MALARIA handout

11th Edition
November 2002

SHOKLO MALARIA RESEARCH UNIT (SMRU)
P.O. Box 46, Mae Sot
Tak Province 63110
Thailand
Tel/Fax: +66.55.531531
Fax: +66.55.535440
Email: shoklo@cscoms.com
Website: http://www.shoklo-unit.com

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Articles:

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I INTRODUCTION

This is the **11th Edition** of the **Malaria handout** prepared for the NGOs working along the Thai-Burmese border and other groups confronting malaria in the region. It is a simple document aimed at helping the organisations in their efforts in malaria control. It is composed of short summaries on **treatment of uncomplicated malaria and of uncomplicated hyperparasitaemia**, **treatment of severe malaria and malaria in pregnancy.**
Corrections have been made since the last edition and the section on management of severe malaria revised. The handout is available in Burmese for the first time. It is completed by relevant recently published articles. A table summarising the treatment protocols and dose tables have been added.

To help us keep this document useful, please send your comments and queries to:

Shoklo Malaria Research Unit
PO Box 46 Mae Sot
Tak Province 63110
Thailand
Tel: +66 (55) 531 531
Fax: +66 (55) 535 440
Email: shoklo@cscoms.com
http://www.shoklo-unit.com

II TREATMENT OF UNCOMPLICATED P.FALCIPARUM MALARIA

REMARK: THE DIAGNOSIS IS CONFIRMED BY A POSITIVE MALARIA SMEAR / RAPID TEST. THERE ARE NO SIGNS OF SEVERE MALARIA (page 9). SEE DOSAGE TABLES.

* Treat the fever
* Ask if the patient is pregnant, perform a pregnancy test if in doubt,
* Ask date of the last treatment with mefloquine
* Check the parasitaemia if microscopy available (hyper =4% RBC).
* Make sure the patient eats and drinks unaided during treatment

KEEP THE PATIENT 1 HOUR AFTER TAKING THE LAST DOSE OF MEDICINE

* The most favourable way to give the medicines is to give them as separate doses (Artesunate first and MFQ second).
* If vomiting occurs within 30 minutes: Repeat whole dose
* If vomiting occurs between 30 minutes and one hour: Repeat half the dose.

FIRST LINE TREATMENT: THE PATIENT HAS NOT TAKEN MEFLOQUINE WITHIN THE LAST TWO MONTHS, IS NOT PREGNANT AND NOT HYPERPARASITAEMIC AND HAS NO CONTRAINDICATION TO MEFLOQUINE(history of neuro-psychiatric disorders, allergy).

* Give combination: mefloquine-artesunate (MAS3)
  Treatment-schedule:

D0 - Artesunate 4 mg/kg
D1 - Artesunate 4 mg/kg + Mefloquine 15 mg/kg
D2 - Artesunate 4 mg/kg + Mefloquine 10 mg/kg

*This treatment can be given to a patient who has a history of taking quinine (+/- tetracyclines) in the past month.
OR

Alternative first line treatment which is still not widely available: Co-artemether or Artemether-lumefantrine (ALN).

Each tablet contains 20mg artemether and 120 mg lumefantrine.
The regimen is twice daily for 3 days given at 0, and approximately 8, 24, 36, 48 and 60 hours. The dose is dependent on body weight.

Co-artemether drug dosages:

<15kg 1 tablet per dose

16-25 kg 2 tablets per dose

26-35 kg 3 tablets per dose

>35 kg 4 tablets per dose

The bioavailability of oral lumefantrine is significantly enhanced with coadministration of fat so we would recommend each dose is taken with some fried food or a carton of flavoured milk.

SECOND LINE TREATMENT: THE PATIENT HAS A FAILURE AFTER TREATMENT WITH MAS3 or ALN OR A SECOND INFECTION (LAST MAS3 < 63 DAYS or last ALN <42 DAYS).

If received MAS3 previously give either ALN or artesunate-doxycycline (AS7D7).

Treatment-schedule of AS7D7:
D0-D6 Artesunate (AS) 2 mg/kg + Doxycycline (D) 4 mg/kg/day.

Remark: If younger than 8 years or pregnant do not give doxycycline,
give artesunate alone following the treatment-schedule above.

If received ALN previously give MAS3 or AS7D7

THIRD LINE TREATMENT: FAILURE AFTER TREATMENT WITH AS7D7 OR AS7, THIS MEANS: THE PATIENT HAS TAKEN THE LAST AS7D7 OR AS7 LESS THAN 42 DAYS AGO.

* Give again artesunate-doxycycline (AS7+/- D7)
Treatment-schedule and remark: see above

UNCOMPLICATED HYPERPARASITAEMIA

Parasitaemia =4% infected RBC. The risk of mortality is higher in this group (observed as 3% in this area compared to 0.15% with uncomplicated non-hyper).
No signs of severity (see WHO criteria page 9 and patient is able to eat and drink by him/herself).

* Admit in IPD, needs careful observation
* Make sure the patient eats and drinks during treatment

Check on admission: temperature, respiratory rate, pulse, blood pressure,

consciousness, dextro, hematocrit or hemoglobin, quantity of urine.
Then check every 4 hours the temperature, respiratory rate, pulse, blood pressure, consciousness and urine production, depending on the condition of the patient. Check the parasite count 6-12 hourly and compare the decline of parasitaemia against the graph in **appendix 1**. To use this graph, simply plot the parasitaemia as % of baseline against time. If the dotted line is reached, attention is required. If the upper line is reached, rescue the patient with iv or im artesunate or im artemether (see dosage tables).

FIRST LINE TREATMENT: THE PATIENT DID NOT TAKE MEFLOQUINE WITHIN THE LAST TWO MONTHS

Give combination: Mefloquine-artesunate: MAS7
Treatment-schedule of MAS7:

D0	- Artesunate 4 mg/kg
D1	- Artesunate 2 mg/kg + Mefloquine 15 mg/kg
D2	- Artesunate 2 mg/kg + Mefloquine 10 mg/kg
D3-D6	- Artesunate 2 mg/kg

SECOND LINE: THE PATIENT TOOK MEFLOQUINE WITHIN THE LAST 63 DAYS

Give Artesunate (AS7) with Doxycycline D7 (4 mg/kg/day) in non-pregnant adults (> 8 years) or artesunate alone if pregnant or a child <8years.
Treatment-schedule of AS7 in hyperparasitaemia:

D0	- Artesunate 4 mg/kg
D1-D6	- Artesunate 2 mg/kg

REMARK: If patient deteriorates treat as severe malaria. In SMRU we use artesunate iv (see chapter on severe malaria page 7).

PRESUMPTIVE TREATMENT

When a confirmation of the diagnosis is not possible, presumptive treatment will rely on the Q7T7 or Q7D7 regimen.
(Q: 30mg/kg/day; D: 4mg/kg/day; T: 16mg/kg/day in 3-4 divided doses)
IN EXCEPTIONAL SITUATIONS where 3 days supervision is not possible (mobile teams) the recommended regimen of confirmed *P.falciparum* malaria is artesunate 4 mg/kg stat followed by MFQ 25 mg/kg stat. The rest of the artesunate (4 mg/kg/d for 2 d) is given to the patient with explanation of the importance of completing the treatment.

