Infection control in child care settings

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Abstract

Over one-third of all under five year old Australian children use some form of licensed child care. The majority of research on infectious diseases in children using care, mainly emanating from North America and Scandinavia, suggests that children in preschool or long day care suffer more frequent infections and more days of illness than those cared for at home or in family day care. In order to minimise these risks it is necessary to apply infection control principles. In this article infection risk factors are outlined and recommendations for immunisation, preventative practices, the use of antibiotics and outbreak management are presented.

Introduction

Largely as a result of an increasing proportion of families in which both parents are in paid employment, there has been a steady rise in the demand for care of young children. This is provided by informal arrangements (care by relatives and friends) and by formal child care (family day care, child care centres and preschools or kindergartens). The latest Australian Bureau of Statistics survey of child care use estimated that 473,000 or 36.6 per cent of under five year old children attended formal child care in 1996[1]. The higher prevalence of infections in children attending child care centres can be minimised by applying infection control principles. However, such principles are unlikely to be put into practice unless substantial support, in the form of training and ongoing advice, can be provided to child care workers by the public health and clinical community.

Increased risk of infections

The spread of infections in child care centres is facilitated by crowding and microbial contamination of the child care environment, as well as the unhygienic behaviours and greater susceptibility of young children[2].

Children attending child care centres experience a greater number of illnesses than do children cared for at home. Wald et al[3] reported that children attending centres had 51 per cent more episodes of infection, and 134 per cent more days of illness than children cared for at home. Another study found that Swedish children in child care required 40 - 80 per cent more medical consultations for acute infections than did children who remained at home[4]. Excess illnesses may be related to upper and lower respiratory tract infections including middle ear infection[5-7]. Gastroenteritis is also an important cause of illness among children attending

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centre based care[8]. The important pathogens, especially among toddlers, are enteric viruses, particularly rotavirus[9], bacteria such as *Shigella* and the parasites *Cryptosporidium*[10] and *Giardia*[11]. Hepatitis A, also an enteric virus, has been responsible for outbreaks in child care centres in Australia[12,13], although not to the extent described in Phoenix, Arizona, where 42 per cent of notified cases in the community were associated with child care[14].

Although invasive *Haemophilus influenzae* type b (Hib) infection has declined by approximately 90 per cent since the infant vaccination program against this disease began in 1993, earlier data from Victoria implicated child care as a risk factor for invasive disease[15]. A Belgian study conducted during a prolonged meningococcal epidemic estimated that child care exposure conferred a 76 times greater risk of infection compared to home care[16]. Both infections have public health ramifications in relation to prophylaxis of secondary cases.

Child care workers and other adult contacts are also at increased risk of infections such as upper respiratory tract infection, gastroenteritis and hepatitis A[17]. Concern has been expressed about acquisition of cytomegalovirus (CMV) by pregnant carers, which may cause severe congenital infection[18], and parvovirus B19 which may be associated with intrauterine death or stillbirth due to fetal hydrops[19].

Immunisation of children

In the case of vaccine preventable diseases, the risk of infection in child care can be significantly reduced if children are age-appropriately immunised prior to entry, and continue to receive recommended vaccines at the appropriate ages. High levels of immunisation in children attending day care are particularly important when the facility is used by children under 12 months of age, in whom diseases such as measles and pertussis may be life threatening.

Child care centres are advised to ensure that they hold an immunisation record for each child, which is updated every six months[20].

In endorsing the *National Immunisation Strategy*[21] in June 1993, the National Health and Medical Research Council (NHMRC) drew particular attention to the recommendation that States and Territories introduce legislation to require all children to show evidence of immunisation status at the time of enrolment in child care facilities and schools[22]. The purpose of such legislation is to allow, in the event of an outbreak of a vaccine preventable disease, the rapid identification of children who are not adequately protected by immunisation, so that they can be excluded from child care. Exclusion is both to protect the health of the child and to prevent further transmission of the disease.

In New South Wales such legislation has been enacted under the Public Health Act 1991, and documentation is also referred to in licencing regulations. The New South Wales legislation also applies to preschools and primary schools. The Australian Capital Territory has similar legislation. Victorian law applies specifically to school entry but it is anticipated that the legislation will be extended to include entry to preschool and child care. All other jurisdictions are considering the introduction of school entry legislation.

Immunisation and screening of staff

Child care workers should maintain up to date immunisations against diphtheria and tetanus and should also be immunised against measles, mumps and rubella. Hepatitis A immunisation is recommended for all child care workers, although the risk of the disease is largely limited to staff caring for children who are not yet fully toilet trained[23]. Hepatitis B immunisation is not recommended routinely as the risk for child care staff of contracting the disease is minimal[23].

Female employees of child bearing age should be screened for rubella immunity at the start of employment. If a child care worker is planning a pregnancy, it is strongly recommended that serological screening for immunity to CMV be carried out prior to conception. Those who are seronegative for CMV should be counselled regarding the small risk of primary maternal CMV infection that can cause damage to the fetus. They should be advised that attention to hand washing, and not caring for children under three years of age can reduce the risk of CMV acquisition[24].

Hand washing and the use of gloves

Human enteric bacteria[25] and viruses[26] can be easily isolated from the hands of children and staff, and from surfaces and toys in child care centres during gastroenteritis outbreaks. Pathogenic viruses including hepatitis A virus[27], rotavirus[28], rhinovirus[29] and respiratory syncytial virus (RSV)[30] can survive on the hands for many hours. Hand contact is important in the transmission of viral respiratory infections caused by rhinovirus[31] and RSV[30] as well as diarrhoeal infections.

Hand washing, using soap and warm running water, is the principal means of reducing transmission. The effectiveness of hand washing has been illustrated by a study[32] which showed that the incidence of diarrhoeal episodes among young children in child care centres was markedly reduced after the introduction of an intensive hand washing program for carers. Carers washed their hands after arrival at the centre, before handling food, and after using the toilet or changing children's nappies. Carers should wash their hands on these occasions as well as after wiping their own or a child's nose, after cleaning up body fluids such as blood, faeces, vomit or urine and before going home[20].

Nappy change areas must be located close to a hand basin. Where a hand basin is not available, alcohol-based hand rinses, shown to reduce the bacterial skin flora[33], can be used. Staff may prefer to use disposable gloves when changing dirty nappies, but their use is optional and does not replace the need for hand washing. Disposable gloves should be worn when cleaning up spills of blood or body fluids, and when handling food. Cuts and open lesions on carers' hands should be kept covered with water resistant occlusive dressings.

