0	0	0	0	0	0	0	0	0
Kunjin virus infection	NN	0	0	0	0	0	0	0	0
Malaria	13	104	24	205	14	16	64	26	466
Murray Valley encephalitis	0	0	0	0	0	0	0	2	2
Ross River virus infection	0	178	63	887	41	117	38	123	1,447
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	2	0	35	0	0	2	1	40
Leptospirosis	0	36	3	91	2	2	18	3	155
Ornithosis	0	143	2	3	3	1	42	5	199
Other lyssavirus (NEC)	0	0	0	0	0	0	0	0	0
Q fever	0	292	1	339	27	0	83	19	761
Other bacterial infections									
Invasive meningococcal infection	6	213	9	123	31	26	210	66	684
Legionellosis	3	42	1	44	66	0	107	55	318
Leprosy	0	0	1	0	0	0	1	1	3
Tuberculosis	15	433	38	122	39	10	270	48	975
Total	1,433	26,280	4,873	25,991	7,241	2,073	21,705	10,684	100,278

* 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 the date of onset was not available the earliest date of the date of specimen collection or the date of report by the notifying agent, was used.

† Unspecified hepatitis includes cases with hepatitis in whom the duration of illness cannot be determined.

‡ The analysis was performed by report date.

§ Includes hepatitis C incident in Northern Territory and Queensland.

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

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

** Northern Territory, Queensland, South Australia, Victoria and Western Australia: includes gonococcal neonatal ophthalmia.

†† Includes 14 cases of congenital syphilis, one from New South Wales and 13 from the Northern Territory.

‡‡ Includes congenital rubella.

NN Not notifiable.

NEC Not elsewhere classified.

Table 3. Notification rates of communicable diseases, Australia, 2002, by state or 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	1.3	5.1	1.5	0.7	4.0	3.6	1.8	2.0
Hepatitis B (unspecified)†,‡	25.5	52.6	NN	20.0	17.6	8.5	38.8	20.9	35.5
Hepatitis C (incident)	1.9	2.2	NN	NN	2.8	3.2	1.8	7.0	2.8
Hepatitis C (unspecified)†,‡,§	70.2	100.5	97.5	72.8	42.2	80.6	84.0	55.7	81.3
Hepatitis D	0.0	0.2	0.0	0.0	0.0	0.0	0.2	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	0.0	0.0	0.0	0.0	0.0
Campylobacteriosis‖	110.6	NN	105.0	104.8	160.6	128.2	103.0	108.4	112.2
Cryptosporidiosis	11.2	4.6	109.6	54.7	8.0	9.9	6.0	11.2	16.6
Haemolytic uraemic syndrome	0.0	0.1	0.5	0.0	0.0	0.0	0.1	0.0	0.1
Hepatitis A	1.2	2.2	23.7	1.8	1.0	0.8	1.5	1.6	2.0
Hepatitis E	0.3	0.1	0.0	0.0	0.0	0.4	0.0	0.0	0.1
Listeriosis	0.0	0.2	0.0	0.5	0.1	0.4	0.3	0.6	0.3
Salmonellosis (NEC)	28.6	30.7	166.7	72.1	33.2	34.9	25.7	36.6	39.4
Shigellosis	0.0	1.2	52.0	2.5	1.6	0.2	1.4	6.4	2.5
SLTEC, VTEC¶	0.0	0.0	0.0	0.1	2.4	0.0	0.1	0.2	0.3
Typhoid	0.3	0.4	0.0	0.3	0.3	0.0	0.5	0.5	0.4
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
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 diseases									
Chlamydial infection (NEC)	142.9	83.2	732.8	174.0	114.5	101.1	102.0	153.9	122.3
Donovanosis	0.0	0.0	4.5	0.1	0.0	0.0	0.0	0.1	0.1
Gonococcal infection**	4.7	21.1	772.7	25.2	12.6	3.0	16.8	69.6	31.8
Syphilis††	3.7	9.4	209.1	9.2	2.0	3.4	0.6	8.4	8.3
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	0.2	1.5	0.2	0.1	0.0	0.0	0.3	0.1
Invasive pneumococcal disease	9.3	12.7	32.8	11.8	11.4	13.3	9.3	10.7	11.5
Laboratory-confirmed influenza	5.9	15.1	28.3	31.1	19.0	1.1	12.3	28.2	18.6
Measles	0.0	0.1	0.0	0.2	0.1	0.0	0.3	0.0	0.2
Mumps	0.0	0.4	0.5	0.2	0.7	0.0	0.2	0.7	0.4
Pertussis	15.5	28.1	18.7	50.0	29.8	8.7	18.1	10.8	27.4
Poliomyelitis	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rubella‡‡	0.9	0.5	0.5	5.1	0.3	0.2	0.3	0.2	1.3
Tetanus	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0

Table 3. Notification rates of communicable diseases, Australia, 2002, by state or territory (per 100,000 population), *continued*

Disease	State or territory								Aust
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	
Vectorborne diseases									
Arbovirus infection (NEC)	0.0	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.1
Barmah Forest virus infection	0.0	5.9	11.6	10.5	0.2	0.0	1.2	1.9	4.6
Dengue	0.9	1.0	16.2	2.2	0.5	0.2	0.2	0.9	1.1
Japanese encephalitis	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Kunjin virus infection	NN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Malaria	4.0	1.6	12.1	5.5	0.9	3.4	1.3	1.3	2.4
Murray Valley encephalitis	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Ross River virus infection	0.0	2.7	31.8	23.9	2.7	24.8	0.8	6.4	7.4
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	0.9	0.0	0.0	0.0	0.1	0.2
Leptospirosis	0.0	0.5	1.5	2.5	0.1	0.4	0.4	0.2	0.8
Ornithosis	0.0	2.2	1.0	0.1	0.2	0.2	0.9	0.3	1.0
Other lyssavirus (NEC)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Q fever	0.0	4.4	0.5	9.1	1.8	0.0	1.7	1.0	3.9
Other bacterial infections									
Invasive meningococcal infection	1.9	3.2	4.5	3.3	2.0	5.5	4.3	3.4	3.5
Legionellosis	0.9	0.6	0.5	1.2	4.3	0.0	2.2	2.9	1.6
Leprosy	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.1	0.0
Tuberculosis	4.7	6.5	19.2	3.3	2.6	2.1	5.5	2.5	5.0

* 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 the date of onset was not available the earliest date of the date of specimen collection or the date of report by the notifying agent, was used.

† Unspecified hepatitis includes cases with hepatitis in whom the duration of illness cannot be determined.

‡ The analysis was performed by report date.

§ Includes hepatitis C incident in Northern Territory and Queensland.

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

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

** Northern Territory, Queensland, South Australia, Victoria and Western Australia: includes gonococcal neonatal ophthalmia.

†† Includes 14 cases of congenital syphilis, one from New South Wales and 13 from the Northern Territory.

‡‡ Includes congenital rubella.

NN Not notifiable.

NEC Not elsewhere classified.

Table 4. Notifications and notification rates (per 100,000 population) of communicable diseases, Australia, 1998 to 2002, by state or territory

Disease	Notifications					Rate per 100,000 population				
	1998	1999	2000	2001	2002	1998	1999	2000	2001	2002
Bloodborne diseases										
Hepatitis B (incident)	265	303	398	424	390	1.4	1.6	2.1	2.2	2.0
Hepatitis B (unspecified)†,‡	6,562	7,164	7,908	8,424	6,916	35.3	38.1	41.6	43.7	35.5
Hepatitis C (incident)	350	396	391	600	434	2.3	2.6	2.5	3.8	2.8
Hepatitis C (unspecified)†,‡,§	18,075	18,653	19,647	19,586	15,981	96.4	98.3	102.2	100.5	81.3
Hepatitis D	–	19	27	21	20	–	0.1	0.2	0.1	0.1
Hepatitis (NEC)	4	0	1	2	0	<0.1	<0.1	<0.1	<0.1	0.0
Gastrointestinal diseases										
Botulism	1	0	2	2	0	<0.1	0.0	<0.1	<0.1	0.0
Campylobacteriosis‖	13,433	12,657	13,602	16,124	14,605	108.3	100.9	107.1	125.2	112.2
Cryptosporidiosis	–	–	–	1,615	3,255	–	–	–	8.3	16.6
Haemolytic uraemic syndrome	–	23	16	3	13	–	0.1	0.1	0.0	0.1
Hepatitis A	2,497	1,554	813	530	388	13.3	8.2	4.2	2.7	2.0
Hepatitis E	–	9	10	10	12	–	0.1	0.1	0.1	0.1
Listeriosis	55	64	66	62	59	0.3	0.3	0.3	0.3	0.3
Salmonellosis (NEC)	7,613	7,147	6,227	7,045	7,756	40.6	37.6	32.4	36.2	39.4
Shigellosis	599	547	496	562	496	4.8	4.4	3.9	2.9	2.5
SLTEC, VTEC¶	–	52	38	49	51	–	0.4	0.3	0.3	0.3
Typhoid	60	68	60	84	73	0.3	0.4	0.3	0.4	0.4
Quarantinable diseases										
Cholera	4	3	1	4	2	<0.1	<0.1	<0.1	<0.1	<0.1
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 diseases										
Chlamydial infection (NEC)	11,490	14,046	17,018	20,026	24,039	92.7	74.0	88.5	102.8	122.3
Donovanosis	36	18	21	33	16	0.2	0.1	0.1	0.2	0.1
Gonococcal infection**	5,469	5,644	5,801	6,158	6,247	29.2	29.7	30.2	31.6	31.8
Syphilis††	1,683	1,849	1,791	1,421	1,627	9.0	9.7	9.3	7.3	8.3
Vaccine preventable diseases										
Diphtheria	0	0	0	1	0	0.0	0.0	0.0	<0.0	<0.1
Haemophilus influenzae type b	35	40	28	26	29	0.2	0.2	0.1	0.1	0.1
Invasive pneumococcal disease	–	–	–	1,681	2,271	–	–	–	8.6	11.5
Laboratory-confirmed influenza	–	–	–	1,286	3,665	–	–	–	7	18.6
Measles	288	238	107	141	31	1.5	1.3	0.6	0.7	0.2
Mumps	182	184	214	114	69	1.0	1.2	1.4	0.6	0.4
Pertussis	5,791	4,417	5,964	9,515	5,388	30.9	23.3	31.0	48.8	27.4
Poliomyelitis	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Rubella‡‡	753	377	323	263	255	4.0	2.0	1.7	1.3	1.3
Tetanus	8	2	6	3	3	0.0	0.0	0.0	0.0	0.0

Table 4. Notifications and notification rates (per 100,000 population) of communicable diseases, Australia, 1998 to 2002, by state or territory, *continued*

Disease	Notifications					Rate per 100,000 population				
	1998	1999	2000	2001	2002	1998	1999	2000	2001	2002
Vectorborne diseases										
Arbovirus infection NEC	88	62	55	36	22	0.5	0.3	0.3	0.2	0.1
Barmah Forest virus infection	529	638	644	1,141	896	2.8	3.4	3.3	5.9	4.6
Dengue	579	132	216	176	219	3.1	0.7	1.1	0.9	1.1
Japanese encephalitis	–	–	–	0	0	–	–	–	–	0.0
Kunjin virus infection	–	–	–	4	0	–	–	–	<0.1	0.0
Malaria	660	732	962	712	466	3.5	3.9	5.0	3.7	2.4
Murray Valley encephalitis	–	–	–	6	2	–	–	–	<0.1	0.0
Ross River virus infection	3,152	4,417	4,225	3,219	1,447	16.8	23.3	22.0	16.5	7.4
Zoonoses										
Anthrax	–	–	–	0	0	–	–	–	0.0	0.0
Australian bat lyssavirus	–	–	–	0	0	–	–	–	0.0	0.0
Brucellosis	45	52	27	19	40	0.2	0.3	0.1	0.1	0.2
Leptospirosis	202	323	245	245	155	1.1	1.7	1.3	1.3	0.8
Ornithosis	64	84	103	131	199	0.7	0.9	1.1	0.7	1.0
Lyssavirus (NEC)	–	–	–	0	0	–	–	–	0.0	0.0
Q fever	560	515	579	696	761	3.0	2.7	3.0	3.6	3.9
Other bacterial infections										
Invasive meningococcal infection	480	590	622	677	684	2.6	3.1	3.2	3.5	3.5
Legionellosis	262	249	474	307	318	1.4	1.3	2.5	1.6	1.6
Leprosy	3	6	4	5	3	<0.1	<0.1	<0.1	<0.1	0.0
Tuberculosis	960	1,146	1,052	989	975	5.1	6.0	5.5	5.1	5.0
Total	82,836	84,420	90,184	104,187	100,278					

* Analysis by date of onset, except for hepatitis B and hepatitis C unspecified, where analysis is by report date. Date of onset 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 the date of onset was not available the earliest date of the date of specimen collection or the date of report by the notifying agent, was used.

† Unspecified hepatitis includes cases with hepatitis in whom the duration of illness cannot be determined.

‡ The analysis was performed by report date.

§ Includes hepatitis C incident in the Northern Territory and Queensland.

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

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

** Northern Territory, Queensland, South Australia, Victoria and Western Australia: includes gonococcal neonatal ophthalmia.

†† Includes 14 cases of congenital syphilis, one from New South Wales and 13 from the Northern Territory.

‡‡ Includes congenital rubella.

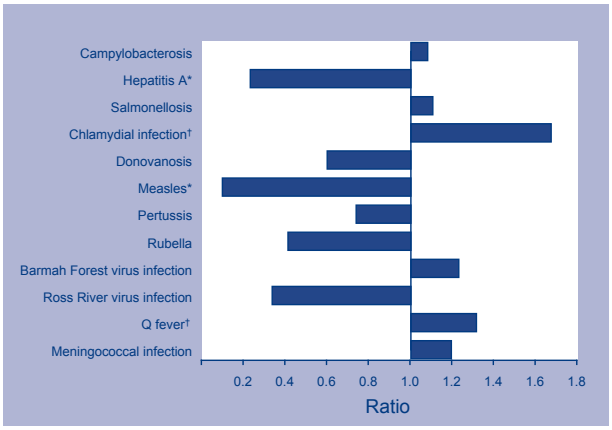
NN Not notifiable.

NEC Not elsewhere classified.

– Elsewhere classified

The major changes in communicable disease notifications in 2002 are shown in Figure 4, as the ratio of notifications in 2002 to the mean number of notifications for the previous five years. Chlamydial infection and Q fever infection notifications in 2002 were highest since 1997 and surpassed the expected range (5-year mean plus two standard deviations). Notifications of hepatitis A and measles infections in 2002 were the lowest since 1997 and 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 2002, with the previous five-year mean



* Notifications below the 5-year mean minus two standard deviations

† Notifications above the 5-year mean plus two standard deviations

In the financial year 2001–02, there were 91,911 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 62,917 separations were recorded with a principal diagnosis of influenza or pneumonia (ICD10–AM J10–J18).

Bloodborne diseases

In 2002, bloodborne viruses reported to the NNDSS included hepatitis B, C, and D. Human immunodeficiency virus (HIV) and acquired immune deficiency syndrome (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 www.med.unsw.au/nchecr.

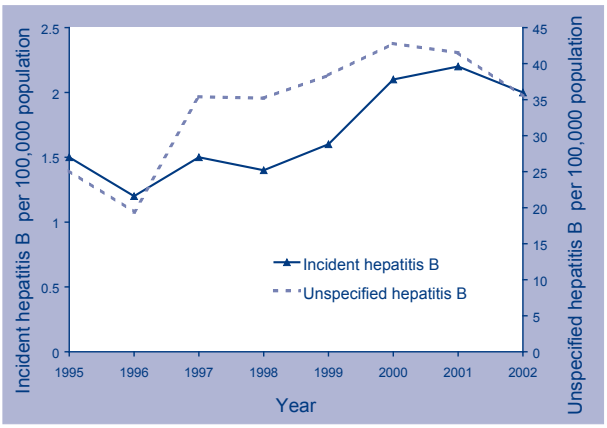
When reported to NNDSS, newly acquired hepatitis C and hepatitis B infections (incident) were differentiated from those where the timing of disease acquisition was unknown (unspecified). As considerable time may have elapsed between onset and report date for chronic hepatitis infections, the analysis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

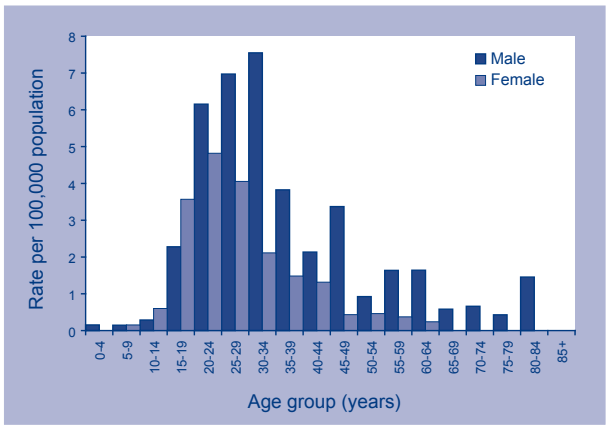
Since 1995, all jurisdictions have reported incident cases of hepatitis B to the NNDSS. The rate of incident hepatitis B notifications between 1994 and 2000 ranges around 1–2 cases per 100,000 population (Figure 5). In total, 400 incident cases were reported to the NNDSS with an onset date in 2002, giving a national notification rate of 2.0 cases per 100,000 population for this year. In 2002, the highest rates were reported from the Northern Territory (5.1 cases per 100,000 population) and Tasmania (4.0 cases per 100,000 population).

Figure 5. Trends in notification rates of incident and unspecified hepatitis B infections, Australia, 1995 to 2002



The highest rates of incident hepatitis B notifications were in the 30–34 year age group for males and the 20–24 year age group for females (Figure 6). The highest notification rate for men was 7.6 cases per 100,000 population, while the highest notification rate for women was 4.8 cases per 100,000 population. Overall, infections in males exceeded those in females, with a male to female ratio of 1.9:1.

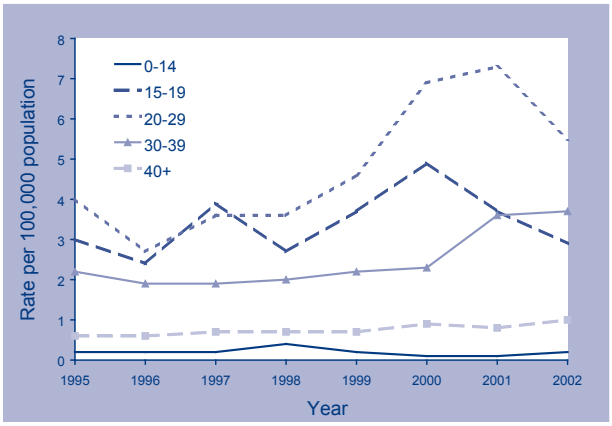
Figure 6. Notification rate for incident hepatitis B infections, Australia, 2002, by age group and sex



Trends in the age distribution of incident hepatitis B infections are shown in Figure 7. Rates in children aged 0–14 years and adults over 40 years have remained relatively stable. The increase in rates of incident hepatitis B in the 20–29 year age range was reversed in 2002 with the first decline in rates since 1996. Declines in rates continued in 2002 in the 15–19 year age group, while the rate of increase in the 30–39 year age range slowed.

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

Figure 7. Trends in notification rates of incident hepatitis B infections, Australia, 1995 to 2002, by age group



Unspecified hepatitis B notifications

Hepatitis B notifications have been reported to the NNDSS since 1991 by all jurisdictions except the Northern Territory, with unspecified cases separately notified from incident cases in most jurisdictions since 1994. The notification rate ranged from 20 to 40 cases per 100,000 population between 1991 and 2002 (Figure 5). In 2002 there were 6,916 unspecified hepatitis B cases notified to NNDSS, a rate of 35.5 cases per 100,000 population. The male to female ratio for unspecified hepatitis B cases was 1.2:1. By jurisdiction, the highest rates of notification were in New South Wales (52.6 cases per 100,000 population) and

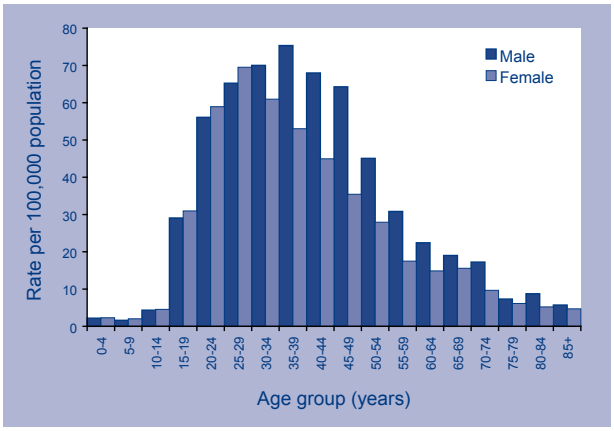
Table 5. Risk factors identified in notifications of incident hepatitis B virus infection, Australia, 2002, by reporting state or territory

Risk factor	NT	SA	Tas	Vic
Injecting drug use	3	1	9	87
Sexual contact with hepatitis B case	0	3	3	48
Household/other contact with hepatitis B	1	1	0	11
Overseas travel	0	1	0	6
Other risk factors	2	1	2	3
No risk factors identified	1	4	3	20
No information available	3	0	2	0
Total	10	11	19	175

Victoria (38.8 cases per 100,000 population). The highest rates were in the 35–39 year age group for men (75.3 cases per 100,000 population) and the 25–29 year age group for women (69.5 cases per 100,000 population) (Figure 8).

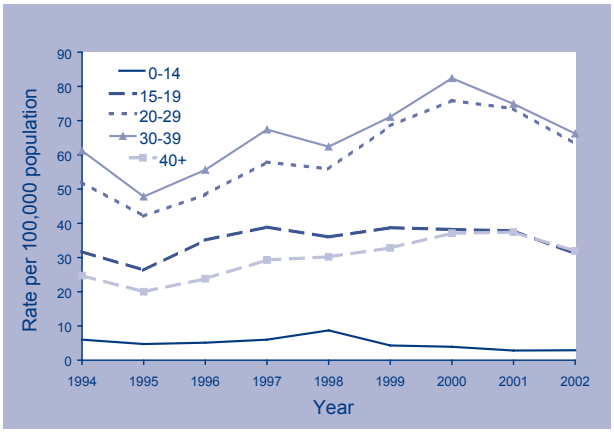
Trends on the age distribution of unspecified hepatitis B infections are shown in Figure 9. There were declines in the rates in all age groups in 2002.

Figure 8. Notification rate for unspecified hepatitis B infections, Australia, 2002, by age group and sex*



* By report date.

Figure 9. Trends in notification rates of incident hepatitis B infections, Australia, 1995 to 2002, by age group*



* By report date.

Infant hepatitis B immunisation was introduced in the Northern Territory in 1988 for Indigenous infants and then for all infants in this jurisdiction in 1990. Universal infant hepatitis B immunisation was introduced in the rest of Australia in May 2000. The effect of vaccination may take a number of years to be evident in childhood rates of hepatitis B infection. Vaccination coverage provided by the Australian Childhood Immunisation Register (ACIR) indicates approximately 95 per cent of infants are currently receiving hepatitis B vaccination in Australia.

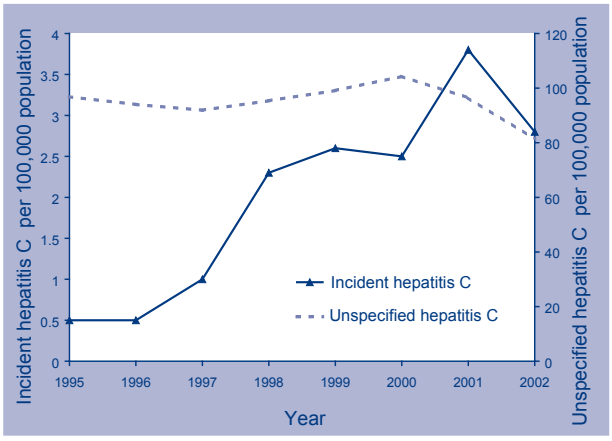
There were 23 cases of unspecified hepatitis B infection in children in the 0–4 year age group reported from Western Australia, New South Wales, Victoria, South Australia, the Northern Territory and the Australian Capital Territory. Seven of these children were not vaccinated with hepatitis B vaccine and the vaccination status of the remainder was unknown.

Hepatitis C

Unspecified hepatitis C notifications

Hepatitis C infection has been notifiable in all Australian jurisdictions since 1995. While the rate of unspecified hepatitis C notifications has remained relatively stable since 1997 (Figure 10), 2001 represented the first year since 1997 where the number of notifications has decreased, a trend that was continued in 2002. 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. Whether the decrease represents the fact that there is a smaller pool of infected individuals who have not been previously diagnosed will only become more apparent over the next few years.

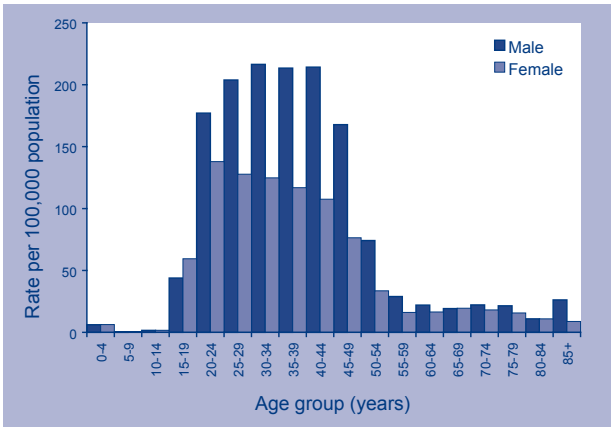
Figure 10. Trends in notification rates, incident and unspecified hepatitis C infection, Australia, 1995 to 2002



In 2002, there were 15,981 unspecified hepatitis C infections reported to NNDSS, a notification rate of 81.3 per 100,000 population. Of the total notifications of unspecified hepatitis C, 42 per cent of the notifications were from New South Wales, which also had the highest notification rate (100.5 cases per 100,000 population). Nationally, the male to female ratio was 1.6:1. The highest notification rate was in the 30–34 year age group for males (216.4 cases per 100,000 population), although there was little variation across the 29–44 year age range, from 203 to 269.1 cases per 1000,000 population. The highest notification rate for females (137.9 cases per 100,000 population) was in the 20–24 year age group (Figure 11).

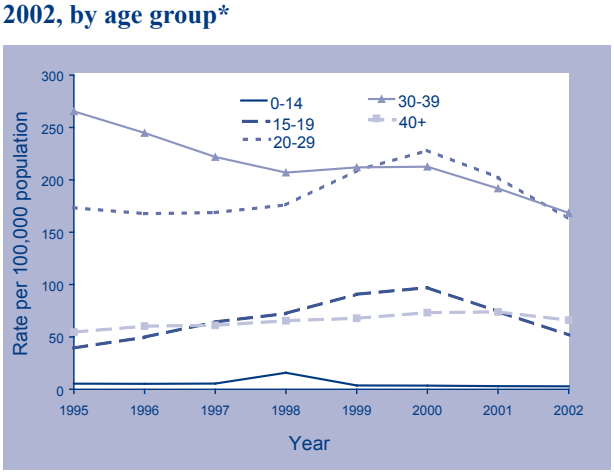
Trends on the age distribution of unspecified hepatitis C infections are shown in Figure 12. Overall, the highest rates were in the 20–39 year age range. Rates fell in the 15–39 year age range in 2002.

Figure 11. Notification rate for unspecified hepatitis C infections, Australia, 2002, by age group and sex*



* By report date.

Figure 12. Trends in notification rates of unspecified hepatitis C infections, Australia, 1995 to 2002, by age group*



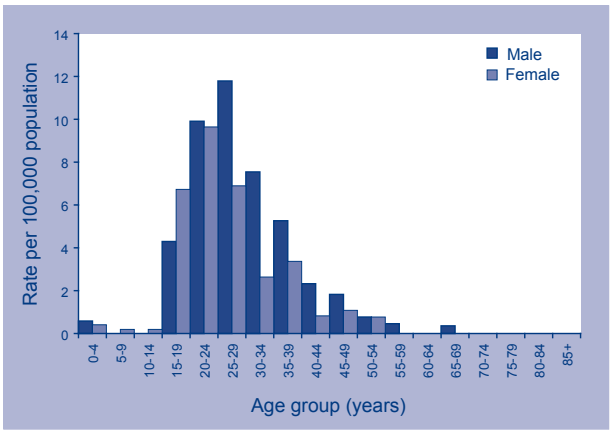
* By report date.

Incident hepatitis C notifications

Reporting of incident hepatitis C notifications from New South Wales and Western Australia commenced in 1993, from the Australian Capital Territory in 1994, from South Australia and Tasmania in 1995 and from Victoria in 1997. Incident hepatitis C cases are not differentiated from unspecified cases in notifications received from Queensland or the Northern Territory. As the introduction of reporting was staggered, for the purposes of this report, only cases from 1997 are included.

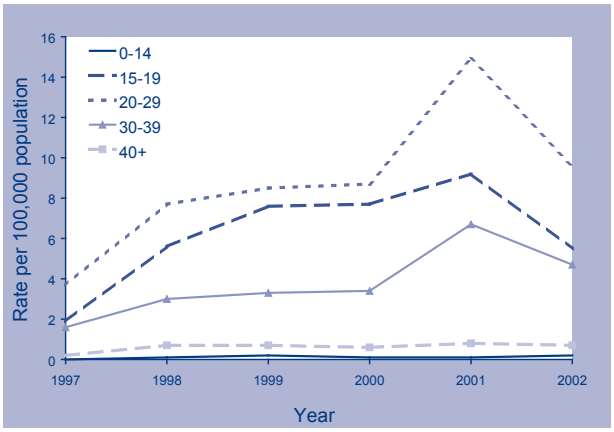
In total there were 434 incident cases of hepatitis C reported with an onset date in 2002, giving a rate of 2.8 cases per 100,000 population. While this represents a decrease in cases relative to 2001, these data should be interpreted with caution as the numbers may be affected by changes in surveillance practices. The proportion of all hepatitis C notifications that were known to be incident cases was 2.6 per cent in 2001. The highest rates of incident hepatitis C infection were reported from Western Australia (7.0 cases per 100,000 population). The highest rates of incident hepatitis C notifications were in the 20–24 year age group for females (9.6 per 100,000 population) and the 25–29 year age group for males (11.8 per 100,000 population) (Figure 13). Overall, the male to female ratio was 1.4:1.

Figure 13. Notification rate for incident hepatitis C infections, Australia, 2002, by age group and sex



Trends in the age distribution of incident hepatitis C infections are shown in Figure 14. While rates in the 0–14 and over 40 year age groups have remained stable, increases observed in the 15–39 year age range between 2000 and 2001 were reversed in 2002.

Figure 14. Trends in notification rates of incident hepatitis C infections, Australia, 1997 to 2002, by age group



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 of persons 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 infected with hepatitis B alone. The modes of hepatitis D transmission are similar to those for other blood borne viruses, and in countries with a low hepatitis B prevalence, intravenous drug users are the main risk group.

There were 20 notifications of hepatitis D to the NNDSS in 2002 at a notification rate of 0.1 cases per 100,000 population. Of the 21 notifications, 10 were reported from New South Wales, 9 from Victoria, and one from Queensland. The majority (18/20, 90%) of cases were males, with the highest rate reported in the 20–24 year age group (0.6 cases per 100,000 population).

Gastrointestinal diseases

Gastrointestinal diseases are a considerable burden on the community and the healthcare system in Australia. Foodborne pathogens alone are estimated to cause about 4.2 million cases of gastroenteritis per year.[1] Surveillance is vital in gathering information on pathogen specific gastrointestinal illnesses. Surveillance data however, highly underestimate the true incidence of pathogen specific gastrointestinal diseases (Figure 1). For example, the probability of a patient with gastroenteritis in the community having a stool test, depends on whether a doctor is consulted or is available, whether the doctor orders a test, patient's age, the severity and duration of illness. Even when stools are collected from patients with gastroenteritis, about 60 per cent of samples have no pathogen identified.[2,3]

In 2002, gastrointestinal diseases that were notified to NNDSS were: botulism, campylobacteriosis, cryptosporidiosis, haemolytic uraemic syndrome (HUS), hepatitis A, hepatitis E, listeriosis, salmonellosis, shigellosis, shiga-like toxin producing *Escherichia coli*/verotoxigenic *E. coli* (SLTEC/VTEC) infections and typhoid. Notification of gastrointestinal diseases increased marginally by 2 per cent, from 26,086 in 2001 to 26,708 in 2002. Compared with 2001, increases occurred in the number of notifications of cryptosporidiosis, salmonellosis and HUS. The increase in salmonellosis notifications may be due to improved surveillance and outbreak investigations conducted by OzFoodNet. Cryptosporidiosis became nationally notifiable in 2001, however 2002 was the first full-year of notifications of this disease from all jurisdictions. The number of notifications of HUS in 2002 was higher relative to 2001 notifications, when only three notifications were received, but was otherwise comparable to other years. There were no other changes of significance in the other notifiable gastrointestinal diseases.

In this section reference will be made to OzFoodNet 2002 annual report of foodborne diseases.[4] This report was used as a resource for additional information on foodborne disease outbreaks in Australia in 2002.

Botulism

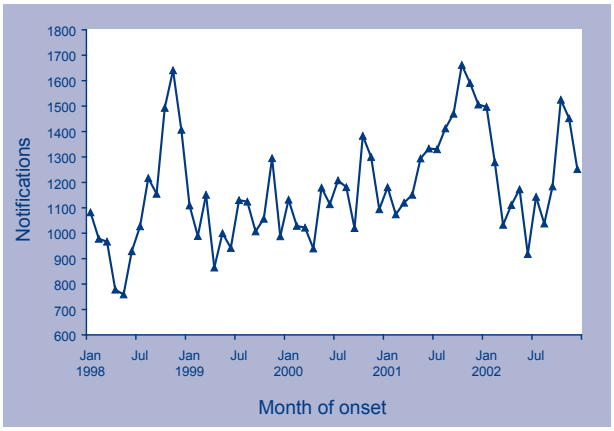
No cases of botulism were reported to NNDSS in 2002. While no classic foodborne botulism has been reported in Australia since the commencement of notifications in 1992, there have been five cases of infant botulism reported between 1998 and 2002.

Campylobacteriosis

There were 14,605 notifications of campylobacteriosis in Australia in 2002. All jurisdictions, except New South Wales, reported cases of campylobacteriosis. Campylobacteriosis is not notifiable in New South Wales. The national rate of notifications in 2002 was 112 cases per 100,000 population; a 10 per cent decrease compared with 125 cases per 100,000 population reported in 2001. South Australia had the highest notification rate (160.6 cases per 100,000 population) for the second consecutive year (Table 3), but this was 9 per cent lower than reports in this state in 2001.

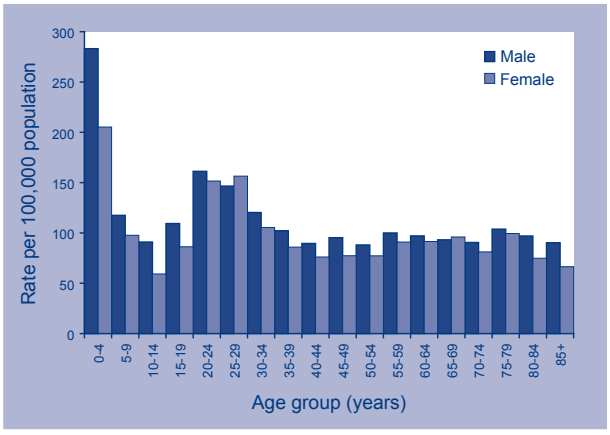
Monthly notifications of campylobacteriosis in 2002, was consistent with previous years (1998 to 2002), with the number of notifications peaking in the third quarter of the year (Figure 15). In 2002, OzFoodNet reported only one campylobacteriosis outbreak, in Far North Queensland, which affected 24 persons and resulted in six hospitalisations.[4]

Figure 15. Trends in notifications of campylobacteriosis, Australia, 1998 to 2002, 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 (283 cases per 100,000 population) than in females (205 cases per 100,000 population). The overall male to female ratio, as in previous years, was 1.2:1.

Figure 16. Notification rates of campylobacteriosis, Australia, 2002, by age group and sex

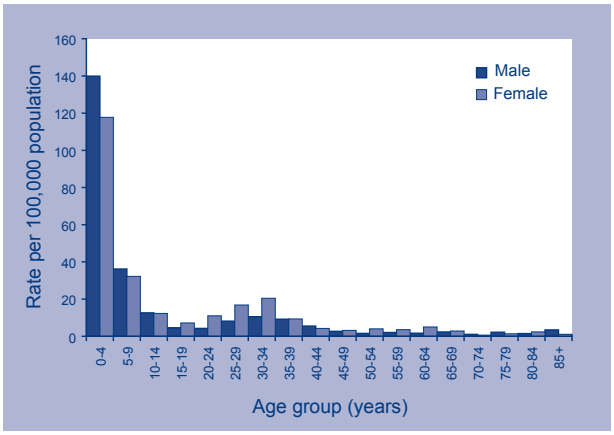


Cryptosporidiosis

Cryptosporidiosis became nationally notifiable in 2001 and in 2002 NNDSS received the first full-year report from all jurisdictions. A total of 3,255 cases were reported to NNDSS, a notification rate of 16.6 cases per 100,000 population. Although Queensland reported 62 per cent (n=2,026) of all cryptosporidiosis notifications received by NNDSS, the Northern Territory had the highest notification rate at 109.6 cases per 100,000 population.

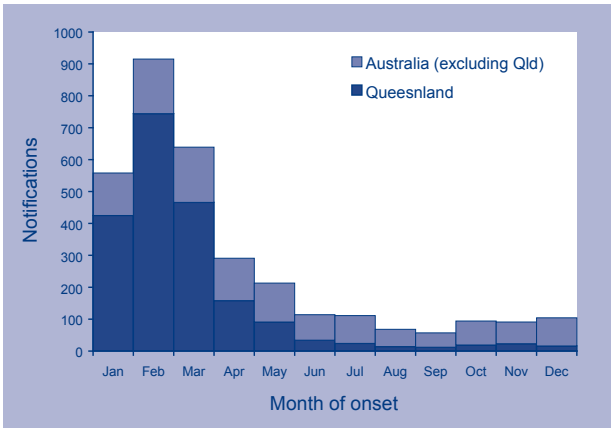
Children under the age of four had the highest notification rate of cryptosporidiosis (129 cases per 100,000 populations) (Figure 17). Notification rates of cryptosporidiosis decreased sharply at the age of 5 to 9 years for both males and females. Among those older than 10 years, females in the 30–34 year age group had the highest notification rate (20 cases per 100,000 population).

Figure 17. Notification rates of cryptosporidiosis, Australia, 2002, by age group and sex



Sixty-five per cent (n=2,112) of cryptosporidiosis notifications in 2002 occurred in the first quarter of the year, of which 77 per cent (n=1,635) were from Queensland (Figure 18). Public health authorities in Queensland noted an increase in cryptosporidiosis above historical levels. Infections through swimming pools, particularly pools hosting 'learn to swim classes', were identified as sources of exposure. Public health authorities issued health alerts where they recommended measures for avoiding infection and advised the swimming pool industry to ensure that persons with diarrhoea did not use public swimming pools.

Figure 18. Notifications of cryptosporidiosis, Australia (excluding Queensland) and Queensland, 2002, by month of onset



Hepatitis A

There were 388 cases of hepatitis A reported to NNDSS in 2002, a notification rate of two cases per 100,000 population. The number of notifications of hepatitis A has been steadily decreasing for the last decade, and compared to 2001, there was a decrease of 27 per cent in 2002 (Figure 19).

Compared to 2001, hepatitis A notification rates decreased in all jurisdictions except in the Northern Territory, where it increased by 21 per cent (from 19 to 23.7 cases per 100,000 population). The notification rate in the Northern Territory was 12 times the national average.

Males had a higher notification rate of hepatitis A (2.4 cases per 100,000 population) than females (1.5 cases per 100,000 population). The highest age specific rate of hepatitis A notifications among males was in the 20–24 year age group (4.5 cases per 100,000 population) and among females in the 35–39 year age group (2.7 cases per 100,000 population) (Figure 20).

Figure 19. Trends in notifications of hepatitis A, Australia, 1991 to 2002, by month of notification

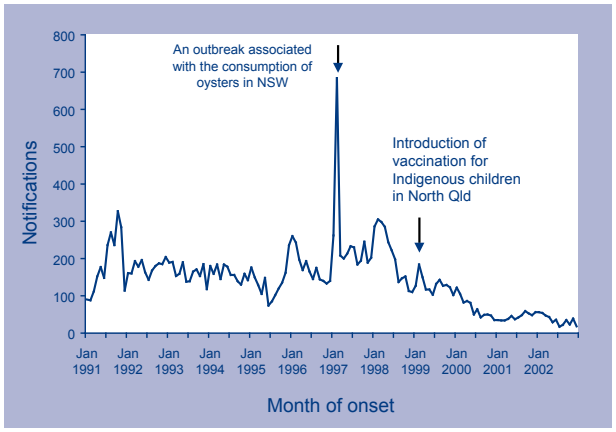
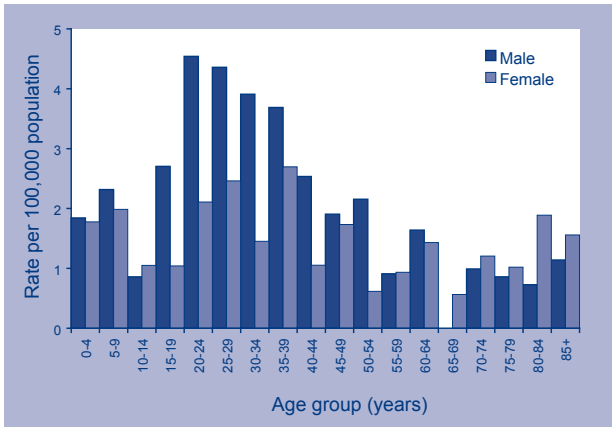


Figure 20. Notification rates of hepatitis A, Australia, 2002, by age group and sex



Hepatitis A is commonly spread from person to person via close contact or from food or water that had been inadvertently contaminated by infected persons. The risk exposures among 214 cases of hepatitis A infection (55% of all notifications) showed that in 2002 the three frequently reported risk exposures identified were (in order of importance): overseas travel, homosexual contact, and household or close contact with confirmed cases (Table 6).

