Australian bat lyssavirus infection in three fruit bats from north Queensland

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Abstract

We report the case findings of Australian bat lyssavirus infection in two black flying foxes (*Pteropus alecto*) and one little red flying fox (*Pteropus scapulatus*) from north Queensland between January 1995 and August 1996. Although the *P. alecto* case in January 1995 is the first recognised case of Australian bat lyssavirus infection in Australia, this was a retrospective diagnosis made after identification of the index case at Ballina in May 1996. Eight persons had exposure to the three bats. Serum antibodies to classical rabies virus were measured in six of these persons; the only one seropositive was a veterinarian who had previously been vaccinated against rabies. Six persons received rabies vaccine following exposure. None of the in-contact humans developed signs of lyssavirus infection. For people exposed to Australian bat lyssavirus-positive bats who have not been scratched or bitten or had mucosal contamination by these bats, we suggest a post-exposure regime of five inoculations of the human diploid cell inactivated rabies vaccine. *Comm Dis Intell* 1997;21:117-120.

Introduction

Lyssavirus infection was first diagnosed in two black flying foxes (*Pteropus alecto*) from Ballina, New South Wales in 1996[1,2]. Both bats exhibited neurological signs and had mild to severe encephalitis[2]. The lyssavirus isolated was found to be significantly different from known genotypes in the *Lyssavirus* genus[2].

In early November 1996, a bat carer from Rockhampton died from a diffuse encephalitis. Australian bat lyssavirus was detected in her cerebrospinal fluid by polymerase chain reaction and her serum contained neutralising antibodies to classical rabies virus[3]. The woman had cared

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for fruit bats in the two to four weeks preceding her illness and had been scratched by them. She had also cared for an insectivorous bat six weeks prior to the onset of clinical signs and received a bite from the bat. The woman had also cared for a variety of native animals in the recent past.

We report three cases of fruit bats infected with Australian bat lyssavirus, and describe the public health actions associated with them.

Bat infections

Case 1 occurred in January 1995 and was an adult wild female black flying fox *(P. alecto*) found behaving aggressively in the back yard of a house in Townsville. Intracytoplasmic eosinophilic inclusions in neurones were detected in histological sections of brain. The bat also had histological and biochemical evidence of lead toxicosis.

Case 2 occurred in May 1996 and was an adult wild male black flying fox *(P. alecto*) with hind limb paresis, found under a tree in Charters Towers. The brain appeared histologically normal, but changes in other organs indicated a bacterial septicaemia.

Case 3 was a little red flying fox (*Pteropus scapulatus*) found in August 1996, with hind limb paresis and clonic muscle spasm, in a suburban garden in Townsville. A non-suppurative meningoencephalitis was present on histology.

Table. Details of exposure of persons to Australian bat lyssavirus-positive bats from north Queensland and subsequent vaccination histories

Person	Date of exposure	Date of vaccination	Vaccination regime	Delay[1]	Comments
Exposed to bat case 1					
Vet 1	Jan 1995	previously vaccinated	booster Nov 1996	na	Exposed at necropsy; neutralising antibodies prior to booster >2 IU/mL
Bat carer 1	Jan 1995	Dec 1996	pre-exposure	23 months	Retrospective diagnosis 21 months; no penetrating wounds; opted for pre-exposure regime
Bat carer 2	Jan 1995	Dec 1996	pre-exposure	23 months	Retrospective diagnosis 21 months; no penetrating wounds; opted for pre-exposure regime
Exposed to bat case 2					
Bat carer 3	May 1996	Dec 1996	post-exposure	6 months	Retrospective diagnosis three months; no penetrating wounds; opted for post-exposure regime after scratch from another bat
Vet 2	Aug 1996	Oct 1996	post-exposure	2.5 months	Iatrogenic wound during necropsy of bat frozen for three months; lack of knowledge about pathogenicity delayed vaccination
Vet 3	Aug 1996	Oct 1996	pre-exposure	2 months	Exposed at necropsy, but no obvious high risk exposure factors; opted for pre-exposure regime
Exposed to bat case 3					
Bat carer 1	Aug 1996	see above	see above		No penetrating wounds
Bat carer 2	Aug 1996	see above	see above		No penetrating wounds
Vet 4	Aug 1996	previously vaccinated	na	na	Exposed at necropsy; annual antirabies titre protective
Vet 5	Aug 1996	nil	na	na	Exposure in clinical setting; no penetrating wound

1. 'Delay' is the time from exposure to Australian bat lyssavirus-positive bat until vaccination.
na = not applicable

For all cases, samples of brain stored at -70°C were submitted to the CSIRO Australian Animal Health Laboratory (AAHL). Brain impression smears stained strongly for lyssavirus on the immunofluorescent antibody test (IFAT), and Australian bat lyssavirus was isolated.

Human contacts

At least eight people had close contact with the three fruit bats (Table). These included three bat carers and five veterinarians, four of whom performed post-mortem examinations on the bats. Time from contact with a particular bat to knowledge of the infection status of the bat ranged from two weeks to 21 months. None of the carers had sustained obvious penetrating wounds or scratches. One veterinarian (Vet 2) had cut a finger with a scalpel blade during the necropsy.

Neutralising antibodies to classical rabies virus were measured at AAHL for six of the eight persons after exposure. One veterinarian (Vet 4) had been vaccinated against rabies virus in 1989 and since then had had annual confirmation of a protective antirabies antibody titre. His antibody status was not measured on this occasion. Five of the six persons tested were negative, while one veterinarian (Vet 1) was strongly positive with a level >2.0 IU/mL. He had received a full course of three doses of human diploid cell rabies vaccine in 1985, with three additional boosters, the last in 1987, and the antibody response was considered to be due to vaccination. The veterinarian (Vet 2) who had been cut during the post-mortem had received no rabies vaccinations and had a negative titre against rabies virus ten weeks after the event.

