Measles in Victoria 1992 to 1996: the importance of laboratory confirmation

Stephen Lambert[1,2]

Abstract

Australia had a major measles epidemic in 1993 and 1994, which appeared to by-pass Victoria. Victorian notification and laboratory testing data for measles, and public hospital discharge codes, from 1992 to 1996, were reviewed. The rate of measles notification in Victoria fell between 1992 and 1996. By contrast the national notification rate increased markedly in 1993 and 1994. The proportion of measles tests performed at the Victorian Infectious Diseases Reference Laboratory (VIDRL) which were positive increased for all age groups in 1993 and 1994. This increase was highest for the 15 to 19 years age group. The hospital discharge codes demonstrated an increase in the number of admissions for measles in 1993 and 1994, largely for adolescents and younger adults. These data suggest Victoria had an age group specific measles outbreak, the magnitude of which was not reflected by the passive notification system. Reasons why younger age groups in Victoria appeared to avoid the epidemic are unclear.

Introduction

The last nationwide measles epidemic occurred during 1993 and 1994, when six cases of encephalitis, three cases of meningitis, and two deaths were reported.[1,2,3] Cases were initially widespread, with highest notification rates in Tasmania, New South Wales, the Australian Capital Territory, Queensland, and the Northern Territory.[4,5,6] There were also confirmed cases of measles related to an outbreak in Western Australia.[7] However, there was no documented increase in the number of cases in Victoria during those years.

The elimination of measles in Australia and its global eradication are possible. Delegates at a meeting cosponsored by the World Health Organization, the Pan American Health Organization, and the Centers for Disease Control and Prevention in July 1996, concluded that measles eradication is technically feasible with current vaccines.[8] Surveillance is a critical

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Contents

Table 1. Measles notifications, 1992 to 1996, for Victoria and Australia, by year

Year	Victorian Notifications		Australian Notifications	
	Reports	Rate per 100,000 population	Reports	Rate per 100,000 population
1992	221	5.0	1,425	8.5
1993	191	4.3	4,536	25.7
1994	185	4.1	4,895	27.4
1995	150	3.3	1,324	7.3
1996	99	2.1	498	2.7
Total	846		12,678	

component of accelerated measles control leading to elimination.

The aims of this review were to compare the measles surveillance data from Victoria during the outbreak years, 1993 and 1994, to the non-outbreak years, 1992, 1995, and 1996; to compare the Victorian data with national data; to consider possible reasons for the differences in Victoria; and to identify ways of improving the usefulness of measles surveillance in the context of measles elimination.

Methods

Notifications

In Victoria medical officers and laboratories are required under the Health (Infectious Diseases) Regulations 1990, to notify the Department of Human Services of any measles cases. During the period under review a case of measles was defined in accordance with National Health and Medical Research Council (NHMRC) recommendations.[9]

All measles notifications with onset dates from 1 January 1992 to 31 December 1996 were collated. Crude and age specific notification rates were calculated using mid-year population estimates from the Australian Bureau of Statistics. The annual number and rate of Victorian notifications were compared with national data from the National Notifiable Diseases Surveillance System (NNDSS).[10]

A laboratory confirmed case was one which met one of the NHMRC laboratory case definition criteria.[10] 'Outbreak years' referred to those years of the nationwide measles outbreak (1993 and 1994). 'Non-outbreak years' referred to the other years of this review (1992, 1995, and 1996).

Laboratory Testing

The Victorian Infectious Diseases Reference Laboratory (VIDRL) notifies most laboratory confirmed cases of measles in Victoria. The results of measles serology performed at VIDRL from 1992 to 1996 were reviewed. A positive laboratory test was one which met one of the laboratory criteria of the NHMRC case definition.

Hospital Data

The Victorian In-patient Minimum Dataset (VIMD) is maintained by the Department of Human Services and contains de-identified information from hospital discharges in Victoria. Data from public hospitals for the years 1992 to 1996 were examined. Private hospital data for these years were incomplete and were not included. Records containing a code for acute measles infection (ICD 9 code 055) were reviewed.

All data were collated and analysed using Epi Info version 6.04b.[11]

Results

Notifications

There were 846 measles notifications made to the Victorian Department of Human Services with onset from

Figure 1. Notifications of measles, Victoria, 1992 to 1996, by month of onset

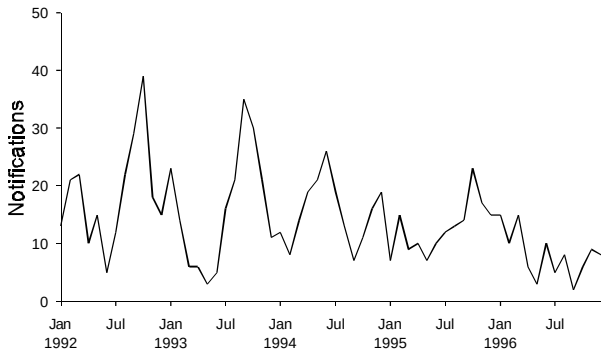
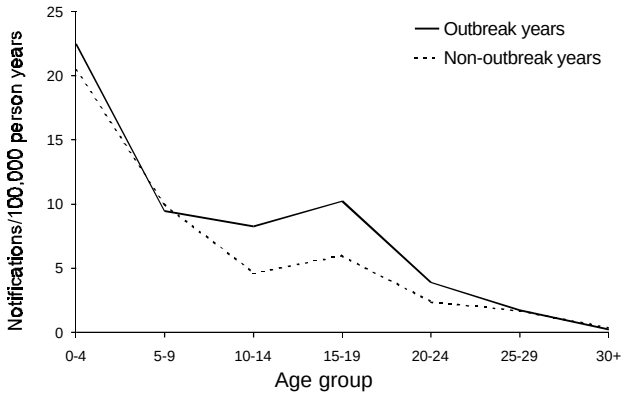


Figure 2. Notification rate of measles, Victoria, 1992 to 1996, by year type and age group



1 January 1992 to 31 December 1996 (Table 1).

In Victoria the crude measles notification rate fell gradually over the five year period (Figure 1). In contrast, national notifications increased substantially in 1993 and 1994 (Table 1).

Notification rates were highest for children below the age of five years (Figure 2). For those aged 15 to 19 years, the rate increased in the outbreak years. Children less than one year of age had the highest rate of notification each year (Figure 3).

Laboratory confirmation was received for 137 of the 846 notifications (16.2%). The VIDRL was the notifying laboratory for 76% of these cases. There were 140 notified cases (17%) under the age of one year. Only five of these (3.6%) were laboratory confirmed.

