Community case management of malaria in urban settings

A feasibility study in five African sites

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World Health Organization

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WHO Library Cataloguing-in-Publication Data

Community case management of malaria in urban settings: feasibility and acceptability of ACTs in five African sites / by Mary Amuyunzu-Nyamongo.

1.Malaria - epidemiology. 2.Malaria - transmission. 3.Antimalarials - supply and distribution. 4.Artemisinins - therapeutic use. 5.Drug therapy, Combination. 6.Community health services. 7.Urban health. 8.Burkina Faso. 9.Ethiopia. 10.Ghana. 11.Malawi. I.Amuyunzu-Nyamongo, M. II.World Health Organization. III.UNICEF/UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases.

ISBN 978 92 4 150269 6 (NLM classification: WC 770)

Design and production: Arcadia/Gecko Media and Lisa Schwarb
Cover picture: Brown Ndhlane for REACH Trust
Pictures: REACH Trust, WHO/TDR/Pagnoni


Burkina Faso


Ethiopia


Ghana


Malawi

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A mother gives a dose of ACT in peri-urban area of Kauma, Lilongwe, Malawi, December 2008.

Contents

Abbreviations and acronyms

ACT	Artemisinin-based combination therapy
AIDS	Acquired Immune Deficiency Syndrome
AL	Artemether Lumefanthrine
ASC	Agent de Santé Communautaire
BCC	Behaviour Change Communication
CCMm	Community Case Management of malaria
CDD	Community Drug Distributor
CHV	Community-based Health Volunteer
CHW	Community Health Worker
CMD	Community Medicine Distributor
CNRFP	Centre National de Recherche et de Formation sur le Paludisme
CSPS	Centre de Santé et de Promotion Sociale
EAs	Enumeration Areas
EPI	Expanded Programme on Immunization
FGD	Focus Group Discussion
GPS	Geographical Positioning System
HIV	Human Immuno-deficiency Virus
HMM	Home Management of Malaria
HSA	Health Surveillance Assistants
IEC	Information, Education and Communication
IDI	In-depth Interview
ISSP	Higher Institute of Population Sciences
ITN	Insecticide Treated Nets
KNUST-SMS	Kwame Nkrumah University of Science and Technology, School of Medical Sciences
MCH	Maternal and Child Health
MDGs	Millennium Development Goals
MoH	Ministry of Health
NGO	Nongovernmental Organisation
NMCP	National Malaria Control Programme
PI	Project Implementers
RBM	Roll Back Malaria
RDT	Rapid Diagnostic Test
REACH	Research for Equity and Community Health
TDR	Special Programme for Research and Training in Tropical Diseases
UNICEF	United Nations Children's Fund
UNDP	United Nations Development Program
WHO	World Health Organization

Acknowledgements

In all the study sites the primary investigators benefited from the cooperation and participation of numerous members of the community. We would like to say a big thank you to all those who volunteered their time to work with us. Your partnership helped us to successfully conclude this initiative and you have our immense gratitude.

We would also like to thank the following country teams for their dedication and contribution:

Burkina Faso

Sodiomon Bienvenu Sirima, Director of CNRFP; the research staff from CNRFP; Mwangaza Action; Lionel W. Ouedraogo, head of the "Ouagadougou Secteur 30" health district; the Wemtenga and Taabtenga health staffs for their supervisory support of the study; community leaders; community health workers; and parents and children for their major contribution to the study.

Ethiopia

Morankar Sudhakar, principal investigator, and other team members Ayalew Tegegn Muluneh, Yihenew Alem Negatu, Wondwossen Kassahun, Sultan Suluiman and Nasir Kelil.

Ghana

In Kumasi: The people of Asokwa sub-metropolitan area in Kumasi; community medicine distributors; Dean of the School of Medical Sciences, KNUST; head and staff of Department of Community Health, KNUST; Joseph Oduro, Metropolitan Health Director, Kumasi; the administrator of the Asokwa Sub-Metropolitan Area, Kumasi; Medical Superintendent; the staff of Kumasi South Hospital, Kumasi; Felicia Owusu-Antwi of the World Health Organization Ghana country office, Accra.

In Bolgatanga: Patricia Akweongo, Philip Adongo, Alexis Nang-Beifubah, Abraham Rexford Oduro, Evelyn Sakeah, Maxell Dalaba, Joseph Amankwa and Abraham Hodgson.

Malawi

REACH Trust and MCP for the technical guidance of the study; Lilongwe district health office for supervisory support of the study; community leaders and the community at large, without which this study would not have been possible.

Health centre in Kauma, Lilongwe, Malawi.

1. Introduction

1.1 Background and Rationale

The rapid increase in the world's urban population has major implications for the epidemiology of malaria. A review of malaria transmission in sub-Saharan Africa urban centres shows a strong likelihood of transmission occurring within these sprawling areas, whatever the size or characteristics of their bio-ecologic environment (Robert et al, 2003). Further, it is projected that about 800 million people will live in the urban areas in Africa by 2025 (Donnelly et al, 2005). Despite the fact that access to quality health care is better on average in urban compared to rural zones, urban slums comparatively have poorer quality health care. In Africa, over 70% of malaria cases in rural and over 50% in urban areas are self-diagnosed and self-treated (McCombie, 1996). Most medicines for treating self-diagnosed malaria are purchased over the counter without prescriptions.

Early appropriate home treatment of malaria can therefore save lives (Kidane & Morrow, 2000; Sirima, 2001; Sirima et al, 2003). In studies conducted in Ghana, Nigeria and Uganda (Salako et al, 2001; Browne et al, 2002) the approach to making anti-malaria medicines available in the community and ensuring that they are used appropriately is now well established. These WHO/TDR-supported studies have demonstrated that interventions, such as pre-packing anti-malarial drugs into unit doses, appropriate labelling, and information, education and communication strategies targeted at providers and mothers can increase the proportion of malaria cases that are treated according to the recommended regimens (Pagnoni et al, 1997; Yeboah-Antwi, 1997; Yeboah-Antwi et al, 2001b; Browne et al; 2002) thus reducing severe malaria morbidity in children (Sirima et al, 2003).

The Community Case Management of Malaria (CCMm) is, therefore, now an established route for distribution of anti-malarial drugs in rural areas, but the feasibility and acceptability of the approach through Community Medicine Distributors (CMDs) in urban areas has previously not been explored. Following the successful implementation of Home Management of Malaria (HMM) in rural areas in four African countries, 'before and after' implementation studies were conducted in five African cities: in Ghana (two areas – Bolgatanga and Kumasi), Burkina Faso (Ouagadougou), Ethiopia (Jimma) and Malawi (Lilongwe) tested the feasibility of the HMM strategy in these cities.

Community Medicine Distributors were trained to educate caregivers, diagnose and treat malaria in under five-year olds with artemesinin-based combined therapy (ACT). In Bolgatanga, Kumasi and Jimma, Rapid Diagnostic Tests (RDTs) for malaria were used by CMDs to identify children carrying malaria antigens. Quantitative and qualitative methods including household surveys, focus group discussions (FGDs) and in-depth interviews (IDIs) were used to evaluate impact.

This guide presents the processes involved in the implementation of the CCMm in urban areas using artemisinin-based combination therapy (ACT). It is a sequel to an earlier handbook by Gyapong and Garshong (2007) on *Lessons Learned in Home Management of Malaria: Implementation Research in four African Countries*.

1.2 Objectives

The research processes in Ghana, Malawi, Ethiopia and Burkina Faso shared the following core objectives. The primary objective was test the feasibility and acceptability of ACT unit-dose pre-pack for the management of malaria in children aged 6-59 months in urban areas.

The specific objectives were to:

- assess knowledge, perceptions and practice of household level preventive and treatment-seeking behaviours (including those surrounding drug use and costs);
- establish the acceptability of the pre-packed anti-malaria drugs;
- select and train a network of community medicine distributors (CMDs)
- develop Information, Education and Communication/ Behaviour Change Communication (IEC/BCC) materials;
- determine the proportion of children treated in <24 hours with pre-packed drugs made available through CMDs;
- assess the adequacy of advice provided by CMDs; and
- establish the compliance level by caregivers with the recommended treatment regimen.

The Bolgatanga (Ghana), Kumasi (Ghana) and Jimma (Ethiopia) teams included this additional objective:

- field test the use of the malaria rapid diagnostic tool in the home setting.

1.3 Study Sites

Ghana

i) Bolgatanga

Bolgatanga municipality is a regional capital of Upper East Ghana. The municipality has a total land area of 729 km^2 with a population of 72 768, and it is the 18th biggest human settlement in the country. The climate is classified as tropical and has two distinct seasons: a short wet season and a long dry season. The municipality has only one hospital and a health centre. The hospital serves as a referral for eight outlying districts. Outreach clinics are held monthly in only four of the fourteen communities of the urban area. There are also two private clinics that provide curative care and a large number of chemist shops operating in Bolgatanga. A few traditional healers can be found in the urban settlement. Complicated malaria can only be treated properly at the regional hospital while clinics and health centres manage uncomplicated malaria as they only have out-patient facilities.

ii) Kumasi

Kumasi lies between latitude 6.35°-6.40° and longitude 1.30°-1.35°, at an elevation ranging between 250 and 300 meters above sea level with a land area of about 254. It is located in the transitional forest zone and is about 270 km north of the national capital, Accra. The centrality of the city from all parts of the country makes it an economic nerve and special place for many migrants. Kumasi district is one of the 23 political districts of the Ashanti region. Kumasi, Ghana's second city, has an estimated population of 1 610 867 (update of 2000 Population and Housing Census, Ghana Statistical Service, March 2002). Its economic life is dominated by retail trade, self-employment (mainly artisans) and public sector employment. This study was carried out in the Asokwa sub-metro of Kumasi, an area whose 2005 population estimate was 415 871.

This is 30.3% of the Kumasi population, and children under five years of age account for 20% of the total population of the city.

Ethiopia

Jimma

The study was conducted in Jimma town, Oromiya Regional State. The town is situated in Jimma district, 335 kilometres from Addis Ababa, in the Southwest part of the country. It has a population of about 145 000 inhabitants. Of the total urban population, about 9.2% are estimated to be less than five years of age. Thus, Jimma approximately consists of 13 340 children under the age of five.