Hepatitis E

There were 12 cases of hepatitis E reported to NNDSS in 2002, two cases more than in 2001. Six cases were reported in New South Wales, two cases each in Tasmania and Victoria and a case each in the Australian Capital Territory and Queensland. There were nine males and three females, all aged between 20 and 54 years. Data on travel history were available for six cases and showed that all had travelled overseas.

Listeriosis

In 2002, 59 cases of listeriosis were reported to NNDSS, a rate of 0.3 cases per 100,000 population. Listeriosis notifications have been stable at this rate since 1998. In 2002, 60 per cent of listeriosis cases were aged over 60 years, with the highest notification rate among males in the 80–84 year age group (Figure 21). There was a preponderance of infections in men (male to female ratio of 2.2:1) in contrast with 2001 when the male to female ratio was 0.7:1.

In 2002, OzFoodNet reported 10 deaths among patients with non-pregnancy related listeriosis, which is equivalent to a 17 per cent case fatality rate. Two maternal-foetal *Listeria* infections were reported, resulting in one foetal death. In 2001, six cases of maternal-foetal listeriosis, including three foetal deaths, were reported. No common-source outbreaks of listeriosis were investigated by OzFoodNet in 2002.[4]

Figure 21. Notification rates of listeriosis, Australia, 2002, by age group and sex

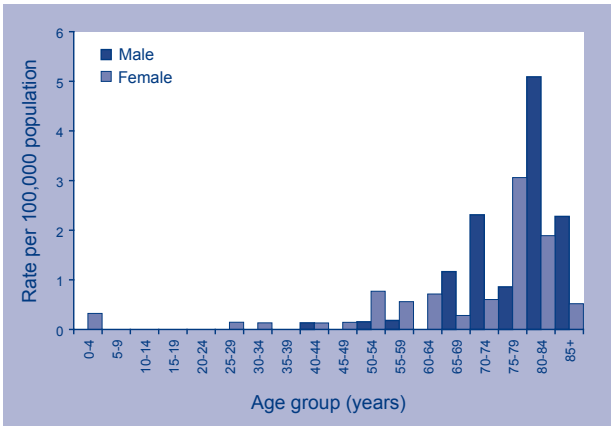


Table 6. Risk exposures associated with infection with hepatitis A virus, Australia, 2002, by state or territory*

Exposure†	State or territory					
	ACT	NSW	Qld	SA	Tas	Vic
Overseas travel	1	32	19	3	4	19
Homosexual contact	–	18	6	2	0	7
Childcare	–	3	3	0	0	13
Household/close contact of case	–	10	5	1	0	1
Injecting drug use	–	9	0	2	0	2
Sex worker	–	–	–	0	0	0
Other	–	189‡	–	0	–	0
Total with risk factors identified	1	92	68	7	4	42
Unknown	3	54	0	8	0	27
Total	4	146	68	15	4	74

* The Northern Territory and Western Australia did not report risk factors.

† Exposures are not mutually exclusive hence more than one exposure per person possible.

‡ Includes 19 cases who ate at a gathering and 51 regular restaurant/takeaway consumers.

– Data were not collected.

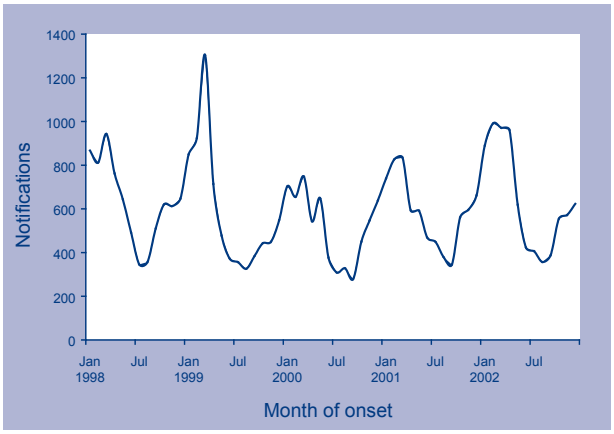
Salmonellosis (non-typhoidal)

A total of 7,756 salmonellosis cases were reported to NNDSS in 2002, a rate of 39.5 cases per 100,000 population and a 9 per cent increase from the rate reported in 2001 (36.2 cases per 100,000 population). During the five year period 1998–2001, the highest national notification rate was 40.6 cases per 100,000 population in 1998.

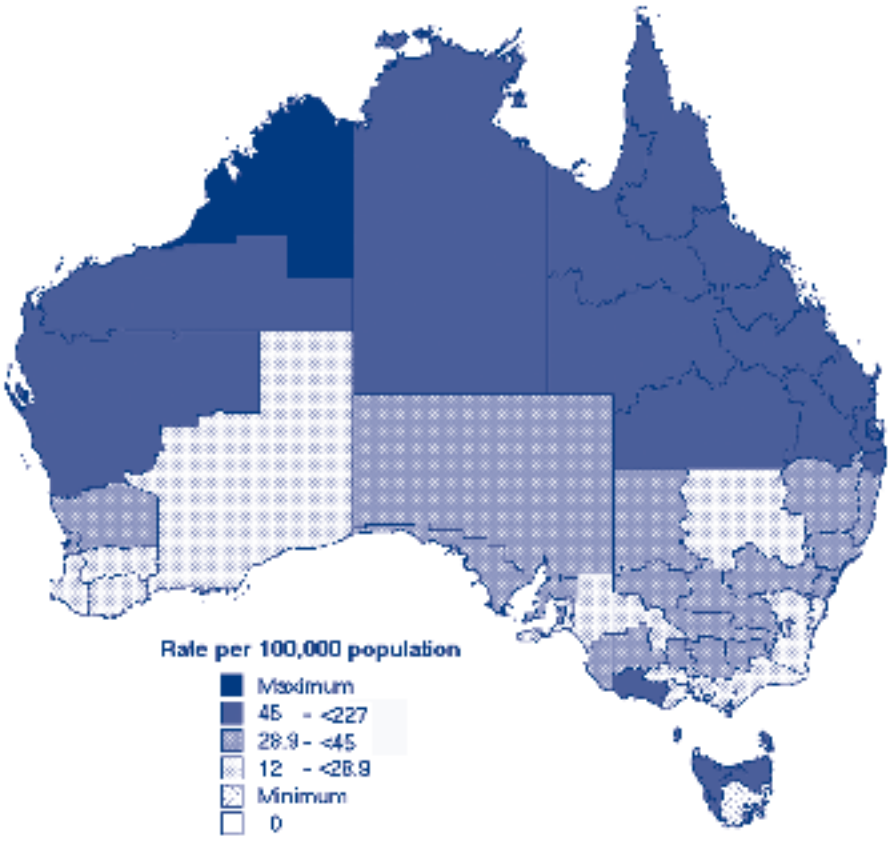
All jurisdictions reported cases of salmonellosis. The highest rates were in jurisdictions in the northern part of the country with the Northern Territory and Queensland reporting rates that were four times and two times the average national notification rate, respectively (Table 2). Notification rates of salmonellosis also varied by Statistical Division (Map 2), with the Kimberley in northern Western Australia having the highest notification rate of 320 cases per 100,000 population.

As in previous years, reports of salmonellosis peaked during summer (January to March). Thirty-six per cent of salmonellosis notifications in 2002 were notified during this period (Figure 22).

Figure 22. Trends in notifications of salmonellosis, Australia, 1998 to 2002, by month of onset

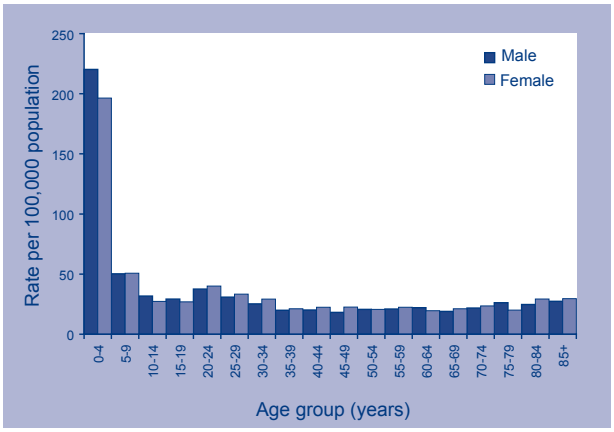


Map 2. Notification rates of salmonellosis, Australia, 2002, by Statistical Division of residence



Age specific notification rates of salmonellosis show a distribution consistent with previous years with children aged less than five years having the highest rate (210.6 cases per 100,000 population) (Figure 23).

Figure 23. Notification rates of salmonellosis, Australia, 2002, by age group and sex



The National Enteric Pathogens Surveillance Scheme reported serovars for 7,701 isolates;[5] representing 99 per cent of notified cases of salmonellosis (n=7,756) in 2002. The 10 most frequently isolated serovars and phage types of *Salmonella,* which accounted for 43.2 per cent of all isolates, are shown in Table 7. Nationally, as in the previous year, the most commonly reported *Salmonella* serovar or phage type was *Salmonella* Typhimurium 135. Three *Salmonella* types: *S.* Typhimurium 170, *S.* Hvittingfoss, and *S.* Muenchen, were not among the top 10 serovars as in 2001 but were among the top 10 serovars reported in 2002. The distribution of *Salmonella* serovars varied across jurisdictions. The most commonly reported serovars in Queensland, Tasmania, and the Northern Territory were *S.* Virchow (10%), *S.* Mississippi (48%) and *S.* Ball (15%), respectively. *S.* Typhimurium was the most commonly reported serovar in the rest of the jurisdictions, accounting for 34 per cent of cases in the Australian Capital Territory, 28 per cent in New South Wales, 60 per cent in South Australia, 66 per cent in Victoria and 15 per cent in Western Australia.

Salmonellosis outbreaks

The most common cause of gastroenteritis outbreaks in Australia in 2002 was *Salmonella,* accounting for 28 per cent of gastroenteritis outbreaks investigated.[4]

S. Typhimurium alone accounted for 23 per cent of gastroenteritis outbreaks investigated by OzFoodNet in 2002, affecting 471 persons including 61 hospitalisations and two deaths. There were five significant outbreaks of salmonellosis in 2002, four of which occurred in South Australia (*S.* Typhimurium phage types 8, 99,135 and 126) and one in New South Wales (*S.* Montevideo).[4]

S. Typhimurium phage type 8 was identified as the agent for a disease outbreak that affected 78 persons including 15 hospitalisations in South Australia. The pathogen was isolated from several ingredients of a Caesar salad including; salad dressing, anchovies, and Parmesan cheese. The outbreaks of *S.* Typhimurium phage types 99, 135 and 126 affected between 20 and 50 persons each. An outbreak of *S.* Typhimurium phage type 99 was associated with the consumption of cakes sold in a bakery. Investigators found that the same piping bag was used to dispense sausage meat

Table 7. Top 10 isolates of *Salmonella*, Australia, 2002

Organism	State or territory									
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Aust	Total %
S. Typhimurium 135	11	238	8	117	14	18	178	91	675	8.8
S. Typhimurium 9	16	268	0	77	24	12	151	44	592	7.7
S. Typhimurium 170	5	161	0	135	1	1	152	3	458	5.9
S. Saintpaul	0	37	20	225	11	2	44	44	383	5.0
S. Virchow 8	0	21	0	268	0	0	11	2	302	3.9
S. Birkenhead	0	95	3	134	4	0	8	1	245	3.2
S. Typhimurium 126	1	62	2	28	39	4	61	8	205	2.7
S. Chester	1	29	16	82	11	2	5	32	178	2.3
S. Hvittingfoss	1	17	6	110	3	1	13	2	153	2.0
S. Muenchen	0	20	12	55	9	3	9	24	132	1.7
Other	60	1,136	248	1,354	405	117	588	470	4,378	56.8
Total	95	2,084	315	2,585	521	160	1,220	721	7,701	100.0

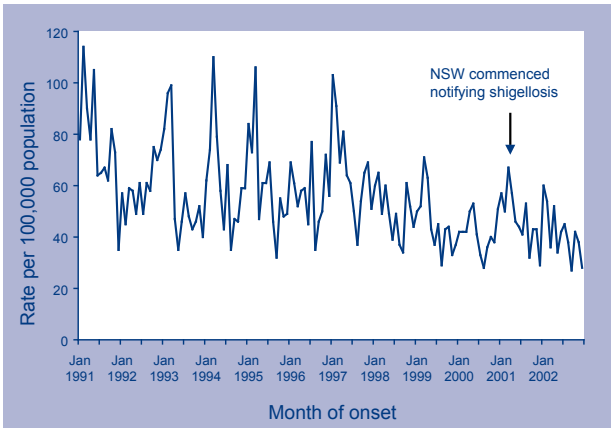
and cream for cakes. Outbreaks of *S*. Typhimurium phage type 135 and 126 were both associated with the consumption of Vietnamese rolls containing pork and/or beef.

In New South Wales, an outbreak of gastroenteritis associated with the consumption of food from a kebab shop affected at least 47 persons. Several sesame seed containing products in the shop, including tahini and hommus, were contaminated with *S*. Montevideo. Further investigation of unopened jars of the same products found contamination with *S*. Montevideo and *S*. Tennessee. These products were imported from Egypt and as a result of the investigation a nationwide consumer and trade recall of the imported products was initiated.

Shigellosis

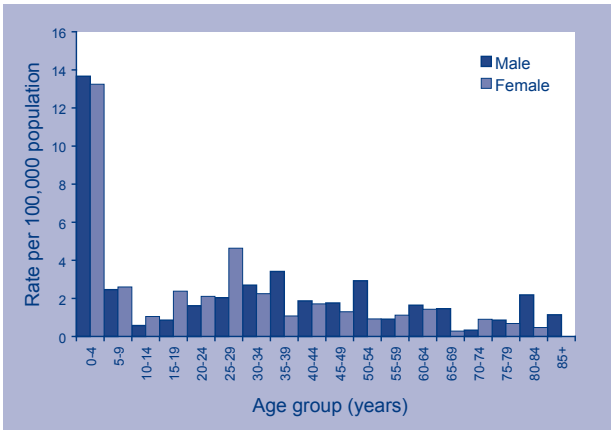
In 2002, 496 cases of shigellosis were reported to NNDSS, a notification rate of 2.5 cases per 100,000 population and a decrease of 13 per cent from the 2.9 cases per 100,000 population reported in 2001. The Northern Territory had the highest notification rate at 52 cases per 100,000 population. Although notification of shigellosis from New South Wales began in 2001, notifications of the disease continued to decline (Figure 24).

Figure 24. Trends in notifications of shigellosis, Australia, 1991 to 2002, by month of onset



Thirty-four per cent of notified cases of shigellosis were children under the age of four and this age group had the highest notification rate (14.1 cases per 100,000 population) (Figure 25). Despite the overall decrease in the number of notifications of shigellosis, there was an increase of 28 per cent in the 0–4 year age group compared to 2001. In the Northern Territory children under the age of four accounted for 64 per cent of shigellosis notifications in that jurisdiction.

Figure 25. Notification rates of shigellosis, Australia, 2002, by age group and sex



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

There were 51 cases of SLTEC/VTEC reported to NNDSS in 2002. With a notification rate of 0.3 cases per 100,000 population the rate of SLTEC/VTEC notifications remained stable relative to the previous year. Seventy-three 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 (PCR) for genes coding for shiga toxin. In South Australia, there was a 37 per cent increase in SLTEC/VTEC notifications compared with 2001. No cases were notified from the Australian Capital Territory, New South Wales, the Northern Territory or Tasmania. OzFoodNet reported that among typed *E. coli*, subtype O157 remains the main subtype (41% of total).

Haemolytic uraemic syndrome

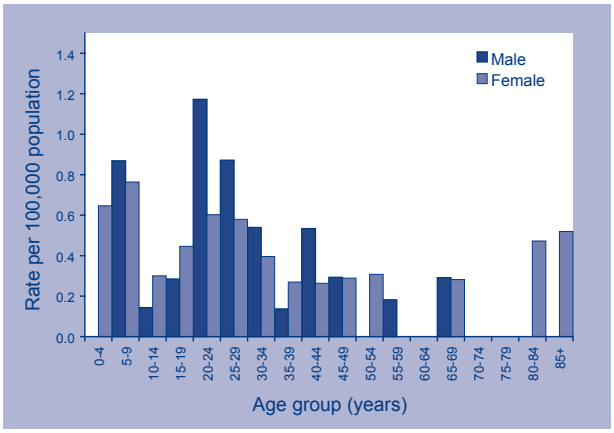
In 2002, 13 cases of HUS were reported to NNDSS, a rate of 0.1 cases per 100,000 population. No HUS cases were notified in the Australian Capital Territory, South Australia, Tasmania or Western Australia. Although there was a fourfold increase in HUS notifications compared to 2001, it was comparable with the three year mean (surveillance of HUS commenced in 1999; three year mean=14). The lowest number of HUS notifications (n=3) since HUS surveillance commenced were received by NNDSS in 2001.

Among the 13 cases of HUS notified in 2002, six were males. The median age among males was 53 years (range 13–62 years) and among females the median age was 21 years (range 0–62 years). OzFoodNet reported that STEC was isolated in six cases of HUS of which three were *E. coli* O157, including one *E. coli* O157:H7.[4]

Typhoid

The notification rate of typhoid has been stable for the last five years. In 2002, there were 73 notifications of typhoid, a rate of 0.4 cases per 100,000 population. This represented a decrease by 14 per cent from the rate reported in 2001. The male to female ratio was 1:1 and the highest notification rates were in males aged 20–24 years (1.2 cases per 100,000 population) and in females aged 5–9 years (0.8 cases per 100,000 population) (Figure 26). The National Enteric Pathogen Surveillance Scheme identified 58 *Salmonella typhi* isolates, 45 of which were from Australian residents and 13 from overseas visitors, including students. Of the 45 Australian residents, 36 had travelled to South and South-east Asian and African countries, but nine had no travel history recorded.

Figure 26. Notification rates of typhoid, Australia, 2002, by age group and sex



Quarantinable diseases

Human diseases covered by the *Quarantine Act 1908,* and notifiable in 2002 were cholera, plague, rabies, yellow fever, and four viral haemorrhagic fevers (Ebola, Marburg, Lassa and Crimean-Congo). In 2002, cholera was the only quarantinable disease notified in Australia, with two cases notified to NNDSS. The first case was a one-year-old female with *Vibrio cholerae* O1 reported in New South Wales and had contracted the infection in Pakistan. The second case was a 71-year-old male with *Vibrio cholerae* O1– bv EL TOR, reported in Victoria and is believed to have been infected in Vietnam.

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/pubhlth/strateg/quaranti/index.htm.

Sexually transmitted infections

Sexually transmitted infections reported to NNDSS in 2002 were chlamydial infection, donovanosis, gonococcal infections and syphilis. Congenital syphilis was reported separately. All states and territories conducted surveillance of these infections.

Other surveillance systems that monitor STI in Australia are specialist laboratory networks, such as the Australian Gonococcal Surveillance Programme. The National Centre in HIV Epidemiology and Clinical Research also collates and analyses data on STI, including data from NNDSS, for its annual surveillance report.[6]

The number of notifications and notification rates of STI reported to the NNDSS between 1998 and 2002 are shown in Table 4. In interpreting these data it is important to note that changes in notifications over time may not indicate changes in disease prevalence. Increases in screening and the use of more sensitive screening tests for STI as well as periodic public awareness campaigns may explain the change in the number of notifications across years. Comparisons of STI notifications between males and females and Indigenous and non-Indigenous status have to be interpreted cautiously by taking into account that data from STI screening are biased towards high risk groups.

Chlamydial infection

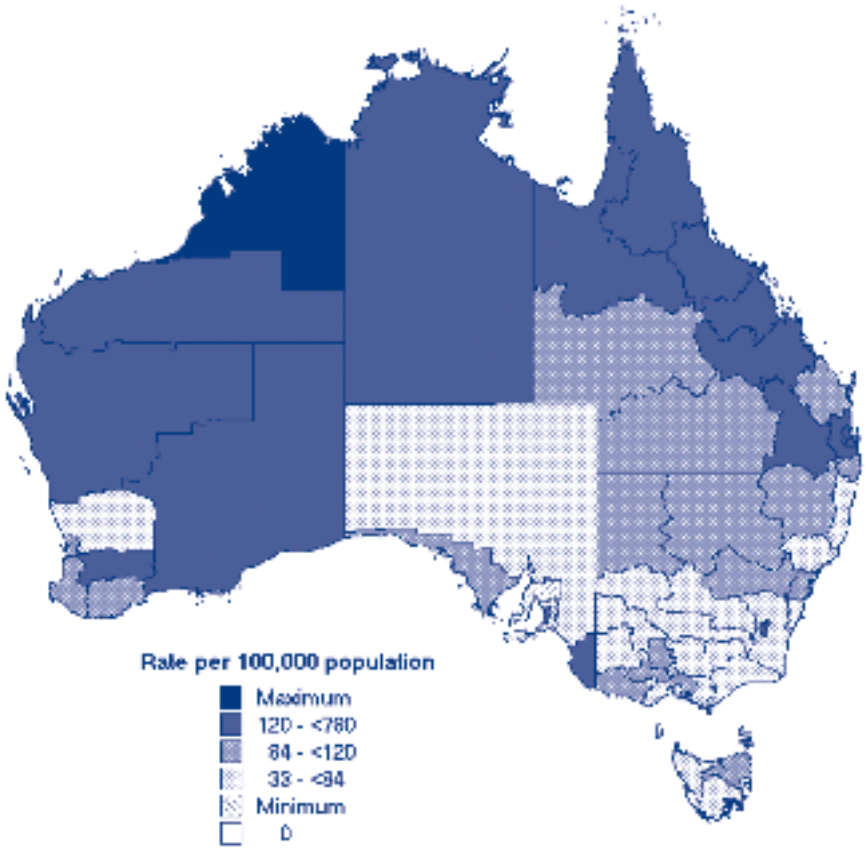
In 2002, a total of 24,039 notifications of chlamydial infection were received by NNDSS, a rate of 122.3 cases per 100,000 population. This rate represents an increase of 19 per cent compared with the rate reported in 2001 (102.8 cases per 100,000 population). From 1998 through 2002, notification rates of chlamydial infection increased annually at an average rate of 11.3 per cent (range 14.5–22.1%). Between 1998 and 2002, notification rates of chlamydial infection increased from 92.7 to 122.3 cases per 100,000 population (Table 4).

Chlamydial infection notification rates were above the national average in the Northern Territory (732 cases per 100,000 population), Queensland (174 cases per 100,000 population), Western Australia (153.9 cases per 100,000 population) and the Australian Capital Territory (142.9 cases per 100,000 population). Compared to 2001, the Australian Capital Territory had the largest percentage increase in the chlamydial infection notification rate in 2002 (54%), most likely, as a result of contact tracing and awareness raising campaigns.

At the regional level, the Kimberley region of Western Australian (1,199 cases per 100,000 population) the Northern Territory (776 cases per 100,000 population), and Far North Queensland (545.5 cases per 100,000 population) had the highest notification rates (Map 3).

Increase in the notification of chlamydial infection was higher in males. Compared to 2001, notification rates increased by 22.2 per cent among males (from 82.1 to 99.4 cases per 100,000 males) and by 18.8 per cent among females (from 122.3 to 144.2 cases per 100,000 females). Although higher rates among women suggest that a greater number of women were screened for the disease, the higher increase among men likely reflects a trend that they are increasingly being diagnosed with *Chlamydia*. Contact tracing of sex partners of women with chlamydial infection, chlamydial infection awareness campaigns, and the availability of non-invasive tests increase the number of men diagnosed with *Chlamydia*. For example, in the Australian Capital Territory (the jurisdiction with the highest increase in notification rates in 2002), where contact tracing was conducted, chlamydial infection notifications increased among males in all age groups, while in females increase occurred only in the 15–29 year age group.

Map 3. Notification rates of chlamydial infection, Australia, 2002, by Statistical Division of residence



Adolescents and young adults continue to have the highest notification rate of chlamydial infection. In 2002, 76 per cent of notified cases were in the 15–29 year age range. The 20–24 year age group accounted for 31.7 per cent of all notifications among males, and 36.3 per cent of all notifications among females. The male to female ratio in this age group was 0.6:1. The highest notification rate occurred among females in the 20–24 year age group (782 cases per 100,000 population), followed by females in the 15–19 year age group (640.8 cases per 100,000 population). Among males, the highest notification rate occurred among the 20–24 year age group (449.9 cases per 100,000 population) (Figure 27). The trend in notification rates of chlamydial infection from 1995 to 2002 shows a steady increase in all age groups in the 15–29 year age range. In 2002, the largest percentage increase from the previous year occurred among females in the 25–29 year age group (26.3% increase) and among males in the 20–24 year age group (23.7% increase) (Figure 28).

Figure 27. Notification rates of chlamydial infections, Australia, 2002, by age group and sex

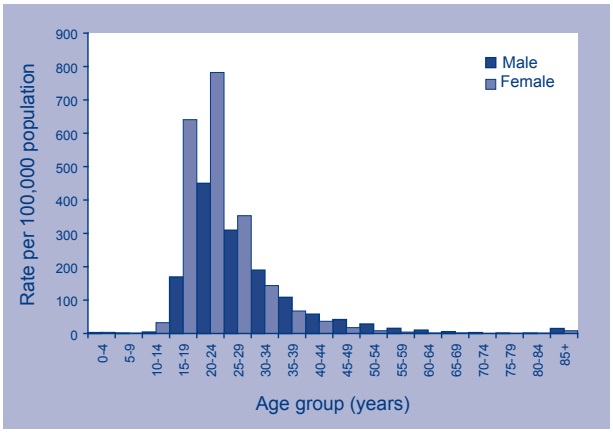
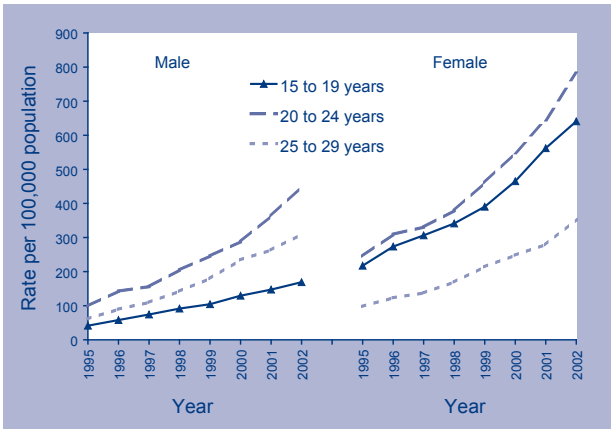


Figure 28. Trends in notification rates of chlamydial infection in persons aged 15–29 years, Australia, 1995 to 2002, by sex

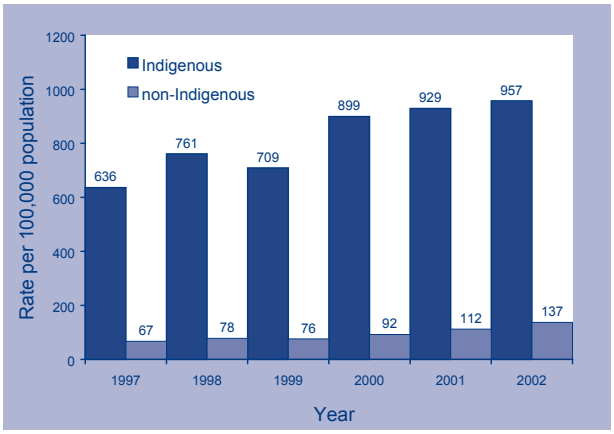


Whether the increase reported in 2002 was the result of changes in surveillance or a true increase in prevalence could not be determined from surveillance data. NNDSS data need to be considered in the context of public health and surveillance activities in states and territories. In 2002, *Chlamydia* awareness programs were carried out in the Australian Capital Territory and in Victoria. In the Australian Capital Territory, as noted above, contact tracing of all notifications of chlamydial infection was carried out in cooperation with diagnosing general practitioners. In Victoria, the *Chlamydia* awareness campaign was the first phase of *The Chlamydia Strategy for Victoria (2001 to 2004)* prepared by the Victorian Department of Human Services.[7] The focus of this first phase was prevention through education targeted at young people less than 24 years of age, through schools and health services. In Queensland, the 'notification period' for chlamydial infection, that is, the exclusion period beyond which subsequent positive laboratory test for a case is counted as a newly acquired infection, was reduced from two months to one. In Tasmania, there was a 14 per cent increase (from 7,020 in 2001 to 7,976 in 2002) in *Chlamydia* testing.

The extent to which public health initiatives, changes in surveillance practices and increases in testing for *Chlamydia* contributed to an increase in reporting is unknown. The pattern observed in surveillance data, that is, increase overtime across gender, age and jurisdictions, signals a need for research to determine the true prevalence of chlamydial infection in the population.

Indigenous status was reported for 88.7 per cent of the Northern Territory notifications, 99.4 per cent in South Australia and 51.3 per cent in Western Australia. These jurisdictions together reported 6,159 cases of chlamydial infection (25.5% of all chlamydial infection notifications received by NNDSS in 2002) of which 1,678 cases were Indigenous, 2,862 non-Indigenous, and 1,619 were of unknown Indigenous status. Based on these data, the age standardised notification rate of chlamydial infection was 957 cases per 100,000 population among Indigenous people, and 137 cases per 100,000 population among non-Indigenous people, a ratio of 7:1 (Figure 29).

Figure 29. Trends in age standardised notification rates of chlamydial infection the Northern Territory, South Australia and Western Australia (combined), 1997 to 2002, by Indigenous status



Source : National Centre in HIV Epidemiology and Clinical Research HIV/AIDS Annual report, 2003.

Note that cases with missing Indigenous status were added to non-Indigenous population.

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.[8,9] In 2001, donovanosis was targeted for elimination from Australia within three years through the donovanosis elimination project. The centrepiece of this project is the activity of project officers, located in Cairns (Queensland), Perth (Western Australia), and Darwin and Alice Springs (Northern Territory), and includes active case follow up, case ascertainment and treatment through primary health care and raising community and medical practitioner awareness of ulcerative STI.[10] In 2002, South Australia commenced surveillance of donovanosis, while Queensland, the Northern Territory and Western Australia continued the enhanced surveillance of donovanosis as part of the donovanosis elimination project.

In 2002, 16 cases of donovanosis, six males and 10 females, were reported to NNDSS. Compared to 2001, the number of notifications decreased by 52 per cent. In 2001, following the implementation of enhanced surveillance for the elimination of donovanosis in Queensland, the Northern Territory and Western Australia, donovanosis notifications had increased by 57 per cent (Figure 30).

Donovanosis cases reported in 2002 were four females and one male from Far North and Northern Queensland respectively, two males from Western Australia (one each from Central and the Kimberley region) and, three males and six females from the Northern Territory from areas other than Darwin and Alice Springs. All but two cases notified in the Northern Territory were Indigenous people. The majority of cases were in the 15–39 year age range (Figure 31).

Figure 30. Number of notifications of donovanosis, Australia 1998 to 2002, by sex

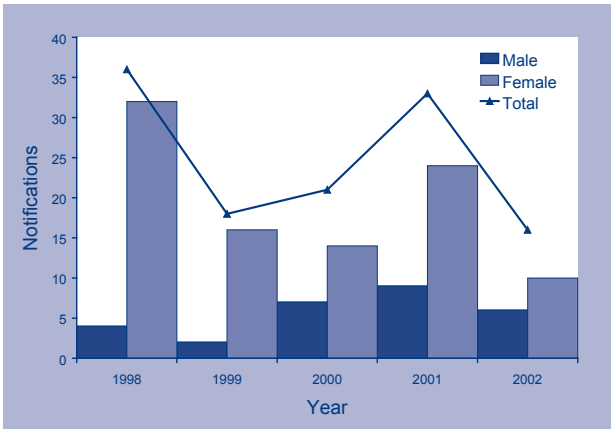
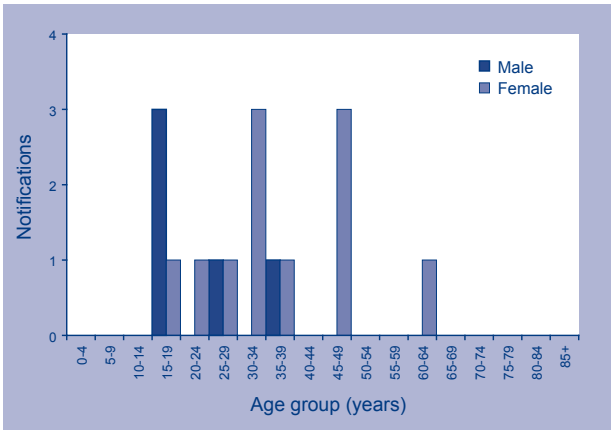


Figure 31. Notifications of donovanosis, Australia 2002, by age group and sex



Gonococcal infection

In 2002, 6,247 notifications of gonococcal infection were received by NNDSS. This represents a rate of 31.8 cases per 100,000 population, a marginal increase (0.6%) from the rate reported in 2001 (31.6 cases per 100,000 population). Increases occurred in the Northern Territory (9%), New South Wales (4%), and Victoria (17%) while there were decreases in all other jurisdictions. Despite enhanced gonococcal infection surveillance in southern Queensland including Brisbane and the Gold Coast, the notification rate in Queensland decreased by 16 per cent compared to 2001 (From 30 to 25 cases per 100,000 population).

Gonococcal infection notification rates were higher than the national level in the Northern Territory (772.7 cases per 100,000 population) and Western Australia (69.6 cases per 100,000 population). In the Northern Territory, supplementary PCR for the diagnosis of gonococcal infection was not available for a period of five months in 2002, possibly resulting in over reporting since culture negative but PCR positive samples were notified during the period.

The highest notification rates in 2002 occurred in the Kimberley Statistical Division (1,383 per 100,000 population), the Northern Territory (773 per 100,000 population) and the Pilbara Statistical Division (634 per 100,000 population), (Map 4).

The notification rates of gonococcal infection in 2002, were 43 cases per 100,000 population for males and 21 cases per 100,000 population for females. The male to female ratio was 2:1, the same rate as reported in 2001. As in previous years, the notification rate of gonococcal infection in females was higher in the 10–14 and 15–19 year age groups, with a male to female ratio of 0.2:1 and 0.7:1, respectively. Higher rates were observed in males compared to females in all other adult age groups (Figure 32).

The trends in the notification rate of gonococcal infection (Figure 33) show that among males, after an overall decrease in 2001, there was an increase among persons aged 20–39 years while rates in the 15–19 year age group fell slightly. The reason for the decrease observed in males in 2001 is not clear and does not appear to be characteristic of the long-term trend. Among females, notification rates declined in the 15–19 year age group, remained unchanged among the 20–24 and 25–29 year age groups and increased in the 30–39 year age group.

Map 4. Notification rates of gonococcal infection, Australia, 2002, by Statistical Division of residence

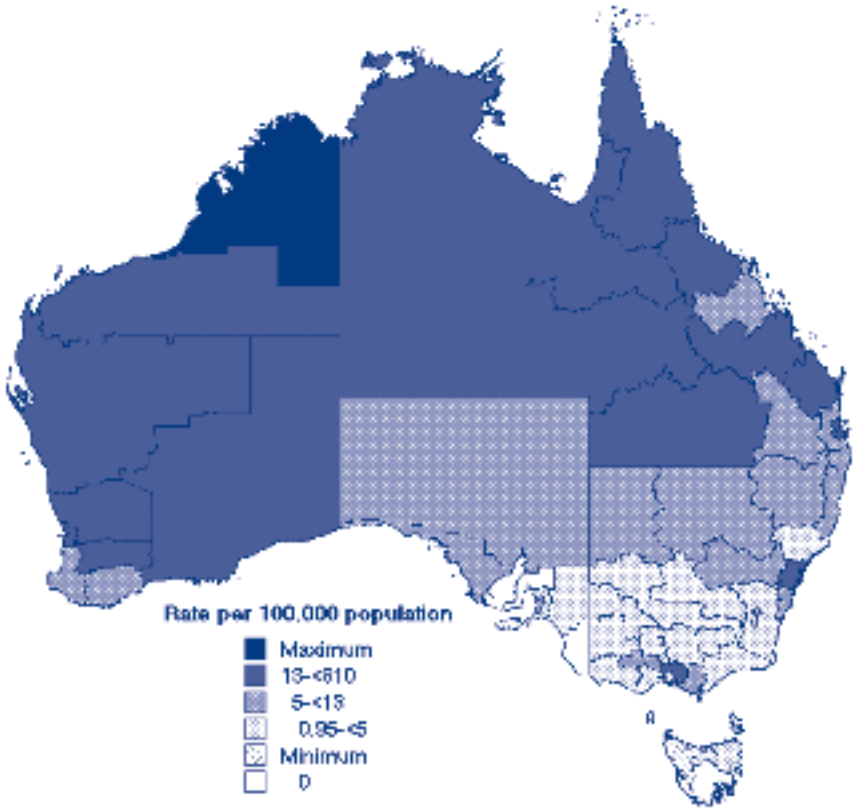


Figure 32. Notification rates of gonococcal infection, Australia, 2002, by age group and sex

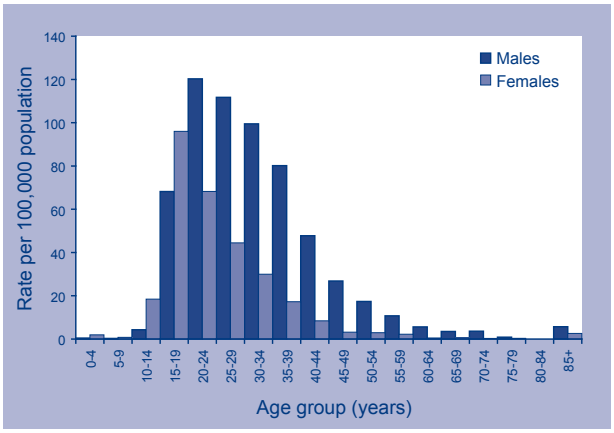
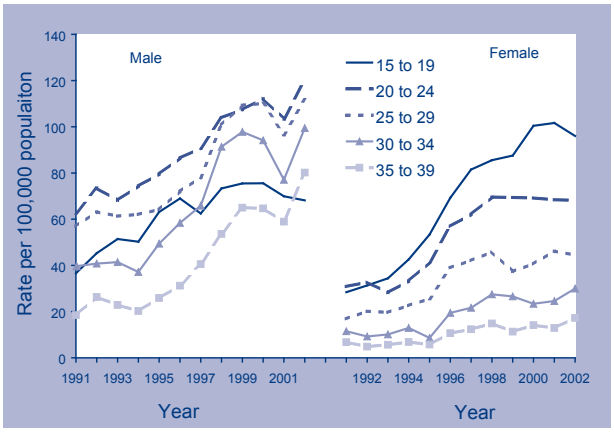
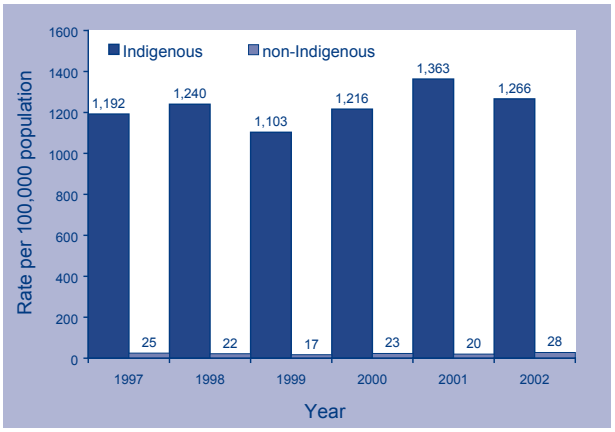


Figure 33. Trends in notification rates of gonococcal infection in persons aged 15–39 years, Australia, 1991 to 2002, by sex



In 2002, Indigenous status was reported in 91.4 per cent of cases of gonococcal infection in the Northern Territory, 100 per cent in South Australia and 82.2 per cent in Western Australia. The combined number of notifications of gonococcal infection in these jurisdictions was 3,063 cases, representing 49.0 per cent of all gonococcal infection notifications received by NNDSS. Of these cases, 2,117 were identified as Indigenous, 585 non-Indigenous and 362 of unknown Indigenous status. Based on these data, the age standardised notification rate of gonococcal infection was 1,266 cases per 100,000 Indigenous population and 28 cases per 100,000 non-Indigenous population, a ratio of 45:1 (Figure 34).

Figure 34. Trends in the age standardised notification rates of gonococcal infection, the Northern Territory, South Australia and Western Australia (combined), 1997 to 2002, by Indigenous status



Source: National Centre in HIV Epidemiology and Clinical Research HIV/AIDS Annual report, 2003.

Note that cases with missing Indigenous status were added to non-Indigenous population.

Other surveillance activities for gonococcal infections

The Australian Gonococcal Surveillance Program is the national laboratory-based surveillance system that monitors the antibiotic susceptibility of gonococcal isolates. A network of reference laboratories in each state and territory contribute to the program, using an agreed and standardised methodology to quantitatively determine susceptibility of the organism to a core group of antibiotics.

The annual results of the Australian Gonococcal Surveillance Programme for 2002 have recently been published.[11] A total of 3,951 gonococcal isolates were analysed by the Australian Gonococcal Surveillance Programme, an increase of 7 per cent on the total isolates analysed in 2001. For males, the most common anatomical site from which isolates were obtained was the urethra (78%) and for females, the cervix (92%). Rectal isolates were only obtained from males, and comprised 13 per cent of all isolates. Of the total number of isolates, 84 per cent were from men, a proportion that has remained unchanged since 2000.

Table 8 shows trends in the proportion of isolates resistant to penicillin, quinolones and tetracycline. In 2002, the proportion of isolates resistant to penicillin by chromosomally-mediated resistance decreased by 56 per cent (from 15.3% of all isolates in 2001 to 10.9 per cent in 2002). The level of quinolone resistance in gonococci remains unacceptably high although the rate decreased by 39.6 per cent compared to the previous year. Quinolone resistance is of special concern in Australia because it continues to spread among sub-populations with high rates of STI, and because rates of resistance are high in countries in South East Asia and West Pacific Region, which are the source of cases imported to Australia.[12]

Syphilis

In 2002, 1,613 cases of syphilis infections were reported to NNDSS, a notification rate of 8.3 cases per 100,000 population (Table 3). This represents an increase of 14.1 per cent compared with the notification rate of 7.3 cases per 100,000 population reported in 2001. Small increases in the notification rates occurred in the Australian Capital Territory, New South Wales, Queensland, South Australia and Victoria. In Western Australia the syphilis notification rate fell by 23 per cent while in the Northern Territory it remained stable.