More notifications were laboratory confirmed in 1993 and 1994 (Figure 4). For the three non-outbreak years, 8 of 44 laboratory confirmed notifications (18%) occurred in the 15 to 19 years age group. In comparison, for the two outbreak years (1993 and 1994), 35 of 93 laboratory confirmed notifications (38%) occurred in the 15 to 19 years age group. These 35 cases were not clustered by time or place. None were identified as being epidemiologically linked to another case.

The notification rate was similar for most age groups in outbreak and non-outbreak years. The greatest difference was among the 15 to 19 years age group, where there was a less than two-fold increase from non-outbreak to outbreak years (Figure 2). The laboratory confirmed incidence rate increased more than six-fold for this age group in the outbreak years (Figure 5).

Laboratory Testing

From 1992 to 1996, 2,725 serological tests for measles were performed by VIDRL. Of these, 300 (11%) were positive. The proportion of positive tests was highest in 1993 and 1994, 18% (94/516) and 17% (75/429) respectively. Most of these were for the 15 to 19 years age group (Figure 6).

Hospital Data

There were 102 discharges with a primary diagnosis relating to measles from Victorian public hospitals from 1992 to 1996. Most were in 1993 and 1994 (Table 2).

Discussion

This review demonstrates the inability of a passive notification system to reflect a change in the epidemiology of measles in Victoria. Based on crude notification data, the incidence of measles cases in Victoria did not increase during the years of the national outbreak. However, the supplementary data indicates that the measles outbreak did reach Victoria, but caused cases largely in adolescents and young adults. In the vaccine era, this age group represents a susceptible cohort which may continue to be at risk of acquiring measles during future outbreaks in Australia.[12,13,14] This susceptibility to infection is likely to have been due to a number of factors. These include those in this age group being too old to have received measles vaccine either in infancy or a second dose through school based programs. Such individuals may also have had little exposure to circulating wild virus.

There was a six-fold increase in the rate of laboratory confirmed notifications among the 15 to 19 years age group for 1993 and 1994. However, the incidence of crude notifications for this age group increased by less than two-fold. Whilst the number of laboratory confirmed cases is small these were not clustered by time or place. They are unlikely to represent unrecognised smaller outbreaks.

The VIDRL testing data suggest the change in laboratory confirmed rates was not a result of a change in testing patterns. Older adolescents and young adults may have been more likely to have had a blood test than those in younger age groups. This would have led to an age specific increase in laboratory confirmed cases. Not only did the absolute number of positive measles tests increase in the 15 to 19 year old age group during outbreak years, but the proportion of positive tests also increased. Each age group during the outbreak years had a higher proportion of positive measles tests. However, for the 15 to 19 year old age group the proportion of positive tests reached very high levels. The discharge data for public hospitals also support the occurrence of an age group specific outbreak involving adolescents and young adults.

There are two possible explanations for the difference between the pattern of measles notifications in Victoria, and other states and territories. Firstly, the outbreak may have been widespread, reached Victoria and not been detected. There is however no

Figure 3. Notification rate of measles in under 5 year olds, Victoria, 1992 to 1996, by year type and age

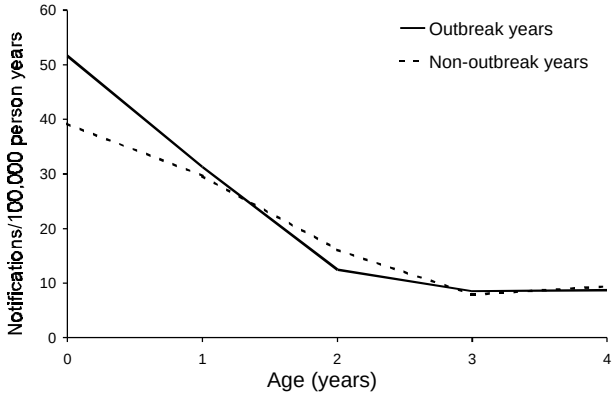


Figure 4. Notifications of measles, Victoria, 1992 to 1996, by year and method of diagnosis

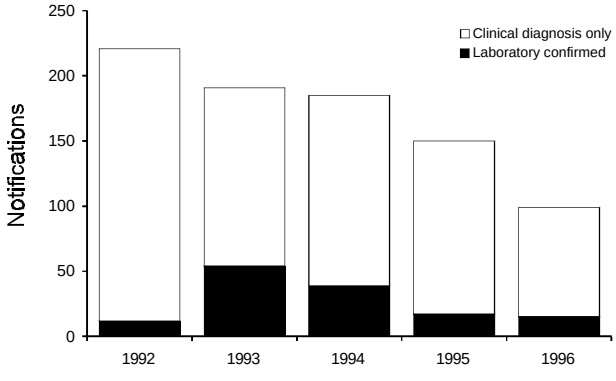


Table 2. Hospital discharges for measles, Victoria, 1992 to 1996, by year and age group

Age group	1992	1993	1994	1995	1996
0 - 4	16	12	11	1	3
5 - 9	2	1	2	2	0
10 - 14	0	3	5	0	0
15 - 19	0	5	7	0	1
20 - 24	2	7	2	1	1
25 - 29	0	6	0	1	2
30+	4	2	1	0	2
Total	24	36	28	5	9

evidence to support this. Problems in each of the passive measles surveillance systems would need to have taken place for an outbreak to have gone undetected. Fundamental errors in each of the passive measles surveillance systems discussed would need to have taken place for an outbreak that crossed into younger age groups to have gone unrepresented. Such errors would need to be state, age group, and disease specific. For example, the rates of Victorian notifications during the current nationwide outbreak of pertussis are amongst the highest in the country, and cross all age groups.

Alternatively, the lower rates of notification, compared to the rest of Australia, may reflect the real situation. Reasons why younger age groups largely avoided the outbreak remain unclear. The 1995 Australian Bureau of Statistics' Childhood Immunisation Survey showed that the reported measles coverage at age two and age six in Victoria was quite high, being 92.5% and 94.9% respectively.[15] These levels, though high, were lower than other states and territories that received large numbers of notifications in the younger age groups during the outbreak. A Victorian serosurvey study performed in 1993 collected blood specimens from 341 children in Year 2, and 641 children in Year 7. Twenty-eight (8.2%) of the Year 2 children were negative for measles antibodies, as were 30 (4.7%) of the Year 7 group.[16] There are no recently published serological data from other states or territories for comparison.

