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FOREWORD
OF THE NATIONAL MALARIA MANAGEMENT GUIDELINES IN CAMEROON

In Cameroon, as in most countries in sub-Saharan Africa, which bear the heavy burden of malaria, improving case management remains an essential strategy to reduce malaria-related morbidity and mortality. The aim is to progress towards pre-elimination and eventually elimination of this parasitic disease. This strategy requires access for the entire population, especially the most vulnerable, to: (i) early diagnosis, (ii) rapid and high-quality treatment, (iii) adequate detection of severe cases and identification of treatment failures to initiate (iv) appropriate referral.

These Guidelines take into account recent international recommendations on malaria control and the challenges faced by the National Malaria Control Programme (NMCP) and its partners in implementing the national malaria management policy. It was drafted in accordance with WHO's **"Roll Back Malaria" Partnership initiative**, and takes into account the factors involved in identifying uncomplicated and severe malaria at the Health District (HD) level, which is the basic operational unit of our health system. It provides all medical and paramedical staff, as well as students of health science training centres with the key information they need to diagnose and treat any case of uncomplicated or severe malaria.

Diagnosis orientation based on fever is the first step, during which the differential factors of febrile pathologies similar to malaria are discussed. The second step consists of confirming the diagnosis using a Rapid Diagnostic Test (RDT) or microscopic test (thick drop) and a blood smear (CBC) and classifying cases as uncomplicated or severe malaria.

It is worth mentioning that the monotherapy drugs used for malaria management have been banned and withdrawn from the market due to the resistance noted. Malaria treatment is now based on Artemisinin combination treatments (ACTs), as recommended by WHO. Cameroon selected four ACTs for the treatment of uncomplicated malaria: Artesunate/Amodiaquine (AS/AQ), Artemether/Lumefantrine (AL), Dihydroartemisinin/Piperaquine (DHA/PPQ) and Pyronaridine-artesunate (PY-AS). Artemether/Lumefantrine (AL) is now the recommended ACT for pregnant women during the 1st trimester.

Injectable Artesunate has become the first-line molecule to treat severe malaria. However, when injectable Artesunate is unavailable, injectable Artemether and Quinine may be prescribed as second and third-line treatments respectively. Thereafter, ACT should be administered orally over three (03) days.

The authors have included definitions and practical notes with examples to help readers understand the necessary procedures. This document equally presents useful care procedures for the management of some comorbidities or complications associated with malaria. Tables on drug dosages and usual precautions in health facilities (HFs) are also available in the document.

I would therefore like to personally thank all those who were involved and committed in developing these national guidelines. Moreover, I would also like to invite all the health sector actors involved at different levels of the health pyramid, and by extension all stakeholders, to take ownership of this document and refer to it on a daily basis to ensure its effective implementation.



The Minister of Public Health

Dr Malachie MANAOUDA

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LIST OF ABBREVIATIONS

Acronyms	Meaning
ACT	Artemisinin-based combination therapy
AE	Adverse Events
AL	Artemether Lumefantrine
AMC	Average Monthly Consumption
ANC	Antenatal consultation
APE	Acute Pulmonary oedema
ARV	Antiretroviral drugs
ASAQ	Artesunate amodiaquine
ASMF	Artesunate-mefloquine
ASPY	Artesunate –Pyronaridine
BP	Blood Pressure
C/I	Contraindication
Cc	Cubic centimeter
CDI	Community Directed Interventions
CENAME	National Procurement Centre for Essential Drugs and Medical Devices
CMV	Cytomegalovirus
CNRBM	Roll Back Malaria National Committee
CTG	Central Technical Group
DHA-PQ	Dihydroartemisinine+Piperaquine
DLMEP	Department of Disease Control Epidemics and Pandemics
DOSTS	Department of Health Care Organisation and Technology
DOT	Directly Observed Therapy
DPML	Department of Drugs and Pharmacy
DPS	Department of Health Promotion

EPD	Epidemic Potential Disease
EQC	External Quality Control
FEFO	First Expired First Out
FHB	Foetal Heart Beat
FP	Focal Person
G6PD	Glucose – 6 – Phosphate Deshydrogenase
GA	Gestational Age
HBHI	High Burden High Impact
HD	Health District
HF	Health Facility
Hgb	Haemoglobin
HIV	Human Immunodeficiency Virus
HR	Heart Rate
IHC	Integrated Health Centre
IM	Intramuscular
IMNCI	Integrated management of newborn and childhood illnesses
IPT	Intermittent Preventive Treatment
IPTi	Intermittent Preventive Treatment in the infancy
IPTp	Intermittent Preventive Treatment in pregnancy
IPTp-C	Intermittent Preventive Treatment in Pregnancy in the community
IRS	Indoor Residual Spray
IV	Intravenous
SDIV	Slow Direct intraveinous
Kg	Kilogram
LLIN	Long Lasting insecticide treated nets
MA	Marketing Authorization

MAR	Monthly Activity Report
mg	Milligram
MHC	Medicalised Health Centre
NHIS	National Health Information System
ml	Mililiter
NMCP	National Malaria Control Programme
NSAIDs	Non-steroidal anti-inflammatory drugs
NSPMC	National Strategic Plan for Malaria Control
NSPV	National System of Pharmacovigilance
ODK	Open Data Kit
P.	Plasmodium
PLHIV	People living with HIV
PMC	Perennial Malaria Chemoprevention
PTP	Periodic Preventive Treatment
PV	Pharmaco Vigilance
QA/QC	Quality Assurance/Quality Control
Qb	Quinine base
RDT	Rapid Diagnostic Test
RFHP	Regional Fund for Health Promotion
RHC	Regional Hospital Centre
RR	Respiratory Rate
SMC	Seasonal Malaria Chemoprevention
SOP	Standard Operating Procedures
SP	Sulfadoxine-Pyrimethamine
SYNAME	National Essential Drug Supply System
Tab	Tablet

UHC	Universal Health Coverage
UTH	University Teaching Hospital
WHO	World Health Organisation

SUMMARY

SUMMARY

Effective management of malaria cases is based on early diagnosis and prompt treatment with efficient antimalarial drugs. These revised guidelines on the diagnosis and appropriate treatment of malaria cases, takes into account the new recommendations, as summarized in Table I:

Table I: Overview

Definition of malaria cases
<u>Epidemiological definition</u> **In endemic zones (Cameroon inclusive)** ❖ Patient with history of fever or temperature ≥ 37.5°C axillary and ≥ 38°C rectally ❖ Patient below 5 years old with palmar-plantar pallor or any other patient with Hb<8g/dl. **In low endemic zones** ❖ History of fever without any other obvious cause, after exposure to malaria (travel to an endemic area). **<u>Clinical definitions</u>** **SUSPECTED CASE OF MALARIA:** person with signs and symptoms that make a health personnel to suspect malaria. These signs and symptoms usually include **fever**. **PRESUMPTIVE CASE OF MALARIA:** suspected case of malaria treated as such, without diagnostic test results to confirm the presence of the disease. **CONFIRMED CASE OF MALARIA:** suspected case of malaria where blood examination by microscopy or RDT revealed the presence of malaria parasites.
Malaria diagnosis
❖ Systematic confirmation of any suspected case by Rapid Diagnostic Test (RDT) or microscopy. ❖ RDTs are subsidized for people above 5 years of age and free for children under five.

- RDT and microscopy must be supported by the establishment of an operational Quality Control and Quality Assurance (QC/QA) system.

The description of tests requirements per level is included in the appendix and in the Quality Assurance Manual.

Treatment of uncomplicated malaria

In Cameroon, treatment no longer takes into account the notion of first and second line. However, the NMCP recommends the use of subsidised drugs as a priority.

In the 8 Regions of Cameroon apart from the North and Far North Regions, the treatment is based on one of the following combinations:

- Artemether - Lumefantrine (AL);
- Artesunate -Amodiaquine (ASAQ);
- Dihydroartemisinin + Piperaquine (DHA-PQ).
- Artesunate - Pyronaridine (AS-PY)

Only solid or dispersible forms (AL and ASAQ) are recommended.

ASAQ and AL are subsidized and free for children under five.

In the North and Far North Regions where SMC is implemented using SPAQ, the combinations are as follows:

- Artemether - Lumefantrine (AL);
- Diydroartemisinin + Piperaquine (DHA-PQ).
- Artesunate-Pyronaridine (AS-PY).

In the community, malaria management within the framework of Community Directed Interventions (CDIs)

- Artesunate - Amodiaquine (ASAQ): for the 8 regions excluding the North and Far North Regions
- Artemether - Lumefantrine (AL): for the 10 regions

Note:

Only solid and dispersible forms are recommended

Oral syrup and suspension forms are not recommended.

- An antipyretic is recommended in children and adults in case of fever.
- **Treatment of malaria caused by other plasmodial species**: Give ACTs as for P.f malaria.

- To prevent relapses, Primaquine can be used for the radical treatment of P. vivax malaria (14-day course);

Treatment of clinical failures

In case of clinical failure, repeat microscopy or RDT (pLDH)

If positive:

- If the ACT is taken incorrectly, the same ACT is recommended.
- If the drug is taken correctly, administration of another ACT is recommended.

If negative:

- Search for another cause and treat.

Treatment of severe malaria

Treatment of severe malaria: pre-reference treatment.

In the community:

- Children under 5 years of age: one dose of Artesunate suppository administered as pre-referral treatment by the Multipurpose Community Health Worker (MCHW).
- Adults and pregnant women: refer to the nearest health facility (HF) with adequate technical platform.

In Integrated Health Centres (IHC) and others of the same category:

- **First line**: first dose of injectable Artesunate preferably intravenously.
- **Second line**: Artemether intramuscular injection.

In the referral health facility, start with the parenteral route (IV or IM) for at least 24 hours followed by an oral relay for 03 days with an ACT as soon as the patient is able to drink.

Three types of treatment are possible:

- First line: Injectable Artesunate;
- Second line: Injectable Artemether;
- Third line: Injectable Quinine, by infusion.

Whatever option is chosen, the relay is taken orally as soon as the patient can swallow, after having performed treatment through the parenteral route for 24-48 hours.
The relay must be respected and should be done with ACT: (AL, ASAQ, DHA-PQ, ASPY) for 3 days.

Exceptionally: the use of oral Quinine as a relay will only be done in case of unavailability or intolerance to ACTs.
NB: The cumulative duration of treatment with quinine is 7 days.

Treatment of malaria in pregnant women

Any case of malaria in a pregnant woman is considered an emergency and must be treated as soon as possible.

In case of uncomplicated malaria

In the first trimester:

- 1st line: Artemether-Lumefantrine (AL)
- 2nd line: Quinine if AL is not available

In the second and third trimesters and during breastfeeding: ACT

Multiple choices are available:

- Artemether-Lumefantrine (AL);
- Artesunate-Amodiaquine (ASAQ);
- DiHydroArtemisinin-Piperaquine (DHA-PQ);
- Artesunate-Pyronaridine (AS-PY).

In case of severe malaria: refer to severe malaria treatment

Note: In pregnant women experiencing uterine contractions on quinine treatment, it is recommended to combine tocolysis with Nifedipine (or Salbutamol or another Betamimetic if Nifedipine is unavailable) as well as antenatal corticosteroid therapy for lung maturation, if the Gestational Age (GA) is between 24 and 34 weeks of pregnancy.

Treatment of specific populations and particular situations

- **PLHIV on ARV** (Efavirenz, Zidovudine): do not administer ASAQ to avoid worsening hepatotoxicity. Preferably administer AL.
- **PLHIV on ARV**+ Cotrimoxazole: Avoid Artesunate + Sulfadoxine-Pyrimethamine (AS + SP).

- **PLHIV treated with protease inhibitors (Ritonavir** – Liponavir): avoid overexposure to Artemether-Lumefantrine (AL) by alternating the treatment of uncomplicated malaria with other ACTs during other episodes of malaria.
- **PLHIV on treatment or not:** avoid over-exposure to Artesunate + Sulfadoxine - Pyrimethamine (AS+SP) by alternating the treatment of uncomplicated malaria with other ACTs during other episodes of malaria.
- **PLHIV with a history of adverse events (intense asthenia, extrapyramidal syndrome, rash, etc.) on** Artesunate-Amodiaquine (ASAQ) treatment: administer Artemether-Lumefantrine (AL).
- Artesunate-Amodiaquine (ASAQ) is contraindicated in patients taking ketoconazole.
- **G6PD deficient patients:** prevent relapses of *Plasmodium vivax and Plasmodium ovale* malaria in areas where these parasitic species are found by treating with Primaquine/Tafenoquine for fourteen (14) days.
- **Malnourished children**: preferably administer Artemether-Lumefantrine (AL) during a meal rich in fats. Avoid DiHydroArtemisinin-Piperaquine (DHA-PQ). Avoid iron supplementation; give multivitamins containing riboflavin in small doses.
- **Non-immune travellers:** Management is carried out according to national guidelines.
- **Overweight subjects (corpulent, obesity)**: due to the risk of underdosing, carefully monitor the treatment outcome (clinical and possibly microscopic evaluation).
  Adapt the dosage of Dihydroartemisinin-Piperaquine (DHA-PQ)
- **Underweight subjects** (<40kg): adapt the dosage of DihydroArtemisinin-Piperaquine (DHA-PQ) to the patient's weight.
- **In the event of adverse events with ASAQ** treatment (severe asthenia, extrapyramidal syndrome, rash, etc.): Preferably administer Artemether-Lumefantrine (AL).
- **Heart rhythm disorders (QT):** Avoid DHA-PQ and AS-PY.
- **Chronic liver damage:** Avoid Artesunate-Amodiaquine (ASAQ).
- **Psychiatric history:** Avoid Artesunate-Mefloquine (ASMF).
- **Other white blood cell pathologies (neutropenia):** Avoid Artesunate-Amodiaquine (ASAQ)

Whatever the case, avoid taking DiHydroArtemisinin-Piperaquine (DHA-PQ) more than two (02) times a year.

Intermittent Preventive Treatment in pregnant women

- **A pregnant woman must take 05 doses of Sulfadoxine-Pyrimethamine (SP),** from the 13th week of pregnancy, an additional dose during childbirth if the last dose was taken for more than 2 months.
- **The interval between two doses must be at least one month (04 weeks).**
- The last IPTp dose can be administered safely at the time of delivery, if there are no contraindications.
- Simultaneous administration of SP and folic acid at doses > 5 mg per day is not recommended, because folic acid in high doses reduces the effectiveness of SP in the prevention of malaria (administer a dose of 2mg folic acid).

SP should not be administered to pregnant women on Cotrimoxazole prophylaxis.

Chemoprophylaxis for travelers

- **Travellers coming from an endemic country**: respect the prescriptions (preventive measures) of their country of origin if prevention has already started and, where applicable, of the host country.
- **Travellers from a non-endemic country**: Follow the doctor's prescriptions in the host country.

  Follow the measures recommended by the NMCP:

  - Chloroquine-proguanil combination (Savarine),
  - Doxycycline 100 mg,
  - Atovaquone-Proguanil (Malarone, Malanil)

  NB: take into account contraindications.

RÉSUMÉ

La PEC (PEC) correcte des cas de paludisme se fonde sur un diagnostic précoce et un traitement rapide au moyen d'antipaludiques efficaces. Les directives revues en ce qui concerne le diagnostic et le traitement appropriés des cas de paludisme, au regard des nouvelles recommandations sont résumées dans le tableau I ci-après :

Tableau I a : Récapitulatif du résumé

Définition des cas de paludisme
<u>Sur le plan épidémiologique :</u> **En zone endémique dont fait partie le Cameroun** ❖ Patient avec histoire de fièvre ou une température ≥ 37,5 °C axillaire et ≥ 38 °C par voie rectale ❖ Patient de moins de 5 ans avec pâleur palmo-plantaire ou toute autre personne avec Hb<8g/dl. **En zone d'endémicité faible** ❖ Histoire de fièvre sans autre cause évidente, après exposition au paludisme (voyage en zone endémique). **<u>Sur le plan Clinique :</u>** **CAS SUSPECT DE PALUDISME** : personne présentant des signes et symptômes au vue desquels, un agent/ personnel de santé pense au paludisme. Ces signes et symptômes incluent habituellement la fièvre. **CAS PRÉSUMÉ DE PALUDISME :** cas suspect de paludisme traité comme tel, sans résultat de test diagnostic pour confirmer la présence de la maladie. **CAS DE PALUDISME CONFIRMÉ** : cas suspect de paludisme dont l'examen du sang par microscopie ou TDR a mis en évidence des parasites du paludisme.
Diagnostic du paludisme
❖ Confirmation systématique de tout cas suspect par un test de diagnostic rapide (TDR) ou par une microscopie de qualité. ❖ Les TDR sont subventionnés et gratuits pour les enfants de moins de cinq ans. ❖ La réalisation du TDR et de la microscopie doit être appuyée par la mise en place d'un système opérationnel de Contrôle Qualité et d'Assurance Qualité (AQ/CQ).

La description des exigences des examens par niveau figure en annexe et dans le Manuel d'Assurance Qualité.

Traitement du paludisme simple

Au Cameroun, le traitement ne tient plus compte de la notion de première et deuxième ligne. Cependant le PNLP recommande l'utilisation des médicaments subventionnés en priorité.

Dans les 8 Régions du Cameroun en dehors de celles du Nord et de l'Extrême Nord, il repose sur une des combinaisons suivantes :

- Artéméther - Luméfantrine (AL) ;
- Artésunate - Amodiaquine (ASAQ) ;
- DiHydroArtémisinine+Pipéraquine (DHA-PQ).
- Artésunate - Pyronaridine (AS-PY)

Seules les formes solides ou dispersibles (AL et ASAQ) sont recommandées.

ASAQ et AL sont subventionnés et gratuits pour les enfants de moins de cinq ans.

Dans les 2 Régions du Nord et de l'Extrême-Nord où l'on met en œuvre la CPS les combinaisons sont les suivantes :

- Artéméther - Luméfantrine (AL) ;
- DiHydroArtémisinine+Pipéraquine (DHA-PQ).
- Artésunate -Pyronaridine (AS-PY).

En communauté, pour la PEC du paludisme dans le cadre des Interventions Sous Directives Communautaires (ISDC) :

- Artésunate - Amodiaquine (ASAQ) : pour les 8 régions autres que celles du Nord et Extrême-Nord
- Artéméther - Luméfantrine (AL) : pour les 10 régions

Note :
Seules les formes solides et dispersibles sont recommandées.

Les formes sirop et suspension orales ne sont pas recommandées.

- Un antipyrétique est conseillé chez les enfants et les adultes en cas de fièvre
- **Traitement du paludisme du à d'autres espèces plasmodiales**
  Donner les ACT comme pour le paludisme à P.f **Pour prévénir les rechutes, donner** la Primaquine pour le traitement radical du paludisme à *P. vivax* (en cure de 14 jours);

Traitement des échecs cliniques

En cas d'échec clinique, refaire la microscopie ou TDR (pLDH)

Si positif :

- En cas de mauvaise prise de l'ACT, la même ACT est recommandée.
- En cas d'une bonne prise, l'administration d'une autre ACT est recommandée.

Si négatif :

- Rechercher une autre cause et traiter.

Traitement du paludisme grave

Traitement du paludisme grave : traitement de pré-référence.

En communauté :

- Enfants de moins de 5 ans : une dose d'Artésunate suppositoire administrée en traitement de pré-référence par l'Agent de Santé Communautaire polyvalent (ASCp).
- Adultes et femmes enceintes : référer à la FOSA disposant d'un plateau technique adéquat.

Dans les Centres de Santé Intégrés (CSI) et assimilés :

- **Première ligne** : première dose d'Artésunate injectable de préférence par voie intraveineuse.

Deuxième ligne : l'Artéméther par voie intramusculaire.

Dans la formation sanitaire de référence, le traitement devra débuter par voie parentérale (IV ou IM) pendant au moins 24 heures suivi d'un relais par voie orale pendant 03 jours avec un ACT dès que le malade est capable de boire.

Trois types de traitement sont possibles :

- Première ligne : Artésunate injectable ;
- Deuxième ligne : Artéméther injectable ;
- Troisième ligne : Quinine injectable, par perfusion.

Quelle que soit l'option choisie, le relais est pris par voie orale dès que le malade peut avaler, après avoir observé au moins 24-48H par voie parentérale.

Le relais devra être strictement respecté, il se fera avec l'ACT : (AL, ASAQ, DHA-PQ, ASPY) pendant 3 jours.

Exceptionnellement : l'utilisation de la Quinine par voie orale comme relais ne sera faite qu'en cas d'indisponibilité ou d'intolérance aux ACT.

NB : La durée cumulative du traitement avec la quinine est de 07 jours.

Traitement du paludisme chez la femme enceinte

Tout cas de paludisme chez la femme enceinte est considéré comme une urgence et doit être pris en charge le plus tôt possible.

En cas de paludisme simple

Au premier trimestre :

- 1ère ligne : Artéméther-Lumefantrine (AL)
- 2ème ligne : Quinine si AL non disponible

Aux deuxième et troisième trimestres et pendant l'allaitement : ACT

Choix multiples:

- Artéméther-Luméfantrine (AL) ;
- Artésunate-Amodiaquine (ASAQ) ;
- DiHydroArtémisinine-Pipéraquine (DHA-PQ) ;
- Artésunate-Pyronaridine (AS-PY).

En cas de paludisme grave : se référer au traitement du paludisme grave

Note : Chez les femmes enceintes présentant des contractions utérines sous traitement à la quinine, il est recommandé d'associer la tocolyse à la nifédipine (ou au Salbutamol ou à un autre bêtamimétique si nifédipine indisponible) ainsi qu'une corticothérapie anténatale pour la maturation pulmonaire si l'Age Gestationnel (AG) est compris entre 24 et 34 semaines de grossesse.

Traitement des populations spécifiques et situations particulières

- **PVVIH sous ARV** (Efavirenz, Zidovudine) : ne pas administrer ASAQ pour éviter d'aggraver l'hépatotoxicité. Préférer AL.
- **PVVIH SIDA sous ARV+** Cotrimoxazole : Evitez Artésunate+ Sulfadoxine-Pyrimethamine (AS + SP).
- **PVVIH traitées avec les anti-protéases (Ritonavir – Liponavir) :** éviter la surexposition à Artéméther-Luméfantrine (AL) en alternant le traitement du paludisme simple avec d'autres ACT lors des autres épisodes de paludisme.
- **PVVIH sous traitement ou pas:** éviter la sur-exposition à Artésunate+Sulfadoxine-Pyrimethamine (AS+SP) en alternant le traitement du paludisme simple avec d'autres ACT lors des autres épisodes de paludisme.

❖	**PVVIH avec antécédents d'effets indésirables** (asthénie intense, syndrome extrapyramidal, éruption cutanée, etc.) sous Artésunate-Amodiaquine (ASAQ) : traiter avec Artéméther-Luméfantrine (AL).
❖	**Patients sous kétoconazole** : L'Artésunate-Amodiaquine (ASAQ) est contre-indiquée.
❖	**Sujets déficients en G6PD** : prévenir les rechutes du paludisme à *Plasmodium vivax* et *Plasmodium ovale* dans les zones où ces espèces parasitaires se trouvent en traitant avec la Primaquine / Tafénoquine en cure de quatorze (14) jours.
❖	**Enfants malnutris** : préférer Artéméther-Luméfantrine (AL) administré au cours d'un repas riche en matière grasse. Eviter DiHydroArtemisinine-Piperaquine (DHA-PQ). Eviter la supplémentation en fer ; donner des multivitamines contenant de la riboflavine en petites doses.
❖	**Voyageurs non immuns** : la PEC se fait selon les directives nationales.
❖	**Sujets corpulents (surpoids, obésité)** : à cause du risque de sous-dosage, bien suivre l'issue du traitement (évaluation clinique et éventuellement microscopique). Adapter le dosage de Dihydroartémisinine-Piperaquine (DHA-PQ)
❖	**Les sous-poids (<40kg):** adapter le dosage de DiHydroArtemisinine-Piperaquine (DHA-PQ) au poids du patient.
❖	**En cas d'effets indésirables sous ASAQ** (asthénie intense, syndrome extrapyramidal, éruption cutanée, etc) : préférer Artéméther-Luméfantrine (AL)
❖	**Troubles du rythme cardiaque (QT)** : Eviter la DHA-PQ et AS-PY.
❖	**Atteintes hépatiques chroniques** : Eviter Artésunate-Amodiaquine (ASAQ).
❖	**Antécédents psychiatriques** : Eviter Artésunate-Méfloquine (ASMF).
❖	**Autres pathologies des globules blancs (neutropénies)** : Eviter Artésunate-Amodiaquine (ASAQ)
❖	**Dans tous les cas, éviter de prendre DiHydroArtemisinine-Piperaquine (DHA-PQ) plus de deux (02) fois par an**.
Traitement Préventif Intermittent chez la femme enceinte	
❖	**La femme enceinte doit prendre 05 doses de Sulfadoxine-Pyrimethamine (SP),** à partir de la 13eme semaine de grossesse, une dose supplémentaire lors de l'accouchement si la dernière dose avait été prise au-delà de 2 mois.

❖ **L'intervalle entre deux doses doit être d'au moins un mois (04 semaines).**

❖ **La dernière dose de TPIg** peut être administrée sans risque au moment de l'accouchement, s'il n'y a pas de contre-indication.

❖ L'administration concomitante de SP et d'acide folique à des doses > 5mg par jour n'est pas recommandée ; car l'acide folique à forte dose diminue l'efficacité de la SP dans la prévention du paludisme (administrer l'acide folique dosé à 2mg).

La SP ne doit pas être administrée aux femmes enceintes recevant une prophylaxie au Cotrimoxazole.

Chimio prophylaxie chez le voyageur

❖ **Voyageurs provenant d'un pays endémique** : respecter les prescriptions (mesures préventives) de son pays de provenance si la prévention a déjà débuté et le cas échéant du pays d'accueil.

❖ **Voyageurs provenant d'un pays non endémique** : utiliser les prescriptions du médecin du pays d'accueil.

Suivre les mesures suivantes recommandées par le PNLP :

- Combinaison chloroquine-proguanil (Savarine),
- Doxycycline 100 mg,
- Atovaquone-Proguanil (Malarone, Malanil)

NB : prendre en compte les contre-indications.

