

MALARIA PREVENTION AND PROPHYLAXIS

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DAN receives many inquiries from members regarding malaria. Indeed, malaria has become an increasing problem due to drug resistance. As divers venture deeper into the African tropics they incur increasing risk of contracting malaria. Lack of medical facilities, transportation and communication add additional complexity to managing this medical emergency. Three DAN members have required evacuation by air over the last three years due to malaria. Understanding malaria prophylaxis and general preventative measures is therefore of the utmost importance. The following section covers the most important considerations in selecting and using malaria prophylactic measures and medications. The treatment of malaria, which is complex and requires close medical supervision, falls outside the scope of this document. If you think that you may have malaria or are concerned about unexplained symptoms after visiting a malaria area, contact DAN immediately on 0800 020111 or +27(0)11 254 -1112.

The Three Commandments of malaria prevention and survival are:

- Do Not Get Bitten
- Seek Immediate Medical Attention If You Suspect Malaria
- Take "The Pill" (Anti-Malaria Tablets / Prophylaxis)

(1) DO NOT GET BITTEN

- Stay indoors from dusk to dawn
- If you have to be outside between dusk and dawn – cover up : Long sleeves, trousers, socks, shoes (90% of mosquito bites occur below the knee)
- Apply DEET containing insect-repellent to all exposed areas of skin, repeat four-hourly
- Sleep in mosquito-proof accommodation :
 - o Air-conditioned, and / or proper mosquito gauze
- Buildings / tents, regularly treated with pyrethrum-based insect repellent / insecticide
- Burn mosquito coils / mats
- Sleep under an insecticide impregnated (Permacote® / Peripel®) mosquito net (Very effective)

(2) SEEK IMMEDIATE MEDICAL ATTENTION IF YOU SUSPECT MALARIA

- Any flu-like illness starting 7 days or more after entering a malaria endemic area is malaria *until proven otherwise*.
- The diagnosis is made on a Blood smear or with an ICT / rapid malaria finger prick test,
- One negative smear / ICT does NOT exclude the diagnosis :
 - o Repeat the smear / ICT until the diagnosis is made, another illness is conclusively diagnosed or spontaneous recovery occurs – e.g. from ordinary influenza...)

(3) TAKE "THE PILL"

There are several dangerous myths regarding malaria prophylaxis. Please note that:

- Prophylaxis does *not* make the diagnosis more difficult
- It *does* protect against the development of *cerebral malaria*
- Prophylaxis is *not* 100% effective - hence the importance of avoiding bites
- *Not* all anti-malaria medication is safe with diving

- *Malaria is often fatal – making prophylaxis justified*
- Anti-malaria drugs, like all drugs, have potential side-effects, but the majority of side-effects decrease with time.
- Serious side-effects are *rare* and can be avoided by careful selection of a tablet or combination of tablets to suit your requirements (Country, region and season).

THE FOLLOWING DRUGS ARE AVAILABLE FOR THE PREVENTION OF MALARIA:

(1) Doxycycline (Vibramycin® or Cyclidox® or Doryx®, etc.):

- Used extensively in the prevention of chloroquine resistant malaria. About 99% effective. Not officially recommended for use in excess of 8 weeks for malaria prevention, but it has been used for as long as three years with no reported adverse effects. Offers simultaneous protection against tick-bite fever.
- Dosage: 100mg daily *after a meal* starting 1 - 2 days before exposure until 4 weeks after exposure.
- Doxycycline should be taken with plenty of *non-alcoholic* liquid.
- Side effects: Nausea, vomiting, diarrhoea, allergy, photosensitisation. May cause vaginal thrush and may reduce the efficacy of oral contraceptives.
- Use in Pregnancy: Unsafe (as is SCUBA DIVING). Also avoid during breast feeding and in children < 8 years old.

Doxycycline is DAN Southern Africa’s agent of choice for divers diving in areas with chloroquine resistance / “resistant malaria”.

