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DEPARTMENT OF HEALTH, HOUSING AND COMMUNITY SERVICES

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

REPORT OF THE AUSTRALIAN MALARIA REGISTER FOR 1991

(Based on the Report of the Australian Malaria Register for 1991 by Adrian Sleigh, Malathi Srinivasa, Amanda Cooper, Simon Forsyth and Ian Riley, The Tropical Health Program, University of Queensland)

The Australian Malaria Register (AMR) is managed by the Tropical Health Program (THP) of the University of Queensland. The THP receives confidential reports of malaria cases from each of the States and Territories of Australia. This is the second THP report for the AMR and covers the calendar year 1991.

MALARIA IN AUSTRALIA

Australia was certified free of malaria by the WHO in 1981, but it is believed that environmental conditions in Australia north of latitude 19°S still favour the transmission of malaria were parasites to be reintroduced. This definition of the 'receptive zone' for malaria arises from mapping of the distribution of verified indigenous cases in Australia[1], and from the later realisation that the principal vector, *Anopheles farauti* s.l. had not been identified south of the nineteenth parallel (J. Bryan, THP, personal communication, 1991).

Malaria is imported into Australia by travellers entering by air or sea through normal immigration points or as a result of traditional movement between Papua New Guinea and Australian Torres Strait islands. The infection may be diagnosed either because a traveller developed symptoms or because a healthy infected person was screened and found to be parasitaemic. Visitors from Papua New Guinea across Torres Strait who remain in Australia overnight or longer are routinely screened.

PURPOSE OF MALARIA REGISTERS

Monitoring for Indigenous Transmission

To monitor the transmission potential of malaria the affected States and Territories need to know about malaria cases imported into the receptive zone. This requires a rapid and reliable system to detect and report all malaria cases and a system to analyse the reported information. Other States and Territories need to be informed if transmission occurs.

To measure the transmission potential in more detail would involve:

1. monitoring the presence and vectorial capacity of potential vectors (this would be difficult and expensive);
2. measuring the delay to diagnosis for each case;
3. determining whether case-vector contact occurred (this is virtually impossible);
4. knowing for how long the case was gametocytaemic (virtually impossible to know reliably but could be estimated).

Such detailed information on the transmission potential is not available. The best approach is to monitor for actual transmission, count the cases occurring in the potential transmission zone and measure the delay to diagnosis. All cases need to be reported rapidly with sufficient information to identify introduced and indigenous cases.

Preventing Indigenous Malaria Transmission

Prompt diagnosis and treatment of malaria are essential in order to minimise the risk of transmission of indigenous malaria. To facilitate this, returned travellers need to consult their doctor if they develop a fever, the doctor needs to take a travel history and a blood slide, and the laboratory needs to report promptly. Impediments to seeking medical care and notification need to be removed (ignorance about malaria, difficulty in diagnosis, ignorance of the notification system, lack of forms, inadequate forms). On arrival, all persons entering the country should be advised of the risk of malaria and of the need for medical advice if any illness occurs after entering Australia.

The States and Territories with malaria-receptive zones should make a special effort to minimise importation of malaria. This requires appropriate advice to travellers and motivating them to follow it. Such a program requires compilation and dissemination of specific information about the risk to travellers, advice on prevention, and measurement of the effects of that advice.

Improving the Quality of Advice, Diagnosis and Treatment

Advice to travellers should be based on the best possible information regarding actual risks. This requires calculation of country-specific attack rates for travellers. These attack rates can only be calculated accurately by a national register if there is full reporting of cases and visitors are distinguished from returning residents. Summaries produced by the Australian Bureau of Statistics provide denominator data for the calculations.

At present the outcome of a malaria episode is not reported to the AMR but is available to some State and Territory Registers. Confusion about which dates are important prevents the AMR from making accurate estimates of delay to diagnosis. If this information is improved the AMR can compare trends for this important variable over time, between regions and between categories of malaria cases.

The adoption of a quality control system to compare the diagnosis made by peripheral and reference laboratories will make it possible to measure the accuracy of species diagnosis available to treating doctors. Such a development would allow the AMR to note trends in diagnostic accuracy over time and compare States and Territories and regions in the annual reports.

The AMR could also be used for generating a case series for detailed case-control studies of various risk factors such as the quality of advice offered before travel, compliance with the advice, and activities within high-risk countries of interest.

Malaria Notification System

The current system varies within and between States and Territories and the degree of under-reporting is probably substantial but remains unknown. Some questions, especially those that deal with chemosuppression, address at the time of diagnosis, date of symptom onset and treatment are often answered incompletely or inconsistently. Reform of the current notification system should begin by aiming to have complete reporting as the highest priority. This may clash with the desire to obtain detailed information because reporting doctors will not fill in complex forms. A one-page, easy-to-use form that is easy to return (eg. a pre-addressed aerogram) would be ideal. A toll-free telephone hot-line could also be used for reporting and for answering any queries. Rapid feedback of useful information is also critical for motivating peripheral reporters.

AUSTRALIAN MALARIA REGISTER

Malaria Case Definition

All cases reported to the AMR with a clinical onset in Australia in 1991 or, lacking a clinical history, a first laboratory report in 1991, were included in the AMR analysis for 1991. Entry of cases occurring in 1991 was closed on 26 July 1992 after verifying with reporting State and Territory Malaria Registers that all notifications were received. Malaria reported to the Australian AMR was classified as imported when infection was acquired outside Australia, and as introduced when infection was thought to have been acquired from an imported case[2]. A relapse was defined as occurring when the one species of parasite was identified from a patient on two occasions separated by an interval greater than 28 days after the onset of the reported primary attack. Reports of episodes in the same person that appear to be less than 28 days apart and involving the same parasite species were merged and counted as a single episode. It was not possible to distinguish recrudescent malaria.

Format of Notified Data

Due to the complex and often incomplete nature of the reported information and its variation within and between States and Territories, the problems encountered in 1991 were the same as those in 1990. To offset the differing registers which have developed separately over several years in the various States and Territories, coding and editing rules were devised to cope with the variable incoming data formats for 1990. Duplicate notifications occurred frequently. The usual cause for duplicate notifications was separate reporting to the AMR by State and Territory registers and laboratories.

A new standard reporting format and code has now been devised by the AMR and accepted by all State and Territory registers. The new format should simplify registration and analysis and improve the annual AMR reports in the future.

Data Analysis

The AMR report for 1991 includes comparison with Australian malaria data for the 1969-1989 period. The analysis used published data from the AMR for 1969-1981[3], data from *Communicable Diseases Intelligence* (*CDI*) covering 1982-1989 (*CDI*, 1982-90), the Queensland Malaria Register (Jamieson, Queensland Health, personal communication, 1991), the AMR report for 1990 produced by the Tropical Health Program, and the information available for cases reported to the AMR for 1991.

The 1991 malaria cases were counted and classified by species, state of notification, delay to diagnosis, occupation, age, sex and probable country or region of exposure. As well, the following three risks were assessed:

(1) of malaria after arrival in Australia of all persons coming from important source regions or countries;

(2) of malaria in Australian residents after returning to this country from important source regions or countries;

(3) of the potential for malaria transmission in the supposed receptive zone north of 19°S.

The total deaths from malaria in Australia each year can be obtained from the Bureau of Statistics. The AMR lacks a source of information about the numbers of Australians dying overseas from malaria each year. It was not possible to determine the accuracy of diagnosis, the quality of case management, the quality of, compliance with or problems caused by pre-travel advice or the efficacy of suppressive or curative anti-malarial therapy. These issues could only be studied by special surveys.

AMR RESULTS FOR 1991

Epidemiological Case Classification

There were 939 malaria cases reported to the AMR for calendar year 1991; 740 (78.8%) were classified as imported, 103 (11.0%) as relapsing and 3 (0.3%) as introduced; 93 (9.9%) could not be classified (Table 1). Introduced cases were fewer than in 1990 (3 versus 27); they occurred in three 8-11 year-old female children born and residing in Torres Strait. They were reported to have acquired their infections at their place of residence, Saibai Island. The Australian Bureau of Statistics recorded no deaths due to malaria in Australia during 1991.

Table 1. Malaria Case Classification in 1991

Classification	Frequency	Percent
Imported	740	78.8
Introduced	3	0.3
Relapse	103	11.0
Unknown	93	9.9
Total	939	100.0

Distribution of Cases

The majority of cases were notified by Queensland (49%), and New South Wales (23%) (Table 2). Over two-thirds of all cases were due to *P. vivax* and nearly one-quarter due to *P. falciparum* (Table 2). The total number of cases reported maintains the steady increase recorded since 1969 (Table 3). Fluctuations in the number of cases reported by individual States and Territories may well represent variation in the system of reporting over the last decade (Table 3).

