Malaria case management and Diagnostics under artemether-lumefantrine treatment policy in Uganda

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Introduction I

- Antimalarial policies have recently changed from ineffective monotherapies artemisinin-based combination therapy (ACT)

- In 21 African,, including Uganda artemether-lumefantrine (AL) was selected as their first-line Rx for uncomplicated malaria

- During 2005 and 2006, the Ugandan Ministry of Health implemented the new treatment policy.

FIRST LINE ANTIMALARIAL TREATMENT FOR UNCOMPLICATED MALARIA

a. **Artemether/Lumefantrine**

Arthemether/Lumefantrine is available as co-formulated tablets containing 20mg Artemether and 120mg Lumefantrine per tablet.

WEIGHT (KG)	AGE	DAY 1	DAY 2	DAY 3 COLOUR CODE	COLOUR CODE
5-14	From 4 months up to 3 years	1 tablet twice a day,12 hourly	1 tablet twice a day,12 hourly	1 tablet twice a day,12 hourly	Yellow
15-24	From 3 years up to 7 years	2 tablets twice a day, 12 hourly	2 tablets twice a day, 12 hourly	2 tablets twice a day, 12 hourly	Blue
25-34	From 7 years up to 12 years	3 tablets twice a day, 12 hourly	3 tablets twice a day, 12 hourly	3 tablets twice a day, 12 hourly	Brown
>35	From 12 years and above	4 tablets twice a day, 12 hourly	4 tablets twice a day, 12 hourly	4 tablets twice a day, 12 hourly	Green

b. **Artesunate + Amodiaquine**

Artesunate + Amodiaquine combination treatment is the alternative that can be used as first line treatment for uncomplicated malaria in situations where Artemether/Lumefantrine is not available. Separate scored tablets contain 50mg of Artesunate and 153mg base of Amodiaquine, respectively.

	Artesunate			Amodiaquine		
	Day 1	Day 2	Day 3	Day 1	Day 2	Day 3
5 -11 months	25 mg (½ tab)	25 mg (½ tab)	25 mg (½ tab)	76 mg (½ tab)	76 mg (½ tab)	76 mg (½ tab)
1 -6 months	50 mg (1 tab)	50 mg (1 tab)	50 mg (1 tab)	153 mg (1 tab)	153 mg (1 tab)	153 mg (1 tab)
7 - 13 years	100 mg (2 tab)	100 mg (2 tab)	100 mg (2 tab)	306 mg (2 tab)	306 mg (2 tab)	306 mg (2 tab)
> 13 years	200 mg (4 tab)	200 mg (4 tab)	200 mg (4 tab)	612 mg (4 tab)	612 mg (4 tab)	612 mg (4 tab)

SECOND LINE ANTIMALARIAL TREATMENT FOR UNCOMPLICATED MALARIA

Oral quinine is the **second line medicine** for the treatment of uncomplicated malaria. This means it should only be given when the first line medicine (Artemether/Lumefantrine) has failed or when it is contra-indicated. Quinine is available as tablets of 300mg salt and the dose is 10 mg/kg, up to a maximum of 600mg, 8 hourly for 7 days

Age	Weight	Dose (to be given every 8 hours for 7 days)
3 months up to 1 year	5 kg up to 10 kg	75 mg (¼ tab)
1 year up to 5 years	10 kg up to 18 kg	150 mg (½ tab)
5 years up to 7 years	18 kg up to 24 kg	225 mg (¾ tab)
7 years up to 10 years	24 kg up to 30 kg	300 mg (1 tab)
10 years up to 13 years	30 kg up to 40 kg	375 mg (1¼ tab)
13 years up to 15 years	40 kg up to 50 kg	450 mg (1½ tab)
15 years and over	over 50 kg	600 mg (2 tab)

TREATMENT OF SEVERE MALARIA

If a patient presents with signs and symptoms of severe malaria and you do not have facilities for admission, the patient should be referred to the next level of care quickly as possible.

Before referral:

Inject into the anterior thigh, 10mg/kg body weight of quinine IM after dilution.

