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Contributions covering any aspect of communicable diseases are invited. Instructions to authors can be found in CDI 1995; 20: 13.

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HIGH LEVEL AMINOGLYCOSIDE RESISTANCE IN ENTEROCOCCAL BLOOD CULTURE ISOLATES

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Abstract

Enterococci may display high level resistance to aminoglycosides, in which case synergy with cell-wall active antibiotics will be lost. All enterococcal blood culture isolates at Royal Brisbane Hospital have been screened by agar dilution for high level resistance to gentamicin and streptomycin since 1989. Of 110 isolates of *Enterococcus faecalis*, 16% displayed high level resistance to gentamicin and 10% showed high level resistance to streptomycin. Four isolates had high level resistance to both antibiotics. None of 23 *Enterococcus faecium* isolates displayed high level resistance to gentamicin and only one to streptomycin. Two *Enterococcus faecium* isolates were resistant to amoxycillin but none to vancomycin. There has been no apparent increase in high level aminoglycoside resistance from 1989 to 1996. High level gentamicin resistant isolates were relatively more common in liver transplant patients. Like vancomycin-resistant enterococci, isolates that are high level resistant to aminoglycosides can be spread by the hands of staff members. Preventing the nosocomial transmission of high level aminoglycoside-resistant enterococci follows the same general principles of preventing transmission of other resistant enterococci.
***Comm Dis Intell* 1996;20:532-535.**

Introduction

Enterococci intrinsically display resistance to low levels of aminoglycosides. However when an aminoglycoside is combined with a cell-wall active antibiotic (for example, amoxycillin or vancomycin), synergistic killing of the enterococcus results. In the last decade, high level resistance of enterococci to aminoglycosides has become an important clinical problem. If the organism exhibits high level resistance to an aminoglycoside, no synergy will be achieved when that aminoglycoside is combined with a cell-wall active antibiotic. This has most relevance in the treatment of serious infections such as endocarditis. Failure of cell-wall active agents used alone has been well described in this context.

Like vancomycin-resistant enterococci, high level aminoglycoside-resistant enterococci have been well recognised to be transmitted within hospitals[1]. Like many other antibiotic-resistant organisms, transmission is often via the hands of health care workers.

We reviewed the laboratory and clinical records of more than 100 patients with enterococcal bacteraemia from 1989 to 1996 to determine whether there was any rise in high level aminoglycoside resistance over that time and whether it has had any impact on the clinical outcome.

Methods

From January 1989 to July 1996, enterococcal blood culture isolates from the Royal Brisbane Hospital complex (Royal Brisbane Hospital, Royal Childrens Hospital and Royal Womens Hospital) were recorded on a database. A commercial system was used to detect growth (BACTEC NR 660 up to mid-1992, and then BacT / Alert). The organisms were identified to the genus level as *Enterococcus* using standard laboratory tests based on Gram stain, catalase reaction, bile tolerance, ability to hydrolyse aesculin, tolerance to 6.5% sodium chloride and pyruvate utilisation. If the organism did not utilise pyruvate, it was speciated using the API 20 STREP, yellow pigment production and motility test.

All enterococcal isolates were tested routinely by the agar dilution method using Steer's replicator. Enterococcal isolates were screened for high level resistance to aminoglycosides using agar plates containing gentamicin at 500 mg / L or streptomycin at 2000 mg / L.

A retrospective review of patients' charts was performed to collect data on underlying conditions, source of infection (nosocomial or community acquired), antibiotic usage and clinical outcome. Nosocomial acquisition of bacteraemia was defined as present if positive blood cultures were drawn more than 48 hours after hospital admission. Relapse was defined as blood culture positivity greater than 72 hours after the most recent positive blood culture was taken. Differences in outcome and other variables were assessed using the software package STATA.

Results

There were 136 episodes of enterococcal bacteraemia of which 110 were with *Enterococcus faecalis (E. faecalis)*, 23 with *Enterococcus faecium*, two with *E. durans* and one with *E. casseliflavus*. The resistance of these isolates to gentamicin and streptomycin is shown in detail in Table 1. Figures 1 and 2 illustrate the resistance patterns of the enterococcal blood culture isolates from 1989 to 1996. Over this period, 16% of *E. faecalis* isolates displayed high level resistance to

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Table 1. Blood culture isolates of enterococci at the Royal Brisbane Hospital, 1989 to 1996

Species of enterococcus	Number of blood culture isolates								
	1989	1990	1991	1992	1993	1994	1995	1996	Total
Enterococcus faecalis	13	17	10	13	13	19	15	10	110
High level resistance to gentamicin	1	2	3	1	1	4		1	13
High level resistance to streptomycin	1	2	1			2	1		7
High level resistance to both agents	1		1			1		1	4
Enterococcus faecium[1]	6	1	2	3	4	3	3	1	23
High level resistance to streptomycin	1								1
Amoxycillin resistant						2			2
Enterococcus durans					1			1	2
Enterococcus casseliflavus						1			1
TOTAL	19	18	12	16	18	23	18	12	136

1. No *E. faecium* isolates displayed high level resistance to gentamicin or vancomycin resistance.

gentamicin and 10% to streptomycin. Four isolates were resistant to both antibiotics. Proportions of resistant isolates have fluctuated widely from year to year, but showed a slight decline since peaking in 1991. No *E. faecium* isolates displayed high level resistance to gentamicin and only one to streptomycin. Two isolates of *E. faecium* were amoxycillin resistant. Neither isolate was a beta-lactamase producer. No blood culture isolate was vancomycin resistant.