QUININE ALLERGY: pre-medicate the patient with 1 vial (4 mg) dexamethasone IM (children ½ vial) before starting the quinine (oral or injection). In other situations, think of the possibility of using artesunate or artemether.
ARTESUNATE ALLERGY: We have documented several cases of allergy to artesunate, some serious. In case of known allergy, use quinine (+ doxycycline) or mefloquine. In children and pregnant women the combination quinine + clindamycin is a good alternative.

TREATMENT OF FALCIPARUM MALARIA IN VERY YOUNG CHILDREN

Mefloquine and artesunate have been given to very young children (starting 3 months old; 4-5kg).

Artesunate is very well tolerated. Mefloquine gives less later side-effects in children than in adults. The main problem is the very high incidence of vomiting during the first hour after mefloquine intake.

Recommendations to give mefloquine:

1) Decrease the fever.
2) Put the child in mother's arms and wait until the child is calm. Explain to the mother the importance of her help.
3) Crush 1 tablet of mefloquine in 5cc of water and take in a syringe the exact dose (example: for 5kgs; 15mg/kg: 1.5cc; 10mg/kg: 1cc) [see dosage tables]
4) Give the medicine to the child with the syringe. Do not fight with the child or pinch the nose.
5) Give sugar or breast milk.
6) Supervise 1 hour.

Some children do not tolerate mefloquine. Do not repeat more than twice. Continue artesunate for a total of 7 days in such cases (4-2-2-2-2-2-2).

III TREATMENT OF SEVERE MALARIA

Severe malaria is caused by ***Plasmodium falciparum***. It is a medical emergency. Most of the deaths are due to delay in treatment or inappropriate therapy. The signs and symptoms of severe malaria are described in detail in the Severe falciparum Malaria supplement, WHO, *Transactions of the Royal Society of Tropical Medicine and Hygiene* (April 2000) 94, supp. 1, and see: *Defining criteria for severe malaria* page 12.

Along the Thai-Burmese border and in many areas of Asia severe malaria is seen in all age groups. The two groups most at risk are children under five years and pregnant women. The treatment protocol can be divided into three parts.

1. Antimalarial treatment:

The recommended drug in Thailand is **Quinine**. It is administered by infusion using 5-10% dextrose and an I.V set equipped with a maitrisette. The line is connected to a cannula (not a needle) inserted in the ante cubital vein. This catheter must be of the maximum possible size and not covered with gauze. In the very small patients a butterfly needle can be used or preferably the I.M route.

The dose of quinine is as follows: 20 mg/kg given in four hours (from H0 to H4). At H8, 10 mg/kg are given over 2 hours (preferably in a maitrisette) and this is repeated every 8 hours (H16, H24 etc…total daily dose 30 mg/kg). When given I.M the loading dose (20 mg/kg) is given in 2 simultaneous injections in the anterior thigh after 50 % dilution of the quinine in sterile water. The maintenance dose (10 mg/kg) is given in one I.M injection every 8 hours using the same dilution. The parenteral treatment is discontinued only when the patient can drink and eat by him/herself.

Practically, there is no contra-indication to the use of the loading dose. The main adverse effect of quinine in the acute phase is hypoglycemia.
A very good alternative to quinine used by SMRU is **iv Artesunate**. An initial dose of 2.4mg/kg is given followed by 1.2mg/kg at 12 hours and 24 hours. Thereafter the patient is given 1.2mg/kg daily until they can tolerate oral medication.
If artesunate is unavailable **i.m. artemether** may be used with an initial dose of 3.2mg/kg followed by 1.6mg/kg every 24 hours until oral medication is tolerated. However there is evidence that it is poorly absorbed initially in **some** patients resulting in a dangerously slow treatment response compared to iv artesunate and iv quinine in these individuals.
Artemisinin derivatives can clear the circulating parasites faster than quinine but have not yet been shown to be superior in terms of mortality. It is difficult to reduce the mortality of cerebral malaria to less than 15%. In Thailand, the patients with cerebral malaria treated with quinine loading dose have a mean fever clearance time of 92 hours, a mean time to recovery of consciousness of 60 hours and a mean time to parasite clearance of 82 (range 20 to 178) hours.

Oral treatment will replace parenteral therapy as soon as the patient can eat and drink. The regimen of choice will be AS7 or AS7D7. Mefloquine is contra-indicated since it increases the risk of post malaria neurological syndrome. If artesunate is not available, Q7 will be used or Q7T7 or Q7D7 in non-pregnant adults (>8 years). **The total dose of quinine is 30 mg/kg/day for 7 days and the total dose of artemether/artesunate is 12-16 mg/kg for 7 days.** This includes the drug given parenterally.

2. Treatment of specific complications:

This is a practical guideline for the treatment of complications related to severe malaria. More detailed information can be found in the booklet "Severe falciparum malaria", *Transactions of the Royal Society for Tropical Medicine and Hygiene*, April 2000, vol 94, Supp 1. Management depends of course on the level of health care that is available. Absolute indications for referral to a well-equipped hospital are: acute renal failure (needs dialysis), respiratory insufficiency (needs intubation and mechanical ventilation) and shock not responding to fluid resuscitation (needs vasopressor therapy). Avoidable mistakes in the management of severe malaria are: missing episodes of hypoglycaemia and inappropriate fluid management.

a. Coma.

- ***Diagnosis***. Make sure that hypoglycaemia, shock or a different disease like meningitis is not the cause of altered consciousness. So: check blood glucose (BM stix) on admission, and then every 4 hours until the patient is conscious. This should be done in every unconscious patient, although the chance of hypoglycaemia is higher in children, pregnant women and with quinine treatment. Also, check blood glucose if there is deterioration in the level of consciousness.

Check blood pressure at least every 4 hours, but more frequently if the patient is unstable. If there is any doubt about the diagnosis of cerebral malaria, a lumbar puncture should be performed to rule out bacterial meningitis. This is the case if: the slide is negative for asexual forms of *P. falciparum*, the patient is in shock or if there is leucocytosis and/or a shift to the left in the white cell count (since these are not common features of severe malaria), and if there are any signs of meningeal involvement like a stiff neck. A cloudy, not clear cerebrospinal fluid (CSF), means meningitis and presumptive treatment with a 3rd generation cephalosporin should be started (i.v. ceftriaxone 2000 mg q12h). If possible, the CSF should be sent for cell count, glucose and protein level, Gram and AFB stain and culture. The Gram stain and cultures (CSF and blood) are most valuable.

- *General care*. Record vital signs, core temperature, oxygen saturation (if pulse oximetry is available), and level of consciousness at least every 4 hours (Glasgow coma scale in adults, Blantyre coma scale in children). Record convulsions and fluids in- and output. Follow parasitaemia twice daily and haematocrit daily. Unconscious patients are at risk for aspiration. Since good ICU facilities are rarely available, endotracheal intubation is not an option. A nasogastric tube should be inserted and the stomach contents let out. If this is not possible the patient should be nursed on his side. The patient should be turned every 2 hours to prevent bed sores. Also, insertion of a Foley catheter is essential to prevent maceration of the skin and for proper fluid management (see below). Eyes should be kept irrigated with saline or artificial tears and the lids kept closed with eye pads.

