NATIONAL MALARIA CONTROL PROGRAM

Updated Malaria Policy ,strategic and Case Management guidelines

Presentation to : BUSOGA HEALTH FORUM

Date:12th AUGUST, 2022

Strategic direction

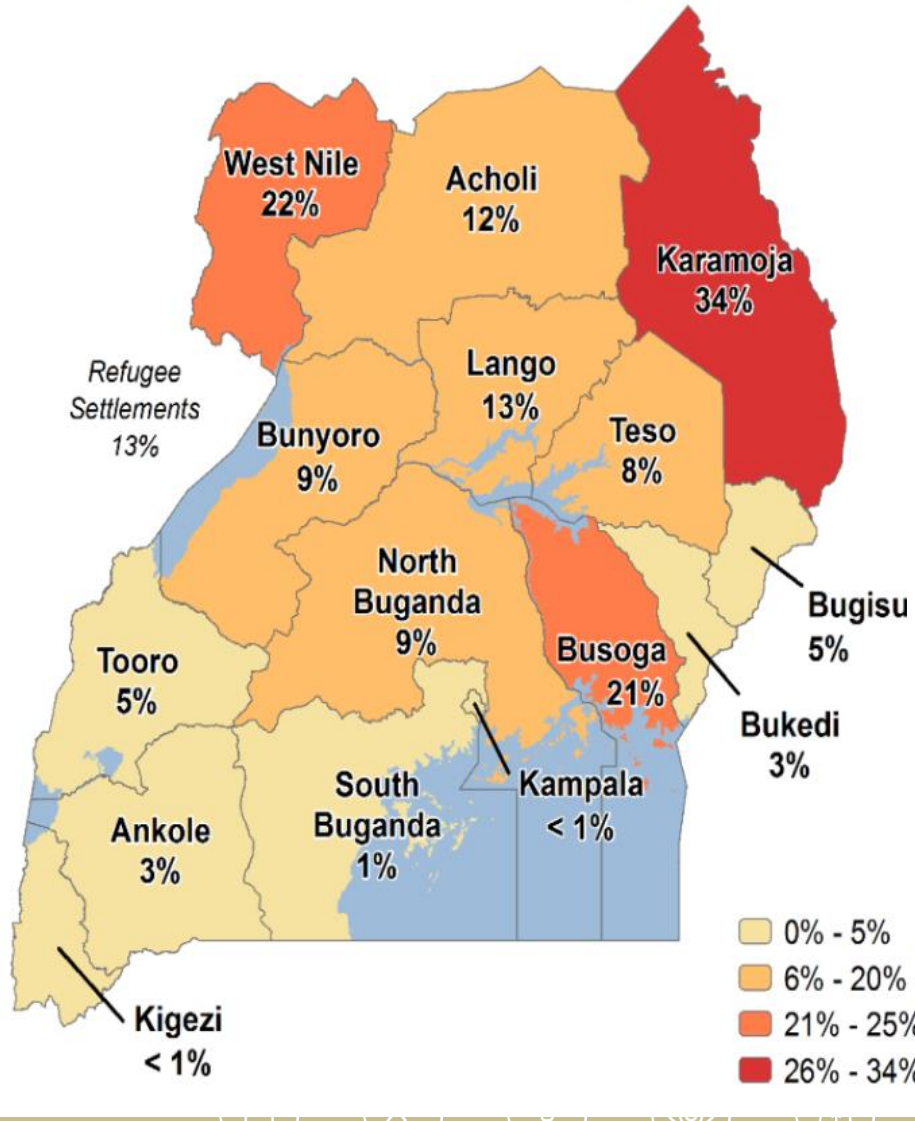
The Uganda Malaria reduction & elimination strategic plan 2021-2025

Background: Ref to the end of term review of UMRSP2015- 2020 done in Dec 2019.