Increases in New South Wales, Queensland and Victoria could be the result of public health activities that were under taken in 2002. In Victoria, active HIV and STI testing had been carried out at selected sex-on premise venues. In New South Wales, a targeted syphilis campaign was carried out to coincide with the Gay Games in Sydney in 2002. In Queensland, a syphilis registry was established in July 2001 and was fully operational in 2002. The registry collects laboratory results for syphilis regardless of test positivity to assess and classify cases. The registry also had the task of reviewing all past syphilis notifications, a task which was ongoing in 2002.

Map 5 displays notification rates of syphilis in 2002, by Statistical Division. The highest rates of syphilis notification occurred in the Kimberley Statistical Division of Western Australia, (338 cases per 100,000 population), the Northern Territory (208 cases per 100,000 population), and North-west Queensland (132 cases per 100,000 population).

The sex specific notification rates for 2002 were 9.8 cases per 100,000 population for males and 6.6 cases per 100,000 population for females. Compared to 2001, these represent an overall increase of 16.6 per cent among males and of 11 per cent among females. An exception to this trend was the Northern Territory, where syphilis notification rates among males fell by 9 per cent (from 211 to 193.8 cases per 100,000 population), but rose among females by 15.6 per cent (from 181 to 212 cases per 100,000 population). Nationally, the male to female notification ratio was 1.5:1, with the highest male to female notification ratio reported in Victoria (4:1) followed by New South Wales (2.3:1).

In 2002, the age specific notification rates among females had a bimodal distribution, with the first peak occurring in the 15–19 and 20–24 year age groups (17.2 and 16.4 cases per 100,000 population respectively) and the second peak in the 80–84 year age group (8.5 cases per 100,000 population). Seventy-two per cent of the cases in this female age group were notified in New South Wales. None of the cases had primary or secondary syphilis confirming that these are cases with late manifestations of syphilis. Manifestations of the disease may continue 5 to 20 years after initial infection or throughout life.[13]

Among males, the peak age specific notification rate shifted from the 20–24 year age group in 2001, to the 30–34 year age group, with a notification rate of 17 cases per 100,000 population (Figure 35). There were three cases of genital syphilis in children under the age of one year, all in northern Queensland.

Table 8. Proportion of gonococcal isolates showing antibiotic resistance, Australia, 1998 to 2002

	Penicillin resistance (% resistance)		Quinolone resistance % resistance)	High level tetracycline (% resistance)
	Plasmid mediated	Chromosomally mediated		
1998	5.3	21.8	5.2	NR
1999	7.4	14.3	17.2	7.9
2000	8.7	10.6	17.8	9.1
2001	7.5	15.3	17.5	9.4
2002	7.1	10.9	10.0	11.4

Source: Australian Gonococcal Surveillance Programme, Annual report 2002.

NR Not recorded.

Map 5. Notification rates of syphilis infection, Australia, 2002, by Statistical Division of residence

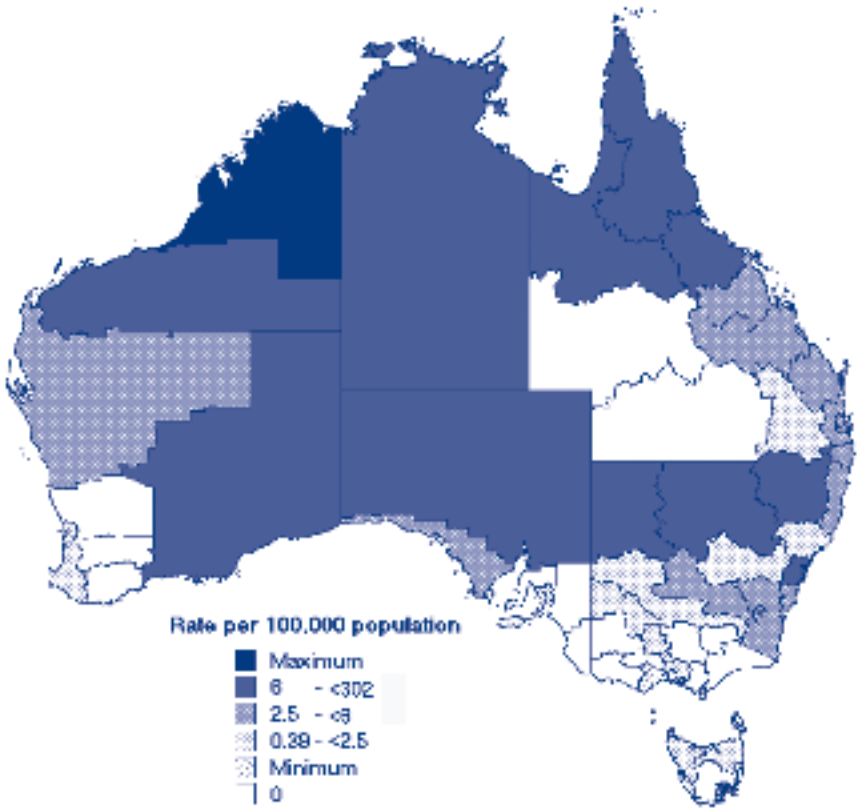
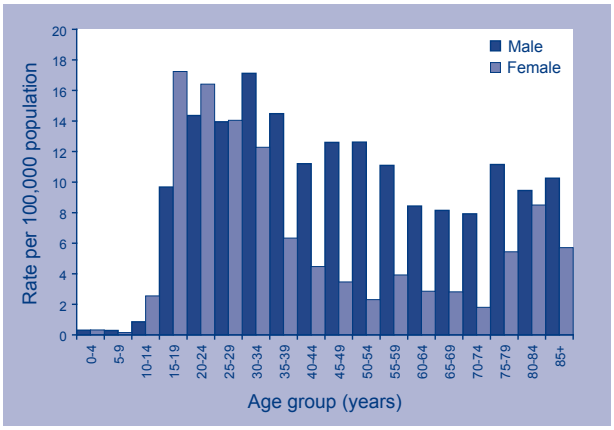
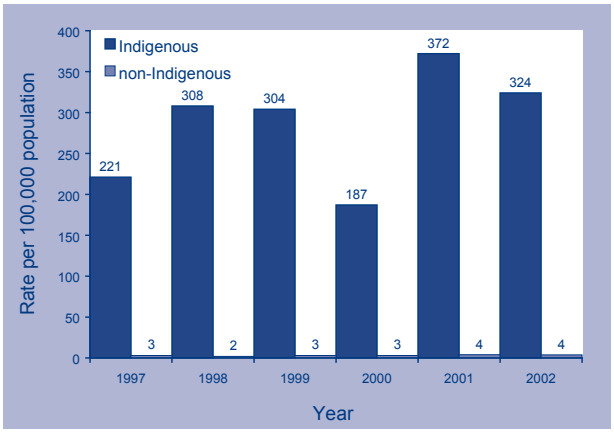


Figure 35. Notification rates of syphilis, Australia, 2002, by age group and sex



Data on Indigenous status in 2002 were available for 85 per cent of notified cases of syphilis from the Northern Territory, 84 per cent from South Australia and 64 per cent from Western Australia. The combined number of notifications of syphilis infections from these jurisdictions was 593 cases, 36.8 per cent of all notifications of syphilis infections received by NNDSS. Of these, 468 cases were Indigenous, 60 non-Indigenous and 65 did not state their Indigenous status. Based on these data, the age standardised notification rate was 324 cases per 100,000 population among Indigenous and four cases per 100,000 population among non-Indigenous populations. The ratio of Indigenous to non-Indigenous cases was 85:1 compared to 93:1 in 2001 (Figure 36).

Figure 36. Trends in age standardised notification rates of syphilis, the Northern Territory, South Australia and Western Australia (combined), 1997 to 2002, by Indigenous status



Source: National Centre in HIV Epidemiology and Clinical Research HIV/AIDS Annual report, 2003.

Note that cases with missing Indigenous status were added to non-Indigenous population.

Congenital syphilis

There were 14 notifications of congenital syphilis reported to NNDSS in 2002, seven males, six females and one for whom gender was not stated. All reported cases were under one year of age, except one case in a 2-year-old female. All cases were from the Northern Territory, except for one case in New South Wales. In 2001, there were 21 cases of congenital syphilis notified.

Vaccine preventable diseases

This section summarises the national notification data for laboratory-confirmed influenza and diseases targeted by the standard childhood vaccination schedule in 2002. This includes diphtheria, *Haemophilus influenzae* type b infection, measles, mumps, pertussis, invasive pneumococcal disease, poliomyelitis, rubella and tetanus. There were no changes to the Australian Standard Vaccination Schedule in 2002.

There were 11,711 notifications of vaccine preventable diseases (VPDs) with onset dates in 2002; 11.6 per cent of the total notifications to NNDSS. Pertussis was the most commonly notified VPD (5,388 cases or 46% of all VPD notifications). Numbers of notifications and notification rates for vaccine preventable diseases in Australia are shown in Tables 2 and 3.

Diphtheria

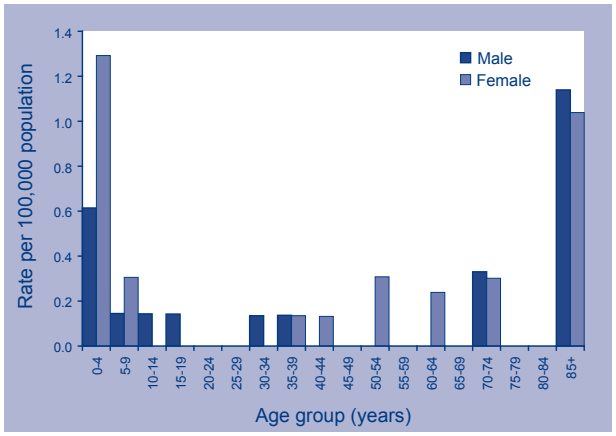
There were no cases of diphtheria reported in 2002. A single case of cutaneous diphtheria in 2001 was the first case reported since 1993.[14]

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.[15]

There were 29 notifications of Hib disease in 2002, a rate of 0.1 cases per 100,000 population. This is a similar rate to that reported in 2001, when the lowest number of notifications was recorded since national surveillance began in 1991. Twelve cases (41% of total cases) were in children aged less than five years of age and six were infants aged less than one year (Figure 37). There continued to be more cases reported in females than males, (male:female ratio 0.7:1) in 2002. The Northern Territory had the highest notification rate (1.5 per 100,000 population, three cases) although most cases (10/29, 34%) were from New South Wales. Of the 24 cases with

Figure 37. Notification rate of *Haemophilus influenzae* type b infection, Australia, 2002, by age group and sex

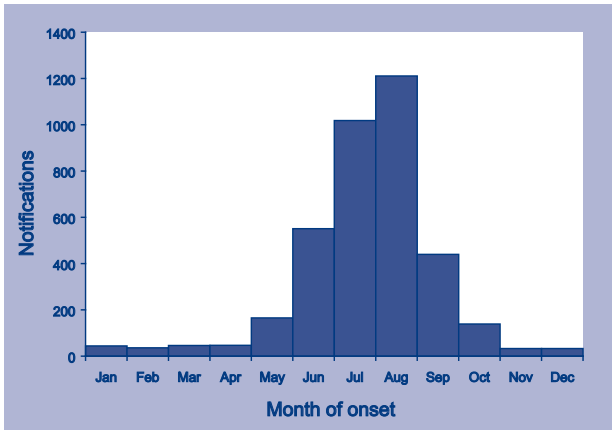


a known Indigenous status, 11 were Indigenous and 13 were non-Indigenous. Nine of the cases in Indigenous people occurred in children aged less than 5 years (17 cases per 100,000 population) compared with 3 cases in non-Indigenous children (0.2 cases per 100,000 population). Although there has been a significant decline in Hib disease, Indigenous children make up a greater proportion of cases than in the pre-immunisation era.[15]

Laboratory-confirmed influenza

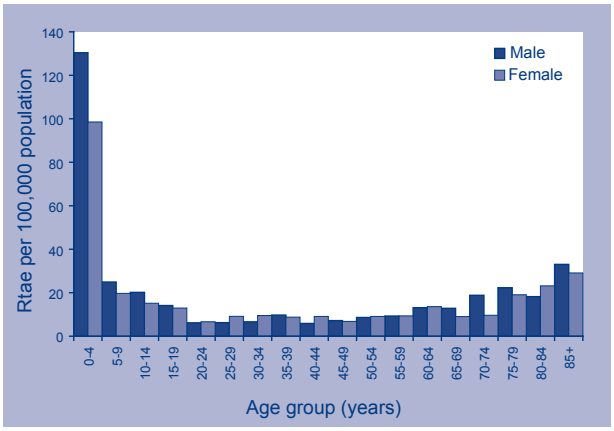
There were 3,665 reports of laboratory-confirmed influenza in 2002, a rate of 18.6 cases per 100,000 population. In 2002, data were available from all jurisdictions for the full year, in contrast to 2001, when reporting was incomplete. Notifications of influenza showed a peak in August (late winter) (Figure 38).

Figure 38. Notifications of laboratory-confirmed influenza, Australia, 2002 by month of onset



The highest rates of influenza were in children aged less than 5 years (Figure 39). 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 39. Notification rate of laboratory-confirmed influenza, Australia, 2002, by age group and sex

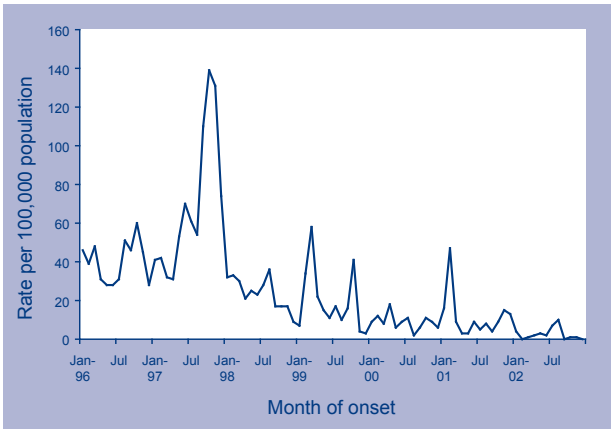


In 2002, influenza A was the dominant type, 99 per cent of which were subtype H3N2 with only a single H1N2 isolate. The influenza A (H3N2) isolates analysed were closely related to the vaccine strains A/Moscow/10/99 and the A/Panama/2007/99. Influenza B accounted for 21 per cent of all isolates and most of these were of the B/Victoria lineage, which has not been seen in Australia for a decade. This strain had a haemagglutinin closely related to the B/HongKong/330/2001 reference strain and a neuraminidase similar to the B/Sichuan/379/99-like viruses, indicating that a genetic reassortment event had occurred. These new B/Hong Kong/330/2001-like viruses were associated with two outbreaks in school groups.[16] Although the 2002 influenza vaccine was not directed against the new strain, a proportion of asymptomatic vaccinees who had received the 2002 influenza vaccine showed protective antibody titres.[16] In 2002, 77 per cent of the over 65 year age group in Australia received influenza vaccination.[17]

Measles

There were 31 confirmed measles cases in 2002, a national rate of 0.2 cases per 100,000 population. This is a steep decline in numbers compared with 2001 when 141 cases were notified, and is the lowest annual rate for Australia since national surveillance began in 1991 (Figure 40). The highest rate was in Victoria with 0.3 cases per 100,000 population (14 cases) (Tables 1 and 2).

Figure 40. Notification rate of measles, Australia, 1996 to 2002, by month of onset



All age groups had the lowest rates on record in 2002. Rates were highest in the 0–4 year age group (0.6 cases per 100,000 population), followed by the 20–24 year age group (0.5 cases per 100,000 population) and the 15–19 year age group (0.4 cases per 100,000 population). Of the eight cases in the under 5 year age group two were aged less than one year. There was only a single case reported in each of the 5–9 and 10–14 year age groups. This illustrates the ongoing impact of the Measles Control Campaign (which involved the mass vaccination of primary school aged children in 1998) and lowering the age for the second dose of measles, mumps, rubella vaccine to age four years. As a result of improved immunity in children and a residual cohort of susceptible adults born in the late 1970s and early 1980s, the proportion of cases in young adults has increased since 1998. In 2002, 35 per cent of the reported cases were aged 20–29 years, where as between 1993 and 1998 only 8 per cent of cases were in this age range.

Of the 31 cases reported in 2002, nine were recorded as having acquired their infection outside Australia. The vaccination status was recorded for 21 cases: two were fully vaccinated for age and 19 were unvaccinated. There were a number of outbreaks of measles in Australia in 2002. In Victoria in May and June a cluster of measles in three young adults was identified. The cases were unvaccinated and had no recent history of travel. In New South Wales in the second quarter of 2002 there were two linked cases of measles. The first was an unvaccinated 1-year-old child who had recently travelled in Pakistan and the second, a vaccinated 1-year-old child contact. An outbreak in the Whitsunday region of north Queensland occurred in July and August 2002 in unvaccinated children with exposure to an infected overseas traveller. Secondary cases occurred in New South Wales as well. This outbreak had two generations of transmission and resulted in a total of seven cases from four families.[18]

Mumps

In 2002, there were 69 notifications of mumps, a rate of 0.4 cases per 100,000 population. This is a decrease of 39 per cent on the 114 cases reported in 2001 and the lowest rate since all states and territories began notifying the disease in 1996. There were notifications from all age groups under 75 years (Figure 41) with the majority (n=48, 70%) from people aged 15 years or more. The highest notification rate (0.6 cases per 100,000 population) was in the 0–4 year age group. As in most years, there was a preponderance of cases in males (male: female ratio 1.5:1).

Pertussis

Pertussis continues to be the most common vaccine preventable illness in Australia, with periodic epidemics occurring at intervals of three to five years on a background of endemic circulation (Figure 42).[19] In 2002, there were 5,388 cases notified (27.4 cases per 100,000 population), a 43 per cent decrease on the epidemic year of 2001 when 9,515 cases were notified.

The highest notification rates were among children aged less than one year (117.4 cases per 100,000 population) and those aged 10–14 years (85.3 cases per 100,000 population) (Figures 43 and 44). The notification rate in children aged less than one year exceeded that for the 10–14 year age group for the first time since 1998 (Figure 43). This may reflect the impact of the fifth dose of the pertussis vaccine, given to 4-year-olds since 1994, and the resultant cohort effect. The overall male to female ratio was 0.9:1.

Figure 41. Notification rate for mumps, Australia 2002, by age group and sex

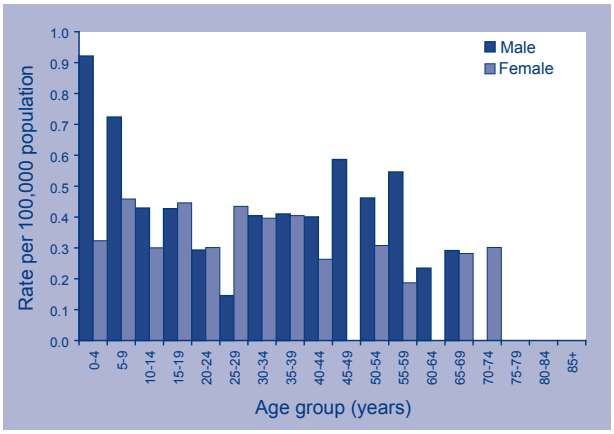


Figure 42. Notifications of pertussis, Australia, 1991 to 2002, by month of onset

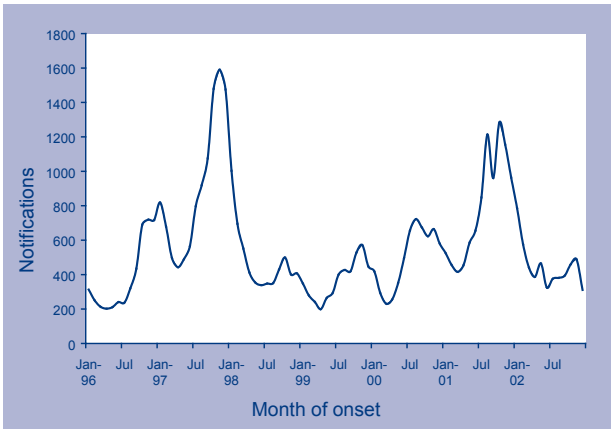
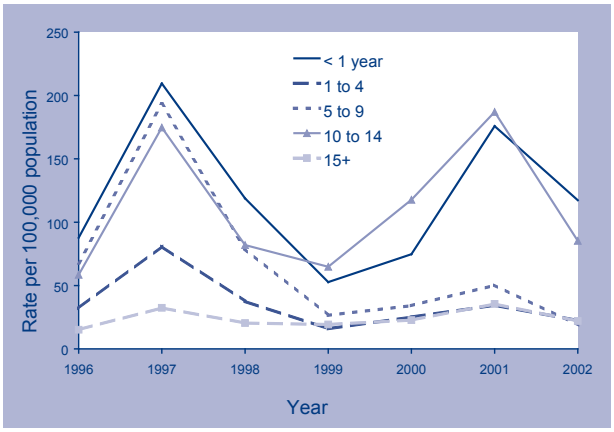


Figure 43. Notification rates for pertussis, Australia, 1996 to 2002, by age group



Notification rates of pertussis varied considerably by geographic location (Map 6). The highest rate was in Queensland (50 cases per 100,000 population) and the lowest rate was in Tasmania (8.7 cases per 100,000 population).

Map 6. Notification rates of pertussis, Australia, 2002, by Statistical Division of residence

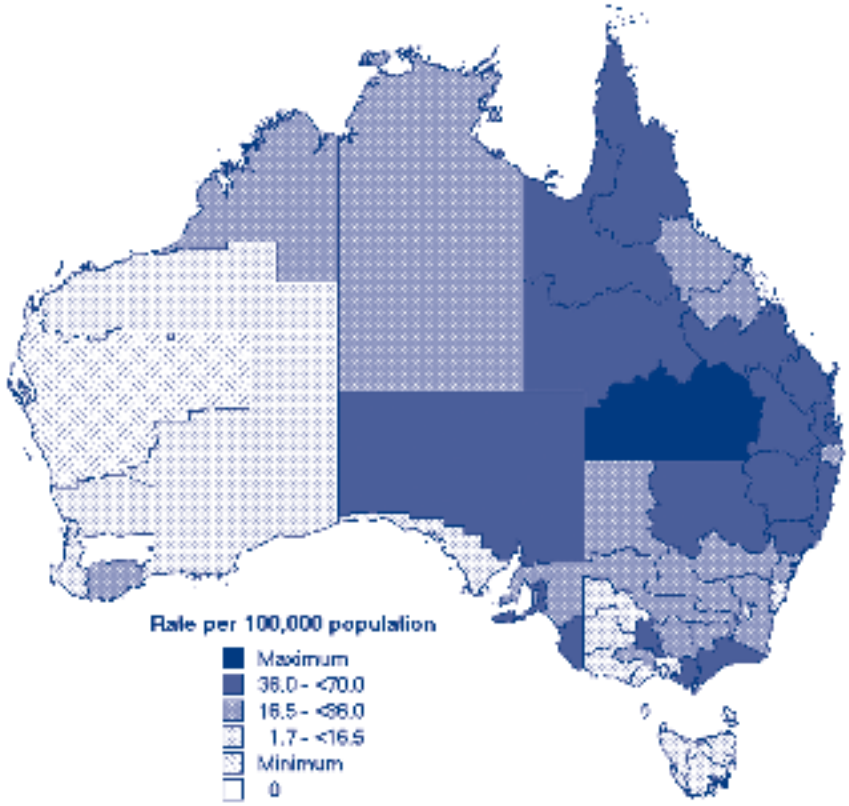
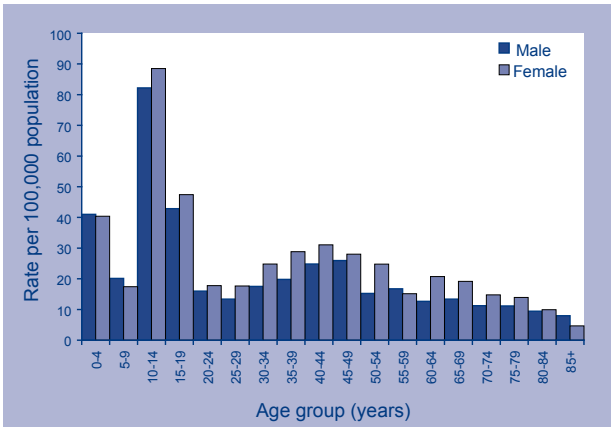


Figure 44. Notification rates for pertussis, Australia, 2002, by age group and sex

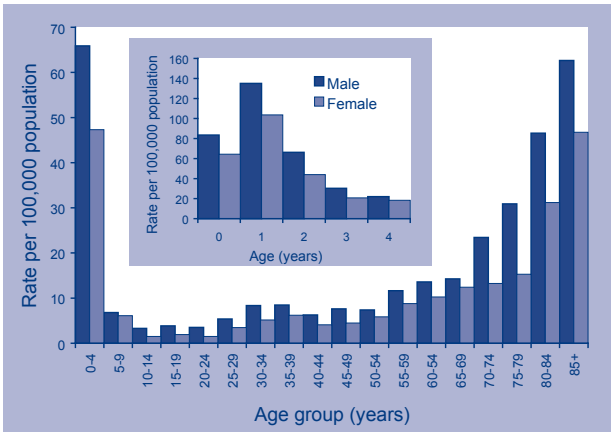


Pneumococcal disease (invasive)

There were 2,271 notifications of invasive pneumococcal disease (IPD) in Australia in 2002 giving a rate of 11.5 cases per 100,000 population. While the largest numbers of cases were reported from New South Wales, Queensland and Victoria (Table 1), the highest rate was in the Northern Territory (32.8 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 was largely a disease of the very young and very old. The highest rates of disease were among children aged less than 5 years (56.8 cases per 100,000 population) and adults aged more than 85 years (51.7 cases per 100,000 population) (Figure 45). There were more cases among males,

Figure 45. Notification rate for invasive pneumococcal disease, Australia, 2002, by age and sex



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 2002. Analyses of these data have recently been published.[21]

Poliomyelitis

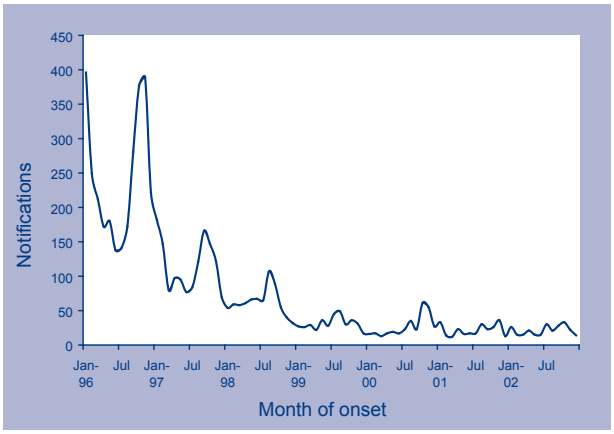
No cases of poliomyelitis were reported in Australia in 2002.

There were 46 cases of acute flaccid paralysis reported in 2002. Of these, 33 occurred in children aged less than 15 years of age; this represents 83 per cent of the WHO indicator target for acute flaccid paralysis. Testing of faecal specimens identified poliovirus Sabin vaccine-like type 3 in a single acute flaccid paralysis case, who was fully vaccinated. The conclusion of the expert review committee was that this was an incidental finding in a case of acute focal neuropathy.[22]

Rubella

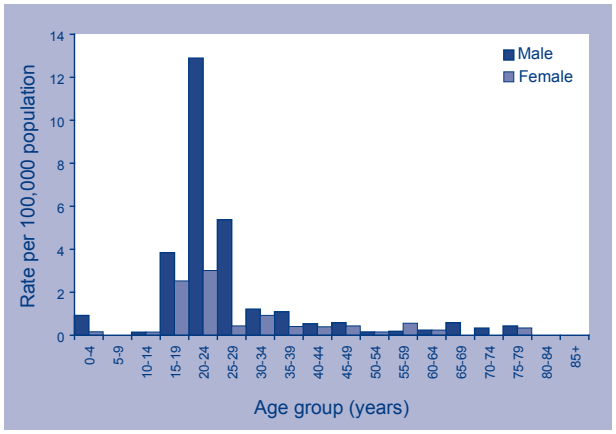
In 2002, there were 254 notifications of rubella, a notification rate of 1.3 cases per 100,000 population. This rate is slightly lower than in 2001 (1.4 cases per 100,000 population) and is the lowest rate recorded since national reporting of rubella commenced (Figure 46).

Figure 46. Notifications of rubella, Australia, 1996 to 2002, by month of onset



As in the past two years, notification rates were highest in males aged 20–24 years (12.9 cases per 100,000 population) (Figure 47). The male to female ratio of notified cases has been increasing since 1999 due to this residual cohort of susceptible young adult males and improved childhood immunity. In 2002 the male:female ratio was 3:1.

Figure 47. Notification rate for rubella, Australia, 2002, by age and sex



In contrast to the rest of Australia, rates of rubella in Queensland have been increasing since 2000, especially amongst young adult males aged 15–29 years and females aged 15–24 years. In 2002, Queensland accounted for 75 per cent of all notified cases of rubella (notification rate 5.1 cases per 100,000 population).

There were 56 cases of rubella notified from women of child-bearing age (15–49 years) in 2002, eight more than in 2001 when the lowest number on record was reported. A single notification of congenital rubella was received in 2002, which occurred in a child infected outside Australia (Australian Paediatric Surveillance Unit report, 2002). Ongoing transmission in Queensland has resulted in two locally acquired cases of congenital rubella syndrome in 2003.[23,24]

Tetanus

Since 1995, less than 8 cases of tetanus have been notified each year. In 2002, there were three reported cases (two female, one male). All three cases were adults aged 64 years or above. This is consistent with the age distribution of notifications in recent years, and indicates that tetanus has become a disease of older adults.

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 2002 are shown in Tables 9, 10 and 11 respectively.

Table 9. Percentage of Australian children born in 2001 vaccinated according to data available on the Australian Childhood Immunisation Register, estimate at one year of age

Vaccine	Birth date			
	1 Jan–31 Mar 2001	1 Apr– 30 Jun 2001	1 Jul–30 Sep 2001	1 Oct–31 Dec 2001
Diphtheria, tetanus, pertussis (%)	91.8	92.5	92.7	92.6
Poliomyelitis (%)	91.7	92.4	92.6	92.5
Haemophilus influenzae type b (%)	93.7	94.7	94.9	94.7
Hepatitis B (%)	94.0	94.9	95.1	95.0
Fully vaccinated (%)	90.2	91.2	91.7	91.4

Table 10. Percentage of Australian children born in 2000 vaccinated according to data available on the Australian Childhood Immunisation Register, estimate at two years of age

Vaccine	Birth date			
	1 Jan–31 Mar 2000	1 Apr–30 Jun 2000	1 Jul–30 Sep 2000	1 Oct–31 Dec 2000
Diphtheria, tetanus, pertussis (%)	90.3	90.9	91.4	91.2
Poliomyelitis (%)	94.2	94.7	94.8	94.9
Haemophilus influenzae type b (%)	95.0	94.3	94.0	94.0
Measles, mumps, rubella (%)	93.2	93.8	94.2	94.2
Fully vaccinated (%)	88.1	88.8	89.4	89.0

Table 11. Percentage of Australian children born in 1996 vaccinated according to data available on the Australian Childhood Immunisation Register, estimate at six years of age

Vaccine	Birth date			
	1 Jan–31 Mar 1996	1 Apr–30 Jun 1996	1 Jul–30 Sep 1996	1 Oct–31 Dec 1996
Diphtheria, tetanus, pertussis (%)	83.7	84.1	84.5	84.3
Poliomyelitis (%)	84.0	84.4	84.7	84.5
Measles, mumps, rubella (%)	82.4	83.1	83.7	83.6
Fully vaccinated (%)	80.6	81.4	82.2	82.2

Vectorborne diseases

There were 3,052 notifications of arboviral infection and malaria reported to NNDSS during 2002 (3% of all notifications to NNDSS). The viral diseases notified include those caused by alphaviruses (Barmah Forest virus infection and Ross River virus infection) and flaviviruses (the viruses causing dengue, Japanese encephalitis, Kunjin virus, and Murray Valley encephalitis). Aspects of the ecology of these viruses and the clinical features of the disease they cause have previously been described.[14] This section also reports on malaria notifications.

Alphaviruses

Barmah Forest virus infection and Ross River virus infection

There were 896 cases of Barmah Forest virus (BF) infection notified to NNDSS in 2002. Eighty-seven per cent of these were reported from New South Wales (389 cases) and Queensland (388 cases). The highest rates of notification occurred in the Northern Territory (11.6 cases per 100,000 population) and Queensland (10.5 cases per 100,000 population). The national notification rate was 4.6 cases per 100,000 population.

A total of 1,447 cases of Ross River virus (RR) infection were notified to NNDSS in 2002. There were 887 notifications reported from Queensland, and 178 from New South Wales. The highest rate was reported in the Northern Territory (31.8 cases per 100,000 population). During 2002 an unusually large number of RR infections were reported from Tasmania.

The national notification rates for both RR and BF infections are less than those observed in 2001. For BF the rate lies within the range observed since reporting began in 1995. The rate for RR, however, is the lowest recorded in the 11 years of data reported to NNDSS (Figure 48).

The age and sex distribution of the BF and RR cases notified are shown in Figures 49 and 50. The notification rates of both diseases were highest in the 45–54 year age range (BF 8.9 cases per 100,000 population; RR 13.6 cases per 100,000 population). The male-to-female ratio for BF was 1:1, and for RR, 0.9:1.

An outbreak of BF infection occurred in the Gippsland region of eastern Victoria with 50 cases notified between January and May 2002.

Figure 48. Notifications of Ross River virus infections, Australia, 1991 to 2002

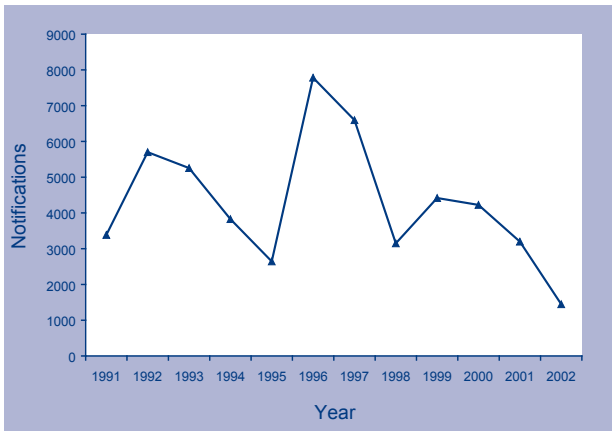


Figure 49. Notification rates of Barmah Forest virus infections, Australia, 2002, by age group and sex

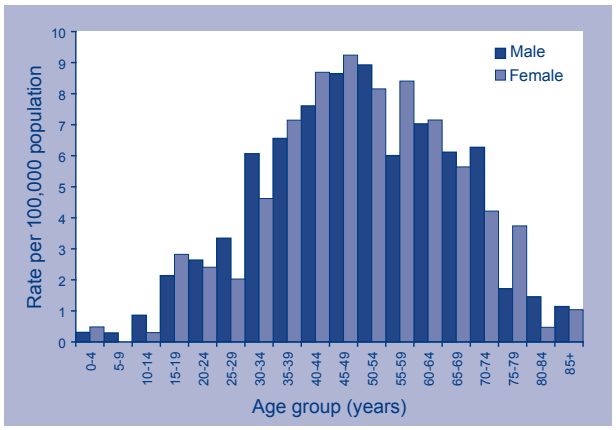
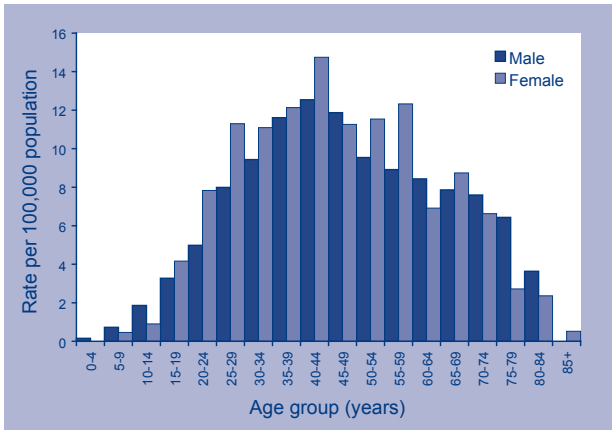


Figure 50. Notification rates of Ross River virus infection, Australia, 2002, by age group and sex



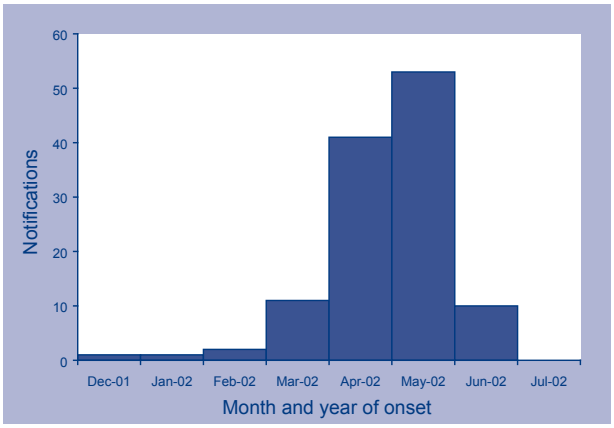
An outbreak of RR occurred in Tasmania with 117 cases notified, a rate of 24.8 cases per 100,000 population (Figure 51). The first cases were notified in November 2001, but most were notified during March and April 2002. The majority of cases (n=68) resided around salt flats in two coastal local government areas to the east of Hobart.

These two outbreaks were notable for occurring outside northern Australian and the eastern seaboard regions, the areas where both diseases are most likely to occur. Indeed, the rate of BF infection in East Gippsland (52 cases per 100,000 population), was the highest rate observed in Australia for 2002 (Map 7). The highest rate for RR infection occurred in the Kimberley Statistical Division of Western Australia (201 cases per 100,000 population) (Map 8).

Flaviviruses

Flaviviruses are single-stranded RNA viruses associated with epidemic encephalitis throughout the world. In Australia, flaviviruses of public health importance are those causing dengue, Japanese encephalitis, Kunjin virus and Murray Valley encephalitis.

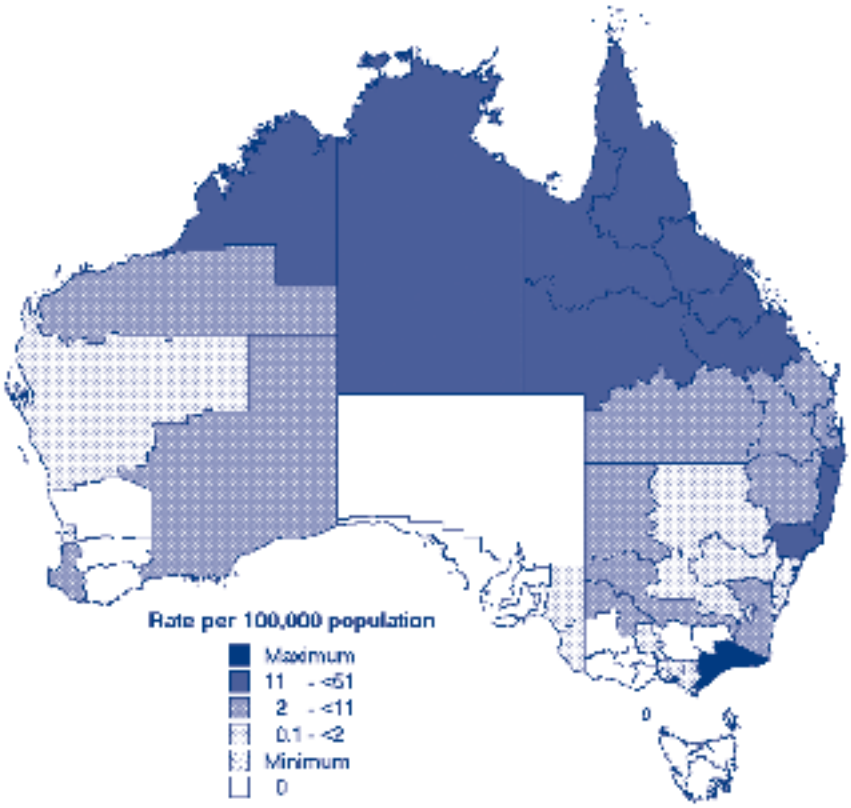
Figure 51. Epidemic curve for outbreak of Ross River virus infection, Tasmania, 2002



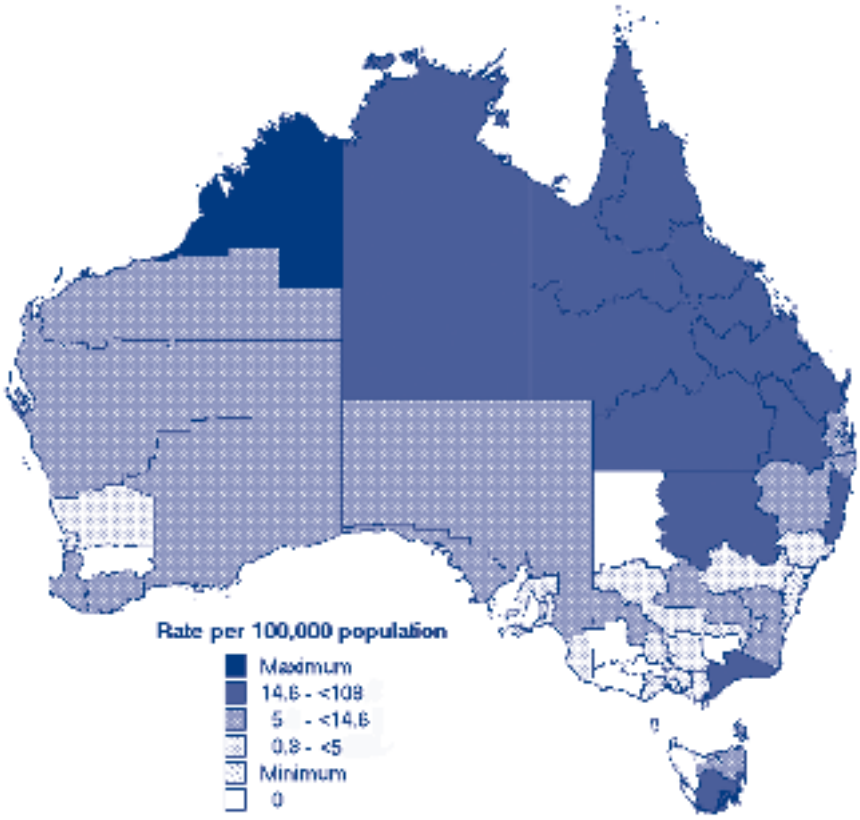
Arboviruses — Not elsewhere classified

Twenty-two notifications were categorised as 'Arbovirus — not elsewhere classified' in 2002. These may include unspecified flavivirus infections (e.g. Murray Valley encephalitis or Kunjin virus), where serology is unable to differentiate the different viruses, or infections caused by other arboviruses which are not separately notifiable (e.g. Sindbis).

