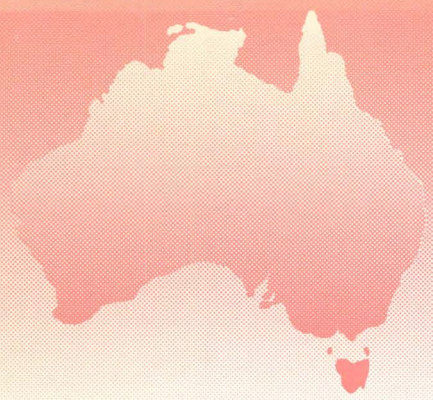


COMMUNICABLE DISEASES INTELLIGENCE

ISSN 0725-3141 VOLUME 17 NUMBER 15 26 July 1993

CONTENTS

CDI is produced fortnightly by:
AIDS/Communicable Diseases Branch
Department of Health, Housing, Local Government and Community Services
GPO Box 9848 Canberra ACT 2601
Fax: (06) 289 7791 Telephone: (06) 289 1555

DEPARTMENT OF HEALTH, HOUSING, LOCAL GOVERNMENT AND COMMUNITY SERVICES

COMMUNICABLE DISEASES NETWORK-AUSTRALIA
A National Network for Communicable Diseases Surveillance

DENGUE SEROTYPE 2 EPIDEMIC, TOWNSVILLE, 1992-93

(R Streatfield, D Sinclair, Tropical Public Health Unit, Cairns; G Bielby, Northern Region Health Authority, Townsville; J Sheridan, M Pearce, Central Office, Queensland Health, Brisbane; and D Phillips, State Health Laboratory, Brisbane)

Until 1992, the most recent dengue epidemic in Australia, affecting the cities of Cairns and Townsville and the community on Thursday Island in the Torres Strait, had been of serotype 1 in 1981[1], and there had been a small outbreak in 1990-91. However, in the first week of March 1992, a Townsville resident, who had not been out of Australia during the incubation period, was serologically confirmed positive for dengue 2 virus by the State Health Laboratory, Brisbane. In the ensuing weeks there were three further cases confirmed as dengue 2, in persons residing close to the original case in the southern suburbs of Townsville. During the sixth week the epidemic gained momentum (Figure 1). Notified cases peaked in incidence in the eleventh week and then tapered off through to the thirty-third week (mid-October). Sporadic cases have occurred through to the fiftieth week (February 1993) and beyond.

A total of 421 cases was diagnosed serologically. A further 231 cases were diagnosed on clinical and epidemiological grounds as they did not have a blood test done. These cases had symptoms and signs consistent with dengue, and either lived in the same household or were closely associated with a serologically proven case, and had similar dates of onset.

As has been noted with dengue epidemics overseas, the distribution has remained characteristically focal in nature. Fifty-four per cent of notified cases gave their residential address as being within a 2.5 kilometre radius of that of the original case, and 74% within five kilometres.

The age and sex distribution of notified cases has also been similar to those in several epidemics overseas [2,3]. The female to male ratio was 1.28:1, with the 20-40 year age group females being the most commonly affected (Figure 2).

In the first 521 notified cases, fever was both the first and the most common symptom, occurring in 96% (Table 1). High fever (defined as 40°C or more, and/or rigors) occurred in almost 70% of these. Headache was reported in 95% of cases and was severe and retro-orbital in 83% of these. Rash was common (70%) and tended to be located on the limbs and/or trunk, rather than head or neck. Joint pains were experienced by two thirds of patients and tended to affect the large joints

Figure 1. Dengue 2 epidemic, cases notified by week of onset, Townsville, 1992-93

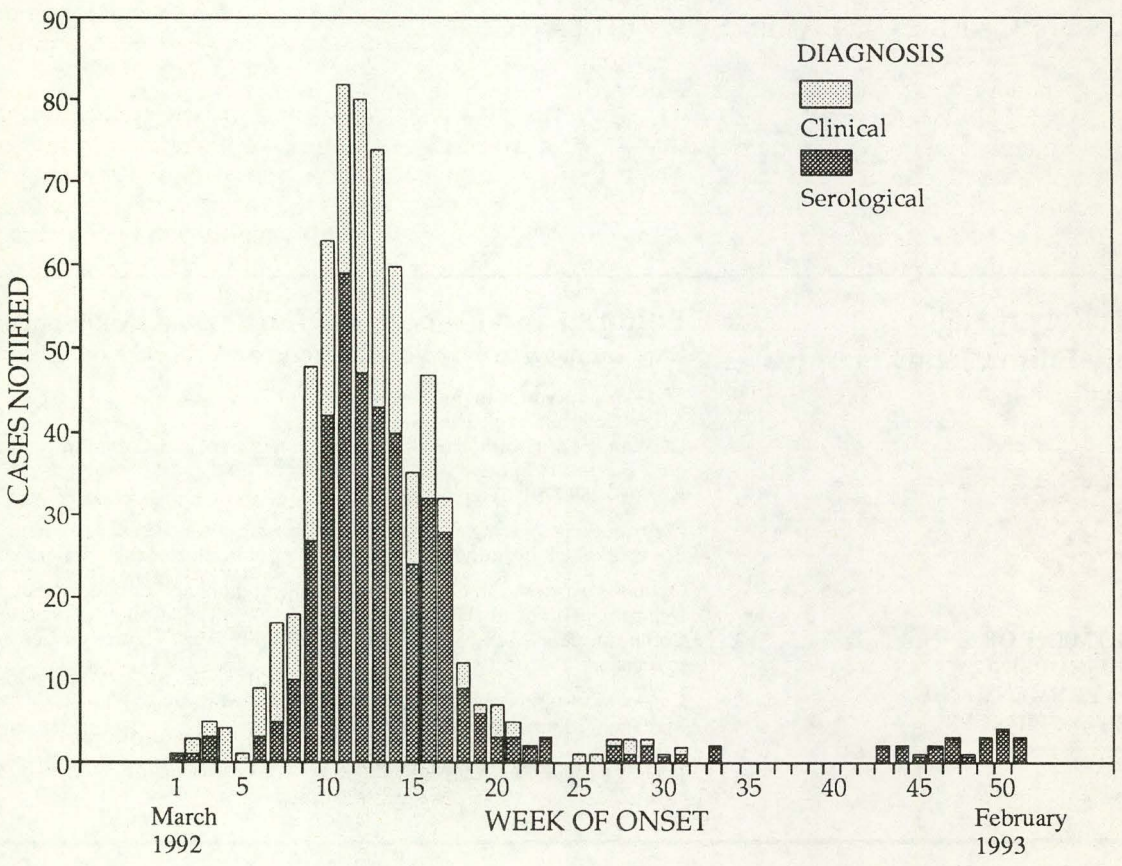
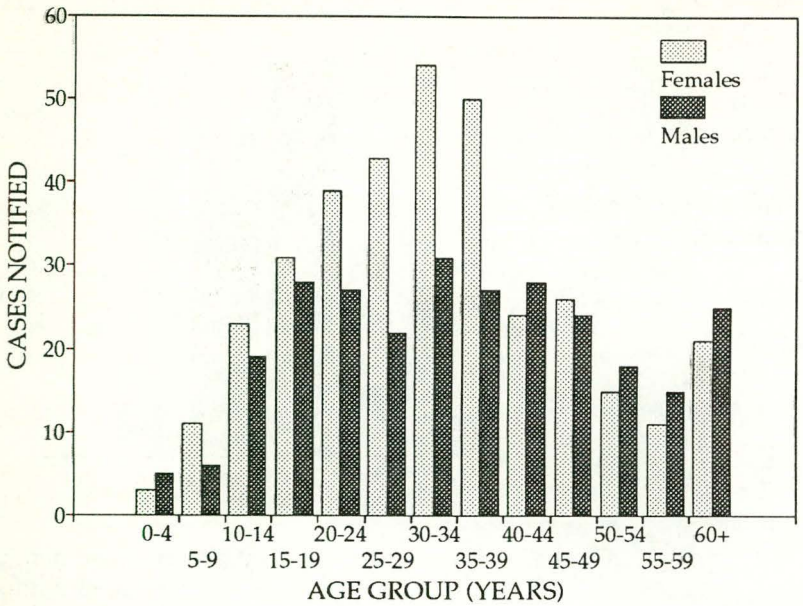


Figure 2. Dengue 2 cases notified, by age group and sex



(knees, hips, elbows, wrists) in the majority of cases. Skin itch occurred in more than half the cases and was noticeably irritating in many patients when it occurred in the palms of the hands and soles of the feet. Over half of the patients suffered mild to severe diarrhoea and/or vomiting and one patient required hospitalisation and intra-venous fluid replacement for the resulting dehydration. A very common symptom volunteered by many was an altered taste sensation, described as 'metallic' by some. Bone pain ('break bone fever') was not a common symptom in this epidemic, being reported by only one third of patients interviewed. Lymphadenopathy, most commonly cervical, was detected in 28%. Twenty-one per cent had spontaneous minor haemorrhagic manifestations, which took the form of gingival bleeding, epistaxis, haematuria or hypermenorrhoea. It is not known whether any of these cases could have been classified as dengue haemorrhagic fever (DHF) according to the World Health Organization criteria, as thrombocyte counts and haematocrit measurements were not available. There were no cases of dengue shock syndrome (DSS).

