# GUIDELINES FOR THE MANAGEMENT OF MALARIA IN CAMEROUN INTENDED FOR HEALTH PERSONNEL

## 5 CALCULATE THE DOSE

■ Calculate and withdraw the required dose **in ml** according to route of administration:

| For intravenous route (IV) | For intramuscular route (IM) |
|---|---|
| $\frac{\text{2.4 mg x body weight (kg)}}{\text{IV artesunate solution concentration 10 mg/ml}}$ | $\frac{\text{2.4 mg x body weight (kg)}}{\text{IM artesunate solution concentration 20 mg/ml}}$ |
| Round up to the next whole number, except if total dose is less than 0.5ml* | Round up to the next whole number, except if total dose is less than 0.5ml* |

| Example: | Example: |
|---|---|
| Dose needed(ml) for de 6kg child: | Dose needed(ml) for de 6kg child: |
| $\frac{2.4 \times 6}{10} = 1.44$ ml | $\frac{2.4 \times 6}{20} = 0.72$ ml |
| 1.44 rounded up to 2 ml | 0.72 rounded up to 1 ml |

*** IMPORTANT**

Total doses less than 0,5 ml should be rounded up to 0,5 ml (not 1ml).
For example, if the dose is 0,3 ml,round up to 0,5 ml.

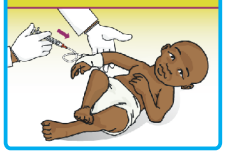
| Intravenous route (IV) Concentration: 10 mg/ml | | | Intramuscular route (IM) Concentration: 20 mg/ml | | |
|---|---|---|---|---|---|
| Weight kg | Dose | | Weight kg | Dose | |
| | mg | ml | | mg | ml |
| < 5 | 10 | 1* | < 5 | 10 | 1* |
| 5 - 8 | 20 | 2 | 5 - 8 | 20 | 1 |
| 9 - 12 | 30 | 3 | 9 - 12 | 30 | 2 |
| 13 - 16 | 40 | 4 | 13 - 16 | 40 | 2 |
| 17 - 20 | 50 | 5 | 17 - 20 | 50 | 3 |
| 21 - 25 | 60 | 6 | 21 - 25 | 60 | 3 |
| 26 - 29 | 70 | 7 | 26 - 29 | 70 | 4 |
| 30 - 33 | 80 | 8 | 30 - 33 | 80 | 4 |
| 34 - 37 | 90 | 9 | 34 - 37 | 90 | 5 |
| 38 - 41 | 100 | 10 | 38 - 41 | 100 | 5 |
| 42 - 45 | 110 | 11 | 42 - 45 | 110 | 6 |
| 46 - 50 | 120 | 12 | 46 - 50 | 120 | 6 |
| 51 - 54 | 130 | 13 | 51 - 54 | 130 | 7 |
| 55 - 58 | 140 | 14 | 55 - 58 | 140 | 7 |
| 59 - 62 | 150 | 15 | 59 - 62 | 150 | 8 |
| 63 - 66 | 160 | 16 | 63 - 66 | 160 | 8 |
| 67 - 70 | 170 | 17 | 67 - 70 | 170 | 9 |
| 71 - 75 | 180 | 18 | 71 - 75 | 180 | 9 |
| 76 - 79 | 190 | 19 | 76 - 79 | 190 | 10 |
| 80 - 83 | 200 | 20 | 80 - 83 | 200 | 10 |
| 84 - 87 | 210 | 21 | 84 - 87 | 210 | 11 |
| 88 - 91 | 220 | 22 | 88 - 91 | 220 | 11 |
| 92 - 95 | 230 | 23 | 92 - 95 | 230 | 12 |
| 96 - 100 | 240 | 24 | 96 - 100 | 240 | 12 |

Remark: the upper limit for each weight band is 0,9 kg e.g. 13-16 kg covers 13 -16.9kg.

## 6 ADMINISTER

CAMEROON & WHO RECOMMENDATED TREATMENT[2]

IV: slow bolus 3-4 ml per minute.



IM: Inject slowly. Spread the doses of more than 2 ml over different sites for babies and 5 ml for adults.

## 7 DOSING SCHEDULE

Give **3 parenteral doses** for a minimun of 24 hours once started, irrespective of the patient's ability to tolerate oral medications earlier:

- **Day 1:**
  **Dose 1: on admission (0 Hours)**
  **Dose 2: 12 hours later**
- **Day 2:**
  **Dose 3: 24 hours after first dose**

- If the patient **can** take oral medication, prescribe a full 3-day course of recommended first line oral Artemisinin Conbination Therapy (ACT).
- If the patient cannot take oral medication, continue with parenteral treatment (one dose a day), for a maximun of 7 days, until oral medication can be given.
- A course of injectable artesunate should always be followed by a 3-day course of ACT.

- **Evaluate the patient's progress regularly.**

**IMPORTANT**

- Prepare a fresh solution for each administration.
- Discard any unused solution after use.







# PREFACE

Case management is an essential strategy in malaria control and effectively contributes to the reduction of morbidity and mortality of this disease.

These guidelines are intended for the health care providers who receive malaria patients on a daily basis. This tool should be used to ease the diagnosis, treatment and follow-up of a patient with either uncomplicated or severe malaria.

The previous edition of these guidelines took into account the recommendations of the World Health Organization concerning countries with resistance to monotherapy. This edition describes malaria case management protocols using artemisinin based combination therapy (ACT).

The current guidelines highlight the recommendations of the World Health Organization and the adoption of systematic biological diagnosis of all suspected cases of malaria before treatment. Rapid Diagnostic Tests (RDTs) are now available to all (Healthcare providers and Community Health Workers), although microscopy remain the test of reference performed in health facilities.

The Ministry of Public Health has since 2006 retained two ACTs for the treatment of uncomplicated malaria. For first line treatment, artesunate-amodiaquine is used. This is free of charge for children under five years and subsidized for the rest of the population since 2011. Artemether-lumefantrine is recommended for the second line treatment.

For severe malaria, injectable artesunate is the recommended first line treatment; injectable artemether and quinine are use for second line treatment. Pregnant women in the first trimester are treated with quinine for severe malaria.

Since July 2014, the treatment of severe malaria with artesunate or artemether is free of charge for children under 5 years and subsidized for people aged 5 years and above, including pregnant women.

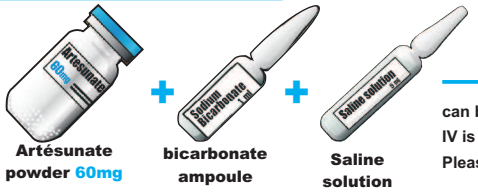
I urge all healthcare providers to make good use of these guidelines in order to significantly improve malaria case management.

THE MINISTER

André MAMA FOUDA



# APPENDIX 12 THE USE OF INJECTABLE ARTESUNATE TO TREAT SEVERE MALARIA




Artésunate powder 60mg + bicarbonate ampoule + Saline solution

## PRODUCT DESCRIPTION[1]

**Dose: 2.4mg/kg**

can be given by intravenous route (IV) or intramuscular route (IM).
IV is the preferred route of administration.
Please refer to the patient information leaflet for more information.

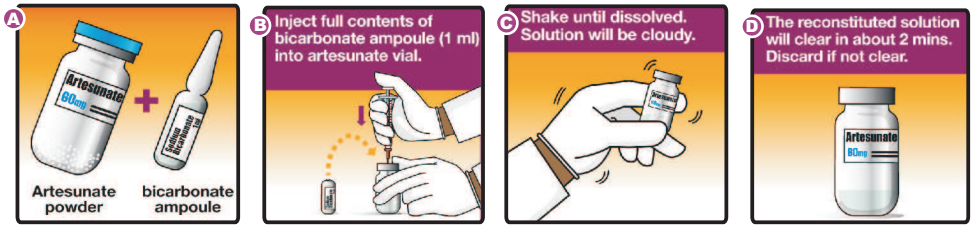
## 1 WEIGH THE PATIENT

## 2 DETERMINE THE NUMBER OF VIALS NEEDED

| Weight | 5kg-25kg | 26kg-50kg | 51kg-75kg | 76kg-100kg |
|---|---|---|---|---|
| 60mg vial | 1 | 2 | 3 | 5 |

## 3 RECONSTITUTE

■ Activate the drug: artésunate pwoder + bicarbonate ampoule (immediately before use)




## 4 DILUTE

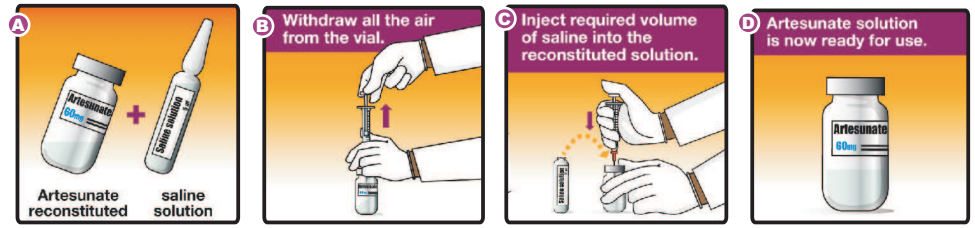
■ Reconstituted artesunate + saline solution (or dextrose 5%)

■ Volume for dilution

| | IV | IM |
|---|---|---|
| Bicarbonate solution volume | 1 ml | 1 ml |
| saline solution volume | 5 ml | 2 ml |
| Total volume | **6 ml** | **3 ml** |
| Artésunate 60mg solution concentration | 10mg/ml | 20mg/ml |

**IMPORTANT**

**Water for injection is not an appropriate dilutant**




1. Word Health Organization (WHO) List of Prequalified Medicinal Products (http://apps.who.int/prequal/query/ProductRegistry.aspx?list=ma): artesunate injectable, reference N°MA051,prequalified on 05-Nov-2010.

2. World Health Organization, Management of severe Malaria - A practical handbook - Third edition - April 2013 - (http://www.who.int/malaria/publications/atoz/9789241548526/en/index.html)

b) 1 vial of 600mg/2ml at 82.6% of quinine base + 4 ml of sterilized water, that is 600mg/6ml or 82.6 mg of quinine base per ml.

Calculation of dose to be administered

82 mg/ml = Weight x Dose (mg/kg)/Quantity to be taken per dose

## Appendix 11: SALT / BASE EQUIVALENCE OF THE MAIN ANTI MALARIAL DRUGS

| QUININE | Salt | Base |
|---|---|---|
| Quinine Sulfate tablets | 362 mg | 300 mg |
| Quinine Disulfate tablets | 508 mg | 300 mg |
| Quinine dihydrochloride tablets (Quinine Lafran*, ...) | 500 mg | 408,5 mg (81,7 %)<br>300 mg (74 %) |
| Quinine dihydrochloride tablets | 405 mg | 82% i.e. 492 mg/2ml |
| Quinine dihydrochloride inj. | 600 mg/2 ml | 82% i.e. 492mg/2ml |
| Quinine dihydrochloride inj. | 600 mg/2ml | 82,6% i.e. 495,6 mg/2ml |
| Quinine sulfate inj. | 600 mg/2ml | |
| Quinune Gluconate inj amp (Quinimax*) | 100 mg | 100 mg (100 %) |
| **ARTEMISININE BASED COMBINATION THERAPY HOMOLOGATED AND RECOMMENDED** | | |
| Artésunate + amodiaquine (Coarsucam*, Asaq*,etc) | 25mg/67.5mg<br>50mg/135mg<br>100mg/270mg | 25mg/67.5mg<br>50mg/135mg<br>100mg/270mg |
| Artémether + Lumefantrine (Coartem*,Artefan*) | 20mg/ 120mg | 20mg/ 120mg |
| **INJECTABLE ARTEMETHER** | (20mg,40mg, 80mg)/ml | (20mg, 40mg, 80mg)/ml |
| **INJECTABLE ARTESUNATE** | 60mg/ml | 60mg/ml |



GUIDELINES FOR THE MANAGEMENT OF MALARIA IN CAMEROON
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## ACKNOWLEDGEMENTS

The present guidelines are the result of extensive work between malaria experts and partners involved in malaria control.