Vet 2 received a post-exposure vaccination regime of five inoculations of human diploid cell inactivated rabies vaccine commencing two and a half months after the injury, while Vet 3 who assisted in the necropsy received a three-inoculation regime. Bat carer 3 received a standard five-inoculation post-exposure regime six months after caring for Case 2 after she was scratched by another bat with neurological signs. The latter bat was Australian bat lyssavirus-negative, but the regime was started before infection status was known. The other two carers received a three-dose regime 23 months after interacting with Case 1. These carers were also exposed to Case 3. A veterinarian who had clinical contact with Case 3 and had no antibodies to rabies virus has not received any rabies inoculations to date, six months after exposure. None of the human contacts of these bats has shown clinical signs of encephalomyelitis.

Discussion

Bat infections

Neurological signs were present in all three fruit bats from north Queensland infected with Australian bat lyssavirus. Fruit bats will exhibit aggressive behaviour in specific types of social interactions, but the aggression shown by Case 1 was excessive. Cases 2 and 3 had hind limb paresis and showed no aggression. The signs of lyssavirus disease in these cases are similar to those seen in classical rabies cases[4]. Paralysis was seen in two of our cases and paralytic rabies is a more common presentation than furious rabies in most species[4].

Case 1 predates the Australian bat lyssavirus infections in the black flying foxes from Ballina, the earliest of which was in March 1995[2]. Currently Case 1 is therefore the first known Australian bat lyssavirus infection in Australia.

Neither of the black flying foxes (*P. alecto)* from north Queensland (Cases 1 and 2) had an encephalitis, although brain smears from both reacted strongly to the IFAT for lyssavirus antigen. Case 1 had histological and biochemical signs of lead toxicosis, while Case 2 had a terminal septicaemia in addition to the Australian bat lyssavirus infection. Both of these cases illustrate that other diagnoses with the potential to cause neurological signs do not exclude the possibility of infection with Australian bat lyssavirus.

The occurrence of Australian bat lyssavirus infection in Case 3, the little red flying fox (*P. scapulatus*), is the first report of Australian bat lyssavirus in this species. The little red flying fox (Case 3) had an encephalitis similar to that of the black flying foxes (*P. alecto*) from Ballina, and it is thus the third report of a fruit bat in Australia with encephalitis caused by Australian bat lyssavirus.

Sick and dead bats that are presented to veterinarians in Townsville are now routinely necropsied, and specimens are sent to AAHL for testing for lyssavirus infection. Bat carer coordinators from Townsville report that in the past two years they have seen three other fruit bats which have exhibited abnormal aggressive behaviour prior to death. Two of these flying foxes chased and attacked other flying foxes. One of these aggressive flying foxes was seen at the same release cage as Case 1 and may have been bitten by Case 1 five weeks previously. Necropsies were not performed on these aggressive bats.

Human contacts

Two of the people who had contact with the three Australian bat lyssavirus infected bats received a post-exposure vaccination regime for rabies using the five-inoculation regime. Three of the remaining six chose to receive the three-inoculation pre-exposure regime, due to the lack of any penetrating wounds. This variation in management of humans exposed to lyssavirus-positive bats may reflect the lack of information available prior to the November 1996 guidelines of the Lyssavirus Expert Group. Two veterinarians had already been fully immunised against rabies, and both had protective levels of antibody.

The delays between potential exposure to Australian bat lyssavirus and post-exposure vaccination were due to several factors. Lyssavirus infection in two fruit bats was retrospectively diagnosed on archived specimens, leading to a delay in discovering the infection status of the bats. Lack of knowledge by individuals about the potential of Australian bat lyssavirus to cause disease in humans or animals other than bats resulted in poor motivation to seek vaccination. Results from pathogenicity studies on the Ballina isolate at the Centers for Disease Control and Prevention were not available until early November 1996, and the death of a human occurred after the cases described here. Prior to the meeting of the Lyssavirus Expert Group in November 1996[5], protocols concerning actions to be taken after exposure to Australian bat lyssavirus were not defined.

The Lyssavirus Expert Group noted that inapparent exposure to lyssavirus could occur[6]. The current guidelines do not offer any definite advice for people who have been exposed to a lyssavirus-positive bat, but who are not aware of receiving any penetrating wound or contamination of mucous membranes with secretions[5]. We suggest that such persons should receive the standard five-inoculation post-exposure regime using killed human diploid cell rabies vaccine.

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Salmonella in Victoria, 1997: the story so far

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Abstract

The Infectious Diseases Unit of the Department of Human Services, Victoria, reported an increased incidence of *Salmonella* infections in early 1997. To 21 April 1997, 944 notifications had been received, passing the previous year's total of 915. Five outbreaks of five separate serovars have been investigated and traced to their sources. The outbreaks, their sources and the control measures undertaken are described. Further clusters of other *Salmonella* serovars are being investigated. *Comm Dis Intell* 1997;21:120-122.

Introduction

The number of notified cases of *Salmonella* infections in Victoria has varied between 712 and 1,062 in the years 1991 to 1996. Notification rates per 100,000 population have been 23.7, 21.7 and 20.4 for 1994, 1995 and 1996 respectively. Notification rates to the National *Salmonella* Surveillance Scheme for the same three years were 21.7, 19.7 and 18.1 per 100,000 population. The Australian average notification rate in 1996 was 31.0 per 100,000 population.

To 21 April 1997, 944 notifications of *Salmonella* had been received in Victoria, passing the previous year's total of 915. A number of clusters were investigated.

Notable outbreaks which have been traced to a source in the past have included 47 cases of *Salmonella* Typhimurium 135 in 1991 associated with Italian-style ice cream (using uncooked eggs), and 54 cases of *Salmonella* Mbandaka in 1996 associated with peanut butter.

In late 1996, there was an outbreak of 36 cases of *Salmonella* Typhimurium RDNC A015 traced to a cafe in an outer suburban shopping centre. The implicated food in this outbreak was mayonnaise, which was made on the premises using raw eggs.

