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MCHIP Maternal and Child Health Integrated Program

Feasibility Study of the Implementation of iCCM in Bondo Sub-County: Leveraging Existing Systems

Endline Assessment Report

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Table of Contents

List of Tables

List of Figures

Acknowledgments

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Abbreviations

ACT	artemisinin-based combination therapy
BCC	behavior change communication
CHC	community health committee
CHEW	community health extension worker
CHMT	County Health Management Team
CHS	Community Health Strategy
CHV	community health volunteer
CU	community health unit
EPCMD	ending preventable child and maternal deaths
HF	health facility
iCCM	Integrated Community Case Management
IMCI	integrated management of childhood illness
IRB	Institutional Review Board
ITN	insecticide-treated bednet
KNBS	Kenya National Bureau of Statistics
M&E	monitoring and evaluation
MCHIP	Maternal and Child Health Integrated Program
MCSP	Maternal and Child Survival Program
MOH	ministry of health
MUAC	Mid-upper arm circumference
ORS	oral rehydration solution
ORT	oral rehydration therapy
RDT	rapid diagnostic test
SE	standard error
SHMT	Sub-County Health Management Team
SP	sulphadoxine pyrimethamine
SVY	survey routine
UNICEF	United Nations Children's Fund
USAID	U.S. Agency for International Development
WHO	World Health Organization

Executive Summary

In Kenya, a significant number of deaths among children under the age of five are preventable. A contributing factor to these deaths is limited access to case management or facility-based services by the high proportion of the population living in rural, hard-to-reach areas. In 2006, aiming to deliver high-impact health interventions to such communities, the Government of Kenya developed the Community Health Strategy (CHS), which supports provision of the Kenya Essential Package for Health at community level. The CHS was initially focused on using community health volunteers (CHVs), who are supported by salaried community health extension workers (CHEWs), to deliver health promotion; when revised in 2012/2013, it gave CHVs the additional task of providing integrated Community Case Management (iCCM) for children under five. The iCCM protocol in Kenya comprises:

- *For fever*—Rapid diagnostic tests (RDTs) and artemisinin-based combination therapy (ACT).
- *For diarrhea*—Oral rehydration solution (ORS) and zinc.
- *For suspected pneumonia and cough/short rapid breaths*—Assessment with respiratory timer and referral of suspected pneumonia cases.
- *For malnutrition*—Measurement of mid-upper arm circumference (MUAC) and referral.
- *For newborns*—Specifically, assessment with a checklist and referral as needed.

The Bondo iCCM Implementation Study

In 2013, the Kenya Ministry of Health (MOH) and the Maternal and Child Health Integrated Program (MCHIP), a program supported by the U.S. Agency for International Development (USAID), initiated an implementation research study to inform the MOH and its partners about the feasibility, success factors, and challenges of implementing iCCM. The study was completed under MCHIP's successor, the Maternal and Child Survival Program (MCSP), together with the MOH.

Specific Objectives

- To determine changes in the community's knowledge and practices, including care-seeking behavior in intervention and comparison CUs during the iCCM implementation period.
- To document the feasibility of iCCM implementation through the assessment of CHV performance, and challenges faced by CHVs during implementation.
- To document the extent to which CHEWs provide support to CHVs, and the challenges CHEWs face.
- To document the extent to which sub-county health management team (SHMT) and community leaders could support implementation of the iCCM package and the challenges faced.
- To document the cost of implementing iCCM in Bondo Sub-County over an 18-month period.

Intervention

The primary intervention was the training and mentoring of 59 CHVs in four community health units (CUs) to provide iCCM at community level over 18 months. CHVs in intervention groups were trained and mentored to assess, classify, and treat or refer children with fever and/or diarrhea. Sick children presenting with cough/suspected pneumonia were referred to a health facility. The CHVs received RDT kits to diagnose malaria.

Methodology

The study design was quasi-experimental. Pre- and post-implementation household surveys were done: A baseline survey was conducted in September 2013, a midline survey six months into iCCM implementation, and an endline survey in June 2015. In addition, data were collected in structured interviews with CHVs, CHEWs, SHMT members, chiefs, community health committee (CHC) members, and religious leaders, and CHVs were observed during consultations with sick children to assess their clinical skills.

Key Findings

Care Seeking: Knowledge and Practices

Communities' confidence in CHVs' ability to deliver iCCM resulted in modification of care-seeking behavior. Introduction of iCCM resulted in a more than 100-percent increase, within the first six months, of iCCM cases managed in the intervention group study area. The additional cases reflected in the increase comprise either those who would previously have been taken to "alternative providers," such as traditional healers and drug shops, or treated by self-medication, or would have received no health care at all. At endline, the proportion of caregivers in intervention CUs who first sought treatment from a CHV increased from 2 to 31 percent ($p < 0.001$).

Fever was the most common reason for seeking care at endline. Prompt diagnosis of malaria and treatment with ACT the same day as onset of fever increased. However, adherence to CHVs' referral advice was only 40 percent. The implication of lack of compliance and delayed compliance in cases of suspected pneumonia needs further exploration.

The proportion of sick children with diarrhea correctly managed using zinc and ORS increased significantly after iCCM introduction, from 10 to 53 percent ($p < 0.001$) in intervention CUs. Caregivers also gave these sick children more fluids and overall, managed diarrhea better.

In addition, at midline, CHVs managed 56 percent of cases overall, reducing catchment-area health facility staff workload.

CHV Competency and Performance

This study addressed a fundamental question about iCCM—namely, "Can lay health providers acquire the skills to correctly identify, assess, classify, and treat sick children or refer to a health facility those who are either too sick or suffering from health conditions not included in the iCCM package?"

In Bondo it is possible. Fifty-eight CHVs attended a six-day didactic training in iCCM, followed by on-site coaching in health facilities over three to six weeks depending on the needs of a CHV and scheduling with the mentor. They were coached to diagnose and treat children under five with diarrhea using ORS and zinc; to diagnose malaria with RDTs and to treat with ACT; to identify and refer cases of suspected pneumonia and malnutrition; and to refer sick newborns. Providing CHVs with this training, supplemented by clinical mentoring and supportive supervision by community leaders and health managers, gave CHVs the skills to implement iCCM services.

At endline, 54 CHVs from intervention CUs were observed managing three to four sick children with fever, diarrhea, or cough and, compared with baseline, demonstrated competence in their ability to correctly follow the iCCM algorithm. To maintain skills, CHVs will need ongoing mentoring by nurses and CHEWs. CHVs were able to manage their stocks and replenish them as necessary via their CHEWs. Lack of commodities at primary link health facilities accounted for roughly 80 percent of stockouts at community level. Where RDTs were used, CHVs were able to appropriately store and dispose of sharps at link health facilities as trained.

Health and Community Systems Support

Successful iCCM implementation in Bondo was built on health and community system support by the SHMT, CHEWs, and the community leaders, support that was established under the community strategy. The SHMT and CHEWs provided supportive supervision and supplied drugs and reporting forms; CHVs met monthly with their assigned CHEW to review records and commodity stocks and for mentorship. The SHMT also successfully advocated with the county government, which in May 2014 began paying CHVs' monthly stipends and continues doing so to date. Chiefs and religious leaders mobilized communities to attend community dialogue days where members of CHCs presented community data gathered by CHVs in order to create a common understanding of health issues affecting children. Community leadership created social belonging and cohesion to build CHV credibility and increase acceptance of iCCM. Leaders promoted household behaviors that would improve local children's health.

Chiefs and religious leaders all strongly felt that iCCM implementation had a positive impact on the health of children in their community and reported that iCCM had resulted in a reduction of child deaths, as evidenced by a drop in requests for burial permits and funeral services.

However, challenges arose. These included: lack of money from the county sufficient to ensure regular supervision; lack of drugs procured and supplied from national medical stores sufficient to meet orders from the health facilities that supplied CHVs; and a dearth of monitoring and reporting tools. Leaders noted that iCCM would not be able to provide its greatest benefits to the community without regular supplies of medicines.

Implementation Costs[1]

Introduction of iCCM adds to the cost of improving health services. The MOH and the county government both contributed to the cost of implementation by providing medicines and supplies, paying the SHMT and CHEW salaries, and over the project's last months, disbursing the approximately US$23 monthly CHV stipend (for the intervention group). The project provided basic CHV kits at about US$70 each; training at $45,660 (including a six-day iCCM training and competency building for CHV and CHEWs, and a training of trainers); and an additional approximately US$177 per CHV for mentorship, supportive supervision, and performance monitoring.

Cost data collected under this study are insufficient to inform discussion of cost-efficiency and cost savings resulting from iCCM implementation. However, it can be inferred that at household level, provision of iCCM services removes the cost of transportation to seek care, and where drugs are available from CHVs, removes the cost of recommended drugs from family budgets.

Many support functions for iCCM implementation (e.g., supportive supervision, data collection and reporting, and community engagement) can be integrated into the current service delivery platform for child health. However, for iCCM to succeed, the county and MOH will need to mobilize resources, both domestic and external, to cover the additional cost of supervision, refresher trainings and mentorship, maintaining drug supplies, monitoring implementation and service quality, and replacing CHV kits when they wear out.

Study Limitations

- Co-occurring activities diminished differences between intervention and comparison groups at endline: during the last three months of the study, iCCM was implemented in comparison CUs by the Siaya County government, and from 2013 to 2015, some villages in comparison CUs were involved in a malaria incidence and surveillance cohort study sponsored by another organization. Co-occurring water, sanitation, and hygiene (WASH) activities funded by UNICEF in some comparison CUs also confounded study results.

[1] The study team intends to conduct additional analysis of the costs of implementing iCCM in Bondo and its implications for scaling up.

- The project did not assess changes in health facility attendance by children with iCCM conditions and the impact of reported reduction in workload on the quality of care provided.
- iCCM implementation costs focused on MCSP/USAID contributions and did not capture health system and MOH-related costs over the implementation period. Thus, the costing data presented are not comprehensive.

Lessons Learned and Implications for Scale-Up

Designing iCCM Services

In some regions in Kenya, iCCM may be the most effective strategy to increase access to timely and quality treatment for sick children. In others, that may not be the case. Additional local resources are required to ensure iCCM success, and counties that most need iCCM have less capacity and fewer development partners to provide these resources. A thorough analysis of iCCM and the context as well as extensive conversation among stakeholders are recommended at county level before iCCM is implemented.

Service Delivery

- iCCM implementation at scale is stronger when aligned with a functioning health system. In Bondo, stock-outs of medicines and supplies, including RDTs at primary health facilities, affected CHVs' ability to deliver services. Their inability to deliver services reduced caregivers' confidence in CHVs as a source of care. Constant availability of medicines is key to sustaining increase in care seeking.
- Strong linkage of sick children referred to health facilities matters. Seeing CHV-referred children as "new visits," as health facility nurses initiated the consultation process afresh resulted in a missed opportunity to underscore CHVs' role and build caregiver confidence in their skills and value.
- Caregiver noncompliance with CHV referrals raises questions about the current policy of referring suspected pneumonia cases to a health facility rather than allowing trained, supervised CHVs to themselves administer antibiotics. Referral compliance was affected by health facilities' reputation for drug stockouts, perceived lack of severity of the child's illness, and easy access to recommended (or alternative) drugs from shops in the community.[2]

Health Systems Support

- Inadequate resources for SHMTs and CHEWs to carry out regular supportive supervision of CHVs can severely undermine iCCM implementation.
- Although most CHVs enjoyed the status that providing iCCM gave them in their communities, the small size of the stipend forced them into other activities to generate income, activities that diminished the time available to provide health care services. Guarding investments of training by sustaining a workforce of CHVs calls for more innovative approaches to incentives.
- CHEWs were too few to support iCCM, and some lacked the clinical background to mentor and supervise CHVs without close supervision. Scaling up iCCM will require a review of needed CHEW competencies.

[2] The study documented availability of drugs in the community as one reason for noncompliance. Per contextual knowledge of the study staff, these are often obtained from poorly regulated drugstores that freely sell antibiotics to people without prescriptions.

Community Support

- CHC members' role with respect to overseeing CHVs requires clarification. The question of whether CHC members need clinical skills for their quasi-supervisory role needs to be resolved.

Recommendations at the County and Sub-County Level and Nationally County and Sub-County (SHMTs)

- *Expand iCCM services*—Expand iCCM to all underserved communities to increase access to timely, effective treatment for childhood illnesses.
- *Referral systems*—Strengthen referral systems from community to facility and back, so that referred clients are seen promptly and those discharged are supported by CHVs.
- *In health facilities*—Conduct an analysis of the reduced workload at health facilities following iCCM introduction; identify opportunities to strengthen facility-based care.
- *Community engagement and mobilization*—Strengthen community mobilization activities to heighten awareness of iCCM services; continue to engage local leaders in iCCM planning, social mobilization, and implementation.
- *Data use*—Foster the use of service delivery data, including data for iCCM, to judge the quality, reach, and benefits of iCCM implementation.
- *Motivating CHVs*—Revisit CHV incentives, including investment of their stipend money into cooperatives, for example, which might generate more than the US$23 monthly stipend.

