

Updated Standard Treatment Guideline (STG Section on Malaria Treatment, updated to include **Artesunate-Pyronaridine** (based on Health Technology Assessment [HTA] evidence generated through SAVING Consortium IR process)

Ministry of Health (SAVING Consortium Work-package 3) working with sustained engagement of the National Malaria Elimination Programme

Note: this section is part of the larger STG and essential medicines list (EML) under review in Ghana

194. Malaria

Malaria is a very common infection in Ghana. It follows the introduction of protozoan malaria parasites into the bloodstream mainly from the bite of an infected female Anopheles mosquito. Malaria is a major cause of significant morbidity and mortality especially among vulnerable individuals, such as children under 5 years of age, pregnant women (sometimes with adverse foetal and maternal outcomes), patients with sickle cell disease, visiting non-immune travellers, etc.

Based on the clinical severity, cases of malaria are categorized as either 'uncomplicated' or 'severe'. A diagnosis of malaria can be suspected based on the patient's symptoms and the physical findings at examination. However, for a definitive diagnosis to be made, laboratory tests (Blood Film and/or Rapid Diagnostic Test) must demonstrate the malaria parasites or their components since the clinical presentation of the condition can be similar to other common diseases such as typhoid fever, urinary tract infection, septicaemia, pneumonia and meningitis in both adults and children and measles, otitis media, tonsillitis, etc. in children. Ghana is currently implementing the 3T policy (Test, Treat and Track). With this policy all suspected cases are to be tested. Cases confirmed positive are to be placed on treatment with adequate follow up.

Preventive measures in the community mainly target elimination of the insect vector or prevention of mosquito bites while additional chemoprophylaxis is required for vulnerable individuals.

The development of resistance within malaria parasites to anti-malarial medications is a matter of major public health concern. This phenomenon is largely the result of 'over-diagnosis' and wrong diagnosis of malaria by healthcare practitioners and patients alike, with its attendant overtreatment and sometimes partial or incomplete treatment, leading to over-exposure of the parasites to the anti-malarial drug.

Artemisinin Combination Therapy (ACT), rather than monotherapy with artemisinin derivatives, is currently recommended for the treatment of uncomplicated malaria to prevent the development of drug resistance.

It is therefore necessary to obtain parasitological confirmation of a diagnosis of malaria before starting treatment. Exceptions to this principle are cases of suspected severe malaria where parasitological confirmation is not immediately possible. For cases of severe malaria, treatment should be started and the patient referred to a facility where confirmatory testing is available.

Causes

- *Plasmodium falciparum* (commonest and responsible for most of "the deaths and morbidity associated with malaria in Ghana)
- *Plasmodium malariae*
- *Plasmodium ovale*
- *Plasmodium vivax* (currently not detected in Ghana)
- *Plasmodium knowlesi* (currently not detected in Ghana)

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Symptoms

- Fever
- Chills
- Rigors
- Sweating
- Headache
- Generalized body and joint pain
- Nausea and/or vomiting
- Loss of appetite
- Abdominal pain (especially in children)

- Irritability and refusal to feed (in infants)

Signs

- Fever
- Mild pallor
- Mild jaundice
- Splenomegaly

Investigations

- Microscopy - thick and thin blood films for malaria parasites
- Rapid Diagnostic Test (RDT)
- FBC
- Other tests as indicated

Treatment

Treatment objectives

- To avoid progression to severe malaria
- To limit the duration of the illness
- To minimize the development of drug resistant parasites

Non-pharmacological treatment

- See “Pharmacological treatment for fever”

Tepid sponging and/or placing a child under a fan to reduce peripheral body temperature has been shown to add no value in fever reduction in children and may even cause discomfort and is therefore not recommended.

