



Updated version (29/07/2016 – UM) see: www.reisgeneeskunde.be

MALARIA-ADVICE IN CASE OF PROLONGED STAY IN THE TROPICS

Information for individuals who make regular or prolonged trips to malaria areas

Complete prevention of malaria is impossible; there is no fool-proof method for preventing infection. All measures are aimed at reducing the risk of a malaria attack to a minimum and at preventing serious and lethal complications. As the risk of malaria is never completely absent, despite the best prevention, information about correct treatment in the case of a possible infection is indispensable.

The strategy to be followed by anyone who spends time in a malaria area is currently based on four cornerstones:

- A. **“Awareness”**: being aware of the malaria risk
- B. Taking measures to prevent **bites by the malaria mosquito** (external protection)
- C. Using malaria **chemoprophylaxis** (tablets) in some cases, to prevent a malaria attack
- D. Knowing what to do in case of a possible malaria **diagnosis** (rapid diagnosis and/or self-treatment)

I. MOSQUITO-REPELLENT MEASURES

The malaria mosquito only bites between dusk and dawn. Not noticing mosquitoes does not mean that there aren't any present (Anopheles mosquitoes do not buzz).

The avoidance of contact with the malaria mosquito is in itself a very effective measure in the prevention of malaria and is particularly useful for young children.

A. General measures

During the evening and at night, stay in a room with windows and ventilation holes that are covered with **gauze** that is impenetrable to mosquitoes. Air conditioning vents should also be covered by **gauze**.

N.B. Air conditioning reduces the aggressive behaviour of mosquitoes, but does not always prevent them from biting. Even if you are staying in rooms with air conditioning, you should take preventive measures against mosquito bites.

- You can apply a pyrethrum-based insecticide either by **spraying** (using an aerosol can) or **evaporation** (using electrically heated plates: these can be used either during the day in a well-closed room (be sure not to remain in the room during application), or during the night while you are sleeping in a well-ventilated room).
- In the evening outside the house, wear clothes that **cover the arms and legs as much as possible**. Mosquitoes are more readily noticed on light-coloured clothing.

B. Insect repellents

Insect repellents contain a product that deters insects, without killing them. These products are applied to exposed parts of the skin. Do not forget to apply it to your ankles and feet! The following protective measures are recommended for all travellers, and for children and pregnant women in particular:

- Avoid excessive rubbing when applying, and avoid contact with the lips, mouth, mucous membranes and eyes, as well as with damaged or irritated skin (wounds, eczema patches, severe sunburn). If product is applied to these areas, rinse immediately with water.
- Rub into the entire exposed area, but use just enough product to cover the skin.
- Do not apply to children's hands to prevent the product from coming into contact with the mouth or eyes.
- Wash the product off when it is no longer needed.
- Store these products well out of reach of children.

Which products are recommended?

DEET (diethyl-m-toluamide – now called N,N-diethyl-3-methylbenzamide) such as MoustiMug[®], Z-stop[®], Anti-M[®], OTC repellent[®], Mouskito[®], Care Plus[®] DEET and other products. This is the most well-known product, but can damage plastics. The optimum concentration for DEET is between 20 and 50 % in the tropics; the higher the concentration, the longer the protection period, which is very practical. The protection time offered by concentrations lower than 20 % is too short. Certain preparations contain 50 - 100 % DEET, but from 50 % upwards the protection period does not increase significantly and higher concentrations therefore have no additional clinical advantage.

The protection period offered by DEET products is usually shorter than that listed on the packaging and these products should be re-applied regularly if necessary, on average every four to six hours (DEET 20 - 30 % only offers four to six hours of protection; a higher percentage of DEET 40 - 50 % offers about eight hours of protection, but you cannot get through the night or even a long evening with just one application!). New preparations with delayed DEET release may be introduced in the future and these will offer a longer period of protection (e.g. Ultrathon[®] cream with an efficacy of 12 hours is currently available in some areas), with a much lower risk of cutaneous absorption.

Most international guidelines on travel medicine (CDC, UK, BEH) allow the use of DEET with **children** from the age of two months, although the WHO does not recommend using DEET on children under the age of two years.