NOTE: • *Dilution of quinine for IM injections: Quinine injection is usually available in 2ml ampoules and each ampoule contains 600mg of quinine salt (300mg/ml). Add 4ml of sterile water to the 2ml quinine (600mg).*

• *If the total volume of the diluted quinine needed is more than 3 ml, split it in two halves and inject one half in each thigh.*

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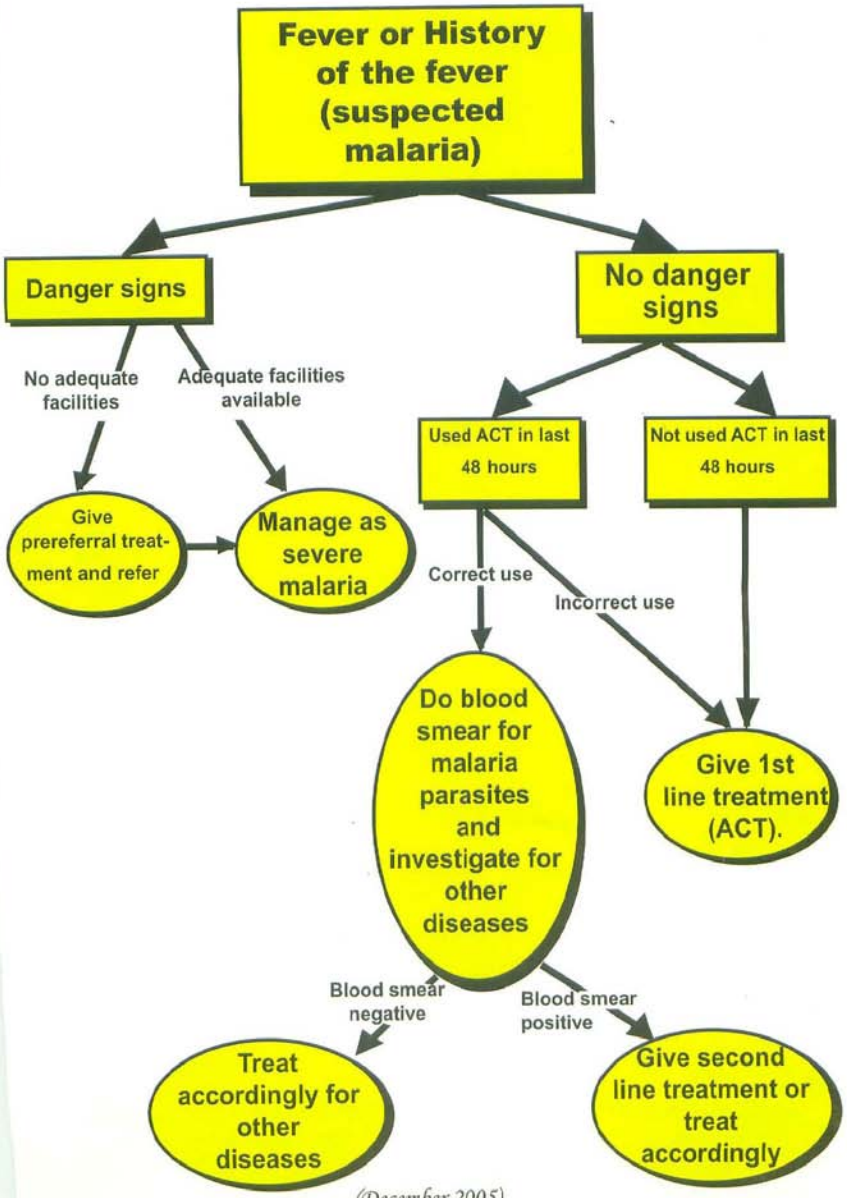
FLOW CHART FOR MANAGEMENT OF MALARIA



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Introduction II

- Effective translation of new guidelines into clinical practice is of critical importance to achieve full impact of ACTs

- In this study we revisit

1) AL case management practices in accordance with national guidelines, approximately 1 year after AL was introduced