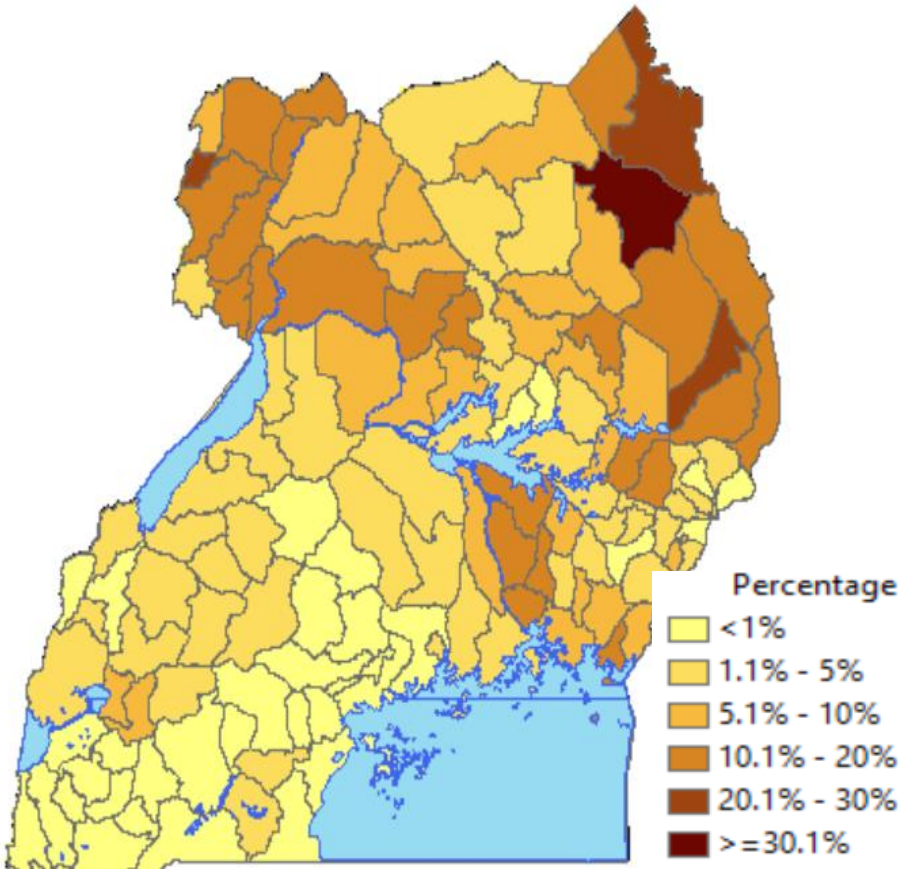
- The whole population of 44.3m is at risk
- Children under 5 years, pregnant women, non immune visitors, PLWHA are most vulnerable to malaria.
- Recent surveys have demonstrated that children aged 5-15 years old are more at risk than previously thought
- Wide variation in the parasite prevalence across the country
  - **Kampala and Kigezi regions at <1% while North-eastern region at 34% in Karamoja**
- There is loss of immunity amongst the population in low transmission regions (27% of districts) and increased frequency of severe malaria cases
- Parasite prevalence – dropped from 19% in 2014 to 9% in 2019 with wide variation between regions and districts as shown on next slide

Malaria Parasite Prevalence – MIS 2019

Percentage of children age 0-59 months who tested positive for malaria by microscopy



District – level parasitaemia distribution



Vision and Mission

❑Vision:

A "Malaria-free Uganda" to enable social economic transformation in line with vision 2040

❑Mission

- ❑To provide quality assured services for malaria prevention and treatment to all the people in Uganda to facilitate the attainment of a good standard of health so as to contribute to national development.

The Malaria reduction and elimination Policy 2018

Goal and strategic Objectives

Goal

- By 2025, reduce malaria infection and morbidity by 50% and malaria related mortality by 75% of 2019 levels.

Strategic objectives

- SO1: To accelerate access to malaria preventive and curative services to achieve universal coverage in all eligible populations by 2025 .
- SO2: By 2025, establish a system for malaria elimination in targeted districts
- SO3: Enhance quality of care of malaria services in at least 80% of the private health facilities managing malaria according to national guidelines and reporting quality data by 2025
- SO4: By 2025, at least 90% of the population sustains the acquired knowledge, utilizes and practices correct malaria management, preventive and curative services
- SO5: By 2025, decisions for malaria programming at all levels are guided by a functional and comprehensive surveillance system and data repository for effective sub-national response, monitoring and evaluation as well as priority operations research
- SO6: By 2025, 80% of districts will have strengthened enabling environment to deliver malaria interventions and measure progress through coordinated partnership and multi-sectoral collaboration

Malaria case management goal and objectives

Goal: To significantly reduce morbidity and prevent mortality attributable to malaria and eventually interrupt transmission.

Objectives:

- ❑ To ensure early diagnosis and prompt, effective treatment of malaria in both public and private settings according to national treatment guidelines,
- ❑ To ensure all suspected malaria cases are subjected to quality assured standard parasitological testing
- ❑ To ensure availability of quality assured diagnostics and malaria treatments in both public and private sector
- ❑ To ensure all cases are properly documented at all points of care including at the community level
- ❑ To provide testing and treatment for asymptomatic/low density malaria cases.
- ❑ To ensure complications of malaria including black water fever are effectively managed in both public and private sector according to national protocols and guidelines

Diagnosis and treatment

Diagnostics:

- ❑ mRDTs shall be used at all levels of service delivery.
- ❑ Microscopy remains gold standard.

Treatment:

- ❑ Treatment regimens for uncomplicated malaria
  - 1st line is an ACT, Artemether/Lumefantrine (AL)
  - Alternative 1st line is Artesunate/Amodiaquine (ASAQ)
  - 2nd line is Dihydroartemisinin Piperaquine (DHA-PPQ)
- ❑ 1st and 2nd line ACTs to be reviewed against results of Therapeutic Efficacy Studies
- ❑ Infants below 5kg to be treated with ACTs at same dosage/kg as for 5kg infants

Treatment

- ❑ Use of child friendly formulations especially dispersible tablets
- ❑ Deployment of MDA, MSAT, FSAT where appropriate in accordance with WHO guidelines
- ❑ iCCM shall be located in hard to reach areas and hotspots.
- ❑ A community strategy of malaria test, treat and track in high burden and hard to reach areas targeting all age groups will compliment iCCM to increase access to treatment.