Concentrations between 20 and 30 % are recommended for children and **pregnant women**. For young children under the age of two years, the recommendation is to apply the product only once a day.

When combining it with sun lotion, the sun lotion should be applied first (with a higher sun protection factor because DEET reduces the effectiveness of sun lotion) and then DEET afterwards.

The use of insect repellents that do not contain DEET has not been studied in as much detail.

- Products based on **(p)icaridin** (Care-Plus[®] Repel-it; Parazet[®]) are good and safe products that do not damage plastics. (P)icaridin may be used from the age of two years. Use in pregnant women is permitted, but not very well documented.
- Products based on **IR3535** (including Cinq sur Cinq[®], Moustidose[®]) are good and safe. A formulation containing 30 % and 35 % has recently been placed on the market, meaning that the protection time is now similar to that of DEET 30 - 50 % (up to eight hours, according to the packaging). The 25 % formulation may be used for children under the age of two years. Use in pregnant women is permitted, but not very well documented.
- Products based on the **citrodiol extract of eucalyptus oil** (also called p-menthane 3,8 diol or PMD) (Care Plus[®] Natural, Mosegor[®]/Mosiguard[®]) These products can be used on young children from the age of 6 months (from the age of 3 years according to CDC). This product may not be used by pregnant women. "Pure" oil of lemon eucalyptus is not recommended because it gives not sufficient protection.

All these products are also moderately effective against fleas and ticks.

Other alternatives are currently not recommended. Products based on plant-derived substances only offer a very short protection period (for example, citronella is only effective for a few minutes). Bracelets impregnated with an insect repellent are also not effective enough.

Gadgets that (allegedly) keep mosquitoes at a distance by emitting (ultra)sound are useless! The efficacy of taking vitamin B1 has never been proven.

C. Treated (impregnated) mosquito nets

A **mosquito net that has been impregnated by the manufacturer** is preferable to and more effective than a non-impregnated mosquito net or a mosquito net that has been treated at home. Any mosquitoes that come into contact with the net will be killed before they can bite. In addition, any mosquitoes in the room will be repelled or killed. If an impregnated mosquito net is used over a cot, it is important to ensure that the baby cannot grab hold of the net and suck on it.

When impregnating a mosquito net at home, the quality is usually sub-standard and the treatment poses an unnecessary risk to personal safety and the environment. A mosquito net impregnated at home has a much

shorter protective period (maximum of six months for permethrin, 500 mg/m² to 12 months for deltamethrin, 25 mg/m² active substance) and authorised products for this application are no longer available on the Belgian market. It is hoped that mosquito nets with improved impregnation will be available in Belgium in the near future, as these nets have the insecticide incorporated into the fibres of the net, resulting in a prolonged period of protection (Long Lasting Impregnated Nets (LLIN), including PermaNet[®]).

Deltamethrin

Deltamethrin is not officially available in Belgium. In many African countries it is commercially available under the name K-O TAB[®] Aventis (insecticide tablets), which are specifically intended for the impregnation of mosquito nets, albeit not for cotton nets.

Permethrin

Until recently, permethrin was available in a number of specialised stores, including under the name “Care Plus[®] Klamboe Impregneerset” by the company “Tropenzorg”. Permethrin is still available in some large chemist shops, but these products are not registered for the impregnation of mosquito nets. Some professional outdoor stores import permethrin from other countries (e.g. No Bite[®]).

These products are extremely toxic to fish, so they must be disposed of at the waste sorting station and should never be poured into waste water or a river!

D. Clothing treated with repellent or insecticide

Repellent on the clothing

There are various repellents that can be applied to clothing, but repellents are very inefficient at a distance and they are less effective when applied only to clothing. DEET also causes synthetic materials (including spectacles) to dissolve. (P)icaridin does not damage plastics.

Clothing treated with insecticides

Pre-impregnated clothing and clothing where permethrin has been incorporated into the fabric during the manufacturing process - for example Nosi Life[®], Colombia Bug Shield[®] - are available and according to the manufacturer, these items remain effective even after dozens of washes. Until recently, permethrin sprays and impregnation sets for clothing could be purchased at most outdoor stores, but these products have been withdrawn from the Belgian market due to the burden placed on the environment, particularly fish (although they are still imported through some professional outdoor stores). The same comments made for the impregnation of mosquito nets also apply here.

