The Cost of Integrated Community Case Management in Kapoeta North County, South Sudan

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Contents

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Key collaboration was provided by Save the Children in South Sudan. Information on iCCM program costs was gathered, and interviews with Home Health Promoters (CBDs) were conducted by MSH staff in Kapoeta North County (See Annex A for the list of payams, bomas, health centers, and sites sampled.)

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Acronym List

ARI	Acute respiratory infection
CBD	Community Based Distributor
CHW	Community Health Worker
CIDA	Canadian International Development Agency
DHMT	District health management team
FBO	Faith-based organization
FMOH	Federal Ministry of Health
GHI	Global Health Initiative
iCCM	Integrated Community Case Management
MCHIP	Maternal and Child Health Integrated Program
MDG	Millennium Development Goal
MoH	Ministry of Health
MSH	Management Sciences for Health
NGO	Non-government organization
ORS	Oral rehydration salt
STC	Save the Children
UNICEF	The United Nations Children's Fund
USAID	United States Agency for International Development
WHO	World Health Organization

Executive Summary

Integrated community case management (iCCM) is considered to be an effective strategy for expanding the treatment of diarrhea, pneumonia, and malaria, which are the leading causes of child mortality and result in nearly 44% of deaths worldwide in children under five years old. 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.

To better understand the costs of iCCM programs, the Bill and Melinda Gates Foundation funded MSH to conduct costing analyses of NGO-run iCCM projects in five African countries – Cameroon, Democratic Republic of the Congo, Sierra Leone, South Sudan, and Zambia. This report describes the results of the costing analysis in South Sudan of an iCCM program implemented by Save the Children in Kapoeta North County. The results of this analysis can potentially be compared with the results of an iCCM impact evaluation conducted in the same county in 2012 to review the cost of achieving the impact. The model and results can also be useful to the government and donors planning to implement or scale up iCCM.

The STC program began functioning in 2009 and focuses on training and supporting volunteer community health workers (CHWs), referred to in South Sudan as Home Health Promoters (HPPs), to provide timely and appropriate treatment, free-of-charge, to children ages two to 59 months for cases of malaria, diarrhea, and pneumonia.

The HPPs provided 152,565 iCCM services (treatments) in 2012, an average of 0.95 services per child (2-59 months) (Table i). The estimated overall level of utilization for STC's program was 14% of which. The utilization levels for the individual illnesses were 21% of expected malaria cases, 6% of expected diarrhea cases, and 57% of expected pneumonia cases.

The STC Project started in 2009 and the start-up costs of training and equipping the original CBDs were incurred before 2012. The estimated costs of training and equipping the original 891 CBDs would have been US$239,692 using 2012 prices. An additional total of US$157,500 was spent on vehicles for management and supervision. Based on the reported attrition rate of 10%, a total of 89 replacement CBDs would need to be trained in 2012 and this would have cost US$23,941. This figure is not included in the recurrent costs.

The total recurrent cost was estimated at US$1,372,057, which covered medicines, management, supervision, training, etc. The major cost element was supervision (50%), followed by management (18%) and STC overhead (13%). Supervision costs were high because access to health centers is extremely limited, and therefore, supervision from health centers would not be a feasible system. Therefore, STC recruited staff specifically to perform supervision of CBDs, and they spend 100% of their time on supervision. The CBD supervisors are responsible for approximately 10 to 20 CBDs each.

The average cost per capita was US$8.58 per child between 2-59 months and the average cost per service was US$12.94 for pneumonia, US$7.80 for diarrhea, US$7.10 for malaria and US$1.50 for a referral.

It is important to note that these are standard costs – i.e., the costs that should be incurred for providing the services. They are not the actual expenditures, with possible exception of some of the overhead costs. In the case of medicines, for example, the cost shown here is the cost of providing the medicines needed for the numbers of services provided. It is not the actual expenditure on medicines. As a result it does not take into account shortages or stock-outs of medicines. This is especially important if the costs are used to compare with impact results, such as in cost per death prevented. In addition, we did not conduct any analysis of bottlenecks and do not know, for example, the extent of medicine stock-outs during the year.

With utilization at 14% of estimated need, increases in utilization could perhaps be achieved, depending on logistics, security, and care-seeking behavior. Given the situation in South Sudan, it is probably not feasible to reduce the fixed costs by much – STC overhead costs, management and supervision costs. Most donor-funded pilot iCCM projects have high overhead, management and supervision costs – this is part of the investment in developing a viable program. If the program is eventually taken over by the government these costs would be expected to fall significantly, for example with much-reduced overhead costs and by supervisors sharing the costs of visits across more community health activities. That would, however, require a much strengthened health system.

Table i. Summary of costing results

	2012
Total number of iCCM services	152,565
iCCM services per capita (2-59 months)	0.95
Total recurrent cost	$1,372,057
Average recurrent cost per capita (2-59 months)	$9
Average recurrent cost per capita (total population)	$1
Cost per malaria (fever) treatment	$7.10
Cost per pneumonia treatment	$12.94
Cost per diarrhea treatment	$7.80

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.