Cleaning and disinfection

Contaminated fomites, surfaces, toys and utensils in the child care environment may also be vehicles for the spread of infection. Influenza virus[34] , RSV[30], rhinovirus, parainfluenza virus[29] and CMV[35] may survive on non-porous objects for many hours. Rotavirus[28], hepatitis A virus[36] and parasites such as *Cryptosporidium*[37] may remain viable for days or weeks outside the body.

All surfaces and articles should be chosen for their ease of cleaning. Daily vigorous physical cleaning of toys and surfaces using water and a neutral detergent is generally all that is required to remove pathogens from contaminated articles. The use of disinfectants should be left to a supplementary role in the control of outbreaks of enteric infection; in such instances a disinfectant should be chosen to suit the pathogen. Specific advice should be sought from a hospital microbiologist or infection surveillance practitioner.

Nappy change areas should use a non-absorbent change mat which is cleaned after each use. Nappies and other items contaminated with body substances should be handled as little as possible. If they are to be laundered at the centre, they should be sluiced with care and machine washed in either hot or cold water using a recommended detergent. Ideally, they should be placed in bins for cleaning by a commercial laundry service.

Separation of children in nappies from older children

Most child care related infections are more common in infants and toddlers than among older children. A study of bacterial contamination in centres found that the prevalence of faecal coliforms on hands, surfaces and in air samples was inversely related to the age of the children. The likelihood of faecal contamination was greatest on the hands of infants and carers, and least on those of the older children[38]. Disposable nappies appear to be superior to cloth nappies in preventing faecal contamination of the environment[39]. Whether the use of disposable nappies can reduce the incidence of diarrhoeal illness is not clear.

Two prospective studies of risk factors for diarrhoeal illness found that centres with non-toilet trained infants, and those in which food-handling staff also changed nappies, had higher diarrhoeal rates[40,41]. The risk of diarrhoeal illness in three year old children who stayed in the same room as under two year olds was 4.3 (95%, CI 2.1-9.0) times greater than the risk in those separated from the under two year olds[40]. In common with other enteric infections, hepatitis A outbreaks are most likely to involve centres containing many children who are still in nappies[42].

Prevention of the spread of enteric infections is best achieved by ensuring that wherever possible, carers have not been involved in nappy changing prior to handling food on the same shift, that minimal contact occurs between children in nappies and older children, and that the same members of staff do not look after both age groups at the same time.

Antibiotics in outbreak control

Antibiotics are generally prescribed when clinical indications are present. Their prescription is influenced by the wish for the child to return to care promptly, as is the case with bacterial conjunctivitis, streptococcal pharyngitis and impetigo. In other infections, the use of antibiotics beyond the first few days of illness has no clear benefit for the patient, but may reduce the likelihood of transmission to contacts. Examples include gastroenteritis caused by *Shigella*[43] or *Campylobacter*[44]. Management of giardiasis remains problematic in the child care setting, as it is usually not clear whether detection of the organism in a child with diarrhoea indicates a causal relationship or coincidence[45-47]. If testing in response to an outbreak of diarrhoeal illness reveals that a large proportion of children in a group are affected, a recommendation for ‘mass treatment’ with metronidazole or tinidazole may be warranted following expert advice. However, treatment of individual children found to be excreting *Giardia* cysts should remain a clinical decision.

In pertussis, a ten day course of erythromycin should be administered to the case if it is within three weeks of onset of the cough, to reduce the infectious period[48]. Prophylactic treatment is recommended for all contacts within household settings (including family day care) who have been in contact with the case within three weeks of the onset of cough. Within child care centres, antibiotic prophylaxis should be limited to contacts under one year of age and children not up to date with pertussis vaccinations. If there is more than one case within a child care centre, prophylaxis should be extended to include all attendees and staff in contact with the case. Roxithromycin may be a suitable alternative to erythromycin for the treatment of cases and contacts, however, it has not been approved for that purpose[48].

When a case of meningococcal or Hib infection occurs in a centre, the public health authority should arrange for dispensing of prophylactic rifampicin to child care contacts, both children and staff, in accordance with current guidelines[49,50].

Immunisation in outbreak control

Normal human immunoglobulin

Post-exposure prophylaxis with normal human immunoglobulin (NHIG) is indicated in a limited number of infections. If given within seven days of exposure in a dose of 0.2ml/kg it may prevent measles, and is indicated for contacts who are immunocompromised, or under 12 months of age[51]. Infants who have received NHIG should be vaccinated against measles, using measles-mumps-rubella (MMR) vaccine as close as possible to 12 months of age, but at least three months after the NHIG[23]. In a dose of 0.03ml/kg, immunoglobulin may be used to prevent or ameliorate hepatitis A if used within two weeks of exposure. Mass administration of immunoglobulin has been used successfully to terminate hepatitis A outbreaks in child care centres[52].

Vaccines

During measles outbreaks, vaccination with MMR vaccine is recommended for all susceptible contacts from nine months of age (unless there are medical contraindications or NHIG has been given). Infants who are vaccinated against measles prior to 12 months of age should be revaccinated in three months time or after the age of 12 months (whichever is the later) to avoid interference by maternal antibody.

Recent guidelines suggest the consideration of vaccination when two or more cases of invasive meningococcal infection with the same serogroup occur in a child care centre within a three month period[51].

It could be speculated that there might also be a place for the use of hepatitis A vaccine (a new formulation for 2-15 year olds), or varicella and pertussis-only vaccines when they become available in the near future.

Exclusion

Child care regulations in each State and Territory require exclusion of children and employees from the centre whilst infectious with a significant, acute illness. Children with mild illnesses, for example the common cold, or with chronic infections such as HIV, hepatitis B or CMV infection are generally not excluded. The NHMRC exclusion table is reprinted in *Staying healthy in child care*[20].

Exclusion policies are time-honoured but have a number of drawbacks. Parents may have difficulty in finding alternative care for mildly unwell children. As a result, they may be tempted to place the children in other centres, thereby increasing the chance of the spread of infection into the wider community. The childhood exanthemata are most infectious during the prodrome, before the illness is recognised and the child excluded. Persons with erythema infectiosum (fifth disease or slapped-cheek syndrome), caused by infection with parvovirus B19, are no longer infectious once the rash appears, so that exclusion is generally not warranted[53]. There is evidence that exclusion of children with chickenpox has little effect on the course of an outbreak[54,55]. Recent studies suggest that children with rotavirus gastroenteritis may be infectious for up to one week before the onset of diarrhoea[9,56]. Thus exclusion for some infections may be less effective than previously thought.

