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Two-Year Operational Plan for Procurement, Storage and Distribution of Antimalarial Medicines

(January 2007–December 2008)

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ACRONYMS

ACT	artemisinin-based combination therapy
CMD	Community Medicine Distributors
CQ	chloroquine
DHMT	District Health Management Team
DHO	District Health Officer
GFATM	Global Fund to Fight AIDS, Tuberculosis and Malaria
HBMF	home-based management of fever
HMIS	health management information system(s)
ICCM	Inter-Agency Coordination Committee for Malaria
IM	intramuscular
IV	intravenous
JMS	Joint Medical Store
kg	kilogram
m^3	cubic metre
M&E	monitoring and evaluation
MCMTWG	Malaria Case Management Technical Working Group
mg	milligram
ml	millilitre
MMSS	Malaria Medicines Supply Service
MoH	Ministry of Health
MSH	Management Sciences for Health
NDA	National Drugs Authority
NGO	nongovernment organization
NMCP	National Malaria Control Programme
NMS	National Medical Stores
PFP	private-for-profit
PMI	Presidential Malaria Initiative
PNFP	private not-for-profit
RBM	Roll Back Malaria
RPM Plus	Rational Pharmaceutical Management Plus (Program)
SP	sulphadoxine-pyrimethamine
SP+CQ	sulphadoxine-pyrimethamine plus chloroquine
USAID	U.S. Agency for International Development
USD	U.S. dollar
WHO	World Health Organisation

SECTION 1. INTRODUCTION

1.1 Background

Uganda's National Malaria Control Programme (NMCP) is currently working to implement a new treatment policy for malaria as part of its strategy to roll back malaria. This change involves the use of an artemisinin-based combination therapy (ACT) as first-line treatment for uncomplicated malaria, in line with World Health Organisation (WHO) recommendations.

The recommendation to change the treatment policy was made on May 17, 2004, by the Malaria Case Management Technical Working Group (MCMTWG) of the Inter-Agency Coordination Committee for Malaria (ICCM). Subsequently, the Ministry of Health (MoH) accepted the recommendations of the MCMTWG and initiated the process of implementing the policy change. To facilitate this implementation, the NMCP has developed detailed malaria standard treatment guidelines (Table 1).

Table 1. Summary of Malaria Treatment Guidelines

Condition	Medication	Strength	Formulation
Uncomplicated malaria	Artemether-lumefantrine tablets (first-line treatment)	Artemether 20 mg and lumefantrine 120 mg	Co-formulated tablets for a fixed-dose combination
Uncomplicated malaria	Artesunate + amodiaquine tablets (alternative first-line treatment)	Artesunate 100 mg and amodiaquine 153 mg base	Co-blistered tablets
Severe malaria	Quinine injection (IV/IM phase)	600 mg/2 ml as a dihydrochloride	Ampoules
Intermittent preventive treatment (in pregnancy)	Sulphadoxine-pyrimethamine (SP)	Sulphadoxine 500 mg and pyrimethamine 25 mg	Co-formulated tablets for a fixed-dose combination
Uncomplicated malaria in pregnant women	Quinine in all trimesters If not available, artemether-lumefantrine tablets in second and third trimesters.	Quinine as a sulphate 300 mg Artemether 20 mg and lumefantrine 120 mg	Tablets
Uncomplicated malaria in children younger than 4 months or weighing less than 5 kg	Quinine tablets	Quinine as a sulphate 300 mg	Tablets

The current recommended ACT is artemether-lumefantrine, or artesunate plus amodiaquine as an alternative first-line treatment, which replaces the combination therapy of SP plus chloroquine (SP+CQ).

1.2 Modalities for Implementation of the New Policy

Implementation of the various aspects of this new policy is planned as a phased process to be achieved over five years (Table 2).

Table 2. Aspects of the New Policy

Implementation Year	Phase-in Approach
Pre-implementation Activities (2004–2005)	The MCMTWG reviewed and updated existing guidelines and developed new ones. The MoH, together with development partners (e.g., Global Fund to Fight AIDS, Tuberculosis and Malaria [GFATM] Round 4), sourced funding for medicines and implementation activities.
Year 1 (2006)	Sensitisation of leaders and the general public was done at national and district level through mass media and seminars; the new policy was officially launched on the Africa Malaria Day (April 25, 2006). The MoH carried out training of health workers in public and private-not-for-profit (PNFP) health facilities throughout the country (February–May 2006). The MoH, with funding from the Department for International Development through the Malaria Consortium, carried out training of health workers in the private-for-profit (PFP) health facilities throughout the country (June 2006-March 2007). The MoH provided supplies of artemether-lumefantrine to public and PNFP health facilities (hospitals and health centres) beginning in March/April 2006. Initially, supplies to all facilities were provided through a push system where needs were determined at the central level based on morbidity data and population. Training of Community Medicine Distributors (CMD) was done, and use of artemether-lumefantrine was started in four districts (Amuru, Gulu, Kitgum and Pader) for home-based management of fever (HBMF) as an initial step towards a countrywide rollout. A study of the viability of ACT use in HBMF was started in mid-2006.
Year 2 (2007)	Training was carried out for as yet untrained health workers in health facilities, school sick bays and CMDs. Artemether-lumefantrine was distributed using a rationalised pull system based on demand from the health facilities and school sick bays. A survey to determine the proportion of outpatient department attendance due to malaria corresponding to the artemether-lumefantrine age groups was

Implementation Year	Phase-in Approach
	carried out with support from the U.S. Agency for International Development (USAID) through Management Sciences for Health's Rational Pharmaceutical Plus (MSH/RPM Plus) Program. Use of artemether-lumefantrine for HBMF to cover the rest of the country continues to be rolled out. The NMCP is being strengthened to provide accurate, reliable and timely information on availability and use of antimalarial medicines (Malaria Information Acquisition System). Introduction of subsidised ACTs for sale in the retail private sector is being phased in. Support supervision was provided for the new policy implementation (central-to-district, district-to-health facilities and health facilities-to-CMDs) Quarterly meetings for CMDs were facilitated at the sub-county level (Health Centre III), which covers approximately 1,000 sub-counties.
Year 3 (2008)	Year 2 activities will be continued and made concrete. A midterm review and re-planning for the next two years (2009–10) will be carried out.
Year 4 (2009)	Implementation will continue according to the midterm evaluation recommendations.
Year 5 (2010)	Year 4 activities will continue to be implemented. Final evaluation will be made of performance of policy implementation and planning for the next five years (2011–15).

To support implementation of this policy, Uganda applied to the GFATM for 158,074,079 U.S. dollars (USD) to cover a period of five years (2005–09) of which USD 66,432,148 has been granted as the first phase to cover the period May 1, 2005, to April 30, 2007. These funds include USD 55,430,703 for the purchase of artemether-lumefantrine for the first two years, sufficient to cover treatment of all cases of uncomplicated malaria in the public sector, PNFP facilities and the HBMF. The artemether-lumefantrine is being procured under a special global agreement between WHO and the supplier (Novartis); under the terms of this agreement, the medicine is supplied at cost and will be used to treat patients free of charge.

The first consignment of artemether-lumefantrine arrived in-country on January 31, 2006. The National Medical Stores (NMS) and the Joint Medical Store (JMS) were chosen by the MoH to store the antimalarial medicines and to distribute them to the public sector and to PNFP health facilities, respectively. In current practice, 80 percent of the artemether-lumefantrine is distributed by NMS and 20 percent by JMS. Artemether-lumefantrine is provided free to patients in public sector and PNFP health facilities as per the malaria standard treatment guidelines.

To ensure appropriate handling of these commodities, the MCMTWG set up a Malaria

Medicines Supply Chain Management subcommittee to review all pharmaceutical management issues surrounding implementation of the new treatment policy and to advise the MCMTWG accordingly. The subcommittee is composed of representatives from the following institutions and organisations: NMCP, National Drugs Authority (NDA), Pharmacy Section MoH, NMS, JMS, MSH, WHO, the Malaria Consortium and a district representative. To ensure that all issues have been identified and addressed appropriately, the subcommittee has held several meetings, discussed with key partners, made relevant visits and co-opted other members as necessary.. This operational plan is the product of the subcommittee's work.