- ***Convulsions.*** Acute treatment is with diazepam (adults 10 mg i.v. in 5 minutes, children 0.3 mg/kg i.v., or intrarectal administration of 0.5 mg/kg). Always check for hypoglycaemia as a possible cause and give antipyretic treatment (paracetamol). Since convulsions are relatively rare in adults, prophylaxis is not indicated in this group, unless there is a history of convulsions before admission. In the latter case the patient should receive i.m. phenobarbital 7 mg/kg. In children prophylaxis is indicated, but the drug of choice and dose have not been established. Phenobarbital might induce respiratory depression in this group (a dose of 20 mg/kg was associated with increased mortality in a study in Kenyan children). Phenytoin i.v. 18 mg/kg over 20 minutes is an option (adult dose is 5 mg/kg).

- *Feeding*. If the patient remains unconscious, enteral feeding through a nasogastric tube should be considered on the 2nd (children) or 3rd day. In adults, commercial (expensive) or pureed feeding can be started in small boluses of 50 ml every 3 hours. Aspiration remains a danger. Position of the NG tube should be checked with auscultation over the stomach region at the moment of air inflation through the tube. Retention of gastric contents should be measured shortly before the next feed. If retention is more than 200 ml (food and gastric juices), feeding should be discontinued. If this is not the case the feeding can be increased daily with 50 ml per 3 hours until a maximum of 200 ml per 3 hours. The head should be kept elevated 15° above horizontal. In children, boluses of milk/sugar solution are given every 1-2 hours, volumes should be calculated according to the intravenous schedule for maintenance fluid management given below *(point c)*.

b. Hypoglycaemia.

Check plasma glucose every 4 hours in the unconscious patient (BM stix). Treat hypoglycaemia with 50% Dextrose, 1 ml per kg over 10 minutes. Be aware that hypoglycaemia can recur after this 'push'.

c. Renal failure and fluid management.

Close monitoring of the fluid balance (in/output) is essential in severe malaria, since dehydration will lead to renal failure and a compromised microcirculation, whereas overfilling will lead to pulmonary oedema. A Foley catheter should be inserted. Renal failure is rare in children, and generally oliguria is caused here by dehydration. If the adult patient is oliguric (< 20 ml per hour), this can be caused by dehydration or acute tubular necrosis (make sure the catheter is patent). Dehydration requires rehydration with normal saline (not with only 5% dextrose), whereas acute tubular necrosis (ATN) requires dialysis (means referral) and there is a danger of fluid overloading since the patients is not likely restore diuresis with appropriate clearance during the following 2 to 5 days. Usually laboratory facilities will not be easily available and this makes distinction between the two conditions difficult. The hydration of the patient should be assessed (skin turgor, dry lips and mouth, tears, central venous pressure (JVP)), but this can be difficult. As a practical guideline the oliguric adult patient (who comes in without a drip) should first be rehydrated with 1 to 1.5 liter of normal saline (200 ml/hour). The danger is fluid overloading and pulmonary oedema, so the patient should be frequently checked for dyspnoea, orthopnoea, and crepitations of the basal lung fields and the JVP should not exceed 5 cm H_2O (not always easy to measure, so take your time). If there is still no diuresis after rehydration, frusemide can be given in increasing doses 40mg-100mg-200mg-400mg at half hour intervals (never start with this on admission). If this has no effect, it is likely that the patient has ATN and should be referred to a hospital. In a hospital with adequate laboratory facilities, the difference between dehydration and ATN can be made on the basis of the urine sodium concentration (<20 mmol/l dehydration, > 40 mmol/l ATN). An easier test is the urine specific gravity: >1020 points to dehydration. Also, in the hospital plasma electrolytes (Na, K, Ca, PO4, HCO3) should be checked and corrected. Indications for dialysis are BUN >40mmol/l (130mg/dl), hyperkalaemia and fluid overloading not responsive to frusemide. Acidosis *per se* is not an indication. If there is a choice, haemodialysis is preferred over peritoneal dialysis.

In absence of renal failure/ oliguria, maintenance infusion rates in adults can be 100 ml/hour (5%DW/NSS/2), but should be tailored to the individual patient. KCl supplementation should be around 1 meq/kg per 24 hours, unless there is renal insufficiency (oliguria). If possible, plasma electrolytes should be checked regularly, but if not, the above scheme should not give big disturbances. In children not drinking or eating, maintenance infusion rates (for instance 0.18% NSS containing 4% dextrose) can be calculated as follows: for the first 10 kg body weight, give 4 ml/kg/h; for the next 10 kg bodyweight, give 2 ml/kg/h, for each additional kg body weight, give 1 ml/kg/h.

d. Respiratory failure.

Pulmonary oedema and Acute Respiratory Distress Syndrome (ARDS) is mainly a complication in adults and pregnancy, and can still develop in the days after admission. It is caused by capillary leakage in the lung due to malaria, but iatrogenic fluid overloading is an important risk factor. It should be distinguished from dyspnoea related to metabolic acidosis (this will give deep breathing, Kussmaul pattern), severe anaemia (check Hct) or secondary pneumonia (check for sputum production, infiltrative changes on physical exam and chest X-ray and peripheral blood white cell count if available). In case of ARDS the chest X-ray will show diffuse shadowing of the lung fields. The patient should be propped upright and receive oxygen therapy (nasal catheter or face mask). Frusemide should be tried to lower the venous pressure, but this will not always relieve symptoms, since the pathogenesis is capillary leakage and not fluid overload as such. In most patients these measures will not be sufficient and the patient will require endotracheal intubation and mechanical ventilation, which means referral to a hospital. Indications are severe dyspnoea (both respiratory rate and work of breathing and exhaustion should be considered) and cyanosis. If available this can be confirmed by pulsoximetry (SaO2<90%) or blood gas analysis (hypoxia or hypercapnia). Don't wait too long to refer, since once the patient becomes exhausted, complete respiratory failure is imminent. A bird ventilator will generally not be sufficient, since the appliance of 'PEEP' (positive end-expiratory pressure) is an essential part of the therapy.

e. Severe anaemia.

The haematocrit should be checked daily. Benefits of blood transfusion should outweigh the risks (esp. HIV and other pathogens). In adults the indication of blood transfusion is a haematocrit below 20% (Hb 6 g/dL). In children the African guidelines are to give transfusion below Hb 5 g/dl in combination with respiratory distress, impaired consciousness or hyperparasitaemia or an absolute cut-off of Hb 4 mg/dl. Both whole blood and packed red cells can be given. Adults generally require 2 units, but this does not mean that 1 unit is not useful if there is a shortage in blood supply. Each unit should be given over 3 hours. In children the volume of transfusion is 20 ml/kg. In case of blood transfusion: blood group, cross-matching, HIV and Hepatitis B, malaria smear and Hct screening of the donor must be performed.

f. Metabolic acidosis.

A severe metabolic (lactic) acidosis is often presence in severe malaria and is caused by tissue hypoxia. Therapy is directed to improve this by prompt anti-malarial treatment (prevention of sequestration of parasitised red cells) and rehydration (*see c*). If blood gas analysis is available, 100 ml 8.4% HCO3 over 30 minutes can be given if the arterial pH drops below 7.2. If this is not available, acidotic breathing (Kussmaul) can indicate severe acidosis, but HCO3 therapy is not recommended only on the basis of this physical sign.

g. Shock.