Map 7. Notification rates of Barmah Forest virus infection, Australia, 2002, by Statistical Division of residence



Map 8. Notification rates of Ross River virus infection, Australia, 2002, by Statistical Division of residence



Dengue

Dengue is locally transmitted within Australia only in northern Queensland, where the vector mosquito *Aedes aegypti* is endemic. Cases in other parts of Australia not originating from Queensland are therefore all acquired overseas.

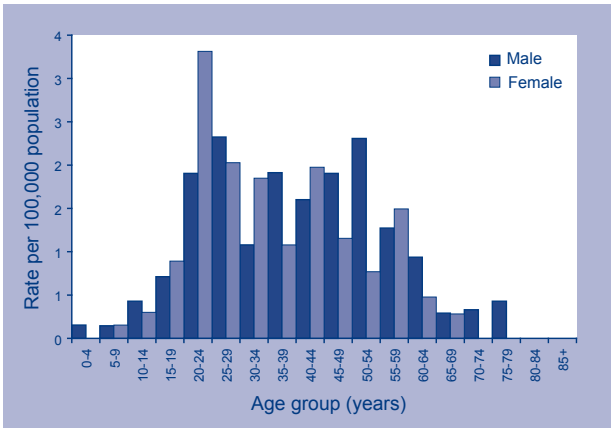
There were 219 cases of dengue notified during 2002. Most cases were reported from Queensland (81 cases, 10.5 cases per 100,000 population) and New South Wales (66 cases, 5.9 cases per 100,000 population), and the highest rate was observed in the Northern Territory (32 cases, 16.2 cases per 100,000 population).

The age and sex distribution of dengue notifications is shown in Figure 52. The male:female ratio was 1.1: 1. Most cases in males occurred in the 25–29 year age group (2.3 cases per 100,000 population), and in females in the 20–24 year age group (3.3 cases per 100,000 population).

In 2002, 25 cases of dengue were locally acquired.[25] These occurred in three outbreaks in north Queensland, in March (21 cases), April (2 cases) and May (2 cases). The dengue serotypes were 2, 1 and 4 respectively. The last outbreak was also the first recorded occurrence of dengue serotype 4 in Queensland. No reports of dengue haemorrhagic fever and no deaths were reported.

Dengue has emerged as a disease of global importance.[26,27,28] Increasing urban populations and ineffective mosquito control efforts are expected to result in sustained increases in the number of cases of dengue worldwide. Computer models suggest that the effects of climate change will increase the number of people living in areas of higher dengue risk, from 1.5 billion in 1990 to over seven billion in 2085.[29]

Figure 52. Notification rates of dengue, Australia, 2002, by age group and sex



Japanese encephalitis

Incursions of Japanese encephalitis (JE) into the Torres Strait Islands in 1995 and mainland Australia in 1998 have earlier been described.[14] Since 1998 no further infections in mainland Australia have been identified, and there were no cases reported in 2002. 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 the JE virus into mainland Australia.

Seroconversions in the sentinel pig herds on the Torres Strait islands have detected the presence of JE virus 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 the JE virus is now endemic on the island of Papua New Guinea. Genetic analysis of mosquitoes collected from Papua New Guinea and Far North Queensland has shown that the two are not isolated, suggesting the spread of the virus by wind-blown mosquitoes, which has been postulated to lie behind the outbreak in northern Queensland in 1998.[30] A review of the emergence of JE in the Australasian region describes the potential for JE to be introduced to Australia and how any incursion should be controlled.[31]

Kunjin virus and Murray Valley encephalitis

There were no cases of Kunjin infection reported in 2002.

Murray Valley encephalitis (MVE) is normally restricted to north-western and northern Australia. Incursions of the Murray Valley encephalitis virus to south-eastern Australia, under appropriate weather conditions, have in the past resulted in several epidemics. The last of these, in which 58 persons developed MVE, occurred in 1974 in the Murray Valley region.

During 2002 only two cases of Murray Valley encephalitis were notified. These were both adult males (aged 26 and 23 years) who most likely acquired their infections in the Kimberley region. The first, a Northern Territory resident who had camped near Kununurra, was notified in January 2002, and the second, a Broome resident, was notified in March 2002.

The small number of MVE notifications and absence of Kunjin in 2002 have coincided with continued widespread drought conditions in south-eastern Australia.

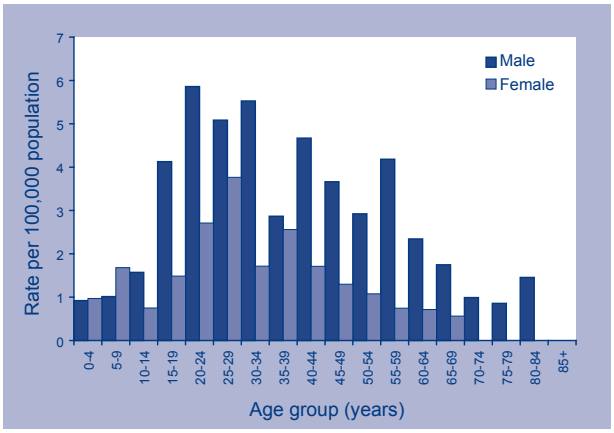
The massive inland bird populations of south-eastern Australia, that gathered with favourable weather conditions in the river red-gum forests of the Murray River valley and other flood-plain habitats, have substantially declined over recent decades. These dense bird populations are believed to have provided the necessary conditions for amplification of the MVE virus and then infecting mosquito populations. It was from these that the virus was then transmitted to human populations. The reduction in the bird populations has been attributed to habitat loss and degradation of the red-gum forests,[32,33] which in turn were caused by altered flooding regimes and increased salinity of the river system.

Malaria

In 2002 there were 466 notifications of malaria, compared with 699 in 2001, a 33 per cent decrease. Most cases were from Queensland (n=205, 5.5 cases per 100,000 population), and 104 were notified from New South Wales (1.6 cases per 100,000 population). The highest rate occurred in the Northern Territory, with 24 notifications (12.1 cases per 100,000 population). The malaria cases notified from New South Wales in 2002 included 26 cases with relapses that were recorded in the New South Wales malaria register (John Walker, personal communication).

The maximum notification rate of malaria occurred in males in the 20–24 year age group (5.9 cases per 100,000 population), and in females in the 25–29 year age group (3.9 cases per 100,000 population) (Figure 53). The male to female ratio was 2.2:1.

Figure 53. Notification rates of malaria, Australia, 2002, by age group and sex



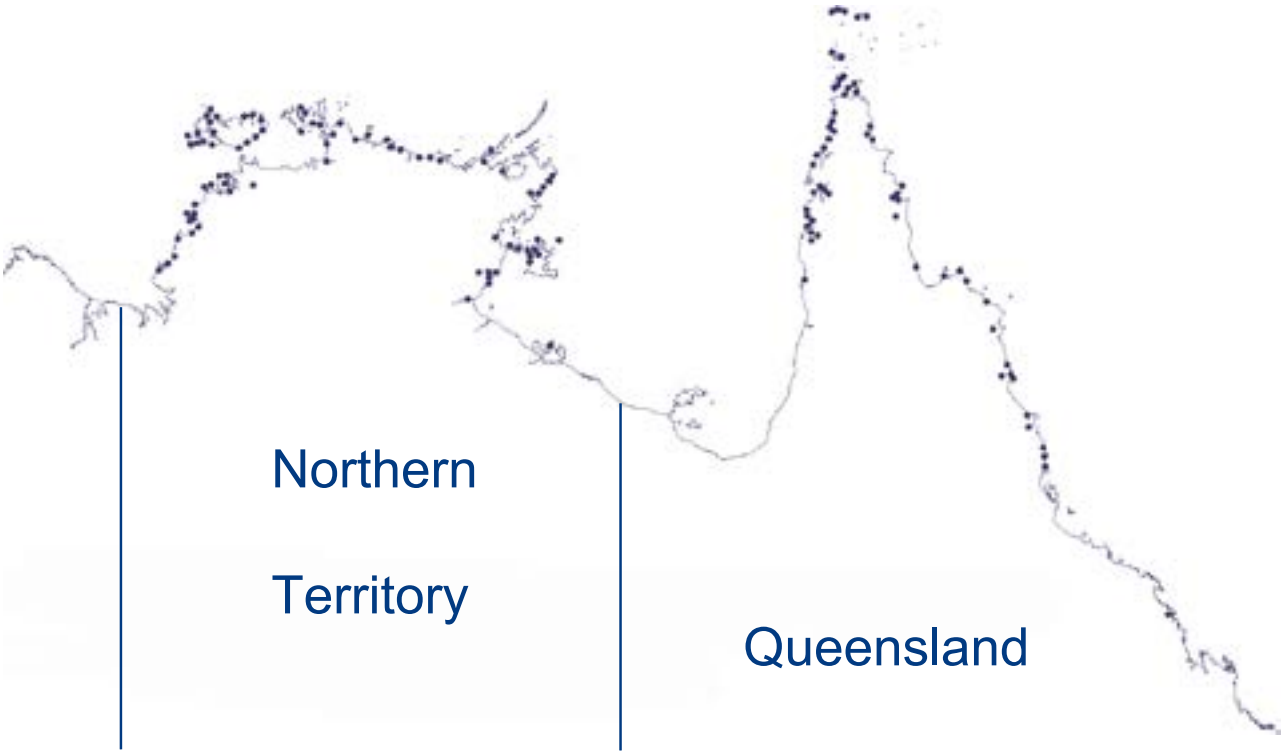
In Australia, the mosquito *Anopheles farauti*, which occurs near the coast in the Northern Territory and north of the 18th latitude in Queensland, is the most significant potential vector for malaria. The mosquito distribution is shown in Figure 54.

An outbreak involving local transmission of *Plasmodium vivax* malaria by *An. farauti* occurred in Far North Queensland in September and October 2002. Ten people were affected, including several overseas visitors. The source of the outbreak was a traveller who probably became infected when visiting Indonesia or Africa during 2001 or 2002.[34]

The outbreak occurred in the same area (Cape Tribulation) as the last previously recorded episode of local malaria in October and November 1986. In this outbreak seven cases of *P. vivax* were identified. The index case had probably acquired malaria in the Solomon Islands.[35]

There are varying clinical severities associated with infection with the different *Plasmodium* spp. The majority of cases in Australia are infected with *P. vivax* (Table 12).

Figure 54. Distribution of *Anopheles ferrati s.s.* in northern Australia



Source: Australian Government Department of Defence, Queensland Office

Table 12. Distribution of malaria cases by infecting *Plasmodium* spp.

Malaria species	State or territory								
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Australia
Plasmodium falciparum	3	39	3	52	7	11	23	10	147
Plasmodium vivax	10	60	21	144	7	4	42	7	294
Plasmodium ovale	0	2	0	7	0	0	1	0	10
Plasmodium malariae	0	1	0	3	0	1	0	0	5
Species unknown	–	2	–	–	–	–	–	9	11
Total	13	104	24*	206	14	16	66†	26	470

* One person had a dual infection, of *Plasmodium falciparum* and *Plasmodium vivax*.

† Two people had dual infections, of *Plasmodium falciparum* and *Plasmodium vivax*.

Zoonoses

Zoonoses are diseases transmitted to humans from animals that are the primary host. The zoonotic diseases that were nationally notifiable in 2002 were anthrax, Australian bat lyssavirus or lyssavirus (unspecified) infection, brucellosis, leptospirosis, ornithosis and Q fever. A total of 1,155 notifications (1.1% of total notifications) were made during 2002. More detailed descriptions of these diseases were provided in the 2001 NNDSS annual report.[14]

Anthrax

Following the deliberate release of anthrax spores in the United States of America in 2001, anthrax became a notifiable disease in Australia. During 2002, 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.[36]

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 outbreaks of anthrax in livestock were reported during 2002. Three outbreaks involving sheep and cattle occurred in New South Wales, and two involved cattle in Queensland. Anthrax in stock in Queensland is considered rare, and these two outbreaks were the first recorded since 1993. Three sporadic cases in cattle occurred in northern Victoria.[37]

Australian bat lyssavirus and lyssavirus (unspecified)

No cases of either Australian bat lyssavirus (ABL) or lyssavirus (unspecified) disease were notified during 2002. 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.[38] 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.

The ABL virus was isolated from one bat in Queensland showing clinical signs. Other animal surveillance data released in 2002 indicated that the ABL virus is taxonomically and geographically more widespread in Australian microchiroptera than previously recognised.

A human case of the related European bat lyssavirus 2 (EBL–2) infection occurred in Scotland in late 2002. Because of the case's occupational exposure as a bat-handler, the link to a lyssavirus infection was able to be made. The man was admitted to hospital with an acutely progressing neurological illness, and died. This was the first human rabies-like infection to occur in the United Kingdom since 1902. There have been 630 human cases of European bat lyssavirus infections in Europe between 1977 and 2000.[39]

Brucellosis

There were 40 cases of brucellosis notified to NNDSS during 2002, a rate of 0.2 cases per 100,000 population. This number of notifications lies within the range observed (13–52 notifications) over the previous 11 years, but was an increase compared to the number reported in 2001, when 19 cases were notified. In 2002 most cases were notified from Queensland (35 notifications, 87 per cent), and two each from New South Wales and Victoria.

Most cases were male (n=34, male:female ratio 5.7:1), and of these, 23 were aged between 20 and 39 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, five were identified as *Br. melitensis*, and four as *Br. suis*.

Leptospirosis

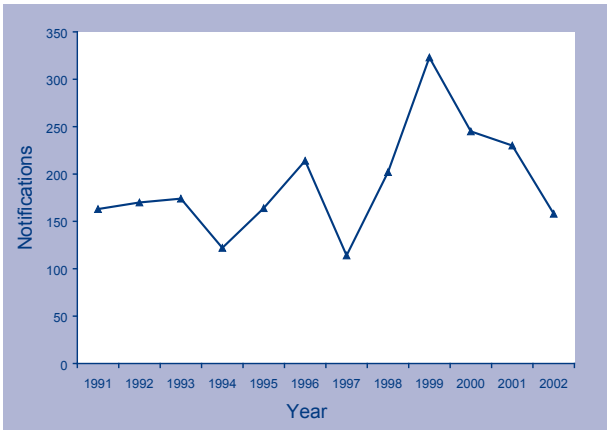
Leptospirosis is caused by the spirochaete *Leptospira*. Nationally, 155 notifications of leptospirosis were received during 2002. This is relatively low compared to the count of previous years (Figure 55) and represents a downward trend since a peak in 1999.

In 2002, the notification rate was highest in Queensland (n=91 notifications, 2.5 cases per 100,000 population). The next highest rates occurred in the Northern Territory (3 notifications, 1.5 cases per 100,000 population) and New South Wales (36 notifications, 0.5 cases per 100,000 population). More males were affected than females (male: female ratio, 8.1:1). The largest rates of notifications, for both sexes, were in the 20–34 year age range. The distribution of leptospirosis notifications by Statistical Division is shown in Map 9.

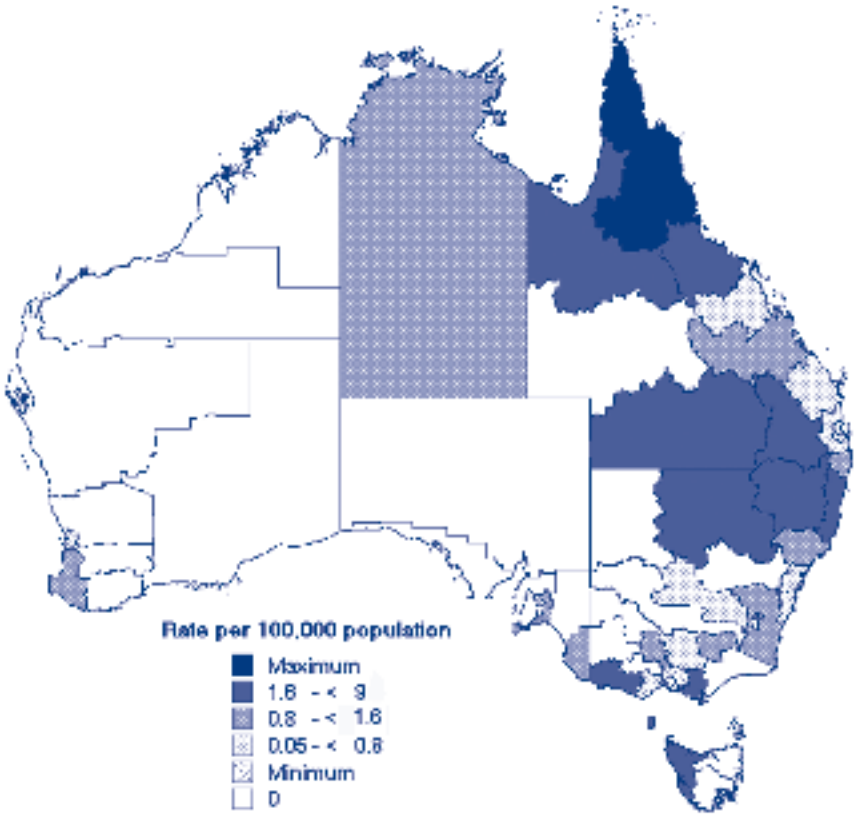
The annual report by the National Leptospirosis Reference Laboratory (www.health.qld.gov.au/qhpss/qhss/lepto_home.htm) provides details of *Leptospira* serovars causing infections in 2002. Of the 128 isolates serotyped, 74 per cent were identified as one of three serovars: *Leptospira interogans* var. *hardjo* (33%); var. *zanoni* (22%); and var. *australis* (19%).

The report identifies a strong association between leptospirosis infection and working in the Queensland banana industry. More specifically, work on banana farms in the Innisfail region is particularly associated with the *Leptospira zanoni* serovar. Butchery in the meat industry was another risk factor identified.

Figure 55. Trends in notifications of leptospirosis, Australia, 1991 to 2002



Map 9. Notifications rates of leptospirosis infection, Australia, 2002, by Statistical Division of residence



Ornithosis

During 2002, 205 notifications of ornithosis were reported to NNDSS (1.0 cases per 100,000 population), compared with 131 notifications in 2001. New South Wales had the highest number of notifications with 148 cases (2.2 cases per 100,000 population). In 2002, the total number of ornithosis notifications was the highest yet observed (Figure 56). Most notifications were males aged 50–54 years (n=25 cases, rate 3.85 cases per 100,000 population), and females aged 60–64 year (n=11 cases, rate 2.62 cases per 100,000 population) (Figure 57).

Figure 56. Trends in notifications of ornithosis, Australia, 1991 to 2002

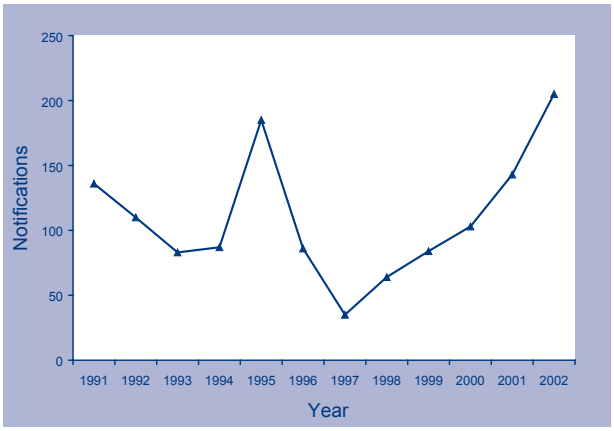
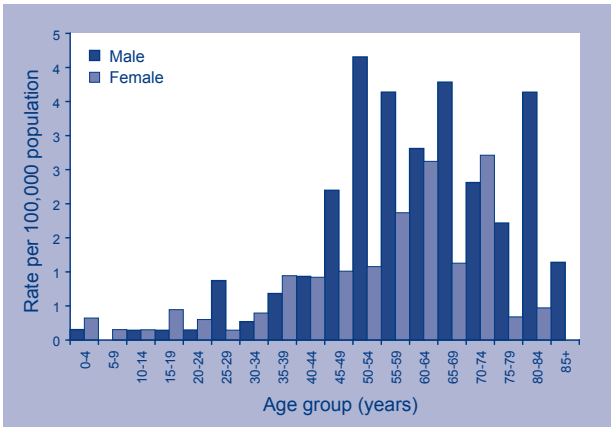


Figure 57. Notification rates of ornithosis, Australia, 2002, by age group and sex

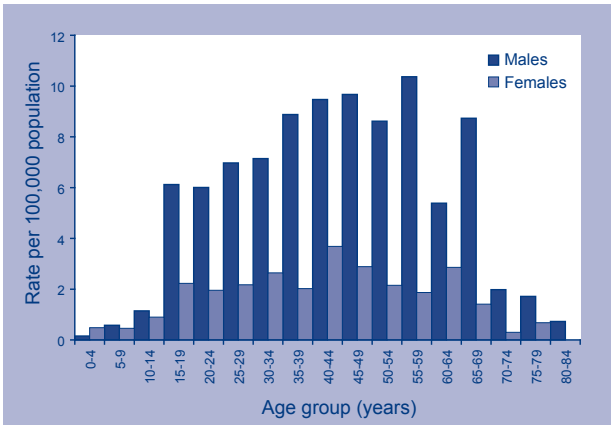


An outbreak of 60 confirmed cases of ornithosis—the largest yet recorded in Australia—occurred in the Blue Mountains, west of Sydney, during 2002. The cases occurred between March and June and involved mostly males aged between 50 and 65 years. The outbreak was identified following the unusual presentations of men to the Blue Mountains Hospital, with atypical pneumonia. A case-control study identified the main risk factors as contact with wild birds or lawn-mowing.[40] The ornithosis outbreak is thought to be linked to the large areas of the Blue Mountains being burnt out in the bushfires of previous summers. This is likely to have led to food shortages for native bird populations and a consequent utilisation of residential gardens.

Q fever

There were 761 cases of Q fever notified to NNDSS during 2002, an increase of 10 per cent from 2001. Notifications have increased each year since 1999, when 515 cases were notified. The largest numbers were from Queensland (n=339, 9.1 per 100,000 population) and New South Wales (n=292, 4.4 per 100,000 population). The highest rate observed for males was 10.4 cases per 100,000 population, in those aged 55–59 years, and for females, 3.7 cases per 100,000 population, in the 40–44 year age group (Figure 58). The male:female ratio was 3.2:1.

Figure 58. Notification rates of Q fever, Australia, 2002, by age group and sex



Two clusters of Q fever were identified in 2002. In South Australia, seven cases were notified between August and September from a rural community. While two were related to occupational exposure, no other exposures could be identified for the remaining five, apart from the presence in the community of meat and livestock industry.

In the second cluster, cases associated with a Victorian abattoir led to screening of the workforce and detection of more cases. In total 28 cases were identified. The abattoir's workforce had been screened two years previously, but following this a large number of new employees had been recruited.

In October 2000, the Australian Government announced funding for the National Q Fever Management Program. The Program aims to reduce the burden of disease associated with Q fever, through a targeted screening and vaccination program.

At a cost of $10.6 million over three years, Phase 1 of the Program commenced in 2001 and is industry-focussed, targeting abattoir workers, those contracted to abattoirs, and sheep shearers. Commencing in 2002 and costing $8 million over three years, Phase 2 of the Program is targeting sheep, dairy and beef cattle farmers, their employees and unpaid family members working on farms.

Reasons for the increase in Q fever notifications in 2002 may include increased suspicion of Q fever as a diagnosis by general practitioners delivering the vaccination campaign, and individual screening for previous exposure to Q fever prior to vaccination. The longer-term results of the campaign will be of much interest, as Australia is the only country in the world to vaccinate against Q fever, despite the worldwide distribution of the disease.[41,42]

Other bacterial infections

Legionellosis, leprosy, meningococcal infection and tuberculosis were notifiable in all states and territories in 2002 and classified as 'other bacterial infections' in NNDSS. A total of 1,980 notifications were included in this group in 2002, which accounted for 1.9 per cent of all the notifications to NNDSS.

Legionellosis

Legionellosis includes notifications of infections caused by all *Legionella* species. There were 318 notifications of legionellosis reported in 2002 giving a national rate of 1.6 cases per 100,000 population. The annual trend since 1991 (Figure 59) shows a marked increase in notifications in 2000 because of the Melbourne aquarium outbreak.[43] Between 1991 and 2000, there was a significant increase in the national legionellosis notification rate, even after excluding cases related to outbreaks.[43] In 2002, the highest rates of legionellosis were reported in South Australia (4.3 cases per 100,000 population) and Western Australia (2.9 cases per 100,000 population). Legionellosis notifications showed a peak in reports in autumn and spring.

Men accounted for 205 of 318 (64%) cases of legionellosis resulting in a male to female ratio of 1.8:1. Cases occurred in almost all age groups, with the highest rates in the 75–79 year age group for men (9.9 cases per 100,000 population) and the 60–64 year age group for women (4.5 cases per 100,000 population) (Figure 60).

Figure 59. Trends in notifications of legionellosis, Australia, 1991 to 2002, by month of onset

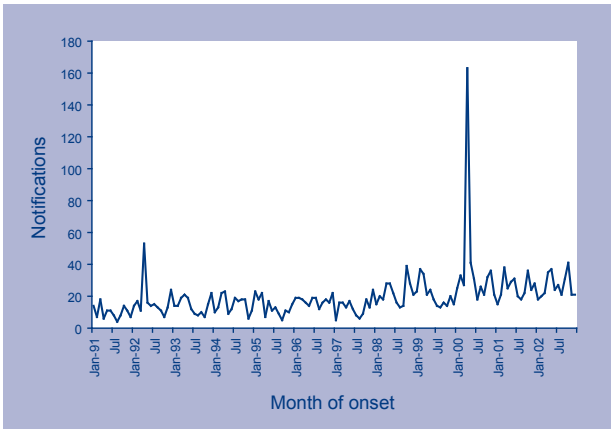
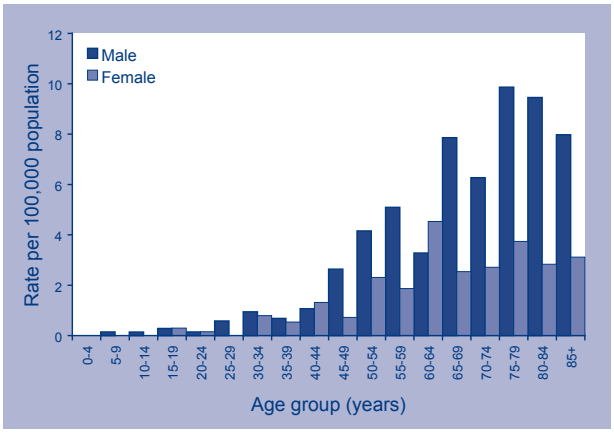


Figure 60. Notification rates of legionellosis, Australia, 2002, by age group and sex



Data on the causative species was available for 304 (96%) of the legionellosis cases. Of these, 118 (39%) cases were identified as *Legionella pneumophila*, 151 (50%) were *L. longbeachae* and 36 (11%) were other species (*L. micdadei* or *L. bozemannii*) (Table 13).

There were several outbreaks of legionellosis reported in 2002. Two outbreaks of *L. pneumophila* in Victoria, one involving eight cases and the other three cases, were associated with water cooling towers contaminated with *L. pneumophila* serogroup 1. No source was identified in another two outbreaks in Victoria in 2002. A cluster of *L. longbeachae* infection cases in New South Wales in July was attributed to use of potting mix. There was one death (Table 14). There were also two linked cases identified in Queensland, but no source of infection was identified

In all there were 14 deaths identified as due to legionellosis in Australia in 2002, giving a case fatality rate of 4.3 per cent. The break down of deaths by jurisdiction and infecting *Legionella* species is shown in Table 14. The case fatality rate for infections with *L. pneumophila* (6/119, 5%) was not significantly higher than for *L. longbeachae* infections (7/154, 4.5%) in contrast to 2001, where the case fatality rate for *L. pneumophila* infections was significantly higher.[14] All deaths reported to be caused by legionellosis occurred in older adults.

Leprosy

Leprosy is a chronic infection of the skin and peripheral nerves with the bacterium *Mycobacterium leprae*. Despite being eliminated in most countries, the disease remains as a major public health problem in six major endemic countries. Leprosy is a rare disease in Australia, with the majority of cases occurring among migrants to Australia from leprosy-endemic countries and in Indigenous communities.

In 2002, three leprosy cases were notified compared with five in 2001. The cases in 2002 occurred in Victoria, the Northern Territory and Western Australia. Two were male and one female and the age range was 25 to 34 years. Two cases were in Indigenous Australians (from the Northern Territory and the Kimberley region of Western Australia) and the third case was initially diagnosed in India.

Table 13. Notifications of legionellosis, 2002, by species and state or territory*

Species	State or territory							
	ACT	NSW	NT	Qld	SA	Vic	WA	Total
Legionella longbeachae	1	20	1	16	60	17	36	151
Legionella pneumophila	0	21	0	26	6	58	7	118
Other species†	0	1	0	2	0	32	0	35
Unknown species	2	0	0	0	0	0	12	14
Total	3	42	1	44	66	107	55	318

* No reports from Tasmania.

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

Table 14. Deaths due to legionellosis by species, 2002, by state or territory

	State or territory							
	ACT	NSW	NT	Qld	SA	Vic	WA	Total
L. longbeachae	0	1	0	1	2	0	3	7
L. pneumophila	0	0	0	0	1	3	2	6
Other species*	0	0	0	0	0	0	1	1
Total	0	1	0	1	3	3	6	14

Invasive meningococcal disease

Meningococcal serogroups A, B, C, Y and W–135 are the major human pathogens. In Australia, serogroups B and C are the major cause of invasive meningococcal disease. Internationally, WHO estimated that there are at least 500,000 invasive meningococcal cases and 50,000 deaths every year.[44] In 2002 there were 684 notifications of invasive meningococcal disease in Australia, a small increase on the 677 reported in 2001. The national notification rate remained at 3.5 per 100,000 population. The highest rate was reported from Tasmania (5.5 per 100,000 population) as a result of an outbreak which began in September 2001 and continued into early 2002. The largest number of cases nationally occurred in winter (85 cases in July and 90 in August) (Figure 61).

The highest age specific rate was in children aged 0–4 years (13.6 cases per 100,000 population) and in the 15–19 year age group (10.3 cases per 100,000 population). There was a small excess of cases among males (male to female ratio 1.3:1), with the largest difference in rates between the sexes in the 15–19 year age group (male to female ratio 1.5:1) (Figure 62).

Among the 684 meningococcal cases, 563 (82%) were serogrouped. Of these, 299 (53%) were serogroup B, 222 (39%) were serogroup C, and 42 (7%) were serogroup W135 or serogroup Y (Table 15).

Figure 61. Trends in notifications of meningococcal infection, Australia, 1991 to 2002, by month of onset

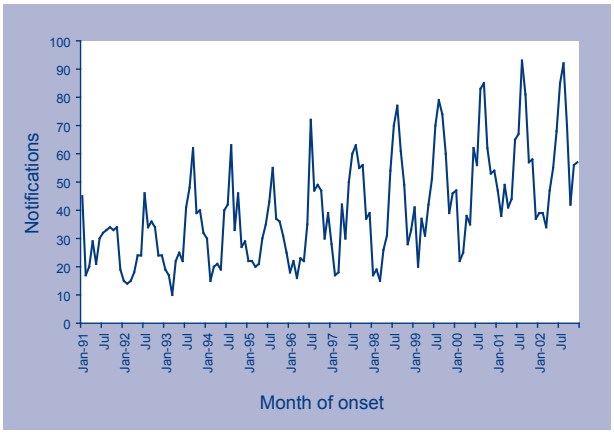


Figure 62. Notification rates of meningococcal infection, Australia, 2002, by age group and sex

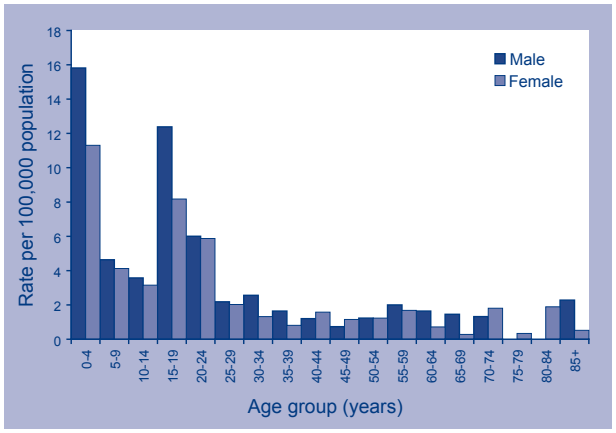


Table 15. Notifications of meningococcal infection by serogroups, 2002, by state or territory

	State or territory								
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Total
Serogroup B	1	105	7	59	16	9	56	46	299
Serogroup C	4	54	1	46	8	17	87	5	222
Other serogroups*	0	5	0	11	1	0	10	15	42
Unknown serogroup	1	49	1	7	6	0	57	0	121
Total	6	213	9	123	31	26	210	66	684

* Other includes serogroups Y and W135.

In 2002, there were 43 deaths due to meningococcal disease giving a crude case fatality rate of 6.2 per cent. The breakdown of deaths by jurisdiction and serogroup are shown in Table 16. The case fatality rate for infections with meningococcal group C (26/221, 11.7%) was significantly higher than for meningococcal group B infections (15/299, 5%, chi-square=7, p<0.01).

Several clusters and outbreaks of meningococcal disease were reported in 2002. In January 2002 two passengers from a cruise ship, one from New South Wales and the other from South Australia, were diagnosed with meningococcal disease after disembarking. One case subsequently died. Over 1,000 passengers had travelled on the cruise ship. Close contacts of the two patients were given antibiotic prophylaxis and there were no further cases. Three clusters of meningococcal disease serogroup C were reported in Victoria, one in a university, one in a child-care centre, and the third was community based. Two clusters comprised only two cases each, while the community outbreak involved four cases. Contacts were given antibiotic prophylaxis and meningococcal group C vaccination. Vaccination was also important in controlling a community outbreak in a rural town in Queensland. In this instance there were three cases and 2,300 residents in the community were vaccinated with the tetravalent polysaccharide meningococcal vaccine. A report on surveillance of meningococcal disease in Queensland has recently been published.[45] In response to community concerns about increases in meningococcal disease in Australia, the Australian Government approved the National Meningococcal C vaccination program, which commenced in January 2003.[46]

Laboratory based meningococcal surveillance

The Australian Meningococcal Surveillance Programme was established in 1994 for the purpose of monitoring and analyses of 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 2002 have recently been published.[47]

In 2002, a total of 393 isolates of *N. meningitidis* was analysed by the program, an increase from the 338 isolates analysed in the previous year. Serogroup B continues to be the predominant strain for the disease (210 isolates, 53%) nationally, followed by serogroup C (162 isolates, 41%). However, there was mix in the phenotypes circulating in the different states and territories. Serogroup C strains predominated in the Australian Capital Territory (80%), Tasmania (70%) and Victoria (56%).

The pattern of age distribution for meningococcal infection varied by the phenotype. Serogroup B was more frequently reported in the 0–4 year age group (40%). In contrast, serogroup C commonly occurred in the 15–19 year age group (29.6%).

In 2002, about two-thirds of all the isolates showed decreased susceptibility to the penicillin group of antibiotics (Minimum Inhibitory Concentration 0.06 to 0.5 mg/L). All isolates tested were susceptible to third generation cephalosporins and to the prophylactic antibiotics, rifampicin and ciprofloxacin.

Table 16. Deaths due to meningococcal infection by serogroups, 2002, by state or territory

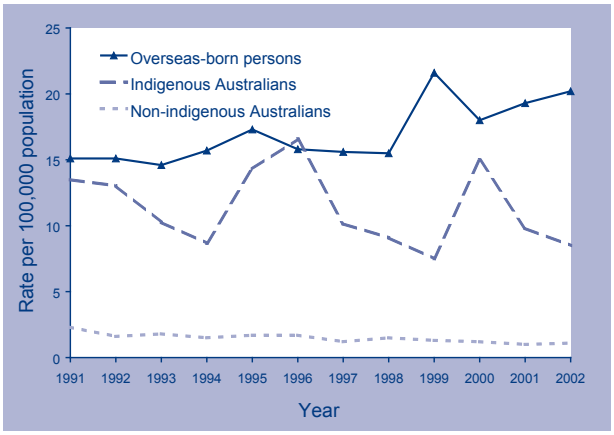
	State or territory								
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Total
Serogroup B	0	8	0	2	3	0	2	0	15
Serogroup C	1	10	0	2	1	2	10	0	26
Other serogroups*	0	1	0	0	0	0	0	1	2
Unknown serogroup	0	0	0	0	0	0	0	0	0
Total	1	19	0	4	4	2	12	1	43

* Other includes serogroup Y and W.

Tuberculosis

While Australia has one of the lowest rates of tuberculosis (TB) in the world the disease remains a public health problem in the overseas-born and Indigenous communities (Figure 63). In 2002, 975 TB notifications were received by NNDSS, a rate of 5.0 cases per 100,000 population a similar number and rate to 2001. The notification rates of TB were lower than the national average in the Australian Capital Territory, Queensland, South Australia, Tasmania and Western Australia as in previous years. The highest rate was reported in the Northern Territory (19.2 cases per 100,000 population).

Figure 63. Trends in tuberculosis notification rates, Australia, 1991 to 2002, by Indigenous status and country of birth



In 2002, the male to female ratio was 0.9:1. Tuberculosis cases occurred in all age groups, with the highest age-specific rates reported in the 80–84 year age group (14.6 cases per 100,000 population). Detailed analyses of TB in Australia has recently been published.[48]

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 2002, a total of 14 laboratories reported 26,052 infectious agents to LabVISE. This represents a 7 per cent increase from reports received in the previous year (Table 17). The top three reporting laboratories were from South Australia (24%), Western Australia (25%) and Queensland (18%). The two jurisdictions with the largest populations, New South Wales and Victoria, contributed 17 per cent and 12 per cent respectively, to the total reports received by LabVISE (Table 17).

Sixty-six per cent (n=17,251) of all reports received by LabVISE were viral infectious agents, and the remaining 34 per cent (n=8,809) were bacterial or other infectious agents. Among viruses, ortho/paramyxoviruses (influenza, parainfluenza and respiratory syncytial virus) were the most commonly reported (33%; 6,276) followed by herpes viruses (24%; 4,642). Measles, mumps and rubella contributed 11 per cent of reports of viral infections (Figure 64). Among non-viral infectious agents, *Chlamydia trachomatis* (43%, 3,859), *Treponema pallidum* (16%, 1,396) and *Mycoplasma pneumoniae* (13%, 1,232) were the most commonly reported pathogens.

Figure 64. Reports of viral infections to the Laboratory Virology and Serology Reporting Scheme, 2002, by viral group

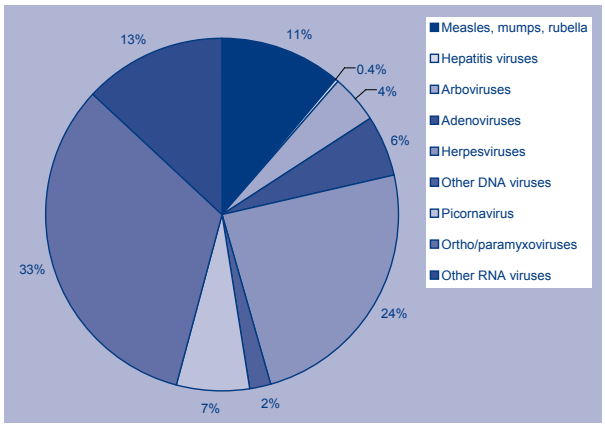


Table 17. Infectious agents reported to the Laboratory Virology and Serology Reporting Scheme, Australia, 2002, by state or territory

Organism	State or territory									
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Total 2002	Total 2001
Measles virus	0	0	0	2	0	0	13	1	16	123
Mumps virus	0	2	1	1	0	0	6	6	16	32
Rubella virus	1	4	1	63	6	0	13	4	92	84
Hepatitis A virus	0	3	11	20	18	0	3	15	70	81
Hepatitis D virus	0	0	0	1	3	0	3	0	7	11
Hepatitis E virus	0	0	1	0	0	2	5	1	9	5
Ross River virus	0	7	26	247	31	11	7	94	423	863
Barmah Forest virus	0	11	6	152	4	1	6	23	203	269
Dengue	1	1	118	3	3	0	1	41	168	221
Murray Valley encephalitis virus	0	0	0	0	0	0	1	6	7	7
Kunjin virus	0	0	0	0	0	0	0	3	3	9
Flavivirus (unspecified)	0	0	3	26	0	1	13	0	43	26
Adenoviruses	3	177	20	44	344	0	125	357	1,070	1,205
Herpesviruses	62	512	119	1,173	1,349	19	347	1,061	4,642	4,849
Other DNA viruses	6	7	16	39	131	0	72	89	360	441
Picornavirus	8	523	34	10	46	10	55	623	1,309	1,519
Ortho/paramyxoviruses	9	1,570	24	381	1,585	38	500	2,169	6,276	4,618
Other RNA viruses	82	497	5	5	667	83	789	409	2,537	1,891
Chlamydia trachomatis not typed	26	555	173	1,133	860	39	20	1,053	3,859	3,404
Chlamydia pneumoniae	14	2	2	0	0	0	0	14	32	7
Chlamydia psittaci	0	0	2	1	5	2	37	15	62	77
Mycoplasma pneumoniae	7	118	10	202	317	29	401	148	1,232	966
Mycoplasma hominis	0	2	0	0	0	0	0	0	2	1
Coxiella burnetii (Q fever)	3	19	2	57	66	0	52	50	249	162
Rickettsia species	0	0	0	0	0	0	1	8	9	105
Streptococcus group A	85	32	44	269	0	0	95	0	525	399
Streptococcus group B	119	5	3	0	0	0	1	0	128	20
Yersinia enterocolitica	0	6	1	2	0	0	0	0	9	5
Brucella abortus	0	0	0	0	0	0	1	1	2	1
Brucella species	0	0	0	4	0	0	1	0	5	5
Bordetella pertussis	5	79	12	275	273	2	238	58	942	1,662
Legionella pneumophila	0	3	1	0	3	0	107	6	120	67
Legionella longbeachae	0	3	0	0	16	0	30	29	78	37
Legionella species	0	0	0	0	0	0	15	0	15	15
Cryptococcus species	0	3	1	9	17	0	0	0	30	21
Leptospira species	0	2	1	12	2	0	0	1	18	39
Borrelia burgdorferi	0	0	0	0	2	0	0	0	2	–
Treponema pallidum	0	152	362	389	421	0	8	64	1,396	1,119
Entamoeba histolytica	0	0	1	3	0	0	12	12	28	11
Toxoplasma gondii	2	9	0	0	6	1	8	2	28	35
Echinococcus granulosus	0	0	0	0	17	0	4	9	30	33
Total	433	4,304	1,000	4,523	6,192	238	2,990	6,372	26,052	24,445

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 who 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 2002, influenza-like illnesses, acute cough (with chest and systemic signs or with chest signs only or with systemic signs only or without signs) and gastroenteritis were the clinical conditions related to communicable diseases, which were reported to ASPREN. Approximately 66 general practitioners from all states and territories participated in the scheme. Seventy-five per cent of these were located in metropolitan areas and the remainder in rural areas. Each week, on average 51 general practitioner practices (with an average capacity of 5,674 consultations per week) reported to the scheme.