1.3 Objectives of the Operational Plan

The objectives of this operational plan to manage antimalarial medicines are to—

- Outline the responsibilities of the key partners who are involved in the rollout of antimalarial medicines in the public and private sector in support of Uganda's malaria treatment policy change
- Specify activities and timelines for the rollout of antimalarial medicines in the public and private sectors in support of Uganda's malaria treatment policy change
- Devise a framework for supervision and for monitoring and evaluation (M&E) of implementation of this operational plan

1.4 Outline of the Operational Plan

This operational plan addresses the pharmaceutical management issues affecting the rollout of the new malaria treatment policy in Uganda. The operational plan is based on the Pharmaceutical Management Cycle, a systematic approach that will ensure that all antimalarial medicines for a complete course of malaria prevention or treatment are available and appropriately used according to the treatment policy and implementation timeline.

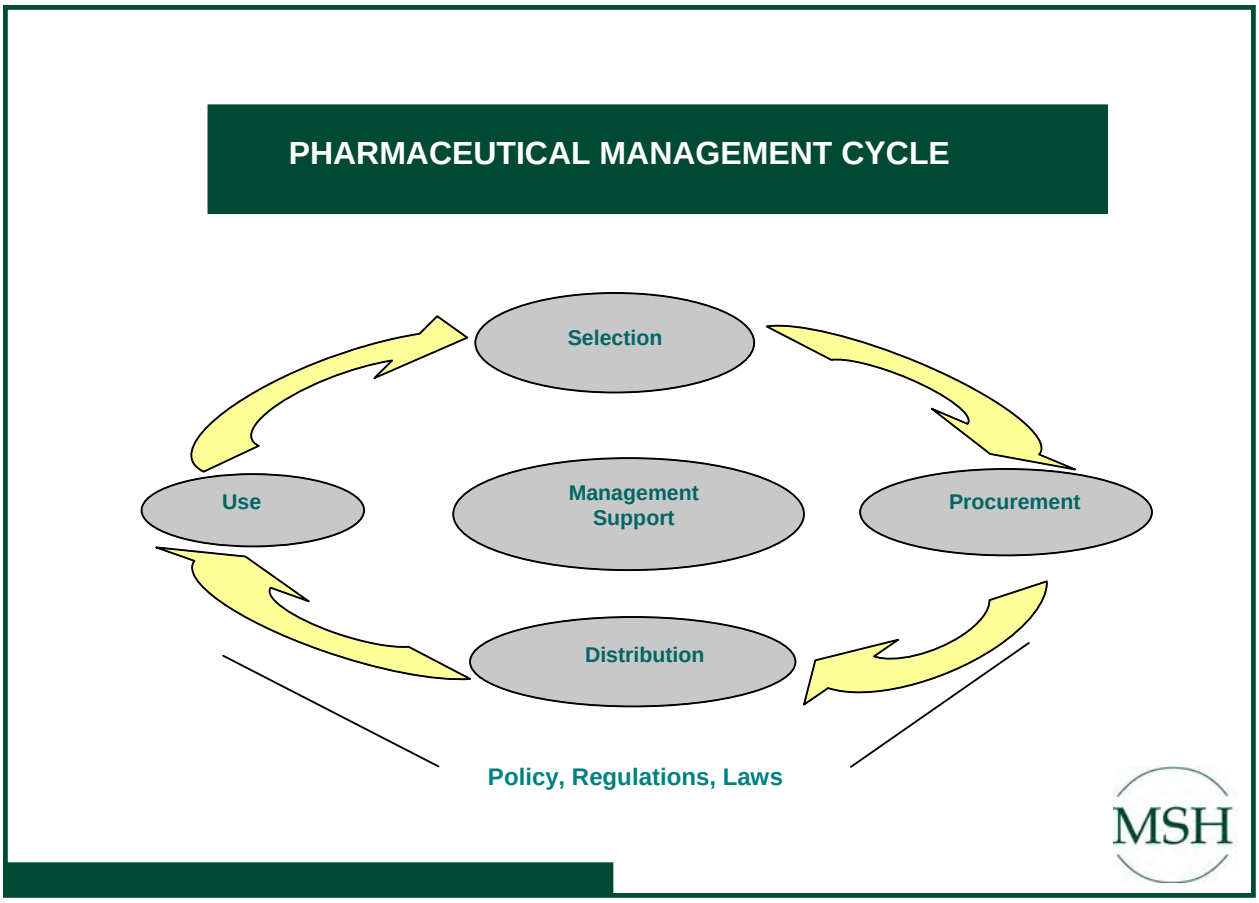

Figure 1. The Pharmaceutical Management Cycle

Pharmaceutical management involves four basic functions: selection, procurement, distribution and use.

- *Selection* involves reviewing the prevalent health problems, identifying treatments of choice, choosing individual medicines and dosage forms and deciding which medicines will be available at each level of health care.

- *Procurement* includes quantifying medicine requirements, selecting procurement methods, managing tenders, establishing contract terms, assuring medicine quality and ensuring adherence to contract terms.

- *Distribution* includes the clearing Customs, stock control, stores management and delivery to medicine depots and health facilities.

- *Use* includes diagnosing, prescribing, dispensing and proper consumption by the patient.

At the centre of the medicine management cycle is a core of management support systems: organisation, financing and sustainability, information management and human resources

management. These management support systems hold the pharmaceutical management cycle together. Finally, the entire cycle rests on a policy and legal framework that establishes and supports the political commitment to essential medicines supply.

This plan specifically addresses the procurement and supply management of artemether-lumefantrine and other antimalarial medicines within the phased policy implementation approach, and it covers the period 2007 to 2008. This plan will be revised in 2008.

To clearly define the processes that need to be instituted by the major agencies involved (NMCP, NMS and JMS) in managing artemether-lumefantrine and other antimalarial medicines, this operational plan has been developed in joint consultation with these agencies and will provide a guide for implementation by each party responsible. NMCP will use M&E to ascertain how implementation is achieving an uninterrupted supply of antimalarials.

Components of this plan include *Selection, Procurement, Warehousing and Distribution, Inventory Management* and *Ensuring Appropriate Use*. This plan also covers issues of *Management Support*, *Human Resources,* and *Information Management* as well as *Transitional Issues* relating to the policy change. *M&E* of the plan, *Activity Costing* and *Timelines* are also covered.

SECTION 2. PLANNED ACTIVITIES

Table 3 lists the planned activities to facilitate rollout of malaria treatment policy, as part of the Roll Back Malaria (RBM) initiative in Uganda.

Table 3. Planned Activities for Years 1 and 2 (January 2007–December 2008)

Activity	Lead Partner[1]	Products	Outputs	Outcomes
Quantify and cost national ACT and other antimalarial requirements in line with malaria control policy	**Pharmacy Section**, NMCP, RPM Plus	Procurement plan	Appropriate quantities and timely procurement of artemether-lumefantrine	Increased availability of ACTs for effective policy implementation
Train health workers on malaria case management to facilitate appropriate use of ACTs and other antimalarials	**NMCP,** Pharmacy Section, WHO	Training manuals Workshop Reports	60% of health workers handling ACTs in public and mission sectors trained	Effective implementation of ACT treatment policy
Train health workers on medicine supply management to facilitate appropriate use of ACTs and other antimalarials	**Pharmacy Section**, NMCP, RPM Plus, NMS	Training package Workshops Reports	All health workers handling ACTs in public and mission sectors trained	Effective implementation of ACT treatment policy
Procure required quantities of quality artemether-lumefantrine on behalf of the government	**WHO,** NMCP	Procurement order	All required quantities of artemether-lumefantrine delivered as per delivery schedule	Efficient procurement of quality artemether-lumefantrine
Receive consignments of artemether-lumefantrine and handle all Customs and port clearance	**NMS**	Reports	Artemether-lumefantrine cleared within a week of arrival	Increased availability of ACTs for effective policy implementation
Quarantine the ACTs for mandatory analysis by NMS	**NMS**	Reports	Artemether-lumefantrine quarantined immediately	Effective implementation of ACT treatment policy
Carry out quality control testing of ACTs and other antimalarials	**NDA**	Quality control reports	Quality control data available to the NMS for release of items	Effective implementation of ACT treatment policy
Submit required returns and reports on artemether-lumefantrine to the GFATM	**NMS**	Reports	Artemether-lumefantrine cleared within a week of arrival	Increased availability of ACTs for effective policy implementation

[1] The bolded partner is the lead partner in circumstances where there is more than one partner for an activity.