Table. Dengue 2 cases by reported symptoms

Symptom	Cases (per cent)
Fever	96.4
Headache	95.3
Myalgia	87.1
Rash	70.8
Arthralgia	69.0
Skin itch	57.7
Diarrhoea/vomiting	57.6
Bone pain	33.9
Lymphadenopathy	28.5
Haemorrhage	21.2

A finding of concern was the strong positive correlation (r=0.87) between increasing week of onset and increasing proportion of cases suffering spontaneous haemorrhagic manifestations. This could be interpreted as a tendency to increasing virulence of the virus with rapid passage through more and more susceptible individuals, as was proposed for a similar finding in the Cuban secondary dengue 2 epidemic of 1981[3].

Comment

Over the last 20 years dengue has become a rapidly expanding disease throughout the tropical areas of the world, and the most important arbovirus disease of humans. There are now over two billion people at risk of infection, and millions of cases occur each year[4,5,6,7]. In Asia and in the Caribbean, dengue epidemics have become steadily more frequent since the 1960s and 1970s, and DHF, the more severe form of the disease, has become more prominent.

The most widely accepted theory of pathogenesis of DHF/DSS is the one relating to sequential infection with different serotypes[8]. In the Cuban epidemic of 1981 over 95% of those with DHF or DSS had evidence of previous infection with a different serotype[3]. Other factors involved may well be variations in virus virulence, interaction of the virus with environmental and host factors, or a combination of these[9].

The cities of Cairns and Townsville are especially vulnerable to dengue epidemics because of the large number of international visitors passing through and the presence of the major vector species *Aedes aegypti*. There is currently a highly pathogenic dengue serotype 3 strain active in South-East Asia and the South-West Pacific[10]. The potential exists for this serotype to be introduced into north Queensland and for it to cause outbreaks of dengue and cases of DHF as has dengue 2 since March last year.

References

1. Guard RW. Dengue surveillance - Cairns. *Comm Dis Intell* 1982;(23):5-7.
2. World Health Organization. *Dengue haemorrhagic fever: diagnosis treatment and control.* Geneva: World Health Organization, 1986.
3. Bravo JR, Guzman MG, Kouri GP. Why dengue haemorrhagic fever in Cuba? 1. Individual risk factors for dengue haemorrhagic fever/dengue shock syndrome (DHF/DSS). *Trans Roy Soc Trop Med Hyg* 1987;**81**:816-820.

4. Kouri GP, Guzman MG, Bravo JR, Triana C. Dengue haemorrhagic fever/dengue shock syndrome: lessons from the Cuban epidemic, 1981. *Bull WHO* 1989;**67**:375-380.

5. Kaplan JE, Eliason DA, Moore M, Sather GE, Schonberger LB, Cabrera-Coello L, Fernandez de Castro J. Epidemiologic investigations of dengue infection in Mexico, 1980. *Am J Epidemiol* 1983;**117**:335-43.

6. Gubler DJ. *Aedes aegypti* and *Aedes aegypti*-borne disease control in the 1990s: top down or bottom up. *Am J Trop Med Hyg* 1989;**40**:571-578.

7. Gubler DJ. Dengue. In: Montath TP, ed. *The Arboviruses: Epidemiology and Ecology*. Boca Raton: CRC Press, Inc, 1988:223-60.

8. Halstead SB. Antibody, macrophages, dengue virus infection, shock and hemorrhage: a pathogenetic cascade. *Rev Infect Dis* 1989;11 Suppl 4: S830-39.

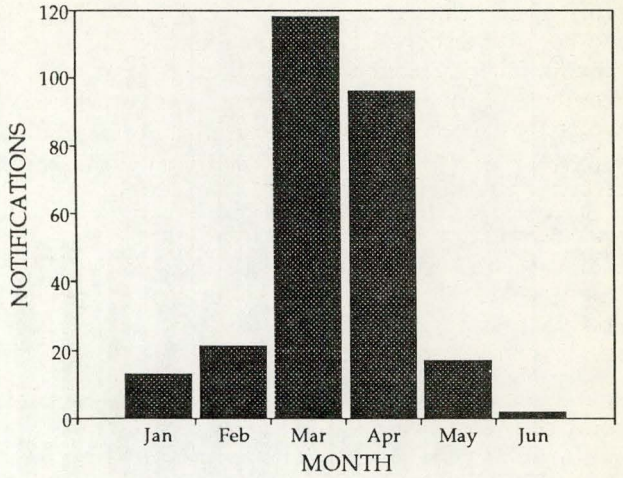
9. Hayes EB, Gubler DJ. Dengue and dengue hemorrhagic fever. *Pediatr Infect Dis J* 1992;**11**:311-17.

10. Lam SK. Current dengue situation in Malaysia. *Virus Information Exchange Newsletter* 1992;**9**:52.

CDI Editorial Comment

The dengue epidemic has continued in north Queensland over the last few months and 267 cases have been notified Australia-wide with a 1993 date of onset (Figure 3). Most of these cases have been from the Townsville area, but there have also been some from the Cairns[1] and Charters Towers[2] areas. All 183 typed dengue laboratory reports this year have been dengue 2. For most (40 reports) of those with symptom information (78), fever and general malaise have been reported. Hepatic disease was reported for one patient, muscle/joint disease for eleven and skin disease for 22.

Figure 4. Dengue notifications, Australia, 1993, by month of onset



References

1. Row D, Pearce M, Sheridan J. Dengue and dengue haemorrhagic fever in Charters Towers, Queensland. *Comm Dis Intell* 1993;**17**:182-183.

2. Streeton C. Dengue in far north Queensland. *Comm Dis Intell* 1993;**17**:215.

MULTIDRUG-RESISTANT *PLASMODIUM FALCIPARUM* MALARIA

(Sharon CA Chen[1], Dominic E Dwyer[1], Hugh Merrell[2], David J Holland[1], Tracy Robinson[1], John Walker[1] and Karl Rieckmann[3])

Introduction

Plasmodium falciparum has developed resistance to most generally available antimalarial drugs. In South-East Asia, particularly in Thailand and certain areas in Burma (Myanmar), the parasite is highly resistant to chloroquine and sulfadoxine-pyrimethamine (Fansidar)[1] and is showing increasing resistance to mefloquine and quinine[2-4]. Although quinine remains effective in controlling acute attacks of malaria, its curative value has steadily declined over the last decade and compliance with the seven day regimen may be poor[5]. There is a 50% therapeutic failure rate when quinine is given alone and 10% when combined with tetracycline[4,5]. We report a case of recurrent falciparum malaria occurring in a traveller returning to Australia from Thailand.

Case report

A 22 year old Burmese-born female, now living in Sydney, presented to Westmead Hospital at the end of January 1993 with two day history of severe headache and myalgia. She had been on holiday in Thailand during November-December 1992 with three other members of her family and had visited northern Thailand including Maeseriang, Maesod and the Thai-Burmese border near the Moei River. She devel-

1. Centre of Infectious Diseases and Microbiology, Westmead Hospital and the University of Sydney, Westmead, New South Wales.
2. The Department of Microbiology and Infectious Diseases, John Hunter Hospital, New South Wales.
3. The Army Malaria Research Unit, Ingleburn, New South Wales.

oped a headache and diarrhoea and was treated at the local district hospital with a standard course of mefloquine in combination with sulfadoxine-pyrimethamine (Fansimef, a combination not available in Australia) with good clinical response. Coincidentally, her mother and father received treatment whilst in Thailand for falciparum and vivax malaria respectively. All members of the family were compliant with Fansidar which they received as malaria prophylaxis, commencing two weeks prior to departure for Thailand. They returned to Australia in early January 1993.

On examination, the patient's temperature was 39°C, her heart rate was 100 per minute and her blood pressure was 110/70 mm Hg. The spleen was not palpable and neurological examination was within normal limits. The patient weighed 42 kg.

Abnormal results of investigations included a platelet count of 145 x 10^9/L and a bilirubin of 23 U/L. Examination of thick and thin blood films revealed ring forms consistent with falciparum malaria; the degree of parasitaemia was estimated at 13.6 x 10^9/L (0.6%). The patient was commenced on oral quinine 1800 mg and doxycycline 200 mg daily (for a total of five and 10 days respectively). The fever resolved within 36 hours of commencement of therapy, however, she developed severe tinnitus and the dose of quinine was reduced to 1350 mg daily. Subsequent blood films over the next few days and at one week after the end of therapy revealed complete clearing of parasitaemia.