Queensland reported 460 cases - slightly fewer than in 1991; the place of onset was reported as Torres Strait for 55, mainland for 364 and "somewhere in Queensland" for 11. New South Wales reported a major increase. The Northern Territory reported 46 cases, 10 more than its 1990 case count which had more than doubled the Northern Territory average over the preceding decade. South Australia, Tasmania, Victoria and Western Australia also reported higher case counts than for 1990.

Nearly three quarters of cases were in males; malaria was most frequently reported in persons 20 to 29 years; (Figure 1).

Occupational information was given with 640 (68%) reports. One quarter of cases involved students or minors. The majority of those who reported their occupation were white-collar workers (27.4%). Approximately 4% of cases were in persons employed in the armed services.

The place or region of onset of malaria was reported for 791 cases (84.2%); for at least 51 persons (5.4%) symptoms commenced outside Australia. This was less than the percentage of cases (85 or 11%) developing symptoms outside Australia in 1990.

Malaria occurring in visitors to Australia, defined as those with a place of residence overseas, was noted in 95 of the 857 cases with this variable reported. Eighty-three of the visitors were from the SW Pacific (all were notified by Queensland) and included 82 from Papua New Guinea and 1 from the Solomon Islands. The other 12 reported visitors lived in Africa (1), Europe (8), North America (1) or South Asia (2). The remaining 762 malaria cases reporting place of residence lived in Australia and included 92 residing in the receptive zone north of 19°S.

Table 2. Malaria Diagnosed in Australia in 1991 by State of Notification and Species of Parasites

State	Species of malaria								TOTAL
	F	V	M	O	FV	FM	VM	Unknown	
ACT	1	8	0	0	0	0	0	1	10
NSW	45	159	2	4	1	0	1	6	218
NSW/ACT	0	3	0	0	1	0	0	0	4
NT	21	22	1	0	1	0	0	1	46
Qld	122	311	4	1	12	0	0	10	460
SA	2	34	0	0	2	0	0	4	42
Tas	0	11	0	0	0	0	0	0	11
Vic	21	88	0	3	0	0	0	0	112
WA	5	26	0	1	2	1	0	1	36
TOTAL	217	662	7	9	19	1	1	23	939

Species:
F = *P. falciparum*
V = *P. vivax*
M= *P. malariae*
O = *P. ovale*

FV = *P. vivax* + *P. falciparum*
FM = *P. malariae* + *P. falciparum*
VM = *P. vivax* + *P. malariae*

Table 3. Malaria Cases in Australia by State/Territory of Notification 1969-1981

Year	ACT	NSW	Vic	Qld	SA	WA	Tas	NT	TOTAL
1969	9	36	23	58	5	6	0	29	166
1970	8	40	39	76	2	9	3	22	199
1971	3	42	32	71	5	20	1	46	220
1972	12	41	17	33	26	13	0	28	170
1973	19	29	45	48	16	8	2	27	194
1974	18	34	27	51	18	4	1	48	201
1975	15	43	45	65	24	25	1	37	255
1976	13	77	54	62	22	16	1	20	265
1977	14	99	53	68	17	26	2	12	291
1978	17	96	55	71	34	37	4	11	325
1979	19	115	87	176	33	30	3	10	473
1980	18	176	120	191	59	50	8	7	629
1981	16	137	95	165	39	31	4	10	497
1982	20	142	92	219	39	20	1	15	548
1983	16	146	80	223	43	33	2	27	570
1984	19	113	66	330	54	34	9	15	640
1985	16	132	99	72	47	37	5	13	421
1986	35	179	93	283	33	43	10	20	696
1987	27	89	95	268	45	23	4	23	574
1988	26	84	65	332	30	42	2	20	601
1989	19	91	65	487	34	60	9	5	770
1990	16	174	91	492	31	32	2	36	874
1991	10	222	112	460	42	36	11	46	939

Source: 1969-81, Black 1981[4]; *CDI* 1982-89; AMR 1990 data set.

Diagnosis of Malaria

There were 808 malaria cases with dates of onset of symptoms and diagnosis recorded, including 217 cases due to *P. falciparum* malaria. As *P. falciparum* malaria can lead to serious complications or death, prompt diagnosis is essential; however, two-thirds of cases remained undiagnosed 48 hours after symptom onset (Figure 2).

The risk of transmission depends upon the development and maturity of malaria gametocytes. The longer a case is allowed to progress, the greater the probability that gametocytes will develop. No data were available to the AMR about the presence of gametocytes in individual cases. However, five days after symptom onset 32.1% of all malaria cases remained undiagnosed (Figure 2) and seven days after symptom onset 21.7% were still undiagnosed. In 1990 38.8% of cases remained undiagnosed after five days and 28.6% after seven days. Delays in diagnosis of one week or more were relatively as frequent for *P. falciparum* as for non-*P. falciparum* malaria.

Of the cases diagnosed in the receptive zone, 26.1% (43/165) remained undiagnosed after five days and 18.8% (31/165) after seven days.

Most of the 39 malaria cases that were diagnosed by screening were detected in Torres Strait (Table 4); 90% of the screened cases were people born in Papua New Guinea and 85% were visiting Australia.

Figure 1. 1991 Malaria Cases by Age and Sex

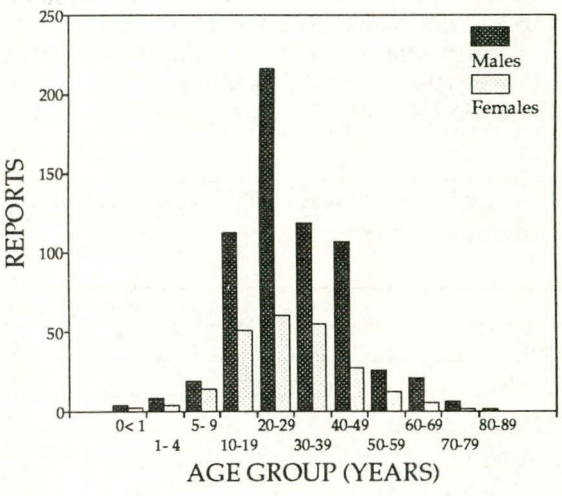
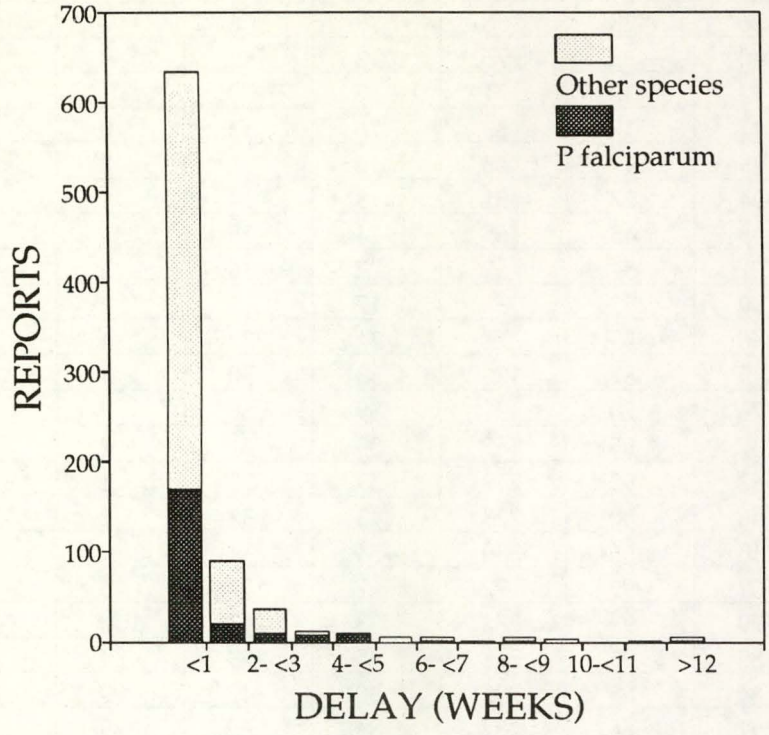


Figure 2. *P. falciparum* and Non-*P. falciparum* 1991 Malaria cases diagnosed each week after onset



Origin of Malaria Diagnosed in Australia

Countries visited were reported to the AMR as "Country Exposed 1, 2 and 3". For a few cases 2 or 3 possible countries of exposure were listed. The majority (83.8%) reported a single country; two or three possible countries were reported in 4.4% and 2.8% of cases respectively. Table 5 lists cases by most probable source country, defined as the most recently visited malarious country entered at least 6 days before the onset of the disease. Probable source countries are grouped by region.