Historically, local councils have been the major provider of all childhood vaccines in Victoria. Many have a systematic recall or reminder program aimed at maximising vaccine coverage. A Victorian study looking at the knowledge and practices relating to maintenance of cold chain showed that councils were significantly better informed about cold chain maintenance, and were significantly more likely to have better cold chain practices in place.[17] Recent surveys of general practitioners highlight problems with knowledge and practices relating to vaccine storage,[18,19] but there is some evidence that these are improving.[20]

The low proportion of cases that are serologically confirmed raises doubts about the quality of Victorian notification data. This is particularly the case for younger age groups. Previous studies have raised concerns about the level of protection afforded to those under the age of one year.[21,22,23] Small serosurvey studies in Australia have suggested that 70-80% of infants may not have protective levels of antibodies at six months of age.[24,25,26] Given the difficulty of clinical diagnosis of measles, the lack of laboratory confirmation for a substantial majority of cases makes it difficult to be certain about the real risk of disease in this age group. Clinical diagnosis of

Figure 5. Laboratory confirmed notifications Victoria, by year type and age group

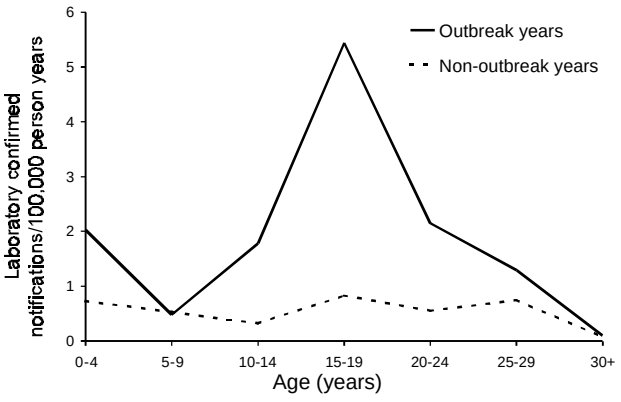
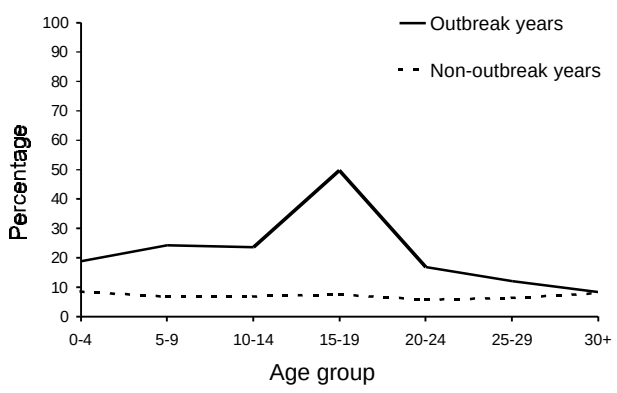


Figure 6. Percentage of positive measles serology results, Victoria, 1992 to 1996, by year type and age group



measles is difficult in populations with high vaccine coverage. In Britain following the National Measles and Rubella Immunisation Campaign 1994, salivary antibody testing of suspected measles cases showed that notification did not provide a reliable measure of disease incidence.[27]

This review has demonstrated that the quality and representativeness of the data collected by the Victorian passive surveillance system is questionable. As Australia approaches measles elimination, surveillance could be improved. A sensitive case definition for public health action, such as that suggested by the NHMRC Measles Working Party, is required to ensure good measles control.[28] Each notification of measles to health authorities should trigger active case finding and encourage laboratory confirmation. A recent proposal for a modified clinical case definition appeared to show an increase in specificity without change in sensitivity. These findings however, may have been due to the application of the new definition to cases detected using the old definition.[29] Notifications should meet a specific case definition before inclusion in notification datasets. In the absence of an outbreak, only cases where laboratory confirmation is available should form part of notification datasets. Changes also need to be made in the way data are collated and reported. The National Notifiable Diseases Surveillance System (NNDSS) needs to include data on laboratory confirmation from all states and territories. The NNDSS annual report could report clinically diagnosed cases and laboratory confirmed cases separately. The Virology and Serology Laboratory Reporting Scheme should consider reporting the proportion of all measles serology tests performed which are positive rather than the number of positive tests.

Other states and territories should consider performing similar retrospective analyses of notification and supplementary data, to enable better characterisation of the nationwide outbreak, particularly with respect to the age group specific rates of laboratory confirmed cases.

If Australia is to interrupt the transmission of measles, the quality of surveillance data will need to be improved. This includes a uniform national approach involving laboratory confirmation of cases. The timeliness of implementing improved methods of surveillance and the introduction of a mass vaccination campaign will determine how quickly Australia achieves the goal of measles elimination.

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Cryptosporidiosis outbreak

As of 13 February 1998, 161 confirmed cases of crytosporidiosis in the Australian Capital Territory had been reported to the Department of Health and Community Care. Approximately 60% of the cases reported to 2 February had swum in one of two public swimming pools, which have subsequently been closed for cleaning. As of 14 February the New South Wales Health Department had received 126 notifications of cryptosporidiosis since the start of December, compared with 57 for January to November 1997. *Cryptosporidium parvum* is very resistant to many common disinfectants including chlorine, and it is considered that any swimming pool could become a vehicle for transmitting the infection. Symptoms usually last for about two weeks and include diarrhoea, vomiting and loss of appetite. The infection may be asymptomatic. Further water testing is being conducted and other possible sources are being investigated. Pool managers and child care centres are being asked to discourage attendance by anyone suffering diarrhoea, and people are being advised to pay particular attention to personal hygiene.

Notice to readers

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This web site has been created by the Department of Entomology, Institute of Clinical Pathology and Medical Research, Westmead Hospital, New South Wales, a unit of the Department of Medicine, University of Sydney. This is the national reference laboratory for medical entomology. This site provides information on insects and other arthropods of medical and public health importance, and on vector-borne diseases and other related problems that are of concern in Australia.

Communicable Diseases Surveillance

Communicable Diseases Surveillance consists of data from varying sources. The National Notifiable Diseases Surveillance System (NNDSS) is conducted under the auspices of the Communicable Diseases Network Australia New Zealand. The *CDI* Virology and Serology Laboratory Reporting Scheme (LabVISE) is a sentinel surveillance scheme. In this report, data from the NNDSS are referred to as 'notifications' while data from the LabVISE scheme are referred to as 'laboratory reports'.

Vaccine preventable diseases

The number of notifications of measles has shown a continuing decline since October 1997 when 147 cases were reported with onset in that month. The number of rubella cases also continued to decline after peaking in September 1997 with 165 cases. Similar trends were observed in the sentinel laboratory data.

Although the number of reports of pertussis appeared to peak in October and has since declined, the number of cases being reported remained high. A total of 9,862 notifications were reported with onset in 1997, the highest number ever recorded by the NNDSS. Most reports were from New South Wales (36%), Queensland (19%), South Australia (16%) and Victoria (14%).

Arboviruses

The number of notifications of Ross River virus infection remained low with 123 and 90 cases reported with onset in December and January respectively. Of these 39% were from Queensland and 28% from Western Australia. Most cases usually occur in the late summer and early autumn months. The number of notifications of Barmah Forest virus infection remain low.

