Contemporary Themes

Malaria prevention in travellers from the United Kingdom

REPORT OF MEETINGS CONVENED BY THE ROSS INSTITUTE

Abstract

Malaria prophylaxis is relative, not absolute, but can provide much protection. Travellers must take prophylactics regularly while in malarious areas and for one month thereafter; despite doing so, they may still develop malaria. For areas without chloroquine-resistant malaria, chloroquine, 300 mg base weekly, or proguanil, 100-200 mg daily, are preferred. In areas of chloroquine sensitivity there may be places with resistance to proguanil and pyrimethamine, but these places are not delineated. The risk of breakthrough of malaria is, therefore, least with chloroquine, but problems of potential side effects and regular medication are fewer with proguanil than chloroquine. Proguanil is preferred for long-term prophylaxis. Malaria poses a greater hazard for pregnant women and infants than do prophylactics. Pyrimethamine/sulphadoxine (Fansidar) or pyrimethamine/diaminodiphenyl sulphone (Maloprim) are the preferred drugs for areas with prevalent chloroquine-resistant Plasmodium falciparum. Fansidar is taken once a week and Maloprim also is usually recommended to be taken once a week.

Introduction

The hazards to travellers from the United Kingdom of contracting malaria while abroad have increased in recent years partly because more people travel to malarious areas and partly because the amount of malaria transmission in the world, particularly in South-east Asia, has increased. At the same time, the task of advising intending travellers on malaria prophylaxis has become more difficult. Resistance of malaria parasites to the commonly used prophylactic drugs has increased in extent and degree, while people are more conscious of the risks of any medication.*

For these reasons two meetings, the first in October 1980 and the second in January 1981, were convened by the Ross Institute, London School of Hygiene and Tropical Medicine. The meetings were attended by a number of individuals most concerned with the chemoprophylaxis of human malaria among those visiting the tropics. This report summarises their deliberations and conclusions, especially for those who have already encountered the issues considered. Clearly there are no final answers to many of the questions raised by those who have to advise prospective travellers, but we hope that this document will both provide guidance and show the relative degree of agreement to be found on different issues. Each part of the discussions concluded with answers to the question, "What would you take if you were going to x?" Where there is no agreed optimal prophylactic we have said so. Often the data are inadequate for an unequivocal conclusion. Consequently, this report leaves open a good many options: no doubt the advice given to travellers will need to be more specific in most cases to avoid confusion.

Three general points deserve particular emphasis: the relative nature of protection; the rapidly changing distribution, intensity of transmission, and drug resistance profile of malaria in the world; and the distinction that needs to be drawn in advice to short-term visitors and to those intending to live in malarious regions for many years. Other general issues concern the advice suitable for pregnant women and small children and the balance between short-term individual protection and longer-term community welfare.

The relative character of protection must be emphasised. It is no longer possible (if indeed it ever was) to say that any given prophylactic or chemosuppressive drug, taken regularly and at an adequate dosage, will certainly protect against malaria. Every traveller to a malarious area must be warned that if he develops a fever, even when taking prophylactics most regularly, malaria is a possible diagnosis. The spread of resistance to many drugs and the lack of precise maps of the distribution of plasmodial resistance make such cautionary advice mandatory. The development of in-vitro tests for parasite sensitivity along the lines of that available at a research level for chloroquine will, we hope, increase our understanding of the distribution of drug resistance. Nevertheless, the dynamic character of resistance and continuing reports of apparent clinical resistance even to the newest antimalarials underline the need for avoiding absolute faith in prophylactics. Even so, it is essential to make clear to travellers the great protection conferred by antimalarials taken regularly, and the *very* much higher risk of malaria and of a lethal outcome in those who do not take them.

It is necessary to distinguish between the needs of short-term and long-term visitors to malarious areas. The common antimalarials have a low level of toxicity, and several are among the safest of effective drugs. Nevertheless, most are toxic if taken in larger doses than are recommended for malarial protection and for periods as long as five to 10 years, while some of the newer drugs advocated in areas of chloroquine-resistance have not been in use on a substantial scale for more than a few years. Therefore, while the issue of toxicity may be largely ignored in choosing antimalarials for visits of a few weeks or months, greater care is needed for those who will consume antimalarials

*As this discussion is concerned with practical advice, we use the term "prophylactic" in a broad way for any drug preventing clinical malaria, unless more precisely defined at that point in the text.