I take this opportunity to thank you for your contributions in the development of this reference document and do hereby express all the gratitude of the National Malaria Control Program.

GUIDELINES FOR THE MANAGEMENT OF MALARIA IN CAMEROON
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## Appendix 10: NUMBER OF DROPS PER MINUTE TO BE RUN IN A DRIP DEPENDING ON THE QUANTITY OF FLUIDS

5 to 10 ml./Kg/4heures
(Max quantity: 500ml per quinine infusion)

| QUANTITY OF FLUIDS TO BE RUN IN 4 HOURS | NUMBER OF DROPS PER MINUTE |
|---|---|
| 50 ml. | 4 |
| 75 ml. | 7 |
| 100 ml | 9 |
| 150 ml | 13 |
| 200 ml | 17 |
| 250 ml | 21 |
| 500 ml | 42 |

### Calculation of dose to be administered

82 mg/ml= body weight x Dose (mg/kg) / Quantity to be obtained in ampoule or vial per dose.

Dilution of quinine

a) 1 vial of 600mg/2ml at 82% of quinine base + 4 ml of sterilized water, that is 600mg/6ml representing 100mg of salt per ml or 82 mg of quinine base per ml.

| | | | |
|---|---|---|---|
| 21 – 25 | 6 – 8 years | Q = 1.5 ml ; G = 250 ml | Q = 0 ; G = 250 ml |
| 26 – 30 | 8 – 10 years | Q = 1.8 ml ; G = 250 ml | Q = 0 ; G = 300 ml |
| 31 – 35 | 10 – 11 years | Q = 2.1 ml ; G = 300 ml | Q = 0 ; G = 300 ml |
| 36 – 40 | 11 – 13 years | Q = 2.1 ml ; G = 300 ml | Q = 0 ; G = 325 ml |
| 41 – 45 | 13 – 14 years | Q = 2.75 ml ; G = 300 ml | Q = 0 ; G = 350 ml |
| 46 – 50 | 14 – 15 years | Q = 3.1 ml ; G = 350 ml | Q = 0 ; G = 375 ml |
| 51 – 55 | 15 – 16 years | Q = 3.4 ml ; G = 400 ml | Q = 0 ; G = 400 ml |
| 56 – 60 | ≥ 16 years | Q = 3.7 ml ; G = 400 ml | Q = 0 ; G = 450 ml |
| > 60 | ≥ 16 years | Q = 3.9 ml ; G = 450 ml | Q = 0 ; G = 450 ml |

***12.5 mg of quinine base = 0.1 ml of quinimax new presentation. G = Glucose or Dextrose.***
****If there is a weighing machine available, it is preferable to use the body weight which is more specific, and not the age.***
***If on the 3rd day, the patient is still comatose, reduce the total quantity of infusions and tube-feed the patient to provide the latter with calories.***

THE QUANTITIES OF SOLUTION PROVIDED HERE ARE ONLY INDICATIVE.
IT IS UP TO THE PRESCRIBING PHYSICIAN TO MODIFY THESE QUANTITIES OR TO PRESCRIBE OTHER SOLUTIONS DEPENDING ON THE CLINICAL OUTLOOK OF THE PATIENT.





# TABLE OF CONTENTS

# Appendix 9: 24 -HOUR TREATMENT OF SEVERE MALARIA WITH QUINIMAX ®

Q = Quinimax®; G = glucose (or Dextrose) 5% or 10% (+ electrolytes)

| Weight of patient (Kg) | AGE of patient* | HOURS | |
|---|---|---|---|
| | | H0-H4 H8-H12 H16-H20 | H4-H8 H12-H16 H20-H24 |
| 3 | ≤ 1 month | Q = 0.2 ml ; G = 50 ml | Q = 0 ; G = 50 ml |
| 4 | 1 – 2 months | Q = 0.26 ml ; G = 75 ml | Q = 0 ; G = 50 ml |
| 5 | 2 – 3 months | Q = 0.32 ml ; G = 100 ml | Q = 0 ; G = 75 ml |
| 6 | 3 – 4 months | Q = 0.4 ml ; G = 100 ml | Q = 0 ; G = 100 ml |
| 7 | 4 – 6 months | Q = 0.45 ml ; G = 100 ml | Q = 0 ; G = 150 ml |
| 8 | 7 – 9 months | Q = 0.5 ml ; G = 150 ml | Q = 0 ; G = 125 ml |
| 9 | 10 – 12 months | Q = 0.6 ml ; G = 200 ml | Q = 0 ; G = 100 ml |
| 10 | 13 – 15 months | Q = 0.65 ml ; G = 200 ml | Q = 0 ; G = 150 ml |
| 11 – 12 | 16 – 24 months | Q = 0.75 ml ; G = 200 ml | Q = 0 ; G = 150 ml |
| 13 – 14 | 2 – 3 years | Q = 0.8 ml ; G = 200 ml | Q = 0 ; G = 200 ml |
| 15 – 16 | 3 – 4 years | Q = 1.0 ml ; G = 200 ml | Q = 0 ; G = 225 ml |
| 17 – 18 | 4 – 5 years | Q = 1.1 ml ; G = 200 ml | Q = 0 ; G = 225 ml |
| 19 – 20 | 5 – 6 years | Q = 1.25 ml ; G = 250 ml | Q = 0 ; G = 225 ml |

| | | | | |
|---|---|---|---|---|
| 8 | 7 – 9 months | Q = 0,52 ml ; G = 150 ml | Q = 0,26 ml ; G = 150 ml | Q = 0 ; G = 125 ml |
| 9 | 10 – 12 months | Q = 0,60 ml ; G = 200 ml | Q = 0,30 ml ; G = 200 ml | Q = 0 ; G = 100 ml |
| 10 | 13 – 15 months | Q = 0,64 ml ; G = 200 ml | Q = 0,32 ml ; G = 200 ml | Q = 0 ; G = 150 ml |
| 11 – 12 | 16 – 24 months | Q = 0,74 ml ; G = 200 ml | Q = 0,37 ml ; G = 200 ml | Q = 0 ; G = 150 ml |
| 13 – 14 | 2 – 3 years | Q = 0,88 ml ; G = 200 ml | Q = 0,44 ml ; G = 200 ml | Q = 0 ; G = 200 ml |
| 15 – 16 | 3 – 4 years | Q = 1 ml ; G = 200 ml | Q = 50 ml ; G = 200 ml | Q = 0 ; G = 225 ml |
| 17 – 18 | 4 – 5 years | Q = 1,12 ml ; G = 200 ml | Q = 1,56 ml ; G = 200 ml | Q = 0 ; G = 225 ml |
| 19 – 20 | 5 – 6 years | Q = 1,26 ml ; G = 250 ml | Q = 1,63 ml ; G = 250 ml | Q = 0 ; G = 225 ml |
| 21 – 25 | 6 – 8 years | Q = 1,48 ml ; G = 250 ml | Q = 1,74 ml ; G = 250 ml | Q = 0 ; G = 250 ml |
| 26 – 30 | 8 – 10 years | Q = 1,8ml ; G = 250 ml | Q = 1,9 ml ; G = 250 ml | Q = 0 ; G = 300 ml |
| 31 – 35 | 10 – 11 years | Q = 2,2 ml ; G = 300 ml | Q = 1,1 ml ; G = 300 ml | Q = 0 ; G = 300 ml |
| 36 – 40 | 11 – 13 years | Q = 2,4 ml ; G = 300 ml | Q = 1,2ml ; G = 300 ml | Q = 0 ; G = 325 ml |
| 41 – 45 | 13 – 14 years | Q = 2,8 ml ; G = 300 ml | Q = 1,4 ml ; G = 300 ml | Q = 0 ; G = 350 ml |
| 46 – 50 | 14 – 15 years | Q = 3,2 ml ; G = 350 ml | Q = 1,6 ml ; G = 350 ml | Q = 0 ; G = 375 ml |
| 51 – 55 | 15 – 16 years | Q = 3,4 ml ; G = 400 ml | Q = 1,7 ml ; G = 400 ml | Q = 0 ; G = 400 ml |
| 56 – 60 | ≥ 16 years | Q = 3,8 ml ; G = 400 ml | Q = 1,9 ml ; G = 400 ml | Q = 0 ; G = 450 ml |
| > 60 | ≥ 16 years | Q = 3,9 ml ; G = 450 ml | Q = 1,95 ml ; G = 450 ml | Q = 0 ; G = 450 ml |





## SUMMARY

Proper management of malaria requires early diagnosis and prompt and effective treatment with antimalarial medications. Guidelines on the diagnosis and appropriate treatment of malaria are summarized in the table below:

| **Malaria Diagnosis** |
|---|
| • Systematic confirmatory diagnosis of all suspected cases of malaria should be done by a rapid diagnostic test (RDT) or good quality microscopy.<br>• RDTs are free of charge to childr**en under five years and subsidized for the rest of the population.** |
| **Treatment of uncomplicated malaria** |
| • 1st line: Artesunate-amodiaquine (ASAQ).<br>• 2nd line: Artemether-Lumefantrine (AL).<br>• Only solid or dispersible forms are recommended.<br>• The artesunate-amodiaquine (ASAQ) is free for children under five years and subsidized for the rest of the population.<br>• Antipyretic treatment is recommended for children under 5 years. |
| **Treatment of cases of clinical failure** |
| In case of clinical failure, repeat the microscopy of an RDT (pLDH).<br>When positive:<br>- If ACT administration was poor, repeat ACT administration.<br>- If ACT administration was good, repeat treatment with another ACT.<br>- If negative: Look for another cause of fever and treat appropriately. |

| **Treatment of severe malaria - pre-referral treatment.** |
|---|
| • First line: First dose of artesunate injection preferably intravenously.<br>• Second line: quinine drips or intramuscular artemether. |
| **Treatment of severe malaria** |
| Parenteral treatment for at 24 hours, followed by an oral treatment when the patient is able to eat and drink.<br>Three types of treatment are available:<br><br>• First line: Artesunate injection, otherwise<br><br>• Second line: Injectable quinine or injectable artemether<br><br>Whatever the option, continue with oral treatment as soon as patient can swallow, for seven days with quinine (when treating with quinine) or for 3 days with artemisinine based combination therapy (ACT) (artesunate-amodiaquine or artemether-lumefantrine). |
| **Treatment of malaria in pregnancy** |
| Malaria in pregnancy is considered as severe malaria and treated as such.<br><u>First trimester:</u><br>Quinine infusion for at least 24 hours followed by oral quinine for up to the 7th day.<br><u>From the second trimester:</u><br>Refer to the treatment of severe malaria above. |





If on the 3rd day, the patient is still comatose, reduce the total quantity of infusions and tube-feed the patient to provide the latter with calories.

**THE QUANTITIES OF SOLUTION PROVIDED HERE ARE ONLY INDICATIVE.**
IT IS UP TO THE PRESCRIBING PHYSICIAN TO MODIFY THESE QUANTITIES OR TO PRESCRIBE OTHER SOLUTIONS DEPENDING ON THE CLINICAL OUTLOOK OF THE PATIENT.