According to the administrative structure of the country, this urban centre is divided into three Higher (Districts) and 13 Kebeles (the lowest political unit of the country). Kebele is the equivalent of a ward in urban and village in rural Ethiopia. Currently, there are three public health facilities (one hospital, one MCH clinic, and one health centre), 35 private clinics and 15 pharmacies in Jimma.

Malawi

Lilongwe

The study was implemented in Kauma squatter settlement within urban Lilongwe. Kauma area has a population of 24 000 inhabitants. It has a poverty head count of 55%, the highest in the Lilongwe urban setting. In addition, 19% of the population of this community is under five years of age; the trend is similar to other squatter or poor settlements in Lilongwe. Kauma was selected because of the high malaria burden compared to other residential areas in the city. Furthermore, the residential area does not have a health facility making transportation and opportunity costs great barriers to access to health care from the nearest facilities.

Burkina Faso

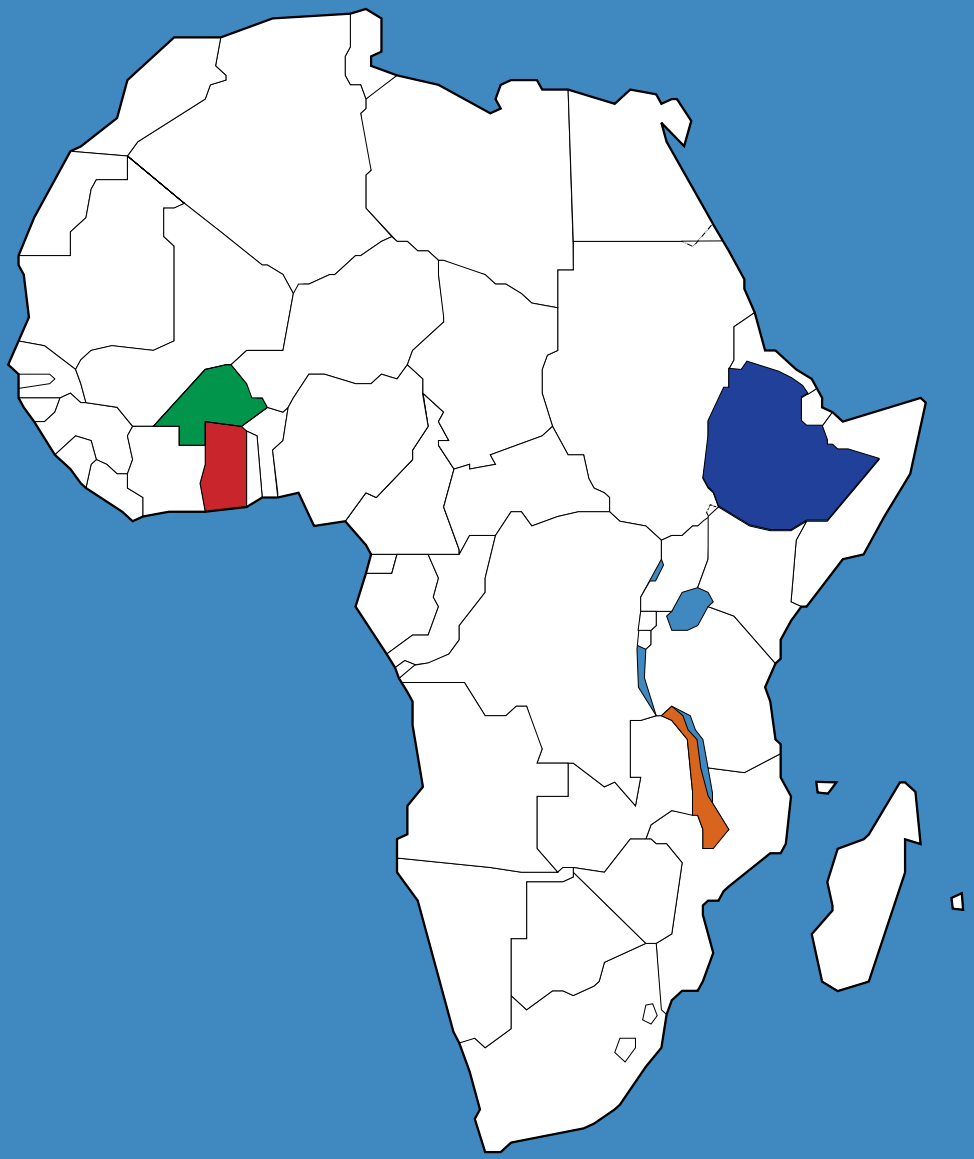
Wemtenga and Taabtenga

Administratively, the city of Ouagadougou has a total of 30 sectors numbered from 1 to 30 with a population of 1.2 million people (General Census 2006). Each sector is composed of several neighbourhoods. In 2002, the Higher Institute of Population Sciences (ISSP) selected area numbers 28 and 29 naming them “Observatoire de population de Ouagadougou” to serve as a research platform for evaluating pilot projects by measuring impact through a demographic surveillance system (DSS) that provides data on the aspects under observation. These are divided into zones or enumeration areas (EAs). An enumeration area has between 1000 and 1200 inhabitants.

Based on the health plan, the city of Ouagadougou is divided into five health districts (Kossodo, Samandin, Paul VI, Urbain and Secteur 30), which cover 30 sectors. The DSS is in the administrative area of district health Secteur 30. The intervention with Coartem involved all six enumeration areas of the Observatory of the two neighbourhoods (Wemtenga and Taabtenga). Wemtenga has water, electricity, health centres, etc, and is inhabited by a relatively rich population.

Taabtenga, on the other hand, is semi-urban consisting of undeveloped facilities, occupied by a relatively poor population. The study area has a population estimated at 10 500 inhabitants with about 1970 children under five years of age. The two neighbouring areas (Wemtenga and Taabtenga) were chosen because they are the most populated in Area 29. They also have a malaria morbidity of over 50% in children under five years of age during the high transmission period (the rainy season from June to November).

Map 1: Map of Africa showing the study countries



2. Key steps in CCMm implementation

In 2005, a planning meeting was held in Nairobi, Kenya, during which the study protocol was developed and adopted by the five country teams. Implementation of the CCMm, similar to the Home Management of Malaria (HMM) in rural areas, requires detailed planning and implementation through clearly defined steps. These steps are defined in the handbook of *Scaling up of home-based management of malaria: from research to implementation* (WHO 2004) and are replicated in Gyapong and Garshong (2007).

These steps include but are not limited to:
- setting core objectives;
- conducting a situation analysis;
- establishing a key implementation group;
- advocacy;
- building partnerships and defining roles;
- implementing the strategy;
- drug procurement and storage;
- module development and training;
- monitoring; and
- evaluation.

The five country teams undertook similar processes of implementing the programme as outlined below:
- pre-intervention activities;
- implementation of activities; and
- evaluation.

The pre-intervention phase involved five main steps:
- establishing a project working group;
- setting objectives;
- community sensitisation and mobilisation;
- situation analysis; and
- selecting and training drug distributors.

The implementation phase involved the following key activities:
- drug procurement, packaging and supplies;
- acquisition of RDT kits for selected study sites;
- preparation of training manuals and training of key stakeholders;
- development and dissemination of Information Education and Communication (IEC) materials; and
- dispensing and use of pre-packs at the community level.

During the implementation process, the following key areas were monitored:
- performance of distributors;
- recognition of malaria symptoms and prompt treatment of ill children;
- treatment compliance by caregivers;
- appropriate use of RDTs;
- availability of drugs at community level;
- effectiveness of IEC materials;
- engagement of the health systems in supervision; and
- community perceptions towards the Community Medicine Distributors (CMDs).

Evaluation

To capture the impact of the project on knowledge, perceptions and health seeking behaviour of the participants, the projects were evaluated at the end of the implementation period in all four countries. The instruments utilised during the situational analyses were repeated, with additional questions included to capture the caregivers' experience with CMDs.

Table 1. Malaria cases the past two weeks prior to the survey date and Rapid Diagnostic Test (RDT) by the Kebele malaria worker/CHV (CDDs) in Ethiopia

Total number of households interviewed	2307
< 5 children sick in last 2 weeks	(29.9%) **689**
Age of the child (months) mean(sd)	(14.6%) **27.9**
Child taken to the Kebele malaria worker	(7.3%) **50**
RDT positive for malaria	(64%) **32**
Children having consumed required dose of medicine	(100%) **32**
Children with improvement after 3rd day	(100%) **32**

Monthly monitoring, supervision, support and supply meeting with community health volunteers in Ethiopia.

3. Pre-intervention activities

To lay the foundation for implementing the study, the five country teams engaged in various preparatory activities. These included:

1. establishing a project working group;
2. setting objectives;
3. community sensitisation and mobilisation;
4. situation analysis; and
5. selecting and training drug distributors.

Step 1: establish a project working group

For the success of any intervention, it is always good practice to set up a project working group consisting of representatives of all stakeholders in the intervention. This ensures both support and ownership of the project. In this regard, the study teams collaborated closely with community leaders, key Ministry of Health (MoH) officials, health facility personnel, and private and nongovernmental organisations (NGOs) serving the respective communities. Each of the core working groups met regularly to monitor progress. The composition of each of these groups is discussed below.

Ghana

i) Bolgatanga

The group was composed of members of the research team, the head of the maternal and child health programme, the regional health education officer, the municipal director of health services and the public health nurse and health information officer of the municipality. Representatives of the Ghana Health Service (GHS) designed the training manual as well as health education materials. They also conducted the training for the community-based distributors. The entire research team met monthly to discuss the progress of work with the community drug distributors.

ii) Kumasi

The Kwame Nkrumah University of Science and Technology, School of Medical Sciences (KNUST-SMS) HMM team of six people managed the project. A project secretariat comprising the principal investigator, social scientist and data manager was set up, based at the Department of Community Health, KNUST-SMS, Kumasi.

Ethiopia

In Ethiopia, the research team from Jimma University, Jimma town health office, Jimma town administration and community leaders made up the project working group of 12 members. The mayor and the health officer were also involved from the inception of the study. They were eager to be part of the capacity development process of the health system in this new approach of delivery of malaria diagnosis and treatment services through Community Based Health Volunteers (CHVs).

Malawi

The project working group in Lilongwe city consisted of the National Malaria Control Programme, Research for Equity and Community Health Trust (REACH Trust), Lilongwe District Health Office, Lilongwe City Asembly and a representative from the Special Programme for Research and Training in Tropical Diseases (TDR).