Activity	Lead Partner[1]	Products	Outputs	Outcomes
Warehouse and distribute artemether-lumefantrine to public sector facilities and provide periodic reports to NMCP on distribution of artemether-lumefantrine	**NMS**	Two monthly distributions	Artemether-lumefantrine distributed efficiently	Increased availability of ACTs for effective policy implementation
Warehouse and distribute artemether-lumefantrine to mission sector facilities and provide periodic reports to NMCP on distribution of artemether-lumefantrine	**JMS**	Quarterly distribution reports	Artemether-lumefantrine distributed efficiently	Increased availability of ACTs for effective policy implementation
Work with the field liaison teams to ensure that stock-outs and expiries are minimal through stock redistribution to needy facilities	**District Health Officer (DHO)**	Monthly reports	Artemether-lumefantrine available and minimal wastage	Increased availability of ACTs for effective policy implementation
Provide monthly reports to the service liaison officers for NMCP on utilisation of ACTs, to facilitate appropriate malaria information management	**DHO**	Monthly reports	Feedback provided to NMCP for decision making	Increased availability of ACTs for effective policy implementation
Monitor distribution and use of artemether-lumefantrine to inform future quantification and supply of the medicines	**Pharmacy Section,** NMCP	Consumption data	Consumption data available for quantification	Increased availability of ACTs for effective policy implementation
Institute postmarketing surveillance and pharmacovigilance of ACT and other antimalarials (NDA)	**NDA, NMCP**	Pharmaco-vigilance reports	Adverse drug reaction monitoring data available to the NDA for decision making	Effective implementation of ACT treatment policy
Monitor safety and quality of ACTs and other antimalarials through postmarketing surveillance.	**NDA**	Postmarketing surveillance reports	Postmarketing surveillance data available to the NDA for decision making	Effective implementation of ACT treatment policy
Provide technical support to NMCP and other government agencies in the rollout of the new treatment policy	**WHO, MSH**	Activity reports	Better understanding of programmatic and pharmaceutical management elements needed for implementation	Effective implementation of ACT treatment policy

SECTION 3. ACTIVITIES

3.1 Selection

The rationale for Uganda's change in malaria treatment policy, as in many other countries in the African region, was to overcome challenges due to the growing resistance of *Plasmodium falciparum* to conventional therapies such as SP and CQ. The new national malarial treatment policy[2] supports major components of the Uganda National Malaria Control Strategic Plan 2005–06 to 2009–10 (see Box 1).

Box 1. Selected Case Management Objectives of the National Malaria Control Strategic Plan

Objective 5: Ensure access by all to ACT including those accessing treatment through the commercial sector.

Objective 6: Enhance the prompt treatment of children younger than 5 years within 24 hours of fever onset through the provision of home-based management of malaria fever using ACT.

Objective 7: Reduce case fatality of severe malaria by establishing a system to provide highly effective pre-referral treatment (e.g., rectal artesunate) and improve the management capacity for severe malaria at health facilities and hospitals.

Objective 8: Increase the proportion of malaria cases confirmed by high-quality clinical and parasitological diagnoses guided by feasibility and cost effectiveness.

The revised policy (summarized in Table 1) provides for the effective treatment of malaria to reduce morbidity and mortality especially in children younger than five years and in pregnant women.

The selection of ACTs for the treatment of uncomplicated malaria in Uganda was based on considerable clinical evidence demonstrating that the ACTs have better cure rates and are well tolerated with few serious adverse effects. Among the WHO-recommended ACTs,[3] artemether-lumefantrine was selected as the first-line treatment for uncomplicated malaria by the MCMTWG citing the following reasons—

- Artemether-lumefantrine is a fixed-dose combination and is prepackaged in treatment courses for specific age groups (one blister pack for one episode of malaria for one patient).
- Resistance to amodiaquine is likely to develop rapidly because of the cross-resistance between CQ and amodiaquine as well as high resistance to CQ.

[2] The purpose of an antimalarial treatment policy is to ensure availability of safe, effective, good quality and affordable antimalarial medicines to those who need them and at the same time promote rational medicine use, which will minimize the emergence of antimalarial medicine resistance.

[3] WHO-recommended ACTs are artemether-lumefantrine, artesunate + amodiaquine, artesunate + mefloquine and artesunate + SP.

- Amodiaquine has not been well accepted or used by consumers and providers in Uganda, although it has been available in Uganda for more than 30 years.

- Even though artemether-lumefantrine is presently more expensive than artesunate plus amodiaquine, prices are expected to come down in the near future due to economies of scale. Furthermore, the GFATM and other sources are expected to supplement pharmaceutical procurement for the foreseeable future.

3.2 Quantification of Artemether-Lumefantrine for 2007 and 2008

Consumption data for other antimalarials (CQ, SP) cannot be used for quantification of ACTs because ACTs have a different profile due to their capacity for reduction of parasite biomass, rapid resolution of clinical symptoms, reduction in gametocyte carriage and efficacy against *P. falciparum.*

Quantification of the initial year was done by a technical committee of the MCMTWG using population age structure, population growth rate and estimated number of clinical malaria episodes per age group. This method showed some shortfalls in estimation since the attendance profile at outpatient departments in health facilities is not distributed in a similar manner with the population structure. In this operational plan, the ACT requirements have been estimated by a consortium of stakeholders including the NMCP, WHO and RPM Plus using an epidemiological model of estimation based on morbidity data for the past year, distribution of malaria cases by artemether-lumefantrine dosage age groups and population growth rate. We hope that in subsequent years as consumption data become available, quantification will be based on consumption. In the meantime, RPM Plus supported the NMCP in carrying out a rapid survey on the national distribution of malaria cases by the artemether-lumefantrine dosage age groups. The survey information will assist with both quantification for procurement and rationalisation of order processing. The tables below show the quantification of artemether-lumefantrine required for the first and second years.

3.2.1 Assumptions

- **Population growth rate**

  The population of Uganda according to the 2002 census was 24,748,977 in 2002 and the population growth rate is 3.4 percent per year (Table 4).

Table 4. Population Projections by Year

Age group	2002	2003	2004	2005	2006	2007	2008	2009	2010
0-3	4,207,326	4,350,375	4,498,288	4,651,230	4,809,372	4,972,890	5,141,968	5,316,795	5,497,566
4-7	3,217,367	3,326,757	3,439,867	3,556,823	3,677,755	3,802,798	3,932,094	4,065,785	4,204,021
8-11	2,969,877	3,070,853	3,175,262	3,283,221	3,394,850	3,510,275	3,629,625	3,753,032	3,880,635
12+	14,354,407	14,842,456	15,347,100	15,868,901	16,408,444	16,966,331	17,543,186	18,139,655	18,756,403
Total	**24,748,977**	**25,590,441**	**26,460,517**	**27,360,175**	**28,290,421**	**29,252,294**	**30,246,873**	**31,275,267**	**32,338,625**

- **Artemether-lumefantrine dosage weight ranges and their age equivalents**

  The Training Taskforce commissioned by the MCMTWG reviewed the treatment guidelines in line with the artemether-lumefantrine dosage packs and came up with body weight ranges equivalent to age groups (Table 5).

Table 5. Average Malaria Attendances Corresponding to Artemether-Lumefantrine Dosage Age and Weight Groups

Note: According to a survey of 80 health facilities in 20 districts

Artemether-Lumefantrine Dosage Weight Range (kg)	Equivalent Age Range	Proportion of the Population (Census) (percentage)	Proportion of Malaria Attendances (Survey) (percentage)
05–14	4 months – 3 years	17	28
15–24	4 years – 7 years	13	13
25–34	8 years – 11 years	12	13
≥35	12 years and older	58	46
—	Overall	100	100

- **Variations in malaria episodes per person per year with age**

  The number of fever episodes per person per year *decreases* as a person grows older. They range from more than four episodes per person per year for children younger than 3 years to fewer than two episodes per person per year for children and adults 12 years and older.

- **Variations in malaria episodes per person per year with time**

  Over the years, the number of episodes per person per year for a specific age group will decrease because of the introduction of effective malaria case management (ACTs for uncomplicated malaria) and the wider coverage of preventive measures (e.g., insecticide-treated nets, indoor residual spraying and environmental management). For example, the number of episodes for children younger than 3 years is expected to decrease from 4.2 episodes per person per year in 2005 to 2.5 episodes per person per year in 2010.