## Appendix 8: 24 -HOUR-TREATMENT OF SEVERE MALARIA WITH QUININE HYDROCHLORIDE WITH A LOADING DOSE.

Q = Quinine hydrochloride; G = glucose (OR dextrose) 5% OR 10%

| WEIGHT OF PATIENT (Kg) | AGE OF PATIENT* | HOURS | | |
|---|---|---|---|---|
| | | Loading Dose H 0-H4 | Maintenance Dose H12-H16, H0-H4 | Keep vein open H4-H12-H16 H16-H24 |
| 3 | ≤ 1 month | Q = 0,2 ml ; G = 50 ml | Q = 0,1 ml ; G = 50 ml | Q = 0 ; G = 50 ml |
| 4 | 1 – 2 months | Q = 0,26 ml ; G = 75 ml | Q = 0,13 ml ; G = 75 ml | Q = 0 ; G = 50 ml |
| 5 | 2 – 3 months | Q = 0,32ml ; G = 100 ml | Q = 0,16ml ; G = 100 ml | Q = 0 ; G = 70 ml |
| 6 | 3 – 4 months | Q = 0,40 ml ; G = 100 ml | Q = 0,2 ml ; G = 100 ml | Q = 0 ; G = 100 ml |
| 7 | 4 – 6 months | Q = 0,46 ml ; G = 100 ml | Q = 0,23 ml ; G = 100 ml | Q = 0 ; G = 150 ml |

| | | | |
|---|---|---|---|
| 11 – 12 | 16 – 24 months | Q = 0.37 ml ; G = 200 ml | Q = 0 ; G = 150 ml |
| 13 – 14 | 2 – 3 years | Q = 0.44 ml ; G = 200 ml | Q = 0 ; G = 200 ml |
| 15 – 16 | 3 – 4 years | Q = 0.50 ml ; G = 200 ml | Q = 0 ; G = 225 ml |
| 17 – 18 | 4 – 5 years | Q = 0.56 ml ; G = 200 ml | Q = 0 ; G = 225 ml |
| 19 – 20 | 5 – 6 years | Q = 0.63 ml ; G = 250 ml | Q = 0 ; G = 225 ml |
| 21 – 25 | 6 – 8 years | Q = 0.74 ml ; G = 250 ml | Q = 0 ; G = 250 ml |
| 26 – 30 | 8 – 10 years | Q = 0.9 ml ; G = 250 ml | Q = 0 ; G = 300 ml |
| 31 – 35 | 10 – 11 years | Q = 1.1 ml ; G = 300 ml | Q = 0 ; G = 300 ml |
| 36 – 40 | 11 – 13 years | Q = 1.2 ml ; G = 300 ml | Q = 0 ; G = 325 ml |
| 41 – 45 | 13 – 14 years | Q = 1.4 ml ; G = 300 ml | Q = 0 ; G = 350 ml |
| 46 – 50 | 14 – 15 years | Q = 1.6 ml ; G = 350 ml | Q = 0 ; G = 375 ml |
| 51 – 55 | 15 – 16 years | Q = 1.7 ml ; G = 400 ml | Q = 0 ; G = 400 ml |
| 56 – 60 | ≥ 16 years | Q = 1.9 ml ; G = 400 ml | Q = 0 ; G = 450 ml |
| > 60 | ≥ 16 years | Q = 1.95 ml ; G = 450 ml | Q = 0 ; G = 450 ml |

*12.5mg of quinine base = 0.45 ml of quinine hydrochloride/chlorhydrate of quinine. G = Glucose or Dextrose*
**If there is a weighing machine available, it is preferable to use the body weight which is more specific, and not the age.*





When uterine contractions develop during treatment with quinine, it is recommended that tocolytics (salbutamol) be associated.

**Treatment of particular populations and in particular situations**

- People living with HIV on ARV treatment (Efavirenz, Zidovudine): Avoid taking ASAQ to avoid hepatotoxicity. Instead take AL;
- History of serious side effects with ASAQ (severe asthenia, extrapyramidal syndrome, skin eruption, etc. take AL;
- Overweight persons: For fear of under-dosing there should be follow up of treatment outcome (clinical evaluation and eventually microscopy);
- Malnourished Children: Preferably take AL.

**Intermittent Preventive Treatment in Pregnancy (IPT)**

- The pregnant woman must take four doses of Sulfadoxine-pyrimethamine as from the second trimester of pregnancy.
- The interval between two doses should be at least one month.
- The last dose of IPT can be taken even during childbirth.
- It is not recommended to administer SP together with folic acid at doses > 5mg per day. This is because folic acid decreases the effectiveness of the SP in malaria prevention.
- Pregnant women on cotrimoxazole should not take SP.

GUIDELINES FOR THE MANAGEMENT OF MALARIA IN CAMEROON
INTENDED FOR HEALTH PERSONNEL

## Appendix 7: 24–HOUR TREATMENT OF SEVERE MALARIA WITH QUININE HYDROCHLORIDE WITHOUT A LOADING DOSE

Q = Quinine hydrochloride; G = glucose (OR dextrose) 5% OR 10%

***12.5mg of quinine base = 0.45 ml of quinine hydrochloride/chlorhydrate of quinine. G = Glucose or Dextrose***

| WEIGHT OF PATIENT (Kg) | AGE OF PATIENT* | HOURS | |
|---|---|---|---|
| | | Loading dose H0-H4 H8-H12 H16-H20 | Keep vein open H4-H8 H12-H16 H20-H24 |
| 3 | ≤ 1 month | Q = 0.1 ml ; G = 50 ml | Q = 0 ; G = 50 ml |
| 4 | 1 – 2 months | Q = 0.13 ml ; G = 75 ml | Q = 0 ; G = 50 ml |
| 5 | 2 – 3 months | Q = 0.16 ml ; G = 100 ml | Q = 0 ; G = 70 ml |
| 6 | 3 – 4 months | Q = 0.20 ml ; G = 100 ml | Q = 0 ; G = 100 ml |
| 7 | 4 – 6 months | Q = 0.23 ml ; G = 100 ml | Q = 0 ; G = 150 ml |
| 8 | 7 – 9 months | Q = 0.26 ml ; G = 150 ml | Q = 0 ; G = 125 ml |
| 9 | 10 – 12 months | Q = 0.30 ml ; G = 200 ml | Q = 0 ; G = 100 ml |
| 10 | 13 – 15 months | Q = 0.32 ml ; G = 200 ml | Q = 0 ; G = 150 ml |

**Day 2 to day 7:** Same regimen if the patient cannot take orally.

***Use 10% glucose in case of hypoglycaemia. Add electrolytes to the drip. Watch out for any case of diabetes.***

***If the quinine cannot be administered by infusion, give it intramuscularly according to the regimen below and refer the patient to the appropriate level of care.***

**INTRAMUSCULAR ROUTE**

For intramuscular injections, it is recommended that the chlorhydrate should be diluted in 0.9% normal saline at the concentration of 60mg/ml and half of the quantity injected in the anterior surface of each lap.

To avoid abscesses, tetanus, hepatitis and HIV, use only disposable injection material.

SWITCH TO ORAL TREATMENT AS SOON AS POSSIBLE AND CONTINUE AT THE SAME DOSE TO THE SEVENTH DAY.

**ORAL TREATMENT**

Start oral treatment as soon as the patient feels better: 8mg/kg Quinine base or 10mg/kg Quinine salt every 8hours for 7 days or with an artémisinine based combination therapy ACT (artesunate-amodiaquine or artemether-lumefantrine) for three days.

**All forms of quinine, injectable or oral Should be used taking into consideration the quantity of quinine base in the tablet or vial**.





# 1. INTRODUCTION

## 1.1. Epidemiology of malaria

Malaria remains a major public health problem in Cameroon. The country has three main epidemiological zones, linked to geo-climatic variations: The sudano-sahelian zone (areas of the Far North and North regions), the large savanna area of interior plateau (Adamawa region) and the large equatorial forest of the south (the remaining 7 regions of the southern part of the country). The existing climatic conditions are favorable for the development of the malaria vectors and the parasites. *Plasmodium falciparum* is the most common species plasmodium (95%), followed by *P. malariae* and *P. oval.*

In 2012, malaria was responsible for 31% of all cases of consultations and 46% of all hospitalizations and is responsible for 19% of all deaths occurring within the health facilities in the country. Approximately, 40% of deaths in children less than 5 years old are due to malaria (Rapport 2012 du PNLP).

The management of uncomplicated malaria in health facilities has improved in recent years thanks to the increased accessibility of ACTs. However, diagnosis and treatment of severe malaria still requires improvement.

## 2. OBJECTIVES OF THESE GUIDELINES

- This document seeks to review the following six (6) questions:
- How is malaria diagnosed?
- How is uncomplicated malaria differentiated from severe malaria?
- How is uncomplicated malaria treated?
- How is severe malaria treated?
- What are the different drugs to be administered and in what doses?
- What preventive measures should be recommended?

**Fever** is the most common symptom of malaria and the most reliable criterion in the diagnosis, treatment, and follow-up of malaria. About 80% of fever cases are first treated as malaria within the communities.

Parasitological diagnosis of malaria is based on the identification of plasmodium using a rapid diagnostic test (RDT) or a microscope either on a blood film and/or a thick blood smear.

Malaria RDTs detect specific antigens (proteins) produced by malaria parasites. These antigens are thus present in blood of infected persons, whether the person is symptomatic or not. Good quality microscopy is the diagnostic test of reference for malaria, when a well-trained laboratory technician and well equipped laboratory are available. RDTs are another acceptable diagnostic test and are easier and much quicker to perform and have good sensitivity and specificity.





**H 4 to H 12**: Glucose 5 % or 10% only (+ electrolytes);
**H 12 to H 16**: 8.3 mg/kg of quinine base in 5 % or 10% glucose (+ electrolytes);
**H 16 to H 24:** Glucose 5 % or 10% only (+ electrolytes).

**Maintenance treatment:** From day 2 right to the day that the patient can take oral treatment.

**H 0 to H 4**: 10 mg / kg of quinine in 5 % or 10% glucose (+ electrolytes) without exceeding 600mg of quinine;
**H 4 to H 12**: Glucose 5 % or 10% only (+ electrolytes);
**H 12 to H 16**: 10 mg / kg of quinine salt in 5 % or 10% glucose (+ electrolytes) without exceeding 600mg of quinine;
**H 16 to H 24**: Glucose (+ electrolytes).

***Regimen 2***

**No loading dose**

**Day 1:**

**H 0 to H 4:** 8 mg/kg of quinine base in 5% or 10% glucose + electrolytes;
**H 4 to H 8:** glucose 5% or 10 % only (+ electrolytes);
**H 8 to H 12**: 8 mg/kg of quinine base in 5% or 10% glucose + electrolytes;
**H 12 to H 16:** glucose 5% or 10 % only (+ electrolytes);
**H 16 to H 20:** 8 mg/kg of quinine base in 5% or 10% glucose + electrolytes;
**H 20 to H 24:** glucose 5% or 10 % only (+ electrolytes);

| | | | |
|---|---|---|---|
| 31 to 35 | 10 to 11 years | 5.3 ml | 2.65 ml |
| 36 to 40 | 11 to 13 years | 6 ml | 3 ml |
| 41 to 45 | 13 to 14 years | 7 ml | 3.5 ml |
| 46 to 50 | 14 to 15 years | 8 ml | 4 ml |
| 51 to 55 | 15 to 16 years | 8.5 ml | 4.25 ml |
| 56 and above | ≥ 16 | 10 ml | 5 ml |

**If there is a weighing machine available, it is preferable to use the body weight which is more specific, and not the age.*
***The small doses of the artemether should be measured with a 1 ml syringe (vaccination or insulin syringe).*

## Appendix 6: DETAILED QUININE ADMINISTRATION REGIMEN

### INTRAVENOUS ROUTE (INFUSION)

Intravenous (infusion) administration of quinine has to follow the following regimens:

***Regimen 1:***

**Loading Dose:**

**H 0 to H 4:** 16.6mg/ kg of quinine base in 5% or 10% glucose (+ electrolytes) without exceeding 1G of quinine base.





RDTs are available in all health facilities through the regional drug supply units (CAPRs). Only in the absence of an RDT or a laboratory should treatment be initiated without diagnosis first, however, this must be predicated by a systematic exploration for other causes of fever.