Cohorting of infectious children

If appropriate staffing and space are available, cohorting of children during outbreaks may reduce the need for exclusion. Cohorting would involve separating affected and unaffected children, and also ensuring that staff who care for one of these groups do not care for the other group for the course of the outbreak. During shigellosis outbreaks in child care, asymptomatic carrier children were successfully cohorted after initiation of specific antibiotic therapy, until the organism was eradicated from the faeces[43]. The Centers for Disease Control and Prevention in the United States of America now recommends cohorting during convalescence, in the management of shigellosis outbreaks in child care[57]. Cohorting was successfully used in a similar way during an outbreak of gastroenteritis caused by *Salmonella typhimurium*[58].

Education, surveillance and reporting

Child care workers need to be supported with formal in-service training which covers modes of spread of infection, immunisation, hygiene (in particular frequent hand washing), reporting requirements and the local public health infrastructure[59]. Infection surveillance practitioners and personnel working in the areas of clinical infectious diseases, microbiology and public health can expect to be called on for advice, and should encourage this contact. Such personnel may encourage the development of practical case definitions, and use of appropriate confirmatory testing as a basis for formal or informal surveillance networks. Surveillance which actively involves child care staff is likely to promote the early seeking of expert advice and recognition of outbreaks, and would serve to enhance preventative approaches to communicable disease in the child care setting[60,61] .

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Communicable Diseases Surveillance

Measles notifications increasing

Measles has been epidemic in New Zealand since April this year and has only recently started to decline. So far in 1997, there have been 1,543 notifications of measles and 118 hospitalisations in New Zealand[1]. In Australia, measles notifications have increased in the last few months after remaining relatively low since the last national outbreak in 1993-1994 (Figure 1). There were 118 measles notifications with onset in September, 67 (57%) were for adjoining Statistical Divisions north of Brisbane; Wide Bay-Burnett (62) and Fitzroy (5). The notification rates for September in the two Statistical Divisions were 28 cases per 100,000 population and 3 per 100,000 population respectively. During October, outbreaks also occurred in Far North Queensland, Northern New South Wales and the Australian Capital Territory (Figure 2).

The proportion of measles notifications which have been laboratory confirmed can not be established through the National Notifiable Diseases Surveillance System (NNDSS) because the method of diagnosis is not currently included in the data. However, data from the Virology and Serology Reporting Scheme, LabVISE (Figure 3), shows a similar trend to the NNDSS data. Although laboratory reports have not increased in recent months this may reflect a reporting delay or the sentinel nature of LabVISE .

Overall, there have been 256 notifications received by the NNDSS with onset since 1 September. Notifications have been highest among infants under 5 years of age, however 45% have been among adolescents and adults aged 10-29 years (Figure 4). Information on vaccination status

Figure 1. Notifications of measles, 1992-1997, by month of onset

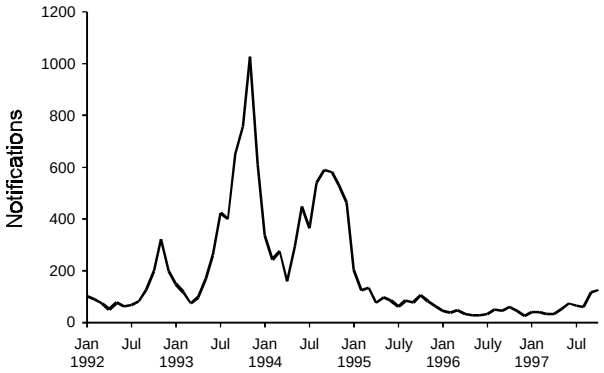


Figure 3. Laboratory reports of measles, 1992-1997, by month of specimen collection

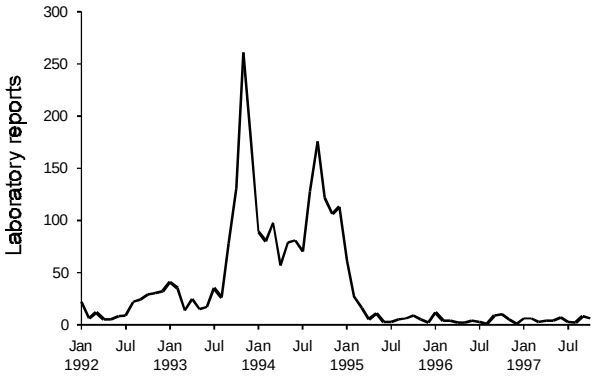


Figure 2. Notification rate of measles, October 1997, by Statistical Division of residence