The medical records pertaining to 100 cases were available for review. Sixty-seven episodes occurred in 62 adult patients (three of whom were in the Royal Womens Hospital) and 33 episodes occurred in 30 paediatric patients (six of whom were in the Neonatal Intensive Care Unit). The ages of patients ranged from one day old to 93 years old. Four of the patients were Japanese children who came to Australia for liver transplantation. There have been no molecular epidemiologic studies performed to determine whether there was a common clone of resistant enterococci in patients from the liver transplant ward. Two adults (one American and one Indonesian) also came to the hospital for specialised medical care. The remaining patients were Australian residents who presumably had acquired their enterococcal species in Australia.

Twelve of the 100 patients whose charts could be reviewed had enterococcal isolates with high level resistance to gentamicin. Risk factors and outcomes associated with infection in patients with enterococcal bacteraemia with and without high level resistance to gentamicin is presented in Table 2. Patients with high level resistance to gentamicin were significantly more likely to be liver transplant recipients (p=0.04). Two patients with high level

Figure 1. Enterococcal bloodstream isolates with high level resistance to gentamicin, 1989 to 1996

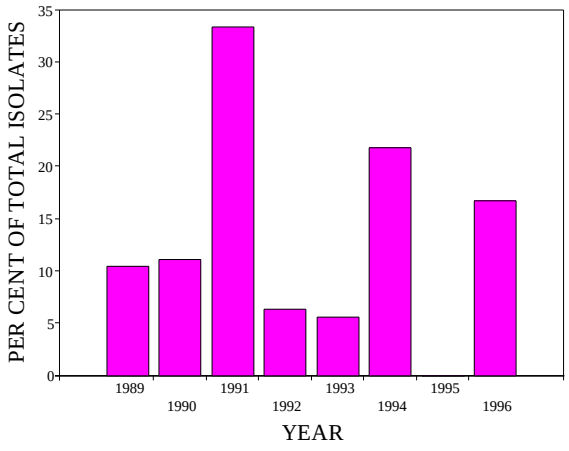

Figure 2. Enterococcal bloodstream isolates with high level resistance to streptomycin, 1989 to 1996

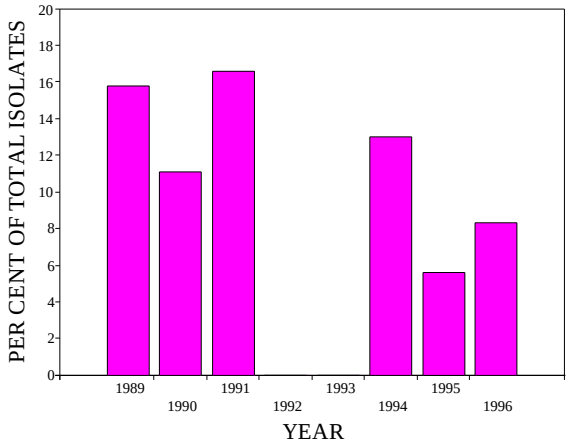

Table 2. Risk factors and outcomes associated with enterococcal bacteraemia with and without high level resistance to gentamicin

	Number with high level resistance to gentamicin (%) (n=12)	Number without high level resistance to gentamicin (%) (n=88)	Level of statistical significance
Risk factors			
Female	6 (50)	41 (47)	NS
Polymicrobial bacteraemia	5 (42)	30 (34)	NS
Nosocomial acquisition	11 (92)	63 (72)	NS
Organ transplant	3 (25)	4 (5)	p = 0.04
Primary bacteraemia	5 (42)	48 (55)	NS
Line-related sepsis	0 (0)	19 (22)	NS
Urosepsis	3 (25)	8 (9)	NS
Endocarditis	2 (17)	1 (1)	p = 0.04
Other site	2 (17)	12 (14)	NS
Outcome			
Relapse	1 (8)	8 (9)	NS
Death within one month	3 (25)	19 (22)	NS

NS: Not significant.

resistance to gentamicin had clinical diagnoses of endocarditis. One patient was treated with vancomycin alone and died of unrelated causes three weeks later. One patient was treated with penicillin and gentamicin, despite the in vitro susceptibility report, and survived.

Paradoxically, patients with high level resistance to gentamicin were more likely to receive an aminoglycoside than patients without high level resistance (p=0.03). Eighty-three per cent of patients with high level resistance to gentamicin were treated with a cell-wall active antibiotic and an aminoglycoside. More than 50% of these patients received the combination therapy for more than one week. An adverse clinical outcome (death within one month or relapse of enterococcal bacteraemia) was not more common in patients with high level resistance to gentamicin, although the numbers of patients studied was small.

Discussion

High level aminoglycoside resistance in enterococci has been well established at Royal Brisbane Hospital since testing began in 1989. Since then, about 16% of *E. faecalis* isolates have displayed high level resistance to gentamicin and 10% have shown high level resistance to streptomycin.

The rates of high level resistance to gentamicin appear somewhat higher than the percentage of 7.3% (of 70 bacteraemic isolates) found in a recent multicentre Australia-wide survey[2]. However, the rates of high level resistance to streptomycin are lower than those found in other parts of Australia (17.7% for *E. faecalis* and 38.9% for *E. faecium* blood culture isolates). The percentage of *E. faecalis* isolates exhibiting high level resistance to gentamicin is certainly less than the 70% recently described in a study on enterococcal isolates in liver transplant recipients at the Mayo Clinic[3].

The opening of a new transplantation ward may have decreased crowding of patients and reduced environmental contamination with resistant enterococci, thereby in part explaining the decrease in high level gentamicin-resistant isolates in 1995 and 1996.

