Epidemiology of malaria in Victoria 1999-2000: East Timor emerges as a new source of disease

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Introduction

Malaria remains a global problem on a huge scale, with approximately 300-500 million cases and up to 3 million deaths annually.[1] In Australia, malaria is uncommon, with approximately 600-900 cases per year notified between 1991 and 1997. Victoria contributes approximately 80-130 notifications per year, making it the third most common State or Territory for malaria cases in Australia after Queensland and New South Wales.[2] Trends across this time period have appeared relatively stable.[2] Cases are imported and most often occur in young male travellers.[2] Deaths are infrequent.[3] Only 2 locally acquired cases of malaria have occurred in Australia since 1962; both in Queensland.[4,5] There have been no previous reports of malaria epidemiology for Victoria in the medical literature and only limited data from elsewhere in Australia. We therefore undertook to describe in detail the profile of malaria cases for Victoria during 1999 and 2000.

Methods

All cases of malaria notified to the Communicable Diseases Section, Department of Human Services, Victoria were reviewed for the period 1999 to 2000. Data were extracted from the Notifiable Infectious Diseases Surveillance (NIDS) database and where available, additional information was obtained from (non-systematically collected) hand-written records. Data routinely collected for NIDS includes notification date, malaria type, survival, country of birth, location of illness onset, primary occupation and reason for travel. Patient records were not reviewed however, data from detailed case report forms were also available for a number of cases admitted to one tertiary Melbourne hospital. Data were entered into Epi Info version 6.0 software.[6]

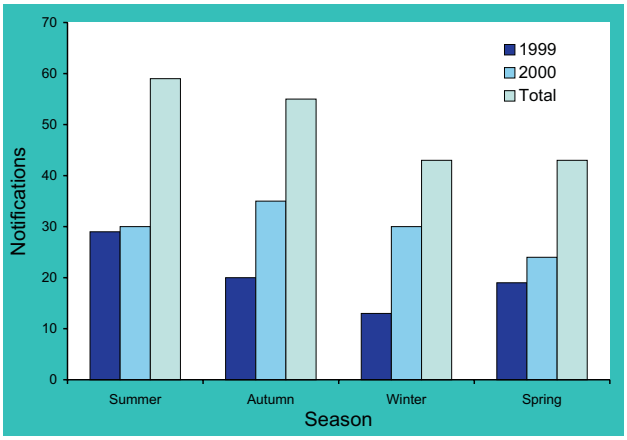
Results

There were 200 notifications for malaria in 1999 to 2000 (81 in 1999, 119 in 2000), representing an average of 2 notifications per week or 0.76 per cent and 0.5 per cent of total Victorian disease notifications respectively. Three individuals had 2 notifications during this period, of which 2 were relapses and one was a reinfection. The mean age of cases was 34 years (range 0-79 years, median 32 years). Seventy-five per cent were male. There were no deaths.

For those cases with a recorded country of birth, 57 per cent (76/133) were Australian born. The next most common countries of birth were Papua New Guinea (PNG) (7%), India (4%) and Sudan (4%). Reasons stipulated for travel outside Australia included holidays (31/98, 32%), employment or education (30/98, 31%), business (7/98, 7%) and visits to relatives (6/98, 6%). The most common reason given for entering Australia was education (72/118, 61%) followed by returning immigrants (11/118, 9%) and returning expatriates (8/118, 7%).

A seasonal trend of notification was observed (chi squared for trend p=0.03), with the greatest number of notifications occurring in the summer months (30%), followed by autumn (28%), spring and winter (22% each) (Figure).

Figure. Notifications of malaria, Victoria, 1999 to 2000, by season



Plasmodium vivax was responsible for 138/198 (70%) of all malaria notifications. Falciparum malaria contributed a further 20 per cent (40/198), *P. ovale* 13/198 (7%) and mixed infections occurred in 5/198 (2%) cases. Two notifications did not record species identification. The majority of *P. vivax* malaria originated in PNG, Indonesia or East Timor, while *P. falciparum* originated from PNG or Africa, and *P. ovale* from Africa. Confirmation of malaria species by a reference laboratory occurred in 139/200 (69%) cases.

Onset of disease in Australia, was most often (81/96, 84%) after return from malaria endemic countries. Malaria was most often acquired in PNG (72/200, 36%) followed by East Timor (26/200, 13%) and India (11/200, 5%) (Table). All but 2 cases from East Timor occurred in 2000. By region,

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Melanesia was the most common area for acquisition (80/200, 40%) due to the high rates from PNG, South East Asia (58/200, 29%) and Africa (40/200, 20%) (Table).