Severe Malaria treatment

- ❑ IV Artesunate use in all patients including infants and pregnant women in all trimesters

Pre-referral treatment:

- ❑ IM Artesunate, Artemether or Quinine for children and adults where injectables are available
- ❑ Rectal Artesunate for children below 5 years at community, HC II levels and where treatment for severe malaria is not available

Referral treatment ,Chemoprevention and Chemoprophylaxis:

- Rectal Artesunate not to be used for older children (above 5 years) and adults
- Where referral is not possible, continue pre-referral treatment till patient is able to tolerate oral medication then complete dose of 1st line ACT.

Chemoprevention:

- Adoption of IPTi, IPTc and SMC as strategies for acceleration along the elimination continuum shall be guided by evidence from OR.

Chemoprophylaxis :

- Non-immune travelers and internal travelers from low to high transmission areas
  - Drug options are weekly Mefloquine, daily Atovaquone + Proguanil and Doxycycline
- In Sickle Cell Anaemia, use SP; if SP is unavailable use CQ
- Immune compromised people except HIV patients on Cotrimoxazole prophylaxis and post splenectomy and HSS patients shall also use monthly SP

Mobile Populations:

- Travelers from regions with drug resistance including peace keeping forces shall be requested for proof of testing and treatment against malaria before departure from the country of origin or subjected to the same at point of entry into Uganda.

- Immigrants and refugees coming into Uganda shall go through screening and treatment at points of entry.

- Residents living in areas of reduced malaria prevalence (<4%) shall take chemoprophylaxis as detailed above when travelling to high transmission areas

Key definitions.

Malaria: An acute febrile illness caused by infection with malaria parasites. Illness can range from mild disease to a severe life-threatening illness.

Uncomplicated malaria: is when malaria symptoms are present but no clinical or laboratory signs to indicate severity or vital organ dysfunction.

Severe malaria: is a malaria illness that is serious enough to be an immediate threat to the life of the patient. You should regard a patient as having severe malaria if there is a positive blood film or RDT and features of vital organ dysfunction/ complications.

Malaria treatment failure: Recurrence of fever and parasitaemia(with microscopy) before 28 days (4 weeks) of treatment.

Note: After 28 days is recrudescence or reinfection

Aetiology:

- Plasmodium Falciparum- 96.9%
- Plasmodium Malariae
- Plasmodium Ovale
- Plasmodium Vivax
- Plasmodium Molesi Knowlesi

Transmission:

- A bite from an infected female *Anopheles* mosquito.
- In rare occasions, through blood transfusion
- Via the placenta from mother to child (vertical transmission).

Consequences:

- Clearance without causing disease especially for those with high immunity.
- Asymptomatic Parasitaemia- parasites seen but no Malaria manifestation.
- Uncomplicated Malaria- parasitaemia with constitutional symptoms.
- Severe Malaria- parasitaemia with features of vital organ dysfunction.

Management of Uncomplicated Malaria

Involves clinical(history taking and physical examination) and laboratory evaluation.

- ❖ During history taking ,it is important to ask for the following:
- ❑ Characteristics of the fever- When it started. how long it has been, other associated symptoms and fever pattern
- ❑ Patient's recent activities – travel, contact with animals& sick persons
- ❑ Past medical history- Diseases managed before,known chronic illnesses
- ❑ Prior treatment
- ❑ Presence of other symptoms
- ❑ Presence of danger signs
- ❖ Physical assessment

Physical assessment

- *Measure the temperature*
  - **Does the patient have fever? (Temp >37.5 =fever & 39.5 = hyperpyrexia**
- *Take the weight*
  - **What is the weight? This guides treatment prescription.**
- *Measure the vital signs*
  - **What is the respiratory rate?**
  - **Are signs of respiratory distress present?**
  - **What is the pulse?**
  - **What is the blood pressure?**

Physical assessment

- *Assess for danger signs*
  - **Convulsions or fits within the last two days or at present**
  - **Not able to drink or breast-feed**
  - **Vomiting everything**
  - **Altered mental state (lethargy, drowsiness, unconsciousness or confusion)**
  - **Prostration or extreme weakness (unable to stand or sit without support)**
  - **Severe respiratory distress (difficult breathing)**
  - **Severe pallor**
  - **Severe dehydration**