II. TAKING PILLS TO PREVENT MALARIA

Please consult the paragraphs on malaria chemoprophylaxis in the basic brochure “How to travel and stay healthy”. Concerning the dosage for children, please consult the brochure “travelling with children and babies”.

Persons staying in a malaria area for the first time will have **to take medicines for prevention, mostly during the first months and sometimes during the first years**, because malaria infections can very quickly lead to dramatic and life-threatening situations.

The guidelines concerning recommended malaria prevention will vary according to **the country and the region, the season and the residential circumstances**. Therefore, malaria prevention advice will often be “personalised”! See also: www.reisgeneeskunde.be

These anti-malaria medicines do not prevent a malaria infection, but only act upon the early parasitic forms, which affect the red blood cells after having matured in the liver. Taking these medications prevents malaria from developing into a full-blown disease. Atovaquone/Proguanil, however, is an exception, in the sense that it blocks transmission before the liver stage, provided that the treatment is started 24 hours prior to arrival, is taken diligently every day and is continued for seven days after leaving the endemic area. If prophylaxis was not started on time, or if a day was skipped, then Atovaquone/Proguanil needs to be continued until four weeks after return from the endemic area, as is the case for the other prophylactics.

The abovementioned malaria prevention is aimed predominantly at preventing a malaria attack by **Plasmodium falciparum**. There are other forms of malaria (e.g. **Plasmodium vivax, ovale, malariae**), which can in some cases lead to severe disease symptoms, but these will only be life-threatening in very rare cases. To date, most of these forms of malaria are sensitive to chloroquine, although they are sometimes insensitive to other anti-malaria medicines. These three Plasmodium types can be responsible for late attacks or relapses of malaria, for example after returning to the country of origin. In fact, the parasite can remain present for many months to years as a dormant form in the liver (**P. vivax, P. ovale**), or in the blood (**P. malariae**), before it causes an attack. These malaria attacks are usually characterised by regular bouts of fever every 48 hours, with intermittent fever-free periods. This necessitates treatment (three days of chloroquine, followed by 14 days of primaquine) in a centre that is familiar with malaria treatment.

III. MALARIA RAPID TEST

A “malaria rapid diagnostic test” (RDT) or antigen test is successfully used **in combination** with a classic “thick smear” and a “thin smear”, analyzed in a laboratory by trained technicians. In theory, this RDT could be an attractive tool for travelers to regions where malaria risk is moderate to low, or for expats or those going on longer journeys. However, this technique has not been validated for use by untrained people and has not been approved as a self-testing device. A number of tests of variable quality are offered for sale over the internet. Often there is a problem with the diluent (the solvent necessary to carry out the test leaks or evaporates in the vial). Untrained persons without a proper manual encounter problems to execute and interpret the test. Because of these obstacles, the use of this type of tests cannot be recommended and the test result in these conditions is

certainly not reliable enough to determine whether or not a person has malaria and to decide whether or not to take treatment.

IV. WHAT TO DO DURING A POSSIBLE MALARIA ATTACK

In principle, resistance (immunity) to malaria only develops after many repeated contacts with the malaria parasite during a prolonged stay in the tropics. However, a prolonged stay in the tropics does not guarantee immunity at all **and most expatriates residing in the tropics do not build up any significant immunity.**

Any acquired immunity is usually lost after leaving the malaria area for more than six months; it can only be built up and maintained through repeated malaria infections. This same problem occurs in areas where malaria only appears for part of the year (e.g. rainy seasons).

However, individuals who have lived in the same place in the tropics for an extended period can often stop taking oral prevention, mostly without serious consequences. As a general rule, good malaria prophylaxis is recommended for a **transition period of approximately three to six months (sometimes shorter, sometimes longer).**

This period should be used to implement other protective measures, such as making the home mosquito-free by means of impregnated mosquito nets and exploring local medical care for good diagnosis and adequate and rapid treatment (possibly including emergency treatment, depending on the availability under local conditions).