National Level

- *Flexibility*—Adapt the iCCM strategy, including the suspected pneumonia referral policy, to different regions; support introduction and/or scale-up of county-appropriate iCCM models.
- *Financial resources*—Mobilize resources, both domestic and external, to strengthen the health system support functions of the SHMT in general; to enable CHEWs to undertake regular supportive supervision and mentorship; to facilitate CHV refresher trainings as needed; and to increase drug procurement and supply chain management.
- *Clarification*—Clarify the CHC roles outlined in the CHS implementation guide in view of iCCM; support counties and SHMTs to reorient CHC members on their newly articulated roles

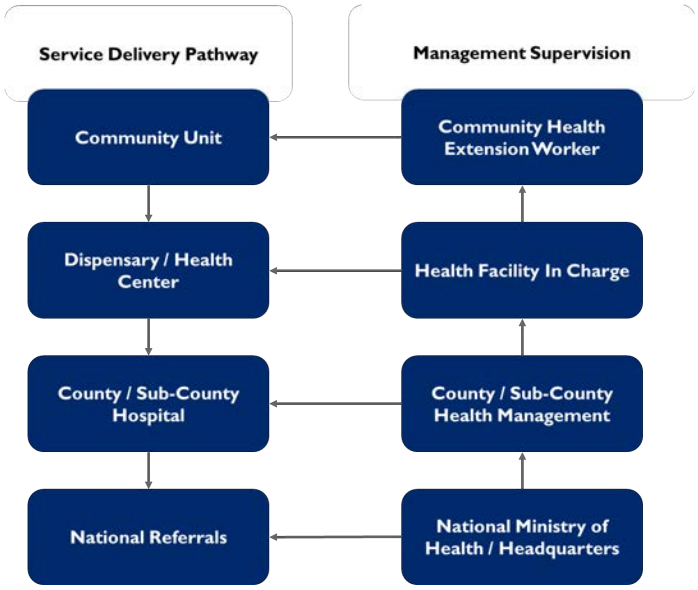
Introduction

Background

In Kenya, where approximately 189,000 children die annually, a significant number of deaths among children under the age of five are preventable, including those resulting from the leading causes of death in this age group: diarrhea, malaria, and pneumonia. A contributing factor to these deaths is the limited access to case management by the high proportion of the population living in rural, hard-to-reach areas. Data from home-based surveys in Kenya suggest that health facility surveillance reported through the routine health information system might have been underestimating the community burden of disease resulting from poor health-seeking behavior for common childhood infectious diseases such as diarrhea (Ayieko et al. 2012).

In 2006, aiming to deliver high-impact health interventions to rural, hard-to-reach communities, the Government of Kenya created the Community Health Strategy (CHS), which supports provision of the Kenya Essential Package for Health at community level. The CHS was initially focused on using community health volunteers (CHVs), who are supported by salaried community health extension workers (CHEWs), to deliver health promotion (Figure 1); when revised in 2012/2013, it gave CHVs the additional function of case management for diarrhea, malaria, pneumonia, malnutrition, and newborn health following the integrated Community Case Management (iCCM) protocol (Ministry of Health 2006).

Figure 1. Organization of Health Service Delivery and Supervision, Kenya



About Integrated Community Case Management

ICCM is a strategy to extend case management of childhood illness beyond health facilities so that more children have access to lifesaving treatments. There is strong evidence that appropriately trained, supervised, and motivated CHVs can correctly identify and treat most children with uncomplicated malaria, pneumonia, and diarrhea. Prevention and prompt diagnosis and treatment of these three conditions are the foremost interventions to reduce child mortality, particularly in low-resource settings, where health service delivery is weakest.

Actual iCCM packages are context dependent, and CHVs are trained based on the interventions they are to provide. Experience from programs in Ethiopia, Ghana, Nepal, and, Zambia has shown that providing case management of childhood illnesses at community level increases access to prompt and appropriate treatment, and in some cases, improves quality of care by minimizing overtreatment of febrile conditions such as malaria (World Health Organization [WHO]/UNICEF 2012).

iCCM in Kenya

To mitigate the high burden of child morbidity and mortality and poor access to health services, the Ministry of Health (MOH) adopted iCCM as a key strategy in 2013 and developed and started operationalizing an iCCM implementation plan (also known as the iCCM Roadmap*)* that defined Kenya's package of iCCM services. The package has five components (Ministry of Health 2013):

- *For fever*— Conduct rapid diagnostic tests (RDTs) and treat with artemisinin-based combination therapy (ACT).
- *For diarrhea*—Assess and treat with ORS and zinc.
- *For suspected pneumonia and cough/short rapid breaths*—Assessment with respiratory timer and referral of suspected pneumonia cases.
- *For malnutrition*—Measurement of mid-upper arm circumference (MUAC) and referral as indicated.
- *For newborns*—Specifically, assessment with a checklist and referral as needed.

Recommendations at the time advised testing the feasibility of iCCM implementation in Kenya's three geophysical areas—an agrarian area, a nomadic area, and an urban slum—in order to generate local evidence to inform scale-up. MCHIP—already working in Bondo Sub-County (agrarian area)—decided to carry out one portion of this study. To our knowledge, no feasibility studies have commenced in other geopolitical areas.

The Intervention

The interventions implemented and evaluated by this study were training and supplying CHVs to work at community level to treat or refer children under five with any one or more of five iCCM illnesses/conditions (i.e., malaria, diarrhea, pneumonia,[3] malnutrition or neonatal illness; CHVs in intervention groups were trained and mentored in the skills and resources to assess, classify, and treat or refer children with fever and/or diarrhea. Sick children presenting with cough/suspected pneumonia were referred to a health facility. The CHVs received RDTs to diagnose malaria. In comparison areas, CHVs continued providing health promotion services and referring all sick children to the nearest health facility. In intervention CUs, CHEWs supported CHVs in their work in different ways:

- **Data Review Sessions:** Each CHEW reviewed CHV-managed iCCM cases and captured data in the CHEW monthly summary form, MOH 515. Data were used to identify CHVs not performing satisfactorily and flag them for remedial measures.
- **Case Observation/Scenarios Assessment:** About once a quarter, CHVs were assessed by CHEWs with case observations and scenario assessments. CHEWs did the iCCM training-of-trainers course and their main role was to act as coaches providing continuous training to CHVs via demonstrations and instructions based on immediate learning needs.
- **Supportive Supervision:** Supportive supervision is one of the cornerstones of community health services—it is most effective when it is performed by multidisciplinary teams with a skills mix that will ensure that service delivery quantity and quality standards are met. During the study, supportive supervision focused on CHV needs, record reviews, service delivery observations, and focused education or on-the-job training. Overall, CHEWs and CHVs were supervised by the Bondo Sub-County Health Management Team (SHMT) and the health facility in-charge using the standard MOH community supportive supervision tool. Supervisors collected summary data from CHEWs during supervisory visits and instituted remedial actions to address emerging challenges. The MCSP research team participated in community supportive supervision sessions.

Table 1. Support Provided to Intervention and Comparison Groups

[3] Treatment of pneumonia at community level was not part of the treatment guidelines in 2013, when this study was designed. UNICEF addressed the research question testing the feasibility of CHVs treating pneumonia with antibiotics at community level.

Support provided to CHVs and CHEWs	Intervention CUs (Experimental)	Comparison CUs (Usual care)
Behavior change communication training and provided tools (e.g., gumboots, flashlight, and bags—to carry data tools and supplies) to all CHVs	X	X
Provided CHVs basic monthly stipend*	X	X
Supported monthly meeting between CHEWs/CHVs/CHCs (e.g., to distribute M&E tools and transport reimbursement)	X	X
Provided CHVs with basic CHV kit[4]: ITNs, Vitamin A, deworming tablets, condoms, flashlight, registers, and health promotion materials*	X	X
Provided iCCM commodities—ORS, zinc, RDTs, ACTs—in addition to kit and tools	X	
Trained CHVs in iCCM	X	
Trained CHEWs on iCCM and IMCI and supervision	X	

* By the time MCHIP initiated the study in 2013, all the CHVs in the 26 CUs in Bondo had been trained on the basic CHV package as part of their orientation/qualification to serve as CHVs. In addition, they were receiving a monthly stipend of about US$23—MCHIP had paid stipends to Bondo CHVs for several years during the RED for PMTCT demonstration project. Therefore, the two activities were not introduced through the iCCM intervention. MCSP continued paying stipends to CHVs only in the eight CUs participating in the study through May 2014. After this time, the government took over stipend payments and continues to the present.

[4] Although the CHS defines the basic CHV kit, specific contents depend on commodities' availability.

Objectives

Overall Objective

The study assessed whether the addition of the iCCM technical module onto the existing CHV platform in Bondo Sub-County improved coverage and quality of services of childhood illnesses at community level after an 18-month implementation period.

Specific Objectives

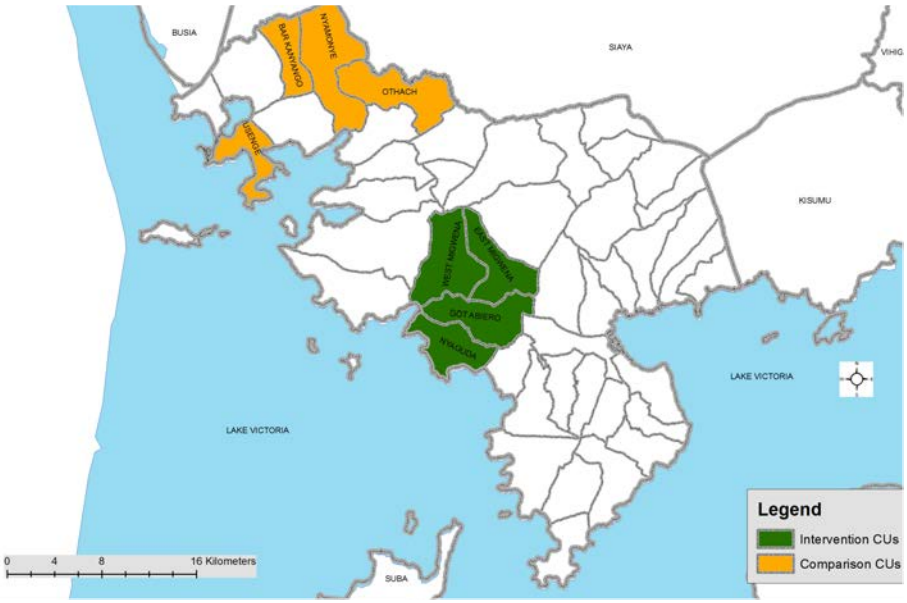
- To determine changes in the community's knowledge and practices, including care-seeking behavior in intervention and comparison CUs during the iCCM implementation period.
- To document the feasibility of iCCM implementation through the assessment of CHV performance, and challenges faced by CHVs during implementation.
- To document the extent to which CHEWs provide support to CHVs, and the challenges CHEWs face.
- To document the extent to which SHMT and community leaders could support implementation of the iCCM package and the challenges faced.
- To document the cost of implementing iCCM in Bondo Sub-County over an 18-month period of implementation.

Methodology

Study Area

Bondo Sub-County is in Siaya County, covering 593 square kilometers, plus more than 600 square kilometers of Lake Victoria. The sub-county borders Busia County to the west, Ugenya Sub-County to the north, Kisumu County to the southeast, Rarieda Sub-County to the east, and Homa Bay County across the lake to the south. The sub-county is administratively divided into three divisions—Nyangoma, Usigu, and Maranda—with 11 locations (each headed by a chief) and 26 sub-locations (headed by assistant chiefs). During study implementation, the sub-county had 26 CUs, all functioning.5 CU boundaries are defined by sub-locations under the administrative structure in effect before devolution in 2013, when administrative structures transitioned from eight provinces to 47 counties. The study focused on eight CUs in relatively hard-to-reach areas—CUs that were purposively geographically removed from one another to reduce the risk of contamination.

Figure 2. Bondo Sub-County Community Units



Study Population

The population of Bondo in 2009 was 157,522 (Kenya National Bureau of Statistics [KNBS] 2010) and was projected to have grown at an average yearly rate of 2.7 percent to about 180,000 in 2014. Children under five years of age comprise 15.5 percent of the population. The majority ethnic group is the Luo, and the main economic activities are subsistence farming and fishing. Nearly half the population and about 40 percent of households live on less than US$1 per day. Devolution has made it challenging to compare health indicators, since earlier estimates were at provincial level. According to the latest Demographic and Health Survey, health indicators have improved. Mortality of children under five dropped from 227 per 1,000 in 2008 (Nyanza Province, Siaya County included) to 159 per 1,000 in 2014 (in Siaya County); infant mortality dropped from 142 per 1,000 live births in 2008 (Nyanza Province) to 54 per 1,000 live births in 2014 (Siaya County). Immunization coverage for children under one year of age has increased from 60 percent in 2008 to 80 percent in 2014 (KNBS and ICF-Macro 2015). However, Siaya County still faces challenges: inadequate infrastructure for health service delivery; inadequate qualified health personnel; and high HIV prevalence in adults—17 percent, compared with an average 6 percent for the rest of the country.

[5] A CU is considered functional if it has trained CHVs and CHEWs linked to a primary health facility.

Study Design

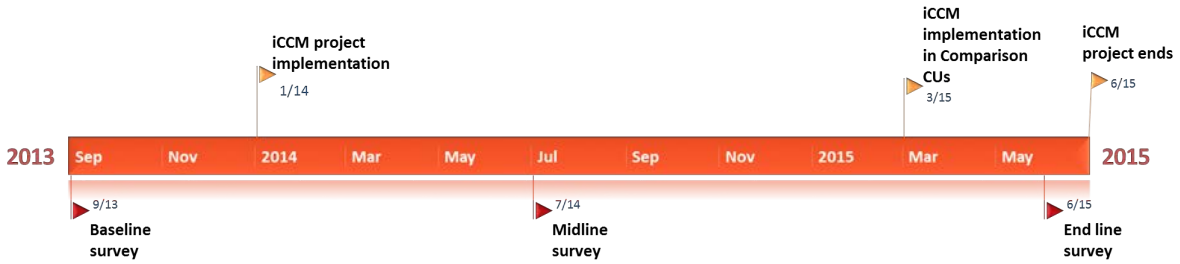
The iCCM implementation feasibility study was based on a quasi-experimental design with non-equivalent comparison groups. Study outcomes were evaluated by comparing results of a post-implementation endline study in June 2015 with a September 2013 pre-project baseline study. Tools for both were identical and included: household surveys, direct observation of CHVs during case management, key informant interviews, and analysis of implementation monitoring program data (including direct program costs). A midline survey carried out in July 2014 after six months of iCCM implementation created the transition from the initial implementation period of 12 months to 18 months. The investigation team had negotiated with USAID to extend the study after a global iCCM evidence review symposium in 2014 recommended implementation of iCCM for at least 18 months prior to the assessment to determine success. Throughout implementation, availability of iCCM medicines and supplies and CHV performance were routinely monitored.