- **Variations in the proportions of fever episodes treated as malaria with age and time**

  Initially, all episodes of fever in all age groups are presumed to be due to malaria and treated as such. For children younger than 3 years, all fever cases will continue to be treated as malaria even if facilities for parasitological diagnosis become more widespread because of the difficulty in interpreting laboratory test results. The prevalence of parasitaemia among healthy children is so high that the presence of malaria parasites in a child with fever does not prove that malaria is the cause of the fever. For older children and adults, however, the prevalence of malaria parasitaemia among healthy individuals is not as high. Therefore, the presence of malaria parasites in a person with fever without other obvious causes of the fever

usually means that malaria is the cause of the fever. Over the years, the proportion of fever episodes treated as malaria will decrease because facilities for parasitological diagnosis (microscopy and rapid diagnostic tests) will become more widespread and presumptive treatment will be used less often. For adults, for example, the proportion of fever episodes treated as malaria will likely decrease from 100 percent in 2005 to 40 percentage in 2010.

- **Variations with time in the proportions of malaria cases treated by public, PNFP and PFP facilities and by HBMF**

  As access to effective treatment (with ACTs) becomes increasingly more available in public and PNFP health facilities, more patients with malaria will choose to be treated in public and PNFP health facilities.

  ACTs will begin to be used widely for HBMF at community level in 2007. As ACTs use for HBMF at the community level increases, the attendance of children at public, PNFP and PFP health facilities will decrease.

  The majority of patients with uncomplicated malaria treat themselves with antimalarial medicines obtained from medicine shops and other PFP facilities. Over time the proportion of patients who use PFP facilities will decrease.

  For example, for children younger than 3 years, the proportion treated for general health issues in public health facilities is expected to increase from 22.5 percent in 2005 to 45 percent in 2007 (when ACTs will become available for HBMF within communities); after which the proportion using public health facilities will decrease to 30 percent. The proportion using PNFP facilities will increase from 7.5 percent in 2005 to 15 percent in 2007 (when ACTs will be used widely for HBMF within communities) then decrease to 10 percent. The proportion using PFP facilities is expected to decrease progressively from 70 percent in 2005 to 20 percent in 2010. The proportion treated at the community level using HBMF is expected to increase from 20 percent in 2007 to 40 percent in 2010. As an example of the specific changes in how people seek treatment, Table 6 compares the projections for 2007 and 2008 for episodes of fever that is treated as malaria.

Table 6. Malaria Episodes per Person per Year and Episodes of Fever Treated as Malaria and Proportions of Malaria Cases Treated by Various Service Providers

Age, Episode, and Treatment	Service Provider	2007	2008
Age: Younger than 3 years			
Number of fever episodes per person per year	—	3.5	3
Proportion of fever episodes treated as malaria	—	100%	100%
Proportion of total treated by:	Government	30.0%	30.0%
	Nongovernment organization (NGO)	10.0%	10.0%
	Private practitioners; informal or community organisations	20.0%	20.0%
	HBMF with ACT	40.0%	40.0%
Age: 3 to younger than 7 years			
Number of fever episodes per person per year		2.5	2.2
Proportion of fever episodes treated as malaria		80%	80%
Proportion of total treated by:	Government	18.8%	22.5%
	NGO	6.2%	7.5%
	Private practitioners; informal or community organisations	63.0%	58.0%
	HBMF with ACT	12.0%	12.0%
Age: 7 to younger than 12 years			
Number of fever episodes per person per year		1.4	1.2
Proportion of fever episodes treated as malaria		60%	60%
Proportion of total treated by:	Government	30.0%	30.0%
	NGO	10.0%	10.0%
	Private practitioners; informal or community organisations	60.0%	60.0%
Age: 12 years or older			
Number of fever episodes per person per year		1.4	1.2
Proportion of fever episodes treated as malaria		40%	40%
Proportion of total treated by:	Government	30.0%	30.0%
	NGO	10.0%	10.0%
	Private practitioners; informal or community organisations	60.0%	60.0%

3.2.2 Treatments Required

Based on the above assumptions, the quantities of artemether-lumefantrine required for 2007 and 2008 are shown in Table 7.

Table 7. Number of Treatments Required for 2007 and 2008

Age in Years	Population	Number of Fever Episodes	Number Treated as Malaria	Number of Treatments: Gov.	Number of Treatments: NGOs	Number of Treatments: Private Practitioners	Number of Treatments: HBMF with ACT	Number of All Treatments: by Gov.	Total Number of Treatments by Gov. and NGO
					2007				
<3	4,972,890	28,667,249	28,667,249	8,600,175	2,866,725	5,733,450	11,466,900	20,067,075	22,933,800
3– < 7	3,802,798	9,506,996	7,605,597	1,429,852	471,547	4,791,526	912,672	2,342,524	2,814,071
7– <12	3,510,275	4,914,386	2,948,631	884,589	294,863	1,769,179	0	884,589	1,179,452
≥12	16,966,331	18,838,478	7,535,391	2,260,617	753,539	4,521,235	0	2,260,617	3,014,156
Total	**29,252,294**	61,927,109	46,756,868	13,175,233	4,386,674	16,815,390	12,379,572	25,554,805	29,941,479
					2008				
<3	5,141,968	25,407,373	25,407,373	7,622,212	2,540,737	5,081,475	10,162,949	17,785,161	20,325,898
3– < 7	3,932,094	8,650,606	6,920,485	1,557,109	519,036	4,013,881	830,458	2,387,567	2,906,603
7– <12	3,629,625	4,355,550	2,613,330	783,999	261,333	1,567,998	0	783,999	1,045,332
≥12	17,543,186	16,696,274	6,678,510	2,003,553	667,851	4,007,106	0	2,003,553	2,671,404
Total	**30,246,873**	55,109,803	41,619,698	11,966,873	3,988,957	14,670,460	10,993,407	22,960,280	26,949,237

The committee recommends that because the estimates in table 7 are highly dependent on the assumptions made, the risk of their being wrong is high, should one or more of the assumptions be erroneous. We therefore recommend that, as more experience is gained and more accurate data become available, these assumptions be revised; revisions at annual (or even shorter) intervals would be wise to avoid shortages due to underestimation or wastages due to overestimation.

3.3 Purchase of Commodities

3.3.1 Procurement of Artemether-Lumefantrine

Overall, procurement of antimalarials, along with other essential medicines for the public health system is centrally managed within the NMS, with a procurement cycle beginning July 1 and ending June 30 of the following year.

The procurement of artemether-lumefantrine, unlike other publicly procured antimalarial medicines,[4] is through single sourcing, because at present only the artemether-lumefantrine by Novartis is qualified by WHO. To ensure broad and equitable access for malaria treatment in countries opting to purchase and use artemether-lumefantrine, WHO and Novartis have formally agreed to work together, and hence for Uganda, WHO is facilitating procurement of (GFATM-funded) artemether-lumefantrine on behalf of the public sector. The MoH obtained approval from the Treasury to order artemether-lumefantrine through single sourcing, based on an existing Memorandum of Understanding between the WHO and Novartis, which offers the product at cost to endemic countries.

3.3.2 Scheduling of Artemether-Lumefantrine Deliveries

Through discussions between the NMS and JMS, with considerations for balancing ACT availability and space requirements, it was agreed that artemether-lumefantrine consignments would be delivered at monthly intervals (Annex 1).

The NMS, before the arrival of the ACTs, confirmed that they would create the required space to hold their respective allocations of each delivery. To minimize risk of expiry, the Malaria Medicines Supply Service (MMSS) has promised to ensure that all consignments have a shelf life of not less than 18 months on arrival in Uganda. Remaining shelf life on the 2006 deliveries consignment received confirmed that MMSS kept its promise.

3.3.3 Customs Clearance and National Drugs Authority Mandatory Analysis

All ACT deliveries will be shipped by air to Entebbe International airport and will be consigned to the NMS. WHO will be responsible for Customs clearance and inland transportation to the NMS designated warehouse. Before arrival, WHO will provide the NMS with import documents including proforma invoices to process import certificates. The NDA will carry out mandatory analysis of the medicines, but the NMS will request for conditional release and quarantine the

[4] These procurements are currently done through annual competitive bidding through the NMS.

medicines to avoid heavy demurrage charges. WHO will be responsible for payment of the NDA proforma verification fees.