Burkina Faso

The National Centre for Research and Training on Malaria of Ouagadougou collaborated with various teams to carry out this study. These were the Higher Institute of Population Sciences (ISSP), Mwangaza Action NGO, the National Malaria Control Programmme (NMCP) and Sector 30 Health District of Ouagadougou.

Step 2: setting core objectives

In Ghana the specific objectives of the formative phase in Bolgatanga were to:

1. identify high risk malaria areas in the urban Bolgatanga setting in northern Ghana;
2. describe and explore knowledge, perceptions about household level preventive and treatment-seeking behaviours (including those surrounding drug use and costs);
3. identify and map the range of health providers in the community and to describe their existing practices and investigate the factors affecting their behaviour;
4. develop IEC materials for the intervention phase;
5. assess community acceptability of the use of diagnostic test;
6. identify the potential financing mechanisms for pre-packs and rapid diagnostic test kits;
7. document the policy context;
8. explore the stakeholder knowledge of, and attitudes towards, current policy that influences home management of malaria.

For all other study sites, the specific objectives for the intervention and evaluation phases of the study were to:

1. measure the changes in perceptions and practices in the community after the intervention;
2. measure the acceptability of the pre-packed anti-malarial drugs and the diagnostic tool;
3. determine the suitability of the identified drug distribution channels;
4. determine the proportion of children treated in <24 hours with pre-packed drugs made available through HMM intervention;
5. assess the adequacy of advice provided by the identified drug distributors;
6. assess the compliance level by caregivers with the recommended treatment regimen;
7. assess the cost effectiveness of the HMM strategy with the normal options for treatment of malaria in urban areas.

The general objective of the study in Ethiopia was to develop and test a strategy for home management of malaria in the urban area of Jimma.

Phase – I: Preparatory Phase

The specific objectives were to:

1. identify areas of highest prevalence of malaria in Jimma Town;
2. assess knowledge, attitudes and practices of the mothers/caregivers of the index children against “hot bodies” or malaria;
3. map sources and identify most suitable distribution channels for pre-packaged ACT drugs;
4. explore views towards the use of pre-packed antimalarial drugs and RDTs for malaria by the public;
5. assess willingness and ability to pay for RDTs and treatment of malaria by the families;

6. develop IEC/Behaviour Change Communication (BCC) materials for intervention; and
7. develop documentation and monitoring systems.

Phase – II: Intervention Phase

The specific objectives were to:

1. carry out community mobilisation and sensitisation through IEC/BCC;
2. conduct capacity building for identified drug distributors through training and supportive supervision);
3. make available pre-packed, unit-dosed anti-malarial drugs for use in the selected areas;
4. monitor and document the intervention processes.

Phase – III: Evaluation Phase

The specific objectives were to:

1. to measure the changes in perceptions and practices in the community after the intervention;
2. to measure the acceptability of the pre-packed anti-malarial drugs and the diagnostic tool;
3. to determine the suitability of the identified drug distribution channels;
4. to assess the adequacy of advice provided by the identified drug distributors;
5. to assess the compliance level by caregivers with the recommended treatment regimen.

Some teams may have added site-specific objectives that recognised local variations. These are detailed in the country site reports.

Step 3: community sensitisation and mobilisation

Community entry

The strategies employed in entering a community to implement a project play an important role in the success or failure of the intervention. Proper community entry encourages community ownership and fosters role-shifts in established programmes. In CCMm, the role of the community is integral to the success or failure of the programme. The inputs, expected outputs, processes, role and responsibilities and expectations of the varying stakeholders are defined during the community entry stage.

Stakeholder consultations

Consultation with stakeholders is vital since it ensures that necessary and useful input is gathered to guide the implementation of the intervention. Furthermore, consultation prevents the study team from avoidable pitfalls by learning from community leaders, individuals and organizations that have experience in working with the target community.

Ghana

i) Bolgatanga

In Bolgatanga, meetings with community leaders were held in the ten selected communities that had parasitaemia levels above 5% in the formative phase. These meetings were aimed at informing the leaders of the study and for scheduling a meeting with community members. During the community gathering, team leaders explained the study to community members, who also were asked to choose one member and one drug shop attendant willing to be trained as community drug distributors.

Consultative meetings were also held with the regional health education officers, the maternal and child health

officer and the Municipal Director of Health Services to discuss the content of the training for the CMD and development of the training manual. The design of IEC formation materials for mothers and communities at large, the training of CMDs on the use of RDTs, as well as resources for deploying the programme at the community level, were also discussed. UNICEF and the regional Red Cross Society were consulted as they had earlier trained a large number of women to provide home-based malaria treatment in communities in rural areas. They were also asked to contribute resources to support the urban programme.

ii) Kumasi

Being a collaborative research, consultative meetings were held with the Metro Health Directorate, Asokwa sub-metro administration and community leaders in the study district. Prior to the commencement of the project, personnel from these units were recruited to become resource people during the implementation. The team also worked closely with the Pharmacy Council, Ghana National Association of Community Pharmacists, Ghana National Chemical (Medicine) Sellers' Association and local NGOs in Kumasi that are active in community-based health programmes.

Ethiopia

The research team visited the Kebele (ward or village) and Idir (traditional social organisation) leaders to discuss the project and explain the objectives of the study. The research team consulted with a number of other stakeholders, including Jimma town health office, Oromia Health Bureau and the Jimma town administration.

Malawi

Community entry in Lilongwe was through the traditional authority of community leaders. Prior to implementation, a meeting was organised with key community leaders on the purpose and approach of the study.

Burkina Faso

The research team organised sensitisation meetings that involved members of the CNRFP, Mwangaza Action, ISSP, NMCP and Sector 30 district health sector. The officials from health Sector 30 included the administrative, religious, traditional and associations' representatives. Meetings were also held with health workers, staff of drug delivery agencies, mothers and associations' members. During these meetings, the purpose, objectives, methods, actors and outcomes of the intervention with all stakeholders were discussed in depth.

Step 4: situation analysis

Any study that hopes to evaluate the impact of the intervention on the target community needs to carry out a situation analysis. A situation analysis provides benchmarks to evaluate the project's impact. Through qualitative methods of gathering contextual data on community characteristics, the processes underlying successes or failures of the intervention are delineated. This helps to understand the processes of the intervention, acceptability and challenges. It eventually enables the implementers to make appropriate recommendations for scaling up. Quantitative methods, on the other hand, are useful in measuring or quantifying the impact of the intervention in facts and figures.

All the study teams in the five sites conducted a situation analysis utilising both qualitative and quantitative methods such as surveys, record reviews, focus group discussions (FGDs) and in-depth interviews (IDIs).

Ghana

i) Bolgatanga

An exploratory qualitative study aimed at examining the communities' beliefs on malaria and other febrile illnesses was conducted from March to June 2006. Issues such as the perceived causes of malaria, signs and symptoms and home treatment-seeking behaviours were addressed in the discussions. Opinions of FGD and IDI participants were also sought on the feasibility and acceptability of the use of pre-packs and Rapid Diagnostic Tests (RDTs) in the treatment of children <5 years of age. A household survey was carried out from August to September 2006 and a prevalence survey in September 2006 as part of the baseline. These surveys were repeated at the same times (August to September) in 2008 to evaluate the impact of the study.

ii) Kumasi

The baseline in Kumasi explored the existing situation in terms of mothers'/care-givers' health seeking behaviour, sources of health information, sources of care and the use of medicines for treatment of fevers. These studies were carried out to inform the design of the intervention on home management of childhood malaria in the Asokwa sub-Metropolitan Assembly, Kumasi. This first phase of the study covered the period January 2005 to December 2005.

Ethiopia

In Jimma town, Ethiopia, a baseline survey was conducted between April and May 2006. This part of the study, which employed a cross-sectional survey approach, was carried out during the dry season which usually has fewer malaria cases. A house-to-house survey was conducted to assess the knowledge, attitude, practices and the health seeking behaviour of mothers or caretakers and their preferences for treatment of "hot bodies", that is, fever and malaria. The qualitative component was used to address issues of appropriate channels of distribution of pre-packed antimalarial drugs, the community's views about pre-packed drugs and the RDT, and the willingness and ability to pay for the service.

Malawi

In Lilongwe, Malawi, both qualitative and quantitative methods were employed to carry out the baseline. A household survey was carried out to assess health seeking practices for children suffering from uncomplicated malaria. The survey included interviewing caregivers of children less than five years old suffering from fever two weeks prior to the survey. A structured questionnaire was also used for interviewing mothers with children aged below five years. Similarly, qualitative methods were used to assess the acceptability of the intervention to policy makers, implementers and to collect community members' perspectives.

Burkina Faso

The study period was between September and October 2006. It was conducted in two coastal areas located in Area 29, east of the city of Ouagadougou. That is the urban district of Wemtenga (furnished with modern facilities) and the semi-urban district of Taabtenga (undeveloped, virtually devoid of infrastructure development). The two districts are part of a population being monitored through the DSS. Data collection consisted of a quantitative survey among mothers/guardians of children aged 6-59 months, and a qualitative survey with women, community leaders, traditional healers, drug vendors, health workers and association members.

Challenges and Lessons Learnt

The time lag between the release of the baseline results and the implementation of the intervention from 2007 to 2008, was too long. This mainly stemmed from late release of funds for the intervention phase. This affected the smooth

continuation of the programme and cost of implementation in the participating countries. Adequate preparations and on-time disbursement of funding and other resources should solve this in the future. Meanwhile, some of the original members, including PI's who developed the proposal and stayed for the baseline period, left the job for other opportunities elsewhere in Ethiopia and abroad. This necessitated replacement of original team members, but staff changes were not a major challenge in other sites.

Step 5: selection of drug distributors

Evidence from literature indicates that the more the target communities are involved, the better and more sustained the drug delivery process (Katabarwa & Mutabazi, 1998; Mutabazi & Duke, 1998). Similar evidence has come from studies on malaria (Kidane & Morrow, 2000).

In the five sites where the study was conducted, distributors were key to getting the drugs to caregivers of children under five years. They were selected depending on the prevailing situation in the research site. For instance, in Malawi, Health Surveillance Assistants (HSAs) were used as drug distributors because they were already part of the government structure through the MoH and received a government salary. Hence, they provided an opportunity for the sustainability of these services in the community. In other sites, the community members' opinions were sought during the situation analysis regarding who was best suited for this task. To ensure drugs were being dispensed as required the drug distributors were supervised by project team leaders.