Systematic Physical Examination

	General Examination	
		▪ Look for evidence of pallor or jaundice ▪ Assess for enlargement or tenderness of lymph nodes
1	Respiratory System	▪ Assess for cyanosis ▪ Look for nasal flaring and chest in-drawings ▪ Listen for any unusual sounds such as rhonchi, crepitation, or wheezes.
2.	Cardiovascular System	▪ Listen for any extra heart sounds such as murmurs, rubs, or gallops
3	Abdomen	▪ Evaluate for enlargement of spleen or liver ▪ Assess for tenderness to palpation ▪ evaluate for palpable masses
4	Skin	▪ Look for skin rashes ▪ Evaluate for any tender swellings or abscesses
5	Musculoskeletal	▪ Evaluate range of motion and reflexes ▪ Evaluate any pain and/or muscle weakness
6	Central Nervous system	▪ Establish level of consciousness (coma score) ▪ Assess the mental state (Confusion, orientation, delirium, agitation, hallucinations and psychosis) ▪ Is there neck stiffness and positive Kerning's sign? ▪ What are their reflexes like? ▪ Any craniopathies?

Laboratory evaluation

To confirm diagnosis

- Do a malaria RDT- HRP2 ,Pan RDTs
- Microscopy is the gold standard.
- Thick film, thin film

Rule out other causes of fever/comorbidities do:

- Full heamogram/Complete blood count.
- Urinalysis
- Blood culture and sensitivity

Treatment

- This comprises of specific and supportive treatments.
- Specific treatment: Artemesnin based combination therapy (ACTs)- 2 medicines with different modes of action are used to;
  - Improve effectiveness
  - Delay drug resistance
- The combination ,comprises of an Artemesnin derivative and another antimalarial for example.
  - Artemether +Lumefuntrine
  - Artesunate +Amodiaquine
  - Dihydroartemesnin + piperaquine

Recommended Treatments

Order of preference	ACT (Generic name)	Examples of Trade names
First line	Artemether plus Lumefantrine (AL)	**Luminer**
		Artefan
		Coartem
		Lumartem
Alternative First line	Artesunate plus Amodiaquine (AS-AQ)	**Larimal**
		Falcimon
		Arsucam
		Ammonite
		Amqunate
Second Line	Dihydro-artemisinin plus Piperaquine (DP)	**Duocotecxin,**
		Pilaxin
		Dartep P.
New ACT in the private sector yet to be adopted in our policy after TES on it	**Pyronaridine Phosphate Plus Artesunate**	**Pyramax**

Dosing Schedule for Artemether Lumefuntrine

Weight (Kg)	Age	Day 1	Day 2	Day 3
<14	Birth to 3 years	1 tablet at 0 hours then 1 tablet at 8 hours	1 tablet twice (12 hourly)	1 tablet twice (12 hourly)
15-24	3 to 7 years	2 tablets at 0 hours then 2 tablets at 8 hours	2 tablets twice (12 hourly)	2 tablets twice (12 hourly)
25-34	7 to 12 years	3 tablets at 0 hours then 3 tablets at 8hours	3 tablets twice (12 hourly)	3 tablets twice (12 hourly)
>35	12 years and above	4 tablets at 0 hours then 4 tablets at 8 hours	4 tablets twice (12 hourly)	4 tablets twice (12 hourly)

- Each tab contains 20mgs Artemether and 120 mgs Lumefuntrine and it is the recommended 1st line treatment.
- For P.Vivax add Primaquine 0. 25mgs/Kg daily for 14 days (G6PD negative

Artesunate amodiaquine dosing schedule

Age	Day 1	Day 2	Day 3
0 – 12 months	25mg / 76mg (½ tab)	25mg / 76mg (½ tab)	**25mg / 76mg (½ tab)**
1 – 6 years	50 mg / 153mg (1 tablet)	50 mg / 153mg (1 tablet)	**50 mg / 153mg (1 tablet)**
> 7 – 13 years	100mg / 306mg (2 tablets)	100mg / 306mg (2 tablets)	**100mg / 306mg (2 tablets)**
>13 years	**200mg / 612mg (4 tablets)**	**200mg / 612mg (4 tablets)**	**200mg / 612mg (4 tablets)**

Artesunate amodiaquine is the alternative 1st line treatment

Dosing schedule for Dihydro artemesnin Piperaquine

Weight (kg)	Age	Day 1	Day 2	Day 3
=< 9.9	0 months – 1 year	½ tablet (20mg/160mg)	½ tablet (20mg / 160mg)	**½ tablet (20mg / 160mg)**
10 – 19.9	2 – 7 years	1 tablet (40mg / 320mg)	1 tablet (40mg / 320mg)	**1 tablet (40mg / 320mg)**
20 – 39.9	8 – 13 years	2 tablets (80mg / 640mg)	2 tablets (80mg / 640mg)	**2 tablets (80mg / 640mg)**
40 – 64.9	Adult	3 tablets (120mg / 960mg)	3 tablets (120mg / 960mg)	**3 tablets (120mg / 960mg)**
60-80kgs	Adult	4 tablets (160mg / 1280mg)	4 tablets (160mg / 1280mg)	**4 tablets (160mg / 1280mg)**
>80kgs	**Adults**	**5 tablets (200mg / 1600mg)**	**5 tablets (200mg / 1600mg)**	**5 tablets (200mg / 1600mg)**

Dihydro artemesnin piperaquine is the 2nd line treatment .