Two weeks after therapy was ceased, the patient re-presented with fever, headache and myalgia. *P. falciparum* parasites were seen on examination of blood films (1.73 x 10^9/L, 0.3%). She was commenced on a further course of quinine (at a dose of 1650 mg daily) and doxycycline, with a prompt clinical response.

Prior to the second course of treatment, a heparinised sample of blood was collected to determine parasite susceptibility to various antimalarial drugs using the standard World Health Organization *in vitro* microtest[7,8]. The isolate was resistant to choloquine (RIII), sulphadoxine-pyrimethamine (RII), amodiaquine (RI-RII) and possibly quinine (borderline RI). In addition, the parasites were less susceptible to doxycycline than other isolates that had been tested previously. However, the parasites were sensitive to mefloquine *in vitro*. In view of these findings, the patient received supplementary treatment with mefloquine (1250mg orally) eight days after receiving the last dose of quinine. There has been no further recurrence of illness due to falciparum malaria 60 days after commencement of the patient's second course of treatment in Australia. However, she developed malaria caused by *P. vivax* three weeks after receiving mefloquine; she was treated with appropriate doses of chloroquine followed by primaquine 45mg weekly for six weeks.

Discussion

Despite worldwide efforts to control malaria, morbidity and mortality from this disease remain substantial[6]. In Australia, there has been an increase in the incidence of imported malaria[6]. *P. falciparum* resistance to a wide range of antimalarial drugs in increasing in prevalence.

In the border region of Thailand, resistance to pyrimethemine-sulfadoxine is now estimated to be as high as 80%[9], while resistance to mefloquine is associated with clinical failure rates of over 50%[10,11]. The combination of mefloquine with sulfadoxine-pyrimethamine (Fansimef) has not been successful in delaying the development of mefloquine resistance and the overall cure rate of this drug is approximately 71%[10]. Our patient demonstrated a clinical response to Fansimef in the initial episode of malaria in Thailand; the first 'recurrence' of illness occurred a month later and may have been due to a reinfection.

Quinine-tetracycline combination is the standard treatment for adults with uncomplicated falciparum malaria in much of South-East Asia. While patient compliance with the seven day regimen may be suboptimal, this was not evident in our case. Quinine has stood up well against the test of time; however, *in vitro* sensitivity tests in Thailand now indicate a steady increase of quinine resistance. To our knowledge, there are no documented clinical reports of high-grade resistance, that is, complete failure to respond in the presence of adequate blood levels[5]. Our patient illustrates the usual pattern of RI resistance where there was an initial clearance of parasitaemia followed by a recrudescence. In addition, the isolate appeared to be less susceptible *in vitro* to doxycycline although it did not test resistant to the drug. The case also illustrates the value of *in vitro* drug susceptibility testing in guiding the clinical management of patients with malaria. In this instance, supplementary treatment with mefloquine was instituted. The patient was cured by mefloquine despite her visit to the Thai-Burmese border where mefloquine-resistant strains are common[12].

The list of reserve drugs for the treatment of drug-resistant falciparum malaria is limited. Halofantrine has been shown to be effective in this situation[13] but there is now evidence of cross-resistance with mefloquine. The artemisinin-containing compounds are not yet licensed in the West. This class of drugs shows promise in the therapy of drug-resistant *P. falciparum* and oral artemether has been documented to be as effective as mefloquine in acute uncomplicated falciparum malaria[14].

In conclusion, the decreasing susceptibility of *P. falciparum* to antimalarial drugs suggests that even quinine-tetracycline combinations may not always be able to cure malaria infections originating in South-East Asia. Medical practitioners should be aware of this possibility and should advise patients to report the reccurence of symptoms promptly. In addition, thick blood films should be examined at weekly intervals for four weeks after treatment to confirm that patients have been cured of their infections. If possible, a heparinised sample of blood should be collected before initial treatment to determine the *in vitro* drug susceptibility of the malaria parasites. Treatment with quinine (with or without a tetracycline) should not be delayed until the results of the drug susceptibility tests are available.

However, if infection is not cured after the initial course of treatment, the test results may be very helpful in selecting an alternative course of treatment that will achieve the desired result.

References

1. Harinasuta T, Bunnag D, Lasser R. Quinine-resistant *Plasmodium falciparum* treated with mefloquine. *Southeast Asian J Trop Med Public Health* 1990;**21**:552-57.
2. Bunnag D, Harinasuta T. The current status of drug resistance in malaria. In: Howell MJ, ed. *Parasitology quo vadis?* Oxford: Pergamon, 1986:180-96.
3. Boudreau EF, Webster HK, Pavanand K, Tosingha L. Type II mefloquine resistance in Thailand. *Lancet* 1982;**ii**:1335.
4. Looareesuwan S, Viravan C, Vanijanonta S et al. Randomised trial of artesunate and mefloquine alone and in sequence for acute uncomplicated falciparum malaria. *Lancet* 1992;**339**:821-24.
5. White NJ. Antimalarial drug resistance: the pace quickens. *J Antimicrob Chemother* 1992;**30**:571-85.
6. Forsyth S, Loeskow K, Pearce M, Riley I, Sleigh A, Srinivasa M. Report of the Austalian Malaria Register for 1990. *Comm Dis Intell* 1992;**15**:400-8.
7. Rieckmann KH, Sax LS, Campbell GH et al. Drug sensitivity of *Plasmodium falciparum*: an *in-vitro* microtechnique. *Lancet* 1978;**1**:22-3.
8. Payne D, Wernsdorfer WH. Development of a blood culture medium and a standard *in-vitro* microtest for field-testing the response of *Plasmodium falciparum* to antifolate antimalarials. *Bull WHO* 1989;**67**:59-64.
9. Oo M, Kyuthavong Y, O'Sullivan W. Malaria in South-East Asia. *Today's Life Science* 1991 July;3(7):42-46.
10. Nosten F, terKuile F, Chongsuphajaisiddhi T et al. Mefloquine-resistant falciparum malaria on the Thai-Burmese border. *Lancet* 1991;**337**:1140-43.
11. terKuile F, Nosten F, Thieren M et al. High-dose mefloquine in the treatment of multi-drug resistant falciparum malaria. *J Infect Dis* 1992;**166**:1393-1400.
12. Wongsrichanalai C, Webster H, Wimonwattrawatee T et al. Emergence of multidrug resistant *Plasmodium falciparum* in Thailand: *in vitro* tracking. *Am J Trop Med Hyg* 1992;**47**:112-16.
13. Halofantrine in the treatment of malaria (Editorial). *Lancet* 1989;**2**:537-38.
14. Karbwang J, Bangchang K, Thanavibul A et al. Comparison of oral artemether and mefloquine in acute uncomplicated falciparum malaria. *Lancet* 1992;**340**:1245-48.

COMMENTARY

The following comments have been received about the article 'A time bomb in north Queensland: case report of introduced malaria south of the nineteenth parallel' published in *CDI* 1993;**17**:211-213, and the subsequent commentary published in *CDI* 1993;**17**:239-40.

Imported, introduced and indigenous malaria

(Bart Currie, Menzies School of Health Research and Royal Darwin Hospital; and Peter Whelan, Entomology, Northern Territory Department of Health and Community Services)

A recent article in *CDI*[1] has led to confusion regarding reintroduction of malaria into Australia. We suggest the case reported is most unlikely to have been introduced malaria, and was probably an imported case with a prolonged incubation period. We also suggest that there is not a need for urgent redefinition of the 'malaria receptive zone' (north of 19°S parallel), which is the area considered at risk for re-establishment of endemic (indigenous) malaria, and not the larger area of possible brief human-mosquito-human transmission (introduced malaria).

It is well recognised that both partial immunity and suboptimal chemotherapy/chemoprophylaxis can prolong the incubation period of *Plasmodium falciparum* malaria beyond the normal range of 7-14 days (mean 12 days)[2]. It seems an unlikely coincidence that the 'introduced' case reported in the *CDI* article was a Papua New Guinean, with probable partial immunity from living in a highly malaria endemic region, who became sick with malaria 14 days after arrival in Australia. It is far more likely that she was infected in Papua New Guinea, but onset of illness was delayed. One of the Papua New Guinean students arriving in Darwin this year was negative for *P. falciparum* on entry screening but developed blood slide positive *P. falciparum* malaria 43 days after arrival. His prolonged incubation period was attributed to both partial immunity and chloroquine use.