Acute cough, without chest or systemic signs, was the most reported condition with a mean weekly consultation rate of 17 cases per 1,000 consultations. Consultation rates for influenza-like illnesses and acute cough reached their peak in mid-July to mid-August (Figures 65 and 66). During this peak period consultation rates per week were 17 cases per 1,000 consultations for influenza-like illnesses, and 27 cases per 1,000 consultations for acute cough without chest or systemic signs. Consultation rates per week for the other categories of acute cough were 13 cases per 1,000 consultations for acute cough with chest signs and eight cases per 1,000 consultation for both acute cough with systemic signs and acute cough with chest and systemic signs. For gastroenteritis consultation rate peaked in December at 14 cases per 1,000 consultation per week (Figure 67).

Figure 65. Consultation rates for influenza-like illness, ASPREN 2002, by week of report

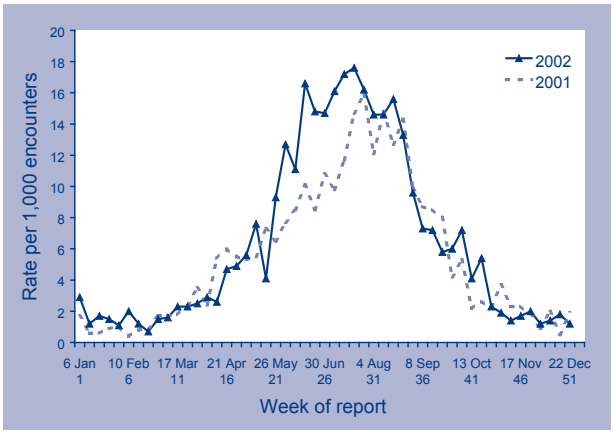


Figure 66. Consultation rates for acute cough, ASPREN, 2002, by week of report

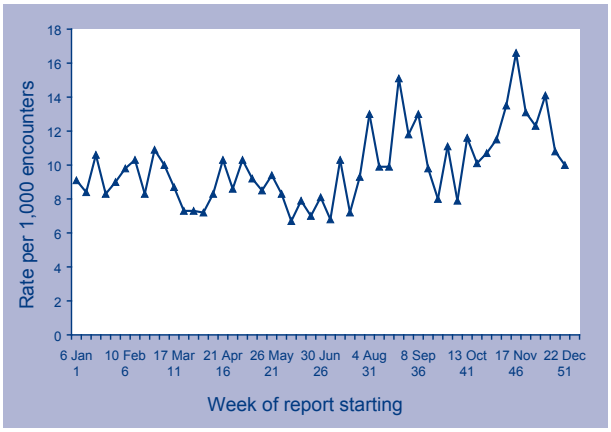
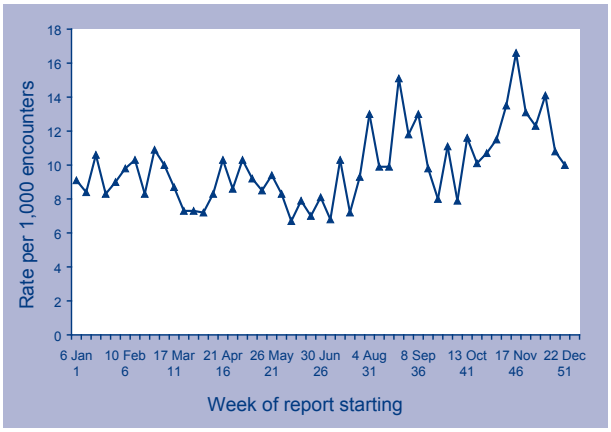


Figure 67. Consultation rates for gastroenteritis, ASPREN, 2002, by week of report



Appendices

Appendix 1. Australian Bureau of Statistics estimate of Australian mid-year population data, 2002, used in the calculation of rates

Australian population by state or territory and sex

Sex	State or territory								
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Australia
Male	158,723	3,296,998	103,693	1,843,078	751,753	232,788	2,401,089	964,313	9,753,818
Female	163,096	3,343,357	94,320	1,864,097	768,489	239,937	2,471,449	963,009	9,908,963
Total	321,819	6,640,355	198,013	3,707,175	1,520,242	472,725	4,872,538	1,927,322	19,662,781

Australian population by state or territory and age group

Age group	State or territory								
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Australia
0–4	20,611	431,333	17,647	247,496	90,639	30,671	306,526	125,291	1,270,421
5–9	21,716	450,700	17,094	264,380	98,264	33,048	325,682	134,253	1,345,413
10–14	22,570	455,835	16,182	267,738	100,719	34,079	328,883	139,884	1,366,161
15–19	24,657	454,306	14,840	267,003	104,218	34,019	333,521	142,747	1,375,472
20–24	27,515	445,075	15,885	256,985	97,525	28,688	339,049	135,958	1,346,811
25–29	25,614	470,636	17,727	258,640	97,063	27,479	347,997	133,644	1,378,959
30–34	25,818	505,495	18,521	277,369	109,128	31,795	383,901	147,186	1,499,403
35–39	24,529	498,109	16,907	273,907	111,363	32,946	369,042	146,965	1,474,007
40–44	25,015	508,912	15,723	283,110	117,102	36,670	371,643	150,898	1,509,294
45–49	23,550	459,189	13,598	257,826	108,260	34,155	337,899	140,424	1,375,138
50–54	22,737	432,313	12,225	247,911	104,384	32,442	316,976	130,790	1,299,961
55–59	17,447	366,056	8,362	208,887	88,484	27,948	264,243	103,716	1,085,254
60–64	11,802	287,815	5,548	159,740	68,784	22,647	210,025	80,023	846,486
65–69	8,584	242,566	3,060	125,906	58,970	18,583	176,848	63,530	698,101
70–74	7,113	223,812	2,140	111,299	56,098	16,856	162,277	55,287	634,905
75–79	5,975	185,912	1,267	90,626	49,337	13,897	136,186	44,129	527,337
80–84	3,825	124,301	709	60,770	33,157	9,259	88,804	28,437	349,273
85+	2,741	97,990	578	47,582	26,747	7,543	73,036	24,160	280,385
Total	321,819	6,640,355	198,013	3,707,175	1,520,242	472,725	4,872,538	1,927,322	19,662,781

Appendix 2. Completeness of National Notifiable Diseases Surveillance System data, received from states and territories, 2002

	State or territory								
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Australia
Total notifications	1,433	26,280	4,873	25,991	7,244	2,073	21,705	10,690	100,291
Sex									
Number missing	9	86	4	28	2	3	312	24	468
% complete	99.4	99.7	99.9	99.9	100.0	99.9	98.6	99.78	99.54
Age									
Number missing	3	71	20	0	2,922	9	225	18	3,268
% complete	99.8	99.7	99.6	100.0	59.7	99.6	99.0	99.83	96.74
Indigenous status									
Number missing	1,340	13,080	488	19,486	1,214	1,799	11,965	4,871	54,243
% complete	6.5	50.2	90.0	25.0	83.2	13.2	44.9	54.43	45.91

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Interruption of rubella virus transmission in Australia may require vaccination of adult males: evidence from a Victorian sero-survey

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Abstract

Prior to the introduction of rubella vaccine to Australia in 1970 rubella was primarily a disease of primary school aged children. Vaccination programs have subsequently altered rubella age and sex susceptibility. Between July 2001 and June 2002, 85 per cent of the 32 laboratory-confirmed cases of rubella ascertained from enhanced surveillance in Victoria were males aged 20–42 years. This study aimed to determine rubella susceptibility by age group and sex in Victoria and to examine the implications of susceptibility for the interruption of circulating rubella virus. Rubella immunoglobulin G concentrations were determined for 934 residual diagnostic sera stored at the Victorian Infectious Diseases Reference Laboratory using a standard commercial enzyme immunoassay. Susceptibility was analysed by age groups defined by previous and current Australian rubella immunisation schedules. Among all subjects aged 1–55 years, males were more susceptible to rubella infection than females (10.2% vs 2.6%, p<0.0001). Although this sex difference occurred in all age groups, it was unlikely to be explained by sampling variation in sera from subjects aged 23–44 years, for whom rubella vaccine had been recommended only for girls aged 10–14 years and rubella susceptible women post-partum. Australia's past rubella immunisation policies have resulted in a susceptible cohort of adult males. If rubella virus transmission is to be interrupted in Australia, consideration needs to be given to a rubella vaccination program targeting men aged 17–44 years. A campaign, targeting both men and women in a similar age group has recently been successful in Costa Rica. *Commun Dis Intell* 2004;28:69–73.

Keywords: rubella, susceptibility, age group, sex

Introduction

Prior to the introduction of vaccination, rubella infection was generally a very common but relatively benign infection of primary school aged children. However 80 per cent of infections during the first eight weeks of pregnancy result in congenital rubella syndrome (CRS).[1] Rubella vaccine, which is thought to confer life long immunity, was first licensed in 1969 in the United States of America and the following year in Australia.[1,2] In 1971 a campaign aimed at vaccinating girls aged 10–14 years and women who were found to be susceptible to rubella post-partum was introduced in Australia.[2] This campaign was successful in reducing the incidence of CRS. Before the introduction of rubella vaccination about 120 cases of CRS occurred each year, equivalent to a case rate of 1 per 2,200 live births. Between 1993 and 1997 the incidence of CRS had decreased to approximately 1 in every 67,000 live births.[3] In 1997 there was one case where the infant had defects associated with congenital rubella and another case in 1999 where the infant had no defects. There were no further cases until 2003 when two cases, both with congenital rubella defects, were reported from Queensland.[4]

During the 1980s and 1990s a change from selective to universal rubella vaccination occurred in many industrialised countries, facilitating the potential eradication of circulating rubella virus.[5] In Australia, the schoolgirls only rubella vaccine program was replaced in 1993 by measles-mumps-rubella (MMR) vaccine for both boys and girls between the ages of 10 and 16 years. This was effectively a second dose of the MMR vaccine, the first having replaced measles-mumps for 12-month-old infants in 1989.[2] It is however, unlikely that many children would have received both the infant and adolescent vaccine doses. In 1998, in conjunction with the national Measles Control Campaign, the recommended age for the second dose of MMR was reduced from 10–16 years to 4–5 years. After the Measles Control Campaign, rubella susceptibility in people aged 1–18 years dropped from 17 per cent to

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9 per cent. However, young adult males were more susceptible to rubella than females in both pre- and post-campaign testing.[6]

Sequential changes to rubella immunisation policies in Australia have altered the age groups most at risk of infection. This is reflected in results from Victoria of the first 12 months of enhanced rubella surveillance, conducted between July 2001 and June 2002, when 29 (85%) of the 32 laboratory-confirmed cases of rubella were males aged 20–42 years.[7] We performed a sero-survey using residual sera at the Victorian Infectious Diseases Reference Laboratory (VIDRL) to determine if cases identified by enhanced surveillance were reflective of sex and age group susceptibility in Victoria. We also aimed to examine the implications of susceptibility for the interruption of circulating rubella virus in Victoria and, by implication, Australia. Interruption of rubella transmission has been achieved in Finland[8] and is a goal of the Pan American Health Organization.[9]

Methods

From all residual sera submitted for diagnostic testing at VIDRL between January and October 2002, a convenience sample of 934 sera from subjects aged 1–55 years at the time of specimen collection, was retrieved. Subjects who had been tested for any illness characterised by a rash, including measles or rubella, were excluded from the sample. Ethics approval for this study was obtained from the Ethics Committee of the Royal Melbourne Hospital Research Foundation.

The sample size was determined by the expected measles immunity in specific age-groups defined by past Australian measles immunisation policies,[10] since the sample was primarily designed to estimate changes in measles immunity following the immunisation campaign targeting young adults.[11]

Sera from approximately equal numbers of male and female subjects were tested at VIDRL for rubella-specific IgG using the Beckman Access Immunoassay System (Beckman Instruments, Chaska, MN, USA). In accordance with the manufacturer's instructions, subjects were considered protected from rubella virus infection if the IgG concentration was >15 IU/ml and susceptible if <10 IU/ml. Initially equivocal specimens (10–15 IU/ml) were re-tested. Equivocal results on final testing were regarded as susceptible.

We have assumed rubella vaccination strategies will have affected rubella immunity in the population and have further assumed that age-specific immunity in the population would be reflected in the convenience sample. Analysis of rubella immunity was thus based on the presumed effect of changes in rubella immunisation policy on different age groups (Table).[2] Rubella vaccination history was unknown for all subjects for whom sera were tested and analysis was based on rubella vaccination recommendations rather than vaccination history. For instance, if a rubella containing vaccine was recommended at 12 months, it was assumed the vaccine would have been given at 12 months. However, because vaccination policies were in place over a number of years, they applied to children in a wider age range in 2002 than the specific age recommended for vaccination, effectively allowing for vaccination to have occurred later than recommended. There was thus an extended opportunity for immunisation policies to affect population immunity. For the purposes of grouping the data, 10–14-year-old girls in the school-based program between 1971 and 1992 and boys and girls aged 10–16 years between 1993 and 1998, were treated as if all vaccines had been recommended at age 13.

The chi-squared or Fisher's exact test was used for the comparison of categorical variables and exact binomial confidence intervals were calculated around proportions.

Results

About 6.5 per cent of all 934 sera tested lacked protective antibodies to rubella, with males being 3.9 times (95% CI, 2.1–7.3) more susceptible to rubella infection than females (10.2% vs 2.6%, $p<0.0001$) (Table). There was no significant difference in rubella susceptibility of males ($p=0.85$) or females ($p=0.46$) by age group.

Although the point estimate of male susceptibility was higher than the point estimate for females in the age groups 1–5 years (11.1% vs 0%, $p=0.12$), 6–16 years (9.7% vs 5.3%, $p=0.25$) and 44–55 years (6.0% vs 2.1%, $p=0.32$), this may have been explained by sampling variation in smaller samples. There was no difference in rubella vaccination policy by sex for these three age groups (Table). However, the sex difference in susceptibility was very unlikely to be due to sampling variation in the 23–44 year age range who had attended school when the rubella immunisation strategy was to target only adolescent girls. In this age range, 11.2 per cent of males were susceptible to rubella compared with 1.8 per cent of females ($p<0.0001$). Those aged 17–22 years had attended school when both boys and girls were eligible for MMR vaccination and, in this group, 10.3 per cent of males were susceptible to rubella compared with 2.8 per cent of females ($p=0.07$).

The sample did not demonstrate a difference in rubella immunity between males aged 1–22 years for whom at least one dose of rubella vaccine had been recommended and males aged 23–44 years for whom no rubella vaccine had been recommended (10. 5% vs 11.6%, p=0.76). There was a small residual rubella susceptibility of approximately two to three per cent in women of child bearing age (Table).

Discussion

This study has shown that about 6.5 per cent of the sample of residual sera collected from the Victorian population aged 1–55 years lacked protective antibodies to rubella. Males were about four times more likely than females to be susceptible to rubella infection. The epidemiology of rubella in Victoria is now similar to that of measles, a disease predominantly affecting young adults.[10] In the last three measles outbreaks in Victoria between 1999 and 2002, the median age of cases has varied between 22 and 25 years.[12,13,14] The median age of rubella cases from enhanced rubella surveillance in Victoria was 22 years.[7]

Although the results from this study are from an analysis of residual sera, they are likely to be applicable to the wider Victorian community. We have previously shown no significant population health difference between susceptibility to a number of vaccine preventable diseases comparing a convenience sample of residual diagnostic sera and sera obtained from a three-stage random cluster survey in Victoria.[15] Moreover, the findings from enhanced rubella surveillance[7] and a long-term survey of pregnant women in Victoria,[16] support the results from this study.

The results are also likely to be broadly applicable Australia wide. With minor exceptions, vaccination policies in Australian states have been similar in the last 50 years. Measles susceptibility has been previously shown to be similar in young adults from Victoria[10] and Australia,[17] suggesting the same may be true for rubella susceptibility. This appears to be borne out by a comparison of rubella susceptibility in Australians aged 16–18 years, and the results of this study. After the Measles Control Campaign in 1999, only 2 per cent of Australian females aged 16–18 years were susceptible to rubella, compared with 18 per cent of males.[6] In this study, with sera collected in 2002, 3 per cent of Victorian females aged 17–22 years were susceptible to rubella, compared with 10 per cent of Victorian males. Persons aged 16–18 years in 1999 would be aged 19–21 years in 2002, so the two samples should be broadly comparable.

There was no apparent difference in rubella susceptibility comparing males who had received at least one dose of a vaccine containing rubella and those who had received no rubella vaccine. While this may have been due to sampling variation, it may also be due to a lower uptake of MMR vaccination

Table. Susceptibility to rubella infection in sera collected from Victoria, reflecting previous and current rubella vaccination strategies

Age group (years) in 2002	Immunisation policy for vaccines containing rubella	Males		Females		P-value males vs females	All	
		Tested	Susceptible N (%) (95% CI)	Tested	Susceptible N (%) (95% CI)		Tested	Susceptible N (%) (95% CI)
1–5	Measles-mumps-rubella (MMR) at 12 months	36	4 (11.1%) (3.1–26.1)	27	0 (0%) (0–12.8)	0.12	63	4 (6.3%) (1.8–15.5)
6–16	MMR at 12 months and second dose MMR at 4–5 years or as part of Measles Control Campaign	93	9(9.7%) (4.5–17.6)	95	5 (5.3%) (1.7–11.9)	0.25	188	14 (7.4%) (4.1–12.2)
17–22	Measles-mumps at 12 months and MMR for boys and girls aged 10–16 years in school-based program	68	7 (10.3%) (4.2–20.1)	71	2 (2.8%) (0.3–9.8)	0.07	139	9 (6.5%) (3.0–11.9)
23–44	School girl only (10–14 years) rubella program	224	25 (11.2%) (7.4–16.0)	222	4 (1.8%) (0.5–4.5)	<0.0001	446	29 (6.5%) (4.4–9.2)
44–55	No rubella vaccine routinely recommended	50	3 (6.0%) (1.3-16.5)	48	1 (2.1%) (0.1–11.1)	0.32	98	4 (4.1%) (1.1–10.1)
All ages	Various	471	48 (10.2%) (7.6–13.3)	463	12 (2.6%) (1.3–4.5)	<0.0001	934	60 (6.4%) (4.9-8.2)

by boys, presumptive evidence for which has been shown for MMR vaccine uptake in the school based program in South Australia.[18]

Because man is the only host for rubella virus[1] it has been suggested that interrupting the transmission of wild-type rubella virus could prevent CRS.[19] This has been accomplished in Cuba using a combined strategy of vaccinating children and adult women.[20] However, in the late 1990s in the United States of America and Mexico, 80 per cent of rubella cases occurred in males aged 15–44 years, primarily of Hispanic ethnicity.[21] For successful elimination of circulating rubella virus, in addition to providing universal vaccination in childhood, vaccination strategies will need to address the issue of residual rubella susceptibility in those countries like Australia where adolescent and adult males provide a reservoir for the virus.[19] This approach was successful in Costa Rica in May 2001, with the completion of a campaign targeting both males and females aged 15–39 years, with a measles-rubella (MR) vaccine. MR coverage achieved in the campaign was 87 per cent in the 30–34 year age group and greater than 90 per cent in all other target age groups.[22]

Since the monovalent rubella vaccine was licensed in Australia in 1970, rubella vaccination strategies have moved from a selective to a universal approach that has the potential to eliminate rubella infection. However, in Australia and other countries with similar past rubella vaccination strategies, adult males are a susceptible reservoir for circulating rubella virus. If Australia were to aim for interruption of rubella transmission in the near future, consideration would need to be given to a rubella vaccination program targeting adult males who were aged 17–44 years in 2002. This is a similar age range to the young adults targeted in Australia's measles vaccination campaign using MMR vaccine.[11] This age group is difficult to reach in a population based program.

With only two cases of CRS in Australia between 1997 and 1999 and no cases between 2000 and 2002, it may have been assumed that Australia's rubella immunisation policies were moving towards successful prevention of rubella infection among pregnant women.[4] However, two cases of CRS in 2003, where both infants were born to young Caucasian Australian-born mothers, suggests there is no room for complacency in rubella control.[4] Continuation of Australia's current rubella vaccine policy will not interrupt rubella virus circulation until all of Australia's population has been eligible for two doses of rubella vaccine. With an average life expectancy in Australia approaching 80 years, this may not happen until mid way through the century. It may be time to review Australia's approach to rubella immunisation.

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Risk factors for sporadic human infection with shiga toxin-producing *Escherichia coli* in South Australia

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Abstract

This paper reports the findings from a preliminary study seeking to identify risk factors for sporadic human infection with shiga toxin-producing *Escherichia coli* (STEC) in South Australia. This phase of the study, conducted between February and September 2002, aimed to make recommendations regarding study methodology, and provided an opportunity to identify any potential risk factors for STEC infections in South Australia. The study design was a prospective age-matched case control study. A case was defined as a person with macroscopic or microscopic evidence of blood in a faecal specimen, and in which a gene associated with the production of shiga toxin (*stx* 1 or 2) was identified. Two community controls per case were randomly selected from the Social Environmental Risk Context Information System database. Eleven cases and 22 controls were enrolled in the pilot phase of the case control study. Cases were more likely than controls to have eaten berries, including strawberries, blueberries, and blackberries, in the 10 days preceding illness (Mantel Haenszel matched OR 11; 95 per cent CI 1.26-96.12). No other exposures were significantly associated with illness. Due to the small number of study participants, the power of the study was insufficient to expect any significant results. National participation will be vital to obtain sufficient cases in a realistic time, however this would necessitate more consistent ascertainment and reporting of STEC disease between the states and territories. *Commun Dis Intell* 2004;28:74–79.

Keywords: Escherichia coli, *foodborne disease, surveillance, case control study*

Introduction

Shiga toxin-producing *Escherichia coli* (STEC) have emerged over recent years as an important cause of gastroenteritis in humans worldwide. Initially acknowledged as a potential foodborne pathogen, the importance of non-food related transmission of STEC is now also being recognised.[1,2] Absolute numbers of infections are low when compared to other enteric pathogens, however the severe and potentially life threatening illness caused by STEC has prompted the need for rapid expansion of knowledge about the organism and the disease it causes.[3]

Outbreaks of STEC in Australia are quite rare, with only three outbreaks being documented prior to 2002.[4,5,6] Due to inconsistencies in ascertainment and reporting practices, STEC disease is likely to be largely under-reported in national surveillance data. Data for Australia suggests a yearly average of 47 cases for the past five years.[7] Internationally, annual incidence rates vary by region and country and appear to be influenced by numerous local factors including seasonality, dietary habits, food management practice, and animal husbandry methods.[3] Globally, incidence rates are almost impossible to interpret due to inconsistencies in surveillance and diagnostic techniques.

Internationally, risk factor information for STEC infection is mostly derived from outbreak investigations and descriptive epidemiological investigations. Studies of common-source outbreaks have identified numerous risk factors for STEC infection, including consumption of ground beef, salami, sliced meats, raw milk, yoghurt, cheese, sprouts, lettuce, and jerky.[4,–11] However, it is not clear what role these or other risk factors play in sporadic disease. A small number of international case control studies have investigated risk factors specifically for sporadic STEC infection.[12,–16] Risk factors identified

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in these studies included; consumption of beef burgers from commercial premises, consumption of sliced meats from caterers, consumption of fish, and recreational or work visits to farms.

To date, no epidemiological studies have been conducted in Australia to identify local risk factors for sporadic STEC disease. We conducted a case control study to investigate risk factors for sporadic human infection with shiga toxin-producing *Escherichia coli* in South Australia. This paper documents the pilot phase of the study that was conducted between February and September 2002. Current practices in South Australia facilitate the detection of STEC. Since 1997, all faecal specimens submitted to laboratories with microscopic or macroscopic evidence of blood have been polymerase chain reaction (PCR) tested for the presence of *stx* genes.

Methods

A prospective age-matched case control study was conducted in South Australia to investigate potential risk factors for STEC infection between February and September 2002. Cases and controls were recruited from the study population defined as the population of South Australia (approximately 1.5 million persons). A case was defined as a person with macroscopic or microscopic evidence of blood in a faecal specimen, and from which the genes associated with the production of shiga toxin (*stx* 1 or 2*)* was identified. The identification of cases in this study was facilitated by the presence of a reporting system, the South Australian Notifiable Diseases Surveillance System (NDSS).

Cases were excluded from the study if they were secondary cases within a household; identified as part of an outbreak; had travelled overseas in the month before onset of illness; or had no residential telephone number. Cases that had a mixed infection, such as cases that were positive for both *Salmonella* and STEC, were also excluded due to difficulties in establishing an accurate onset date for the STEC infection.

For each case, two controls were randomly selected from the Social Environmental Risk Context Information System (SERCIS). The main role of SERCIS is to conduct health surveys via a computer assisted telephone interview method. Through these surveys SERCIS also recruits participants for other more specific surveys or studies such as case control studies. The reliability of the SERCIS telephone health survey method has been demonstrated.[17,18]

Two controls were matched to each case by five-year age groups, except for those less than 12 months of age who were matched by 6-month age groups (for example, 0–5 months, 7–11 months, 1–4 years, 5–9 years, >65 years etc). The controls were not matched to cases on any other variables. Controls were excluded if they had a history of gastrointestinal illness in the 14-day period prior to the day of interview; reported overseas travel in the month prior to the day of interview; reported another household member with diagnosed STEC disease in the 10-day period before the day of interview; or had *stx* detected in a faecal specimen in the 10-day period before the day of interview.

Information on food and environmental exposures for the 10 days prior to the onset of illness for cases and prior to interview for controls was collected using a questionnaire administered by telephone. One hundred and twelve exposures were selected either because they were previously reported or suspected to be related to STEC infections, because they were food items or sources from which STEC had ever been detected, or they were hypotheses generated in a local case series investigation conducted in South Australia between 1994 and 1997 (Table 1). Details were also collected regarding illness, demography, occupation and household contacts. Data were analysed using Epi Info Version 6.04 software. Mantel Haenszel matched odds ratios were calculated for all dichotomous variables.

Results

In total, there were 11 cases that were enrolled between February and September 2002. The cases were identified from laboratory notifications received by the South Australian Communicable Disease Control Branch that fitted the case definition. Twenty-two age-matched controls were selected from the SERCIS database and enrolled in the study. The median age of the cases was 75 years (age range: 4–90 years) compared with 66.5 years (age range: 2–77 years) for the controls. There was an over representation of females in the control group (59% female) compared with the cases (45% female).

Prevalence of symptoms among the cases varied (Table 2). All cases reported experiencing diarrhoea, with only nine self-reporting that it was visibly bloody. Most cases experienced abdominal pain (n=9), however fewer reported nausea (n=4), vomiting (n=3), headache (n=4), and/or fever (n=4). One case reported constipation prior to diarrhoea onset but subsequent to the onset of other symptoms. One case reported rigors. Five of the 11 cases were hospitalised, and almost all cases sought medical advice from a general practitioner or medical centre (n=10). Three cases reported missing between one and six days of work, recreation time, or childcare.

Table 1. Exposures examined as risk factors for shiga toxin-producing *Escherichia coli* infection, South Australia, 2002

Food exposures	Environmental exposures	Travel exposures
Beef/beefburger/minced beef/roast beef/beef steak/beef shish kebab/shaslicks/beef sausages/silverside/corned beef	Regular attendance at any of the following institutions: Childcare centre Primary school Pre-school Play group Special needs school Hospital Aged care facility	Travel overseas
Sausages		Travel interstate
Lamb		Camping
Pork		
Offal		
Chicken/chicken meat	Occupational exposure to animals	
Turkey/turkey roll	Occupational exposure to raw meat	
Duck	Household member with occupational exposure to animals	
Fish or seafood	Household member with occupational exposure to raw meat	
Salami/mettwurst/cabanossi	Having a household pet	
Jerky	Having a sick household pet	
Devon	Exposure to pet foods: Commercial canned Commercial dry Household leftovers Raw meat Cooked meat	
Ham		
Fruit: Apples/pears/plums/peaches/nectarines/ apricots/strawberries/other berries/ watermelon/rockmelon/honeydew melon		
Fruit salad	Handling of raw red meat fed (either cooked or raw) to household pets	
Vegetables: Lettuce/cabbage/pre-packaged/bagged salad/carrots/spring onion/shallots/radishes/ celery/cucumber/alfalfa sprouts		
	Handling of dried meat strips subsequently fed to pets	
	Living in a rural farm or remote property	
Eggs (raw or cooked)	Visiting a farm	
Unpasteurised dairy products	Touching animals	
Consumption of the following types of water: Tap/municipal water Bore or well water Rain water from above ground tank Rain water from below ground tank Dam water River or stream water	Visiting zoos, petting zoos, wildlife parks	
	Attending regional shows/fairs where there were animal displays	
	Contact with fertiliser or compost made from animal faeces	
Unpasteurised fruit or vegetable juices	Swimming in: Public pool Private pool Paddling pool Spa/jacuzzi River stream Lake Sea Dam	
Handling of any of the following while preparing a meal or snack: Raw meat Raw fish Raw fruit Raw poultry Raw vegetables		
Involved in the slaughter, cutting up, packaging or wrapping of any raw red meat (not part of work)		
Being given a sample of meat to eat in a butcher, supermarket or food store		
Eating at: Restaurant cafe National hamburger chain National pizza chain National chicken chain Milk bar Bakery School/work canteen Home cooked meal at someone else's house		

The consumption of 'berries' in the 10 days before the onset of illness was associated with STEC infection (Mantel Haenszel matched OR 11.00, 95% CI 1.26–96.12). Six of the 11 cases reported eating strawberries, blackberries, or blueberries. The association between STEC and eating strawberries alone was not significant although the OR was elevated (Mantel Haenszel matched OR 5.00, 95% CI 0.97–25.77). Of the five who reported eating strawberries, two reported obtaining these from supermarkets, while the other three were obtained directly from the farm, of which only one was a commercial berry farm. The case that reported eating blackberries obtained them from his own farm, and the case that reported eating blueberries obtained them from a commercial berry farm.

No other food items were significantly associated with STEC infection. Despite this, there were several that had elevated ORs in the matched analysis (Table 3). No environmental exposures were associated with illness. There was no association with travel interstate, intrastate or camping. Many of the ORs obtained in the matched analysis were undefined because the Mantel Haenszel numerator or denominator was zero. This was not unexpected due to the small numbers of cases and controls available for the study.

Table 2. Case illness profile (N=11)

Symptoms	Number of cases
Diarrhoea	11
Bloody diarrhoea*	9
Nausea	4
Vomiting	3
Abdominal pain	9
Headache	4
Fever	4
Other	2
– constipation – rigors	

* Self reported by cases as blood being visible in faeces.

Discussion

The consumption of berries, including strawberries, blackberries and blueberries, in the exposure period was the only exposure significantly associated with sporadic STEC infection in South Australia. No other food or environmental exposures were significantly associated with STEC infection. Some risk factor exposures did have elevated odds ratios, but their association with illness was not significant. Additionally, due to the small study numbers and zero cell counts, many of the odds ratios were undefined, which restricted the interpretation of the results.

Table 3. Selected food exposure frequencies and matched odds ratios in shiga toxin-producing *Escherichia coli* cases and controls

Exposure	Exposed (cases)	Exposed (controls)	Matched OR	95% CI
Berries (including strawberries, blackberries and blueberries)	6/11	2/22	11.00	1.26–96.12
Strawberries	5/11	2/22	5.00	0.97–25.77
Apricots	3/11	1/22	6.00	0.62–57.68
Plums	4/11	3/22	3.50	0.60–20.45
Pork	4/11	3/22	2.67	0.60–11.92
Chicken	10/11	15/22	3.5	0.45–27.13
Turkey	2/11	1/22	4.00	0.36–44.11
Beef	7/11	19/22	0.40	0.06–2.65
Salami	3/11	1/22	6.00	0.62–57.68
Delicatessen sliced meats	7/11	15/22	0.80	0.16–3.91
Being given a sample of meat to eat in a butcher, supermarket or food store	2/11	1/22	4.00	0.36–44.11
Eating at a national hamburger chain	4/11	3/22	6.00	0.56–64.71
Involved in the slaughter, wrapping, or packaging of large quantities of raw red meat*	4/11	2/22	3.50	0.62–19.89

* If a child, immediately present at the time of slaughter, wrapping, or packaging of large quantities of raw red meat.

The association between sporadic STEC disease and the consumption of berries though unexpected is a possible vehicle of infection. Outbreaks of STEC and other enteric pathogens due to the consumption of fresh produce have been documented illustrating that it is a biologically plausible route of infection.[19,20,21] Implicated raw produce have included radish sprouts, lettuce, alfalfa sprouts, unpasteurised apple juice and apple cider.[5,10,22,23]

This is the first reported study to examine risk factors for sporadic infection with STEC conducted in Australia. Conducted as a pilot over a 6-month period, it was not anticipated that any significant results would be obtained from this study. This was due to the limited number of cases of STEC disease that are notified in South Australia, and the requirement for a large study sample to facilitate the detection of any effect. Additionally, it is likely that any association between a risk factor exposure and illness would be small. Given the resource and time limitations, the study was successful in meeting stated objectives. National participation in this study will be vital to identify more reliably the risk factors for STEC in Australia. It would reduce the time frame for the study due to an increased number of cases available for potential inclusion in the study. National participation would require more consistent ascertainment and reporting of STEC disease between the states and territories. The benefits of a national study would include an increased understanding of risk factors for STEC disease, which would enhance the national capability to facilitate the development of targeted prevention and control strategies.

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Uptake of influenza vaccine among Aboriginal and Torres Strait Island adults in north Queensland, 2003

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Abstract

The uptake of the vaccine in at-risk Aboriginal and Torres Strait Island adults in north Queensland in 2003 was determined using the state-wide computerised immunisation register. The uptake in Aboriginal and Torres Strait Island adults ≥50 years was 63 per cent, and assuming that a third of Aboriginal and Torres Strait Island adults 15–49 years of age had a medical risk factor, 85 per cent of those at-risk were vaccinated in 2003. There were considerable improvements in vaccine uptake in both age groups in the Cairns, Charters Towers, Mackay and the Tablelands Health Service Districts (HSDs) in 2003, but there were been considerable declines in both age groups in the Innisfail and Mt Isa HSDs in 2003 compared to 2002. There was also a decline in uptake in adults 15–49 years of age in the Townsville HSD. *Commun Dis Intell* 2004;28:80–82.

Keywords: influenza, surveillance, vaccine

Introduction

Since 1999 the Australian Government has provided funding so that free influenza vaccine can be provided to all Aboriginal and Torres Strait Island adults aged ≥50 years and to those aged 15–49 years with a medical risk factor.[1] The annual uptake of the vaccine in Aboriginal and Torres Strait Island adults in north Queensland can be assessed using the state-wide immunisation database, Vaccination Information and Vaccination Administration System (VIVAS). In 2002 the uptake was 59 per cent in those ≥50 years of age, and assuming that a third of those aged 15–49 years had a risk factor, the uptake in those at-risk in this age group was 85 per cent.[2] This report details the uptake of the influenza vaccine in Aboriginal and Torres Strait Island adults in north Queensland in 2003.

Methods

The vaccine uptake figures were derived as described previously, using the population estimates obtained from the 2001 national census.[2] Because the prevalence of medical risk factors in Aboriginal and Torres Strait Island adults 15–49 years of age is not known with any precision in north Queensland, the uptake in this age group was calculated assuming that one third of this age group has a risk factor.[2]

Results

The number of doses given to, and the uptake of influenza vaccine in, Aboriginal and Torres Strait Island adults ≥50 years of age in north Queensland in 2003 are shown in Table 1. The uptake in this population in each of the Health Service Districts (HSDs) in north Queensland in 2002 and 2003 are compared in Table 2.

The number of doses given to, and the uptake of influenza vaccine (assuming a risk factor prevalence of 33%) in, Aboriginal and Torres Strait Island adults 15–49 years of age in north Queensland in 2003 are given in Table 3. The uptake in this population in each of the HSDs in north Queensland in 2002 and 2003 are compared in Table 4.

Discussion

There was an overall increase of 190 doses of influenza vaccine used in north Queensland in 2003 compared to 2002. The increase was only in Aboriginal and Torres Strait Island adults ≥50 years, with no increase in the overall uptake in adults 15–49 years of age.

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Table 1. Influenza vaccine doses given to Aboriginal and Torres Strait Island adults ≥50 years of age in 2003, north Queensland

Health Service District	Number vaccinated	Uptake* %
Bowen	51	28
Cairns	595	49
Cape York	402	87
Charters Towers	56	51
Innisfail	125	48
Mackay	155	52
Moranbah	8	22
Mt Isa	490	51
Tablelands	294	75
Torres Strait and Northern Peninsula Area	818	94
Townsville	539	64
Total north Queensland	3,533	63

* Based upon Census 2001 population estimates.

Table 2. The uptake of influenza vaccine in Aboriginal and Torres Strait Island adults ≥50 years of age in 2002 and 2003

Health Service District	2002 %	2003 %	Difference %
Bowen	28	28	0
Cairns	40	49	+9
Cape York	88	87	–1
Charters Towers	26	51	+25
Innisfail	62	48	–14
Mackay	44	52	+8
Moranbah	11	22	+11
Mt Isa	58	51	–7
Tablelands	60	75	+15
Torres Strait and Northern Peninsula Area	87	94	+7
Townsville	63	64	+1
Total north Queensland	59	63	+4

Table 3. Influenza vaccine doses given to Aboriginal and Torres Strait Island adults 15–49 years of age in 2003, north Queensland

Health Service District	Number vaccinated	Uptake* %
Bowen	46	19
Cairns	1,133	55
Cape York	946	142
Charters Towers	124	79
Innisfail	267	67
Mackay	333	58
Moranbah	27	42
Mt Isa	831	59
Tablelands	783	120
Torres Strait and Northern Peninsula Area	1,750	156
Townsville	1,431	83
Total north Queensland	7,671	85

* Based upon the assumption that 33 per cent of the Census 2001 population estimate had a risk factor.

Table 4. The uptake of influenza vaccine in Aboriginal and Torres Strait Island adults 15–49 years of age in 2002 and 2003

Health Service District	2002 %	2003 %	Difference %
Bowen	23	19	–4
Cairns	49	55	+6
Cape York	147	142	–5
Charters Towers	31	79	+48
Innisfail	84	67	–17
Mackay	35	58	+23
Moranbah	11	42	+31
Mt Isa	77	59	–18
Tablelands	105	120	+15
Torres Strait and Northern Peninsula Area	159	156	–3
Townsville	88	83	–5
Total north Queensland	85	85	0

* The uptake is based upon the assumption that 33 per cent of the Census 2001 population estimate had a risk factor.

Based upon a review of a substantial body of scientific literature,[3] authorities in the United States of America have made a number of recommendations that have been shown to improve vaccine uptake. For example, they strongly recommend that regular reminders of due (and overdue) immunisations be provided to vaccine providers and that regular assessment and feedback of vaccination coverage be provided to these providers.[4] These recommendations (and several others) are now incorporated into standards for adult immunisation practice.[5]

Early each year, a listing of all Aboriginal and Torres Strait Island adults who have previously received a dose of influenza vaccine, is provided to the vaccine service providers in Queensland and recorded as having administered the most recent doses. It is assumed that this listing serves as a reminder so that the providers can recall these individuals for their annual influenza vaccination. Similarly, towards the end of each year, a influenza vaccination uptake report for the current year is provided to all HSD managers in north Queensland. Again, it is assumed that this report serves as feedback for the services in each District, and that further strategies for subsequent years are developed where necessary.

It can be seen that, compared to 2002, there have been considerable improvements in influenza vaccine coverages in both age groups in the Cairns, Charters Towers, Mackay and the Tablelands HSDs in 2003, suggesting that the 2002 feedback may have served a useful purpose in these Districts.

However, there have been considerable declines in coverage in both age groups in the Innisfail and Mt Isa HSDs in 2003 compared to 2002. There was also a decline in uptake in adults aged 15–49 years in the Townsville HSD. These Districts will need to review their vaccine delivery strategies in preparation for the 2004 Aboriginal and Torres Strait Island adult influenza vaccination program. High annual uptake of influenza vaccine is crucial, particularly for those at high-risk, not only for the prevention of influenza, but also for influenza pandemic preparedness.

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Fish, so foul! Foodborne illness caused by combined fish histamine and wax ester poisoning

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Abstract

Nine people who ate a fish curry from a mobile canteen experienced increased heart rate, flushed skin, headache, nausea and diarrhoea shortly afterwards. These symptoms, which lasted for a mean of nine hours, were thought to have been associated with a combination of fish histamine and wax ester poisoning. The incriminated fish used was eventually identified as castor oil fish (*Ruvettus pretiosus*). Fish histamine poisoning is not confined to any particular species but wax ester intoxication only results from the consumption of two fish species, making identification of the incriminated fish of great importance in ascertaining a cause. *Commun Dis Intell* 2004;28:83–85.

Keywords: fish histamine, foodborne disease, Ruvettus pretiosus, *wax ester*

Introduction

South Eastern Sydney Public Health Unit was alerted to a possible outbreak of foodborne illness associated with a catered work-site meal when seven persons were transported by ambulance to four inner-Sydney hospitals on 8 January 2001. The public health response comprised epidemiological and food safety investigations.