PYRONARIDINE TETRAPHOSPHATE/ ARTESUNATE (PYRAMAX)

Body Weight	Product Description	Day 1 Dose	Day 2 Dose	Day 3 Dose
5kg to < 8kg	**Pyronaridine / Artesunate (60mg / 20mg)** Sacket granules for Oral Suspension	1 Sachet	1 Sachet	1 Sachet
8kg to < 15kg		2 Sachets	2 Sachets	2 Sachets
15kg to <20kg		3 Sachets	3 Sachets	3 Sachets
20kg to < 24kg	**Pyronaridine / Artesunate (180mg / 60mg)** Film Coated Tablet	1 tablet	1 tablet	1 tablet
24kg to < 45kg		2 Tablets	2 Tablets	2 Tablets
45kg to < 65kg		3 Tablets	3 Tablets	3 Tablets
> = 65kg		4 Tablets	4 Tablets	4 Tablets

Options being explored to replace Dihydroartemesnin piperaquine as second line

Supportive treatment

- Fever relief: Antipyretics are recommended for axilla temperatures above 38.5°C
- Other measures to relieve fever include removal of clothes, tepid sponging, fanning and fluid intake.
- Any of the following antipyretics are acceptable:
  - Paracetamol (Panadol) 10mg/kg every 6 hours
  - Ibuprofen 5mg/kg
- Avoid using antipyretics for more than 3 days to avoid masking fever and other symptoms.

Common errors during the management of Malaria

Common Error	Rationale
Presumptive treatment of malaria	Poor management of actual illness; wastage of antimalarial medicines; potential for development of resistance to antimalarial medicines
Delay in starting antimalarial therapy	Progression to severe disease
Partial treatment or incorrect dosages	Progression to severe disease; potential for development of resistance to antimalarial medicines
Monotherapy	Progression to severe disease or death; potential for development of resistance to antimalarial medicines
Delay or failure to refer a patient who needs referral	Progression to severe disease or death
Inappropriate route of administration of the medicines (e.g. giving a patient with severe malaria oral treatment)	Progression of symptoms or death
Failure to recognize severe malaria	Progression of symptoms or death
Failure to recognize and treat other conditions	Failure of patient to recover and progression of complications of the other conditions

Severe Malaria Management

It Includes

1. Triage for timely identification of those patients with danger signs, hence the complications.
2. Resuscitation – the management of complications and stabilization of the patient.
3. Specific treatment – clearance or reduction pf the parasite load.
4. Patient monitoring and nursing care
5. Pre-referral treatment
6. Follow up .

	Emergency /danger Sign
1	Obstructed airway
2.	Central cyanosis
3	Severe respiratory distress (Rapid weak pulse)
4	Cold and blue hands (cold extremities)
5	Slow capillary refill (more than 3 seconds)
6	Lethargy or unconsciousness
7	Sunken eyes
8	Very slow skin pinch
9	Convulsions at the time of examination
10	Severe anaemia (severe pallor of palms and mucous membranes)

	Priority Signs in Severe Malaria
1	Convulsions or fits in the last 2 days
2	Notable to drink or breastfeed
3	Vomiting everything
4	Altered
5	Prostration or extreme weakness (unable to stand or sit without support)
6	Respiratory distress
7	Dehydration (coated tongue, lethargy, in ability to drink)
8	Severe malnutrition
9	A sick young infant (less than 2 months)
10	Cases that have been assessed and referred from another health facility with; Temp. >39.5^{O}C, Trauma, Poisoning Restless, Burns, Oedema of both feet

	Complication	Complication description
1	Severe anemia	▪ The patient presents with severe pallor and has a low hemoglobin (Hb) level of less than 5g/dl or a hematocrit of less than 15% with parasitemia.
2	Hypoglycemia	▪ A patient with a low blood sugar of less than 60 mg/dl (3.0 mmol/L). ▪ The patient may have mental confusion, extreme weakness, sweating, convulsions and may be in coma. ▪ The patient's condition may rapidly deteriorate despite antimalarial treatment.
3	Repeated Convulsions	▪ The patient presents with a history of 2 or more convulsions in 24 hours. ▪ Take note of subtle convulsions such as nystagmus, fixed conjugate gaze and frothing of saliva and treat them as if they are full convulsions
4	Circulatory collapse	▪ The patient presents in shock with a systolic pressure of less than 80mmHg in adults or 50 mmHg in children with cold extremities and clammy skin.
5	Fluid and electrolyte abnormalities	▪ Patients often present with hypovolemia and clinical signs of dehydration. ▪ These include dry mucous membranes and a slow skin pinch. ▪ Acidosis is a major electrolyte disturbance and presents with low plasma bicarbonate of less than 15mmol/L, hyperventilation and deep breathing