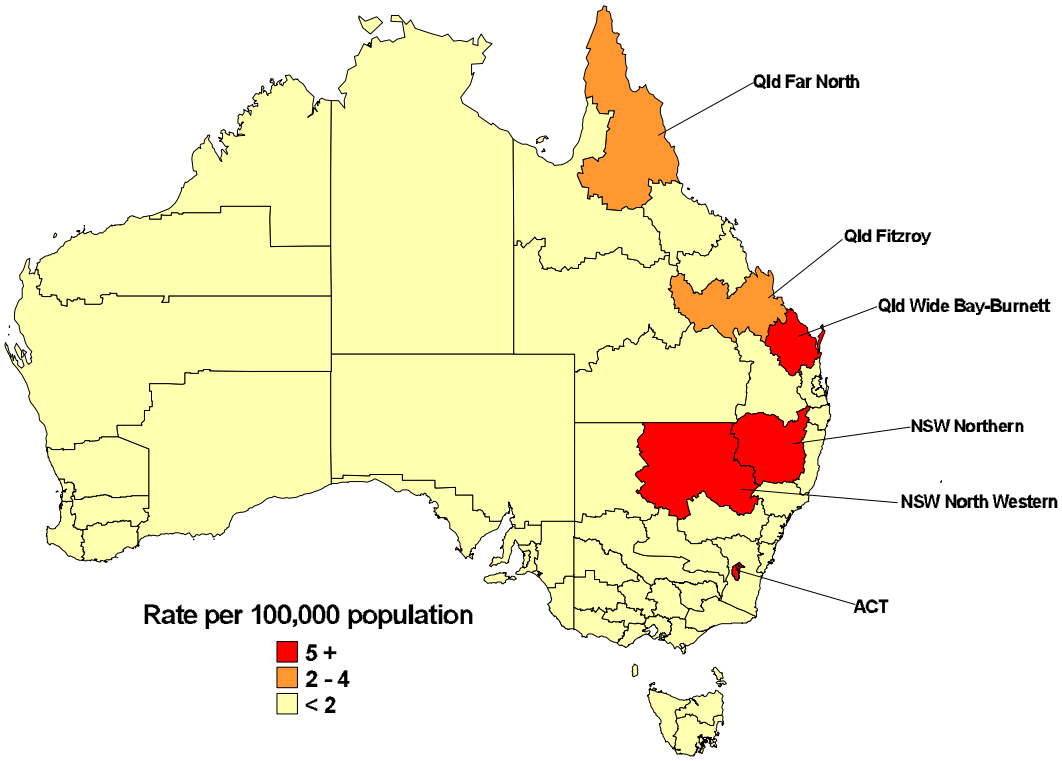
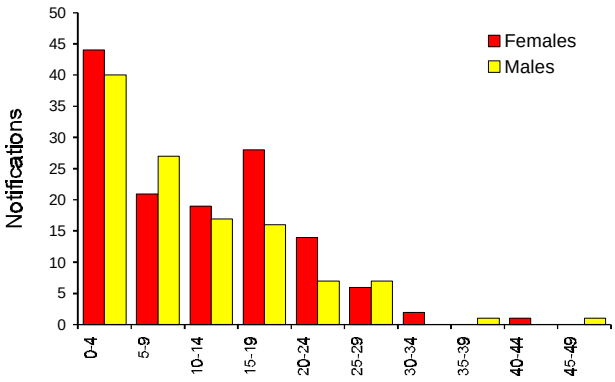


Figure 4. Notifications of measles with onset since 1 September 1997, by age group and sex



was either unknown or not reported for 237 (93%) of the notifications.

The data suggest that a national outbreak of measles may be imminent. Although children under five years of age are at greatest risk in Australia, adolescents and young adults are currently an important risk group to be considered when predicting the impact of measles outbreaks, and planning control measures. Vaccination against measles, mumps and rubella is recommended at 12 months of age and at 10-16 years of age, unless there is a genuine contraindication[2]. Preschool children who have not been vaccinated and those who are not up to date with the recommended schedule should be vaccinated.

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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 1997;21:5.

Reporting period 15 October to 11 November 1997

There were 4,976 notifications received for this four-week period (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 5).

The numbers of reports for Barmah Forest virus infection and Ross River virus infection remain low. However, the rates of disease are expected to rise in the near future. Most recent reports were received from Queensland.

Notifications of hepatitis A have risen steadily in number over the last 2 months. The total received for the current period was 36% higher than for the previous four-week period, but remains low by comparison with numbers reported earlier in the year. The majority of notifications (76%) were received from New South Wales and Queensland. For the 223 notifications with dates of onset in October and November, the male:female ratio was 1.6:1; 32% of cases were males in the age range 20-39 years (Figure 6).

There were 47 notifications of meningococcal infection for the current period, bringing the total number of cases for the year so far to 436, 59 cases (16%) more than for the

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 15 October to 11 November 1997

Disease[1,2]	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	This period 1997	This period 1996	Year to date 1997	Year to date 1996
Diphtheria	0	0	0	0	0	0	0	0	0	0	0	0
Haemophilus influenzae type b	0	2	0	0	0	0	0	0	2	2	44	49
Measles	19	28	0	72	3	1	10	7	140	63	668	437
Mumps	0	1	1	2	1	0	3	3	11	9	170	106
Pertussis	15	361	0	224	168	12	126	128	1,034	492	6,996	2,818
Rubella	2	5	0	43	20	0	49	3	122	307	1,202	2,325
Tetanus	0	0	0	0	0	0	0	0	0	1	7	2

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 15 October to 11 November 1997

Disease[1,2]	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	This period 1997	This period 1996	Year to date 1997	Year to date 1996
Arbovirus infection (NEC)[3]	0	0	1	1	0	0	4	0	6	4	120	49
Barmah Forest virus infection	0	3	-	25	0	0	0	0	31	28	598	780
Campylobacteriosis[4]	25	-	2	360	137	40	389	97	1,050	1,048	9,887	10,266
Chlamydial infection (NEC)[5]	18	NN	46	246	0	26	208	115	659	686	7,030	7,240
Dengue	0	0	1	5	0	-	0	0	6	4	202	34
Donovanosis	0	NN	0	0	NN	0	0	0	0	7	28	44
Gonococcal infection[6]	0	36	61	55	0	1	0	87	240	338	3,773	3,608
Hepatitis A	11	74	4	88	10	0	19	6	212	145	2,736	1,960
Hepatitis B incident	0	3	1	3	0	0	10	0	17	18	210	204
Hepatitis C incident	0	0	0	-	0	0	-	-	0	6	13	55
Hepatitis C unspecified	25	NN	24	230	NN	16	277	34	606	772	8,160	8,371
Hepatitis (NEC)	0	0	0	0	0	0	0	NN	0	0	13	15
Legionellosis	0	0	0	1	3	0	0	7	11	13	127	162
Leptospirosis	0	2	0	0	0	0	7	1	10	27	107	203
Listeriosis	0	0	0	1	1	0	0	0	2	5	65	60
Malaria	0	5	1	0	1	1	6	0	14	68	691	756
Meningococcal infection	1	15	3	9	2	1	9	7	47	49	436	377
Ornithosis	0	NN	0	0	0	0	0	0	0	2	41	66
Q Fever	0	15	0	20	4	0	0	0	39	39	512	470
Ross River virus infection	0	11	0	31	4	0	4	3	53	71	6,454	7,583
Salmonellosis (NEC)	8	126	28	124	34	12	74	30	436	421	5,966	4,938
Shigellosis[4]	1	-	9	22	9	0	8	8	57	32	700	558
Syphilis	1	22	22	36	0	0	0	4	85	103	1,079	1,325
Tuberculosis	0	12	2	8	2	1	29	2	56	84	847	930
Typhoid[7]	0	0	0	2	1	0	1	3	7	3	61	77
Yersiniosis (NEC)[4]	0	-	0	12	3	0	1	0	16	37	215	238

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. 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