When the decision is taken to stop prophylactic medication - after a few weeks, months or years - it is very important

(1) to ensure maximum protection against mosquito bites during the evening and at night, and
(2) to be able to recognise (or at least suspect) a possible malaria attack and to be able to treat it correctly. Since a malaria attack might (although rarely) occur despite maximum protection, malaria guidance consequently also emphasises correct treatment.

For growing children, pregnant women and persons who for one reason or another have a weakened physical condition, it often remains quite risky to stop taking prophylactic medication without professional advice; such decisions should be reviewed on an individual basis.

Travellers staying in a malaria area for a short period only are not in the same situation as long-term residents in the tropics. They are in a much more vulnerable position and they are also continually moving from place to place, with constantly shifting malaria risks.

It is very important that they take prophylactic medicines, particularly in Africa. In many areas of Asia and Latin America (<http://www.dtg.mwn.de/malaria/karte.htm>), it may be possible for travellers (even on adventure trips) to decide not to use chemoprophylaxis. Such a decision should only be taken following a detailed discussion with a **specialised doctor** and a thorough evaluation of the malaria risk in relation to the type of accommodation, and provided that strict anti-mosquito measures are taken from dusk to dawn and that **emergency malaria treatment (Atovaquone/Proguanil®)** with full instructions are taken along on their travels.

Every increase in body temperature (from 38 °C in the armpit) lasting more than 24 hours and occurring during or up to three months after a stay in an area where malaria is endemic - whether accompanied by other signs and symptoms or not - must be considered as a malaria attack until proved otherwise and requires swift medical attention.

Always keep a thermometer on hand and check your body temperature regularly (every eight hours) if you feel unwell, even if you do not think that you have a fever! The first days of a malaria infection can often be relatively mild and can easily be confused with other conditions, but the longer you wait to start the correct treatment, the higher the risk of severe illness, complications and even death. The only way to confirm (or rule out) a malaria diagnosis is by means of a blood test (“thick drop” and “smear” in combination with a rapid test). After you return to Belgium, you should insist on this test being done **urgently** whenever you have a fever (until three months after leaving the malaria zone) and on obtaining the result within a few hours!

The use of any of the options summarised below for emergency treatment for malaria, implemented at your own initiative following your return home, can result in dangerous errors and is absolutely not recommended!

In the case of **warning symptoms** such as **fever lasting longer than three days, dark urine, jaundice, shortness of breath or reduced consciousness, an urgent hospitalisation is indicated.**

The following **treatment schedules** have been selected, because their effectiveness is close to 100 %. Many other schedules are possible, but they are definitely less effective.

- A. ATOVAQUONE/PROGUANIL[®]**
- B. RIAMET[®] or EURARTESIM[®]**
- C. QUININE + DOXYCYCLINE**

SCHEDULE A

Atovaquone/Proguanil[®] is a very effective medicine, which is used in the case of non-complicated malaria (it contains two active ingredients in one tablet: 250 mg atovaquone + 100 mg proguanil). Children > 40 kg and adults should take **four tablets once a day, at the same time of day for three consecutive days**. **Atovaquone/Proguanil**[®] should preferably be taken with some food or with milk. Sometimes the intake of this medicine can cause vomiting.

Dose adjustment for children:

5 - 8 kg	2 paediatric tablets/day, taken at once, for 3 consecutive days
9 - 10 kg	3 paediatric tablets/day, taken at once, for 3 consecutive days
11 - 20 kg	1 adult tablet/day, taken at once, for 3 consecutive days
21 - 30 kg	2 adult tablets/day, taken at once, for 3 consecutive days
31 - 40 kg	3 adult tablets/day, taken at once, for 3 consecutive days
from 40 kg upwards	4 adult tablets/day, taken at once x 3 days = adult dose

One paediatric tablet of **Atovaquone/Proguanil Junior**[®] contains 62.5 mg atovaquone and 25 mg proguanil.

SCHEDULE B

A very effective medicine, which is used in the case of non-complicated malaria, is one of the two following combination drugs with an **artemisinin derivative**:

Eurartesim[®] (contains two active ingredients in one tablet: dihydroartemisinin 40 mg + piperaquine 320 mg).

Riamet[®] (contains two active ingredients in one tablet: **artemether** 20 mg + lumefantrine 120 mg).