Severe hypotension (systolic blood pressure below 80 mm Hg) is an uncommon finding in severe malaria and if present concomitant septic shock should be suspected. The possible source for infection should be searched for, if at all

possible (blood) cultures should be taken and empirical antibiotic therapy covering gram negative organisms should be started (e.g. for adults ceftriaxone 2000 mg/kg q24h or cefotaxime 1000 mg/kg q8h, with or without a single dose of gentamicin 4 mg/kg). A fluid challenge (in adults 500 ml NSS; colloids are much more expensive and do not have big advantages) should be given. If this does not improve the blood pressure, the patient will probably need vasopressor therapy (dopamine, noradrenaline) and should be referred to a hospital. In the meantime fluid resuscitation should be continued until the mean blood pressure (=diastolic BP + 1/3*(systolic BP-diastolic BP) is above 60 to 70 mmHg. Care should be taken that the patient does not overfill (dyspnoea/orthopnoea etc.). In septic shock, without the help of vasopressor drugs and possibilities for intubation/ ventilation, this balance between fluid resuscitation and decompensation is sometimes not achievable.

h. DIC.

Disseminated intravascular coagulation (DIC) can be suspected if there is spontaneous bleeding and oozing from venepuncture sites. It is relatively rare in severe malaria (5%), but much more common in septicaemia, so that concomitant septicaemia should be considered. As therapy 10 mg vitamin K should be given intravenously (slowly) q24h for 3 days. The diagnosis can be confirmed by measurement of the clotting times in citrated blood, but this is not essential in the field situation. Also additional therapies are not recommended in this setting.

i. Jaundice.

Patients with severe malaria can be severely jaundiced, due to intravascular haemolysis of parasitized red cells and hepatic dysfunction. It is a prognostic sign, but there is no specific therapy.

j. Blackwater fever.

Haemoglobinuria due to massive intravascular haemolysis is associated with quinine therapy and G6PD deficiency. Transfusion of fresh blood should aim to maintain a haematocrit above 20%. There is no specific therapy.

3. Nursing care

Patients with severe malaria must be kept under intensive care (see *General care* above). Comatose patients will be nursed on their side and turned every 4 hours. The injection site must be cleaned and checked frequently. In case of I.M injections of quinine the muscles will be massaged with warm compresses after each injection.

Defining criteria of severe PF malaria (WHO):

1 Cerebral malaria (unrousable coma)
2 Severe (normocytic) anaemia
3 Renal failure
4 Pulmonary oedema
5 Hypoglycaemia
6 Circulatory collapse, shock
7 Spontaneous bleeding/disseminated intravascular coagulation
8 Repeated generalized convulsions
9 Acidaemia/acidosis
10 Malarial haemoglobinuria

Other manifestations:

1 Impaired consciousness but rousable
2 **Cannot eat and drink by him/herself**
3 Prostration, extreme weakness
4 Hyperparasitaemia
5 Jaundice
6 Hyperpyrexia
7 Pigment in neutrophils

IV TREATMENT OF PLASMODIUM FALCIPARUM MALARIA IN PREGNANCY

- The added risks of malaria in pregnancy, even in uncomplicated malaria, means that every treatment in pregnant women should be supervised.

- Quinine (Q) should be used as the 1st line treatment for uncomplicated infections in pregnancy.

- Supervised quinine has a failure rate of 33% in this area (confirmed by PCR genotyping), so the pregnant woman should be warned (take time to explain to her), that if she gets fever or headache, she had better get a repeat malaria smear, or better still provide weekly malaria smears for all pregnant women.

- Artesunate (AS) should be used as the 2nd line drug in the treatment of malaria in pregnancy. Current studies (see attached paper) show it has good cure rates, no foetal abnormality recorded to date, it is well tolerated and that it has the added bonus of reducing gametocyte carriage which can have an important impact on reducing transmission of malaria.

- Since the malaria parasites can hide in the placenta for months, it is difficult to establish whether a treatment is effective or not. In our studies, 85% of second infections in pregnancy are caused by the same parasite, so the use of the term *failure* is not relevant. We will just use the term *recrudescent infection.*

- For safety reasons, less than 3 months pregnant should be assumed to be a fundal height of less than 12cm as measured from the top edge of the pubic symphysis to the top of the fundus. The woman's estimation of gestation should also be taken into account (e.g. twins). In Karen women the relationship between fundal height and gestational age is linear and can be estimated by the equation: **gestational age (in weeks)= fundal height (cm) x 0.887+4.968**

- The effects of ARTESUNATE OR MEFLOQUINE in the first trimester are not known and these drugs are not usually recommended, so it is important to ask all women of childbearing age if they could be pregnant before giving MAS3. Confirm by feeling for the uterus and doing a urine pregnancy test if in doubt.

TREATMENT OF UNCOMPLICATED *P. falciparum*:

- **All Trimesters**[1]

First infection PF:	Supervised Q7 10mg/kg/dose, tid x 7days
Second infection PF:	Supervised AS7 2,2,2,2,2,2,2 (14mg/kg)
Third infection PF:	Supervised AS7

[1] For alternative see table

TREATMENT OF UNCOMPLICATED HYPERPARASITAEMIA

- **ALL trimesters** – supervised oral artesunate (AS7) – 4,2,2,2,2,2,2 (total dose 16mg/kg)

(note the loading dose of 4mg/kg on day 0)

TREATMENT OF SEVERE MALARIA

- **ALL trimesters –**

I.V Artesunate

D0(H0) Artesunate loading dose 2.4mg/kg
D0(H12) Artesunate 1.2mg/kg
D1(H24) Artesunate 1.2 mg/kg
D2-D6: 1.2mg/kg once daily until the patient can tolerate oral artesunate.

I.M Artemether

D0 Artemether initial dose is 3.2mg/kg IM
D1 Artemether 1.6mg/kg every 24 hours
D2-D6: 1.6mg/kg is continued until the patient can tolerate oral artesunate. A combined dose of 16mg/kg of artemether and artesunate is given. 10% DW is still needed while the pregnant woman is unable to eat and drink unassisted, because of the risk of hypoglycaemia.

I.V. Quinine

Still used when no artemisinins are available but causes hypoglycemia. Treatment protocol: see page 7.

Note: Signs of severe malaria (WHO criteria page 12)

Particular complications of pregnancy:

1) Hypoglycaemia: Hypoglycaemia is a common problem in pregnant women with severe malaria. When IV quinine is used for treatment 50% of PW will develop hypoglycaemia. Quinine treated women in the 2nd and 3rd trimesters of pregnancy are at high risk of hypoglycaemia even if they are not severe.
2) Pulmonary oedema: This may present on admission or develop suddenly during treatment. It commonly develops immediately after delivery and may occur at anytime in the 1st week post-partum.
3) Premature labour: Appears to be related to the fever but can develop later in treatment after fever has cleared. Treat fever appropriately in all severe cases.

CONGENITAL MALARIA

Vertical transmission of malaria can be diagnosed by finding parasites in the neonate within 7 days of birth. Most evidence from malarious parts of the world indicate that congenital malaria is rare despite the prevalence of placental infection.