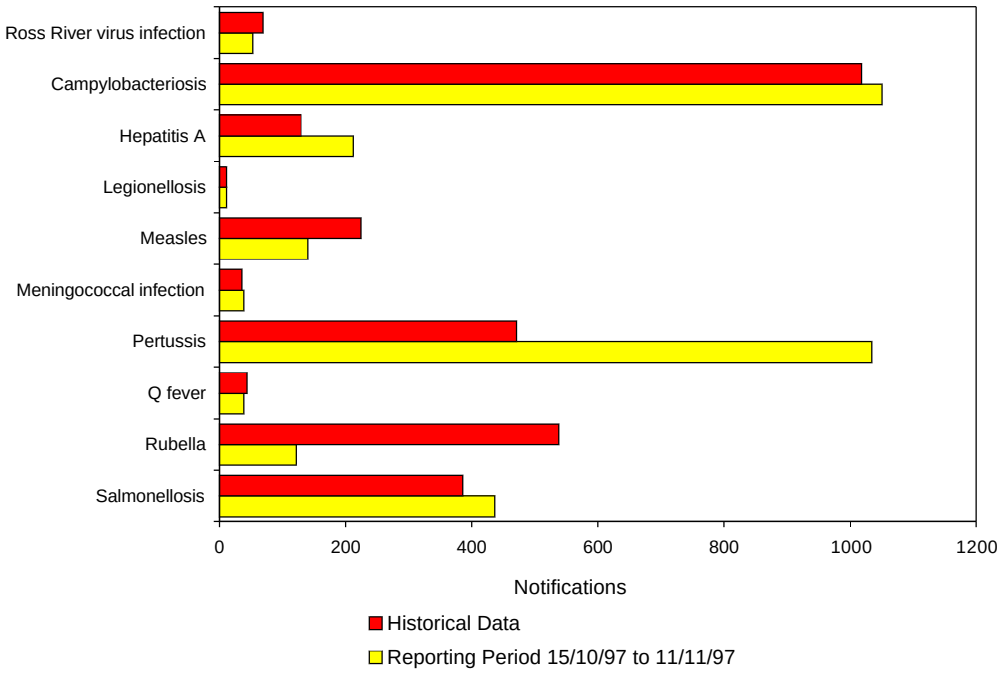
- Elsewhere Classified.

same period in 1996. Cases were reported from all jurisdictions.

The number of notifications received for pertussis has been sustained at a high level (Figure 7), 1,034 reports being received for the current four-week period. This is more than double the number received for the corresponding period last year, and is higher than for any four-week period since the inception of the NNDSS in its present form in 1991. The increased level of activity has been seen in all jurisdictions except the Northern Territory, but especially in New South Wales and Queensland, which account for 31% and 28% respectively of the 1,751 recorded cases with onset dates from the beginning of September. Of these recent cases, 25% have been in children 5-9 years of age, and 24% in children 10-14 years of age.

The 436 notifications received for salmonellosis comprised the highest four-weekly total since April. New South Wales, Queensland and Victoria accounted for 74% of the total reports. One hundred and sixty-one cases (36%) were in children under 5 years of age.

Figure 5. 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 preceeding and following those.

Table 3. Notifications of rare[1] diseases received by State and Territory health authorities in the period 15 October to 11 November 1997

Disease[2]	Total this period	Reporting States or Territories	Total notifications 1997
Brucellosis	2	Qld	33
Chancroid			1
Cholera	1	Vic	3
Hydatid infection	4	Qld, Vic	47
Leprosy			10

1. Fewer than 60 cases of each of these diseases were notified each year during the period 1988 to 1996.
2. No notifications have been received during 1997 for the following rare diseases: botulism, lymphogranuloma venereum, plague, rabies, yellow fever, or other viral haemorrhagic fevers.

Figure 6. Notifications of hepatitis A with onset in October and November 1997, by age group and sex

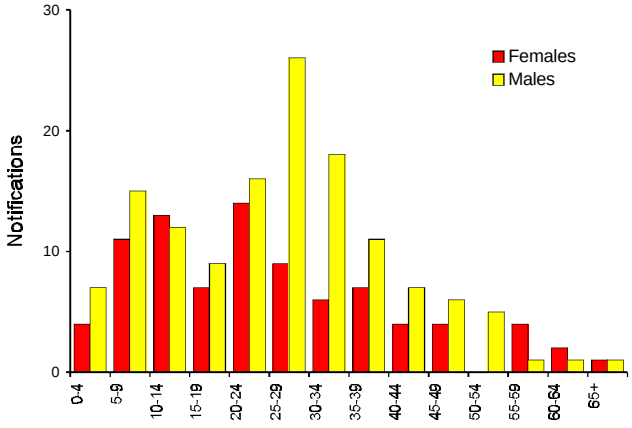
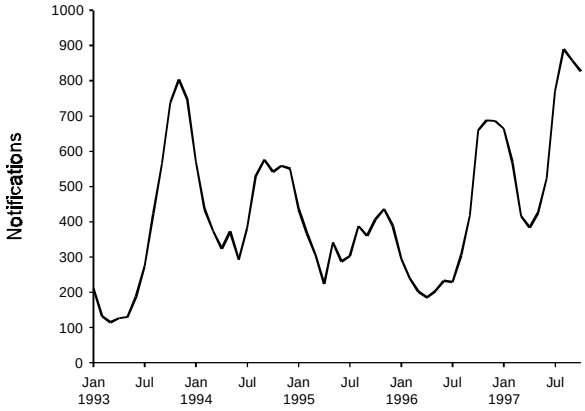


Figure 7. Notifications of pertussis, 1993-1997, by month of onset



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.