Eurartesim[®] must be taken as a single dose, at the same time each day, for **three consecutive days**, so three doses in total. An adult weighing 36 to 74 kg takes three tablets of 320 mg/40 mg per day (nine tablets in total); an adult weighing 75 to 100 kg takes four tablets of 320 mg/40 mg per day (12 tablets in total); to be taken without food, on an empty stomach.

The total dose for **Riamet**[®] is 6 x 4 tablets: four tablets at the time of diagnosis, four tablets eight hours later and then four tablets every 12 hours for another two days; to be taken with food. According to the current guidelines, these medications may not be taken together with antibiotics to treat travellers' diarrhoea; the package insert states that a follow-up with **ECG** is often indicated. This means that it will not be given as a routine treatment to take with you when you go travelling; it will not be administered without medical supervision.

- N.B. The medicine **artemisinin and its derivatives** are currently available in many countries in the Far East, as well as several countries in sub-Saharan Africa. Since 2005, the World Health Organisation formally rejects the use of artemisinin as monotherapy, due to the fear of developing resistance. Only the combination with another effective malaria treatment is acceptable ("ACT" = "artemisinin combination therapy"), for example with doxycycline (as with quinine), mefloquine (Lariam[®]), or lumefantrine (**Riamet**[®] is therefore *an approved form of ACT*). In Africa this combination is readily available under the name **Co-artem**.
- **Tea or herbal tablets made from extracts of the *Artemisia annua* plant are absolutely not recommended, because of the insignificant - sometimes even nonexistent - effectiveness.**

SCHEDULE C

Quinine in combination with doxycycline is also very effective, but it is not very useful as “stand-by emergency treatment”.

QUININE (capsules of 500 mg quinine sulphate) or **QUINIMAX**[®] (tablets of 500 mg, not available in Belgium): for an **adult, 500 mg** every eight hours for **four days**. If the fever drops slowly, it is advisable to continue taking quinine for several more days, at the rate of one capsule every 12 hours. In Southeast Asia and in the Amazon region, quinine must be taken for seven days.

At the same time (if retching or vomiting occurs wait until the third day), start with either:

- **DOXYCYCLINE (VIBRAMYCINE[®], VIBRATAB[®], DOXYLETS[®], etc.)** two tablets of 100 mg (= 3.5 mg/kg) **the first day**, followed by **one tablet of 100 mg** (= 2 mg/kg) **per day** for the next **six days**.
- Or **TETRACYCLINE** 20 mg/kg (max. **3 x 500 mg/day**) **for seven days**.

The dosage for **children** over the age of eight is adjusted according to body weight (quinine: identical schedule as for adults; 10 mg/kg) and should be administered every eight hours.

- The combination in SCHEDULE C remains 100 % effective in Africa and Latin America and almost 100 % effective in Asia.
- Quinine sulphate must be prepared by a pharmacist. If the capsules are stored in a closed, brown glass bottle with a desiccant, the shelf-life will be **one year** (in a cardboard box, it will expire much sooner).
- When the malaria attack is only treated with quinine (e.g. only with Quinimax[®] injections), there is a small but genuine risk of a later relapse of malaria, since it is not always possible to eliminate all the parasites with this treatment.
- Quinine can be replaced by artemisinin.
- Tetracycline and doxycycline alone are too weak to be used as anti-malaria medication. Therefore, they should **always** be combined **with quinine**.
- If the medication is vomited, quinine (in the form of quinine bishydrochloride) must be administered intravenously for several days, at the same dose, every eight hours, with each infusion administered over a period of four hours. As soon as the patient improves, the quinine can be given orally, combined with tetracycline or doxycycline.
- If it is not possible to administer an infusion, then quinine can be administered by intramuscular injection (in the thigh muscle) at the same dosage, every eight hours (= three injections per day). (NEVER INJECT INTRAVENOUSLY: RISK OF CARDIAC ARREST OR FATAL DROP IN BLOOD PRESSURE).
- Taking tetracycline or doxycycline can cause hypersensitivity reactions in the skin when exposed to sunlight. Therefore, be careful with direct exposure to sunlight.
- Tetracycline and doxycycline are **not** indicated for **children under the age of eight years** or **pregnant women** (because of possible discolouration of teeth). If there is no alternative available, **quinine** can be continued for this group for **seven to ten days**, or it can be combined with clindamycin (4 x 5 mg/kg per day, up to 3 x 600 mg per day for five days).