Confounding Activities

The study design was based on the assumption that few changes would take place within the comparison group during the implementation period. However, comparison CU similarities to intervention CUs increased due to three confounding activities.

- CHVs were trained on iCCM in the comparison group during the last three months of the study (March through June 2015) as part of Siaya County's iCCM rollout. This affected the endline comparative differences between intervention and comparison groups.
- Some villages and CHVs in comparison CUs were involved in a malaria incidence and surveillance cohort study sponsored by another organization from November 2013 to November 2015. As part of this study, they were trained to diagnose and treat uncomplicated malaria using RDTs and ACTs.
- Co-occurring WASH activities supported by UNICEF in some comparison CUs also confounded study results.

Figure 3. iCCM Implementation Timeline



Sampling

Selection of Intervention and Comparison CUs

Eight functional CUs fulfilling one or more characteristics of a hard-to-reach area in Bondo (Figure 4) were selected, in conjunction with the SHMT, for the feasibility study. A scoring system was used to assign the CUs to either intervention or comparison group. CUs were selected in a manner that minimized contamination between the two groups; the distance between the two study groups was at least 10 kilometers. Four CUs in Nyangoma Division were selected as intervention sites and another four in Usigu Division as comparison sites. Island CUs, even those meeting criteria as hard to reach, were excluded, due to unique challenges atypical of those of the context in which iCCM will be implemented.

The eight CUs selected for the study formed the basis (universe) for sampling for all study assessments.

Figure 4. Characteristics Defining Hard-to-Reach Areas

- Distance from community unit link facility to sub-county hospital more than 10 kilometers
- Link facility operational for fewer than 24 hours daily
- Poverty, as perceived by the SHMT members (no index used)
- Unplanned urban settlement within CU
- Poor infrastructure/lack of reliable transportation
- Religious/cultural issues affecting care-seeking behavior
- CU is an island in Lake Victoria

Table 2. Sample Sizes by Category of Respondents

Category of Respondents	Intervention CUs	Comparison CUs	Baseline (Total)	Endline (Total)
Household survey	360	360	720	720
CHV survey participants	60	60	120	120
CHV observation sick child visits	120	N/A	120	120
CHEW survey participants	8	8	16	16
Key informants—SHMT members*	—	—	12	12
Key informants—chiefs	8	8	16	16
Key informants—religious leaders	8	8	16	16
Key informants—CHC members	20	20	40	40
Referral compliance—caregivers	20	20	—	40

*SHMT members supervised operations in both intervention and comparison group CUs.

Household Survey

Sampling Methodology: Household survey participants were selected via a two-stage cluster sampling, with villages within the CUs being the "clusters." Villages were chosen using probability-proportional-to-size sampling; households within these villages were selected systematically (i.e., every nth household from a random starting number). Updated household lists obtained from CHVs comprised the sampling frame.

Inclusion Criteria: Respondents were parents or caregivers of children from birth through 59 months of age who had experienced an episode of illness in the two weeks preceding the survey. All households were in study area CUs and had a primary caregiver who was over 18 years of age and able to provide written consent.

Sample Size: The sample size for number of caregivers was estimated based on the assumption that 55 percent of diarrhea cases were managed at community level; the study team hypothesized a 15 percent increase in the number of cases of diarrhea that would be managed effectively at the community level as a result of iCCM implementation. Using this difference in proportions, allowing for 10 percent nonresponse, and a cluster design effect of 1.83 and 80 percent power to detect the difference at 5 percent error, a sample size of 360 respondents per study arm was computed. Between 30 and 60 percent of the villages were selected from each CU, depending on the population, resulting in a total of 2,366 households in the intervention group and 2,145 households in the comparison group. From these, 360 eligible caregivers of sick children per group were interviewed both at baseline and at endline to meet the required sample of 720 households for baseline and endline surveys (Table 2).

Survey Questionnaire: The same questionnaires/tools were used in the baseline and the endline surveys to gather data, with the exception of a few specific questions evaluating iCCM not applicable at baseline, which were asked only at endline (see Annex for questionnaires). The household survey questionnaire solicited information from caregivers of sick children under five on symptoms of the youngest child who had been ill

over the preceding two weeks, utilization of services for common childhood illnesses, barriers to care seeking, and general perception of community health services.

Recruitment and Training of Survey Personnel: Fourteen research assistants with at least mid-level college training in community health or development services were recruited to conduct the household survey, CHV and CHEW interviews, and key informant interviews. In addition, five health workers—who also trained the CHVs on iCCM after the baseline survey—were recruited to observe and record the CHV sick child consultations. Training of the survey team was conducted from June 1 to 5, 2015, and covered survey procedures, research ethics, and quality assurance. Training methods included discussions, role plays, short lectures, and a pre-test at a non-participating CU.

Data Collection: Endline data collection took place over three weeks in June 2015. Every nth household from a complete list of households for each selected village (cluster) was preselected for the survey; 30 to 60 percent of the villages in each CU were chosen. If no eligible children could be found in the preselected household, the next household on the list was picked as a substitute and visited. This process continued until an eligible child was found, although an eligible child was found in more than 70 percent of cases. The research assistant then administered a written informed consent and questionnaire to eligible household respondents. Information was sought for only one eligible child per household. Where the household contained more than one eligible child, the caregiver was asked to provide information about the youngest eligible child.

Key Informant Interviews

Inclusion Criteria: CHVs in the study area (estimated at 60 in intervention and 60 in comparison CUs) were eligible to be interviewed, as well as all CHEWS in both study groups. In addition, Bondo SHMT members, CHC members, chiefs, and religious leaders from the eight CUs were eligible. At endline, interviews were conducted with all available SHMT members and, in addition, two chiefs, five CHC members, and two religious leaders per CU.

Structured Interview Guides for CHEWs and CHVs: The same questionnaires/tools were used in the baseline and the endline surveys to gather data, with the exception of a few specific questions evaluating iCCM not applicable at baseline, which were asked only at endline.

CHEW and CHV interview guides were used at baseline and endline to collect information on knowledge and practices relating to iCCM and on challenges in providing care for iCCM conditions at community level.

Additional semi-structured questionnaires collected perceptions on iCCM and information about support provided to community health services from SHMT, CHC members, chiefs, and religious leaders.

CHEW and CHV Interviews: Endline data collection took place over three weeks in June 2015. After administration of informed consent, two research assistants administered in-depth interview questionnaires to CHEWs and CHVs at the link health facilities associated with the CUs. One questionnaire was administered per respondent.

Key Informant Interviews: Endline data collection took place over three weeks in June 2015. Appointments were made with key informants, and they were interviewed at a place of their choosing. Community leaders were interviewed in their homes; SHMT members were interviewed at work. One questionnaire was administered to each respondent.

Observations of Sick Child Consultations

Observed CHV Sick Child Consultations at the Health Facility: In intervention CUs, CHVs were observed working with sick children under five who presented spontaneously to the primary care facility within their CU with at least one of the following presenting complaints: fever/malaria, cough, fast/difficulty breathing,

and diarrhea. Endline data collection took place over three weeks in June 2015. Children presenting to health facilities with complaints of fever, cough, or diarrhea but no general danger signs were considered suitable for CHV observation. CHEWs informed caregivers of identified sick children about the study. Health workers performing the observations ("assessors" or "validators") administered informed consent to caregivers willing to participate. CHVs were then allocated a sick child for assessment. Each CHV performed three to four sick child consultations for different iCCM conditions. All sick children were subsequently reassessed and treated by staff at the health facility per its usual care protocol.

Sample Sizes: Only CHVs in the four intervention CUs were observed attending to sick children with different iCCM conditions at a health facility. Two case management observations were conducted per CHV at baseline and three to four per CHV at endline, subject to case load.

CHV Observation Checklist: A checklist was used to record actions and decisions taken by CHV in assessing and treating sick children. These observations were made at a health facility by an iCCM trainer considered the "gold standard" of iCCM case management.

Additional Data Collection

Program Monitoring Data: Routine program monitoring data collected during implementation were analyzed at endline.

Program Costs Tool: Direct program costs tracked during implementation were analyzed, including the costs of startup and CHV training costs. Program costs were collected at endline.

Referral Compliance: Data were analyzed from structured interviews with caregivers of children referred to health facilities by CHVs; some of these caregivers had complied with the referral advice and some had not, and equal numbers of compliant and noncompliant caregivers were interviewed at endline.

Data Quality Assurance and Analysis

Quality Assurance

At the end of each day, data collection supervisors reviewed questionnaires for completeness and consistency of responses. Supervisors and a consultant met regularly with research assistants to review the questionnaires and to discuss and address data collection challenges. They also observed some actual household interviews to ensure that questions were being correctly asked and that responses were correctly recorded. Finally, prior to data entry, all questionnaires were reviewed once again for consistency and completeness.

Data Analysis

Data were entered electronically, then cross-checked by a supervisor before being stored in a Research Electronic Data Capture (REDCap) database at Jhpiego Kenya offices. Quantitative data analyses were done using Stata (Version 12.1) and utilized the inbuilt survey routine (SVY) to account for the sampling design used for the intervention. Descriptive statistics comprising proportions or means were calculated for selected indicators. Bivariate analysis for continuous predictors such as age of child, health worker age and years of experience, and outcomes of interest was done using survey-adjusted t-tests. Pearson chi-square tests were used for categorical variables (e.g., gender, education level, treatment used, outcomes of interest) to determine the relationships between iCCM intervention status and baseline characteristics of interest.

This entailed comparing both intervention and comparison groups and baseline versus endline surveys on key variables and indicators of interest. Means and corresponding standard errors (SE) or medians and corresponding interquartile ranges were reported, as appropriate, after assessing for normality of continuous outcome. Counts and corresponding percentages were also used to display the categorical outcomes. For some particular categorical outcomes and indicators of interest, graphical presentations were created—normal

and clustered bar charts, pie charts to display commodity stockouts, a line graph (including a trend line) to display trends in CHV-managed fever and diarrhea cases. All statistical tests were evaluated at the 95 percent level of significance.

In tables in this report, levels of significance are reported in the columns entitled "p," where differences between means or proportions were significant at baseline and endline.

Qualitative data analysis was undertaken to decipher themes of key informant interviews. This analysis is captured in the findings.

Ethical Considerations

The Kenyatta National Hospital/University of Nairobi Ethics and Research Committee (Protocol Number P286/05/2013) and the Institutional Review Board (IRB) of the Johns Hopkins University Bloomberg School of Public Health (IRB Number 00005073) approved this study (see Annex). Written informed consent was obtained from all study participants prior to administering study tools. No compensation was provided for participating in the surveys. All sick children participating in the CHV sick child consultation observation at endline were reviewed and treated as appropriate by health facility personnel.

Findings

The five sections below describe findings related to the study's five specific objectives:

Community Knowledge and Care Seeking: This section describes the changes in caregivers' knowledge and care-seeking behavior for sick children in the iCCM implementation period.

CHV Performance: This section summarizes the findings of community case management implemented by CHVs based on interviews of CHVs to assess knowledge and clinical observations to assess their competencies.

CHEW Support: This section summarizes how iCCM implementation was supported by CHEWs and the challenges they faced.

SHMT and Community Leadership Support: This section highlights support for iCCM implementation by community leaders and the Bondo SHMT.

Costs: MCSP program costs and household costs associated with care seeking are summarized in this section.

Community Knowledge and Care Seeking

Implementation of iCCM in intervention CUs resulted in an increase in the number of caregivers knowing a CHV working in their area, as well as knowledge of their roles compared with baseline. Caregivers also had confidence in CHVs treating sick children, indicated by an increase in the number of caregivers first seeking care from CHVs for fever, diarrhea, and cough—even though treatment of cough was not part of the case management package children with suspected pneumonia were referred to a health facility. Caregivers described CHVs as caring, available, and interested in providing treatment and observed that CHVs provided the same treatment as facility health workers. Although CHVs visited client homes to follow up on sick children, caregivers sometimes sought care for their children in the CHVs' own homes, where they sometimes found other caregivers also waiting to be attended.

Sociodemographic Characteristics of Survey Respondents

Both baseline and endline surveys collected sociodemographic information (Table 3). Between baseline and endline, there were some differences in occupations of caregivers who were sampled. For example, in intervention CUs the proportion of respondents who were farmers increased from 23.9 to 34.9 percent, and in comparison CUs the proportion of respondents who were housewives doubled from 12.5 to 25.8 percent. The occupation of the caregiver can affect their care-seeking practices as they compete for time with child care responsibilities. Respondents' relationship with the eligible child also differed in both groups: More caregivers were the mothers of the eligible children at endline and fewer were fathers. Compared with baseline, there were no significant differences in mean ages, sex, and proportion of children who had an illness within two weeks of the endline survey, or in mean caregiver age (30 years in intervention CUs, 32 in comparison CUs).

Table 3. Sociodemographic Characteristics of Household Survey Respondents

Characteristic	Baseline		Endline		P[Θ]
	Intervention N=360	Comparison N=361	Intervention N=361	Comparison N=356	
Caregivers' age (mean, SD)	30 (0.9)	32 (1.3)	30(0.4)	32 (0.8)	0.494
Occupation (%)					<0.001
• Farmer	23.9	33.5	34.9	33.4	
• Housewife	23.3	12.5	13.9	25.8	
• Small-scale business	19.4	31.6	13.9	17.7	
• Fishmonger	10.8	7.8	18.0	5.3	
• Shopkeeper	8.1	2.5	7.2	3.4	
• Tailor	2.5	1.7	3.3	3.1	
• Fisherman	1.9	0.8	1.1	1.4	
• Mason	1.7	0.3	-	0.6	
• Casual laborer	1.1	2.5	0.8	1.1	
• Teacher	1.1	2.5	1.9	2.5	
• Student	1.1	0.3	0.8	0.3	
• Other	2.9	2.3	4.2	5.4	
• Missing	2.2	1.7	-	-	
Relationship with sick child (%)					0.033
• Mother	80	73.1	87.5	81.2	
• Father	8.3	9.1	4.2	5.6	
• Grandmother	8.1	12.2	7.2	11.8	
• Aunt	1.7	1.7	0.6	1.1	
• Other	1.1	2.8	0.5	0.3	
• Missing	0.8	1.1	-	-	
Number of children under five found (N)	574	543	460	455	
• Male (%)	48.4	49.7	49.3	50.7	0.712
• Age in years (mean, SE)	2.3 (0.1)	2.4 (0.2)	2.4 (0.0)	2.3 (0.1)	0.566
• Children sick 2 weeks to survey (%) [#]	72.8	76.4	78.3	77.7	0.925

HH—Household. SE—Standard error of the mean. #Some households had more than one child who had been sick. [Θ]Difference between baseline and endline.