Table 4. New diagnoses of HIV infection, new diagnoses of AIDS and deaths following AIDS occurring in the period 1 July to 31 July 1997, by sex and State or Territory of diagnosis

										Totals for Australia			
		ACT	NSW	NT	Qld	SA	Tas	Vic	WA	This period 1997	This period 1996	Year to date 1997	Year to date 1996
HIV diagnoses	Female	0	2	0	2	1	0	1	0	6	10	40	47
	Male	0	29	0	10	1	0	15	3	58	64	394	469
	Sex not reported	0	3	0	1	0	0	0	0	4	1	16	4
	Total[1]	0	34	0	13	2	0	16	3	68	75	450	521
AIDS diagnoses	Female	0	0	0	2	0	0	0	0	2	6	15	20
	Male	0	2	0	1	3	0	2	0	8	51	122	379
	Total[1]	0	2	0	3	3	0	2	0	10	57	137	399
AIDS deaths	Female	0	0	0	0	0	0	0	0	0	1	6	14
	Male	0	7	0	2	0	0	1	2	12	45	101	296
	Total[1]	0	7	0	2	0	0	1	2	12	46	107	310

1. Persons whose sex was reported as transgender 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 1997, by sex and State or Territory

		ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Australia
HIV diagnoses	Female	21	493	6	112	47	4	187	77	947
	Male	180	10,551	91	1,769	617	78	3,601	823	17,710
	Sex not reported	0	2,058	0	1	0	0	28	0	2,087
	Total[1]	201	13,115	97	1,887	664	82	3,825	903	20,774
AIDS diagnoses	Female	7	152	0	39	19	2	59	23	301
	Male	80	4,166	28	722	311	40	1,483	329	7,159
	Total[1]	87	4,329	28	763	330	42	1,549	354	7,482
AIDS deaths	Female	2	109	0	27	14	2	40	14	208
	Male	52	2,949	22	506	208	26	1,163	238	5,164
	Total[1]	54	3,064	22	535	222	28	1,209	253	5,387

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

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) 9332 4648 Facsimile: (02) 9332 1837.

HIV and AIDS diagnoses and deaths following AIDS reported for July 1997, as reported to 31 October 1997, are included in this issue of *CDI* (Tables 4 and 5).

Australian Sentinel Practice Research Network

The Australian Sentinel Practice Research Network (ASPREN) currently comprises 107 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. Of these, CDI reports the consultation rates for chickenpox, gastroenteritis, HIV testing (doctor initiated), HIV testing (patient initiated), influenza, measles, pertussis, Ross River virus infection and rubella. For further information, including case definitions, see CDI 1997;21:6.

Data for weeks 42 to 45 ending 19 and 26 October, and 2 and 9 November are included in this issue of *CDI* (Table 6). During the current reporting period, the consultation rate for pertussis continued at a high level; in the last 10 weeks, the rate averaged more than double the consultation rates seen previously this year. The consultation rate for influenza-like illness declined to a very low level. The gastroenteritis consultation rate has remained at a low level since the beginning of June. The consultation rates for chickenpox were steady from June until the last 3 reporting weeks, during which there was an increase. Measles, rubella and Ross River virus infection

Table 6. Australian Sentinel Practice Research Network reports, weeks 42, 43, 44 and 45, 1997

Condition	*Week 42, to 19 October 1997* Reports	Rate per 1,000 encounters	*Week 43, to 26 October 1997* Reports	Rate per 1,000 encounters	*Week 44, to 2 November 1997* Reports	Rate per 1,000 encounters	*Week 45, to 9 November 1997* Reports	Rate per 1,000 encounters
Chickenpox	10	1.4	15	2.0	16	2.3	17	2.7
Gastroenteritis	102	14.7	77	10.0	77	11.0	71	11.3
HIV testing (doctor initiated)	6	0.9	3	0.4	6	0.9	3	0.5
HIV testing (patient initiated)	12	1.7	15	2.0	7	1.0	7	1.1
Influenza	19	2.7	33	4.3	25	3.6	6	1.0
Measles	0	0.0	0	0.0	0	0.0	0	0.0
Pertussis	4	0.6	4	0.5	3	0.4	5	0.8
Ross River virus infection	0	0.0	0	0.0	1	0.1	0	0.0
Rubella	3	0.4	3	0.4	2	0.3	4	0.6

consultation rates have remained low for several months. The consultation rates associated with HIV testing have remained at moderate levels throughout the year.

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 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 periodically. 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 January to 31 March 1997

The AGSP laboratories examined 678 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 March quarter of 1997.

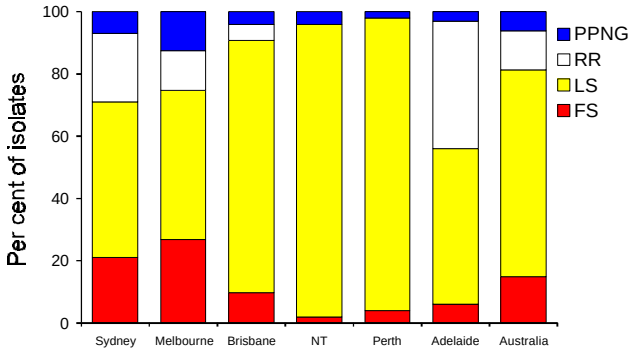
Penicillins

Resistance to this group of antibiotics (penicillin, ampicillin, amoxycillin) was present in a high proportion of isolates examined in Adelaide (44%), Sydney (29%), and Melbourne (25%). The proportion of penicillin-resistant strains was 9% in Brisbane, 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 (CMRNG), and the proportion of penicillinase-producing *Neisseria 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 42 PPNG identified in this reporting period (6.2% of all isolates). These were distributed widely with 16 PPNG reported from Melbourne, 15 from Sydney, 8 from Perth, 6 from Brisbane, 2 from the Northern Territory and Perth and a single PPNG from Adelaide. Whilst some infections with PPNG were acquired locally, most were acquired in South East Asian countries often visited by Australians.

Eighty-five (12.5%) of all isolates were resistant to the penicillins by separate chromosomal mechanisms. These CMRNG were most often reported from Sydney (47 strains, 22%), Melbourne (16 strains, 12.6%) and Adelaide

Figure 8. Penicillin resistance of *N. gonorrhoeae*, Australia, 1 January - 31 March 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*

(14 strains, 41%). No relatively resistant isolates were reported from 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-nine isolates (7.2%) throughout Australia had altered resistance to this group of antibiotics (QRNG) with 32 of these showing high level resistance. Twenty-eight QRNG (13%) were detected in Sydney, 9 in Melbourne (7.1%), 8 in Brisbane (5.2%), 3 in Perth, and a single QRNG was detected in Adelaide.

Two concerning trends emerged this quarter in relation to quinolone sensitivity of gonococcal isolates; firstly, the increase in rates of isolation of QRNG and secondly, the appearance of QRNG in locally acquired infections in Sydney and Melbourne. In the corresponding period of 1996, QRNG comprised 2.8% of all isolates and infections were all acquired overseas. The quinolone antibiotics are the oral agents most often used in centres where the penicillins are ineffective. If resistance to the quinolones continues to increase, options for successful treatment will be substantially reduced.