	Complication	Complication description
6	Hemoglobinuria or Black water fever	▪ The patient presents with, hemoglobin or myoglobin or protein in urine that is characterized by 'dark coloured' urine normally described as tea coloured urine with positive uristicks test for blood but no red blood cells on microscopy. ▪ This is due to the haemolysed red blood cell by the parasites but sometimes it may be due to massive intravascular hemolysis which is induced by drugs such as quinine especially in patients with glucose 6 phosphate dehydrogenase (G6PD) deficiency
7	Renal failure	▪ The patient presents with failure to pass urine for several hours and the urine output of less than 0.3 ml/kg/hr for children and less than 17ml/hr for adults despite adequate correction of dehydration or hypotension. ▪ The plasma creatinine and blood urea are usually raised indicating acute renal failure (Normal ranges: Creatinine 0.5-1.2mg/dl, Blood urea 8-18mg/dl).
8	Spontaneous bleeding	▪ Bleeding tendencies such as from the gums, nostrils, under the skin and sub-conjunctival hemorrhages. ▪ Very rare manifestation and occurs in non-immune such as immigrants

	Complication	Complication description
9	Respiratory distress in children	▪ Deep breathing (Acidotic breathing, acidotic or sweet smell breath); ▪ Fast breathing due to high temperature or anaemia; Labored breathing (nasal flaring, intercostal recession and chest in-drawing), Cheyne stokes breathing
10	Pulmonary Oedema	▪ Features of respiratory distress(fast breathing > 20bpm, nasal flaring, head nodding and chest in-drawing with a +VE RDT/BS
11	Acidosis	▪ Positive malaria test with deep (acidotic) breathing, Plasma bicarbonate < 15 mmol/L
12	Respiratory Distress	▪ Positive malaria test with Tachypnea, nasal flaring and intercostal recession in a patient
13	Cerebral Malaria	▪ More than 2 convulsions in 24 hours, deep coma (GCS<10/15), positive m- RDT or BS and normal CSF.

Patient resuscitation

Severe malaria complication	Emergency treatment
1.Hemoglobinuria (Black water fever)	• Rehydrate patients, to avoid the accumulation of haemoglobin in the renal tubules, which may lead to acute renal failure • Avoid drugs such as Quinine and primaquine which can trigger massive haemolysis in patients with glucose 6 phosphate dehydrogenase (G6PD) deficiency. • Assess for anaemia and transfuse with blood if necessary
2.Spontaneous bleeding	• Transfuse with fresh whole blood • Or give fresh frozen blood or platelets.
3.Acidosis	• Gibe bolus of IV fluid like normal saline and if IV access cannot be achieved, use a nasogastric Administer oxygen if needed • Give Sodium bicarbonate if serum lactate is high • Exclude Hypoglycemia, Hypovolemia and Septicaemia
4.Fluid and electrolyte abnormalities	• Rehydrate with Normal Saline or Ringer's Lactate.
5.Renal failure	• Exclude the pre-renal causes such as shock or hypovolaemia (commonly due to dehydration and/or bleeding). • Check the fluid balance (input and output) and urinary sodium. If urine output is inadequate despite sufficient fluid replacement, give a diuretic or dopamine • If this fails, refer for peritoneal dialysis and hemodialysis.
6.Respiratory distress	• Exclude other diagnoses like severe Pneumonia, Pulmonary oedema or severe anemia and if present manage accordingly. • Rehydrate with Ringers lactate or normal saline if suspected electrolyte imbalance. • If patient has Cyanosis and oxygen concentration SpO2 < 90%, administer oxygen in recommended doses.

Patient resuscitation

Severe malaria complication	Emergency treatment
7.Cerebral Malaria	▪ Ensure safety-turn patient 2 hourly, catheterisation and NGT for feeding. ▪ Quickly assess ABCD (start oxygen if needed) ▪ I.V Diazepam slowly over 1 minute (0.2mg/kg) OR Rectal Diazepam 0.5mg/kg. Repeat the dose if convulsions have not stopped after 10 mins. ▪ Don't give more than three doses of diazepam within 24 hours. If convulsions persist, use other anticonvulsants; Phenobarbitone: I.V 15mg/kg given slowly I.V. as a loading dose OR Phenytoin: 15mg/kg given slowly I.V. as a loading dose.
8.Repeated convulsions	• Same as above

Severe malaria complication	Emergency treatment
9.Severe anemia	• Group and cross match • Transfuse with 20mls/kg of whole blood under 1-2 mls /kg of I.V Lasix • Or Packed cells 10- 15mls/kg. • Can give oxygen if in respiratory distress or oxygen saturation is < 92% at room air. Or if there features of congestive cardiac failure.
10.Circulatory collapse/shock	• Rule out shock due to septicemia (blood culture) and if present manage accordingly • Correct haemo-dynamic changes using IV fluids (normal saline or Ringer's lactate or half strength Darrows • **Dose:** Give a bolus of 20ml/kg slowly over 15 minutes, then reassess. You can give up to 3 doses
11.Pulmonary Oedema	• Prop up the patient in bed at 45 degrees. • Avoid or minimize giving IV fluids. • Give IV Lasix 1-2 mgs/kg .