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for several years, and it may be advisable for such people to change to a different type of antimalarial after periods of two to four years to avoid any possible long-term toxicity. It must be emphasised that this is a precaution against a hypothetical and not a demonstrated risk at the dosages of prophylactics recommended below.

Advice on malaria prophylaxis for very young children and even more for pregnant women is difficult. Except as mentioned below, antimalarials cause a very small and undefined risk in pregnancy, whereas malaria is unequivocally dangerous to both mother and fetus, and is commonly more severe in pregnant inhabitants of endemic areas than in women resident there who are not pregnant. In view of the hypothetical risk in early pregnancy women at this stage should, if possible, avoid going to malarious areas if there is no special need to do so. Such advice may well not be taken. In that case they should not neglect to take antimalarials in endemic areas because of an imagined risk to the fetus. (Advice given by one non-British airline on this topic could easily lead to this unfortunate happening.) Children of non-immune parents, if exposed to infective mosquito bites, are also at risk, regardless of how young they are. Although some antimalarials are excreted in human milk, one cannot rely on adequate concentrations of them reaching the suckling infant.

In the past one reason for selecting a particular antimalarial for prophylaxis was to retain another to treat malaria. The widespread prophylactic use of drugs that might be needed for treatment favours the spread of resistance and it is preferable to minimise the selection pressure operating. This argument, however, has now sadly lost much of its force in relation to travellers from the United Kingdom. In most malarious countries the drugs likely to be recommended are readily available to the public, so that the selection pressure in favour of drug resistance is negligibly affected by British travellers. Except, therefore, in countries that by stringent drug control are attempting to limit the spread of resistance, consideration of community long-term issues need not influence the selection of chloroquine as an antimalarial.

TABLE I—*Recommended antimalarials*

Name (non-proprietary) where available)	Formulation of tablet	Adult prophylactic dose	Comments
(A) *In areas of chloroquine-resistant P falciparum*			
Fansidar or	Pyrimethamine 25 mg Sulphadoxine 500 mg	One tablet weekly	In areas of high *P vivax* exposure chloroquine as in (B) may be added
Maloprim	Pyrimethamine 12·5 mg Dapsone 100 mg	Usually one tablet weekly	
(B) *In areas without chloroquine-resistance*			
Chloroquine or	100 mg, 150 mg, or 300 mg of base	300 mg base weekly	Change drug after a few years. Alternative regimen: 100 mg daily, except Sunday
Proguanil or	100 mg	100-200 mg daily	Resistance occurs. Otherwise very safe
Pyrimethamine	25 mg	25 mg weekly	Resistance occurs. Tasteless

TABLE II—*Countries with a malaria risk in some part*

Afghanistan	Guatemala	Paraguay
Algeria	Guinea	Peru
Angola	Guinea-Bissau	Philippines
Argentina	Guyana	Qatar
Bahrain	Haiti	Rwanda
Bangladesh	Honduras	Sao Tome and Principe
Belize	India	Saudi Arabia
Benin	Indonesia	Senegal
Bhutan	Iran	Sierra Leone
Bolivia	Iraq	Solomon Islands
Botswana	Ivory Coast	Somalia
Brazil	Jordan	South Africa
Burma	Kenya	Sri Lanka
Burundi	Korea, Republic of (South)	Sudan
Cameroon	Lao People's Democratic Republic	Surinam
Cape Verde	Liberia	Swaziland
Central African Republic	Libyan Arab Jamahiriya	Syrian Arab Republic
Chad	Madagascar	Tanzania, United Republic of
China, People's Republic of	Malawi	Thailand
Colombia	Malaysia	Togo
Comoros	Maldives	Tunisia
Congo	Mali	Turkey
Costa Rica	Mauritania	Uganda
Democratic Kampuchea	Mauritius	United Arab Emirates
Djibouti	Mexico	Upper Volta
Dominican Republic	Morocco	Vanuatu (formerly New Hebrides)
East Timor	Mozambique	Venezuela
Ecuador	Namibia	Vietnam
Egypt	Nepal	Yemen
El Salvador	Nicaragua	Yemen, Democratic
Equatorial Guinea	Niger	Zaire
Ethiopia	Nigeria	Zambia
French Guiana	Oman	Zimbabwe
Gabon	Pakistan	
Gambia	Panama	
Ghana	Papua New Guinea	