High level tetracycline resistance

Thirty-four tetracycline resistant *N.gonorrhoeae* (TRNG) were detected throughout Australia (5% of all strains) with isolates of this type again present in most centres. The highest proportion of TRNG was found in Perth where the 6 TRNG represented 6% of all isolates. TRNG were also prominent in Sydney (11 isolates, 5%), Melbourne (7 isolates, 5.5%) and Brisbane (8 isolates, 5.2%). There were 2 TRNG isolated in Darwin. Indonesia was the overseas source of acquisition most often identified. Local acquisition was also recorded.

LabVISE

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 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 1997;21:8-9.

There were 2,224 reports received in the *CDI* Virology and Serology Laboratory Reporting Scheme this four-week period (Tables 7 and 8).

The number of reports of rotavirus continued to decline after peaking in September (Figure 9); this is consistent with the characteristic annual trend. There were 259 reports received this period. The majority (68%) of reports were from New South Wales followed by South Australia (22%). The male to female ratio was 1.3:1, with 62% of reports for children in the 1-4 years age group, and 22% for infants in the 1-11 months age group.

Reports of *Mycoplasma pneumoniae* remained high (Figure 10). The number of reports for 1997 to date is higher than any yearly total since 1993. There were 158 reports received this reporting period. Forty-two per cent of reports were from Queensland followed by 31% from South Australia. The male to female ratio was 1:1.4, with 49% of reports for the 5-14 years age group and 20% of reports for the 25-44 years age group.

As expected for this time of year, reports of influenza virus continued to decline (Figure 11), after peaking in the winter months. There were 89 reports of influenza A virus this

Figure 9. Rotavirus laboratory reports, 1995 - 1997, by month of specimen collection

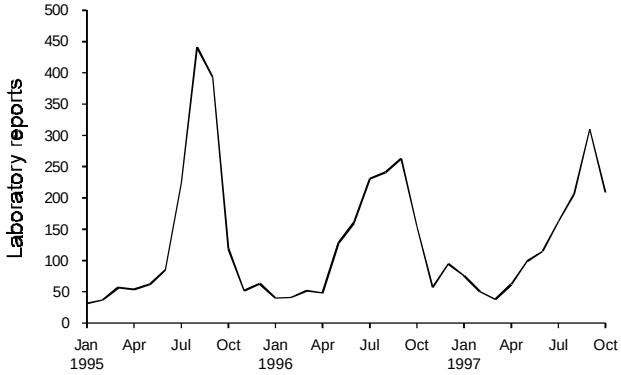


Figure 10. *Mycoplasma pneumoniae* laboratory reports, 1995 - 1997, by month of specimen collection

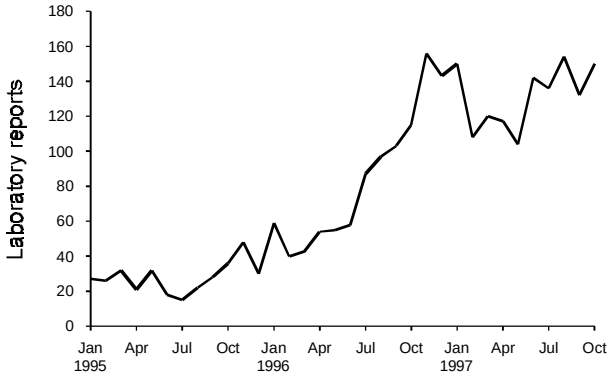


Figure 11. Influenza virus laboratory reports, 1997, by type and month of specimen collection

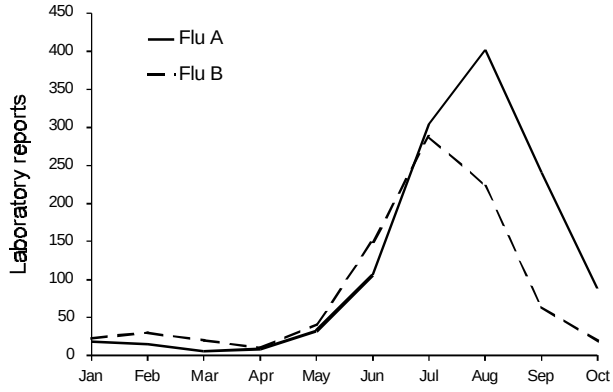


Table 7. Virology and serology laboratory reports by State or Territory[1] for the reporting period 9 October to 5 November 1997, and total reports for the year

	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			2			1	5	58
Mumps virus					1				1	42
Rubella virus		1		21	16		1		39	520
Hepatitis viruses										
Hepatitis A virus		1	4	13	6			6	30	658
Arboviruses										
Ross River virus			1	4	6			8	19	2,069
Barmah Forest virus				10				4	14	227
Dengue not typed								1	1	59
Flavivirus (unspecified)				1					1	23
Adenoviruses										
Adenovirus type 1					5				5	26
Adenovirus type 2					6				6	37
Adenovirus type 5					2				2	8
Adenovirus type 7					1				1	8
Adenovirus not typed/pending		24		1	47	5	3	5	85	933
Herpes viruses										
Cytomegalovirus		9		15	8	3	4	6	45	1,009
Varicella-zoster virus		16		35	22	2	1	18	94	1,225
Epstein-Barr virus		22	7	47	98	1	3	36	214	2,271
Other DNA viruses										
Parvovirus				6	3			4	13	315
Picorna virus family										
Coxsackievirus A9		1							1	9
Coxsackievirus B3		2							2	10
Poliovirus type 1 (uncharacterised)		1			1				2	7
Rhinovirus (all types)	2	4			8			5	19	560
Enterovirus not typed/pending		2	1	5				7	15	553
Ortho/paramyxoviruses										
Influenza A virus		1	2	3	73	1		9	89	1,333
Influenza B virus		1			19			2	22	911
Influenza virus - typing pending					40				40	471
Parainfluenza virus type 1		4			1			1	6	66
Parainfluenza virus type 3		53		6	27		5	41	132	1,067
Parainfluenza virus typing pending					23	2			25	254
Respiratory syncytial virus		140		5	161	3	14	29	352	4,634
Other RNA viruses										
HTLV-1								1	1	13
Rotavirus		177			58	1	12	11	259	1,499

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

Table 7. Virology and serology laboratory reports by State or Territory[1] for the reporting period 9 October to 5 November 1997, and total reports for the year, continued

	State or Territory[1]									
	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	Total this period	Total reported in *CDI* in 1997
Other										
Chlamydia trachomatis not typed	1	22	69	53	66	2	9	84	306	4,191
Chlamydia species type pending						7			7	7
Mycoplasma pneumoniae		13	1	67	49		11	17	158	1,627
Coxiella burnetii (Q fever)		1		14					15	284
Salmonella species								1	1	2
Bordetella pertussis		2		103			61	22	188	1,673
Legionella longbeachae					4			3	7	31
Cryptococcus species		2							2	20
TOTAL	3	501	85	409	753	27	124	322	2,224	28,710

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

period, mainly from South Australia (82%). The male to female ratio for influenza A virus was 1:1.0. Twenty-two reports of influenza B virus and 40 reports of influenza virus untyped were received, once again mainly from South Australia (86% and 100% of total reports respectively). The male to female ratios for influenza B virus and influenza virus untyped, were 1:1.4 and 1:1.2 respectively.

