Costing of Integrated Community Case Management in Malawi

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Contents

Acknowledgements iii
Acronym List iv
Executive Summary v
1. Introduction 1
2. Background and Country Context: Malawi 2
3. Methodology 7
Tool Development 7
Ethics 10
Partner and Central Level Data Collection 10
Facility and Village Clinic Data Collection 11
Catchment Population 12
Staffing 13
Medicines 13
Operating Costs 14
Financing 14
4. Data Collection 16
Population Figures 16
CHW Availability & CCM Service Delivery Assumptions 16
Program & Coverage Assumptions 17
Incidence Rates for the CCM Interventions 17
Standard Treatment Guidelines 17
Program Start-Up Costs 18
Supervision and Meetings 19
Financing 20
Data Challenges 20
Exclusions 21
5. Analysis 22
HSA time on CCM activities 22
Utilization 22
Costs 25
Start-up Costs 25
Recurrent costs 26
Total Costs 31
Financing 33
6. Conclusion 34
References 36
Annexes 37
Annex A. Health Centers and Village Clinics Sampled 38
Annex B. People Contacted 40
Annex C. Questionnaire Templates for District, Health Facility, and Community (VC) Level 41
Annex C1. District Health Office Questionnaire 42
Annex C2. Health Center Questionnaire 45
Annex C3. Community Level Questionnaire 49

Annex C4. Staff Template used to collect staff salary information at all three levels of the health system 52
Annex C5. Training template to collect information about each of the trainings held at all levels of the health system that HSAs are expected to attend. 54
Annex C6. Template to collect information on all meetings that HSAs are expected to attend at all levels of the health system. 56
Annex D. Sample Village Clinic Monthly Reporting Form for Under Fives 58
Annex E. Standard Treatment Guidelines 59
Annex F. Total Costs of iCCM program in Malawian Kwacha (MK) 61
Annex G. Glossary 62
Annex H. Lessons Learned 64

Tables

Table 1. Activities conducted by HSAs 4
Table 2. Examples of activities conducted by Community Health Volunteers 5
Table 3. Sources of costs used in the iCCM tool 9
Table 4. Summary of data collection 12
Table 5. Population figures, 2010 16
Table 6. Standard Treatment Guidelines($) 18
Table 7. iCCM program start-up costs per HAS, 2010 ($) 19
Table 8. Total CCM supervision staff costs, 2010 ($) 19
Table 9. Broad funding sources, 2010 20
Table 10. Number of CCM services from the Actual and 100% Coverage scenarios, 2010 – 2015 23
Table 11. CCM-HSA figures for the Actual and 100% Coverage scenarios, 2010 – 2015 24
Table 12. iCCM program start-up costs for the actual number of CCM-HSAs employed, 2010 ($) 25
Table 13. iCCM program start-up costs for the 100% Coverage scenario, 2011 – 2015 ($) 26
Table 14. Total recurrent costs for Actual and 100% Coverage scenarios, 2010 – 2015 ($) 27
Table 15. Total recurrent costs by type of cost and CCM intervention, 2010 ($) 28
Table 16. Total recurrent costs and cost per service by CCM intervention, 2010 ($) 29
Table 17. Direct and indirect costs per service by CCM intervention, 2010 ($) 29
Table 18. Total recurrent costs and cost per service by CCM intervention for the 100% Coverage scenario, 2011 – 2015 ($) 30
Table 19. Total iCCM program cost and cost per capita for the Actual and 100% Coverage scenarios, 2010 – 2015 ($) 31

Figures

Figure 1. Commodity and information flows for medicines in Malawi 14
Figure 2. Funding Projections by source, 2010 – 2015 ($ '000) 33

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Acronym List

ACT	Artemisinin-Based Combination Therapy
BASICS	Basic Support for Institutionalizing Child Survival, project funded by USAID
CBDA	Community-Based Distribution Agent
CCM	Community Case Management
CFPHS	Community-Based Family Planning and HIV & AIDS Services, project funded by USAID
CHAM	Christian Health Alliance of Malawi
CHV	Community Health Volunteer
CHW	Community Health Worker
CMS	Central Medical Stores
CRS	Catholic Relief Services
CTC	Community Therapeutic Care
DHO	District Health Office
DHS	Demographic Health Survey
DOTS	Directly Observed Treatment, Short course
GHI	Global Health Initiative
HSA	Health Surveillance Assistant
HMIS	Health Management Information System
iCCM	Integrated Community Case Management
IMCI	Integrated Management of Childhood Illness
MDG	Millennium Development Goal
MOH	Ministry of Health
MSH	Management Sciences for Health
NGO	Nongovernmental Organization
ORS	Oral Rehydration Solution
PMI	President's Malaria Initiative
PSI	Population Services International
RDT	Rapid Diagnostic Test
RMS	Regional Medical Stores
STC	Save the Children
TB	Tuberculosis
TBCAP	Tuberculosis Control Assistance Program
TRAction	Translating Research into Action, project funded by USAID
UNICEF	The United Nations Children's Fund
URC	University Research Co., LLC
USAID	United States Agency for International Development
VC	Village Clinic
WHO	World Health Organization
WVI	World Vision International

Executive Summary

Integrated community case management (iCCM) has proven to be an effective strategy for expanding the provision of diarrhea, pneumonia, and malaria services and has been accepted as a key approach to meet Millennium Development Goal 4 on reducing child mortality by international donors and developing countries. Furthermore, it is a pivotal strategy in the recently announced Global Health Initiative (GHI) vision.

The purpose of this study is to develop a simple, user-friendly tool to determine the costs of starting up and/or expanding iCCM programs. Malawi is the first of three research countries used to inform the tool development. The results of the development and use of the tool in Malawi are described in this report.

Training and implementation of Malawi's national iCCM program began in 10 districts in 2008, with support from the World Health Organization (WHO), The United Nations Children's Fund (UNICEF), and the United States Agency for International Development (USAID) funded Basic Support for Institutionalizing Child Survival (BASICS) project. The program utilizes existing Health Surveillance Assistants (HSAs) to provide iCCM services to children (ages 2-59 months) in "hard-to-reach" areas at the community level through service delivery points called village clinics (VCs).

The iCCM costing tool was used to develop a tool specific for the Malawi community case management (CCM) program, using information from 2010 as baseline data. It covers all aspects of the program, including service delivery costs at the community level and support, supervision, and management costs at all levels of the health system. Thirty-five HSAs from six districts were interviewed to determine their time and activity profiles, and to get details of supervision, training, and support received from the health center, district, and central levels. Program data were collected at all levels of the system and input into the tool, which estimated the program costs for 2010 – 2015. Epidemiological assumptions were applied to catchment areas to determine expected caseloads for the CCM services, which then drove the cost calculations in the tool.

In 2010, Malawi's total hard-to-reach population was 6 million, of which, approximately 1 million (17%) were assumed to be children aged 2-59 months. Based on estimated incidence rates, this meant there was a total estimated need (assuming 100% coverage of services) for over 5.7 million CCM treatments in 2010; of which roughly 4.8 million would be for diarrhea, 590 thousand would be for malaria and 296 thousand would be for pneumonia. The remaining services were for treatment of red-eye and assessment of nutrition and anemia.

In actuality, the iCCM program covered 2,328 (58%) of the estimated 4,000 hard-to-reach areas and provided over 620 thousand services (roughly 11% of the estimated need) in 2010. Based on these figures it appears that the iCCM program was under-utilized although possibly not as much as the figures indicate because the national utilization figures may be under-stated. In 2010 each CCM-HSA provided, on average, 2.6 CCM services per working day. However, the total number of estimated CCM services needed is roughly 14.2 treatments per CCM-HSA per day. Based on the standard times, it should be possible for a CCM-HSA to provide around 16.3 services per day, which means that the iCCM program can be scaled up to full coverage with an average of one CCM-HSA per hard-to-reach area (areas with larger populations would require more CCM-HSAs or more working days dedicated to providing CCM services).

There are two ways in which CCM coverage can be expanded in Malawi. The first is by expanding the number of services provided in the 2,328 hard-to reach areas covered by the existing CCM-HSAs. The second is by expanding the number of CCM-HSAs until all 4,000 hard-to-reach areas are covered. These two approaches can be combined to reach full scale up of services.

The cost of scaling up the iCCM program from its level in 2010 to achieve 100% coverage in all 4,000 hard-to-reach areas would be roughly $2.1 million for additional start-up costs and roughly $5.5 million for additional annual recurrent costs. If this was a new program in Malawi, the total iCCM program start-up costs required to meet this need would be $4.6 million and the total recurrent costs for one year would be $6.9 million. By 2015, the largest recurrent cost category would be medicines (73%), followed by CCM-HSA salaries (24%), meetings (2%) and supervision (1%).

The start-up cost per capita (child under five) in 2010 was $4.00 and this reduces significantly in subsequent years due to the fact that the majority of the CCM-HSAs would be trained in 2010, in addition to economies of scale. The recurrent cost per capita in 2010 was only $2.16 because of the low coverage and this would increase to $5.67 by the time full coverage would be achieved in 2015.

In terms of the recurrent cost per service (of the actual number of services provided) in 2010, diarrhea was the most expensive at $2.44, followed by malaria ($2.38), pneumonia ($1.70), red-eye ($2.19), nutritional assessment ($1.62) and anemia ($0.25). If full coverage is achieved in 2015, the average cost of these treatments would fall considerably due to economies of scale. For example, the cost of diarrhea treatment would fall to $1.13 per treatment, malaria would fall to $1.06, and pneumonia would fall to $0.39.

In 2010 the government funded 14% of the program ($868,315); donors exclusively funded 42% of the program ($2,522,691); and a mix of government and donors funded the remaining 43% ($2,595,212). Without forecasts for the intervening years of 2011 and 2012 we assumed that the 2010 mix of funds would apply. This means that donor funding would probably decline in 2011 and 2012 due to the reduction in start-up costs. If, as reportedly intended, the Malawian government takes over all the funding in 2013 it would need to provide almost $6 million in that year and the figure would rise to over $7 million in 2015.

It should be noted that the main purpose of this work was to test the tool and only a small sample of facilities and community health workers was required for that purpose. That sample is too small for the resulting data to be representative of the program as a whole and the results of the modeling shown in this report should, therefore, be considered as illustrative. Nevertheless, we believe that these results can be useful to the MOPH and partners and the figures used in the tool can be updated as desired.

1. Introduction

Integrated community case management (iCCM) has proven to be an effective strategy for expanding the provision of diarrhea, pneumonia, and malaria services and is accepted by international donors and developing countries as a key strategy to meet Millennium Development Goal 4 on reducing child mortality. Furthermore, it is a pivotal strategy to achieve the Global Health Initiative (GHI) vision.

Diarrhea, malaria and pneumonia are leading causes of child mortality and cause nearly 44% of deaths in children under five years old. Community case management (CCM), the delivery of timely and low-cost interventions at the community level by community health workers (CHWs), is promoted by the World Health Organization (WHO), The United Nations Children's Fund (UNICEF), United States Agency for International Development (USAID), and the Global Health Initiative (GHI) as an effective strategy to deliver lifesaving interventions for these illnesses. Several developing countries have adopted and promoted policies and programs in which CHWs promote timely care by treating uncomplicated cases of diarrhea, pneumonia, and malaria and referring severe cases to health facilities.

Despite the success of this strategy in several low-income countries, iCCM programs in many other countries have yet to be implemented or expanded. This is partly due to concern or uncertainty about the costs and financing of iCCM programs. A comprehensive understanding of costs and financing will help countries who are considering implementing or expanding iCCM programs to advocate to donors and ministries of finance for necessary funding and to allocate sufficient funds to appropriate levels of the health system. It will also allow for costs to be better monitored and controlled, thus ensuring efficient use of scarce resources.

Unfortunately in many developing countries, there is a lack of skills necessary to analyze the cost and funding needs of such programs, as well as a need for simple, user-friendly tools with which to conduct this analysis. Moreover, the absence of a standardized analysis tool means that even where cost and financing studies are done, they may not be accurate or complete and are not generally comparable across countries or over time.

The purpose of this work is to develop a simple, user-friendly tool to determine the costs of starting up and expanding iCCM programs. The work includes visits to three countries to help develop and test the tool, beginning with Malawi. The results of the development and use of the tool in Malawi are described in this report.

2. Background and Country Context: Malawi

Training and implementation of Malawi's national iCCM program began in 10 districts in 2008, with support from WHO, UNICEF, and USAID's Basic Support for Institutionalizing Child Survival (BASICS) project. The program utilizes existing Health Surveillance Assistants[1] (HSAs) to provide quality, cost-effective iCCM services to children (ages 2-59 months) at the community level through the development of service delivery points called village clinics (VCs). The Integrated Management of Childhood Illnesses (IMCI) Unit in Malawi's Ministry of Health (MOH) has been coordinating, leading and guiding the standardized implementation and roll out of the iCCM program. The iCCM program is currently being implemented in all 28 districts in the country, with support from Catholic Relief Services (CRS), Population Services International (PSI), Save the Children (STC), UNICEF, President's Malaria Initiative (PMI), WHO, World Vision International (WVI), and USAID's DELIVER and BASICS projects. These key partners share some of the programs costs with the MOH related to training, mentoring, and drug procurement. Their support has been divided among specific districts to minimize duplication of effort. The partners' activities are also integrated with the national health strategies and rely on coordination with many units in the MOH, including Integrated Management of Childhood Illnesses, Malaria, Environmental Health, and others.

Despite Malawi's progress in recent years to address high infant- and under-five mortality rates, challenges continue to remain; in 2010, the infant mortality rate was 66 per 1,000 live births and the under-five mortality rate was 112 per 1,000 live births.[2] Seventy percent of all child deaths in Malawi are due to preventable causes such as malaria, diarrhea, pneumonia, anemia, malnutrition and neonatal causes.[3] One of Malawi's key strategies to address these critical issues is to have HSAs provide iCCM services at the community level.

There are two approaches to implementation of community iCCM in Malawi: a) coverage of iCCM in hard-to-reach areas; and, b) universal coverage of iCCM.[4] The national MOH strategy is to target iCCM in hard-to-reach areas. Currently there are 4,000 specific hard-to-reach areas in Malawi, which accounts for approximately 40% of the country's population. A hard-to-reach area is defined as any geographical region in which a population has limited access to healthcare because of a physical distance of greater than eight kilometers from the nearest health facility, or the presence of physical barriers to a health facility such as impassable rivers or mountains. Within each hard-to-reach area, the MOH goal is for each HSA to serve a total catchment population of around 1,000 people, which may encompass one or more villages. In 2010, the population of hard-to-reach areas ranged from 500 to 3,500 people, with a mean of 1,780. During that time, there were an estimated 10,451 HSAs working in Malawi; of these, 2,328 HSAs were providing iCCM services in 2,328 communities.

[1] HSAs are community-based health workers who promote primary health care interventions at the community level. They serve as a key link between health facilities and the community.
[2] National Statistical Office (NSO) and ICF Macro. Malawi Demographic and Health Survey 2010. Zomba, Malawi, and Calverton, Maryland, USA: NSO and ICF Macro. September 2011.
[3] Malawi: Challenges for Children. Save the Children. Website last updated Oct 2011. Accessed from: http://www.savethechildren.org/site/c.8rKLIXMGIpI4E/b.6150451/.
[4] The universal coverage approach is being applied by PSI in 5 districts in the Southern Region of Malawi.