Methods

Investigations of *Salmonella* clusters begin with a weekly review of all notifications, including *Salmonella*, compared with historical data. Once it is identified that there is a cluster of cases of the same serovar, an outbreak investigation is commenced. A standard questionnaire is administered by telephone to all notified cases in the cluster by staff of the Infectious Diseases Unit of the Department of Human Services. The questionnaire asks about the person's food history in the three days prior to becoming ill, and about foods consumed as part of their routine diet. Premises nominated by cases where foods have been purchased are also recorded. The data are constantly reviewed for possible links, and food sampling either from cases' homes or from nominated premises is undertaken as appropriate.

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Outbreaks in 1997

***Salmonella* Muenchen**

Twenty-four cases of *Salmonella* Muenchen were notified to the Department of Human Services from mid-February to mid-March 1997. This is a relatively uncommon serovar, with three to seven cases notified per year in recent years. Dates of onset of illness varied from 21 January to 30 March 1997. We were also notified that seven cases had been reported in South Australia.

The ages of cases ranged from one year to 95 years. There were relatively few young children notified compared with the notification rates for all *Salmonella*. There were two deaths associated with this outbreak: a 79 year old male and an 86 year old female.

In their food histories, three cases mentioned a retail butcher in the northern suburbs of Melbourne. Among samples obtained from this butcher, sliced corned beef was positive for *Salmonella* Muenchen. The source of the corned beef was a smallgoods manufacturer in the northern suburbs. This supplier sold products directly from a retail shop, as well as distributing products to delicatessens and small supermarkets. A few customers then sold products to other outlets. Extensive samples and environmental swabs were obtained from the smallgoods supplier and a distribution list for outlets was obtained.

Of the 24 cases, 22 mentioned ham and/or corned beef either in their specific three day food history, or in the list of foods generally eaten. Of these, 15 cases were shown to have purchased sliced meats from premises on the distribution list. Samples and swabs from the smallgoods supplier were negative. However, the epidemiological evidence was such that a recall of the implicated product was considered necessary. A voluntary recall of corned beef and two types of ham, with a public announcement to discard these products if the source was unknown, was undertaken on 21 March 1997. Preparation of these products involved handling and repackaging after cooking, and therefore provided the potential for post-cooking contamination.

Since the recall, *Salmonella* Muenchen has also been isolated from unopened packages of corned beef from the factory, both in Victoria and South Australia.

***Salmonella* Typhimurium 1**

On 23 March 1997, the Department of Human Services was notified of large numbers of patients seeking treatment for gastroenteritis at two hospitals in the south-eastern suburbs of Melbourne. Many cases had eaten Vietnamese pork rolls from a particular hot bread shop in the area.

The Department of Human Services received 808 reports. Of these, 598 were reported from hospital emergency departments, and 79 cases required hospitalisation. To 21 April 1997, 415 isolations of *Salmonella* Typhimurium 1 had been officially notified to the department since the weekend of the outbreak. No deaths were reported in conjunction with this outbreak.

The hot bread shop identified as the source was closed on the evening of the day on which the outbreak was notified, and remains closed indefinitely. Seven hundred and seventy-four of the cases had a definite association with eating Vietnamese rolls. Three other premises which sold the rolls from the hot bread shop had cases associated with them.

***Salmonella* Anatum**

Nineteen cases of *Salmonella* Anatum were notified to the Department of Human Services in March 1997. The age range of the cases was one to 74 years. Cases were scattered through the suburbs of Melbourne, and four cases were from two towns in north-eastern Victoria. None of the cases required hospitalisation, although one case acquired her infection while in hospital for an unrelated complaint. Dates of onset varied from 1 February to 13 March. Seventeen of the 19 cases mentioned consumption of ham in their specific three day food history; all 19 reported consumption of ham in their routine diet. Fourteen of the 19 also mentioned consumption of corned beef. Sampling of smallgoods from a delicatessen nominated by three of the cases revealed *Salmonella* Anatum in unopened corned beef and two types of ham. A recall of the affected products was commenced on 2 April.

Six further cases have been notified since the recall was announced. Dates of onset are available for four of these cases; all were prior to the announcement of the recall.

***Salmonella* Chester**

Five cases of *Salmonella* Chester infection occurred in the southern bayside suburbs of Melbourne in February - March 1997. One case required hospitalisation. Four of the five cases revealed a link with a delicatessen in a large local supermarket. The delicatessen was closed for cleaning and sanitising. Food and environmental samples and faecal specimens from staff were collected. Two further cases have been notified since the second cluster, but neither has links with the delicatessen.

Investigations into this outbreak are continuing and the delicatessen remains closed. A more complete description of this outbreak will be reported separately.

***Salmonella* Typhimurium 43**

Seven cases of this serovar occurred in March 1997, with three of the cases being from one family. The seventh case was a notification from the State coroner. The organism was isolated from the bowel of a 27 year old man at post mortem. This man had a four day history of moderate gastroenteritis. He had visited his general practitioner on two occasions in the several days prior to being found dead at home. The cause of death as reported by the coroner was indeterminate, as there was no evidence that the *Salmonella* infection was the cause.

Five of the cases had a definite history of having eaten at a Vietnamese/Chinese restaurant in the south-eastern suburbs of Melbourne. The deceased man had recently been employed at a fish shop two doors away from this restaurant. The owners of the fish shop used to regularly order food for their employees, or send them to this restaurant for lunch. No one could definitely confirm whether this man had eaten food from the restaurant before becoming ill, but this seems likely to have occurred. The seventh case reported no association with the restaurant. The shop was closed for

cleaning and sanitising, and faecal tests on staff were carried out.

Conclusions

Detailed investigation of *Salmonella* clusters by a team of public health officers has shown that successful results can be obtained, even when the source of an outbreak is an unlabelled, distributed product, as was the case with the two outbreaks involving smallgoods. The time taken to find the source in these two outbreaks contrasts with the ease of finding a cause in the case of a point source outbreak with a very high attack rate.

The high incidence of *Salmonella* in Victoria in 1997 may be due to a higher load of organisms being present in meat coming from abattoirs. This has been combined with gross errors of food handling in some cases, and minor errors in others. Undoubtedly, mishandling by consumers has also contributed to the increased incidence. The majority of these outbreaks occurred during and shortly after the hottest summer ever recorded in Melbourne.