Choice of antimalarial

For the practical purposes of British visitors to the tropics today, choice of an antimalarial is limited to six substances: pyrimethamine or proguanil, which are both antifolates; chloroquine or amodiaquine, which are 4-aminoquinoline drugs; and the two mixtures of drugs known as Maloprim and Fansidar (table I). Many other drugs exist, and each of the antifolates and 4-aminoquinolines is available under several brand names in differing countries, but they add little to the range of antimalarial activity obtainable with the above drugs.

There are over 100 countries (table II) with some risk of malaria. This may be limited to specific geographical areas within the country and by altitude, season, and whether one is visiting the city or countryside. The possible need for prophylactics should be considered if any of these countries is to be visited, however briefly. For the choice of appropriate drugs, they may be broadly divided into those with chloroquine-resistant *Plasmodium falciparum* (table III) and the remainder. The most difficult problems are associated with the chloroquine-resistant areas, and these are considered first.

Areas with chloroquine-resistance prevalent in P falciparum

The most serious form of malaria is due to *P falciparum*. Strains of this parasite that are resistant to 4-aminoquinolines have spread from foci in Colombia and Thailand to affect large parts of South America and, especially, much of south-east Asia. They are just beginning to reach peninsular India. In places such as Thailand well over three-quarters of the circulating strains of *P falciparum* are resistant to chloroquine. Many of these strains have also already acquired resistance to the antifolates pyrimethamine and proguanil, so that neither of them nor chloroquine (nor other 4-aminoquinolines, such as amodiaquine) are effective antimalarials. In these conditions, which we call "prevalent chloroquine-resistant malaria," the choice of antimalarial is between Fansidar and Maloprim. Precise distribution of chloroquine-resistance is changing rapidly. A list for 1980 appears as table III.

TABLE III—*Areas of chloroquine-resistant P falciparum, 1980*

Central and South America	Bolivia, Brazil, Colombia, Ecuador, French Guiana, Guyana, Panama, Surinam, Venezuela
Asia	Bangladesh (north and east), Burma, China (Hainan Island and southern provinces), India (NE especially Assam), Indonesia (Kalimantan, Irian Jaya), Kampuchea, Laos, Malaysia, Nepal, Philippines, Thailand, Vietnam
Oceania	Papua New Guinea, Solomon Islands (West)
Africa	Kenya and Tanzania coastal areas

Fansidar is a mixture of pyrimethamine with sulphadoxine, a long-acting sulphonamide, while Maloprim contains pyrimethamine and dapsone, the sulphone drug used to treat leprosy (see table I). The pharmacological basis of these mixtures is that the components act at different sites along the same metabolic pathway and successfully impede folate metabolism even in malaria parasites resistant to single antifolates. No other prophylactic antimalarial is as satisfactory at present, and the newer single compound, mefloquine, is still undergoing field trials.

Choice between Fansidar and Maloprim is difficult, and members of the group varied in their preferences. On pharmacodynamic grounds Fansidar has advantages as the half life in the body of each constituent is comparable, so that parasites would encounter protective concentrations of both drugs for corresponding times and both drugs would remain at protective concentrations throughout the weekly intervals between doses. Fansidar has only recently become available in the United Kingdom and where it cannot be used as an initial prophylactic, another antimalarial should be given to cover the initial period abroad until it is obtained locally. Under conditions of very heavy malarial risk there is clear field evidence of the recommended dose of 1 tablet of Fansidar a week giving good protection. It is also of great value in treating acute chloroquine-resistant malaria and is already widely used for prophylaxis in countries with prevalent chloroquine-resistance.