Method

Individuals who had eaten the implicated meal were interviewed in the 24 hours following the notification. A questionnaire was developed which asked about symptoms experienced, the time of onset and the duration, the foods consumed, and about any exposure to hazardous substances during the course of their work. Cases were defined as persons who had not been ill prior to the meal and subsequently suffered from nausea, increased heart rate, or diarrhoea. Interview data were recorded and relative risks calculated using EpiInfo version 6.0.

The mobile caterer who had provided the work-site meal and the fish merchant were inspected in order to determine the level of hygiene, food preparation methods, storage practices (including potential for cross contamination), and the possibility of temperature abuse. The implicated fish was ultimately traced back to the fishing vessel from which it had been caught. Food samples were sent to the NSW Health Division of Analytical Laboratories for microbiological and chemical testing.

Results

Epidemiological investigation

Twenty-eight people were interviewed including nine who fulfilled the case definition. Of the cases, five (56%) were men, compared to 14 (74%) of the 19 controls. The mean ages of both cases and controls were 34 years. For cases, the mean time between consumption and onset of illness (incubation period) was 59 minutes, with a median of 30 minutes (range 10–240). Five patients had recovered by the time of interview with a mean illness duration of nine hours (range 1–16).

The most common symptoms were headaches and hot flushes, followed by increased heart rate and diarrhoea (Table). Headache, hot flushes and increased heart rate occurred together in seven cases. The case with a prolonged incubation period of 240 minutes experienced only diarrhoea.

Epidemiological analysis clearly implicated the fish curry which had been eaten by all cases and six of the nineteen controls.

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Table. Symptoms experienced by nine cases

Symptoms	Number
Headache	8
Hot flushes	8
Increased heart rate	7
Diarrhoea	5
Nausea	5
Abdominal cramps	4
Rash	4
Fever	3
Paraesthesiae	3
Sore throat	1
Numbness	1

Food safety inspection

The mobile caterer and the merchant who provided the fish used in the curry were both inspected and defects were found in handling, including storage of fish at incorrect temperatures likely to lead to spoilage. A sample of the fish used in the curry was found to contain histamine at a level of 2,009 mg/kg (maximum allowable level up to 100 mg/kg). No organochlorine or organophosphorus pesticides were detected and all metal concentrations were found to be within the limits set out in the Australian Food Standards Code. The implicated fish had the common name of rudderfish, shared by a number of unrelated species, and was eventually identified by the NSW Department of Fisheries as *Ruvettus pretiosus.*

Discussion

Based on symptoms of flushing and headache after a short incubation period, the food inspectors quickly arrived at a provisional diagnosis of fish histamine poisoning. The involvement of the wax ester in the fish flesh was only recognised later. The investigation was greatly hampered in this respect by the difficulties of identifying the fish involved. Fish histamine poisoning is not restricted to any specific fish or group of fish. However, the presence of high levels of wax esters in the flesh is species-specific and so diagnosis of this element of the illness would have been greatly assisted by an earlier, accurate identification of the fish species.

Due to the use of the common name 'rudderfish' by the food vendor and the fish monger, effort was initially expended in explaining illness attributable to two species generally accorded this name, *Kyphosus vaigensis* (family Kyphosidae) and *Centrolophus niger* (family Centrolophidae), both innocent of known association with food poisoning. The definitive identification of the fish as *Ruvettus pretiosus* (family Gempylidae) required the expertise of NSW Department of Fisheries.

Fish histamine poisoning is well recognised in the medical literature. Bacteria, introduced either from the marine environment or during handling, multiply and consume muscle histidine, converting it to histamine.[1] Consumption of histamine leads to a syndrome typified by cardiovascular symptoms (flushing, urticaria, hypotension and headache); gastrointestinal symptoms (abdominal cramps, diarrhoea and vomiting); and neurological symptoms (pain and paraesthesiae).[1] Prompt and continuing refrigeration of the fish inhibits the proliferation of the offending bacteria. The fish implicated in this outbreak contained 20 times the upper level of histamine allowed by the Australian Food Standards Code,[2] and severe toxicity is expected at this concentration.[3]

Wax ester poisoning is less well documented. The causative compounds are probably part of the fish's buoyancy system and do not seem to be intended as a deterrent to predators.[4] *R. pretiosus* has been used as a medicinal purgative by Polynesian and Melanesian people as part of their traditional practices.[5,6] The fish is known in English as the 'castor oil fish' as a result of the purgative action of its flesh.[7,8] However, according to one authority, 'the taste qualities of this fish are high. It is an excellent table fish',[9] and this may explain its continued use as food. It has a worldwide distribution at depths between one hundred and seven hundred metres;[7] one of the few places where it is actively sought as a food fish are the Comoro Islands where catches of Coelacanth are associated with the *Ruvettus* fishery.[8] Watery or oily diarrhoea is the only recorded symptom associated with the consumption of fish with high quantities of wax esters.[7,8] One record of experience of this states that the fish 'has a drastic effect….without however any pain preceding' and also that 'In the Line Islands it is called "Te icka na peka"—hardly translatable in polite English; but not to be too coarse we will say it means "the fish that makes you obey the call of nature in double quick time"'.[5]

Conclusions

The pattern of symptoms experienced after consumption of the fish curry resulted from a combination of histamine contamination secondary to inadequate refrigeration and the high wax ester fraction of the fish from which the dish had been prepared. Neither fish histamines nor wax esters are broken down by cooking. The presence of histamines was verified by the laboratory tests while the wax ester component was inferred from the identity of the fish and from the existence of a single case that only experienced diarrhoea. The confusion of common names applied to unrelated, but similar looking, fish, only some of which are high in wax esters, contributes to the ongoing occurrence of this form of food poisoning.[11] Steps are being taken by food safety agencies and industry to improve this situation.[11] When outbreaks of fish-related intoxication occur, investigators should consider the possibility that there are multiple causative agents and seek prompt, accurate identification of the implicated fish.

Acknowledgements

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OzFoodNet: enhancing foodborne disease surveillance across Australia: quarterly report, 1 October to 31 December 2003

The OzFoodNet Working Group

Introduction

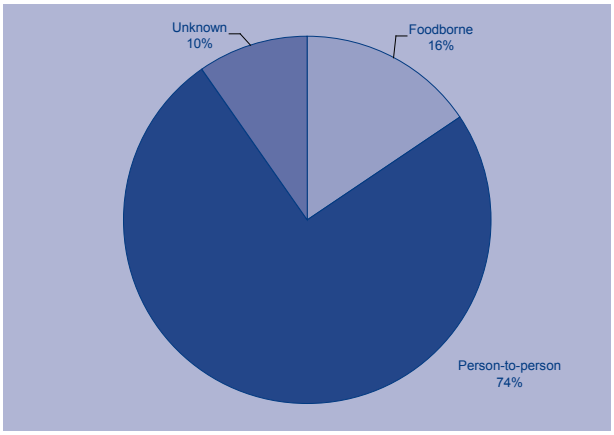
The Australian Government Department of Health and Ageing established the OzFoodNet network in 2000 to collaborate nationally to investigate foodborne disease. OzFoodNet conducts studies on the burden of illness and coordinates national investigations into outbreaks of foodborne disease. This quarterly report documents investigations of gastroenteritis outbreaks and clusters of disease potentially related to food occurring around Australia. For information on sporadic cases of foodborne illness, see Communicable Disease Surveillance, Highlights for 4th quarter 2003 in this issue of *Communicable Diseases Intelligence.*

This report summarises the occurrence of foodborne disease outbreaks and cluster investigations between October and December 2003. Data were reported from all Australian state and territory jurisdictions and a sentinel site in the Hunter region of New South Wales. The data in this report are provisional and subject to change, as results of outbreak investigations can take months to finalise. We would like to thank state, territory and public health unit investigators, public health laboratories, and local government environmental health officers who contributed data to this report.

Foodborne disease outbreaks

During the fourth quarter of 2003, OzFoodNet sites reported 174 outbreaks of gastrointestinal infections (Figure). One hundred and forty-seven of these outbreaks were spread from person-to-person or were of unknown transmission affecting 3,897 persons, hospitalising 153 and causing two fatalities. The majority of these outbreaks occurred in aged care facilities (59%), hospitals (18%) and childcare centres (8%). Outbreaks of gastroenteritis not transmitted by food have often not been reported to health agencies or the reports have been delayed, meaning that these figures significantly under represent the true burden of these infections.

Figure. Mode of transmission for gastro-intestinal outbreaks reported by OzFoodNet sites, 1 October to 31 December 2003



Twenty-seven outbreaks were due to foodborne transmission compared to 21 in the previous quarter and 26 outbreaks for the same quarter in 2002 (Table). Due to Christmas celebrations, there has been a larger number of outbreaks in the fourth quarter of the year. The outbreaks affected 587 persons 33 of whom were hospitalised. There were three fatalities possibly related to contamin-

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All data are reported using the date the report was received by the health agency.

ated food in two outbreaks. There were seven outbreaks of *Salmonella* Typhimurium infection and five outbreaks of norovirus infection, two outbreaks of ciguatera poisoning and one outbreak each of campylobacteriosis and scombroid poisoning. The remaining 10 outbreaks were of unknown aetiology, affecting a total of 217 people. Nine of the outbreaks occurred in association with meals at restaurants and six in association with meals prepared by commercial caterers. Nine outbreaks each occurred in October and November, while seven occurred in December 2003.

Table. Outbreaks of foodborne disease reported by OzFoodNet sites,* 1 October to 31 December 2003

State	Month of outbreak	Setting category	Agent responsible	Number exposed	Number affected	Evidence	Responsible vehicles
ACT	November	Childcare centre	Unknown	48	13	A	Vegetable pasta salad
NSW	October	Restaurant	Unknown	6	6	D	Unknown
	October	Caterer	Unknown	38	23	D	Unknown
	October	Caterer	Unknown	70	19	D	Unknown
	October	Caterer	Unknown	193	78	D	Unknown
	November	School	*S.* Typhimurium RDNC	250	19	AM	Cordial based drink
	November	Restaurant	*S.* Typhimurium 170	100	33	AM	Fried rice
	November	Health care facility	Unknown	7	3	D	Chicken schnitzel
	December	Home	*Eosinophilia* gastroenteritis	20	13	D	Unknown
	December	Restaurant	Unknown	48	25	D	Unknown
NT	October	Caterer	Norovirus	13	11	D	Curried egg sandwich
	November	Caterer	Suspected *Salmonella*	21	10	D	Spicy quail
	December	Restaurant	Norovirus genotype II	Unknown	48	A	Cooked Japanese oysters
Qld	October	Restaurant	Ciguatoxin	15	15	D	Spanish mackerel
	October	Home	*S.* Typhimurium u307	Unknown	7	D	Unknown
	October	Restaurant	Unknown	Unknown	5	D	Unknown
	November	Home	Ciguatoxin	3	3	D	Fish head soup – red emperor
	December	Home	*S.* Typhimurium 197	12	6	D	Unknown
	December	Aged care facility	*S.* Typhimurium 135a	71	47	D	Unknown – suspect raw egg
Vic	October	Takeaway	Unknown	75	28	D	Suspected vegetables and chilli dish
	November	School	*Campylobacter*	38	13	D	Unpasteurised milk or animal to person contact
	December	Hotel	Histamine poisoning	59	22	AM	Butterfish
	December	Restaurant	Norovirus	29	18	D	Unknown
	December	Hotel	*S.* Typhimurium 170	Unknown	46	A	Unknown — suspect raw eggs
WA	November	Restaurant	Norovirus	100	35	A	Oyster shooters
	November	Caterer	Unknown	26	17	D	Club sandwiches
	December	Restaurant	Norovirus	70	24	D	Unknown

* No outbreaks were reported from South Australia or Tasmania.

D Descriptive evidence implicating the suspected vehicle or suggesting foodborne transmission.

A Analytical epidemiological association between illness and one or more foods.

M Microbiological confirmation of agent in the suspect vehicle and cases.

Sites conducted 11 retrospective cohort studies and five case control studies to investigate these foodborne outbreaks. Forty per cent of outbreak investigations relied on descriptive epidemiology alone. Three outbreak investigations obtained both epidemiological evidence of an association with a food and microbiological evidence of the agent in the food. In four outbreaks investigators obtained analytical epidemiological evidence only.

During the quarter, OzFoodNet coordinated an investigation into two outbreaks of norovirus associated with imported oysters from Japan. One of these outbreaks occurred in Western Australia and was associated with oyster shooters (served in shot glasses with sauce) at a function. The other outbreak occurred in the Northern Territory and was associated with oysters cooked at a restaurant. Traceback investigations identified that both products were harvested from the same estuary system in Japan.

Two previous outbreaks of suspected norovirus associated with oysters from Japan occurred in Western Australia in August 2002 and February 2003. A recent report indicated that 54 per cent (154/287) of foodborne norovirus outbreaks in Japan were due to oyster consumption.[1] It is important for the food service industry in Australia to be aware of the concerns with these oysters, and that they must not be consumed raw. Most outbreaks have occurred when these oysters were served raw as 'shooters'. The amount of cooking required to make them safe is unknown, but may be in excess of several minutes for large oysters.[2]

The Victorian Department of Human Services investigated an outbreak of histamine poisoning amongst a group of people eating butterfish. Histamine poisoning has been associated with a build-up of histamine in the fish flesh following bacterial growth when the fish has been mishandled. The symptoms have included tingling or burning sensation in the mouth, rashes, lowered blood pressure, headaches, itchy skin and diarrhoea.[3] Butterfish can also be associated with oily diarrhoea due to high levels of indigestible oils, which may have also caused illness in this outbreak.[4] Victoria also reported an outbreak of 13 cases of gastroenteritis following a school camp. *Campylobacter* was isolated from two cases, and the risk of illness was higher in people who drank unpasteurised milk, although the association was not significant. Evidence has suggested that school children on excursions should not drink unpasteurised milk, as this can lead to outbreaks of campylobacteriosis. They should also be encouraged to wash their hands after coming in contact with or handling animals.

New South Wales reported two outbreaks of *Salmonella* Typhimurium during the quarter, one of which was phage type 170 and the other was an unrecognised phage pattern (RDNC). In one of these outbreaks the vehicle was suspected to be a cordial based drink contaminated by a food handler. The other outbreak was due to contaminated fried rice.

There were two outbreaks of ciguatera in Queensland affecting a total of 18 persons. In one outbreak, illness occurred following the consumption of fish head soup (red emperor) in a home, and the other followed a meal of Spanish mackerel. The Spanish mackerel was caught on a charter boat and cooked at a resort. Outbreaks of ciguatera have been common in Queensland and highlight the need for the education of amateur fishermen and charter companies.[5] Queensland reported three outbreaks of *Salmonella* Typhimurium, all of which were of unknown cause. One outbreak of *Salmonella* Typhimurium 135 occurred in a nursing home and was particularly severe. This outbreak was suspected to be associated with feeding residents raw egg drinks, although food histories were difficult to obtain and *S.* Typhimurium 135 was not isolated from the egg-laying environment. The provision of raw egg drinks to residents of aged care facilities is inappropriate and has previously resulted in outbreaks.[6]

The Northern Territory reported three outbreaks for the quarter including an outbreak of suspected salmonellosis after a meal of quail supplied by a commercial caterer. The Australian Capital Territory reported an outbreak of gastroenteritis following a meal of vegetable pasta. There were no outbreaks of foodborne disease reported from South Australia or Tasmania during the quarter.

Cluster investigations

During the third quarter of 2003, Australian states and territories conducted several investigations into clusters of various *Salmonella* serovar infections, including *S.* Oranienberg in Western Australia; *S.* Typhimurium U290 and *S.* Infantis in Victoria; *S.* Anatum, *S.* Typhimurium 41 in South Australia; *S.* Montevideo in the Hunter; and *S.* Virchow in New South Wales.

During the quarter there was a recall of organic alfalfa sprouts and organic salad due to contamination with *S.* Havana. Other products from the same company were also positive for *S.* Welikade and *S.* Orion. All OzFoodNet sites investigated human cases of infection with these serovars for infections related to consumption of these products, but none was identified.

South Australia investigated four cases of *Yersinia pseudotuberculosis* infections in children from Adelaide. *Y. pseudotuberculosis* was isolated in three of these cases and the fourth was diagnosed serologically. Three cases had an appendectomy as a result of their illness. No source was identified for the cluster of cases. *Y. pseudotuberculosis* is a rare cause of gastroenteritis with similar clinical symptoms to infections with *Y. enterocolitica*, but its significance as a foodborne pathogen is unknown.[3]

There were three clusters of hepatitis A investigated during the quarter in South Australia, New South Wales and the Northern Territory, respectively. In one of the investigations, a food handler was hepatitis A IgM seropositive. A large scale public health response resulted in several hundred people receiving immunoglobulin treatment. No mode of transmission was identified for the other two clusters.

Summary

A key feature of the quarter was the significant number of outbreaks of gastroenteritis spread by person-to-person transmission, especially in outbreaks of norovirus. There were also a large number of outbreaks of foodborne illness prior to Christmas 2003. Also important have been the significant efforts to investigate outbreaks relating to oysters imported from Japan. These oyster related outbreaks highlight the importance of norovirus as a cause of foodborne gastroenteritis with potential for international spread.

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Reporting of communicable disease conditions under surveillance by the APSU, 1 January to 30 September 2003

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Background

The Australian Paediatric Surveillance Unit (APSU) was established in 1993 and is a unit of the Division of Paediatrics and Child Health, Royal Australasian College of Physicians. The activities of the APSU are funded in part by the Australian Government Department of Health and Ageing through the communicable diseases program. The APSU is a founding member of the International Network of Paediatric Surveillance Units (INoPSU). INoPSU now has 14 member units who employ a similar methodology.

The APSU conducts national active surveillance of rare diseases of childhood, including infectious and vaccine preventable diseases, genetic disorders, childhood injuries and mental health conditions. Surveillance through the APSU provides the only available method of national data collection for most of the childhood conditions studied.

The primary aim of the APSU is to document the epidemiology of the conditions under surveillance, their clinical features, current management and short-term outcome. The APSU's secondary aims are to provide a mechanism for national collaborative research and to disseminate data acquired by the Unit to inform best practice, appropriate prevention strategies and optimal health resource allocation.

Contributors to the APSU are clinicians known to be working in paediatrics and child health in Australia. In 2002 over 1,050 clinicians participated in the monthly surveillance of 14 conditions, with an overall response rate of 96 per cent.

As 100 per cent case ascertainment is unlikely to be achieved by any one surveillance scheme, rates reported below represent estimates of minimum incidence in the relevant population. Where available, additional data sources are used to supplement or verify case finding through the APSU. For further information please contact the APSU by telephone on +61 2 9845 2200 or by email to: apsu@chw.edu.au

The Table shows the confirmed cases of communicable diseases reported to the APSU between 1 January and 30 September 2003.

Acute flaccid paralysis

Heath Kelly, Bruce Thorley, Kerri Anne Brussen, Jayne Antony, Elizabeth Elliott, Anne Morris

Acute flaccid paralysis (AFP) surveillance in children under 15 years of age was initiated in 1995 to help meet the World Health Organization certification standards for poliomyelitis eradication. To the end of 2002 there were 262 confirmed cases of non-polio AFP. Based on these data, the reported incidence

Table. Confirmed cases of communicable diseases reported to the Australian Paediatric Surveillance Unit between 1 January and 30 September 2003*

Condition	Previous reporting period January to December 2002	Current reporting period January to September 2003*
Acute flaccid paralysis	30	11
Congenital cytomegalovirus		
confirmed (< 3 weeks of age)	9	6
suspected (3 – 52 weeks of age)	8	3
Congenital rubella	3†	2
Perinatal exposure to HIV	25	10
Neonatal herpes simplex virus infection	11	6
Hepatitis C virus infection	Commenced 2003	8

* Surveillance data are provisional and subject to revision.

† There were two imported cases in children born to mothers who had rubella in Indonesia. One child was born in Indonesia and one child was born in Australia. The third infant was born in Victoria in 2001, but was not notified to the APSU until 2002. The parents were Fijian, it is not known where the mother acquired her infection.

of non-polio AFP is 0.86 (95% CI 0.76–0.97) per 100,000 children under 15 years. In 2002, the reporting of AFP was down on the preceding year with non-polio AFP 0.75 (95% CI 0.51–1.08) per 100,000 children. As noted previously, Guillain-Barré syndrome was the most common cause of AFP (27% of confirmed cases), followed by transverse myelitis (17%) and trauma (13%).

Congenital cytomegalovirus infection

William Rawlinson, Daniel Trincado, Gillian Scott, Sian Munro, Pamela Palasanthiran, Mark Ferson, David Smith, Geoff Higgins, Michael Catton, Alistair McGregor, Dominic Dwyer, Alisson Kesson

Congenital cytomegalovirus infection (CMV) surveillance in children up to 12 months of age commenced through the APSU in 1999. Between January 1999 and December 2001 there were 25 confirmed cases of CMV, that is, with CMV being isolated in blood, urine, saliva or tissue in the first three weeks of life. The estimated incidence of congenital CMV is 2.61 (95% CI 1.71–3.83) per 100,000 live births. An additional eight cases of suspected CMV infection, in which the diagnosis was made between three weeks and 12 months of age, were identified in 2002.

Congenital rubella

Margaret Burgess, Jill Forrest, Cheryl Anne Jones, Peter McIntyre

Surveillance of newly diagnosed congenital rubella in children and adolescents under 16 years commenced in 1993. Forty-five children with congenital rubella were identified through the APSU between May 1993 and December 2002. Twenty-nine of these children were born in Australia and 22 of these infants had defects attributable to congenital rubella. Several of these children had mothers who were born overseas and were not vaccinated. The estimated incidence of congenital rubella in children born in Australia is 1.20 (95% CI 0.80–1.73) per 100,000 live births. The incidence of congenital rubella with defects is estimated to be 0.91 (95% CI 0.57–1.38) per 100,000 live births. There have been two recent reports of congenital rubella infection in children born to Australian-born mothers in Queensland in 2003. These are the first such cases reported since 1999.

HIV infection, AIDS and perinatal exposure to HIV

Ann McDonald, John Kaldor, Michelle Good, John Ziegler

This study monitors new cases of HIV/AIDS infection in children under 16 years and perinatal exposure to HIV. Perinatal exposure to HIV is now the most frequently reported source of HIV infection in Australian children. Between January 1997 and December 2002, 122 children with perinatal exposure to HIV were reported through the APSU and/or the National HIV/AIDS surveillance program. The estimated incidence of perinatal HIV exposure is 8.16 (95% CI 6.78–9.75) per 100,000 live births. HIV transmission during the perinatal period may be reduced from 25 per cent to less than 2 per cent among women whose HIV infection is diagnosed prior to delivery, through the use of antiretroviral therapy, elective Caesarean delivery, and the avoidance of breast feeding.

Neonatal herpes simplex virus infection

Cheryl Anne Jones, David Isaacs, Peter McIntyre, Tony Cunningham, Suzanne Garland

Surveillance of herpes simplex virus (HSV) infection in children aged up to 28 days commenced in 1997. There were 54 confirmed cases of neonatal HSV infection in infants up to 28 days of age between January 1997 and December 2002. The estimated incidence is 3.61 (95% CI 2.71– 4.71) per 100,000 live births. Herpes simplex type 1 remains the predominant isolate causing neonatal disease in Australia.

Hepatitis C virus infection

John Kaldor, Cheryl Anne Jones, Elizabeth Elliott, Winita Hardikar, Alisson Kesson, Susan Polis, Catherine Mews

Surveillance of hepatitis C infection in children commenced in January 2003. APSU contributors are asked to report any child less than 15 years of age with:

- at least one confirmed positive anti-HCV antibody test performed at age greater than or equal to 18 months; OR
- a positive anti-HCV antibody test on a single occasion AND a positive test for HCV RNA (PCR or RT-PCR) on single occasion at any age greater than one month of age; OR
- a positive HCV RNA test (PCR or RT-PCR) on two separate occasions.

Eight cases of hepatitis C virus infection were confirmed between January and September 2003.

National Centre for Immunisation Research and Surveillance of Vaccine Preventable Diseases

Peter McIntyre
National Centre for Immunisation Research and Surveillance of Vaccine Preventable Diseases

Rationale for a national centre

In 1997, a competitive tender was let by the then Commonwealth Department of Health and Family Services, to establish a national centre consolidating expertise in the range of research and surveillance issues pertaining to immunisation programs. It was recognised that although a number of groups around Australia had conducted valuable studies in various aspects of vaccine preventable diseases, sometimes with the National Health and Medical Research Council or other external funding, much of the work needed to inform vaccination policy was not eligible for such funds.

Establishment of a core of expertise, along similar lines to that available through the Centres for Disease Control in the United States of America or the then Communicable Disease Surveillance Centre in the United Kingdom, was needed for a number of reasons. Firstly, it was recognised that immunisation had become one of the largest public health programs nationally, requiring additional resources in research and evaluation to underpin it, including behavioural and social research. Secondly, the newly established Australian Childhood Immunisation Register (ACIR) required epidemiological expertise and analysis capacity independent from the Health Insurance Commission which housed it. Thirdly, the development of policy options for new vaccines, which had started with the *Haemophilus influenzae* type b (Hib) vaccine in 1993, was likely to increase. Finally, the centre was to provide postgraduate training to develop more professionals skilled in research and evaluation related to immunisation programs.

Following success in the tender process by a team led by Professor Margaret Burgess, the National Centre for Immunisation Research and Surveillance of Vaccine Preventable Diseases (NCIRS) was established at the Children's Hospital at Westmead, Sydney, and as a Department of the University of Sydney, in August 1997. Matching funds and in-kind support were provided by the NSW Health Department.

Development of NCIRS and relationships with other groups since 2000

In 2000, an external review of NCIRS recommended increased support from the Commonwealth and the NSW Health Department to enable greater capacity in some key areas, guided by a strategic plan. These were increased support for the Australian Technical Advisory Group on Immunisation (ATAGI), including economic evaluation of vaccines, enhancing behavioural research and reporting of adverse events following immunisation (AEFI) in Australia and initiatives in immunisation for Aboriginal and Torres Strait Islander people. The strategic plan highlights these needs, with the aims of supporting policy and program development, in line with both national priorities and the international context. This expertise should be made available both through promoting development of networks with other groups throughout Australia and securing appropriately skilled personnel in NCIRS. Memoranda of understanding have been established with the University of Sydney, the Australian Institute of Health and Welfare, the NSW Health Department and the Cooperative Research Centre for Vaccine Technology, Brisbane. The current staff of NCIRS brings together a group of experts and postgraduate students in public health, preventive medicine, paediatrics, infectious disease, epidemiology, health economics, behavioural research and laboratory science. NCIRS contributes to immunisation and surveillance policy and planning through its representatives on, and reports for, a range of policy and planning groups, including the National Immunisation Committee, the Communicable Diseases Network Australia (CDNA) and the ATAGI.

Current research and surveillance activities

The areas of NCIRS' core business are listed below, with a separate working group managing each area. Further information about the personnel and activities relevant to each working group is available from the NCIRS website at: www.ncirs.usyd.edu.au/

Epidemiology and surveillance of vaccine-preventable diseases and adverse events after immunisation

Since 2000, NCIRS has produced a biennial supplement to *Communicable Diseases Intelligence*, titled *Vaccine Preventable Diseases and Vaccination Coverage in Australia*.[1,2] This publication is a comprehensive report on the epidemiology of vaccine preventable diseases and vaccine coverage in Australia. NCIRS also provides input into enhanced surveillance for the National Notifiable Diseases Surveillance Scheme, and has collected enhanced surveillance data for Hib and pneumococcal disease.

Sero-epidemiology and laboratory research

NCIRS established a nationally representative serosurvey in 1998, initially as part of the evaluation of the National Measles Control Campaign. The first serosurvey was used to test population immunity to over 12 vaccine preventable diseases (VPDs) in Australia.[3] A second serosurvey has been completed, and it is hoped these will become regular collections. The data from the serosurvey provide crucial information on immunity to vaccine preventable diseases in the population. This enables us to target vulnerable groups and assess the impact of vaccination campaigns. The data are also a key input into mathematical modelling of vaccine preventable diseases (see Health policy support and modelling).

The Australian Childhood Immunisation Register

NCIRS maintains the only historical data from the Australian Childhood Immunisation Register. These data are used to generate immunisation coverage maps to identify under-immunised sub-groups in the population. The data have also been used to look at Prevenar (PCV7) coverage in Indigenous children, to examine small area coverage methods, to study the timeliness of immunisation and the demographic characteristics of non-immunising parents. In 2001, NCIRS published a comprehensive evaluation of the validity of the ACIR data.[4] This report also looked at the impact of parental incentives on immunisation, reasons for under-immunisation and coverage of the 2nd dose of the measles–mumps–rubella vaccine.

Behavioural and attitudinal research

NCIRS is involved in a range of behavioural and social research projects. These include looking at the attitudes and experiences of health care professionals about childhood immunisation, attitudes and behaviour of parents of children with developmental delay to childhood immunisations, parental experiences of adverse events following immunisation and evaluation of an adverse events clinic. Media coverage of anthrax vaccination and military personnel has also been analysed.

Health policy support and modelling

The Health Policy and Modelling group manages projects responding to or informing policy needs. The volume of new publications on immunisation-related topics is high and increasingly constantly. Health policy support activities are directed at producing evidence-based summaries of recent literature as a resource for ATAGI. These may later be published in *Communicable Diseases Intelligence* or other fora. Modelling activities include both economic and disease modelling. Economic analyses have included a cost-effectiveness study of universal infant vaccination with 7-valent pneumococcal conjugate vaccine, and subsequently, a comparison of meningococcal C vaccination with conjugate pneumococcal vaccination, which is ongoing. Economic analyses of varicella and inactivated polio vaccine have also been published. In collaboration with Mr Nigel Gay at the now Health Protection Agency in the United Kingdom, training and capacity in mathematical modelling of VPDs has been developed. Studies have so far looked at the impact of the Measles Control Campaign in Australia and predict future epidemics,[5,6] and the potential impact of universal varicella vaccination.[7]

Immunisation issues and vaccine preventable diseases in Indigenous people

The range of activities looking at vaccine coverage, access and disease control in Aboriginal and Torres Strait Islander people has been expanded over the past three years. Projects include an evaluation of the National Indigenous Pneumococcal and Influenza Immunisation program and a report, to be published in *Communicable Diseases Intelligence* in 2004, comparing vaccine preventable diseases and vaccination coverage in Indigenous and non-Indigenous Australians.

Adverse events

NCIRS now liaises closely with the Adverse Drug Reaction Advisory Committee of the Therapeutic Goods Administration to produce periodic analyses of AEFI data, using population denominators such as the ACIR. An evaluation of national AEFI reporting mechanisms is also in progress. In addition, we have conducted a range of other related projects including: evaluating issues emerging from the Children's Hospital Adverse Events Clinic, examining the temporal relationship between sudden infant death syndrome and vaccination and evaluating adverse events following yellow fever vaccine.

Communication and postgraduate training

The volume of new information relevant to immunisation programs in Australia and the diversity of information needs for consumers and providers necessitates a range of communication approaches. These include teleconferences, media interviews and articles, reports and scientific publications, and presentations at national and international conferences. In 2002, a quarterly immunisation newsletter, sent to all interested providers in Australia, was initiated. At the end of 2003, an email list-server (Australian Immunisation Professionals) was established to facilitate rapid communication with and between personnel providing immunisation across the country. NCIRS also provides telephone advice on immunisation to health-care workers and interested lay people. Fact sheets on the following topics are available on our website:

(a) thiomersal in vaccines;

(b) diabetes and vaccines;

(c) measles-mumps-rubella vaccine, inflammatory bowel disease and autism;

(d) hepatitis B vaccine and multiple sclerosis;

(e) anthrax vaccine;

(f) vaccines, asthma and allergies.

NCIRS holds regular seminars and workshops on areas of immunisation of current national importance. Recent examples include meningococcal and pneumococcal disease and vaccines, vaccines against respiratory infections and human papilloma virus vaccine. These workshops have been valuable opportunities for national discussion and formulation of new policy options.

NCIRS has run a two day elective in the University of Sydney's Master of Public Health Program, entitled *Vaccines in Public Health* since 2000. In addition, staff contribute to teaching in the medical and Master of Public Health programs and supervise postgraduate and Honours students.

Governance and reporting

NCIRS has a Management Committee, chaired by the Director, and a Scientific Advisory Committee (SAC), chaired by an external expert. The management committee oversees internal administrative matters, while the SAC reviews the research program and advises on its methodology and priorities. In 2003, an Advisory Board was formed to provide guidance on the strategic development of NCIRS and implementation of the strategic plan. The Advisory Board reports to the Board of the Children's Hospital at Westmead. Regular reports are provided to the ATAGI, the National Immunisation Committee and the CDNA.

Future directions

NCIRS has an ongoing commitment to its current areas of activity, as well as the enhancement of existing and future networks, with the aim of ensuring maximum value from the wide variety of expertise present around Australia in immunisation and related programs. In particular, we are keen to enhance our communication strategies, capacity in mathematical modelling, work in Indigenous immunisation issues, and social research. A potential new area of interest is immunisation in an international health context, especially in the Western Pacific Region. Further questions would be welcome at the address listed below, or through our website.

Contacts

Website: www.ncirs.usyd.edu.au

Address: The National Centre for Immunisation Research
Royal Alexandra Hospital for Children
Locked Bag 4001
Westmead NSW 2145
Telephone: +61 2 9845 0520
Facsimile: +61 2 9845 3082

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1. McIntyre P, Amin J, Gidding H, Hull B, Torvaldsen S, Tucker A, *et al*. Vaccine preventable diseases and vaccine coverage in Australia, 1993–1998. *Commun Dis Intell* 2000;24 Suppl:53–57.

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CDI instructions for authors

Communicable Diseases Intelligence (*CDI*) is a quarterly publication of the Surveillance and Epidemiology Section, Communicable Diseases Branch, Australian Government Department of Health and Ageing. The aim of *CDI* is to disseminate information about the epidemiology and control of communicable disease in Australia. *CDI* invites contributions dealing with any aspect of communicable disease epidemiology, surveillance or prevention and control in Australia. Submissions can be in the form of original articles, short reports, surveillance summaries, reviews or correspondence.

CDI is published quarterly in March, June, September and December.

Submission procedure

Contributions and requests for further information should be sent to:

The Editor
Communicable Diseases Intelligence
Surveillance and Epidemiology Section
Department of Health and Ageing
GPO Box 9848 (MDP 6)
CANBERRA ACT 2601
Telephone: (02) 6289 8245
Facsimile: (02) 6289 7791
E-mail: cdi.editor@health.gov.au

Authors are asked to provide an electronic copy of the manuscript by email or on a computer disk (on 3.5 inch diskette). Microsoft Word for Windows 97 (or earlier version) is preferred, or alternatively Rich Text Format (RTF) files should be used. Arial font is preferred, and if not available; Times New Roman. Do not use headers or footers, or automatic numbering for references or footnotes. Do not use numbered paragraphs.

Label disks with the title of the article, authors' names, and the word-processing format.

All manuscripts should have a title page that should include:

- title (e.g. Professor, Doctor, Ms, Miss, Mrs, Mr) and full name, including middle initial of each author;
- position held, and address of the institution where the article was produced;
- name of corresponding author; and
- current postal address, telephone number, facsimile number and email address of the corresponding author.

All manuscripts should be accompanied by a covering letter that should include:

- signatures of all authors if sent by mail, or list of all authors if sent by email;
- confirmation that the manuscript contents (in part or in full) has not been submitted or published elsewhere; and
- whether the manuscript is being submitted as an article, short report, surveillance summary, outbreak report or case report.

All articles, short report and letters to the Editor may be edited for style.

Articles

Manuscripts submitted to *CDI* for peer review must be offered exclusively to the Journal.

The text of articles must be structured to contain an abstract; introduction; methods; results; discussion; acknowledgments; and references. Structured abstracts are not acceptable. Manuscripts submitted as articles must be 3,000 words or less and are peer-reviewed. A separate word count of the main text and of the abstract must be included on the title page.

Short reports

Short reports of less than 2,000 words are not peer-reviewed and include:

Surveillance summaries

A report of 1,000 words or less which briefly reports on changes in the local epidemiology of communicable disease, changes in surveillance systems, or new interventions, such as implementing vaccination in an at-risk group. Surveillance summaries should provide a brief description of the setting and a discussion of the significance of the events, changes or interventions. Surveillance summaries should be structured like articles including an abstract.

Outbreak reports

Short (500 to 1,000 words) unstructured reports of communicable disease outbreaks. Outbreak reports will be considered for publication based on their public health significance. Reports should include details of the investigation, including results of interventions and the significance of the outbreak for public health practice. More comprehensive reports on outbreaks should be submitted as articles.

Case reports

Brief unstructured reports of 500 to 1,000 words on unique cases of communicable disease. Case reports will be considered based on their public health significance. Authors must note the instructions on protection of patient's right to privacy (see below). Some discussion of the significance of the case for communicable disease control should be included.

Letters to the Editor

The editors welcome comments on articles published in *Communicable Diseases Intelligence* in the form of letters to the Editor. Letters should normally be less than 500 words, include no more than a single figure and less than six references.

Abstract and keywords

Include up to 10 keywords. Do not cite references in the abstract. Abstracts should not exceed 250 words.

Copyright

All authors are asked to transfer copyright to the Commonwealth before publication.

Authors

Authorship should be based on substantial contribution to the article; each author should have participated sufficiently to take public responsibility for the article. Others contributing to the work should be recognised in the acknowledgments.

Style

Avoid too many abbreviations. Use standard abbreviations only; do not make up abbreviations. Spell out name in full on first mention and only use an acronym if the name occurs at least five times in the manuscript.

Tables

Submit all tables in Word on separate pages; simplify the information as much as possible, keeping the number of columns to a minimum and the headings brief. Information in tables should not be duplicated in the text.

Tables are to be submitted without borders, blank rows or blank columns for spacing. Do not use paragraph returns. Separate rows or columns are to be used for each information type; e.g. percentage and number should be in separate columns rather than having one in parentheses in the same column.

Figures and illustrations

Supply a copy of all figures on a separate page, labelled with the figure number and title. Histograms and graphs should be produced in Microsoft Excel and created on a separate worksheet. The numerical data on which these are based must be provided to enable editing for in-house style. Worksheets should be appropriately titled to distinguish each figure. Do not include the graph heading on the Excel worksheet.

All other figures should be provided in an appropriate graphic format. Electronic copies of computer-generated illustrations should be saved in Adobe Photoshop, or similar graphic software, JPEG, EPS, GIF, or TIFF formats. Electronic versions of photos need to be at least 300 dpi. Black and white illustrations or photographs can be included if required.

Do not embed figures or graphs in the manuscript text document. Use Arial font for figure lettering. Figures, symbols, lettering and numbering should be clear and large enough to be legible when reduced.

All table and figure headings should be provided in the manuscript at the end of the text. All tables and figures should be referred to within the results section and should not duplicate information in the text.

References

References should be identified consecutively in the text by the use of superscript numbers without brackets. Any punctuation should precede the reference indicators.

Accuracy of references is the responsibility of authors. Use the Vancouver reference style (see International Committee of Medical Journal Editors. Uniform requirements for manuscripts submitted to biomedical journals. *Ann Intern Med* 1997;1126: 36-47) and abbreviate journal names as in Medline (e.g. *Commun Dis Intell*). Give surnames and initials of all authors (or only the first six authors, et al, if there are more than six). Cite the first and last page numbers in full, and specify the type of reference (e.g. a letter, an editorial, an abstract, a supplement). Cite personal communications and unpublished papers in the text, not in the reference list, with the exception of material that has been accepted for publication (in press). Obtain written permission from people cited, and give their titles, positions and affiliations.

Ethics committee approvals and patients' rights to privacy

All investigations on human subjects must include a statement that the subjects gave their written informed consent, unless data collection was covered by public health legislation or similar studies have been considered by a relevant ethics committee and a decision made that its approval was not required. The name of the ethics committee that gave approval for the study should be included in the text. Alternatively, if approval is not required a statement to this effect should also appear in the manuscript. When informed consent has been obtained it should be included in the article.

Ethical approval and patient consent may also be required for case reports. Identifying details about patients should be omitted if they are not essential, but data should never be altered or falsified in an attempt to attain anonymity.

Review process

Reports, surveillance summaries, reviews and correspondence are not subject to peer review but will be edited for style and clarity.

On receipt of a manuscript, authors will be sent a brief acknowledgment. The articles then undergo a review process that may include peer review by two experts in the topic area. Articles may be rejected without peer review. Occasionally, reports of urgent public health importance may be published immediately, at the discretion of the Editor. Authors may be asked to revise articles as a result of the review process before the final decision about publication is made by the Editor.

Revised articles are to be returned with a covering letter addressing each comment made by each reviewer. All authors are required to sign a copyright release form transferring copyright to the Commonwealth. The Commonwealth copyright will be rescinded if the article is not accepted for publication. Accepted manuscripts are edited and final proofs returned to the corresponding author for checking prior to printing.

Surveillance systems reported in *CDI*, 2004

This article describes the surveillance schemes that are routinely reported on in *Communicable Diseases Intelligence* (*CDI*).

In Australia, communicable diseases surveillance systems exist at national, state and local levels. State and local surveillance systems are crucial to the timely and effective detection and management of outbreaks and in assisting in the effective implementation of national policies. The national surveillance system combines some of the data collected from state and territory-based systems to provide an overview at a national level. Specific functions of the national surveillance system include: detection and management of outbreaks affecting more than one jurisdiction; monitoring of the need for and impact of national control programs; guidance of national policy development and resource allocation; and description of the epidemiology of rare diseases for which there are only a few notifications in each jurisdiction. National surveillance also assists in quarantine activities and facilitates international collaborations such as reporting to the World Health Organization.

Surveillance has been defined by the World Health Organization as the 'continuing scrutiny of all aspects of the occurrence and spread of disease that are pertinent to effective control'. It is characterised by 'methods distinguished by their practicability, uniformity, and frequently by their rapidity, rather than complete accuracy.'[1] Although some surveillance schemes aim for complete case ascertainment, others include only a proportion of all cases of the conditions under surveillance, and these samples are subject to systematic and other biases. Results generated from surveillance schemes must be interpreted with caution, particularly when comparing results between schemes, between different geographical areas or jurisdictions and over time. Surveillance data may also differ from data on communicable diseases gathered in other settings.

The major features of the surveillance schemes for which *CDI* publishes regular reports are described below.

Other surveillance schemes for which *CDI* publishes annual reports include tuberculosis notifications (*Commun Dis Intell* 2003;27:449–458), the Australian Mycobacterium Reference Laboratory Network (*Commun Dis Intell* 2003;27:459–465), invasive pneumococcal notifications (*Commun Dis Intell* 2003;27:466–477) and laboratory surveillance (*Commun Dis Intell* 2003;27:478–487), and the Australian Rotavirus Surveillance Program (*Commun Dis Intell* 2003;27:492–495).