The high success rate in tracking the sources of outbreaks, and the associated publicity, probably led to more testing and more reporting of outbreaks which may previously have gone unreported. A lowered threshold of suspicion has led to investigation of small clusters with successful results, as with *Salmonella* Typhimurium 43. All such successes add to our knowledge of the epidemiology of this type of food-borne disease, and add to prospects for prevention.

Acknowledgments

We wish to thank Geoff Hogg, Agnes Tan, Diane Lightfoot and all the staff of the Microbiological Diagnostic Unit for their enormous contribution to these investigations. The volume of work undertaken, and the advice freely given at all hours, has been much appreciated by the Department of Human Services team. Similarly, the work of Tony Harrison and the department's Food and Water Unit has been greatly valued. The support of the senior management of the Public Health Branch, especially Geoff Lavender and William Hart, has been invaluable. The rapid and professional response provided by regional environmental health officers and local government teams involved in these outbreaks has made the task much easier. Finally, thanks go to those hospitals and general practitioners who have been diligent in notifying us promptly, and for providing follow-up information where requested.

Meningococcal infection

Neisseria meningitidis is the most common cause of bacterial meningitis in Australia. Between 5% and 10% of the population asymptomatically carry *Neisseria meningitidis* in the nasopharynx. In a small proportion of these individuals infection progresses to an acute invasive disease such as septicaemia, meningitis or pneumonia.

Neisseria meningitidis is spread by direct contact with an infected person through respiratory droplets from the nose and throat. The incubation period is 3 to 4 days. Symptoms and signs may include fever, headache, nausea, stiff neck and petechial rash.

There are 13 different serogroups of *Neisseria meningitidis.* Of these, three, serogroups A, B and C, account for 90% of invasive infections. While serogroup A organisms are rarely isolated in Australia, outbreaks have been reported in Aboriginal communities in central Australia. Serogroup B organisms account for most cases of sporadic disease in Australia. However the isolation of serogroup C organisms has increased in recent years.

From 1994 to 1996 the Australian Meningococcal Surveillance Program of the National Neisseria Network tested 750 islolates of *Neisseria meningitidis* associated with invasive disease. Of these, approximately 95% were serogroups B and C. Serogroup B predominated nationally and in most States and Territories, with the exception of 1994 when serogroup C was more prominent in New South Wales, Tasmania and South Australia. Group C was also more prevalent in the Northern Territory in 1994 and 1995.

Vaccines containing groups A, C, Y and W135 are available in Australia, and can be used in the control of outbreaks due to these serogroups. However, they do not protect against the more commonly isolated group B organisms. Outbreaks of any serogroup can be controlled by the prophylactic use of rifampicin or other suitable antibiotics. These reduce or eliminate the carriage of the organism in the nasopharynx. Close contacts, including household contacts, those in nurseries and those exposed to oral secretions (for example, by kissing) should receive chemoprophylaxis.

Meningococcal infection is a notifiable disease in all States and Territories. The notification rate recorded by the National Notifiable Diseases Surveillance Scheme rose from 1.6 cases per 100,000 population in 1991 to 2.1 per 100,000 population in 1995. The number of reports has risen in recent months but remains similar to previous years (Figure 1). Meningococcal infection is most commonly reported for those in the 0 - 4 years age group, with a further peak for those aged 15 - 24 years (Figure 2).

Figure 1. Notifications of meningococcal infection, 1993 to 1995, by month of onset

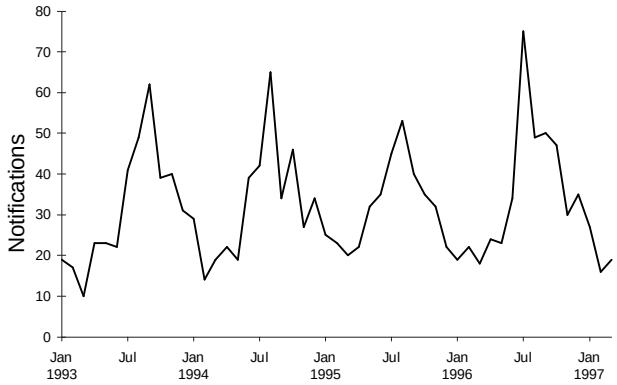
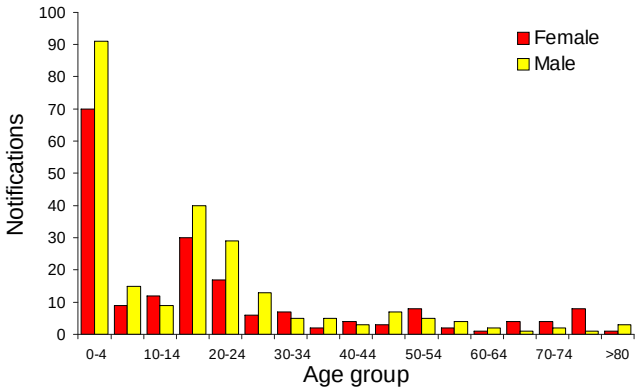


Figure 2. Notifications of meningococcal infection, 1996, by age group and sex



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.

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 2 to 15 April 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	0	0	0	0	0	0	0	0	0	17	17
Measles	0	1	0	2	0	1	2	1	7	10	132	147
Mumps	0	1	0	NN	1	0	7	1	10	6	56	39
Pertussis	3	68	1	20	29	6	65	20	212	69	2513	1008
Rubella	1	1	0	21	1	0	8	4	36	63	473	933
Tetanus	0	0	0	0	0	0	0	0	0	0	2	1

NN Not Notifiable.

1. No notifications of poliomyelitis have been reported since 1986.
2. Totals comprise data from all States and Territories. Cumulative figures are subject to retrospective revision, so there may be discrepancies between the number of new notifications and the increment in the cumulative figure from the previous period.