Healthcare personnel are confronted with cases of malaria at different stages of severity. It is up to them to order an urgent treatment procedure if the malaria case is considered severe and to refer complicated cases to an appropriate level of care as soon as possible and under the best possible conditions.

Prevention is an indispensable stage in the management of malaria.

## 3. HOW IS MALARIA DIAGNOSED?

Fever or a history of fever is the most common symptom of malaria. It can be reported by the patient or the parents/caregivers of a child (even if the temperature is normal at the time of examination) or ascertained by taking the temperature (higher or equal to 37°C under the armpit or 37.5°C rectally).

It should be noted that the cause of fever should be sought thorough clinical examination, followed by a parasitological test for malaria. All fever cases should be tested parasitologically for malaria, even if the fever is thought to be from another cause.

Table 1 presents the most frequent causes of fever that should be ascertained during collection of the patient history with the patient or his/her family and by a simple test:

**Table I: Signs and symptoms of the causes of fever to be sought at first contact with a febrile patient**

| SIGNS AND SYMPTOMS | THINK OF : |
|---|---|
| Stiff neck<br>Bulging fontanel (young infant) | **MENINGITIS*** |
| Runny nostrils<br>Cough | **COMMON COLD*** |
| Cough,<br>Fast breathing<br>Chest in-drawing (sub-costal, intercostal…) | **PNEUMONIA*** |
| Spontaneous pain in the ear<br>Pain with pressure on the tragus<br>Discharging ear | **OTITIS*** |
| Pain in the throat<br>Red inflamed throat with or without whitish spots<br>Painful cervical lymph nodes | **TONSILLITIS (sore throat)*** |
| Colicky pains, Diarrhoea (bloody or not)<br>Vomiting | **GASTRO-ENTERITIS** |
| Prolonged fever not responding to appropriate antimalarial treatment.<br>Dissociation between the pulse rate and temperature | **TYPHOID FEVER‡** |
| Abdominal pains<br>Pains (burns) on micturition, Turbid urine | **URINARY INFECTION*** |
| Many cases in the neighbourhood<br>Characteristic skin rash | **n pox) etc.…** |
| Bilateral or unilateral swelling behind the jaw | **MUMPS** |
| Functional impotence, local inflammation of a | **OSTEO-ARTHRITIS** |





| | | | |
|---|---|---|---|
| **51 to 55** | **15 to 16 years** | 4.25 ml | 2.12 ml |
| **56 and above** | **≥ 16** | 5 ml | 2.5 ml |

**If there is a weighing machine available, it is preferable to use the body weight which is more specific, and not the age.*
***The artemether should be measured with a 1 ml syringe (vaccination or insulin syringe).*

## Appendix 5: ARTEMETHER 20MG/ml
1 vial of 1ml = 20 mg

| Weight of patient (Kg) | AGE * | 1ST DAY: IN TWO DOSES | 2ND TO 7TH DAY: IN ONE DOSE |
|---|---|---|---|
| 3 to 4 | 1 – 2 months | 0.64 ml | 0.28ml |
| 5 to 7 | 3 – 6 months | 1 ml | 0.5 ml |
| 8 to 10 | 7 – 11 months | 1.5 ml | 0.72 ml |
| 11 to 15 | 1 to 3 years | 2 ml | 1 ml |
| 16 to 20 | 4 – 6 years | 3 ml | 1.5 ml |
| 21 to 25 | 7 to 8 years | 4 ml | 2 ml |
| 26 to 30 | 9 to 10 years | 4.5 ml | 2.25 ml |

***The artemether should be measured with a 1 ml syringe (vaccination or insulin syringe).*

## Appendix 4: ARTEMETHER 40mg/ml
1 vial of 1ml = 40 mg

| Weight of patient (Kg) | AGE * | 1ST DAY: IN TWO DOSES | 2ND TO 7TH DAY: IN ONE DOSE |
|---|---|---|---|
| 3 to 4 | 1 – 2 months | 0.28ml | 0.14 ml |
| 5 to 7 | 3 – 6 months | 0.5 ml | 0.24 ml |
| 8 to 10 | 7 – 11 months | 0.72 ml | 0.36 ml |
| 11 to 15 | 1 to 3 years | 1 ml | 0.5 ml |
| 16 to 20 | 4 – 6 years | 1.5 ml | 0.72 ml |
| 21 to 25 | 7 to 8 years | 2 ml | 1 ml |
| 26 to 30 | 9 to 10 years | 2.25 ml | 1.12 ml |
| 31 to 35 | 10 to 11 years | 2.65 ml | 1.32 ml |
| 36 to 40 | 11 to 13 years | 3 ml | 1.52 ml |
| 41 to 45 | 13 to 14 years | 3.5 ml | 1.72 ml |
| 46 to 50 | 14 to 15 years | 4 ml | 2 ml |





| | |
|---|---|
| limp | |
| Fever resistant to appropriate treatment<br>Altered general physical state | **SEPTICAEMIA** |
| Icterus (jaundice), Enlarged spleen<br>Right hypochochondrial pain | **HEPATITIS** |

* *Refer to the appropriate algorithms*

***If any of the above diseases is diagnosed, it should be treated appropriately while keeping in mind that the patient could always still be coninfected with malaria.***

***Therefore in all cases of fever, malaria should be suspected and a confirmatory test (rdt or microscopy) performed.***

***If the test is negative, look for another cause of the fever and if found treat it appropriately.***

***If the test is positive, grade the case as either uncomplicated or severe malaria***

For management of fever, see algorithms on pages 13 and 14.

## WHAT IS UNCOMPLICATED MALARIA?

In uncomplicated malaria, the patient does not present any signs of severity. In addition to fever, the uncomplicated malaria may present with the following main symptoms:

- Chills / shivering
- Headache
- Body aches
- Joint pain
- Abdominal pain in the child

- Digestive disorders (loss of appetite, diarrhea, nausea, vomiting).

### WHAT IS SEVERE MALARIA?

In severe malaria, the patient presents with one or more signs of severity (table 2, page 11).

## 4. HOW TO RECOGNIZE SEVERE MALARIA

Once malaria has been diagnosed, the presence of one or more of the following symptoms indicates a severe case.

### Table II: Signs of severe malaria

**CONSCIOUSNESS DISORDERS** (Irritability, confusion, delirium, obnubilation, drowsiness, coma).

**CONVULSION CRISES**

**ACUTE RESPIRATORY DISTRESS** (superficial breathing, rapid breathing, chest in drawing ...).

**REPEATED VOMITING** (Hindering oral treatment).

**DEHYDRATION** ( Thirsty, dry lips, sunken eyes, depressed fontanel, persistent abdominal skin pinch, absence of tears in children).

**SEVERE ANAEMIA** (pallor of the palms, plantar and conjunctiva, haemoglobin level < 5g/dl or Haematocrit<15%).

**HYPOGLYCAEMIA < 40 mg/dl or 2.2 mmol/l.**

**ICTERUS** ( Jaundice).

**ABNORMAL BLEEDING (at injection site, nose bleeding or bleeding of the gum, etc.).**





## APPENDIX 3: ARTEMETHER 80mg/ml
1 vial of 1ml = 80 mg

| Weight of patient (Kg) | AGE * | 1ST DAY: IN TWO DOSES (3.2MG/KG) | 2ND TO 7TH DAY: IN ONE DOSE (1.6 MG/KG) |
|---|---|---|---|
| 3 to 4 | 1 – 2 months | 0.14ml | 0.07 ml |
| 5 to 7 | 3 – 6 months | 0.24 ml | 0.12 ml |
| 8 to 10 | 7 – 11 months | 0.36 ml | 0.18 ml |
| 11 to 15 | 1 to 3 years | 0.5 ml | 0.25 ml |
| 16 to 20 | 4 – 6 years | 0.72 ml | 0.36 ml |
| 21 to 25 | 7 to 8 years | 1 ml | 0.5 ml |
| 26 to 30 | 9 to 10 years | 1.12 ml | 0.55 ml |
| 31 to 35 | 10 to 11 years | 1.32 ml | 0.65 ml |
| 36 to 40 | 11 to 13 years | 1.52 ml | 0.75 ml |
| 41 to 45 | 13 to 14 years | 1.72 ml | 0.85 ml |
| 46 to 50 | 14 to 15 ears | 2 ml | 1 ml |
| 51 to 55 | 15 to 16 years | 2.12 ml | 1.06 ml |
| 56 and above | ≥ 16 | 2.5 ml | 1.2 ml |

**If there is a weighing machine available, it is preferable to use the body weight which is more specific, and not the age.*

## Appendix 2: CLASSIFICATION OF THE MAIN ANTIMALARIALS

| SCHIZONTICIDES |
|---|
| **NATURAL ANTIMALARIALS**<br><br>Cinchona alkaloids: Quinine, Quinidine, Cinchonine<br>Qinghaosu (Artemisia) derivatives : Artemether, Artesunate |
| **SYNTHETIC ANTIMALARIALS**<br><br>Amino-4-quinolines: Chloroquine, Amodiaquine, Amopyroquine<br>Aryl-Amino-alcohols : Mefloquine, Halofantrin<br>Antifolics and Antifolinics : Sulfonamides, Sulfones, Pyrimethamine, Proguanil and Chlorproguanil, Atovaquone<br>Antibiotics and others : Cyclines, Macrolides, Fluoroquinolones, Hydroxynaphtoquinones |
| **GAMETOCIDES** |
| Amino-8-quinolines : Primaquine, tafenoquine |





**BLACK URINE or « COCA-COLA URINE »** (massive Haemoglobinuria),

**EXTREME FATIGUE** ( The patient is unable to sit up or stand up),

**ABSENT OR RARE URINE** (Acute kidney failure),

**CLINICAL ACIDOSIS** (Deep and ample respiration),

**HIGH TEMPERATURE** > 40°C (rectal) or 39.5°C (axillary),

**SHOCK** ( low blood pressure, rapid and thready pulse and cold extremities),

**Biological signs of severe malaria**

- **Hypoclycaemia** (Glycaemia <40mg/dl or glycaemia <2.2mmol/l);
- **Metabolic acidosis** (Serum bicarbonates <15mmol/l);
- **Severe anaemia** (Hb<5g/dl or Hematocrite <15%);
- **Haemoglubinuria**;
- **Hyperparasitaemia** (parasitaemia>5% of red blood cells or >250,000/µl);
- **Serum lactate** (lactate >5mmol/l);
- **Kidney failure** (serum creatinine >265µmol/l).

***Any patient with any of the symptoms of severe malaria should be immediately administered an initial dose of injectable artesunate. Alternatively, injectable quinine or injectable artemether can be administered and if necessary the patient should be referred to a higher level of care as soon as possible.***

***IN PREGNANCY: All confirmed cases of malaria (with RDT or microscopy) in a pregnant woman should be considered as severe malaria.***

***NEW SUBJECTS COMING INTO A MALARIA ENDEMIC ZONE: All new subjects coming into a malaria endemic zone with confirmed malaria and symptoms of sever malaria should be treated as such, otherwise treat as uncomplicated malaria.***

## 5. ALGORITHM FOR MALARIA CASE MANAGEMENT IN A HEALTH FACILITY FROM A "FEVER" SYMPTOM

1. **Fever may be present (temperature equal to or above 37.5°C rectally or 37°C axillary)** when the patient is examined or revealed during the patient history. Fever can also be ascertained by a warm body to touch.