Professor R Black has definitively described the epidemiology of malaria in Australia from before colonisation to 1969[3]. He collated the data on the foci of endemic malaria in 'receptive' tropical Australia, the additional epidemics which followed heavy wet seasons, and the gradual elucidation of the responsible *Anopheles* vectors. In addition, he noted reported episodes of introduced malaria south of 19°S. That such cases occurred occasionally from local transmission was not considered surprising as *Anopheles annulipes* was described originally from Tasmania in 1856.

Black's report of probable introduced malaria during this century includes two *P. vivax* cases in Victoria (1921 and 1948), two cases in south-west Western Australia (1919 and 1920) and 12 in New South Wales (1914, 1919, 1921, 1926, 1930, 1943, 1944 and 1946). There were no documented introduced cases in Tasmania or South Australia, despite the presence of *An. annulipes.*

There was a larger number of introduced cases south of 19°S in Queensland, most notably 56 *P. vivax* cases in the military, regarded as being locally infected, between October 1942 and May 1943. Locations of these cases included Coolangatta (one), Brisbane (12), Sellheim (30) and Townsville (six). Despite the large war-related epidemics in Cairns (17°S) in 1916-1917 and in 1942, there were no cases of local transmission in the Townsville area (just south of 19°S) during 1910-1921.

The recurring message of these reports of introduced malaria is that no endemic focus has ever been established outside 'receptive' tropical Australia, despite an estimated 10,000 to 15,000 troops returning parasitised after World War I, and 110,726 malaria cases in Australian troops treated within Australia in 1943 and 1944.

Many factors interact to determine the levels and periods of malaria transmission. *Anopheles* species vary in biting habit, preference for humans or other blood sources, susceptibility to infection with *Plasmodium* species, time for sporogony and longevity. Rainfall, temperature and humidity are also critical for vector breeding and rate of sporogony. It is these factors which have determined the 'receptivity' of the tropical north. South of the 'receptive' area, transmission is broken as a result of the species present, the reduced mosquito survival times and the prolonged periods required for sporogony.

An. punctulatus, mentioned as a 'well documented vector of malaria in northern Australia'[1], is not to our knowledge present in Australia, but is certainly an important vector of transmission in Papua New Guinea. There are at least eight *Anopheles* species in the Northern Territory and *An. farauti* s.1. is the most likely 'Top End' vector. *An. annulipes* is considered to have been a likely vector in past epidemics further inland and in north-west Western Australia.

The Northern Territory Department of Health and Community Services takes responsibility for active malaria case detection by screening all new and returning students from Papua New Guinea[4] and other high risk persons, such as boat people and co-travellers of malaria cases. The Department also funds and oversees the implementation of standard malaria treatment protocols and supports compliance with therapy, including radical cure with primaquine. Entomological surveillance is performed in gametocytaemic cases and adult mosquito control measures are initiated in risk situations.

Conclusion

The last Australian indigenous case of malaria was from Roper River Mission, Northern Territory, in 1962. As has occurred throughout the century, including in Gladstone, Queensland (24°S) in 1969[3], occasional local transmission resulting in introduced malaria will occur outside the 'receptive' zone for endemic malaria. Global warming and other environmental factors may enlarge this 'receptive' zone, but as noted by Professor Black[3], the areas at greatest risk for reintroduction of endemic malaria are the Torres Strait Islands and other remote areas of tropical far northern Australia, where there may be an influx of infected people into developments such as mining or tourism projects near Aboriginal communities, and high vector densities. Ongoing studies of vector species and numbers in and south of the 'receptive' area are required to monitor variations in receptivity.

A coordinated approach to screening 'at risk' groups, malaria case management, case follow-up and entomological surveillance and control seems required across northern Australia, especially given the increasing numbers of imported malaria cases.

References

1. Murray-Smith S, Weinstein P. A time bomb in north Queensland: case report of introduced malaria south of the nineteenth parallel. *Comm Dis Intell* 1993;**17**:211-213.

2. Bradley DJ, Newbold CI, Warrell DA. Malaria. In: Weatherall DJ, Ledingham JGG, Warrell DA eds. *Oxford Textbook of Medicine*. 2nd edition. Oxford: Oxford University Press, 1987:5.484.

3. Black RH. *Malaria in Australia*. Canberra: Australian Government Publishing Service, 1972.

4. Currie B, Whelan P, Dyer M, Beeby J, Noonan C, Patel M. Malaria in visiting Papua New Guinean students in the Northern Territory. *Comm Dis Intell* 1991;**15**:116.

Clinical aspects

(Thein Htut, Toowoomba Base Hospital, Queensland)

I wish to comment on some clinical aspects of the case reports of malaria (*CDI* 1993;**17**:211-213) and the subsequent commentary (*CDI*;**17**:239-240). As Murray-Smith and Weinstein mentioned, the generally accepted incubation period for falciparum malaria is 9 to 14 days[1,2]. However, the period may be prolonged to weeks or months for many reasons including the immune status of the patient and chemophrophylaxis[3].

Chemoprophylaxis is continued for four weeks after leaving the malarious area. This is advised for all strains of malaria parasite and not just for *Plasmodium falciparum*. Ninety-five per cent of primary malaria cases present clinically within four weeks of exposure[4]. The taking of antimalarials is continued to eliminate parasites that may remain in small numbers in the internal organs[1].

Screening of the blood sample from Case 1 did not reveal parasites initially. This brings to mind two possibilities: (a) blood may have been collected during the

pre-patent period of her infection, and (b) initially, there may have been a highly synchronous infection with all parasites at the same stage of development. Mature trophozoites and schizonts would be sequestered within the microcirculation of the internal organs for at least half of the 48-hour life cycle. Pronounced synchronism is described in semi-immune patients[3].

References

1. Bruce-Chwatt LJ. *Essential malariology.* 2nd edn. London: Heinemann, 1985.
2. Cook GC. Prevention and treatment of malaria. *Lancet* 1988;1:32-37.
3. Quinn TC, Strickland GT. Clinical manifestations of malaria. In Strickland GT ed. *Clinics in tropical medicine and communicable diseases: malaria, vol 1.* Philadelphia: Saunders, 1986:127-170.
4. Hoffman SL. Diagnosis, treatment and prevention of malaria. In: *Medical clinics of North America: travel medicine, vol 76.* Phildelphia: Saunders, 1992: 1327-1355.

CDI Editorial Comment

CDI thanks all those who have shown an interest in this issue, and hopes that the publication of these comments and those previously published has helped to clarify the original article and related issues. No further comments will be published on this topic.

OVERSEAS BRIEFS

In the last two weeks, the following information has been supplied by the World Health Organization.

Cholera Update

Khuzestan Province in Iran has been declared cholera infected. Cases have been reported for May and June from Bolivia, Brazil, Chile, El Salvador, Iran, Laos, Malaysia, Mexico, Mozambique and Nicaragua.

Other countries reporting cases this year are Argentina, Belize, Cameroon, Colombia, Costa Rica, Ecuador, Ghana, Guatemala, Guyana, Honduras, India, Malawi, Panama, Peru, Rwanda, Togo, Venezuela, Zambia and Zimbabwe. India and Banhladesh have reported cases of cholera caused by *Vibrio cholerae* O139.

COMMUNICABLE DISEASES SURVEILLANCE

Virology and Serology Reporting Scheme

There were 2748 reports received in the *CDI* Virology and Serology Reporting Scheme this fortnight (Tables 7, 8 and 9). Included were some reports from Queensland that were unable to be included in the last two fortnights.

- **Measles** was reported for 15 patients. Postcode information was provided for 14 - Tasmania 7, Queensland 5 and New South Wales 2. Three patients were aged less than one year, and the ages of the other patients ranged up to 27 years.
- There were 47 **rubella** reports this fortnight. Included were 15 females in the age group 15 to 44 years.
- **Hepatitis A** was reported for 37 patients. Included was a one year old child for adoption who was being screened for hepatitis B surface antigen. A total of 302 reports of hepatitis A has been received so far this year.
- There were 45 reports of **Ross River virus** infection this fortnight. Forty-two were presumptive (IgM) and 2 were confirmed (fourfold changes). Specimen collection dates were July for 3, June for 30 and May for 12. Locations were Queensland (42), New South Wales (1), and Port Hedland in Western Australia (2). The peak in reports this year was in March.
- **Barmah Forest virus** infection was reported for 10 patients. Nine were presumptive cases (IgM) and one was confirmed (fourfold change). All were from Queensland.
- **Unspecified flavivirus** was reported for 8 patients from Queensland. Four cases were confirmed (fourfold change) and 4 were presumptive (IgM). Locations were all in the Townsville area. Two were described as clinically dengue.
- There were 26 reports of **adenovirus type 3** this fortnight. A total of 120 of these reports have been received for the year so far, more than for any year since 1990. The 24 reports for May is the largest number received for any one month since March 1990.
- **Untyped echovirus** was reported for the first time to the *CDI* Laboratory Reporting Schemes on the basis of detection of nucleic acid by PCR in CSF. The four patients were aged 5 weeks, 6 weeks, 2 years and 4 years. Two had meningitis as the reported symptom, one had encephalitis and one had high fever.