Table 2. Notifications of other diseases received by State and Territory health authorities in the period 2 to 15 April 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)[3,4]	0	0	10	1	0	0	7	7	25	11	119	54
Barmah Forest virus infection	0	15	0	18	1	0	2	-	36	49	235	348
Campylobacteriosis[5]	14	-	18	115	89	10	54	28	328	304	3419	3507
Chlamydial infection (NEC)[6]	10	NN	38	155	0	10	76	44	333	201	2401	2010
Dengue	0	1	0	68	0	-	0	0	69	1	169	17
Donovanosis	0	NN	0	1	NN	0	0	0	1	0	9	17
Gonococcal infection[7]	1	18	62	69	0	1	16	32	199	127	1229	1054
Hepatitis A	1	29	9	20	1	0	7	2	69	71	1252	782
Hepatitis B incident	0	0	0	3	0	0	1	5	9	7	95	67
Hepatitis C incident	1	1	0	-	0	0	-	-	2	0	3	11
Hepatitis C unspecified	6	NN	17	87	NN	17	16	22	165	274	2330	2646
Hepatitis (NEC)	0	0	0	0	0	0	2	NN	2	0	7	8
Legionellosis	0	1	0	1	2	0	3	3	10	6	51	57
Leptospirosis	0	2	0	3	0	1	1	0	7	7	38	69
Listeriosis	0	0	0	1	0	0	2	7	10	3	34	16
Malaria	0	8	9	14	1	0	2	1	35	39	199	224
Meningococcal infection	0	7	1	4	2	0	7	0	21	8	88	72
Ornithosis	0	NN	0	0	0	0	0	0	0	6	22	25
Q Fever	0	7	0	14	1	0	1	1	24	15	164	136
Ross River virus infection	0	66	30	322	134	2	70	69	693	679	3609	5222
Salmonellosis (NEC)	4	78	24	104	26	6	502	45	789	199	3057	2128
Shigellosis[5]	0	-	11	15	8	0	1	2	37	18	295	207
Syphilis	0	25	8	18	0	2	0	0	53	59	365	438
Tuberculosis	0	10	1	4	0	4	10	2	31	31	279	343
Typhoid[8]	0	3	0	0	0	0	1	1	5	4	28	45
Yersiniosis (NEC)[5]	0	-	0	6	1	0	0	0	7	4	111	88

1. For HIV and AIDS, see *CDI* 1997;21:97. 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 2 to 15 April 1997

Disease[2]	Total this period	Reporting States or Territories	Total notifications 1997
Brucellosis			12
Chancroid			1
Cholera			1
Hydatid infection	1	Tas	7
Leprosy	2	Qld	6

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 4. Notifications of shigellosis, 1994 to 1997, by month of onset

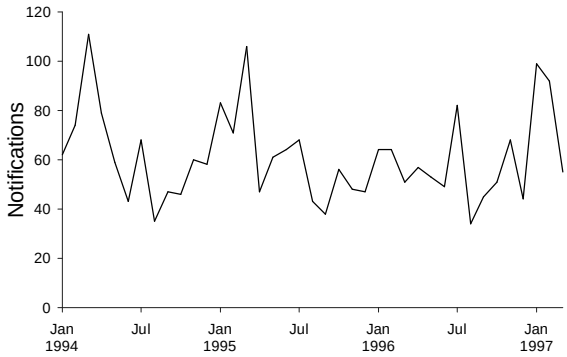
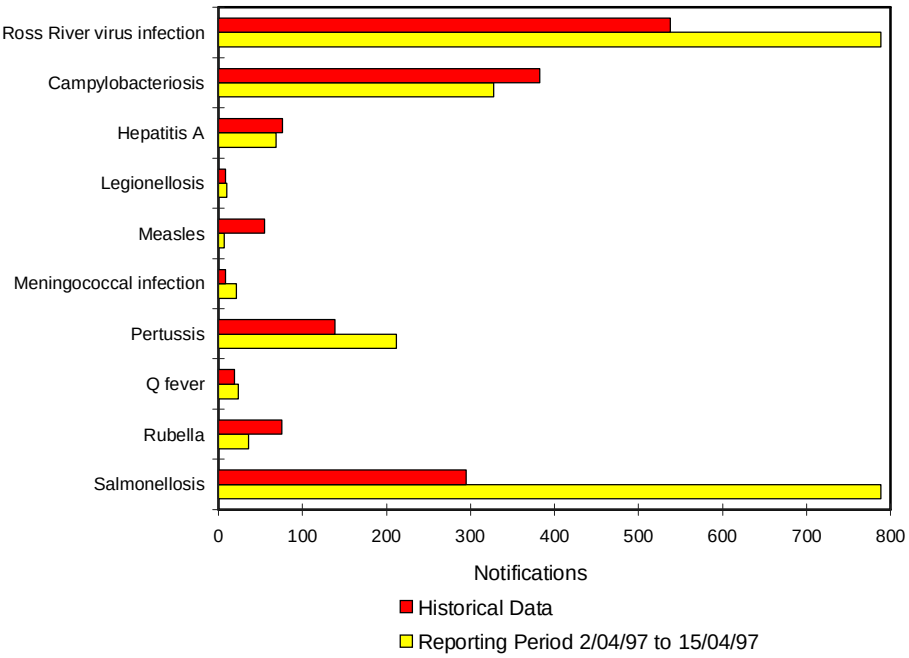


Figure 3. Selected National Notifiable Diseases Surveillance System reports, and historical data[1]



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.

Reporting period 2 to 15 April 1997

There were 3,413 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 corresponding periods in the previous three years (Figure 3).

Reports of Ross River virus infection continued to rise, with 693 notifications received this period. The majority of notifications were from Queensland (322) and South Australia (134). Fifty per cent of reports were for the 25 - 44 years age range. The total numbers received for this year are still below the levels reported for the same period in 1996.

Notifications of salmonellosis have increased markedly in recent weeks and reports received so far in 1997 are above the numbers for the same period in 1996. The highest number of cases for this period was reported from Victoria (502), with the majority having dates of onset during March. Recent outbreaks detected in Victoria (see page 120) have contributed to the high number of notifications.