Table 4. Place of diagnosis for 1991 malaria cases identified by screening

Place	Frequency	Per Cent
Badu Island	8	20.5
Boigu Island	1	2.6
Murray Island	1	2.6
Saibai Island	17	43.6
Thursday Island	1	2.6
Yam Island	3	7.7
Yorke Island	1	2.6
Cairns	2	5.1
Charter Towers	2	5.1
Ingham	1	2.6
Brisbane	2	5.1
TOTAL	39	100

There were 853 cases with reported data on the country of exposure and for 64% of these the SW Pacific was the most probable source. Overall, the most important countries of exposure were in the SW Pacific or Asia and were ranked as follows: Papua New Guinea (456), Indonesia (127, including Irian Jaya (5), Timor (3) and Bali (3)), Solomon Islands (68), India (60), Vanuatu (21) and Thailand (20) (Table 5).

In 1981 the numbers of cases from these countries were Papua New Guinea (239), Indonesia (64), Solomon Islands (50), India (44) and Vanuatu (11). Most of the increase in the number of cases diagnosed in Australia over the decade 1981 to 1991 is due to an increase in malaria imported from PNG. Indonesia in 1991 accounted for twice as many cases as it did in 1981 and made up 15% of the 1991 cases with source country determined.

Cases from drug resistant areas of Africa were the most likely to be due to *P. falciparum* malaria (30/57 or 53%). Cases from the SW Pacific were the next most likely to be *P. falciparum* infections (144/550 or 26%). Only 6 cases of *P. falciparum* malaria were acquired in regions in SE Asia where frequent resistance to all drugs is reported.

Cases of malaria acquired in PNG were more frequently due to *P. falciparum* (30%) than were infections acquired in the Solomon Islands (21%) (Table 5). Over the last decade, the proportion of cases from Papua New Guinea involving *P. falciparum* has varied from 30% in 1981[3], to 40% in 1990[5] and 30% (139/456) in 1991. This may be related to changes in disease patterns, changes in travel itinerary, or to natural variation. The

Table 5. Exposure Region*/Country for 1991 Malaria cases

Region/Country of exposure	Species of malaria*								TOTAL
	F	V	M	O	FV	FM	VM	Unknown	
Australia									
Torres Strait	2	1	0	0	0	0	0	0	3
Asia	1	0	0	0	0	0	0	0	1
S Asia									
India	1	57	0	0	0	0	0	2	60
Nepal	0	3	0	0	0	0	0	0	3
Pakistan	0	6	0	0	0	0	0	0	6
Sri Lanka	0	1	0	0	0	0	0	0	1
S E Asia									
Indonesia	22	87	0	0	4	0	0	3	116
- Bali	0	2	0	0	1	0	0	0	3
- Timor	0	3	0	0	0	0	0	0	3
Malaysia	0	2	0	0	0	0	0	0	2
Philippines	0	2	0	0	0	0	0	0	2
S E Asia									
Burma	0	4	0	0	0	0	0	0	4
Laos	0	1	0	0	0	0	0	0	1
Thailand	4	16	0	0	0	0	0	0	20
Vietnam	2	8	0	0	0	0	0	0	10
TOTAL (all Asia)	30	192	0	0	5	0	0	5	232
S W Pacific									
Irian Jaya	0	5	0	0	0	0	0	0	5
PNG	132	300	5	1	7	0	1	10	456
Solomon Island	11	53	0	0	3	0	0	1	68
Vanuatu	1	20	0	0	0	0	0	0	21
Guam	0	1	0	0	0	0	0	0	1
TOTAL	144	379	5	1	10	0	1	11	551
America									
Central America									
'Central America'	0	1	0	0	1	0	0	0	2
El Salvador	0	1	0	0	0	0	0	0	1
Guatemala	0	2	0	0	0	0	0	0	2
Mexico	0	2	0	0	0	0	0	0	2
S America									
Argentina	0	1	0	0	0	0	0	0	1
Bolivia	0		1	0	0	0	0	0	1
TOTAL	0	8	0	0	1	0	0	0	9
Africa									
'Africa'	6	4	0	2	0	0	0	1	13
'East Africa'	1	0	0	2	0	0	0	0	3
Ghana	5	1	1	1	0	0	0	1	9
Kenya	3	1	0	1	0	0	0	0	5
Liberia	0	1	0	0	0	0	0	0	1
Madagascar	0	1	0	0	0	0	0	0	1
Malawi	0	1	0	0	1	0	0	0	2
Nigeria	4	1	0	0	0	1	0	2	7
Tanzania	3	0	0	0	0	0	0	0	4

Table 5. Exposure Region*/Country for 1991 Malaria cases, continued

Regio/Country of exposure	Species of malaria*								TOTAL
	F	V	M	O	FV	FM	VM	Unknown	
Uganda	0	0	0	0	0	0	0	1	1
Zaire	1	0	0	1	0	0	0	0	2
Zambia	3	0	0	0	0	0	0	0	3
Zimbabwe	4	0	0	1	1	0	0	0	6
TOTAL	30	10	1	8	2	1	0	5	57
Middle East									
Turkey	0	1	0	0	0	0	0	0	1
Unknown (1 'Many')	11	71	1	0	1	0	0	2	86
WORLD TOTAL	217	662	7	9	19	1	1	23	939

* see footnote Table 2 for explanation of species names

most recent information about the percentage of *P falciparum* cases within PNG itself is that 71.3% of cases in 1988, 77.2% in 1989, and 77.2% in 1990 were due to *P. falciparum*[7]. 1991 data is not available. The much lower percentages of *P. falciparum* malaria diagnosed in Australia in travellers from Papua New Guinea is probably a reflection of differences in severity and the natural history of disease.

Guam, designated a malaria-free island by WHO, was reported as the place of exposure to malaria for a pilot visiting Australia (Table 5). This case could not be followed up as this visitor had left the country.

Malaria Source and Zone of Diagnosis

Different States and Territories have characteristic patterns of acquisition of malaria by country. Most Queensland cases originated in the SW Pacific. About half the New South Wales, Victorian, Tasmanian, and South Australian cases originated in the SW Pacific and most of the remainder in Africa or Asia. Half or more of the Northern Territory and Western Australia cases originated in Asia. Western Australia had the highest proportion of African cases (8/36 or 22%).

176 cases were diagnosed in the receptive area (19% of the 928 cases with zone of onset recorded). Malaria of Papua New Guinea or other SW Pacific origin is of major importance in the Queensland receptive zone; in contrast, more than half of the cases in the diagnosed in the Northern Territory and Western Australia receptive zones originated in South East Asia. Only five of the 59 cases of *P. falciparum* malaria in the Queensland receptive zone were reported to have originated outside the SW Pacific and 49 came from PNG.

In the Queensland receptive zone *P. falciparum* malaria was very significantly more frequent (59/139 or 42%) than elsewhere in Australia (172/800 or 22%) (Table 6).

Reason for Exposure to Malaria Infection

Reason for exposure was given for 83% (777/939) of cases reported.

Residence or resident employment in a malarious area was the predominant reason for exposure to the infection (373/939 or 40%). Holidaying was reported for almost a third (31%) of all cases. Visiting relatives was reported for 31 cases (3.3%). Between them backpackers and business travellers accounted for only 4.1% of the 939 cases in 1991. Military service and "refugee" each were reported as the reason for exposure for less than 2% of the cases.

Risk to Australian Residents Abroad

The estimates of risk to travellers in 1981, as published by Black[3] and calculated for the 1990 cases in the AMR report for that year, were also calculated for 1991. Only the important source regions or countries were included. The total number of travellers arriving from various "countries of stay overseas" were obtained from estimates provided by the Australian Bureau of Statistics[6]. The ABS estimates are based on random computer samples of entry records and have small standard errors. Recalculation of Black's estimates for 1981 yielded results almost identical to those published by him for that year indicating that we are using the same method. It is valid to compare his 1981 estimates to those of 1990 and 1991. Black's method and the available 1981 ABS data were used for calculations that filled gaps in his published 1981 risk estimates for certain countries.

Comparison of the 1981, 1990 and 1991 risks for the important source countries reveals remarkable stability in the risks for most countries (Table 7). There is no evidence of a substantial increase in risk to travellers abroad for any country. As for 1981 and 1990, the highest risk countries for 1991 were the Solomon Islands (10.0/1000 arrivals) and Papua New Guinea (6.31/1000 arrivals).

Black[3] had included all arrivals in his denominators. For 1990 and 1991 we also calculated adjusted risks by deleting visitors from the cases and from the estimated number of arrivals; this allowed calculation of the risk to returning Australian residents. All cases whose place of residence was reported as overseas were assumed to be visitors and deleted from the numerator; and all visitors reported on the breakdown of ABS arrival totals by country of previous stay were deducted from the total arrivals for that country.