It is well known that inter-hospital and even inter-country transfer of resistant organisms can occur. Screening for rectal carriage of resistant enterococci and cephalosporin-resistant Enterobacteriaceae may be prudent in patients referred for transplantation or other specialised attention such as intensive care. Preventing the transmission of high level aminoglycoside-resistant enterococci follows the same general principles as preventing transmission of other resistant enterococci. Attention to hand washing by staff members is a key intervention. Single room isolation of patients with aminoglycoside-resistant enterococci has not been practised at our hospital.

It is surprising that more than 50% of patients with high level resistance to gentamicin were treated with this drug in combination with a cell-wall active agent despite knowledge of the in vitro susceptibility result. Theoretically the use of an aminoglycoside in this situation is more likely to result in adverse effects such as nephrotoxicity and ototoxicity, without any benefit being achieved for the patient. Drug toxicity was not determined in this study.

Uptake of aminoglycosides into enterococci depends on aerobic oxidative metabolism. The anaerobic metabolism of enterococci leads to their intrinsic resistance to low concentrations of these antibiotics. There are a number of mechanisms for acquiring high level resistance to the aminoglycosides[4]. High level resistance to gentamicin is mediated by aminoglycoside modifying enzymes (a fused 6'-acetyltransferase / 2''-phosphotransferase). These en-

zymes alter the aminoglycoside molecule so that it binds poorly to the ribosome (the site of action of aminoglycosides). The fused enzyme that produces high level gentamicin resistance produces resistance to synergy with all other clinically used aminoglycosides except streptomycin. Thus if a patient has high level resistance to gentamicin, streptomycin is the only option for synergy. Unfortunately enterococci with high level resistance to both gentamicin and streptomycin, and therefore all aminoglycosides, occur. Four such isolates were found in our series. Such a finding has dire consequences for a patient with enterococcal endocarditis.The genes coding for these aminoglycoside-modifying enzymes are found on plasmids, with the exception of a 6'-acetyltransferase of *E. faecium* which is chromosomally encoded. This enzyme is produced by all strains of *E. faecium*, and inactivates tobramycin, netilmicin and kanamycin[5]. These drugs should never be used for synergistic action against *E. faecium*.

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Update on bat lyssavirus

The second meeting of the Lyssavirus Expert Group was held on 3 December 1996. The group reviewed new information on the virus. This included the first identification of lyssavirus in an insectivorous bat. A yellow-bellied sheathtail bat, *Saccolaimus flaviventris*, was found on the ground and unable to fly, near Toowoomba, Queensland. Following euthanasia, the animal was found to have a non-suppurative encephalitis on histopathology and was lyssavirus positive by immunofluorescence.

Research priorities for the bat lyssavirus were discussed by the group. These included both wildlife and human aspects. This research will further inform public health action required for the control of the virus.

The group noted that while current advice to medical practitioners and public health authorities stands[1], there is the possibility of inapparent exposure to lyssavirus. This has been the experience with rabies in the United States of America[2,3]. The group recommended that neurologists and intensive care physicians be alerted to look for lyssavirus infection in cases of unexplained encephalopathy. The recommendations of the National Health and Medical Research Council for post-exposure vaccination of previously vaccinated persons for rabies should be applied to lyssavirus[4].

The group recommended that the National Health and Medical Research Council *Australian Immunisation Procedures Handbook* be updated to include advice on pre- and post-exposure prophylaxis for lyssavirus.

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NOTICE TO READERS

A note from the Editor

Ana Herceg, Acting Editor, CDI

This is the last issue of *Communicable Diseases Intelligence* (*CDI*) for 1996. The editorial team of *CDI* would like to wish all our readers a very happy Christmas and best wishes for 1997. We would particularly like to thank all those readers who have contributed articles, editorials, correspondence, outbreak reports and surveillance reports to *CDI*.

The first issue of *CDI* for 1997 will be published on 9 January. You will notice that the publication day of *CDI* is changing from Monday to Thursday in 1997, in order to accommodate printing schedules. *CDI* will continue to be published every fortnight except for the fortnight of Christmas / New Year.

Finally, *CDI* will have a new cover and content design in 1997. As always, we would appreciate your comments on *CDI* in 1997.

OVERSEAS BRIEFS

Source: World Health Organization (WHO)

Yellow Fever, Ghana

A total of 27 cases of yellow fever with five deaths has been reported over a period of a few weeks in the Upper East Region of the country. Out of 15 blood samples tested, three were positive for yellow fever. Health authorities have initiated a vaccination campaign of the population considered to be at risk. Some stocks of vaccine are already available and WHO is sending further supplies.

COMMUNICABLE DISEASES SURVEILLANCE

National Notifiable Diseases Surveillance System

The 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 1996;20:9-10.

Reporting period 10 to 23 November 1996

There were 2,522 notifications received for this two-week period (Tables 1, 2 and 3). The numbers of reports for selected diseases have been compared with average data for this period in the previous three years (Figure 1).

Twenty-five notifications of measles were received in this period, 11 (44%) of which were for children under the age of 5 years.The number of cases remains low for the time of year (Figure 2).

Rubella was notified for 175 persons in this period. The number of notifications has risen in recent months but is below the level reported for the same period in the past two years (Figure 3). Eighty-four cases (48%) were for adults aged 15 to 24 years. There was a predominance of males, the male:female ratio being 2:1.

There were 324 cases of pertussis reported this period of which 60% were under the age of 20 years. Included were 137 notifications from Victoria where there is currently an outbreak.