Thirty-seven reports of shigellosis were received this period. The number of notifications in 1997 is higher than the number for the same period in 1996, but the trend is consistent with the higher incidence seen in spring and summer in recent years (Figure 4). In 1997, the highest number of reports has been in the 0 - 4 years (104), 5 - 9 years (37) and 25 - 29 years (25) age groups.

Figure 5. Sentinel general practitioner influenza consultation rates, 1997, by week and scheme

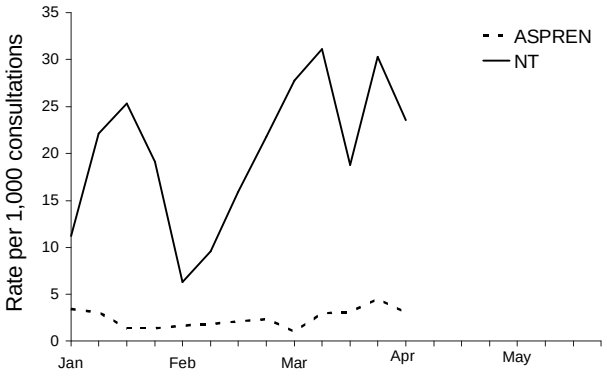
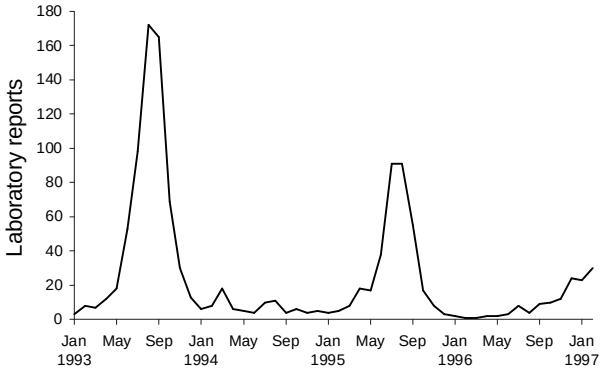


Figure 6. Influenza B laboratory reports, 1997, by week



National Influenza Surveillance, 1997

Australian Sentinel Practice Research Network; Communicable Diseases Intelligence Virology and Serology Laboratory Reporting Scheme Contributing Laboratories, New South Wales Department of Health; Victorian Department of Health; World Health Organization Collaborating Centre for Influenza Reference and Research.

Three types of data are included in National Influenza Surveillance, 1997. These include Sentinel General Practitioner Surveillance, Laboratory Surveillance and Absenteeism Surveillance. These are described below.

Sentinel General Practitioner Surveillance

Data will be included from four sources this season: ASPREN (the Australian Sentinel Practice Research Network); the Department of Health and Community Services, Victoria; the Department of Health, New South Wales; and Tropical Influenza Surveillance of the Department of Health and Community Services, Northern Territory.

The ASPREN consultation rate for influenza-like illness has remained below 5% so far for 1997, which is usual for the time of year (Figure 5). However, Tropical Influenza Surveillance in the Northern Territory recorded a peak in the consultation rate in mid-January, and after falling in early February has risen again in recent weeks.

No data are available from Victoria and New South Wales this fortnight.

Laboratory Surveillance

Laboratory surveillance data from the Communicable Diseases Intelligence Virology and Serology Laboratory Reporting Scheme will be included in National Influenza Surveillance, 1997. The World Health Organization Collaborating Centre for Influenza Reference and Research will also contribute information on strains isolated.

This fortnight 9 reports of influenza A were received. Thirty-five reports have been received for the year to date, which is similar to previous years.

Nineteen reports of influenza B have been received this fortnight, bringing the total number of reports for the year to date to 70. This is the highest number recorded by this scheme for the time of year (Figure 6). The male:female ratio was 1.1:1 and 30% of reports were for children under the age of 5 years.

Absenteeism Surveillance

National absenteeism data will continue to be supplied by Australia Post and included in National Influenza Surveillance, 1997.

The national absenteesim rate has remained stable throughout February and March at approximately 2.5%.

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 rates for chickenpox, HIV testing (doctor initiated), HIV testing (patient initiated), influenza, measles, pertussis, Ross River virus infection, rubella and gastroenteritis. For further information including case definitions see CDI 1997;21:6.

Data for weeks 14 and 15 ending 6 and 13 April respectively are included in this issue of *CDI* (Table 4). The consultation rate for gastroenteritis has continued to decline during the last 3 months. The rate for chickenpox has declined from the higher consultation rate reported during the summer, to a rate comparable with the 1996 autumn period (Figure 7). Patient-initiated HIV testing has shown a significantly reduced consultation rate over the last 4 reporting weeks to little more than half the rate experienced during the previous 10 weeks; consultation

Table 4. Australian Sentinel Practice Research Network reports, weeks 14 and 15, 1997

Condition	*Week 14, to 6 April 1997*		*Week 15, to 13 April 1997*	
	Reports	Rate per 1,000 encounters	Reports	Rate per 1,000 encounters
Chickenpox	15	2.3	9	1.3
Gastroenteritis	71	10.9	64	9.3
HIV testing (doctor initiated)	6	0.9	8	1.2
HIV testing (patient initiated)	10	1.5	7	1.0
Influenza	26	4.0	27	3.9
Measles	0	0.0	0	0.0
Pertussis	1	0.2	2	0.3
Ross River virus infection	4	0.6	1	0.1
Rubella	1	0.2	0	0.0

rates for doctor-initiated testing have not varied appreciably. Consultation rates for Ross River virus infection have remained low during 1997. The numbers of reported cases of measles, rubella and pertussis have remained low.

Sentinel Chicken Surveillance Programme

Annette Broom, Brenda Van Heuzen and Suzan Caulfield, Department of Microbiology, The University of Western Australia, QEII Medical Centre, Nedlands Western Australia 6009

There have been a number of seroconversions to Murray Valley encephalitis and Kunjin viruses in the sentinel chicken flocks in the north of Western Australia during the 1997 wet season. A summary of the number of confirmed positives recorded from the Kimberley and Pilbara flocks in March and early April 1997 is presented in Table 5.