In case of Fansidar resistance or allergy to sulphonamides **and** unavailability of mefloquine, **quinine** can be continued for this group for **seven to ten days**. In principle, Atovaquone/Proguanil[®] is not administered to pregnant women (although it can be used in exceptional cases).

N.B.

HALOFANTRINE (HALFAN®), in tablets of 250 mg (box of six) or in syrup (100 mg per 5 mL, 45 mL).

Halfan is no longer available from the pharmacy in Belgium.

Only oral intake is possible. For adults and children weighing more than 40 kg: **Take two tablets every six hours for a total of three doses in one day**, on an empty stomach! It is advisable **to repeat** this treatment **after one week**. For children under 40 kg: see package leaflet. Not to be used during pregnancy or breast-feeding. Possible side effects are gastro-intestinal discomfort, itching and skin rash.

Recent reports indicate that the administration of Halfan® has been linked - in very rare cases - to fatal cardiac arrhythmias. **For this reason, Halfan® is no longer recommended as self-medication in the event of an emergency to treat suspected malaria (without the supervision of a medical doctor)**. Patients who do decide to use it can only do so on condition that a **previously recorded electrocardiogram was normal** (i.e. with a **normal "QT interval"**). Halfan® is only safe as medication if the patient has not taken **Lariam® (in the last four weeks) or quinine (in the last 24 hours)**, as well as a number of other medications such as medications for arrhythmias, anti-depressants, anti-allergy medicines such as Triludan®, certain antibiotics such as Erythromycine, water tablets (diuretics) such as Lasix® and others. Therefore, it is best not to take Halfan® in combination with other medicines, if you are not sure that the combination is safe. **At the moment, Halfan® should be replaced by the abovementioned anti-malaria treatments.**

N.B.

Start with **QUININE** or **QUINIMAX®** for the first several days, as in Schedule B.

At the same time (if retching or vomiting occurs wait until the third day), **FANSIDAR®** (no longer available in Belgium) should be taken, in the form of **three tablets at once**.

If the fever drops slowly, it is advisable to continue taking quinine for several more days.

For **children**, the dose adjustment of Fansidar® is as follows (as a function of body weight):

children < 10 kg: ½ tablet

children between 10 and 20 kg: 1 tablet

children between 20 and 30 kg: 1½ tablets

children between 30 and 50 kg: 2 tablets

children > 50 kg: 3 tablets

Fansidar® is not recommended for **infants** under two months of age.

They can be given quinine drops (see above), also at a dosage of 10 mg (= one drop) per kilogram, every eight hours (= 3 x per day) for seven to ten days (the indicated dosage should not be exceeded).

- Fansidar[®] can only be taken if the patient has **no known allergy to sulphonamides**.
- When the malaria attack is mild and uncomplicated, Fansidar[®] can be given alone. Nevertheless, one has to take into account that Fansidar[®] usually has a noticeable effect only after one or two days. This is one of the reasons for combining Fansidar[®] with quinine, especially when the disease symptoms are very severe.
- There are several areas where Fansidar[®] resistance has already been detected; in the Far East, there is multiple resistance. This is the main reason why Fansidar[®] should always be combined with quinine. If the fever has not gone down after two days, or if disease symptoms re-appear after a few weeks, this could indicate Fansidar[®] resistance. In such cases, refer to Schedule A or B.

N.B.

Mefloquine (LARIAM[®]) is no longer used in practice as emergency malaria treatment, due to the potential side effects.

TREATMENT OF PREGNANT WOMEN:

- Either with quinine alone: 3 x 500 mg per day for seven days (for ten days in case of travel to the Far East)
- Or quinine for five days, in combination with clindamycine (3 x 600 mg per day, for five days) or with Fansidar[®] (only **during the second trimester of pregnancy and the first half of the third trimester**; no longer available in Belgium since the end of 1997). Quinine causes some uterine contractions, but it can only trigger labour at the end of the pregnancy. On the other hand, the fever caused by malaria also increases the risk of miscarriage or premature birth.
- Riamet[®] and Eurartesim[®] may be used during the second and third trimester of the pregnancy; their use is not recommended during the first trimester, unless the situation is life-threatening and there are no other suitable and effective malaria treatments available. Atovaquone/Proguanil can also be used in exceptional circumstances.