Ghana

i) Bolgatanga

During the formative phase various channels of drug distribution outside the formal sector were explored. The following responses indicate the most preferred and sustainable channels of distribution cited by the respondents:

...The community health volunteers have been trained for that and they do a lot of services for us. The community health volunteers go to the communities to educate them on health issues therefore if there is any problem, they go to them. In short, the pre-packs should be given to them (IDI, Health worker, Bolga Central Health Centre, 2006).

...Since we are volunteers and we are not far from the clinic, if it were alone, we will put it at the clinic. Then we can always go collect and distribute the medicine (FGD, Dagwew, Community-Based Distributor, 2006).

During the first community meeting, members present were asked to choose one community member and one drug shop to participate in the study. The community members selected were members considered have a stable background, had either been volunteers for health programmes or were considered responsible and reliable, had basic education and came from varied occupations such as traders, watchmen and teachers resident in the project area.

ii) Kumasi

In order to develop appropriate selection criteria for the CMDs, the following categories were field tested for their sustainability:

- pharmacy and licensed chemical sellers;
- corner shops (commercial outlets);
- community based surveillance volunteers (who exist already);
- community volunteers selected purposely for this project;

- market women in selected markets in the study area; and
- teachers/attendants at day-care centres and kindergartens.

Categories a-d were restricted to one per cluster, whilst e-f were involved in all clusters. Based on the assumption that the spirit of voluntarism is weaker in the urban setting, the research team explored the views of communities on their preferred choice of community medicine distributors.

Ethiopia

During the baseline study in August 2006, community members expressed their preference for Community Health Volunteers (CHVs) as drug distributors. The following criteria were used for selection of the CHVs:

- be a member of Idir for at least one year;
- willing to work voluntarily;
- residents in the Kebele for at least two years;
- available to the community most of the time;
- minimum education level of eighth grade with a pass;
- preferably married women;
- self-employed or unemployed members of the Kebele;
- participation in health related clubs (HIV/AIDS, Red Cross etc.); and
- be acceptable to the community.

One CHV was to serve about 100-125 households in Jimma town. It was decided that there be at least 15 CHVs in each ward giving a total of 150 CHVs in 10 wards. After a fortnight, Idir and Kebele leaders provided a list of 122 CHVs who were trained by the research team. Ten supervisors were also selected from the health system in Jimma town health office and Jimma zone health office to supervise the CHVs. Supervisors were required to volunteer extra time for the project.

Malawi

As mentioned earlier, drug distributors in Lilongwe were HSAs selected because they were already part of the government structure through the MoH and were on a government salary. They provided an excellent opportunity for sustainability of services in the community.

Burkina Faso

After the sensitisation meetings and outreach, Mwangaza Action, a local NGO familiar with community based interventions facilitated the process of defining the criteria for selecting community volunteers. Given the need to document activities at the community level by drug distributors, the research team proposed the following basic criteria:

- be a resident in the locality;
- be available to volunteer;
- able to read and write in French;
- be accepted by the members of his community; and
- willing to work for the general interest of the community.

Once consensus was reached on the selection criteria, a total of 32 community health workers (CHWs) were recruited for the intervention area (each CHW would cover about 60 children below five years). CHWs who dropped out because of death, emigration or retirement would be replaced by other people volunteering to be trained.

Challenges and lessons learnt

One of the key lessons learnt was that community distributors, if intensively trained and supervised, can effectively administer malaria treatment to children less than five years old. In Jimma, Bolgatanga and Kumasi, it was reported that CMDs correctly used RDTs on site.

In Malawi, most community distributors were not residents of the intervention areas, and this limited the provision of

services to community members, especially at night. Consequently, it is important that resident community members be involved in the provision of services in future. This would ensure that sick children have access to care within the community at all times.

Another challenge is the financial motivation of community distributors to provide the service. A CMD in Bolgatanga, Ghana, expressed his concerns over the lack of motivation:

There are many problems here. There is nothing in the work that motivates us to do it as we should. It is true that we are volunteers; we want to help our communities and we also want to help the government, but they should motivate us to enable us work hard with happiness…

Cash payments have been found to be unsustainable when programmes end. However, volunteers need to be motivated in innovative ways. The use of volunteers' time in urban settings, where people spend time at work without any form of motivation, may not be successful. Motivation may be in the form of ongoing training and material incentives which are not direct cash payments for service provision but which are tied to training.

Urban Taabtenga, Burkina Faso.

Table 2: Categories of drug distributors used in the various countries

Existing care providers at community level	Ghana		Ethiopia	Malawi	Burkina Faso
	Bolgatanga	Kumasi			
Private/non-formal health care providers					
Chemical sellers/pharmacies	√	√			
Drug vendors	√	√			
Private practitioners (local artisans, market women, etc.)	√				
Public health providers					
Community-based surveillance assistants/ Health surveillance assistants	√	√		√	
New providers selected during the CCMm studies	**Ghana**		**Ethiopia**	**Malawi**	**Burkina Faso**
	Bolgatanga	**Kumasi**			
Teachers	√				
Farmers	√				
Community volunteers		√	√		√

Training of CDDs in Jimma, Ethiopia, August 2007.

4. Main intervention activities

The main intervention activities in the five sites were:

1. procurement and supply of drugs;
2. development of training manuals and training of key implementers;
3. development and implementation of IEC strategies;
4. dispensing and use of pre-packs and RDTs at community level.

Step 1: drug procurement and supply

Ghana

i) Bolgatanga

As part of the collaborative effort with the Municipal Health Directorate, the supply of drugs and supervision of CMDs was to be part of the duties of the Directorate. However, due to its involvement in the implementation of the National Health Insurance policy, it could not actively participate in the supply of drugs. Due to a lack of manpower, the Directorate was also unable to take up the role of supervising CMDs. It was, therefore, necessary for the research team to take up these roles. Noteworthy is the fact that the drugs were free. The Municipal Directorate provided the storage boxes for each CMD who was trained, as well as boxes for waste disposal of used RDTs and other disposables.

ii) Kumasi

The health system personnel led by the hospital pharmacist in the study area procured, stored and distributed the drugs. Drugs were supplied by MAPHAR, a Moroccan drug manufacturing company. There was no evidence of stock-out for more than a day during the study period.

The medicines were pre-packed for pre-school children aged one to six years (50mg Artesunate and 153mg Amodiaquine base) daily for three days as full dose treatment. The CCMm team pre-packed some of these drugs for infants aged 6 to 11 months (25mg artesunate and 76.5mg amodiaquine base) daily for three days as a full dose treatment. These were exactly half of the pre-school dose and were labelled with the logo of a crawling child for ease of identification by caregivers.

Ethiopia

Pre-packed drugs were made available continuously from the local government health office to CHVs assigned to the ten Kebeles. If any of the CHVs/drug distributors went missing for over one month, they were replaced immediately. However, if it was for a shorter period, the nearest CHV and health facility were given the responsibility of drug distribution. These distributors were expected to record and report every vital event and number of disease episodes among children less than five years on a monthly basis in a register. Diagnosis and treatment was free of charge in accordance with the current policy in the Ethiopian government.

Malawi

The drugs were supplied by the MoH through the National Malaria Control Programme. Drugs were prepared in pre-packed form (blister packs) according to dosages. To ensure safety, the drugs were stored at a traditional leader's house. To ensure accessibility and equity for the poor, all community members accessed the drugs for their children at no cost. This is in line with the Government of Malawi policy to deliver services free of charge at the point of delivery.

Burkina Faso

Coartem was chosen by the National Malaria Control Program as a first-line drug in malaria treatment in Burkina Faso. WHO/TDR provided blister packs of Coartem. As part of community support, a community-based pharmaceutical company, Cipla, developed dosage units for age-specific treatment to minimise confusion among parents and guardians when administering the drug.

The first unit was for children six months to three years old and had a yellow label and contained six tablets 20/120mg. The dosage for this unit was one tablet in the morning and one at night for three days. The second unit was reserved for children over three to five years. It had a blue tag and contained twelve tablets 20/120mg. The dosage for this unit was two tablets taken twice daily, morning and evening for three days.

Through efforts of WHO/TDR, Coartem units were procured for the implementation of the study. All the Coartem doses were stored in CNRFP and supplied to the study population through the existing official drug distribution system.

There were three stages in the supply of Coartem from the CNRFP to mothers:

- CNRFP supplied only the Depot Level Dispatcher District Health Sector 30;
- the Depot Level Dispatcher District Health Sector 30 supplied the two pharmacies of Wemtenga and Taabtenga public health facilities (named CSPS) involved in the study; and
- each pharmacy supplied the CDDs of its area.

The units of Coartem were sold to mothers by both the drug managers (at the CSPS level) and the CDDs (at the community level) of Wemtenga and Taabtenga.

To re-stock, CDDs went back to the CSPS' pharmacies, the pharmacies to the Depot Level Dispatcher District Health Sector 30 and the Depot Level Dispatcher to the CNRFP. The sustainability of the programme was based on the calculation of a total recovery of costs plus a profit margin of 10%, which would be used to compensate CHWs and drug managers' efforts.

Challenges and lessons learnt

Pre-packed Coartem was considered by the study communities as an effective drug. It was user friendly even to uneducated mothers/caregivers: the morning dose was identified with a picture of the sun while the evening dose had the picture of the moon. Nonetheless, in Jimma, very few caregivers took advantage of the CHVs' services (both diagnostic and treatment) available in their neighbourhoods, with most of them preferring to take their children to health facilities. The caregivers attributed this to the difficulty encountered in contacting CHVs and not trusting their skills and ability to use the RDT kit. However, those community members who made use of CHVs' services received proper diagnosis and treatment within 24 hours.