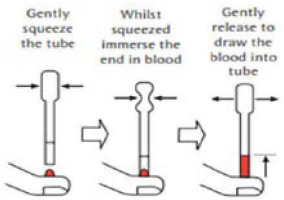
2. **Look for signs of severe malaria.**

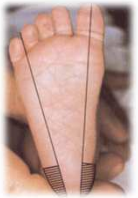
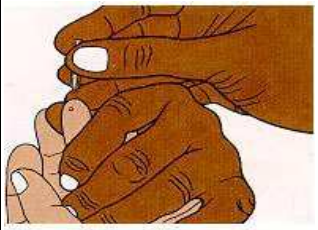
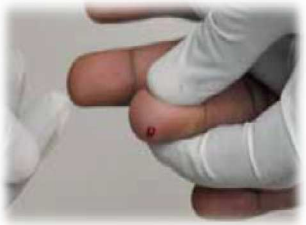
2.1. In case of one or more signs of severe malaria

- At the Health Centre: Perform an RDT or microscopy.
  - If test is positive, administer first dose of injectable artesunate, preferably intravenously, otherwise intramuscularly. Alternatively, administer injectable quinine or injectable artemether then refer immediately.
  - If test is negative, observe algorithm of IMCI – PCIME or refer immediately.
- In the Hospital: Perform an RDT or microscopy
  - In case the test is positive, administer injectable artesunate, preferably intravenously, otherwise intramuscularly. Alternatively, administer injectable quinine or injectable artemether.
  - If both tests are negative, look for another cause of the fever and treat accordingly. In case of doubt, repeat test, preferably during a fever peak.





| | | |
|---|---|---|
| **Step 7** | Take a sample pipette provided, and while gently squeezing the tube, immerse the open end in the blood drop and then gently release the pressure to draw blood into the sample pipette up to the black line.<br><br>**NB**: ***Never set the lancet down before discarding it.***<br>***Never discard the lancet in a non-sharps container.***<br>***Never use a lancet on more than one person.*** |  |
| **Step 8 Test procedure** | Hold the RDT flat on the table top with one hand. With your other hand, carefully add (5µl) of whole blood from the pipette into the Sample well (small well).<br>Discard the pipette in the sharps container.<br>Add two drops of assay buffer into the buffer well. Hold buffer vertically.<br>Check the time or begin a stop watch. Read the test result in 20 min. Do not read the test before or after the 20 minutes. You may get false results. | |

| | | |
|---|---|---|
| | For infants < 5 kg prick the heel<br>For infants 5-10 kg prick the big toe<br>For children > 10 kg prick the finger. |  |
| **Step 6 (a)** | Squeeze the tip of the finger with your own fingers and prick the outside of the fleshy part. This is less painful than pricking in the middle or at the tip. Prick once hard enough so that a drop of blood quickly appears on the skin. |  |
| **Step 6 (b)** | Discard the lancet in the sharps box immediately after pricking finger.<br>Wipe away the first drop of blood with sterile gauze or cotton. Apply gentle pressure to the finger until a new blood drop appears. |  |





2.2. If there is no sign of severe malaria, do an RDT or microscopy.

- If test is positive, treat as uncomplicated malaria with ASAQ or AL, and look for any other cause of fever and treat accordingly.
- If test is negative, look for other causes of fever and treat accordingly. When in doubt or with temperature spikes, repeat the test.

**NB: Never treat for malaria when the malaria test is negative.**

3. **Re-evaluate patient at least 48 hours** later, or if patient's condition worsens.

4. **In case of improvement,** continue treatment to completion.

5. **In case of persistence of fever or recurrence 48 hours after initial treatment,**
   **-** Re-evaluate the patient and look for signs of severe malaria;
   **-** Hospitalize or refer to a higher facility if necessary;
   **-** Re-perform RDT (pLDH) or microscopy.

5.1. - If test is positive, inquire about current treatment (how effective is current treatment; dose, quality of medication, duration of treatment etc?),

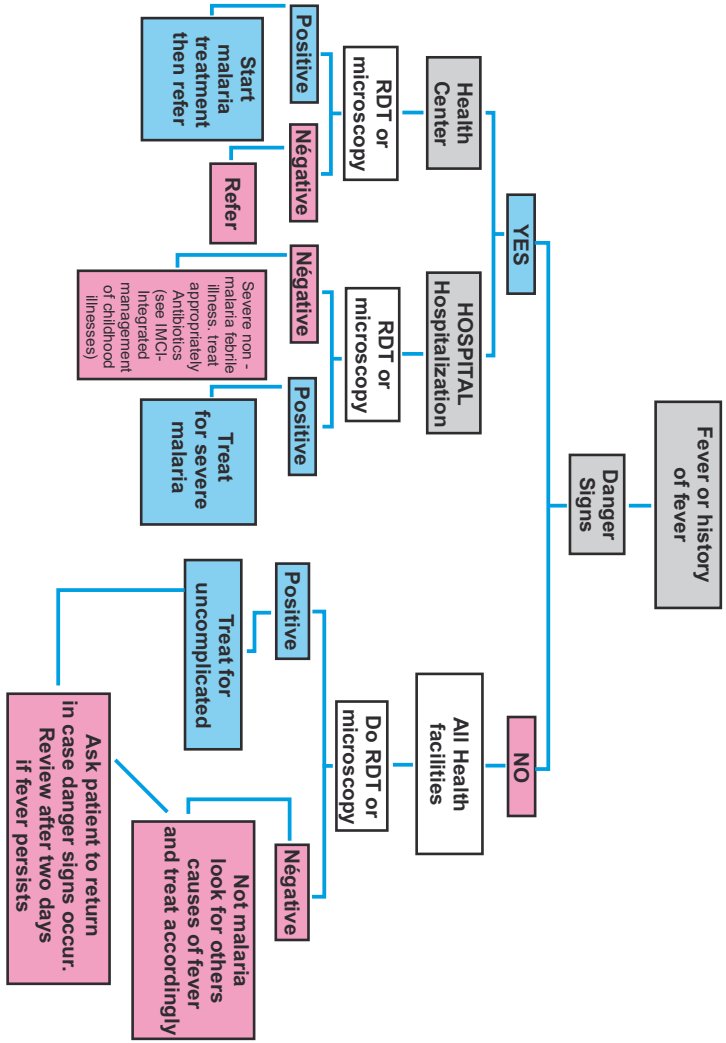
- If treatment is poorly administered, re-administer in correct dosage (ACT for uncomplicated malaria and injectable artesunate / quinine / artemether for severe malaria),

- If treatment is correctly administered, re-perform the test using microscopy. For patients that have initiated antimalarial treatment, an RDT can appear as a false positive. These patients should only be diagnosed using microscopy.

5.2. If test is negative, look for cause of fever and treat accordingly, otherwise refer patient if necessary.

## 6. ALGORITHM FOR MALARIA CASE MANAGEMENT

### 6.1. First visit








| | | |
|---|---|---|
| | *the RDT may give a false result*).<br>Write the patient's name and or OPD number on the cassette. *(Pencil works best for writing on the RDT)* | |
| **Step 5 Specimen collection using a lancet** | Open the alcohol swab.<br>Ask if the patient is right-handed or left-handed (What is this result?<br>If right-handed, use the left hand).<br>With the palm upwards; select the fourth finger (ring) preferably, or the fifth finger,<br>Clean with an alcohol swab and allow it to dry.<br><br>***NB: The thumb or index finger should not be used. The fourth finger is chosen because it is the least used finger and will cause the least inconvenience to the patient).*** |  |

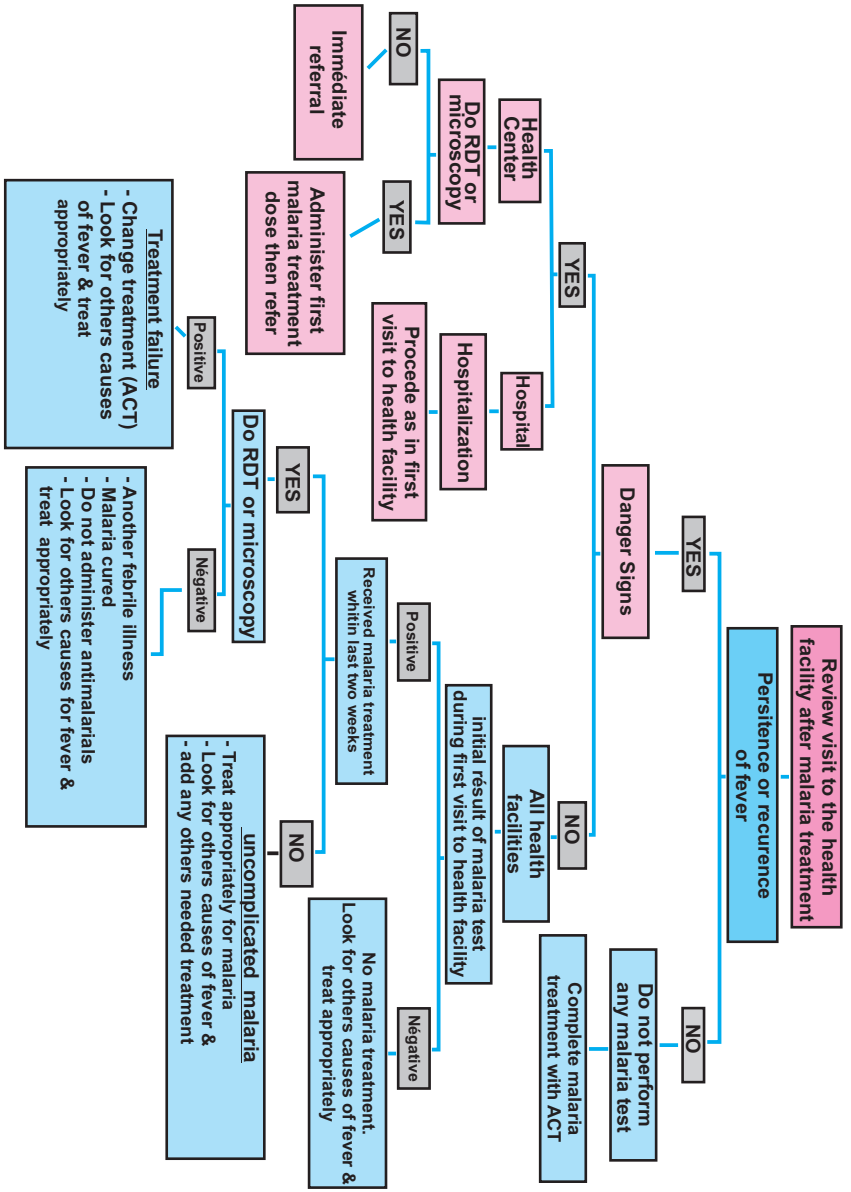
## Appendix 1: HOW TO TEST FOR MALARIA WITH A RAPID DIAGNOSTIC TEST

| | |
|---|---|
| **Step 1** Organize your workspace. | Preferably this should be a designated, well lit space, with a washable surface (can be plastic table cloth) with sufficient space to place all test kit components, sharps box and non-sharps waste bin and registry book. |
| **Step 2** Ensure you have the following materials before you begin the test: | NEW unopened cassette test packet<br>NEW pipette<br>NEW unopened alcohol swab<br>NEW unopened lancet<br>NEW pair of disposable gloves<br>Buffer<br>Timer or clock<br>Sharps container<br>Non-sharps waste container |
| **Step 3** Review the instructions in the box, or national RDT SOP | Prior to performing the test to ensure you are familiar with the instructions.<br>Explain to the patient what the test is for and the procedure.<br>Check expiration date on the packet. An expired RDT may give a false result. |
| **Step 4** Puton gloves | Put on a pair of gloves (***Use a new pair for each patient***).<br>Open the packet and remove the test cassette. (***Note***: *Do not open an RDT packet until you are ready to use it for a patient. If a packet has been open for some time before the RDT is used,* |





## 6.2. NEXT VISIT



# 7. HOW TO TREAT UNCOMPLICATED MALARIA

## 7.1. Treatment of uncomplicated malaria in the general population

The treatment of uncomplicated malaria consists of the use of a combination of two antimalarial medicines one of which is always an artemisinine derivative. In Cameroon, the two combinations retained are: amodiaquine + artesunate (AS-AQ) and artemether + lumefantrine (AL). These combinations are known by the name ACT (Artemisinine-based Combination Therapy). They are administered by the oral route with an antipyretic.