Hepatitis A

One hundred and eighty-one notifications of hepatitis A were received during the current reporting period, bringing the total with onset since October 1997 to 594 cases (Figure 1). Of these, 109 (18%) were reported from the Statistical Division of Brisbane and 103 (17%) and 44 (7%) respectively from the New South Wales Statistical Divisions of Sydney and Richmond-Tweed. One hundred and eighty notifications (30%) were for males aged 20-34 years (Figure 3)

The LabVISE scheme demonstrated a similar pattern of reporting to that observed in the notification data (Figure 2). The number of reports has fallen in recent months after the large peak in early 1997, followed by a second smaller peak in September. Twenty-one laboratory reports of hepatitis A were received this period. A total of 624 laboratory reports was received for 1997, of which 45% were for the 25 to 44 years age group. The male:female ratio was 2:1 for this age group whilst the overall male:female ratio was 1.5:1.

Salmonellosis

The number of notifications of salmonellosis has fluctuated after peaking in March of last year (Figure 4). Of 1,761

Figure 1. Notifications of hepatitis A, 1995 to 1998, by month of onset

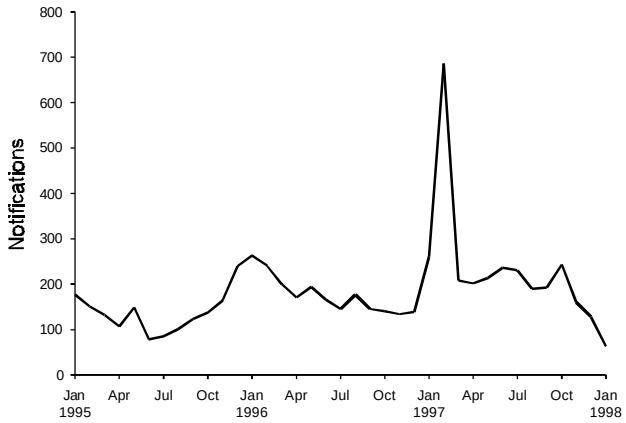


Figure 2. Laboratory reports of hepatitis A, 1995 to 1998, by month of specimen collection

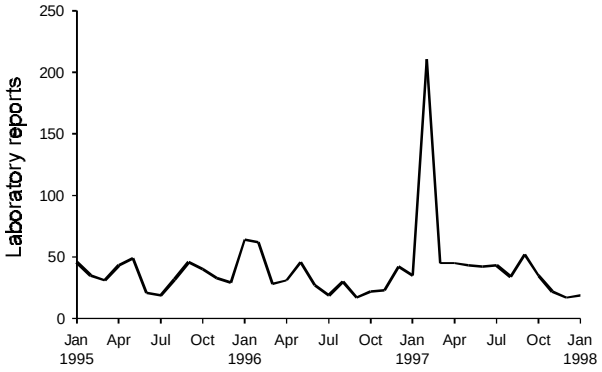


Figure 3. Notifications of hepatitis A, October 1997 to February 1998, by age group and sex

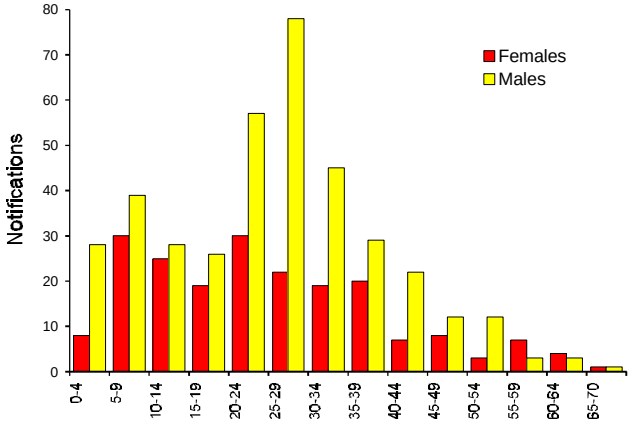


Figure 4. Notifications of salmonellosis, 1995 to 1998, by month of onset

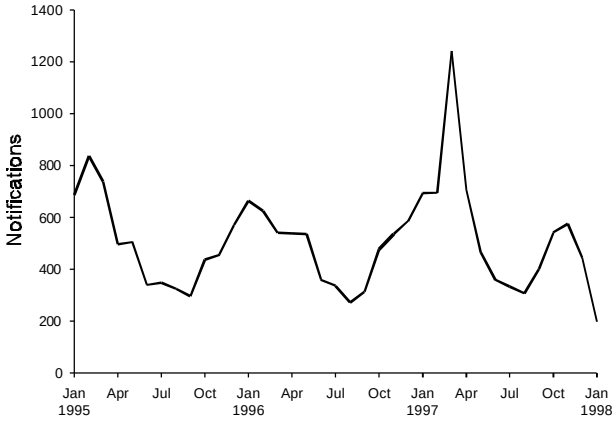
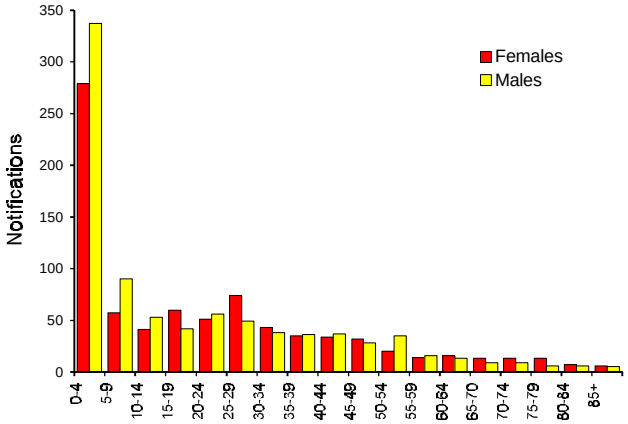


Figure 5. Notifications of salmonellosis with onset from October 1997 to February 1998, by age group and sex.

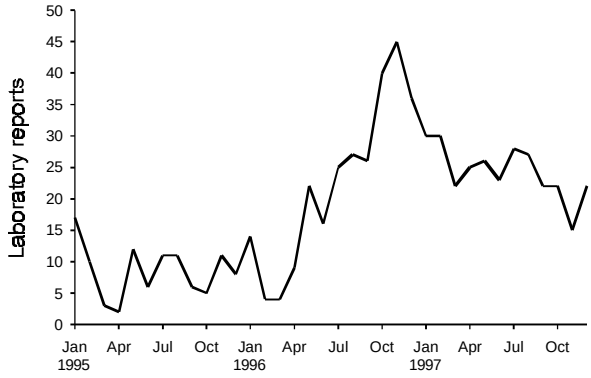


notifications with a date of onset in October 1997 or later, 37% were reported from Queensland, 21% from New South Wales and 20% from Victoria. The male:female ratio of reported cases was 1.1:1; 628 cases (38%) were in children under 5 years of age (Figure 5).