HSAs are a paid MOH cadre. Selected trainees are given a 10-week basic course to become HSAs. Additionally, all HSAs selected to provide iCCM services participate in a six-day training at the district level, which utilizes a curriculum adapted from the WHO Guidelines on IMCI. During this training, HSAs learn to diagnose, treat, and refer for the key childhood illnesses: malaria, diarrhea, pneumonia, and red eye. They also learn to identify signs of anemia and malnutrition, which are prevalent in a large proportion of children; identify and refer complicated cases to nearby health facilities; provide pre-referral treatment where needed; counsel caretakers on administering certain medications; check children's vaccination status and encourage caregivers to complete the remaining vaccines; deliver prevention-related messages to community members; and complete the required reporting forms.

Once trained, CCM-HSAs return to their community to provide treatment (and referral, if needed) for children ages 2 to 59 months for malaria, diarrhea, pneumonia, and red eye. They also identify and refer for anemia, and conduct nutritional assessments on all children who come for CCM services, referring those who are malnourished. CCM-HSAs typically provide these services two to three full days per week at the VC, which are specific spaces dedicated for the use of HSAs to provide CCM.[5] While CCM-HSAs provide both preventive and curative services at the VC, they also participate in active case finding through household visits. When sick children are identified, they are either brought to the VC for treatment or the HSA treats them in their homes.

In addition to working at the VCs, CCM-HSAs are responsible for implementing their general HSA duties during the remaining two to three days per week. These include activities such as: health education talks and/or dramas; promotion of environmental health through inspection of water and sanitation facilities at places such as schools, churches, and homes; collection of vital statistics and maintenance of a village register; disease outbreak identification and response; vector and vermin control; management and supervision of community health volunteers (CHVs); and organization and implementation of outreach campaigns. All of these non-CCM specific activities are provided in locations throughout the community and do not take place at the VC.

Certain HSAs, including CCM-HSAs, receive training to provide additional services at either the health center level, or within their community/village(s). Examples of additional services provided include: Depo-Provera, HIV & AIDS testing and counseling, directly observed treatment (DOTS) for tuberculosis (TB) patients, sputum smears for TB suspects, youth-specific education on reproduction and health, and community therapeutic care (CTC) for undernourished children. HSAs receive these additional trainings and responsibilities based on the needs of the community and the availability of resources - in particular, due to vertical program and/or donor funding. As such, one HSA may receive no additional training and responsibilities, while another may be trained to provide one or more additional service (see Table 1). While HSAs have been found capable to deliver these various services, in very few cases has the entire group of services been provided by a single HSA to a given community.[6]

[5] In some hard-to-reach areas, no VC has been built yet. In these cases, the HSA tends to work out of his or her home to provide CCM.

[6] Rohde, Jon. Community Health in Malawi – Lessons from the MSH Experience and Suggestions for the Future Evolution of Community Primary Health Care in Malawi. August 2011. Unpublished report.

Table 1. Activities conducted by HSAs

Activities conducted by all HSAs	Examples of additional activities conducted by select HSAs
■ Disease surveillance ■ Water and sanitation inspection (e.g., of schools, homes, churches) ■ Health education (e.g., malaria, TB, HIV & AIDS, nutrition, water and sanitation, family planning, vaccinations) ■ Referrals to nearby health facility ■ Outreach clinics immunization and growth monitoring ■ Vermin and vector control ■ Collection of vital statistics and maintenance of a village register ■ Immunizations ■ Management of community health committees and CHVs	■ iCCM ■ Provide DOTS to TB patients and/or collect TB sputum smears from TB suspects ■ Maternal and neonatal health: identify, counsel, refer, and follow up pregnant and postnatal mothers ■ HIV & AIDS testing and counseling ■ Depo-Provera injections ■ Provide CTC or ready to use therapeutic feed to undernourished ■ Youth-friendly services: provide education on reproduction, health, and family planning to youth

In addition to conducting the standard HSA duties as described in Table 1, CCM-HSAs provide the following services:

- Identify and treat common childhood illnesses (malaria, diarrhea, pneumonia, and red eye);
- Identify anemia and malnutrition;
- Identify and refer complicated cases to nearby health facilities, and provide pre-referral treatment where needed;
- Check children's vaccination status and encourage caregivers to complete the remaining vaccines;
- Counsel caretakers on administering prescribed medications; and
- Deliver prevention-related messages to community members.

In some cases, these services were reported as only being provided during the days set aside for CCM services. However, they were not included in the CCM package for costing purposes because data were lacking on the numbers of services and because they are not believed to be significant.

Many HSAs work side by side with CHVs, both at the health center and at the community level (see Table 2). CHVs are well respected community members and are often nominated by their peers or community leaders to be a volunteer. CHVs assist HSAs in various activities, such as providing health education (either via home visits or through health talks/drama groups), identifying and reporting of TB suspects, assisting CCM-HSAs with small tasks, [7] and/or conducting water and sanitation inspections. One particular type of CHV is a Community-Based Distribution Agent (CBDA). CBDAs are volunteers who focus on providing family planning education and counseling, and are trained to provide oral contraceptives. In addition, some CHVs are part of committees (such as Village Clinic Committees); often times, community leaders participate in these committees as well. As with HSAs, the types of CHVs present in each community depends on the needs of the community, as well as the responsibilities of the HSA they are working with. Typically, CHVs receive a brief orientation by the HSA they are working with on the different health topics and activities they have been asked to support.

Table 2. Examples of activities conducted by Community Health Volunteers

Type of CHV	Examples of activities conducted by select CHVs
CHV (general)	■ Provide education to community members on various health topics. ■ Assist with iCCM, such as providing health education or referring ill children to the CCM-HSA/VC. ■ Identify TB suspects and collect sputum smears. ■ Assist with outreach campaigns. ■ Assist health centers with vaccinations, weighing children, etc. ■ Conduct patient follow-up/home visits.
CBDAs	■ Provide education and counseling on family planning methods. Provide oral contraceptives and condoms. In some cases, provide HIV testing and counseling in certain areas.
Committee Volunteers	■ Participate in community committee(s) (e.g., VC committee, village health committee, water and sanitation committee). Often times, community/village leaders volunteer as well.

CCM-HSAs are responsible for reporting monthly to the health center via two specific reporting structures. They provide: 1) a monthly HSA activity report (which includes information on all of their HSA duties) to the general HSA supervisor at the health center; and, 2) an iCCM Report to the CCM-supervisor (e.g., a senior HSA, nurse or in-charge who has been trained in iCCM). [8] Currently, HSAs use the following tools for the monitoring and reporting of iCCM activities: [9]

- A Sick Child Recording Form (used to guide HSAs in management of sick children)
- iCCM Register (used to register and record patient health and demographic information)
- iCCM Report (counts the number of health conditions that are seen by HSAs and includes logistic statistics)

[7] These services were not taken into account in the costing because they are not believed to be significant.
[8] In some cases, the HSA general supervisor and the CCM-supervisor are the same person.
[9] Partners may have additional reporting requirements, depending on their needs.

The CCM-supervisor reviews and consolidates the reports for all CCM-HSAs in the health center's catchment population and submits them to the District IMCI Coordinator, who consolidates the information at the district level and sends it to National IMCI Unit.

Various challenges have been reported for Malawi's iCCM program. These include: human resource shortages (lack of HSAs)[10], lack of availability of CCM medicines, lack of supervision of CCM-HSAs, competing priorities at the district level by the district management team, and inadequate resources to ensure service delivery to all the targeted and hard-to-reach areas.

[10] Currently there are not enough HSAs to reach the MOHs target goal of reaching all hard-to-reach areas. Because of the limited job opportunities in Malawi, once HSAs are selected and trained, there is good retention.

3. Methodology

Tool Development

The Malawi iCCM costing tool was developed from the prototype of the generic iCCM costing tool. It covers all aspects of the vertical program, comprising start-up costs, service delivery costs at the community level, and support, supervision, and management costs at all levels of the health system. Additionally, the tool has a financing element that can be used to show and project financing sources. The tool covers the three key CCM interventions (diarrhea, pneumonia, and malaria), as well as the other interventions provided as part of the Malawi iCCM package (treatment of red eye, and nutrition and anemia assessment). At the service delivery level, it is a bottom-up activity-based costing tool, in which costs are built up by type of resource (such as medicines) based on an estimated numbers of services. Other costs, such as supervision and training, are allocated using a top-down methodology. The tool uses standard treatment protocols as the base for the standard costs. Malawi used national protocols developed by an expert group of practitioners, including the IMCI Unit Head.

The tool contains a need norms section that uses incidence rates to estimate the expected caseload for the specific catchment population. The user also inputs assumptions into the tool about CHW availability, so the number of projected services is constrained to the number of available CHW work hours.

The tool estimates the numbers of CHWs required and the anticipated cost of support and supervision staffing needs, based on assumptions entered by the user. The tool then estimates the unit cost per service, as well as the aggregate costs for different levels of the health system (i.e., community, district, and national) and the total costs.

In summary, the tool automatically produces the following outputs:

- Total program costs, baseline year and five-year cost projections;
- Costs per capita, per contact, per disease type, and per resource type;
- Incremental costs and incremental financing of the iCCM programs (start-up and recurrent) as a whole and for each level (national, regional, district, facility and community) over time;
- Costs per treatment area (pneumonia, diarrhea, malaria, etc.), with the capability to include other iCCM interventions;
- Key drivers of costs and cost categories as a percent of total costs; and
- Five-year projections of financing with sources of funding.

These outputs can be used to:

- Measure cost efficiency and effectiveness;
- Conduct a sustainability analysis;
- Produce global and country financial CCM indicators, as developed by the CCM technical advisory group; and
- Develop "what-if" scenarios that were considered by researchers or program managers to improve program sustainability or reduce funding requirements.

The tool produces the above outputs for three different scenarios, as described below. For each scenario, the cost and *utilization data* were derived from either the *actual or standard* data.

Actual number of cases treated scenario ("Actual")

Utilization for the actual scenario is based on the actual total numbers of CCM services provided, as reported in the Health Management Information System (HMIS) system. Since the iCCM tool is used to calculate costs for the baseline year and project costs for five additional years, this scenario is only available for the baseline year. In the case of Malawi, the baseline year used in the tool was 2010. The total (national) number of services provided for each treatment area was provided by the IMCI unit.

Costs for the actual scenario are based on a mix of actual and standard costs (see Table 3 below). [11]For example, actual salaries were collected to determine supervision costs, but standard estimates for staff time spent on supervision were used to arrive at a total supervision cost. At the community level, the actual number of iCCM services was combined with the standard costs[12] of providing each service to arrive at a total cost. This scenario also uses the actual number of HSAs currently providing iCCM, and multiplies this figure by the standard HSA salary that is allocated to CCM. For trainings and meetings, the actual costs of each are applied to the normative number of each occurrence. For example, standard cost inputs for the monthly HSA meetings were determined and multiplied by 12, assuming that all monthly meetings occurred as planned.

100% Coverage scenario ("100% Coverage")

Utilization for the 100% coverage scenario is based on the incidence rates for each CCM condition. In the case of Malawi, average Sub-Saharan incidence rates for pneumonia, diarrhea, and malaria were used. [13] The incidence rates can be changed by year in the tool, but in the case of Malawi, the same rates were used for each program year. These incidence rates were applied to the total population aged 2 to 59 months within hard-to-reach areas. The "100% coverage" in this scenario refers to the assumption that there will be a full met need for all cases.

Costs for the 100% coverage scenario are based on standard costs, using a similar methodology as described under the actual scenario. For this scenario, the required number of HSAs is driven by demand. This is obtained by calculating the expected caseload, based on the epidemiology and population size, and applying HSAs time constraints to determine the total number of HSAs needed. The tool then multiplies the number of HSAs by the standard salary per HSA to determine total salary costs. Note that only the portion of the HSA salary that can be attributed to CCM is included in the final iCCM program cost. Training, meeting, and supervision costs are all calculated based on standard costs, using assumptions input by the user. For example, as the number of health centers supervising iCCM increases (input by the user), the supervision costs at the health center will also increase (calculated by the tool).

[11] Actual costs of the iCCM program in Malawi were not available to the necessary level of detail or breakdown by specific line item. Certain costs were available (e.g., from NGOs) for specific elements (such as training), but determining the total actual cost of the program was not possible.
[12] Standard costs of a service (treatment) are determined by calculating the cost of drugs, supplies, staff time and other resources required according to standard treatment guidelines.
[13] Detailed information and citation for incidence rates used is described in Section 4 of this report.

Target % of cases treated scenario ("Target Coverage")

Utilization for the target coverage scenario is based on the incidence rates for each CCM condition, similar to the methodology described above for the 100% coverage scenario. However, the key difference in this scenario is the assumption that a target is set that is less than the full need. This is expressed as a percentage of the total expected caseload. The user enters a % for each treatment area, which can be input by year to model the cost implications of gradual scale-up. The target scenario is most useful when the gap between actual and full coverage utilization is perceived to be too large to fill immediately.

Costs for the target coverage scenario are based on standard costs, using a similar methodology as described under the actual scenario. Similar to the 100% coverage scenario, the number of HSAs required is calculated by multiplying the expected number of services by the time available for each HSA. However, in this scenario the expected number of services is reduced to a percentage of total need.

For the scenarios, it was assumed that the full need of children (ages 2-59 months) in the hard-to-reach areas should be met by HSAs providing CCM services, as opposed to seeking facility-based treatment. For the purpose of simplicity, only the actual and 100% coverage scenarios are shown in this report.

Table 3. Sources of costs used in the iCCM tool

Element	Source	Comment
HSA and CCM Training	Average of the actual unit costs of training from partners	The actual unit cost was multiplied by the standard number of expected participants to arrive at total cost
HSA Incentives	Actual unit costs of incentives (e.g., kits, bicycles) for HSA provided by IMCI Unit of MOH	The actual unit cost was multiplied by the total number of CCM-HSAs (assumed they all received bicycles, for example)
CCM Treatment	Actual unit drug and supply prices	The standard quantities of medicines and supplies were multiplied by the drug prices shown in the Malawi CMS Drug Catalogue
HSA Salaries	Actual 2010 salary of an HSA provided by IMCI Unit of MOH	Individual HSA salary costs are multiplied by a standard % allocation to CCM services (40%); this figure was then multiplied by the total number of CCM-HSAs
Health Center, District Health Office, and Central level salaries	Actual 2010 salary costs collected provided by IMCI Unit of MOH	Actual salaries were multiplied by standard estimates for time spent on supervision to derive the total supervision cost
HSA Meetings	Average of the actual unit costs for meetings from partners	The actual unit cost was multiplied by the standard number of expected participants to arrive at total cost

Ethics

This study received approval from the Government of Malawi, MOH. Oral consent was obtained in advance of all interviews with central, district, and health center staff and HSAs. This study was judged to have no risk to participants and any personal data collected was de-identified at the time of analysis. Participants were allowed to terminate the interviews at any time for any reason, without personal detriment.