I . INTRODUCTION

I. INTRODUCTION

Malaria remains one of the main causes of morbidity and mortality in Cameroon. At the national level, the number of confirmed cases per 1000 population (incidence) dropped from 110.5 cases in 2019 to 106 in 2023, a drop of about 4%. The mortality rate or number of malaria-related deaths per 100,000 people dropped from 17.7 in 2019 to 6.3 in 2023, a drop of 64% over the period.

Despite these performances, in 2023, malaria represented **28% of consultations and 7.3% of deaths** in health facilities. Children under 5 years of age represent the most affected group with proportional morbidity of 40.7% and proportional mortality of 18.2%.

In response to this scourge, the Government has made the fight against malaria a national priority. Five successive generations of the NMSP have been developed and implemented, for 2002-2006, 2007-2010, 2011-2015, 2014-2018 and 2019-2023 periods respectively. The “sixth generation” NMSP covering the period 2024-2028 has just been developed and validated. Its general objectives by 2028 are to: (i) reduce malaria-related morbidity by at least 75% compared to the situation in 2015, and (ii) reduce malaria-related mortality by at least 75% compared to the situation in 2015. It focuses on the 4 pillars of the “High Burden to High Impact” (HBHI) approach.

Compliance with national guidelines for malaria diagnosis and management in the context of the new "High Burden to High Impact" initiative will contribute to reversing the current trend and aim towards reaching the pre-elimination phase of this significant disease.

II. OBJECTIVES OF THESE GUIDELINES

II. OBJECTIVES OF THESE GUIDELINES

2.1. General objectives:

Provide healthcare providers with tools to enable them to improve the quality of the management of malaria cases at all levels in order to reduce morbidity and mortality linked to this disease by 75% by 2028, compared to the situation in 2015, as recommended by the 2024-2028 NMSP.

2.2. Specific objectives

This guide has several specific objectives which consist particularly in leading the healthcare provider to:

- master and promote malaria prevention measures, including those newly adopted: Anti-Malaria Vaccine and Perennial Malaria Chemoprevention (PMC);
- harmonize and promote malaria diagnostic methods;
- standardize therapeutic protocols to enable healthcare providers ensure the correct management of cases of uncomplicated and severe malaria;
- help monitor, detect and prevent resistance of plasmodial species to antimalarial drugs;
- know the programmatic support measures for malaria management as well as the fight against malaria such as supervision, management of inputs, data collection and pharmacovigilance.

III. DEFINITION OF MALARIA CASES

III. CASE DEFINITION

3 .1. What is malaria?

Malaria is an infectious parasitic disease caused by a protozoan of the genus *Plasmodium*. This protozoan is generally transmitted to humans by the bite of a female mosquito of the genus, *Anopheles.* However, other transmission modes exist: blood transfusion and from mother to child.

Fever (or history of fever), the most common symptom, is the most reliable basic criterion for suspecting a case of malaria and assessing progress during treatment.

The biological diagnosis of malaria is based on the detection of *Plasmodium* through an RDT or under the microscope on a thick film and/or a blood smear.

Malaria RDTs detect specific antigens (proteins) produced by *Plasmodium*. These antigens are present in the blood of infected people, whether the infection is recent or not.

Quality microscopy remains the reference test and makes it possible to identify not only the parasites in the blood of infected people, but also to determine the parasite density. However, it requires the presence of a qualified laboratory technician, a laboratory equipped with a functional microscope and quality reagents to obtain reliable results. RDTs, on the other hand, are easier and quicker to perform and have satisfactory sensitivity and specificity.

RDTs are now made available for all health facilities through Regional Funds for Health Promotion (RFHP) or approved wholesalers. Exceptionally, the absence of an RDT or a microscopy should not prevent the initiation of treatment in the event of a strong clinical suspicion of malaria. This treatment must be accompanied by a systematic search for other causes of **fever**.

In any confirmed case of malaria, the health personnel should administer proper treatment, or refer the patient to the appropriate level as quickly as possible. In case of referral, **always administer a pre-referral treatment dose for cases of severe malaria**.

Prevention, particularly vector control, is an essential step in malaria management. It helps reduce contact between humans and the vector, subsequently reducing cases of the disease.

3.2. Suspected malaria case

3.2.1. Based on the level of transmission

Commonly used criteria for suspecting malaria include:

For people residing in endemic areas, including Cameroon, (high to low transmission) or in active outbreaks in elimination zones:

- Malaria should be suspected in any febrile patient or patient who has a history of fever, i.e. high temperature (axillary ≥37.5 ◦C or rectally ≥38 ◦C) without other obvious causes of fever. (WHO 2023).
- For people residing in non-endemic areas where the transmission rate is very low, or maintained at zero: Malaria should be suspected in patients with unexplained fever and a history of travel to areas at risk of malaria, within the country or abroad (Adapted from the **Reference Manual for Monitoring and Evaluation, WHO 201**8).

3.2.2 Based on the clinical picture

- **Suspected malaria case:**

Person showing signs and symptoms that make a health personnel to think of malaria, usually fever or a history of fever.

All patients suspected of malaria must have a confirmatory test (RDT or microscopy).

- **Presumed malaria case**

All suspected cases of malaria which did not benefit from a biological examination to confirm Plasmodium, but treated presumptively as a case of malaria. The case should be reported as a "presumed malaria case".

- **Confirmed malaria case:**

A suspected cases of malaria for which RDT or microscopy provides evidence of the presence of *Plasmodium* in the blood.

DEFINITION OF MALARIA

Malaria is an infectious parasitic disease caused by a protozoan of the genus *Plasmodium*. This protozoan is transmitted by the bite of a female mosquito of the genus *Anopheles*, by blood transfusion or from mother to child. Fever is the most common symptom.

- **Depending on the level of transmission:**

For people residing in endemic areas, including Cameroon, (high to low transmission) or during active outbreaks in elimination zones:

- ❖ Malaria should be suspected in any febrile patient or patient who has a history of fever, i.e. high temperature (axillary ≥37.5 ◦C or rectally ≥38 ◦C) without other obvious causes of fever.

For people residing in non-endemic areas where the transmission rate is very low, or maintained at zero:

- ❖ Malaria should be suspected in patients with unexplained fever and a history of trips to areas at risk of malaria, inside the country or abroad (WHO Surveillance Guide)

- Depending on the clinical signs:

We can distinguish between suspected cases, confirmed cases and presumed cases.

NB: In the current epidemiological context of Cameroon, any case of fever or with a history of fever is a suspected case of malaria. However, it must be subject to biological confirmation before treatment initiation.

IV. CLINICAL AND BIOLOGICAL DIAGNOSIS OF MALARIA

IV. MALARIA DIAGNOSIS

Malaria diagnosis is both clinical and biological.

4.1 Clinical diagnosis of malaria

Fever or history of fever is the main sign of malaria. It can be declared by the parents (even if the temperature is normal at the time of the examination) or confirmed by taking the temperature (greater than or equal to 37.5°C axillary or 38°C rectally).

NB: Do not take the temperature rectally in infants less than two months old due to the risk of thermometric ulceration.

The cause of the fever must be sought by a complete clinical examination followed by a parasitological malaria test. **Malaria test should be carried out for any case of fever even if there is another cause. The results of the diagnostic tests must be available within 2 hours following the patient's request for care.** Furthermore, microscopy and RDT must be supported by a quality assurance programme (See quality assurance document).

Signs and symptoms of malaria are not specific. Most often, malaria is clinically suspected based on a fever or history of fever. Fever can also be caused by several other infectious or non-infectious diseases. Malaria diagnosis based solely on clinical characteristics is very non-specific and results in over-treatment.

The most common causes of fever to be sought by discussing with the patient or the family and by simple examinations are described in the table below:

Table II: Signs and symptoms of the causes of fever to look for from the first examination of a febrile individual.

SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS: Also look for
Stiff neck, bulging fontanelle (infant), convulsion	MENINGITIS*…
Runny nose, cough	RHINITIS, FLU, COVID 19*…
Rapid breathing, breathing difficulties (subcostal, intercostal indrawing, nasal flaring, etc.), cough*	PNEUMONIA*…
Spontaneous ear pain, Tragus pressure pain, runny ear	OTITIS*…
Throat pain, red throat with or without white spots, Sore neck lymph nodes	ANGINA*…
Throat pain, Presence of false membrane,	DIPHTHERIA*…
Bloody diarrhoea or not, Vomiting, Colic	GASTROENTERITIS*…
Prolonged fever not responding to properly administered antimalarial treatment. Dissociation between pulse and temperature	THYPHOID FEVER*…
Abdominal pain, Painful urination, Cloudy urine, Vomiting and Diarrhoea (in children)	URINARY TRACK INFECTION*…
Skin rash, several cases in the entourage	VIRAL DISEASES *: MEASLES, CHICKENPOX etc.

SIGNS AND SYMPTOMS	DIFFERENTIAL DIAGNOSIS: Also look for
Unilateral or bilateral swelling behind the cheek	**MUMPS…**
Functional impairment, Local inflammatory signs of a limb	**OSTEO-ARTHRITIS*, CELLULITIS, ERYSIPELAS…**
Fever resistant to properly administered treatment, deterioration of the general condition	**SEPTICEMIA*…**
Jaundice, enlarged liver, right hypochondrium pain	**HEPATITIS*….**
Muscle and joint pain, lymphadenopathy, skin rashes	**DENGUE*…**
Muscle pain and fever	**CHIKUNGUNYA*…**

** See appropriate algorithms*

If you have any of the above diagnoses, treat the related condition. Always consider performing RDT or microscopy because malaria can be associated with other febrile illnesses.

If the test is negative, look for another cause of fever and treat it See Table I.

If the test is positive and malaria diagnosis is confirmed, the case should be classified as uncomplicated malaria or severe malaria.

Action to take in case of fever, see management algorithm (Page 62-67)

4.1.1. What is uncomplicated malaria?

Malaria is said to be uncomplicated when the patient shows no sign of severity (see Table III), with a positive parasitological examination (RDT or microscopy). Its clinical picture may include; isolated fever, history of fever or fever associated with one or more of the following symptoms:

- Chills
- Excessive sweating
- Headaches (Migraine)
- Body pains
- Fatigue
- Joint pain
- Abdominal pain
- Digestive disorders (loss of appetite, nausea, episodic vomiting that does not prevent taking oral medications, liquid stools without signs of dehydration)

4.1.2. What is severe malaria?

Malaria is said to be severe when the patient presents: one or more of the severe signs of malaria listed in the table below and a positive parasitological examination (RDT or microscopy).

Table III: Clinical and biological signs of severe malaria

Clinical severity criteria
PERSISTENT VOMITING (preventing oral treatment)
DISORDER OF CONSCIOUSNESS (agitation, confusion, delirium, obtundation, drowsiness, coma)
ACUTE RESPIRATORY DISORDER OR DISTRESS (shortness of breath, rapid breathing, inhalation, etc.): respiratory rate >24 cycles/min in adults and in children ≥ 50 cycles/min (Infant 2 – 12 months) and ≥ 40 cycles/min (Child 12 -59 months), signs of struggle, cyanosis, SaO2 < 92% in ambient air, presence of crackling noise
EXTREME FATIGUE: Inability to sit, stand or move without support
CONVULSIONS: tonic-clonic contractions of the limbs, abnormal movements **NB**: ***A single convulsion is enough to classify malaria as severe.***
MODERATE TO SEVERE DEHYDRATION: extremely thirsty, inability to drink or breastfeed, restlessness, irritability, extreme fatigue; abdominal skin fold that returns slowly (lazy) or very slowly (> 2 seconds), dry lips, sunken eyes, sunken anterior fontanelle, absence of tears, unconsciousness
JAUNDICE: yellow colouring of the integuments and mucous membranes
METABOLIC ACIDOSIS: deep and laboured Kussmaul-type breathing

Clinical severity criteria
CARDIOVASCULAR COLLAPSUS OR SHOCK STATE low BP (systolic BP < 70 mmHg in adults or < 50 mmHg in children) or uncontrolled BP, rapid and weak pulse, cold extremities, skin recoloration time > 3 seconds
ABNORMAL SPONTANEOUS BLEEDING: Epistaxis, gingivorrhagia, vaginal bleeding in pregnant women, bleeding at injection sites, etc.
SEVERE ANAEMIA: revealed by extreme pallor (look at the conjunctivas, palms of the hand and soles of the feet, especially in children)
URINE: dark or "coca cola" coloured
RARE OR ABSENT URINE (Acute kidney failure): less than 400 ml of urine per day in adults and less than 12ml /kg/day in children
HIGH TEMPERATURE: in children under 5 years T > 40ºC (rectally) or > 39.5°C (axillary)
Biological criteria and other observations of severity
SEVERE ANAEMIA Haemoglobin level < 5g/dl or Haematocrit < 15% in children, Haemoglobin level < 7g/dl or Haematocrit < 21% in adults and pregnant women.
HYPERPARASITEMIA : parasitaemia ≥ 250,000 trophozoites/mm ^{3} of blood **NB:** The relationship between high parasitaemia and severity depends on the level of malaria transmission (endemicity); it will always be necessary to compare the clinical examination with biological examination.

Clinical severity criteria
HYPOGLYCEMIA: blood sugar < 54 mg/dl or < 3 mmol/l
HEMOGLOBINARIA: presence of haemoglobin in urine detected with the urine strip
METABOLIC ACIDOSIS: bicarbonate blood level < 15 mmol/l
HYPERLACTATEMIA: lactic acid > 5 mmol/l
ACUTE KIDNEY FAILURE: serum creatinine ≥ 265 mmol/l or 30 mg/l
ACUTE PULMONARY OEDEMA (APO): bilateral hilary enlargement with interstitial syndrome on chest x-ray

NB: If the HF cannot perform a blood sugar test, any child under 5 years of age with severe malaria must be considered a hypoglycaemic patient and should receive 5ml/kg of SG 10% IV.

If the patient's RDT or microscopy is positive and has one of the above severity signs, immediately administer through the parenteral route the 1st dose of injectable Artesunate (IV or IM) or injectable Artemether (IM) if Artesunate is unavailable and refer him if necessary to the appropriate level as soon as possible.

New patients: They should be treated as severe malaria cases only if they show signs of severity. Otherwise, consider them as uncomplicated malaria cases.

4.2. Biological diagnosis of malaria

4.2.1. Who should be tested for malaria?

All patients suspected of malaria (as defined above) before treatment initiation at all levels of the health pyramid, including in the community.

All patients, regardless of malaria diagnostic test results, should be thoroughly investigated for other causes of fever and diseases.

NB: A patient with fever may simultaneously have malaria and another cause of fever.

All patients tested for malaria, especially those with negative test result, should receive treatment according to the etiology of their fever and be informed of the need to return immediately if symptoms or fever persist longer than 12 hours.

If, during follow-up the patient still meets the definition of suspected malaria, he or she should be retested for malaria.

If febrile patients return for a follow-up visit more than two weeks after malaria treatment, they should be considered to have a new episode of fever and tested by RDT or microscopy (see **Malaria management algorithm (**Pg. 62-67).

For patients presenting signs of severity at the peripheral level or in an HF that does not have an adequate technical platform, an RDT should be performed immediately and if the test result is negative, symptomatic treatment should be administered before referral.

4.2.2. Recommended diagnostic tests

In HFs, diagnosis will be performed by RDT or microscopy, depending on the level and technical platform.

Until a QA/QC system is made operational at the national level, microscopy should only be carried out in public and private health facilities with adequate equipment and trained staff. This guide recommends that microscopy be performed within hospitals as from district hospitals and others of the same category, including accredited laboratories. As for other health facilities (IHC, MHC and others of the same category), microscopy will be subject to the availability of qualified personnel and adequate technical platform.

In all cases, competent authorities will ensure the verification of best practices in accordance with QA/QC standards with a view to the certification of HFs at all levels.

The algorithm for malaria diagnosis per level is found in the Figures in Appendix 1, 2, 3).

4.2.2.1. RDTs

There are several types of RDTs for malaria diagnosis. In Cameroon, two tests are recommended:

1. HRP-2 RDTs for the detection of *P. falciparum* malaria. HRP2 may be positive for 2-3 weeks after elimination of the parasite from the blood and is not suitable for post-treatment monitoring.

2. pLDH RDTs for the detection of *P. falciparum* and/or non- *falciparum* malaria. pLDH RDT may be useful for post-treatment monitoring.

NB: RDT does not measure parasitemia, if it's possible to take a sample, it should be sent to the nearest reference structure depending on the clinical picture.

- **Who should conduct RDT?**

At the **community level**, RDT diagnosis is conducted by the **MCHW**. RDTs will also be made available to school infirmearies and secondary schools, including hospital pharmacies, to increase the rate of diagnosis of suspected cases before treatment.

RDT can be conducted by **anyone trained in accordance with national malaria diagnosis and QA/QC guidelines.** The usage of RDTs must be governed by a rigorous External Quality Control (EQC) system or by an RDT competency evaluation system.

All RDTs purchased must comply with national QA/QC guidelines or recommended by WHO. These tests must be subject to batch quality controls upon receipt and must be stored under the required conditions.

It is necessary to set up an internal Quality Assurance system for RDTs including records and analysis of results on a daily basis, then monitor any abnormal number of HRP2 negative RDTs which may indicate the presence of the strains of *Plasmodium* having a deletion of the HRP2 gene among others.

- **How are RDTs conducted?**

All RDTs should be performed in accordance with the **NMCP malaria diagnostic guidelines** and in accordance with **relevant standard operating procedures**, taking into account the manufacturer's recommendations.

4.2.2.2. Microscopy

- **Who should perform microscopy?**

It can be done by **anyone trained in accordance with national malaria diagnosis and Quality Assurance guidelines** (Prohibited at the community level).

Trained personnel must be certified and enrolled in an EQC programme or microscopy competency assessment system.

- **Quality assurance in microscopy (see Quality Assurance guide.)**

It consists of two modalities, namely: internal control and external evaluation.

Internal Quality Control is a set of measures that the service provider must take from equipment, reagents, readings to the rendering of results, to reassure themselves of the reliability of the diagnosis in their health facility. This internal control can be done daily, weekly, monthly or quarterly depending on the type of activities in the laboratory.

The external evaluation of the quality of biological diagnosis of malaria is carried out by the superior level: the community and health area by the district, the district level by the regional level, the regional level by the central level, and the central level by experts.

External Quality Assessment (EQA) consists, among other things, (see QA/QC manual):

- Blind verification of routine slides and RDT cassettes of the lower level by the structure of the superior level,

- Reading the RDT slides and cassettes selected and sent by the higher level (supervisor) to the lower level (supervised),
- Supervisory training (evaluation of the work environment, coaching, etc.)

Therefore, all microscopes, consumables and laboratory reagents must comply with national QA/QC guidelines or as recommended by WHO, reagents must be subject to batch quality control upon receipt and must be stored under the conditions indicated.

External Evaluation will be carried out quarterly.

- **How to do a good microscopy**

❖ Microscopy should be performed in accordance with national malaria diagnostic guidelines and Standard Operating Procedures (SOPs).

❖ As a reminder, thick film and blood smear must be carried out, and on the same slide for each patient (see SOP).

The necessary equipment include: a microscope in good condition and functional, regularly maintained (systematically cleaned and well covered after a reading), good quality reagents. Staff must be trained in malaria microscopy and regularly retrained.

Regular assessment of staff skills is necessary. It will be carried out once every two years (for retraining) including quarterly on-site supervisory training.

4.2.3. Where should microscopy be performed?

- Reference hospital (general, central, and regional hospitals, etc.).
- Reference laboratories.
- Regional hospital and others of the same category

- District hospital and others of the same category certified for microscopy

NB: As a general rule, community agents, IHCs, MHCs and those of the same category will not be able to carry out microscopy. Only MHCs and others of the same category certified for microscopy will be able to carry out microscopy within their HF.

All HFs must be regularly subjected to external quality assessment.

A list of HFs certified to perform microscopy will be regularly updated and distributed to all healthcare providers at the MOH level.

To be certified, a Certification request for microscopy must be sent to the Minister of Public Health care of the NMCP (see QA/QC manual).

SUMMARY: BIOLOGICAL DIAGNOSIS OF MALARIA

Biological diagnosis to confirm malaria is mandatory before any treatment:

- Any suspected case of malaria must benefit from a diagnostic test,
- Malaria diagnosis is mainly done by RDT.
- Microscopy will be conducted by HFs with an adequate technical platform. These HFs include General hospitals, University Teaching hospitals, central hospitals, RHCs, regional hospitals, reference laboratories. The district hospitals and others of the same category, certified for microscopy from the competent authorities can also perform microscopy for malaria testing.

  Furthermore, HFs of the lower level (MHC, IHC and others of the same category) having obtained prior certification will also be able to perform microscopy.

  A list of HFs certified to perform microscopy will be regularly updated and distributed to all healthcare providers by the MOH.

  Any structure involved in the biological diagnosis of malaria must participate in an internal QA/QC and EQA programme.

V. MALARIA MANAGEMENT ALGORITHM

V. MALARIA MANAGEMENT ALGORITHM

5.1. Malaria management algorithm based on the "fever" symptom in an HF

- Fever may be present (temperature equal to or greater than 38°C rectally or 37.5°C axillary) when the patient is seen or during consultation. Fever can also be evidenced by a body that is hot when touched.
- Clinical assessment searches for signs of severity.

5.1.1. In the event of one or more signs of severity:

- **In a health centre or HF that does not have an adequate technical platform: do RDT.**

  - If RDT is positive, give the first dose of injectable Artesunate preferably IV or IM; or Artemether injectable by IM route and immediately refer to a health facility with an adequate technical platform;

  - If RDT is negative, refer immediately or follow the Integrated Management for newborn and Childhood Illnesses (IMNCI) algorithm (Appendix …).

- **In a hospital: Do RDT or Microscopy** (to confirm or rule out the diagnosis of malaria)**.**

  - If the parasitological test is positive, administer injectable Artesunate IV or IM, or injectable Artemether IM.
  - If the test is negative, look for another cause of fever and seek appropriate treatment. If in doubt, repeat the test at the time of the thermal peak, preferably microscopy.

5.1.2. If there are no signs of severity:

Do RDT or Microscopy.

- If positive, treat uncomplicated malaria with:
    - In the Far North and North regions: AL, DHA-PQ, AS-PY
    - In the other 8 regions: AL, ASAQ, DHA-PQ, AS-PY

NB: It is recommended to prescribe the subsidized and free antimalarial drugs in priority (AL, ASAQ, for now).

- If negative, look for another cause of fever and seek appropriate treatment. If in doubt, repeat the test at the time of the febrile peak, preferably microscopy.

NB: Do not treat as malaria in the event of a negative test.

✓ Reassess the patient's condition after 48 hours or before if it worsens.

- If there is improvement, continue treatment until completion.
- If fever persists or resurfaces after 48 hours after initial treatment
    - Reassess the patient for signs of severity
    - Hospitalize or refer if there are signs of severity
    - Perform microscopy
    - Look for other causes of fever and treat.

If positive microscopy result:

➢ Check drug intake (effectiveness and conditions of administration, quality of the medication, doses, duration).

➢ If the treatment is taken incorrectly (inadequate dose, interval between doses or duration), repeat the same molecule while ensuring that the ACT is taken

correctly for uncomplicated malaria or administer injectable Artesunate or Artemether or Quinine if onset of signs of severity;

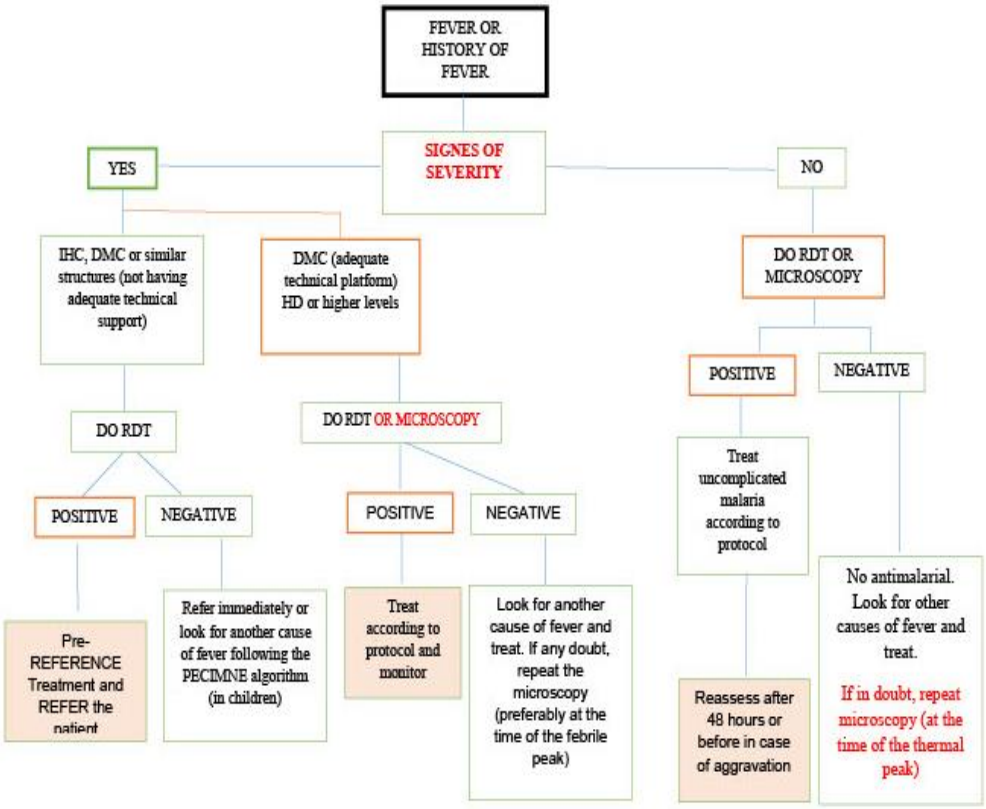
- If the treatment was taken correctly, choose another ACT from that which was initially administered (uncomplicated malaria) or another molecule (severe malaria), ensuring that it is taken correctly.

If negative microscopy result:

- Another cause of the fever should be investigated and treated or if necessary, the patient should be referred to the appropriate level.

Note: School infirmearies and hospital pharmacies are considered to be at the community level.