Table 1. Notifications of diseases preventable by vaccines recommended by the NHMRC for routine childhood immunisation, received by State and Territory health authorities in the period 10 to 23 November 1996

DISEASE[1]	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	TOTALS FOR AUSTRALIA[2]			
									This period 1996	This period 1995	Year to date 1996	Year to date 1995
Diphtheria	0	0	0	0	0	0	0	0	0	0	1	0
Haemophilus influenzae b infection	0	0	0	0	0	0	0	0	0	2	48	61
Measles	0	4	5	6	0	2	6	2	25	41	459	1242
Mumps	0	2	1	NN	4	0	1	1	9	6	113	137
Pertussis	0	43	0	38	88	3	137	15	324	197	3373	3890
Rubella	1	10	0	76	51	3	22	12	175	389	2389	3696
Tetanus	0	0	0	0	0	0	0	0	0	1	2	4

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 2. Notifications of other diseases received by State and Territory health authorities in the period 10 to 23 November 1996

DISEASE[1]	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	TOTALS FOR AUSTRALIA[2]			
									This period 1996	This period 1995	Year to date 1996	Year to date 1995
Arbovirus Infection (NEC)[3,4]	0	0	2	0	0	0	0	1	3	0	95	65
Barmah Forest virus infection	0	3	-	9	0	0	0	-	12	27	748	713
Ross River virus infection	0	10	3	28	0	1	0	6	48	59	7638	2523
Dengue	0	0	0	1	1	-	0	2	4	1	37	29
Campylobacteriosis[5]	14	-	15	193	89	29	108	82	530	538	10657	9724
Chlamydial infection (NEC)[6]	5	NN	16	184	0	13	56	39	313	341	6672	5714
Donovanosis	0	NN	0	0	NN	0	0	0	0	3	45	74
Gonococcal infection[7]	0	19	33	41	0	1	4	31	129	145	3425	2854
Hepatitis A	2	19	4	22	5	0	8	2	62	66	2001	1388
Hepatitis B incident	0	0	0	1	0	0	0	1	2	14	179	290
Hepatitis C incident	0	1	0	-	0	0	-	-	1	2	29	65
Hepatitis C unspecified	9	NN	11	198	NN	26	38	23	305	399	8268	8722
Hepatitis (NEC)	0	0	0	0	0	0	0	NN	0	0	17	12
Legionellosis	0	2	0	2	3	0	2	1	10	6	165	147
Leptospirosis	0	1	0	1	0	2	4	0	8	7	210	122
Listeriosis	0	0	0	0	0	0	0	0	0	4	59	53
Malaria	1	5	3	13	0	0	6	2	30	36	780	586
Meningococcal infection	0	3	1	2	2	0	7	0	15	13	385	350
Ornithosis	0	NN	0	0	0	0	8	1	9	21	67	145
Q Fever	0	7	0	14	0	0	0	0	21	27	475	430
Salmonellosis (NEC)	2	40	11	94	20	6	18	16	207	222	5098	5403
Shigellosis[5]	0	-	6	21	4	0	0	3	34	22	593	681
Syphilis	0	15	21	13	0	1	0	1	51	64	1328	1694
Tuberculosis	0	6	2	12	0	1	15	2	38	57	983	940
Typhoid[8]	0	1	0	0	0	0	0	0	1	3	74	65
Yersiniosis (NEC)[5]	0	-	0	7	4	0	0	0	11	8	247	283

1. For HIV and AIDS, see Tables 4 and 5. 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. Tas: includes Ross River virus and dengue.

4. NT, Vic and WA: includes Barmah Forest virus.

5. NSW: only as 'foodborne disease' or 'gastroenteritis in an institution'.

6. WA: genital only.

7. NT, Qld, SA and Vic: includes gonococcal neonatal ophthalmia.

8. NSW, Vic: includes paratyphoid.

NN Not Notifiable.

NEC Not Elsewhere Classified.

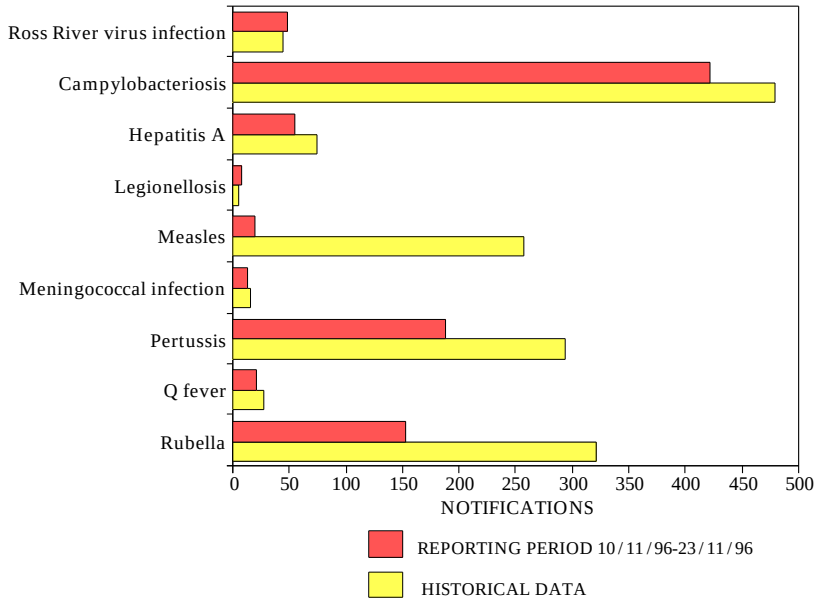
- Elsewhere Classified.

Table 3. Notifications of rare[1] diseases received by State and Territory health authorities in the period 10 to 23 November 1996

DISEASE[2]	Total this period	Reporting States or Territories	Year to date 1996
Brucellosis	3	Qld	35
Chancroid	0		1
Cholera	0		4
Hydatid infection	1	Qld	35
Leprosy	0		9

1. Fewer than 60 cases of each of these diseases were notified each year during the period 1988 to 1995.
2. No notifications have been received during 1996 for the following rare diseases: botulism; lymphogranuloma venereum; plague; rabies; yellow fever; or other viral haemorrhagic fevers.