3.3.4 Procurement of Other Antimalarials

The successful implementation of this new treatment policy will depend on an uninterrupted supply of not only ACTs but also other antimalarial medicines to health facilities while minimizing wastage. Other antimalarials will be procured by the NMS and JMS from their normal suppliers, and distributed to the facilities through regular distribution systems. The MoH-NMCP, NMS and JMS will ensure that adequate supplies of these commodities are available at all times to support malaria control policy implementation.

Mechanisms will be instituted to ensure that adjunct therapy is supplied along with artemether-lumefantrine so that at each health facility, prevention and management of all categories of malaria will be possible.

3.4 Warehousing and Distribution of Artemether-Lumefantrine

The NMS will receive the consignments of artemether-lumefantrine on behalf of the public sector and quarantine it awaiting results of mandatory analysis. Within the NMS warehouse, artemether-lumefantrine will be subjected to NMS procedures[5] for receiving supplies, which include (among other checks) quantity checks against order, price checks against quotes and expiry date checks against batch. The NMS will release consignments for distribution and to the JMS only after receiving clearance from the NDA's quality control laboratory. After clearance by the NDA, 20 percent of the consignment will then be dispatched to the JMS.

Both the NMS and JMS have adequate warehouse space and are prepared to receive the consignments when they arrive and to distribute them as scheduled.

3.4.1 Packaging of Artemether-Lumefantrine for Distribution

Packaging of artemether-lumefantrine for the public sector facilities will be done according to requests from the health units for a district. All mission sector facilities will order their ACT requirements from the JMS based on estimated demand. The JMS will communicate with its facilities beforehand to prepare them to estimate their quantities. The NMS and JMS, however, are expected to consult the recipients in issuing artemether-lumefantrine, based on the recommended dosages and the known workload of the various facilities and with due regard to the short shelf life of the product. Careful monitoring of stock levels along the supply chain will be necessary to ensure continuous availability of stocks.

[5] Written procedures for receiving and warehousing are available at both the NMS and the JMS.

3.4.2 Distribution of Artemether-Lumefantrine

It is important that existing systems used for distribution of medicines and medical supplies to facilities be maintained for artemether-lumefantrine, and all efforts will be made to avoid creating a vertical system. Distribution of artemether-lumefantrine to all public sector health facilities will be integrated into the relevant public and mission sector distribution systems. The NMS currently distributes commodities to hospitals every two months through a "pull" system. The JMS operates a "cash and carry" system, and therefore, facilities will be expected to pick their ACTs.

Distribution should ensure that by the time artemether-lumefantrine reaches health facilities, it should have a shelf life of not less than 12 months.

The JMS and NMS will continuously advise their clients to exercise extreme care concerning the quantities of artemether-lumefantrine that health facilities stock because of the product's shelf life of about two years and because the product is relatively bulky compared to other antimalarials.

3.5 Inventory Management

Inventory management of artemether-lumefantrine is a key requirement by the NMCP, and the artemether-lumefantrine distributed will need to be carefully tracked to ensure stock availability and minimize wastage, to reduce leakage of stocks and to obtain consumption data for future reordering and redistribution of stocks. To ensure proper inventory management, health facilities must have registers to record the issuing of the medicines so that a clear paper trail is established for receipt, storage and issue of artemether-lumefantrine. Forms must exist to summarize the consumption and the stock-levels, and a system must be in place so districts can monitor and act on stock levels and calculate future artemether-lumefantrine requirements.

Specifically, the following information needs to be tracked at various levels—

- Artemether-lumefantrine receipt, storage and issue information in the health facility stores

- Artemether-lumefantrine dispensing information (consumption) in the facility dispensaries

- Summary information to send to the district level containing—

    - Health facility stock-out data
    - Health facility consumption data
    - Health facility stock balance data, including medicines pending expiry

The districts can then calculate—

- Health facility adjusted consumption data (consumption data adjusted for number of days out of stock)
- Number of days supply in stock (balances of artemether-lumefantrine in stock as compared to consumption data)
- Future orders

From these calculations, they can redistribute stock between health facilities as needed, based on reported stock levels and medicine expiry data.

At the national level, adjusted consumption data are needed for future purchasing planning, and stock-outs of first-line antimalarial medicines represent one of the key indicators for case-management.

NMCP's long-term strategy is to track antimalarial medicine information through a harmonized health information management system (HMIS) reporting system. Health facility data on stock-outs and consumption would be reported monthly to the district HMIS officer, who would process the data and give it to the DHO, as well as send information on to national levels. To further this process, the antimalarial medicine information needs were presented to the Infectious Diseases Surveillance and Response committee for consideration with an aim of incorporating them into the HMIS. The process of harmonization through the HMIS is continuing, but clearly, it will take some time before the antimalarial medicine information is satisfactorily tracked through HMIS and available at the district and national levels.

In the meantime, because of the expense and importance of artemether-lumefantrine, it has been agreed that a system needs to be urgently put in place to record and track the usage of the medicines. This system would be temporary, in use for the immediate needs until such time as the antimalarial medicine information is incorporated into the HMIS and implemented nationwide.

Tracking of artemether-lumefantrine will therefore be as described above. Reporting tools have been developed by the NMCP in conjunction with the Office of the Principal Pharmacist and the HMIS department of the MoH. At the public sector rural health facilities, the developed dispenser books,[6] stock control ledger and bin cards will be used for daily inventory management. At the end of the month, the health facility staff in charge of managing medicines will compile a consumption summary which will be sent to the district Logistics Officer.[7]

In all hospitals, the tool that will be used for consumption data capture will also be the dispenser books and bin cards. Monthly summaries of consumption data will be made and will form the basis of placing the next order of medicines. The forms will also be forwarded to the district Logistics Officer, who will condense all the consumption data and send the report to the DHO

[6] Artemether-lumefantrine is not listed on the existing registers.
[7] Plans are under way to identify a district Logistics Officer who will coordinate district orders for medicines.

for subsequent forwarding to the MoH. While making the orders, the district Logistics Officer will ensure that the needs of rural health facilities are taken into account and that stock is redistributed to avoid wastage and stock-outs.

The district Logistics Officer, as identified by the district, will be responsible for inventory management at the district level. The district Logistics Officer will be identified for each district and will be sensitised on the inventory management system to be put in place. The district Logistics Officer will work with the District Health Management Teams (DHMTs) to ensure that facilities are adequately stocked with medicines, that they are generating consumption data and that they can use the data at their level to redirect stocks within the district and raise any issues with the NMS concerning stock-outs and near-expiries. The NMS will generate consumption data from the monthly summaries.

3.6 Ensuring Appropriate Use of Artemether-Lumefantrine and Other Antimalarials

Appropriate use of antimalarials under this new treatment policy will depend on proper diagnosis, prescribing, dispensing and patient information by health workers and proper adherence by patients. To initiate this process, the NMCP carried out nationwide training of health workers on the new malaria treatment guidelines. This effort will be complemented by ensuring continued availability at the health facilities of all commodities mentioned in these guidelines (including diagnostics) as well as the use of information, education and communication to support appropriate use of ACTs.

Within the MoH, a service liaison team needs to be identified to work closely with the DHMTs and facility staff to ensure that medicines are managed appropriately. The service liaison officers will make periodic visits to health facilities, assist with the processing of their orders and offer on-the-job training to facility staff. The MoH will institute appropriate mechanisms to monitor product use through supervisory visits to facilities, the review of patient and commodity data and appropriate surveys.

3.7 Management Support

3.7.1 Human Resources

To effectively implement the new malaria treatment policy, health workers should be available, informed and oriented on the new malaria treatment guidelines. The NMCP carried out nationwide training of health workers on the new malaria treatment guidelines beginning with a training of trainers. The NMCP estimated numbers of public and mission health facility staff when planning for this training. A training curriculum, training materials and job aids were developed by the NMCP with the support of RBM Partners.

3.7.2 Training of Pharmacy Personnel

At the health facility level, the MoH (particularly the NMCP and the Pharmacy Section) will train staff on pharmaceutical supplies management. This training should focus on both clinical and supply management training in an affirmative manner. The training should have components on the treatment policy, supporting legal framework, selection, procurement, distribution and use. In addition it should discuss management support issues on how the items will be accounted for using existing inventory control management and reporting systems.