(2) Chloroquine (Nivaquine® or Daramal® or Plasmaquine®):

- Contains only *chloroquine*. *Must be taken in combination with Proguanil (Paludrine®)*
- Dosage: 2 tabs weekly starting one week before exposure until 4 weeks after leaving the malaria endemic area.
- Contra-indications : Known allergy, epilepsy
- Side effects: Headache, nausea & vomiting, diarrhoea, rashes; may cause photosensitivity (sunburn; prevention – apply sun block)
- Use in Pregnancy: Safe. (Note: SCUBA diving is not considered safe during pregnancy)

(3) Proguanil (Paludrine®):

- *Must be taken in combination with Chloroquine (Nivaquine® or Daramal® or Plasmaquine®)*
- Dosage: 2 Tablets every day starting one week prior to exposure until 4 weeks after.
- Contra-indications: Known allergy to Proguanil. Interactions with Warfarin (An anti-coagulant / blood thinning agent -- that is incompatible with diving)
- Side-effects: *Heartburn* (Tip: Take after a meal, with a glass of water & do not lie down shortly after taking Proguanil); *mouth ulcers* (Tip: Take Folic acid tablets 5mg per day if this occurs); *loose stools* (self limiting – no treatment required)
- Use in Pregnancy: Safe - but must be taken with Folic acid supplement: 5mg per day. (Note: SCUBA diving is not considered safe during pregnancy)

The combination of Chloroquine & Proguanil is about 65% effective for resistant falciparum malaria. Although not a first choice, its relative safety and limited side-effects may justify its use in certain individuals.

(4) Atovaquone / Proguanil (Malarone® ; Malanil®)

- Registered in South African as a causal prophylaxis in February 2004. Safety in diving has not been established. Preliminary data suggests it may be safe for pilot and divers.
- Effective against Malaria isolates that are resistant to other drugs.
- Controlled studies have shown a 98% overall efficacy of Atovaquone / Proguanil in the prevention of *P. falciparum* malaria
- Dosage: 1 Tablet daily for adults, starting 24 – 48 hours prior to arrival in endemic area, during exposure in endemic areas and for 7 days after leaving the endemic area only.
- Dose should be taken at the same time each day with food or a milky drink.
- Contra-indications: Known allergy to Proguanil or Atovaquone or renal impairment (i.e., significant renal disease is likely to be incompatible with diving). Safety in children < 11kg has not been established.
- Side-effects: *Heartburn* (Tip: Take after a meal, with a glass of water & do not lie down shortly after taking Proguanil); *mouth ulcers*. To date Atovaquone has been well tolerated and the most common adverse reaction being *headache*.
- Use in Pregnancy: Safety in pregnancy and lactating women has not been established. (Note: SCUBA diving is not considered safe during pregnancy)

The safety of Malanil has not been confirmed in diving. Accordingly, even though preliminary data suggests that it may be safe, we are not able to recommend it. Doxycycline remains the first choice for divers diving in Africa where there is resistance to chloroquine.

(5) Mefloquine (Lariam® or Mefliam®)

- About 90% effective.
- Dosage: One tablet /week.
- Side effects: May cause drowsiness, vertigo, joint aches and interfere with fine motor co-ordination (Making it difficult to exclude DCI in some cases).
- Use in Pregnancy: Probably safe in early pregnancy and may be used with confidence after the first trimester of pregnancy. May be used in breast feeding and babies weighing more than 5kg.

Mefloquine is considered unsafe for divers & pilots. It is contra-indicated in epilepsy but is a good first choice for other travellers.

(6) Pyrimethamine / Dapsone (Maloprim® or Deltaprim® / Malazone®):

- No longer regarded as effective.

(7) Sulfadoxine & Pyrimethamine. (Fansidar®):

- No longer used as *prophylactic*

(8) Quinine (Lennon-Quinine Sulphate®):

- Not used for *prophylaxis* but is the backbone in the *treatment* of moderate and severe malaria. Serious side-effects are not uncommon during treatment.