There are still a number of possible seroconversions from both regions waiting to be confirmed. To date, there have been no cases of Australian encephalitis reported from the Kimberley or Pilbara regions.

Figure 7. ASPREN consultation rate for chickenpox, 1996 to 1997, by week

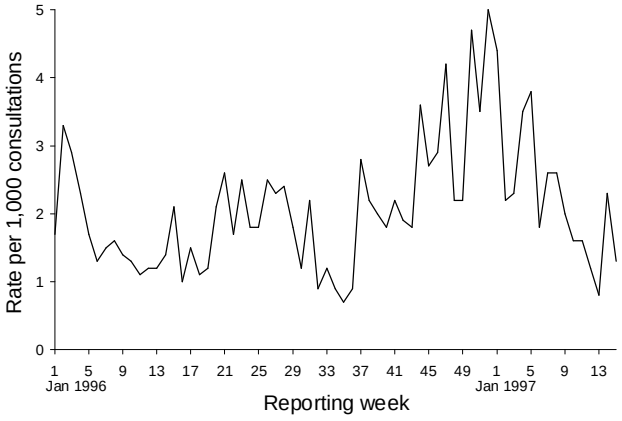


Table 5. Sentinel Chicken Surveillance Programme seroconversions, Western Australia, March and April 1997

	March			April			
	MVE	Kunjin	MVE and Kunjin	MVE	Kunjin	MVE and Kunjin	Total
Kimberley							
Kununurra	3			1		5	9
Derby (town)	2	1					3
Broome	2		1				3
Pilbara							
Harding Dam (Karratha)				6	1		7
Tom Price				2		1	3
Paraburdoo						1	1
Ophthalmia (Newman)	1	1	1	2		1	6
Whaleback Mine (Newman)					1	2	3

Figure 8. Respiratory syncytial virus laboratory reports, 1995 to 1997, by month of specimen collection

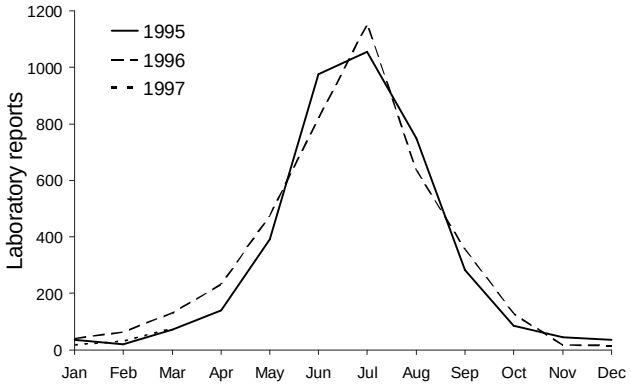


Figure 9. *Mycoplasma pneumoniae* laboratory reports, 1994 to 1997, by month of specimen collection

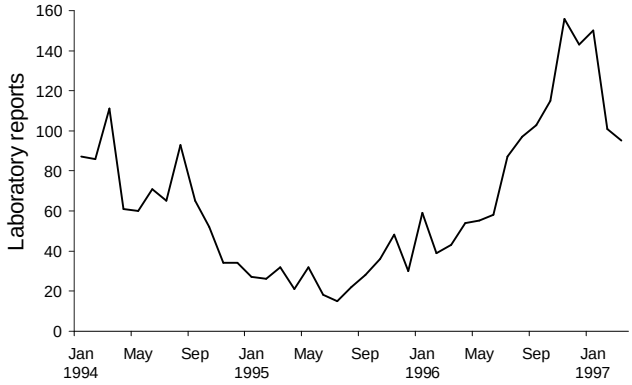
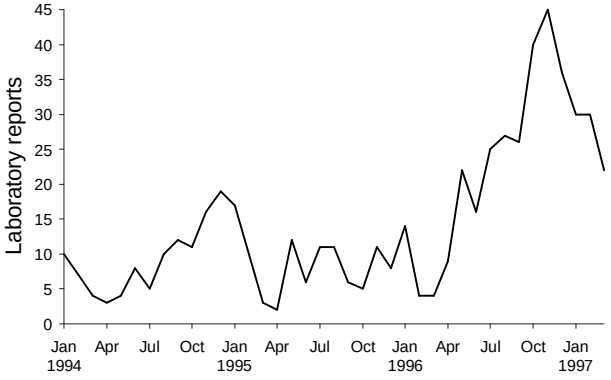


Figure 10. Parvovirus laboratory reports, 1994 to 1997, by month of specimen collection



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 1,058 reports received in the *CDI* Virology and Serology Laboratory Reporting Scheme this period (Tables 6 and 7). The largest number of reports (264) was of Ross River virus infection. Diagnosis was by IgM detection (249), four-fold rise in titre (14) and single high titre (1). Reports of Ross River virus infection are continuing to increase as reported in *CDI* 1997; 21:107-108.

Reports of respiratory syncytial virus infection are also increasing as expected (Figure 8). There were 52 reports received this fortnight, with diagnosis by antigen detection (28), virus isolation (22) and single high titre (1). One report did not indicate the method of diagnosis.

Laboratory reports of *Mycoplasma pneumoniae* are continuing to decline but are well above those received in corresponding periods over the last two years (Figure 9). There were 54 reports received in the last fortnight, with diagnosis by IgM detection (35), single high titre (11), total antibody (6) and four-fold rise in titre (2).

A similar pattern is evident in the number of laboratory reports of parvovirus (Figure 10). Although the number of reports of parvovirus is declining, the number reported for March is the highest recorded for that month in the previous five years.