Caregivers' Knowledge of CHV Roles

At baseline, caregivers in both groups most commonly explained that CHVs checked immunizations and referred sick children to health facilities (Table 4). Intervention-group caregivers' knowledge of CHV roles relating to sick children increased significantly during the study, particularly of CHV roles relating to treatment (from 8.3 to 66.0 percent, p<0.001). In both intervention and comparison CUs, the proportion of caregivers who *first* sought treatment from a CHV increased from 2.1 to 31.1 percent and from 0.6 to 21.3 percent, respectively (p<0.001;

Table 5). The increase in comparison CUs was likely due to iCCM introduction there three months from the end of project implementation.

Table 4. Caregiver Knowledge of and Utilization of CHV Services

Knowledge Area	Baseline		Endline		P[Θ]
	Intervention	Comparison	Intervention	Comparison	
	N=360	N=361	N=361	N=356	
Caregivers know CHV working in the area (%)	85.0	83.9	94.5	85.1	0.487
Sought care or advice from local CHW (%)	8.3	23.8	30.7	22.5	<0.001
Advice given by CHV during sick visit* (%)	N=30	N=86	N=111	N=80	
• Take the child to HF if child becomes sicker	36.7	90.7	35.1	31.3	
• Give medication for all the days	23.3	34.9	72.1	33.8	
• Take child to HF if vomits everything	13.3	1.2	2.7	—	
• Take child to HF if develops a fever	36.7	12.8	0.9	1.3	<0.001
• Take child to HF if convulses	—	7	2.7	2.5	
• Take child to HF if unable to eat anything	6.7	2.3	—	—	
• Take child to HF if bloody loose stool	—	4.7	1.8	3.8	
• Take child to HF if difficulty breathing	—	5.8	—	2.5	
CHV referred child to nearest facility (%)	N=30 56.7	N=86 75.6	N=111 17.1	N=80 41.3	0.072
Where CHV recommended taking child (%)	N=17	N=65	N=19	N=33	
• Government hospital	—	1.5	—	12.1	
• Health center	—	4.6	5.3	—	0.002
• Dispensary	100	92.3	94.7	84.9	
• Private hospital	—	1.5	—	3.0	
CHV role with respect to children* (%)	N=310	N=303	N=341	N=303	
• Assess child immunization status	94.1	78.3	39.3	48.8	
• Assess the sick child for referral	39.9	51.3	18.5	39.9	
• Referral of the sick child	18.2	50.0	26.1	18.8	
• Follow up sick children on treatment	10.2	29.0	12.6	27.1	
• Provide home treatment to sick child	8.3	7.4	66.0	21.8	<0.001
• Assess child nutritional status	1.3	4.5	2.3	2.6	
• Conduct tests to look for disease	—	4.2	49.3	7.3	
• Perform weight measurements	1.3	1.6	0.3	0.3	
• Perform growth measurements	0.7	0.3	0.6	0.3	
• Other	4.6	8.4	0.3	2.6	

HF—Health facility. *Multiple responses allowed. Proportions may add up to more than 100. [Θ]Difference between baseline and endline.

Care Seeking by Caregivers of Sick Children

Virtually all caregivers sought care for the illness of the index child (
Table 5). Overall, although care seeking from dispensaries dropped with the increase in CHV service provision, dispensaries remained caregivers' most common first stop for care in both intervention and comparison groups. Over the project period, the proportion of sick children managed by a facility health worker significantly decreased—from 78.6 to 56.0 percent ($p<0.001$) in intervention CUs and from 90.6 to 81.5 percent in comparison CUs ($p=0.002$). The main reasons that caregivers sought care from these workers did not change; reasons for *not* seeking their care included distance to their health facility, lack of money, and the fact that care had been sought from a CHV. Throughout the project area, the proportion of caregivers seeking treatment from facility health workers as first point of contact declined.

Table 5. Sources of Care and Care-Seeking Behavior of Caregivers of Sick Children

Care Seeking	Baseline		Endline		P[Θ]
	Intervention	Comparison	Intervention	Comparison	
Sought treatment for sick child [N(%)]	346 (96.1)	352 (97.5)	345 (95.6)	352 (98.9)	1.000
First point of care/treatment for sick child (%)	N=346	N=352	N=345	N=352	<0.001
• Dispensary	62.4	74.1	41.2	60.8	
• Pharmacy	6.9	7.1	10.7	6.3	
• Health center	4.3	5.7	4.3	4	
• Shops	6.9	3.4	3.5	1.1	
• Home management	10.1	3.4	—	—	
• Government hospital	2.6	2.6	2.9	3.1	
• Private clinic/hospital/outreach	3.5	2	4.1	1.7	
• Traditional practitioner	0.3	0.9	0.9	0	
• CHV	2.1	0.6	31.1	21.3	
• Outreach site	0.9	0.3	—	—	
• Missing	—	—	1.4	1.7	
Child attended by facility health worker any time during illness (%)	78.6	90.6	56.0	81.5	0.027
Reasons for seeking care from facility health worker* (%)	N=283	N=327	N=202	N=290	
• Fever	90.1	91.1	84.2	83.8	
• Diarrhea	21.9	50.5	23.3	16.6	
• Cough and difficulty breathing	32.9	46.5	15.3	37.9	
• Vomiting	28.3	37.3	26.2	17.2	
• Vomiting everything	6.4	14.1	4	0.3	
• Cough and visible fast breathing	5.3	11.9	13.4	7.2	
Reasons for not seeking care from health worker* (%)	N=75	N=33	N=143	N=62	<0.001
• Long distance to health facility	22.7	24.2	44.8	22.6	
• Not enough money	17.3	30.3	44.4	6.5	
• Very sick to travel	2.7	-	1.3	11.3	
• Perceived poor care at health facility	1.3	-	6.3	4.8	
• CHV treated the child	-	-	25.9	37.1	
• Child was not seriously ill	-	-	9.1	14.5	

*Respondents were allowed multiple responses; column percent may be more than 100. [Θ]Difference between baseline and endline.

Care Seeking for Fever

Fever was the most common complaint throughout the project—at endline affecting 88.4 and 86.5 percent of sick children in intervention and comparison CUs, respectively; treatment was sought for 96.2 and 98.7 percent, respectively. The proportion of caregivers seeking treatment for fever from CHVs increased from 2.7 to 31.7 percent in intervention CUs and from 0.9 to 12.8 percent in comparison CUs, from baseline to endline, with proportionate drops in care sought from dispensaries (Table 6). This difference was statistically significant, as was the difference in the "person providing initial care"—primarily driven by an increase in CHVs as providers of initial care for children with fever ($p<0.001$; Table 6). Despite the increase in caregivers seeking care from CHVs, dispensaries were still the most common first point of care for fever.

Table 6. Care Seeking for Children with Fever

Management of Fever	Baseline		Endline		P[©]
	Intervention	Comparison	Intervention	Comparison	
Fever two weeks prior to survey [N (%)]	298 (82.7)	330 (91.4)	319 (88.4)	308 (86.5)	0.479
Those with fever who sought treatment [N (%)]	295 (98.9)	328 (99.4)	306 (96.2)	304 (98.7)	0.434
Where treatment first sought (%)	N=295	N=328	N=306	N=304	
• Dispensary	66.8	78.4	42.8	67.8	
• Private pharmacy	8.8	6.7	11.1	5.3	
• Health center	5.1	5.8	3.6	5.3	
• Shop	5.8	2.4	2.3	1.3	
• CHV	2.7	0.9	31.7	12.8	
• Private clinic/hospital	2.7	2.4	4.3	2.0	<0.001
• Government hospital	2.4	1.4	2.3	4.8	
• Outreach	1.0	-	-	0.7	
• Traditional practitioner	0.3	0.6	0.3	-	
• Other	4.4	1.4	1.6	-	
From whom advice/treatment first sought (%)	N=295	N=328	N=306	N=304	
• Facility health worker	74.2	84.1	47.4	77.6	
• Private pharmacy worker	8.8	6.7	10.8	3	
• Local shopkeeper	5.7	2.4	2.3	1.6	<0.001
• CHV	3.7	2.4	33.2	13.5	
• Private clinic worker/doctor	2.7	2.4	4.2	3.9	
• Other	3.7	1.5	0.7	-	
• Missing	1.2	0.5	1.4	0.4	
A blood test was done for malaria	N=295 60.1	N=328 70.6	N=306 79.9	N=304 86.7	0.107

[©]Difference between baseline and endline

Testing and Treatment of Fever

The reported proportion of children with fever tested for malaria prior to treatment increased from 60.1 to 79.9 percent in intervention CUs and 70.6 to 86.7 percent in comparison CUs – difference was not statistically significant (Table 6). The CHVs conducted RDTs on children with fever as per the iCCM algorithm and although caregivers were not asked where these tests were performed, about 82 percent of children in both groups at endline were treated with an ACT—up from baseline's 73.6 percent in intervention CUs and 78.7 percent in comparison CUs (Table 7).

The reported proportion treated with other antimalarials declined at endline (Table 7), with only one child in each group treated with quinine. Other significant baseline-to-endline differences were increases in the proportion of children receiving ACT on the day of onset of fever (from 10.6 to 38.8 percent in intervention

CUs and 12.4 to 62.8 percent in comparison CUs; p<0.001) and in CHVs being the source for ACT (from 1.7 to 27.6 percent in intervention CUs and 0.3 to 7.8 percent in comparison CUs; p<0.001). Although the proportion of children visited at home by a CHV after treatment was low at endline (17.6 percent in intervention CUs and 21.2 percent in comparison CUs), the increase from baseline (from 6.1 and 17.6 percent in intervention and comparison CUs, respectively) was significant (p=0.039).

Table 7. Treatment of Fever

Treatment of Fever	Baseline		Endline		P©
	Intervention	Comparison	Intervention	Comparison	
	N=295	N=328	N=312	N=306	
Child treated for fever (%)	98.9	99.4	98.1	99.3	0.664
Took an antimalarial (%)	N=295	N=328	N=312	N=306	
• ACT	73.6	78.7	82.7	81.7	
• Amodiaquine	0.3	6.4	0.0	0.0	
• Quinine	0.7	2.1	0.3	0.3	0.008
• Sulphadoxine pyrimethamine (SP)	0.3	9.8	0.0	0.0	
• Don't know	4.7	3.0	0.6	0.3	
• No antimalarial	20.4	0.0	16.4	17.7	
Took any antipyretic (%)	N=295	N=328	N=312	N=306	
• Paracetamol	86.4	93.0	90.1	89.5	
• Ibuprofen/aspirin	2.7	4.0	1.6	2.0	
Took antibiotic/other medicine (%)	N=295	N=328	N=312	N-306	
• Amoxicillin	8.1	2.7	10.6	8.8	
• Cotrimoxazole	3.0	2.7	5.4	6.2	
• Metronidazole	1.0	1.2	-	-	
• Erythromycin	0.3	0.3	1.0	2.0	
How long after fever onset was ACT given (%)	N=217	N=258	N=258	N=250	
• Took ACT same day	10.6	12.4	38.8	62.8	
• Took ACT next day	56.7	61.6	34.1	24.0	<0.001
• Took ACT after 2 days	24.0	19.4	18.6	10.4	
• Took ACT after 3 or more days	8.7	6.6	8.5	2.8	
Source of medicines taken by child (%)	N=295	N=328	N=312	N=306	
• Mother/caregiver	4.1	3.7	3.5	2.0	
• Facility health worker	81.7	86.3	50.3	70.6	
• CHV	1.7	0.3	27.6	7.8	<0.001
• Private pharmacy/shop	0.0	0.0	12.5	9.2	
• Other	0.3	0.3	4.2	7.8	
• Missing	12.2	9.5	1.9	2.6	
CHV visited child at home after treatment (%)	N=295	N=328	N=312	N=306	
• CHV visited within 3 days (%)	6.1	7.9	17.6	21.2	0.039
• CHV visited after 4 or more days (%)	5.1	6.4	15.7	18.9	
	1.0	1.5	1.9	2.3	

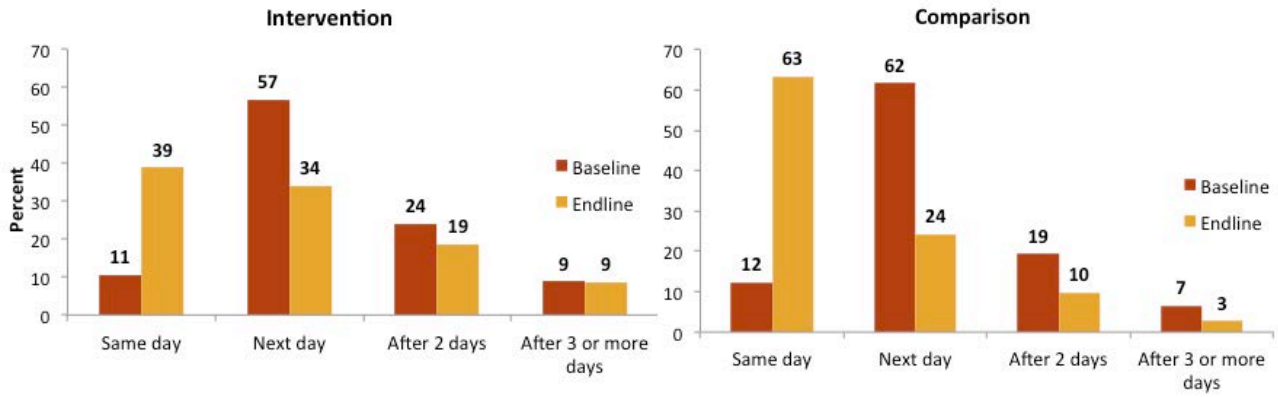
©Difference between baseline and endline.