Partner and Central Level Data Collection

Partners were interviewed to determine what support they provide for iCCM implementation. A standard questionnaire was used, which was amended depending on the degree to which activities varied for each partner. In the standard questionnaire, partners were asked for the following information:

- Districts in which partner supports iCCM implementation;
- Training data for HSAs (including # trained, total costs, and unit cost);
- Supervision data (including total spent per year at each level – central to facility, facility to community – and the unit costs for supervision);
- Costs and quantities of medicines/supplies provided to HSAs for iCCM (including transport and storage costs);
- Partner iCCM program support costs (including supervision, mentoring, reporting time provided directly from partner staff to IMCI unit, or districts); and
- Budget/projections for future spending/commitment on iCCM activities.

However, partners were unable to provide the detailed 5-year budget projections required for the financing component of the tool. Instead, the financing projections were based on the current sources of funding (see section on Financing below).

The research team met with the iCCM/child health focal staff at the following organizations, projects, and initiatives to collect the information described above: CRS, PSI, STC, UNICEF, USAID PMI, USAID DELIVER, USAID BASICS, WHO, and WVI. Together, these partners provide iCCM support across the 28 districts of Malawi.

Information collected at the central level (e.g., national IMCI and Environmental Health units, and other relevant departments in the MOH) included:

- Names of staff, salaries, and % time spent on the iCCM program (including % of time spent on supervision, trainings and meetings);
- National treatment protocols for HIV, PMTCT, and TB;
- National IMCI manual for HSAs;
- iCCM program start-up costs (e.g., trainings, HSA start-up kit);
- Historical program costs;
- Quality of Care report, authored by the Institute of International Programs at Johns Hopkins University, the Malawian MOH, WHO in Malawi and Geneva, and UNICEF;

- Caseload for all iCCM services (malaria, pneumonia, diarrhea, red eye, malnutrition and anemia) in 23 of Malawi's districts; and
- Drug information from the Malawi Drug Catalogue.[14]

Facility and Village Clinic Data Collection

As described above, the iCCM costing tool is intended to utilize both actual and standard expenditure and utilization data. While the purpose of the tool is to provide estimates of starting new iCCM programs and scaling-up existing ones, actual data was used as a reference point to test the tool. For testing the functionality of the assumptions, norms, and standards used in the tool, actual costs and revenues were collected, entered, and analyzed for a small number of communities. The actual data collected was also used to build a picture of Malawi's community health program.

Only a small sample of districts, facilities and communities was required to test the tool. Six districts were chosen to take into account geographic diversity (across all three of Malawi's zones) and partner diversity. Support for iCCM is primarily divided between four main partners: USAID-BASICS, UNICEF/WHO, STC, and PSI. The MOH's IMCI unit coordinates the partner support, ensuring consistency (such as having all partners use the same training protocols).

Within each district, data were collected at three levels of the health system: the district level (District Health Office [DHO]), the health center level, and the community level (HSAs and CHVs). At the DHO, data were collected from the District IMCI Coordinator, HMIS Coordinator, accounts personnel, human resources personnel, and procurement personnel. At the health centers, staff provided catchment population figures, utilization data, and expenditure figures for these facilities and the communities they serve. At the community level, HSAs provided population and utilization figures for their specific hard-to-reach catchment areas, as well as information on their time usage, salaries, and supervision, reporting, and meeting requirements.

All data were collected via oral interviews. Where possible, soft copies of documents were collected; if only hard copies existed, photographs were taken for subsequent data entry. A standard questionnaire, which includes a data collection checklist, was applied at each level (See Annex C for the questionnaire template).

Within the six districts sampled, 14 health centers and 35 of their respective hard-to-reach areas were selected for data collection (Table 4).

[14] Malawi CMS Catalogue. 2010 October to 2011 June.

Table 4. Summary of data collection

District Visited	Health Center Visited	# of CCM-HSAs Interviewed	Partner Organization
Salima	Kombedza	1	USAID BASICS
	Lifuwu	1	
Kasungu	Chamwabvi	1	
	Mkhota	1	
	Santhe	1	
Balaka	Chiendausiku	1	
	Kwitanda	1	
	Kalembo	1	
Lilongwe	Mbabzi	5	UNICEF/WHO
	Chiwambe	3	
Dowa	Dzaleka	4	STC
	Bowe	5	
Machinga	Ntaja	5	PSI
	Mangamba	5	
TOTAL	**14**	**35**	**5**

The health centers sampled were not far from the DHO and were believed to have good quality data and reporting. Within each district, health centers with different catchment populations were selected based on catchment population figures. Within each health center, HSAs were chosen by the in-charge (either randomly or by convenience). As a result, sampling bias may have occurred. See Annex A for details of actual facilities sampled.

The utilization figures for individual village clinics came from the VC Reporting Form that the HSAs complete each month and submit to the health center (see Annex D for example of reporting form).

Catchment Population

Catchment population figures for the villages were collected at the health center level. The in-charges and/or Senior HSAs provided reports that indicated the following for both the facility and the individual VCs: estimated size of the catchment population, the number of villages and households included, and the estimated proportion of key population segments (pregnant women, children under five, and children under one).

Staffing

Actual staffing levels were obtained at the facility level from a staff roster or an oral report given by the in-charge and/or Senior HSA at each health center. Where available, the human resource division of the DHO produced a Staff Return document that listed each staff person, his/her title, and the pay grade.

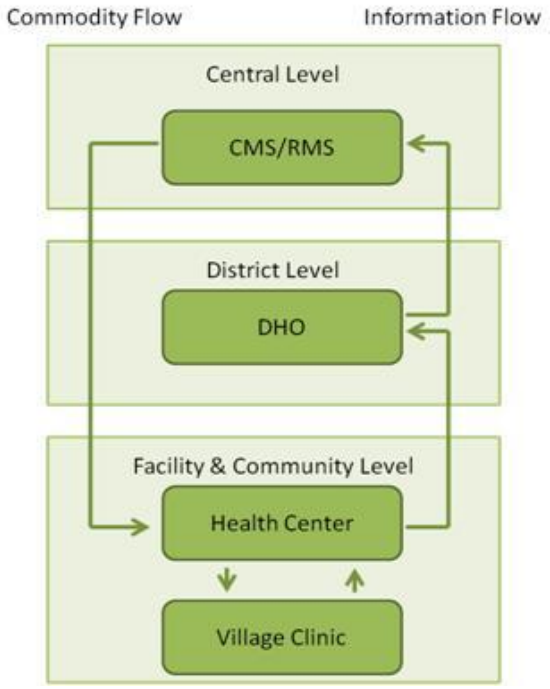
Information related to usage of staff time was collected, including the number of training events and the number of supervisory meetings attended per year. This information was collected at all levels (district, health center and community). The staff and salary information was entered into the tool to determine the costs of supervision at the district and health center level.

HSAs were interviewed to determine their time availability and use, including the amount of time spent on: CCM activities versus other preventive or promotional activities, supervision visits and monthly meetings at the health facility, and completing registers and reporting. This information was used to determine the total available time for HSAs, which was then input into the tool to calculate the necessary number of HSAs based on Malawi's epidemiological profile.

Medicines

Information about commodity flows in Malawi was difficult to track, which was most evident during the attempt to collect drug expenditures at the health center and community levels. Figure 1 below depicts the flow of information and of commodities within all levels of the health system. Medicines are distributed directly from the Regional Medical Stores (RMS) to the Health Centers. Medicine requisitions are made by the health center to the DHO, where the DHO compiles all of the requisitions for the districts and then sends the complete requisition for the district to the RMS. Medicine expenditures are tracked by the DHO using a supply chain management program, which was the source of drug distribution information at the health center level.

Figure 1. Commodity and information flows for medicines in Malawi



At the community level, HSAs report on drug consumption and submit new drug requisitions to the health center. The health center then compiles the requests from all VCs that report to them and includes the totals in the health center request to the District. When the medicines are delivered to the health centers, HSAs travel to the health centers to collect their medicines. The quantity and types of medicines picked up by the HSAs depend on the need at their VCs, and the availability at the health center.

The flow of information and commodities in Figure 1 relates only to the MOH and the Government. Additional private donations from partners including PSI, STC, UNICEF, and others are not captured in this graphic. These donations go directly to health centers, bypassing the Central Medical Stores (CMS) and the RMS, and certain medicines may be earmarked for use at VCs.

Operating Costs

In general, DHOs are responsible for paying the operating expenditures of health centers in their district. These expenditures are made from a central account at the DHO. Key accounts personnel were interviewed in each district to obtain operating expenditure data. This data only consisted of expenditures at the facility level, and did not include any community-level expenditures. The HSAs interviewed did not pay any operating costs, such as rental costs or electricity; rather, most were found to be operating out of their own homes, or using structures such as VCs to provide treatment.

Financing

Partner organizations and the IMCI Unit at the MOH were asked to provide information on financing projections for the next five years. Unfortunately, this information was not readily available due to a lack of certainty of funding commitments from partners, and the fact that some donor-funded projects (such as USAID BASICS) were coming to an end. The sources of the actual 2010 expenditure data for trainings, supervision, mentoring, medicines/supplies, and any other associated program costs were, therefore, used for the financing component. This assumed the current distribution of expenditure by source would remain the same in the projected years. Thus, while the figures for projected sources are incorrect they demonstrate that this element of the tool is functional. These assumptions can be easily changed in the tool as more up-to-date information is made available.

While various financing methods exist in other countries, such as collecting user fees and/or insurance premiums, this does not occur in Malawi. All iCCM program costs are funded by either the MOH or partner organizations.

4. Data Collection

The following information was obtained through the various data collection methods above and was entered into the iCCM tool. All costs are reported in U.S. dollars, using an exchange rate of 162 Malawian Kwacha (Mk) to $1.00.[15]

Population Figures

As described in the Introduction, Malawi has selected specific hard-to-reach areas in which to focus iCCM service delivery. Together, these areas make up approximately 40% of the total population. The total target population for CCM-HSAs (i.e., children aged 2-59 months in hard-to-reach areas) is 1,056,957. This figure refers to the total population of children that should be reached with iCCM services. However, it should be noted that in 2010 Malawi only covered 2,328 of the 4,000 hard-to-reach areas. In addition, HSAs only provide CCM services to children ages two to 59 months; therefore, the total target population for CCM-HSAs excludes newborns under two months of age. Table 5 summarizes the population figures used.

Table 5. Population figures, 2010

Total Malawi Population	15,448,000
Total "Hard-to-Reach" Population	6,179,200
Total "Hard-to-Reach" Target Population for iCCM (ages 2-59 months)	1,056,957
Total Districts in Malawi	28
Total Health Centers in Malawi	440
Total "Hard-to-Reach" Areas in Malawi	4,000
Total "Hard-to-Reach" Areas with CCM services	2,328
Average Total Population Size of "Hard-to-Reach" Area	1,545
Annual Population Growth Rate	2.8%

Source: IMCI Unit, Malawi MOH

CHW Availability & CCM Service Delivery Assumptions

According to the national policy, all HSAs are supposed to spend eight hours per day, five days per week working year round. Of those five days per week, CCM-HSAs should spend two days (or 40% of their total working time) providing CCM services. Based on these figures, a total of 757 hours per year per CCM-HSA should be available for provision of CCM services (equivalent to 7.9 days per month).[16] Additionally, the HSAs interviewed reported spending an average of 91 hours per month on travel, supervision, meetings, trainings, reporting and other management activities. Thus, the tool takes into account the constraints of the CCM-HSAs time to spend on CCM, and calculates the needed number of CCM-HSAs accordingly. These assumptions can be easily changed by the user.

[15] This was the exchange rate at the time of the study, reported as of August 2011.
[16] The 757 hours is calculated as follows: 8 hours per day x 2 days per week on CCM x 47 working weeks per year.

Program & Coverage Assumptions

As stated earlier, the MOH goal is for each HSA to serve a catchment population of 1,000 people. As far as CCM services are concerned, the policy is to have one CCM-HSA in each hard-to-reach area. Therefore, based on the average size of the hard-to-reach areas, each CCM-HSA should cover an average of 1,545 persons for CCM services. A yearly attrition rate of 2% and a yearly salary increase of 2% were assumed.

Incidence Rates for the CCM Interventions

Incidence rates for pneumonia, diarrhea, and malaria were not available for Malawi at the time of this study. Instead, internationally-recognized incidence figures in sub-Saharan Africa were used: 0.56 episodes per child per year for malaria;[17] 0.28 episodes per child per year for pneumonia;[18] and 4.5 episodes per child per year for diarrhea.[19] These rates can be easily updated in the tool if other figures become available.

For the remaining CCM services (red eye, nutrition assessment, and anemia), relevant incidence rates were not available. Therefore, a proxy rate was determined by taking the total caseload for these services seen in the community in 2010 divided by the total hard-to-reach population under five. These amounted to 0.03 cases per child per year for red eye; 0.01 cases per child per year for nutritional assessment; and 0.004 cases per child per year for anemia. It is worth noting that the proxy rate would be less that the real incidence rate, since care would not have been sought for all cases that occurred.

Standard Treatment Guidelines

The tool focuses on the interventions that comprise the CCM package provided by Malawi's CCM-HSAs: malaria, diarrhea, pneumonia, red eye, anemia and nutritional assessments. Specifically, the tool focuses on the curative services provided by the CCM-HSAs (i.e., the costs associated with treating these illnesses, such as the drug costs and salary costs on time spent per service), and does not include the costs associated with the preventive services that are provided separately from the CCM activities. In the tool, only the proportion of the costs that relate to the time CCM-HSAs should spend on CCM activities were accounted for. The alternative method of allocating the total costs of a CCM-HSA to all curative and preventive services would be much more complex and would require determining standard treatment guidelines for all those services. Table 6 shows the cost of one treatment per illness, based on the standard treatment guidelines developed by the expert group. Annex E provides further details on how the cost estimates were calculated, including the unit cost per drug.

[17] Korenromp E., Roca-Feltre A., Carneiro I. Malaria incidence estimates at country level for the year 2004. World Health Organization, Roll Back Malaria; Geneva, Switzerland. March 2005.
[18] Rudan I., Boschi-Pinto C., Biloglav Z., Mulholland K., Campbell H. Epidemiology and etiology of childhood pneumonia. Bulletin of the World Health Organization. Volume 86, Number 5, May 2008, 321-416.
[19] Childhood Diarrhea in Sub-Saharan Africa: Child Health Research Project Special Report. Volume 2, Number 1, April 1998.

Table 6. Standard Treatment Guidelines ($)

	Average time needed for one patient visit (minutes)	Medicines needed[A]	Average drug cost per episode
Diarrhea	26	ORS + Zinc	0.82
Pneumonia	26	Cotrimoxazole	0.08
Malaria (presumptive treatment)	26	Coartem + Paracetamol	0.76
Red eye	26	Tetracycline eye ointment	0.57
Nutritional assessment	26	None	0
Anemia	4	None	0

[A] *No additional supplies or tests were reported as being necessary for these services.*

Program Start-Up Costs

Table 7 shows the start-up costs per CCM-HSA, as identified for the Malawi iCCM program in 2010. The initial training session for HSAs is a 10-week course that provides basic medical background. In addition, HSAs can receive a number of trainings in specific (often vertical) programs, such as TB, HIV, CTC, or family planning, as well as CCM. For the purposes of this costing, only the CCM training costs are included, as well as a portion of the costs of the original HSA training (equivalent to 40% of the total HSA training cost),[20] on the grounds that this training provides the required basis for the iCCM skills as well as for other services. It was not possible to identify the pretraining costs necessary for national introduction of iCCM, including policy development, and training manual and job aide development and printing.