2) The policy implications of malaria misdiagnosis in Uganda ie The accuracy of

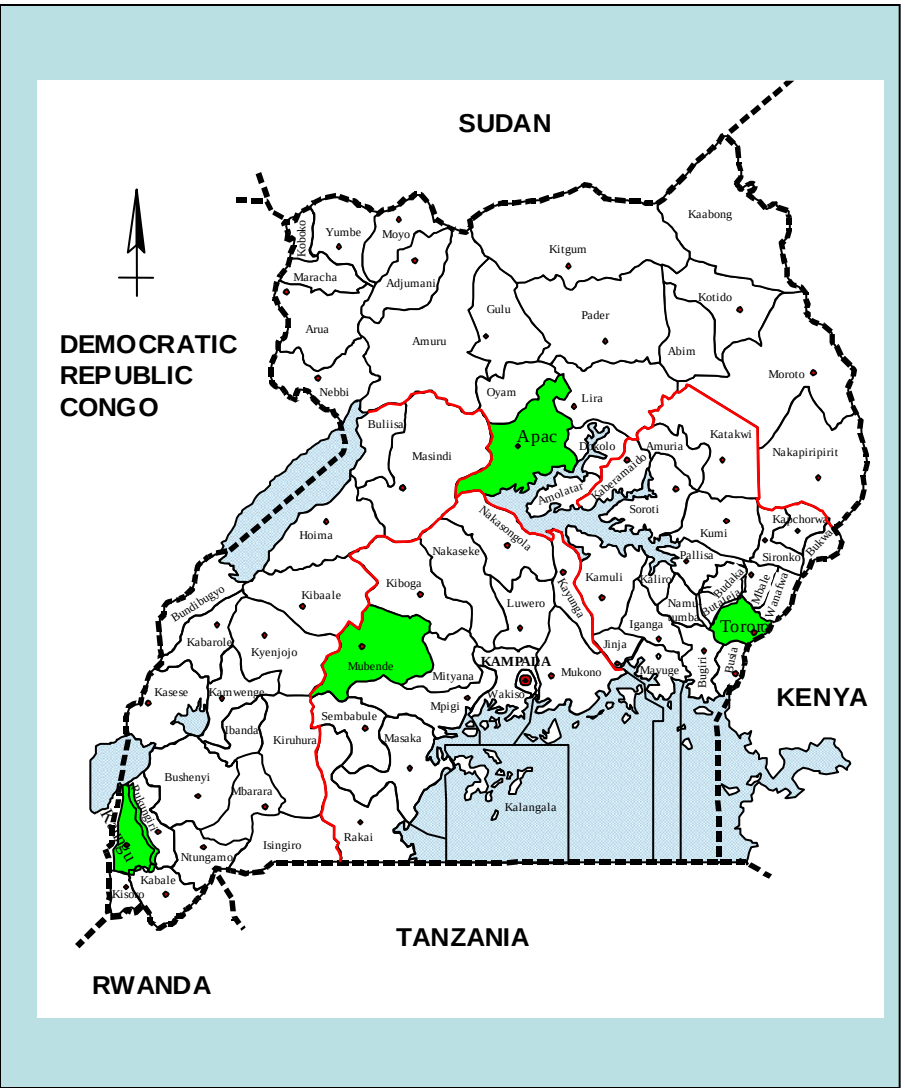
-National malaria diagnosis recommendations

- Routine malaria diagnostic practices

- Interpretation and accuracy of malaria field microscopy.

Methods

Study Districts



- Cross sectional study done in 4 districts in 2007
- All government and private-not-for profit health facilities
- Data collected over one day during exit interviews, H/W and H/F assessment
- Diagnostic and treatment information was collected from patient records.
- Finger prick sample for malaria done on all patients


RESULTS

- 1,763 outpatient consultations made by 233 health workers at 195 facilities
- 246 patients excluded from analysis (242 not meet inclusion criterion, 4 missing expert microscopy results)
- 494(33.3%) children below 5 years
- 578(38.9%) from very high transmission districts (Apac and Tororo)
- All patients accepted to participate in the study.

Table 1: Health facility Characteristics

Health facility characteristics (N=195)	All districts [n (%)]
Health facility type	
Hospital	8 (4.1)
Health centre IV	12 (6.2)
Health centre III	56 (28.7)
Health centre II*	**119 (61.0)**
Health facility ownership	
Government	**172 (88.2)**
Non-government	12 (6.2)
Mission	11 (5.6)
Availability of artemether-lumefantrine on the survey day	
Any tablets of artemether-lumefantrine	169 (86.7)
Artemether-lumefantrine 6 tablets pack	162 (83.1)
Artemether-lumefantrine 12 tablets pack	140 (71.8)
Artemether-lumefantrine 18 tablets pack	**75 (38.5)**
Artemether-lumefantrine 24 tablets pack	124 (63.6)

Table II: Characteristics of the health workers

Health worker characteristics (N=233)	n (%)
In-service training on malaria	
Any training including artemether-lumefantrine	182 (78.5)
MoH training on artemether-lumefantrine	124 (53.5)
On-job training on artemether-lumefantrine	107 (46.1)
IMCI training including artemether-lumefantrine†	**9 (3.9)**
Any IMCI training	160 (69.0)
Possession of guideline document	
Any guidelines including artemether-lumefantrine	158 (68.1)
Management of uncomplicated malaria	153 (66.0)
New policy for uncomplicated malaria	**58 (25.0)**
Any supervisory visit including appropriate use of AL†	**78 (33.8)**