Clinical Features

MOST CASES ARE ASYMPTOMATIC

Fever, irritability, feeding problems, hepatosplenomegaly, anaemia, jaundice

Differential Diagnosis

Neonatal sepsis, Cytomegalovirus(CMV), herpes simplex, rubella, toxoplasmosis, syphilis

Investigations

1. EVERY neonate born to a mother who is *P. falciparum* or *P.vivax* slide positive at delivery or who received treatment within 7 days of delivery should have a malaria smear irrespective of the clinical picture. This should be done 1) at birth and 2) at 7 days of age OR 3) if the clinical condition of the neonate is worrying.
2. Haemoglobin / HCT⇒ if positive smear
3. Blood Glucose⇒ if positive smear

Treatment:

A neonate with malaria can deteriorate VERY quickly so all cases should be treated INITIALLY as severe malaria using parenteral drugs.

I.V Artesunate

D0(H0) Artesunate loading dose 2.4mg/kg
D0(H12) Artesunate 1.2mg/kg [CAN BE OMITTED IF NOT CLINICALLY SEVERE]
D1(H24) Artesunate 1.2 mg/kg
D2-D6: 1.2mg/kg once daily until the patient can tolerate oral artesunate.

OR if unavailable: IM Artemether(3.2mg/kg)

After 24 hours give IM artemether 1.6mg/kg daily until oral medication can be tolerated.

Oral artesunate dose is 2 mg/kg once per day until 7 days.

The total dose of artemether/artesunate is 12mg/kg over 7 days.

OR

Quinine IV - in 10% Dextrose and water commencing with 20mg(base) /kg IV over 4 hours, followed with 10mg(base)/kg 8 hourly. Use a maitrisette or intra-muscular injection. Intravenous is switched to oral quinine at 10mg (base)/kg three times daily as soon as possible. Check blood glucose 2-4 hourly.

Quinine – In the event of difficulty gaining IV access in small babies the IM route may be used: Quinine 10mg (base) /kg base IM stat, followed by quinine oral 10mg (base) /kg three times daily for 7 days.

NB:

1. Care must be taken with IM Quinine. It is necessary to dilute the dose of quinine by 50% with sterile water to reduce abscess formation.
2. The intake of the neonate must be observed and if it is insufficient or the neonate exhibits signs of hypoglycaemia a blood glucose level must be checked. Insertion of a nasogastric tube and regular intake of glucose is an efficient way to manage this problem without having to insert an IV line.

NB:

In all cases of congenital malaria, the mother, particularly if under quinine treatment herself, needs to be stimulated to take adequate amounts of glucose and fluids (4-6 litres/day) to help breast milk production and to maintain her blood sugar level and hence the neonate's.

NB:

Quinine, chloroquine and mefloquine are excreted in the breast milk, but the suckling neonate would receive only a few mg/day. Maternal hypoglycaemia, a common complication of malaria or its treatment with quinine, may cause marked foetal bradycardia and other signs of foetal distress.

1. UNCOMPLICATED PF **parasitaemia < 4% RBC & no signs severe malaria**			**2. UNCOMPLICATED HYPERPARASITAEMIA** **>=4% RBC infected & no signs severe malaria**			**3. SEVERE MALARIA** **CHECK below for WHO criteria of severe PF malaria**	
	CHECK	**TREAT - supervised**		**CHECK**	**TREAT - supervised**	**CHECK FOR:**	**TREAT -supervised**
1	**NO** MFQ in lst 2 mths/63 days **NOT** pregnant **NO contraindication to MFQ**	**MAS3 (total AS=12mg/kg)** d0 - AS 4mg/kg d1 - AS 4mg/kg + MFQ 15mg/kg d2 - AS 4mg/kg + MFQ 10mg/kg **OR ALN bid for 3d:** <15kg 1 tab,16-25 kg 2 tab, 26-35 kg 3 tab,>35 kg 4 tab.per dose	**1**	**NO** MFQ in lst 2 mths/63 days **NOT** pregnant NO contraindication to MFQ Patient **CAN** eat & drink **unaided** *Admit IPD for close observation*	**MAS7 (total AS=16mg/kg)** d0 - AS 4mg/kg d1 - AS 2mg/kg + MFQ 15mg/kg d2 - AS 2mg/kg + MFQ 10mg/kg D3-d6 - As 2mg/kg	1.cerebral malaria (unrousable coma) 2. Severe (normocyctic) anaemia 3. Renal failure 4. Pulmonary oedema 5. Hypoglycaemia 6. Circulatory collapse	**ARTESUNATE IV (7d)** **Total artemisinin 16mg/kg** LD 2.4 mg/kg, 1.2 mg/kg H12,H24,H48… **OR: Artemether im(7d)** LD: 3.2mg/kg, 1.6mg/kg at H24 and OD **OR**
2	MFQ in last 2mths e.g. MAS3 failure < 63 d **NOT** pregnant NO contraindication to MFQ ALN in last 42 days	**AS7D7 (total AS=14mg/kg)** d0 to d6 AS 2mg/kg + D 4mg/kg No D for children < 8 y **OR ALN bid for 3d as above** **AS7D7 (total AS=14mg/kg)** **or MAS3 (if no MFQ 1st line)**	**2**	MFQ in last 2mths **NOT** pregnant No contraindication to MFQ Patient **CAN** eat & drink **unaided** *Admit IPD for close observation*	**AS7D7 (total AS=16mg/kg)** d0 - AS 4mg/kg + D 4mg/kg d1-d6 - AS 2mg/kg + D 4mg/kg No D if < 8 y Use AS7 alone	7. Spontaneous bleeding 8. Repeated generalized convulsions 9. Acidaemia/acidosis 10. Malaria haemoglobinuria *other associated manifestations:* 11. Impaired consciousness but rousable	**Q IV (total 30mg/kg/day 7 days)** LD: 20mg/kg in 4hrs (h0-h4) RD:10mg/kg in 2 or 4 hrs Repeat RD 8 hrly (h8,h16, h24) use 5-10 % dextrose **OR**
3	Failure of AS7D7 **NOT** pregnant	**AS7D7 (total AS=14mg/kg)** **OR ALN bid for 3d as above**	**3**	Hyper failure of AS7D7 **NOT** pregnant Patient **CAN** eat & drink **unaided** *Admit IPD for close observation*	**AS7D7 (total AS=16mg/kg)** regimen as above	**12.Cannot eat and drink unaided** 13. Prostration, extreme weakness 14. Hyperparasitaemia 15. Jaundice 16. Hyperpyrexia 17. Pigments in neutrophiles	**Q IM (total 30mg/kg/day 7 days)** use 50% dilution Q in sterile water LD: 20mg/kg In 2 sites in the anterior thigh RD: 10mg/kg every 8 hrs 1 injection site only Be aware of abscess

Abbreviations: MFQ=mefloquine, AS=artesunate, D=doxycycline, d= day, T = tetracycline (dose = 16mg/kg/day in 3 divided doses), Q = quinine, ALN= artemether-lumefantrine, LD= Loading dose, RD = routine dose, bid = twice daily

For all treatments of severe malaria: 1) oral treatment replaces parenteral as soon as the patient can eat and drink unaided **2)** The regimen of choice is AS7D7 or AS7 or Q7 or Q7T7 or Q7D7

3) The total dose of artemether/artesunate, IM+oral, is 16mg/kg over 7 days **4)** Phenobarbitone 7mg/kg IM stat: Not recommended for children. Give to adults with neuro impairment or history of convulsions.