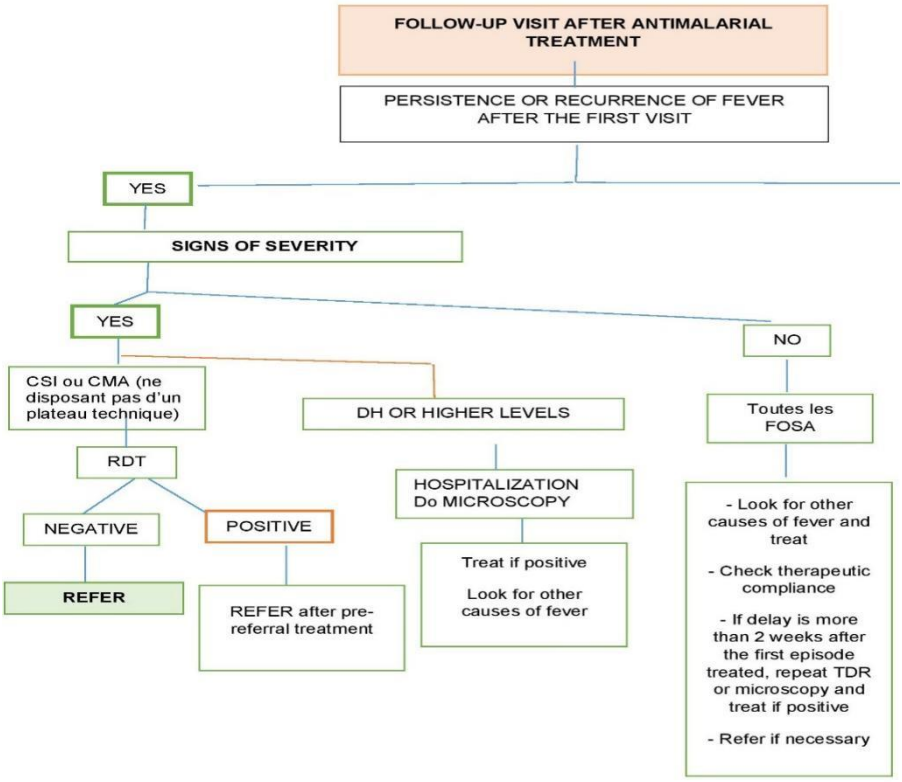
ALGORITHM FOR MALARIA MANAGEMENT AT FIRST VISIT



***DMC**: District Medical Centre*
***IHC**: Intergrated Health Centre*
***DH**: District Hospital*
***IMNCI**: Intergrated Management of Newborn and Childhood Illnesses*
***RDT** : Rapid Diagnostic Test*

Figure 1: Malaria management algorithm at 1st visit

ALGORITHM FOR MALARIA MANAGEMENT AT SECOND VISIT



ACT : *Artemisinin Combine Therapy*
DMC : *District Medical Centre*
CSI : *Intergrated Health Centre*
HD : *District Hospital*
RDT : *Rapid Diagnostic Test*

Fig 2 : malaria management algorithm at 2nd visit
(At least 48 hours after the start of treatment)

VI. TREATMENT OF UNCOMPLICATED MALARIA

VI. HOW TO TREAT UNCOMPLICATED MALARIA ?

All suspected cases of malaria should be tested for diagnosis by RDT or microscopy. The therapeutic objective is to treat malaria infection as soon as possible, eliminate parasites that cause infection and stop the disease from progressing, decrease transmission by reducing the infectious reservoir, then prevent the emergence of drug resistance.

The treatment of uncomplicated malaria is based on the use of a combination of two antimalarial drugs, including an artemisinin derivative. In Cameroon, the combinations selected are as follows:

- Artemether + Lumefantrine (AL),
- Artesunate +Amodiaquine (AS-AQ);
- Dihydroartemisinine + Piperaquine (DHA-PQ).
- Artesunate + Pyronaridine (ASPY).

These combinations are known under the acronym ACT (Therapeutic Combination Based on Artemisinin Derivatives). They are administered orally with an antipyretic in case of temperature greater than or equal to 38.5°C.

The duration of the ACT therapeutic protocol is 3 days.

6.1. Antimalarial combinations based on Artemisinin

6.1.1. Artemether +Lumefantrine (AL) combination.

This is a fixed dose combination, with each tablet containing either:

- 20mg/ Artemether and 120mg Lumefantrine
- 40mg/Artemether and 240mg Lumefantrine

- 60mg/ Artemether and 360mg Lumefantrine
- 80mg/Artemether and 480mg Lumefantrine.

The maximum daily dose should not exceed 160 mg/Artemether and 960 mg Lumefantrine, per day, in adults. Tablets for paediatric use are scored and dispersible. They should be taken with a meal rich in lipids.

There are dispersible paediatric forms containing 20 mg Artemether and 120 mg Lumefantrine in fixed doses for easy administration.

NB: Only dispersible forms are recommended. Suspension and syrup forms are unstable and are not recommended.

6.1.2. Artesunate + Amodiaquine combination

Four presentations exist:

- 3 tablets each dosed with 25 mg Artesunate + 67.5 mg Amodiaquine
- 3 tablets each dosed with 50 mg Artesunate + 135 mg Amodiaquine
- 3 tablets each dosed with 100 mg Artesunate + 270 mg Amodiaquine and
- 6 tablets each dosed with 100 mg Artesunate + 270 mg Amodiaquine

6.1.3. Dihydroartemisinine + Piperaquine 40mg/320mg combination (DHA-PQ)

These are co-formulated tablets of Dihydroartemisinine (DHA) and piperaquine (PQ) which come in blister pack form, for a complete treatment for one individual. They must be administered as a single daily dose at the same time for 3 consecutive days.

5 different presentations exist:

- Tablet of 20 mg DHA/160 mg of PQ blister of 3 tablets
- Tablet of 40 mg DHA/320 mg of PQ blister of 3 tablets
- Tablet of 40 mg DHA/320 mg of PQ blister of 6 tablets
- Tablet of 40 mg of DHA/320 mg of PPQ blister of 9 tablets
- Tablet of 40 mg DHA /320 mg of PQ blister of 12 tablets

6.1.4. Artesunate + Pyronaridine combination

This is a fixed combination of Artesunate (AS) and Pyronaridine Tetraphosphate, a blood schizonticide.

Two presentations exist:

- Tablets of 180 mg Pyronaridine and 60 mg Artesunate
- Sachets of 60 mg Pyronaridine and 20 mg Artesunate.

6.2. Treatment protocol

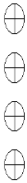
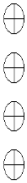
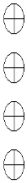
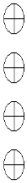
6.2.1. Artemether + Lumefantrine (AL) combination

It should be taken with a meal rich in lipids**.**

Dosage:

- Artemether/Lumefantrine: 4mg/24mg/kg per day in 2 doses for 3 days
- NB: Respect the interval of 8 hours between the first 2 doses

Table IV: Dosage of the AL fixed combination according to weight and age

WEIGHT OF THE PATIENT (Kg)	AGE	► DOSAGE OF ARTEMETHER – LUMEFANTRINE 20MG/120MG					
		1st day : two intakes		2nd day : two intakes		3rd day : two intakes	
		H0 (Immediately)	H8 (8 hours later)	Morning	Evening	Morning	Evening
Less than 5 Kg		¾ cp	¾ cp	¾ cp	¾ cp	¾ cp	¾ cp
5 to < 15	1month – 2yrs						
15 to < 25	3 – 8yrs						
25 to < 35	9 – 11yrs						
35 and above	>11 yrs						

6.2.2. Artesunate + Amodiaquine Combination

It must be administered as a single daily dose at the same time every day for 3 consecutive days. **It should be taken during meals** for better tolerance. Tablets for paediatric use are scored or dispersible.

Dosage

Table V: Dosage for fixed AS-AQ combination based on weight and age

WEIGHT OF THE PATIENT (Kg)	AGE	PRESENTATION	1st day	2nd day	3rd day
≥4,5 to <9	2 – 11 months	**Artesunate + amodiaquine 25mg/67.5mg blister of 3 tablets**	⊕	⊕	⊕
≥9 to <18	1 – 5 yrs	**Artesunate + amodiaquine 50mg/135mg blister of 3 tablets**	⊕	⊕	⊕
≥18 to < 36	6 – 13 yrs	**Artesunate + amodiaquine 100mg/270mg blister of 3 tablets**	⊕	⊕	⊕
≥ 36	14 yrs and above	**Artesunate + amodiaquine 100mg/270mg blister of 6 tablets**	⊕ ⊕	⊕ ⊕	⊕ ⊕

6.2.3. Dihydroartemisinin + Piperaquine 40mg/320mg combination (DHA-PQ)

Dosage:

- Child from 5 to 25 kg: 2.5 to 10 mg/kg per day of DHA + 20 to 32 mg/kg per day of PQ
- Children above 25 kg and adults: 2 to 10 mg/kg per day of DHA + 16 to 27 mg/kg per day of PQ

Table VI: Dosage of DHA-PQ based on the weight

Weight	Tab of 20 mg/160 mg	Tab of 40 mg/320 mg
5 to < 8 kg	1 Tab	–
8 to < 11 kg	1½ Tabs	–
11 to < 17 kg	–	1 Tab
17 to < 25 kg	–	1½ Tab
25 to < 36 kg	–	2 Tabs
36 to < 60 kg	–	3 Tabs
60 to < 80 kg	–	4 Tabs
≥ 80 kg	–	5 Tabs

NB: In all cases, avoid administering Dihydroartemisinin/piperaquine (DHA-PQ) more than twice a year.

Remarks:

- ❖ Pregnancy: No contraindication
- ❖ Breastfeeding: No contraindication
- ❖ Not recommended during meals (2-3 hours after or before the meal) with a glass of water.
- ❖ Tablets can be crushed and mixed in water.
- ❖ Storage: temperature below 25°C

6.2.4. Artesunate + Pyronaridine combination

Dosage:

- For adults and children weighing more than 20 kg: 180 mg/60 mg, film-coated tablets, 1 to 4 tablets, once a day at the same time, for three consecutive days, with or without food.

- For children weighing 5 to 20 kg: 60 mg/20 mg, granules for oral suspension suitable for children, taste masked, dissolves in 2 teaspoons of liquid. 1 to 3 sachets depending on weight, once a day at the same time, for 3 consecutive days.

The dosage is as follows:

Table VIIa: Dosage of AS-PY based on the weight of the granule forms of oral suspension for persons below 20 kg

Weight of patient (Kg)	DAY 1	DAY 2	DAY 3
5kg <8kg	1 sachet	1 sachet	1 sachet
8kg <15kg	2 sachets	2 sachets	2 sachets

Weight of patient (Kg)	DAY 1	DAY 2	DAY 3
15kg <20kg	3 sachets	3 sachets	3 sachets

Step 1: Pour the granules into a small quantity of water

Step 2: Stir gently until the granules form a uniform suspension.

Step 3: Give the medicine and make sure the child drinks all of the medicine.

Table VIIb: Dosage of AS-PY based on the weight of tablet forms for persons above 20 kg

Weight of patient (kg)	DAY 1	DAY 2	DAY 3
20kg to <24kg	1 Tab	1 Tab	1 Tab
24kg to <45kg	2 Tabs	2 Tabs	2 Tabs
45kg to <65kg	3 Tabs	3 Tabs	3 Tabs
>65kg	4 Tabs	4 Tabs	4 Tabs

Remark

- Can be taken with or without meals;
- Can be co-administered with Primaquine for the radical treatment of *P. vivax* malaria;

6.2.5. Antipyretics/analgesics

Indication: temperature ≥38.5ºC or pain.

The following medications are recommended for symptomatic management of fever and pain particularly in children under five years of age:

Paracetamol (oral or rectal form)

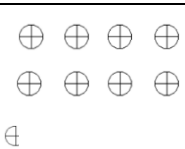
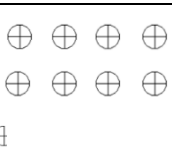
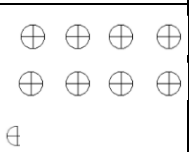
60 mg/kg per day in 4 doses (every 6 hours), maximum dose 3g/day in adults.

- The recommended form for children is the 100 mg tablet.

Dosage is determined based on age or weight

If you have a scale, it is preferable to use the weight which is more precise than the age.

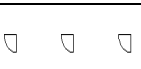
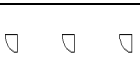
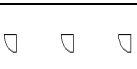
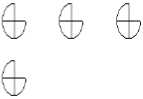
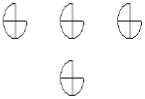
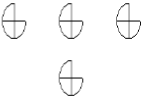
Table VIII: Dosages of paracetamol 100mg

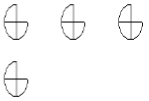
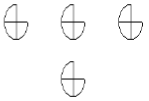
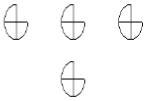
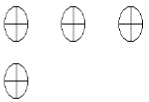
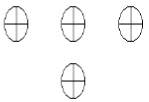
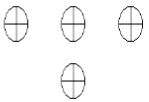
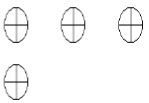
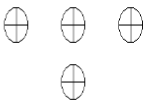
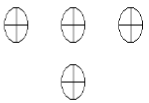
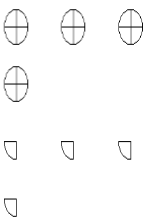
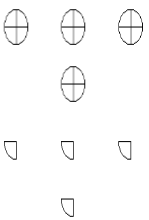
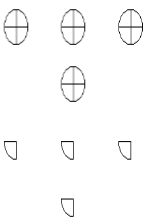
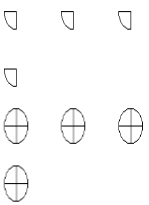
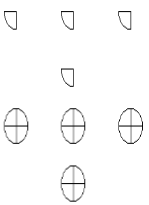
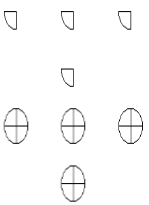
Weight of patient (Kg)	AGE	Dose of Paracetamol 100mg		
		Day 1: 4 doses	Day 2: 4 doses	Day 3 : 4 doses
3 to 4	1 – 2 months			
5 to 7	3 – 6 months			
8 to 10	7 – 11 Months			
11 to 15	1 – 3 Yrs			
16 to 20	4 – 6 Yrs			

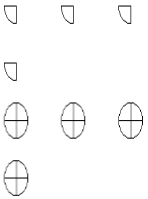
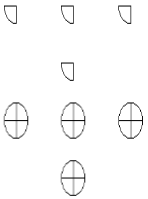
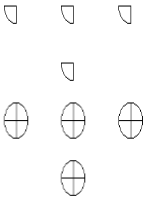
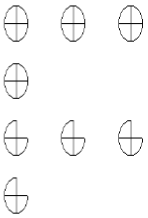
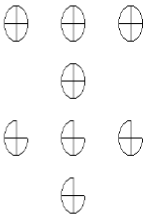
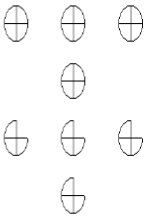
- **500 mg Tabs**

The 500 mg form is mainly indicated for adults, but in the absence of 100 mg tablets it can be used for children.

Table IX: **Dosages of paracetamol 500mg**

Weight of the patient (kg)	AGE			
		Day 1: 4 doses	**Day 2: 4 doses**	**Day 3: 4 doses**
3 to 4	**1 – 2 months**			
5 to 7	**3 – 6 months**			
8 to 10	**7 – 11 months**			
11 to 15	**1 – 3 yrs**			
16 to 20	**4 – 6 yrs**			
21 to 25	**7 – 8 yrs**			

Weight of the patient (kg)	AGE			
		Day 1: 4 doses	Day 2: 4 doses	Day 3: 4 doses
26 to 30	9 – 10 yrs			
31 to 35	10 – 11 yrs			
36 to 40	11 – 13 yrs			
41 to 45	13 – 14 yrs			
46 to 50	14 – 15 yrs			

Weight of the patient (kg)	AGE			
		Day 1: 4 doses	Day 2: 4 doses	Day 3: 4 doses
51 to 55	15 – 16 yrs			
56 and above	≥ 16 yrs			

- **Paracetamol suspension**

The dosage is 15mg/kg/6 hours.

In addition to the administration of paracetamol, physical measures are also recommended to reduce fever in children (wraps or lukewarm baths).

6.3. Management of uncomplicated malaria in specific populations

6.3.1. Pregnant women

In pregnant women, the severity of malaria is linked to foetal complications due particularly to the invasion of the placenta by parasitized red blood cells which can occur during pregnancy. Symptoms and complications related to malaria during pregnancy vary depending on the intensity of malaria transmission in a given geographic area, as well as the

individual level of acquired immunity. In this regard, we can distinguish the manifestations of uncomplicated malaria from those of severe malaria.

Uncomplicated malaria in pregnant women, whether febrile or not, should be considered an emergency and its management should be done in the HF and on an outpatient basis. The antimalarial treatment in this case is that of uncomplicated malaria.

6.3.1.1 Recognizing uncomplicated malaria in pregnant women

- **Uncomplicated malaria**

The signs and symptoms are similar to those of the general population in the context of uncomplicated malaria and the clinical diagnostic criteria are identical to those of adults.

Malaria is said to be uncomplicated when the pregnant woman presents symptoms of malaria and a positive parasitology test (RDT or microscopy), without any sign of severity. Its clinical picture may include isolated fever, a history of fever or fever associated with one or more of the following symptoms:

- Chills
- Profuse sweating;
- Headaches (migraines);
- Body pains
- Fatigue;
- Joint pain;
- Abdominal pain;
- Digestive disorders (loss of appetite, nausea, episodic vomiting which does not prevent the taking of oral medication, liquid stools without signs of dehydration)

6.3.1.2. Treatment of uncomplicated malaria in pregnant women

- **1st trimester**

First line Artemether + Lumefantrine 80/480mg: 1 tab 2 times/day for 3 days

2nd line: if Artemether + Lumefantrine (AL) not available or intolerance prescribe Quinine orally (for 7 days)

Dosage:

Oral quinine: 8.3mg/kg of quinine base every 8 hours (total treatment duration of 7 days) maximum daily dose: 1.5g.

NB:

AL is now the first-choice treatment during the first trimester in pregnant women

Foetal complications can be potentially serious even in cases of uncomplicated malaria. The healthcare provider must therefore assess foetal well-being (uterine height, foetal heart sound, active foetal movements, etc.)

- **2nd and 3rd trimester**

1st line (several choices):

- Artemether + Lumefantrine (AL): 80/480mg 1 tab 2 times/day for 3 days

  or

  Artesunate + Amodiaquine (AS-AQ) 100mg/270mg/day for 3 days

  or

- Dihydroartemisinin + Piperaquine (DHA-PQ) 320 mg/40 mg: 3 tabs/day for 3 days.

2nd line

- Artesunate + Pyronaridine (AS-PY).

Dosage (as in adults above)

6.3.2. PLHIV

HIV-infected patients diagnosed with malaria must immediately receive effective antimalarial treatment in accordance with the recommendations summarized in the table below:

Table X. Recommendations for malaria management in PLHIV

No.	Specificities of the PLHIV population	Recommendations
1	Any PLHIV with severe malaria	Treat severe malaria in the general population according to management recommendations
2	Any PLHIV	Avoid over-exposure (repeated treatments) to Artesunate/Sulfadoxine Pyrimethamine (AS+SP)
3	In patients with HIV/AIDS and uncomplicated *P. falciparum* malaria treated with Cotrimoxazole	Artesunate + SP is not recommended
4	Any PLHIV on ARV (Efavirenz, Zidovudine) or its equivalent To avoid hepatotoxicity	Preferably administer Artemether/Lumefantrine (AL) Do not administer Artesunate/Amodiaquine (ASAQ)
5	PLHIV AIDS on ARV + Co-trimoxazole	Avoid Artesunate/Sulfadoxine pyrimethamine (AS+SP)

No.	Specificities of the PLHIV population	Recommendations
6	PLHIV treated with protease inhibitors (Ritonavir / Liponavir):	Avoid over-exposure to Artemether/Lumefantrine (AL)

6.3.3. G6PD deficiency

- Prevention of relapses in G6PD deficient persons of *P. vivax* infections: Primaquine base at a dose of 0.75 mg/kg/day, once a week, for 8 weeks, under close medical supervision (haemolysis risk);
- G6PD status unknown, and test unavailable: the decision to prescribe must take into account the risks and benefits;
- Pregnant and breastfeeding women with G6PD deficiency: Primaquine is contraindicated during pregnancy. Give IPT according to protocol until delivery. After delivery, give Primaquine to prevent relapse.

6.3.4. Malnourished persons (deficiency type)

Generally:

- Preferably administer Artemether/Lumefantrine (AL) with a meal rich in lipids;
- Avoid Dihydroartemisinin/piperaquine (DHA-PQ) ; Avoid iron supplementation;
- Give Riboflavin in small doses contained in multivitamins during convalescence;
- Advise breastfeeding

6.3.5. History of serious adverse events while taking ASAQ

In the event of adverse events during ASAQ intake (intense asthenia, extrapyramidal syndrome, rash, etc.), preferably administer Artemether/Lumefantrine (AL).

6.3.6. Non-immune travellers:

For non-immune subjects, the management is similar to that of the general population.

6.3.7. Heart rhythm disorders (QT segment)

❖ Avoid Dihydroartemisinin/Piperaquine (DHA-PQ) and Artesunate/Pyronaridine (ASPY)

6.3.8. Chronic liver disease

❖ Avoid Artesunate/Amodiaquine (ASAQ)

6.3.9. Psychiatric history

❖ Avoid Artesunate/Mefloquine (ASMF)

6.3.10. Other white blood cell pathologies (neutropenia).

❖ Avoid Artesunate/Amodiaquine (ASAQ)

6.3.11. Cases of overweight or BMI (Body Mass Index) ≥ 25 (>80kg) and underweight or BMI ≤ 18.5 (<40kg)

- **In case of overweight**

❖ Because of the risk of under-dosing, carefully monitor the treatment outcome (clinical and possibly microscopic evaluation).

❖ Adapt the dosage of Dihydroartemisinin/piperaquine (DHA-PQ) to the patient's weight (without exceeding 5 tablets of 40mg/320mg per day).

- **In case of underweight**

❖ Adapt the dosage of Dihydroartemisinin/piperaquine (DHA-PQ) to the patient's weight

❖ In all cases, avoid Dihydroartemisinin/piperaquine (DHA-PQ) more than twice a year.

6.3.12. Cases of simple malaria caused by P. ovale, P. malariae or P. knowlesi

Treatment is with ACTs combining piperaquine, mefloquine or lumefantrine, as for *P. falciparum* malaria. Treatment of *vivax* malaria has a dual objective: to cure the acute blood infection and to eliminate the hypnozoites from the liver in order to prevent subsequent relapses. This is known as "radical cure". ACTs are effective against all species of parasite, making them the treatment of choice for mixed infections.

Relapse prevention in cases of *P. vivax* or *P. ovale* malaria (2015)

In order to prevent relapses, children and adults with *P. vivax* or *P. ovale* malaria (with the exception of pregnant women, infants under 6 months of age, women breastfeeding infants under 6 months of age, women breastfeeding older infants unless they are known not to be G6PD deficient, and people with G6PD deficiency) should be treated with a 14-day course of Primaquine, regardless of the context of transmission (WHO, 2023).

USEFUL TIPS

Dispersible tablets should be dissolved in a small amount of water and possibly mixed with sugar, if necessary, to facilitate intake fof children or elderly patients.

In the event of fever, in addition to the antipyretic, it is advisable to:

Undress the child,

Give them water to drink regularly and increase feedings (infant),

Give them lukewarm baths or wraps in cloths moistened with lukewarm water if the fever persists,

Request for patient to be brought to the HF if signs of severity appear or if they do not improve after 24 hours.

Every prescriber should have the management algorithm with the dosage of drugs adopted in national policy.

Prescribers must respect the medications validated in the national policy document and the dosages according to age groups. All exceptional cases must be justified and documented. Regional Delegates for Public Health, Health Districts Heads, Hospital Directors and HF Heads are each responsible for monitoring the implementation of these guidelines. All situations of non-respect observed during supervision must be sanctioned.

Quality assurance

Quality assurance must ensure the proper management of drugs, monitoring of expiry dates, and adequate storage and transport conditions. The supervision grid must include quality control of drug stocks.

Ensure the implementation and proper maintenance of drug management tools. Store drugs properly: conditions of temperature, use and storage according to the FEFO rule (first expired first out) to avoid expirations.

Lay emphasis on pharmacovigilance by insisting on the training of health care providers, adapting pharmacovigilance sheets and making them available in health facilities, collection, analysis and feedback.

Pharmacovigilance must be integrated into the national health information system.

TREATMENT OF UNCOMPLICATED MALARIA

In the general population

- **Several choices:**

- **Artemether + Lumefantrine (AL), Artemether/Lumefantrine: 4mg/24mg/kg per day in 2 doses for 3 days**

- **Artesunate + Amodiaquine (ASAQ); Artesunate+ Amodiaquine: dosage based on weight and age, 1 dose per day for 3 days, to be taken during meals**

Dihydroartemisinin + piperaquine (DHA-PQ)

- **Children from 5 to 25 kg: 2.5 to 10 mg/kg per day of DHA + 20 to 32 mg/kg per day of PQ**

- **Children over 25 kg and adults: 2 to 10 mg/kg per day of DHA + 16 to 27 mg/kg per day of PQ**

Artesunate + Pyronaridine (AS-PY). For adults and children weighing over 20 kg: 180 mg/60 mg; For children weighing between 5 and 20 kg: 60 mg/20 mg.

NB: SUBSIDIZED ACTS WILL BE PRESCRIBED AS A PRIORITY

A therapeutic protocol should be used over 3 days with an ACT.

Combine with antipyretics/analgesics; paracetamol,

In pregnant women:

1st trimester;

a. **1st line: AL (Artemether/Lumefantrine 80mg/480 mg): 1 tablet twice a day for 3 days.**

b. **2nd line: the use of oral quinine 8.3mg/kg quinine base every 8 hours for 7 days will exceptionally be used in the event of unavailability or intolerance to the ACTs recommended for pregnant women.**

2nd and 3rd trimesters and during breastfeeding: several choices

ACT: Multiple choice as for adults, respecting contraindications.