National Notifiable Diseases Surveillance System

National compilations of notifiable diseases have been published intermittently in a number of publications since 1917.[2] The National Notifiable Diseases Surveillance System (NNDSS) was established in 1990 under the auspices of the Communicable Diseases Network Australia (CDNA).

The system coordinates the national surveillance of more than 50 communicable diseases or disease groups endorsed by the CDNA. Under this scheme, notifications are made from doctors and laboratories to state or territory health authorities under the provisions of the public health legislation in their jurisdiction. Computerised, de-identified unit records of notifications are supplied to the Australian Government Department of Health and Ageing for collation, analysis and reporting in *CDI*.

Data provided for each notification include a unique record reference number, state or territory, disease code, date of onset, date of notification to the relevant health authority, sex, age, Indigenous status and postcode of residence. Additional data now being collected includes infecting organism and subtype, the diagnosis method, full details of vaccination where appropriate, resident location as defined in the National Localities Index, dates of onset, specimen collection, notification and date when notification was received by health authorities, indigenous status defined as per the Australian Bureau of Statistic's format, outbreak reference number, how the case was found, whether the case was confirmed, and whether the case was imported from overseas.

Aggregated data are presented on the *Communicable Diseases Australia* Internet site (www.cda.gov.au). Data are published in *CDI* every quarter and in an annual report. Numbers of notifications for each disease by state or territory, and totals for Australia are presented for the current period, the year to date, and for the corresponding period of the previous year. The national total for each disease is compared with the average number of notifications over the previous five years in the same period. A commentary on the notification data is included with the tables in each issue of *CDI* and graphs are used to illustrate important aspects of the data.

HIV infection and AIDS notifications are not included in this section of *CDI*. Surveillance for these conditions is conducted separately by the National Centre for HIV Epidemiology and Clinical Research and is reported in the HIV and AIDS surveillance reports (see below).

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 who report presentations of defined medical conditions each week. The aim of ASPREN is to provide an indicator of the burden of disease in the primary health care setting and to detect trends in consultation rates.

There are currently about 50 general practitioners participating in the network from all states. Seventy-five per cent of these are in metropolitan areas and the remainder are rural based. Between 4,000 and 6,000 consultations are recorded each week.

The list of conditions is reviewed annually by the ASPREN management committee and an annual report is published. In 2004, nine conditions are being monitored, four are related to communicable disease issues. These include influenza, gastroenteritis, varicella and shingles. Data for communicable diseases are published in *CDI* every quarter. Data are presented in graphic format as the rate of reporting per 1,000 consultations per week. The conditions are defined as follows:

Influenza

There are two definitions for influenza in 2004. A patient may be coded once or twice depending on their symptoms. The definition for influenza 1 will include more individuals.

Influenza 1

Must have the following: cough, fatigue and fever. (Note there is no time frame to these symptoms).

Influenza 2

(a) Viral culture or serological evidence of influenza virus infection; or

(b) influenza epidemic, plus four of the criteria in (c); or

(c) six of the following:

1. sudden onset (within 12 hours);
2. cough;
3. rigors or chills;
4. fever;
5. prostration and weakness;
6. myalgia, widespread aches and pains;
7. no significant respiratory physical signs other than redness of nasal mucous membrane and throat;
8. influenza in close contacts.

Gastroenteritis

Intestinal disease – presumed or proven to be infective in origin.

Varicella/chickenpox

Any consultation at which varicella/chickenpox is diagnosed on clinical or other grounds.

Shingles

Any consultation at which shingles is diagnosed on clinical or other grounds.

HIV and AIDS surveillance

National surveillance for HIV and AIDS is coordinated by the National Centre in HIV Epidemiology and Clinical Research (NCHECR) within the University of New South Wales, in collaboration with state and territory health authorities and the Commonwealth of Australia.

Cases of HIV infection are notified to the National HIV Database on the first occasion of diagnosis in Australia, either by the diagnosing laboratory (Australian Capital Territory, and Tasmania) or by a combination of laboratory and doctor sources (New South Wales, Northern Territory, Queensland, South Australia, Victoria and Western Australia). Cases of AIDS are notified through the state and territory health authorities to the National AIDS Registry. Diagnoses of both HIV infection and AIDS are notified with the person's date of birth and name code, to minimise duplicate notifications while maintaining confidentiality.

Currently, two tables presenting HIV infection diagnoses, AIDS diagnoses and AIDS deaths are published in each issue of *CDI* when available. Tabulations of diagnoses of HIV infection and AIDS are based on data available three months after the end of the reporting period, to allow for reporting delay and to incorporate newly available information.

Each year from 1997, the NCHECR has published *HIV/AIDS, viral hepatitis and sexually transmissible infections in Australia Annual Surveillance Report*. The annual surveillance report, available through www.med.unsw.edu.au/nchecr/, provides a comprehensive analysis and interpretation of surveillance data on HIV/AIDS, viral hepatitis and sexually transmissible infections in Australia.

National Influenza Surveillance Scheme

Influenza surveillance in Australia is based on several schemes collecting a range of data that can be used to measure influenza activity.

- Since 2001, laboratory-confirmed influenza has been a notifiable disease in all Australian states and territories and reported in the National Notifiable Diseases Surveillance System (see above).
- In 2003, five sentinel general practitioner schemes contributed reports of influenza-like illness: the Australian Sentinel Practice Research Network, Tropical Influenza Surveillance from the Northern Territory, the New South Wales Sentinel General Practice Scheme, the Victorian Sentinel General Practice Scheme and Western Australian sentinel general practices.
- The Virology and Serology Laboratory Reporting Scheme (LabVISE) laboratory reports of influenza diagnoses including virus type.

The results of each of the schemes are published together fortnightly throughout the year on the *Communicable Diseases Australia Website* as the National Influenza Surveillance Scheme.

Annual reports on influenza in Australia are published in *CDI* each year (*Commun Dis Intell* 2003;27:162–172). These reports include the above data as well as absenteeism data from a major national employer, hospitalisation and mortality data and influenza typing data from the WHO Collaborating Centre for Influenza Reference and Research.

Sentinel Chicken Surveillance Programme

The Sentinel Chicken Surveillance Programme is used to provide an early warning of increased flavivirus activity in Australia. The main viruses of concern are Murray Valley encephalitis (MVEV) and Kunjin. MVEV virus causes the disease Murray Valley encephalitis (formerly known as Australian encephalitis), a potentially fatal disease in humans. Encephalitis is less frequent in cases of Kunjin virus infection and these encephalitis cases have a lower rate of severe sequelae.

These viruses are enzootic in parts of the north-east Kimberley region of Western Australia and the Top End of the Northern Territory but are epizootic in other areas of the Kimberley, Pilbara, Gascoyne Murchison and Mid-west regions of Western Australia, in north Queensland and in Central Australia. MVEV virus is also responsible for occasional severe epidemics of encephalitis in eastern Australia. The most recent was in 1974 when there were 13 fatalities and cases were reported from all mainland States. Since then, 71 cases of MVEV have been reported, 63 from the north of Australia and eight from central Australia. Since 1974 there have been 20 cases of Kunjin virus disease reported.

Since 1974, a number of sentinel chicken flocks have been established in Australia to provide an early warning of increased MVEV virus activity. These programs are supported by individual State health departments. Each State has a contingency plan which will be implemented if one or more chickens in a flock seroconverts to MVEV virus.

Currently, 31 flocks are maintained in the north of Western Australia, 8 in the Northern Territory, 10 in New South Wales and 10 in Victoria. There are no flocks in Northern Queensland in 2003–04. The flocks in Western Australia and the Northern Territory are tested all year round but those in New South Wales and Victoria are tested only in the summer months, during the main MVEV risk season. Results will be posted on the National Arbovirus Surveillance Website by State representatives. A yearly summary is presented in *CDI*.

Australian Gonococcal Surveillance Programme

The Australian Gonococcal Surveillance Programme (AGSP) is a continuing program to monitor antimicrobial resistance in *Neisseria gonorrhoeae* and includes the reference laboratories in all states and territories. These laboratories report data on sensitivity to an agreed core group of antimicrobial agents on a quarterly basis and provide an expanded analysis as an annual report in *CDI* (*Commun Dis Intell* 2003;27:189–195). The antibiotics which are currently routinely surveyed are the penicillins, ceftriaxone, ciprofloxacin and spectinomycin, all of which are administered as single dose regimens. One main purpose of the AGSP is to help define standard protocols for antibiotic treatment of gonococcal infection. When *in vitro* resistance to a recommended agent is demonstrated in five per cent or more of isolates, it is usual to reconsider the inclusion of that agent in current treatment schedules. Additional data are also provided on other antibiotics from time to time. At present all laboratories also test isolates for the presence of high level resistance to the tetracyclines

and intermittent surveys of azithromycin resistance are conducted. Comparability of data is achieved by means of a standardised system of MIC testing and a program-specific quality assurance process.

Virology and Serology Laboratory Reporting Scheme

The Virology and Serology Laboratory Reporting Scheme began operating in 1977. The scheme comprises 17 laboratories from all states and the Australian Capital Territory. Contributors submit data fortnightly on the laboratory identifications of viruses and other organisms. Each record includes mandatory data fields (laboratory, specimen collection date, a patient identifier code, and organism), and optional fields (patient's sex, date of birth or age, postcode of residence, specimen source, clinical diagnosis, and the method of diagnosis). Monthly updates of LabVISE data are published on the Communicable Diseases Australia website.

Reports are collated, analysed and published quarterly. Each report includes summary tables of total numbers of organisms identified by state or territory and numbers of reports by month and participating laboratory. The delay between date of specimen collection and date of publication ranges from two weeks to several months. A commentary on the laboratory reports includes the observation of recent trends with accompanying graphical presentation.

Data derived from this scheme must be interpreted with caution. The number and type of reports received is subject to a number of biases. These include the number of participating laboratories, which has varied over time. The locations of participating laboratories also create bias, as some jurisdictions are better represented than others. Also changes in diagnostic practices, particularly the introduction of new testing methodologies, may affect laboratory reports. The ability of laboratory tests to distinguish acute from chronic or past infection must also be considered in interpretation of the data. Although changes in incidence cannot be determined with precision from this data, general trends can be observed, for example with respect to seasonality and the age-sex distribution of patients. (*Commun Dis Intell* 2002;26:323)

Australian Paediatric Surveillance Unit

The Australian Paediatric Surveillance Unit (APSU) conducts national, active surveillance of uncommon conditions of childhood, including infectious, genetic, mental health, and vaccine preventable diseases and childhood injuries. Communicable diseases currently under surveillance through the APSU include: acute flaccid paralysis, congenital cytomegalovirus infection, congenital rubella, HIV infection, AIDS and perinatal exposure to HIV, neonatal herpes simplex virus infection, and hepatitis C virus infection.

The primary objectives of the APSU are to document the number of Australian children under 15 years, newly diagnosed with specified conditions, their geographic distribution, clinical features, current management and outcome. Contributors to the APSU are clinicians known to be working in paediatrics and child health in Australia. In 2002, over 1,000 clinicians participated in the surveillance of 14 conditions through the APSU, with an overall response rate of 96 per cent. For further information please contact the APSU on telephone: +61 2 9845 2200 or email: apsu@chw.edu.au.

National Enteric Pathogens Surveillance System

Since 1980, the National Enteric Pathogens Surveillance System (NEPSS) has collected, analysed and disseminated data on human enteric bacterial infections diagnosed in Australia. These pathogens include *Salmonella, Escherichia coli, Vibrio, Yersinia, Plesiomonas, Aeromonas* and *Campylobacter*.

Communicable Diseases Intelligence NEPSS quarterly reports include only *Salmonella*. Data are based on reports to NEPSS from Australian laboratories of laboratory-confirmed human infection with *Salmonella*. *Salmonella* are identified by reference laboratories to the level of serovar and, if applicable, phage-type. Infections apparently acquired overseas are included. Multiple isolations of a single *Salmonella* serovar/phage-type from one or more body sites during the same episode of illness are counted once only. The date of the case is the date the primary diagnostic laboratory isolated a *Salmonella* from the clinical sample.

Communicable Diseases Intelligence NEPSS quarterly reports include historical quarterly mean counts. These should be interpreted cautiously, as they may be affected by outbreaks and by surveillance artefacts such as newly recognised and incompletely typed *Salmonella*.

NEPSS is operated by the Microbiological Diagnostic Unit — Public Health Laboratory, Department of Microbiology and Immunology, University of Melbourne; and is overseen by a Steering Committee of state, territory and commonwealth stakeholders. Contact NEPSS at Microbiological Diagnostic Unit, or by telephone on +61 3 8344 5701 or facsimile +61 3 9625 2689.

Scientists, diagnostic and reference laboratories contribute data to NEPSS, which is supported by state and territory health departments and the Australian Government Department of Health and Ageing.

Australian Childhood Immunisation Register

Accurate information on the immunisation status of children is needed at the community level for program management and targeted immunisation efforts. A population-based immunisation register can provide this need. The Australian Childhood Immunisation Register (ACIR) commenced operation on 1 January 1996 and is now an important component of the *Immunise Australia Program*. It is administered and operated by the Health Insurance Commission (HIC). The Register was established by transferring data on all children under the age of seven years enrolled with Medicare from the HIC to the ACIR. This constitutes a nearly complete population register, as approximately 99 per cent of children are registered with Medicare by 12 months of age. Children who are not enrolled in Medicare are added to the Register when a recognised immunisation provider supplies details of an eligible immunisation. Immunisations are generally notified to the HIC either by electronic means, the Internet or by paper ACIR notification forms. Immunisations recorded on the Register must have been given in accordance with the guidelines for immunisation determined by the National Health and Medical Research Council.

From the data finally entered onto the ACIR, the HIC provides regular quarterly coverage reports at the national and state level. Coverage for these reports is calculated using the cohort method described in *Commun Dis Intell* 1998;22:36–37. With this method, a cohort of children is defined by date of birth in three-month groups. This birth cohort has the immunisation status of its members assessed at the three key milestones of 12 months, 24 months and 6 years of age. Analysis of coverage is undertaken three months after the due date for completion of each milestone, so that time is available for processing notifications and the impact on coverage estimates of delayed notification to the ACIR is minimised. Only children enrolled with Medicare are included in order to minimise inaccuracies in coverage estimates due to duplicate records.

The HIC coverage reports for the three milestones are published in *CDI* every quarter. Coverage estimates are provided for each state and territory and Australia as a whole and for each individual vaccine assessed at each milestone. Changes in 'fully immunised' coverage from the previous quarter are also included in the tables.

A commentary on ACIR immunisation coverage estimates is included with the tables in each issue and graphs are used to provide trends in immunisation coverage.

OzFoodNet: enhanced foodborne disease surveillance

The Australian Government Department of Health and Ageing established the OzFoodNet network in 2000 to collaborate nationally in the investigation of foodborne disease. OzFoodNet conducts studies on the burden of illness and coordinates national investigations into outbreaks of foodborne disease.

OzFoodNet reports quarterly on investigations of gastroenteritis outbreaks and clusters of disease potentially related to food. Annual reports have been produced and published in *CDI* since 2001. Data are reported from all Australian jurisdictions.

References

1. Last JM. A dictionary of epidemiology. New York: Oxford University Press, 1988.

2. Hall R, Notifiable diseases surveillance, 1917 to 1991. *Commun Dis Intell* 1993;226–236.

Communicable diseases surveillance

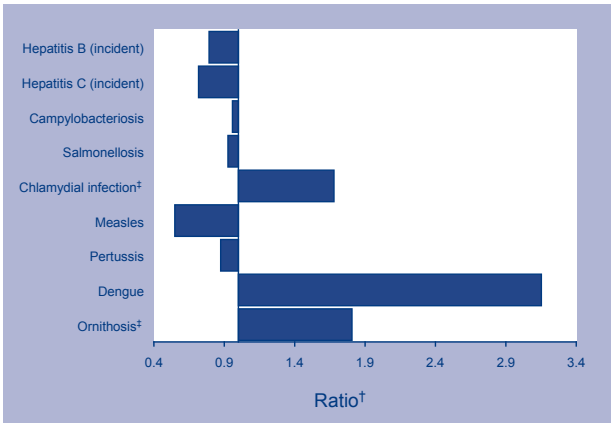
Highlights for 4th quarter, 2003

Communicable disease surveillance highlights report on data from various sources, including the National Notifiable Diseases Surveillance System (NNDSS) and several disease specific surveillance systems that provide regular reports to Communicable Diseases Intelligence. These national data collections are complemented by intelligence provided by State and Territory communicable disease epidemiologists and/or data managers. This additional information has enabled the reporting of more informative highlights each quarter.

The NNDSS is conducted under the auspices of the Communicable Diseases Network Australia. NNDSS collates data on notifiable communicable diseases from State or Territory health departments. The Virology and Serology Laboratory Reporting Scheme (LabVISE) is a sentinel surveillance scheme which collates information on laboratory diagnosis of communicable diseases. In this report, data from the NNDSS are referred to as 'notifications' or 'cases', and those from ASPREN are referred to as 'consultations' or 'encounters' while data from the LabVISE scheme are referred to as 'laboratory reports'.

Figure 1 shows the changes in disease notifications with an onset in the fourth quarter of 2003, compared with the 5-year mean of the same period. Disease notifications outside the 5-year mean plus or minus two standard deviations are marked. During the fourth quarter of 2003, notifications of chlamydial infection and ornithosis were above the 5-year mean plus two standard deviations. Chlamydial infection notifications have continued to increase for four consecutive quarters in 2003. Notifications for dengue were above the 5-year mean of the fourth quarter but were not significantly above historical levels. Notifications of incident hepatitis B, hepatitis C, campylobacteriosis, salmonellosis, measles and pertussis in the fourth quarter, were below the 5-year average (Figure 1).

Figure 1. Selected* diseases from the National Notifiable Diseases Surveillance System, comparison of provisional totals for the period 1 October to 31 December 2003 with historical data†



* Selected diseases are chosen each quarter according to current activity.

† Ratio of current quarter total to mean of corresponding quarter for the previous five years.

‡ Notifications above or below the 5-year mean plus or minus two standard deviations for the same period

Gastrointestinal diseases

Salmonellosis

Salmonellosis notifications increased after the seasonal low in the third quarter of 2003. In the fourth quarter there were 1,551 cases of salmonellosis notified, an increase of 46 per cent from the third quarter. However, the number of notified cases was less than for the same quarter of 2002 and the year to date notifications were less than the mean of the last five years (Table 1).

Campylobacteriosis

There were 3,928 notifications of campylobacteriosis cases with onset in the fourth quarter of 2003. This represents a seasonal increase of notifications of 13 per cent during this quarter compared to the third quarter, however, compared to the 5-year mean there was a decrease of four per cent.

Vaccine preventable diseases

Measles

There were 17 cases of measles with onset in the fourth quarter reported to NNDSS. Of these 11 cases were notified in South Australia and two each in New South Wales, Queensland, and Victoria. For the fourth consecutive quarter there were no cases of measles reported from Tasmania, the Australian Capital Territory or Western Australia.

The 11 cases notified in South Australia were linked to an outbreak that started in Adelaide on 31 August 2003. The last case linked to this outbreak which affected 22 persons, was reported in mid-October 2003. The index case in this outbreak had a travel history to New Zealand prior to the onset of illness. Of these 11 cases, two were fully vaccinated, two partially vaccinated one of unknown vaccination status and the remaining six cases were not vaccinated.

There were also two cases linked to this outbreak reported from other jurisdictions—one in Victoria and the other in New South Wales.

Of the two measles cases reported in Queensland, one was linked to an earlier outbreak in the Whitsunday Islands, reported in the third quarter of 2003 and the other was acquired in Bali.

Pertussis

There were 1,629 cases of pertussis notified in the fourth quarter of 2003, a notification rate of 33 cases per 100,000 population. The number of notifications increased by five per cent from the previous quarter, however, compared to the same quarter of 2002 and to the year-to-date mean for last five years, it was lower by 13 per cent and 20 per cent, respectively.

Notifications of pertussis increased in the fourth quarter compared with the third quarter, in Tasmania (102 cases compared with 34) and Western Australia (144 cases compared with 29 cases). Notifications decreased in the fourth quarter compared with the third quarter, in the Australian Capital Territory (108 compared with 180) and South Australia (42 compared with 52 cases). There was no significant change in notifications of pertussis in the remaining jurisdictions.

Vectorborne diseases

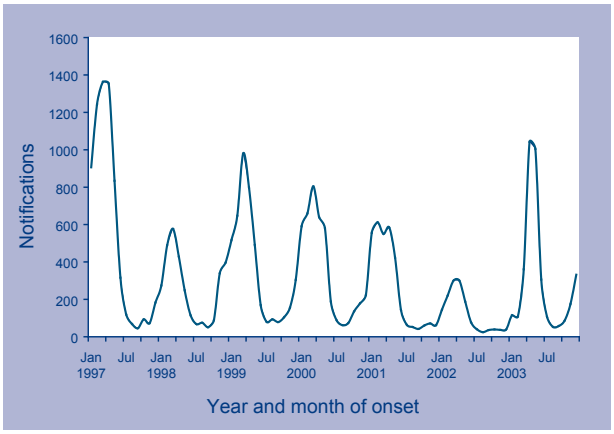
Dengue

There were 203 cases of dengue notified during the fourth quarter, a notification rate of four cases per 100,000 population. This represents a sixfold increase compared to the previous quarter. In Queensland, where 87 per cent (180/203) of notified cases occurred, two outbreaks of Dengue Type 2 were reported. The first outbreak started on Yam Island, Torres Strait, at the end of the third quarter 2003. This outbreak affected 98 persons and is now reported to be under control. The second outbreak on Thursday Island began in November 2003. This outbreak which has so far affected 100 persons is reported to have spread from Yam Island.

There have also been small clusters of cases of Dengue Type 2 cases in Cairns and Townsville. In Cairns, one recent case appeared to be locally acquired, although all others were imported cases. In Townsville, there was evidence of local transmission which was limited to two suburbs.

Overall, dengue notifications for 2003 peaked in the second quarter (Figure 2). Whether the increase in the number of notifications in the fourth quarter signals an early start for the dengue season remains to be seen. In the meantime, mosquito control and community education continues in the affected areas.

Figure 2. Notifications of dengue Australia, 1997 to 2003, by month of onset



Ross River virus

There were 478 cases of Ross River virus infection notified in the fourth quarter of 2003, a notification rate of 10 cases per 100,000 population. The number of notifications represents a 120 per cent increase on the previous quarter. This increase was accounted for by a large number of notifications (n=327) of Ross River virus infection in Western Australia (68% of all notified cases). Most of these notifications were from the south-west of the state. This area also experienced a large outbreak in the summer of 1998–99 with 650 cases notified.[1] Western Australia has also reported higher than usual notifications of Ross River virus in 1997 and 2000 (Figure 3). Notifications usually increase from the end of the fourth quarter well into the first quarter of the following year, depending on the breeding conditions for the vector mosquitoes. In 2003, notifications in Western Australia have already exceeded the number in the peak of notifications in 2000 and may continue to increase during the first quarter of 2004.

Figure 3. Notifications of Ross River virus infections. Western Australia, 1997 to 2003, by month of onset

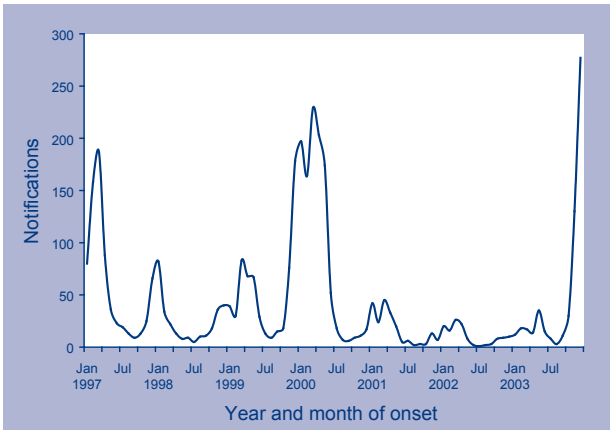
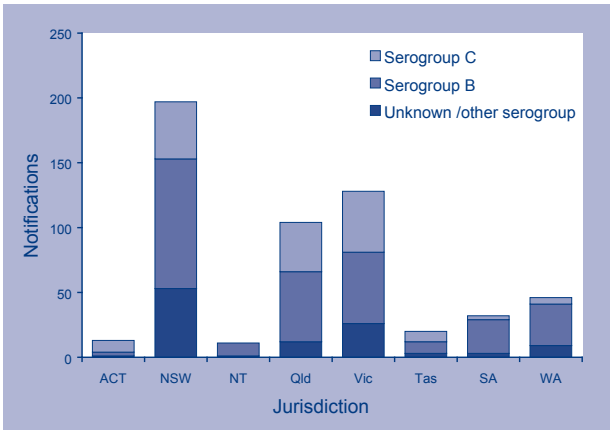


Figure 4. Notifications of meningococcal infections, Australia, 2002 and 2003, by jurisdiction and serogroup



* Notifications and deaths from unknown or other serogroups are not included.

Tables

A summary of diseases currently being reported by each jurisdiction is provided in Table 1. There were 25,857 notifications to the National Notifiable Diseases Surveillance System (NNDSS) with a notification date between 1 October and 31 December 2003 (Table 2). The notification rate of diseases per 100,000 population for each State or Territory is presented in Table 3.

There were 4,692 reports received by the Virology and Serology Laboratory Reporting Scheme (LabVISE) in the reporting period, 1 October to 31 December 2003 (Tables 4 and 5).

Table 1. Reporting of notifiable diseases by jurisdiction

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
Gastrointestinal diseases	
Botulism	All jurisdictions
Campylobacteriosis	All jurisdictions except NSW
Cryptosporidiosis	All jurisdictions
Haemolytic uraemic syndrome	All jurisdictions
Hepatitis A	All jurisdictions
Hepatitis E	All jurisdictions
Listeriosis	All jurisdictions
Salmonellosis	All jurisdictions
Shigellosis	All jurisdictions
SLTEC, VTEC	All jurisdictions
Typhoid	All jurisdictions
Quarantinable diseases	
Cholera	All jurisdictions
Plague	All jurisdictions
Rabies	All jurisdictions
Viral haemorrhagic fever	All jurisdictions
Yellow fever	All jurisdictions
Sexually transmissible infections	
Chlamydial infection	All jurisdictions
Donovanosis	All jurisdictions
Gonococcal infection	All jurisdictions
Syphilis	All jurisdictions

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

Disease	Data received from:
Vaccine preventable diseases	
Diphtheria	All jurisdictions
Haemophilus influenzae type b	All jurisdictions
Influenza	All jurisdictions
Measles	All jurisdictions
Mumps	All jurisdictions
Pertussis	All jurisdictions
Pneumococcal disease	All jurisdictions
Poliomyelitis	All jurisdictions
Rubella	All jurisdictions
Tetanus	All jurisdictions
Vectorborne diseases	
Arbovirus infection NEC	All jurisdictions
Barmah Forest virus infection	All jurisdictions
Dengue	All jurisdictions
Japanese encephalitis	All jurisdictions
Kunjin	All jurisdictions except ACT*
Malaria	All jurisdictions
Murray Valley encephalitis	All jurisdictions except ACT*
Ross River virus infection	All jurisdictions
Zoonoses	
Anthrax	All jurisdictions
Australian bat lyssavirus	All jurisdictions
Brucellosis	All jurisdictions
Leptospirosis	All jurisdictions
Ornithosis	All jurisdictions
Other lyssaviruses (NEC)	All jurisdictions
Q fever	All jurisdictions
Other bacterial infections	
Legionellosis	All jurisdictions
Leprosy	All jurisdictions
Meningococcal infection	All jurisdictions
Tuberculosis	All jurisdictions

Table 2. Notifications of diseases received by State and Territory health authorities in the period 1 October to 31 December 2003, by date of notification*

Disease	State or territory								Total 4th quarter 2003[1]	Total 3rd quarter 2003	Total 4th quarter 2002	Last 5 years mean 4th quarter	Year to date 2003	Last 5 years YTD mean	Ratio†
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA							
Bloodborne diseases															
Hepatitis B (incident)	0	14	5	9	2	0	26	8	64	91	75	81	350	361	0.8
Hepatitis B (unspecified)	13	625	NN	227	62	46	427	88	1,488	1,644	1,644	1,865	6,468	7,393	0.8
Hepatitis C (incident)	4	6	NN	NN	23	2	21	29	85	131	95	119	461	452	0.7
Hepatitis C (unspecified)	62	1,726	59	670	138	128	862	311	3,956	4,181	3,739	4,392	15,907	18,378	0.9
Hepatitis D	0	4	0	0	0	0	2	0	6	10	2	6	27	19	1.0
Hepatitis (NEC)	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	0	0	0	1	2	0.0
Campylobacteriosis[2]	124	NN	26	870	487	352	1,550	519	3,928	3,482	4,256	4,102	15,723	14,064	1.0
Cryptosporidiosis‡	1	58	11	20	12	18	38	34	192	201	302	341	1,226	2,406	0.6
Haemolytic uraemic syndrome	0	3	0	0	1	0	2	0	6	3	3	5	16	14	1.3
Hepatitis A	2	41	6	4	3	2	4	25	87	93	84	218	416	1,155	0.4
Hepatitis E	0	0	0	0	0	0	0	0	0	5	1	1	8	9	0.0
Listeriosis	1	6	0	2	0	0	4	3	16	13	14	14	70	61	1.1
Salmonellosis	13	405	60	551	101	52	257	112	1,551	1,060	1,775	1,675	7,087	7,129	0.9
Shigellosis	0	13	20	6	6	2	8	26	81	97	108	123	437	538	0.7
SLTEC,VTEC[3]	0	0	0	0	7	0	0	0	7	9	11	11	47	42	0.6
Typhoid	0	7	0	2	0	0	2	1	12	13	14	14	51	68	0.8
Quarantinable diseases															
Cholera	0	0	0	0	0	0	0	0	0	0	1	0	1	3	0.0
Plague	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
Viral haemorrhagic fever	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

Table 2. Notifications of diseases received by State and Territory health authorities in the period 1 October to 31 December 2003, by date of notification,* *continued*

Disease	State or territory								Total 4th quarter 2003	Total 3rd quarter 2003	Total 4th quarter 2002	Last 5 years mean 4th quarter	Year to date 2003	Last 5 years YTD mean	Ratio†
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA							
Sexually transmissible diseases															
Chlamydial (NEC)	140	1,964	334	1,809	425	280	1,427	918	7,297	7,875	5,958	4,345	30,232	17,307	1.7
Donovanosis	0	0	1	0	0	0	0	0	1	3	3	4	14	22	0.3
Gonococcal infection[4]	4	255	250	244	58	18	188	375	1,392	1,614	1,494	1,385	6,480	5,860	1.0
Syphilis	3	264	47	78	5	8	74	31	510	512	471	419	2,061	1,757	1.2
Syphilis - congenital	0	0	0	0	0	0	0	0	0	0	2	2	11	9	0.9
Vaccine preventable disease															
Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.0
Haemophilus influenzae type b	0	1	2	0	0	0	0	1	4	7	4	7	22	31	0.6
Influenza (laboratory confirmed)‡	0	57	31	72	19	0	14	62	255	3,123	197	194	3,610	2,480	1.3
Measles	0	2	0	2	11	0	2	0	17	25	3	31	91	161	0.5
Mumps	1	12	0	2	3	0	2	7	27	16	13	29	76	153	0.9
Pertussis	108	871	1	164	42	144	197	102	1,629	1,556	1,412	1,863	4,970	6,177	0.9
Pneumococcal disease (invasive)‡	6	180	15	110	39	26	106	38	520	830	524	460	2,219	1,980	1.1
Poliomyelitis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Rubella	0	2	0	1	0	0	0	0	3	7	66	99	56	393	0.0
Rubella - congenital	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0.0
Tetanus	0	0	0	0	0	0	0	0	0	1	0	1	3	4	0.0
Vectorborne diseases															
Arbovirus infection NEC	0	2	0	23	0	0	2	0	27	20	5	9	85	52	2.9
Barmah Forest virus infection	0	55	1	89	1	0	1	5	152	167	139	136	1,358	767	1.1
Dengue	2	8	5	180	3	2	3	0	203	34	33	64	844	266	3.2
Japanese encephalitis‡	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Kunjin virus‡	0	0	0	2	0	0	0	0	2	0	0	0	19	4	0.0
Malaria	0	28	3	59	8	28	11	16	153	136	106	144	635	703	1.1
Murray Valley encephalitis‡	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0.0
Ross River virus infection	1	39	5	87	8	4	7	327	478	217	118	444	3,632	3,289	1.1

Table 2. Notifications of diseases received by State and Territory health authorities in the period 1 October to 31 December 2003, by date of notification,* *continued*

Disease	State or territory								Total 4th quarter 2003	Total 3rd quarter 2003	Total 4th quarter 2002	Last 5 years mean 4th quarter	Year to date 2003	Last 5 years YTD mean	Ratio†
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA							
Zoonoses															
Anthrax‡	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
Brucellosis	0	0	0	2	0	0	0	0	2	4	11	11	17	37	0.2
Leptospirosis	0	3	2	9	1	0	4	2	21	27	23	51	122	232	0.4
Other lyssavirus (NEC)‡	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Ornithosis	0	24	0	0	1	0	33	2	60	66	22	33	198	120	1.8
Q fever	0	46	0	45	3	0	1	7	102	86	186	154	516	617	0.7
Other bacterial infections															
Legionellosis	0	11	1	7	25	0	16	29	89	61	86	79	322	322	1.1
Leprosy	0	0	0	0	0	0	0	0	0	0	0	1	4	4	0.0
Meningococcal infection	8	48	1	24	12	8	32	11	144	206	154	144	545	610	1.0
Tuberculosis	2	73	3	14	2	2	94	12	202	243	203	248	852	1,014	0.8
Total	495	6,853	889	5,384	1,508	1,122	5,417	3,101	25,857	27,869	23,357	12,673	107,291	93,526	2.1

1. Totals comprise data from all states and territories. Cumulative figures are subject to retrospective revision so there may be discrepancies between the number of new notifications and the increment in the cumulative figure from the previous period.
2. Not reported for New South Wales because it is only notifiable as 'foodborne disease' or 'gastroenteritis in an institution'.
3. Infections with shiga-like toxin (verotoxin) producing *Escherichia coli* (SLTEC/VTEC).
4. Northern Territory, Queensland, South Australia , Victoria and Western Australia: includes gonococcal neonatal ophthalmia.

* Date of notification = a composite of three dates: (i) the true onset date from a clinician, if available, (ii) the date the laboratory test was ordered, or (iii) the date reported to the public health unit.

† Ratio = ratio of current quarter total to the mean of last 5 years.

‡ Notifiable from January 2001 only. Ratio and mean calculations are based the last two years.

NN Not notifiable

NEC Not elsewhere classified.

Table 3. Notification rates of diseases by state or territory, 1 October to 31 December 2003. (Rate per 100,000 population)

Disease[1]	State or territory								
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Australia
Bloodborne diseases									
Hepatitis B (incident)	0.0	0.8	10.1	1.0	0.5	0.0	2.1	1.7	1.3
Hepatitis B (unspecified)[†,‡]	16.1	37.6	NN	24.3	16.3	38.9	34.9	18.2	30.5
Hepatitis C (incident)	5.0	0.4	NN	NN	6.0	1.7	1.7	6.0	2.2
Hepatitis C (unspecified)	77.0	103.7	119.4	71.9	36.3	108.2	70.5	64.3	80.2
Hepatitis D	0.0	0.2	0.0	0.0	0.0	0.0	0.2	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	0.0	0.0	0.0	0.0	0.0
Campylobacteriosis[2]	153.9	NN	52.6	93.3	127.9	297.4	126.8	107.3	120.2
Cryptosporidiosis	1.2	3.5	22.3	2.1	3.2	15.2	3.1	7.0	3.9
Haemolytic uraemic syndrome	0.0	0.2	0.0	0.0	0.3	0.0	0.2	0.0	0.1
Hepatitis A	2.5	2.5	12.1	0.4	0.8	1.7	0.3	5.2	1.8
Hepatitis E	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Listeriosis	1.2	0.4	0.0	0.2	0.0	0.0	0.3	0.6	0.3
Salmonellosis	16.1	24.3	121.4	59.1	26.5	43.9	21.0	23.2	31.4
Shigellosis	0.0	0.8	40.5	0.6	1.6	1.7	0.7	5.4	1.6
SLTEC,VTEC[3]	0.0	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.1
Typhoid	0.0	0.4	0.0	0.2	0.0	0.0	0.2	0.2	0.2
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
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 diseases									
Chlamydial infection	173.8	118.0	675.8	194.0	111.7	236.6	116.8	189.8	148.0
Donovanosis	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0
Gonococcal infection[4]	5.0	15.3	505.8	26.2	15.2	15.2	15.4	77.5	28.2
Syphilis	3.7	15.9	95.1	8.4	1.3	6.8	6.1	6.4	10.3
Syphilis - congenital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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	4.0	0.0	0.0	0.0	0.0	0.2	0.1
Influenza (laboratory confirmed)	0.0	3.4	62.7	7.7	5.0	0.0	1.1	12.8	5.2
Measles	0.0	0.1	0.0	0.2	2.9	0.0	0.2	0.0	0.3
Mumps	1.2	0.7	0.0	0.2	0.8	0.0	0.2	1.4	0.5
Pertussis	134.1	52.3	2.0	17.6	11.0	121.7	16.1	21.1	33.0
Pneumococcal disease	7.4	10.8	30.3	11.8	10.2	22.0	8.7	7.9	10.5
Poliomyelitis	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rubella	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.1
Rubella - congenital	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Tetanus	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 3. Notification rates of diseases by state or territory, 1 October to 31 December 2003. (Rate per 100,000 population) , *continued*

Disease[1]	State or territory								Australia
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	
Vectorborne diseases									
Arbovirus infection NEC	0.0	0.1	0.0	2.5	0.0	0.0	0.2	0.0	0.5
Barmah Forest virus infection	0.0	3.3	2.0	9.5	0.3	0.0	0.1	1.0	3.1
Dengue	2.5	0.5	10.1	19.3	0.8	1.7	0.2	0.0	4.1
Japanese encephalitis	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	0.2	0.0	0.0	0.0	0.0	0.0
Malaria	0.0	1.7	6.1	6.3	2.1	23.7	0.9	3.3	3.1
Murray Valley encephalitis	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ross River virus infection	1.2	2.3	10.1	9.3	2.1	3.4	0.6	67.6	9.7
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	0.2	0.0	0.0	0.0	0.0	0.0
Leptospirosis	0.0	0.2	4.0	1.0	0.3	0.0	0.3	0.4	0.4
Other lyssavirus (NEC)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ornithosis	0.0	1.4	0.0	0.0	0.3	0.0	2.7	0.4	1.2
Q fever	0.0	2.8	0.0	4.8	0.8	0.0	0.1	1.4	2.1
Other bacterial infections									
Legionellosis	0.0	0.7	2.0	0.8	6.6	0.0	1.3	6.0	1.8
Leprosy	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Meningococcal infection	9.9	2.9	2.0	2.6	3.2	6.8	2.6	2.3	2.9
Tuberculosis	2.5	4.4	6.1	1.5	0.5	1.7	7.7	2.5	4.1

1. Rates are subject to retrospective revision.
2. Not reported for New South Wales because it is only notifiable as ‘foodborne disease’ or ‘gastroenteritis in an institution’.
3. Infections with Shiga-like toxin (verotoxin) producing *Escherichia coli* (SLTEC/VTEC).
4. Northern Territory, Queensland, South Australia, Victoria and Western Australia: includes gonococcal neonatal ophthalmia.

NN Not Notifiable.

NEC Not Elsewhere Classified.