Maloprim is readily available in the United Kingdom and, like Fansidar, is also an effective prophylactic in endemic areas showing pronounced chloroquine-resistant malaria. On a weekly dosage, as usually recommended, only one component persists at a protective level throughout that time, as the pharmacological half life in the body of ingested dapsone is around 25 hours, as compared with over 100 hours for pyrimethamine. The dose of pyrimethamine in a Maloprim tablet is half that in a tablet of Fansidar.

On pharmacodynamic grounds it would therefore make more sense to give Maloprim twice weekly. Some observations, however, suggest that high and repeated doses of dapsone as an antimalarial may in rare instances be associated with agranulocytosis, though this relation is not proved. It appears, however, that in practice good protection is afforded by one tablet a week. It was considered that, for the present, the prophylactic adult dose should usually be one tablet a week. Nevertheless, further experience and careful monitoring are required before a final decision on the dosage of Maloprim can be taken. Some people report mild gastrointestinal side effects. Methaemoglobinaemia is an occasional complication. Resistance of *P falciparum* to Maloprim has not been well documented.

PREGNANT WOMEN, CHILDREN, AND SPECIAL CASES

Pyrimethamine is teratogenic when administered in very high doses to animals, and other antifolates would be expected to behave similarly. There is no recorded evidence, however, that pyrimethamine alone, or in the combinations used in Fansidar or Maloprim, has any teratogenic effects whatsoever on the human fetus in the doses used for antimalarial purposes. Experience with pyrimethamine for this purpose is vast, with no evidence of increased fetal risk. The same may be said of dapsone, which has been extensively used in higher doses than in Maloprim to treat leprosy, and there are extensive reports on sulphonamides. There is no evidence that sulphadoxine has toxic effects on pregnant women at the concentrations given for malarial protection, though the manufacturers do not recommend Fansidar in pregnancy, and sulphonamides are to be avoided in the late stages of pregnancy because of the risk of kernicterus. Thus if it were necessary for a pregnant woman to travel to areas of prevalent chloroquine-resistance and considerable malaria risk, the group considered Maloprim a satisfactory antimalarial drug.

There is little experience with the long-term use of these drugs in children, but clear evidence of the hazard of malaria without them. Some manufacturers and national authorities recommend that combined antimalarials should not be used by pregnant women and infants, but we do not think this is practicable except in the case of neonates. Dosage should be based ideally on weight rather than age, but in practice the latter often has to be used (table IV). For infants and young children it is difficult to get the correct dose of Maloprim by breaking a tablet into quarters or less: the syrup formulation is preferable but is only available in some countries, excluding Britain at present. Therefore Fansidar may be preferred if tablets only are available.

TABLE IV—*Doses of antimalarials for children. (When weight and age are both available, weight is preferable)*

Dose in relation to adult dose	Age range (years)	Weight range (kg)
One-quarter	< 1	< 5
One-half	1-5	5-20
Three-quarters	6-12	20-40
Adult dose	> 12	> 40

This may be applied to all antimalarials for prophylaxis.

The neonatal period presents difficulties. There is a risk of infection, and the child of a British parent will not have protective maternal antibodies. The immaturity of enzyme systems and the practical problems of giving the correct dose mean that only the least toxic antimalarials should be given prophylactically. Proguanil or chloroquine syrup may be given in areas without resistance to these antimalarials. Everywhere mosquito nets should be used to avoid exposure to mosquito bites.

In areas of chloroquine-resistance neither of the two appropriate antimalarials—Maloprim or Fansidar—is considered by the manufacturers suitable for the first six weeks of life. Several members of the committee would rely on proguanil and mosquito nets, treating any fever with Fansidar. It was universally thought that no entirely satisfactory strategy was currently available.

People sensitive to sulphonamides should not receive Fansidar. Although Maloprim could be given to many individuals hypersensitive to sulphonamides, the first doses should be taken under close supervision in case of cross-sensitivity. Those also sensitive to dapsone will have to take chloroquine or proguanil knowing that they are not fully protected.

The above advice is suitable for both short-term and long-term visitors to areas of prevalent chloroquine-resistance, though the latter should have their regimens reviewed by their doctor every few years when returning on leave. There is good anecdotal evidence of the safety of Maloprim for over five years and no reason to be concerned about Fansidar. It has often been said that Fansidar or Maloprim should be given only for limited periods, such as six months, but then no advice is given on what to do thereafter. While experience is limited, there is no practical alternative.