Most caregivers complied with the instructions of the CHVs and the children were well within seven days by

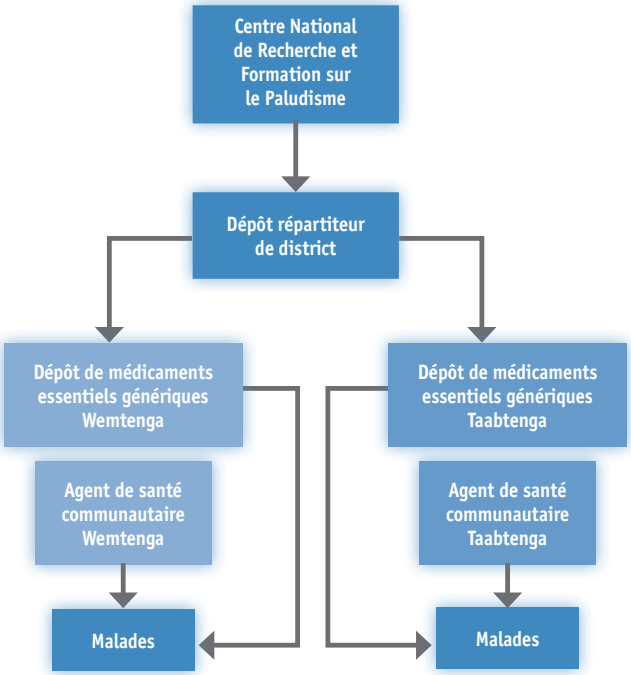
the time they visited the CHV. It is, therefore, important to continuously engage members of the community in IEC campaigns so that they understand the role of CHVs in malaria treatment. It is also useful to assure members of the community that the CHVs have been adequately trained to take up their healthcare roles.

In Kumasi, there were no problems with competitors (alternative health providers). Some accepted to distribute CCMm products and filled in the various forms used in the project. Over 95% of the CMDs' records were filled according to the standard of operations of CCMm. Since this was a research project, supplies were maintained uninterrupted, sometimes diverting supplies from other areas in order to forestall stock-outs. However, the reality is that in future there could be a shortage of supply.

Another lesson learnt is that keeping a multi-disciplinary research team intact is impossible for a long term research programme. The inability of health officials in some sites to take an active role in the supply and supervision of CMDs is, therefore, a serious limitation for sustainability of CCMm strategy.

Three participants were involved in the provision of Coartem in the study area as shown in Figure 1.

Figure 1: Distribution flow of pre-packaged drugs in Burkina Faso



Step 2: preparing training manuals and training key implementers

To ensure that procedures are followed before any intervention, training is necessary for all key implementers, ultimately ensuring the success of the project. In all five sites, key implementers underwent training depending on the roles they were going to play in the intervention.

Training of trainers

In Bolgatanga, the regional training unit designed a training manual together with the coordinator of the Maternal and Child Health Unit and the Municipal Director of Health Services. The regional training unit and the MCH unit conducted a two week training of the CDDs. Participants then spent two days at the regional hospital laboratory learning how to use the RDTs, dispose waste and interpret the RDT results. The two-day course was part of the two week training of trainers.

In Kumasi, the training of trainers was conducted for three days with health staff. The PI, social scientist, pharmacists and a public health nurse facilitated the training (as shown in Table 4). In Burkina Faso, health staff and supervisors facilitated a joint team of four members – 3 from CNRFP and one from District Health Sector 30 participated in this training. All the nurses and managers of pharmaceutical depots of two health zones were involved. The topics covered included malaria symptoms (uncomplicated and severe forms), the national policy on malaria treatment, use and management of Coartem and response in case of side effects from the drug.

In Ethiopia, the principal investigator who is a social scientist conducted the training, while two members of the core team who are physicians prepared training materials. Training materials were on prevention and control of malaria, use of the RDT, community mobilization and case registration. Forms on RDT diagnosis, patients' treatment and outcome, monitoring, supervision and supply were prepared by the research team. The research team trained one pediatrician and laboratory technician from Jimma University to train supervisors and community drug distributors.

Training of supervisors

In Bolgatanga Ghana, supervisors of the CMDs were trained together by the regional training unit during the two week training of CMDs. This enabled them to understand the knowledge and skills of each CMD and to support each other in the field. In Kumasi, the PI, social scientist, pharmacist, public health nurse and environmental officer facilitated the training of supervisors. They were trained twice: the first training for supervisors alone lasted for three days. In the second training session, supervisors together with CMDs were trained for five days. The goal was to help supervisors understand the scope of the work of CMDs and address any grey areas during the first training.

In Burkina Faso, the main research team and the district health team conducted the training of supervisors. The trainees were nurses. In Ethiopia, a paediatrician and laboratory health professionals conducted the training of supervisors. Trainees were current supervisors in the Ministry of Health.

Training of distributors

Training was conducted for all distributors soon after the situational analysis had been carried out. The training covered the following aspects:

- signs and symptoms of uncomplicated malaria;
- drug dosage;
- how to ensure adherence;

A health centre in Lilongwe, Malawi.

- how to treat uncomplicated malaria using ACT;
- follow up of patients in their households;
- identification and referral of complicated malaria cases;
- drug procurement and supply procedures;
- how to complete fever registers as well as time log sheets for fevers and community health education; and
- testing for malaria using the RDT kit (in three sites only).

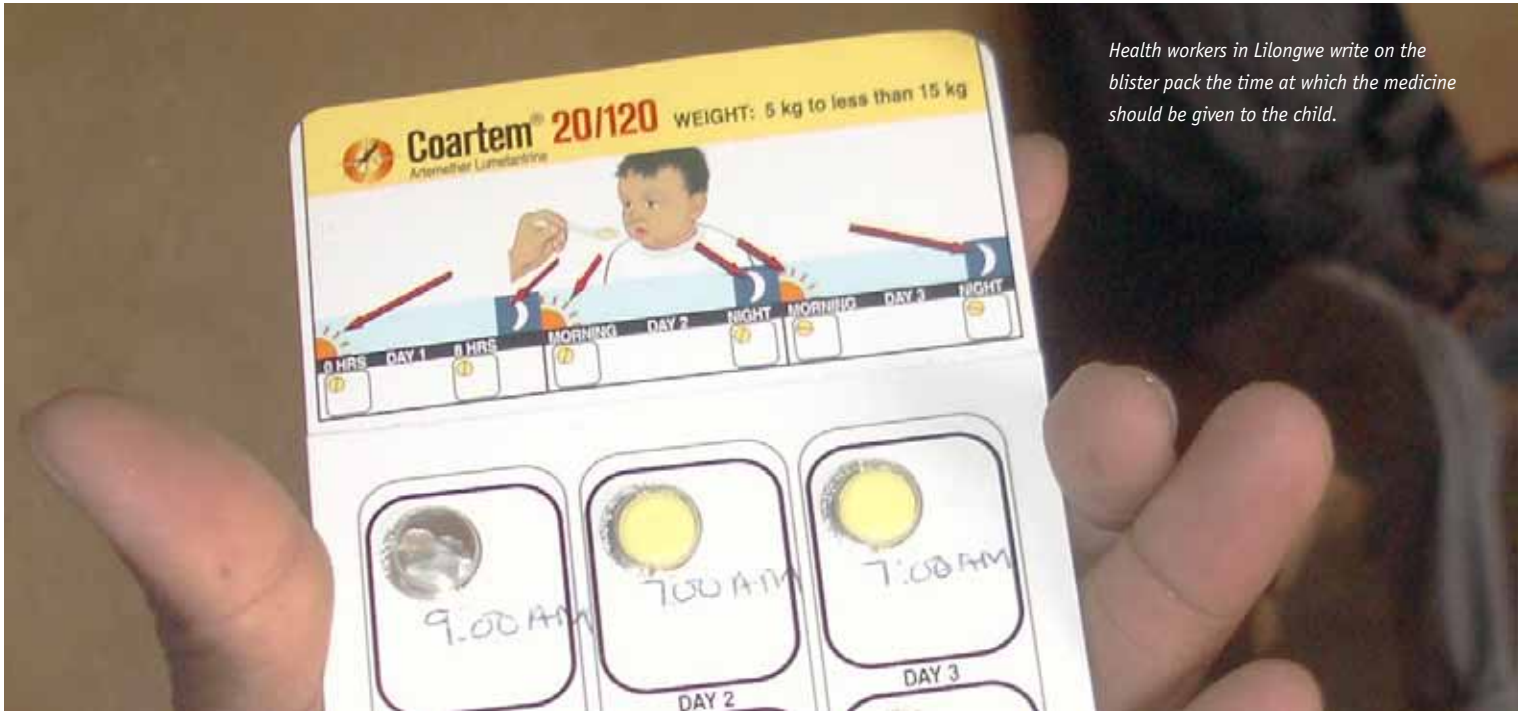
Ghana

i) Bolgatanga

In Bolgatanga, the training manual and health education leaflets and pictorials were developed by the Regional Health Directorate of the Ghana Health Service Education Unit together with the Municipal Director of Health Services, the Municipal Public Health, nurse and the Child and Maternal Health Unit. The head of the Child and Maternal Health Unit and public health nurse conducted the training.

During the first week participants were trained on the minor signs and symptoms of malaria, severe malaria and its various forms, referrals, etc. Two days of the second week were spent visiting consultation rooms and the in-patient wards to see children presenting with minor and severe forms of malaria. The third and fourth days were spent at the laboratory where CDDs were trained on how to use the RDT, the various safety measures such as use of gloves, storage of the tests and proper storage and waste disposal.

Participants were then tested on the various aspects of the training. Out of the 30 participants that were trained, 28 were certified to provide education, treatment and use of the RDT kit. One was disqualified and one was asked to provide only health education. Consequently, there were two communities that had only one person qualified to carry out the CCMm, hence CDDs close to these areas supported in filling the gap.



Health workers in Lilongwe write on the blister pack the time at which the medicine should be given to the child.

Table 3: training approach used in Bolgatanga

Who was trained	By whom	Content of training and roles of trainees
Supervisors	Regional Training Unit Maternal and Child Health Unit	• Signs and symptoms of malaria • Differences in signs and symptoms of severe and uncomplicated malaria • Use of RDTs and interpretation of results • Record keeping and bookkeeping • Adverse events reporting • Monitoring and supervision
CDDs	Regional Training Unit Maternal and Child Health Unit	• Signs and symptoms of malaria • Differences in signs and symptoms of severe and uncomplicated malaria • Use of RDTs and interpretation of results • Record keeping and book keeping • Adverse events reporting • Referrals • Use of Pictorials for IEC
Chemists/drug shop managers	Regional Training Unit Maternal and Child Health Unit	• Signs and symptoms of malaria • Differences in signs and symptoms of severe and uncomplicated malaria • Use of RDTs and interpretation of results • Record keeping and book keeping • Adverse events reporting • Referrals • Use of Pictorials for IEC

ii) Kumasi

The selected providers were trained to prescribe and dispense artesunate-amodiaquine for home management of malaria. Twenty CMDs who were active were selected for a one-week training on RDTs from some of the study communities. They were trained on the following:

- overview of the project, theory on malaria and aseptic techniques;
- principle of RDTs, how to prick and take finger-prick blood sample;
- how to use RDTs and the interpretation of the test outcome; and
- getting consent from caregivers before taking finger-prick blood samples from children.