Figure 5.1 – Job Aid on how to administer Artesunate

GUIDELINES FOR ADMINISTRATION OF INJECTABLE ARTESUNATE FOR SEVERE MALARIA

WHO RECOMMENDED TREATMENT [2]

PRODUCT DESCRIPTION [1]

Dose: For children < 20 kg: 3.0 mg/kg
For children > 20 kg and adults: 2.4 mg/kg

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

* Water for injection is not an appropriate dilutant

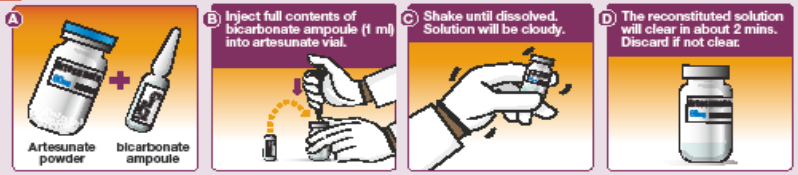
1 WEIGH THE PATIENT

2 DETERMINE THE NUMBER OF VIALS NEEDED

Weight	less than 25 kg	26-50 kg	51-75 kg	76-100 kg
60 mg vial	1	2	3	4

3 RECONSTITUTE

■ Activate the drug: artesunate powder + bicarbonate ampoule (immediately before use)



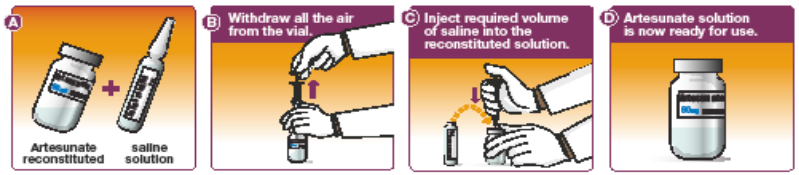
4 DILUTE

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

	IV	IM
Bicarbonate solution volume	1 ml	1 ml
Saline solution volume	5 ml	2 ml
Total volume	**6 ml**	**3 ml**
Artesunate 60 mg solution concentration	10 mg/ml	20 mg/ml

IMPORTANT

Water for injection is not an appropriate dilutant



1. World Health Organization (WHO) List of Prequalified Medicinal Products (http://apps.who.int/prequal/query/ProductRegistry.aspx?list=ma); artesunate injectable, reference N° MA061, 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)
Concentration: 10 mg/ml

3.0 mg x body weight (kg) / IV artesunate solution concentration 10 mg/ml
Round up to the next whole number

Example:
Dose needed (ml) for 4 kg child: $\frac{3.0 \times 4}{10} = 1.2$ ml
1.2 ml rounded up to 2 ml

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

For intramuscular route (IM)
Concentration: 20 mg/ml

3.0 mg x body weight (kg) / IM artesunate solution concentration 20 mg/ml
Round up to the next whole number

Example:
Dose needed (ml) for 4 kg child: $\frac{3.0 \times 4}{20} = 0.6$ ml
0.6 ml rounded up to 1 ml

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

More than 20 kg

Concentration: 10 mg/ml

2.4 mg x body weight (kg) / IV artesunate solution concentration 10 mg/ml
Round up to the next whole number

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

Weight kg	Dose mg	Dose ml
21 - 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

Concentration: 20 mg/ml

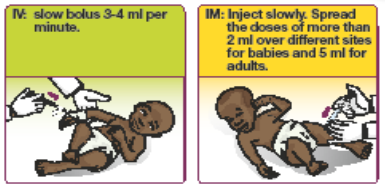
2.4 mg x body weight (kg) / IM artesunate solution concentration 20 mg/ml
Round up to the next whole number

Example:
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
21 - 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



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.**

MINISTRY OF HEALTH REPUBLIC OF UGANDA

Appropriate Patient referral

1. Control temperature by undressing the patient, tepid sponging and giving Paracetamol
2. Control convulsions if present.
3. Give Dextrose to any patient who has had convulsions or is drowsy.
   - Where dextrose is not available, prepare sugar and water by mixing 20 gm of sugar (equivalent to 4-level tea spoons) with 200 ml of clean and safe drinking water.
   - Give 50 ml of this solution orally or by nasogastric tube if the patient is unconscious.
4. Do a malaria rapid diagnostic test(mRDT) and provide results
5. For children less than 6 years, insert 10 mg/kg body weight of Artesunate suppository (rectal Artesunate).
   - If the suppository is expelled within 30 minutes of insertion, a second suppository should be inserted.
   - In young children especially, the buttocks should be held together for 10 minutes to ensure retention of the rectal dose of Artesunate.
   - If more than three suppositories are needed, first give three, wait ten minutes then add the rest.
6. . In case suppositories are not available or in children older than 6 years and adults, give 10 mg/kg body weight quinine I.M. after dilution.
7. Give the patient oral fluids if she/he is dehydrated and if necessary, give oral fluids through a nasogastric tube.
8. Counsel the patient or caretaker on the need for referral;
9. Write a referral note stating the treatment given and the time.