Table 8. Virology and serology laboratory reports by contributing laboratories for the reporting period 9 October to 5 November 1997

State or Territory	Laboratory	Reports
New South Wales	Institute of Clinical Pathology & Medical Research, Westmead	40
	New Children's Hospital, Westmead	63
	Royal North Shore Hospital, St Leonards	291
	Royal Prince Alfred Hospital, Camperdown	24
	South West Area Pathology, Liverpool	69
Queensland	Queensland Medical Laboratory, West End	436
South Australia	Institute of Medical and Veterinary Science, Adelaide	752
Tasmania	Northern Tasmanian Pathology Service, Launceston	4
	Royal Hobart Hospital, Hobart	23
Victoria	Microbiological Diagnostic Unit, University of Melbourne	6
	Royal Children's Hospital, Melbourne	116
Western Australia	PathCentre Virology, Perth	165
	Princess Margaret Hospital, Perth	68
	Western Diagnostic Pathology	167
TOTAL		2,224

Notices to Readers

Review of Human Quarantine Legislation

Call for Submissions

As part of the implementation of the Competition Principles Agreement, the National Centre for Disease Control is undertaking a review of Human Quarantine Legislation (provisions in the *Quarantine Act 1908* and subordinate legislation relating to Human Quarantine).

The Review Steering Committee is chaired by Dr Judith Whitworth, Commonwealth Chief Medical Officer and Director of Human Quarantine. It also includes representatives of Commonwealth agencies with a direct role or interest in Human Quarantine policy or administration, and a representative of the Chief Quarantine Officers network in the States and Territories. The Steering Committee is to report to the Minister for Health in early 1998.

The Steering Committee is seeking submissions to the Review from all interested stakeholders in industry, non-government and government sectors. A discussion paper outlining challenges inherent in contemporary Human Quarantine and communicable diseases regulation has been developed to provide a framework for submissions, and will be available shortly from the:

Project Officer
Human Quarantine Review Secretariat
National Centre for Disease Control
Department of Health and Family Services
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Communicable Diseases - Australia
Internet web site
'http://www.health.gov.au/hfs/pubs/cdi/cdihtml.htm'

The web site contains 4 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 disease outbreak information, updated as appropriate.
2. Overseas: overseas disease outbreak information, updated as appropriate.

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

Overseas briefs

Source: World Health Organization (WHO)

Leptospirosis, India

In 1997 leptospirosis has spread from the Valsad district south of Surat, where the disease has been reported for many years, to the Surat district. Cases were first reported in mid-July. As of 11 September, 281 cases with 34 deaths (case fatality rate, CFR 12%) had been reported in the Valsad district, and 132 cases with 14 deaths (CFR 11%) in the Surat district. Cases are still being reported.

Cholera

Kenya. About 2,500 cases of cholera have been admitted to hospitals in Nyanza Province. Of these 140 (5.6%) died. The first case was reported on 25 June.

Following the recommendations issued jointly by the Ministry of Health and the WHO, the government has allocated funds for the purchase of drugs and management activities. These activities aim at improving early case detection, case management in health care facilities, health education, surveillance through contact tracing and distribution of oral rehydration salts in the affected communities.

Mozambique. The Ministry of Health has reported 1,664 cases of cholera with 62 deaths (case fatality rate 3.7%) since the second week of August. The cases have mainly been reported from five quarters of Maputo city, all with very poor sanitary conditions and unsafe water, as well as other areas of Maputo Province. More recently, 47 suspected cases (10 confirmed) have been reported from Gaza Province. The poor condition of sanitation and water supply in other cities is increasing the risk of spread to other provinces. The circulating strain of *Vibrio cholerae* is resistant to the antibiotics available, so therapy has centered on rehydration.

Control activities instituted by the Ministry of Health include public education through the mass media and home visits, community based activities and the treatment of cases.

Plague, Malawi

The Ministry of Health has reported an outbreak of plague in the Nsanje district in the southern region. The first case was reported on 29 September in Madani Village, Ndamera Traditional Authority Area. Two other areas have also reported cases. A total of 43 cases (17 of which were seropositive) were reported up to 23 October. Over 60% of cases were children under 5 years of age. No deaths have been reported.

Current control measures include surveillance, spraying of houses, treatment and health education at the local level.

Absence of Lassa fever in Ghana

A suspected case of Lassa fever in a 37 year old male who arrived in Mainz, Germany on a Ghana Airways flight has since been ruled out. The case died in Mainz hospital. On 26 September the Mainz hospital authorities called a press conference and announced that tests conducted at the Tropical Disease Institute at the Bernhard Nocht Institute, Hamburg had excluded Lassa fever as the cause of death.

Monkeypox, Democratic Republic of the Congo

The WHO team investigating the outbreak of human monkeypox identified 419 suspected cases in October amounting to 511 suspected cases reported reported since February 1996.

Of the 419 suspect cases identified by the team in October 1997, 344 occurred in the Katako Kombe health zone and 75 in the Lodja health zone. Fourteen had active disease. Most cases were in children under 16 years of age. Five cases, aged between 4 and 8 years of age, died within three weeks of rash onset.

This outbreak represents the largest ever reported cluster of suspect cases spread over a large area of the Katako-Kombe and Lodja zones.

Transmission appears to have ceased at the original epicentre of the outbreak and the immediate surrounding villages. The more recently detected suspect human cases occurred in more geographically distant clusters, the majority with no apparent link to the original outbreak. These suspect cases of sporadic transmission may be due to independent introductions of virus into the human population through increased animal contact.

CDI is produced fortnightly 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. For subscriptions or change of address please fax (02) 6269 1212 or write to PO Box 462, Fyshwick ACT 2609.