Parvovirus

Twenty-one laboratory reports of parvovirus were received this reporting period. Included were 15 females, nine of whom were in the 15 to 44 years age group, and six males. The number of reports has remained elevated after rising in mid 1996 (Figure 6).

Figure 6. Laboratory reports of parvovirus, 1995 to 1998, by month of specimen collection



There were 4,482 notifications to the National Notifiable Diseases Surveillance System (NNDSS) for this four week period, 7 January to 3 February 1998 (Tables 1, 2 and 3). The numbers of reports for selected diseases have been compared with historical data for corresponding periods in the previous three years (Figure 7).

NNDSS is conducted under the auspices of the Communicable Diseases Network Australia New Zealand. The system coordinates the national surveillance of more than 40 communicable diseases or disease groups endorsed by the National Health and Medical Research Council (NHMRC). Notifications of these diseases are made to State and Territory health authorities under the provisions of their respective public health legislations. De-identified core unit data are supplied fortnightly for collation, analysis and dissemination. For further information, see CDI 1998;22:4-5.

There were 1,498 reports received in the CDI Virology and Serology Laboratory Reporting Scheme this four week period, 1 January to 28 January (Tables 4 and 5).

The Virology and Serology Laboratory Reporting Scheme (LabVISE) is a sentinel reporting scheme. Twenty-one laboratories contribute data on the laboratory identification of viruses and other organisms. Data are collated and published in Communicable Diseases Intelligence each four weeks. These data should be interpreted with caution as the number and type of reports received is subject to a number of biases. For further information, see CDI 1998;22:8.

Table 1. Notifications of rare[1] diseases received by State and Territory health authorities in the period 7 January to 3 February 1998

Disease[2]	Total this period	Reporting States or Territories	Total notifications 1998
Brucellosis	9	ACT, Qld, Vic	9
Hydatid infection	7	SA, Qld, Vic	7

1. Fewer than 60 cases of each of these diseases were notified each year during the period 1988 to 1998.
2. No notifications have been received during 1998 for the following rare diseases: botulism, lymphogranuloma venereum, plague, rabies, yellow fever, or other viral haemorrhagic fevers.

Table 2. Notifications of diseases preventable by vaccines recommended by the NHMRC for routine childhood immunisation, received by State and Territory health authorities in the period 7 January 1998 to 3 February 1998

Disease[1,2]	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	This period 1998	This period 1997	Year to date 1998	Year to date 1997
Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0
Haemophilus influenzae type b	0	0	0	0	0	0	0	0	0	8	1	8
Measles	1	7	1	15	0	5	9	3	41	35	45	38
Mumps	0	1	0	2	2	0	4	1	10	18	10	20
Pertussis	3	254	1	281	124	2	28	100	793	718	1,005	809
Rubella	2	1	0	27	4	2	10	1	47	213	52	227
Tetanus	0	1	0	0	0	0	0	0	1	0	1	1

NN. Not Notifiable

1. No notifications of poliomyelitis have been reported since 1986.
2. 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.

Table 3. Notifications of other diseases received by State and Territory health authorities in the period 7 January 1998 to 3 February 1998

Disease[1,2]	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	This period 1998	This period 1997	Year to date 1998	Year to date 1997
Arbovirus infection (NEC)[3]	0	0	1	5	0	0	0	0	6	21	6	21
Barmah Forest virus infection	0	5	-	35	0	0	1	-	45	75	52	78
Campylobacteriosis[4]	25	-	18	398	98	38	17	102	696	1108	834	1229
Chlamydial infection (NEC)[5]	10	NN	61	301	0	11	134	91	608	623	668	671
Dengue	0	3	0	9	1	0	2	2	17	56	18	56
Donovanosis	0	NN	8	1	NN	0	0	0	9	1	9	1
Gonococcal infection[6]	3	19	91	70	0	1	36	81	301	241	335	259
Hepatitis A	8	82	2	55	11	0	21	2	181	146	219	181
Hepatitis B incident	0	2	0	5	0	0	3	0	10	15	13	18
Hepatitis C incident	0	4	0	-	0	1	-	-	5	1	6	1
Hepatitis C unspecified	13	NN	22	274	NN	17	1	73	400	675	435	774
Hepatitis (NEC)	0	0	0	0	0	0	0	NN	0	4	0	5
Legionellosis	0	2	0	3	2	0	1	3	11	14	13	18
Leptospirosis	0	2	1	11	0	0	2	0	16	13	16	14
Listeriosis	0	5	0	0	0	0	0	0	5	8	6	9
Malaria	0	7	0	26	1	1	2	4	41	75	44	80
Meningococcal infection	0	7	0	3	0	0	1	2	13	24	16	30
Ornithosis	0	NN	0	0	1	1	0	0	2	6	2	6
Q Fever	0	5	0	21	1	0	0	2	29	57	30	61
Ross River virus infection	0	15	18	84	8	0	3	80	208	512	244	535
Salmonellosis (NEC)	5	108	39	332	41	12	111	73	721	700	810	757
Shigellosis[4]	1	-	6	18	12	0	16	9	62	79	67	87
Syphilis	2	12	24	33	0	1	0	6	78	87	87	92
Tuberculosis	0	19	3	11	5	2	20	3	63	80	67	85
Typhoid[7]	0	3	0	1	0	0	1	3	8	10	10	10
Yersiniosis (NEC)[4]	0	-	1	28	3	0	6	0	38	39	43	39