SECTION 4. MONITORING AND EVALUATION

4.1 Information Management

Uganda has a public health responsibility for monitoring the performance of artemether-lumefantrine in the field. Currently, an information system comprising the following elements is being recommended for institution—

- Routine data recording and collection (through the HMIS)
  - Planning, budgeting and monitoring for malaria activities
  - Targets and budgets
  - Expenditure
  - Technical and financial
- Survey-based data (health facility and households)
- Other systems—
  - Epidemics detection monitoring system
  - ACTs and other antimalarials trail
  - Facility level medicine audit
  - Consumption and stock-out information
  - Training information system
  - RBM sentinel sites
  - Pharmacovigilance system
  - Strengthening M&E and technical capacity at the NMCP
  - Facilitating partnerships on malaria information systems and M&E

Planners envisage that the data will be accessible to the NMCP for decision making and reporting.

4.2 Postmarketing Surveillance

The regulatory authority (the NDA) has responsibility for postmarketing surveillance—for quality and safety (pharmacovigilance). The NMCP will work closely with the NDA to implement surveillance on ACT and other antimalarials and to mobilize the necessary resources. The support will include developing and implementing a strategy to monitor the quality and safety of antimalarials. The process could also be extended to product availability and redistribution programs.

Planners envisage that before large-scale introduction of ACTs for HBMF and phasing out of monotherapies in Uganda, a survey of current antimalarials in the marketrelevant to provide baseline information. The NDA will carry out this survey with the provision of technical and financial support from RPM Plus.

4.3 Quality Assurance and Monitoring

The artemether-lumefantrine being procured for Uganda has been pre-qualified by WHO, and will continue to be procured from a single, pre-qualified source under a secure procurement arrangement between Novartis and WHO, through the MMSS. These conditions are meant to provide minimum assurance of quality for the product on receipt in the country. A certificate of analysis will continue to accompany each batch of the medicine.

Both the NMS and JMS have quality assurance procedures in place, which are designed to ensure that quality of products is maintained from receipt of deliveries, during storage and throughout the distribution process.

The National Quality Control Laboratory currently has the capacity to test ACTs. Their testing will ensure that the quality of these products can be assessed periodically during the distribution process.

4.4 Safety Monitoring

A pharmacovigilance system being established to conduct medicine safety monitoring, taking into consideration that Uganda has limited knowledge and experience in the use of ACTs and that some of the newer medicines are being introduced for use on a wide scale.

The NDA has a pharmacovigilance unit that has made some initiatives to develop a surveillance system.

SECTION 5. TRANSITIONAL ISSUES

5.1 Minimizing Leakage

One of the major challenges of the public sector subsidised provision of artemether-lumefantrine by Novartis is pilferage. The commercial laws of supply and demand came into effect once this brand of artemether-lumefantrine was deployed in the public sector. Measures to prevent leakage that are currently being instituted in Uganda include—

- Filling out stock records properly
- Frequent monitoring of health facility inventory management and supervision by the district
- Creating partnerships with the private sector
- Strengthening inspection and enforcement by the NDA
- Developing plans to increase access of artemether-lumefantrine in the private sector

The different packaging and colour coding used for the public sector is also meant to discourage this leakage and to facilitate identification of the public sector product. Other recommendations to minimize leakages include—

- Stamping primary and secondary packaging "GOU—Not for RESALE" (future orders)
- Conducting postmarketing surveillance, which could detect public sector product in the private sector
- Undertaking advocacy and public awareness, to encourage patients to seek treatment for malaria in the public sector

5.2 Phasing Out Artemisinin Monotherapies and Limiting SP and Other Antimalarials

Phasing out of monotherapies from the previous policy is important if adherence to the new policy is to be achieved. The NMS and JMS will work with the NDA to determine the existing pipelines for SP and CQ within the public and mission sectors and to develop a plan to limit SP (for intermittent preventive treatment during pregnancy use only) and to phase out CQ. The NDA in collaboration with RPM Plus has developed a phase-out plan for CQ and other monotherapies.

Some strategies that might be used to achieve phasing out include public education on new treatment recommendations, advocacy to the private sector to follow new treatment guidelines, voluntary de-registration of other products and postmarketing surveillance.

5.3 Private Sector

Artemether-lumefantrine is already available in private sector facilities (hospital pharmacies, community pharmacies and medicine outlets), but the private sector price of the ACT is up to 10 times higher (USD 5–10) than is planned for the public sector. This differential makes the cost to the end user accessing artemether-lumefantrine in the private sector inequitable. The rollout of artemether-lumefantrine into the formal and informal private sectors in Uganda is therefore planned for Year 2 onwards. Strategies to introduce artemether-lumefantrine into these sectors through subsidised schemes will be explored by the NMCP and NDA and their support partners.

SECTION 6. SUMMARY

The NMS and JMS will play a prominent role in storage and transportation of ACTs up to health facilities. Their capacity to store bulk items such as artemether-lumefantrine packages provides an added value to the implementation of the malaria treatment policy. The NMCP will take advantage of the existing transport network and ordering and inventory control systems within the two institutions and build on them to ensure continued access to the product. The NMCP will use the existing systems, formats and tools to account for the ACTs. The pharmacy personnel and all those involved in dispensing and prescribing ACT will be oriented in supply and clinical management, respectively.

SECTION 7. BUDGET AND TIMELINES

Activity	Cost for 2007 order (USD)	Timeline 2007	Cost for 2008 order (USD)	Timeline 2008
Procurement of artemether-lumefantrine[8]	16,404,954.59 (16.4 million doses)	January 2007	17,193,877	January 2008
Procurement of additional artemether-lumefantrine[9]	4,344,192 (4.3 million doses)	May 2007	No additional doses to be bought	
Clearance and demurrage costs (first order)	Within WHO costs	February 2007 to August 2007	Within procurement agent cost	March 2008 to January 2009
Clearance and demurrage costs (first order)	Within WHO costs	September to December 2007	Within procurement agent cost	March 2008
Warehousing and distribution costs—NMS (first order)	Paid for directly by the GFATM and the Presidential Malaria Initiative (PMI)	February 2007 to January 2008	Paid for directly by the GFATM and PMI	February 2008 to January 2009
Warehousing and distribution costs—JMS (first order)	Paid for directly by the GFATM and PMI (20% of the doses)	February 2007 to October 2008	Paid for directly by the GFATM and PMI (20% of the doses)	February 2008 to January 2009
Warehousing and distribution costs—NMS (second order)	Paid for directly by the GFATM and PMI	November 2007 to February 2008	Paid for directly by the GFATM and PMI	April 2008
Warehousing and distribution costs—JMS (second order)	Paid for directly by the GFATM and PMI (20% of the doses)	November 2007 to February 2008	Paid for directly by the GFATM and PMI (20% of the doses)	April 2008
M&E costs	RBM Partners to support	May 2007 onwards	RBM Partners to support	Continuous from previous year
HBMF introduction and support	RBM Partners to support	July 2007 onwards	RBM Partners to support	Roll out already taken place, part of the general distribution plan

[8] These quantities include HBMF ACTs.
[9] Procurement of stock including GFATM and PMI funding also include HBMF Coartem.

SECTION 8. DISTRIBUTION OF ARTEMETHER-LUMEFANTRINE FOR HBMF

8.1 Introduction

The MoH's Health Sector Strategic Plan II aims to increase the proportion of children younger than 5 years of age getting correct treatment within 24 hours of onset of symptoms to 80 percent by 2010. To achieve this target, the MoH is implementing the HBMF strategy, the goal of which is help reduce morbidity and mortality of children due to malaria fever.

Most attacks of malaria are simple and uncomplicated. If treated promptly, full recovery of the patient, with no residual disabilities, is expected. If treatment is delayed, however, uncomplicated malaria can quickly progress to become severe and complicated.

In rural parts of Uganda, access to health care facilities that provide effective treatment for malaria is still unsatisfactory. In response to this situation, the MoH together with its development partners devised the HBMF strategy for improving management of malaria and fever at the community and household levels. Safe and effective antimalarial medicines for treatment of uncomplicated malaria are made available within communities so that mothers and caretakers can quickly access these life-saving medicines as soon as their children develop symptoms of malaria or fever. With proper implementation, the strategy has been observed to improve treatment-seeking behaviour, reduce occurrence of complicated cases of malaria and therefore reduce the malaria-related morbidity and mortality.