The adjusted risk estimates (Table 8) were not influenced by visitors, and it was not possible to adjust for immigrants from the available ABS data. However, the number of immigrants from the countries for which risks were calculated is probably quite small. Adjusted estimates yielded useful country-specific risks of malaria for Australian residents returning and are the best available reflection of the malaria risk for Australian residents going abroad. The risks for Australian residents returning from the Solomons (13.42/1000) or Papua New Guinea (5.67/1000) were much larger than for other important source countries.

ERRATUM 1990 REPORT

Due to late notification, 61 malaria cases were not reported in the "Final Report of the Australian Malaria Register for 1990" CDI 1991;22:400. There were 47 extra cases from Victoria, 10 from Queensland, 3 from Western Australia and 1 from New South Wales. The total number of malaria cases reported for 1990 is now 874 (Table 3).

Nearly all of the additional 1990 cases were imported, with only three being classed as relapsing.

There were 17 cases due to *P. falciparum*, 41 cases due to *P. vivax* and 2 mixed infection of *P. falciparum* and *P. vivax*. There was 1 case where the infection was unknown.

Papua New Guinea was reported as the source of infection for 22 of the cases, 11 cases reported infection from Africa, 10 cases from South East Asia B (See Table 11), 8 from South East Asia C, 3 from South Asia B and 7 of unknown origin.

Table 6. Species of Malaria by Zone of onset

Onset Region*	Species of malaria**								TOTAL
	F	V	M	O	FV	FM	VM	Unknown	
A	27	33	2	1	2	0	0	5	70
B	66	312	2	6	5	1	1	9	402
C	14	20	1	0	1	0	0	1	37
D	2	8	0	1	0	0	0	0	11
E	52	213	2	1	8	0	0	4	280
F	22	56	0	0	2	0	0	4	84
G	34	20	0	0	1	0	0	0	55
TOTAL	217	662	7	9	19	1	1	23	939

* A Onset not in Australia
B Non-receptive area in Australia but not Queensland
C Receptive area in Australia in WA or NT
D Areas in WA or NT but not known if in receptive zones
E Non receptive area in Queensland
F Receptive area in Queensland on the mainland
G Receptive area in Queensland in Torres Strait

** see footnote Table 2 for explanation of species names

Table 7. Malaria Risk by Exposure Region/Country for persons arriving in Australia in 1981, 1990 and 1991

Area of Exposure	Total arrivals			Malaria Cases			Cases per 1000 arrivals		
	1981	1990	1991	1981	1990	1991	1981	1990	1991
Africa	17,482	28,325	26,961	23	37	57	1.31	1.30	2.11
India	16,527	35,235	35,497	44	42	60	2.66	1.19	1.69
Indonesia	100,292	196,776	212,520	64	90	116	0.63	0.45	0.54
Malaysia	119,481	128,979	123,629	9	4	2	0.07	0.03	0.01
Thailand	26,785	120,259	97,879	8	12	20	0.29	0.09	0.20
PNG	54,939	71,955	72,186	239	423	456	4.35	5.87	6.31
Solomons	4,077	7,272	6,799	50	49	68	12.26	6.46	10.00
Vanuatu	4,589	19,384	22,215	11	26	21	2.39	1.34	0.94

* Based on total arrivals estimated by the Australian Bureau of Statistics. No distinction made between Australian residents and visitors. The 1981 estimates are by Black (1982).

Table 8. Risk of Malaria in returning Australian residents* by most recent exposure country, 1991

Area of exposure	Arrivals		Cases		Rate/1000	
	1990	1991	1990	1991	1990	1991
Africa	18,386	17,392	27	50	1.46	2.87
India	23,804	25,152	34	44	1.42	1.74
Indonesia	160,257	173,006	87	111	0.54	0.64
Malaysia	78,695	71,333	3	1	0.04	0.01
Thailand	99,679	72,163	11	19	0.11	0.26
PNG	36,487	36,127	264	205	7.23	5.67
Solomons	4,173	3,798	32	51	9.10	13.42
Vanuatu	16,721	19,549	22	17	1.31	0.86

* Risk estimate adjusted by deleting visitors from calculations

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CDI Editorial Comment

The most recent report of the WHO on the global malaria situation (**CDI** 1992;15: 314) stated that more than 40% of the world population remained at risk to malaria. More than 100 million cases occur per year. The WHO estimates that 10,000 travellers each year develop malaria after returning home and 1% of those with malaria due to *P. falciparum* die. There were three fatal cases of malaria in Australia in 1992 (none reported for 1993 to date). In contrast there were only 9 deaths from malaria in the decade 1981 to 1990. A combination of deteriorating malaria situations in a number of countries, including 'frontier areas' in South-east Asia and South America and an increasing number of Australian travellers and workers staying in the semi-rural and rural areas of countries where malaria is prevalent are major contributors to a steadily increasing number of malaria cases being imported.

Malaria chemoprophylaxis and/or anti-mosquito measures are essential for Australians travelling to areas where they will be at risk to this disease. Whether or not chemoprophylaxis is required, and what type of drugs are to be used is a complex issue. It depends not only on the traveller's destination (and therefore on the species of parasites present and their resistance to antimalarial drugs), but also on the length of stay, type of accommodation, age of the patient, medical history, and whether or not a female traveller is pregnant or lactating.

Detailed information on malaria risks and prophylaxis is available in *Health Information for International Travel*, published by the Department of Health, Housing and Community Services in 1991. This book, which also covers other aspects of preventative medicine for travellers, is available from the Australian Government Publishing Service at a cost of $9.95. AGPS publications are available from the Commonwealth Government Bookshops in each State and Territory:

Adelaide	(08) 237 6955
Brisbane	(07) 229 6822
Canberra	(06) 247 7211
Darwin	(089) 89 7152
(NT Government Information Centre)	
Hobart	(002) 23 7151
Melbourne	(03) 663 3010
Parramatta	(02) 893 8466
Perth	(09) 322 4737
Sydney	(02) 299 6737
Townsville	(077) 21 5212 or (008) 80 5896

In addition, the Department of Health, Housing, Local Government and Community Services maintains a computerised message service, the INTERNATIONAL TRAVEL HEALTH *INFO-LINE*, available on (06) 269 7815. The *INFO-LINE* is composed of approximately 40 up-to-date messages on a wide variety of travel health topics and is primarily intended to assist general practitioners advising intending travellers. Individual messages can be accessed by using the key pad of a touch-tone telephone.

Malaria has been notifiable in most States and Territories, and the notifications have been nationally collated, since 1917. Peak incidences of notified malaria were recorded in 1919, 1934 and 1946 (Figure 9).

In 1946 5,496 notifications were received for a national malaria notification rate of 1, 375.5 per 100,000 population. This major peak was recorded at the time as being due to cases in returned servicemen after the Second World War. Since 1952 there has been an exponential increase in the rate of notified malaria to 5.2 cases per 100,000 population in 1991 (Figure 10).

It should be noted that though malaria is a notifiable disease throughout Australia there is significant underreporting. In 1991 there were 790 cases notified to the National Notifiable Diseases Surveillance System and 939 reports to the Australian Malaria Register

Figure 9. Malaria notifications per 100,000 population, 1917 to 1991

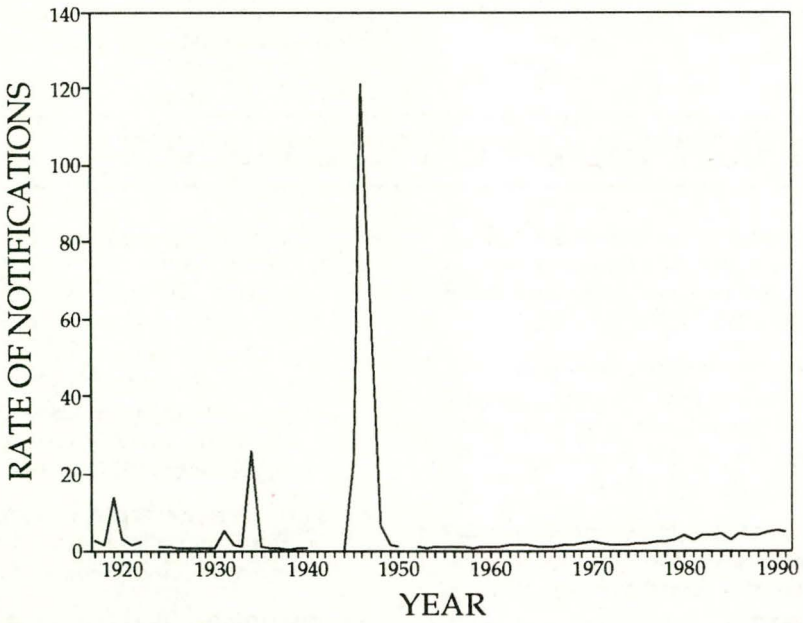
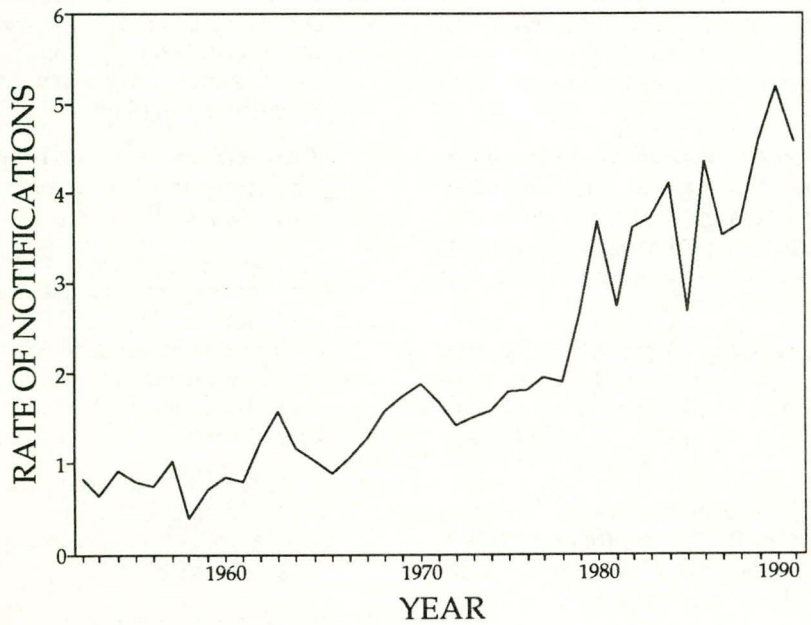