Pharmacological treatment

Evidence Rating: [A]

- Artesunate + Amodiaquine, oral, (See Table 18-5 on page 484, Table 18-6 on page 484, Table 18-7 on page 484)

Or

- Artemether + Lumefantrine, oral, (See Table 18-8 on page 485)

Or

- Dihydroartemisinin + Piperaquine, oral, (See Table 18-9 on page

485)

Or

- Artesunate + Pyronaridine, oral, (See Table 18-10 on page 485)

Table 18-5: Artesunate + Amodiaquine co-blistered formulation (Regimen for ONCE DAILY DOSING)

Weight	Age	Artesunate (50 mg tablets) Number of Tablets to Be Given			Amodiaquine (150 mg base tablets) Number of Tablets to Be Given		
		Day 1	Day 2	Day 3	Day 1	Day 2	Day 3
5-10 kg	< 1 yr	½	½	½	½	½	½
11-24 kg	1-6 yrs	1	1	1	1	1	1
24-50 kg	7-13 yrs	2	2	2	2	2	2
50-70 kg	14-18 yrs	3	3	3	3	3	3
>70 kg	> 18 yrs	4	4	4	4	4	4

The dose in mg/body weight is: Amodiaquine 10 mg/kg + Artesunate 4 mg/ kg, taken as a single dose daily for three (3) days, after meals.

Table 18-6: Artesunate + Amodiaquine co-blistered formulation (Regimen for TWICE DAILY DOSING)

Weight	Age	Artesunate (50 mg tablets) Number of Tablets To Be Given						Amodiaquine (150 mg base tablets) Number of Tablets To Be Given					
		Day 1		Day 2		Day 3		Day 1		Day 2		Day 3	
		AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
5-10 kg	< 1 yr	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼	¼
11-24 kg	1-6 yrs	½	½	½	½	½	½	½	½	½	½	½	½

24-50 kg	7-13 yrs	1	1	1	1	1	1	1	1	1	1	1	1
50-70 kg	14-18 yrs	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½
>70 kg	> 18 yrs	2	2	2	2	2	2	2	2	2	2	2	2

The dose in mg/body weight is: Amodiaquine 10 mg/kg + Artesunate 4 mg/kg, taken as two divided doses daily for three (3) days, after meals.

Table 18-7: Artesunate + Amodiaquine Fixed Dose Combination (Standard Regimen, using the 3 available dosing strengths)

		Artesunate (AS) + Amodiaquine (AQ) Number of Fixed Dose Combination Tablets to be given			
Weight	Age	Tablet Dosing Strength	Day 1	Day 2	Day 3
<8 kg	2-11 mo.	AS: 25 mg AQ: 67.5 mg	1	1	1
9-17 kg	1-5 yrs	AS: 50 mg AQ: 135 mg	1	1	1
18-35 kg	6-13 yrs	AS: 100 mg AQ: 270 mg	1	1	1
> 36 kg	> 13 yrs	AS: 100 mg AQ: 270 mg	2	2	2

Each Fixed Dose Combination tablet contains both Artesunate (AS) and Amodiaquine (AQ), at the dosages indicated. The product packaging clearly indicates which dosing strength applies to which age group. The *maximum daily dose of Artesunate/Amodiaquine is 200 mg/600 mg*

Table 18-8: Artemether + Lumefantrine (Dosing Regimen)							
		Artemether (20 mg) + Lumefantrine (120 mg) Number of Tablets To Be Given					
Weight	Age	Day 1		Day 2		Day 3	
		First Dose	Second Dose (after 8hrs)	AM	PM	AM	PM
< 5 kg	< 6 mo	Not recommended for patients under 5 kg					
5-15 kg	6 mo-3 yr	1	1	1	1	1	1
15-25 kg	3-8 yr	2	2	2	2	2	2
25-35 kg	8-12 yr	3	3	3	3	3	3
>35 kg	>12 yr	4	4	4	4	4	4

| Uncomplicated Malaria |

Table 18-9: Dihydroartemisinin + Piperaquine (Dosing Regimen)				
Weight	Age	Dihydroartemisinin (40 mg) / Piperaquine (320 mg base) Number of Tablets To Be Given		
		Day 1	Day 2	Day 3
5-10 kg	< 1 yr	¼	¼	¼
11-15 kg	1-3 yr	½	½	½
16-24 kg	4-6 yr	1	1	1
24-35 kg	7-10 yr	1¼	1¼	1 ¼
36-50 kg	11-13 yr	1½	1½	1 ½

50-70 kg	14-18 yr	2	2	2
>70 kg	> 18 yr	3	3	2

Table 18-10: Artesunate and Pyronaridine (Recommended Dosing Regimen)

Weight	Artesunate (20 mg) / Pyronaridine (60 mg base) Number of Sachets To Be Given Once Daily			
	Day 1	Day 2	Day 3	
5-8 kg	1 sachet	1 sachet	1 sachet	
9-15 kg	2 sachets	2 sachets	2 sachets	
16-20 kg	3 sachets	3 sachets	3 sachets	
Artesunate (60 mg) / Pyronaridine (180 mg base) Number of Tablets To Be Given Once Daily				
21-24 kg	1 tablet	1 tablet	1 tablet	
25-45 kg	2 tablets	2 tablets	2 tablets	
46-65 kg	3 tablets	3 tablets	3 tablets	
>65 kg	4 tablets	4 tablets	4 tablets	

AP tablets or sachets (granules for oral suspension) to be taken once daily for 3 days

Artesunate + Pyronaridine should not be used in patients with liver impairment due to its potential hepatotoxic effects.