Characteristics of staff trained on AL

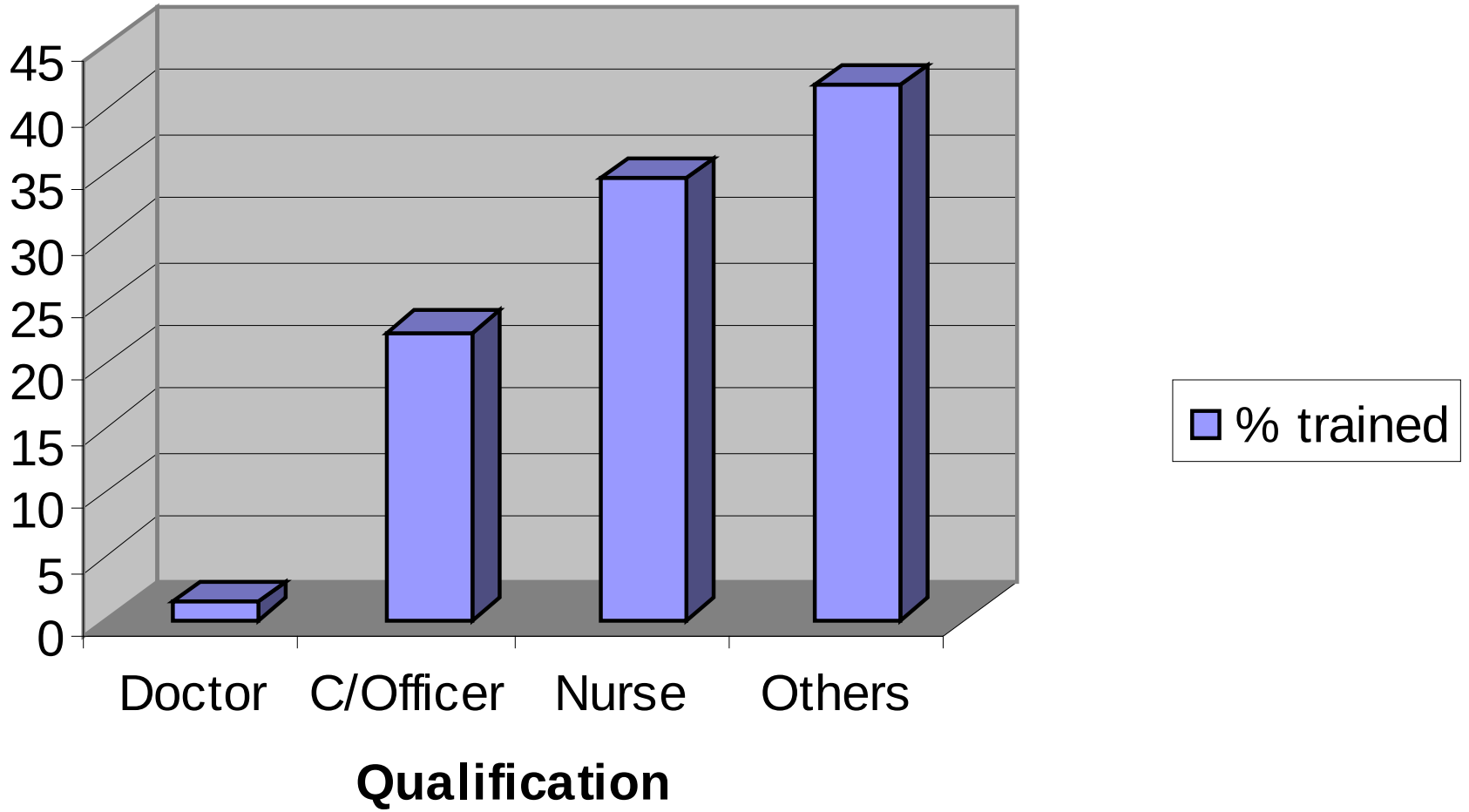


Table II: Quality of dispensing and counseling practices for patients who had AL dispensed