5) Mefloquine is contraindicated **6)** List of criteria is only given as reminder, see WHO document for details.

2. PF MALARIA IN PREGNANCY

1) The added risks of PF in pregnancy, even uncomplicated, requires every treatment in pregnancy to be SUPERVISED

2) Quinine should be used as the 1st line treatment

3) Supervised quinine has a failure rate of 33% as 1st line treatment. Pregnant women need to be explained: if she gets fever or headache, she needs a repeat malaria smear.

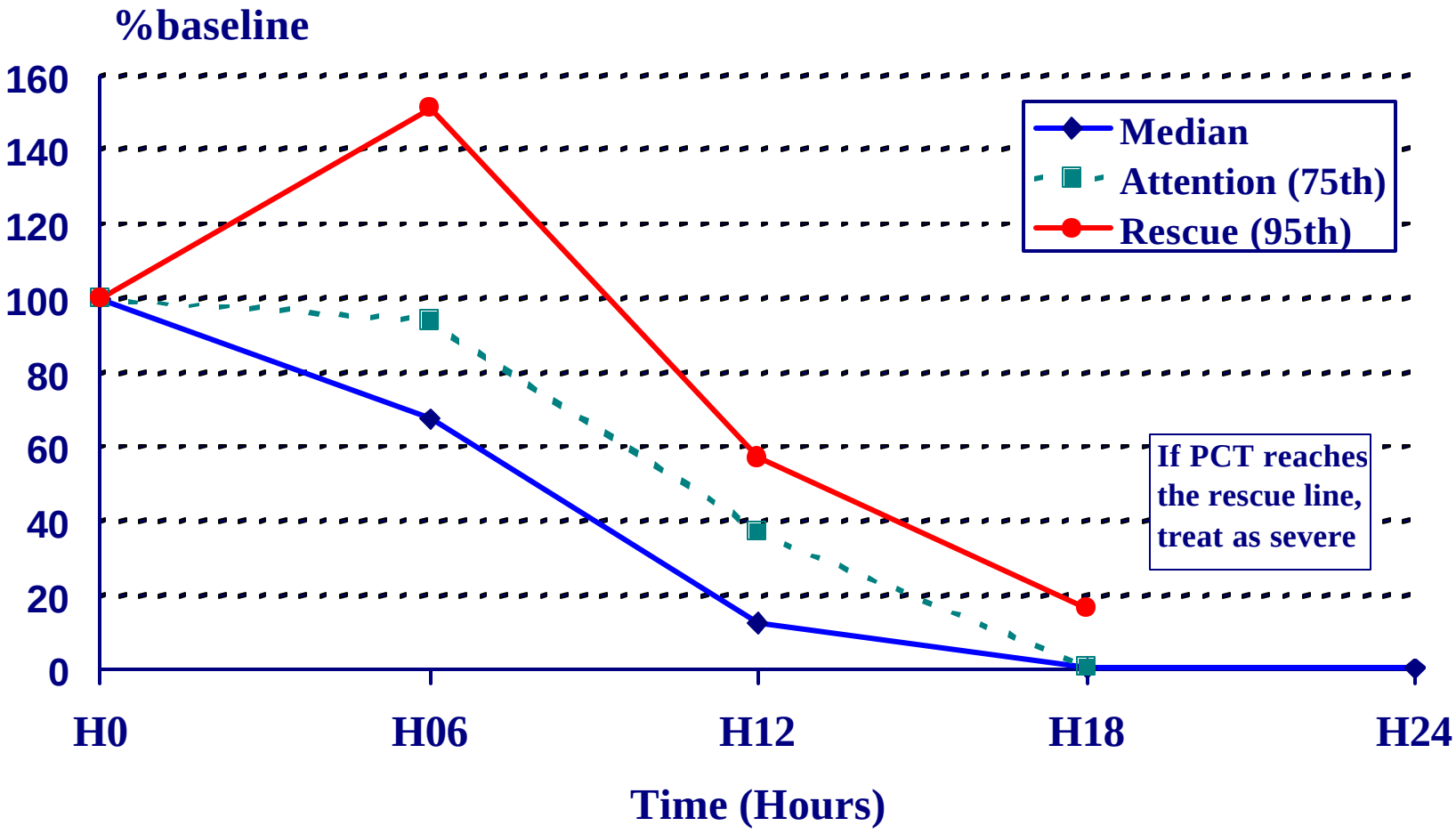
4) Artesunate should be used as the 2nd line drug in the treatment of malaria in pregnancy, except for hyperparasitaemia and severe

5) All women treated with artesunate in pregnancy should have the outcome documented

UNCOMPLICATED PF				**UNCOMPLICATED HYPERPARASITAEMIA**			**SEVERE MALARIA**		
parasitaemia < 4% and no signs severity				>4% RBC infected & no signs severity			check non-pregnant for WHO criteria of severe malaria		
TRIMESTER	EPISODE	RECOMMENDED		TRIMESTER	EPISODE	RECOMMENDED	TRIMESTER	EPISODE	RECOMMENDED
All trimesters	1st PF	**SQ7 (total Q=30mg/kg/day)** 10mg/kg/dose, TID, 7 days		ALL TRIMESTERS	ANY	**AS7 (total AS=16mg/kg)** D0 - 4mg/kg D1-D6 - AS 2mg/kg	ALL	ANY	**ARTESUNATE IV** **Total artemisinin 16mg/kg** LD: 2.4mg/kg, 1.2mg/kg H12,H24,H48… **or ARTEMETHER IM** LD: 3.2mg/kg, 1.6mg/kg at H24 and OD both until able to eat & drink -then oral artesunate to 7d **10% dextrose - risk of hypoglycaemia** ***NB:*** *Artesunate should be used instead of IV quinine to minimize hypoglycaemia of PF infection in pregnant women*
	2nd PF	**AS7 (total AS=14mg/kg)** 2mg/kg/day, 7 days							
	3rd PF	**AS7 (total AS=14mg/kg)** 2mg/kg/day, 7 days							
	Remarks 1) Oral quinine can cause hypoglycemia in pregnant women 2) Mefloquine increases the risk of stillbirth. 3) AS can be combined to clindamycin 5mg/kg/dose tid 7d 4) 70% of pregnant women need treatment for anaemia 5) The only strategy to control maternal mortality is weekly screening								

Abbreviations: SQ7=supervised quinine 7 days, UQ7=unsupervised quinine 7 days, AS7=artesunate 7 days, LD= loading dose, RD=routine dose, TID=3 times per day, Clindamycin dose is 5 mg/kg/dose TID for 7 days