- There were 46 reports of **influenza**, 14 of **untyped influenza A** (one isolate, 3 antigen detections, one fourfold change, 5 single high titres, 4 other serological), 30 of **influenza B** (16 isolations, 6 antigen detections, one IgM, 5 single high titres and 2 other serological)and an isolate of an untyped influenza. Four influenza A reports and one influenza B report were for patients aged over 65 years. There has been a total of 90 reports of influenza A and 95 reports of influenza B with 1993 specimen collection dates so far.
- **Respiratory syncytial virus** infection was reported for 489 patients this fortnight, bringing the total for the year to 1467. This fortnight there were 29 reports for patients aged less than one month and 326 for those aged 1 to 11 months. The male:female ratio was 1.5:1.0. The number of reports received so far this year is about the same as the average recorded for the last 5 years.
- There were 203 **rotavirus** reports this fortnight. The number of rotavirus reports received so far this year is higher than the average recorded for the last 5 years. The peak month for rotavirus reports in Australia since 1982 has been June in one year, July in 5 years, August in one year, and September and October in 2 years each.
- ***Bordetella pertussis*** or ***Bordetella*** **species** infection was reported for 23 patients. Two were aged between one and 11 months and there were 9 aged 5 to 14 years. Ages of the others ranged up to the 75 to 99 year age group. Laboratory reports of these infections have increased since April, in contrast to the fall in pertussis cases which has been usually documented in winter in Australia.
- There were 35 cases of **Q fever** reported this fortnight. Five were in females (22 years, 38 years, 51 years, 61 years, 88 years) and 30 were in males (age range 15 to 47 years). Abattoir work or other animal contact was reported as a risk factor for 3 patients. Locations recorded were in Western Australia (2), New South Wales (15), Queensland (17) and South Australia (1). A total of 249 Q fever reports has been received so far for this year.
- An case of ***Acanthamoeba*** **species** infection was reported. The patient was a 21 year old female with eye disease. The organism was isolated from a conjunctival swab.
- ***Treponema pallidum*** infection was reported for 16 patients. Included was a male infant for whom congenital infection was reported. Positive serology was reported on cord blood. Positive syphilis serology was also reported for a 24 year old male migrant/refugee who was being screened.

Australian Sentinel Practice Research Network

The Australian Sentinel Practice Research Network collected data from 6129 patient encounters in Week 28 and from 4746 patient encounters in Week 29 (Table 1). Influenza continues to be reported at a high rate.

AIDS and HIV Surveillance - Correction

Three corrections are required for Table 3 in the AIDS and HIV Surveillance report in the last issue of *CDI* 1993;17:316-17. The total cumulative AIDS diagnoses for males should be 3861, not 3661. The cumulative AIDS deaths in New South Wales should be 1426 for males and 1471 in total.

Sterile Sites Surveillance (LabDOSS)

Data for this fortnight have been provided by 11 laboratories. *CDI* welcomes Woden Valley Hospital, ACT to the LabDOSS scheme.

A total of 272 reports have been included: Liverpool Hospital 27, Royal North Shore Hospital 27, Northern Tasmanian Pathology Service 8, Nambour Hospital 9, Gosford Central Coast Hospital Services 28, Toowoomba General Hospital 16, Westmead 60, Woden Valley Hospital 22, Tamworth Laboratory, New England Pathology 8, Sullivan and Nicolaides Partners, Brisbane 18, Institute of Medical and Veterinary Science, Adelaide 49.

The LabDOSS scheme received 3 reports of *Listeria monocytogenes* this fortnight from 3 laboratories (2 NSW, 1 ACT). Risk factors were identified in two patients. One was a 70 year old male with meningitis and a history of renal failure and the second was a 22 year old male with a history of injecting drug use. The third case was a 65 year old female with meningitis.

Table 1. Australian Sentinel Practice Research Network, Weeks 28 and 29 1993

Condition	Week 28, to 11 July 1993		Week 29, to 18 July 1993	
	Reports	Rate per 1000 encounters	Reports	Rate per 1000 encounters
Influenza	80	13.1	47	9.9
Measles	4	0.6	0	0
Rubella	1	0.2	2	0.4
Pertussis	1	0.2	0	0
Genital herpes	2	0.3	2	0.4
Gastroenteritis	63	10.3	44	9.3

The three isolates have been forwarded to the Microbiological Diagnostic Unit, University of Melbourne, for typing.

Organisms reported 5 or more times from blood are detailed in Table 2. Other blood isolates were:

Gram positive: 3 *Streptococcus* Group B (1 neonate, 73 year old female, 71 year old male), 1 *Streptococcus* Group F, 2 *Streptococcus* Group G, 3 *Streptococcus* 'milleri', 4 *Streptococcus sanguis*, 1 *Streptococcus mitis*, 3 Streptococcus species, 3 *Corynebacterium* species, 2 *Corynebacterium jeikeium* (immunocompromised females, 28 years and 31 years), 3 *Enterococcus* species, 3 *Enterococcus faecalis*, 2 *Enterococcus faecium*, 1 *Listeria monocytogenes*, 1 *Bacillus* species.

Gram negative: 1 *Acinetobacter* species, 3 *Klebsiella* species, 1 *Klebsiella oxytoca*, 1 *Enterobacter aerogenes*, 4 *Enterobacter cloacae*, 2 *Serratia marcescens*, 1 *Citrobacter* species, 4 *Haemophilus influenzae* type b (2 years, 3 years, 6 years, 59 years), 1 *Haemophilus parainfluenzae*, 1 *Proteus mirabilis*, 1 *Flavobacterium* species, 1 *Aeromonas* species, 2 *Xanthomonas maltophilia*, 1 *Eikenella corrodens*.

Anaerobes: 1 *Bacteroides* species, 1 *Bacteroides thetaiotaomicron*, 1 *Bacteroides ovatus*, 2 *Clostridium* species, 1 *Peptostreptococcus* species, 1 *Propionobacterium* species, 1 *Propionobacterium acnes*.

Fungi: 1 *Candida* species, 2 *Candida albicans*.

Most isolates were from patients aged over 15 years (Figure 1).

CSF isolates and meningitis reports

Eighteen reports of CSF isolates and/or meningitis were received this fortnight (Table 3).

Isolates from sites other than blood or CSF

Peritoneal dialysate: 1 *Candida* species, 1 *Acinetobacter* species, 1 *Klebsiella oxytoca*, 1 *Escherichia coli*, 1 *Streptococcus* 'viridans', 1 *Staphylococcus aureus*, 1 *Bacteroides fragilis*.

Pleural fluid: 1 *Corynebacterium* species, 1 *Enterococcus* species, 1 *Peptostreptococcus* species.

Other: 1 *Leuconostoc* species, 1 *Branhamella catarrhalis*, 1 *Cryptococcus neoformans*, 1 *Enterococcus faecalis*, 1 *Escherichia coli*, 1 *Staphylococcus aureus*.

Figure 1. LabDOSS reports of isolates from blood, by age group

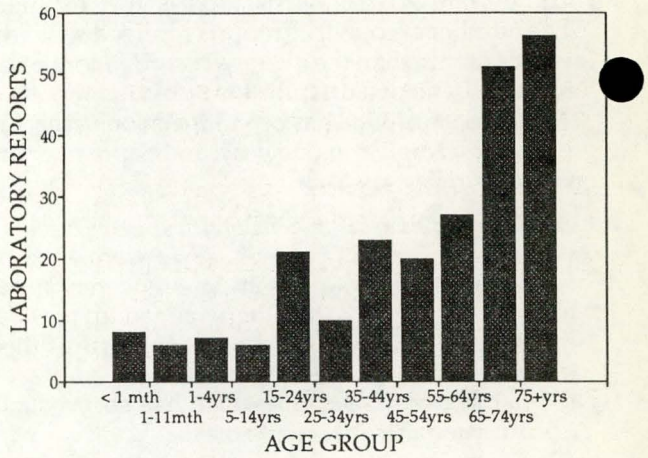


Table 2. LabDOSS reports of blood isolates, by organism and clinical information

Organism	Clinical Information						Risk Factors					Total[1]	Total reported this year
	Bone/Joint	Lower respiratory	Endocarditis	Gastrointestinal	Urinary Tract	Skin	Surgery	Immunosuppressed	IV line	Hospital acquired	Neonatal		
Staphylococcus aureus[2]		1	3	1	2	10	5	6	6	5		47	355
Staphylococcus epidermidis								2				9	112
Staphylococcus coagulase negative								3	9	8	2	30	157
Streptococcus Group A								1	1			7	20
Streptococcus pneumoniae									1			14	72
Escherichia coli					1	1	1	8			1	35	440
Proteus mirabilis							1		1			5	38
Klebsiella pneumoniae							2	1	1			7	76
Bacteriodes fragilis							1					6	22
Pseudomonas aeruginosa								2	3			10	96