All health facilities	< 5 years (N=296)		≥ 5 years (N=373)		All patients (N=669)	
	n (%)	95% CI	n (%)	95% CI	n (%)	95% CI
Weight measured	192 (64.9)	55.9-73.8	151 (40.5)	30.9-50.1	343(51)	43.2-59.4
First dose given at the facility	40 (13.5)	7.4-19.7	58 (15.6)	8.4-22.7	98 (14.7)	8.5-20.8
Swallowing of first dose observed	34 (11.5)	5.3-17.6	56 (15.0)	7.8-22.2	90(13.5)	7.3-19.7
Dosage explained	**284 (96.0)**	93.3-98.6	**363 (97.3)**	95.1-99.5	**647(96)**	94.7-98.7
Advised to complete all doses	**185 (62.5)**	55.1-69.9	**262 (70.2)**	64.1-76.4	**447(67)**	61.3-72.3
Advised to take drug after a meal	132 (44.6)	37.1-52.1	182 (48.8)	42.7-54.9	314(47)	41.3-52.6
Advised on what to do if vomiting	24 (8.1)	2.9-13.3	20 (5.4)	2.1-8.6	44 (6.6)	3.1-10.1

Case-management

- 1,400 patients needed treatment with AL(had fever/temp rise)
- AL the recommended treatment was prescribed for 60% of these
- CQ+SP for 14%, quinine for 4%, CQ for 3%, other antimalarials for 3% and 16% of patients left facility with no antimalarial prescription.
- 95% of patients who got AL prescription were prescribed correct AL dose

DIAGNOSTICS

- Prevalence of parasitaemia was low (27.8%)
- While prevalence of fever was high (79.2%)
- Prevalence of malaria disease (fever + parasitaemia) was just slightly lower than prevalence of parasitaemia (24.2% vs 27.8%)
- Routine malaria diagnosis was commonly made (70.5%) and didn’t vary with age group nor transmission setting.

Table IV: Parasite prevalence by district and age group

AGE GROUP	District			
	Apac, EIR=1586 n, % (95% CI)	**Tororo** , EIR= 562 n, % (95% CI)	**Jinja**, EIR =6 n, % (95% CI)	**Mubende**, EIR = 4 n, % (95% CI)
All age groups	63/162, 38.9 (29.5-48.3)	140/416,33.7 (29.0-38.3)	121/531, 22.8 (17.8-27.7)	89/376, 23.7 (19.7-27.7)
Age < 5	**34/60, 56.7 (44.0-69.3)**	77/146, 52.7 (47.0-58.5)	67/175, 38.3 (28.1-48.4)	39/113, 34.5 (24.7-44.3)
Age ≥ 5	29/102, 28.4 (17.6-39.3)	63/270, 23.3 (18.3-28.4)	54/356, 15.2 (11.2-19.1)	50/263, 19.0 (14.1-24.0)

Accuracy of policy recommendations (fever as malaria)

- Sensitivity and NPV very high (100%)
- Specificity and PPV were very low (27.4 and 30.5 respectively)
- Malaria over-diagnosis (1-PPV) varied from 45.3% to 80.9%

Accuracy of health worker malaria diagnosis

- Had higher overall specificity than policy recommendations (35.6% vs 27.4%)
- However, resulted lower sensitivities (89.7 vs 100%)
- And higher rates of malaria under-diagnosis (1-NPV) (39.9% in <5 years from v. high transmission)

Use, interpretation and accuracy of routine malaria microscopy

- Use of microscopy in facilities where it was present was low 163/473 (34.5%)
- No difference in microscopy use between child <5 years and patients above (33.6% vs 34.9%)
- 96.2% of patients with +ve slides and 47.6% of patients with –ve smear were treated for malaria
- Sensitivity, specificity and PPV of field microscopy were low (58.6%, 52.7% and 21.8% resp.)

Summary –case management

- Use of AL prevailed over non-recommended therapies
- However, the quality of AL case management at the point of care is not yet optimal
- ACTs are not readily available at the periphery of health system

Summary-Diagnostics

- Prevalence of fever among outpatient groups is high while that of parasiteamia is lower than previously expected.
- Malaria over-diagnosis in Uganda is still high
- Deviation from recommendations results into under-diagnosis in most vulnerable group
- For facilities with functional microscopy, use was low and quality was poor
- Negative results were often ignored

Recommendations

Performance of the new policy will depend on;

- Quality of care improvement interventions (regular re-training, support supervision)
- Adequate, and timely delivery of ACTs
- Change of health workers practices with screening of all fevers and only treating those with a positive results.
- Quality assurance at both peripheral and national level
- Development, validation and distribution of clear clinical and diagnostic guidelines
- Adequate and timely procurement and supply of re-agents including RDTs

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