Diarrhea, malaria and pneumonia are leading causes of child mortality and cause nearly 44% of deaths in children under five years old. iCCM, 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 Global Health Initiative 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 as well as the quantitative health outcomes that will result from the investment. A comprehensive understanding of costs as they relate to results will help countries who are considering implementing or expanding iCCM programs to advocate for donors and ministries of finance to allocate sufficient funds to appropriate levels of the health system to achieve improved health outcomes. It will also allow for costs to be better monitored and controlled, thus ensuring sufficient use of scarce resources.

To better understand the costs, the Bill and Melinda Gates Foundation funded MSH to conducted costing analyses of NGO-run iCCM projects in five African countries – Cameroon, Democratic Republic of the Congo, Sierra Leone, South Sudan, and Zambia.[1] The results of these analyses could be used to compare with the results of impact evaluations to review the cost of achieving those results and can serve as a set of baseline studies for future analyses. This report describes the results of the costing analysis in South Sudan of an iCCM program implemented by Save the Children in Kapoeta North County. It is expected that the model and results will be useful to the government and donors planning to implement or scale up iCCM in the country.

[1] The reports can be found at http://www.msh.org/our-work/health-systems/health-care-financing/costing-of-health-services

Background and Country Context: South Sudan

After four decades of civil war, the newly independent country of South Sudan remains one of the least-developed nations in the world. Struggling to rebuild and transition from top-down emergency relief to a more long-term approach to health and development, the country remains heavily dependent on foreign aid while facing an uncertain economic future following the stoppage of oil production. Plagued by instability, conflict, and issues of chronic food insecurity, the country also has some of the worst health indicators globally including an infant mortality rate of 69.97 deaths/1,000 live births[2] and a maternal mortality rate of 2,054 deaths/100,000 live births.[3] More than 30 percent of people in South Sudan do not have access to safe water and an estimated 15 percent of the population lacks access to adequate latrines.[4] With many South Sudanese never having received formal education, 27 percent of the population is literate.[5]

Despite significant foreign investment into the country's health system, South Sudan's health system faces significant challenges impeding the delivery of basic health services including high staff turnover in government-managed health facilities, minimal training and supervision support, low and irregularly paid wages, and an overall severe shortage of staff. According to recent estimates, there is approximately one physician per 65,574 persons and one midwife per 39,088 thus furthering a heavy reliance on inadequately trained and low-skill level staff.[6] Consequently, the majority of services are still provided through non-governmental organizations with the majority of funding coming from the World Bank, DFID, the US Government, and other private funders and foreign governments.

South Sudan's health system is structured along four distinct tiers: Primary Health Care Units (PHCUs), Primary Health Care Centres (PHCCs), County Hospitals (CH), and State and Teaching Hospitals. PHCUs serve as the first level of primary care and are located in Bomas (basic units of local government) and provide basic, preventive, promotional, and curative services for an estimated 15,000 persons. PHCCs serve as the immediate level of referral for PHCUs, providing the same services as PHCUs in addition to diagnostic laboratory services, maternity and inpatient care. Serve an estimated 50,000 and are either located at Payam headquarters (administrative level between the county and boma) or at the Boma /Payam level depending on whether it is located in an urban or rural area. CHs are located at the county administrative headquarters of local government and serve as referrals for PHCCs and provide the same services at PHCCs in addition to emergency surgical operations, serving a population of 300,000. State Hospitals (SH) serve an estimated 500,000 and represent secondary health care level which employs surgeons, obstetricians, physicians, and pediatricians. Teaching Hospitals (THs) provide tertiary care. In total, the country has an estimated 1,486 health facilities among which an estimated 1,147 are functional, including 51 hospitals (three teaching hospitals, seven state hospitals, 27 county hospitals), 284 PHCCs, 792 PHCUs, 10 private facilities, 14 specialized hospital/clinics, and 10

[2] The World Factbook 2012-2013. Washington, DC. Central Intelligence Agency, 2013.
[3] The World Factbook 2006. Washington, DC. Central Intelligence Agency, 2006.
[4] UNICEF, 2013. http://www.unicef.org/southsudan/10935_11140.html
[5] The World Factbook 2009. Washington, DC. Central Intelligence Agency, 2009.
[6] Government of South Sudan. Ministry of Health. Health Strategic Plan (2011-2015). September 2010.

police and military facilities (HSDP). Among these facilities, an estimated 18 percent require major renovations and 33 percent need complete replacement.[7]

The National Ministry of Health (MOH) is responsible for providing overall leadership within the health system by developing policies, guidelines, and standards; engaging in advocacy and resource mobilization; and supervising healthcare service delivery. The MOH also directly manages the three teaching hospitals. The State Ministry of Health (SMOH) provides leadership for health service delivery and management in each state. The County Health Department manages the delivery of PHC services at Payam, boma/village level and the SMOH and CHDs are responsible for delivery of secondary and primary health services. The Payam Health Committee and Boma/Village Health Committee manage local health care facilities.