Practice on how to take blood samples was repeated until the CMDs were able to take these samples with little or no supervision. One CMD who could not cope with taking the blood samples was dropped while the rest successfully completed the training.

Table 4: training approach used in Kumasi

Who was trained	By whom	Content of training and roles of trainees
Metropolitan Assembly members, community leaders	Research team (principal investigator, social scientist and IEC focal person and public health nurse)	• The historical and scientific background of home management of fevers concept • Roles and responsibilities of community members, community leaders, CMDs and research team • Benefits of HMM to communities, Ghana and MDGs 4 & 6
Health staff & supervisors	Research team (PI, metropolitan health director, social scientist, IEC focal person and public health nurse)	• The historical and scientific background of home management of fevers concept • Roles of HMM in RBM and achieving MDGs 4 & 6 • Roles and responsibilities of CMDs and supervisors in caring for the sick child in the area of: - malaria - diarrhoea • Drug administration and adverse events • Identifying and referring children with cough and fast breathing • Rapid diagnostic testing • BCC campaigns, information, education and communication (IEC) on: - HMM - education on growth monitoring and EPI - deworming and vitamin A supplementation • Stores and stock management • Record-keeping • Reporting • Monitoring and evaluation and supervision

Table 4 (continued)

Who was trained	By whom	Content of training and roles of trainees
Chemist/pharmaceutical sellers	Research team (PI, social scientist, IEC focal person and public health nurse)	• The historical and scientific background of home management of fevers concept • Benefits of HMM to communities, Ghana and MDGs 4 & 6 • Caring for the sick child in the area of: - malaria - diarrhoea • Rapid diagnostic testing • BCC campaigns; Information, education and communication (IEC) on: - HMM - education on growth monitoring and EPI - deworming and vitamin A supplementation • Reporting
Community health workers/volunteers	Research team (PI, social scientist, IEC focal person and public health nurse)	• The historical and scientific background of home management of fevers concept • Benefits of HMM to caregivers and communities • Community entry and social mobilisation • Caring for the sick child in the area of: - malaria - diarrhoea • Drug administration, compliance and adverse events • Identifying and referring children with cough and fast breathing • Rapid diagnostic testing • BCC campaigns, Information, education and communication (IEC) on: - HMM - education on growth monitoring and EPI - deworming and vitamin A supplementation • Stores and stock management • Record-keeping • Reporting

Ethiopia

CHVs were selected and trained along with 10 supervisors from the existing health system on voluntary basis. Jimma Regional Hospital Specialists conducted the three-day intensive training in two sessions. On the first two days, training was on prevention and control of malaria conducted by a paediatrician. On the last day, CHVs were taught how to use the RDT kit by a senior laboratory health professional from the School of Laboratory Sciences at Jimma University.

The training manual covered:

- necessary skills and knowledge to diagnose and manage febrile child (hot body);
- how to store, prescribe and deliver anti-malarial drugs to the sick child;
- education of caretakers/mothers on signs and symptoms of malaria;
- record keeping on the registration format prepared by the investigators and follow up of patient;
- dosage chart and levels of drug, potential side and adverse effects of the drugs;
- signs of severe/complicated malaria for referral to the nearest health facility; and
- follow up of children on drugs to monitor compliance to treatment.

The training was in Amharic and handouts were also prepared in the language.

Table 5: training approach used in Ethiopia

Who was trained	By whom	Content of training	Materials and methods used	Job description
Trainers: One paediatrician and one laboratory health professionals	Principal investigator and other project team members oriented about the project	Prevention and control of malaria and use of the RDT kit	PowerPoint presentation	Train other project staff, and distributors
Supervisors: Current supervisors from Jimma Health Bureau and Jimma Zone Health Bureau from Ministry of Health	Paediatrician and laboratory health professionals	Recognise illness, proper drug storage, education of mothers/care-takers, monitoring, record keeping, and referral	PowerPoint presentation, training material handouts in Amharic, face to face, group discussions, and practical exercises	Deliver drugs, supervise distributors/mothers and monitor sales
Distributors	Paediatrician and laboratory health professionals	Recognise illness, proper drug storage, education of mothers/care-takers, monitoring, record keeping, referral and follow up	PowerPoint presentation, training material, handouts in Amharic, face to face, group meetings, practical exercises, experimenting on group partners for blood collection and RDT training	Collect drugs, identifying illness, drug distribution, record keeping, referral and follow up
Mothers/care-takers	Drug distributors conducted sessions	Signs and symptoms of mild and severe malaria, drug dosage, management of illness and referral when necessary	Pamphlets in Amharic, individual and family meetings, group meetings, and face to face discussions	Recognise early signs of illness, buy drugs, treat appropriately, recognise severe malaria and seek professional help promptly

Malawi

Training for HSAs working in Kauma community was conducted on how to identify children with uncomplicated malaria by making use of signs and symptoms, the new anti-malarial drug, dosage and how to ensure adherence. The training package involved effective communication skills, how to treat malaria using the newly approved first-line ACT anti-malarial drug (AL) and follow up with patients in their households to ensure treatment outcome, compliance and monitor any side effects of treatment. Training also included identification and referral of complicated malaria cases. Drug charts were developed for the HSAs to be used in the community to ensure appropriate treatment of cases using appropriate doses.

Table 6: Dosage schedule for lumefantrine-artemether in Malawi

Body weight in Kg	No. of tablets at approximate timing of dosing					
	Day 1		Day 2		Day 3	
	Start dose	After 8 hours	am	pm	am	pm
5-14.9 kg (less than 3 years)	1	1	1	1	1	1
15-24.9 kg (>3-8 years)	2	2	2	2	2	2

Burkina Faso

Following the information and awareness sessions, the target communities chose community volunteers with the help of health officials. A total of 36 community volunteers were recruited: 20 in Wemtenga (18 women and two men) and 16 in Taabtenga (12 women and four men). The coordinates of their homes were geo-referenced using GPS.

The training of CHWs was facilitated by a team of nurses from the clinic in their area. Their training focused on recognising signs of uncomplicated and complicated malaria, Coartem use, the benchmarks of febrile illness, attitude towards mothers when they report side effects, and the management of therapeutic units of Coartem.

Table 7: training approach used in Burkina Faso

Who was trained	By whom	Content of training and roles of trainees
Twenty nurses	Central research team and district health team	Definition of malaria, signs of malaria, national policy on malaria treatment, use and management of Coartem and response in cases of side effects with the drug, supervision and training of community volunteers
Pharmaceutical managers	Central research team and district health team	Definition of malaria, signs of malaria, national policy on malaria treatment, use and management of Coartem and response in cases of side effects with the drug, management of drug stocks and drug distribution
Community health workers/ volunteers	Nurses	Recognising signs of uncomplicated and complicated malaria, use of Coartem, the benchmarks of febrile illness, attitude towards mothers when they report side effects, management of therapeutic units of Coartem, drug distribution and public health training on use of Coartem for treatment of malaria

Administrating first dose of Coartem in CDD clinic set up in Kauma, Lilongwe, Malawi, December 2008.

Challenges and Lessons Learnt

In Kumasi, the training for the Metropolitan Assembly members was considered informative but participants were not happy with the transportation allowance allocated to them. Their expectations were higher based on their participation allowances at the assembly. The five-day training and monthly updates (at least for the first three months for CMDs), fortnightly visits to every CMD by supervisors, and bi-monthly visits by the principal investigator were sufficient for the implementation of the HMM. Every CMD was literate and this made the training easier.

In Jimma, some CHVs left work without informing the supervisor or any other responsible project personnel. Subsequently, the project team advised the CHVs to seek leave from their supervisors when they felt the need to be away. CHVs who dropped out were replaced by newly recruited and trained CHVs.

Step 3: development and execution of IEC strategies

Each of the five sites involved in the intervention had an IEC component that was executed in the formative stages and modified throughout the intervention period based on field experiences, especially to make the materials specific and culturally sensitive. The IEC materials were informed by the situational analyses and review of available IEC materials.

Ghana

i) Bolgatanga

The regional training unit developed the content of the pictorials and an artist was recruited to draw the illustrations. The content included pictures depicting the causes of malaria, case management of uncomplicated malaria at the CMD, prevention tools such as a child under age five sleeping under an ITN.

ii) Kumasi

New Behaviour Change Communication (BCC) materials were developed and pre-tested in study communities followed by an intensive BCC campaign. Preferred providers were trained and closely supervised by the field supervisor to carry out BCC campaigns on CCMm with a special focus on mothers and caregivers in their respective catchment areas in collaboration with the Sub-Metro Health Team.

The focus of public and individual face-to-face education was on early and prompt home management of malaria using artesunate-amodiaquine pre-packs for full treatment. Such messages targeted:

- mothers/fathers/caregivers in the homes;
- other household members; and
- community members in general.

A variety of approaches were used including:

- face-to-face discussions with mothers/fathers/caregivers, heads of households, opinion leaders, identifiable voluntary groups in the community using flip charts, etc;
- posters, wall-charts for community information campaigns;
- meetings at the community, churches, schools, markets, etc;
- intensive house-to-house interactive education; and
- drama in local languages.

Effective community education facilitated acceptability and use of ACT pre-packs. The key messages of the BCC campaign were on how to:

- reliably recognise fever and complications;
- seek prompt immediate treatment from a trained preferred provider;

- comply with instructions by trained preferred providers and complete treatment course;
- report back to preferred providers if child does not respond to treatment in 24 hours; and
- comply with referral, if required.

Ethiopia

Based on the knowledge and perception gap identified among caregivers, promotional materials were developed and utilised before and during the intervention phase. A training manual was prepared for CHVs on malaria diagnosis and treatment. It covered:

- job description;
- general information about malaria;
- clinical features of malaria;
- identification of children with hot bodies;
- signs of severe malaria;
- treatment of children with hot bodies;
- when to refer;
- follow-up;
- briefing about the drug, Coartem;
- adherence to treatment;
- drug storage;
- registration and reporting;
- what and how to teach; and
- getting consent from caregivers.