### 7.1.1. Antimalarial medicines:

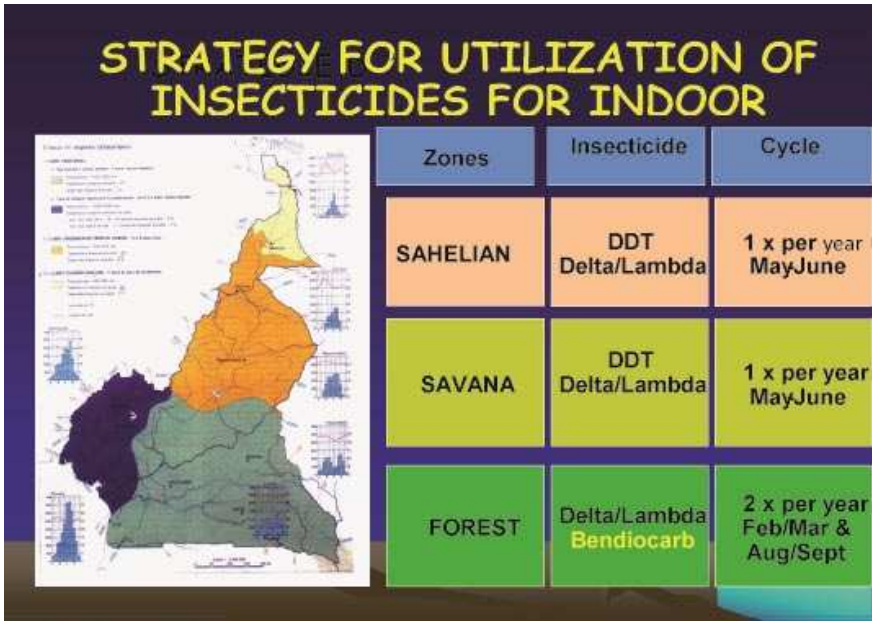
#### 7.1.1.1. The Amodiaquine + Artesunate Combination

The fixed dose combination is the only recommended formulation in Cameroon. It should be administered as a daily single dose for 3 consecutive days. **It should be taken with food** to encourage tolerance. The paediatric formulations are breakable or dispersible.
There are four presentations of the fixed combination:

A blister of 3 tablets, each containing 25mg of artesunate + 67, 5mg of amodiaquine
A blister of 3 tablets, each containing 50mg of artesunate + 135mg of amodiaquine
A blister of 3 tablets, each containing 100mg of artesunate + 270mg of amodiaquine,
A blister of 6 tablets, each containing 100mg of artesunate + 270mg of amodiaquine.








In Cameroon, the insecticide treated bed nets are distributed free of charge to the entire population during mass distribution campaigns and to pregnant women during antenatal consultations (ANC)

against the vectors of disease. It aims at reducing malaria-related morbidity and mortality by preventing transmission. Vector control involves individual and collective protective measures.

1. **Individual protective measures**

   There are many individual protective measures but that which has a high cost-effective ratio is the long lasting insecticide treated bed net (LLIN). An LLIN is a special net that is treated with an insecticide that kills and repels mosquitoes without danger to man.

   For the bed net to give optimal protection, it must follow certain conditions:

   - It should not be perforated;
   - It should be properly tucked around the bed at bedtime.
   - It should withstand washing with simple laundry soap for a maximum of 20 times without losing its insecticidal properties.
   - It should be slept under every night.

2. **Collective protective measures**

   Among these measures which include environmental management, using wire screens on windows and doors, treatment of curtains, in-door residual spraying, larviciding…), in-door residual spraying (IRS) is the method that has a direct impact on the reduction of the transmission of malaria. The insecticides used during IRS and the spraying cycle vary in function of the epidemiological facies.





**Table III:** *Dosage of fixed dose combination AS-AQ according to age and body weight*

| Weight of patient (Kg) | AGE | PRESENTATION | Day 1 | Day 2 | Day 3 |
|---|---|---|---|---|---|
| ≥4,5 à <9 | 2 – 11 months | Artesunate + amodiaquine 25mg/67,5mg blister of 3 tablets | ⊕ | ⊕ | ⊕ |
| ≥9 à <18 | 1 – 5 years | Artesunate + amodiaquine 50mg/135mg blister of 3 tablets | ⊕ | ⊕ | ⊕ |
| ≥18 à < 36 | 6 – 13 years | Artesunate + amodiaquine 100mg/270mg blister of 3 tablets | ⊕ | ⊕ | ⊕ |
| ≥ 36 | 14 years and above | Artesunate + amodiaquine 100mg/270mg blister of 6 tablets | ⊕ ⊕ | ⊕ ⊕ | ⊕ ⊕ |

#### 7.1.1.2. The Artemether + Lumefantrine (AL) Combination

**The tablet form is the only form recommended for use and distributed in Cameroon.**

This is a fixed combination with each tablet containing 20mg of artemether and 120mg of lumefantrine. The maximum daily dose must not exceed 8 tablets per day in an adult.

The paediatric tablets are breakable and dispersible.

AL should be taken with a lipid rich diet.

**Dosage:**

**Artemether:** 4mg/kg per day in 2 administrations for 3 days.
**Lumefantrine:** 24 mg/kg per day in 2 administrations for 3 days.

**Table IV:** *Dosage AL fixed dose combination according to age and body weight.*

| Weight of Patient (Kg) | AGE | ► DOSE OF ARTEMETHER – LUMEFANTRINE 20MG/120MG | | | | | |
|---|---|---|---|---|---|---|---|
| | | Day 1 : two doses | | Day 2 : two doses | | Day 3 : two doses | |
| | | H0 (Immediately) | H8 (8 hours later) | Morning | Evening | Morning | Evening |
| Less than 5 Kg | | ¾ tablet | ¾ tablet | ¾ table | ¾ tablet | ¾ tablet | ¾ tablet |
| 5 to < 15 | 1 month – 2 years | ⊕ | ⊕ | ⊕ | ⊕ | ⊕ | ⊕ |
| 15 to < 25 | 3 – 8 years | ⊕ ⊕ | ⊕ ⊕ | ⊕ ⊕ | ⊕ ⊕ | ⊕ ⊕ | ⊕ ⊕ |
| 25 to < 35 | 9 – 11 years | ⊕ ⊕ ⊕ | ⊕ ⊕ ⊕ | ⊕ ⊕ ⊕ | ⊕ ⊕ ⊕ | ⊕ ⊕ ⊕ | ⊕ ⊕ ⊕ |
| 35 and above | >11 years | ⊕ ⊕ ⊕ ⊕ | ⊕ ⊕ ⊕ ⊕ | ⊕ ⊕ ⊕ ⊕ | ⊕ ⊕ ⊕ ⊕ | ⊕ ⊕ ⊕ ⊕ | ⊕ ⊕ ⊕ ⊕ |





during the stay and for 4 weeks after returning from a malaria endemic area.

**NOTE: This medicine is contraindicated in infants less than one year and weighing less than 11Kg.**

Due to the unavailability of the syrup or contraindication of certain medications in infants, erythromycin (50 mg / kg / day) could be used. This should be taken throughout during the stay in a malaria endemic area and for 4 weeks after return.

**In adults**

- Atovaquone - proguanil 250 mg (Malarone)
- 1 tablet per day,

Started the day before or the day of departure.
Taken throughout during the whole stay and continued for 4 weeks after return.

- Doxycycline (doxycycline monohydrate) 100mg daily in patients over 40Kg and 50mg per day for patients less than 40Kg body weight, starting the day before departure. It should be taken during the whole stay and for 4 weeks after return from a malaria endemic area.
Doxycycline is contraindicated in children less than 8 years.

***N.B : Malarone and doxycycline are contraindicated in pregnancy.***

## 10.2. SELECTIVE VECTOR CONTROL

**Definition:** Selective vector control is the application of targeted and efficient control methods, adapted to each site

- Elements of pharmacovigilance should be introduced in the monitoring and evaluation process at all levels.

## 10.1.2. CHEMOPROPHYLAXIS IN CHILDREN AGED 03 TO 59 MONTHS AND NEW SUBJECTS

### *10.1.2.1. Chemoprevention in children aged 03 to 59 months*

***For children aged 03 to 12 months***

- Sulfadoxine-pyrimethamine + Amodiaquine (SP+ AQ 250/12,5mg + 75 mg)

  Day 1 : 1 tablet of SP and 1 tablet of AQ,
  Day 2 : 1 tablet of AQ,
  Day 3 : 1 tablet of AQ.

***For children aged 13 to 59 months***

- Sulfadoxine-pyrimethamine + Amodiaquine (SP+ AQ 500/25mg + 153 mg)

  Day 1 : 1 tablet of SP and 1 tablet of AQ,
  Day 2 : 1 tablet of AQ,
  Day 3 : 1 tablet of AQ.

### *10.1.2.2. Chemoprophylaxis in new subjects*

***In children***

- Atovaquone - proguanil 250 mg (Malarone)
  - 1 to 4 years: 1/4 tablet per day,
  - 5 to 10 years: ½ tablet per day,
  - 10 years and above: 1 tablet per day.

  Start treatment the day before or the travelling day.
  Prophylactic treatment should be taken throughout





## 7.1.2. Antipyretics / analgesics

Indication: - Temperature ≥ 38.5ºC or pain
The following medications are recommended for the symptomatic treatment of fever and pain, particularly in children less than 5 years.

**7.1.2.1. Paracetamol (oral or rectal)**

60 mg/kg in 4 divided doses (6 hourly), maximum dose of 3g/day in adults.

**7.1.2.2. Acetyl-salicylic acid (oral)**

50 mg/kg /day in 4 divided doses (six hourly), maximum dose of 3g/day in adults.

**7.1.2.3. Ibuprofene (Oral)**

25 g/kg per day in 4 doses (6 hourly); maximum dose of 1.5g/day in adults.

**Dosage of Paracetamol**

**a. Tablets of 100mg**

The recommended dose for children is the 100mg tablet.

Dosage is according to age and body weight.
If a scale balance is available, it is preferable to use body weight in dose calculation than age.

**Table V:** *Dosage of 100mg paracetamol*

| Weight of Patient (Kg) | AGE | DOSE OF PARACETAMOL 100MG | | |
|---|---|---|---|---|
| | | Day 1 : in 4 doses | Day 2 : in 4 doses | Day 3 : in 4 doses |
| 3 - 4 | 1 – 2 months | | | |
| 5 - 7 | 3 – 6 months | | | |
| 8 - 10 | 7 – 11 months | | | |
| 11 - 15 | 1 – 3 years | | | |
| 16 - 20 | 4 – 6 years | | | |





Follow up and implementation committees need to establish a team whose role will be to develop a proper communication strategy based on findings of a situation analysis. The most appropriate tools and techniques of communication should be used.

Target groups are pregnant women, health workers, administrative, religious, political and traditional leaders, members of dialogue structures, traditional birth attendants, traditional healers etc.

## x. Supervision, monitoring and evaluation

### a. Data Collection

Routine data collection registers for antenatal clinics and laboratories will be adapted to allow the monitoring and evaluation of these guidelines. Implementation of guidelines will be supervised, monitored, and evaluated by the monitoring committees at various levels of the health pyramid. Coordination will be primarily by the Central technical group / National Roll Back Malaria Committee and Family Health Unit of the Ministry of Health. .

Timely evaluation surveys will be conducted to give an overview of the situation.

### b. Institution of a pharmacovigilance system

- Forms for data collection of adverse reactions to SP should be provided to managers of ANC clinics.
- These health care providers should be trained to fill these reporting forms.