Patient Monitoring

Parameter to monitor	Finding	Response
Level of Parasitemia	Positive B/S, same level of parasitemia as before initiation treatment after dose 3 of treatment.	Revisit the doses of the treatment in use and where need be make adjustments.
	Persistent positive B/s after day 3 even after adjustment of doses.	Stop the current treatment, change to the alternative treatments .
PV bleeding and fetal movements	Per vaginal (PV) bleeding Reduced or no fetal movements	Request for an urgent obstetric ultrasound scan.
Pressure sores	Presence of pressure sores	Catheterization and 2 hourly turning
Colour of urine	Passing c/tea colored /coca like cola urine ,Hb>8g/dl	IV fluids and monitor Hb
	Tea colored or coca cola like urine with Hb < 8g/dl.	Group and crossmatch Transfuse
Convulsions	Subtle or generalized convulsions and RBS>3.3mmols/L or 60g/dl	Control convulsions with diazepam, Monitor RBS and encourage feeding Do other investigations(CBC, blood culture and sensitivity urinalysis and CSF analysis to rule out comorbidities
	Subtle/generalized convulsions with RBS<3.3mmol/L or 60g/dl	IV 25% dextrose 1-2mls/kg(adults)&5mls/kg of 10% dextrose. Do other investigations (CBC ,Urinalysis, blood culture and sensitivity and CSF analysis

Follow up

- ❑ Perform a neurological examination
- ❑ Assess the patient's functional capacity to hold and use objects, ability to feed, gait and posture. (NB assess whether the patient was able to do these previously)
- ❑ Assess vision and hearing
- ❑ Do a thorough physical examination, check for anaemia, jaundice and the general nutritional status
- ❑ Health education on malaria prevention and nutrition
- ❑ Refer to appropriate specialists such as the physiotherapists and other therapists, ear nose and throat (ENT) surgeons, neurologists and neuropsychiatrists, ophthalmologists) for further management where necessary
- ❑ Follow up at day 7 and 14, and 28:
- ❑ Repeat packed cell (PCV) and blood films

Suspected Malaria treatment Failure

History taking → *Assess Patient for Danger signs and Review all systems including History of previous treatment for current illness and any chronic conditions*

System Examination → *Examine all relevant systems based on history (Cardio-vascular, respiratory, ENT, central nervous system, urinary tract musculo-skeletal, Gastrointestinal)*

Assess Duration since last malaria treatment was taken

	Completed treatment less than 28 days ago		Completed treatment more than 28 days ago	
Laboratory Test	Microscopy for actual presence of parasites		Either microscopy or malaria RDT	
Results	**Positive**	Negative	**Positive**	Negative
Management				
Consider Severity	Uncomplicated Malaria	Severe Malaria	Uncomplicated Malaria	Severe Malaria
Treatment	*Second Line oral antimalaria Dihydro-artemesinin / Piperaquine*	*I.V or IM Artesunate completed with Dihydro-artemesinin / Piperaquine*	*First Line Antimalaria Artemether / Lumefantrine*	*IV or IM Artesunate Completed with Artemether / Lumefantrine*

NOTE: *For negative test patients, manage as per assessment for other diagnosis or symptomatic treatment and advise to return if fever persists or gets worse*

SUSPECTED MALARIA CASE MANAGEMENT FLOW CHART

History taking

Assess Patient for Danger signs and Review all systems
(Respiratory, cadio-vascular, urinary tract, central nervou system, Ear-Nose-Throat, musculo-skeletal including History of previous treatment for current illness and any chronic conditions)

System Examination

Examine all relevant systems based on history
(Cardio-vascular, respiratory, ENT, central nervous system, urinary tract musculo-skeletal, Gastrointestinal)

Malaria Lab tests

1) Either microscopy or malaria RDT
2) Include other investigations relevant to the history and examination findings

Results

Positive

Negative

Diagnosis

- Uncomplicated Malaria
- Severe Malaria
- **Other diagnosis** *Respiratory tract Infections, PID, Urinary tract Infections, ENT GIT conditions etc*
- No evidence of disease

Treatment

- *First Line Antimalaria Artemether / Lumefantrine*
- *I.V or IM Artesunate completed with Artemether Lumefantrine*
- *Manage according to guidelines*
- *Manage symptoms (return if no improvement or gets worse)*

NOTE: *For negative test results, manage other diagnosis if found or symptomatic treatment and advise to return if fever persists or patient gets worse*

End ,thank you and questions