The HBMF strategy was officially launched in the country on June 17, 2002, by His Excellency the President of Uganda. The strategy is currently being implemented in all the districts. Since the launch, the strategy has been based on prepackaged CQ and SP (Homapak®). Over time, however, the resistance of *P. falciparum* to the CQ and SP combination became unacceptably high. Therefore the MoH decided to change the malaria treatment policy: ACTs replaced CQ and SP, and artemether-lumefantrine was the ACT selected as the first-line treatment for uncomplicated malaria. The new malaria treatment policy was launched in April 2006 and rolled out within health facilities. Case management was recommended as a strategy for malaria control. The prevention of malaria requires prompt case detection and management. The use of effective antimalarial combination therapy for uncomplicated malaria episodes complements malaria prevention efforts by—

- Reducing the number of cases that would otherwise progress to severe malaria
- Delaying development of drug-resistant strains
- Reducing malaria transmission through the reduction of the blood load of transmissible forms of the parasite
- Shortening the period of sickness due to malaria

The main focus is to make this effective treatment accessible for children under the age of five through the community distribution system for medicines.

8.2 Introducing ACTs at Community Level

The process of introducing ACTs at the community level will involve several steps. Below is an outline of the critical issues involved—

- Reclassifying Coartem®
- Identifying needs (logistics)
- Quantifying needs
- Developing appropriate guidelines and tools
- Procuring, storing and distributing supplies
- Training health workers
- Developing advocacy issues and mobilising the community; providing information, education and communication; and sensitising leaders and communities
- Identifying, selecting and training CMDs
- Distributing community ACTs and withdrawal of Homapak

8.2.1 Reclassification of Coartem

For Coartem to be used to treat patients with malaria fever at community level by CMDs, it has to be reclassified by the NDA from a prescription only medicine to an over-the-counter medicine.

8.2.2 Identification of Needs (Logistics)

The necessary logistical elements critical for the successful implementation of the HBMF strategy must be identified. They include the following—

- The medicine (artemether-lumefantrine)
- Medicine storage facilities at all levels (national, district, health facility and community)
- Stock cards at all levels
- Medicine registers
- Transportation and distribution requirements
- The components of the motivation package for the community medicine distributors

8.2.3 Quantification of Needs

Quantification of needs at national, district and health facility levels is necessary. This process will involve quantifying basic needs such as—

- Artemether-lumefantrine for HBMF
- Medicine storage boxes
- Community medicine distributors' registers
- Community medicine flipcharts for counselling clients
- Health facility registers
- Components of the motivation package for the CMDs

8.2.4 Development of Appropriate Guidelines and Tools

Various guidelines and tools will be either developed or updated in conformity to the new drug policy as it applies at community level. These guidelines and tools will include—

- Artemether-lumefantrine procurement plan
- Guidelines for use of artemether-lumefantrine at the community level
- Training materials for health workers and CMDs
- Community sensitisation tools including a strategy for promoting HBMF
- Updated medicine registers

8.2.5 Procurement, Storage and Distribution of Supplies

After quantification, the existing tools and guidelines will be used to inform the procurement, storage and distribution of essential supplies for implementation of HBMF using artemether-lumefantrine within communities.

8.2.6 Training the Health Workers

The staff based in the health unit will play a big role in the rollout of community Coartem. They will be trained and sensitised on the following—

- Their supervisory roles in support of the CMDs
- The use of HBMF monitoring tools
- Coartem stock management
- Quantification of Coartem needs at facility level
- Tracking of adverse effects of Coartem in the community

8.2.7 Advocacy and Community Mobilisation

Before introducing ACTs at the community level, the community members and their leaders will be sensitised on—

- The HBMF strategy

- The burden of malaria
- The role of the community in the implementation of the HBMF strategy
- The criteria for selecting the CMD
- The various roles to be played by the CMD

8.2.8 Identification, Selection and Training of CMDs

The community members will identify and select CMDs with guidance from the community leaders.

All CMDs will be trained on the use of artemether-lumefantrine (Coartem) to manage uncomplicated malaria. We must emphasise that the role of the CMDs is to complement the work of health facilities to which they are accountable.

The training will focus on helping the CMDs to acquire the following skills—

- Recognition of a child with fever
- Classification of a child with fever
- Determination of what amount of Coartem to give
- What features to consider before referring a child to a higher level
- Safe handling and storage of medicines
- Their roles in the community
- Recording and reporting on HBMF activities

8.2.9 Distribution of Community ACTs and Withdrawal of Homapak

Community ACTs will be distributed immediately after CMDs are trained on Coartem. At the end of the training, each CMD will be given the initial supply of Coartem to begin implementing the policy.

The plan is that, at the time of the training, the CMDs will bring along with them any stock of Homapak they have. The Homapak is then handed over to the trainers in exchange for a new supply of Coartem.

8.3 Support Supervision

The CMDs will need a lot of support supervision from the health workers. Periodical supervision will improve the quality of services provided by the medicine distributors. The health managers at the district, health subdistrict and health facility level will be responsible for ensuring that CMDs are supervised effectively.

The general objective of the supervision is to improve the quality of services provided by the CMDs.

- For technical supervision, health workers of the health facility from which the CMDs get their supplies of medicine are the primary supervisors of CMDs. The health workers will have been trained on how to supervise CMDs.

- For administrative supervision, local leaders such as members of local councils, chiefs and religious leaders should be involved.

Components of the supervision of CMDs will include the following—

- Every distributor should be visited by staff from the nearest health facility at least once every quarter.

- Meetings of CMDs should also be organised at the nearest health facility at least once every quarter.

- Health workers should discuss with CMDs technical issues of concern during their visits to collect medicines.

8.4 Motivation of CMDs

Although the CMDs are volunteers, all stakeholders agree that they need to be motivated to keep working. The incentives may be tangible or intangible and may take the form of the following—

- Public recognition as members of the health service delivery system
  - Being mentioned at public gatherings
  - Badges
  - Certificates
  - Printed t-shirts
- Availability of tools that facilitate work
  - Adequate supplies of the medicine (artemether-lumefantrine)
  - Medicine distributors' registers
  - Flipcharts for counselling clients
  - Means of transport (e.g., bicycles)
- Updating of the CMDs' knowledge and skills
  - Support supervisory home visits
  - Quarterly CMDs' meetings
  - Interviews when CMDs come to the health facility to collect medicines
- Money
  - Allowances for CMDs during the quarterly meetings
  - Allowances for CMDs during refresher trainings

Periodic efforts will be made to motivate this workforce to maintain their interest and commitment to the implementation of HBMF.

8.5 Monitoring and Evaluation of HBMF using Coartem

Monitoring, which will be a key component of HBMF using Coartem, will be carried out at all levels of the health care delivery system. Effective monitoring will help to—

- Assess progress towards the set objectives
- Identify and address operational problems such as stock-outs of Coartem and attrition of CMDs and design timely solutions

Representatives of all stakeholders including the MoH and health development partners will carry out regular, effective monitoring as arranged by the DHMT.

8.6 Withdrawing Homapak

In preparation for withdrawing Homapak, the following must occur—

- All health workers must be conversant with the new malaria treatment policy.
- The community leaders need to be educated on the malaria treatment policy change.
- Adequate, sustainable supplies of artemether-lumefantrine must be in place.
- All people who handle medicines must be trained to safely store artemether-lumefantrine.
- Health unit in-charges must be taught on how to estimate and order for adequate supplies of artemether-lumefantrine to avoid stock-outs.
- Health unit in-charges should distribute artemether-lumefantrine to CMDs who have confirmed that they have exhausted or returned their Homapak supplies.

8.7 Action on Existing Stocks of Homapak

- Existing stocks of Homapak should be taken to the district stores for appropriate storage.
- The viable SP in the Homapak should be used for intermittent preventive treatment.
- Expired stocks of both CQ and SP shall be sent for eventual disposal at the national incinerator.

8.8 Parallel Implementation and Utilisation of ACTs and SP+CQ

We anticipate that during the transition period, both ACTs and SP+CQ will exist in the health system. In this case, the following course of actions should be engaged—

- CMDs shall not be in possession of both ACTs and Homapak.
- Homapak will be withdrawn from all trained CMDs at the point of receiving supplies of artemether-lumefantrine.
- Health facility in-charges should not distribute Homapak to the CMDs who have used or dispensed ACT in the past.