196 Severe Malaria

Severe or 'complicated malaria' can arise from delay in diagnosis or inappropriate treatment of uncomplicated malaria. It mostly occurs in children under 5 years of age, pregnant women and non-immune individuals. The events causing most deaths in severe malaria are related to cerebral involvement (cerebral malaria), severe anaemia, hypoglycaemia, severe dehydration, renal failure and respiratory distress.

The diagnosis of severe malaria is based on clinical features and confirmed with laboratory testing. Not all cases of severe malaria have

high parasitaemia and initial blood film examination may be negative. Where the diagnosis is suspected, treatment must be started without delay while awaiting confirmation.

Symptoms

- Poor oral intake (e.g. breast milk in children)
- Repeated profuse vomiting
- Dark or 'cola-coloured' urine
- Passing of very little urine
- Difficulty in breathing
- Generalised weakness, inability to walk or sit without assistance
- Altered consciousness (change of behaviour, confusion, delirium, coma)
- Repeated generalized convulsions

Signs

- Hyperpyrexia (axillary temperature > 38.5°C)
- Extreme pallor (severe anaemia; Hb < 5 g/dl)
- Marked jaundice
- Circulatory collapse or shock (cold limbs, weak rapid pulse)
- Tachypnoea (Rapid breathing)
- Crepitations on chest examination
- Sweating (due to hypoglycaemia)
- Haemoglobinuria (dark or 'cola-coloured' urine)
- Oliguria
- Spontaneous unexplained prolonged bleeding (disseminated intravascular coagulation)
- Altered consciousness (change of behaviour, confusion, delirium, coma)

Investigations

- Rapid diagnostic tests
- Blood film for malaria parasites - thick and thin blood films (should be done where available)
- FBC
- Sickling test
- Random blood glucose
- BUE and creatinine
- Blood grouping and cross-matching

- Lumbar puncture in the convulsing or comatose patient to exclude meningitis or encephalitis

Treatment

Treatment objectives

- To ensure rapid clearance of parasitaemia
- To provide urgent treatment for life threatening complications or conditions e.g. convulsions, hypoglycaemia, dehydration, renal impairment
- To provide appropriate supportive care

Non-pharmacological treatment

- Place patients who are unconscious or having seizures in an appropriate position to prevent aspiration

Pharmacological treatment

Evidence Rating: [A]

A. Pre-referral treatment

- Artesunate, IM,
Adults and Children > 20 kg
2.4 mg/kg
Children < 20 kg
3 mg/kg
Or
- Artemether, IM,
Adults and Children
3.2 mg/kg

Or
- Quinine, IM, 10 mg/kg (See Table 18-10 below)
Or
- Artesunate, rectal, 10 mg/kg (preferred in children under 6 years;

Table 18-10: Dosing Regimen for Quinine IM Injection in young Children

Weight	Volume of Quinine Dihydrochloride Injection (50 mg/ml dilution)
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< 5 kg	1.0 ml
5.1-7.5 kg	1.5 ml
7.6-10.0 kg	2.0 ml
10.1-12.5 kg	2.5 ml
12.6-15.0 kg	3.0 ml
15.1-17.5 kg	3.5 ml - half to each thigh
17.6-20.0 kg	4.0 ml - half to each thigh
20.1-22.5 kg	4.5 ml - half to each thigh
22.6-25.0 kg	5.0 ml - half to each thigh
25.1-27.5 kg	5.5 ml - half to each thigh
27.6-30.0 kg	6.0 ml - half to each thigh

The dosage for IM Quinine is 10 mg (0.2 ml) per kg of bodyweight every 8 hours.