To address the high burden of infant and childhood mortality, iCCM is implemented by four partners - Save the Children, Population Services International (PSI), International Rescue Committee (IRC), and Malaria Consortium - geographically spread to provide national coverage of iCCM services. Below are the states in which these partners implement iCCM:

Table 1. iCCM programs in South Sudan

IRC	Malaria Consortium	PSI	Save the Children
Unity NBEG	Unity	Central Equatoria Western Equatoria	Eastern Equatoria Western Equatoria Lakes Jongolei Upper Nile

Save the Children (STC) began implementing an iCCM program in five states and ten counties in 2009 initially with support from the Canadian International Development Agency (CIDA). The program focuses on training and supporting volunteer CHWs called CBDCommunity Based Distributors (CBDs)[8] to provide timely and appropriate treatment to children ages two to 59 months for cases of malaria, diarrhea, and pneumonia, free-of-charge. While CBDs are unpaid, they do receive a modest per diem for the trainings they attend, in addition to a motivation package which includes a T-shirt, certificates/awards, job aids for identifying danger signs, and standard CBD materials and equipment including a counting respiratory rate (ARI timer) and beads.

Serving approximately 40 households or a population of roughly 200-500 people, CBDs are selected by members of their respective communities and represent an accessible point of entry to the formal health system, providing case referrals to children with severe symptoms. Following selection, CBDs attend a competence-based 7-day basic training session at the PHCU on using an algorithm for the diagnosis and treatment of uncomplicated cases of pneumonia, malaria, and diarrhea. Trainings are led by the STC Training Officer and are focused on practical demonstrations and role playing for

[7] South Sudan Ministry of Health. Health Sector Development Plan 2012-2013. January 2012.
[8] The CHWs are currently called Community based distributors. The Ministry is in the process of harmonizing the nomenclature of all the community based service providers to Home Health Promoters (HPP).

communicating information and skills, as most CBDs are illiterate women. In addition to the basic training, CBDs also participate in a three-day bi-annual refresher training focused on continuing education and dissemination of improved techniques or treatment norms.

Following the initial training, CBDs receive direct support and supervision from CBD supervisors who oversee 10-20 CBDs. Employed by STC and living and working at the Boma level, CBD supervisors are selected for the position based on their ability to read and write and conduct supervision visits. Supervisors typically visit CBDs at their homes on a weekly or bi-weekly basis and follow a supervision checklist to ensure that their reports are up-to-date, they have a full supply of medicines and equipment, and that they are accurately diagnosing and treating patients, in addition to storing medicines appropriately. Often the supervisor will also visit a patient who has recently received a consultation by the CBD to ensure they received proper care and treatment. Every month, supervisors are required to gather and submit CBD reports to the PHC facilities and the STC Training Officer who in turn checks the report for errors by matching the number of cases with the amount of medicines consumed. When CBD medicine stock levels are low, supervisors fill out a requisition and way-bill for each of the medicines (Artesunate+Amodiaquine combination, ORS and Zinc, and Amoxycillin) and can pick them up at the PHCU and deliver them directly to the CBDs during supervision visits.

CBD Supervisors receive supervision support from the STC Training Officer who regularly participates in supervision visits and is responsible for conducing iCCM trainings, compiling monthly reports, and monitoring and requesting medicines and supplies. The Project Officer supervises the Training Officer and oversees the program implementation at the field office level while responsible for the overall coordination of HPPs and supporting staff. The Project Officer reports to the iCCM program manager who is responsible for the STC-implemented iCCM program in country.is the regional manager of the iCCM program. The Project Officer regularly participates in site visits in addition to annual Training of Trainers at STC offices in Juba.

Due to the limited capacity of the MOH and the critical shortage of trained and capable health workers, involvement of government staff at the county and PHCU level in iCCM supervision is still limited. However, the role of the MOH in iCCM supervision is expected to increase in the coming years with the intent of integrating iCCM into MOH health programming and eventually transitioning training, reporting, supplies management, monitoring and evaluation, as well as supervision responsibility to the MOH.

Methodology

Costing Model

The South Sudan iCCM costing model was adapted from the generic iCCM Costing and Financing Tool developed under the USAID-funded Translating Research into Action (TRAction) project.[9] 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. At the service delivery

[9] See http://tractionproject.org/content/integrated-community-case-management-costing-financing-tool or http://www.msh.org/resources/integrated-community-case-management-costing-financing-tool

level, costs were developed using a bottom-up activity-based costing method, in which standard costs are built up by type of resource (such as medications) based on an estimated numbers of services. STC and other iCCM implementing partners in South Sudan have implemented the iCCM program according to WHO iCCM guidelines. Other costs, such as supervision and training, were allocated using a top-down methodology.