Timeliness of Fever Treatment

Between baseline and endline, there was a significant difference in the time between onset of fever and malaria treatment with ACT (Figure 5). The proportion of children with fever who were tested and received ACT the same day as onset of fever increased from 10.6 to 38.8 percent in intervention CUs and from 12.4 to 62.8 percent in comparison CUs (p<0.001). There were proportionate declines in children receiving treatment

the day after and two days after symptom onset; the proportion who received malaria treatment after three or more days remained more or less the same in intervention CUs but dropped in comparison CUs.

Figure 5. Time Taken to Malaria Testing and Treatment after Onset of Fever



The quality of care for malaria case management, including testing before treatment and treatment of positive cases with an ACT, while well established at baseline, improved in both intervention and comparison CUs by endline.

In comparison CUs, a small proportion of caregivers received malaria diagnosis and treatment from CHVs who had already received iCCM training. Here, although fever case management was not implemented on a large scale at community level, some households and CHVs were involved from September 2013 to November 2015 in a fever surveillance cohort study not sponsored by MCSP. Using commodities provided by that study, CHVs in this area were able to test for and treat malaria cases. The Siaya County iCCM training rollout in comparison CUs toward the end of the MCSP study also skewed results. Overall, CHVs in comparison CUs promoted prompt treatment seeking for fever and referred those with fever to a health facility for testing and treatment because they did not have a good supply of RDTs and ACTs.

Care Seeking and Management of Diarrhea

At the time of the endline survey, three of four comparison CUs had been implementing community case management of diarrhea with ORS and zinc tablets for at least three months; as part of the Siaya County iCCM scale-up, CHVs were accessing these commodities from link health facilities. Among sick children in intervention CUs at endline, 19.9 percent had diarrhea—similar to the 23.1 percent at baseline. In comparison CUs, there were significantly fewer children with diarrhea at endline (18.5 percent) than at baseline (50.4 percent); this difference was statistically significant ($p<0.001$).

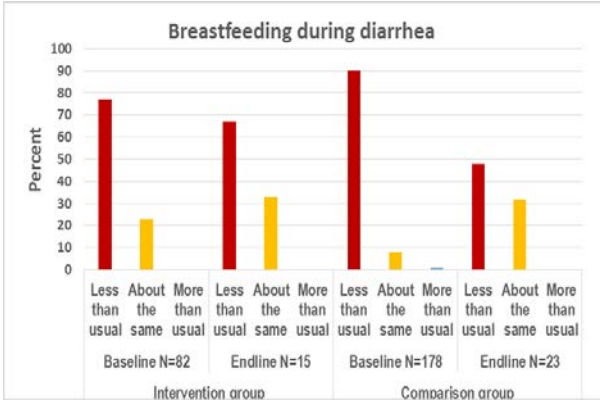
The proportion of caregivers seeking out CHVs for treatment of children with diarrhea increased from a baseline of approximately 1 percent in both groups to 16.2 percent in intervention CUs and 27.1 percent in comparison CUs. Caregivers seeking treatment from facility health workers for their child's diarrheal illness declined from 69.6 to 66.2 percent in intervention CUs and from 89.9 to 64.4 percent in comparison CUs—both drops statistically significant ($p=0.014$). The proportion of children treated with both ORS and zinc tablets increased significantly in both groups, from 10.1 to 52.9 percent in intervention CUs and from 42.9 to 62.7 percent in comparison CUs. In addition, the use of ORS alone ($p<0.001$) dropped overall. Details of diarrhea treatment and follow-up are below (Table 8).

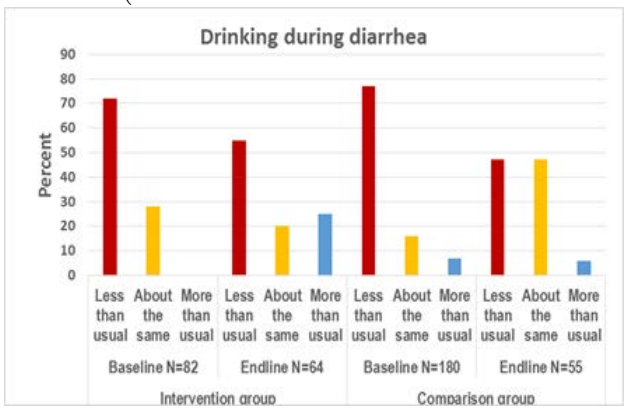
Table 8. Care Seeking and Treatment of Diarrhea

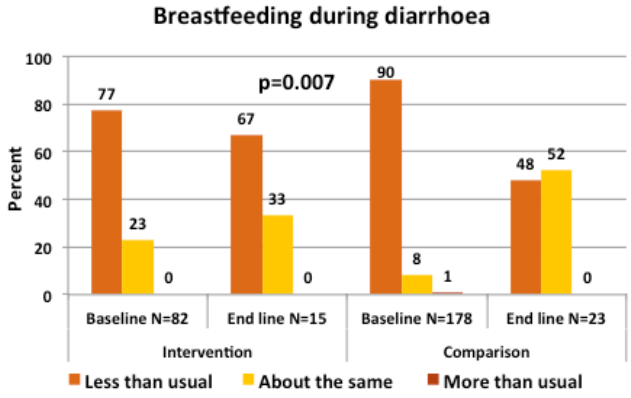
Treatment of Diarrhea	Baseline		Endline		P©
	Intervention	Comparison	Intervention	Comparison	
Diarrhea§ in 2 weeks prior to survey [N (%)]	83 (23.1)	182 (50.4)	72 (19.9)	66 (18.5)	<0.001
Sought treatment for diarrhea (%)	95.2	92.3	94.4	89.4	<0.001
Where treatment first sought (%) • Dispensary • Health center • CHV • Government hospital • Private clinic/hospital • Pharmacy • Shop • Traditional practitioner • Missing	N=79 62.0 2.5 1.3 3.8 7.6 6.3 5.1 2.5 8.9	N=168 77.4 10.1 1.2 1.8 2.4 3.0 1.2 3.0 -	N=68 57.4 4.4 16.2 2.9 5.9 7.4 1.5 2.9 1.5	N=59 52.5 - 27.1 8.5 3.4 5.1 - - 3.4	0.117
From whom treatment first sought (%) • Facility health worker • CHV • Private health facility worker • Shopkeeper • Other	N=79 69.6 1.3 15.2 5.1 8.9	N=168 89.9 1.2 4.8 1.2 3.0	N=68 66.2 14.7 13.2 1.5 4.4	N=59 64.4 23.7 8.5 - 3.4	0.014
Treatment given at first contact point [N (%)]	78 (98.8)	160 (95.2)	65 (95.7)	57 (96.6)	<0.001
Treatment for diarrhea (%)* • ORS powder only • Zinc tablets only • Both ORS and zinc • Injection medicine • Intravenous fluid • Home remedies/herbal medicines • Other	N=79 70.9 2.5 10.1 5.1 - 7.6 3.8	N=168 47.0 1.2 42.9 21.4 7.7 6.0 2.4	N=68 26.5 13.2 52.9 4.4 - 2.9 13.2	N=59 20.3 5.1 62.7 - - 1.7 10.2	<0.001
Source of the treatment used (%) • CHV • Health worker • Pharmacist • Other	N=79 1.3 73.8 8.9 16.0	N=168 0.6 92.3 3.6 3.6	N=68 14.7 66.2 7.3 11.8	N=59 22.0 64.4 10.2 3.4	0.004
CHV follow-up after treatment (%) • Within 3 days • After 3 days or more	N=79 16.3 2.5	N=158 10.1 1.1	N=68 12.1 -	N=59 24.6 8.8	0.039
Knowledge of diarrhea treatments (%)* • Has heard of ORS • Used ORS during this illness • Correctly described ORS preparation • Has heard of zinc tablets • Used zinc tablets during this illness	N=83 92.9 78.6 60.7 14.3 11.9	N=182 96.2 87.1 77.4 46.8 43.5	N=72 98.6 77.8 70.8 75.0 61.1	N=66 92.4 74.2 59.1 74.2 57.6	<0.001

§ Diarrhea defined as three or more loose stools in a day. * Respondents were allowed multiple responses; column percent may be more than 100. © Difference between baseline and endline.

Caregiver tendency to breastfeed children with diarrhea less or to give older children less to drink dropped between baseline and endline to a statistically significant extent. The proportion of intervention CU caregivers who breastfed their children less during diarrheal illness dropped from 77 to 67 percent, while the proportion breastfed about the same increased from 23 to 33 percent. In comparison CUs, the change in breastfeeding practice was more marked; the proportion of children with diarrhea breastfed less than usual dropped from 90 to 48 percent, while those breastfed about the same increased from 8 to 52 percent. The breastfeeding practice difference from baseline to endline was significant (p=0.007). For older children, the drinking practice during diarrheal illness also changed significantly (p<0.001). The proportion of caregivers offering sick children less than usual to drink dropped from 72 to 55 percent in intervention CUs and from 77 to 47 percent in comparison CUs. Those offered more than usual to drink increased from 0 to 25 percent in intervention CUs but remained about the same in comparison CUs (







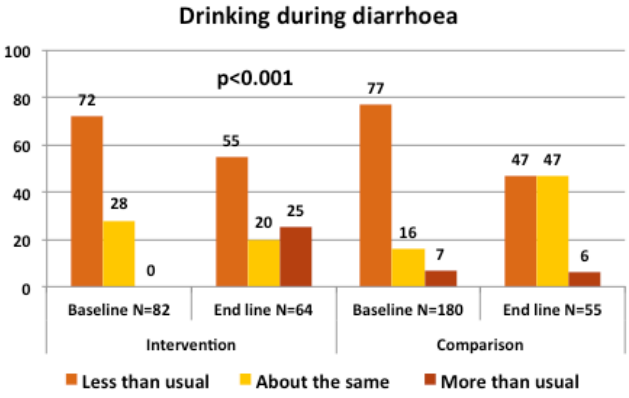


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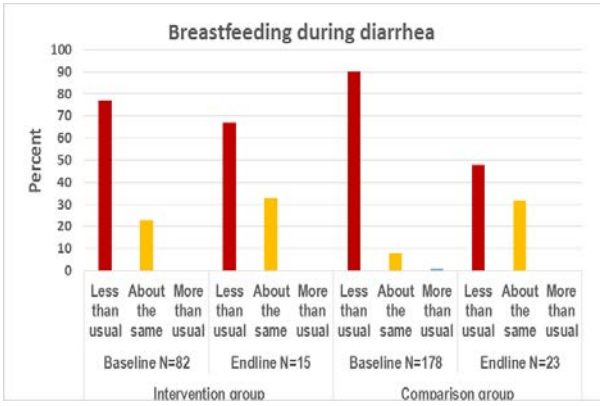
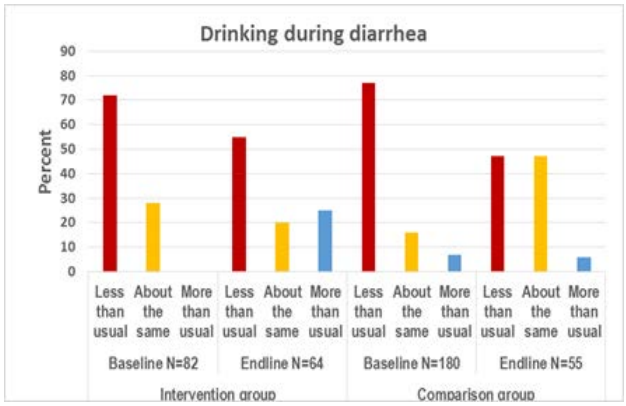
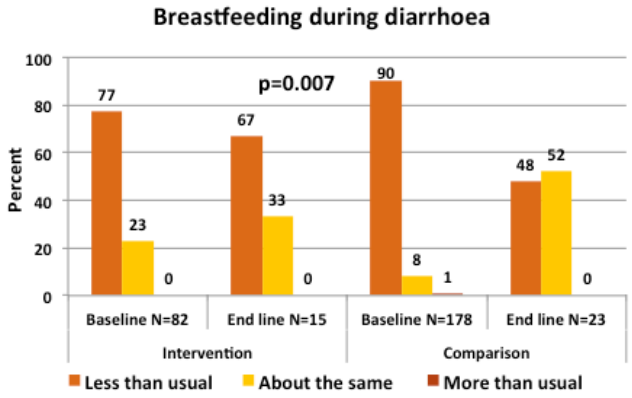
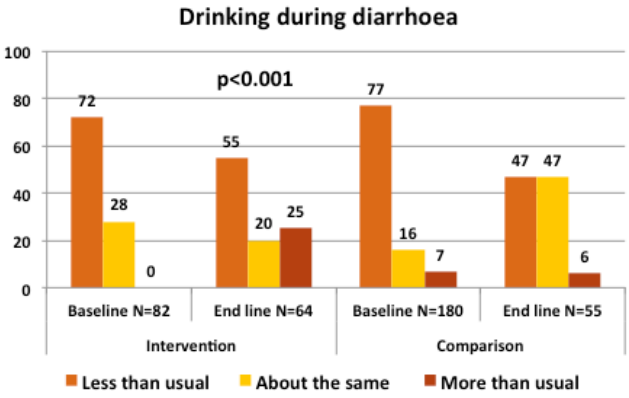
Figure 6. Caregiver Feeding Practices During Diarrheal Illness









Intervention-group CHVs had been trained on correct management of sick children with diarrhea using ORS and zinc as well as on proper feeding practices. This information was to be passed on to caregivers as part of CHV health promotion activities. By the end of the study, use of ORS and zinc by sick children with diarrhea improved significantly in intervention CUs after the introduction of iCCM, as did caregivers' practice of giving sick children more to drink during diarrheal illness. In comparison CUs, diarrhea treatment also improved, although use of both ORS and zinc was much higher at baseline (42.9 percent) than in intervention CUs (10.1 percent; Table 8).