Note 18-10

How to give Intramuscular Quinine

Intramuscular Quinine in Young Children:

- Weigh the child
- Prepare a Quinine dilution of 50 mg/ml: Use a 10 ml sterile syringe and needle to draw up 5 mls of sterile water for injection or saline (not dextrose). Then into the same syringe draw up 300 mg (1ml) from an ampoule of Quinine. The syringe now contains 50 mg Quinine per ml.
- The dosage is 10 mg (0.2 ml) per kg or body weight every 8 hours. Calculate the volume to give based on body weight. (For examples of body weights and doses in children < 30 kg, See Table 18:10).
- Administer by intramuscular injection to the thigh. If the diluted volume exceeds 3 ml, inject half the dose into each thigh.

Intramuscular Quinine in Adults:

- Use a Quinine dilution of 100 mg/ml. To prepare this, draw 2 mls of Quinine 600 mg and add 4 mls of sterile water or saline (not dextrose)

- The dosage is 10 mg/kg body weight of Quinine given 8 hourly by deep IM injection, to a maximum dose of 600 mg
- Small adults (weighing less than 60 kg) should be weighed to calculate the correct dose. Larger adults will simply receive the maximum dose (600 mg)
- If the required volume is more than 5 ml, divide it into two and inject at separate sites

Table 18-11: Rectal Artesunate (Pre-Referral Treatment in Children)

Weight	Age	Artesunate Dose	Regimen
5 - 8 kg	< 1 yr	50	One 50 mg suppository
9 - 19 kg	1 - 1½ yrs	100	Two 50 mg suppositories
20 - 29 kg	1½ - 5 yrs	200	One 200 mg suppository
30 - 39 kg	6 - 13 yrs	300	Two 50 mg and one 200 mg suppositories
> 40 kg	> 14 yrs	400	Two 200 mg suppositories

B. Treatment in Referral Centre

Note 18-11

Parenteral antimalarials and follow-on treatment.

The current recommendation is to give parenteral antimalarials in the treatment of severe malaria for a minimum of 24 hours (irrespective of the patient's ability to tolerate oral medication) until the patient is able to tolerate oral medication as follow-on treatment. Recommended follow-on treatments include ACTs and Quinine + clindamycin.

- Artesunate, IV or IM,
Adults and Children > 20 kg
 2.4 mg/kg 12 hourly
 Given at time 0 hour (i.e. on admission), at 12 hours and 24 hours
Then
 2.4 mg/kg daily until patient can swallow (max. 7 days)
Then
 A full 3-day course of recommended oral artemisinin combination therapy (ACT) Children < 20 kg

3 mg/kg 12 hourly

Given at time 0 hour (i.e. on admission), at 12 hours and 24 hours

Then

3.0 mg/kg daily until patient can swallow (max. 7 days)

Then

A full 3-day course of recommended oral ACT

Note 18-12

Artesunate reconstitution for parenteral injection

Reconstitution:

Use a syringe to draw and inject the solvent (sodium bicarbonate 50mg/ml solution) into the vial of artesunate powder. Shake the vial until the powder is completely dissolved and the solution is clear.

For intravenous injection:

Add either glucose 50 mg/ml (i.e. 5% Dextrose solution) or sodium chloride 9 mg/ml (i.e. 0.9% Normal saline solution) to the reconstituted artesunate solution to create a **10 mg/ml solution** of artesunate.

Draw required volume and give slowly by IV at about 3-4 ml/min. (See Table 18:12)

For intramuscular injection:

Add either glucose 50 mg/ml (i.e. 5% Dextrose solution) or sodium chloride 9 mg/ml (i.e. 0.9% Normal saline solution) to the reconstituted artesunate solution to create a **20 mg/ml solution** of artesunate.

Draw required volume and give slowly by IM anterior thigh. If the required volume is more than 5 ml, divide it into two and inject at separate site. (See Table 18:12)

Table 18-12: Approximate quantities for dilution

Route	IV Injection			IM Injection		
	30 mg	60 mg	120 mg	30 mg	60 mg	120 mg
Strength of medicine						
Sodium bicarbonate 50 mg/ml solution for reconstitution (ml)	0.5	1	2	0.5	1	2
Glucose 50 mg/ml solution for injection	2.5	5	10	1	2	4

Or Sodium chloride 9 mg/ml for injection (ml)						
Total diluent needed (ml)	3	6	12	1.5	3	6
Artesunate concentration (mg/ml)	10	10	10	20	20	20