### vi. What to do in case of contraindication to SP

In cases of contraindications to SP, the alternative is the association chloroquine-proguanil (Savarine ®) at a daily dose of one tablet from the second trimester to term. The cost of this medication is however an important limitation, the risk of an allergy should also be considered. In extreme cases, we may use the amodiaquine curative dose (35mg/kg spread over 03 days) once every trimester as from the second trimester. Remember that this molecule is poorly tolerated.

### vii. Advice to the pregnant woman

This should focus on the following:
- The benefits of effective IPT;
- Possible side effects of treatment;
- The need for the use of insecticide-treated nets;
- The importance of antenatal consultations.

### viii. Procurement and stock management of SP

Management of SP stocks is integrated into the existing essential medicines distribution system of CENAME. Stock supplies to health facilities are made by CENAME through the regional essential drug units, under the coordination of Central technical group / National Roll Back Malaria Committee. The SP is free of charge.

Pregnant women receive their dose of SP free of charge in the presence of the health personnel, irrespective of whether they have eaten or not.

### ix. Behaviour Change Communication (BCC)

The role of the community health workers is crucial for home visits because they guide pregnant women to health facilities for ANC.



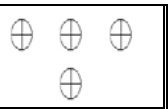
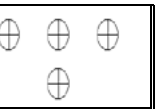
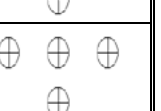
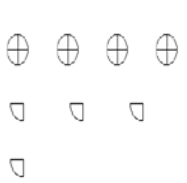
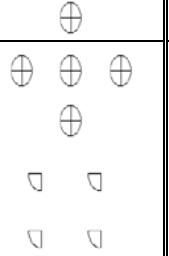
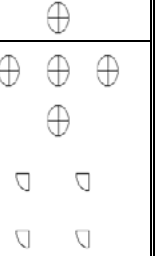
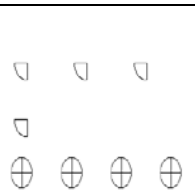
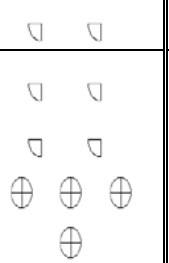
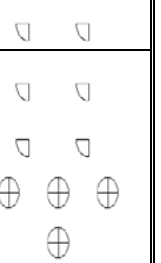
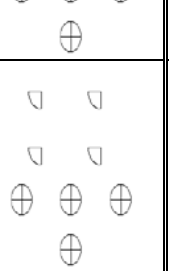
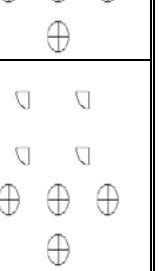
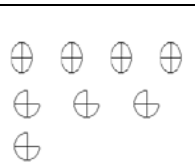
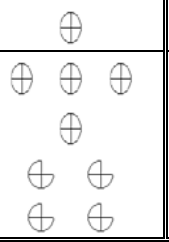
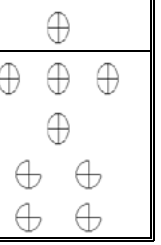


### b. Tablets of 500mg

The 500mg tablets is primarily indicated for adults. However in the absence of the 100mg tablets, the 500mg tablets can be used for children.

**Table VI:** *Dosage of 500mg paracetamol*

| Weight of Patient (Kg) | AGE | Day 1 : in 4 doses | Day 2 : in 4 doses | Day 3 : in 4 doses |
|---|---|---|---|---|
| 3 - 4 | 1 – 2 months | | | |
| 5 - 7 | 3 – 6 months | | | |
| 8 - 10 | 7 – 11 months | | | |
| 11 - 15 | 1 – 3 years | | | |
| 16 - 20 | 4 – 6 years | | | |
| 21 - 25 | 7 – 8 years | | | |
| 26 - 30 | 9 – 10 years | | | |

| | | | | |
|---|---|---|---|---|
| **31 - 35** | **10 – 11 years** |  |  |  |
| **36 - 40** | **11 – 13 years** |  |  |  |
| **41 - 45** | **13 – 14 years** |  |  |  |
| **46 - 50** | **14 – 15 years** |  |  |  |
| **51 - 55** | **15 – 16 years** |  |  |  |
| **56 and over** | **≥ 16 years** |  |  |  |

**Dosage of Acetyl Salicylic Acid**

**a. Tablets of 500mg**

Dosage is according to age and body weight. If a scale balance is available, it is preferable to use body weight in dose calculation than age.





**iii. Place and mode of utilization of IPT**

- It is recommended to administer the IPT under direct observation of the nursing staff (Directly Observed Therapy (DOT)).
- SP can be administered to a pregnant woman on an empty stomach or after meals.

**iv. Periodicity of treatment**

- To improve the coverage of IPT in pregnant women we need to ensure that every ANC opportunity is used to administer the IPT in the second trimester (ie, from the 16th week of pregnancy or from perception of the 1st fetal active movements). Note that in general, the first dose of IPT should be administered as soon as possible during the second trimester of pregnancy.
- A pregnant woman should take four IPT treatments.
- The interval between doses should be at least one month.
- The last dose of IPT can be administered even at the time of delivery.

**v. Precautions for use of IPT**

Administration of SP together with folic acid at doses greater than 5mg per day is not recommended. This is because folic acid reduces the effectiveness of the SP in the prevention of malaria. SP should not be administered to pregnant women receiving cotrimoxazole prophylaxis.

### iv. Contraindications

- First trimester pregnancy,
- Known allergy to sulphonamides,
- Severe liver disease,
- Renal failure,
- History allergic skin disease.

## C- How to administer IPT in health facilities

### i. Prerequisites

- Staff trained in IPT with SP,
- Constant availability of SP,
- Availability and need for drinking water (glass / cup),
- Pregnant woman informed and aware of the IPT with SP.

### ii. Effective commencement of IPT

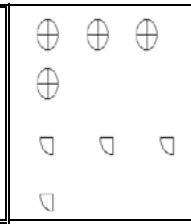
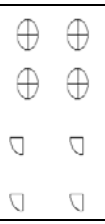
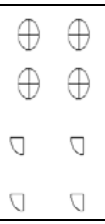
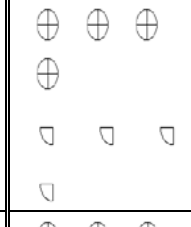
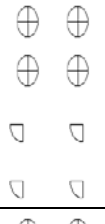
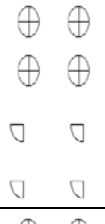
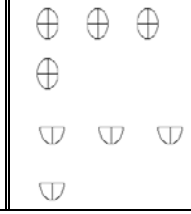
- As from the second trimester of pregnancy or at the first perception of fetal movement by pregnant women.
- It is recommended that every pregnant woman completes 4 ANC consultations.
- IPT is not given in the first trimester.
- From the 16th week of pregnancy (second trimester) or from the perception of the first fetal active movements by the pregnant woman, IPT should be administered at each ANC visit. In all cases, the interval between doses should be at least 1 month.





**Table VII:** *Dosage of 500mg Acetyl Salicylic Acid*

| Weight of Patient (Kg) | AGE | Day 1 : in 4 doses | Day 2 : in 4 doses | Day 3 : in 4 doses |
|---|---|---|---|---|
| 3 - 4 | 1 – 2 months | ◔ | ◔ | ◔ |
| 5 - 7 | 3 – 6 months | ◔ ◔ | ◔ ◔ | ◔ ◔ |
| 8 - 10 | 7 – 11 months | ◔ ◔ ◔ ◔ | ◔ ◔ ◔ ◔ | ◔ ◔ ◔ ◔ |
| 11 - 15 | 1 – 3 years | ◔ ◔ ◔ ◔ | ◔ ◔ ◔ ◔ | ◔ ◔ ◔ ◔ |
| 16 - 20 | 4 – 6 years | ◔ ◔ ◔ ◔ | ◔ ◔ ◔ ◔ | ◔ ◔ ◔ ◔ |
| 21 - 25 | 7 – 8 years | ◔ ◔ ◔ ◔ | ◔ ◔ ◔ ◔ | ◔ ◔ ◔ ◔ |
| 26 - 30 | 9 – 10 years | ◔ ◔ ◔ ◔ | ◔ ◔ ◔ ◔ | ◔ ◔ ◔ ◔ |
| 31 - 35 | 10 – 11 years | ◔ ◔ ◔ ◔ | ◔ ◔ ◔ ◔ | ◔ ◔ ◔ ◔ |
| 36 - 40 | 11 – 13 years | ◔ ◔ ◔ ◔ | ◔ ◔ ◔ ◔ | ◔ ◔ ◔ ◔ |
| 41 - 45 | 13 – 14 years | ◔ ◔ ◔ ◔ | ◔ ◔ ◔ ◔ | ◔ ◔ ◔ ◔ |

| | | | | |
|---|---|---|---|---|
| **46 - 50** | **14 – 15 years** |  |  |  |
| **51 - 55** | **15 – 16 years** |  |  |  |
| **56 and over** | **≥ 16 years** |  |  |  |

## 7.2. Treatment of malaria in particular populations

### 7.2.1. Pregnancy

- Fever in pregnancy should always be considered an emergency, and its management should always be done in a health facility.
- Malaria treatment: Treat as severe malaria if signs and symptoms of malaria are present.
- In case severe uterine contractions occur, administer tocolytics, according to stage of pregnancy. (1st trimester: Papaverine, diazepam. 2nd and 3rd trimester: Spasfon, Salbutamol or diazepam).
- Use paracetamol as anti-pyrexia.





retained as the drug for IPT of malaria in pregnancy. In the absence of any contraindications and for better efficiency, four doses of SP are recommended in all areas where HIV seroprevalence is greater than 10%. Administration of IPT should respect gestational age and the minimum interval between doses.

WHO recommends increasing access to IPT in all areas with moderate and high malaria transmission in Africa, as part of prenatal care and is composed of four ANC sessions for each pregnancy. To improve IPT coverage for pregnant women we will ensure that any opportunity for ANC is used to administer IPT to pregnant women as from the second trimester (i.e. from perception of 1st fetal movements).

**B- Sulfadoxine-Pyriméthamine**

**i. Active principle**

This is a fixed combination tablet containing 500 mg of sulfadoxine and 25 mg of pyrimethamine.

**ii. Dosage**

03 tablets administered as a single dose

**iii. Side effects**

- Gastrointestinal Disorders,
- Allergic skin reactions,
- Blood Disorder,
- Lyell Syndrome (burn like skin rash),
- Kidney affection with rare and unusual elevation of transaminases.

# 10. PREVENTION OF MALARIA

Malaria prevention has two components: chemoprevention and vector control.

## 10.1. CHEMOPREVENTION

Chemoprevention is the use of drugs as prophylaxis against malaria.
There are two aspects of chemoprevention:

- Intermittent Preventive Treatment (IPT) of pregnant women with with sulphadoxine-pyrimethamine.
- Chemoprevention for children aged 03 to 59 months (Seasonal Malaria Chemoprevention – SMC) and chemo prophylaxis for new subjects or travelers from non-endemic countries.

### 10.1.1. Intermittent preventive treatment of malaria in pregnancy (IPT)

**Generalities on Intermittent Preventive Treatment (IPT) of Malaria in Pregnancy**

**A- Definition**

Intermittent preventive treatment (IPT) of malaria in pregnancy involves the pregnant woman taking a periodic curative dose of an antimalarial from the second trimester of pregnancy, in order to prevent malaria infection.

After the withdrawal of chloroquine from the list of antimalarial drugs in Cameroon, sulfadoxine-pyrimethamine (SP) was





**7.2.2. Persons living with HIV**

- Persons living HIV and diagnosed with malaria should immediately receive an effective antimalarial medicine following the recommendations of the new malaria diagnosis and treatment guidelines.
- HIV positive pregnant women on antiretroviral (ARV) treatment (Efavirenz, Zidovudine) should not take ASAQ as this may worsen hepatotoxicity. In this case preferably use AL for treatment of malaria.