Figure 10. Malaria notifications per 100,000 population, 1952 to 1991



OVERSEAS BRIEFS

In the previous two weeks the following information regarding cholera has been supplied by the World Health Organization.

Cholera in the Americas Update

Brazil has reported that although the cholera epidemic is centred in the north-eastern states of the country, the disease continues to spread widely and cases are now occurring in the larger cities to the south, including Rio De Janeiro (13 cases reported for 1993, only 1 case prior to that). To March 1993 Brazil had recorded 39,990 confirmed cases, with 528 fatalities since the start of the epidemic in 1991.

Cholera in Africa Update

Zambia has declared the eastern province of the country to be newly infected.

Cholera in Asia Update

Iran reported that as of 18 March 1993 the whole country was free of cholera and had been removed from the infected area list.

COMMUNICABLE DISEASES SURVEILLANCE

There were 1618 reports received in the CDI Virology and Serology Reporting Scheme during this fortnight (Tables7, 8, and 9), and 264 reports of isolates from normally sterile sites (LabDOSS, Table 2).

- Ten cases of **measles** were reported. Of these cases 6 were children 5 years of age or younger (3 males, 3 females) and 4 were adults aged 18 to 36 years (1 male, 3 females). One patient, a 36 year old woman, was reported as having CNS symptoms.
- IgM to **rubella** was detected in the serum of a 7 year old girl with encephalitis. Of the 37 reports of rubella received 8 were in women aged from 15-44 years. Again, most reports (33/37) received during this fortnightly period were from Queensland although no more than 2 reports were received from any one postcode.
- Nine reports of **hepatitis A** were received, including one, a 23 year old male who reported an occupational risk for hepatitis A. Of the remaining reports, 2 were boys aged 5 and 10 years, 2 were females aged 28 years and 4 were males aged 29 to 43 years.
- Risk factors were provided for 3 of the 109 **hepatitis B surface antigen positive** reports. These included a diabetic, an injecting drug user and an immunocompromised patient. One patient was reported as hospitalised and 34 reports were from pregnant women.
- Of 138 **hepatitis C** reports, 21 reported injecting drug use as a risk factor (10 females, 11 males; ages ranged from 25 to 37 years). One report was from a pregnant woman. Two reports noted needlestick injury.
- A total of 153 **Ross River virus** reports was received during this fortnight (NSW 23, Vic 40, Qld 81, WA 9). Reports from NSW and Queensland were mostly in the vicinity of the Murray River. One report from Queensland stated that the patient was from the Northern Territory. There are no reports for South Australia since no virus reports were received from IMVS during this period. Twelve reports were confirmed cases showing rising titre, the rest were presumptive cases (IgM detected). Four patients were also seropositive for Barmah Forest virus. Twenty-four reports of **Barmah Forest** seropositivity (IgM) were received.
- Four **dengue** reports were received, 3 of which were further characterised as type 2. Three reports were from Townsville and one from Cairns.
- Five **unspecified flavivirus** reports were received. Two of these reported overseas travel (one to Thailand and the Philippines and the other did not specify location). The remaining reports originated from around Townsville (2) and Mackay (1).
- Of the 62 **cytomegalovirus** reports risk factors were provided for 8: 3 HIV positive patients, 3 transplant patients (2 heart, 1 liver), 1 patient with pancytopenia and 1 pregnant woman. One report of virus isolation from placental tissue was received.
- **Two reports of coxsackievirus A1** were received including one CSF isolate from a 20 year old male with encephalitis.
- **Coxsackievirus B1** was isolated from lung and liver biopsy tissues form a 9 month old child on postmortem. This virus was also isolated from the cerebrospinal fluid (CSF) of a 1 month old male infant with meningitis. The remaining isolations were from faecal (4) or nasal samples. There have been 15 reports of this virus so far this year.
- Three of the four **coxsackievirus B5** isolations were from cerebrospinal fluid. The patients were two males under 1 year of age and a 25 year old female. The remaining isolate was from a throat swab.

- There were 12 reports of **echovirus 7** during this fortnight continuing the increased activity for this virus from last year. Four patients had meningitis or encephalitis (CSF isolates). The virus was also isolated from the urine of a 61 year old transplant patient. There have been 68 reports since the May 1992 (Figure 1). Of these 56% have been reported as meningitis, encehalitis or have been CSF samples. The age and sex breakdown of cases reported during this period are shown in Table1.

Figure 1. *CDI* Laboratory reports of echovirus 7, by sample collection date, April 1992 to present

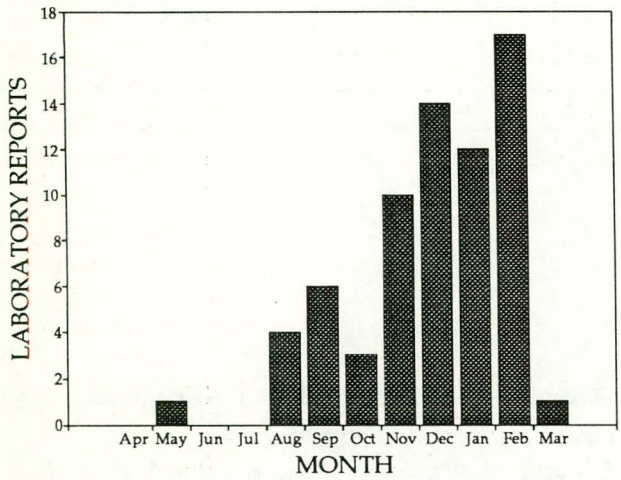


Table 1. *CDI* Laboratoryreports for echovirus 7, April 1992 to present, by age and sex

Age group	Sex			Total
	Male	Female	Unknown	
<1 month	1	2	0	3
1-11 months	7	11	1	19
1-4 years	9	4	0	13
5-14 years	3	3	1	7
15-24 years	1	1	0	2
25-44 years	8	7	0	15
45-64 years	2	0	0	2
Unknown	4	2	1	7
Total	35	30	3	68

- One of the 9 **influenza A** reports was diagnosed by virus isolation; others were serological reports (single high titre). Of these reports 5 were over 60 years of age.
- There were 3 reports of **influenza B**, 1 confirmed cases (fourfold rise in titre) and 2 presumptive cases (single high titre). Of these reports only 1 patient was over 60 years of age.
- Of 38 reports of **Q fever**, exposure details were provided for 5 - 2 meatworkers, a farmer and 2 station-hands. IgM was detected in 19 reports while the remaining reports were single high titres. Ages ranged from 19 to 73 years (10 females, 28 males).
- Three reports of infection with **Norwalk-like agent** (diagnosis by electron microscopy) were received. The 3 women (one 76 years of age) were investigated for gastroenteritis, one at the end of February and 2 in early March. This is the fourth report this year; 6 cases were reported last year.
- A total of 192 ***Chlamydia trachomatis*** reports were received including 2 reports of pelvic inflammatory disease (aged 18 and 23 years) and 1 report of a congenital eye infection in a neonate.
- Eight ***Bordetella pertussis*** reports and one ***Bordetella* species** report were received (IgM detection). These reports included a 4 month old infant, 4 children aged 1, 2, 5, and 9 years and 3 adults aged 18 to 33 years.
- A report of congenital syphilis was included in the 52 ***Treponema pallidum*** reports received during this fortnight.