Note 18-13

Calculation of dose of Artesunate needed (ml):

Adults:

For IV route:

2.4 mg x body weight (kg)

IV Artesunate solution concentration 10 mg/ml For

IM route:

2.4 mg x body weight (kg)

IM Artesunate solution concentration 20 mg/ml

Children < 20kg:

For IV route:

3 mg x body weight (kg)

IV Artesunate solution concentration 10 mg/ml For

IM route:

3 mg x body weight (kg)

IM Artesunate solution concentration 20 mg/ml

Precautions:

- Inject immediately after reconstitution and discard if not used within 1 hour
- Discard if solution is not clear
- Do not use in IV drip, give slowly by direct IV injection at about 3-4 ml/min

Or

- Artemether, IM,
Adults and Children
3.2 mg/kg stat.
Then (8 hours later)
1.6 mg/kg

Then (24 hours after initiation of treatment)

1.6 mg/kg once daily until patient can swallow (up to 5 days)

Then

A full 3-day course of recommended oral artemisinin combination therapy (ACT)

Or

- Quinine, IV, (in Dextrose saline or in 5% Dextrose [5-10 ml/kg])
Adults and Children
10 mg/kg (max. dose 600 mg) infused over 4-8 hours.
Repeat infusion 8 hourly until patient can swallow.

Then

- Quinine, oral, 10 mg/kg 8 hourly to complete 7 days of treatment

And

- Clindamycin, oral, 10 mg/kg, 12 hourly for 7 days

Note 18-14

Clindamycin should be administered with food and copious amounts of water. Quinine, IV, should always be given by a slow infusion, never by bolus intravenous injection as this may cause severe hypotension.

Or

- Quinine, IM,
Adults and Children
10 mg/kg (max. dose 600 mg), 8 hourly until patient can tolerate oral medication

Then

- Quinine, oral, 10 mg/kg 8 hourly to complete 7 days of treatment

And

Clindamycin, oral, 10 mg/kg, 12 hourly for 7 days

Referral Criteria

Patients diagnosed as having severe malaria or who fail to respond to the recommended antimalarial medications must be referred. Appropriate treatment as indicated above must be initiated prior to transferring the patient. If referral is not possible immediately, continue the treatment regimen as shown above for severe malaria until referral is possible.

197 Malaria in Pregnancy

Pregnancy makes women more likely to get malaria or die from malaria. Malaria infection is more severe during pregnancy while pregnancy and its outcomes can become complicated by it. The effects of malaria on the pregnant mother include a severe form of the illness, anaemia, miscarriage, pre-term labour, and post-partum haemorrhage. Risks to the foetus include foetal anaemia, pre-maturity, intra-uterine growth restriction, low birth weight, stillbirth, congenital malaria, and increased perinatal mortality. Preventive measures must be emphasised (i.e. Insecticide-treated Nets [ITNs] and Intermittent Preventive Treatment in pregnancy [IPTp] under direct observation) while confirmed cases must be treated promptly.

Treatment objectives

- To ensure prompt and effective case management

Non-pharmacological treatment

- None

Pharmacological treatment

A. Treatment of Uncomplicated Malaria in the First Trimester

- Artemether + Lumefantrine, oral, (See Table 18-8 on page 485)

Or

- Quinine, oral, (may be given as monotherapy if Clindamycin is not available)
10 mg/kg (max. 600 mg) 8 hourly for 7 days

And

- Clindamycin, oral, 10 mg/kg, twice daily for 7 days

Note 18-15

The drug of choice for uncomplicated malaria for pregnant women in the first trimester is oral Quinine. ACTs are not recommended for use in the first trimester. However, their use should not be withheld in cases where they are considered to be life-saving, or where other antimalarials are considered to be unsuitable.