Data Collection

Data for this analysis were collected at two levels: first, at the central level, specifically from Save the Children (STC); and second, at the community (county) level, through questionnaires administered to CBDs and their supervisors.

Central and Partner Level Data Collection

The main purpose of the data collection at the partner level was to gather assumptions on the standard costs of implementing the iCCM program. All standards, norms, and protocols were collected from STC.

The scope of this costing study focused on the five states in which iCCM was being implemented by STC. Data was collected from STC's headquarters in Juba and included iCCM program information, standard treatment protocols, population coverage, prices of equipment and medicines, and management, supervision, meeting and training costs. Some costs associated with supervision and training was provided by county staff in the Kapoeta North field office.

All program costs incurred directly by STC were entered into the tool and any relevant STC policies were followed. STC management costs were also taken into account, such as management and administrative staff costs, drivers, and office overhead costs.

Community (County) Level Data Collection

The purpose of the data collection at the community level was twofold: first, to serve as a 'reality check' that will provide on-the-ground context for the costing study; and second, to provide additional information on the CBDs' time, availability, and activities, which are not standardized. The data collected was used to help better understand how the program functions at the county although we recognize that the relatively small sample size may limit the extent to which the results reflect the entire iCCM program.

Two MSH staff, with the help of two STC staff (serving as translators), conducted interviews with CBDs and their supervisors. A total of 40 CBDs and 10 supervisors were interviewed from five different *payams* that cater up to thirteen *bomas.* The below table is a summary of the sample size for data collected at the community level. The selection of *payams* was based on accessibility (weather and road conditions).

Table 2. Sample of CBDs and Supervisors Interviewed

Payam	Primary Health Care Centre name	CBDs Interviewed	Supervisors Interviewed
Lomeyen	Lomeyen PHCC	8	2
Chumakori	Riwoto PHCC	4	1
Mossingo	Mossingo PHCU	8	2
Najie	Najie PHCC	8	2
Paringa	Paringa PHCC	12	3
	Total	40	10

Assumptions and Standard Data Inputs

Period of Analysis

The year of analysis was 2012, which was the last complete calendar year of data. This was also the year chosen for the impact evaluation, which meant that data could potentially be compared. The data collection visit and CBD interviews took place in July 2013.

iCCM Package of Services

CBDs were trained to identify and treat non-severe cases of diarrhea, pneumonia, and malaria. In addition, they can assess and provide counseling for cough and malnutrition. In the event of any danger signs, the CBDs will refer the patient to the nearest health center. Table 3 below shows a summary of the treatment protocols, medicine cost per treatment, and treatment times for each intervention in the iCCM package (see Annex C for details).

Diarrhea cases were treated with ORS and zinc. Suspected pneumonia cases are assessed for rapid breathing using an ARI timer and counting beads; positive cases are given amoxicillin, and negative cases are designated as 'cough' and provided counseling on better feeding practices. Suspected malaria cases – all children with fever – were treated presumptively with ACTs. Rapid diagnostic tests were not used in 2012.

Table 3: Treatment protocols and costs for diarrhea, pneumonia, and malaria (USD)

	Average time to treat one patient (minutes)	Medicines/supplies needed	Average medicine cost per episode (USD)
Diarrhea	46.8	ORS, Zinc	0.56
Pneumonia	82	Amoxicillin	0.27
Malaria	41	ACT	0.77

Population and Geographic Coverage Targets

Table 4 shows the actual population and coverage for 2012. In 2012, there were 919,564 people living in areas covered by the iCCM program, comprising 313 bomas and 48 payams. Children between the ages of 2-59 months were the target of iCCM treatments; they made up 17.4 percent of the total population, amounting to 160,004 in the baseline year.

Table 4. Population and Coverage Assumptions, 10 Counties with iCCM implementation, 2012

	2012
Number of Counties with iCCM coverage	10
Number of Payams with iCCM coverage	48
Number of Bomas providing iCCM	313
Target population covered by iCCM (all ages)	919,564
Target population covered by iCCM (0-59 months) (17.4%)	160,004
Total Number of CBDs	891

Incidence Rates

Incidence rates were entered into the iCCM Costing and Financing Tool as the number of episodes per child per year. The following rates were provided by STC for use in the iCCM costing study: 4.0 episodes of diarrhea per child per year; 0.50 episodes of pneumonia; and 2.0 episodes of malaria.

Table 5 shows the summary of incidence rates input into the tool.

Table 5. Incidence Rates for diarrhea, pneumonia, and malaria (episodes per child year)

	Incidence rate used in tool
Diarrhea	4.0
Pneumonia	0.5
Malaria	2.0

Caseload and Service Delivery Targets

Actual caseload data for the baseline year, 2012, were provided by STC and input into the tool (see Table 6 below).