According to the MOH, as incentives, all HSAs receive a bicycle for transportation, and a 'start-up kit', which includes a drug box, medicine cups, spoons, timer, water containers, and a plastic basin. These are considered to be a one-time cost, given to each HSA at the beginning of their tenure.[21] The costs of these were input into the tool as part of the start-up costs. As with the HSA training, only a portion of these total costs are included, given that they are distributed to all HSAs. Note that these costs are not assumed to be recurrent (i.e., only one of each per HSA for the duration of the program), and depreciation costs are not included.

[20] In the case of Malawi, a 40% attribution factor for CCM activities is used, due to the fact that HSAs are supposed to spend 40% of their time on CCM and the remaining 60% on other HSA activities.
[21] These start-up costs do not include depreciation costs or costs due to renewal of assets.

Table 7. iCCM program start-up costs per HSA, 2010 ($)

	Total cost per HSA	CCM-portion of cost per HSA[A]
Initial HSA Training	1,555	622
CCM Training	364	364
HSA Incentives and Starter Kit	179	72
Start-up Kit	*56*	*22*
Bicycle	*123*	*49*
TOTAL COST	**2,098**	**1,058**

[A] *The CCM portion is equal to 40% of the total cost, as all HSAs obtain these items. The exception is the CCM training, which is 100% attributable to the iCCM program.*

Supervision and Meetings

According to the MOH and those interviewed, three levels of supervision occur regularly: central, district, and health center. Supervision costs are comprised of salary costs for those that spend time supervising and managing the iCCM program. Other supervision costs, such as transport, were not included. Table 8 provides an overview of the breakdown in supervision salary costs by level. Note that in the case of central level supervision, this includes overall supervision of the iCCM program, which can also be referred to as program management. Several key staff in the IMCI Unit spend a significant portion of their time on program management, which is why the costs at this level appear rather high in proportion to the district and health center costs.

Table 8. Total CCM supervision staff costs, 2010 ($)

	Total annual salary costs for supervision (baseline)
Central	14,334
District Health Office	4,008
Health Center	24,938
TOTAL COST	**43,280**

In addition, two types of meetings were accounted for in the tool. A CCM review meeting is held four times per year at the district level with an estimated total annual cost of $79,037 in 2010. A monthly IMCI meeting is also held at the health center with a total annual cost of $11,407. Transport, per diem and food costs are included for the HSAs and health center supervisors in the district level meeting, while the health center meetings only include transport costs for the higher-level supervisors, typically the IMCI Coordinator). The salary costs of the supervisors are not included because they were covered in the separate supervision costs.

Financing

Malawi's national iCCM program adapted the WHO Guidelines on IMCI. HSAs receive standard training, and the same service standards are applied nationwide. Malawi's 28 districts are supported by a host of partners. Each district has at least one main partner providing financial and technical support for all trainings, review meetings, supervision, etc. The district coverage by partners is as follows: Mulanje, Blantyre, Nkhotakota, Mchinji, Dowa, Ntchisi (STC); Mwanza, Neno, Machina, Zomba, Thyolo (PSI); Karonga, Mzimba, Kasungu, Lilongwe, Dedza, Ntcheu, Balaka, Chiradzulu, Phalombe, Nsanje (UNICEF); Chitipa, Rumphi, Nkahta Bay, Likoma, Salima, Kasungu, Mangochi, Phalombe, Chikwawa, Nsanje (BASICS through September 2011, and currently JPHIEGO).

In 2012 and 2013, support from partners will be more closely aligned with MOH objectives for CCM. Currently, the MOH's IMCI Unit has submitted funding proposals to the Bill and Melinda Gates Foundation for CCM activities. UNICEF, WHO, and STC have submitted a funding proposal to the Canadian International Development Agency (CIDA). Those funding streams will cover IMCI activities through 2013, and then it is expected that the Malawian government will be fully financing the iCCM program. Currently, partners support all required activities that are set forth by the IMCI Unit in the MOH.

The 2010 financing sources for iCCM program elements are shown in Table 9.

Table 9. Broad funding sources, 2010

Element of iCCM program	Funder
Medicines and supplies	Mixed government/donor
CHW salaries	Government
Supervision	Mixed government/donor
Meetings	Donors
Trainings	Donors

Data Challenges

While the majority of district, health center, and community level staff were very cooperative, there were difficulties in obtaining some information. For example, in Salima district, the HSA for one of the selected VCs in our sample was not able to be located, although confirmation was received that the HSA would be available for an interview. Another example was that one of the health centers visited was affiliated with CHAM (Christian Health Alliance of Malawi), and the inconsistent record keeping there did not provide all the necessary data for our study.

Given that the majority of data from the tool came from the questionnaires, a response bias may have occurred (e.g., the persons interviewed may have responded in such a way that they were providing answers that they thought were desirable, rather than what is actually happening). For example, this may have occurred with the HSA interviews, as many of them over-reported the amount of time they spent working per day or week (with some reporting they worked up to 120 hours/week).

The lack of infrastructure and resources in Malawi means that little information is collected or stored electronically; thus, soft copies of information such as financial records, drug invoices, and service utilizations records from DHOs, health centers and VCs were difficult to acquire. Instead, data collection relied heavily on taking photos of hard copy records for documentation and later input and analysis. Finally, as explained above, because the flow of information is not parallel to the flow of commodities, this led to challenges in knowing at which level or location the required records would be stored.

There are many partners in Malawi supporting iCCM activities; as such, collecting cost and utilization information from each of the major partners was a challenge. In certain cases, central level offices did not have historical cost records disaggregated to the level of VCs. Additionally, historical cost information may be considered as sensitive information, which may explain some organizations' reticence to share detailed records.

Future funding data was not able to be collected to perform a complete 5-year sustainability analysis. Collecting detailed funding information from partners was a challenge, in particular in the case of projects that are ending in a few months (such as USAID BASICS). Other partners declined to provide existing funding information, or did not have projections available. The government perspective was equally difficult to obtain, in view of the current uncertainties surrounding donor contributions to Malawi.[22] Financing information from 2010 was collected, which provided an adequate understanding of the current financing situation by iCCM program element (training, medicines, meetings, salaries, etc.)

Exclusions

The iCCM costing tool includes costs for nearly all of the iCCM program's key components at all levels of the health system. However, some costs were not able to be included. The main excluded costs are:

- The cost of developing policies and guidelines for community health, IMCI, and iCCM (these activities occurred several years in the past and cost data were not available);
- The cost of constructing the VCs;
- The cost of technical assistance provided by consultants or organizations in the development and/or evaluation of the program; and
- The indirect cost of the MOH and non-governmental organizations (NGOs) (e.g., the operating costs of the health center in which the supervisors are based and the cost of supervisory and management transport).

[22] The UK, in particular, has significantly reduced DFID funding in Malawi; see for example: http://www.bbc.co.uk/news/world-africa-14154485

5. Analysis

HSA time on CCM activities

The CCM-HSAs were interviewed using a standardized questionnaire (see Annex C3). Despite having the same standardized job descriptions, their responses varied with regards to time spent on different activities, supervisory visits, and in meetings and trainings. According to the national policy, as determined by the IMCI Unit, CCM-HSAs should spend 40% of their time (or two days a week) providing CCM services. Of the CCM-HSAs sampled, responses for time spent on CCM activities varied from 1 day to 6 days per week.

As salaried workers in Malawi, HSAs are expected to spend 8 hours a day working. As such, approximately 16 hours of their workweek (40%) should be dedicated to CCM. However, responses to the total number of hours spent on CCM varied greatly, ranging from 8 hours per week to 28 hours per week (see Annex A). Thus, based on these findings, CCM-HSAs time usage does not always conform to standards set by the MOH. Therefore, the standards set by the MOH was used in the modeling with the expectation that HSAs are available 40% of their time (i.e., two days per week) to provide CCM services to their communities.

Utilization

The total actual number of CCM services provided in 2010 was 620,990 (according to the central IMCI Unit); these figures were used in the tool (Table 10). The table also shows the projected number of cases for 2011-2015 based on the 100% coverage scenario. In 2010, the total number of CCM-HSAs providing services was 2,328. As such, the average number of cases per CCM-HSA per year was 31 for diarrhea, 87 for pneumonia, 137 for malaria, 7 for red-eye, 1 for nutritional assessment, and 1 for anemia.

A sample of utilization data taken from 5 months of reports of the 35 CCM-HSAs sampled indicated, however, that in some areas the treatment figures for pneumonia, malaria, and red-eye were much higher than the nationally-reported figures stated above. The average number of monthly services provided by each of the 35 CCM-HSAs ranged from 22 to 40 for diarrhea, 6 to 14 for pneumonia, 32 to 53 for malaria, 0 to 2 for red-eye, 0 to 1 for nutritional assessment, and 0 to 1 for anemia. These utilization figures vary as a result of a number of factors, such as variations in their catchment population, issues with correct reporting, and reported frequent drug stock outs (which prevented the HSA from providing a particular service that month). For example, one HSA reported a complete stock out of medicines in April 2010, and three HSAs reported complete stock outs of medicines in May and June 2010. Based on our limited sample it appears likely that the national figures are under-stated.

The total number of expected cases for 2010 under the 100% coverage scenario is shown in Table 10. These figures were calculated by applying the incidence rate for each service to the hard-to-reach target population (children aged 2-59 months). Under this scenario, the average number of cases per CCM-HSA was 2,043 for diarrhea, 127 for pneumonia, and 254 for malaria. In the case of red-eye, nutritional assessment and anemia, incidence rates were not available as the actual figures were used. To provide 100% coverage, approximately 3,307,567 CCM services should have been provided. The numbers of cases per capita are shown in the bottom part of Table 10. These were calculated by dividing the total number of services by the target population (children aged 2-59 months in hard-to-reach areas). Based on these figures, it is clear that CCM services were underutilized in 2010.[23]

For the remaining program years, utilization figures were calculated for the 100% coverage scenario based on the incidence rates and assuming an average population growth rate of 2.8% per year. Note again that incidence rates for red-eye, nutritional assessment, and anemia were unavailable and therefore, projections were based on the actual 2010 utilization figures.

Table 10. Number of CCM services from the Actual and 100% Coverage scenarios, 2010 – 2015

	2010		2011	2012	2013	2014	2015
	Actual Cases Treated	100% Coverage	100% Coverage				
Cases							
Diarrhea	73,121	2,768,171	3,254,441	3,765,772	4,303,185	4,867,742	5,460,540
Pneumonia	204,307	172,242	202,499	234,315	267,754	302,882	339,767
Malaria	320,898	344,484	404,997	468,629	535,508	605,763	679,534
Red eye	16,974	16,974	19,956	23,091	26,386	29,848	33,483
Nutritional assessment	3,188	3,188	3,748	4,337	4,956	5,606	6,289
Anemia	2,508	2,508	2,949	3,412	3,899	4,410	4,947
TOTAL	**620,996**	**3,307,567**	**3,888,589**	**4,499,556**	**5,141,688**	**5,816,251**	**6,524,560**
Per Capita Figures (<5)							
Diarrhea	0.07	4.5	4.5	4.5	4.5	4.5	4.5
Pneumonia	0.19	0.28	0.28	0.28	0.28	0.28	0.28
Malaria	0.3	0.56	0.56	0.56	0.56	0.56	0.56
Red eye	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Nutritional assessment	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Anemia	0.002	0.002	0.002	0.002	0.002	0.002	0.002
TOTAL	**1.01**	**5.38**	**5.38**	**5.38**	**5.38**	**5.38**	**5.38**

[23] This may be due to lack of demand or to supply side constraints, such as drug stock outs.

There are two ways in which CCM coverage can be expanded in Malawi. One is by expanding the number of services provided in 2,328 hard-to reach areas covered by the existing CCM-HSAs. The other is by expanding the numbers of CCM-HSAs until all 4,000 hard-to-reach areas are covered. These two approaches can be combined to reach full scale up of services.

If the 620,996 services provided in 2010 (Table 10) were divided by the 2,328 CCM-HSAs, an average of 267 CCM services per year is obtained, which comes to 2.6 services per working day (assuming 50 weeks times 2 days). Based on the standard time for each service, CCM-HSAs should be able to provide 16 CCM treatments in an 8 hour day.[24]

To provide 100% coverage of the 2,328 hard-to-reach areas with CCM-HSAs, the number of CCM services required in 2010 would have been 3,307,567 (Table 10). While this would have been a large increase, compared to the 620,996 services actually provided, it could have been achieved with the same number of CCM-HSAs since it works out to 14.2 treatments per day, less than the maximum of 16.3 per day. Thus, it is clear that the iCCM program can be expanded to meet the full need for services with one CCM-HSA per hard-to-reach area.

For the years 2011 through 2015, a steady increase in the number of hard-to-reach areas was assumed until all 4,000 are covered by 2015. It was also assumed that full coverage would be achieved in all hard-to-reach areas. The tool was set to assume a minimum of 1 CCM-HSA per hard-to-reach community; as such, the number of CCM-HSAs also increased to 4,000 in 2015. The total number of services per CCM-HSA per year increased slightly with population growth, but still remained achievable at roughly 16.3 CCM services per day by 2015.

Table 11. CCM-HSA figures for the Actual and 100% Coverage scenarios, 2010 – 2015

	2010		2011	2012	2013	2014	2015
	Actual Cases Treated	100% Coverage	100% Coverage				
Total # HSAs	2,328	2,328	2,662	2,997	3,331	3,666	4,000
Total # of CCM Cases	620,996	3,307,567	3,888,589	4,499,556	5,141,688	5,816,251	6,524,560
# annual services per CCM-HSA	267	1,421	1,461	1,501	1,543	1,587	1,631
# daily services per CCM-HSA	2.6	14.2	14.6	15	15.4	15.8	16.3
HSAs/1,000 pop (<5)	3.8	3.8	3.7	3.6	3.5	3.4	3.3

[24] The standard time for treating all types of cases was estimated at 26 minutes, with 4 minutes for anemia.

Costs

Start-up Costs

Malawi has a long-standing community health program, and HSAs have been a formal part of the MOH payroll system for several years. The addition of CCM services to the HSA job description has been a gradual effort since 2008. As a result, with regards to start-up costs, only the basic training and equipment costs for HSAs were identified (as described in the Methodology section).[25]

For the actual start-up costs, the cost of training and equipping the 2,328 HSAs who were employed in 2010 was estimated, even though some were trained and equipped in the years prior. Table 12 shows the number of HSAs that require training and equipment, which is the same for both scenarios due to the minimum figure of one HSA per hard-to-reach area. To fully train and equip 2,328 HSAs, it would have cost an estimated $2,462,247, the majority of which was spent on the initial 10-week HSA training.