Employment status was known for 122/200 (61%) cases, of whom 108 (88%) were in active employment or were students. Of interest, 13/122 (11%) were health professionals. In 1999 only 4 cases were employed as either military personnel or aide workers (all in PNG). In 2000, however, this increased to 25, of whom 20 were personnel based in East Timor. This group represented 17 per cent (20/119) of all notifications in 2000 and an important new source of notifications for Victoria.

Forty-one cases answered an additional questionnaire at a tertiary hospital. Of these, 21/40 (54%) admitted seeking travel advice prior to departure to malaria endemic countries, including PNG (18/40, 44%), East Timor (3/40, 7%), Indonesia (3/40, 7%), Ghana (2/40, 5%) and Uganda (2/40, 5%). Almost half (19/41, 46%) had previously experienced malaria. Ten (52%) of these were frequent visitors to PNG. Use of insect repellent as protection against mosquito bites was reported by 13/41 (32%) cases and screens were used at night by 11/41 (27%). Antimalarial drug prophylaxis was taken by 18/40 (44%) of whom one (6%) admitted experiencing side effects. The vast majority took doxycycline (13/18). Other drugs taken were chloroquine (3) and mefloquine (2). One person took Maloprim™ in addition to chloroquine. There were insufficient data to comment on the nature of advice provided to travellers or its suitability for the regions visited, or the compliance in those who took drug treatment.

Discussion

Malaria is a rare and imported disease in Victoria. The number of notifications appears to have increased during 1999 and 2000. Disease occurs predominantly among young men, with notifications occurring most often in the warmer months of the year. *Plasmodium vivax* continues to be the most common form of malaria seen, originating most frequently in PNG, Indonesia or East Timor.

Although data are somewhat limited, there is a clear lack of uptake of advice and prophylactic treatment among cases. Only half the notified cases had sought pre-travel advice or attempted to take treatment. A similar proportion described previous episodes of malaria. In addition, as no malaria prophylactic drug treatment can guarantee protection against infection, the lack of precautions taken against mosquito bites through use of insect repellent or screens at night is also a concern.

Important subgroups affected by malaria are those who travel to and from PNG without prophylactic treatment, health professionals, and more recently, military personnel and aide workers based in East Timor. With the recent increased Australian presence in East Timor, health providers should be aware of the need to provide advice on malaria prophylaxis to those intending to visit malaria endemic countries. There remains an ongoing need to encourage travellers to all malaria-endemic areas to seek professional advice about preventive treatment against malaria, to know how to take this treatment effectively, and to use protective measures against mosquitoes in addition to drug treatment.

Table. Notifications of malaria, Victoria, 1999 to 2000, by probable country and region of infection

Region/country	1999	2000	Total
Africa			
Africa	5	2	7
Congo	0	1	1
Eritrea	0	1	1
Ethiopia	1	0	1
Gambia	0	1	1
Ghana	1	4	5
Kenya	2	1	3
Madagascar	0	1	1
Malawi	1	1	2
Nigeria	1	2	3
South Africa	0	1	1
Sudan	2	6	8
Tanzania	2	0	2
Uganda	2	1	3
Zambia	0	1	1
Total	17	23	40
South East Asia			
Indonesia	4	6	10
Bali	1	0	1
Bintan Island (Indonesia)	1	2	3
Borneo	1	0	1
East Timor	2	24	26
Flores (Indonesia)	1	0	1
Irian Jaya (Indonesia)	2	2	4
Lombok	1	3	4
Malaysia	0	1	1
SE Asia	1	1	2
Sumatra	1	0	1
Thailand	0	1	1
Vietnam	0	3	3
Total	15	43	58
Southern Asia			
Afghanistan	3	1	4
Bangladesh	0	1	1
India	4	7	11
Pakistan	2	1	3
Sri Lanka	0	2	2
Total	9	12	21
Melanesia			
Bougainville	1	0	1
Papua New Guinea	36	36	72
Solomon Islands	1	3	4
Vanuatu	1	2	3
Total	39	41	80
Central America			
Honduras	1	0	1
Total	81	119	200

From a public health point of view, it would also be useful for notifiable Diseases databases to include information on the nature of advice provided to travellers and its suitability for the regions visited. This would enable feedback for patients (many of whom are repeat travellers), as well as doctors who may not be aware of the constantly changing profile of malaria resistance in endemic countries.

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