VII. TREATMENT OF SEVERE MALARIA

VII. TREATMENT OF SEVERE MALARIA

After biological confirmation (positive RDT or positive microscopy), treatment for severe malaria is initiated in one of the following situations.

- Existence of one or more signs of severity;
- Complication with appearance of signs of severity under treatment for uncomplicated malaria.

Management of severe malaria must be carried out at the appropriate level. When the technical platform is not appropriate, refer the patient.

The patient must be referred after parenteral administration of the first dose of Artesunate injection by IV or IM, or Artemether injection by IM.

7.1. Pre-referral treatment

- **At community level:**

MCHWs should administer Artesunate suppositories to children under 5 years of age before referring them promptly to the nearest health facility.

NB: MCHWs should explain that this is only a pre-referral dose and does not replace anti-malarial treatment.

Dosage (10mg/kg)

Table XI: Dosage of Artesunate suppository

Age Weight	2 to 5 months 5 to 7kg	From 6 months to 3 years 8 kg to 14 kg	3 years to 5 years 14 kg to 20 Kg
Suppositories 50 mg	**1**	**2**	**-**
Suppositories 100 mg	**-**	**1**	**2**
Suppositories 200 mg	**-**	**-**	**1**

- **In health facilities**

In health facilities, if the technical platform does not enable a case of severe malaria to be managed adequately, the health staff should refer the patient to the next level, but the patient must first be given a pre-reference anti-malarial treatment as follows:

- **In children, a single dose of any of the following according to body weight**

a) Artesunate IM injection

The dosage is as follows:

- If weight < 20kg: give 3 mg/kg body weight
- If weight ≥ 20kg: give 2.4mg/kg of body weight in a single dose, then refer the patient.

b) Artemether injection (IM)

The dosage is as follows: 3.2mg/kg bodyweight in a single dose, then refer the patient.

c) Rectal Artesunate by the Multi-purpose community health worker (MCHW)

The dose is 10mg/kg body weight in a single dose, then refer the patient.

NB: In the event of stock-outs or inability to administer the parenteral pre-referral treatment, health workers at the Health facility level may administer Artesunate Suppository as a pre-referral treatment.

Do not forget the prevention and/or treatment of other complications presented by the patient. Referral must be made immediately to the appropriate health facility for proper management.

7.2. Curatives treatment

Treatment should always be initiated parenterally for at least 24 hours (even if the patient is able to take oral treatment), followed by oral ACT for 03 consecutive days, as soon as the patient is able to drink.

Three lines of treatment are possible:

- Artesunate injection as first-line treatment, or as an alternative,
- Artemether injection as second-line treatment
- Quinine injection as a third-line treatment

The dosage for the management of severe malaria is presented below.

7.2.1. First line: Treatment with Artesunate injection

Dosage :

This is 2.4 mg/kg (or 3mg/kg in children less than 20 kg) at time 0 (H0), 12 hours later (H12) and 24 hours (H24) after the start of the first dose; then once every 24 hours until the patient is able to take oral treatment.

Route of administration:

Artesunate Injection is preferably administered intravenously (IV) or, review, intramuscularly (IM).

7.2.2. Second line: Treatment with Artemether Injection

This treatment will be administered in the absence of Artesunate injection.

Adult dosage:

D1:80mg in two doses (12 hours interval), administered by IM injection.

From D2: 80mg once a day by IM injection, until the patient is able to drink.

Then take ACT orally for 03 consecutive days.

Artemether injection will be continued for 6 consecutive days if the oral relay cannot be carried out.

Dosage for children:

D1: 3.2 mg/kg per day, in two doses (12 hours interval), administered by IM injection.

From D2: 1.6 mg/kg, once a day until the patient is able to drink

Then follow with an oral ACT for 03 consecutive days

The treatment will be continued for 6 consecutive days if the oral relay cannot be done.

The injection is done into the upper outer quadrant of the buttock in adults and the anterior aspect of the thigh in children.

7.2.3. Third line: Treatment with Quinine

Regimen 1: *(see details in Appendices 9, 10 , 11 and 12)*

This regimen uses a loading dose of quinine:

At D1:

- **Loading dose:** 16.6 mg/kg of quinine base (see appendix 8 for quinine salt equivalents). In 5% or 10% glucose serum with electrolytes (NaCl, KCl, Calcium gluconate) without exceeding 1g of quinine base, to be administered over 4 hours.

- 8 hours after starting the loading dose, give 8.3mg/kg of quinine base in 5% or 10% glucose serum over 4 hours, without exceeding 500mg of quinine base per dose.

From day 2:

- **Maintenance dose**: 8.3mg/kg of quinine base in 5% or 10% glucose serum to be administered over 4 hours every 8 hours, without exceeding 500mg of quinine base per dose.

Regimen 2:

This regimen does not use the loading dose:

Quinine base: 8.3 mg/kg of quinine base in 4-hour infusions, every 8 hours, not exceeding 500 mg of quinine base per dose.

Maximum dose: 1.5 g of quinine base per day.

If the patient has received quinine within the previous 24 hours or Mefloquine within the previous 7 days, or if the patient has a heart condition, the loading dose should not be administered, only the non-loading dose regimen should be followed in this case.

Whichever regimen is chosen, the next dose should be taken orally as soon as the patient is able to swallow, using an ACT for 3 consecutive days.

NB: treatment for severe malaria should be given parenterally for at least 24 hours before switching to the oral regimen.

7.2.4. Treatment of severe malaria caused by other plasmodial species (P. vivax)

Although severe *P. vivax* malaria is considered benign, with a low case-fatality rate, there are cases in which *P. vivax* causes a debilitating febrile illness with progressive anaemia and may also occasionally cause severe illness, as in the case of *P. falciparum* malaria. Reported manifestations of severe *P. vivax* malaria include severe anaemia,

thrombocytopenia, acute pulmonary oedema and, more rarely, cerebral malaria, pancytopenia, jaundice, splenic rupture, haemoglobinuria, acute renal failure and shock.

Prompt and effective treatment and case management should be the same as for severe *P. falciparum* malaria (see section 5.5.1). After parenteral artesunate, treatment may be completed by a full course of oral ACT or chloroquine (in countries where chloroquine is the treatment of choice). A complete radical course of primaquine should be administered after recovery (WHO, 2023).

7.3. Specific case of severe malaria in pregnant women

Severe malaria in pregnant women, whether febrile or not, is an emergency and requires hospitalisation. Antimalarial treatment in this case will be the same as for severe malaria.

7.3.1. Diagnosing severe malaria in pregnant women

The diagnosis of severe malaria is made if the pregnant woman presents one or more of the following severe criteria:

- **Clinical criteria**
    - Impaired consciousness (drowsiness, agitation, confusion, delirium, coma)
    - Incoercible vomiting preventing oral treatment
    - Generalised weakness/prostration preventing walking with or without assistance, or sitting up
    - Convulsions (one is enough)
    - Deep breathing, respiratory rate greater than 30 cycles per minute, heart rate greater than 100 beats per minute (bpm) (respiratory distress)
    - Bilateral pulmonary crackles at the bases (severe pulmonary oedema)

- Pallor, cold extremities, systolic BP < 80 mmHg, pulse greater than 110 bpm (anaemia/shock)
- Coca cola coloured urine (haemoglobinuria)
- Diuresis (oligo-anuria) = less than 400cc/24h or no urine (acute renal failure)
- Clinical jaundice/yellowing of the conjunctivae with signs of dysfunction of other vital organs
- Vaginal bleeding
- Pelvic pain or lumbopelvic pain with uterine contractions (signs of labour)

Biological criteria

- Hypoglycaemia (blood glucose < 2.2 mmol/l or < 40 mg/dl)
- Metabolic acidosis (plasma bicarbonate < 15 mmol/l); hyperlactataemia (lactic acid > 5 mmol/l)
- Severe normocytic anaemia (Hb < 7 g/dl, haematocrit < 21%)
- Haemoglobinuria (presence of haemoglobin in the urine)
- Hyperparasitaemia (parasite density >100,000/µl)
- Kidney failure (serum creatinine > 265 µmol/l)
- Pulmonary oedema (radiological)
- Plasma or serum bilirubin >50 µmol/L (3 mg/dL).

7.3.2. Treatment of severe malaria in pregnant women

1st line: Artesunate injection.

Dosage :

- 2.4 mg/kg per dose at time 0; 12 hours and 24 hours after the first dose, then once every 24 hours until the pregnant woman can take the oral treatment.

- The maximum dose not to be exceeded is 200 mg per dose, no matter the weight.

- The oral treatment is administered as soon as the woman can swallow, and consists of administering ACT for three days.

- If the malaria is severe in the first trimester, the oral relay should be done with Artemether+Lumefantrine 80/480mg, 1tab 2 times/day for 3 days.

- If the malaria is severe in the second and third trimesters, oral relay should be with Artemether+lumefantrine 80/480mg 1tb twice/day for 3 days, or Artesunate amodiaquine 100/270mg, once/day for 3 days or with Dihydroartemisinin+piperaquine 40/320 mg, 4 tb/day for 3 days as well as ASPY.

Route of administration: Artesunate is preferably given IV or, by IM.

2nd line: Artemether Injection (IM only)

This treatment will be administered in the absence of Artesunate injection.

Dosage:

160 mg on the first day, i.e. 80 mg in two doses (12 hours apart), administered IM. Then 80 mg IM once a day for the next 6 days.

3rd line: Quinine injection without loading dose (for 7 days)

Dosage:

- 8.3 mg/kg quinine base every 8 hours, in 4-hour infusions.

- Maximum daily dose: 1.5 g.
- As soon as the pregnant woman can swallow, switch to an oral ACT for 3 days or, to Quinine at 8.3mg/kg of quinine base every 8 hours (total duration of treatment: 7 days).

7.3.3. Combination therapies for malaria in pregnant women

Maternal fever is dangerous for the foetus, can lead to foetal tachycardia (FHB greater than 160bpm) or even foetal distress, and can induce premature labour. Reducing fever is therefore the first therapeutic step in the management of severe malaria in pregnant women if the maternal temperature is ≥ 38°C.

If a pregnant woman experiences uterine contractions during an episode of malaria or during treatment with Quinine, tocolytics should be administered.

Protocol for tocolysis

a. Nifedipine protocol (10mg immediate release in soft capsules or tablets)

- 10mg **immediately** then 10mg every 15min without exceeding 40mg in the 1st hour then 10mg every 6h.

- Stop after 48h if lung maturation is complete if gestational age greater than 28 weeks and less than 34 weeks and refer according to pyramid level.

Do not administer if:

-systolic blood pressure < 90 mmHg

-serious heart disease

NB: Nifedipine is contraindicated in the first trimester and must not be taken sublingually (risk of foetal death in utero due to placental hypoperfusion).

b. Salbutamol protocol: (to be used if Nifedipine is not available)

Prepare a solution of 10 ampoules of 0.5 mg/ml, i.e. 5 mg of Salbutamol in 250 ml of isotonic saline or 5% glucose solution.

Start at 10 drops/minute and increase by 10 drops every 10 minutes until contractions stop, but do not exceed 60 drops/minute.

Salbutamol 2 mg tablets, 1 tablet every 12 hours, are taken as oral replacement.

Administration of Salbutamol may cause adverse effects (palpitations, tachycardia, arrhythmia, tremors). Monitoring is therefore necessary. It consists of:

- Pulse monitoring: should not exceed 110 bpm
- BP monitoring: should not fall below 90/60 mmHg or exceed 140/90 mmHg.

If the pulse exceeds 110 bpm and the BP falls below 90/60 mmHg, stop the tocolysis and continue the malaria treatment.

c. Pulmonary maturation protocol:

Indication: threat of premature delivery between 24 and 34 weeks of pregnancy.

- **Protocol for a treatment:** (to be administered as soon as the pregnant woman is admitted)

  - **Betamethasone**
    - 1st injection of 12mg IM

- 2nd injection of 12mg IM 24 hours later

❖ **Dexamethasone**

- 12mg IM injection every 12 hours for 48 hours

NB: the total dose of corticosteroids must not exceed 24 mg.

- Prefer transfer in utero (before delivery) according to the health pyramid

7.3.3.1. Treatment of fever

➢ **In children**

Paracetamol injection at 15 mg/kg every 6 hours by IV infusion over 15 to 30 minutes, if temperature ≥ 38.5°C.

Paracetamol suspension or tablet at 15 mg/kg every 6 hours per os, if temperature ≥ 38.5°C.

Paracetamol suppository: 15 mg/kg every 6 hours rectally in children without diarrhoea, if temperature ≥ 38.5°C.

If paracetamol is not available, acetylsalicylic acid or oral ibuprofen can be administered.

Injectable lysine acetylsalicylate: 50 mg/ kg per day in 4 doses, by the IV (or IM) route, if injectable paracetamol is not available.

NB: For children, paracetamol is preferable.

Combine with physical measures: undress the child, give a warm bath or wrap the child in a warm towel.

➢ **In adults**

Injections of 1g paracetamol every 8 hours, infused slowly over 15 to 30 minutes, are preferred.

➢ **Pregnant women**

- Paracetamol

Dosage:

The dose is 15mg/kg every 6 hours if the temperature is >38.5°C (oral route if uncomplicated malaria and parenteral route if severe malaria).

NB: Do not administer non-steroidal anti-inflammatory drugs (acetylsalicylic acid, ibuprofen, etc.) during the third trimester of pregnancy.

7.3.3.2. Treatment of anaemia

In the case of malarial anaemia, it is important to distinguish between patients who require blood transfusions and those who do not.

Iron is prohibited in the first phase of the management of severe acute malnutrition aggravated by infection and septicaemia.

a. Patients to be transfused:

- Children: Haemoglobin < 5 g/dl in children or Haematocrit < 15%,

- Adults and pregnant women: Haemoglobin < 7g/dl, or Haematocrit < 21%;

In the event of signs of poor clinical tolerance (severe polypnoea, tachycardia, gallop rhythm, convulsion) and extreme pallor, even in the absence of haematocrit and haemoglobin, the patient must be transfused.

Methods of transfusion:

In children:

If available and if the child is not dehydrated, transfuse at 10cc/kg of packed red blood cells within 4 hours.

If there is no packed red blood cell, transfuse 20 cc/kg of whole blood within 4 hours. In case of signs of overload (oedema, increased heart rate, increased respiratory rate, etc.), administer 1mg/kg of furosemide intravenously, except in patients who are dehydrated or showing signs of collapse.

The blood must be ABO and Rhesus compatible and tested negative for the following infections (HIV, hepatitis B & C, syphilis, CMV).

During transfusion, clinical signs should be monitored (colour of the integument to look for jaundice or bleeding from the mucous membranes; heart rate to look for acceleration; respiratory rate to look for dyspnoea; colour and volume of urine to look for coca cola - coloured urine or a decrease **In diuresis**: state of consciousness to look for agitation, coma or convulsions, increase in fever during transfusion).

If any of the following signs are present: skin rash, pruritus, chills, increase in temperature or allergic reaction, etc., the transfusion must be suspended and an injection of 0.15 mg/kg IV dexamethasone must be given, the blood grouping and cross-match must be repeated to replace the blood with an appropriate bag and the patient referred if necessary.

Check the haematocrit or haemoglobin level at the end of the transfusion.

After the transfusion, it is advisable to give the patient iron and folic acid supplements for 2 to 3 months.

b. Other anaemic patients who do not require a blood transfusion

They can benefit from iron supplementation (6 to 10mg/kg taken twice a day) and folic acid. Iron should preferably be given outside of mealtimes for better absorption.

Pregnant women:

If she does not require a transfusion, prescribe iron and folic acid (daily supplements).

7.3.3.3. Treatment of convulsions

- **In children**

Stop the convulsion with Diazepam injection: 0.5 mg/kg intrarectally via a cannula (or diluted IV if no cannula is available) in a single dose to be repeated once 10 minutes later if convulsions persist.

Then prevent the onset of new convulsions by administering aqueous phenobarbital injection: loading dose of 10mg/Kg in a single dose, followed by a maintenance dose of 5mg/Kg to be administered 24 hours later by SDIV. Phenobarbital doses should be diluted with distilled water or physiological saline.

In case of fever, undress the patient, give a warm bath and administer an antipyretic (paracetamol).

Unblock the airways, do not feed orally and place a nasogastric tube as soon as possible.

NB: do not forget to look for other causes of convulsion and treat them (fever and hypoglycaemia+++).

- **In adults**

Treat convulsions with a benzodiazepine (Diazepam, Midazolam, Clonazepam)

Diazepam: 10 mg diluted in 9 ml of physiological saline, and administered ml per ml until the convulsions stop. If convulsions persist for more than 10 minutes, administer a second dose but do not exceed 1mg/kg/24h.

Prevent further convulsions with phenobarbital at a dose of 15mg/kg/24h.

- **Pregnant women**

Anticonvulsants if convulsions:

Diazepam: 0.5 mg/kg intra rectally in a single dose to be repeated once or one ampoule maximum.

NB: Always begin by treating the convulsion symptomatically, then look for and treat the cause.

7.3.3.4. Other treatments for complications of severe malaria

1. Treatment of hypoglycemia

Definitions:

In adults: blood sugar level <54mg/dl or blood sugar<3mmol/l)

In children:

Depends on nutritional status

- *Children without signs of severe malnutrition:*

blood sugar level <45 mg/dl or blood sugar <2.5 mmol/l

- *Child with signs of severe malnutrition:*

Blood sugar level 54mg/dl or blood sugar<3mmol/l)

Severe malnutrition is very common in children under three, particularly those who are undernourished.

Symptoms include Pallor, sweating, behavioural problems (irritability, confusional state, drowsiness, apathy), impaired consciousness (coma), convulsions are very often indicative of hypoglycaemia.

Warning! All these signs are non-specific, hence the need to carry out a blood sugar test on any child diagnosed with severe malaria.

NB: If a blood sugar test is not possible, treat the hypoglycaemia

Correction of hypoglycaemia:

In children:

Immediately administer 5 ml/kg of 10% dextrose by peripheral route, followed by an intravenous infusion of 5 ml/kg of 10% dextrose or 10 ml/kg of 5% dextrose per hour to prevent recurrence of hypoglycaemia.

NB: Avoid bolus administration of dextrose because of the risk of recurrence of hypoglycaemia

In adults:

Administer 25g of Dextrose (preferably 10%) for 5-10 minutes. Continue with an IV infusion of 5% or 10% dextrose at a dose of 200-500mg/kg.

Avoid using hypertonic glucose (>20%). It is not recommended as it has an irritant effect on peripheral veins.

2. Treatment of circulatory collapse (shock)

- The signs of circulatory collapse are: Capillary refill time > 3seconds, cold extremities of hands and/or feet), rapid and weak pulse, low BP (systolic BP < 70mmHg in adults or < 50mmHg in children or impenetrable).

- Correcting circulatory collapse (SHOCK); Immediately administer filling fluids (0.9% saline, macromolecules) at a dose of 3-4 ml/kg per hour. (WHO Guidelines).

PRACTICALLY: 20 cc/kg in a 30 min bolus, repeated as necessary.

- Children under 5: who show signs of severe dehydration (unconscious, unable to drink or breastfeed, skin fold returns very slowly), must be rehydrated rapidly by intravenous (IV) injection. This is PLAN C REHYDRATION.

- The best IV solution is Ringer Lactate (also known as Hartmann's solution for injection). If this is not available, isotonic saline (0.9% NaCl) may be used.

Administer 100ml/kg of the chosen solution as follows:

• *For children < 12 months, give 30ml/kg over 1 hour, then the remaining 70ml/kg over the following 5 hours.*

• *For children ≥ 12 months, give 30 ml/kg over 30 minutes, then the remaining 70 ml/kg over the following 2.5 hours.*

- Repeat the first dose of 30 ml/kg if the radial pulse remains very weak or undetectable, or if the child's condition has not improved.

- After reassessment, if the child is able to drink, administer oral rehydration PLAN B using oral rehydration salts combined with zinc:
- Dilute 1 sachet of ORS in 1 litre of drinking water and give: 75 ml/kg of the solution over 4 hours. While refeeding the child.

Administration of Zinc:

- Children under 06 months: 10 mg / day (half tablet) for 10 to 14 days
- Children over 06 months: 20 mg / day (1 tablet) for 10 to 14 days.

NB:

- a 5% glucose (dextrose) solution is not effective and must not be administered.

- For a child with severe acute malnutrition (P/T ratio < -3 Zscore, PB< 115mm, oedema) who has fluid losses, Ringer lactate should not be used, but rather ReSoMal solution: 5-10 ml/kg over 10 to 12 hours. Lactated Ringer's should only be used if the child is experiencing circulatory collapse (SHOCK).

- For children over 5, adults and pregnant women: Intravenous (IV) rehydration, solution used: Ringer lactate

- Protocol: 30ml/kg of Ringer lactate over 30 minutes, repeated once if signs of severe dehydration persist, then 70ml/kg over 3 hours.

III- Children, adults and pregnant women unable to absorb oral medication properly

These patients, who do not meet the diagnostic criteria for severe malaria, but are unable to swallow or keep in their stomachs the drugs administered orally, must be admitted to hospital and treated with parenteral antimalarial drugs

A delay in the introduction of effective treatment can cause the disease to progress to severe malaria.

3. Acute pulmonary oedema (APO)

➢ ***How is it defined?***

Accumulation of fluids and solutes in the extravascular spaces of the lungs, the main consequence of which is sudden flooding of the pulmonary alveoli and interstitial lung tissue, likely to lead very rapidly to acute respiratory failure.

➢ What are the causes?

- Over-use of infusions
- Quick correction in the event of collapse
- Quick correction of anaemia
- Cardiac intoxication with quinine

➢ *How do you recognise it?*

In the presence of:

- Difficulty in breathing with respiratory rate > 24 /mn (in adults) and ≥ 50 /mn in children aged 02 to 11 months and ≥ 40/mn in children aged 1 year to 5 years, signs of struggle + cyanosis + SPO2 < 92% on room temperature

- Presence of crackling and sub-crackling sounds

- Tachycardia: heart rate > 100/mn (in adults) and > 100 /mn in children aged 3months to 12 months, > 110/mn in children aged 12months to 5 years and > 75/mn in children aged over 10 years.

- Hypoxia can lead to delirium, agitation, convulsions and a deterioration in the state of consciousness; the patient can die within a few hours

- Chest X-ray: interstitial syndrome, butterfly wing opacity

➢ **What groups are at risk? Patients with :**

- Malaria with high parasitaemia

- History of heart disease (heart failure, myocardial infarction)

- Severe anaemia being treated

➢ **How should it be treated?**

- **In adults:**

- Keep the patient in a semi-seated position (by raising the head of the bed or lowering the foot of the bed).

- Give oxygen at a high concentration through a mask (4-6 l/min) or a face mask (10-12 l/min).

- Administer a diuretic such as furosemide (Lasilix) intravenously at a dose of 0.6 mg/kg (i.e. 40 mg).

If there is no response, gradually increase the dose up to a maximum of 200 mg.

- **In children:**

- Administer furosemide (Lasilix) IV at a dose of 1mg/kg, which should cause an increase in diuresis within 2 hours.

NB: For a faster response, administer the drug intravenously.

- If the initial dose is not effective (in the absence of a response and depending on the clinical situation), administer 2mg/kg and repeat after 12 hours if necessary.

- Thereafter, a daily oral dose of 1 to 2 mg/kg is generally sufficient

- **Oxygen therapy**

The initiation of the oxygen therapy will depend on the SpO2 target to be achieved, which is > 95%.

- ***if APO is the result of overhydration:***

- *stop all intravenous fluid intake and administer furosemide;*

- *if there is no improvement, collect 250 ml of blood from the patient, which will be re-injected into the patient later;*

- *in case of renal failure and no response to diuretics, recourse to dialysis.*

4. Metabolic acidosis

➢ **How is it defined?**

- Decrease in plasma bicarbonate concentration (bicarbonataemia) < 22 mmol/l.

➢ **How do you recognise it?**

- A frequent complication of malaria, which should be investigated in cases of:

- Breathing difficulties with wide, deep breathing (**KUSSMALL** dyspnoea)

- ***Coma***
  - Accidental: blood gas monitoring
  - Blood bicarbonate dosage

➢ **How is it treated?**

- ***Prevention:***

- **Rehydration**
  - Orally: drinking water
  - Intravenously: 0.9% saline solution

- ***Treatment:***
  - Hospitalization
  - Oxygen therapy: Flow rate for SpO2>95%.
  - Rehydration, monitoring diuresis and signs of overload
    - Continuous rehydration: 0.9% saline solution
    - Bicarbonate 1.4% 250 or 500ml infusion

5. Haemoglobinuria

➢ **How is it defined?**

- It is the presence of haemoglobin in urine. It is a frequent complication of malaria, often favoured by a G6PD deficiency and the use of certain antimalarial drugs (quinine, primaquine, lumefantrine, halofantrine).

➢ **How to identify it during malaria treatment:**

- Symptoms: black or "coca cola" coloured urine

- Complications: signs of intolerance, anaemia, jaundice
- Confirmation Haemoglobinuria: Urine dipstick test
- Effects: Anaemia, high total and free bilirubin, high blood urea and creatinine

➢ **How should it be treated?**

- Hospitalization
- Stopping the antimalarial drug in question
- Rehydration (carefully to avoid haemodilution in the case of anaemia)
- Administer 0.9% saline to maintain a diuresis of > 1ml/kg/hour in adults. In children, hyperhydrate to 3 litres/m2 body surface area (0.9% saline or ringer lactate).

NB: Formula for body surface area in children: (4P+7) / (P+90), where P is weight in kg.

- In the event of anuria, refer the patient to haemodialysis.
- If the anaemia is tolerated, prescribe blood but defer the blood transfusion under strict supervision until the offending drug has been eliminated from the body. If signs of anaemia intolerance appear, proceed with the blood transfusion.

6 Acute kidney injury (AKI)

➢ **How is it defined?**

- It is the sudden and rapid drop in glomerular filtration rate (GFR), evolving for less than 3 months, most often reversible, affecting only renal exocrine functions

➢ How do you recognise it?