Table 12. iCCM program start-up costs for the actual number of CCM-HSAs employed, 2010 ($)

	Unit cost per CCM-HSA	Total cost of training and equipping CCM-HSAs
Number of CCM-HSAs to be trained and equipped	—	2,328
Initial HSA Training (40% of cost)	622	1,448,016
CCM Training (100% of cost)	364	847,120
HSA Incentives and Starter Kit (40% of cost)	72	167,110
TOTAL	**1,058**	**2,462,247**

As described earlier, the number of CCM-HSAs drives the program costs in the tool; due to the fact that the estimated number of HSAs required was less than 1 per average hard-to-reach population size, the minimum of 1 HSA per area was used as a default. As a result, in both scenarios, the number of CCM-HSAs required remains the same. Thus, the training and incentive costs are also identical.

Table 13 shows the start-up costs for the remaining program years for the 100% coverage scenario. Although these costs occur after the start of the program, they are still considered start-up costs because they apply to the newly added HSAs each program year. Additional HSAs are required after the first program year for two reasons: first, to make up for workers lost to attrition and death (assumed to be 2%); and second, to allow for scale-up of communities from 2,328 in 2010 to a total of 4,000 in 2015. Based on the coverage of hard-to-reach areas, the additional number of HSAs required is calculated, resulting in the figures shown in the first row of Table 13.

[25] The cost of developing policies and manuals was, for example, not available.

Table 13. iCCM program start-up costs for the 100% Coverage scenario, 2011 – 2015 ($)

	2011	2012	2013	2014	2015
	100% Coverage				
Number of hard-to-reach areas covered	2,662	2,997	3,331	3,666	4,000
Number of CCM-HSAs required	2,662	2,997	3,331	3,666	4,000
Number additional HSAs to be trained and equipped from previous year[1]	381	388	394	401	408
Initial Training cost for new HSAs	236,957	241,117	245,277	249,437	253,597
Training cost of new CCM-HSAs	138,625	141,059	143,492	145,926	148,360
Incentives and Starter Kit cost for new CCM-HSAs	27,346	27,826	28,307	28,787	29,267
TOTAL	**402,928**	**410,002**	**417,076**	**424,149**	**431,223**

[1] Additional HSAs required to increase coverage and cover loss due to attrition.

Recurrent costs

Recurrent costs are divided between direct and indirect costs in the tool. Direct costs include all costs that are directly involved in service delivery; namely, medicines and HSA salary costs. The indirect costs are comprised of supervision/management and meeting costs at all levels of the health system, and also the cost of the time that the CCM-HSAs do not spend providing CCM services.[26]

The total recurrent cost of the program in 2010 is estimated at $1,331,536 (Table 14). This is based on the actual number of cases treated and the mix of actual and standard costs, as described earlier in the methodology. The cost of treating all cases represented in the 100% coverage scenario in 2010 would have been $3,553,972. The total projected annual recurrent program cost rises from $4.2 million in 2011 to nearly $6.9 million in 2015.

The major cost elements in each year are medicines and CCM-HSA salaries. The actual costs in 2010 were $329,497 for medicines and $868,315 for CCM-HSA salaries ($132,211 direct and $736,104 indirect). These reflect 25% and 66% of the total cost, respectively. Supervision and meeting costs made up 3% and 6% of the actual total costs in that year. Assuming an increase in the number of hard-to-reach areas in 2011 and 100% coverage in those areas, the total drug and CCM-HSA salary costs would rise to $3.0 million and $1.1 million, respectively, making up 72% and 24% of the total cost of $4.1 million. Supervision and meeting costs are projected at 1% and 2% of the actual total costs in that year. The main increase is in drug costs, since it directly relates to the number of services provided. The increase in salary costs is much less since it relates mainly to the increase in hard-to-reach areas. There are significant economies of scale involved in the staffing costs since the CCM-HSAs were relatively under-utilized in 2010 (this is shown by the decrease in indirect salary costs from 2010 to 2011).

[26] It is assumed for the purpose of this exercise that the CCM-HSAs do not spend the unused portion of the 2 CCM days per week on other services.

Supervision costs were a relatively low portion of total costs in 2010 and remain low in the projected years. This is because it relates only to the increase in the number of CCM-HSAs, and assumes that many of them are under health centers that already have iCCM programs. These costs are based on central, district and health center supervision activities and comprise the proportion of the salary costs per staff that are attributable to supervising and managing CCM activities.[27] Meeting costs were also a relatively low portion of total costs in 2010, although they increased in the subsequent years related to the increases in the numbers of CCM-HSAs.

Table 14. Total recurrent costs for Actual and 100% Coverage scenarios, 2010 – 2015 ($)

	2010		2011	2012	2013	2014	2015
	Actual Cases Treated	100% Coverage	100% Coverage				
Direct Costs							
Medicines	329,497	2,551,933	3,000,217	3,471,604	3,967,037	4,487,493	5,033,984
Salary (Direct)	132,211	706,149	846,799	999,443	1,164,915	1,344,100	1,537,942
Indirect Costs							
Supervision	43,280	43,280	44,145	45,028	45,929	46,847	47,784
Meetings	90,444	90,444	101,798	113,151	124,504	135,857	147,210
Salary (Indirect)	736,104	162,166	166,105	163,485	153,633	135,826	109,292
TOTAL	**1,331,536**	**3,553,972**	**4,159,063**	**4,792,710**	**5,456,017**	**6,150,124**	**6,876,212**

The total actual and 100% coverage recurrent costs for 2012 are broken down by case type in Table 15. This clearly shows that the significant increase in the cost of scaling up to 100% coverage of diarrhea cases is mostly due to increases in drug costs.

[27] The cost of supervisory and management transport was excluded due to difficulties in estimating these costs nd an assumption that such visits are also used for other purposes.

Table 15. Total recurrent costs by type of cost and CCM intervention, 2010 ($)

	2010									
	Actual Cases Treated					100% Coverage				
	Direct Costs		Indirect Costs			Direct Costs		Indirect Costs		
	Medicines / Supplies	CHW Salary	Super-vision	Meetings	Indirect CHW Salary	Medicines / Supplies	CHW Salary	Super-vision	Meetings	Indirect CHW Salary
Total Recurrent Costs										
Diarrhea	59,886	15,621	5,114	10,686	86,972	2,267,132	591,370	36,245	75,743	135,807
Pneumonia	16,990	43,647	14,288	29,858	243,008	14,324	36,796	2,255	4,713	8,450
Malaria	242,945	68,554	22,441	46,897	381,684	260,801	73,593	4,510	9,426	16,900
Red eye	9,675	3,626	1,187	2,481	20,189	9,675	3,626	222	464	833
Nutritional assessment	—	681	223	466	3,792	—	681	42	87	156
Anemia	—	82	27	56	459	—	82	5	11	19
TOTAL	**329,497**	**132,211**	**43,280**	**90,444**	**736,104**	**2,551,933**	**706,149**	**43,280**	**90,444**	**162,166**

Most of the actual costs in 2010 are related to malaria ($762,522), although based on 100% coverage the highest cost should have been on diarrhea ($3,106,298) (Table 16). The cost per service varied from $0.25 for anemia to $2.44 for diarrhea in the actual scenario; and from $0.05 for anemia to $1.12 for diarrhea in the 100% coverage scenario.[28]

The same table shows that the actual average recurrent cost per service was actually $2.44 for diarrhea but if the 100% coverage had been achieved that cost would have been $1.12 due to economies of scale.[29]

[28] The high cost of diarrhea in the 100% coverage scenario is due to the relatively high incidence rate of 4.5 episodes per child per year.

[29] Indirect costs (salary costs for supervision and meeting costs) were allocated across the services in proportion to the HSA time spent on those services.

Table 16. Total recurrent costs and cost per service by CCM intervention, 2010 ($)

	2010	
	Actual Cases Treated	100% Coverage
Total Recurrent Costs		
Diarrhea	178,279	3,106,298
Pneumonia	347,790	66,538
Malaria	762,522	365,231
Red eye	37,158	14,821
Nutritional assessment	5,162	966
Anemia	625	117
TOTAL	**1,331,536**	**3,553,972**
Cost per Service		
Diarrhea	2.44	1.12
Pneumonia	1.70	0.38
Malaria	2.38	1.06
Red eye	2.19	0.87
Nutritional assessment	1.62	0.30
Anemia	0.25	0.05

The reduction in cost per service due to scaling up is shown more clearly in Table 17. The direct costs, which are based on standards, do not change from the actual to 100% coverage scenarios, but the indirect costs are much less due to economies of scale under the 100% coverage scenario. The indirect cost the same for all services except anemia because it is allocated in accordance with the standard time required, which is the same for those services (26 minutes). The standard time for seeing a child with anemia is only four minutes because that is only a referral service.

Table 17. Direct and indirect costs per service by CCM intervention, 2010 ($)

	2010					
	Actual Cases Treated			100% Coverage		
	Direct Costs	Indirect Costs	Total	Direct Costs	Indirect Costs	Total
Cost per Service						
Diarrhea	1.03	1.41	**2.44**	1.03	0.09	**1.12**
Pneumonia	0.30	1.41	**1.70**	0.30	0.09	**0.39**
Malaria	0.97	1.41	**2.38**	0.97	0.09	**1.06**
Red eye	0.78	1.41	**2.19**	0.78	0.09	**0.87**
Nutritional assessment	0.21	1.41	**1.62**	0.21	0.09	**0.30**
Anemia	0.03	0.22	**0.25**	0.03	0.01	**0.05**

The cost per service would remain fairly stable from 2011 through 2015 (Table 18). For example the cost of treating a malaria case would only decline by $0.01 from 2011 to 2015. This small change is due to some economies of scale because of increases in case load due to population growth offset by an assumed annual increase of 2% in salaries.[30] The major change in the costs per service is shown in the comparison between the actual 2010 figures and the projected 2010 and 2011 figures (Tables 17 & 18), which reflect the considerable economies of scale.

Table 18. Total recurrent costs and cost per service by CCM intervention for the 100% Coverage scenario, 2011 – 2015 ($)

	2011	2012	2013	2014	2015
Total Recurrent Costs					
Diarrhea	3,635,872	4,190,538	4,771,267	5,379,064	6,014,971
Pneumonia	77,226	88,326	99,855	111,825	124,251
Malaria	427,386	492,471	560,599	631,885	706,453
Red eye	17,326	19,946	22,686	25,551	28,546
Nutritional assessment	1,118	1,274	1,436	1,604	1,777
Anemia	135	154	174	194	215
TOTAL	**4,159,063**	**4,792,709**	**5,456,017**	**6,150,123**	**6,876,213**
Cost per Service					
Diarrhea	1.12	1.11	1.11	1.11	1.10
Pneumonia	0.38	0.38	0.37	0.37	0.37
Malaria	1.06	1.05	1.05	1.04	1.04
Red eye	0.87	0.86	0.86	0.86	0.85
Nutritional assessment	0.30	0.29	0.29	0.29	0.28
Anemia	0.05	0.05	0.04	0.04	0.04

[30] It was assumed that other costs, which are shown in $, would not increase.

Total Costs

The total iCCM program cost was determined by adding the start-up and recurrent costs for each year of the program. The total actual cost for 2010 was nearly $3.8 million (Table 19), which covers the cost of starting the program and the cost of providing the actual numbers of services as if they were spread over a full year. [31] If 100% coverage was achieved for the full first year of operations and the starting costs were incurred in that first year the cost would have been $6.0 million. The actual and 100% coverage start-up costs per capita (child under five) in 2010 are the same at $4.00 because both scenarios assume the same numbers of "new" CCM-HSAs.[32] The start-up costs per capita in the subsequent years only relate to new CCM-HSAs and the new populations covered and are slightly smaller because of population growth. The actual recurrent cost per capita (child under five) in 2010 was low because the coverage rate was low. The projected recurrent cost per capita was greater when full coverage was assumed and did not vary much over the years.

Table 19. Total iCCM program cost and cost per capita for the Actual and 100% Coverage scenarios, 2010 – 2015 ($)33

	2010		2011	2012	2013	2014	2015
	Actual Cases Treated	100% Coverage	100% Coverage				
Start-up cost	2,462,247	2,462,247	409,928	410,002	417,076	424,149	431,223
Recurrent cost	1,331,536	3,553,972	4,159,063	4,792,710	5,456,017	6,150,124	6,876,212
TOTAL	**3,793,783**	**6,016,219**	**4,561,991**	**5,202,713**	**5,873,093**	**6,574,273**	**7,307,435**
Total Population <5 Covered by CCM Program	615,149	615,149	723,209	836,838	956,263	1,081,720	1,213,453
Start-up cost per capita	4.00	4.00	0.56	0.49	0.44	0.39	0.36
Recurrent cost per capita	2.16	5.78	5.75	5.73	5.71	5.69	5.67
Total cost per Capita (<5)	6.17	9.78	6.31	6.22	6.14	6.08	6.02

[31] In reality the full costs would not be incurred during the year in which an iCCM program is introduced, but for simplicity the full annual costs are showed in the tool.
[32] The population figure for children under five was used since all CCM interventions provided in Malawi are geared towards this population.
[33] These costs are shown in Malawi Kwacha in Annex F.

The costs of starting a new program in Malawi can be calculated from the data in Table 19. Assuming that it takes six years (2010 to 2015) to scale up coverage to all 4,000 villages, the total start-up costs to put 4,000 CCM-HSAs in place would be the total start-up costs over the six years, which is $4,547,626 (including replacing CCM-HSAs who were lost to attrition). The annual recurrent costs of providing 100% coverage of the services needed in the 4,000 hard-to-reach areas would be roughly $6,876,212 (the total for 2015).

The cost of scaling up the iCCM program from its level in 2010 to achieve 100% coverage in all 4,000 hard-to-reach areas was also calculated. The start-up costs of increasing the number of CCM-HSAs from 2,328 to 4,000 would be $2,085,379 and the additional annual recurrent costs of reaching 100% coverage would be roughly $5.5 million (the projected $6.8 million in 2015 less the $1.3 million spent in 2010).

In the tool, targets were also set for scaling up the individual case treatments at different levels. The results are not shown here for reasons of simplicity.

Comparisons with other studies

The current literature on CCM was reviewed to serve as a source of comparison with our results; two reports in particular stood out: Benjamin Johns et al., "The Cost of Child Health Services in Four Districts of Malawi,"[34] and the Earth Institute's "One Million Community Health Workers."[35]

Johns et al. report costs and cost-effectiveness for child health in general, but not CCM specifically due to difficulties in collecting utilization rates of village clinics and drug usage by HSAs. The authors note that cost of training HSAs in CCM is approximately $165 per HSA, taking into account only per diems and not including material costs. This can be compared with the costs from our report of $363, which covered per diems, in addition to all other relevant costs.

The Earth Institute's report on CHWs did not provide total unit costs per CCM treatment, but did include the following drug costs: diarrhea, $0.54 for oral rehydration solution (ORS) and zinc tablets; malaria, $0.61 per rapid diagnostic test (RDT) kit and $0.45 per artemisinin-based combination therapy (ACT) treatment; and pneumonia, $0.27 for antibiotics. This can be compared with the estimates from our tool, which produced the following unit drug costs: diarrhea, $0.82 for 3 ORS sachets and zinc tablets; malaria, $0.65 per ACT treatment and $0.02 for paracetamol; and pneumonia, $0.08 for antibiotics. The Earth Institute report, furthermore, estimated the average yearly expenditure of Malawi's entire CHW (not CCM-specific) program, at a total of $57.69 million.