In addition, promotional materials were developed as leaflets focusing on general instructions for caregivers, administering anti-malarial drugs, what to do when your child gets a hot body, where to find the community health workers, what services are provided by health workers, what to be done if the child has malaria and what to expect from caregivers. Drug distributors also used this information during community gatherings, family meetings and group meetings. Pamphlets were distributed to caregivers/mothers and to the general public during meetings. Furthermore, as part of the community mobilisation strategy, Jimma community radio was used to promote CCMm once a week.

Malawi

To raise awareness in the community, IEC materials on signs of malaria, seeking early care and adherence to malaria treatment were used. These materials were developed based on findings of the formative study conducted within Kauma and review of available IEC materials. The HSAs used the developed materials during meetings with groups at the community level and in one-to-one communication with caregivers of children suffering from uncomplicated malaria.

Burkina Faso

The research team and senior members of the District Health Sector 30 in Ouagadougou recruited a pool of district nurses to provide information on the definition, scope, symptoms of malaria, and the national policy for malaria treatment, emphasising the use of Coartem and how to respond in case of side effects from the drug. To facilitate its recognition and acceptance, an appropriate name was given to the new anti-malarial drug in accordance with expectations from the community.

IEC materials (mainly posters) focused on early treatment of malaria in children less than five years of age. These materials were developed based on a review of those used during a similar study with chloroquine pre-packed units.

Challenges and Lessons Learnt

To ensure maximum use of the services of drug distributors, it is important that all community members are intensely sensitised. In Jimma, Ethiopia, and Lilongwe, Malawi, there was underutilisation of the services of drug distributors because some community members were not aware that the service was available in their locality. In Ethiopia,

not providing any medicine apart from baby paracetamol to children whose RDT was found negative and simply advising caregivers to take children to health facilities sometimes created negative thinking among mothers/caretakers who never returned subsequently for care.

In Kumasi, Ghana, the high cost of disseminating information on CCMm through radio, which is one of the popular health education medium, posed a financial challenge. In rural communities, the cost of using the town crier or gonggong beater was far lower.

Another challenge encountered was the absence of most mothers/caregivers at home during the scheduled time for home visits by the health education team. This was attributed to the nature of the urban setting where women are often involved in economic activities away from the home. Furthermore, some mothers/caregivers felt that the health talks were a waste of their time. Others questioned the competence of CMDs in managing malaria cases and the necessity of their services since there were health facilities and chemist shops all over town.

In order to overcome some of these challenges, visiting times were rescheduled to include weekends and early morning and evenings. Caregivers/mothers were also reassured of the competence of the CMDs and told that their services were closely monitored and supervised to ensure that they complied with standard procedures in medical practice.

Step 4: dispensing and use of drugs at the community level

Dispensing and use of drugs began after the community distributors had been trained and initial IEC campaigns had been held. This primarily involved launching the project and introducing the distributors to the target communities. The drug distributors were given tool boxes containing RDT kits (for sites using the kit), pre-packed anti-malarial drugs, gloves and registers for recording cases attended to and time spent on each case. It should be noted that in Bolgatanga, Ghana, at the time of the baseline survey, there had not been a policy change on the first line drug for malaria treatment from chloroquine to artesunate-amodiaquine.

Ghana

i) Bolgatanga

In Bolgatanga, only 21% of mothers reported using artesunate-amodiaquine to treat their children for malaria in the two weeks prior to the baseline survey in 2006, and in 2008, a relatively lower proportion (20.1%) of caregivers reported using the recommended drug. FGD participants had this to say regarding the use of chloroquine:
You give chloroquine and paracetamol and the next day you send the child to the hospital. (FGD, Soe woman with children under five, 2006).

At baseline, only 27% of the caregivers correctly administered artesunate-amodiaquine to the sick children. In contrast, in 2008, 40% administered it correctly. Although there was an increase in knowledge of the correct daily dose of artesunate-amodiaquine after the intervention, it was still low considering that it was the first line drug for treating uncomplicated malaria. Regarding health seeking behaviour, 61.7% of the households with children under five years of age reported that they sought health care at the baseline. In contrast, post intervention, 99.4% of house-

holds with children under five years of age were reported to have been ill sought health care. Only 15% of the caregivers took action within 24 hours of onset of illness at the time of the baseline survey. However, the number of caregivers who took action within 24 hours of onset of illness increased significantly to 37.5% after the intervention.

Knowledge of RDTs was only 9.5% at the baseline but increased to an overwhelming 92% after the intervention. In addition, at baseline only 5% of the caregivers reported to have used an RDT before but this rose to 58.1% after the intervention. Although reported use of pre-packs was only 53% in the baseline, about 63% of caregivers reported use of pre-packs after the intervention.

Compliance to daily recommended dose of chloroquine or artesunate-amodiaquine as well as administering full dosage depended on the seriousness of the illness. Most caregivers who administered the complete dose as their first action did so because they perceived the child's malaria to be serious (75%). A similar observation was noted after the intervention, where 85% of caregivers completed the recommended dose because they perceived the child's malaria case to be severe.

Table 8: Utilisation of CDD service in Bolgatanga, Ghana (August, 2007-June, 2008)

Outcomes	Number	%
Children in which blood smear was taken (% of 100ml)	1263	99.8
Referred without blood smear	3	0.2
RDT test (N=1,262)		
RDT test results: positive	896	71
Negative	366	29
RDT +: Received AA+paracetamol	870	97
RDT+: Received only AA	24	2.7
RDT+: No treatment-referred Fever+Cough	2	0.3
RDT negative: Paracetamol only-referred Fever-79% Diarr-21% Vomit-27% Cough-48.7%	112	30.6
RDT negative: No treatment-referred	254	69.4

ii) Kumasi

The first dose of treatment was given under the supervision of the provider (CMD) to demonstrate how mothers/caregivers should administer the treatment. All providers were given a toolbox with essential items for their work. The majority of the caregivers (92.8%) in Kumasi who sent their children to CMDs were mainly mothers while 4.8% were fathers and 2.4% were other relatives. After treatment, about 99% of the children had their fevers resolved and became well. All caregivers whose children were treated with the pre-packs said they would use the pre-packs again because their children were cured following treatment.

Caregivers and mothers affirmed that it was easy to differentiate between and use the two drug regimens for the infants and pre-school children. The two-colour combinations coupled with education by CMDs contributed to this. According to mothers, the use of CMDs to distribute the pre-packs was not only convenient but it also improved compliance, especially when follow-ups were done. Through the FGDs, most mothers/caregivers also said they could readily pay for the medicine because they considered it affordable.

Table 9: compliance of treatment schedule in Kumasi, Ghana

Infant: 6-11 months (total 44)	nb of children	%
Day 1	44	100
Day 2	43	97.2
Day 3	43	97.2
Day 1-3	43	97.2
Pre-school: 12-59 months (total 206)	**nb of children**	**%**
Day 1	206	100
Day 2	204	100
Day 3	203	98.5
Day 1-3	203	98.5

Table 10: early and appropriate timeliness of treatment of fevers at home in Kumasi, Ghana

Variables	Same day		Next day		> Two days	
Age (months)	Nb of Children	%	Nb of Children	%	Nb of Children	%
6-11 (total children 35)	26	74.3	5	14.3	4	11.4
12-60 (total children 398)	227	57	119	29.9	52	13.1
Total	**253**	**58.4**	**124**	**28.7**	**56**	**12.9**

Ethiopia

The drug used for the study was arthemeter-lumefanthrine combination (Coartem 20/120) based on the national drug list and national treatment guidelines. The dosage form chosen was the tablet because it is the most appropriate unit dosage. The package chosen was blister packaging, which is considered attractive and promotes patient compliance.

Coartem pre-pack dosage schedule was adopted as per the Ministry of Health's guidelines for RDT positive children as follows:

1. Children aged 6-11 months: morning 1 tablet and evening 1 tablet for three days. Total course of 6 tablets. One Coartem packet was given. (If adult dose packet is given instructions were to only use six tablets and the remaining six tablet packet was collected back by CHV on the morning of the fourth day when CHV visited to check the fever status of the child.)

Table 11: experience with use of drugs and RDT and compliance in Jimma, Ethiopia, August, 2007-July, 2009

Variable	Sub-variable	Number (3139)	%
Gender	Male	1568	50
	Female	1571	50
Age	Months mean (min-max)	33.5 (6-59)	
Time lag between starting of fever and receiving treatment (N=1371)	<12 hours	519	37.9
	12-23 hours	367	26.8
	>=24 hours	485	35.4
Consent for RDT (N=3139)	Agreed	2624	83.6
	Didn't agree	10	0.3
	Excluded from analysis	505	16.1
Infection on pricked finger	Yes	7	2.4
	No	289	97.6
RDT Results (2634)	Positive	1211	46
	Negative	1423	54

2. Children aged 12-59 months: morning 2 tablets and evening 2 tablets for three days. Total course of 12 tablets. (Two Coartem packets were given if child dose packets were given.)

Since the drug is not manufactured in Ethiopia, the plan was to incorporate two leaflets written in local languages, one for the caregiver and the second for the drug distributor. The contents of the leaflets included general instructions on how to administer the drug (the use of age and weight to determine dosage), drug handling and storage, side effects and adverse effects, and drug interaction, among others.

The following table summarises the number of children seen by CHVs, treatment within 24 hours, and use of the RDT kit in Jimma.

Malawi

In Lilongwe, the majority (90%) of children treated for uncomplicated malaria completed their treatment within the required duration of three days. Caregivers did not report any problem related to treatment. The main outcome observed by caregivers was that the children felt better and this was the main reason for following through with treatment. Further, over 80% of the sick children accessed artemether-lumefantrine (AL) within the community. The time taken between noticing fever and seeking care for the children also improved after intervention. In 2006, the proportion of those who sought care within 24 hours was 66.4%, while those who sought care within the same time period in 2009 was 86.4%.

Regarding payment for anti-malaria pre-packs, slightly more than half of the caregivers (57.4%) indicated that they would not be able to pay for the pre-packs if they were to be sold. Those who said they could afford to pay said they could pay related this to low cost at less than Kwacha 50 per pack (US$ = 0.33).