1. Only organisms with 5 or more reports are included in this table.
2. MRSA 5

Table 3. LabDOSS meningitis reports, by organism and age group

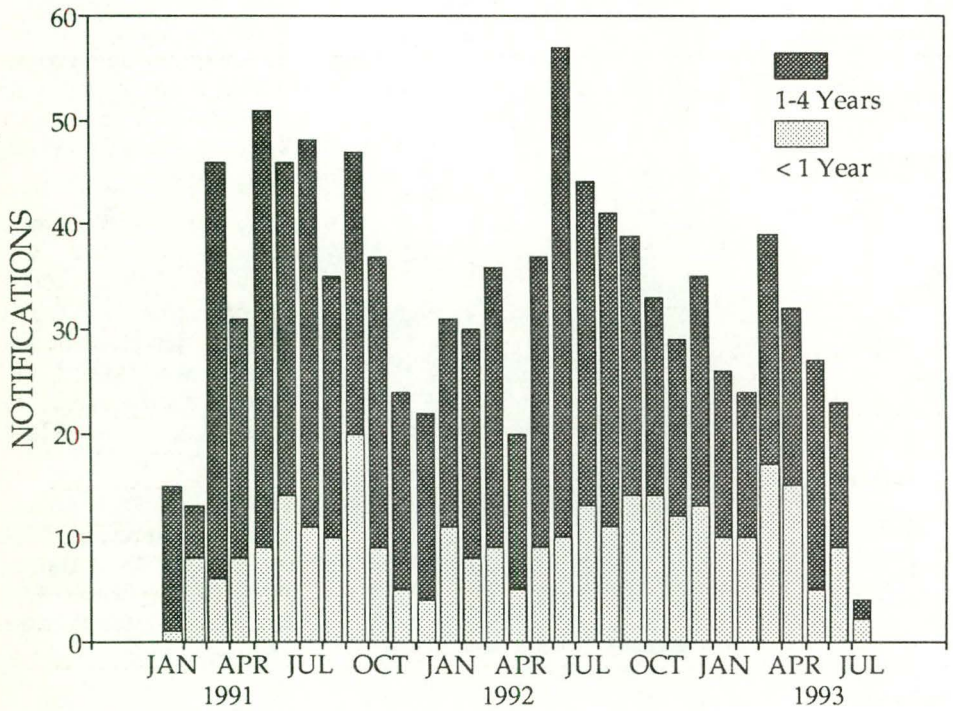
	<1 month	1-11 months	1-4 years	5-14 years	25-34 years	35-44 years	65-74 years	Total	Total reported this year
Listeria monocytogenes							2	2	3
Haemophilus influenzae		2 (type b)	1					3	22
Streptococcus pneumoniae				2				2	10
Cryptococcus neoformans						1		1	
var *neoformans*						1		1	19
var *gatti*					1			1	
Enterococcus faecalis					1			1	1
Serratia marcescens	1							1	2
Staphylococcus aureus			1					1	4
Streptococcus 'viridans'		1						1	1
Neisseria meningitidis group B		2						2	
group Z		1						1	16
ungrouped				1				1	

National Notifiable Diseases Surveillance System, 27 June to 10 July 1993

A total of 1,780 reports was received for this period (Tables 5, 6 and 7, and Figure 3).

- There were 148 cases of **Ross River virus infection** notified this period to bring the total for the year to 4,582 cases. The cases this period comprised 84 males and 64 females, and ages recorded ranged from the 0-4 to the 75-79 years age groups. Cases were recorded from statistical divisions in much of New South Wales and Queensland and in the statistical divisions of Melbourne, Northeastern Victoria, Pilbara and Southwest Western Australia.
- Thirty-nine notifications of **dengue** were received for a total for the year to date of 148 notified cases. Seventeen were males and 22 were females. Ages reported ranged from the 5-9 to the 80-84 years age groups. Thirty cases were recorded from Townsville and surrounding areas, one from Brisbane, one from Toowoomba, 4 from Cairns and 2 from Mt Isa.
- There was a single case of **brucellosis** in a male from Brisbane in the 45-49 years age group.
- Ninety-two cases of **gonococcal infection** were notified this period. Of these, 65 were males and 27 were females, and ages ranged from the 15-19 years to the 75-79 years age groups.
- *Haemophilus influenzae* type b (Hib) infection was reported for 16 cases. They comprised 8 males and 8 females. Five cases was aged less than one year and 13 were less than 5 years. There were no apparent clusters of cases.

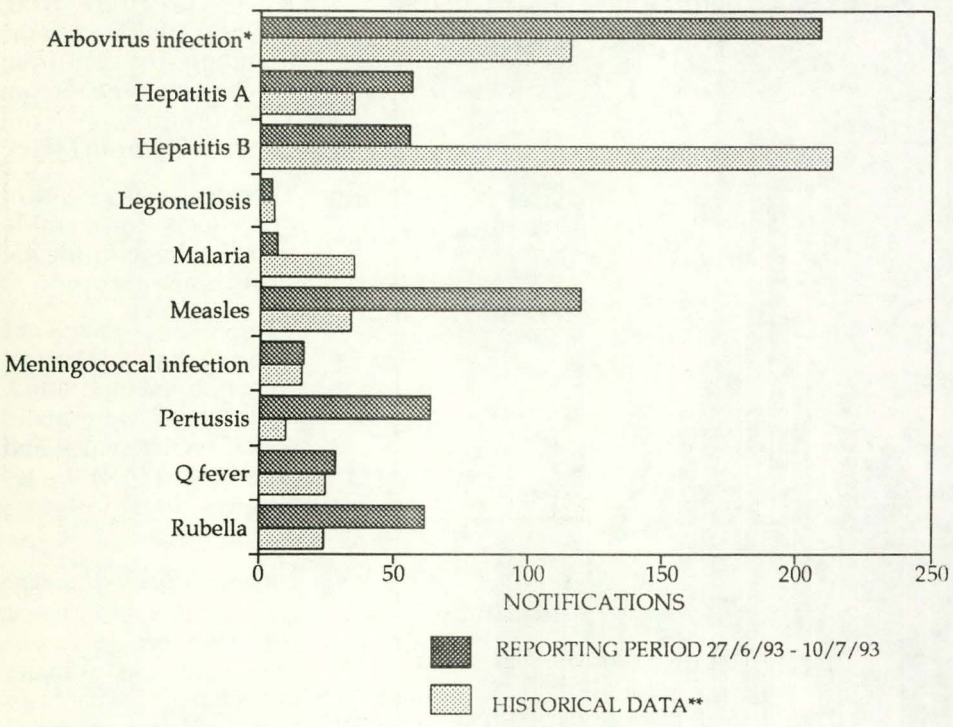
Figure 2. *Haemophilus influenzae* type b infection notifications, January 1991 to July 1993, by month



A total of 549 cases of Hib infection was notified for 1991, 501 for 1992, and 238 cases have been notified so far this year (Figure 2). It is expected that the newly introduced Hib vaccines will result in a rapid decline in the number of notifications of this disease.

- There were 57 notifications of **hepatitis A** this period. These comprised 30 males and 27 females. Ages ranged from the 0-4 to the 80-84 years age group.
- A single case of **hydatid infection** was notified, in a male in the 35-39 years age group.
- Five cases of **legionellosis** were notified. Three were males and 2 were females. The cases were in the 75-79 years (2 cases), 60-64, 35-39 and 25-29 (one case each) years age groups. Two cases had recorded onset dates within 7 days of each other in adjacent postcode areas.
- Three cases of **leptospirosis** was reported for males in the 20-24, 45-49 and 60-64 years age groups from Brisbane and rural areas of Tasmania and Victoria.
- There was a single report of listeriosis, in a male in the 60-64 years age group in the Melbourne statistical division.
- There were 7 reports of **malaria**; 5 were males and 2 were females.
- A total of 120 notifications of **measles** was received with 100 from Tasmania. Of these, 66 were males, 52 were females and for 2 cases sex was not recorded. Six cases were aged than one year, and the mean age was 15.7 years. There were 15 apparent clusters in separate postcode areas in Tasmania, with 2 to 8 cases each.
- There were 17 notifications of **meningococcal infection** for 14 males and 3 females. Six cases had recorded ages in the 0-4 years age group, the oldest case was in the 80-84 years age group. There were 2 cases in a single postcode area with onset dates on subsequent days.
- There were 64 cases of **pertussis** notified to bring the total for the year to 822, many more than the 234 notified by this time last year. Four of these cases were aged less than one year, 11 were aged less than 5 years and ages ranged up to the 90-94 years age group. There were 7 apparent clusters of 2 or 3 cases each in separate postcode areas. Intervals between the index and further cases ranged from onset on the same day to 28 days.
- There were 29 notifications of **Q fever**. Twenty-four were males, 4 were females and sex was not recorded in one case. Ages ranged from the 15-19 to the 65-69 years age groups.