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



1. The historical data are the averages of the number of notifications in 9 previous 2-week reporting periods: the corresponding periods of the last 3 years and the periods immediately preceding and following those.

Figure 2. Measles notifications, 1991 to 1996, by month of onset

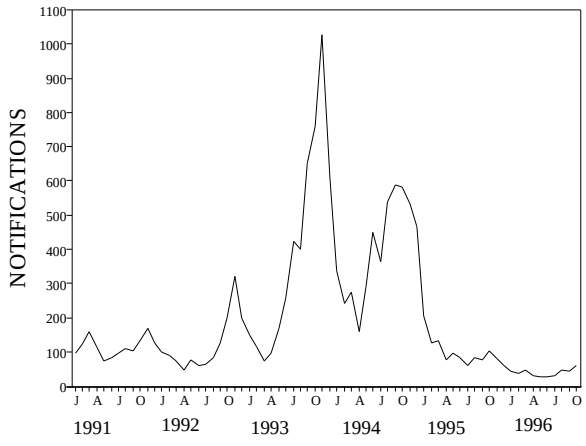
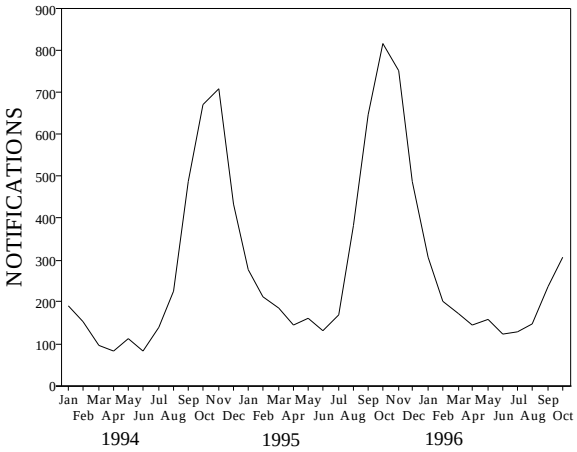


Figure 3. Rubella notifications, 1994 to 1996, by month of onset



Forty-eight notifications of Ross River virus were received in this period. Included were several apparent clusters in the Statistical Divisions of Fitzroy, Queensland (8 cases); Brisbane, Queensland (7 cases); Wide Bay-Burnett, Queensland (4 cases); Far North Queensland (4 cases); and Northern New South Wales (3 cases). Numbers remain low which is usual for the time of year.

One hundred and twenty-nine cases of gonococcal infection were reported in this period. Sixty-four (50%) were for persons in the 15 to 24 years age group. The male: female ratio was 1.7:1. Twenty cases were reported from the Statistical Division of Far North Queensland, 33 from the Northern Territory, 14 from Sydney and 15 from Kimberley, Western Australia.

Legionellosis was notified for 10 persons in this period. All cases were in the 40 to 84 years age range. For the year to date a total of 165 notifications have been received, of which 81% were for persons over 50 years of age (Figure 4). Most reports (69%) were for males.

Fifteen cases of meningococcal disease were reported in this period, of which 9 (60%) were for children 2 years of age or under. The number of notifications has remained stable since August, after peaking in July (Figure 5).

Figure 4. Legionellosis notifications, 1996, by age group and sex

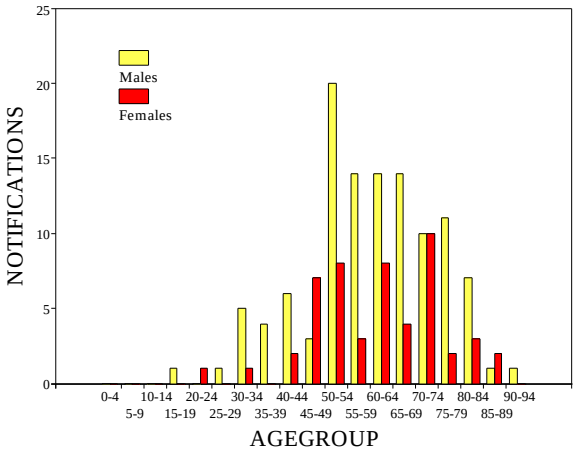
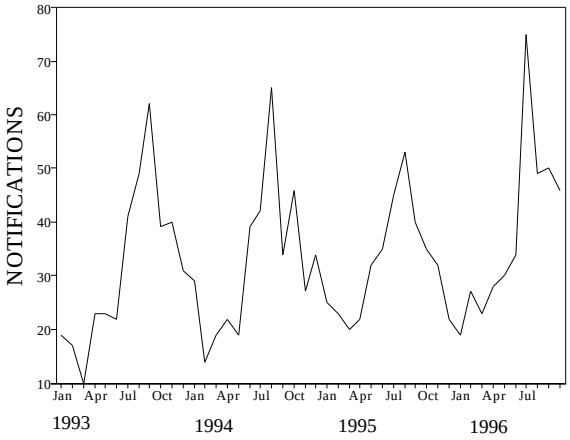


Figure 5. Meningococcal notifications, 1993 to 1996, by month of specimen collection



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 (ACT, 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, available from the National Centre in HIV Epidemiology and Clinical Research, 376 Victoria Street, Darlinghurst NSW 2010. Telephone: (02) 332 4648 Facsimile: (02) 332 1837.

HIV and AIDS diagnoses and deaths following AIDS reported for July 1996, as reported to 31 October 1996, are included in this issue of *CDI* (Tables 4 and 5).