Resistance to the combined antimalarials has been reported from Papua New Guinea, but the group would still recommend Maloprim or Fansidar for that country at present. Specialist advice should be sought by anyone visiting the Thailand-Kampuchea border, where much of the *P falciparum* is resistant to both chloroquine and Fansidar. Prophylaxis is unsatisfactory under these conditions, but the addition of oral quinine, 325 mg twice daily, to more conventional prophylactics has been used in places of high risk on that border, though there are misgivings over the use of oral quinine as a prophylactic, and there is no evidence to date that resistance to Maloprim occurs in this area.

P falciparum is not the only, nor indeed often the most common, malaria parasite in areas of prevalent chloroquine-resistance to that species. When there is also a large risk of *P vivax*, for which Fansidar and Maloprim are less than ideal prophylactics, there may be a case for simultaneous administration of chloroquine, as discussed below.

The selection of Fansidar or Maloprim is clearly indicated in the chloroquine-resistant *P falciparum* areas of Asia and the Americas. A list of such places valid for 1980 is given in table III, but it is always changing, and up-to-date information may be acquired from the sources listed in the appendix. The situation in Africa, where there are reports of some degree of chloroquine-resistance in a limited part of the Kenya coast, and a few less precisely located confirmed cases from Tanzania, causes much concern. It was agreed that there was no reason to advocate the use of Fansidar or Maloprim in most of Africa at present (and good reasons for avoiding their unnecessary local use there, although this is tending to occur). Opinion was divided over the preferred course of action for visitors to the Kenya coast, with some favouring the continued use of chloroquine and a majority recommending Maloprim. For those becoming resident in that area, opinion was more in favour of Maloprim and Fansidar, particularly for the Mombasa area. The set-up is likely to change rapidly there and in nearby regions.

The discussion illustrated the difficulty of making recommendations in the face of a locally rapidly changing spectrum of drug response.

The group considered that neither mepacrine nor co-trimoxazole—for instance, Bactrim and Septrin—had a role in malarial prophylaxis under normal conditions.

Areas without chloroquine-resistant P falciparum

The choice of antimalarials for areas without chloroquine-resistant *P falciparum* lies between the antifolate (di-hydrofolate reductase inhibiting) drugs proguanil and pyrimethamine, and the 4-aminoquinoline chloroquine.

Proguanil taken daily has two major practical advantages. Firstly, it has a very low toxicity and no toxic side effects have been reported at the concentrations used for malaria prevention even over many years, and, secondly, daily dosage is considered easier to remember and means that occasional forgotten doses put the patient at risk for a shorter period, as compared with omission of the same number of doses of a compound taken weekly. These two advantages of safety and convenience in practice are the basis of the widespread use of proguanil.

Pyrimethamine has the advantage of being tasteless, compared with the very bitter taste of both proguanil and chloroquine, and it is available in syrup form so that it is much easier to administer to small children. The weekly dosage regimen also makes the task of protecting children easier. The drug is, however, toxic if taken in excess, and the lack of taste has led to more accidents with pyrimethamine than with antimalarials whose bitter taste deters a child from accidentally swallowing a large amount.

Resistance to the antifolates by *P falciparum* has arisen in many localities in Africa and the East, though, in the absence of satisfactory in-vitro tests, neither the scale nor the distribution of such resistance is accurately known. Some degree of cross-resistance between pyrimethamine and proguanil is usual, and resistance emerges rapidly in indigenous communities given pyrimethamine prophylaxis. Evidence of falciparum malaria breaking through prophylaxis with antifolates has been reported several times in the United Kingdom, and there are sufficient reliable anecdotal reports that it cannot be dismissed. Pyrimethamine breakthroughs have been reported more often than for proguanil, perhaps because of failure to take the prophylactic regularly, but adequate data on the numbers of people taking each prophylactic are not available. Many of the group considered proguanil the preferred antifolate in most conditions. The usual daily dose of proguanil for an adult is 100 mg, but in regions of heavy challenge, such as sub-Saharan Africa, a dose of 200 mg may be recommended on the basis of a study in Lagos, which showed breakthrough of malaria at the lower but not the higher dose. Evidence on the wider applicability of that study is lacking. Where fully susceptible strains are concerned, the antifolates have a truly causal prophylactic effect against pre-erythrocytic stages of *P falciparum*. In 1979, however, for the first time the deaths from the United Kingdom included individuals who were said to have been taking pyrimethamine or proguanil.

Although many chloroquine-resistant strains of malaria are, in addition, resistant to proguanil (or pyrimethamine or both), neither in these nor in chloroquine-susceptible antifolate-resistant strains has an adequate trial been done to determine whether a daily dose of 200 mg of proguanil continues to have a true causal prophylactic action against the pre-erythrocytic stages of *P falciparum*. Anecdotal evidence suggests that it works, which is why many of the group continue to recommend proguanil for such places as West Africa.

Outside the areas of true chloroquine-resistance, the 4-aminoquinolines are highly effective in protecting against malaria on a weekly dosage regimen of 300 mg of the base, by suppression of the erythrocytic stages. The chief problems with chloroquine, if we ignore the long-term community issues discussed at the beginning of this paper, which affect only prophylactic use of chloroquine by visitors where there is indigenous control of its use for prophylaxis, concern toxicity. A few people have minor gastrointestinal upsets, and dark-skinned individuals may itch, which cause them to take alternative antimalarials more readily. Long-term toxicity occurs in some recipients of chloroquine in very large doses for non-parasitic diseases, who have shown retinal damage after taking total amounts in excess of 100 g. On malaria prophylaxis this would be attained after three to seven years of regular medication. There is, however, no substantial evidence that the data from those on very high daily doses of chloroquine can be extrapolated in this way, and large numbers of people have used chloroquine for many years without such adverse effects. Amodiaquine is comparable to chloroquine in its advantages but has the defect of causing skin pigmentation. No adequate data exist on its retinal effects after long-term use as an antimalarial. It is not marketed in the United Kingdom.

We consider that for short visits to malarious areas chloroquine or proguanil are the preferred antimalarials, with chloroquine the more reliable if taken properly, and proguanil an easier regimen to follow, with less likelihood of side effects but a greater chance of a breakthrough of malaria. Some members, but not all, gave chloroquine as their first choice, and the British statistics have moved towards favouring that view. For those taking up residence in malarious areas for periods likely to exceed three years, or on continued medication because of frequent travel, the preference tends towards proguanil. If chloroquine had been initially selected it was considered wise to change after about two years and use an antifolate thereafter, treating any breakthrough with chloroquine.

For pregnant women who have to reside in malarious areas there are no special considerations affecting choice between chloroquine and proguanil. A weekly dose of the tasteless pyrimethamine may be preferable if vomiting of pregnancy is a problem, but the hypothetical teratogenic potential has to be balanced against this. For young children it is necessary to balance the ease of administering pyrimethamine against the

greater risk of accidental overdosage for the family concerned and greater risk of breakthroughs.

Certain groups are at special risk. Those with sickle-cell disease need special advice. If given antifolates pregnant women should receive folic or folinic acid supplements. Any person who has received large doses of chloroquine for other diseases should not be given 4-aminoquinolines as a prophylactic.

MALARIA DUE TO PLASMODIUM VIVAX

The choice of antimalarial is chiefly dictated by concern to prevent *P falciparum* since this is the cause of almost every malarial death in the United Kingdom and is the most severe type of malaria. *P falciparum* is, however, responsible for under 20% of the malaria in Britain, where most of the malaria seen, particularly that contracted in South-east Asia, is due to *P vivax*. The antimalarial regimen recommended above will, in general, provide protection against species of malaria other than *P falciparum*, but the possibility of *P vivax* breaking through in the absence of specific drug resistance is real. Where exposure is likely to be very great, as in some areas of chloroquine-resistant *P falciparum* in South-east Asia, particularly Papua New Guinea, it is reasonable to combine Fansidar or Maloprim with chloroquine, since pyrimethamine in the doses found in these drugs is sometimes inadequate to control *P vivax*, and sulphonamides are relatively ineffective against that parasite. Although proguanil-resistance was described many years ago at sites in South-east Asia, there has been no recent evidence of proguanil-resistance, or of cross-resistance with other drugs, on the part of *P vivax*.

P vivax may give rise to delayed or prolonged exoerythrocytic development so that a proportion of people taking regular prophylactics may develop a primary malarial attack many months after returning to the United Kingdom. The way to cope with this is to forewarn travellers to areas of high *P vivax* endemicity. The group are opposed to the presumptive treatment of all travellers returning from *P vivax* endemic areas with a full course of primaquine to remove any possible dormant exoerythrocytic stages. Primaquine is a drug with more side effects than other antimalarials and is apt to precipitate acute haemolytic anaemia in those with glucose-6-phosphate dehydrogenase deficiency. In the group's view it should be reserved for the treatment, rather than prophylaxis, of *P vivax* infections in British travellers.

DURATION OF PROPHYLAXIS

Adequate blood concentrations of antimalarials may normally be achieved by a dose the day before travelling, but it is better to begin taking antimalarials one week before departure, so that the traveller becomes accustomed to taking the medication and to disclose any acute drug idiosyncrasy in adequate time.

Antimalarials should be continued for not less than four weeks after returning to the United Kingdom, while some would recommend six weeks. Evidence is inadequate to justify deviation from the four weeks customarily recommended by the World Health Organisation. The need to continue for this time should be emphasised to travellers and reinforced by any doctor they contact for any reason on their return. Malaria must be considered in any sick individual who has visited an endemic area. Thick and thin blood films should be taken and curative treatment begun at once if the slides cannot be read straight away or if malaria parasites are present.

In addition to taking antimalarial drugs, travellers should be reminded of the need to take other protective measures against mosquito bites, such as wearing suitable clothing (long sleeves, long trousers, etc), using insect sprays and repellents, house screening, and mosquito nets, especially for babies and young children.

The precise circumstances of the individual traveller, as well as the current epidemiological state of affairs and range of drug resistance in the countries to be visited, must all be considered to reach the best decision on prophylaxis. Local advice about stopping antimalarial protection should be viewed with extreme suspicion. In conclusion, we emphasise the changing pattern of malaria in the world, the need for scepticism in accepting that any area is free from risk, the risks at stops on the journey as well as at the destination, and the relative nature of antimalarial protection. Further advice and up-to-date information may be obtained from the institutions listed in the appendix. No doubt individual clinicians will have their own views that may well not be identical with those expressed here, but we have tried to reflect the balance of informed opinion among some of those concerned with the subject.

The group emphasises the need for the accurate reporting of malaria that occurs in the United Kingdom. Reports of cases, and also slides for confirmation of identification, should be sent to the Malaria Reference Laboratory (address below). Reports of malaria in British travellers while they are abroad would also be welcome and should be accompanied by full information on any prophylactics being taken. In an episode of apparently drug-resistant malaria it is notoriously difficult to decide whether true drug resistance is present or whether there has been a failure to take (and absorb) a prophylactic regularly. Cases of suspected resistance from a new area should be notified urgently, so that an attempt may be made to culture the parasites and test sensitivity in vitro. Better advice depends on better data. Every effort should be made to ensure that people are aware of the risks of malaria and that they take prophylactics when visiting endemic areas.

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Appendix

LIST OF ADDRESSES FOR FURTHER INQUIRY

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Keppel Street (Gower Street),
London WC1E 7HT. Tel: 01-636 8636

Hospital for Tropical Diseases,
4 St Pancras Way,
London NW1 0PE. Tel: 01-387 4411

Liverpool School of Tropical Medicine,
Pembroke Place,
Liverpool L3 5QA. Tel 051-708 9393

East Birmingham Hospital,
Bordesley Green Road,
Birmingham B9 5ST. Tel: 021-772 4311

Department of Health and Social Security,
Alexander Fleming House,
Elephant and Castle,
London SE1 6BY. Tel 01-407 5522

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*Cases of malaria in the United Kingdom are reported to, and any information on malaria in British travellers abroad should be sent to, the Secretary, Malaria Reference Laboratory, at this address.