Table 6. Virology and serology laboratory reports by State or Territory[1] for the reporting period 27 March to 9 April 1997, historical data[2], and total reports for the year

	State or Territory[1]							Total this fortnight	Historical data [2]	Total reported in *CDI* in 1997
	NSW	NT	Qld	SA	Tas	Vic	WA			
Measles, mumps, rubella										
Mumps virus			2			1		3	1.5	15
Rubella virus	1		1	1			4	7	7.2	339
Hepatitis viruses										
Hepatitis A virus	2	5	1	1		4	8	21	10.5	351
Arboviruses										
Ross River virus		4	75	78	1	26	80	264	103.3	1,251
Barmah Forest virus	1	3	3				7	14	2.8	113
Sindbis virus							1	1	0.0	1
Dengue not typed							1	1	0.7	37
Kunjin virus							1	1	0.3	3
Flavivirus (unspecified)			3			2		5	3.0	13
Adenoviruses										
Adenovirus type 3					1	1		2	2.5	13
Adenovirus not typed/pending	5		5	11	1	18	1	41	41.5	348
Herpes viruses										
Herpes virus type 6				1				1	0.0	3
Cytomegalovirus	1		3	8		13	8	33	57.3	425
Varicella-zoster virus	1		4	7	1	17	9	39	35.0	553
Epstein-Barr virus	13	2	5	20		7	22	69	43.0	1,111
Other DNA viruses										
Parvovirus	1			2		17	2	22	1.5	156
Picornavirus family										
Coxsackievirus B3						1		1	0.8	3
Poliovirus type 2 (uncharacterised)				1				1	0.2	6
Rhinovirus (all types)	3			1		5	8	17	28.2	237
Enterovirus not typed/pending			6				19	25	36.5	256
Ortho/paramyxoviruses										
Influenza A virus			9					9	8.7	145
Influenza B virus			11			5	3	19	1.5	112
Influenza virus - typing pending				22				22	0.0	105
Parainfluenza virus type 1				2		1		3	14.5	37
Parainfluenza virus type 2			1			5		6	12.3	25
Parainfluenza virus type 3	6		1	1		4		12	15.7	334
Parainfluenza virus typing pending				26				26	0.8	135
Respiratory syncytial virus	24		1	3	1	20	3	52	69.3	306
Other RNA viruses										
HTLV-1		1						1	0.2	8
Rotavirus	5			3		13	13	34	21.2	314
Astrovirus						2		2	0.2	5
Norwalk agent						11		11	1.2	49
Small virus (like) particle						1		1	0.2	2

Table 6. Virology and serology laboratory reports by State or Territory[1] for the reporting period 27 March to 9 April 1997, historical data[2], and total reports for the year, continued

	State or Territory[1]							Total this fortnight	Historical data [2]	Total reported in *CDI* in 1997
	NSW	NT	Qld	SA	Tas	Vic	WA			
Other										
Chlamydia trachomatis not typed	3	40	11	20	1	8	62	145	75.7	1,768
Chlamydia psittaci						2		2	4.0	33
Mycoplasma pneumoniae	22	2	8	2		13	7	54	13.2	662
Coxiella burnetii (Q fever)	3		5				3	11	3.8	106
Rickettsia australis						1		1	0.3	10
Rickettsia tsutsugamushi			2					2	0.0	4
Bordetella pertussis						68	4	72	21.0	875
Legionella pneumophila			1					1	0.5	3
Cryptococcus species						1		1	0.7	5
Leptospira hardjo			2					2	0.8	10
Leptospira australis			1					1	0.5	2
TOTAL	91	57	161	210	6	267	266	1,058	642.0	10,289

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 7. Virology and serology laboratory reports by contributing laboratories for the reporting period 27 March to 9 April 1997

State or Territory	Laboratory	Reports
New South Wales	Institute of Clinical Pathology & Medical Research, Westmead	40
	The New Children's Hospital, Westmead	20
	South West Area Pathology Service, Liverpool	26
Queensland	Queensland Medical Laboratory, West End	34
	State Health Laboratory, Brisbane	127
South Australia	Institute of Medical and Veterinary Science, Adelaide	208
Tasmania	Royal Hobart Hospital, Hobart	4
Victoria	Microbiological Diagnostic Unit, University of Melbourne	8
	Monash Medical Centre, Melbourne	20
	Royal Children's Hospital, Melbourne	133
	Victorian Infectious Diseases Reference Laboratory, Fairfiel	114
Western Australia	PathCentre Virology, Perth	179
	Princess Margaret Hospital, Perth	22
	Western Diagnostic Pathology	123
TOTAL		1,058

Overseas briefs

Source: World Health Organization (WHO)

Cholera

Somalia. Outbreaks of acute diarrhoea and cholera have continued to occur in various parts of Somalia since late 1996. Cholera has been confirmed and continues to be reported in Mogadishu and Merca and new outbreaks have been reported in Lower Shabelle region. The total number of cholera cases (including suspect cases) reported since the first case on 30 November 1996 is 1,535, with 47 deaths.

The number of cases in Mogadishu North has almost tripled in the last weeks following recent heavy rainfalls. Although the treatment centre there is coping well with the increased cases, medical supplies are running short and WHO is trying to purchase these elsewhere. ECHO (European Community for Humanitarian Action) is also providing support and sending supplies. A WHO consultant who was in Mogadishu to study cholera transmission and assist in setting up a cholera committee will now extend his stay to help deal with the increasing number of cases. However, in recently affected rural areas coordination of control activities is difficult.

Based on trends of cholera outbreaks in previous years, a decline in numbers is expected in the next six to eight weeks. The remote areas affected continue to be difficult to reach. Cholera task forces are meeting regularly to review the situation.

Zaire. A confirmed cholera outbreak has been reported in Kasese refugee camp near Kinsangani in Haut-Zaire Province. A WHO team in Kinsangani together with teams from Médecins sans Frontières and UNICEF are currently assisting in the implementation of control measures for this outbreak.

Since the beginning of 1997 suspected cholera outbreaks have been reported in several regions of Zaire, particularly Kinshasa and Equateur Provinces. Cholera treatment kits have been sent to Kinshasa and a WHO consultant is visiting the area affected.

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Contributions covering any aspects of communicable disease are invited. Instructions to authors can be found in *CDI* 1997;21:9.

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