Table 4. New diagnoses of HIV infection, new diagnoses of AIDS and deaths following AIDS occurring in the period 1 July to 31 July 1996, by sex and State or Territory of diagnosis

		ACT	NSW	NT	Qld	SA	Tas	Vic	WA	TOTALS FOR AUSTRALIA			
										This period 1996	This period 1995	Year to date 1996	Year to date 1995
HIV diagnoses	Female	0	4	0	4	0	0	2	0	10	5	46	57
	Male	0	30	0	16	2	1	12	1	62	58	446	458
	Sex not reported	0	1	0	0	0	0	0	0	1	1	4	8
	Total[1]	0	36	0	20	2	1	14	1	74	64	497	525
AIDS diagnoses	Female	0	1	0	1	0	0	0	0	2	0	10	19
	Male	0	10	0	4	0	0	3	0	17	44	248	417
	Total[1]	0	11	0	5	0	0	3	0	19	44	258	437
AIDS deaths	Female	0	1	0	0	0	0	0	0	1	4	11	26
	Male	0	11	0	7	1	0	2	1	22	50	206	368
	Total[1]	0	12	0	7	1	0	2	1	23	54	217	395

1. Persons whose sex was reported as transsexual are included in the totals.

Table 5. Cumulative diagnoses of HIV infection, AIDS and deaths following AIDS since the introduction of HIV antibody testing to 31 July 1996, by sex and State or Territory

		ACT	NSW	NT	Qld	SA	Tas	Vic	WA	AUSTRALIA
HIV diagnoses	Female	15	569	3	102	44	4	169	73	979
	Male	171	10131	84	1634	577	75	3423	761	16856
	Sex not reported	0	2049	0	0	0	0	42	0	2091
	Total[1]	186	12757	87	1741	621	79	3643	836	19950
AIDS diagnoses	Female	5	138	0	30	18	2	48	17	258
	Male	76	3899	26	666	284	32	1372	293	6648
	Total[1]	81	4047	26	698	302	34	1427	312	6927
AIDS deaths	Female	2	102	0	24	13	2	37	11	191
	Male	50	2728	20	469	195	21	1083	217	4783
	Total[1]	52	2836	20	495	208	23	1126	229	4989

1. Persons whose sex was reported as transsexual are included in the totals.

Australian Sentinel Practice Research Network

The Australian Sentinel Practice Research Network (ASPREN) comprises 99 sentinel general practitioners from throughout the country. Approximately 9,000 consultations are recorded each week for 12 conditions. Of these, CDI reports the consultation rate for influenza, rubella, measles, chickenpox, pertussis and gastroenteritis. For further information including case definitions see CDI 1996;20:98-99.

Data for weeks 46 and 47 ending 17 November and 24 November 1996 respectively are included in this issue of *CDI* (Table 6). There has been no significant change in the rates of notifications of gastroenteritis over recent reporting periods. Consultation rates for chickenpox rose during week 47 compared with recent weeks, while those for influenza-like illnesses have remained steady. The numbers of cases of pertussis and measles have remained low.

Table 6. Australian Sentinel Practice Research Network reports, weeks 46 and 47, 1996

	Week 46, to 17 November 1996		Week 47, to 24 November 1996	
Condition	Reports	Rate per 1,000 encounters	Reports	Rate per 1,000 encounters
Influenza	30	3.6	26	3.5
Rubella	4	0.5	6	0.8
Measles	0	0	1	0.1
Chickenpox	25	3.0	34	4.6
Pertussis	5	0.6	3	0.4
Gastroenteritis	148	17.9	126	17.2

Sentinel Chicken Surveillance Programme

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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 23 flocks are maintained in the north of Western Australia, 8 in the Northern Territory and 10 in Victoria. The flocks in Western Australia and the Northern Territory are tested all year round but those in Victoria are tested only from November to March, during the main MVE risk season.

Results are coordinated by the Arbovirus Laboratory in Perth and reported bimonthly.

Sentinel chicken serology was carried out for 16 of the 22 flocks in Western Australia in September and October 1996. There were no seroconversions during this period. Twenty-one of the 22 flocks of sentinel chickens were replaced during September. Those at Port Hedland were not replaced. New flocks were established at Lombadine, an Aboriginal community in the West Kimberley, and at Nullagine in the Pilbara. There are now 23 flocks in the north of Western Australia.

Five flocks of sentinel chickens from the Northern Territory were also tested in September and October. During this period there were no seroconversions to flaviviruses.

Gonococcal surveillance

John Tapsall, The Prince of Wales Hospital, High Street, 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 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 1996

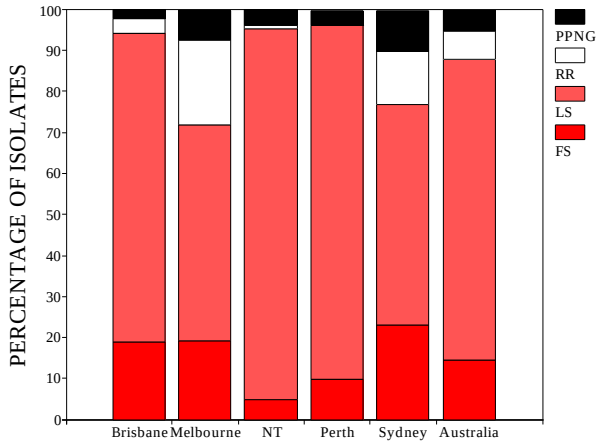
The AGSP laboratories examined 710 isolates of *Neisseria gonorrhoeae* for sensitivity to the penicillins, ceftriaxone, quinolones and spectinomycin and for high level resistance to the tetracyclines in the June quarter of 1996.