(9) Artemether (Cotexin®):

- The “Chinese drug”. Available in some areas of Africa. *Not for prophylaxis*. Used in *combination with other drugs* in the treatment of mild to moderate malaria.

(10) Halofantrine (Halfan®):

- Not used for prophylaxis and best avoided for treatment.

RECOMMENDED MALARIA DRUG PROPHYLAXIS IN DAN SOUTHERN AFRICA REGION
(AFRICA & INDIAN OCEAN ISLANDS)

AREA	MALARIA	RECOMMENDED DRUGS
Kruger Park Mpumalanga Northern Province KwaZulu Natal (Excluding Ingwavuma & Ubombo)	Low: June to October / low rainfall High: Hot wet seasons November to May	# High risk persons : Mefloquine Doxycycline Malanil® Chloroquine & Proguanil Low risk persons: *Nothing – see below.
Ingwavuma & Ubombo	Throughout the year	Mefloquine Doxycycline Malanil® Chloroquine & Proguanil
Swaziland	Throughout the year in lowveld areas	Mefloquine Doxycycline Malanil® Chloroquine & Proguanil Nothing
Zimbabwe	Mainly November to June in areas below 1200m and throughout the year in the Zambezi valley	Mefloquine Doxycycline Malanil® Chloroquine & Proguanil Nothing
Angola, Comoros Kenya, Madagascar Malawi, Mozambique Zaire	Throughout the year	Mefloquine Doxycycline Malanil® Chloroquine & Proguanil
Botswana	Mainly November to June in the northern parts of the country (e.g. Okavango)	Mefloquine Doxycycline Malanil® Chloroquine & Proguanil Nothing

Namibia	Mainly November to June in northern rural areas (E.g. Ovambo, Kavango & Etosha)	Mefloquine Doxycycline Malanil® Chloroquine & Proguanil Nothing
Zambia	Mainly November to June in areas below 1200m and throughout the year in the Zambezi valley	Mefloquine Doxycycline Malanil® Chloroquine & Proguanil Nothing
Seychelles	No malaria	*
Mauritius	Only benign forms of malaria in the north	Chloroquine in northern areas * Nothing
<p>* In situations where the risk of contracting malaria is low, (e.g. in cities, air conditioned hotel or when rainfall has been low, etc.) the traveller may be advised to take no drug prophylaxis but standby treatment must be carried unless medical care is readily available. PERSONAL PROTECTION AGAINST BITES MUST BE ADHERED TO AT ALL TIMES.</p> <p># High risk people include babies & children under 5 years, pregnant women, elderly people (> 65 years), people with suppressed immunity (e.g. diabetics, etc.)</p>		

NOTE:

- (1) Prophylaxis significantly reduces the incidence of malaria and slows the onset of serious symptoms of malaria.
- (2) All anti-malaria drugs excluding Mefloquine are considered compatible with diving. Safety of Malanil® (Atovaquone / Proguanil) has not been confirmed in diving, but is presumed to be safe for pilots.
- (3) Like with all other medication, anti-malaria drugs should be tried and tested on land well in advance.
- (4) If unpleasant side-effects occur, please consult your doctor or DAN: (011) 242-0112 or 0800 020111 or WORLDWIDE TRAVEL MEDICAL CONSULTANTS: (011) 214 9030
- (5) Whether or not you take prophylaxis, be paranoid about malarial symptoms. Malaria can present in many ways varying from fever, diarrhoea to flu-like symptoms. Always inform your doctor that you have been in a malaria area. Symptoms can start within 7-14 days from first exposure until 30 days (and rarely even months) after leaving a malaria area.
- (6) No single medication is 100% effective and barrier mechanisms / personal protection against bites (e.g. mosquito repellents, nets, protective clothing, not going outdoors from

- dusk to dawn) must be applied.
- (7) Any strange symptom occurring during or within 6 weeks of leaving a malaria area should be regarded with suspicion and requires medical attention.

The above mentioned recommendations were compiled from material supplied by the National Department of Health and WORLDWIDE TRAVEL MEDICAL CONSULTANTS.