It was observed that community members were using the community-based treatment facility run by HSAs for treatment of malaria for children less than five years. However, the community members suggested that the treatment facility should include care for adults, as stated below:
We are happy with the clinic here, and we wish it could be for everyone (FGD, Men).

In addition, community members suggested that the clinic should offer a variety of drugs and operate for longer hours:
The clinic is opened at 10.00 a.m. and closes at noon, this is not good. (FGD, Women)

Burkina Faso

Among mothers in the two intervention districts that used Coartem, over 50% used it correctly. It was noted that up to 71% of mothers in Wemtenga and 79% in Taabtenga administered the treatment correctly. In addition, CHWs in both sites provided appropriate advice to mothers and caregivers on dosages and duration of use of drugs in 76.6% of the cases. Improved health of the child was the main reason for discontinuation of treatment by mothers and caregivers.

A total of 4320 units of Coartem treatment were procured for the implementation of the study through efforts of WHO/TDR. These drugs were distributed as follows: 2/3 of the doses for children six months to three years and 1/3 of the doses for children over three to five years. CSPS together with 36 CHWs in Wemtenga and Taabtenga community were able to distribute in total 3703 therapeutic units of Coartem out of the 4320 received. The distribution rate was 86%.

Table 12: Utilization of CMDs for treatment of children with fever and CMD performance in delivering ACTs in five sites

Ouagadougou	
Number of CMDs	36
Total number febrile episodes in children aged less than 5 treated with ACTs by CMDs*	1818
Number (%) of children referred to nearest HF**	101 (5.6%)
Correctness of prescription (from CMD register): • Number (%) of all children correctly dosed by age group	1818 (100%)
Number (%) of occasions on which CMD explained (from survey): • Treatment schedule • Danger signs • Possible adverse events	1400 (77%)
Availability of CMDs (from survey Nb=382)) • Number (%) of mothers who did not find the CMD at the first attempt	36 (12.7%)

(Source: *CMD registers, ** Household survey)

Challenges and Lessons Learnt

In Lilongwe, Malawi, it was pointed out that the community drug delivery point did not have water for cleaning cups and for taking the drugs. However, the HSAs and the research team later resolved this.

Regarding the use of RDTs, some mothers and caregivers were apprehensive about the competence of the CMDs. However, after reassurance some agreed to have their children tested within the community. This is expected given the concerns around drawing blood, which is a sensitive issue and could have detrimental effects if the CMDs are not properly trained.

In almost all sites, CMDs were not always available to attend to patients because they were not residents of the intervention areas. In the future, it would be useful to recruit volunteers from the intervention areas to work alongside community distributors who are already part of the health system and may not be residents of the target areas.

Compliance was highest in areas where community members had been intensely sensitised regarding the CCMm strategy. It is, therefore, very important that IEC campaigns are conducted and refined throughout the implementation period so as to be relevant and culturally sensitive.

The issue of CMDs' material motivation was also critical. CMDs' attrition was reported in some sites due to lack of monetary incentives. Creative ways of motivating CMDs in the future should be considered such as providing on-going training and material incentives, which are not direct payments for services rendered but a means of appreciating their contribution. It is also interesting to note that non-graduates (artisans and petty traders) were very committed and excelled in their volunteer duties compared to graduates. This implies that commitment to this kind of work is more important than academic qualifications.

Children at a clinic in Kauma, Lilongwe, Malawi. December 2008.

5. Monitoring and evaluation

Monitoring and evaluation was integral to the interventions in all the five study sites. Monitoring was undertaken regularly in order to assess progress while evaluation was necessary at the end of the study period to document the impact of the interventions on the target areas.

Ghana

i) Bolgatanga

Two members of the research team visited the CDDs weekly to collect data from registers and to provide supplies to CDDs. Monthly meetings were held throughout the intervention phase with CDDs to address field challenges and to offer any refresher training and on the job training.

ii) Kumasi

Four field supervisors drawn from the research team from KNUST were trained to supervise the implementing communities. They undertook 'riders for health' training to ensure they could ride motorcycles safely. They visited each preferred provider at least fortnightly and completed a supervision checklist. Preferred providers and field supervisors then met with the research team once a month for regular updates and reviews.

Ethiopia

Monthly monitoring meetings with CHVs, supervisors and the research team were held to discuss: (i) field level problems faced by CHVs and supervisors; (ii) and supply of RDTs, Coartem, baby paracetamol, gloves and reporting formats.

Ten supervisors were assigned, one each to a Kebele (ward) and were responsible for following up and supporting CHVs, supplying drugs, collecting registration forms and summarising reports from these forms on a monthly basis. These reports were then given to the project coordinator who checked and forwarded them to data entry clerks for recording. Although they were always available at the Jimma Health Centre for collection by CHVs and supervisors whenever they were required, new patient registration forms, gloves, RDTs and IEC materials were also distributed during these monthly meetings.

Malawi

A checklist used to monitor progress and treatment outcomes was developed. The checklist was used by the District Malaria Coordinator during supervisory visits. Some of the data collected using this checklist included:

- number of patients treated;
- compliance;
- treatment outcomes;
- audit of drugs; and
- identification of capacity building gaps among HSAs.

Review meetings were also held monthly with the HSAs, community representatives, the District Malaria Coordinator and the research team.

Burkina Faso

The activities of each CHW were overseen on a monthly basis by a nurse leader in the health facility to which he or she was attached. The performance indicators monitored included adequacy of Coartem units in storage, the number of children treated and the number of children referred to health facilities. Each nurse supervisor provided monthly reports on monitoring to the investigation team.
The project team, in collaboration with members of Sector 30, also supervised the implementation on a monthly basis. The performance indicators monitored were:

- adequacy of the condition of storage of units of Coartem;
- management tools for units of Coartem;
- the number of children seen for malarial fever;
- those treated with Coartem; and
- those referred to health facilities due to Coartem side effects.

To prevent any form of abuse by CHWs, a disciplinary committee was formed. It consisted of the following persons or their representatives: the PI, the Chief Medical Officer of District Sector 30 and two leaders from the study area. This committee met whenever a case was reported by community members and/or supervisors. The committee would assess the case and take appropriate disciplinary actions. In case of revocation of a CHW's appointment by the disciplinary committee, his or her replacement was secured from the community using the same approach as during the initial recruitment.

Challenges and Lessons Learnt

In Bolgatanga Ghana, there was low involvement of MoH officials in the monitoring and evaluation exercises due to inadequate manpower and this posed a challenge for sustainability of this intervention. To ensure the smooth running of the project, the research team had to take on this role.

In Taabtenga, Burkina Faso, some people who had been part of the intervention during implementation left prior to assessment due to loss of homes occasioned by floods and the construction of development projects in parts of the project site. Also in Burkina Faso, noncompliance to operating procedures of the Coartem supply chain by the health district and the filing dispatcher health district officials was a challenge. In the opinion of health personnel in health facilities and RSA, Coartem stocks ran out very quickly because of competition between the ASC and the CSPS. According to an officer from Taabtenga CSPS:
"There was no regulation that required us to keep part of stocks specifically for ASC or CSPS. People come from everywhere and not just Taabtenga and Wemtenga. When there was an outbreak of malaria, we encouraged them to find Coartem which is cheaper here."

In Ethiopia, completion of monitoring forms posed a challenge. After completing the health education sessions, CHVs found it burdensome to fill up the forms, as well presenting summaries of monthly activities. They also had to maintain up-to-date diagnosis and treatment registers. These efforts were also not compensated financially, eliciting perpetual complaints during monthly monitoring meetings.

6. Summary and conclusions

This guide seeks to describe the processes that were involved in testing the feasibility and acceptability of ACT unit dose pre-packs for the management of malaria in children less than five years of age in urban areas in five African sites. The study was conducted in three main phases namely:

1. pre-intervention;
2. intervention; and
3. monitoring and evaluation.

The pre-intervention phase involved conducting situational analyses to assess the basic situation in the target areas and establishing benchmarks for monitoring and evaluation. The knowledge, perceptions and practice of household level preventive and treatment-seeking behaviours including those on drug use and costs were established at this stage. Findings from the situational analyses indicated that most of the caregivers had information about malaria. Most knew that mosquitoes cause malaria with a few mentioning other modes of transmission (e.g. unhygienic environment). Knowledge of common signs and symptoms of malaria in children under five years of age was high. This knowledge contributed to timely treatment of those affected and necessitated the taking of appropriate preventive measures.

Based on the findings from the situational analyses, CMDs were selected and trained. In some sites (mainly Malawi), the communities chose existing health providers as drug distributors. Community members argued that the selected health providers were already involved in health campaigns and were part of the health system, hence, were better suited to take up this role. It was also argued that the use of existing health providers would ensure sustainability of the project. Nonetheless, this decision posed a challenge in the distribution of drugs since some of the distributors were not residents of the target communities and could not be reached after working hours.

Development of IEC materials was informed by the situational analyses and review of existing IEC materials. These materials were modified throughout the implementation period depending on the prevailing conditions. It is notable that communities that were exposed to intense IEC campaigns reported a higher proportion of adoption of the strategy. They also reported a higher proportion of children treated within 24 hours of onset of illness with pre-packed drugs and had higher compliance levels with the recommended treatment regimen. Conversely, where the IEC component was weak, caregivers and mothers were suspicious of CMDs. However, when supervisors assured them that CMDs were trained and monitored to ensure they followed standard medical procedure in carrying out their activities, they took up treatment. They also reported that advice given by CMDs was adequate.

The use of the ACT unit dose pre-pack is feasible and acceptable. When CMDs are properly trained, the community is properly sensitised and pre-packed drugs are provided either free or sold at an affordable cost, the quality of services delivered by CMDs and adherence by caregivers are similar to those seen in rural CCMm settings. The proportion of cases seen by CMDs, however, tended to be lower than was generally seen in rural CCMm. Urban CCMm is feasible, but it struggles against other sources of established healthcare providers.

Child consuming anti-malaria dose.

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ISBN 978 92 4 150269 6

The Special Programme for Research and Training in Tropical Diseases (TDR) is a global programme of scientific collaboration established in 1975. Its focus is research into neglected diseases of the poor, with the goal of improving existing approaches and developing new ways to prevent, diagnose, treat and control these diseases. TDR is sponsored by the following organizations:

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