Penicillins

The usefulness of this group of antibiotics (penicillin, ampicillin, amoxycillin) is progressively diminishing and is least effective in Sydney and Melbourne where about a quarter of all isolates are resistant by one or more mechanisms. Figure **6** shows the proportion of isolates fully sensitive, less sensitive or relatively resistant to the penicillins by chromosomal mechanisms and the proportion of penicillinase-producing gonococci (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 37 PPNG identified in this reporting period (5.2% of all isolates). These were found in all centres except Adelaide, with 14 PPNG reported from Sydney, 8 from Melbourne, 7 from Perth, 5 from the Northern Territory and lower numbers in the other centres. Infections with PPNG were acquired locally, and in Indonesia, the Philippines, Malaysia, Vietnam, China and Thailand. Fifty (7%) of all isolates were resistant to the penicillins by separate chromosomal mechanisms. These so-called CMRNG were present in all centres except Perth, but most prominent in Sydney (18 isolates, 13% of the total there) and Melbourne (23 isolates, 21%). Perhaps somewhat paradoxically, the

Figure 6. Penicillin resistance of gonococcal isolates for Australia and by region, 1 April to 30 June 1996



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

proportion of isolates fully sensitive to penicillin increased in Sydney and Melbourne in this quarter.

Ceftriaxone and spectinomycin.

All isolates from all parts of Australia were sensitive to these injectable agents.

Quinolone antibiotics

Twenty-four isolates (3.4%) had altered resistance to this group of antibiotics (ciprofloxacin, norfloxacin and enoxacin), with half of these showing high level resistance (QRNG). High level resistance to the quinolones was present in strains from all centres. Nine QRNG (8.2%) were detected in Melbourne, 6 in Sydney (4.4%), 3 each in Darwin and Perth, 2 in Adelaide and one in Brisbane. Most infections with QRNG were acquired overseas, with China and the Philippines identified most often as countries of acquisition. Other sources of QRNG included Malaysia, Indonesia, Vietnam and Thailand.

High level tetracycline resistance

Thirty-four tetracycline-resistant *Neisseria gonorrhoea* (TRNG) were detected throughout Australia with isolates of this type again present in all centres. The highest proportion of TRNG was found in Sydney where the 11 TRNG represented 8.1% of all isolates. TRNG were also prominent in Perth (12 isolates, 6.6%) and there were 4 TRNG isolated in both Melbourne and Darwin. Overseas sources of TRNG most often identified were Vietnam and Indonesia. Local acquisition was also recorded.

Serious Adverse Events Following Vaccination Surveillance Scheme

The Serious Adverse Events Following Vaccination Surveillance Scheme is a national surveillance scheme which monitors the serious adverse events that occur rarely following vaccination. More details of the scheme were published in CDI 1995:19; 273-274.

Acceptance of a report does not imply a causal relationship between administration of the vaccine and the medical outcome, or that the report has been verified as to the accuracy of its contents.

It is estimated that 250,000 doses of vaccines are administered every month to Australian children under the age of six years.

Results for the reporting period 15 September to 23 November 1996

There were 14 reports of serious adverse events following vaccination for this reporting period. Reports were received from the Australian Capital Territory (1), the Northern Territory (3), South Australia (2), Tasmania (1), Victoria (3) and Western Australia (4).

The 14 reports included cases of persistent screaming, hypotonic / hyporesponsive episodes, convulsions and 4 'other' events (Table 7). The 'other' events included a severe local reaction and three episodes of acute urticarial rash, one with facial swelling.

Two children were hospitalised. All cases recovered.

LabVISE

The Virology and Serology 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 fortnight. 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 1996;20:9-12.

There were 800 reports received in the *CDI* Virology and Serology Reporting Scheme in this period (Tables 8 and 9).

Laboratory reports of parvovirus for October are the highest recorded (Figure 7). The virus is presumed to be transmitted via respiratory secretions. Infection is most common in school aged children but can occur at any age. In the last fortnight, 26 reports were received, with diagnosis by IgM detection (25) and four-fold rise in titre (1).

There were 31 reports of influenza A for this reporting period. Diagnosis was by single high titre (28) and four-fold rise in titre (3).

There were 101 laboratory reports of *Bordetella pertussis* received in this fortnight, all but one were from Victoria. The increase in reports has been associated with an outbreak of pertussis in Victoria and may also reflect increased testing.

Table 7. Adverse events following vaccination for the period 15 September to 23 November 1996

Event	Vaccines					Reporting States or Territories	Total reports for this period
	DTP	DTP / Hib	DTP / OPV / Hib	DTP / OPV	MMR		
Persistent screaming	1		1	1		Tas, WA	3
Hypotonic / hyporesponsive episode	1	1	2		1	ACT, NT, SA, WA	5
Convulsions		2				Vic, WA	2
Other	1	1	1		1	NT, Vic	4
TOTAL	3	4	4	1	2		14

Figure 7. Parvovirus laboratory reports, 1993 to 1996, by month of specimen collection

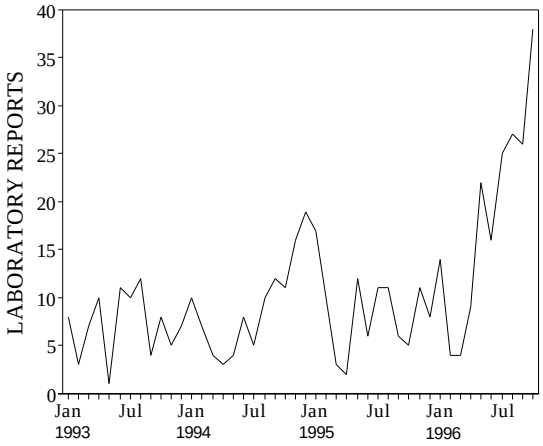
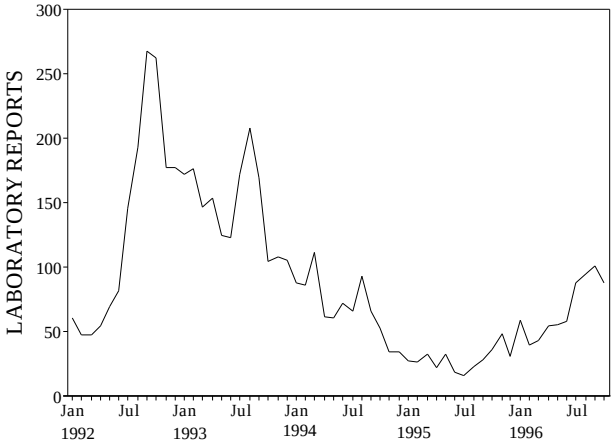