Table 6. Actual 2012 caseloads

	2012
Diarrhea	38,636 (6%)
Pneumonia	45,865 (57%)
Malaria	66,267 (21%)

The actual caseloads were used in conjunction with the population covered under geographic coverage assumptions, and the incidence rates for each disease, to calculate the expected number of cases treated through the iCCM program each year. For example, 11% service delivery coverage of diarrhea in 2013 would result in 40,800 cases treated using the following calculation: 11% * (4.0 episodes of diarrhea per year) * (92,419 children covered by iCCM in 2013) = 40,800.

We calculated the percentage of actual iCCM coverage achieved in the baseline year by dividing total actual caseloads in 2012 by the expected number of cases for the same year. This resulted in 6% for diarrhea; 57% pneumonia; and 21% malaria. The unusually high iCCM coverage of pneumonia in 2012 (57%) is likely attributable to over-treatment, which is a recognized challenge as (a) CBDs do not consistently distinguish between cough and pneumonia, and (b) limited specificity and sensitivity of fast breathing as an indicator for pneumonia, which leads to overtreatment. Additionally, the service delivery coverage estimates are based on population numbers and incidence rates that may be inaccurate due to enumeration challenges in South Sudan, which would also affect the accuracy of the coverage rates.

CBD Availability & iCCM Service Delivery Assumptions

Since CBDs are unpaid volunteer health workers, they are not expected to work a standard number of hours per day or days per year. As mentioned previously, CBDs primarily serve their own village and are assumed to available most of the time. For the purposes of this analysis, the actual number of CBDs in all ten counties in 2012 was included in the tool.

STC staff estimated an annual attrition rate of 10.2% for CBDs.

The CBDs interviewed reported working an average of 16 hours per week on various activities as a community health worker. Of this time, an average of 10 hours per week would be spent specifically on iCCM activities. This amounts to 63% of the time as a CBD spent on iCCM. CBDs unanimously described themselves as available at all times of the day, and all days in the year, since patients are typically brought to their houses for treatment as needed. The iCCM tool uses the 63% figure as a factor to allocate indirect costs to the iCCM program specifically. For example, if a health center in-charge conducts a general supervision visit to the community, the cost of the visit would be multiplied by 63% to arrive at the portion allocated to the iCCM program.

Of the 40 CBDS, 15 reported experiencing stock-outs of medicines of seven days or more in the last year. These medicines were ACT 25, ACT 50, zinc and ORS.

Management, Supervision, Meetings and Trainings

Costs of management, supervision, meetings and trainings were primarily provided by STC, and supplemented with information from peer supervisors. Management costs primarily comprise salary costs for any staff involvement in the management or the administration of the iCCM program. Although STC receives support through STC's international regional and home offices, we limited the analysis to include only salary costs for staff based in South Sudan. Each relevant 2012 staff is input into the iCCM tool, in addition to the total annual salary and percentage of time spent on the iCCM program.

Supervision costs are input into the tool in two ways: first, the salary costs for all staff involved in supervision are considered; and second, the costs of supervision visits are input into the tool. For South Sudan, the supervision visit costs include only salary cost. Currently, STC has 72 CBD supervisors that provided supervision across the 10 counties. There were also 4 project officers, 4 health officers, 9 training officers, and 3 M&E officers that manage data and supervise the CBDs' data validation. Supervision visits are made monthly. During the supervision visits the CBD supervisors collect the CBD monthly reports, replenish CBDs' drug stock and give feedback to the CBDs.

Meetings between CBDs and CBD supervisors are held twice a year at the PHCU while meetings for CBD supervisors are held quarterly at the STC compounds. The CBD supervisor collects the caseload treatment monthly reports from the CBDs which are then compiled and validated at the County level by the Project Officer and Training Officer. The M+E Officer enters the paper reports into the DHIS which is then exported to the M+E Manager at the country office. Costs associated with these meetings include per diems for CBDs and CBD supervisors and costs for consumables such as refreshments/ food given during the meetings.

Training costs in the iCCM tool are split between start-up trainings and refresher trainings. Start-up trainings are assumed to occur a single time for each new CBD, whereas refresher trainings would be applied to the entire pool of CBDs that are working in a given year. Start-up trainings also include CBD training, CBD supervisor training and Training-of-Trainer training for the training officers.

Analysis

Utilization

A total of 152,565 iCCM cases were seen, of which 38,636 were diarrhea, 45,865 were pneumonia, 66,267 were presumptive malaria and 1,797 were referred (Table 7). On a per capita basis (child 2-59 months) this came to 0.24 for diarrhea, 0.29 for pneumonia and 0.41 for malaria, making a total of 0.94 treatments. This represents 14% of the total expected number of cases per capita.

Table7. Summary of actual and projected iCCM caseloads and cases per capita, 2012

	2012
Population 2-59 months	160,004
Total number of iCCM cases	
Diarrhea	38,636
Pneumonia	45,865
Malaria	66,267
Referral	1,797
Total cases	152,565
Number of iCCM cases per capita (children 2-59 months)	
Diarrhea	0.24
Pneumonia	0.29
Malaria	0.41
Referral	0.01
Total cases per capita	0.95

The number of CBDs and cases treated per CBD are shown in Table 8. Based on STC records, there were 891 CBDs working in the intervention areas in 2012. In that year, CBDs treated, on average, 3.3 iCCM cases per week.