Figure 3. Selected National Notifiable Diseases Surveillance System reports, and



* Includes Ross River virus and Dengue

** The historical data are the averages of the number of notifications in 6 previous 2-week reporting periods: the corresponding periods of the last 2 years and the periods immediately preceding and following those.

- There were 62 notifications of **rubella** received, 38 males, 23 females and sex was not recorded in a single case. Two cases were recorded as being aged less than one year. The mean age was 25.8 years and there were 15 reports for females in the 15-44 years age group. There were 7 apparent clusters of 2 to 6 cases each in separate postcode areas.
- Fifty-four notifications of **syphilis** were received this period. Twenty-four were males, 28 were females and sex was not recorded in 2 cases. A single case was aged less than one year.
- There were 78 notifications of **tuberculosis**, 39 males and 35 females. Ages ranged from 0-4 to the 85-89 years age groups.

Table 4. Notifiable Diseases preventable by vaccines recommended by the NHMRC for routine childhood immunisation for the reporting period 27 June to 10 July 1993

DISEASES	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	TOTALS FOR AUSTRALIA[1] This Period 1993	This Period 1992	Year to Date 1993	Year to Date 1992
Diphtheria	0	0	0	0	0	0	0	0	0	0	31	8
Haemophilus influenzae b infection[2]	0	7	1	2	4	0	2	0	16	34	238	265
Measles	2	14	0	1	0	100	2	1	120	24	856	480
Mumps	0	0	NN	NN	NN	NN	0	2	2	0	4	15
Pertussis	0	7	0	15	14	4	15	9	64	16	822	234
Poliomyelitis	0	0	0	0	0	0	0	0	0	0	0	0
Rubella[3]	3	4	0	39	2	0	11	3	62	29	1489	251
Tetanus	0	0	0	NN	0	0	0	0	0	1	5	7

1. Totals comprise data from all States and Territories. Cumulative figures are subject to retrospective revision, so there may be discrepancies between the number of new notifications and the increment in the cumulative figure from the previous period.
2. SA: only as 'bacterial meningitis'; meningococcal infection is separately notified; Tas: only as 'non-meningococcal meningitis'; Vic: epiglottitis and meningitis only.
3. NT, Tas: CRS only; ACT, NSW, Qld: rubella only.

NN Not Notifiable.

Table 5. Other Notifiable Diseases[1], for the reporting period 27 June to 10 July 1993

DISEASES	ACT	NSW	NT	Qld	SA	Tas	Vic	WA	TOTALS FOR AUSTRALIA[2] This Period 1993	This Period 1992	Year to Date 1993	Year to Date 1992
Arbovirus infection (NEC)[3]	0	1	NN	17	0	0	2	2	22	7	373	189
Ross River virus infection	0	12	8	110	-	NN	4	14	148	87	4582	4791
Dengue	0	-	0	39	-	NN	0	NN	39	53	277	151
Campylobacteriosis[4]	2	-	1	64	68	9	60	20	224	282	4132	4203
Chlamydial infection (NEC)[5]	2	1	52	81	0	13	41	33	223	254	3382	3600
Donovanosis	0	NN	1	1	NN	NN	0	1	3	4	30	41
Gonococcal infection[6]	0	4	35	15	0	0	3	35	92	133	1618	1558
Hepatitis A	0	4	11	32	4	0	3	3	57	79	1059	1115
Hepatitis B	8	0	0	39	2	1	0	6	56	238	1150	2661
Hepatitis C	8	0	11	108	NN	12	99	53	291	295	3230	4317
Hepatitis (NEC)	0	0	0	1	0	0	1	NN	2	2	42	34
Legionellosis	0	1	0	3	0	0	1	0	5	5	101	110
Leptospirosis	0	0	0	1	0	1	1	0	3	7	85	61
Listeriosis	0	0	NN	0	NN	0	1	0	1	0	28	20
Malaria	0	1	0	1	0	1	3	1	7	29	340	420
Meningococcal infection	0	4	0	4	2	1	4	2	17	21	127	118
Ornithosis	0	NN	0	0	2	0	0	0	2	3	48	49
Q fever	0	9	0	17	0	0	1	2	29	22	415	250
Salmonellosis (NEC)	0	23	7	40	9	3	13	25	120	129	2895	2980
Shigellosis[4]	0	-	1	6	2	0	1	5	15	20	440	333
Syphilis	1	15	19	17	0	0	1	1	54	124	1171	1379
Tuberculosis	0	13	0	4	6	0	44	11	78	25	493	376
Typhoid[7]	0	0	0	0	0	0	0	0	0	0	20	29
Yersiniosis (NEC)[4]	0	-	0	7	3	0	1	0	11	15	238	374

1. For HIV and AIDS, see Tables 2 and 3, *CDI* 1993;17:316-17. For rarely notified diseases, see Table 6.
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. SA, Tas: includes Ross River virus and dengue.
   WA: includes dengue.
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 and Vic: includes paratyphoid.

NN Not Notifiable.

NEC Not Elsewhere Classified.

\- Elsewhere Classified.

Table 6. Rarely Notified Diseases[1] for the reporting period 27 June to 10 July 1993

DISEASES	Total This Period	Reporting States or Territories	Year to Date 1993
Botulism	0		0
Brucellosis	1	Qld	12
Chancroid	0		2
Cholera	0		2
Hydatid infection	1	Qld	18
Leprosy	0		6
Lymphogranuloma venereum	1	Vic	1
Plague	0		0
Rabies	0		0
Yellow fever	0		0
Other viral haemorrhagic fevers	0		0

1. Fewer than 50 cases of each of these diseases were notified each year during the period 1987 to 1992.

Table 7. Laboratory reports by State or Territory of reporting laboratory for the reporting period 1 to 14 July 1993, historical data[1], and total reports for the year

	STATE OR TERRITORY OF REPORTING LABORATORY							Total this fortnight	Historical data [1]	Total reported this year
	ACT	NSW	Qld	SA	Tas	Vic	WA			
MEASLES, MUMPS, RUBELLA										
Measles virus		6	5			4		15	3.8	195
Mumps virus			3			1		4	1.0	38
Rubella virus	1	1	44				1	47	5.3	619
HEPATITIS VIRUSES										
Hepatitis A virus		2	30	1		1	3	37	12.0	369
Hepatitis B virus		23	68	5		12	14	122	77.3	1,522
Hepatitis C virus	6	4	82	70			71	233	94.2	2,307
Hepatitis D virus			1					1	2.3	36
Hepatitis E virus			1					1	.0	2
ARBOVIRUSES										
Ross River virus			43				2	45	26.0	1,526
Barmah Forest virus			10					10	5.8	154
Flavivirus (unspecified)			8					8	.7	67
ADENOVIRUSES										
Adenovirus type 1		3				3		6	4.2	49
Adenovirus type 2		6				1		7	3.0	64
Adenovirus type 3	3	17				6		26	2.8	148
Adenovirus type 4						1		1	.8	58
Adenovirus type 5						2		2	1.0	21
Adenovirus type 7						1		1	.2	6
Adenovirus type 9						1		1	.2	2
Adenovirus type 10		1						1	.0	1
Adenovirus not typed/pending		17	15	10		8	11	61	45.3	729
HERPES VIRUSES										
Herpes simplex virus type 1		7	116	20		49	22	214	106.2	2,465
Herpes simplex virus type 2	1	21	163	22		32	46	285	147.7	2,931
Herpes simplex not typed/pending	3	21	2	1		4	3	34	32.2	389

Table 7. Laboratory reports by State or Territory of reporting laboratory for the reporting period 1 to 14 July 1993, historical data[1], and total reports for the year, continued