- When symptoms occur
- Significant drop in diuresis (oliguria) or absence of urine (anuria)
- Black or "coca cola" coloured urine
- In the presence of factors predisposing to the condition
- Cardiovascular collapse or shock
- Dehydration
- Losses: digestive, skin, blood
- Lack of fluid intake
- Administration of drugs that may aggravate AKI (aminoglycosides, NSAIDs, converting enzyme inhibitors, angiotensin 2 receptor antagonists)
- When complications occur
- Oedema, convulsions, coma or respiratory distress
- Incidental: during a renal check-up

➢ How should it be treated?

Curative treatment

NB: these patients must be referred to a health facility capable of providing this renal replacement treatment

General measures:

- **Hospitalization**
- **Rehydration or fluid restriction depending on condition**

- Stop all nephrotoxic drugs
- Adjust the dosage of renal elimination drugs
- Normoprotein diet: 1 g/kg/day
- Calorie intake: 20 to 40 cal/kg/day

- **Pharmacological measures**
  - Continuous, cautious rehydration, monitoring for signs of overload
  - 0.9% saline solution
  - Combine 5% or 10% glucose serum if hypoglycaemia
  - Compensate for daily needs and losses
  - In case of hyperkalaemia:
    - *Calcium gluconate: 1 ampoule (slow IV) Single dose*
    - *B2 agonist: Salbutamol spray (hand-held nebuliser with 2 sprays, repeat 6 hours later). Alternatively, Salbutamol injection (1 ampoule subcutaneous).*
    - *Polystyrene (Kayexalate): 1 measuring spoon (15g) diluted in half glass of water three times a day with meals.)*

- **In case of APO: give Furosemide**
  - **In bolus form:** 240 mg diluted in 100 ml of saline as a slow infusion over 30 minutes (in adults) and in children administer a dose of 1mg/kg, which should cause an increase in diuresis within 2 hours. If the initial dose is not effective,

administer 2mg/kg and repeat after 12 hours if necessary. Thereafter, a daily dose of 1 - 2mg/kg/per os is generally sufficient.

- Maintenance dose: depending on the response to the bolus and the patient's clinical condition

- **In cases of metabolic acidosis**

- **In children :**
  - administration of isotonic sodium solution (0.9% saline) or Ringer lactate
  - Oxygen therapy until SpO2 is greater than 95%.
- **In adults :**
  - Oxygen therapy until SpO2 is greater than 95%
  - Rehydration with saline
  - Administer 1.4% sodium bicarbonate: 250 or 500 ml by infusion.

- **In case of anaemia: Blood transfusion (according to tolerance)**

- **Renal replacement therapy if all these measures fail**
  - Haemodialysis
  - Peritoneal dialysis

- **Preventive treatment**

- **Rehydration**: To compensate for normal daily requirements and losses (vomiting, diarrhoea and fever)
  - Orally: drinking water

- Intravenously: 0.9% saline solution
- Stop using nephrotoxic substances
- Maintain effective blood volume
- Fluid and electrolyte resuscitation
- Coma nursing

7.2.4. Poorly or inadequately treated malaria received in health facilities

Sometimes, health care providers receive people in health facilities who say they have taken anti-malarial treatment at home before going there. If the clinical signs persist, it may be a case of inadequately or poorly treated malaria, or another febrile pathology.

Case classification:

The patient is received for consultation to look for clinical and biological signs of malaria. If the test is positive, the patient is classified as having uncomplicated or severe malaria.

- If the treatment taken at home was not at the correct dose, correct and specify the recommended dosage.
- If the treatment was given at the correct dose, change the ACT.
- In the case of severe malaria, follow national guidelines for the management of the disease.

NB : The severity of a case of malaria should be assessed based on clinical symptoms. A patient who has undergone treatment and whose symptoms persist cannot systematically be classified as having severe malaria.

ADVICE ON CURATIVE TREATMENT OF MALARIA

- Malaria is a disease that is costly to the family and to society, which underlines the importance of well-managed curative treatment.
- The doses and duration of treatment must be respected.
- Drugs should be bought from the hospital pharmacy or from a dispensary
- Drugs should be taken with meals and with plenty of water.
- Drugs must be dissolved or crushed for children and diluted in breast milk for newborns under 6 months, or in drinking water.
- Drugs and inputs should be kept out of the sun and heat and out of the reach of children.
- The patient should return to the health centre immediately in case of the appearance of severe signs or persistence of fever after 48 hours (see IMNCI)

TREATMENT OF SEVERE MALARIA

In the general population

a. **1st line:** Artesunate injection, IV or IM: 2.4 mg/kg (or 3mg/kg in children less than 20 kg) at time 0, 12 hours after and 24 hours after the first dose; then once every 24 hours

b. **2nd line :** Artemether Injection: IM

Adult : 160mg per day, i.e. 80mg/taken in two doses (12 hours apart), administered by IM injection on the first day. Then 80mg once a day by IM injection for the next 6 days.

i. **In children:** 3.2 mg/kg per day, taken twice (12 hours apart), administered by IM injection on the first day. Then 1.6 mg/kg once a day for the next 6 days

c. **3rd line:** Quinine injection: two regimens, with loading dose and maintenance dose

- **loading dose:** 16mg/kg in 500cc of Qb to be diluted in SG 5% (in adults) or in 250cc of Qb to be diluted in SG 10% (in children) by slow infusion over 4 hours.
- **Maintenance dose:** 8mg/kg/8 hours in 500cc of Qb diluted in 5% or 10% SG as a slow infusion over 4 hours, repeated every 8 hours. This treatment continues until the patient is able to drink. The total duration of treatment is 7 days.
- **In pregnant women:** same as for adults, but without loading dose of quinine

Combined treatments should be considered

Treat other complications

VIII. MALARIA PREVENTION

VIII. MALARIA PREVENTION

Malaria prevention has three components: chemoprevention, vector control and malaria vaccination.

8.1. Chemoprevention

Chemoprevention is one of the high-impact strategies recommended by WHO in the fight against malaria.

In Cameroon, there are 4 major interventions, including chemoprevention in new patients:

a) Intermittent Preventive Treatment of malaria in pregnant women (IPTp) with Sulfadoxine+Pyrimethamine in hospitals and in the community;

b) Perennial malaria chemoprevention (PMC) formerly known as Intermittent Preventive Treatment of malaria in infants under 2 years of age (IPTi) with Sulfadoxine+Pyrimethamine in areas where malaria transmission is permanent or recurrent;

c) Seasonal malaria chemoprevention (SMC) with Sulfadoxine-Pyrimethamine + Amodiaquine (SPAQ) for children aged between 03 and 59 months in areas where seasonal malaria is prevalent;

d) Chemo-prophylaxis for new patients or travellers from non-endemic countries.

8.1.1. Intermittent preventive treatment of malaria in pregnant women (IPTp)

General information on IPTp

A. Definition

IPTp is the periodic administration of a curative dose of antimalarial drugs to pregnant women from the 13th week of pregnancy, with the aim of preventing malaria, especially placental malaria.

In Cameroon, after chloroquine was withdrawn from the list of anti-malarial drugs, SP was chosen as the IPT drug for malaria in pregnant women in the absence of any contraindication, and a minimum of 05 doses of SP are recommended in all regions where HIV seroprevalence is greater than 10% for greater efficacy, while respecting the age of pregnancy and the minimum interval between doses.

WHO recommends increasing access to IPT in all areas of moderate and high malaria transmission in Africa, as an integral part of antenatal care. It recommends that 8 ANC sessions be planned for each pregnancy. To improve IPT coverage of pregnant women we should ensure that every opportunity for ANC is used to administer IPT to pregnant women from the 13th week of pregnancy.

B. Presentation of Sulfadoxine + Pyrimethamine

- **Active substance**

This is a fixed combination in tablet form containing 500mg of sulphadoxine and 25mg of pyrimethamine.

- **Dosage:**

03 tablets to be taken as a single dose.

❖ **Adverse events**

- Gastrointestinal disorders
- Allergic skin reactions
- Haematological disorders
- Lyell syndrome (burning skin rash)
- Renal impairment and rare elevation in transaminases

❖ **Contraindications**

- First trimester of pregnancy,
- Known allergy to sulphonamides
- Severe liver damage,
- Kidney failure,
- History of skin allergy.

(NB: in pregnant women living with HIV, see Precautions for use).

C. Conducting IPTp in health facilities

❖ **Prerequisites**

- Staff trained in IPT using SP,
- Permanent availability of SP,
- Availability of potable water and drinking utensils (glass, cup, etc..) in the ANC Units,
- Pregnant women informed and sensitised about IPTp using SP.

❖ **Effective start of IPTp**

- From the 13th week of pregnancy or, if not possible, as soon as the pregnant woman feels the first active foetal movements. The minimum interval between two doses is 4 weeks. Administration on the day of delivery is possible.

- It is recommended that all pregnant women have at least 8 ANCs.
- IPT is not administered during the 1st trimester.

❖ **How is IPTp administered?**

- It is recommended that IPT be administered under direct observation by healthcare personnel (directly observed therapy (DOT)).
- SP can be administered to pregnant women on an empty stomach or after a meal.
- SP should be administered with drinking water.

❖ **Treatment frequency**

- After the start of IPTp at the 13th week of pregnancy or as soon as the first active foetal movements are felt by the pregnant woman, it is recommended that IPTp be administered with a minimum interval of 4 weeks between two doses. Administration on the day of delivery is possible.

❖ **Precaution for use**

Co-administration of SP and folic acid in doses > 5mg per day is not recommended as folic acid reduces the efficacy of SP in preventing malaria.

SP should not be administered to pregnant women receiving Cotrimoxazole prophylaxis (it increases the side effects of sulphonamides).

❖ **What to do if SP is contraindicated**

If the patient has a contraindication to SP, curative doses of ACTs should be administered in accordance with the recommended protocols every month from the second trimester of pregnancy onwards.

Another alternative recommended by WHO is to use a combination of chloroquine+proguanil (Savarine®), to be taken daily at a dose of one tablet from the second

trimester until full term. However, cost is a major limitation, and the risks of allergy also need to be taken into consideration. Remember that this molecule is poorly tolerated.

Drugs contraindicated in pregnancy: Atovaquone+proguanil (Malarone®), Mefloquine and doxycycline are contraindicated in pregnant women.

❖ **Advice for pregnant women**

This should include:

- The benefits of taking the treatment effectively ;
- The possible adverse events of treatment;
- The need for correct use of LLINs
- The importance of antenatal consultations ;
- Begin to raise awareness of PMC and vaccination during ANCs;

Nb: It is useful to monitor SMC and IPTp to detect any drug resistance as early as possible and look for alternatives.

Table XII : Contact schedule and initiation of IPT recommended by WHO[1] (WHO, 2018)

Table 1: 2016 ANC contact schedule with proposed timelines for implementation of malaria in pregnancy interventions#

ANC Contact Schedule and Proposed Time of IPTp-SP Administration *(To be adapted to country context, also considering disease burden and health needs)*		MiP-related Interventions and Considerations during ANC Contacts
Contact 1: Up to 12 weeks		• Register pregnant women, provide ITNs, and counsel on their use. Screen for HIV. • Administer 30 to 60 mg of elemental iron and 400 µg (0.4 mg) of folic acid daily. These supplements should be given as early as possible in pregnancy and continue throughout pregnancy. • **Counsel to return for a visit at 13 to 16 weeks (see contact 1a below) to receive the first dose of IPTp-SP (as directed by national guidelines).*** • Counsel on prompt diagnosis and effective treatment/malaria case management during pregnancy.
Additional contact (1a): *In moderate to high malaria transmission areas in Africa where IPTp-SP is policy,* ***a contact should be made early*** *in the* ***second trimester (13 to 16 weeks) to administer SP as early as possible****.*	IPTp-SP dose 1	Remember: • Do not administer IPTp-SP before week 13 of pregnancy. • Administer the first IPTp-SP dose **as early as possible in the second trimester** to fully benefit from the protective capacity in this critical period of pregnancy.† • **Administer the second dose of IPTp-SP one month later**. • Administer the following doses of IPTp-SP starting from the scheduled contact at 20 weeks, **observing at least one-month intervals between SP doses**. • SP can be **safely** administered from the beginning of the second trimester until the time of delivery. • One full dose of IPTp-SP consists of 1,500 mg/75 mg SP (i.e., three tablets of 500 mg/25 mg SP). • Provide IPTp-SP by directly observed treatment. • Pregnant women on co-trimoxazole should not receive IPTp-SP due to an increased risk of adverse events when both drugs are given in parallel. • Continue to administer 30 to 60 mg of elemental iron and 400 mcg (0.4 mg) of folic acid. • Continue counseling as above.
Contact 2: 20 weeks	IPTp-SP dose 2	
Contact 3: 26 weeks	IPTp-SP dose 3	
Contact 4: 30 weeks	IPTp-SP dose 4	
Contact 5: 34 weeks	IPTp-SP dose 5	
Contact 6: 36 weeks	No SP administration if last dose was received at contact 5 in week 34	
Contact 7: 38 weeks	IPTp-SP dose 6 (if no dose was received at contact 6 in week 36)	
Contact 8: 40 weeks		
Pregnant women should receive MiP interventions as appropriate, even when they come at weeks not designated in the contact schedule. Despite the known side effects associated with sulfonamides, SP for IPTp is generally very well tolerated. Mild and transient side effects including nausea, vomiting, weakness and dizziness have been reported by some women, particularly with the first dose of SP. Studies have demonstrated that side effects tend to decrease with the administration of further doses (§,‡). Side effects should be discussed openly and managed in the ANC.		

This schedule is a suggested adaptation of the WHO ANC schedule for countries implementing IPTp; training should highlight that women attending off-schedule should be attended to appropriately, and that it is the interval, rather than the specific weeks, which are most critical

* It is recommended that the first dose of IPTp-SP be given as early as possible in the second trimester of pregnancy to ensure optimal protection from malaria for the mother and her baby. However, pregnant women who come later in pregnancy can and should receive their first dose anytime (as long as it is not in the first trimester), with following doses being given at least one month apart. When malaria-endemic countries are planning their ANC programming, they may wish to add another contact to allow for monthly dosing of IPTp-SP.

❖ **Precaution for use**

Co-administration of SP and folic acid in doses > 5mg per day is not recommended as folic acid reduces the efficacy of SP in preventing malaria.

SP should not be administered to pregnant women receiving cotrimoxazole prophylaxis (it potentiates the side effects of sulphonamides).

❖ **What to do if SP is contraindicated**

If the patient has a contraindication to SP, curative doses of ACTs should be administered in accordance with the recommended protocols every month from the second trimester of pregnancy onwards.

Another alternative recommended by WHO is combination of chloroquine + proguanil (Savarine®) to be taken daily at a dose of one tablet from the second trimester until full term. However, cost is a major limitation, and the risks of allergy also need to be taken into consideration. Remember that this molecule is poorly tolerated.

Drugs contraindicated in pregnancy: Atovaquone+Proguanil (Malarone®), Mefloquine and Doxycycline are contraindicated in pregnant women.

❖ **Advice for pregnant women**

This should include:

- The benefits of taking the treatment effectively
- The possible adverse events of treatment
- The need for proper use of LLINs
- The importance of antenatal consultations
- Begin to raise awareness on PMC and vaccination during ANC

NB: It is useful to monitor SMC and IPTp to detect any drug resistance as early as possible and look for alternatives.

D. Conducting IPTp in the community

❖ **Prerequisites**

- The first dose of IPTp should be administered by a qualified health worker in the health facility;
- MCHW trained in SP-based lPTp;
- Permanent availability of SP
- Availability of drinking water and drinking utensils (glass, cup, etc.) in the house;
- Pregnant women informed and sensitised about SP-based IPTp in the community.

❖ **Effective start of IPTp-C**

- From the second dose of IPTp, on condition that the first dose was received in the health facility. The interval between two successive doses should be 4 weeks. After administration, the MCHW should encourage the pregnant woman to continue to go to the health facility in order to benefit from the full ANC package.

❖ **How IPTp-C is administered**

- It is recommended that IPTp be administered under direct observation by the MCHW;
- SP can be administered to pregnant women on an empty stomach or after a meal;
- SP should be administered with water regularly used by the household for consumption.

❖ **Treatment frequency**

- IPTp-C should be administered after the first dose initially taken at the health facility;

- The interval between two doses should be at least 4 weeks.

❖ **Precautions for use (see IPTp)**

❖ **What to do in the event of contraindication to SP (see IPTp)**

8.1.2. Perennial malaria chemoprevention (PMC)

A. Definition of PMC

PMC consists of administering a complete treatment with SP to infants under two years of age, in EPI immunization services, at intervals corresponding to the usual immunization schedule.

In Cameroon, the national PMC strategy adopted 5 doses of SP to be administered to babies at the ages of 10 weeks, 14 weeks, 6 months, 9 months and 15 months (according to the vaccination schedule).

B. Presentation of Sulfadoxine+Pyrimethamine

❖ **Active substance (see IPTp)**

Dosage depends on the child's weight.

Paediatric SP is also available in the form of a dispersible, scored tablet containing 250 mg of sulphadoxine and 12.5 mg of pyrimethamine.

Storage of SP

- Store in a dry place and at a room temperature below 30°C.
- Always keep SP tablets with the equipment and inputs used by immunisation and preventive child health services.

❖ **Dosage:**

Table XIII: SP dosage

Weight	Presentation SP 500/25 mg tablet Scored	Presentation SP 250/12.5 mg tablet Dispersible	Route of administration
Less than 5kg	¼ tablet	½ tablet	Oral
5 to 10 Kg	½ tablet	1 tablet	Oral
10 to 25Kg	1 tablet	2 tablets	Oral

NB : Most babies weigh more than 5 kg, but this may not be the case in areas affected by malnutrition. It is therefore useful to weigh children to determine the correct dose of SP to administer.

❖ **Adverse events**

There are 2 types of adverse events: minor and serious.

A minor AE is any event that does not lead to hospitalisation or is not life-threatening after administration of SP.

The most frequently encountered minor events or side effects following the administration of SP are: cutaneous eruption, vasculitis, pruritus, urticaria, sore throat, fever and photosensitivity.

Serious AEs are defined as:

Any medical event occurring within 30 days of SP administration that causes or leads to:

- A life-threatening illness in the child
- Hospitalisation of the child

- The extension of a current hospitalisation
- Significant or persistent disability
- Death

The clinical signs potentially associated with serious AEs are Lyell syndrome and Steven Johnson syndrome.

How to conduct PMC in health facilities (immunisation service)

When a child comes for vaccination :

1. Explain to the parent or guardian :

• The aim of PMC is to reduce the risk of the baby developing malaria and anaemia.

2. Check that the child meets the eligibility criteria for PMC:

• Does not have a fever (take their temperature);

• Has never had an adverse drug reaction since birth:

- If they have, find out to which drugs;

- If the reaction was caused by SP (e.g. Fansidar) or other drugs containing sulphonamides, e.g. cotrimoxazole (Bactrim) and Metakelfin, the child should not be given SP.

• Has not taken SP or any other sulphonamide in the last 4 weeks (SP is found in the following drugs: SP AQ, used during the SMC in the target districts of the Far North and North regions, Novidar SP, Fansidar, Malafan and Suldox).

• Not born to an HIV-positive mother and not taking part in a prevention of mother-to-child transmission (PMTCT) programme; if the child is taking part in a PMTCT programme and is taking cotrimoxazole, SP should not be administered.

3. Check dosage: (see table XIII SP dosage)

4. How to give SP to a child :

- In a spoon, dissolve the SP tablet in a small quantity of drinking water or breast milk.
- Administer the solution to the child in a semi-seated position in the mother's arms.
- Make sure that the child swallows all the SP solution.
- Apply infection prevention measures by cleaning (preferably sterilising, but at least washing with soap and water) the spoon (or measuring cup if necessary) after administering the SP to each child. It is preferable to encourage each parent/guardian to come along with the administration equipment.
- The SP should be administered before the tracer vaccine is administered or injected, as it is easier to get a child who is not crying to swallow the solution and the risk of choking is low.

5. Monitor the child:

- If the child vomits within 30 minutes, wait half an hour before giving another dose of SP.

Do not give a third dose if the child vomits again after the second attempt.

- Advise the parent about the possibility of adverse events and the need to return to the hospital.
- Tell the parent when to return for the next vaccination and the next dose of SP.

6. Keep a record of the SP administration:

The dose of SP and the date of administration should be recorded on the child's health card, in the health facility's log books and on tally sheets.

7. Specific actions

- Discard all unused split SP tablets at the end of the day (quarters and halves)
- In case of vaccine stock-out, when a child comes for vaccination, the SP will be administered on its own and recorded on the child's health card. Also, if the SP is out of stock, the child must receive the vaccines that were scheduled.
- Infants under 2 years of age who have missed their vaccinations (for example because they were not brought in on time for the first vaccination) will receive the PMC at the same time as the DTP-HepB2-Hib2, DTP-HepB3-Hib3 and measles and rubella vaccinations, whatever their age. To facilitate implementation, administration should be combined with these vaccinations and not with the child's age.

❖ **Effective start of PMC**

The first dose of SP should be administered to children aged at least 10 weeks.

It is recommended that each child takes all doses as scheduled for optimal protection.

❖ **Where and how is PMC administered**

• The drug is administered orally under the direct observation of health personnel as a fixed strategy in health facilities or as an outreach strategy for health facilities located between 5km and 15km away from households ;

• SP can be administered to babies on an empty stomach or after a meal.

• SP should be administered with drinking water or breast milk.

Table XIV: PMC calendar combined with EPI

Children				
Contacts	**Age**	**Vaccines** */other inputs*	**Route/sites of administration**	**Disease**
1st contact 	At birth	**OPV-0**	Oral	Poliomyelitis
		BCG	Intradermal (left forearm)	Tuberculosis
		HepB-BD	Intramuscular (left thigh)	Hepatitis B infection
2nd contact 	6 weeks (1 and a half months)	**OPV-1**	Oral (mouth)	Poliomyelitis
		ROTA-1	Oral (mouth)	Rotavirus diarrhoea
		DTC-HepB-Hib-1	Intramuscular (left thigh)	Diphtheria, Tetanus, Whooping cough, Hepatitis B, Haemophilus influenzae type b
		Pneumo 13-1	Intramuscular (right thigh)	Pneumococcal infections
3rd contact 	10 weeks (2 and half months)	**OPV-2**	Oral (mouth)	Poliomyelitis
		ROTA-2	Oral (mouth)	Rotavirus diarrhoea
		*IPTi-1**	Oral (mouth)	Malaria
		DTC-HepB-Hib-2	Intramuscular (left thigh)	Diphtheria, Tetanus, Whooping cough, Hepatitis B, Haemophilus influenzae type b
		Pneumo 13-2	Intramuscular (right thigh)	Pneumococcal infections
4th contact 	14 weeks (3 and a half months)	**OPV-3**	Oral (mouth)	Poliomyelitis
		ROTA-3	Oral (mouth)	Rotavirus diarrhoea
		IPTi-2	Oral (mouth)	Malaria
		DTC-HepB-Hib-3	Intramuscular (left thigh)	Diphtheria, Tetanus, Whooping cough, Hepatitis B, Haemophilus influenzae type b
		Pneumo 13-3	Intramuscular (right thigh)	Pneumococcal infections
		IPV-1	Intramuscular (right thigh)	Poliomyelitis
5th contact 	At 6 months	*Vit A*	Oral (mouth)	Vitamin A deficiency
		IPTi - 3	Oral (mouth)	Malaria
		AMV-1	Intramuscular (left thigh)	Malaria
6th contact	At 7 months	**AMV-2**	Intramuscular (left thigh)	Malaria
7th contact 	At 9 months	**MR-1**	Sub cutaneous (right thigh)	Measles-Rubella
		YFV	Sub cutaneous (left thigh)	Yellow fever
		IPV-2	Intramuscular (right thigh)	Poliomyelitis
		AMV-3	Intramuscular (left thigh)	Malaria
		IPTi - 4	Oral (mouth)	Malaria
		LLIN		Malaria
8th contact 	At 12 months	*Vit A*	Oral (mouth)	Vitamin A deficiency
		Mebendazole	Oral (mouth)	Intestinal worms
9th contact 	At 15 months	**MR 2**	Sub cutaneous (right thigh)	Measles-Rubella
		Men A/ACYW135	Intramuscular (left deltoid)	Meningitis and other severe meningococcal infections
		IPTi - 5	Oral (mouth)	Malaria
10th contact 	At 18 months	*Vit A*	Oral (mouth)	Vitamin A deficiency
		Mebendazole	Oral (mouth)	Intestinal worms
11th contact 	At 24 months	**AMV-4**	Intramuscular (left thigh)	Malaria
		Vit A	Oral (mouth)	Vitamin A deficiency
		Mebendazole	Oral (mouth)	Intestinal worms

* IPTi in 8 regions (except Far North and North) as part of perennial chemoprevention against malaria (PCP)

8.1.3. Seasonal malaria chemoprevention (SMC) in children aged 03 - 59 months

Definition:

SMC is defined as the intermittent administration of a full treatment of antimalarial drugs during the season of high malaria transmission (rainy season) to prevent the disease.

SMC aims to reduce malaria-related morbidity and mortality in children aged between 03 and 59 months in the health districts of the North and Far North regions.

It is recommended in health districts where the following conditions are met:

- More than 60% of malaria cases occur during a short period of about 4 months.
- The attack rate (incidence) is higher than 10% during the high transmission season in the target group.
- SP AQ drug remains effective (> 90%)

These conditions are met in the districts of the Far North and North regions. The SMC is implemented according to a strategy based on the following main points: mobilisation and door-to-door distribution, marking of households and children receiving treatment, pharmacovigilance and epidemiological surveillance activities

Ineligibility criteria:

- Malaria
- HIV+ patient on Cotrimoxazole.
- Severe acute or chronic disease.
- Inability to swallow.
- Allergy to SP or AQ.

- Have taken SP and ASAQ or AQ, or medication with sulphonamide in the previous month.