Table 4. Virology and serology laboratory reports by state or territory[1] for the reporting period 1 October to 31 December 2003, and total reports for the year[2]

	State or territory								This period 2003	This period 2002	Year to date 2003[3]	Year to date 2002
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA				
Measles, mumps, rubella												
Measles virus	-	-	-	2	18	-	1	-	21	1	71	16
Mumps virus	-	-	-	-	1	-	-	2	3	3	10	16
Rubella virus	-	-	-	3	1	-	2	1	7	12	26	92
Hepatitis virus												
Hepatitis A virus	-	1	3	-	2	-	2	15	23	17	87	71
Hepatitis D virus	-	-	-	-	1	-	-	3	4	1	19	7
Arboviruses												
Ross River virus	-	2	2	21	3	-	2	21	51	46	1,234	423
Barmah Forest virus	-	5	-	27	-	-	-	1	33	32	408	203
Dengue not typed	-	-	3	-	-	-	-	1	4	8	31	163
Flavivirus (unspecified)	-	-	1	9	-	-	4	-	14	6	122	43
Adenoviruses												
Adenovirus type 40	-	-	-	-	-	-	-	4	4	18	32	48
Adenovirus not typed/ pending	-	43	3	19	52	-	3	22	142	322	894	1,013
Herpesviruses												
Cytomegalovirus	3	51	3	17	33	-	8	2	117	275	819	1,124
Varicella-zoster virus	1	32	4	226	70	-	8	88	429	392	1,691	1,726
Epstein-Barr virus	-	18	23	171	136	-	12	48	408	482	1,716	1,798
Other DNA viruses												
Molluscum contagiosum	-	-	-	-	-	-	-	4	4	8	15	26
Contagious pustular dermatitis (Orf virus)	-	-	-	-	-	-	-	1	1	1	4	3
Parvovirus	1	2	-	37	1	-	15	34	90	73	258	324
Picornavirus family												
Coxsackievirus A9	-	1	-	-	-	-	-	-	1	-	23	2
Coxsackievirus A16	-	1	-	-	-	-	1	-	2	1	11	4
Echovirus type 6	-	1	-	-	-	-	-	-	1	3	9	63
Poliovirus type 1 (uncharacterised)	-	2	-	-	-	-	-	-	2	15	34	37
Poliovirus type 2 (uncharacterised)	-	2	-	-	-	-	-	-	2	6	11	18
Poliovirus type 3 (uncharacterised)	-	2	-	-	-	-	-	-	2	2	6	6
Rhinovirus (all types)	-	64	-	1	1	-	-	58	124	193	513	543
Enterovirus not typed/ pending	-	1	1	3	1	-	2	22	30	165	156	571
Ortho/paramyxoviruses												
Influenza A virus	-	2	6	10	113	-	6	66	203	144	1,949	1,809
Influenza B virus	-	1	-	-	17	-	-	3	21	51	118	547
Parainfluenza virus type 1	-	6	-	-	1	-	-	1	8	32	41	291
Parainfluenza virus type 2	-	-	-	-	-	-	-	1	1	10	67	79
Parainfluenza virus type 3	-	49	-	3	91	-	3	49	195	250	600	606
Respiratory syncytial virus	-	39	-	27	50	3	3	37	159	184	1,734	2,955
Other RNA viruses												
HTLV-1	-	-	-	-	-	-	-	1	1	4	11	7
Rotavirus	1	163	-	1	418	-	27	57	667	615	1,236	1,985
Calicivirus	-	-	5	-	-	-	-	66	71	14	174	22
Norwalk agent	-	1	-	-	-	-	97	-	98	281	189	537

Table 4. Virology and serology laboratory reports by state or territory[1] for the reporting period 1 October to 31 December 2003, and total reports for the year,[2] *continued*

	State or territory								This period 2003	This period 2002	Year to date 2003[3]	Year to date 2002
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA				
Other												
Chlamydia trachomatis not typed	1	96	-	353	184	-	10	234	878	954	4,278	3,874
Chlamydia pneumoniae	-	-	-	-	-	-	-	4	4	17	15	32
Chlamydia psittaci	-	-	-	-	1	-	29	1	31	16	118	62
Chlamydia spp typing pending	-	-	-	-	-	-	1	-	1	-	1	5
Mycoplasma pneumoniae	-	25	3	74	76	-	54	8	240	237	1,143	1,234
Coxiella burnetii (Q fever)	-	2	-	16	12	-	4	2	36	59	177	251
Rickettsia prowazeki	-	-	-	-	-	-	-	1	1	-	3	-
Rickettsia tsutsugamushi	-	-	-	-	-	-	1	1	2	-	4	-
Rickettsia - Spotted fever group	-	-	1	-	-	-	1	-	2	1	2	1
Streptococcus group A	-	2	-	77	-	-	49	-	128	102	490	526
Yersinia enterocolitica	-	3	-	-	-	-	-	-	3	1	12	9
Brucella abortus	-	-	-	-	2	-	1	-	3	-	5	2
Brucella species	-	1	-	1	-	-	-	-	2	1	7	5
Bordetella pertussis	7	22	1	18	13	3	74	4	142	156	506	944
Legionella pneumophila	1	-	-	-	-	-	15	1	17	42	130	120
Legionella longbeachae	-	-	-	-	3	-	8	18	29	30	83	78
Legionella species	-	-	-	-	-	-	7	-	7	2	17	15
Cryptococcus species	-	-	-	2	3	-	-	-	5	5	25	30
Leptospira hardjo	-	-	-	-	-	-	-	1	1	-	2	-
Leptospira species	-	-	-	3	-	-	-	-	3	-	24	18
Treponema pallidum	-	28	-	107	56	-	5	3	199	301	1,157	1,400
Entamoeba histolytica	-	-	-	1	-	-	1	2	4	6	14	28
Toxoplasma gondii	-	2	-	3	-	-	1	-	6	5	38	28
Echinococcus granulosus	-	-	-	-	5	-	-	-	5	5	19	30
Total	15	670	59	1,232	1,365	6	457	888	4,692	5,607	22,589	25,870

1. State or territory of postcode, if reported, otherwise state or territory of reporting laboratory.
2. From January 2000 data presented are for reports with report dates in the current period. Previously reports included all data received in that period.
3. Totals comprise data from all laboratories. Cumulative figures are subject to retrospective revision, so there may be discrepancies between the number of new notifications and the increment in the cumulative figure from the previous period.

– No data received this period

Table 5. Virology and serology reports by laboratories for the reporting period 1 October to 31 December 2003*

State or territory	Laboratory	October 2003	November 2003	December 2003	Total this period
Australian Capital Territory	The Canberra Hospital	-	-	-	-
New South Wales	Institute of Clinical Pathology and Medical Research, Westmead	63	96	31	190
	New Children's Hospital, Westmead	143	72	29	244
	Repatriation General Hospital, Concord	-	-	-	-
	Royal Prince Alfred Hospital, Camperdown	-	-	-	-
	South West Area Pathology Service, Liverpool	100	72	27	199
Queensland	Queensland Medical Laboratory, West End	490	426	387	1,303
	Townsville General Hospital	-	-	-	-
South Australia	Institute of Medical and Veterinary Science, Adelaide	691	672	-	1,363
Tasmania	Northern Tasmanian Pathology Service, Launceston	3	-	-	3
	Royal Hobart Hospital, Hobart	-	-	-	-
Victoria	Monash Medical Centre, Melbourne	55	8	-	63
	Royal Children's Hospital, Melbourne	66	63	24	153
	Victorian Infectious Diseases Reference Laboratory, Fairfield	64	86	87	237
Western Australia	PathCentre Virology, Perth	461	396	-	857
	Princess Margaret Hospital, Perth	-	-	-	-
	Western Diagnostic Pathology	38	18	24	80
Total		2,174	1,909	609	4,692

* The complete list of laboratories reporting for the 12 months, January to December 2003, will appear in every report regardless of whether reports were received in this reporting period. Reports are not always received from all laboratories.

– Nil reports

Additional reports

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 network of general practitioners who report presentations of defined medical conditions each week. The aim of ASPREN is to provide an indicator of the burden of disease in the primary health setting and to detect trends in consultation rates.

There are currently about 50 general practitioners participating in the network from all states and territories. Seventy-five per cent of these are in metropolitan areas and the remainder are rural based. Between 4,000 and 6,000 consultations are recorded each week.

The list of conditions is reviewed annually by the ASPREN management committee and an annual report is published.

In 2003, 13 conditions are being monitored, five of which are related to communicable diseases. These include influenza, gastroenteritis, antibiotic prescription for acute cough, varicella and shingles. Definitions of these conditions were published in Commun Dis Intell *2003;27:125–126.*

Data from 1 October to 31 December 2003 are shown as the rate per 1,000 consultations in Figures 5, 6, and 7.

Figure 5. Consultation rates for influenza-like illness, ASPREN, 1 October to 31 December 2003, by week of report

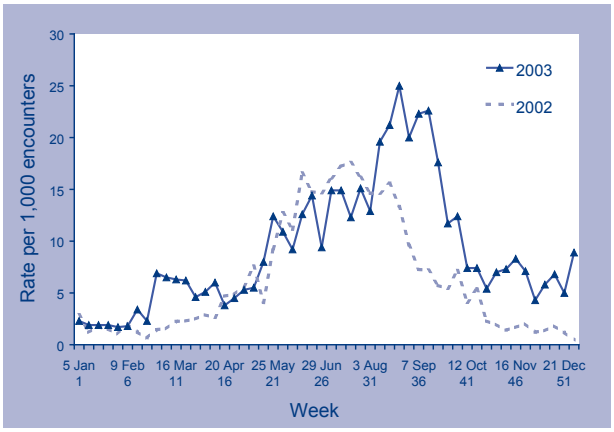


Figure 6. Consultation rates for gastroenteritis, ASPREN, 1 October to 31 December 2003, by week of report

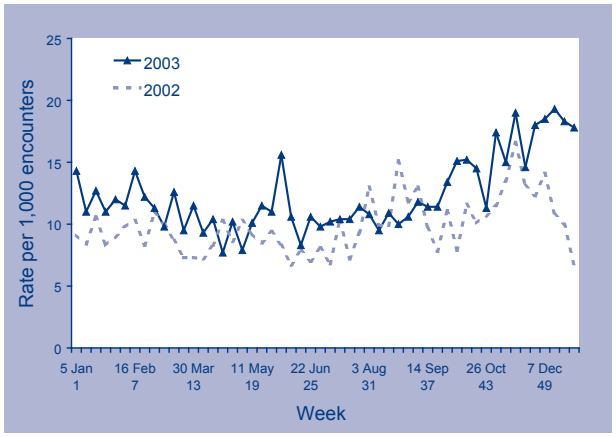
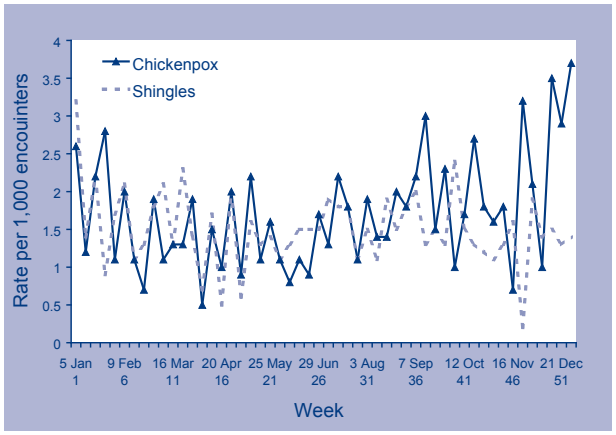


Figure 7. Consultation rates for varicella, ASPREN, 1 October to 31 December 2003, by week of report



Gonococcal surveillance

John Tapsall, The Prince of Wales Hospital, Randwick NSW 2031 for the Australian Gonococcal Surveillance Programme.

The Australian Gonococcal Surveillance Programme (AGSP) reference laboratories in the various States and Territories report data on sensitivity to an agreed 'core' group of antimicrobial agents quarterly. The antibiotics currently routinely surveyed are penicillin, ceftriaxone, ciprofloxacin and spectinomycin, all of which are administered as single dose regimens and currently used in Australia to treat gonorrhoea. When in vitro resistance to a recommended agent is demonstrated in 5 per cent or more of isolates from a general population, it is usual to remove that agent from the list of recommended treatment.[1] Additional data are also provided on other antibiotics from time to time. At present all laboratories also test isolates for the presence of high level (plasmid-mediated) resistance to the tetracyclines, known as TRNG. Tetracyclines are however, not a recommended therapy for gonorrhoea in Australia. Comparability of data is achieved by means of a standardised system of testing and a program-specific quality assurance process. Because of the substantial geographic differences in susceptibility patterns in Australia, regional as well as aggregated data are presented. For more information see Commun Dis Intell *2003;27:128.*

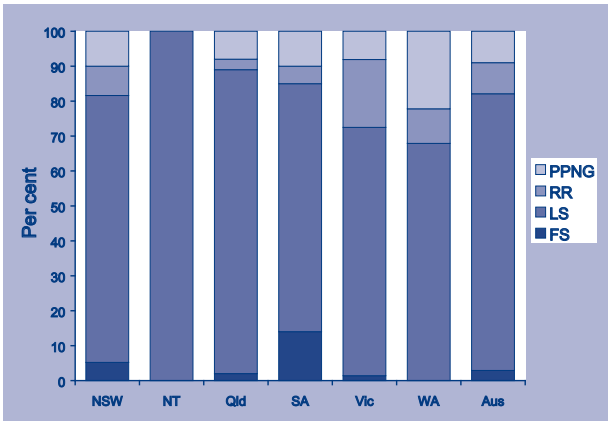
Reporting period 1 July to 30 September 2003

The Australian Gonococcal Surveillance Programme laboratories examined 857 isolates in this quarter and another 22 strains were non-viable. The total of 879 is slightly less than the 913 strains in the same period of 2002. About 29 per cent of this total was from New South Wales, 24 per cent from Victoria, 18 per cent from Queensland, 15 per cent from the Northern Territory, 10 per cent from Western Australia and 5 per cent from South Australia. Isolates from other centres were few. Numbers examined again decreased in New South Wales by about 30 per cent, but increased in Victoria by the same proportion when compared with data in the third quarter of 2002. Little change was seen in the numbers of isolates examined in other centres.

Penicillins

Figure 8 shows the proportions of gonococci fully sensitive (MIC ≤ 0.03 mg/L), less sensitive (MIC 0.06 – 1 mg/L), relatively resistant (MIC ≥ 1 mg/L) or else penicillinase producing (PPNG) aggregated for Australia and by state or territory. A high proportion of those strains classified as PPNG or else resistant by chromosomal mechanisms, fail to respond to treatment with penicillins (penicillin, amoxycillin, ampicillin) and early generation cephalosporins.

Figure 8. Categorisation of gonococci isolated in Australia, 1 July to 31 September 2003, by penicillin susceptibility and region



FS Fully sensitive to penicillin, MIC ≤0.03 mg/L.

LS Less sensitive to penicillin, MIC 0.06–0.5 mg/L.

RR Relatively resistant to penicillin, MIC ≥1 mg/L.

PPNG Penicillinase producing *Neisseria gonorrhoeae.*

In this quarter, about 18 per cent of all isolates were penicillin resistant by one or more mechanisms. This proportion approximates the 17 per cent penicillin resistance seen in gonococci in the third quarter of 2002. PPNG and resistance by chromosomally mediated mechanisms (CMRNG) occurred in equal proportions. The proportion of penicillin resistant strains ranged from zero per cent in the Northern Territory to 32 per cent in Western Australia.

The number of PPNG isolated across Australia increased to 77 from the 59 seen in the September quarter of 2002 and the 66 detected in the same quarter of 2001. The highest proportion of PPNG was found in isolates from Western Australia (22%). In other states, PPNG accounted for 8–10 per cent of all isolates. No PPNG were detected in the Northern Territory.

The number (76) and proportion (8.9%) of isolates resistant to the penicillins by separate chromosomal mechanisms continued to decrease. In the same period in 2001, 173 CMRNG were detected and 93 in 2002. CMRNG were most prominent in Victoria (41 CMRNG, 19.4%), but were less than 10 per cent of isolates in other states. CMRNG were not detected in the Northern Territory.

Ceftriaxone

Low numbers of isolates with decreased susceptibility to ceftriaxone have been repeatedly detected in a number of jurisdictions for several years, but all isolates were fully susceptible in this quarter.

Spectinomycin

All isolates were susceptible to this injectable agent.

Quinolone antibiotics

Quinolone resistant *Neisseria gonorrhoeae* (QRNG) are defined as those isolates with an MIC to ciprofloxacin equal to, or greater than, 0.06 mg/L. QRNG are further subdivided into less sensitive (ciprofloxacin MICs 0.06 – 0.5 mg/L) or resistant (MIC ≥ 1 mg/L) groups.

The total number (136) and proportion (16%) of QRNG increased in this quarter when compared with the third quarter of 2002 when 96 QRNG represented 11 per cent of all isolates. The number and proportion of QRNG in the September quarter in 2001 (151, 17%) was similar to the current data.

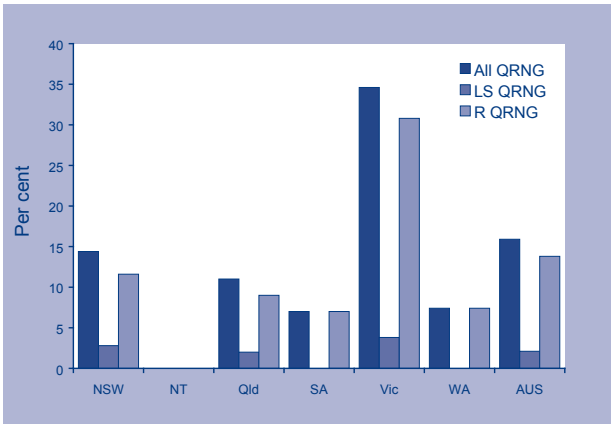
QRNG were again widely distributed, although none were detected in the Northern Territory. High rates were maintained in Victoria (35%) and increased in New South Wales (14%) and Queensland (11%).

In this quarter most (118 of 136) of the QRNG again exhibited higher levels of resistance MICs ≥ 1 mg/L (Figure 9).

High level tetracycline resistance

The number (98) and proportion (11%) of high level tetracycline resistance (TRNG) *Neisseria gonorrhoeae* was essentially unchanged from data in the September quarter of 2002. TRNG represented 28 per cent of isolates from Western Australia, and between 7 and 14 per cent of strains from Victoria, New South Wales, Queensland and South Australia.

Figure 9. The distribution of quinolone resistant isolates of *Neisseria gonorrhoeae*, Australia, 1 July to 30 September 2003, by jurisdiction



LS QRNG Ciprofloxacin MICs 0.06–0.5 mg/L.

R QRNG Ciprofloxacin MICs ≥1 mg/L.

References

1. World Health Organization. Guidelines for the management of sexually transmitted infections. WHO/HIV_AIDS/(2001).01;WHO/RHR/o1.10:pp 1–5 World Health Organization, Geneva 2001.

HIV and AIDS surveillance

National surveillance for HIV disease is coordinated by the National Centre in HIV Epidemiology and Clinical Research (NCHECR), in collaboration with State and Territory health authorities and the Commonwealth of Australia. Cases of HIV infection are notified to the National HIV Database on the first occasion of diagnosis in Australia, by either the diagnosing laboratory (Australian Capital Territory, New South Wales, Tasmania, Victoria) or by a combination of laboratory and doctor sources (Northern Territory, Queensland, South Australia, Western Australia). Cases of AIDS are notified through the State and Territory health authorities to the National AIDS Registry. Diagnoses of both HIV infection and AIDS are notified with the person's date of birth and name code, to minimise duplicate notifications while maintaining confidentiality.

Tabulations of diagnoses of HIV infection and AIDS are based on data available three months after the end of the reporting interval indicated, to allow for reporting delay and to incorporate newly available information. More detailed information on diagnoses of HIV infection and AIDS is published in the quarterly Australian HIV Surveillance Report, and annually in 'HIV/AIDS, viral hepatitis and sexually transmissible infections in Australia, annual surveillance report'. The reports are available from the National Centre in HIV Epidemiology and Clinical Research, 376 Victoria Street, Darlinghurst NSW 2010. Internet: http://www.med.unsw.edu.au/nchecr. Telephone: +61 2 9332 4648. Facsimile: +61 2 9332 1837. For more information see Commun Dis Intell *2003;27:57.*

HIV and AIDS diagnoses and deaths following AIDS reported for 1 July to 30 September 2003, as reported to 31 December 2003, are included in this issue of Communicable Diseases Intelligence *(Tables 6 and 7).*

Table 6. New diagnoses of HIV infection, new diagnoses of AIDS, and deaths following AIDS occurring in the period 1 July to 30 September 2003, by sex and state or territory of diagnoses

	Sex	State or territory								Totals for Australia			
		ACT	NSW	NT	Qld	SA	Tas	Vic	WA	This period 2003	This period 2002	Year to date 2003	Year to date 2002
HIV diagnoses	Female	1	10	1	2	0	0	3	4	21	15	64	64
	Male	1	75	0	24	16	0	46	7	169	180	572	529
	Sex not reported	0	4	0	0	0	0	0	0	4	0	7	1
	Total[1]	2	89	1	26	16	0	49	12	195	197	644	598
AIDS diagnoses	Female	1	0	1	0	0	0	0	0	2	3	8	10
	Male	1	17	0	2	1	0	10	3	34	49	100	148
	Total[1]	2	17	1	2	1	0	10	3	36	52	109	159
AIDS deaths	Female	1	1	0	0	0	0	0	0	2	2	7	4
	Male	0	9	0	1	3	0	5	1	19	21	49	52
	Total	1	10	0	1	3	0	5	1	21	23	56	56

1. Totals include people whose sex was reported as transgender.

Table 7. Cumulative diagnoses of HIV infection, AIDS, and deaths following AIDS since the introduction of HIV antibody testing to 30 September 2003 and reported by 31 December 2003, by sex and state or territory

	Sex	State or territory								
		ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Australia
HIV diagnoses	Female	29	718	15	203	78	7	285	158	1,493
	Male	243	12,243	119	2,351	783	85	4,542	1,048	21,414
	Not reported	0	239	0	0	0	0	24	0	263
	Total[1]	272	13,226	134	2,562	861	92	4,869	1,213	23,229
AIDS diagnoses	Female	10	213	1	56	30	4	88	33	435
	Male	92	4,984	39	936	378	47	1,802	402	8,680
	Total[1]	102	5,211	40	994	408	51	1,900	437	9,143
AIDS deaths	Female	6	126	0	38	20	2	57	22	271
	Male	71	3,417	26	614	255	31	1,339	275	6,028
	Total[1]	77	3,552	26	654	275	33	1,404	298	6,319

1. Totals include people whose sex was reported as transgender.

Childhood immunisation coverage

Tables 8, 9, and 10 provide the latest quarterly report on childhood immunisation coverage from the Australian Childhood Immunisation Register (ACIR).

The data show the percentage of children fully immunised at 12 months of age for the cohort born between 1 July and 30 September 2002, at 24 months of age for the cohort born between 1 July and 30 September 2001, and at 6 years of age for the cohort born between 1 July and 30 September 1997 according to the Australian Standard Vaccination Schedule.

A full description of the methodology used can be found in Commun Dis Intell 1998;22:36-37.

Commentary on the trends in ACIR data is provided by the National Centre for Immunisation Research and Surveillance of Vaccine Preventable Diseases (NCIRS). For further information please contact the NCIRS at telephone: +61 2 9845 1256, Email: brynleyh@chw.edu.au.

Immunisation coverage for children 'fully immunised' at 12 months for Australia has decreased from the last quarter by 0.7 percentage points to 91.0 per cent (Table 8). There were substantial decreases in 'fully immunised' coverage by state and territory in two jurisdictions, the Northern Territory (–4.3%) and the Australian Capital Territory (–3.3%). All other jurisdictions experienced either a small decrease or no change in coverage. The Northern Territory also experienced decreases in coverage for diphtheria, tetanus, pertussis (DTP) (–3.5%), poliomyelitis (OPV) (–4.1%), *Haemophilus influenzae* type b (Hib) (–1.5%) and hepatitis B (Hep B) (–0.9%). Significant decreases in coverage in jurisdictions like the Northern Territory and the Australian Capital Territory, which have relatively small populations, are likely to be the result of small numbers of unimmunised children having a large impact on the coverage percentages.

Coverage measured by 'fully immunised' at 24 months of age for Australia increased significantly from the last quarter by 2.4 percentage points to 91.6 per cent (Table 9). Coverage for individual vaccines for Australia basically remained largely unchanged except for DTP, which increased substantially by 4.5 percentage points. In fact, DTP coverage increased significantly in all jurisdictions due to the removal of the 4th dose of DTP (due at 18 months), from the immunisation schedule from the December 2003 quarter onwards. The coverage assessment for the 24-month cohort now excludes the requirement for the 18-month dose of DTP. Coverage for this cohort now looks for a third or a fourth dose of diphtheria, tetanus and pertussis vaccine. Prior to the change, the 24-month cohort assessment looked for the 4th dose only.

Table 10 shows immunisation coverage estimates for 'fully immunised' and for individual vaccines at six years of age for Australia and by state or territory. 'Fully immunised' coverage at six years of age for Australia increased again, this time by 0.6 percentage points from the previous quarter to 83.7 per cent with significant increases in the Australian Capital Territory (+1.6%) and Tasmania (+2.6%). Encouragingly, coverage for all individual vaccines at six years of age again increased in most states and territories with some substantial increases in some jurisdictions. Coverage for vaccines assessed at six years is now over 85 per cent in the majority of jurisdictions, and close to 85 per cent in most jurisdictions, although coverage in Western Australia for this age group decreased for all vaccines and remains well below other jurisdictions.

Table 8. Proportion of children immunised at 1 year of age, preliminary results by disease and state or territory for the birth cohort 1 July to 30 September 2002; assessment date 31 December 2003

Vaccine	State or territory								
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Australia
Number of children	1,071	21,811	899	12,651	4,510	1,485	15,818	6,028	64,273
Diphtheria, tetanus, pertussis (%)	92.8	92.5	88.8	92.5	93.0	92.9	93.1	90.7	92.5
Poliomyelitis (%)	92.6	92.4	87.9	92.3	92.7	93.0	93.0	90.4	92.3
Haemophilus influenzae type b (%)	91.7	94.2	93.3	94.4	94.7	95.8	95.0	93.3	94.4
Hepatitis B (%)	95.6	95.1	94.8	94.7	95.3	95.6	94.9	93.1	94.8
Fully immunised (%)	88.3	91.0	85.5	91.3	91.6	91.7	91.7	89.1	91.0
Change in fully immunised since last quarter (%)	-3.3	-0.5	-4.3	-0.8	0.0	-0.4	-0.9	-0.5	-0.7

Figure 10 shows the trends in vaccination coverage from the first ACIR-derived published coverage estimates in 1997 to the current estimates. There is a clear trend of increasing vaccination coverage over time for children aged 12 months, 24 months and six years, although the rate of increase has slowed over the past two years, especially for children in the 12 and 24 month age groups.

Acknowledgment: These figures were provided by the Health Insurance Commission (HIC), to specifications provided by the Commonwealth Department of Health and Ageing. For further information on these figures or data on the Australian Childhood Immunisation Register please contact the Immunisation Section of the HIC: Telephone: +61 2 6124 6607.

Figure 10. Trends in vaccination coverage, Australia, 1997 to 2003, by age cohorts

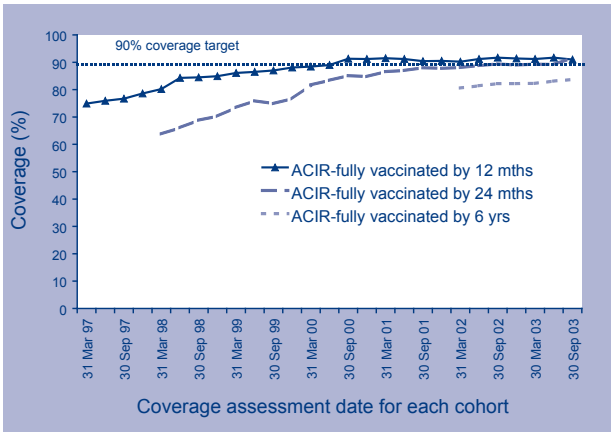


Table 9. Proportion of children immunised at 2 years of age, preliminary results by disease and state or territory for the birth cohort 1 July to 30 September 2001; assessment date 31 December 2003[1]

Vaccine	State or territory								
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Australia
Total number of children	1,019	22,036	858	13,160	4,575	1,456	15,831	6,398	65,333
Diphtheria, tetanus, pertussis (%)	95.6	95.7	96.5	95.9	96.3	96.4	96.0	94.6	95.8
Poliomyelitis (%)	94.6	94.4	96.2	95.0	95.7	96.0	95.0	93.1	94.7
Haemophilus influenzae type b (%)	91.0	92.6	94.6	94.2	94.2	95.0	93.3	91.5	93.2
Measles, mumps, rubella (%)	91.1	92.7	94.9	94.2	94.5	95.0	93.7	92.1	93.4
Hepatitis B(%)	95.0	95.4	97.4	95.7	96.4	96.4	96.0	94.6	95.6
Fully immunised (%)[2]	89.0	90.8	93.6	92.5	92.9	94.4	92.1	89.8	91.6
Change in fully immunised since last quarter (%)	+3.9	+2.3	+4.2	+2.5	+2.7	+1.4	+2.2	+2.4	+2.4

1. The 12 months age data for this cohort was published in *Commun Dis Intell* 2003;27:88.
2. These data relating to 2-year-old children should be considered as preliminary. The proportions shown as 'fully immunised' appear low when compared with the proportions for individual vaccines. This is at least partly due to poor identification of children on immunisation encounter forms.

Table 10. Proportion of children immunised at 6 years of age, preliminary results by disease and state or territory for the birth cohort 1 July to 30 September 1997; assessment date 31 December 2003

Vaccine	State or territory								
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Australia
Total number of children	1,061	23,079	786	13,673	4,775	1,635	16,293	6,779	68,081
Diphtheria, tetanus, pertussis (%)	86.6	85.4	83.5	85.0	85.2	86.5	87.3	81.7	85.4
Poliomyelitis (%)	86.5	85.4	84.9	85.1	85.5	87.3	87.5	82.1	85.6
Measles, mumps, rubella (%)	85.9	84.2	84.5	84.8	84.8	86.1	87.4	81.6	84.9
Fully immunised (%)[1]	84.7	83.0	82.4	83.6	83.6	85.0	86.2	80.2	83.7
Change in fully immunised since last quarter (%)	+1.6	+0.9	+0.9	+1.2	+0.4	+2.6	+0.4	-1.0	+0.6

1. These data relating to 6-year-old children should be considered as preliminary. The proportions shown as 'fully immunised' appear low when compared with the proportions for individual vaccines. This is at least partly due to poor identification of children on immunisation encounter forms.

National Enteric Pathogens Surveillance System

The National Enteric Pathogens Surveillance System (NEPSS) collects, analyses and disseminates data on human enteric bacterial infections diagnosed in Australia. These pathogens include Salmonella, E. coli, Vibrio, Yersinia, Plesiomonas, Aeromonas *and* Campylobacter.

Communicable Diseases Intelligence *NEPSS quarterly reports include only* Salmonella. *Data are based on reports to NEPSS from Australian laboratories of laboratory-confirmed human infection with* Salmonella. Salmonella *are identified to the level of serovar and, if applicable, phage-type. Infections apparently acquired overseas are included. Multiple isolations of a single* Salmonella *serovar/phage-type from one or more body sites during the same episode of illness are counted once only. The date of the case is the date the primary diagnostic laboratory isolated a* Salmonella *from the clinical sample.*

Interpret historical quarterly mean counts cautiously – these may be affected by outbreaks and surveillance artefacts such as newly recognised and incompletely typed Salmonella.

Reported by Joan Powling (NEPSS Co-ordinator) and Mark Veitch (Public Health Physician), Microbiological Diagnostic Unit — Public Health Laboratory, Department of Microbiology and Immunology, University of Melbourne. NEPSS can be contacted at the above address or by telephone: +61 3 8344 5701, facsimile: +61 3 9625 2689.

Reports to the National Enteric Pathogens Surveillance System of Salmonella infection for the period 1 October to 31 December 2003 are included in Tables 11 and 12. Data include cases reported and entered by 16 January 2004. Counts are preliminary, and subject to adjustment after completion of typing and reporting of further cases to NEPSS. For more information see Commun Dis Intell *2003;27:129.*

Fourth quarter 2003

The total number of reports to NEPSS of human *Salmonella* infection increased to 1,281 in the fourth quarter of 2003, 46 per cent more than the third quarter of 2003, and around the usual incidence at this time of year. The incidence of human salmonellosis typically begins to increase during the latter months of each year. Case counts to 16 January 2004 are approximately 90 per cent of the expected final counts for the quarter.

During the fourth quarter of 2003, the 25 most common *Salmonella* types in Australia accounted for 852 (67%) of all reported human *Salmonella* infections.

Nineteen of the 25 most common *Salmonella* infections in the fourth quarter of 2003 were amongst the 25 most commonly reported in the previous quarter.

Counts of *S*. Typhimurium phage type 170 continue to exceed historical averages, and were mostly reported from New South Wales and Victoria. There were a further two reports of the similar phage type, *S*. Typhimurium phage type 108.

Increases in *S*. Anatum and *Salmonella* subspecies I serovar 16:l,v:- involved cases from most of the eastern mainland states.

Acknowledgement

We thank scientists, diagnostic and reference laboratories, State and Territory health departments, and the Australian Government Department of Health and Ageing for their contributions to NEPSS.

Table 11. Reports to the National Enteric Pathogens Surveillance System of *Salmonella* isolated from humans during the period 1 October to 31 December 2003, as reported to 16 January 2004

	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Australia
Total all *Salmonella* for quarter	13	362	53	440	81	21	226	85	1,281
Total contributing *Salmonella* types	10	87	30	88	39	12	73	47	194

Table 12. Top 25 *Salmonella* types identified in Australia, 1 October to 31 December 2003, by state or territory

National rank	*Salmonella* type	State or territory								Total 4th quarter 2003	Last 10 years mean 4th quarter	Year to date 2003	Year to date 2002
		ACT	NSW	NT	Qld	SA	Tas	Vic	WA				
1	*S.* Typhimurium 135	1	26	1	70	5	0	15	4	122	130	681	675
2	*S.* Typhimurium 170	0	63	0	5	0	0	22	0	90	33	431	461
3	*S.* Typhimurium 9	0	24	0	22	2	2	26	3	79	122	415	592
4	*S.* Virchow 8	0	22	0	42	0	0	1	0	65	29	195	304
5	*S.* Saintpaul	0	9	4	23	3	1	4	4	48	68	282	383
6	*S.* Chester	0	3	5	23	0	0	1	5	37	35	214	178
7	*S.* Typhimurium 197	0	6	0	27	1	0	2	0	36	8	167	123
8	*S.* Infantis	0	10	0	2	4	0	14	3	33	29	198	117
9	*S.* Anatum	0	5	2	13	9	0	2	2	33	16	117	84
10	*S.* Birkenhead	0	12	0	19	0	0	0	0	31	57	173	246
11	*S.* Typhimurium 12	0	17	0	0	3	0	11	0	31	7	105	76
12	*S.* Typhimurium U290	1	9	0	0	2	1	17	0	30	4.7	145	103
13	Sal subsp I ser 16:l,v:-	0	6	0	10	5	0	7	0	28	8	77	53
14	*S.* Muenchen	0	6	5	6	3	0	1	3	24	27	133	132
15	*S.* Typhimurium 4	0	7	1	4	6	0	5	0	23	13	78	58
16	*S.* Typhimurium 126	0	0	0	4	1	0	5	7	17	26	72	206
17	*S.* Stanley	0	3	0	1	0	2	6	5	17	11	52	59
18	*S.* Aberdeen	0	2	2	9	1	0	2	0	16	17	83	130
19	*S.* Typhimurium 6 var 1	2	9	0	3	0	0	2	0	16	0.6	38	9
20	*S.* Waycross	0	7	0	7	0	0	0	0	14	15	70	106
21	*S.* Typhimurium RDNC	0	4	0	4	3	0	2	0	13	18	66	60
22	*S.* Agona	0	5	1	4	0	1	0	2	13	15	66	88
23	*S.* Typhimurium U307	0	4	0	9	0	0	0	0	13	8	32	24
24	*S.* Give	0	2	1	2	0	0	6	1	12	4.9	36	21
25	*S.* Havana	0	1	1	5	1	0	2	1	11	11	62	34

Overseas briefs

ProMED-mail

This material has been summarised from information provided by ProMED-mail (http://www.promedmail.org). A link to this site can be found under 'Other Australian and international communicable diseases sites' on the Communicable Diseases Australia homepage.

Confirmation of first BSE case in the United States

Source: OIE, 29 December 2003 (edited)

The World Animal Health Organisation (OIE) Reference Laboratory for bovine spongiform encephalopathy (BSE) in Weybridge, United Kingdom, confirmed the diagnostic results obtained at the National Veterinary Services Laboratories, Ames, Iowa, USA, of finding a positive case of BSE in the State of Washington.

The positive Holstein cow was traced back from the slaughter plant, where the positive brain tissue was collected, to a 4,000-animal dairy farm. The United States Department of Agriculture (USDA) continues to work with the Canadian officials to verify the origin of the index animal. Records indicate that this animal was approximately six and a half years old at the time of slaughter. The age of the animal is significant. She would have been born before feed bans were implemented in North America in August 1997. The feed bans prohibit the inclusion of ruminant protein in feed intended for other ruminants. That practice has been identified as the primary means by which BSE is spread.

The herd the affected animal came from is under a State quarantine in Washington. While USDA has not made any decisions on the dispositions of this herd, any cattle that die on the farm will be tested for BSE.

Suspected severe acute respiratory syndrome case in southern China

Source: WHO/WPRO, 28 December 2003 [edited]

On 26 December 2003, the Chinese Ministry of Health informed the World Health Organization (WHO) office in Beijing of a suspected case of severe acute respiratory syndrome (SARS) in a hospital in Guangzhou, Guangdong Province.

The patient, described as a 32-year-old television producer from Guangzhou, is in isolation in hospital. According to information supplied to WHO by the Chinese Ministry of Health, the patient developed a fever and headache on 16 December 2003. On 20 December, he sought medical assistance and was diagnosed as having pneumonia. Chest x-rays showed changes in the lower right lung. He was placed in isolation that day for observation.

The Ministry of Health also reported that all relevant human contacts of the patient have been identified, tested, and are deemed to be doing well, although some remain in isolation, under observation. The Chinese Ministry of Health said epidemiological investigations show that in the two weeks prior to the onset of symptoms, the patient had no known contact with high-risk groups such as health workers or animal handlers. The source of the suspected SARS infection is therefore unclear at this stage.

This is the first suspected SARS case found since 23 May 2003 when WHO lifted the SARS-related travel advisory against Guangdong Province.

South Korea: Avian influenza spreading across country

Source: Reuters Health eLine, 23 December 2003 [edited]

Nearly a million chickens and ducks were slaughtered across South Korea to combat a highly contagious strain of avian influenza virus that has spread across the country and could also infect humans. So far there has been no evidence of transmission of avian influenza virus from chickens or ducks to humans during the course of this outbreak of avian influenza A(H5N1) virus in South Korea.

Avian influenza, which in rare cases can be deadly to humans, has caused poultry sales to tumble as authorities confirm outbreaks at farm after farm across the country.

UK: variant CJD suspected to have been contracted by blood donation

Source: BBC News online, 17 December 2003 [edited]

A man who received blood during an operation in 1997 has developed variant Creutzfeldt-Jakob disease (vCJD) and died. The blood was taken long before the donor was diagnosed with the vCJD. Fifteen other persons have received blood from donors who went on to develop vCJD. All have been contacted and offered counselling. However, none of these has so far gone on to develop the disease, although it may have a long incubation period.

The risks of receiving blood carrying the 'rogue' prions that cause vCJD are largely unknown, although previously thought to be tiny, as no confirmed cases could be identified. In this case, the donor involved gave blood in 1997, and fell ill with [variant] CJD in 1999, dying shortly afterwards. The disease did not develop in the recipient until this year, and the patient died earlier this month. Postmortem results appear to confirm vCJD.

Measures already exist which attempt to cut the risk of CJD transmission during blood transfusions. So far, 143 cases of vCJD have been diagnosed in the United Kingdom, although the number of new cases is falling. There is no established treatment for the illness, which causes massive brain damage and normally kills within months of being detected.

Cluster of cases of tetanus in injecting drug users in England

Source: Eurosurveillance Vol 7, Issue 49, 4 December 2003 [edited]

Eight cases of clinical tetanus, including one death, have been reported in injecting drug users (IDUs) in England since July 2003, six of which occurred since October. The cases are in five women and three men aged between 20 and 47 years, and the latest reported onset date was 17 November 2003. Two of the cases are known to be unimmunised, and one case is known to have received a dose of tetanus toxoid nine years ago. The presentation of these cases so far has ranged from mild trismus to full-blown tetanus and respiratory arrest in the emergency department.

Potential sources for tetanus infection in IDUs are contaminated drugs, paraphernalia, and contaminated skin. The source of infection in this incident is not known. The close clustering of recent cases suggests contamination of drugs, either the drug itself or an adulterant.

China: Human rabies death toll continues to rise

Source: Reuters Health online, 25 November 2003 [edited]

Rabies cases leapt nearly 63 per cent in China in the first nine months of 2003 as the people's affair with pet dogs deepened, the China Daily reported on 25 November 2003. Rabies, 'mad dog disease' in Chinese, killed 1,297 people up to the end of September 2003, far exceeding the 1,003 deaths the Health Ministry reported for all of 2002. This is the fifth straight year that China has seen a big jump in rabies infections. Experts from the China Center for Disease Control and Prevention are blaming the trend on pet ownership, the poor quality of rabies vaccines, low public awareness and low vaccination rates among dogs as the major causes of the rapid rise in cases. Another factor was stray dogs running wild on the outskirts of cities and in rural areas. The Ministry said earlier this year that rabies was the most deadly infectious killer in China, well surpassing SARS and AIDS.

UK (England & Wales): Mumps cases at highest level for a decade

Source: The Independent online, 23 November 2003 [edited]

Cases of mumps are at the highest levels for almost a decade. So far this year, there have been more than 2,000 formal notifications of the disease in England, at least half of them thought to be positive. In Wales there have been 323 confirmed cases, compared with just two in 1999.

Public health doctors have warned that in some areas, one child in five starting primary school this year was not protected against the disease. The massive rise in mumps cases is a cause of huge concern for health officials, who have seen the take-up of the triple measles, mumps and rubella (MMR) vaccination drop alarmingly because of health scares.

Mumps can cause fever, headache and inflammation of the salivary glands, and occasionally infection of the membrane covering the brain. The disease can also cause permanent deafness. About one in five adolescent or adult males who contracts mumps develops a painful inflammation and swelling of the testicles, which can in a small number of cases result in infertility. Central nervous system complications are not uncommon. Teenagers are the group most at risk because they may have missed out on the MMR, which was introduced in 1988. Some universities are now offering MMR vaccinations to students.

There have been warnings that the fall in the take-up of the MMR, blamed on controversial and hotly disputed links that have been made between the vaccine and autism, will result in more outbreaks of measles and rubella. Less attention has been paid to mumps, which is often considered a benign illness with low mortality rates. However, doctors warn that it should not be underestimated.

New TB strain in South Africa

Source: Ninemsn.com, 18 November 2003 [edited]

A new 'super' strain of tuberculosis (TB) that is costly and time-consuming to treat has been identified in South Africa's Western Cape Province. The team found that the strain (DRF150) was resistant to almost all antimicrobial agents, used to treat tuberculosis. Usually five drugs are used to combat TB. The DRF150 strain is resistant to four of these.

The new strain had its epicenter in the town of George, about 400 kilometres (250 miles) east of Cape Town, where about 60 cases had been identified. About 20 other cases have been identified in other parts of the Western Cape, but isolates of the new strain have also been found in the South Africa's Northern Province, the Pumalanga Province and in Nairobi, Kenya. Last year 224,420 cases of tuberculosis were reported in South Africa.

Republic of the Congo: Officials confirm Ebola haemorrhagic fever outbreak

Source: Newsday.com, 14 November 2003 [edited]

Health officials, on 14 November 2003, confirmed Ebola haemorrhagic fever as the cause of 11 deaths in the northern forests, signalling the Republic of Congo's second outbreak of Ebola haemorrhagic fever this year. Blood specimens from corpses suspected to be infected with Ebola virus have tested positive.

First reports from the remote northern region emerged on 31 October 2003. Ebola haemorrhagic fever, one of the world's deadliest viral diseases, causes rapid death through massive blood loss in up to 90 per cent of those infected. In June 2003, Republic of Congo health authorities announced the end of an Ebola epidemic that killed over 120 people in the same region. That epidemic was believed to have been started by contact with infected gorilla flesh, which is eaten in parts of sub-Saharan Africa. The WHO says Ebola haemorrhagic fever has killed more than 1,000 people since the virus was first identified in 1976 in western Sudan and in the Democratic Republic of the Congo.