B. Treatment of Uncomplicated Malaria in the Second and Third Trimesters

- Artesunate + Amodiaquine co-blistered formulation (Regimen for TWICE DAILY DOSING) or the dose in mg/body weight is: Amodiaquine 10 mg/kg + Artesunate 4 mg/kg, taken as two divided doses daily for three (3) days, after meals. (See Table 18-5 on page 484, Table 18-6 on page 484, Table 18-7 on page 484)

Or

- Artemether + Lumefantrine, oral, (See Table 18-8 on page 485)

Or

- Quinine, oral, (See section Treatment of Uncomplicated Malaria in the First Trimester)

C. Treatment of Severe Malaria in Pregnancy (All trimesters and puerperium)

Evidence Rating: [A]

- Artesunate, IV or IM,

Then

- ACT, oral, for 3 days
(See section on Treatment of ‘Severe Malaria’ above)

Or

- Quinine, IV or IM,

Then

- Quinine + clindamycin combination, oral,
(See section on Treatment of ‘Severe Malaria’ above)

D. Treatment of Severe Malaria in Pregnancy (Second and Third trimesters and Puerperium)

- Artemether, IM,

Then

- 3 days of oral ACT
(See section on Treatment of ‘Severe Malaria’ above)

E. Intermittent Preventive Treatment in Pregnancy (IPTp)

IPTp consists of giving the fixed-dose combination medication Sulphadoxine Pyrimethamine (SP) in treatment doses at predefined intervals after quickening (16 gestational weeks). Current recommendation is that IPTp with sulfadoxine-pyrimethamine (IPTp-SP) be given to all pregnant women at each scheduled antenatal care visit

except during the first trimester. WHO recommends a schedule of four focused antenatal care visits for normal pregnancy. In Ghana, the national malaria control strategy reserves SP for the purpose of intermittent preventive treatment only.

To prevent the development of drug resistance, SP is not to be used for other purposes such as treatment of acute attacks of malaria.

- Sulphadoxine (500 mg)-Pyrimethamine (25 mg), oral,

Note 18-16

Co-administered as Directly Observed Therapy (DOT) during antenatal visits on at least 3 occasions and at most on 7 occasions

Dose of IPTp	Antenatal visit	Recommended gestational weeks	Health worker to administer
IPTp1	First ANC visit after quickening	16	Midwives, Medical officers, Family physicians, Obstetricians
IPTp2	At least one month after the first dose.	20	Midwives, Medical officers, Family physicians, Obstetricians
IPTp3	At least one month after the second dose.	24	Physician assistants, Community Health Officers, Community Health Nurses
IPTp4-7	At least one month after each dose.	28, 32, 36, 40	

Note 18-17

Pregnant women with the following conditions shall be exempted from using SP:

- First trimester of pregnancy (< 13 weeks gestation)
- G6PD enzyme deficiency
- Severe liver disease or unexplained recurrent jaundice
- Known allergy to any sulpha drugs or allergy to pyrimethamine
- History of previous reaction to SP

- Recent treatment with a sulpha drug such as co-trimoxazole (within 4 weeks)
- Post-dates pregnancy (gestation beyond 36 weeks)
- Breastfeeding
- Acute case of malaria (treat as above)

Owing to antagonism between folic acid and SP, folic acid supplementation should be delayed and started one week after SP administration. For additional information on IPTp and malaria in pregnancy, refer to the latest Ghana Health Service training manuals and guidelines on the subject.

198 Seasonal Malaria Chemoprevention (SMC)

This is the intermittent administration of full treatment courses using the recommended anti-malarial medicine during peak malaria transmission seasons to prevent malaria illness. A complete treatment course is given to children aged between 3 and 59 months at monthly intervals to a maximum of 4 doses during the malaria transmission season. In Ghana, SMC has been implemented in the Northern Savannah using Sulphadoxine-Pyrimethamine and Amodiaquine (SP + AQ)

- Sulphadoxine-Pyrimethamine, oral,
- And**
- Amodiaquine, oral,

199 Vaccination for Malaria

The RTS, S/AS01 malaria vaccine stands presently as the first and sole malaria vaccine endorsed by the World Health Organization (WHO) for preventing malaria and significantly mitigating life-threatening severe malaria in children. It is specifically recommended for children under 5 years residing in malaria-endemic regions, administered through intramuscular (IM) injection, with a full protective regimen requiring four (4) doses.

As per the current national immunization schedule, the four doses of the RTS,S malaria vaccine should be administered at 6 months, 7 months, 9

months, and 18 months of age. In cases where children are unable to receive the vaccine at the scheduled times, it is advised to administer the vaccine as soon as possible. The catch-up schedule for dose 1 is designated for children aged 6 – 11 months, while the catch-up for dose 4 is recommended for those aged 18 – 59 months.

The RTS,S malaria vaccine is presently not recommended for adults or non-immune travellers. It is also contraindicated in cases of severe hypersensitivity to any of the vaccine components