[34] Johns, B., Munthali, S. The Cost of Child Health Services in Four Districts of Malawi: Baseline data for Estimating the Cost and Cost-effectiveness of the Rapid Scale-up for Child Health. University of Malawi, Johns Hopkins Bloomberg School of Public Health. July 2011.
[35] One Million Community Health Workers. Technical Task Force Report. The Earth Institute, Columbia University. 2011.

Financing

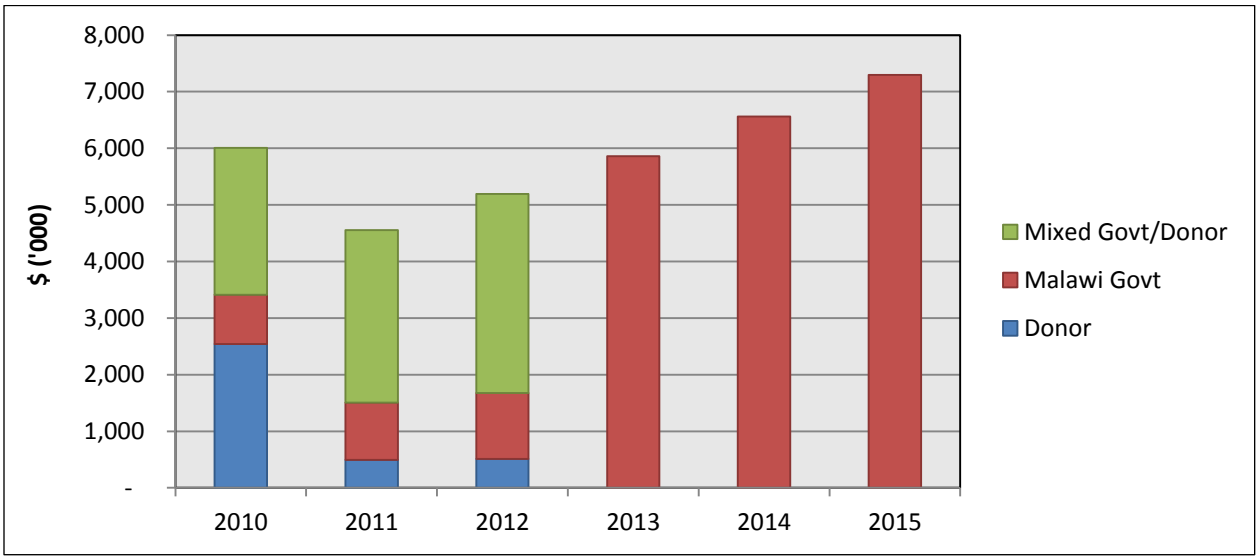
The tool has a section on financing which can be used to show the forecasted funding sources. As described earlier in the methodology and data collection sections of this report, specific funding forecasts from the government and donors were not obtainable at the time of this study.

The breakdown of funding for 2010 was as follows: donors entirely funded the start-up costs, which comprise training and HSA incentives, in addition to funding the regular HSA supervision meetings. The Malawian Government funded entirely the salaries paid to the HSAs. A mix of donor and government funding covered the remaining elements: supervision and medicines and supplies. In 2010, this breakdown meant that the government funded 14% of the program ($868,315); donors exclusively funded 42% of the program ($2,552,691); and a mix of government and donors funded the remaining 43% ($2,595,212) (Figure 2).

The IMCI Head stated that it is the intention of the Malawian government to fund the entire program from 2013. Without forecasts for the intervening years of 2011 and 2012 we assumed that the 2010 mix of funds would apply. This means that donor funding would decline in 2011 and 2012 due to the reduction in start-up costs.

If the Malawian MOH takes over all the funding in 2013 it would need to provide almost $6 million in that year and that figure would rise to over $7 million in 2015.

Figure 2. Funding Projections by source, 2010 – 2015 ($ '000)



6. Conclusion

In Malawi in 2010 there was a total hard-to-reach population of 6 million of which 1 million (17%) were assumed to be children aged 2-59 months. Based on estimated incidence rates, this meant a total estimated need (assuming 100% coverage of services) for over 5.7 million CCM treatments in 2010, of which roughly 4.8 million would be for diarrhea, 590,000 would be for malaria and 296,000 would be for pneumonia. The remaining services were for treatment of red-eye and assessment of nutrition and anemia.

In 2010 the iCCM program covered 2,328 (58%) of the estimated total of 4,000 hard-to-reach areas and provided 620 thousand services (roughly 11% of the need). Based on these figures it appears that the iCCM program was under-utilized although possibly not as much as the figures indicate because the national utilization figures may be under-stated. In 2010 each CCM-HSA provided, on average, 2.6 CCM services per working day. The total number of CCM services needed comes to about 14.2 treatments per day. Based on the standard times it should be possible for a CCM-HSA to provide 16.3 services per day, which means that the iCCM program can be scaled up to full coverage with an average of one CCM-HSA per hard-to-reach area. Areas with larger populations would require more CCM-HSAs or more days dedicated to CCM activities.

There are two ways in which CCM coverage can be expanded in Malawi. One is by expanding the number of services provided in 2,328 hard-to reach areas covered by the existing CCM-HSAs. The other is by expanding the numbers of CCM-HSAs until all 4,000 hard-to-reach areas are covered. These can be combined. The cost of scaling up the iCCM program from its level in 2010 to achieve 100% coverage in all 4,000 hard-to-reach areas would be roughly $2.1 million for additional start-up costs and roughly $5.5 million for additional annual recurrent costs If this was a new program, the total iCCM program start-up costs required to meet this need would be $4.6 million and the total recurrent costs for one year would be $6.9 million. By 2015, the largest recurrent cost category would be medicines (73%), followed by CCM-HSA salaries (24%), meetings (2%), and supervision (1%).

The start-up cost per capita (child under five) in 2010 was $4.00 and this reduces significantly in subsequent years due to the fact that the majority of the CCM-HSAs would be trained in 2010, in addition to economies of scale. The recurrent cost per capita in 2010 was only $2.16 because of the low coverage and this would increase to $5.67 by the time full coverage would be achieved in 2015.

In terms of the recurrent cost per service of the actual services provided in 2010, diarrhea was the most expensive at $2.44, malaria was $2.38, pneumonia was $1.70, red-eye was $2.19, nutritional assessment was $1.62, and anemia was $0.25. If full coverage is achieved in 2015, the average cost of these treatments will fall considerably due to economies of scale. For example, the cost of diarrhea treatment will fall to $1.13, malaria will fall to $1.06, and pneumonia will fall to $0.39 (per treatment).

In 2010 the government funded 14% of the program ($868,315), donors exclusively funded 42% of the program ($2,552,691), and a mix of government and donors funded the remaining 43% ($2,595,212). Without forecasts for the intervening years of 2011 and 2012 we assumed that the 2010 mix of funds would apply. This means that donor funding would probably decline in 2011 and 2012 due to the reduction in start-up costs. If, as reportedly intended, the Malawian government takes over all the funding in 2013 it would need to provide almost $6 million in that year and that figure would rise to over $7 million in 2015.

It should be noted that the main purpose of this work was to test the tool and only a small sample of facilities and community health workers was required for that purpose. That sample is too small for the resulting data to be representative of the program as a whole and the results of the modeling shown in this report should, therefore, be considered as illustrative. Nevertheless, we believe that these results can be useful to the MOPH and partners and the figures used in the tool can be updated as desired.

The lessons learned from using the cost tool for this study can be found in Annex H.

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Annexes

ANNEX A.	Health Centers and Village Clinics Sampled
ANNEX B.	People Contacted
ANNEX C.	Questionnaire Templates for District, Health Facility, and Community (VC) Level
ANNEX D.	Sample Village Clinic Reporting Form
ANNEX E.	Standard Treatment Guidelines
ANNEX F.	Total Costs if iCCM Program in Malawian Kwacha
ANNEX G.	Glossary
ANNEX H.	Lessons Learned

Annex A. Health Centers and Village Clinics Sampled

District	Health Center (HC)	HC catchment	Village Clinic	VC catchment population	# of households within VC catchment population	# of hours per day working in VC	# of days per week working in VC
Salima	Kombedza	51884	Chimonjo	4065	793	10 hrs	2 days
	Lifuwu	13147	Kanchentche	2124	—	8 hrs (2d) + 4-5 hrs between other 3 days	2 days
Kasungu	Chamwabvi	27,418	Mitula	3472	821	4 hrs	6 days
	Mkhota	26,396	Kalimira	974	157	7 hrs	2 days
	Santhe	35,622	Chamkoma	4822	—	8.5 hrs	3 days
Balaka	Chiendausiku	14,904	Samanyada	1162	—	4.5 hrs	3 days
	Kwitanda	25,147	Thapaniwa	1214	269	2-4.5 hours	5 days
	Kalembo	42,628	Maninji	1797	418	7.5 hrs	2 days
Lilongwe	Chiwambe	54,544	Chimutu II (Mseche)	3658	698	8 hrs	2 days
			Salambula	991	314	8 hrs	2 days
			Maloamyama	1683	579	8 hrs	2 days
			Chimutu I	2230	512	8 hrs	2 days
			Mbununu	1935	430	5 hrs	2 days
	Mbabzi	37,466	Nankumba	2481	480	8 hrs	2 days
			Mgongonda	2523	296	8 hrs	2 days
			Chilambo	3734	688	8 hrs	2 days
Dowa	Dzaleka	38,723	Mpisi	1584	476	8 hrs	2 days
			Chibwata	2029	275	2 hrs	5 days
			Nyundo	1798	278	6.5 hrs (3d) / 2 hrs (2d)	3 days / 2 days
			Chuzu I (Chauwa)	1539	485	5 hrs[36]	5 days
	Bowe	28,123	Dambalika	1163	232	8 hrs	2 days
			Mwavu	1680	329	8 hrs	2 days
			Matsewa	1465	269	8 hrs	2 days
			Katuntha	1884	391	8 hrs	2 days
			Linthembwe	1543	323	8 hrs	2 days
Machinga	Ntaja	44,581	Masambaka	2784	553	8 hrs	2 days
			Masaka	1359	352	8 hrs	2 days
			Jumamtopa	413	96	8 hrs	2 days
			Salanje	1824	170	8 hrs	1 day
			Simba	349	69	8 hrs	2 days
	Mangamba	18,747	Nakalapa	1717	607	8 hrs	1 day
			Masanje	2481	403	8 hrs	1 day

[36] This HSA may have been including time outside of normal working hours, as the clinic was in his household. In the HSAs schedule, he only lists having two village clinic days in the month of July 2011.

District	Health Center (HC)	HC catchment	Village Clinic	VC catchment population	# of households within VC catchment population	# of hours per day working in VC	# of days per week working in VC
			(Balakasi)				
			M'Mwala	1722	224	8 hrs	1 day
			Ngongondo	2770	647	8 hrs	2 days
			Chikuluma	2075	285	8 hrs	1 day

Annex B. People Contacted

PARTNER ORGANIZATIONS

Catholic Relief Services

Antonia Powell, Deputy Chief of Party – IMPACT

PSI

Mary Baloyi, Malaria and Child Survival, Programme Manager

Sarah Gibson, Communications Director

Tsitsi Mtsuko, Finance Assistant

Robert Mahala, Malaria and Child Survival Programme Assistant

Ricki Orford, Resident Director

Save the Children

Tiyese Chimuna

Joby George

Ignasio Wachepa

JSI/DELIVER

Willy Kabuya

BASICS

Rudi Thetard, Chief of Party

Timothy Kachule, Child Survival Specialist

Nitta Kalonga, M&E/Statistician

Misheck Luhanga, M&E/Statistician

Lusako Mwalwenje, Accountant

Joe Kumadzulo, Malaria Grants Manager

TBCAP

Chifundo Kachiza, Chief of Party

CFPHS

Mexon Nyirongo, Chief of Party

UNICEF

Allan Macheso

Texas Zamasiya

World Health Organization

Leslie Mgalula

Francis Magombo

World Vision International

Regina Mandere

MOH

IMCI Unit

Humphreys Nsona, Head, IMCI Unit

Angella Mitimuni, M&E, IMCI Unit

Clifford Dedza, Logistics

Environmental Health

Edwin Nkhono, Primary Healthcare Coordinator, MOH

National Malaria Control Programme

John Sande, Malaria Case Management & GF Desk Officer

Regional Medical Store

Chikondi Kadawati (by email and phone)

USAID

Catherine Chiphazi, USAID Malawi

Kate Wolfe, President's Malaria Initiative (PMI)

Annex C. Questionnaire Templates for District, Health Facility, and Community (VC) Level

Annex C1. District Health Office Questionnaire

DISTRICT HEALTH OFFICE QUESTIONNAIRE	
Date of Interview:	
Name of Interviewer:	
Location of Interview:	
Name of District:	
Name of Person Interviewed:	
Title:	
Contact Number:	

Statistics		**Period of Analysis**
For the selected health center(s), collect the following statistics:		
(If not available at district level, identify the level at which they can be located)		
1)	Monthly HMIS reports (disaggregated by HC)	2010 - PRESENT
	Reports should include all curative and preventive services provided by HC	
2)	Monthly HMIS reports (aggregated for district)	2010 - PRESENT
	NOTE: Ask if CCM activities are counted as part of total in HMIS reports.	
2)	Monthly HSA activity reports (disaggregated by HC)	2010 - PRESENT
3)	Compiled data from iCCM Village Clinic registers (disaggregated by HC)	ALL DATA AVAILABLE TO DATE

Staff	
For the selected health center(s), collect the following:	
1)	List of staff (clinical and support staff) at each health center
2)	Staff salaries and source of funding
3)	List of HSAs / Village Clinics
4)	Salaries and source of funding for HSAs
For district health office staff, collect the following:	
5)	List of all district health office staff involved in supporting CCM
6)	Staff salaries and source of funding for staff in (5)
7)	% of time spent on community health activities or HSAs

	Reporting, support, supervision *NOTE FOR CCM ACTIVITIES ONLY*	Period of Analysis
1)	**Number of supervisory meetings for HSAs at district level in the past year**	2010
	District health office and health center staff involved	
	Number of HSAs, HC staff, other in attendance	
	Length of meetings	
	Associated meeting costs - travel, per diems, food, etc	
2)	**Number of supervisory visits in the community in the past year (as outreach)**	2010
	District health office and health center staff involved	
	Number of HSAs, HC staff, other in attendance	
	Length of meetings	
	Associated meeting costs - travel, per diems, food, etc	
3)	**Amount of time spent on reporting HSA activities by district health office**	
	Title, name, salary of staff	
	% of time spent reporting on HSA activities	
4)	**Other support / supervision (list activities and cost breakdown)**	
5)	**Other transport costs for support and supervision**	

	Training	Period of Analysis
1)	**List each HSA training held by the district health office in the past year.**	2010
	For each training:	
	Type of training (start-up; refresher; module such as diarrhea or ARI, etc)	
	Number and cadres of trainers	
	Number of HSAs in attendance	
	Number of health center staff in attendance	
	Number of district or higher-level attendants	
	Costs of per diem, transport, training fee, supplies, food, etc	
	Location of training	