PCT with oral artesunate



oral Artesunate Doses

1 Tablet contains 50 mg

A Suspension (10 mg/ml) is made by dissolving 1 tablet in 5 ml water

Weight (kg)	4 mg/kg (OD)		2 mg/kg (OD)	
	tab	ml	tab	ml
2		0.8		0.4
3		1.2		0.6
4		1.6		0.8
5		2.0		1.0
6	1/2	2.4	1/4	1.2
7	1/2	2.8	1/4	1.4
8	3/4	3.2	1/4	1.6
9	3/4	3.6	1/4	1. 6
10	3/4	4.0	1/2	2.0
11	1	4.4	1/2	2.2
12	1	4.8	1/2	2.4
13 - 14	1		1/2	
15 - 16	1 1/4		1/2	
17 - 20	1 1/2		3/4	
21	1 3/4		3/4	
22 - 23	1 3/4		1	
24 - 26	2		1	
27 - 28	2 1/4		1	
29	2 1/4		1 1/4	
30 - 32	2 1/2		1 1/4	
33 - 34	2 3/4		1 1/4	
35	2 3/4		1 1/2	
36 - 39	3		1 1/2	
40	3 1/4		1 1/2	
41 - 42	3 1/4		1 3/4	
43 - 45	3 1/2		1 3/4	
46	3 3/4		1 3/4	
47 - 48	3 3/4		2	
49 - 51	4		2	
52 - 53	4 1/4		2	
54	4 1/4		2 1/4	
55 - 57	4 1/2		2 1/4	
58 - 59	4 3/4		2 1/4	
60	4 3/4		2 1/2	
61 - 64	5		2 1/2	
65	5 1/4		2 1/2	
66 - 67	5 1/4		2 3/4	
68 - 70	5 1/2		2 3/4	

Artemether I.M. (1 ml=80 mg)

For treatment of severe malaria.
Initial dose of 3.2 mg/kg (loading dose)
followed by 1.6 mg/kg (routine dose) every 24 hours (OD)
Until the patient can tolerate oral medication

weight	loading	routine
kg	ml	ml
2-3	0.1	0.05
4-6	0.2	0.1
7	0.3	0.1
8	0.3	0.2
9-11	0.4	0.2
12	0.5	0.2
13	0.5	0.3
14-16	0.6	0.3
17	0.7	0.3
18	0.7	0.4
19-21	0.8	0.4
22	0.9	0.4
23	0.9	0.5
24-26	1.0	0.5
27	1.1	0.5
28	1.1	0.6
29-31	1.2	0.6
32	1.3	0.6
33	1.3	0.7
34-36	1.4	0.7
37	1.5	0.7
38	1.5	0.8
39-41	1.6	0.8
42	1.7	0.8

weight	loading	routine
kg	ml	ml
43	1.7	0.9
44-46	1.8	0.9
47	1.9	0.9
48	1.9	1.0
49-51	2.0	1.0
52	2.1	1.0
53	2.1	1.1
54-56	2.2	1.1
57	2.3	1.1
58	2.3	1.2
59-61	2.4	1.2
62	2.5	1.2
63	2.5	1.3
64-66	2.6	1.3
67	2.7	1.3
68	2.7	1.4
69-71	2.8	1.4
72	2.9	1.4
73	2.9	1.5
74-76	3.0	1.5
77	3.1	1.5
78	3.1	1.6
79-80	3.2	1.6

Artesunate i.v.

FOR SEVERE MALARIA ONLY
The solution is light sensitive, prepare directly before injection.
Throw away the excess solution
A suspension is made by dissolving 1 vial in 1 ml 5% sodium bicarbonate
1 vial contains 60 mg artesunate (60 mg/ml)
Loading dose (H0): 2.4 mg /kg ; H12 & H24 1.2 mg/kg (routine dose)
and then 1.2 mg/kg/24 hours
Until the patient can tolerate oral medication

weight	loading	routine
kg	ml	ml
2-3	0.1	0.05
4-6	0.2	0.1
7	0.3	0.1
8	0.3	0.2
9-11	0.4	0.2
12	0.5	0.2
13	0.5	0.3
14-16	0.6	0.3
17	0.7	0.3
18	0.7	0.4
19-21	0.8	0.4
22	0.9	0.4
23	0.9	0.5
24-26	1.0	0.5
27	1.1	0.5
28	1.1	0.6
29-31	1.2	0.6
32	1.3	0.6
33	1.3	0.7
34-36	1.4	0.7
37	1.5	0.7
38	1.5	0.8
39-41	1.6	0.8

weight	loading	routine
kg	ml	ml
42	1.7	0.8
43	1.7	0.9
44-46	1.8	0.9
47	1.9	0.9
48	1.9	1.0
49-51	2.0	1.0
52	2.1	1.0
53	2.1	1.1
54-56	2.2	1.1
57	2.3	1.1
58	2.3	1.2
59-61	2.4	1.2
62	2.5	1.2
63	2.5	1.3
64-66	2.6	1.3
67	2.7	1.3
68	2.7	1.4
69-71	2.8	1.4
72	2.9	1.4
73	2.9	1.5
74-76	3.0	1.5
77	3.1	1.5
78	3.1	1.6
79-80	3.2	1.6

CHLOROQUINE DOSES when using tablets

Chloroquine phosphate 161mg salt = 100mg base
1 Tablet contains 250 mg chloroq. phosphate (= 155.3 mg base)
d1-d2-d3 : 10-10-5 (mg base/kg, OD)

Weight kg	d1, d2 tabs	d3 tabs
3-5	1/4	1/4
6-9	1/2	1/4
10-11	3/4	1/4
12	3/4	1/2
13-17	1	1/2
18-19	1 1/4	1/2
20	1 1/4	3/4
21-25	1 1/2	3/4
26-27	1 3/4	3/4
28	1 3/4	1
29-33	2	1
34-35	2 1/4	1
36	2 1/4	1 1/4
37-41	2 1/2	1 1/4
42	2 3/4	1 1/4
43-44	2 3/4	1 1/2
45-48	3	1 1/2
49-50	3 1/4	1 1/2
51-52	3 1/4	1 3/4
53-56	3 1/2	1 3/4
57	3 3/4	1 3/4
58-60	3 3/4	2
61-64	4	2
65-66	4 1/4	2
67	4 1/4	2 1/4
68-72	4 1/2	2 1/4
73	4 3/4	2 1/4
74-75	4 3/4	2 1/2
76-79	5	2 1/2
80-82	5 1/4	2 1/2

CHLOROQUINE DOSES when using DIPHOSPHATE SYRUP

Diroquine syrup should only be used for babies
161mg Chloroquine diphosphate = 100mg of chlorquine base
1 ml Diroquine syrup contains 15.6 mg chloroquine diphosphate (= 9.7 mg base)
d1-d2-d3 : 10-10-5 (mg base/kg, OD)
Dose for treatment given in cc (mls) in last two columns

kg	10 mg/kg base	d1, d2 mls (cc)	d3 mls (cc)
3	30	3.1	1.5
4	40	4.1	2.1
5	50	5.2	2.6
6	60	6.2	3.1
7	70	7.2	3.6
8	80	8.2	4.1
9	90	9.3	4.6
10	100	10.3	5.2
11	110	11.3	5.7
12	120	12.4	6.2
13	130	13.4	6.7
14	140	14.4	7.2
15	150	15.5	7.7

MEFLOQUINE DOSES

Total dose is 25 mg/kg

but give as a split dose: d1 - d2 : 15 - 10 mg/kg (OD)