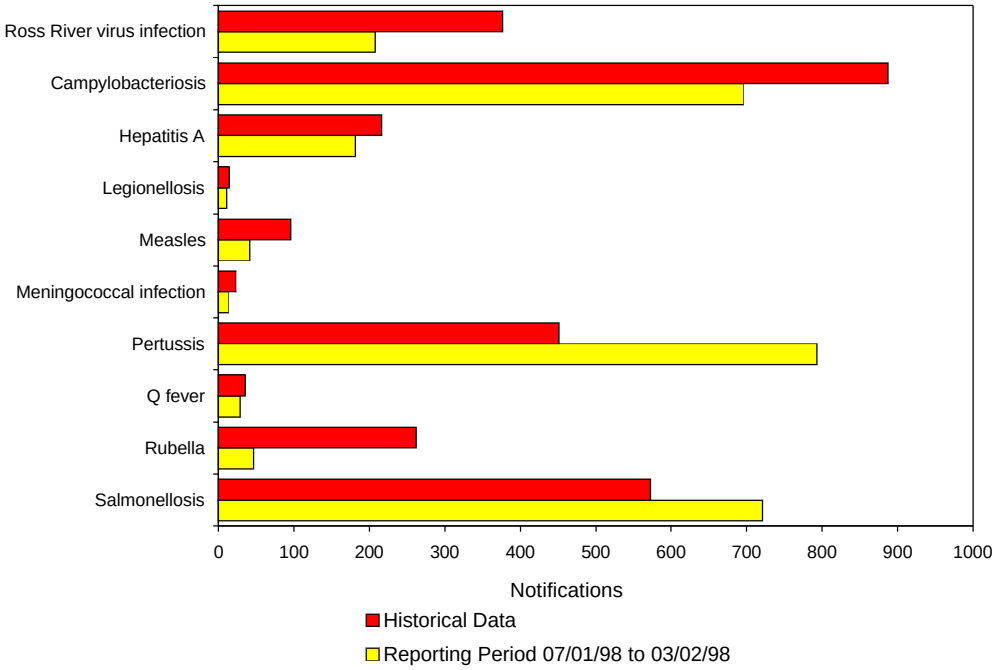
1. For HIV and AIDS, see *CDI* 1997; 21:362. For rarely notified diseases, see Table 3.
2. Totals comprise data from all States and Territories. Cumulative figures are subject to retrospective revision so there may be discrepancies between the number of new notifications and the increment in the cumulative figure from the previous period.
3. NT: includes Barmah Forest virus.
4. NSW: only as 'foodborne disease' or 'gastroenteritis in an institution'.
5. WA: genital only.
6. NT, Qld, SA and Vic: includes gonococcal neonatal ophthalmia.
7. NSW, Vic: includes paratyphoid.

NN Not Notifiable.

NEC Not Elsewhere Classified

- Elsewhere Classified.

Figure 7. Selected National Notifiable Diseases Surveillance System reports, and historical data[1]



1. The historical data are the averages of the number of notifications in the corresponding 4 week periods of the last three years and the two week periods immediately proceeding and following these.

Table 4. Virology and serology laboratory reports by State or Territory[1] for the reporting period 1 January to 28 January 1998, and total reports for the year

	State or Territory[1]								Total this period	Total reported in *CDI* in 1997
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA		
Measles, mumps, rubella										
Measles virus							2	1	3	78
Mumps virus								3	3	49
Rubella virus				4	1		3	1	9	563
Hepatitis viruses										
Hepatitis A virus	2		2	7	4		1	5	21	723
Hepatitis D virus				1					1	20
Arboviruses										
Ross River virus		2	14	37	4		1	50	108	2,245
Barmah Forest virus							2	4	6	240
Dengue not typed								2	2	63
Flavivirus (unspecified)				3					3	28
Adenoviruses										
Adenovirus type 1					1		1		2	34
Adenovirus type 2					4				4	47
Adenovirus type 3					3				3	27
Adenovirus type 7					1		1		2	12
Adenovirus not typed/pending	1	5			28		1	12	47	1,109
Herpes viruses										
Cytomegalovirus		7		18	11		28	22	86	1,223
Varicella-zoster virus	2	4	1	24	24		34	29	118	1,532
Epstein-Barr virus		2	1	30	69	1	22	33	158	2,691

Table 4. Virology and serology laboratory reports by State or Territory[1] for the reporting period 1 January to 28 January 1998, and total reports for the year, continued

	State or Territory[1]								Total this period	Total reported in *CDI* in 1997
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA		
Other DNA viruses										
Parvovirus				2	2		14	3	21	366
Picornavirus family										
Coxsackievirus A9							1		1	10
Coxsackievirus A16							1		1	11
Coxsackievirus B3							1		1	13
Echovirus type 11							1		1	2
Poliovirus type 1 (uncharacterised)					1		1		2	10
Rhinovirus (all types)		7	1	1	8		9	12	38	682
Enterovirus not typed/pending			2		3		2	31	38	642
Ortho/paramyxoviruses										
Influenza A virus				1	14		3	6	24	1,469
Influenza B virus					7		1	1	9	956
Parainfluenza virus type 1		4			1		2	5	12	84
Parainfluenza virus type 2							1	1	2	121
Parainfluenza virus type 3		6		2	4		14	31	57	1,249
Respiratory syncytial virus	1	2			2		6	26	37	4,835
Other RNA viruses										
HTLV-1			2					2	4	20
Rotavirus		2				7		15	24	1,585
Astrovirus							2		2	8
Norwalk agent							12		12	104
Small virus (like) particle							1		1	3
Other										
Chlamydia trachomatis not typed	17	13	50	57	75	2	5	107	326	5,001
Chlamydia psittaci							7	2	9	68
Chlamydia species				1					1	32
Mycoplasma pneumoniae		1	5	63	46	1	27	8	151	2,077
Coxiella burnetii (Q fever)		3		4			1	2	10	314
Rickettsia australis						1			1	15
Salmonella species								4	4	7
Bordetella pertussis	1	4		32		1	52	35	125	2,217
Legionella longbeachae					1				1	41
Cryptococcus species	3	1				1	1		6	29
Leptospira hardjo								1	1	15
TOTAL	27	63	78	287	314	14	261	454	1,498	32,670

1. State or Territory of postcode, if reported, otherwise State or Territory of reporting laboratory.

Table 5. Virology and serology laboratory reports by contributing laboratories for the reporting period 1 January to 28 January 1998

State or Territory	Laboratory	Reports
Australian Capital Territory	Woden Valley Hospital, Canberra	28
New South Wales	New Children's Hospital, Westmead	26
	Royal Prince Alfred Hospital, Camperdown	20
Queensland	Queensland Medical Laboratory, West End	318
South Australia	Institute of Medical and Veterinary Science, Adelaide	312
Tasmania	Northern Tasmanian Pathology Service, Launceston	15
Victoria	Microbiological Diagnostic Unit, University of Melbourne	3
	Monash Medical Centre, Melbourne	63
	Royal Children's Hospital, Melbourne	68
	Victorian Infectious Diseases Reference Laboratory, Fairfield	129
Western Australia	PathCentre Virology, Perth	343
	Princess Margaret Hospital, Perth	64
	Western Diagnostic Pathology	109
TOTAL		1,498

Australian Sentinel Practice Research Network

The Australian Sentinel Practice Research Network (ASPREN) currently comprises about 100 general practitioners from throughout the country. Up to 9,000 consultations are reported each week, with special attention to 12 conditions chosen for sentinel surveillance. CDI reports the consultation rates for all of these. For further information, including case definitions, see CDI 1998;22:5-6.

Data for weeks 1 to 4, ending 11, 18, 25 January and 1 February 1998 respectively, are included in this issue of *CDI* (Table 6). Consultations for vaccination of older children and adults with tetanus/diphtheria (Td) vaccine, and of children with any pertussis-containing vaccine are included for the first time, along with adverse reactions to pertussis vaccines given at the reporting clinic. During this reporting period, the consultation rates for chickenpox and pertussis have remained moderately high. However, consultation rates for other conditions, including rubella and measles, have remained low or steady. No increase in the consultation rate for Ross River virus infection has been reported so far.