	Medicines and supplies	Period of Analysis
1)	Actual drug costs for the selected health center(s)	2010
	Drugs, medical supplies, lab reagents, etc.	
	If no drug costs available, monthly requisition forms for health center(s)	
2)	Actual cost of drugs and supplies donated to health center in the past year	
	If no cost available, quantities of each drug or supply	
3)	Actual cost of drugs and supplies purchased for HSAs in the past year	
4)	Actual cost of drugs and supplies donated for HSAs in the past year	
	If no cost available, quantities of each drug or supply	

Expenditure		Period of Analysis
1)	Operating costs for each of the selected health center(s)	2010
	Fuel, electricty, water, maintenance, cleaning supplies, etc.	
2)	Expenditure on incentives for HSAs	
3)	All other expenditure on CCM not listed above	

Annex C2. Health Center Questionnaire

HEALTH CENTER QUESTIONNAIRE	
Date of Interview:	
Name of Interviewer:	
Location of Interview:	
Name of District:	
Name of Person Interviewed:	
Title:	
Contact Number:	
Health Center:	
Period of Analysis:	
Start Date (MM/YY)	
End Date (MM/YY)	

Health Center Information		**Period of Analysis**
For the selected health center(s), collect the following:		
1)	Type of Health Center (MOH, CHAM, NGO - source of funding)	
2)	Location of Health Center (rural, urban)	
3)	Catchment Population	
4)	Number of beds	
5)	Hours/day Health Center open	
6)	Days/week Health Center open	
7)	Days/year Health Center is CLOSED (holidays, etc)	
8)	Number of Village Clinics	

Statistics **(IF ALREADY AVAILABLE AT DISTRICT LEVEL, PROCEED TO NEXT SECTION)**		**Period of Analysis**
1)	Monthly HMIS reports	2010 - PRESENT
	Reports should include all curative and preventive services provided by HC	
	NOTE: Ask if CCM activities are counted as part of total in HMIS reports.	
2)	Monthly HSA activity reports	Sample Report
3)	Compiled data from iCCM Village Clinic registers	ALL DATA AVAILABLE TO DATE
	NOTE: FOR ALL VILLAGE CLINICS FOR HEALTH CENTER	

Staff	
For health center-based staff:	
1)	List of staff (clinical and support staff) at each health center Include job title/description, level, etc.
2)	For clinical staff: % of spent on direct service delivery
3)	Staff salaries and source of funding
4)	List of all health center staff involved in community health program or HSAs
5)	% of time spent on community health activities or HSAs
For HSAs:	
1)	List of HSAs for each Village Clinic associated with health center

Village Clinic Information		Period of Analysis
For each Village Clinic associated with Health Center:		
1)	Name of Village Clinic	
2)	Catchment Population	
3)	Total number of houses	
4)	Total number and list of HSAs	
5)	Number of houses covered by each HSA	
6)	Expected hours/week per HSA	
7)	Average number of contacts per day per HSA	

Reporting, support, supervision FOR CCM ACTIVITIES		Period of Analysis
1)	**For each health center based staff member who supports HSAs or HSA program:**	
	Title, name, salary of staff	
	% of time spent supporting HSAs (if full time i.e.. Senior HSA, 100%)	
2)	**Number of supervisory meetings at health center in the past year**	
	Health center staff involved	
	Number of HSAs in attendance	
	Length of meetings	
	Associated meeting costs - travel, per diems, food, etc	
3)	**Number of supervisory visits in the community in the past year (as outreach)**	
	Health center staff involved	
	Number of HSAs in attendance	
	Length of meetings	
	Associated meeting costs - travel, per diems, food, etc	

Reporting, support, supervision FOR CCM ACTIVITIES		Period of Analysis
4)	**Amount of time spent on reporting HSA activities by health center staff**	
	Title, name, salary of staff	
	% of time spent reporting on HSA activities	
5)	**Other support / supervision (list activities and cost breakdown)**	

Training		Period of Analysis
1)	**List each HSA training held by the health center in the past year.**	
	For each training:	
	Type of training (start-up; refresher; module such as diarrhea or ARI, etc)	
	Number and cadres of trainers (health center staff)	
	Number of HSAs in attendance	
	Number of district or higher-level attendants	
	Costs of per diem, transport, training fee, supplies, food, etc	
	Location of training	

Drugs and supplies		Period of Analysis
1)	Total cost of all drugs and consumable supplies for Health Center in the past year	
2)	Actual cost of drugs and supplies donated to health center in the past year	
	If no cost available, quantities of each drug or supply	
3)	List of essential drugs, supplies, commodities provided to HSAs	
4)	Actual cost of drugs and supplies purchased for HSAs in the past year	
5)	Actual cost of drugs and supplies donated for HSAs in the past year	
	If no cost available, quantities of each drug or supply	

Expenditure		Period of Analysis
1)	Total operating costs for health center in the past year, broken down by type	
2)	List all other sources of expenditure on HSAs or HSA program	

Health Center Level Checklist	
Copy or photograph the last complete month for the following documents (where applicable):	
1)	Aggregated HSA activity reports (total numbers of each kind of treatment, etc) for HEALTH CENTER
2)	Staff list (all health center staff who supervise or train HSAs) - names, titles, salaries
3)	HSA drug and supply list; stock sheets; logs
4)	List of trainings and cost breakdowns for each
5)	HSA registers
6)	Package of HSA services or interventions
7)	Fee for service receipts, records, etc
8)	List of tariffs, fees for service, etc
9)	List of regular supervisory meetings and cost breakdowns for each
10)	Any other HSA support costs
11)	Transport costs (including vouchers, etc)

Annex C3. Community Level Questionnaire

COMMUNITY HEALTH WORKER QUESTIONNAIRE	
Date of Interview:	
Name of Interviewer:	
Location of Interview:	
Name of District:	
Name of Community:	
Name of Person Interviewed:	
Supervising Health Center:	
Period of Analysis:	
Start Date (MM/YY)	
End Date (MM/YY)	

Health Center Information		
A) Time availability and contacts		
1)	How many hours per day do you spend working as an HSA?	
2)	How many days per week?	
3)	How many weeks per month?	
4)	How many months per year?	
5)	On average, how many visits or contacts do you have per week?	
	Ask HSA to list daily activities for a typical week	
7)	What times of the year do caregivers come in most frequently for treatment?	
8)	How much time do you spend (per day, week or month) on travel throughout the community?	
B) Training, reporting, and supervision		
9)	In the last year, how many supervisory meetings were held? (Note if they are monthly, quarterly, etc)	
10)	Of these supervisory meetings, how many did you attend?	
11)	On average, how long is each supervisory meeting?	
12)	On average, how much time did it take to travel to each supervisory meeting?	
13)	With whom, and where, are the supervisory visits? (Health center, district office, etc)	
14)	How many days of training were required to become an HSA (taking the MOH approved HSA training program)?	
15)	What topics were covered in the HSA training program? (List the specific interventions covered)	

Health Center Information		
16)	Other than the initial HSA training, how many other training sessions did you attend in the past year?	
	For each training session, list the length of training, travel time required, topics covered, who provided the training, etc.	
17)	In addition to supervision and training, did you participate in any other meetings in the past year?	
	For each meeting, list the length of the meeting, travel time required, topics covered, who required the meeting, etc.	
18)	How much time do you spend on the following activities, and at what frequency (daily, weekly, monthly, etc)?	
	Restocking medical and other supplies	
	Filling out reports (if multiple, list each type of report)	
	Routine surveillance	
	Patient follow-up	
	Other management activities (list each type)	
19)	Describe the reporting structure - who do you report to, what is the reporting format, etc.	
C) Services provided		
20)	List each type of service provided and approximate % of total time spent	
A)	IMCI – Diarrhea	
B)	IMCI – Pneumonia	
C)	IMCI – Malaria	
D)		
E)		
21)	Estimate approximate time spent on one treatment (minutes)	
A)	Diarrhea	
B)	Pneumonia	
C)	Malaria	
22)	Do you participate in additional periodic events, such as vaccination campaigns, bednet distributions, etc?	
	List each additional event, length of time, frequency, etc.	
D) Drugs, supplies and equipment		
23)	List the drugs and medical supplies regularly provided	
A)	LA 6x1	
B)	LA 6x2	
C)	ORS	
D)	Cotrimoxazole	
E)	Zinc	

Health Center Information		
F)	Eye Ointment	
G)		
24)	From where are through what mechanism are drugs, supplies etc. provided to you? How frequently? What quantities?	
E) Fees for service - NOT APPLICABLE IN MALAWI		
25)	Do you collect fees for service?	
	List each type of service and the fee for each service	
F) Pay		
26)	What amount is your regular monthly salary?	
27)	What is the source of your salary? (MOH "established post" or Global Fund "non-established post")	
28)	In addition to the monthly salary, do you receive other pay? What is this pay for, what amount, and what frequency?	
29)	Do you receive salary top-ups? What amount or percentage of your regular salary?	
30)	Do you receive any "in-kind" incentives? List what has been received, and what they were given for.	
31)	How much did you receive for each training course that you attended in the last year? Per diem, transport, other.	
32)	How much did you receive for each meeting that you attended in the last year? Per diem, transport, other.	

Community Level Checklist	
Copy or photograph the last complete month for the following documents (where applicable):	
1)	Sample Activity Report
2)	Sample CCM Village Clinic Report
3)	Drug Requisition Form
4)	Patient register
5)	Pay slip

Annex C4. Staff Template used to collect staff salary information at all three levels of the health system

STAFF TEMPLATE	
District:	
Health Center:	
Village Clinic:	

1)								
Level (District, HC, Comm)								
Name					**Title/Position**			
Grade	**% Time spent on CCM**	**% Time spent direct service delivery**	**% Time sent on Training**	**Source of Salary**	**Base Salary**	**Top-Up**	**Other**	**Total Salary**

2)								
Level (District, HC, Comm)								
Name					**Title/Position**			
Grade	**% Time spent on CCM**	**% Time spent direct service delivery**	**% Time sent on Training**	**Source of Salary**	**Base Salary**	**Top-Up**	**Other**	**Total Salary**

3)								
Level (District, HC, Comm)								
Name					**Title/Position**			
Grade	**% Time spent on CCM**	**% Time spent direct service delivery**	**% Time sent on Training**	**Source of Salary**	**Base Salary**	**Top-Up**	**Other**	**Total Salary**

4)

Level (District, HC, Comm)								
Name					Title/Position			
Grade	% Time spent on CCM	% Time spent direct service delivery	% Time sent on Training	Source of Salary	Base Salary	Top-Up	Other	Total Salary

5)								
Level (District, HC, Comm)								
Name					Title/Position			
Grade	% Time spent on CCM	% Time spent direct service delivery	% Time sent on Training	Source of Salary	Base Salary	Top-Up	Other	Total Salary

6)								
Level (District, HC, Comm)								
Name					Title/Position			
Grade	% Time spent on CCM	% Time spent direct service delivery	% Time sent on Training	Source of Salary	Base Salary	Top-Up	Other	Total Salary

7)								
Level (District, HC, Comm)								
Name					Title/Position			
Grade	% Time spent on CCM	% Time spent direct service delivery	% Time sent on Training	Source of Salary	Base Salary	Top-Up	Other	Total Salary

Annex C5. Training template to collect information about each of the trainings held at all levels of the health system that HSAs are expected to attend.

TRAINING TEMPLATE	
District:	
Health Center:	
Village Clinic:	

1)								
Level (District, HC, Comm)					**Date or Frequency of Training**			
Description of Training								
Length of Training (Days)	**Source of Funding**	**# Supervisors**	**# Trainers**	**# Participants**	**Travel cost per participant**	**Food cost per participant**	**Per diem cost per participant**	**Rental Cost**

2)								
Level (District, HC, Comm)					**Date or Frequency of Training**			
Description of Training								
Length of Training (Days)	**Source of Funding**	**# Supervisors**	**# Trainers**	**# Participants**	**Travel cost per participant**	**Food cost per participant**	**Per diem cost per participant**	**Rental Cost**

3)								
Level (District, HC, Comm)					**Date or Frequency of Training**			
Description of Training								
Length of Training (Days)	**Source of Funding**	**# Supervisors**	**# Trainers**	**# Participants**	**Travel cost per participant**	**Food cost per participant**	**Per diem cost per participant**	**Rental Cost**

4)								
Level (District, HC, Comm)					Date or Frequency of Training			
Description of Training								
Length of Training (Days)	Source of Funding	# Supervisors	# Trainers	# Participants	Travel cost per participant	Food cost per participant	Per diem cost per participant	Rental Cost

5)								
Level (District, HC, Comm)					Date or Frequency of Training			
Description of Training								
Length of Training (Days)	Source of Funding	# Supervisors	# Trainers	# Participants	Travel cost per participant	Food cost per participant	Per diem cost per participant	Rental Cost

6)								
Level (District, HC, Comm)					Date or Frequency of Training			
Description of Training								
Length of Training (Days)	Source of Funding	# Supervisors	# Trainers	# Participants	Travel cost per participant	Food cost per participant	Per diem cost per participant	Rental Cost

7)								
Level (District, HC, Comm)					Date or Frequency of Training			
Description of Training								
Length of Training (Days)	Source of Funding	# Supervisors	# Trainers	# Participants	Travel cost per participant	Food cost per participant	Per diem cost per participant	Rental Cost

Annex C6. Template to collect information on all meetings that HSAs are expected to attend at all levels of the health system.