A suspension (50mg/ml) is made by dissolving 1 tablet in 5 m

1 tablet contains 250 mg mefloquine

kg	d1, (15 mg/kg)		d2, (10 mg/kg)	
	tabs	(or mls)	tabs	(or mls)
5	1/4	1.5 mls	1/4	1.0 mls
6	1/4	1.8 mls	1/4	1.2 mls
7	1/2	2.1 mls	1/4	1.4 mls
8	1/2	2.4 mls	1/4	1.6 mls
9	1/2	2.7 mls	1/2	1.8 mls
10	1/2	3.0 mls	1/2	2.0 mls
11	1/2	3.3 mls	1/2	2.2 mls
12	3/4	3.6 mls	1/2	2.4 mls
13	3/4	3.9 mls	1/2	2.6 mls
14	3/4	4.2 mls	1/2	2.8 mls
15	1	4.5 mls	1/2	3.0 mls
16	1		1/2	
17-18	1 1/4		1/2	
19-21	1 1/4		3/4	
22-23	1 1/2		3/4	
2426	1 1/2		1	
27-28	1 3/4		1	
29-31	1 3/4		1 1/4	
32-33	2		1 1/4	
34-36	2		1 1/2	
37-38	2 1/4		1 1/2	
39-41	2 1/2		1 1/2	
42-43	2 1/2		1 3/4	
44-46	2 3/4		1 3/4	
47-48	2 3/4		2	
49-51	3		2	
52-53	3 1/4		2	
54-56	3 1/4		2 1/4	
57-58	3 1/2		2 1/4	
59-61	3 1/2		2 1/2	
62-63	3 3/4		2 1/2	
64-66	4		2 1/2	
67-68	4		2 3/4	
69-71	4		3	
72	4 1/4		3	
73-77	4 1/2		3	
78	4 3/4		3	
79-81	4 3/4		3 1/4	
82-83	5		3 1/4	
84-85	5		3 1/2	
86-88	5 1/4		3 1/2	
87	5 1/4		3 1/2	
89-90	5 1/2		3 1/2	

Artemether-Lumefantrine

Each tablet contains 20 mg artemether and 120mg lumefantrine.
The regimen is twice daily for 3 days given at 0, and approximately 8, 24, 36, 48 and 60 hours.
The bioavailability of oral lumefantrine is significantly enhanced with coadministration of fat and we would recommend giving a 200ml carton of milk with each dose.

weight kg	tablets per dose
<15	1
16-25	2
26-35	3
>35	4

Quinine Doses (oral)

For adults

quinine sulphate 103 mg = 100 mg of quinine base
1 tablet contains 300 mg quinine sulphate
10 mg salt/kg TID (30 mg salt/kg/d) x 7 days

Weight kg	number of tablets	
15-18	1/2	TID
19-26	3/4	TID
27-33	1	TID
34-41	1 1/4	TID
42-48	1 1/2	TID
49-56	1 3/4	TID
57-63	2	TID
64-71	2 1/4	TID
72-78	2 1/2	TID
79-86	2 3/4	TID

For children

A suspension is made by dissolving 1 tablet in 5 mls water
1 ml suspension contains 60 mg quinine sulphate (salt)

weight kg	10 mg /kg salt	dose suspention in ml (cc)
4	40	0.7
5	50	0.8
6	60	1.0
7	70	1.2
8	80	1.3
9	90	1.5
10	100	1.7
11	110	1.8
12	120	2.0
13	130	2.2
14	140	2.3

Quinine parenteral (i.v.)

105 mg quinine hydrochloride is equivalent to 100 mg quinine base
1 amp. of 2 mls. contains 600 mg. quinine dihydrochoride (salt)
It is administered by infusion using 5-10 % dextrose and I.V. set equipped with maitrisette.
Loading dose: 20 mg **salt**/kg are given over 4 hours (H0-H4)
At H8, 10 mg salt/kg (routine dose) are given over 2 hours, and this is to repeat every 8 hours. Total daily dose 30 mg **salt**/kg

weight kg	loading mls	routine mls
2	0.1	0.07
3	0.2	0.1
4	0.3	0.1
5	0.3	0.2
6	0.4	0.2
7	0.5	0.2
8	0.5	0.3
9	0.6	0.3
10	0.7	0.3
11	0.7	0.4
12	0.8	0.4
13	0.9	0.4
14	0.9	0.5
15	1.0	0.5
16	1.1	0.5
17	1.1	0.6
18	1.2	0.6
19	1.3	0.6
20	1.3	0.7
21	1.4	0.7
22	1.5	0.7
23	1.5	0.8
24	1.6	0.8
25	1.7	0.8
26	1.7	0.9
27	1.8	0.9
28	1.9	0.9
29	1.9	1.0
30	2.0	1.0
31	2.1	1.0
32	2.1	1.1
33	2.2	1.1
34	2.3	1.1
35	2.3	1.2
36	2.4	1.2

weight kg	loading mls	routine mls
37	2.5	1.2
38	2.5	1.3
39	2.6	1.3
40	2.7	1.3
41	2.7	1.4
42	2.8	1.4
43	2.9	1.4
44	2.9	1.5
45	3.0	1.5
46	3.1	1.5
47	3.1	1.6
48	3.2	1.6
49	3.3	1.6
50	3.3	1.7
51	3.4	1.7
52	3.5	1.7
53	3.5	1.8
54	3.6	1.8
55	3.7	1.8
56	3.7	1.9
57	3.8	1.9
58	3.9	1.9
59	3.9	2.0
60	4.0	2.0
61	4.1	2.0
62	4.1	2.1
63	4.2	2.1
64	4.3	2.1
65	4.3	2.2
66	4.4	2.2
67	4.5	2.2
68	4.5	2.3
69	4.6	2.3
70	4.7	2.3
71	4.7	2.4

Clindamycin caps. (150 mg)

To be used in combination with quinine for pregnant women
capsules cannot be split or broken
5 mg/kg TID for 7 days

weight	dose (TID for 7 days)		
Kg	in mg	caps (150 mg)	
< 35	150	1	TID
35 - 69	300	2	TID
> 69	450	3	TID

Doxycycline caps.

One capsule (caps) is 100mg; capsules cannot be split or broken
Doxycycline should not be given to children < 8 y.o or pregnant women
Dose given once a day for 7 days (4 mg/kg/day)

weight	**Nearest dose Doxy**	
kg	**(caps)**	
15 - 37	1	OD
38 - 62	2	OD
> 62	3	OD

Paracetamol syrup

Dose: 50 mg/day divided in 3 doses (16.6 mg/kg TID)
5 ml (cc) syrup contains 120 mg paracetamol (1 ml = 24 mg)

Weight	syrup	
kg	mls (cc)	
2	1.4	TID
3	2.1	TID
4	2.8	TID
5	3.5	TID
6	4.2	TID
7	4.8	TID
8	5.5	TID

Paracetamol tablet (500 mg)

Weight	nr. of tabs.	
kg		
9-11	1/4	TID
12-18	1/2	TID
19-26	3/4	TID
27-33	1	TID
34-41	1 1/4	TID
42-48	1 1/2	TID
49-56	1 3/4	TID
> 57	2	TID