**7.2.3. Over weight persons**

- In order to avoid the risk of taking under dose, monitor treatment with microscopy.

**7.2.4. History of serious side effects from ASAQ**

In case of severe asthenia and other severe side effects, evaluate and eventually stop treatment and prefer AL.

**7.2.5. Malnourish children**

Prefer AL. In case of severe malaria, prefer injectable artesunate.

**PRACTICAL NOTES**

- *To ease taking the tablets orally, the tablet can be ground and mixed with sugar and a little bit of water;*
- *In addition to the antipyretics, it is advised to:*
  - *undress the child,*
  - *give him/her ample water to drink,*
  - *if the fever persists, bath the child with lukewarm water or do tepid sponging.*

*Ask that the patient be brought back if any signs of severity occur or if he/she does not improve after 48 hours.*

- *The malaria treatment algorithm, with the dosing instructions in accord with the national guidelines should be made available to all prescribers.*
- *Prescribers should follow the treatment and dosage guidelines validated in the national guidelines. Any exceptions should be justified and documented. Directors of hospitals, regional delegates of public health, as well as district medical officers are each expected to ensure health care providers adhere to the national guidelines.*

## Quality Assurance

Quality assurance should ensure that medications are properly managed. Expiry dates and good transport conditions should always adhered to.

- The supervision checklist includes quality control checks of stocks.
- Ensure that drug stock management tools exist and are well kept, medications are neatly arranged, and drugs are stored in temperatures according to manufacturer guidelines. FEFO (First Expiry First Out) should be used to avoid expiries.
- Health care providers should be wary of pharmacovigilance. Pharmacovigilance forms should be available to all health facilities.
- Pharmacovigilance should be integrated into national health information management system.





5mg/kg body weight IVD. In case of fever, undress patient and tepid sponge and administer antipyretics. Clear airways and avoid feeding.

***b. Look for and treat the cause of convulsion***

- Correct glycaemia,
- Correct fluid-electrolytic imbalance,
- Nursing care of coma…

# 9. HINTS ON CURATIVE TREATMENT OF MALARIA

- Malaria is a costly disease to the household and to society. The importance of an appropriate treatment cannot be overemphasized.
- The doses and treatment duration must be respected.
- Drugs must be procured from the health facility pharmacy or from the commercial pharmacy.
- Drugs must be kept away from sunlight, heat, and out of reach of children.
- If fever persists or any sign of severity appears, the patient must report back to the health facility as soon as possible.

of an increase in the heartbeat; the respiratory rate in search of dyspnoea; the colour and volume of urine in search of dark coloured (coca-cola) urine or diminished urine output; the state of consciousness in search of agitation, coma or convulsion);

- Blood transfusion should be immediately stopped on occurrence of skin eruptions, pruritus of chills. Redo blood grouping and cross match and replace the blood bag with an appropriate one;
- Check the level of haematocrit or haemoglobin at the end of transfusion.

After blood transfusion, it is recommended that the patient be given iron and folic acid supplements for at least 2 to 3 months.

**2. <u>Other anaemic patients not needing blood transfusion</u>**

They can be given iron and folic acid supplements (6 to 10mg/kg in two daily doses).

#### 8.2.3.3. Other treatments

##### *8.2.3.3.1. Management of convulsions*

Start with symptomatic treatment of convulsions, and then proceed by looking for the cause of convulsions.

***a. Symptomatic treatment of convulsion***

Injectable diazepam 0.5mg/kg intrarectally in a single dose to be repeated just once 10 min after if convulsion persists, after which aqueous phenobarbital injection 10mg/kg in a single dose. This can be administered again 24 hours later at





# 8. HOW TO TREAT SEVERE MALARIA

## 8.1. Treatment of severe malaria in the general population

After parasitological diagnosis, sever malaria should be diagnosed through one of the following ways:

- Existence of one or several signs of severe malaria;
- Worsening of condition of patient being treated for uncomplicated malaria.

**Severe malaria should be managed at an appropriate level of care. Refer the patient IF NECESSARY after the parenteral administration of an initial parenteral dose of artesunate, quinine, or artemether.**

Initial treatment should always be parenteral for at least 24 hours relayed by oral treatment as soon as the patient is able to eat and drink.

**Three types of treatment regimens exist:**

- Injectable artesunate as first line treatment,
- Injectable quinine,
- Injectable artemether.

### 8.1.1. First line treatment: Injectable artesunate

**Dosage:** 2.4mg/kg at 0.12 and 24 hours, followed by administration every 24 hours until the patient is able to take oral treatment (timing can then become less stringent for practical reasons).

**Route of administration:** Injectable artesunate is preferably administered intravenously (IV) otherwise it should be administered intramuscularly (IM).

### 8.1.2. Second line: Treatment with Quinine

**Regimen *1***: *(see details in appendices 6, 7, 8 and 9)*

This regimen entails a loading dose of quinine and is administered in two daily infusions:

**Loading Dose:** 16.6 mg/kg of quinine base (see appendix 8 for equivalents in quinine salts) in 5 % or 10% glucose with electrolytes (NaCl, KCl, Calcium gluconate), without exceeding 1 gram of quinine base, to be run in 4 hours.

**Maintenance Dose:** 12 hours after the onset of the loading dose, give 8.3 mg/kg of quinine base in 5 % or 10% glucose to be run in 4 hours every 12 hours without exceeding 500mg of quinine per dose.

**If the patient is pregnant, if he/she had taken quinine within the previous 24 hours, Mefloquine within the 7 previous days, or is a cardiac patient do not administer the loading dose. Quinine will be given at the dose of 8.3 mg/kg of quinine base every 12 hours.**

**Regimen 2 :**

This regimen has no loading dose. Treatment is given in three infusions per day:

**Quinine base:** 8.3 mg /kg/ of quinine base in four-hour infusions, every 8 hours

- maximum Dose: 1,5 g/day of quinine base

**In case the patient has received quinine in the preceding 24 hours, mefloquine in the preceding 7 days or if the patient has a cardiac disease, no loading dose should be**





#### *8.2.3.2. Treatment of anaemia*

When faced with malaria-related anaemia, it is necessary to distinguish patients who need transfusion from the others.

**1. Patients who need transfusion**

***Indications for transfusion:***

- Haematocrit < 15% in children or <20% in adults of pregnant women
- Haemoglobin < 5 g/dl in children or < 7 g/dl in adults or pregnant women
- Symptoms of poor clinical tolerance (severe intensive polypnoea, tachycardia, gallop rhythm).

Even in the absence of haematocrit and haemoglobin, a patient presenting with extreme pallor and symptoms of poor clinical tolerance should be transfused.

***Transfusion conditions:***

- Packed cells 10cc/kg in 3 hours;
- In the absence of packed cells, transfuse 20 cc of whole blood/kg in 3 hours and then administer *furosemide* 1mg/kg intravenously at the beginning or during transfusion, except for patients who are dehydrated or exhibiting signs or symptoms of shock;
- The blood should be compatible within the ABO/ Rhesus grouping system and screened for the following diseases: HIV, hepatitis B and C, syphilis) During transfusion monitor clinical vital signs (the colour of mucosae in search for jaundice or submucosal bleeding; the heart rate in search

#### *8.2.2.3. Third line: Injectable Artemether*

Injectable artemether is used in the absence of injectable artesunate or when quinine is contra indicated.

**Dosage in adults:**
160mg per day: 80mg in two doses (with an interval of 12 hours), administered by IM injections the first day. This is then followed by 80mg once a day IM for the next 6 days.

**Dosage in children:**
3.2mg per day in two doses: 1.6mg in two doses (with a 12 hour interval), administered by IM injections the first day. This is followed by 1.6mg once a day by IM injections for the next 6 days. The injection is administered on the superior external quadrant of the buttock or on the anterior surface of the lap.

### 8.2.3. Associated treatment

#### *8.2.3.1. Antipyretics (oral,rectal or parenteral)*

First line treatment: Injectable paracetamol - 60 mg/kg/day divided into 4 doses in children IV.

Second line treatment: Injectable Lysine acetylsalicylate acid - 50mg/ kg per day in 4 doses, I.V. (or I.M.).
Paracetamol suppositories: 60mg/kg/day in 4 doses in children without diarrhoea.
Oral paracetamol, Acetyl salicylic acid or ibuprofen: like in treatment of uncomplicated malaria.
**Never administer non-steroidal anti inflamatories (acetyl salicylic acid, ibuprofen etc.) during the 3rd trimester of pregnancy.**





**administered. Only the regimen without a loading dose should be used.**

**Whatever the chosen regimen, s**witch to **Oral treatment** as soon as the patient is able to swallow: 8.3 mg/ kg of quinine base every 8 hours for a total of 7 days from the beginning of treatment, or an artemisinine based combined therapy (ACT) (ASAQ of AL), for three days.

### 8.1.3. Third line: Treatment with injectable artemether

Injectable artemether is used in the absence of injectable artesunate and when quinine is contraindicated.

**Dosage in adults:**

160mg per day: 80mg in two doses (with an interval of 12 hours), administered by IM injections the first day. This is then followed by 80mg once a day IM for the next 6 days.

**Dosage in children:**
3.2 mg per day, in two doses (with a 12 hour interval); administered by IM injections the first day. This is followed by 1.6mg once a day by IM injections for the next 6 days. The injection is administered on the superior external quadrant of the buttock or on the anterior surface of the lap.

## 8.2. Treatment of malaria in pregnancy (Severe malaria)

During pregnancy, the severity of malaria is linked to foetal complications. Hence all cases malaria during pregnancy should be considered as severe malaria and treated as such.

### 8.2.1. Treatment during the first trimester

Treatment with quinine without a loading dose (Regimen 2 above).
This regimen uses 3 perfusions per day:
Quinine bases: 8.3 mg/kg of quinine bases in 4 hours infusion, every 8 hours.
Relay is made with oral treatment as soon as patient can swallow. The oral dose is 8.3 mg/kg of quinine bases every 8 hours until the 7$^{th}$ day of treatment, starting from the beginning of the treatment.
Maximum dose 1.5g of quinine base per day.

### 8.2.2. Treatment during the second & third trimesters

#### *8.2.2.1. First line: Treatment with injectable artesunate*

**Dosage:** 2.4mg/kg at 0.12 and 24 hours, followed by one administration every 24 hours until the patient is able to take oral treatment (timing can then become less stringent for practical reasons).
**Route of administration:** Injectable artesunate is preferably administered intravenously (IV) otherwise it should be administered intramuscularly (IM).

#### *8.2.2.2. Second line: Treatment with Quinine without a loading dose (Regimen 2 above)*

If uterine contractions occur during treatment with quinine, administer tocolytics.





**Dosage of tocolytics**

Initial treatment: Salbutamol (ventoline) infusion:
Add 10 ampoules of 0.5mg/ml of ventoline (i.e. 5mg of salbutamol) in 250ml of normal saline or 5% dextrose solution.

Start with 10 drops/minute, increasing by 10 drops every 10 minutes until contractions cease. Do not exceed 60 drops/minute.

Relay with salbutamol tablets 2mg: 1 tablet every 12 hours.

Salbutamol can cause the following side effects: palpitations, tachycardia, arythmia and trembling. Consequently treatment requires strict monitoring. This consists of:

- Monitoring the pulse – should not exceed 100 per minute,
- Monitoring of blood pressure – Should neither fall below 90/60mmHg or rise above 140/90mmHg.

In case the pulse rate exceeds 110 beats per minute or blood pressure falls below 90/60mmHg or rises above 140/90mmHg, stop administration of tocolytics but continue malaria treatment.
**Whatever regimen used, continue with oral quinine as soon as the patient is able to swallow. This should be at a dose of 8.3mg/kg of quinine base every 8 hours** for a total of 7 days from onset of treatment, **otherwise administer ACTs (ASAQ of AL) for 3 days, as from the second trimester of pregnancy**.