N.B.: When it is decided to treat a malaria attack with **chloroquine only** (for example when staying in an area where THE RISK OF CHLOROQUINE RESISTANCE IS VERY MINIMAL OR NIL and when no chloroquine was taken as prevention and initial symptoms suggest malaria), then it is very important to do this in a correct way: **25 mg/kg body weight for three days**, no less and no more.

NIVAQUINE[®]

	For adults	For children
day 1	6 tablets of 100 mg, at once 3 tablets of 100 mg, 8 hours later	10 mg/kg 5 mg/kg
day 2	3 tablets of 100 mg	5 mg/kg
day 3	3 tablets of 100 mg	5 mg/kg

If **no effect is observed after 24 - 48 hours**, then chloroquine resistance must be assumed. When relapse of the disease symptoms occurs and/or other malaria symptoms appear **within three to four weeks**, it must be assumed that the original malaria parasite was not eradicated and that it has developed (partial) **resistance** to chloroquine (this is also sometimes seen after the use of medicines like Fansidar[®]). Sometimes, because of the partial effects of chloroquine or Fansidar[®], the symptoms of malaria are much less clearly recognisable (for example, only slight fever, headache and tiredness). Sometimes it is actually an unrecognised malaria ovale or vivax.

In all these situations, it is important to discontinue treatment with chloroquine and immediately switch to Schedule A or B.

Closing remarks:

There is often contradictory advice about malaria, both in the form of advice from doctors and in the form of well-meaning advice from people in the immediate surroundings who have already lived in the tropics for some time.

This also explains why, over the last 20 years, the advice has had to be updated repeatedly, and it will undoubtedly change again in the future.

This information brochure aims to list the current practical knowledge and to offer a logical approach to preventing and treating malaria.

In any case, discuss the contents of this brochure with your treating doctors and pass this information on to others.

NOTES

SUMMARY:
MALARIA PREVENTION AND TREATMENT

Information for individuals staying for a prolonged period in a malaria area:

I. EXTERNAL PROTECTION TO PREVENT EXPOSURE

Between dusk and dawn:

Impregnated mosquito nets, mosquito gauze, air conditioning, clothing that covers the body, mosquito-repellent on the skin, spraying, evaporation.

II. TAKING TABLETS

- **ATOVAQUONE/PROGUANIL[®]** (one tablet per day, starting one day before departure and continuing until seven days after return)
- **DOXYCYCLINE** (one tablet per day, starting one day before departure and continuing until four weeks after return; sometimes a tolerance test of several days can be indicated)
- **LARIAM[®]**: (one tablet once a week, starting several weeks before departure and continuing until four weeks after return). In order to have an effective amount of **LARIAM[®]** in the blood upon arrival in the malaria area, it is advisable to start taking this product two to three weeks before departure. People who have never taken this product before are advised to start taking it two to three weeks in advance, in order to deal with any side effects (dizziness, insomnia, nightmares, agitation, inexplicable anxiety, palpitations - for details, refer to the basic brochure "How to travel and stay healthy").

III. WHAT TO DO DURING A POSSIBLE MALARIA ATTACK

- A. ATOVAQUONE/PROGUANIL[®]**
B. EURARTESIM[®] or RIAMET[®]
C. QUININE + DOXYCYCLINE

(all these schedules are discussed extensively in this document)

ATOVAQUONE/PROGUANIL[®] (four tablets/day for three days, **to be taken with food**).

EURARTESIM[®] (for an adult weighing 36 to 74 kg: three tablets/day for three days; for an adult weighing 75 to 100 kg: four tablets/day for three days; to be taken without food). Often a follow-up with ECG is indicated.

RIAMET[®] (6 x 4 tablets: four tablets at the time of diagnosis, four tablets eight hours later and then four tablets every 12 hours for another two days, **to be taken with food**). Often a follow-up with **ECG** is indicated.