Figure 8. *Mycoplasma pneumoniae* laboratory reports, 1992 to 1996, by month of specimen collection



In the last fortnight, 52 reports of *Mycoplasma pneumoniae* were received, with diagnosis by IgM detection (38), single high titre (13) and four-fold rise in titre (1). The highest attack rates are generally in persons aged 5 to 20 years, but *Mycoplasma pneumoniae* can occur at any age and may cause particularly severe disease in neonates. Reports appear to have peaked in September and are now expected to decline (Figure 8).

Table 8. Virology and serology laboratory reports by State or Territory[1] for the reporting period 14 to 27 November 1996, historical data[2], and total reports for the year

	State or Territory[1]								Total this fortnight	Historical data[2]	Total reported this year
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA			
MEASLES, MUMPS, RUBELLA											
Measles virus				1					1	18.7	53
Mumps virus		1		1					2	2.3	37
Rubella virus		5		61	1	1	2		70	105.5	630
HEPATITIS VIRUSES											
Hepatitis A virus			2	7					9	17.7	376
ARBOVIRUSES											
Ross River virus			6	22			1		29	12.5	3,143
Barmah Forest virus				13					13	6.3	208
Flavivirus (unspecified)				1					1	1.2	23
ADENOVIRUSES											
Adenovirus type 2						1			1	2.2	31
Adenovirus type 3							1		1	1.5	69
Adenovirus type 8							2		2	.5	9
Adenovirus not typed / pending		1		13		1			15	55.5	1,287
HERPES VIRUSES											
Cytomegalovirus			2	15			3		20	60.7	1,438
Varicella-zoster virus		3	3	36		2	6		50	46.5	1,102
Epstein-Barr virus		14	2	89			8		113	79.0	1,959
OTHER DNA VIRUSES											
Parvovirus				23			3		26	5.8	218

Table 8. Virology and serology laboratory reports by State or Territory[1] for the reporting period 14 to 27 December 1996, historical data[2], and total reports for the year, continued

	State or Territory[1]								Total this fortnight	Historical data[2]	Total reported this year
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA			
PICORNA VIRUS FAMILY											
Coxsackievirus A16							1		1	.0	6
Coxsackievirus B2						1	1		2	1.0	14
Coxsackievirus B4							1		1	.2	6
Coxsackievirus B untyped / pending				2					2	.0	2
Poliovirus type 2 (uncharacterised)							1		1	1.7	16
Rhinovirus (all types)		5		2			3		10	36.8	659
Enterovirus not typed / pending				2					2	39.0	771
ORTHO / PARAMYXOVIRUSES											
Influenza A virus		2		29					31	8.7	1,501
Influenza B virus							2		2	3.8	56
Parainfluenza virus type 2							1		1	1.2	70
Parainfluenza virus type 3		2		8			6		16	45.5	657
Respiratory syncytial virus		2		7			1		10	46.0	4,087
OTHER RNA VIRUSES											
Rotavirus		1				6	1		8	74.0	1,545
Norwalk agent							6		6	2.3	38
OTHER											
Chlamydia trachomatis not typed		13	9	115		2	9		148	106.0	3,509
Chlamydia psittaci							6		6	11.5	83
Mycoplasma pneumoniae		6		14			32		52	18.3	773
Coxiella burnetii (Q fever)		5		4			2		11	10.3	179
Rickettsia australis		1							1	1.3	18
Rickettsia tsutsugamushi				2					2	.2	13
Bordetella pertussis				1			100		101	24.3	699
Bordetella species				25					25	13.7	275
Legionella longbeachae				1					1	.2	15
Legionella species				1					1	.5	11
Leptospira hardjo				1					1	.0	20
Leptospira species				2					2	1.3	59
Schistosoma species							3		3	4.7	233
TOTAL		61	24	498	1	14	202		800	868.3	25,898

1. State or Territory of postcode, if reported, otherwise State or Territory of reporting laboratory.
2. The historical data are the averages of the numbers of reports in 6 previous 2 week reporting periods: the corresponding periods of the last 2 years and the periods immediately preceding and following those.

Table 9. Virology and serology laboratory reports by contributing laboratories for the reporting period 14 to 27 November 1996

STATE OR TERRITORY	LABORATORY	REPORTS
New South Wales	Institute of Clinical Pathology & Medical Research, Westmead	16
	Royal Alexandra Hospital for Children, Camperdown	8
	Royal Prince Alfred Hospital, Camperdown	11
Queensland	Queensland Medical Laboratory, West End	482
	State Health Laboratory, Brisbane	67
Tasmania	Northern Tasmanian Pathology Service, Launceston	3
	Royal Hobart Hospital, Hobart	9
Victoria	Microbiological Diagnostic Unit, University of Melbourne	9
	Royal Children's Hospital, Melbourne	122
	Victorian Infectious Diseases Reference Laboratory, Fairfield Hospital	73
TOTAL		800