Table 8. Number of CBDs and cases treated per CBD, 2012

	2012
Total Number of CBDs	891
Total Number of iCCM Services	152,565
Average Number of iCCM Cases per CBD (year)	171
Average Number of iCCM Cases per CBD (week)	3.3
CBDs Per 1,000 Population	1.0
CBDs per Boma	2.8

Costs

Total iCCM program costs are divided between start-up costs and recurrent costs. Start-up costs are generally incurred at the beginning of the program but may also continue throughout the life of the program—for example, the cost of expanding the program or training new CBDs in iCCM to replace those lost to attrition. Recurrent costs are regularly incurred as part of the running of the iCCM program, such as the cost of medicines, supervision, and management.

All costs were input into the iCCM Costing and Financing Tool in US Dollars – due to procurement challenges in South Sudan, most costs were incurred directly in USD; other than local salaries, all costs are input in USD. Where necessary, local costs were converted from South Sudanese Pounds to USD.

Startup and CBD Training Costs

The STC Project started in 2009 and the start-up costs of training and equipping the original CBDs were incurred before 2012. The estimated costs of training and equipping the original 891 CBDs would have

been US$239,692 using 2012 prices. An additional total of US$157,500 was spent on vehicles for management and supervision.

Based on the reported attrition rate of 10%, a total of 89 replacement CBDs would need to be trained in 2012 and this would have cost US$23,941. This figure is not included in the recurrent costs.

Recurrent Costs

Table 9 shows the total recurrent costs for the iCCM program for 2012, based on the actual numbers of services provided in 2012.[10] Recurrent costs are split between direct and indirect costs. Since CBDs are volunteers and receive no salary, the only direct variable costs of iCCM treatments are medicines. The remaining program costs are relatively fixed over the short period - management, supervision, meetings, trainings, and program overhead costs. The total recurrent costs for 2012 were US$1,372,057.

The largest cost element was supervision (50%), followed by management (18%) and STC overhead costs. The cost of medicines was 6% of the total.

Table 9. Recurrent iCCM program costs, 2012 (USD)

	2012
Medicines	84,710
% of total cost	6%
Management	241,388
% of total cost	18%
Supervision	688,315
% of total cost	50%
Meetings	73,850
% of total cost	5%
Refresher trainings	109,300
% of total cost	8%
Overhead costs	174,493
% of total cost	13%
TOTAL	1,372,057

Management costs comprised central level or partner organization salary costs for staff involved in managing the iCCM program. In the case of South Sudan, access to health centers is extremely limited, and therefore, supervision from health centers would not be a feasible system. Therefore, STC instead recruited staff specifically to perform supervision of CBDs, and they spend 100% of their time on supervision. The CBD supervisors are responsible for approximately 10 to 20 CBDs each.

Meeting and training costs are based on standard costs of per diems, transportation reimbursements, lodging, training materials, and other related costs. These costs were provided by STC based on their

[10] We also estimated the projected annual costs for the program through 2016. These figures are not shown here as they were not required for this study but they can be made available on request.

training budgets. Overhead costs were also provided by STC, and include the cost of fuel and vehicle maintenance, as well as office costs in Juba and Kapoeta.

Table 10 shows the average annual recurrent cost per capita which is calculated by dividing total recurrent costs by total population—expressed as both per capita for children 2-59 months and per capita for the entire population within the coverage areas. The cost per child aged 2-59 months was US$8.58 in 2012.

The average program supervision cost and the average recurrent cost per CBD in 2012 was US$773 and US$1,540, respectively. . The supervision cost is part of the total recurrent cost, and was pulled out to highlight the amount that would be spent directly supervising the community workers, since supportive supervision tends to be an important indicator of the success of iCCM programs. The average supervision cost per CBD is calculated by dividing the total supervision cost, which entails the supervision visits in the field as well as the salaries of all staff involved in supervision, by the total number of CBDs. Supervision costs are quite high, when compared with other countries – as described earlier, the country's weak health system means that supervision via the government-run health facilities is not a feasible option. Therefore, STC had to hire their own staff as CBD supervisors, in addition to full-time iCCM Project Officers, field manager, and M&E officers.

The recurrent iCCM program cost per CBD is calculated by dividing the total recurrent cost by the total number of CBDs.

Table 10. Recurrent cost per service, per capita, and per CBD, 2012 (USD)

	2012
Total recurrent cost	1,372,057
Total number of services	152,565
Average cost per capita (2–59 months)	8.58
Average cost per capita (total population)	1.49
Average supervision cost per CBD	773
Average recurrent cost per CBD	1,540

Table 11 shows the recurrent cost per individual service in the iCCM package. As mentioned previously, direct costs, comprising medicine costs, are variable and increase with each additional service provided. Indirect costs, such as management and supervision, do not vary with the volume of services provided, but may vary as a result of adding more CBDs or scaling up to additional districts.