Table 6. Australian Sentinel Practice Research Network reports, weeks 1 to 4, 1998

Week number	1		2		3		4	
Week ending on	11 January 1998		18 January 1998		25 January 1998		1 February 1998	
Doctors reporting	21		49		48		31	
Total consultations	2,112		5,979		6,155		3,055	
Condition	Reports	Rate per 1,000 population	Reports	Rate per 1,000 population	Reports	Rate per 1,000 population	Reports	Rate per 1,000 population
Influenza	4	1.9	11	1.8	7	1.1	1	0.3
Rubella	1	0.5	2	0.3	1	0.2	1	0.3
Measles	0	0.0	0	0.0	1	0.2	0	0.0
Chickenpox	7	3.3	12	2.0	7	1.1	5	1.6
Pertussis	3	1.4	3	0.5	4	0.6	2	0.7
HIV testing (patient initiated)	4	1.9	17	2.8	9	1.5	4	1.3
HIV testing (doctor initiated)	4	1.9	11	1.8	7	1.1	1	0.3
Td (ADT) vaccine	15	7.1	50	8.4	49	8.0	30	9.8
Pertussis vaccination	22	10.4	70	11.7	71	11.5	41	13.4
Reaction to pertussis vaccine	2	0.9	0	0.0	3	0.5	0	0.0
Ross River virus infection	0	0.0	2	0.3	0	0.0	1	0.3
Gastroenteritis	28	13.3	72	12.0	76	12.3	38	12.4

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 on a quarterly basis. The antibiotics which are currently routinely surveyed are the penicillins, ceftriaxone, ciprofloxacin and spectinomycin, all of which are administered as single dose regimens. When in vitro resistance to a recommended agent is demonstrated in 5% 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. Tetracyclines are however not a recommended therapy for gonorrhoea. Comparability of data is achieved by means of a standardised system of testing and a programme-specific quality assurance process. Because of the substantial geographic differences in susceptibility patterns in Australia, regional as well as aggregated data are presented.

Reporting period 1 April to 30 June 1997

The AGSP laboratories examined 757 isolates of *Neisseria gonorrhoeae* (*N. gonorrhoeae*) for sensitivity to the penicillins, ceftriaxone, quinolones and spectinomycin and for high level resistance to the tetracyclines in the June quarter of 1997.

Penicillins

Resistance to this group of antibiotics (penicillin, ampicillin, amoxycillin) was present in a high proportion of isolates examined in Adelaide (42%) Sydney (39%) and Melbourne (30%). In Perth the proportion of penicillin-resistant strains was 10% and lower in other centres. Figure 8 shows the proportion of isolates fully sensitive, less sensitive or relatively resistant to the penicillins by chromosomal mechanisms and the proportion of penicillinase-producing *N. gonorrhoeae* (PPNG) in different regions and as aggregated data for Australia. PPNG and relatively resistant isolates usually fail to respond to therapy with the penicillins. Those in the fully sensitive and less sensitive categories (minimal) inhibitory concentration - MIC ≤ 0.5 mg/L) usually respond to a regimen of standard treatment with the above penicillins.

There were 43 PPNG identified in this reporting period (5.7% of all isolates). These were distributed widely with 18 PPNG reported from Sydney (8.3% of isolates), 12 (8.9%) from Perth, 5 (5.6%) from Melbourne, 4 (2.7%) from Brisbane, 3 (2.3%) from the Northern Territory and a single PPNG in Adelaide. Infections with PPNG were acquired locally but more frequently in southeast Asian countries often visited by Australians.

One hundred and ten (14.5%) of all isolates were resistant to the penicillins by separate chromosomal mechanisms. These strains of *N. gonorrhoeae* (CMRNG) were most often seen in Sydney (68 strains, 31%), Melbourne (22 strains, 25%) and Adelaide (16 strains, 39%). No relatively resistant isolates were seen in Perth or the Northern Territory.

Ceftriaxone and spectinomycin.

Although all isolates from all parts of Australia were sensitive to these injectable agents, a small number of isolates showed some decreased sensitivity to ceftriaxone.

Quinolone antibiotics

This group of antibiotics includes ciprofloxacin, norfloxacin and enoxacin. Forty-two isolates (5.5%) throughout Australia had altered resistance to this group of antibiotics, with 30 of these showing high level resistance. These quinolone resistant *N.gonorrhoeae* (QRNG) were mainly concentrated in Sydney where 30 QRNG (14%) were detected . Four QRNG were isolated in Melbourne (4.5%), 4 (2.7%) in Brisbane, 3 in Perth, and a single QRNG detected in both Adelaide and Darwin.

In the previous quarter, an increase in rates of isolation of QRNG and the appearance of QRNG in locally acquired infections in Sydney and Melbourne were specifically mentioned. The high rate of locally acquired QRNG was maintained in Sydney in the June quarter. Although one instance of local acquisition of QRNG was again recorded in Melbourne, the total number of QRNG decreased in that centre.

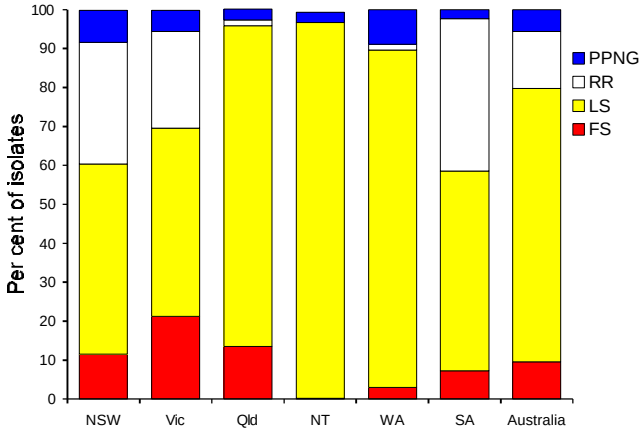
In the corresponding period of 1996, QRNG comprised 3.4% of all Australian isolates and the infections were acquired overseas.

The quinolone agents are the oral agents most often used in centres where penicillins are ineffective. If resistance to the quinolones continues to increase, options for successful treatment will be substantially reduced.

High level tetracycline resistance

Forty-three tetracycline resistant *N. gonorrhoeae* (TRNG) were detected throughout Australia (5.7% of all strains) with isolates of this type again present in most centres. The highest proportion of TRNG was again found in Brisbane

Figure 8. Penicillin resistance of *N. gonorrhoeae*, Australia, 1 April to 30 June 1997, by 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 *N. gonorrhoeae*

where the 15 TRNG represented 10% of all isolates. TRNG were again prominent in Perth where the 12 TRNG represented 8.9% of all isolates. TRNG were also found in Sydney (12 isolates, 5.5%), Melbourne (5 isolates, 5.6%) and there was a single TRNG in Darwin. Indonesia was the overseas source of acquisition most often identified. Local acquisition was also recorded.