Sterile Sites Surveillance (LabDOSS)

Data for this fortnight have been provided by 4 laboratories. A total of 264 reports have been included for this report.

169, ICPMR Westmead

54, Liverpool Hospital

29, Concord Hospital

12, Toowoomba General Hospital.

Organisms reported 5 or more times from blood are detailed in Table 2.

Other blood isolates not included in Table 2 were:

Gram positive: *1 Streptococcus* Group A, *4 Streptococcus* Group B (3 neonates, 1 aged 5 weeks) *1 Streptococcus* Group G, *3 Streptococcus milleri,2 Streptococcus sanguis,2 Streptococcus "viridans"*, 3 *Streptococcus pneumoniae* 1 *Streptococcus uberis*, 4 *Streptococcus mitis*, 1 *Streptococcus bovis*,2 *Streptococcus* sp, *1 Corynebacterium Group A-4 (immunocompromised)*, 1 *Listeria monocytogenes* (neonate).

Gram negative: *2 Alcaligenes sp* , 3 *Serratia marcescens*, *2 Citrobacter sp (1 freundii)* , *3 Pseudomonas (2 paucimobilis,)*, 1 *Haemophilus influenzae type b*, 1 *Yersinia enterocolitica*, *4 Proteus mirabilis*, 3 *Xanthomonas maltophilia*, 2 *Aeromonas sp*

Anaerobes: 3 *Bacteroides sp (1 fragilis, 1 vulgatus)*, *1 Clostridium ramosum, 2 Fusobacterium sp(1 nucleatum),*

Fungi: *2 Rhodotorula sp, 2 Cryptococcus neoformans var neoformans (Both HIV)*

Table 2. LabDOSS reports of blood isolates for the reporting period 11 to 24 March 1993

Organism	Total[1]	Clinical Information						Risk Factors				
		Bone/Joint	Lower respiratory	Endocarditis	Gastrointestinal	Urinary Tract	Skin	Surgery	Immunosuppressed	IV line	Perinatal	Neonatal
Staphylococcus aureus	39[2]	4	2	2			3	5	4	5		1
Staphylococcus coagulase negative	33				1		3	4	2	14		1
Enterococcus sp	10[3]			2	4	2	2	1	3	3		
Escherichia coli	38		4		6	16		2	5	4	2	1
Klebsiella sp	12[4]		1		2	2			1	3		1
Enterobacter sp	10[5]				1	1	1	1	1	2		
Pseudomonas aeruginosa	7		1		1	1	1		1	3		
Candida albicans	6							1	1	3	1	

1. Only organisms with 5 or more reports are included in this table.
2. 7 MRSA
3. 4 *Enterococcus faecalis*
4. 4 *Klebseilla oxytoca*, 5 *Klebsiella pneumoniae*
5. 2 *Enterobacter aerogenes*, 6 *Enterobacter cloacae*

CSF Isolates and Meningitis Reports

1 Haemophilus influenzae type b (3 M), 1 *Group B Streptococcus* (M neonate) 1 *Bacillus sp*, 1 *Enterobacter aerogenes (neonate) 2 Coagulase negative Staphylococci, 1 Serratia Marcescens, 2 Cryptococcus neoformans* (both HIV).

Isolates from Sites other than Blood or CSF

Peritoneal dialysate:1 *Acinetobacter sp, 1 Escherichia coli, 2 Staphylococcus aureus, 3 Staphylococcus epidermidis,1* Coagulase negative staphylococcus

Joint fluid: *1 Escherichia coli 2 Staphylococcus aureus*

Pleural fluid: 1 *Comomonas sp*, 1 *Rhodotorula sp*,1 *Acinetobacter sp*,1 *Enterococcus sp*,*1 Escherichia coli*,4 *Staphylococcus aureus* (1 MRSA) , 6 Coagulase negative staphylococci,1 *Streptococcus sanguis*

Other: *1 Alcaligenes sp, 1 Eikenella corrodens,2 Enterococcus sp (1 faecium , 1 faecalis), 6 Staphylococcus aureus (1* MRSA *),1 Staphylococcus epidermidis, 2 Streptococcus milleri,1* group A *Streptococcus*

Australian Sentinel Practice Research Network

The Australian Sentinel Practice Research Network collected data from 6812 patient encounters in week 12 and 5467 encounters in week 13 (Table 3).

Table 3. Australian Sentinel Practice Research Network, Weeks 12 and 13 1993

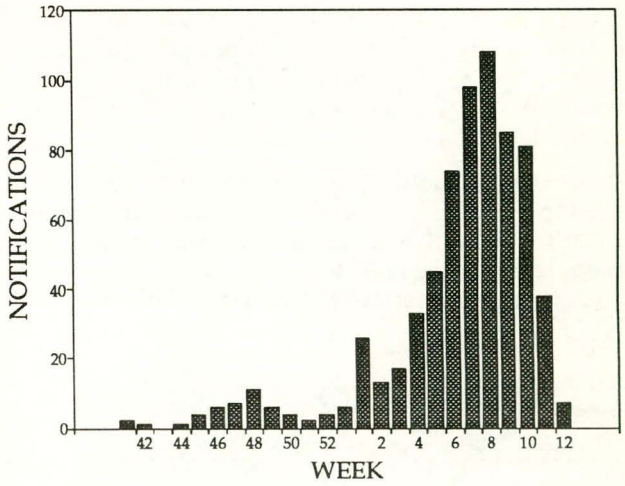
Condition	Week 12, 21 March 1993		Week 13, to 28 March	
	Reports	Rate per 1000 encounters	Reports	Rate per 1000 encounters
Influenza	28	4.1	14	2.6
Measles	1	0.1	0	0
Rubella	6	0.9	1	0.2
Pertussis	0	0	1	0.2
Genital herpes	5	0.7	1	0.2
Gastroenteritis	61	9.0	47	8.6

Ross River Virus Infection in South Australia, Update

The number of laboratory and doctor notifications of Ross River Virus infection received by the Communicable Disease Control Unit from the end of September 1992 to the 31st March 1993 now totals 679. The numbers being notified have continued to fall following the peak in the last week of February (Figure 2). A followup questionnaire to assess the effects of RRV infection on the community is now being prepared.

(Scott Cameron, Joanne Bell, Ossama El Saadi, SAHC; Suzanne Selden, NCEPH/SAHC).

Figure 2. Ross River virus reports, South Australia,



National Notifiable Diseases Surveillance System, 7 March to 20 March 1993.

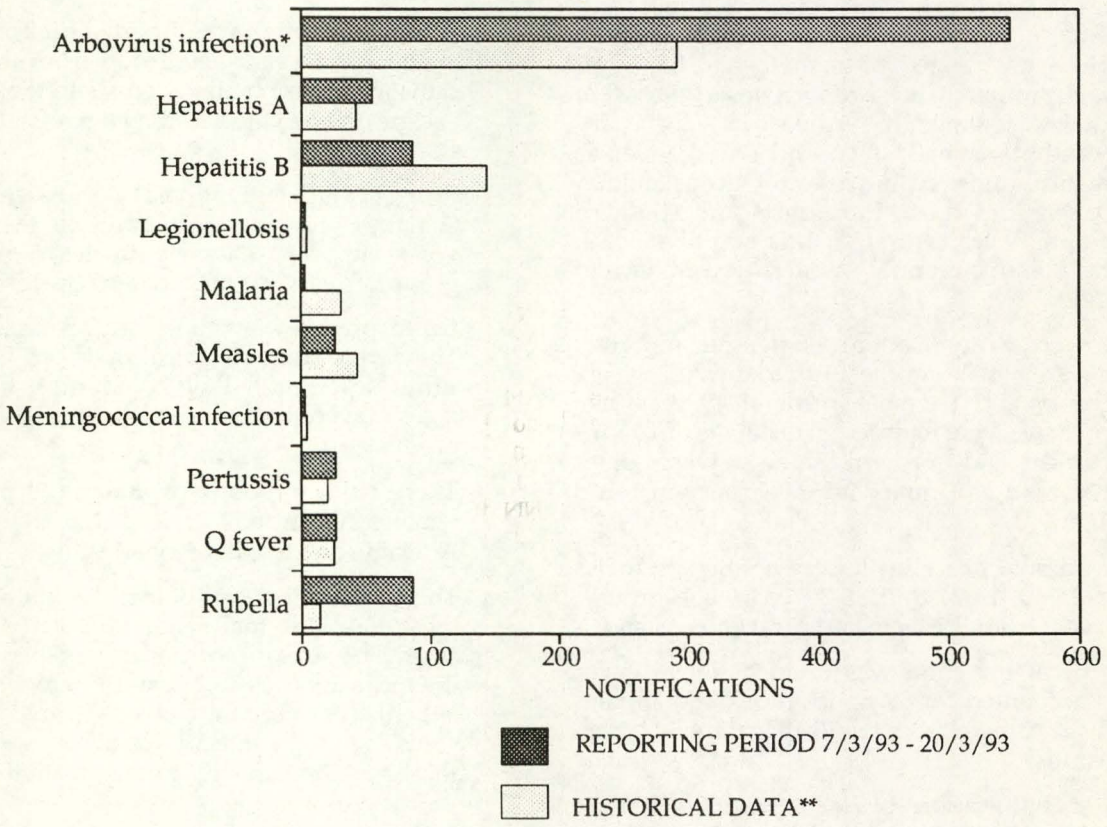
A total of 2,046 reports was received for this period (Tables 4, 5 and 6, Figure 3).