Changes in comparison CUs toward the end of the study had a negative effect on their suitability as a control group; CHVs there were actively involved in clean water and sanitation activities, including identifying children with diarrhea and referring them to health facilities for treatment—even before implementing community case management for diarrhea. The WASH activities, which were prioritized, may have contributed to the significant reduction in the number of cases of children with diarrhea in comparison CUs at endline. CHEWs in intervention CUs—involved in training comparison-group CHVs—reinforced sick-child follow-up. Perhaps this explains the higher rate of improvement in breastfeeding practices during diarrheal illness and in the use of both ORS and zinc tablets to treat diarrhea in comparison CUs.

Care Seeking for Cough/Suspected Pneumonia

Both at baseline and at endline, management of cough/suspected pneumonia was not implemented at community level, and CHVs were advised to refer all children with cough and fast or difficult breathing, after assessment, to a health facility. There were no differences between baseline and endline in the proportion of sick children who had fast or difficult breathing in addition to cough. Although the proportion of caregivers in intervention CUs first seeking treatment for cough from CHVs increased from 1.2 to 17.4 percent, the dispensary was still the first point of care for most caregivers (Table 9).

Table 9. Treatment of Cough/Suspected Pneumonia

Treatment of Cough/Suspected Pneumonia	Baseline		Endline		P[Θ]
	Intervention	Comparison	Intervention	Comparison	
Sick child had cough in 2 weeks prior to survey [N (%)]	191 (53.1)	233 (64.5)	158 (43.8)	186 (52.2)	0.832
Sick child had cough and fast/difficulty breathing [N (%)]	138 (38.3)	216 (59.8)	92 (25.5)	159 (44.7)	0.221
Sought care or treatment for this illness (%)	171 (89.5)	222 (95.3)	138 (87.3)	170 (91.4)	0.956
Where treatment for cough/fast breathing first sought (%)	N=171	N=222	N=138	N=170	
• Dispensary	64.9	78.4	49.3	67.1	<0.001
• Pharmacy	9.4	9.0	12.3	9.4	
• CHV	1.2	0.0	17.4	9.4	
• Government hospital	4.1	1.4	5.8	5.3	
• Health center	6.4	5.9	4.3	4.7	
• Shop	9.4	2.3	0.7	0.0	
• Private clinics	2.3	1.8	7.2	1.8	
• Other	2.3	1.2	3.0	2.3	
Duration of cough/fast breathing before treatment sought (%)	N=167	N=212	N=87	N=147	
• Same day	9.0	11.3	13.8	21.1	<0.001
• Next day	52.1	63.2	28.7	40.8	
• After 2 days	18.6	17.0	26.4	23.1	
• After 3 or more days	20.3	8.5	31.1	15.0	
CHV visited child at home after treatment [N (%)]	13 (7.6)	18 (8.1)	13 (9.4)	30 (17.6)	1.000
• Within 3 days	9 (5.3)	18 (7.2)	9 (6.5)	23 (13.5)	
• After 3 or more days	4 (3.3)	2 (0.9)	4 (2.9)	7 (4.1)	

[Θ] *Difference between baseline and endline.*

Although community-level treatment of cough and fast breathing was not part of the iCCM package in intervention CUs, iCCM implementation resulted in an increase in the proportion caregivers of sick children first seeking care for cough and or fast breathing from a CHV, who then referred them to a health facility.

Caregiver Perspectives on CHVs and iCCM Services

Caregivers who had interacted with CHVs for any sick child visits were asked to provide perspectives on their experience (Table 10). At baseline, out of 721 care givers, 126 caregivers responded (17.4 percent); 80 (63.4 percent) were from comparison CUs and 46 (36.5 percent) from intervention CUs. At endline, out of 717 care givers who participated in the survey, 170 (23.7 percent) shared their perspectives, most from intervention CUs (120, or about 71 percent).

Satisfaction with Initial Communication by CHV: At endline, as at baseline, all caregivers were very satisfied with initial communication by CHVs (Table 10). They described the manner in which CHVs spoke to them as warm, polite, happy, respectful, friendly, caring, and "not harsh." Initial communications evoked happiness (75/170), good feelings (27/170), and satisfaction (23/170), and brought them encouragement, relief, and relaxation. Caregivers said that what they liked most about the initial contact was that the CHVs were polite towards them, readily attended to them, showed concern, and listened attentively.

Table 10. Caregivers' Feelings during Initial Communication with CHV

Caregiver Feelings During Initial Communication with CHV	Baseline		Endline	
	Intervention N=46	Comparison N=80	Intervention N=120	Comparison N= 50
Happy/glad	22	44	59	16
Satisfied	13	13	13	10
Good/fine/nice	7	10	20	7
Encouraged/motivated to visit	7	2	4	4

"I liked the first meeting because the CHV was very humble and wanted to know more about the child's illness, as the child was in a bad state."
—Caregiver #65 (Intervention)

"She left everything she was doing to attend to my case."
—Caregiver #46 (Intervention)

Satisfaction with CHV Attitude during Sick Child Consultation: All but one caregiver described the attitude of the CHV during the sick child consultation positively. CHV moods were described as jovial/cheerful (72/170), polite (58/170), encouraging (26/170), good (17/170), and sympathetic (7/170). One caregiver described the CHV as being in a bad mood but understood and attributed it to the many sick children she had to attend to on that day.

Caregivers also described how they perceived or knew that the CHV was attentive to them as they explained their child's illness (Table 11). At baseline and endline, most caregivers in both intervention and comparison groups described CHVs as "attentive" or "keen listener[s]." Nonverbal signs of CHV attentiveness included nods, eye contact, adequate time given to caregiver descriptions of the child's problem, and vocalized responses to and paraphrasing of caregiver observations.

Table 11. How Caregivers Perceived that CHVs Were Attentive

Indications that the CHVs listened to caregiver	Baseline		Endline	
	N=126	Percent	N=170	Percent
Was attentive	65	52	67	39
Asked questions	5	4	22	13
Maintained eye contact	15	12	15	9
Allowed adequate time for caregiver to explain child's problem	16	13	11	6
Was nodding as caregiver spoke	17	13	10	6
Examined child as caregiver spoke	5	4	6	3
Left what she was doing to attend to child	1	1	5	3
Switched off phone/radio	1	1	3	2
Paraphrased/restated child's problem	2	2	1	1

Satisfaction with CHV Management of the Sick Child: At endline, caregivers expressed satisfaction with CHV management of their children and were able to describe how their children were assessed during sick-child consultations with the CHV (Table 12). At baseline, 65 percent of caregivers in intervention CUs and 1 percent in comparison groups reported that the CHV did not assess the sick child; at endline, all caregivers reported that CHVs performed some form of assessment. In intervention CUs, the most common assessment reported was feeling child's body for fever (79/120) and performing a malaria test (87/120). In comparison CUs, feeling the child's body for fever (27/50), putting tape around the arm (10/50), and counting breaths and checking the child's eyes (8/50) were most common.

Table 12. Caregiver Report of Assessment of Sick Children by CHV

How CHV assessed sick child	Intervention		Comparison	
	N=120	Percent*	N=50	Percent*
Felt body of child for hotness	79	65	27	54
Pricked finger for a malaria test	87	71	5	10
Measured arm with a tape	4	3	10	20
Counted breaths	3	2	8	16
Examined the child's eyes	4	3	8	16
Measured child's weight	-	-	4	8
Exposed the child	5	4	2	4
Felt the child's stomach	5	4	1	2
Checked tongue			-	-
Looked at the child's stool			-	-
Demonstrated how to prepare ORS			3	2
Measured temperature using a thermometer			2	2

**Caregivers gave more than one response. Column totals may exceed N and 100 percent.*

Caregiver Perceptions on CHV Case Management Skills: At endline, most caregivers in both intervention CUs (99/120) and comparison CUs (47/50) judged CHVs as skilled and competent in their work (Table 13).

Table 13. Caregiver Perceptions of CHV Skills

Performance	Baseline		Endline	
	Intervention N=46	Comparison N=80	Intervention N=120	Comparison N=50
• Effective	4	39	68	7
• Good/competent/skilled	14	23	31	40
• Require more training or skills	28	18	21	3

Caregiver Perceptions on Correctness of CHV Case Management: All caregivers from intervention CUs believed that the CHV correctly managed their child's case. A subset of the caregivers (7/120) said that they thought their child received proper treatment because the CHV administered the same medicine that had been given at a health facility for a similar illness. One caregiver was convinced the CHV was acting properly because the CHV showed her the positive malaria test, confirming her child's need for medication. In comparison CUs, some CHVs helped with case management at facilities—which caregivers sometimes reported as "iCCM."

"[I] was convinced when I saw the CHV performing a malaria test just like [doctors] at the hospital."
—Caregiver #13 (Comparison)

"She referred me to the dispensary, and the medicines she recommended were the same ones I was given at the dispensary."
—Caregiver #24 (Comparison)

Caregiver Challenges in Seeking Care from CHVs: Most caregivers (73/120 in intervention CUs, 34/50 in comparison CUs) faced no challenges. In intervention CUs, the main issue was that CHVs lacked drugs to treat malaria and fever (22/49). Other challenges were similar to those faced by caregivers in comparison CUs: the CHV lived far away (8/49), the CHV was away from his or her home (4/49), and the caregiver had to wait to see the CHV due to a press of clients at the CHV's home (4/49)—in many instances, unless a CHV found a sick child during a routine home visit, it was the caregiver who, with the sick child, visited the CHV's home. A few caregivers in intervention CUs (3/49) complained that CHVs did not treat older children, so that they had to seek treatment in two places, and that CHVs did not treat fever if the malaria test was negative.

The challenges faced in comparison CUs included: CHV away from his or her home (5/16); distance to the CHV home (4/16); charges for services (4/16); and poor CHV communication (3/16). During the survey, it was found that some CHVs in the comparison CUs were providing injections and charging clients for them; this was reported to the SHMT for action.

"For injection, if you don't have money, it is a problem—you may not be injected. . . ."
—Caregiver #11 (Comparison)

"I don't have a challenge. . . . But you have to pay [the CHV] some money, which at times is not there."
—Caregiver #34 (Comparison)

Caregiver Satisfaction with CHV Case Management: Most caregivers (101 of 120 in intervention CUs and 49 of 50 in comparison CUs) were happy or satisfied with CHV services. In intervention CUs, 5 of 120

caregivers were unhappy with stockouts and the fact that CHVs did not treat children over five years of age. One caregiver in each CU (intervention and comparison) was unhappy with CHV services, and one caregiver in each CU was dissatisfied that some CHVs were slow in performing duties and not always available.

Caregiver Recommendations for Improving iCCM: Caregivers from both intervention CUs (52/120) and comparison CUs (10/50) expressed gratitude for the iCCM program and recommended that it continue. A few specific recommendations were made to improve the services (
Table 14).

Table 14. Caregiver Recommendations for Improvement of CHV Services

Recommendations	Intervention		Comparison	
	N=120	Percent	N=50	Percent
No recommendation	31	26	26	56
iCCM is valuable to the community and should continue	52	43	10	20
More CHVs are needed	11	9	3	6
CHVs need more training to treat other childhood ailments	8	7	1	2
CHVs should be available in the community, not at facility	-	-	5	10
CHVs should perform more follow-up visits	3	2	-	-
Medicines should always be available with CHVs	8	7	-	-
Other	7	6	5	6

CHV Performance

Data were collected through interviews (to assess knowledge) and direct observation of CHVs managing sick children.

Sociodemographic Characteristics of CHVs

CHVs interviewed at baseline were interviewed at endline as well—54 from intervention CUs and 61 from comparison CUs (Table 15). The number of CHVs in intervention CUs was lower at endline than at baseline, as some CHVs had left the service due to personal and family conflicts, and the SHMT terminated the services of one other. More than 80 percent of CHVs in both intervention and comparison CUs were female. Mean age and average years of service increased about two years between baseline and endline in intervention groups. Additionally, the proportions of CHVs who had received other types of training increased from baseline to endline ($p<0.001$). At endline, trainings in the basic CHV package and in iCCM had been received by all CHVs in intervention CUs and, as part of iCCM scale-up in Bondo Sub-County, by 83.6 percent of CHVs in comparison CUs.

Table 15. CHV Sociodemographic Characteristics

Characteristic	Baseline		Endline		P***
	Intervention N=59	Comparison N=62	Intervention N=54[o]	Comparison N=61	
Females	81.4	88.7	85	90	0.819
Mean age in years (SE)	42 (2.2)	38 (0.7)	44 (2.2)	39 (0.8)	<0.001
Mean years working as CHV (SE)	7.7 (4.8)	3.7 (0.5)	10 (1.2)	6.5 (1.2)	<0.001
Highest level of education (%)					
• Secondary	18.6	40.3	22.2	41.0	0.586
• Primary	81.4	59.7	77.8	59.0	
CHV training received (%)*					
• Basic CHV package	42.4	38.7	100.0	83.6	
• Family planning	81.4	88.7	90.6	95.1	
• HIV	20.3	54.8	41.5	57.4	
• iCCM	3.4	-	*100.0*	*83.6*	<0.001
• Multidrug resistant TB	8.5	12.9	22.6	21.3	
• Infant and young child feeding	20.3	33.9	30.2	32.8	
• Other training[#]	76.3	54.8	56.6	44.3	

*Respondents were allowed multiple responses; column percent may be more than 100.[o] Four CHVs left the service due to personal and family conflicts; the SHMT terminated one other. *Difference between baseline and endline. [#]Other training covered malaria case management, maternal and child health, home-based care, disease infection and prevention, water and sanitation, peer counseling, prevention of mother-to-child transmission of HIV, and palliative care.