	STATE OR TERRITORY OF REPORTING LABORATORY							Total this fortnight	Historical data [1]	Total reported this year
	ACT	NSW	Qld	SA	Tas	Vic	WA			
Cytomegalovirus	1	5	27	2		38	21	94	56.0	956
Varicella-zoster virus		5	35	4		15	4	63	18.7	584
Epstein-Barr virus			71	8		2	7	88	43.2	1,117
Herpes virus group - not typed						2	1	3	1.7	20
OTHER DNA VIRUSES										
Molluscum contagiosum							2	2	.8	5
Parvovirus						7	1	8	2.8	74
PICORNA VIRUS FAMILY										
Coxsackievirus A9		1						1	1.2	35
Coxsackievirus A untyped/pending			1					1	.0	1
Coxsackievirus B1		2						2	.7	63
Coxsackievirus B3		1				2		3	.2	11
Coxsackievirus B5		1						1	.7	36
Echovirus type 7						1	1	2	.0	92
Echovirus type 11		4		1		3	1	9	.0	47
Echovirus type 14		3		1				4	.2	21
Echovirus type 17						1		1	2.5	7
Echovirus type 18						1		1	.0	2
Echovirus type 30		1		1				2	.0	19
Echovirus not typed/pending						4		4	.0	4
Poliovirus type 1 (uncharacterised)		1						1	2.8	30
Poliovirus type 3 (uncharacterised)		1						1	1.7	17
Rhinovirus (all types)		4	27	2		8	7	48	27.0	440
Enterovirus not typed/pending		8	34			3	3	48	32.0	460
ORTHO/PARAMYXOVIRUSES										
Influenza A virus		1		8		3	2	14	57.5	110
Influenza B virus			11	6			13	30	9.5	100
Influenza virus - typing pending							2	2	.0	2
Parainfluenza virus type 1				1				1	5.5	17
Parainfluenza virus type 2		1	2	2	1	2	2	10	6.3	67
Parainfluenza virus type 3	2	1	4	2		10	3	22	19.3	290
Parainfluenza virus typing pending						5	1	6	2.8	27
Respiratory syncytial virus	23	153	117	43	1	116	36	489	324.5	1,488
OTHER RNA VIRUSES										
HIV-1			4				4	8	1.0	48
Rotavirus	19	76	6	14	2	49	37	203	74.7	863
Astrovirus		2						2	.3	5
Norwalk agent		2						2	1.0	15
Small virus (like) particle		3						3	1.8	30
OTHER										
Chlamydia trachomatis not typed	2	16	94	8	1	7	40	168	73.7	1,838
Chlamydia psittaci				1		2		3	5.7	52
Chlamydia species		1						1	.0	10
Mycoplasma pneumoniae		18	78	1		15		112	24.2	1,157
Coxiella burnetii (Q fever)		12	20	1			2	35	5.5	301
Rickettsia australis			1					1	.0	1
Streptococcus group A			36					36	.0	178

Table 7. Laboratory reports by State or Territory of reporting laboratory for the reporting period 1 to 14 July 1993, historical data[1], and total reports for the year, continued

	STATE OR TERRITORY OF REPORTING LABORATORY							Total this fortnight	Historical data [1]	Total reported this year
	ACT	NSW	Qld	SA	Tas	Vic	WA			
Yersinia enterocolitica			1					1	.2	4
Bordetella pertussis			3			8		11	.3	109
Bordetella species			12					12	.0	120
Leptospira species			1					1	.3	9
Treponema pallidum		12	4					16	3.3	393
Entamoeba histolytica			3					3	.0	6
Acanthamoeba species						1		1	.0	1
Toxoplasma gondii			4					4	.3	39
Echinococcus granulosus			2					2	.0	10
TOTAL	61	464	1189	235	5	431	363	2,748	1,381.8	25,029

1. 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 8. Laboratory reports by clinical information for the reporting period 1 to 14 July 1993

	Encephalitis	Meningitis	Other CNS	Congenital	Respiratory	Gastrointestinal	Hepatic	Skin	Eye	Muscle/joint	Genital	Other/unknown	Total
MEASLES, MUMPS, RUBELLA													
Measles virus					1			3				11	15
Mumps virus												4	4
Rubella virus								10				37	47
HEPATITIS VIRUSES													
Hepatitis A virus							17					20	37
Hepatitis B virus							34					88	122
Hepatitis C virus						1	21				1	210	233
Hepatitis D virus												1	1
Hepatitis E virus							1						1
ARBOVIRUSES													
Ross River virus							1	5		16		23	45
Barmah Forest virus								1		3		6	10
Flavivirus (unspecified)												8	8
ADENOVIRUSES													
Adenovirus type 1					3				1			2	6
Adenovirus type 2					2	3						2	7
Adenovirus type 3					10	6		1	3			6	26
Adenovirus type 4									1				1
Adenovirus type 5					1	1							2
Adenovirus type 7					1								1
Adenovirus type 9												1	1
Adenovirus type 10											1		1
Adenovirus not typed/pending					28	19		1	2			11	61

Table 8. Laboratory reports by clinical information for the reporting period 1 to 14 July 1993, continued

	Encephalitis	Meningitis	Other CNS	Congenital	Respiratory	Gastrointestinal	Hepatic	Skin	Eye	Muscle/joint	Genital	Other/unknown	Total
HERPES VIRUSES													
Herpes simplex virus type 1	1	1			10			109	11		69	13	214
Herpes simplex virus type 2								69	1		205	10	285
Herpes simplex not typed/pending	1	1			3			17	1		4	7	34
Cytomegalovirus			1	1	30		4	3	2			53	94
Varicella-zoster virus			1				1	46				15	63
Epstein-Barr virus					3			1				84	88
Herpes virus group - not typed								3					3
OTHER DNA VIRUSES													
Molluscum contagiosum								2					2
Parvovirus								2		1		5	8
PICORNA VIRUS FAMILY													
Coxsackievirus A9						1							1
Coxsackievirus A untyped/pending			1										1
Coxsackievirus B1					1							1	2
Coxsackievirus B3		1			2								3
Coxsackievirus B5					1								1
Echovirus type 7		1	1										2
Echovirus type 11		4			4							1	9
Echovirus type 14		2										2	4
Echovirus type 17		1											1
Echovirus type 18		1											1
Echovirus type 30	1				1								2
Echovirus not typed/pending	1	2										1	4
Poliovirus type 1 (uncharacterised)					1								1
Poliovirus type 3 (uncharacterised)												1	1
Rhinovirus (all types)					43							5	48
Enterovirus not typed/pending	1		4		22	3		3				15	48
ORTHO/PARAMYXOVIRUSES													
Influenza A virus					11							3	14
Influenza B virus					26							4	30
Influenza virus - typing pending					2								2
Parainfluenza virus type 1					1								1
Parainfluenza virus type 2					10								10
Parainfluenza virus type 3					22								22
Parainfluenza virus typing pending		1			4							1	6
Respiratory syncytial virus			1		458			1				29	489
OTHER RNA VIRUSES													
HIV-1												8	8
Rotavirus					4	177						22	203
Astrovirus						1						1	2
Norwalk agent						2							2
Small virus (like) particle						2						1	3

Table 8. Laboratory reports by clinical information for the reporting period 1 to 14 July 1993, continued

	Encephalitis	Meningitis	Other CNS	Congenital	Respiratory	Gastrointestinal	Hepatic	Skin	Eye	Muscle/joint	Genital	Other/unknown	Total
OTHER													
Chlamydia trachomatis not typed					2			1	2		127	36	168
Chlamydia psittaci					3								3
Chlamydia species											1		1
Mycoplasma pneumoniae			1		64					1		46	112
Coxiella burnetii (Q fever)							4					31	35
Rickettsia australis												1	1
Streptococcus group A					1							35	36
Yersinia enterocolitica												1	1
Bordetella pertussis					8							3	11
Bordetella species					5							7	12
Leptospira species												1	1
Treponema pallidum				1								15	16
Entamoeba histolytica												3	3
Acanthamoeba species									1				1
Toxoplasma gondii					1							3	4
Echinococcus granulosus												2	2
TOTAL	5	15	10	2	789	216	83	278	25	21	408	896	2748

Table 9. Laboratory reports by contributing laboratories for the reporting period 1 to 14 July 1993

STATE OR TERRITORY	LABORATORY	REPORTS
Australian Capital Territory	Woden Valley Hospital, Canberra	61
New South Wales	Institute of Clinical Pathology & Medical Research, Westmead	252
	Prince Henry/Prince of Wales Hospitals, Sydney	8
	Royal Alexandra Hospital for Children, Camperdown	90
	South West Area Pathology Service, Liverpool	100
	Tamworth Laboratory, New England Pathology	14
Queensland	Dr TB Lynch, Pathologist, Rockhampton	99
	Queensland Medical Laboratory, West End	863
	State Health Laboratory, Brisbane	227
South Australia	Institute of Medical & Veterinary Science, Adelaide	235
Tasmania	Northern Tasmanian Pathology Service, Launceston	5
Victoria	Fairfield Hospital, Melbourne	250
	Microbiological Diagnostic Unit, University of Melbourne	5
	Royal Children's Hospital, Melbourne	176
Western Australia	Princess Margaret Hospital, Perth	114
	State Health Laboratory Services, Perth	249
TOTAL		2748