- There were 507 reports of notifications of **Ross River virus infection** to bring the total for the year to date to 1,865. The reports were for 249 males and 250 females, for 8 reports sex was not reported. Reported ages ranged from the 0-4 to the 95-99 years age groups. In these reports onset dates were recorded as December in 1, January in 17, February in 216 and March in 273. Locations were given as in statistical divisions in western Queensland, on the Queensland coast, in western and southern New South Wales, central Victoria, southern South Australia and in central Western Australia and Adelaide.
- There were 7 notifications of **dengue** reported. There were 6 males in the 15-19 to the 70-74 years age groups and 1 female in the 45-49 years age group. Cases were reported in residents of Townsville, Cairns and northern Sydney. Onset dates was recorded as January in 5, February in 1 and March in 1.
- Three cases of **brucellosis** were notified, in males in the 15-19, 20-24 and 35-39 years age groups. They were from Brisbane and rural Queensland.
- **Gonococcal infection** was notified for 96 cases. Males accounted for 59 notifications and females for 37, ages ranged from the 10-14 to the 45-49 years age groups.
- Fourteen notifications of ***Haemophilus influenzae* type b infection** were received. Six were males and 8 were females. Four were aged less than 1 year and 10 were less than 5 years, other cases were in the 25-29 (1), 40-44 (1) and 60-64 (2) years age groups. There were no apparent clusters of cases.
- Fifty-six notifications of **hepatitis A** were received. Thirty were recorded as male and 26 as female. The peak age-specific incidence of notifications was in the 20-24 years age group with 6 male and 6 female cases. Cases were reported from widespread statistical divisions in New South Wales, Queensland, South Australia, Victoria and Western Australia.
- **Hydatid infection** was reported for 2 cases, a male in the 20-24 years age group from the Brisbane statistical division and a female in the 70-74 years age group from the Darling Downs statistical division.
- Five reports of **legionellosis** were received, 4 males (2 in the 65-69 1 in the 70-74 and 1 in the 55-59 years age groups)and 1 female (in the 65-69 years age group). There was no apparent clustering of cases.
- **Leptospirosis** was reported for 5 cases, all males. They were from statistical divisions in Adelaide, rural New South Wales and rural Queensland. Ages ranged from the 20-24 to the 45-49 years age groups.
- There were 4 reports of **malaria**, 2 males and 2 females. Recorded locations were in the Brisbane, Adelaide and Greater Hobart statistical divisions.
- There were 28 reports of **measles** notifications. Of these, 14 were males and 14 were females. In 2 cases the age was recorded as less than 1 year, and the mean age was 10.2 years. There were 3 apparent clusters in separate postcode areas with 2 to 3 cases each. The intervals between onset dates for these apparent clusters ranged from the same day to 9 days.
- Four reports of **meningococcal infection** were received. Of these, 1 was male and 3 were females, ages were in the 0-4 (3 cases) and the 15-19 (1 case) years age groups. There was an apparent cluster of 2 cases occurring on the same day in a single postcode area.
- **Pertussis** was notified for 28 cases. Nine were males and 19 were females. Two of these cases were aged less than 1 year and 8 were aged less than 5 years. There were 4 apparent clusters of 2 or 3 cases each, occurring in separate postcode areas.

Intervals between the index and further cases ranged from onset on the following day to 13 days.

- There were 28 reports of notifications of **Q fever**. Of these, 20 were males and 8 were females. Ages ranged from the 15-19 to the 70-74 years age groups. Eighteen cases were reported from rural Queensland, 2 from Brisbane, 5 from rural New South Wales, 1 from Sydney, and 1 from rural South Australia.
- There were 87 notifications of **rubella**, to bring the total to date this year to 872. Sex was recorded as male for 54 and female for 33. Two cases were recorded as being aged less than 1 year. The mean age of cases notified was 24.4 years. There were 18 reports for females in the 15-44 years age group. There were 13 apparent clusters of 2 to 6 cases each in separate postcode areas.
- There were 108 notifications of **syphilis** received. Of these, 50 were males, 56 were females and sex was not recorded in 2. The age was recorded as less than 1 year in 1 case and less than 15 in 3 cases.
- Three notifications of **typhoid** were received. They were 2 males in the 15-19 and 25-29 years age groups and a female in the 25-29 years age group from the central area of Sydney.

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



* 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.

Table 4. Notifiable Diseases preventable by vaccines recommended by the NHMRC for routine childhood immunisation for the reporting period 7 to 20 March 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	0	3
Measles	3	9	0	3	8	0	4	1	28	40	272	234
Mumps	0	0	NN	NN	NN	NN	0	NN	0	1	0	7
Pertussis	0	4	1	8	7	0	0	8	28	13	354	95
Poliomyelitis	0	0	0	0	0	0	0	0	0	0	0	0
Rubella[2]	2	9	0	73	3	0	0	0	87	17	872	91
Tetanus	0	0	0	NN	0	0	0	0	0	0	3	4

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. NT, Tas, WA: CRS only; ACT, NSW, Qld: rubella only; SA, Vic: rubella and CRS.

NN Not Notifiable.

Table 5. Other Notifiable Diseases[1], for the reporting period 7 to 20 March 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	5	1	17	0	0	11	0	34	21	131	65
Ross River virus infection	0	52	24	191	202	0	25	13	507	747	1865	1726
Dengue	0	1	0	6	-	NN	0	NN	7	1	29	5
Campylobacteriosis[4]	4	-	23	140	46	24	2	45	284	308	1877	1908
Chlamydial infection (NEC)	3	NN	9	141	0	20	0	0	173	241	1214	1384
Donovanosis	0	NN	0	0	NN	NN	0	1	1	2	9	11
Gonococcal infection[5]	1	5	36	24	0	0	0	30	96	152	587	532
Haemophilus influenzae b infection[6]	1	4	1	4	2	0	2	NN	14	13	78	88
Hepatitis A	0	8	6	36	3	0	2	1	56	83	441	441
Hepatitis B	0	0	0	78	2	0	0	7	87	251	459	994
Hepatitis C	0	1	8	118	NN	5	2	NN	134	418	791	1690
Hepatitis (NEC)	0	0	0	0	0	0	0	NN	0	2	11	7
Legionellosis	0	1	0	1	0	0	3	0	5	7	29	26
Leptospirosis	0	2	0	2	1	0	0	0	5	5	37	26
Listeriosis	0	0	NN	0	NN	0	0	0	0	2	11	6
Malaria	0	0	0	1	2	1	0	0	4	35	137	159
Meningococcal infection	0	0	0	1	0	0	3	0	4	5	47	29
Ornithosis	0	NN	0	1	0	0	0	0	1	0	23	18
Q fever	0	6	0	21	1	0	0	0	28	20	127	88
Salmonellosis (NEC)	0	27	22	90	19	17	4	40	219	283	1317	1412
Shigellosis[4]	0	-	8	24	9	0	5	10	56	18	246	126
Syphilis	0	22	20	56	0	0	0	10	108	87	454	457
Tuberculosis	0	2	4	11	7	2	1	1	28	24	160	139
Typhoid[7]	0	3	0	0	0	0	0	0	3	1	14	18
Yersiniosis (NEC)[4]	0	-	0	20	1	0	0	0	21	20	108	157

1. For rarely notified diseases, see Table 7.
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. NT, Qld, SA and Vic: includes gonococcal neonatal ophthalmia.
6. SA: only as 'bacterial meningitis'; meningococcal infection is separately notified; Tas: only as 'non-meningococcal meningitis'; Vic: epiglottitis and meningitis only.
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 7 to 20 March 1993

DISEASES	Total This Period	Reporting States or Territories	Year to Date 1993
Botulism			
Brucellosis	3	Qld	9
Chancroid			1
Cholera			1
Hydatid infection	2	Qld	4
Leprosy			2
Lymphogranuloma venereum			
Plague			
Rabies			
Yellow fever			
Other viral haemorrhagic fevers			