SECTION 9. ANNEXES

ANNEX 1. UGANDA ARTEMETHER-LUMEFANTRINE PROCUREMENT 2007 (ALL ORDERS)

		1	2	3	4	5	6	7
	STATUS	**Placed 01/24/07 Delivery 02/13/07**	**Placed 01/24/07**	**Placed 01/24/07**	**Placed 01/24/07**	**Placed 01/24/07**	**Proforma Invoice Pending (Money Rec'd at WHO)**	**Proforma Invoice Pending (Money Rec'd at WHO)**
		02/16/07	**03/05/07**	**03/23/07**	**04/10/07**	**04/23/07**		
	6*1	**702,720**	**691,200**	**691,200**	**633,600**	**633,600**	**541,440**	**541,440**
6*1	Remaining. 6*1	7,637,760	6,946,560	6,255,360	5,621,760	4,988,160	4,446,720	3,905,280
	Weight in kg	9,113.40	8,964.00	8,964.00	8,217.00	8,217.00	7,021.80	7,021.80
	Volume in m^3	70.28	69.13	69.13	63.37	63.37	54.15	54.15
	6*2	**299,520**		**149,760**	**149,760**	**149,760**	**218,880**	**218,880**
6*2	Remaining. 6*2	2,995,200	2,995,200	2,845,440	2,695,680	2,545,920	2,327,040	2,108,160
	Weight in kg	4,479.80	0.00	2,239.90	2,239.90	2,239.90	3,273.70	3,273.70
	Volume in m^3	29.95	0.00	14.98	14.98	14.98	21.89	21.89
	6*3	**138,240**		**63,360**	**51,840**	**51,840**	**178,560**	**178,560**
6*3	Remaining. 6*3	1,797,120	1,797,120	1,733,760	1,681,920	1,630,080	1,451,520	1,272,960
	Weight in kg	3,067.20	0.00	1,405.80	1,150.20	1,150.20	3,961.80	3,961.80
	Volume in m^3	27.64	0.00	12.67	10.37	10.37	35.71	35.71
	6*4		**334,080**	**167,040**	**167,040**	**167,040**	**506,880**	**501,120**
6*4	Remaining. 6*4	5,650,560	5,316,480	5,149,440	4,982,400	4,815,360	4,308,480	3,807,360
	Weight in kg	0.00	7,893.80	3,946.90	3,946.90	3,946.90	11,976.80	11,840.70
	Volume in m^3	0.00	66.80	33.40	33.40	33.40	101.36	100.21
	Total number of treatments delivered	**1,140,480**	**1,025,280**	**1,071,360**	**1,002,240**	**1,002,240**	**1,445,760**	**1,440,000**
	Total number of treatments remaining	18,080,640	17,055,360	15,984,000	14,981,760	13,979,520	12,533,760	11,093,760
	Volume in m^3	127.88	135.93	130.18	122.11	122.11	213.10	211.95
	Weight in kg	16,660.40	16,857.80	16,556.60	15,554.00	15,554.00	26,234.10	26,098.00
	Equivalent in standard 20' containers	**4**	**4**	**4**	**5**	**5**	**8**	**8**
	Number of batches	**4**	**5**	**5**	**5**	**5**	**9**	**9**
	Purchase order reference	**CPS/07/8814**	**CPS/07/8818**	**CPS/07/8819**	**CPS/07/8820**	**CPS/07/8821**		

		8	9	10	11	12	13	14	15
	STATUS	**Proforma Invoice Pending (Money Rec'd at WHO)**	**Proforma Invoice Pending (Money Rec'd at WHO)**	**Proforma Invoice Pending (Money Rec'd at WHO)**	**Proforma Invoice Pending (Money Rec'd at WHO)**	**Proforma Invoice Pending (Money Rec'd at WHO)**	**Proforma Invoice 07UGA002 Sent 19 Feb. (add. Order)**	**Proforma Invoice 07UGA002 sent 19 Feb. (add. Order)**	**Proforma invoice 07UGA002 sent 19 Feb. (add. Order)**
6*1	**6*1**	**541,440**	**541,440**	**541,440**	**541,440**	**541,440**	**403,200**	**403,200**	**391,680**
	Rem. 6*1	3,363,840	2,822,400	2,280,960	1,739,520	1,198,080	794,880	391,680	0
	Weight in kg	7,021.80	7,021.80	7,021.80	7,021.80	7,021.80	5,229.00	5,229.00	5,079.60
	Volume in m^3	54.15	54.15	54.15	54.15	54.15	40.32	40.32	39.17
6*2	**6*2**	**218,880**	**218,880**	**218,880**	**207,360**	**207,360**	**345,600**	**345,600**	**345,600**
	Rem. 6*2	1,889,280	1,670,400	1,451,520	1,244,160	1,036,800	691,200	345,600	0
	Weight in kg	3,273.70	3,273.70	3,273.70	3,101.40	3,101.40	5,169.00	5,169.00	5,169.00
	Volume in m^3	21.89	21.89	21.89	20.74	20.74	34.56	34.56	34.56
6*3	**6*3**	**178,560**	**178,560**	**178,560**	**172,800**	**172,800**	**132,480**	**132,480**	**126,720**
	Rem. 6*3	1,094,400	915,840	737,280	564,480	391,680	259,200	126,720	0
	Weight in kg	3,961.80	3,961.80	3,961.80	3,834.00	3,834.00	2,939.40	2,939.40	2,811.60
	Volume in m^3	35.71	35.71	35.71	34.55	34.55	26.49	26.49	25.34
6*4	**6*4**	**501,120**	**501,120**	**501,120**	**501,120**	**501,120**	**437,760**	**432,000**	**432,000**
	Rem. 6*4	3,306,240	2,805,120	2,304,000	1,802,880	1,301,760	864,000	432,000	0
	Weight in kg	11,840.70	11,840.70	11,840.70	11,840.70	11,840.70	10,343.60	10,207.50	10,207.50
	Volume in m^3	100.21	100.21	100.21	100.21	100.21	87.54	86.39	86.39
	Total number of treatments delivered	**1,440,000**	**1,440,000**	**1,440,000**	**1,422,720**	**1,422,720**	**1,319,040**	**1,313,280**	**1,296,000**
	Total number of treatments remaining	9,653,760	8,213,760	6,773,760	5,351,040	3,928,320	2,609,280	1,296,000	0
	Volume in m^3	211.95	211.95	211.95	209.65	209.65	188.92	187.76	185.46
	Weight in kg	26,098.00	26,098.00	26,098.00	25,797.90	25,797.90	23,681.00	23,544.90	23,267.70
	Equivalent in standard 20' containers	**8**	**8**	**8**	**8**	**8**	**7**	**7**	**7**
	Number of batches	**9**	**9**	**9**	**9**	**9**	**8**	**8**	**8**
	Purchase order reference[10]								

[10] The purchase order references were not confirmed by the time this document was prepared.

Additional Order for Placing in May 2007 Including PMI

Artemether-Lumefantrine	Unit of Measure	Quantity	Unit Cost (USD)	Total Price (USD)
6*1	**30**	39,936	13.50	539,136.00
6*2	**30**	34,560	27.00	933,120.00
6*3	**30**	13,056	40.50	528,768.00
6*4	**30**	43,392	54.00	2,343,168.00
Grand Total	**—**	**130,944**	**—**	**$4,344,192**[11]

[11] Cost excludes freight, insurance and handling by procurement agent.

ANNEX 2. NON-ACT REQUIRED ANNUALLY FOR CASE MANAGEMENT OF MALARIA IN PUBLIC AND PNFP FACILITIES IN UGANDA

Item	Unit of Measure	Quantity Required 2007	Quantity Required 2008
Artemether injection 20 mg/ml (5–24 kg)	Ampoule	691,685	715,202
Artemether injection 80 mg/ml	Ampoule	467,091	482,972
Quinine dihydrochloride injection 600 mg/2 ml total	Ampoule	1,077,238	1,113,864
Quinine sulphate 300 mg tablets film coated	Tablet	7,259,856	7,506,691

The quantification for non-ACT case management requirements was done based on the following major assumptions—

- That the therapeutic efficacy of artemether-lumefantrine is 98 percent; hence, of the total number of cases affected by malaria and who receive first-line treatment, 2 percent will encounter treatment failure that calls for the administration of second-line treatment, quinine tablets.

- Of the 5 percent of patients expected to contract severe malaria, 4 percent will receive quinine IV and 1 percent will receive artemether injection (those who are contraindicated for quinine) for an average of three days followed with oral ACT for two days.