Sentinel Chicken Surveillance Programme

Sentinel chicken flocks are used to monitor flavivirus activity in Australia. The main viruses of concern are Murray Valley encephalitis (MVE) and Kunjin which cause the potentially fatal disease Australian encephalitis in humans. Currently 26 flocks are maintained in the north of Western Australia, seven in the Northern Territory, nine in New South Wales and ten in Victoria. The flocks in Western Australia and the Northern Territory are tested year round but those in New South Wales and Victoria are tested only from November to March, during the main risk season.

Results are coordinated by the Arbovirus Laboratory in Perth and reported bimonthly. For more information see CDI 1998;22:7

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Sentinel chicken serology was carried out for 20 of the 28 flocks in Western Australia in December 1997. There were no seroconversions to flaviviruses in December. The November seroconversion to MVE in the Derby flock was confirmed, but because these chickens had not been bled since August it was impossible to determine when the chickens actually seroconverted.

Five flocks of sentinel chickens from the Northern Territory were tested in December 1997, and there were no seroconversions recorded.

The sentinel chicken programmes in New South Wales and Victoria commenced at the beginning of November 1997. There have been no seroconversions to flaviviruses in November or December 1997 from these regions.

Communicable Diseases - Australia
Internet web site

‘http://www.health.gov.au/hfs/pubs/cdi/cdihtml.htm’

The web site contains four major subject areas, each subdivided as outlined below:

- *Communicable Diseases Intelligence* publication
- National Notifiable Diseases Surveillance System (NNDSS)
- Outbreaks
- Software and other links

Communicable Diseases Intelligence (CDI) publication

1. Introduction to *CDI* - a brief description of *CDI.*
2. Current issue - the most recent issue of *CDI* is available in both the ‘Adobe Acrobat’ format and ‘html’ format. The whole publication or individual parts can be downloaded from this page.
3. *CDI* fortnightly tables - disease notification table for the current fortnight.
4. 1997 issues - archive of 1997 issues in ‘Adobe Acrobat’ format.
5. 1996 issues - archive of 1996 issues in ‘Adobe Acrobat’ format.

National Notifiable Diseases Surveillance System (NNDSS)

1. Introduction to NNDSS - a brief description of the National Notifiable Disease Surveillance System.
2. Annual data - disease notification tables for the period 1991 to date, by year and month; disease notification tables for the period 1991 to date, by year and State/Territory. These tables are updated each fortnight.
3. Australian population data - Australian population data 1990 to 1996, by State.
4. 1996 Annual report.
5. 1995 Annual report.
6. 1994 Annual report.

Outbreaks

1. Australia: Australian current disease outbreak information.
2. Overseas: overseas current disease outbreak information.

Software and other links

1. Acrobat Reader software - download facility for Adobe Acrobat Reader Software (Version 3).
2. Epi Info software site - link to the Epi Info software site.
3. Other Australian and international communicable diseases site - links to other international Internet web sites related to communicable diseases, such as the World Health Organization, the United Kingdom Ministry of Health, the United States of America - Centres for Disease Control and Prevention (CDC), and New Zealand Public Health.

Overseas briefs

Source: World Health Organization (WHO)

Influenza A(H5N1), Hong Kong

The total number of confirmed cases of influenza A(H5N1) remains at 18, of which 6 were fatal. Ten cases have recovered and two remain hospitalised. The date of onset of the last case was 28 December 1997.

The World Health Organization (WHO) team found no human case of influenza A(H5N1) virus infection in Guangdong province in southern China during its mission there from 16 to 22 January. However there is still a need to maintain intensified levels of surveillance for at least six months, because of the potential risk of adaptation of the H5N1 virus to humans.

Rift Valley Fever, Kenya and Somalia

Rift Valley fever (RVF) is widely distributed in Kenya and Somalia, primarily in animals but also in humans. The estimated number of deaths in Kenya is now 350-400. These deaths are concentrated in Kenya's Northeastern Province and in southern Somalia, where, after a review of the data from Somalia, a revised count indicates that 80 deaths are suspected to be due to haemorrhagic fever. A task force consisting of representatives from the Kenyan ministries of health and agriculture, international organisations and non-government organisations has been established. WHO recommends that travellers do not cancel travel to Kenya. Travellers should however be aware that Rift Valley fever is transmitted by mosquitoes, and if travelling to areas near reported outbreaks should take appropriate preventive measures. These include wearing long-sleeved shirts and long trousers, and using mosquito repellant and bednets.

Meningococcal meningitis, Democratic Republic of the Congo

Meningococcal meningitis group A has been confirmed in an outbreak in Tembo, Bandundu Region which is close to Lunda Norte Province in neighbouring Angola. Up to 25 January 114 cases, of which 32 were fatal (case fatality rate 28%), had been reported. The first case was reported on 2 January and coincided with the return of over 9,000 Congolese citizens from Angola. A team from the Ministry of Health, WHO and Médecins Sans Frontières has visited Tembo to assess the situation and plan control measures such as a vaccination campaign, training of health care staff, and public health education. Meningitis has also been reported in Kikwit and in Panzi health zones, in particular at Kingwangala and Kahemba. Eighty cases of meningitis were also hospitalised across the border in Angola.

Cholera

Congo. Up to 5 February 1998, a total of 485 cases with 83 deaths had been reported since the outbreak began on 27 November 1997. Four areas of Pointe-Noire are currently affected, the worst being Arrondissements III and IV where water quality and sanitary conditions are extremely poor. Madingo-Kayes which is 80 kms north of Pointe-Noire on the coast, and Kaka Mueka 180 kms to the north-east in forest area, have also reported cholera outbreaks although figures are not yet available. The situation in neighbouring countries is being carefully monitored and WHO is facilitating the exchange of information with these countries.

Comoros Islands. Up to 7 February a total of 193 cases with 8 deaths had been reported on Grande Comore Island. Although the first cases were recorded in Mbéni, 77 of the 193 cases occurred in Moroni, and 12 districts and villages in and around the capital. Measures for treatment and prevention have been implemented by the cholera task force recently established by the Ministry of Health and WHO.

Mozambique. The outbreak which began in the port city of Beira two weeks ago has increased dramatically, and around 2,000 cases with 109 deaths had occurred up to 9 February according to reports from the national health authorities. Strict control measures are being implemented by the Ministry of Health in cooperation with other health organisations but are hampered by the very poor sanitary conditions prevailing in the city.

CDI is produced every four weeks by the National Centre for Disease Control, Department of Health and Family Services, GPO Box 9848 Canberra ACT 2601; fax: (02) 6289 7791, phone: (02) 6289 6895.

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