In 2012, four iCCM services were provided: diarrhea, malaria (presumptive), pneumonia, and referrals. The cost per service in 2012 was as follows: US$12.94 for pneumonia, US$7.80 for diarrhea, US$7.10 for malaria, and US$3.87 per referral. Although referrals do not have any direct costs, since no medication is provided, a portion of the indirect costs of the program are allocated to referrals based on the time required.

Table 11. Recurrent cost per iCCM service, 2012 (USD)

	2012
Diarrhea	7.80
Pneumonia	12.94
Malaria	7.10
Referral	3.87

Conclusions

The STC program began functioning in 2009 and focuses on training and supporting volunteer community health workers (CHWs), referred to in South Sudan as Home Health Promoters (HPPs), to provide timely and appropriate treatment, free-of-charge, to children ages two to 59 months for cases of malaria, diarrhea, and pneumonia.

The HPPs provided 152,565 iCCM services in 2012, an average of 0.95 services per child (2-59 months). The estimated overall level of utilization for STC's program was 14% of which. The utilization levels for the individual illnesses were 21% of expected malaria cases, 6% of expected diarrhea cases, and 57% of expected pneumonia cases.

The STC Project started in 2009 and the start-up costs of training and equipping the original CBDs were incurred before 2012. The estimated costs of training and equipping the original 891 CBDs would have been US$239,692 using 2012 prices. An additional total of US$157,500 was spent on vehicles for management and supervision. Based on the reported attrition rate of 10%, a total of 89 replacement CBDs would need to be trained in 2012 and this would have cost US$23,941. This figure is not included in the recurrent costs.

The total recurrent cost was estimated at US$1,372,057, which covered medicines, management, supervision, training, etc. The major cost element was supervision (50%), followed by management (18%) and STC overhead (13%). Supervision costs were high because access to health centers is extremely limited, and therefore, supervision from health centers would not be a feasible system. Therefore, STC recruited staff specifically to perform supervision of CBDs, and they spend 100% of their time on supervision. The CBD supervisors are responsible for approximately 10 CBDs each.

The average cost per capita was US$8.58 per child between 2-59 months and the average cost per service was US$12.94 for pneumonia, US$7.80 for diarrhea, US$7.10 for malaria and US$1.50 for a referral.

It is important to note that these are standard costs – i.e., the costs that should be incurred for providing the services. They are not the actual expenditures, with possible exception of some of the overhead costs. In the case of medicines, for example, the cost shown here is the cost of providing the medicines needed for the numbers of services provided. It is not the actual expenditure on medicines. As a result it does not take into account shortages or stock-outs of medicines. This is especially important if the costs are used to compare with impact results, such as in cost per death prevented. In addition, we did not conduct any analysis of bottlenecks and do not know, for example, the extent of medicine stock-outs during the year.

With utilization at 14% of estimated need, increases in utilization could perhaps be achieved, depending on logistics, security and care-seeking behavior. Given the situation in South Sudan it is probably not feasible to reduce the fixed costs by much – STC overhead costs, management and supervision costs. Most donor-funded pilot iCCM projects have high overhead, management and supervision costs – this is part of the investment in developing a viable program. If the program is eventually taken over by the government these costs would be expected to fall significantly, for example with much-reduced overhead costs and by supervisors sharing the costs of visits across more community health activities. That would, however, require a much strengthened health system.

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Annexes

Annex A. Zones, Health Centers and Sites Sampled

Annex B. CBD Questionnaire

Annex A. Zones, Health Centers and Sites sampled for CBD Questionnaires

Payam	*Boma*	Village
Chumakori	Napetete	Poot
		Dachaa
		Kurer
	Poot	Kateok
Lomeyen	Naminitoit	Nyagiya
		Kadanya
		Kateok
	Rukuruk	Kateok
		Nawona
		Kateok
		Naatire
Mossingo	Narengonea	Napeyokor
		Sungur
	Loukwamor	Nawotapeta
		Napeichoeke
	Naregenai	Nyangalem
		Poot
	Napetete	Nawoyameyen
		Namitoit
Najie	Lolepan	Kadanyia
		Nyangiya
		Kaleok
		Lotukatan
	Nangoletirai	Docha
		Kolukoro
		Poot
		Kateok
Paringa	Choroi	Navinomeyen
		Kanachangari
		Naminioit
		Nawoyareng
	Kop	Kabum
	Naterienget	Napotopot
	Nacholobo	Kabuni
		Toror
		Kabuni
		Kadanya
	Nyuda	Kabuni
		Kabuni