Dosage:

For children aged 03 months to 11 months

• Sulfadoxine-Pyrimethamine + Amodiaquine

(SP_250/12,5 +AQ_75)

- Day 1 : 1 SP tablet + 1 tablet of AQ
- Day 2 : 1 tablet of AQ
- Day 3 : 1 tablet of AQ

For children aged 12 months to 59 months

• Sulfadoxine-Pyrimethamine + Amodiaquine

(SP_500/25 + AQ_150)

- Day 1. 1 SP tablet + 1 tablet of AQ
- Day 2 : 1 tablet of AQ
- Day 3 : 1 tablet of AQ

Frequency of treatment :

- Children aged 03 - 59 months should take a maximum of 04 or 05 doses during high transmission (June to September or even October, depending on the number of cycles.
- Drugs should be administered monthly, with an interval of 28 days between doses.

8.1.4. Chemoprophylaxis in new subjects (travellers)

1. Atovaquone – Proguanil 250 mg (Malarone)

Dosage of Atovaquone Proguanil in children of 11 kg body weight or more

- >11 to < 20 kg : 1/4Tablet per day.
- 20 to < 30 kg : /4 tablet per day.
- 30 to <40 kg : 1 tablet taken once a day.

For children (if there is no scale)

- 1 to 4 years old: 1/4 tablet per day
- 5 to 10 years old: ½ tablet per day
- Above 10 years old: 1 tablet per day
- Started the day before or on the day of departure.
- Taken for the duration of your stay and 4 weeks after your return.

N.B: *This drug is contraindicated in babies under one-year-old and weighing less than 11 kg.*

Due to the unavailability of the syrup form or the contraindication of certain drugs in infants, Erythromycin (50 mg/kg/d) should be used. Taken for the duration of your stay and 4 weeks after your return.

For adults

• Atovaquone – Proguanil 250 mg (Malarone)

1 tablet per day, starting the day before or the day of departure.

Taken during your stay and 4 weeks after your return.

2. Doxycycline (Doxycycline monohydrate)

100mg per day for patients weighing over 40kg and

50mg per day for those weighing less than 40kg, starting the day before departure.

Taken during your stay and 4 weeks after your return. Doxycycline is contraindicated before 8 years of age.

NB: These drug (Malarone and doxycycline) are contraindicated for pregnant women.

3. Mefloquine 500 mg tb :

1 tab / week (CI: pregnant or breast-feeding women)

4. Chloroquine-Proguanil

(CI: renal failure; patients on dialysis; retinopathy; epilepsy; liver failure; G6PD deficiency). This drug is recommended in areas where chloroquine is still effective.

5. Another chemoprevention option:

This will involve starting the PPT (Periodic Preventive Treatment) on arrival in endemic areas during their stay for a maximum of 03 months and then 02 weeks after their return.

8.2. Selective vector control

Definition : Selective vector control is the application of targeted, site-specific and cost-effective methods. Its main aim is to reduce malaria morbidity and mortality by curbing transmission. In vector control, a distinction must be made between individual and collective protection measures

8.2.1. Individual measures

There are many such measures, but the most cost-effective **is the Long- Lasting Insecticidal Net (LLIN)**. The LLIN is a special fabric treated at the factory with an insecticide that kills and repels mosquitoes, but is harmless to humans.

For this mosquito net to provide optimum protection, you need to:

- Properly cover the bed at bedtime;
- Make sure there are no holes in the net, and if there are, use thread and a needle to sew it up;
- Ensure proper care (wash with soap no more than 20 times and sew up any holes);

In Cameroon, LLINs are distributed free of charge to the entire population during mass campaigns, to pregnant women during antenatal consultations (ANC) and to children under the age of 5 during routine immunisation campaigns.

A national LLIN distribution campaign is organised periodically. The strategy of 01 LLIN for every two people is applied during distribution. Priority will be given to the purchase of chlorfenapyr-based LLINs pre-validated by WHO for distribution throughout the country.

Routine distribution of LLINs primarily targets pregnant women in ANC and children under 5 in vaccination units. LLINs are available in health facilities. Quantities are made available to ANC and vaccination units. Pregnant women attending ANC receive 01 LLIN on first contact. Children undergoing vaccination each receive 01 LLIN during EPI activities for the first dose of measles-rubella vaccine (RR1). Pregnant women and children (accompanying adults) must sign out the LLINs they receive on the forms provided for this purpose.

LLINs distributed both during mass campaigns and on a routine basis must be spread out in the shade for 24 hours before use. Some users may experience mild and temporary skin reactions.

8.2.2. Collective measures

These measures include: environmental sanitation, putting nets or old LLINs in windows, soaking curtains, house spraying (treatment of breeding sites). **Intra-domiciliary spraying** (**IDS**) has a direct impact on reducing malaria transmission. Insecticides used during IDS depend on the insecticide resistance profile of the vector, and the spraying cycle varies according to epidemiological situations.

8.3. Malaria vaccination

Cameroon is introducing malaria vaccination as a new strategy to boost malaria control in children under five.

At the end of 2021, WHO issued a recommendation for the RTS,S/AS01 malaria vaccine to be used for the prevention of *P. falciparum* malaria in children living in areas with moderate and high transmission.

The malaria vaccine is introduced into the EPI : The target group is infants aged between 6 and 24 months, according to the following schedule:

(See Table XIV: **PMC Calendar Combined with EPI)**

MALARIA PREVENTION

Malaria prevention has three components;

CHEMOPREVENTION

Intermittent Preventive Treatment (IPTp) during pregnancy

This involves the administration of a Sulfadoxine Pyrimethamine-based malaria treatment from the 13th week of pregnancy, after the first active foetal movements are noticed by the pregnant woman.

Doses should be administered at least one month apart. **IPTp-C** from the second dose of IPT (after having received the first dose in hospital) with an interval of 4 weeks between two successive doses and until delivery. It is recommended that IPT be administered under direct observation by the MCHW; the interval between two doses should be at least one month.

Perennial malaria chemoprevention (PMC)

This is the administration of a complete therapeutic regimen to infants in the vaccination unit in order to prevent malaria in them at 10 weeks, 14 weeks, 6 months, 9 months and 15 months.

Seasonal Malaria Chemoprevention in children aged 03 to 59 months (SMC)

For children aged 03 months to 11 months

Sulfadoxine-pyrimethamine + Amodiaquine
(SP_250/12.5 + AQ_75)

Day 1: 1 SP tab + 1 tab of AQ,

Day 2: 1 tablet of AQ,

Day 3 : 1 tablet of AQ

For children aged 12 months to 59 months

Sulfadoxine-pyrimethamine + Amodiaquine
(SP_500/25 + AQ_150)

Sulfadoxine-pyrimethamine + Amodiaquine

(SP_500/25 + AQ_150)

Day 1: 1 SP tab + 1 tab of AQ,

Day 2: 1 tablet of AQ,

Day 3: 1 tablet of AQ

2. MALARIA VACCINE

The RTS,S /AS01 malaria vaccine is administered in a 4-dose schedule to children aged 6 months and above.

Chemoprophylaxis in newborns

Atovaquone - Proguanil 250 mg (Malarone)

Cycline (doxycycline monohydrate)

3. VECTOR CONTROL

INDIVIDUAL MEASURES: LLINs; repellents

Collective measures: Intra-domiciliary spray

IX. INPUT MANAGEMENT, PHARMACOVIGILANCE, COMMUNICATION, SUPERVISION AND MONITORING-EVALUATION

IX. MANAGEMENT OF INPUTS, PHARMACOVIGILANCE, COMMUNICATION, SUPERVISION AND MONITORING-EVALUATION

9.1. Supply and management of stock inputs

The management of inputs for malaria control is integrated into the existing SYNAME supply circuit. The supply of inputs, including those intended for community management, will be done in HFs by CENAME and the RFHP, under the coordination of the CTG/NMCP.

For an efficient stock management, refer to the pharmaceutical SOP manual for stock management. This manual contains all the necessary procedures and tools required for stock management. Stocks should be managed rigorously for the following reasons:

- To facilitate compliance with guidelines.
- To maintain the performance of HFs at a high level.
- To avoid stockouts or expiries and to promote accountability and transparency.
- To reduce waste and promote rational use of inputs.
- To place adequate and timely orders for inputs and improve the quality of healthcare.
- To facilitate the quantification of needs in other to improve inputs consumption forecasts in the country.

9.1.1. Some concepts used in stock management

Available and usable stock refers to the quantity of drugs and inputs available for use when needed.

Safety stock (SS) is the buffer stock or reserve stock. It represents the stock needed to avoid shortage in the event of unforeseen situations (it must be equivalent to a reserve stock that can cover 01 months at the HF level).

Minimum stock or alert threshold stock is the least quantity of drugs and inputs available in

an HF to avoid input shortages (it must be equivalent to a reserve stock that can cover 01 month at the HF level).

Maximum stock which is the upper threshold stock is the quantity of inputs above which an HF should not reach to avoid input expiries (it must be equivalent to a reserve stock that can cover 04 months at the HF level).

Average Monthly Consumption (AMC) is the average number of input units consumed over a period. The AMC must be reassessed every 3 or 6 months depending on the level of activity or seasonality of the disease concerned.

Number of months for available stock (MAS): This is the availability period, i.e., the number of months covered by the quantity of usable drugs in stock, taking into account the consumption rate for the current period.

9.1.2. Stakeholders

Refers to anyone who handles or is involved in decision making on these stocks. Namely: the Supply and Stock Management team (Central, Regional, District and HFs); people in charge of HFs; pharmacists or stock managers of HFs and hospital pharmacies; and the laboratory manager and staff, MCHW, etc.

9.1.3. Procurement and stock management cycle

The inputs management cycle can be summarised as follows:

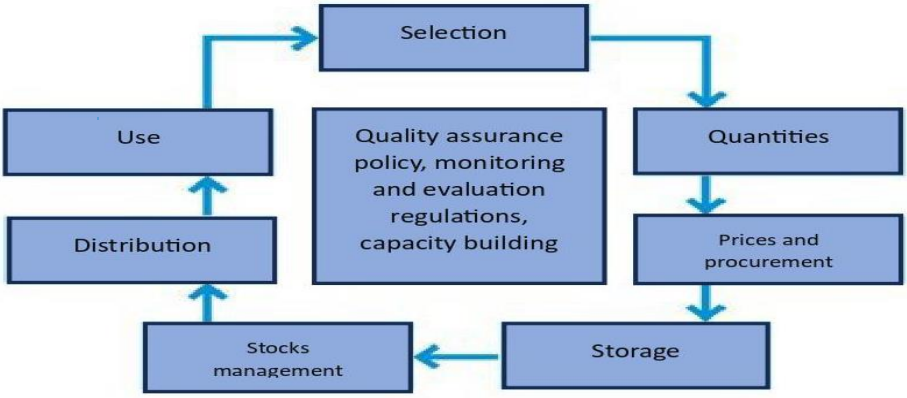


Figure 3: Inputs management cycle

- **Selection**

Products selection takes the following into account:

- ❖ the list of products approved in the country;
- ❖ the national list of essential drugs (depending on the HF category);
- ❖ Standard national treatment protocols. At the HF level, depending on the treatment capacities (technical platform), the selection is the responsibility of the inputs purchasing committees.

- **Quantification**

Quantification or estimation of needs is an operation which allows, on the basis of the average monthly consumption data, to estimate and value the quantity of each pharmaceutical product to be ordered as well as to determine the delivery periods necessary to ensure uninterrupted supply.

- **Supply**

Sources of supply of inputs include CENAME, RFHP, religious centres and authorized suppliers (see DPML website). The usual supply system at the HFs is requisition (PULL). However, for fully subsidized inputs, an allocation system (PUSH) is used. Stakeholders in stock management must refer to the pharmaceutical management SOP manual.

The distribution of inputs, from the central level to the regional level is done by CENAME. From the regional level to the HF, it is done by the RFHP. Reception is done at the HF by the HF reception committee and a report shall be drawn up and signed by the various members after verification of the quantity and quality of the inputs supplied.

- **Storage**

The HF must ensure the availability of compliant storage space (shelves, layout, temperature, security, etc.) and the inputs shall be stored according to the FEFO principle (see Good storage and distribution practices guidelines).

- **Stock management**

a- Stock management tools:

Primary tools:

- Information on stock consumption tools: stock sheet (main tool recommended for stock tracking), daily sales register, inventory sheets, tally sheet, and other management software;
- Stock transaction tools: purchase order, delivery slip, report, complaint form, returns form, transfer form, etc.
- Quality assurance tools: temperature and humidity measurement, etc.
- Accounting tools: reception report, purchase invoices, loss register or loss sheet, etc.

NB: The stock sheet must be available and used at any point where an input is stored (pharmacies, laboratory for RDTs, ANC and the vaccination service for SP and LLINs, etc.). This should be coordinated by the HF pharmacy service.

Secondary tools:

The MAR (for logistics) is the secondary tool; it reports monthly information on stock movements in the HF, registered in the stock sheet. It is filled in on the basis of the inventories carried out at the end of the month. Data and pharmacy managers shall ensure that input data is accurate and complete.

Data from the MAR must be entered into DHIS 2 in due time to facilitate visibility of the facility's stocks and ease decision-making by the higher level.

b- Inventory:

Drug inventory is an operation which consists of counting physically all the products available in the storage points and comparing the quantities found to the values found on the stock cards (theoretical stock). It must be done monthly under the supervision of the pharmacist and the coordination of the HF Head using an inventory sheet (see SOP for input management).

c- Logistic Management Information System (LMIS)

LMIS is a data and reporting system used to collect, organize and present data concerning the movement of products at all levels of the health pyramid. Any structure that manages inputs must present a stock management report for proper monitoring of inputs. Data accuracy, completeness and promptness is the key element that enables the functioning of the management cycle.

d- Rational use of inputs

To ensure the rational use of drugs, the service provider must respect the 6 right rules:

- the right drug
- is in the right place to be prescribed
- To the right person
- At the right time
- in the right dosage

- and at the right price.

An irrational use of drugs may cause the following effects:

- therapeutic effects that are not optimal (often resulting in therapeutic resistance or therapeutic failure)
- minor or serious adverse events.
- considerable waste of material and human resources.

e- Managing the stock of multi-purpose Community Health Workers (MCHW) for community management.

Managing the stock of MCHWs

The Health Area Head is responsible for managing the stock of MCHWs and they are supplied from the main HF's pharmacy. The Health Area Head receives the list of needs from MCHWs every month. On the 25th of each month, the MCHW prepares a report where they summarise their consumption and submit it to the Health Area Head who later validates and ensures that the data is integrated into the National health Information System (NHIS). The transfer of inputs from the HF to the MCHW is done via the input distribution sheet. Any stock transaction, withdrawals or returns to the MCHWs must be reported in the stock sheet of the main HF for stock traceability.

Logistics data collection tools of the MCHWs are:

- The MCHW's inputs distribution sheet
- The communication register containing the needs expression sheet and the daily consumption sheet/monthly stock summary
- The MCHW's monthly report;
- The MCHW's monthly stock management report.

9.2. PHARMACOVIGILANCE

Pharmacovigilance is a health monitoring activity carried out on drugs and health products. It is defined as "the science and activities relating to the detection, evaluation, understanding and prevention of adverse reactions or any other problem associated with drugs or any other health product". The pharmacovigilance component of the National Vigilance System (NSPV) is a mechanism regrouping structures and stakeholders responsible for surveillance and safety of drugs and other health products. It starts at the central level, extends to the peripheral level, including the community. Several reasons justify the need to detect adverse events (AEs), notably: improving the patient's management; encouraging adherence ; detecting new AEs (AEs not listed in the summary of the product's characteristics); taking actions to minimize risk; assessing the frequency of AEs and the benefit/risk balance; identifying subjects at risk and issue alerts/signals.

9.2.1. Definition and classification of Adverse effects/events

An adverse event is any harmful and unintended manifestation that occurs in a person treated with drugs, without prejudging a causal link with the drugs or any other health product.

Adverse reaction is a harmful and unwanted reaction suspected of being caused by a drug. It occurs during consumption whether in compliance or not with the terms and conditions of the Marketing Authorization (MA) of the drug or the registration of the drug. AEs also includes cases of overdose, misuse, abuse, medication error, drug interaction, therapeutic ineffectiveness, drug intake during pregnancy, breastfeeding and in occupational settings.

AEs are classified according to their: frequency, nature, **degree of severity** and mechanism of action.

Depending on the seriousness, an adverse effect is said to be severe if it is likely to cause:

- death
- a threat to the patient's life at the time the event occurs

- a need for hospitalization or an extension of hospitalization period
- significant and lasting after-effects or incapacity (incapacity meaning any inability to perform everyday activities)
- a congenital abnormality or perinatal damage.

A severe AE is one that requires extra treatment after stopping the drug.

A minor or trivial adverse reaction is one that is neither severe nor serious.

9.2.2. Who can/should detect adverse events?

Detection of adverse events likely to occur following the administration of a drug can be done by the treating medical doctor, the pharmacist, the dental surgeon, the nurse, any other health personnel, the MCHW, stakeholders of traditional medicine, the patient or a relative.

- **Where, When and How to detect adverse events?**
- Where? Detection is done in HFs, in clinical trial sites, in pharmaceutical establishments or in patients.
- When? Detection is done during consultations, active research, mass campaigns, dispensation, etc.
- How? During consultations or during active research.

AEs are detected on the basis of patient complaints during consultations and by reviewing consultation/hospitalisation registers and para-clinical examinations during active research.

Prior to any prescription, management or medical follow up of a patient, the healthcare professional shall question the patient on the drugs taken during the last sixty days. Then look for the occurrence of an adverse event in the sixty (60) days following the new prescription and notify.

- **During drug dispensation**

The pharmacist or dispensing chemist must inform the patient on potential AEs that may occur during treatment and invite the patient to report them. He should systematically ask the patient about the occurrence of AEs each time a new drug is prescribed.

- **At home**

Patients or their relatives should report any new symptoms arising after taking the drug to their carer.

NB: healthcare personnel must communicate with patients to encourage them to report any Adverse Event (AE) suspected to be linked with the use of a medication or other healthcare product intended for human use. Remind the public that they can contact the DPML through its website www.dpml.cm or via email at alertevigilancedpmlcameroon@gmail.com to obtain information on the safety, regulatory status of a product or to inform of an AE likely to be linked to the use of a medication or any other health product.

9.2.3. Who are the stakeholders of Pharmacovigilance and what are their roles?

Stakeholders involved in pharmacovigilance are:

- At the central level: the Department of Pharmacy, Drugs and Laboratories; the National Drug Commission; the Commission Specialized in Pharmacovigilance, the Technical Pharmacovigilance Committee; health programmes; the National Laboratory for the Quality Control of Drugs and Expertise (LANACOME);
- At the Regional and District level: Regional Vigilance FPs; Vigilance FPs of Health Districts; the HF Vigilance FP.
- The Regional Vigilance FP is the regional manager of the PV under the coordination of the RTG for the fight against malaria with regard to antimalaria inputs under the general

supervision of the RDPH.

- The Health District Vigilance FP is responsible for PV activities at the level of the Health district under the coordination of the District Health Officer.
- The HF Vigilance FP ensures the implementation of PV activities within the HF under the coordination of the HF's Head.

5- Who notifies? What are the notification tools?

The pharmacovigilance system is essentially based on spontaneous notification. Its aim is to collect useful information concerning the risks presented by health products in order to provide decision-makers with critical information for decision-making.

Notification must be done by all healthcare professionals in the event if :

Ø A suspected adverse event, relating to the consumption of one or more products, occurring under normal conditions of use, whether expected, unexpected, serious or not-serious

- Adverse event occurring outside normal conditions of abusive use; medication error; therapeutic ineffectiveness
- syndrome; effects on the product of conception or drug exposure during pregnancy; defective product/reagent.

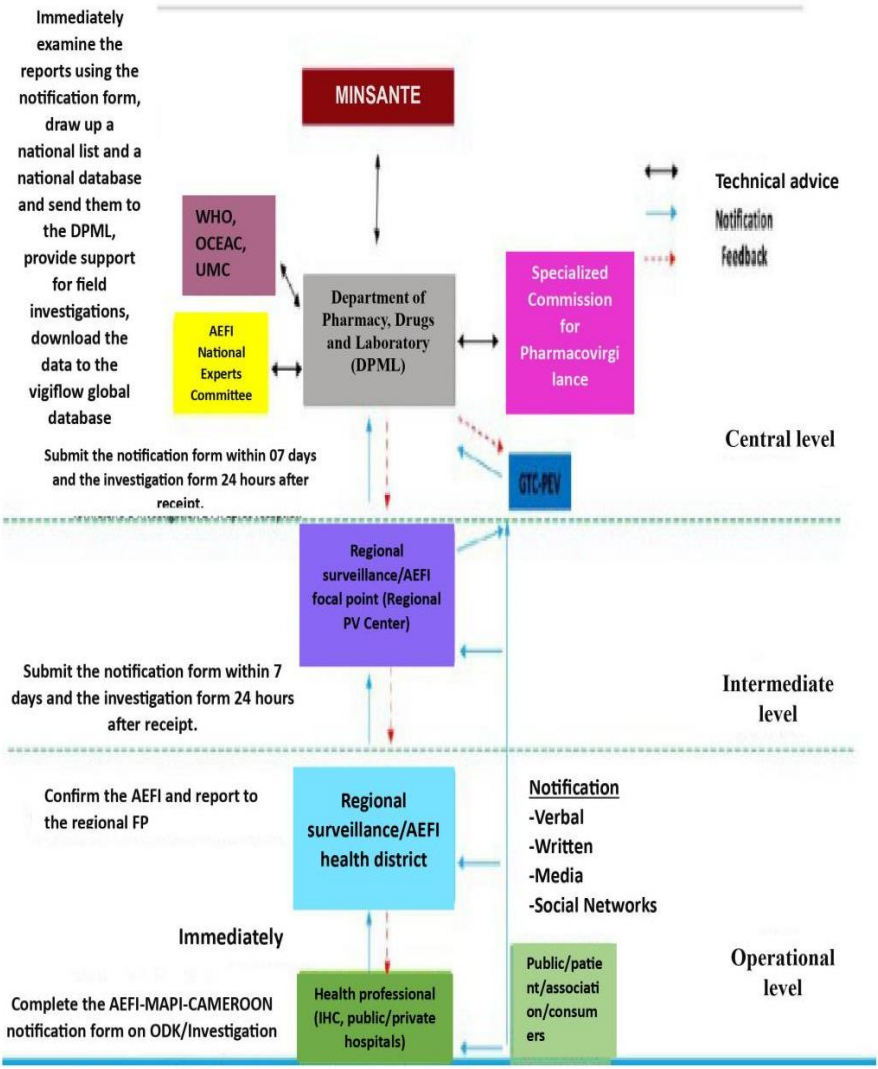
Reporting tools and means of transmission are as follows:

- Notification and investigation forms: duly filled, **ODK Collect, DHIS2, DPML website (**www.dpml.cm),
- Means of transmission: email (alertevigilancedpmlcameroon@gmail.com), telephone, physical mail.

6- Notification circuit:

The regular transmission of information according to the established notification circuit is

essential to improve centralization at the local, regional and national level.



Figures 4 : Notification circuit

Health personnel must keep archives relating to the suspected adverse event so that, if necessary, they can supplement the information previously sent, cooperate with the MOH service in charge of pharmacovigilance, especially in the context of investigations.

Types of adverse effects

- **Some AEs caused by antimalarial inputs**

Table XV: AEs related to anti-malarial drugs

International non-proprietary name (INN)	Adverse effects
Artemether/Lumefantrine	Headache, anorexia, dizziness, asthenia, QT prolongation
Dihydroartemisinin /Piperaquine	-Digestive disorders, liver disorders, -Cardiac disorders (tachycardia, QT interval prolongation), -Pruritus, muscle and joint pains
Artesunate	-Gastrointestinal disorders, dizziness, headache, fever, pruritus, muscle and joint pains -Delayed haemolytic anaemia (2 to 3 weeks after treatment) -Cardiac disorders (QT interval prolongation)

Quinine	-Gastrointestinal disorders, tinnitus, visual disturbances, -Allergies, -Mental disorders, -Heart rhythm disorders -Acute haemolytic anaemia -Low Blood pressure
Sulfadoxine-Pyrimethamine	-Skin rash, cutaneous vasculitis, pruritus, urticaria, severe sore throat, fever, -photosensitivity -Haematological disorders, kidney damage -Lyell and Steven Johnson syndrome

Amodiaquine	-Digestive disorders (nausea, vomiting, abdominal pain -Discoloured stools -Haematological affections (leukopenia, agranulocytosis) -Drug-induced hepatitis -Extrapyramidal disorders (dyskinesia) -Eye disorders (opacification of the cornea) -Fatigue, dark-coloured urine, cough, fever, pruritus, jaundice

What to do in the event of AEs

In the event of an AE, health personnel shall take the following actions:

- Manage cases according to the AE that occur
- Collect samples of cases that require biological confirmation
- Ensure additional medical examinations depending on the type of AE
- Refer cases of severe AEs which cannot be managed in your HF to the next level.

TABLE XVI: Actions to take for minor AEs

Minor adverse effects	What to do?
Fever/headache	Analgesics-antipyretics (Paracetamol…)
Urticaria, pruritus, rash, atopic dermatitis,	Antihistamines/Corticoids (Chlorpheniramine, Dexamethasone, etc.)
Nausea, vomiting	Antiemetics (Metoclopramide…)
Diarrheoa	ORS, if necesssary: Ringer's, isotonic saline
Lyell and Steven Johnson syndrome	Hospitalisation in an intensive care unit with appropriate care to avoid infection. Immediate discontinuation of the suspected drug Intravenous administration of solutions to fight back fluids and salts losses resulting from skin lesions Administration of antibiotics if there is any infection etc.

9.3. Communication for social and behaviour change

There are a number of challenges relating to communication on malaria management. The dissemination of normative texts is aimed at improving the knowledge and appropriation of these guidelines by healthcare providers. Communication for social and behaviour change will contribute to improve their knowledge, behaviours and practices to improve malaria management in HFs and in the community. It will also raise awareness amongst patients on the availability and use of malaria control services to encourage adherence to malaria management in HFs and in the community. In this light, the role of MCHWs will be critical during home visits, as they will have to manage uncomplicated cases and refer severe cases and pregnant women to HFs for management. They will also provide key information concerning malaria prevention to households.

For an optimal implementation of these updated guidelines, the following communication actions will be carried out: (i) institutional communication (ministerial memos, dissemination via digital networks); (ii) mass communication (posters, radio, TV, written press, etc.); (iii) interpersonal communication (capacity building, supervisory training, educational talks, etc.). (iv) institutional advocacy (stakeholder engagement meetings).

Priority goes to public health officials, health personnel, stakeholders and the private sector (HFs, hospital pharmacies, etc.), target populations (community leaders, parents/guardians, pregnant women, community mobilisers, etc.).

9.4. Supervision, monitoring and evaluation

To ensure maximum implementation of these guidelines, supervision, surveillance, monitoring and evaluation actions will be carried out at all levels

9.4.1. Supervision

Supervision is an implementation support activity which consists of providing support to stakeholders in fulfilling their missions. It is done through periodic site visits by technically

competent personnel from a higher level to lower levels, with the aim of ensuring that activities are carried out in compliance with established procedures. Supervision will be organised at all levels. It is organized regularly twice a year by the central level, quarterly by the regional and district levels, monthly within the HF and towards the community.

The different types of supervision are differentiated into integrated and thematic supervision (EUV, mentoring, data quality audit, etc.). Supervision essentially involves observing the following four aspects: (i) adequacy of objectives (ii) compliance with norms and standards (iii) staff motivation (iv) improvement of staff performances and skills

Exceptionally, supervision should be organised in the following situations: newly trained staff on malaria control strategies; new strategy introduced in the fight against malaria; untrained staff, newly assigned staff and poor performance observed. This supervision shall be carried out by trained HF heads using a harmonised tool at each level. The aim is to supervise each health care provider and each MCHW at least once every six months at the central/regional level and every four months at the district level. During integrated supervision, every aspect of malaria management as described in these guidelines will be supervised, including diagnosis, treatment, management of inputs and logistical data, collection and management of clinical data, with an emphasis on the attitude and skills of the health care provider towards the patient.

9.3.1. Control, monitoring and evaluation of malaria management

9.3.1.1. Data management system

- **Organisation of the system**

The data management system for the management of malaria cases is integrated into the National Health Information System (NHIS) of the Ministry of Public Health (MOH). This integration concerns the collection levels (Community, HF), management tools (Registers, MAR Form, Entry and analysis platform which is the DHIS2). However, stakeholders and operational

procedures are integrated generally at the operational level (Community, HF, Health District) and specifically at the regional and central levels.

- **Collection of malaria management data**

Health care providers/laboratories/pharmacy clerks, at the HF level and the MCHW will ensure the collection of data on primary collection tools (registers, monitoring sheet for the dispensation of inputs, etc.), then they will ensure the consolidation of weekly and monthly data collected in the EPD and MAR forms. Data consolidated in the EPD or MAR are entered into forms in DHIS2 by an HF or Health District official appointed for this purpose by the Head of the HF or Health District.

- **Analysis of malaria management data**

It is recommended that HF Heads and MCHWs should institute monthly meetings to review and validate data consolidated in MARs for the management of diseases (including malaria) before entering them into the DHIS2 platform. In addition, monthly analysis of trends in cases of uncomplicated or severe malaria, supported by the construction and regular updating of monitoring graphs to track changes in the diagnoses of uncomplicated or severe cases, should also be instituted at the level of the HF or MCHW.

The Health District ensures quality control of the data stored by the HF in DHIS2. It analyses trends in morbidity indicators (suspected cases, tested cases, uncomplicated and severe positive cases, treated cases), mortality indicators (malaria-related deaths) and performance in the implementation of actions to fight against malaria (Biological diagnosis, Treatment, IPTp, IPTn, LLIN distribution), as well as the management of inputs (continuous availability of inputs by HF or MCHW), and provides feedback to HFs to undertake actions for improvement.

The central and regional levels provide technical support to the health districts to improve data collection, analysis and interpretation.

- **Use of malaria management data**

At HF level, monitoring cases and deaths makes it possible to regularly assess the effectiveness of preventive actions (IPTp, IPTi, LLIN, etc.) and management actions (RDT, ACT, Artesunate, etc.) by observing their trend, in order to take appropriate measures, if necessary. Regular analysis of inputs stock management data will allow asserrment of the effectiveness of stock management activity (continuous availability of inputs) and improve the rational management of inputs (control of the AMC).

At the District and Regional level, the analysis and interpretation of malaria management data, in addition to the uses mentioned above, enables the stratification of the burden of cases and deaths linked to malaria, as well as the coverage of actions to fight against malaria, in order to improve targeting and implementation.

The central level (NMCP) is in charge of using the information for strategic decision-making as well as ensuring its dissemination to its technical and financial partners.

- **Data transmission circuit**

On a monthly basis, the MCHW will transmit the consolidated data from their activities, in a MAR, to the reference IHC in their health area for review/validation. Further transmission will be done to the health district where the data will be entered into DHIS2;

HFs will draw up the activity report (MAR) on a monthly basis and enter it into the DHIS2 platform or send it to the health district for entry into the DHIS2 platform;

Health districts will ensure or coordinate entry of routine monthly data by the HF and the District Civil Society Organisation (DCSO) on behalf of the MCHW, followed by quality review, analysis and use to guide decision-making;

Regions will monitor the quality of data entered into the DHIS2 platform, analyse and produce periodic information bulletins in order to guide decision-making;

Finally, the central level will be responsible for validating, using and disseminating information to the supervisory authorities, HFs, technical and financial partners, for decision-

making.

The diagram below describes the information circuit.

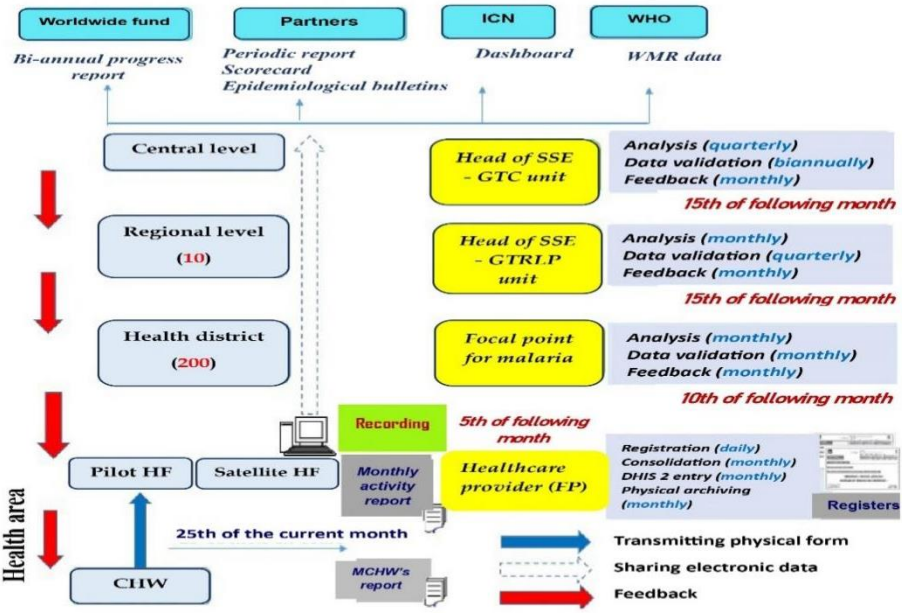


Figure 5: Information circuit from operational level to central level

- **Periodic surveys (DHS, MIS)**

Considering that data from the routine collection system only reports data from HFs, which does not reflect the situation of the general population, the NMCP will rely on survey data to obtain additional information necessary for rational and strategic decision-making. These include DHS and MIS surveys, which measure the progress made in malaria management at the level of households (go to HFs in the event of fever, diagnosis, treatment).

- **Sentinel surveillance**

A sentinel surveillance system has been set up to ensure the collection of some essential

data not covered by the routine surveillance system and household surveys. It includes 35 health districts and 105 HFs representing the different eco-epidemiological strata of malaria in Cameroon. These sentinel sites will help overcome these difficulties by rapidly providing quality data that inform on trends for some indicators, based on additional information specific to the routine system and household surveys. This involves data on the diagnosis of plasmodial species and the efficacy of the drugs used, through the setting up of reference services for the biological diagnosis of malaria and the regular implementation (every two years) of Therapeutic Efficacy Tests (TET) for the drugs used.

The implementation of activities will be monitored during coordination meetings, data review and validation meetings and during supervision. Timely evaluation surveys will be carried out to give an overview of the evolution of malaria management indicators. An overall evaluation for this guide's implementation is planned every two years, to identify the strengths, weaknesses, opportunities and threats and to suggest recommendations for the next revision.

Coordination will take place at all levels, including in the community, mainly through the CTG/Technical Working Group for case management and prevention of malaria in pregnant women /CNRBM DLMEP, DOSTS, DPML and DSF at the central level.

As part of the implementation of a surveillance system, it is necessary to take into account a pharmacovigilance system (see pharmacovigilance chapter).

9.5. Aspects of free malaria management in Cameroon

The President of the Republic decreed free management for uncomplicated and severe malaria in children under 5 years old. For uncomplicated malaria, consultation, RDT, ACT, paracetamol 100 mg, in HFs and in the community are free. Regarding severe malaria, a free management kit for children under 5 years old is provided. This policy has been integrated into the package of services offered within the framework of Universal Health Coverage (UHC). Community monitoring and accountability mechanisms are put in place to raise awareness among providers and beneficiaries.

Universal Health Coverage

UHC is one of the main health strategies chosen by the MOH to achieve the Sustainable Development Goals (SDGs). It contributes to achieve a set of objectives such as social inclusion, reduction of inequalities, gender equality, eradication of poverty, development of human capital and economic growth.

Its aim is to increase the access and use of subsidized services by removing financial barriers and improving the quality of health care and services. Its targets are pregnant women, children under 5 (a key target of the National Malaria Control Programme), people living with HIV, people suffering from tuberculosis and patients requiring dialysis treatment.

Basket of care

- **Preventive and promotional healthcare:**

❖ Nutrition intervention package
❖ Vaccination
❖ Community interventions package

Curative healthcare and services

❖ Consultation of children aged 0 to 5 years for all types of pathologies (10 Regions)
❖ Treatment of uncomplicated or severe malaria in children aged 0 to 5 years (10 Regions)
❖ Management of the pregnant woman enrolled in the UHC Phase I and her newborn up to 42 days of life (05 Regions: Far North, North, Adamawa, East and South)
❖ Antiretroviral treatment for people living with HIV (10 Regions)
❖ Treatment of Tuberculosis (10 Regions)
❖ Management of dialysis sessions (10 Regions)

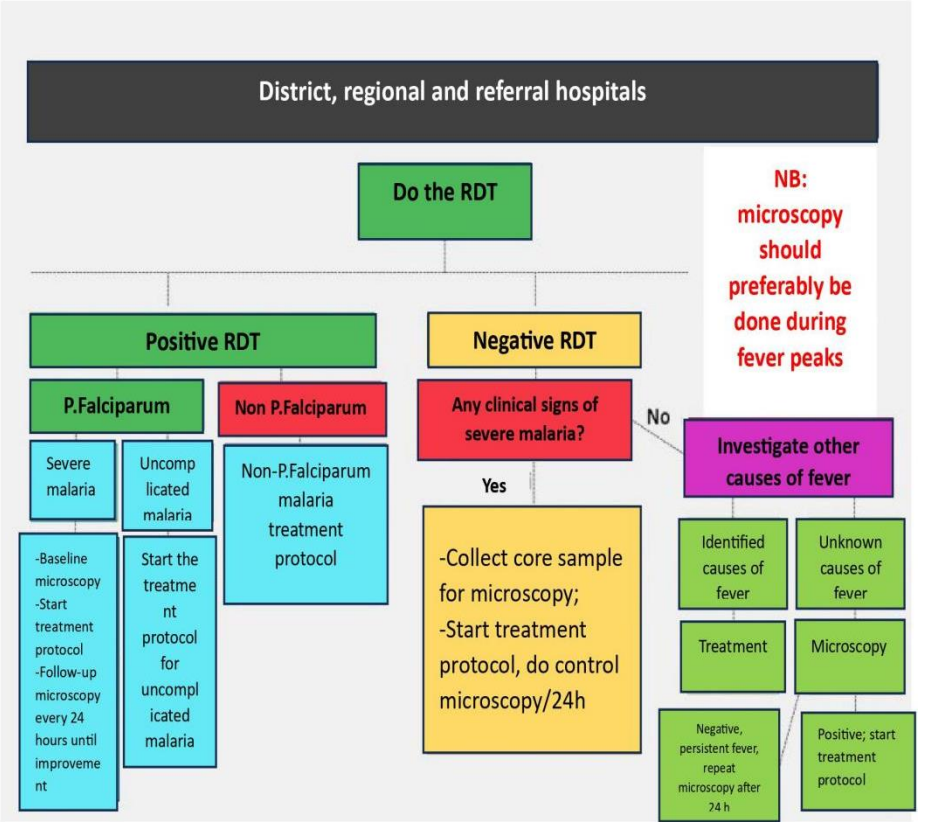
To benefit from the above intervention package, you must first be enrolled and the enrolment mechanism is found in Appendix XX of the document.

APPENDICES

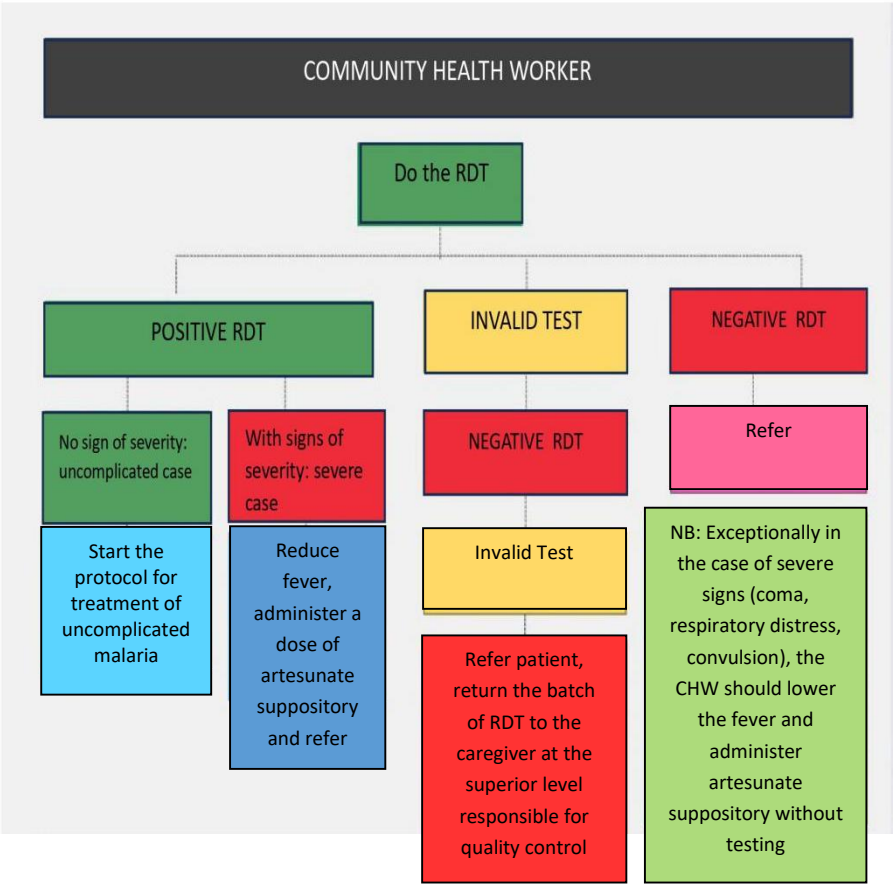
IX. APPENDICES

Appendix 1: MALARIA DIAGNOSIS ALGORITHM ACCORDING TO THE LEVEL OF THE HEALTH PYRAMID

APPENDIX 2 : In MHCs and others of the same category

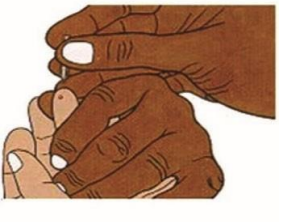


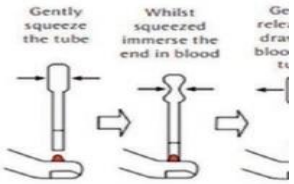
APPENDIX 3 : At the level of the community



Appendix 4: HOW TO CONDUCT A MALARIA TEST WITH RDT

Step 1 Prepare the workspace.	Preferably, this should be a well-lit space, with a washable surface, sufficient space to place all components of the test kit, the safety box, the trash can and the register.
Step 2 Make sure you have the following items before you start the test:	New unopened test kit (cassette), New pipette, New unopened alcohol swab, new unopened lancet New pair of disposable gloves, Swab Timer or clock Safety Box, trash can.
Step 3 Read the instruction manual carefully.	- Before performing the test, make sure you have mastered all instructions. - Explain the importance and procedure of the test to the patient. Check the expiration date indicated on the test packet. An expired RDT may give a false result.
Step 4 Put on gloves	- Put on a pair of gloves **(Use a new pair for each patient).** - Open the sachet and remove the test cassette. **NB:** Do not open the RDT kit until you are ready to use it. A test left open for some time before use may give false results. Write the patient's name and or number on the cassette. (A pencil is more appropriate than a pen)

Step 5 a) Prepare the blood by pricking the patient with a lancet	Open the alcohol swab. Ask if the patient is right- or left-handed. If right-handed, use the left hand. With the palm facing upwards; preferably select the fourth finger (ring finger) or the fifth finger. Clean with the alcohol swab and leave to dry. ***NB: The thumb or index finger should not be used. (The fourth finger is chosen because it is the finger least used and causes least inconvenience for the patient).***	
	For infants weighing <5 kg, prick the heel. For infants weighing 5-10 kg prick the big toe For children > 10 kg prick the finger	
Step 6 (a)	Pinch 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 and firmly to obtain a drop of blood.	

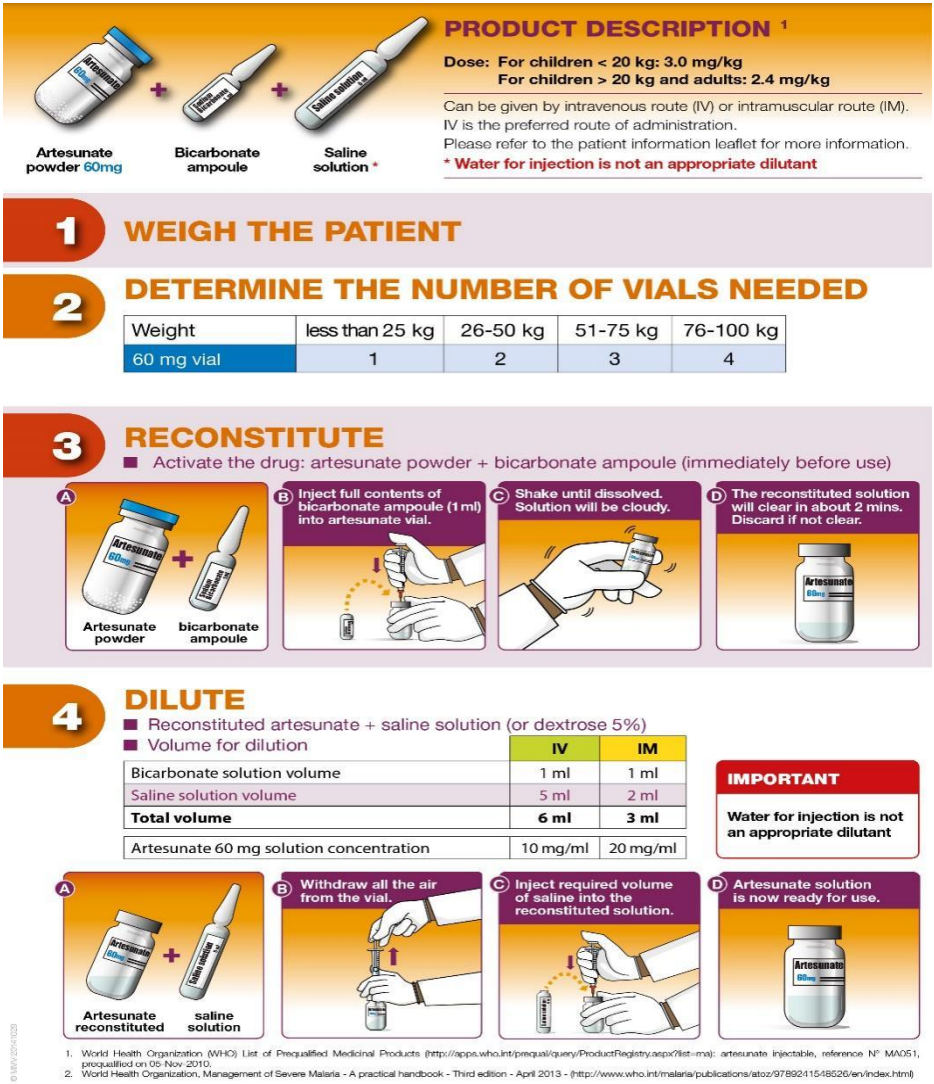
Step 6 (b)	Discard the lancet in the safety box immediately after the finger prick. Wipe off the first drop of blood with the sterile compress or cotton wool. Apply gentle pressure to the fingertip until you get another drop of blood	
Step 7	Using the pipette provided, take the sample, while gently squeezing the tube by dipping the open end into the drop of blood, then gently release the pressure to draw the blood into the pipette until the black line is reached. ***NB: Never place the lancet on the bench before disposing of it in a safety box. Use one lancet for one person only.***	
Step 8 Procedure for the test	Hold the RDT flat on the table with one hand. With the other hand, carefully add 5 µL of the pipette's total blood into the sample well (small well). Discard the pipette used in the safety box. Drop the diluent into the appropriate hole. Respect the number of drops recommended by the manufacturer. Check the time before reading the result. Read the test result following the instructions of the manufacturer (15 – 20 minutes)	

Appendix 5: CLASSIFICATION OF THE MAIN ANTIMALARIAL DRUGS

SCHIZONTOCIDES
NATURAL ANTIMALARIAL DRUGS Cinchona alkaloids: Quinine, Quinidine, Cinchonine, Cinchonidine Derivatives of Qinghaosu (Artemisia): Artemisinin, Artemether, Artesunate
SYNTHETIC ANTIMALARIAL DRUGS Amino-4-quinolines: Chloroquine, Amodiaquine, Amopyroquine Aryl-Amino-Alcohols: Mefloquine, Halofantrine Antifolics, antifolinics: Sulfonamides, Sulfones, Pyrimethamine, Proguani, Chlorproguanil, Atovaquone Antibiotics and others: Cyclins, Macrolides, Fluoroquinolones, Hydroxynaphthoquinones
GAMETOCYTOCIDES
Amino-8-quinolines Primaquine, Tafenoquine

Appendix 6: DOSAGE AND USE OF INJECTABLE ARTESUNATE

INJECTABLE ARTESUNATE FOR SEVERE MALARIA



1. World 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)

5 CALCULATE THE DOSE

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

Less than 20 kg

For intravenous route (IV)	For intramuscular route (IM)
Concentration: 10 mg/ml	**Concentration: 20 mg/ml**
3.0 mg x body weight (kg) / IV artesunate solution concentration 10 mg/ml Round up to the next whole number	3.0 mg x body weight (kg) / IM artesunate solution concentration 20 mg/ml Round up to the next whole number
Example:	**Example:**
Dose needed (ml) for 8 kg child: $\frac{3.0 \times 8}{10} = 2.4$ ml 2.4 ml rounded up to **3 ml**	Dose needed (ml) for 8 kg child: $\frac{3.0 \times 8}{20} = 1.2$ ml 1.2 ml rounded up to **2 ml**

Weight kg	Dose mg	Dose ml
6 - 7	20	2
8 - 10	30	3
11 - 13	40	4
14 - 16	50	5
17 - 20	60	6

Weight kg	Dose mg	Dose ml
6 - 7	20	1
8 - 10	30	2
11 - 13	40	2
14 - 16	50	3
17 - 20	60	3

More than 20 kg

Concentration: 10 mg/ml	Concentration: 20 mg/ml
2.4 mg x body weight (kg) / IV artesunate solution concentration 10 mg/ml Round up to the next whole number	2.4 mg x body weight (kg) / IM artesunate solution concentration 20 mg/ml Round up to the next whole number
Example:	**Example:**
Dose needed (ml) for 26 kg child: $\frac{2.4 \times 26}{10} = 6.24$ ml 6.24 ml rounded up to **7 ml**	Dose needed (ml) for 26 kg child: $\frac{2.4 \times 26}{20} = 3.12$ ml 3.12 ml rounded up to **4 ml**

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

Weight kg	Dose mg	Dose ml
20 - 25	60	3
26 - 29	70	4
30 - 33	80	4
34 - 37	90	5
38 - 41	100	5
42 - 45	110	6
46 - 50	120	6
51 - 54	130	7
55 - 58	140	7
59 - 62	150	8
63 - 66	160	8
67 - 70	170	9
71 - 75	180	9
76 - 79	190	10
80 - 83	200	10
84 - 87	210	11
88 - 91	220	11
92 - 95	230	12
96 - 100	240	12

Remark: the upper limit for each weight band is 0.9 kg e.g. 14 - 16 kg covers 14 - 16.9 kg.

6 ADMINISTER

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

1. Give **3 parenteral doses** over 24 hours as indicated in the opposite table

2. Give **parenteral doses** for a minimum of 24 hours once started irrespective of the patients ability to tolerate oral treatment earlier.

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

- When the patient can take oral medication, prescribe a full 3-day course of recommended first line oral Artemisinin Combination Therapy (ACT). The first dose of ACT should be taken **between 8 and 12 hours** after the last injection of artesunate.
- Until the patient is able to take oral medication, continue parenteral treatment (one dose a day) **for a maximum of 7 days.**
- 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.**

This document is intended to demonstrate to health workers how to prepare and administer injectable artesunate, a treatment for severe malaria. It is not intended to provide personal medical advice. The responsibility for the interpretation and use of this material lies with the reader. In no event shall MMV be liable for damages arising from its use.
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Appendix 7: Dosage of ARTEMETHER 80mg/ml

1 ampoule of 1ml = 80 mg

Patient WEIGHT (kg)	AGE	1st day: in 2 doses (3.2 mg/kg)	2nd to 7th day: in 1 dose (1.6 mg/kg)
3 to 4	1 - 2 months	0.14 ml	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 - 3 years	0.5 ml	0.25 ml
16 to 20	4 - 6 years	0.72 ml	0.36 ml
21 to 25	7 - 8 years	1 ml	0.5ml
26 to 30	9 - 10 years	1.12 ml	0.55 ml
31 to 35	10 - 11 years	1.32 ml	0.65 ml
36 to 40	11 - 13 years	1.52 ml	0.75 ml
41 to 45	13 - 14 years	1.72 ml	0.85 ml
46 to 50	14 - 15 years	2 ml	1 ml
51 to 55	15 - 16 years	2.12 ml	1.06 ml

**** If you have a bathroom scale, it is preferable to use the weight rather than the age. The weight is more accurate.***

*****Artemether should be measured with a 1 ml syringe (vaccination or insulin syringes).***

Appendix 8: Dosage of ARTEMETHER

20 mg / ml 1 ampoule of 1 ml = 20 mg

Weight (kg)	AGE	1st day: in 2 doses	2nd to 7th day: in 1 dose
3 to 4	1 - 2 months	0.64 ml	0.28 ml
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 - 3 years	2 ml	1 ml
16 to 20	4 - 6 years	3 ml	1.5 ml
21 to 25	7 - 8 years	4 ml	2 ml
26 to 30	9 - 10 years	4.5 ml	2.25 ml
31 to 35	10 - 11 years	5.3 ml	2.65 ml
36 to 40	11 - 13 years	6 ml	3 ml
41 to 45	13 - 14 years	7 ml	3.5 ml
46 to 50	14 - 15 years	8 ml	4 ml
51 to 55	15 - 16 years	8.5 ml	4.25 ml
56 and above	≥ 16 years	10 ml	5 ml

** If you have a bathroom scale, it is preferable to use the weight rather than the age.*

****Small doses of Artemether should be measured with a 1 ml syringe (vaccination or insulin syringes)**

Appendix 9: REGIMEN FOR QUININE ADMINISTRATION

INTRAVENOUS ROUTE (Infusion)

Quinine should be administered intravenously according to one of the following regimens:

Regimen 1:

Loading dose:

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

From H 4 to H 8: 5% or 10% glucose alone (+ electrolytes)

Maintenance dose: After loading dose until oral treatment is tolerated

From H 8 to H 12: 8.3 mg/kg quinine base in 5% or 10% glucose + electrolytes

From H 12 to H 16: 5% or 10% only glucose (+ electrolytes)

From H 16 to H 20: 8.3 mg/kg quinine base in 5% or 10% glucose (+ electrolytes)

From H 20 to H 24: 5% or 10% only glucose (+ electrolytes)

Regimen 2

No loading dose - Day 1 :

From H 0 to H 4: 8.3 mg/kg of quinine base in glucose of 5% or 10% + electrolytes

From H 4 to H 8: 5% or 10% only glucose (+ electrolytes)

From H 8 to H 12: 8.3 mg/kg Quinine base in 5% or 10% glucose + electrolytes

From H 12 to H 16: 5% or 10% only glucose (+ electrolytes)

From H 16 to H 20: 8.3 mg/kg quinine base in 5% or 10% glucose (+ electrolytes)

From H 20 to H 24: 5% or 10% only glucose (+ electrolytes).

Days 2 to 7: same regimen if treatment cannot be given orally.

In the event of hypoglycaemia, use 10% glucose. Add electrolytes to the infusions. Diabetes must not be overlooked.

If intravenous infusion is not possible, administer quinine intramuscularly according to the diagram on the following page and refer the patient to the appropriate level.

INTRAMUSCULAR ROUTE

For the intramuscular route, it is recommended to dilute quinine hydrochloride in 9‰ saline at a concentration of 60 mg/ml and inject half into the anterior aspect of each thigh. To avoid abscesses, tetanus, hepatitis and HIV only duly sterilised equipment should be used, preferably single use.
SWITCH TO ORAL ROUTE AS SOON AS POSSIBLE AND CONTINUE TREATMENT AT THE SAME DOSAGE UNTIL THE SEVENTH DAY

ORAL ROUTE

Oral treatment should start as soon as the patient feels better.

8.3 mg/kg of quinine base or 10 mg/kg of quinine salt every 8 hours for a total duration of 7 days or with a therapeutic combination based on Artemisinin ACT (Artesunate-Amodiaquine or Artemether-Lumefantrine) for three days.

Any injectable or oral quinine must be used, taking into account the quantity of quinine base contained in the ampoule or tablet.

Appendix 10: 24-HOUR TREATMENT OF SEVERE MALARIA WITH QUININE

HYDROCHLORIDE WITHOUT LOADING DOSE

Q = Quinine hydrochloride
G = glucose (or dextrose) 5% or 10%.

12.5 mg of quinine base = 0.45 ml of quinine

Hydrochloride/quinine hydrochloride. G=Glucose or Dextrose

PATIENT WEIGHT (kg)	PATIENT AGE *	Hours	
		Loading dose H0 - H4 H8-H12 H16-H20	Keep vein open H4-H8 H12-H16 H20-H24
3	≤ 1 months	Q = 0.1 ml; G = 50ml	Q = 0; G = 50ml
4	1 - 2 months	Q = 0.13 ml; G = 75ml	Q = 0; G = 50ml
5	2 - 3 months	Q = 0.16 ml; G = 100ml	Q = 0; G = 70ml
6	3 - 4 months	Q = 0.20 ml; G = 100ml	Q = 0; G = 100ml
7	4 - 6 months	Q = 0.23 ml; G = 100ml	Q = 0; G = 150ml
8	7 - 9 months	Q = 0.26 ml; G = 150ml	Q = 0; G = 125ml
9	10 – 12 Months	Q = 0.30 ml; G = 200ml	Q = 0; G = 100ml
10	13 – 15 Months	Q = 0.32 ml; G = 200ml	Q = 0; G = 150ml
11 - 12	16 – 24 Months	Q = 0.37 ml; G = 200ml	Q = 0; G = 150ml

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

**** If you have a bathroom scale, it is preferable to use the weight rather than the age. The weight is more accurate.***

As at day 3, if the patient is still in the comatose state, reduce the total number of infusions and feed the patient via a nasogastric tube to provide calories.

THE QUANTITIES OF SOLUTE ARE GIVEN FOR INDICATIVE PURPOSES.

IT IS UP TO THE PRESCRIPTOR TO MODIFY THESE QUANTITIES OR TO PRESCRIBE OTHER SOLUTES DEPENDING ON THE PATIENT'S CLINICAL STATE.

Appendix 11: 24-HOUR TREATMENT OF SEVERE MALARIA WITH QUININE HYDROCHLORIDE PROTOCOL WITH LOADING DOSE

Q = Hydrochloric quinine; G = glucose (or dextrose) 5% or 10%

PATIENT WEIGHT (Kg)	PATIENT AGE *	Hours		
		Loading dose H0 - H4	Maintenance dose H12-H16, H0-H4	Keep vein open H4-H12-H16 H16-H24
3	≤ 1 months	Q = 0.2 ml ; G = 50ml	Q = 0.1 ml ; G = 50ml	Q = 0 ; G = 50ml
4	1 - 2 months	Q = 0.26 ml ; G = 75ml	Q = 0.13 ml ; G = 75ml	Q = 0 ; G = 50ml
5	2 - 3 months	Q = 0.32 ml; G = 100ml	Q = 0.16 ml; G = 100ml	Q = 0 ; G = 70ml
6	3 - 4 months	Q = 0.40 ml; G = 100ml	Q = 0.2 ml; G = 100ml	Q = 0 ; G = 100ml
7	4 - 6 months	Q = 0.46 ml; G = 100ml	Q = 0.23 ml; G = 100ml	Q = 0 ; G = 150ml
8	7 - 9 months	Q = 0.52 ml; G = 150ml	Q = 0.26 ml; G = 150ml	Q = 0 ; G = 125ml
9	10 - 12 months	Q = 0.60 ml; G = 200ml	Q = 0.30 ml; G = 200ml	Q = 0 ; G = 100ml
10	13 - 15 months	Q = 0.64 ml; G = 200ml	Q = 0.32 ml; G = 200ml	Q = 0 ; G = 150ml

11 - 12	16 - 24 months	Q = 0.74 ml; G = 200ml	Q = 0.37 ml; G = 200ml	Q = 0 ; G = 150ml
13 - 14	2 - 3 years	Q = 0.88 ml ; G = 200ml	Q = 0.44 ml ; G = 200ml	Q = 0 ; G = 200ml
15 - 16	3 - 4 years	Q = 1 ml ; G = 200 ml	Q = 50 ml ; G = 200ml	Q = 0 ; G = 225ml
17 - 18	4 - 5 years	Q = 1.12 ml ; G = 200ml	Q = 1.56 ml ; G = 200ml	Q = 0 ; G = 225ml
19 - 20	5 - 6 years	Q = 1.26 ml ; G = 250ml	Q = 1.63 ml ; G = 250ml	Q = 0 ; G = 225ml
21 - 25	6 - 8 years	Q = 1.48 ml ; G = 250ml	Q = 1.74 ml ; G = 250ml	Q = 0 ; G = 250ml
26 - 30	8 - 10 years	Q = 1.8 ml ; G = 250 ml	Q = 1.9 ml ; G = 250ml	Q = 0 ; G = 300ml
31 - 35	10 - 11 years	Q = 2.2 ml ; G = 300ml	Q = 1.1 ml ; G = 300ml	Q = 0 ; G = 300ml
36 - 40	11 - 13 years	Q = 2.4 ml ; G = 300ml	Q = 1.2 ml ; G = 300ml	Q = 0 ; G = 325ml
41 - 45	13 - 14 years	Q = 2.8 ml ; G = 300ml	Q = 1.4 ml ; G = 300ml	Q = 0 ; G = 350ml
46 – 50	14 - 15 years	Q = 3.2 ml ; G = 350ml	Q = 1.6 ml ; G = 350ml	Q = 0 ; G = 375ml
51 – 55	15 - 16 years	Q = 3.4 ml ; G = 400ml	Q = 1.7 ml ; G = 400ml	Q = 0 ; G = 400ml
56 – 60	≥ 16 years	Q = 3.8 ml ; G = 400ml	Q = 1.9 ml ; G = 400ml	Q = 0 ; G = 450ml
> 60	≥ 16 years	Q = 3.9 ml ; G = 450ml	Q = 1.95 ml ; G = 450ml	Q = 0 ; G = 450ml

Appendix 12:
24-HOUR TREATMENT OF SEVERE MALARIA WITH QUINIMAX

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

12.5 mg of Quinine Base =0.1 ml of Quinimax new presentation
G = glucose (or dextrose)

PATIENT WEIGHT (Kg)	PATIENT AGE*	Hours		
		Loading dose H0 - H4	Maintenance dose H12-H16 H0-H4	Keep vein open H4-H12-H16 H16-H24
3	≤ 1 months	Q = 0.2 ml; G = 50ml	Q = 0.1 ml; G = 50ml	Q = 0; G = 50ml
4	1 - 2 months	Q = 0.26 ml; G = 75ml	Q = 0.13 ml; G = 75ml	Q = 0; G = 50ml
5	2 - 3 months	Q = 0.32 ml; G = 100ml	Q = 0.16 ml; G = 100ml	Q = 0; G = 70ml
6	3 - 4 months	Q = 0.40 ml; G = 100ml	Q = 0.2 ml; G = 100ml	Q = 0; G = 100ml
7	4 - 6 months	Q = 0.46 ml; G = 100ml	Q = 0.23 ml; G = 100ml	Q = 0; G = 150ml
8	7 - 9 months	Q = 0.52 ml; G = 150ml	Q = 0.26 ml; G = 150ml	Q = 0; G = 125ml
9	10 - 12 months	Q = 0.60 ml; G = 200ml	Q = 0.30 ml; G = 200ml	Q = 0; G = 100ml
10	13 - 15 months	Q = 0.64 ml; G = 200ml	Q = 0.32 ml; G = 200ml	Q = 0; G = 150ml
11 - 12	16 - 24 months	Q = 0.74 ml; G = 200ml	Q = 0.37 ml; G = 200ml	Q = 0; G = 150ml
13 - 14	2 - 3 years	Q = 0.88 ml; G = 200ml	Q = 0.44 ml; G = 200ml	Q = 0; G = 200ml
15 - 16	3 - 4 years	Q = 1 ml; G = 200 ml	Q = 50 ml; G = 200ml	Q = 0; G = 225ml

17 - 18	**4 - 5 years**	**Q = 1.12 ml; G = 200ml**	**Q = 1.56 ml; G = 200ml**	**Q = 0; G = 225ml**
19 - 20	**5 - 6 years**	**Q = 1.26 ml; G = 250ml**	**Q = 1.63 ml; G = 250ml**	**Q = 0; G = 225ml**
21 - 25	**6 - 8 years**	**Q = 1.48 ml ; G = 250ml**	**Q = 1.74 ml ; G = 250ml**	**Q = 0 ; G = 250ml**
26 - 30	**8 - 10 years**	**Q = 1.8 ml ; G = 250 ml**	**Q = 1.9 ml ; G = 250ml**	**Q = 0 ; G = 300ml**
31 - 35	**10 - 11 years**	**Q = 2.2 ml ; G = 300ml**	**Q = 1.1 ml ; G = 300ml**	**Q = 0 ; G = 300ml**
36 - 40	**11 - 13 years**	**Q = 2.4 ml ; G = 300ml**	**Q = 1.2 ml ; G = 300ml**	**Q = 0 ; G = 325ml**
41 – 45	**13 - 14 years**	**Q = 2.8 ml ; G = 300ml**	**Q = 1.4 ml ; G = 300ml**	**Q = 0 ; G = 350ml**
46 – 50	**14 - 15 years**	**Q = 3.2 ml ; G = 350ml**	**Q = 1.6 ml ; G = 350ml**	**Q = 0 ; G = 375ml**
51 – 55	**15 - 16 years**	**Q = 3.4 ml ; G = 400ml**	**Q = 1.7 ml ; G = 400ml**	**Q = 0 ; G = 400ml**
56 – 60	**≥ 16 years**	**Q = 3.8 ml ; G = 400ml**	**Q = 1.9 ml ; G = 400ml**	**Q = 0 ; G = 450ml**
> 60	**≥ 16 years**	**Q = 3.9 ml ; G = 450ml**	**Q = 1.95 ml ; G = 450ml**	**Q = 0 ; G = 450ml**

**** If you have a bathroom scale, it is preferable to use the weight rather than the age. The weight is more accurate.***

As of day 3, if the patient remains comatose, reduce the total number of infusions and feed the patient via a nasogastric tube to provide calories.

THE QUANTITIES OF SOLUTE ARE GIVEN FOR INDICATIVE PURPOSES.

IT IS UP TO THE PRESCRIBER TO MODIFY THESE QUANTITIES OR TO PRESCRIBE OTHER SOLUTES DEPENDING ON THE PATIENT'S CLINICAL STATE

Appendix 13: NUMBER OF DROPS PER MINUTE IN AN INFUSION FOLLOWING THE QUANTITY OF LIQUID

5 to 10 ml/Kg/4 hours (Maximum quantity 500ml per quinine infusion)

QUANTITY OF LIQUID TO DROP 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 the dose to be administered

82 mg/ml= Weight x Dose (mg/kg)/ Quantity to take per dose Dilution of quinine

a) 1 ampoule of 600mg/2ml of 82% quinine base + 4 ml of sterile water i.e. 600 mg/6ml or 100 mg of salt per ml or 82 mg of quinine base per ml

b) 1 ampoule of 600 mg/2ml of 82.6% quinine base + 4 ml of sterile water, i.e. 600 mg of salts/6ml or 82.6 mg of quinine base per ml

Appendix 14: SALT/BASE MATCHING OF THE MAIN AUTHORIZED ANTIMALARIAL DRUGS

QUININE	SALT	BASE
Quinine sulfate Tab	362 mg	300 mg
		300 mg
Quinine disulfate Tab	508 mg	408.5 mg (81.7 %)
Quinine hydrochloride Tab (Quinine Lafran*, etc.)	500 mg	300 mg (74 %)
Quinine dihydrochloride Tab,	405 mg	82% i.e. 492 mg/2ml
injectable Quinine dihydrochloride.	600 mg/2 ml	82% i.e 492
		mg/2ml
Injectable Quinine hydrochloride.	600 mg/2 ml	82,6% i.e 495,6
Injectable Quinine sulphate.		mg/2 ml
Quinine gluconate, amp (Quinimax*)	600 mg/2 ml	100 mg (100 %)
	100 mg	

APPROVED AND RECOMMEDED **THERAPEUTIC COMBINATIONS BASED ON ARTEMISININ** Artesunate + amodiaquine (Coarsucam*, Asaq*, etc) Artemether + Lumefantrine (Coartem*,Artefan*) Artemether+ Lumefantrine (*) **INJECTABLE ARTEMETHER** **INJECTABLE ARTESUNATE**	25mg/67.5mg 50mg/135mg 100mg/270mg 20mg/ 120mg (20mg/40mg , 80mg)/ 120mg 60mg/ml	25mg/67.5mg 50mg/135mg 100mg/270mg 20mg/ 120mg (20mg/40mg , 80mg)/ 120mg 60mg/ml

APPENDIX 15: CRITERIA FOR SELECTION AND CLASSIFICATION OF ACTs USED FOR THE MANAGEMENT OF SIMPLE MALARIA IN CAMEROON

1. THE USE OF ACT IN HEALTH FACILITIES

	AL	ASAQ	DHAP	ASPY	Comment
COST	1,704	0,498	0,88	1,1453	
Desirable Effects (LONG TERM EFFICACY)	4	4	4	4	Available data show that these drugs had considerable efficacy between 2006 and 2016
Undesirable Effects (SIDE EFFECTS AND CONTRA-INDICATIONS IN SPECIAL POPULATIONS)	3	1	3	2	ASAQ is no longer indicated for people living with HIV and patients with chronic hepatitis. DHAP is contraindicated in patients with either weight deficit or overweight. Similarly, its consumption with fatty foods presents an increased risk of cardiac rhythm disorders. There is not enough hindsight to make a decision on ASPY.
Certainty of evidence (NUMBER OF AVAILABLE STUDIES)	4	4	4	2	Good number of studies on AL, ASAQ, DHAP. Fewer number of studies on ASPY comparatively
Values (PERCEPTION BY POPULATION)	4	2	3	1	Providers prefer AL. Strong tendency to prescribe DHAP has been observed in the private sector. Unlikely, multiple reluctances to prescribe ASAQ have been reported. We do not have enough information about the use of ASPY in the general population and even amongst prescribers.

Balance of effects	4	2	3	2	It is clear from the discussions that prescribers and the public believe the side effects outweigh the benefit of its use. The fact that ASPY has not been widely until today does not give us sufficient perspective to make a decision on this drug.
Resources required (COST OF ONE TREATMENT)	1	4	3	2	Cost prices report from the worldwide fund show that AL is the most expensive drug, followed by ASPY, DHAP and finally ASAQ.
Equity (COVERAGE FOR ALL POPULATIONS)	4	3	3	2	AL is indicated for all regions. ASAQ cannot be used in children under 05 years of age one month before and after SMC. No enough information for ASPY.
EASE OF USE (ADAPTED GENERIC FORMS)	2	3	3	4	The fact that two doses of AL are required per day makes the drug more difficult to use than the others. It is further more complicated to use because, it needs to be taken with a fatty meal. ASPY comes in powder form, making it easier to use.
Acceptability (PRESCRI-BERS AND PATIENT)	4	2	4	2	AL and DHAP are very widely prescribed in FOSA, unlike ASAQ. Insufficient data to comment concerning ASPY.
Feasibility (EASE OF AP-PLICATION WITHIN 6 MONTHS)	4	4	3	2	Using DHAP and ASPY in the next six months will require prior training activities for healthcare providers. This requirement is not imposed in the case of ASAO and AL.
Total	**34**	**29**	**33**	**23**	
RANK	**1st**	**3rd**	**2nd**	**4th**	

2. ACT CLASSIFICATION FOR THE NORTH AND FAR NORTH REGIONS

	AL	DHAP	ASPY	Comment
Desirable Effects (LONG TERM EFFICACY)	4	4	4	Available data show that these drugs had considerable efficacy between 2006 and 2016
Undesirable Effects (SIDE EFFECTS AND CONTRAINDICATIONS IN SPECIAL POPULATIONS)	3	3	2	ASAQ is no longer indicated for people living with HIV and patients with chronic hepatitis. DHAP is contraindicated in patients with either weight deficit or overweight. Similarly, its consumption with fatty foods presents an increased risk of cardiac rhythm disorders. There is not enough hindsight to make a decision on ASPY.
Certainty of evidence (NUMBER OF AVAILABLE STUDIES)	4	4	2	Good number of studies on AL, ASAQ, DHAP. Fewer number of studies on ASPY comparatively.
Values (PERCEPTION BY POPULATION)	4	3	1	Providers prefer AL. Strong tendency to prescribe DHAP has been observed in the private sector. On the contrary, multiple reluctances to prescribe ASAQ have been reported. Insufficient data about the use of ASPY in the general population and even amongst prescribers.
Balance of effects	4	3	2	It is clear from the discussions that prescribers and the public believe the side effects outweigh the benefit of its use. The fact that ASPY has not been widely used until today does not give us sufficient perspective to make a decision on this drug.

Resources required (COST OF ONE TREATMENT)	1	3	2	Cost prices reported by the worldwide fund show that AL is the most expensive drug, followed by ASPY, DHAP and finally ASAQ.
Equity (COVERAGE FOR ALL POPULATIONS)	4	3	2	AL is indicated for all regions. ASAQ cannot be used in children under 05 years of age one month before and after SMC. Insufficient information concerning ASPY.
EASE OF USE (ADAPTED GENERIC FORMS)	2	3	4	The fact that two doses of AL are required per day makes this drug more difficult to use than the others. It is further more complicated to use because, it needs to be taken with a fatty meal. ASPY comes in powder form, making it easier to use.
Acceptability (PRESCRIBERS AND PATIENT)	4	4	2	AL and DHAP are very widely prescribed in FOSA, unlike ASAQ. No sufficient information to comment concerning ASPY.
Feasibility (EASE OF APPLICATION WITHIN 6 MONTHS)	4	3	2	Using DHAP and ASPY in the next six months will require prior training activities for healthcare providers. This requirement is not imposed in the case of ASAQ and AL.
Total	**34**	**33**	**23**	
Rank	**1st**	**2nd**	**3th**	

3. ACT CLASSIFICATION FOR CHWs

	AL	ASAQ	DHAP	ASPY	Comments
Desirable Effects (LONG TERM EFFICACY)	4	4	4	4	Available data show that these drugs had considerable efficacy between 2006 and 2016
Undesirable Effects (SIDE EFFECTS AND CONTRA-INDICATIONS IN SPECIAL POPULATIONS)	3	2	3	2	ASAQ is no longer indicated for people living with HIV and patients with chronic hepatitis. DHAP is contraindicated in patients with either weight deficit or overweight. Similarly, its consumption with fatty foods presents an increased risk of cardiac rhythm disorders. There is not enough hindsight to make a decision on ASPY.
Certainty of evidence (NUMBER OF AVAILABLE STUDIES)	4	4	4	2	Good number of studies on AL, ASAQ, DHAP. Fewer number of studies on ASPY comparatively.
Values (PERCEPTION BY POPULATION)	4	4	2	2	No reluctance to prescribe ASAQ amongst ASCs was reported. Insufficient data on the use of ASPY in the general population and even amongst CHWs.
Balance of effects	4	4	2	2	CHWs did not report any adverse effects that could limit the use of ASAQ.
Resources required (COST OF ONE TREATMENT)	1	4	3	2	Cost prices reported by the worldwide fund show that AL is the most expensive drug, followed by ASPY, DHAP and ASAQ.

Equity (COVERAGE FOR ALL POPULATIONS)	4	3	4	4	AL is indicated for all regions. ASAQ cannot be used in children under 05 years of age one month before and after SMC. Insufficient information concerning ASPY.
EASE OF USE (ADAPTED GENERIC FORMS)	1	4	4	3	Having to take two doses of AL per day made it difficult, on the one hand, for the ASC to explain the dosage and, on the other hand, for patients to use it. ASPY comes in powder form, making it easier to use.
Acceptability (PRESCRIBERS AND PATIENT)	2	4	4	3	The communities expressed their satisfaction with the use of ASAQ prescribed by the CHWs
Feasibility (EASE OF APPLICATION WITHIN 6 MONTHS)	4	4	2	2	The prescription of ASPY and DHAP has as a prerequisite a multitude of training courses which will probably last more than six months.
Total	31	37	32	26	
RANK	3rd	1st	2nd	4th	

Appendix 16 : ALGORITHM OF THE PECIMNE
(Source : PECIMNE, Minsante 2021)

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Appendix 18 : ENROLLEMENT MECHANISM FOR THE CSU

WHAT ARE THE ADVANTAGES OF ENROLLING IN UHC PHASE I?

Who ?	What?	How much?	Where ?
The general public	Preventive and promotional services on the various health topics	Free of charge (paid by the State)	In all the 10 regions
Children 0-5 years	• Free consultation • Treatment of uncomplicated or severe malaria	Free of charge for the child (paid by the State)	In all the ten regions • Integrated Health Centre (IHC) • Medicalized Health Centre (MHC) • District Hospital (DH)
Pregnant women + newborn up to 42 days of life	• Antenatal consultations • Childbirth (even if complication requiring a caesarean section) • Care of newborn up to 42 days old	FCFA 6 000 /pregnancy	In all the 10 regions
Persons living with HIV/ AIDS, tuberculosis, Onchocerciasis	Treatment	(Free of charge for the person)	In all the 10 regions
People on dialysis	Dialysis sessions for 1 year	FCFA 15 000 annual bundle (instead of FCFA 520 000/ year)	In all the 10 regions

HOW TO ENROLL IN UHC PHASE I?

Download the **CamerHealthCoverage application** in Playstore then follow instruction

Or

Go to the address: **csu.minsante.cm** then follow the instruction

Or

Go to:

An identified fixed enrollment post (**Health Facility, Town Halls, Chiefdoms, Health Districts, partner structures, etc.**)

A mobile station with the enrolling agents (**public place or at home**)