CHV Ability to Correctly Assess and Refer Sick Children

Identification of Sick Children: CHVs were interviewed to assess their knowledge of symptoms of illness. In both intervention and comparison CUs, CHV knowledge of the common causes of death in children under five improved significantly (p=0.001;

Table 16). In intervention groups, all CHVs said that fever/malaria was the most common cause of death, followed by diarrhea and difficulty breathing. At endline, all CHVs also demonstrated a relatively high level of knowledge of general danger signs in children under five, signs of pneumonia, and signs of malnutrition. For example, the proportion of CHVs in both groups mentioning chest indrawing, difficulty breathing, inability to drink, and cough lasting more than 14 days as general danger signs increased. Knowledge of blood in stool as a general danger sign also increased—from 3.4 to 67.9 percent in intervention CUs and from 1.6 to 75.4 percent in comparison CUs. Knowledge of reading the red position on the MUAC tape as a danger sign increased fivefold in intervention CUs, from 17.2 to 84.9 percent, and from 33.9 to 59.0 percent in comparison CUs. Knowledge of swollen feet as a danger sign increased from 3.4 to 49.1 percent among CHVs in intervention CUs.

Some knowledge of the correct response to a general danger sign dropped. The proportion of CHVs mentioning "referral of all children with general danger signs" as a step in sick-child management decreased from 98.3 to 45.3 percent in intervention CUs while increasing slightly in comparison CUs, from 45.2 to 50.8 percent. The proportion of CHVs mentioning "not able to breastfeed" and "not able to drink" as general danger signs in children under five was only 17.0 and 32.1 percent, respectively, in intervention CUs, although about half of CHVs in comparison CUs mentioned both. Lastly, at endline, 90.6 percent of CHVs in the intervention group mentioned "fast breathing" as a sign of suspected pneumonia, which as up from 25.4 percent at baseline (p<0.001). However, none of the CHVs in intervention CUs mentioned "difficulty breathing" as a sign of suspected pneumonia which was surprising. CHVs in the comparison CUs mentioned difficult breathing approximately 7 percent at both endline and baseline.

Table 16. CHV Knowledge of Common Childhood Illnesses

CHV knowledge of common under-five illness	Baseline		Endline		P[Θ]
	Intervention	Comparison	Intervention	Comparison	
	N=59	N=62	N=54	N=61	
Common causes of death in children under five					<0.001
• Fever/malaria	91.5	95.2	100.0	96.7	
• Diarrhea	64.4	79.0	81.1	93.4	
• Difficulty breathing	13.6	33.9	58.5	57.4	
• Malnutrition	1.7	14.5	20.8	23.0	
• Neonatal illness	0.0	8.1	3.8	6.6	
Steps in identifying a child's problems from a caregiver*					<0.001
• Ask the caregiver	98.3	66.1	84.9	82.0	
• Look at the child for signs of illness	86.4	87.1	88.7	82.0	
• Record in the sick child recording card	5.1	-	34.0	21.3	
• Treat children who are sick with no danger sign	22.0	1.6	18.9	18.0	
• Refer all children with general danger signs	98.3	45.2	45.3	50.8	
Knowledge of general danger signs in a child under five*					<0.001
• Cough for 14 days or more	19.0	12.9	66.0	62.3	
• Diarrhea for 14 days or more	56.9	12.9	73.6	73.8	
• Blood in stool	3.4	1.6	67.9	75.4	
• Fever for more than 7 days	58.6	14.5	69.8	68.9	
• Convulsions	51.7	38.7	67.9	72.1	
• Not able to breastfeed	12.1	29.0	17.0	47.5	
• Not able to drink or feed	13.8	22.6	32.1	52.5	
• Vomits everything	50.0	37.1	49.1	60.7	
• Chest indrawing	1.7	9.7	54.7	41.0	
• Difficulty breathing	19.0	27.4	47.2	59.0	
• Unusually sleepy or unconscious	19.0	24.2	22.6	24.6	
• Red MUAC	17.2	33.9	84.9	59.0	
• Swollen feet	3.4	11.3	49.1	23.0	
Recognition of signs of suspected pneumonia in a child*					<0.001
• Cough	16.9	17.7	60.4	67.2	
• Fast breathing	25.4	30.6	90.6	72.1	
• Chest indrawing	3.4	29.0	58.5	49.2	
• Fever	23.7	43.5	7.5	18.0	
• Difficulty breathing	35.6	6.5	0.0	6.6	
Identification of children with malnutrition*					<0.001
• Yellow MUAC	53.5	46.8	75.5	70.5	
• Red on MUAC tape	58.6	64.5	94.3	80.3	
• Weight	34.5	46.8	5.7	24.6	
• Skin	36.2	37.1	22.6	23.0	
• Brown wavy hair	5.1	11.3	1.9	11.5	
• Swollen feet/abdomen	8.5	6.5	22.6	9.8	

*Respondents were allowed multiple responses; column percent may be more than 100. [Θ]Difference between baseline and endline.

Sick Child Conditions Treated at Home: Project staff tracked and documented changes in the environment in which the study was implemented. At baseline, all CHVs in the intervention group and 77.4 percent of those in comparison group practiced the correct steps when referring all sick children to link health facilities for care and explained why the child needs to be referred (Table 17). At endline, 91 percent of CHVs in intervention CUs and 87 percent in comparison CUs treated nonbloody diarrhea with ORS and zinc, while 94 and 30 percent of those in intervention and in comparison CUs, respectively, tested fever cases with an RDT and treated those testing positive with ACT. It is important to note that 84 percent of CHVs in comparison CUs reported receiving iCCM training and were able to treat fever at community level, but could not do so effectively due to a limited availability of RDTs. In comparison CUs, where, as noted, some CHVs were involved in a malaria incidence and surveillance cohort study, the standard of care was to test and confirm malaria before treatment, so children with fever were more often than not referred for testing and treatment at a health facility. The differences in proportions of illness managed at home between baseline and endline were statistically significant ($p<0.001$).

Table 17. Conditions for Referral and Steps to Be Taken by CHVs

Referral by CHVs	Baseline		Endline		P[©]
	Intervention N=59	Comparison# N=62	Intervention N=53	Comparison N=61	
iCCM conditions the CHV would refer* (percent)					
• Cough for more than 2 weeks	18.6	0.0	62.3	82.0	
• Diarrhea for 14 days or more	72.9	0.0	79.2	78.7	
• Blood in stool	11.9	0.0	75.5	70.5	
• Fever for more than 7 days	40.7	1.6	71.7	72.1	
• Convulsions	61.0	3.2	67.9	77.0	
• Not able to breastfeed	18.6	0.0	13.2	55.7	<0.001
• Not able to drink or feed	18.6	0.0	34.0	52.5	
• Vomits everything	42.4	3.2	50.9	57.4	
• Chest indrawing	0.0	0.0	58.5	37.7	
• Difficulty breathing	25.4	1.6	56.6	52.5	
• Unusually sleepy or unconscious	22.0	0.0	20.8	31.1	
• Red MUAC	8.5	1.6	75.5	65.6	
• Swollen feet	0.0	0.0	26.4	27.9	
Correct steps for referral of child to link health facility* (percent)					<0.001
Explain to the caregiver why child needs to go to the facility	100	77.4	45.3	86.9	
Write a referral note	72.9	91.9	94.3	93.4	

* Respondents were allowed multiple responses; column percent may be more than 100. [©] Difference between baseline and endline.
# CHVs in comparison area who had not heard of iCCM at baseline did not respond to some questions.

Referral of Sick Children with General Danger Signs: While the proportion of CHVs' knowledge about some general danger signs (Table 16) dropped slightly by endline, CHVs needed no prompting to articulate the steps to take when referring a sick child with a general danger sign. In intervention CUs, the proportion of CHVs who mentioned telling the caregiver the reason for referral decreased from 100 percent at baseline to 45.3 percent at endline, which was unexpected—perhaps because these CHVs had been treating for a longer time and thus were making fewer referrals. The proportion who mentioned writing a referral note and following up with the child once a week, however, increased from 72.9 to 94.3 percent. In comparison CUs, the proportion who advocated explaining the reasons for referral increased from 77.4 to 86.9 percent, while those who advised writing a note remained about the same, moving just from 91.9 to 93.4 percent. The difference between CHVs from intervention and comparison CUs with regard to the correct steps for referrals was statistically significant at baseline and endline ($p<0.001$).

Difficulties Faced by CHVs When Managing Children under Five in the Community: CHV challenges varied (
Table 18). In intervention CUs, the most commonly cited difficulties included feeling insufficiently trained and caregiver ignorance at baseline and, at endline, lack of medical supplies and caregiver noncompliance with referral advice and treatment instructions. Caregiver adherence to CHV referral advice was only about 40 percent, with a demonstrated preference for alternative sources of care over health facilities. In comparison CUs, difficulties mentioned (e.g., lack of equipment, inadequate medical supplies, poor linkage of referred clients with health facility) were similar at baseline and endline, but the proportion of respondents varied.

Table 18. Difficulties CHVs Faced Managing Sick Children in the Community

Difficulties faced managing sick children (Percent)*	Baseline		Endline	
	Intervention	Comparison	Intervention	Comparison
	N=59	N=62	N=54	N=61
Lack of medical supplies (e.g., ORS, zinc)	6.8	96.8	59.2	88.5
Lack of equipment (e.g., RDT kit)	6.8	67.8	7.4	100
Do not feel sufficiently trained	89.8	29.0	—	19.7
Poor linkage of referred clients with health facility	—	43.5	7.4	33.9
Do not have enough time to attend to clients	—	11.3	16.7	13.1
Noncompliance with referral advice	—	—	72.2	21.3
Noncompliance with treatment advice	—	—	27.8	11.5
Caregiver ignorance and attitude	89.8	—	27.8	8.2

Management of iCCM Commodities

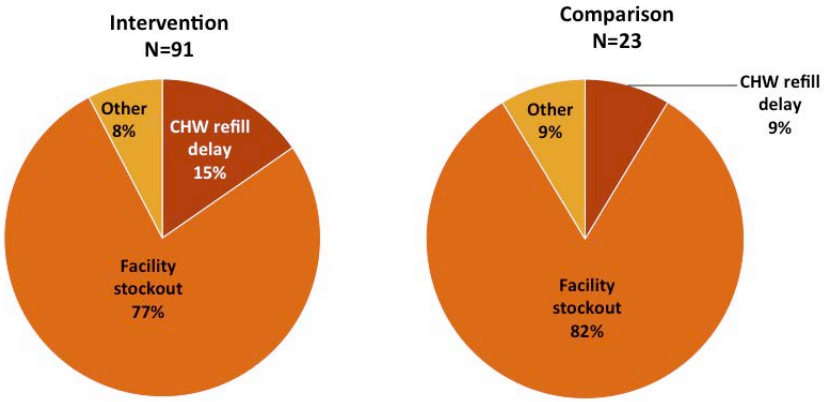
Management of iCCM commodities was not assessed at baseline, as CHVs in intervention CUs had not been issued these commodities. At endline, CHVs were asked whether they had experienced stockouts of medicines or RDTs during iCCM implementation (Table 19 and Figure 7). In comparison CUs, where CHVs were managing only nonbloody diarrhea with ORS and zinc at community level, nearly 20 percent reported stockouts of needed commodities. This may be because, as the study team learned, some comparison-group CHVs had been trained to manage malaria under the November 2015 surveillance study mentioned earlier. Lack of commodities at link health facilities was the most common reason that CHVs experienced stockouts (77 percent in intervention CUs and 82 percent in comparison CUs), followed by failure of the CHV to refill stocks (accounting for 15 percent in intervention CUs and 9 percent in comparison CUs). Other reasons given were CHEW failure to restock, lack of training on stock management, and poor recordkeeping (specific to RDT stockout in intervention CUs).

Table 19. Proportion of CHVs Experiencing Stockouts

Commodity stockouts	Intervention		Comparison	
	N =54	Percent	N =61	Percent
ACT*	36	66.7	N/A	N/A
ORS	20	37.0	11	18.0
Zinc tablets	15	27.8	12	19.7
Malaria RDTs*	20	37.0	N/A	N/A

* CHVs in comparison CUs did not have commodities to manage fever at community level.

Figure 7. Reasons CHVs Experienced Commodity Stockouts



N=Number of instances of commodity stockouts. Other reasons: Intervention—Poor recordkeeping, increased number of cases. Comparison—increased number of cases seen.

Few CHVs in comparison CUs had experience using RDTs, and those who did used them only within health facilities and could not speak to proper disposal at community level. In intervention CUs, 76 percent of CHVs disposed of sharps and used RDTs at their link facilities, while 24 percent used pit latrines for disposal, although this was not in accordance with the disposal guidelines discussed during training. Thirteen CHVs (24 percent) described challenges disposing of sharps and RDTs—long distances to health facilities that were cumbersome when carrying one or more boxes of sharps (13 percent), and insufficient supply of safety boxes that required improvisation (9 percent). Additional training and supervision of sharps disposal may be needed to ensure that only approved means are used.

Supervision of CHVs

Supportive supervision, a cornerstone of community case management, focuses on CHV needs, record reviews, observations of service delivery, and education or on-the-job-training. During the study, clinical mentorship of CHVs and reviewing of data collected fell to CHEWs during their monthly CHV meetings and during quarterly supervision visits with the SHMT (Table 20). Seventy-six percent of CHVs in intervention CUs and 90.2 percent in comparison CUs reported being supervised at least once during the three months preceding the endline survey; 67.3 percent of CHVs from comparison CUs were supervised three times over the same period, compared with only 31.7 percent of CHVs in intervention CUs. In intervention CUs, CHVs were supervised by someone from all levels of the health service over the three months before the endline, while at baseline, nearly all supervision was by CHEWs alone.