Annex B. CBD Questionnaire

COMMUNITY BASED DISTRIBUTOR (CBD) QUESTIONNAIRES	
CBD #	
Date of interview:	
Name of interviewer:	
Location of interview:	
Start time of the interview:	
Name of CBD being interviewed:	
Sex (Male/Female):	
Name of village or community:	
Supervising health center:	
Boma	
Payam:	
County:	
State:	
Month and year the person began working as a CBD?	
Period of analysis:	
Start Date (MM/YY)	
End Date (MM/YY)	
A) Population served by CBD	
1)	What is the population of the households that you serve?
2a)	How many children (0-5 years) are included in this population?
3)	Is there more than one CBD working in this village?
3)	If yes:
3a)	Do you divide the population between the CBDs, or cover the entire population but alternate? How do they divide up the households in the village?
3a)	What is the population of the households that the other CBD serves?
B) CBD Time	
1)	In general, how many hours per day are you available to work as a CBD?
2)	In general, how many days per week are you available to work as a CBD?
3)	In general, do you work as a CBD all year, or are there days/months that you take off?
Fill out ANNEX 3: CBD TIME by asking the following questions	
1)	Please list all the activities that are typically done as a CBD? (If they are not already listed in ANNEX 3 then add to the blank spaces, rows 18-21)
2)	Was the last week a typical week for you as a CBD?
	If yes, proceed with the following questions. If no, ask them to think of a 'typical' week in terms of their activities as a CBD.

3)	List the different types of activities you did as a CBD in the previous week:
3a)	How many hours did you take for each activity?
3b)	For each activity, where did you go?
3c)	For each activity, how long did it take to travel (i.e. to or from a household)?
3d)	For each activity, was this specifically relating to iCCM, or just for CBD activities in general?
C) Supervision and Reporting	
1a)	How often does the CBD supervisor come to visit you?
1b)	How often does the CBD supervisor come to your house to collect your reports?
2)	With what frequency do you fill out regular CBD or iCCM activity reports?
3)	With what frequency does your supervisor provide you with drugs and supplies?
4)	How long does it take to go to the health center, and how far away is it? (one way)
5)	Do you spend the whole day to go to the health center (round trip)?
6)	When was the last time you received a supervision visit by your supervisor?
D) Meetings and Trainings	
Fill out ANNEX 2. Meeting and Training by asking the following questions:	
1)	Please make a list of the different trainings and meetings you had in the last year (2012).
2)	For each training (fill out in the appropriate section if it's a meeting or a startup or refresher training)
2a)	Who was the meeting or training funded by? (if the CBD doesn't know, leave blank)
2b)	Where was the meeting or training held?
2c)	How frequent is the meeting or training (if refresher)?
2d)	How long was the meeting or training?
2e)	Was the CBD paid a per diem or incentive? If yes, how much?
E) iCCM Services	
1)	What iCCM treatments are you able to provide now?
1a)	Were you providing the same treatments in 2012?
2)	For each iCCM service, list the approximate amount of time that is required to provide the treatment:
2a)	Diarrhea
	Treatment
	Follow-up
2b)	Pneumonia
	Treatment
	Follow-up
2c)	Malaria
	Treatment
	Follow-up
2d)	Malnutrition Screening
	Assess/ Diagnose

2e)	Referrals
	Treatment
	Follow-up
	Accompanying referral
2f)	(Other treatment, if provided)
	Treatment
	Follow-up
3)	When a patient is referred to the health center, do you record the patient in your register?
3a)	Do you accompany the patients to the health center?
3b)	Do you provide an initial treatment to the patient before referring them?
4)	How do you test to make a diagnosis for pneumonia?
4a)	If the test is negative, what do you do? Do you provide any treatment?
4b)	If the test is negative, how do you record the patient in your register?
4)	How do you test to make a diagnosis for malaria?
4a)	If the test is negative, what do you do? Do you provide any treatment?
4b)	If the test is negative, how do you record the patient in your register?
F) Periodic CBD activities	
1)	Do you participate in any periodic activities relating to community health, such as vaccination campaigns or distribution of insecticide-treated nets?
2)	If yes, list the events and their frequency.
G) Medications, supplies and equipment	
1)	For the following medications, have you received these in the past year, and have you had any issues with stock-outs (more than 7 days)?
a	ORS
b	Zinc
c	ACT infant
e	ACT toddler
e	Amoxicillin
f	
g	
2)	For the following equipment, have you received these, and have you had any issues with stock-outs?
a	Medicine Box
b	Respiratory Timer
c	Beads (Infant and Toddler)
d	Mid-Upper Arm Circumference (MUAC) Tape
e	Patient Register
f	Referral Cards
g	Pictograms / job aid
h	Flashlight / torch

i	Jugs (for clean water to make ORS)
j	Spoons
k	Cups
H) Payment and Incentives	
1)	Do you receive any forms of payment for your services as a CBD?
1a)	If yes, from what source is the payment, and how much?
2)	Do you receive any incentives "in kind" for your services as a CBD? (t shirt, gerry cans, umbrella, sleeping mats, etc.)
2a)	If yes, from what source is the incentive, and how much?
3)	Do you receive any incentives from your community?
3a)	If yes, what incentives do you receive?
	End time of the interview:
	Duration (minutes / hours) of the interview: