

# Malaria

*Plasmodium* species; *P. falciparum*, *P. ovale*, *P. malariae*, *P. vivax* & *P. knowlesi*.  
Protozoan parasites of humans.



## Risk Assessment

### Epidemiology

- Malaria is endemic in more than 100 countries in tropical and sub-tropical areas of the world, with about 3 billion people exposed. See Map 5-6.
- There is an overlap of malaria species, however, *P. falciparum* is most common in Africa and Hispaniola, and *P. vivax* is most common in South Asia and Latin America. *P. ovale* and *P. malariae* are relatively uncommon.
- Human cases of *P. knowlesi* have recently been reported in peninsular Malaysia and Malaysian Borneo.
- See NaTHNaC Country Information Pages<sup>1</sup> [www.nathnac.org](http://www.nathnac.org).

### Exposure

- Malaria is transmitted via the bite of an infected *Anopheles* mosquito. *Anopheles* mosquitoes feed predominately in the hours from dusk until dawn.
- All travellers to malaria endemic areas are at risk.
- Travellers at higher risk of malaria, or from serious complications, include VFRs, pregnant women, infants and young children, the elderly, the immunocompromised, those with homozygous sickle-cell disease, and those with no spleen or severe splenic dysfunction. See Special Risks Section 3.

## Imported Cases

In 2008, there were 1,370 cases of malaria acquired abroad, and 6 deaths from malaria. Where the species was known, 79% of cases were of *P. falciparum* and 8% of *P. vivax*. Where a history of prophylaxis was stated, 83% of cases had not taken antimalarials. 77% occurred in VFRs.

## Signs and Symptoms

- Incubation period is variable; as short as 8 days in *P. falciparum* infection, and as long as several months in *P. vivax* infection.
- Following a prodrome of fever, headache and myalgias, symptoms of malaria progress to high fever and severe myalgia.
- The fever pattern can become cyclical with hot and cold phases occurring in a 48 hour cycle with *P. vivax*, *P. ovale* and *P. falciparum*, and a 72 hour cycle with *P. malariae*.
- *P. falciparum* infections can progress rapidly to serious complications including coma (cerebral malaria), renal failure, anaemia, shock, pulmonary oedema and death.

<sup>1</sup> Alternatively see Travax <http://www.travax.nhs.uk/> or Fit for Travel <http://www.fitfortravel.nhs.uk/>

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- Infections with non-falciparum species are less likely to result in severe complications. Morbidity associated with these species is often associated with co-morbidity.

**Risk Assessment** See Resource Guide: A5 and A22 – Key Resources.

- **Awareness of risk:** Risk depends on the specific destination, season of travel, length of stay, activities and type of accommodation.
- **Bite prevention:** Travellers should take mosquito bite avoidance measures. *Anopheles* mosquitoes feed predominantly during the hours from dusk to dawn.
- **Chemoprophylaxis:** No malaria prevention tablets are 100% effective. Taking malaria prevention tablets in combination with mosquito bite avoidance measures will give substantial protection against malaria.  
See Tables 5-1 and 5-2. See Special Risks Section 3.
- **Diagnosis:** Travellers who develop a fever of 38°C (100°F) or higher more than 1 week after being in a malaria risk area, or who develop any symptoms suggestive of malaria within a year of return should seek immediate medical care.
- See The Post-Travel Consultation Section 4.

**Diagnosis** Thick and thin blood film to detect and speciate malaria parasite. Antigen detection for *P. falciparum* and *P. vivax* and PCR are available.

**Treatment**

- *P. falciparum*: Specialist advice is recommended. All patients should be treated in hospital. Drugs depend upon severity of illness. Oral agents: co-artemether or atovaquone/proguanil; parenteral agents: quinine combined with oral doxycycline or clindamycin. Artesunate can be obtained after specialist advice for cases of severe malaria. Official UK guidance should be followed.
- Non-*P. falciparum* species: Chloroquine and primaquine.
- See Resource Guide: 5.6.
- See Table 5-3.

**Notification** Malaria is a notifiable infectious disease.  
See Resource Guide: 5.1.

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Table 5-1. Antimalarials for adults and children\*

Drug	Presentation	Adult dosage	Child dosage	Contraindications	Adverse events
Atovaquone/ proguanil	Adult: 250mg atovaquone/100mg proguanil. Paediatric: 62.5mg atovaquone/25mg proguanil.	One tablet daily. Begin 1 to 2 days before travel and continue for 7 days after travel.	< 11kg – not recommended 11 to 20kg – 1 paediatric tablet 21 to 30kg – 2 paediatric tablets 31 to 40kg – 3 paediatric tablets > 40kg – 4 paediatric tablets or 1 adult tablet	Hypersensitivity to atovaquone or proguanil; severe renal failure.	Common – headache, abdominal pain, nausea and vomiting. Rare – rash.
Chloroquine	155mg chloroquine base tablet 50mg/5ml chloroquine syrup	Two tablets weekly. Begin 1 week before travel and continue for 4 weeks after travel.	Under 6kg – ¼ tablet 6 to 9.9kg – ½ tablet 10 to 15.9kg – ¾ tablet 16 to 24.9kg tablet – 1 tablet 25 to 44.9kg – 1 ½ tablets 45kg and over – 2 tablets See <a href="#">Table 5-2</a> for chloroquine syrup dosage	Epilepsy. May exacerbate psoriasis and myasthenia gravis.	May exacerbate psoriasis. Common – headache, pruritis in those of African descent. Occasionally – blurred vision, partial alopecia. Rare – retinopathy, myopathy, photophobia.
Doxycycline	100mg capsule	One capsule daily. Begin 1 to 2 days before travel and continue for 4 weeks after travel.	<12 years of age – not recommended. >12 years – 1 capsule	Allergy to tetracycline, children <12 years, pregnancy, breastfeeding.	Stains teeth in children < 12 years. Common – gastrointestinal upset, photosensitivity, vaginitis. Rare – allergic reaction, oesophageal ulceration, benign intracranial hypertension.

(continued)





## Malaria

Table 5-1. Antimalarials for adults and children\* (continued)

Drug	Presentation	Adult dosage	Child dosage	Contraindications	Adverse events
Mefloquine	250mg tablet	One tablet weekly. Begin 2 to 3 weeks before travel and continue for 4 weeks after travel.	< 5kg – not recommended 5 to 15.9kg – ¼ tablet 16 to 24.9kg – ½ tablet 25 to 44.9kg – ¾ tablet > 45kg – 1 tablet	Depression, history of psychosis, epilepsy, cardiac conduction disorders. Caution in pregnancy.	Common – dizziness, nausea, diarrhoea, headache, vivid dreams, insomnia, mood alteration. Rare – seizures, psychosis.
Proguanil	100mg tablet	Two tablets daily. Begin 1 week before travel and continue for 4 weeks after travel.	<6kg – ¼ tablet 6 to 9.9kg – ½ tablet 10 to 15.9kg – ¾ tablet 16 to 24.9kg – 1 tablet 25 to 44.9kg – 1 ½ tablets > 45kg – 2 tablets	Allergy to proguanil. Caution in renal impairment. Folic acid supplements required during pregnancy.	Common – nausea, abdominal pain, headache. Rare – rash.

\*Adapted from ACMP malaria guidelines. See Resource Guide: 5.6. Suitable regimens are dependent on the destination; see NaTHNaC Country Information Pages<sup>1</sup> [www.nathnac.org](http://www.nathnac.org). Drug information should be checked in the British National Formulary (BNF); see Resource Guide: A2 – Key Resources.

1 Alternatively see Travax <http://www.travax.nhs.uk/> or Fit for Travel <http://www.fitfortravel.nhs.uk/>

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Table 5-2. Chloroquine syrup dosage for children\*

Weight	Dosage
< 4.5kg	2.5ml
4.5 to 7.9kg	5ml
8 to 10.9kg	7.5ml
11 to 14.9kg	10ml
15 to 16.5kg	12.5ml

Note that these doses are not the same as for chloroquine tablets which have different chloroquine content. Chloroquine syrup contains 50mg chloroquine base per 5ml.

\* Drug information should be checked in the British National Formulary (BNF); see [Resource Guide: A2 – Key Resources](#).

Table 5-3. Emergency standby treatment for adults\*

Standby treatment regimens	Dosage per tablet	Adult dose
Co-artemether	20mg artemether plus 120mg lumefantrine	4 tablets initially followed by further doses of 4 tablets each given at 8, 24, 36, 48 and 60 hours. Total 24 tablets over a period of 60 hours
Atovaquone plus Proguanil	250mg atovaquone plus 100mg proguanil	4 tablets as a single dose on each of 3 consecutive days
Quinine plus Doxycycline	300mg quinine plus 100mg doxycycline	Quinine 2 tablets 3 times a day for 3 days, accompanied by 1 tablet of doxycycline twice daily for 7 days
Chloroquine	155mg chloroquine bases	4 tablets on days 1 and 2, 2 tablets on day 3
Quinine plus Clindamycin	300mg of quinine 75 or 150mg (75mg preferred) clindamycin	Quinine 2 tablets 3 times a day for 5 to 7 days, Clindamycin 3 tablets (450mg), 3 times a day for 5 days

\* Adapted from ACMP malaria guidelines. See [Resource Guide: 5.6](#). Suitable regimens are dependent on the destination. See NaTHNaC Country Information Pages<sup>1</sup> [www.nathnac.org](http://www.nathnac.org). Drug information should be checked in the British National Formulary (BNF); see [Resource Guide: A2 – Key Resources](#).

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