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 11 to 24 March 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	1	5	2			2		10	6.3	129
Rubella virus			33			1	3	37	5.3	433
HEPATITIS VIRUSES										
Hepatitis A virus		1	8					9	18.5	202
Hepatitis B virus		61	20			11	17	109	84.8	712
Hepatitis C virus	7	27	30		1		73	138	55.7	937
ARBOVIRUSES										
Ross River virus		23	81			40	9	153	77.2	569
Barmah Forest virus			22				2	24	3.8	66
Dengue type 2			3					3	.0	11
Dengue not typed			1					1	.7	9
Flavivirus (unspecified)			3			2		5	1.5	31
ADENOVIRUSES										
Adenovirus type 1		2						2	1.3	29
Adenovirus type 3						2		2	2.8	36
Adenovirus type 4						1		1	1.3	45
Adenovirus type 5		1			1	1		3	.3	13
Adenovirus type 8						1		1	.8	6
Adenovirus type 40		1						1	.0	5
Adenovirus not typed/pending		13	16			16	3	48	33.2	325
HERPES VIRUSES										
Herpes simplex virus type 1		9	56		1	48	33	147	140.7	1,281
Herpes simplex virus type 2		15	49		1	29	42	136	162.2	1,407
Herpes simplex not typed/pending	3	14	1			4		22	35.7	183
Cytomegalovirus		4	35			15	8	62	77.5	449
Varicella-zoster virus	1	2	11			12	5	31	20.3	276
Epstein-Barr virus		7	46			5	16	74	64.0	614
Herpes virus group - not typed						2	1	3	2.7	10
OTHER DNA VIRUSES										
Molluscum contagiosum							1	1	.5	2
Parvovirus						3		3	1.7	45

Table 7. Laboratory reports by State or Territory of reporting laboratory for the reporting period 11 to 24 March 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			
PICORNA VIRUS FAMILY										
Coxsackievirus A9		2						2	1.2	16
Coxsackievirus B1		7						7	.2	41
Coxsackievirus B5		3				1		4	2.2	33
Echovirus type 7		11				1		12	.2	56
Echovirus type 9		4						4	1.8	31
Echovirus type 11		1						1	.0	7
Echovirus type 22		1						1	.7	6
Echovirus type 25		1						1	.2	13
Poliovirus type 1 (uncharacterised)		2						2	.8	18
Poliovirus type 3 (uncharacterised)		3						3	.8	9
Rhinovirus (all types)		7	8			28	2	45	21.0	215
Enterovirus not typed/pending		1	7		1	13	6	28	34.5	206
ORTHO/PARAMYXOVIRUSES										
Influenza A virus			7				2	9	5.8	37
Influenza B virus			2				1	3	3.2	16
Parainfluenza virus type 1		1				1		2	12.2	5
Parainfluenza virus type 3			4			10		14	17.3	153
Respiratory syncytial virus		5	1			1	2	9	20.5	58
OTHER RNA VIRUSES										
HIV-1			3				3	6	1.8	22
Rotavirus		7	4		2	12	7	32	25.8	279
Astrovirus		1						1	.5	3
Calici virus		2						2	.7	4
Norwalk agent						3		3	.0	5
Coronavirus		3						3	1.0	8
Small virus (like) particle		2				2		4	1.8	16
OTHER										
Chlamydia trachomatis not typed	3	50	96		1	10	32	192	106.8	863
Chlamydia psittaci			3			1		4	7.2	28
Chlamydia species		1						1	.0	4
Mycoplasma pneumoniae		9	35			37	3	84	15.7	642
Coxiella burnetti (Q fever)		17	21					38	13.0	125
Streptococcus group A			3					3	.0	80
Bordetella pertussis			1			7		8	.0	36
Bordetella species			1					1	.0	81
Leptospira icterohaemorrhagiae			1					1	.0	1
Leptospira species			2					2	.0	3
Treponema pallidum		12	40					52	.0	189
Entamoeba histolytica			1					1	.0	3
Toxoplasma gondii			5					5	.0	17
Echinococcus granulosus			2					2	.0	3
TOTAL	15	338	664		8	322	271	1,618	1,095.7	11,157

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 theperiods immediately preceding and following those.

Table 8. Laboratory reports by clinical information for the reporting period 11 to 24 March 1993

	Encephalitis	Meningitis	Other CNS	Congenital	Respiratory	Gastrointestinal	Hepatic	Skin	Eye	Muscle/joint	Genital	Other/unknown	Total
MEASLES, MUMPS, RUBELLA													
Measles virus			1					3				6	10
Rubella virus	1				1			14		1		20	37
HEPATITIS VIRUSES													
Hepatitis A virus							6					3	9
Hepatitis B virus							27					82	109
Hepatitis C virus							20					118	138
ARBOVIRUSES													
Ross River virus						1		4		71		77	153
Barmah Forest virus										10		14	24
Dengue type 2								3					3
Dengue not typed								1					1
Flavivirus (unspecified)										1		4	5
ADENOVIRUSES													
Adenovirus type 1						2							2
Adenovirus type 3									1			1	2
Adenovirus type 4									1				1
Adenovirus type 5					3								3
Adenovirus type 8									1				1
Adenovirus type 40						1							1
Adenovirus not typed/pending					10	23			2			13	48
HERPES VIRUSES													
Herpes simplex virus type 1		1			5			90	5		37	9	147
Herpes simplex virus type 2								64			66	6	136
Herpes simplex not typed/pending					2			6			7	7	22
Cytomegalovirus			1	2	9		4		1			45	62
Varicella-zoster virus							1	25				5	31
Epstein-Barr virus					10					3		61	74
Herpes virus group - not typed								3					3
OTHER DNA VIRUSES													
Molluscum contagiosum								1					1
Parvovirus								1		1		1	3
PICORNA VIRUS FAMILY													
Coxsackievirus A9	1				1								2
Coxsackievirus B1		1				1						5	7
Coxsackievirus B5		1										3	4
Echovirus type 7	1	3			1	2						5	12
Echovirus type 9	1	1			1	1							4
Echovirus type 11		1											1
Echovirus type 22												1	1
Echovirus type 25												1	1
Poliovirus type 1 (uncharacterised)						1						1	2
Poliovirus type 3 (uncharacterised)						1						2	3
Rhinovirus (all types)	1	1			40							3	45
Enterovirus not typed/pending		3	1		9	5	1	3				6	28

Table 8. Laboratory reports by clinical information for the reporting period 11 to 24 March 1993, continued

	Encephalitis	Meningitis	Other CNS	Congenital	Respiratory	Gastrointestinal	Hepatic	Skin	Eye	Muscle/joint	Genital	Other/unknown	Total
ORTHO/PARAMYXOVIRUSES													
Influenza A virus					3							6	9
Influenza B virus					2	1							3
Parainfluenza virus type 1					2								2
Parainfluenza virus type 3					11							3	14
Respiratory syncytial virus					9								9
OTHER RNA VIRUSES													
HIV-1												6	6
Rotavirus						31						1	32
Astrovirus						1							1
Calici virus						1						1	2
Norwalk agent						3							3
Coronavirus						1						2	3
Small virus (like) particle						2		1				1	4
OTHER													
Chlamydia trachomatis not typed				1	2				4		134	51	192
Chlamydia psittaci					3							1	4
Chlamydia species					1								1
Mycoplasma pneumoniae			1		61	1				1		20	84
Coxiella burnetti (Q fever)					4					3		31	38
Streptococcus group A										1		2	3
Bordetella pertussis					7							1	8
Bordetella species												1	1
Leptospira icterohaemorrhagiae												1	1
Leptospira species												2	2
Treponema pallidum				1							4	47	52
Entamoeba histolytica												1	1
Toxoplasma gondii												5	5
Echinococcus granulosus												2	2
TOTAL	5	12	4	4	197	79	59	219	15	92	248	684	1618

Table 9. Laboratory reports by contributing laboratories for the reporting period 11 to 24 March 1993

STATE OR TERRITORY	LABORATORY	REPORTS
Australian Capital Territory	Woden Valley Hospital, Canberra	15
New South Wales	Institute of Clinical Pathology & Medical Research, Westmead	190
	Prince Henry/Prince of Wales Hospitals, Sydney	8
	Royal Alexandra Hospital for Children, Camperdown	28
	South West Area Pathology Service, Liverpool	109
	Tamworth Laboratory, New England Pathology	3
Queensland	Dr TB Lynch, Pathologist, Rockhampton	89
	Queensland Medical Laboratory, West End	258
	State Health Laboratory, Brisbane	317
Tasmania	Northern Tasmanian Pathology Service, Launceston General Hospital	8
Victoria	Fairfield Hospital, Melbourne	194
	Microbiological Diagnostic Unit, University of Melbourne	9
	Royal Children's Hospital, Melbourne	119
Western Australia	Princess Margaret Hospital, Perth	16
	State Health Laboratory Services, Perth	255
TOTAL		1618