MEETING TEMPLATE	
District:	
Health Center:	
Village Clinic:	

1)								
Level (District, HC, Comm)				**Date or Frequency of Meeting**				
Description of Meeting								
Length of Meeting (Days)	**Source of Funding**	**# Supervisors**	**# Trainers**	**# Participants**	**Travel cost per participant**	**Food cost per participant**	**Per diem cost per participant**	**Rental Cost**

2)								
Level (District, HC, Comm)				**Date or Frequency of Meeting**				
Description of Meeting								
Length of Meeting (Days)	**Source of Funding**	**# Supervisors**	**# Trainers**	**# Participants**	**Travel cost per participant**	**Food cost per participant**	**Per diem cost per participant**	**Rental Cost**

3)								
Level (District, HC, Comm)				**Date or Frequency of Meeting**				
Description of Meeting								
Length of Meeting (Days)	**Source of Funding**	**# Supervisors**	**# Trainers**	**# Participants**	**Travel cost per participant**	**Food cost per participant**	**Per diem cost per participant**	**Rental Cost**
4)								

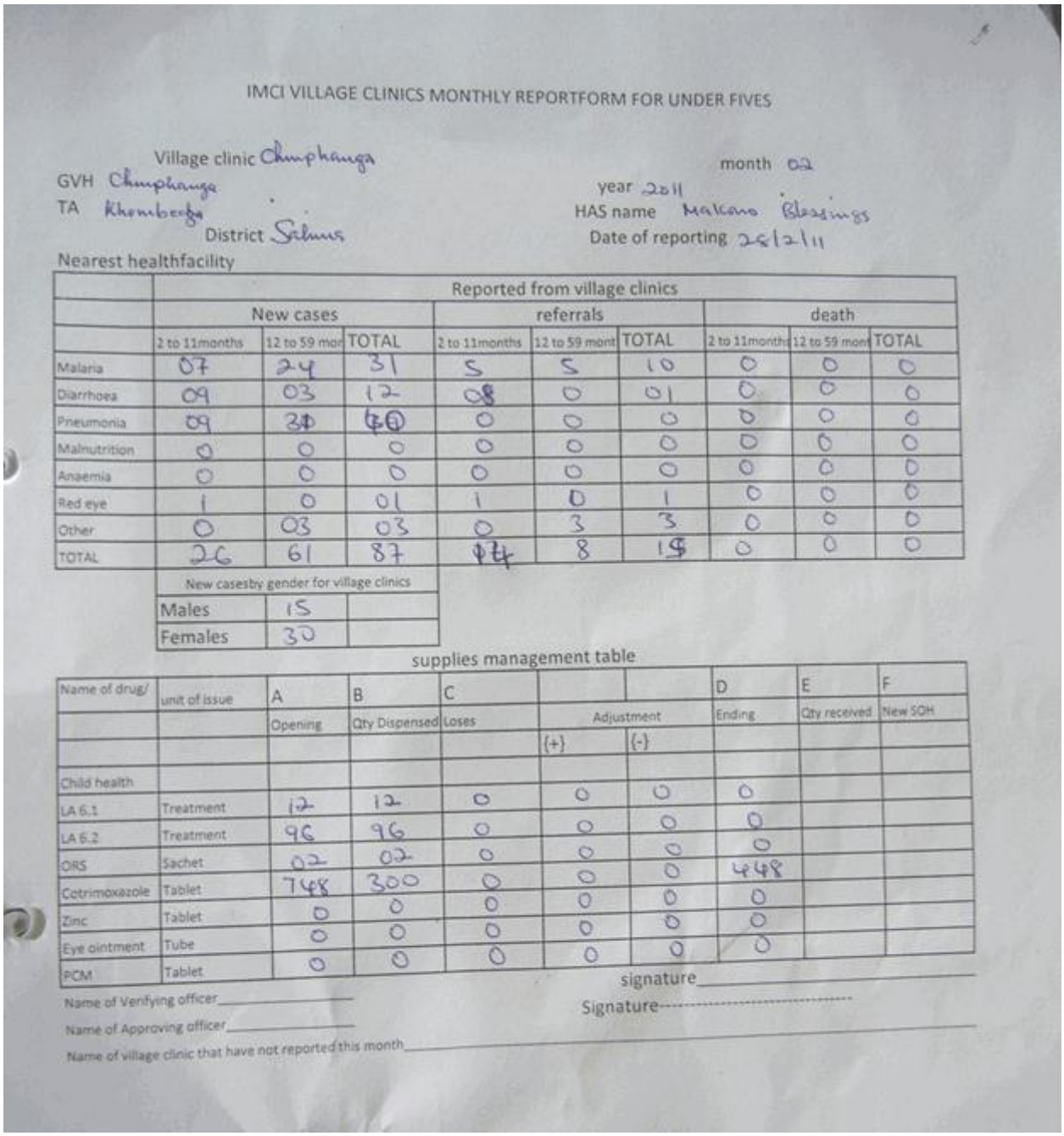
Level (District, HC, Comm)					Date or Frequency of Meeting			
Description of Meeting								
Length of Meeting (Days)	Source of Funding	# Supervisors	# Trainers	# Participants	Travel cost per participant	Food cost per participant	Per diem cost per participant	Rental Cost

5)								
Level (District, HC, Comm)					Date or Frequency of Meeting			
Description of Meeting								
Length of Meeting (Days)	Source of Funding	# Supervisors	# Trainers	# Participants	Travel cost per participant	Food cost per participant	Per diem cost per participant	Rental Cost

6)								
Level (District, HC, Comm)					Date or Frequency of Meeting			
Description of Meeting								
Length of Meeting (Days)	Source of Funding	# Supervisors	# Trainers	# Participants	Travel cost per participant	Food cost per participant	Per diem cost per participant	Rental Cost

7)								
Level (District, HC, Comm)					Date or Frequency of Meeting			
Description of Meeting								
Length of Meeting (Days)	Source of Funding	# Supervisors	# Trainers	# Participants	Travel cost per participant	Food cost per participant	Per diem cost per participant	Rental Cost

Annex D. Sample Village Clinic Monthly Reporting Form for Under Fives



IMCI VILLAGE CLINICS MONTHLY REPORTFORM FOR UNDER FIVES

Village clinic Chimphanga — month 02

GVH Chimphanga — year 2011

TA Khombedza — HAS name Makawa Blessings

District Salima — Date of reporting 25/2/11

Nearest healthfacility

	Reported from village clinics								
	New cases			referrals			death		
	2 to 11months	12 to 59 mon	TOTAL	2 to 11months	12 to 59 mont	TOTAL	2 to 11months	12 to 59 mont	TOTAL
Malaria	07	24	31	5	5	10	0	0	0
Diarrhoea	09	03	12	08	0	01	0	0	0
Pneumonia	09	31	40	0	0	0	0	0	0
Malnutrition	0	0	0	0	0	0	0	0	0
Anaemia	0	0	0	0	0	0	0	0	0
Red eye	1	0	01	1	0	1	0	0	0
Other	0	03	03	0	3	3	0	0	0
TOTAL	26	61	87	14	8	15	0	0	0

New casesby gender for village clinics		
Males	15	
Females	30	

supplies management table

Name of drug/	unit of issue	A	B	C			D	E	F
		Opening	Qty Dispensed	Loses	Adjustment		Ending	Qty received	New SOH
					(+)	(-)			
Child health									
LA 6.1	Treatment	12	12	0	0	0	0		
LA 6.2	Treatment	96	96	0	0	0	0		
ORS	Sachet	02	02	0	0	0	0		
Cotrimoxazole	Tablet	748	300	0	0	0	448		
Zinc	Tablet	0	0	0	0	0	0		
Eye ointment	Tube	0	0	0	0	0	0		
PCM	Tablet	0	0	0	0	0	0		

signature

Name of Verifying officer

Signature

Name of Approving officer

Name of village clinic that have not reported this month

Annex E. Standard Treatment Guidelines

The following standard treatment guidelines for drugs were determined by consulting an expert group. The unit cost per drug was obtained from the Malawi Drug Catalogue (CMS 2010 Oct. to 2011 June). No additional supplies, drugs and/or tests were reported as being necessary for nutritional assessment or anemia. The nutrition or anemia services are assessments only and drugs are not provided. The nutrition assessment is estimated to need 26 provider minutes and the anemia assessment 4 minutes.

Diarrhea <5

Time required for one treatment (mins): 26								
Drug, Supply, or Test	**# of times/ day**	**# of days/ cycles**	**% of cases treated**	**Units per dose**	**Total units**	**Unit cost (Mk)**	**Total cost (Mk)**	**Total cost ($)**
ORS, powder sachet for 1000ml	1	3	100.0%	1.00	3.00	29.16	87.48	0.54
Zinc	1	10	20.0%	0.50	1.00	5.02	5.02	0.03
Zinc	1	10	80.0%	1.00	8.00	5.02	40.18	0.25
Average episode drug cost:							**132.68**	**0.82**

Pneumonia <5

Time required for one treatment (mins): 26								
Drug, Supply, or Test	**# of times/ day**	**# of days/ cycles**	**% of cases treated**	**Units per dose**	**Total units**	**Unit cost (Mk)**	**Total cost (Mk)**	**Total cost ($)**
Cotrimoxozole tablet 480mg	2	5	20.0%	0.50	1.00	1.50	1.50	0.01
Cotrimoxozole tablet 480mg	2	5	80.0%	1.00	8.00	1.50	11.98	0.07
Average episode drug cost:							**13.47**	**0.08**

Malaria <5 (presumptive treatment)

Time required for one treatment (mins): 26								
Drug, Supply, or Test	**# of times/ day**	**# of days/ cycles**	**% of cases treated**	**Units per dose**	**Total units**	**Unit cost (Mk)**	**Total cost (Mk)**	**Total cost ($)**
COARTEM Tab (Artemether 20mg + Lumefantrine 120mg) 1x6	2	3	20.0%	1.00	1.20	11.86	14.23	0.09
COARTEM Tab (Artemether 20mg + Lumefantrine 120mg) 2x6	2	3	80.0%	2.00	9.60	10.99	105.53	0.65
Paracetamol tablet 500mg	3	3	20.0%	0.25	0.45	0.71	0.32	0.002
Paracetamol tablet 500mg	3	3	80.0%	0.50	3.60	0.71	2.56	0.02
Average episode drug cost:							**122.65**	**0.76**

Red eye

Time required for one treatment (mins): 26								
Drug, Supply, or Test	**# of times/ day**	**# of days/ cycles**	**% of cases treated**	**Units per dose**	**Total units**	**Unit cost (Mk)**	**Total cost (Mk)**	**Total cost ($)**
Tetracycline HCL eye ointment 1%, 3.5g	1	1	100.0%	1.00	1.00	92.34	92.34	0.57
Average episode drug cost:							**92.34**	**0.57**

Annex F. Total Costs of iCCM program in Malawian Kwacha (MK)

Total Program Cost and Cost per Capita, 2010 (MK)

	2010	
	Actual Cases Treated	100% Coverage Scenario
Total Program Cost	614,592,799	974,627,413
Total Population <5 Reached	615,149	615,149
Cost per Capita (<5)	999	1,584

Total Program Cost and Cost per Capita for the 100% Coverage scenario, 2011 - 2015 (MK)

	2011	2012	2013	2014	2015
Total Program Cost	739,042,596	842,839,432	951,441,024	1,065,032,240	1,183,804,456
Total Population <5 Reached	723,209	836,838	956,263	1,081,720	1,213,453
Cost per Capita (<5)	1,022	1,007	995	985	976

Annex G. Glossary

Capital expenditure:	the cost for resources that last more than one year, such as building, vehicles, computers, pre-service training. Sometime a price ceiling is also defined (usually $US100), below which costs are considered as recurrent. The cost of capital equipment is net of depreciation. Also called investment or non-recurrent cost/expenditure. (World Health Organization - Health Systems Strengthening Glossary: http://www.who.int/healthsystems/Glossary_January2011.pdf)
Cost benefit analysis:	a comparison of costs and achieved benefits, where both costs and benefits are expressed in monetary terms. (ibid)
Cost effectiveness analysis:	a form of economic evaluation where costs are expressed in money terms but consequences are expressed in physical units. It is used to compare different ways of achieving the same objective. (ibid)
Costing:	(i) the estimation of a specific strategy or intervention, or of an overall national policy, strategy or plan. (ii) the estimation of the cost of different scenarios, corresponding to different priorities or strategies, in the short, medium or long term. (ibid)
Direct cost:	(i) internal cost of an activity or decision including cost of labor, other goods and services, capital (usually considered as a rental value) and consumables. Direct cost excludes external costs, productivity costs, uncompensated forgone earnings and elements of cost that may be undervalued by market prices.42 (ii) all the goods, services and other resources that are consumed in the provision of a particular service or area (e.g. hospital supplies), including medical costs (e.g. payments to providers, material) and non-medical costs (e.g. transportation to hospital). (ibid)
Depreciation:	the reduction in value of a capital asset through wear and tear. (ibid)
Economies of Scale:	the decline in average cost of each unit produced as output increases, due to the distribution of production costs and other fixed costs across a higher number of units. (ibid)
Fixed cost:	A cost that does not change with variations in output. For example, the rent of a clinic building does not change with the number of patients treated (until the capacity of the clinic is reached.
Indirect costs:	total sum of morbidity costs (goods and services not produced by the patient because of the illness), mortality costs (goods and services the person could have produced had the illness not been incurred and the person not died prematurely), and productivity cost (related to lost productivity incurred by an employee who leaves work to provide care for the patient). (World Health Organization - Health Systems Strengthening Glossary: http://www.who.int/healthsystems/Glossary_January2011.pdf)

Marginal cost:	the change in total cost that results from a unit increase in output. (ibid)
Opportunity cost:	"the value of the next best alternative forgone as a result of the decision made." (ibid)
Recurrent expenditures – costs:	costs that refer to inputs which last less than one year and are regularly purchased for continuing an activity, such as salaries, drugs and supplies, repair maintenance, and others. (ibid)
Variable cost:	A cost that is directly proportional to the number of outputs produced. For example, in a clinic the cost of medicines can be regarded as varying directly with the number of patients treated.
Semi-Variable Cost:	A cost which has a fixed element and a variable element and which varies to some degree with the volume of outputs produced. An example would be the cost of a training course which has a fixed element (the rent of the room) and a variable element (materials for the students).
Step-variable cost:	A cost which is fixed up to a certain volume of outputs. An example would be a nurse at a clinic who can see up to 30 patients per day. Her salary is a fixed cost when the volume is up to 30 patients. When there are 31 patients another nurse has to be hired and the salary cost increases to that of two nurses. Presented graphically these costs look like steps.

Annex H. Lessons Learned

As the first of three research countries for the development of the iCCM cost tool, Malawi served as a test of the data collection tools and methodology that had been developed prior to the visit. The data collection visit to Malawi occurred simultaneously with the development of the prototype tool; thus, the numerous iterations of the tool were shaped by our findings in the field. As a result, there were several lessons learned with regards to the data collection process, and, subsequently, the tool development.

The lessons learned focused on the logistics of data collection, availability of data, clarification of questionnaires, and strategies to overcome difficulties collecting information from partners related to CCM. The timing of data collection was tight, and communication with health centers and HSAs was challenging. It will be important going forward to leave enough time to allow informants to arrive at the location of the interview. Additional time will also allow for more CHWs to be interviewed if they are asked to come to the health center, as opposed to the research team spending time to travel to the various communities. Going forward in the remaining research countries, it will be important to allocate time for travel and improve coordination with districts, health centers, and CHWs in order to have enough time to effectively conduct and complete the interviews. It was clear after the trip to Malawi that the role of the co-principal investigator is critical to the success of the data collection.

Several questions on the Health Surveillance Worker questionnaire seemed unclear and required clarification during the interviews. The two questions that were most difficult for interviewees to answer were: Question 18: "How much time do you spend on the following activities, and at what frequency?" and Question 20: "List each type of service provided and approximate % of total time spent." This is evident when entering the data because the answers are not always plausible. For instance, some HSAs reported spending more hours a week working than there are hours in a week. In future country visits, it will be important to revise the way this question is asked so that the answers obtained are valid.

Collecting cost information from the partners was an ongoing challenge, although positive working relationships seemed to have formed. Understandably, some organizations may have been reticent to share sensitive cost information, though that concern was never voiced aloud when the information was requested.

Each of these areas and challenges provided lessons learned for the next research trip and adjustments to the methodology. Furthermore, the additional data that was intended to be collected will allow for additional analysis to be conducted using the iCCM cost tool. This includes the comparison of different treatment scenarios for the same illness, such as comparing the cost-effectiveness of RDTs for malaria with presumptive treatment. The research team intended to collect more information on start-up costs, such as policy writing, initial assessments, and other costs that were not available in Malawi. Finally, the sustainability analysis will require detailed budget and financing information from partners and the central MOH.