In intervention CUs, of 13 CHVs who reported not being supervised at all during the three months before the endline, seven did not know why supervision did not take place. Reasons mentioned by the remaining six CHVs included the unavailability of a CHEW supervising two CUs or on maternity leave, and the CHV not being informed about when supervision would take place.

In comparison CUs, six CHVs had no supervision—two did not know why, two had personal reasons, and two cited non-availability of a CHEW covering more than one CU.

Mentorship involved a review of CHV records (Table 20), with more simulated case scenarios in both intervention and comparison CUs at endline than at baseline. In all study areas, these case scenarios covered malaria/fever, diarrhea, and cough, using a timer to assess respirations; in intervention CUs only, case scenarios also included performing RDTs and preparing ORS. In the three months preceding the endline survey, the content of supervision changed in the intervention CUs, putting greater focus on strengthening clinical skills. In 87.8 percent of visits at endline, the supervisor used simulated case scenarios to mentor CHVs on clinical skills, up from 10.9 percent at baseline ($p<0.05$).

Table 20. Supportive Supervision and Clinical Mentorship of CHVs

Supervision of CHVs	Baseline		Endline		P[◎]
	Intervention	Comparison	Intervention	Comparison	
Had routine supervision in the last 3 months[6] (%)	78.0	95.2	76.0	90.2	0.875
Person conducting supervision in the last 3 months* (%)	N=46	N=59	N=41	N=55	
• SHMT member	22	1.7	29.3	1.8	<0.001
• CHMT member	-	-	17.1	3.6	
• National level	-	-	7.3	-	
• CHEW	97.8	100	73.2	96.4	
Number of times supervised in the last 3 months (%)	N=46	N=59	N=41	N=55	
• Once	50.0	1.7	26.8	10.9	0.126
• Twice	26.1	3.4	31.7	12.7	
• Three times	19.6	42.4	31.7	67.3	
• More than three times	2.2	52.5	7.3	9.1	
Supportive supervision involved review records and clinical mentorship (%)	93.5	96.4	95.1	100.0	0.646
Supportive supervision involved clinical mentorship using case scenarios (%)	10.9	N/A	87.8	61.8	0.035

CHMT—County Health Management Team. *Respondents were allowed multiple responses; column percent may be more than 100.
[◎]Difference between baseline and endline

In all groups, the sick child form, child referral form, community and household mapping records, and the commodities register were reviewed (Table 21). In comparison CUs, a wider variety of CHV records were reviewed by supervisors during supervision; commodity registers, monthly summaries, births and deaths of children under five, and antenatal mothers' records were reviewed for more than 10 percent of CHVs.

Table 21. CHV Records Reviewed during Supervision

Other Records Reviewed*	Intervention		Comparison	
	N=54	Percent	N=61	Percent
Sick child form	32	59.3	11	18.0
Child referral form	19	35.2	27	44.3
Community/household mapping	8	14.8	5	8.2
Commodity register	3	5.6	8	13.1
Monthly summaries	1	1.9	8	13.1
Births and deaths (children <5 years)	-	-	10	16.4
Sanitation and hygiene records	-	-	12	19.7

**Respondents were allowed multiple responses; column percent may be more than 100.*

At endline, supervision contacts by CHEWs in the field were more frequent in comparison CUs than in intervention CUs—perhaps due to the recent introduction of iCCM and the Bondo SHMT's higher focus on supervision in the CUs "newly enrolled" to provide iCCM. However, all CHVs in intervention CUs met monthly

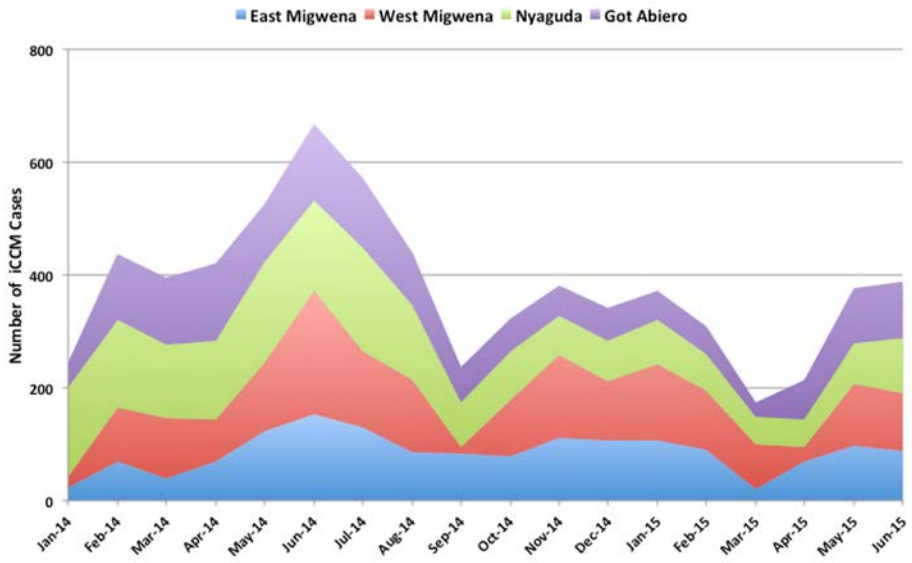
[6] Some CHVs did not "perceive" the monthly meetings with CHEWs at the facility as "supervision" and thus did not report it.

with their CHEWs[7] to review CHV records and commodity stocks as part of ongoing mentorship and reporting, and these meetings provided an opportunity for mentorship, with discussions of iCCM case scenarios.

iCCM Cases Managed by CHVs during Study Implementation

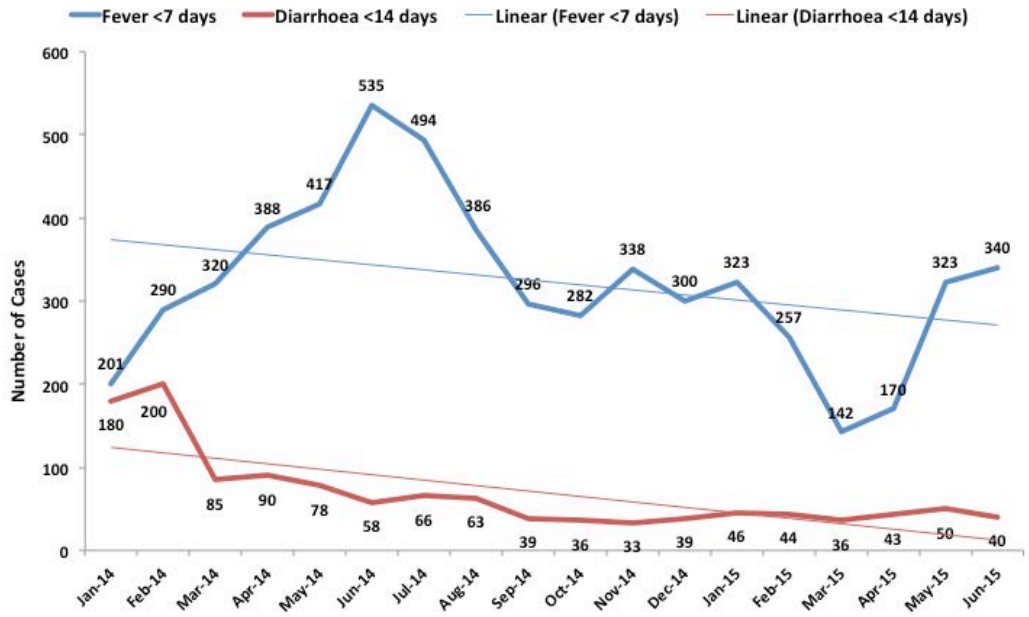
The midline survey found that the number of iCCM cases managed in the four CUs doubled from January to June 2014 at health facilities to 2,079 and at community level to 2,789 (combined total of 4,868), up from 2,367 cases managed at health facilities alone during the corresponding period in 2013, before iCCM's introduction. In addition, data from study progress reports showed that in the 18-months implementation period (i.e., January 2014 to June 2015), an average of 380 iCCM cases per month were managed by the CHVs in the four CUs. The distribution of cases per CU over the study period is shown in Figure 8. About 85 percent of cases managed by CHVs had fever, and of these, 81 percent had positive RDTs and were treated with artemether-lumefantrine. Of the remaining cases, 13 percent had diarrhea and 2 percent cough. Fever cases managed by CHVs from January 2014 to June 2015 (Figure 9) fluctuated seasonally, with fever peaking between March and August 2014 with fewer cases between March and April 2015 following rain patterns. During the 18 months of project implementation, CHVs attended to 7,658 children, 1,271 of them (17 percent) were immediately referred to health facilities.

Figure 8. iCCM Cases Managed by CHVs in the Intervention CUs from January 2014 to June 2015



[7] Some CHVs did not "perceive" the montly meetings as "supervision" thus did not "report it" as such. This explains the seeming contradiction with the results above.

Figure 9. 18-Month Trends in Fever and Diarrhea Cases Managed by CHVs



CHEWs regularly reviewed CHVs' sick child records and checked for case management per guidelines. Of 4,238 children managed by CHVs over the 12 months before the endline survey, program data show that 95 percent were managed appropriately, following the iCCM protocol, and 90 percent of the sick children were reported to have recovered from their index illness. No deaths were reported at community level among children managed by CHVs during the study period.

iCCM Cases Referred by CHVs[8]

To understand the number of referrals made by CHVs and compliance by caregivers, program data were reviewed. The project monitoring data show that from July 2014 to June 2015, 13 percent of iCCM cases that presented to CHVs in the four intervention CUs (i.e., 639 of 4,869) were referred to link health facilities. This was proportionately lower than the 24 percent of cases reported at midline, following six months of iCCM implementation. Documented successful referrals of iCCM cases to link health facilities between July 2014 and June 2015 were 55 percent (350 of 639), or more than 20 percentage point higher than the 33 percent seen during the six months from January to June 2014. However, during the same period, the proportion of successful referrals within 24 hours was low (38 percent) compared with the 49 percent of the six months before July 2014 (i.e., the first six months of the project covered by the midline assessment). The main reasons for referral were RDT-negative fever of less than seven days' duration and cough with fast breathing.

Caregiver Compliance with Referral Advice from CHV: To assess reasons for compliance or noncompliance with CHVs' referral advice, 39 caregivers who sought treatment for a sick child from a CHV and were referred to a health facility—caregivers from both intervention CUs (N=20) and comparison CUs (N=19)—were interviewed.[9] Caregivers were chosen purposively to include those who complied with referral instructions and those who did not. In intervention CUs, 19 of the 20 caregivers understood the reasons for referral and 18 of 20 received a referral note from the CHV; in comparison CUs, all 19 caregivers understood the reason for referral and were given a referral note.

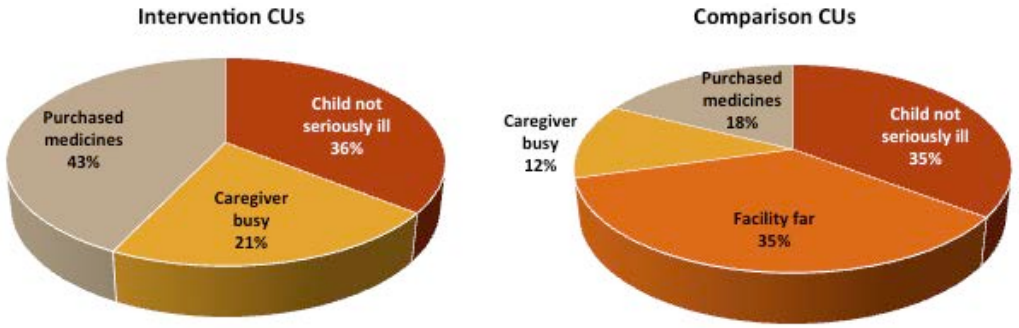
[8] Referral compliance was identified as an issue at midline. The research team added the review of referral records to better understand referral decisions and documentation by CHVs and compliance by care givers.

[9] This was an additional feedback mechanism introduced during implementation after observing relatively low compliance during the midline assessment.

Reasons for referral in the intervention area included: fever and a negative RDT test (14/20), lack of malaria tests and medicines (3/20), and cough with fast or difficult breathing (3/20). In comparison CUs, where only case management for nonbloody diarrhea was being implemented, children of 16 of 19 referred caregivers presented with fever.

Caregivers' main reason for complying with referral advice in both intervention and comparison CUs was the perception that the child's illness was serious (6/10 for each CU; Figure 10). In intervention CUs, the main reasons caregivers did not comply were that they had purchased medicines (4/10), perceived the child to be not seriously ill (3/10), or were busy with other things (2/10); in comparison CUs, caregivers cited the late hour for getting to a health facility (6/9) and lack of money for transport there (2/9) as well as the perception that the child was not seriously ill (5/9). CHVs followed up within three days of referral with most caregivers referred in all CUs; only three caregivers in intervention CUs received no follow-up visit from the CHV.

Figure 10. Reasons for Noncompliance with CHV Referral Advice



*10 caregivers in intervention and 9 caregivers in comparison CUs were interviewed. More than one reason for noncompliance with referral advice could be given.

Observation of CHV Sick Child Consultations

Fifty-four CHVs from the four intervention CUs were observed during sick child consultations by health workers trained on iCCM at endline, slightly fewer than the 59 CHVs who were observed at baseline as four CHVs left the service during the study period (Table 22–Table 25), and one was terminated by the SHMT. At endline, each of the 54 CHVs was observed managing three to four sick children under five with fever and/or diarrhea and/or cough at a health facility. The observation was conducted by iCCM trainers who are considered the gold standard of iCCM skills. Key points in the observation were the steps of case management in iCCM (i.e., ask, assess, classify, treat or refer, and counsel and advise). There were 206 sick child consultations by CHVs at endline compared with 115 at baseline, when each CHV was assessed on two cases.

Assess and Classify the Sick Child—Check for General Danger Signs and Ask for Main Symptoms of Illness: There were areas of notable improvement at endline (Table 22). For example, 92.7 percent of CHVs asked a caregiver for the child's health booklet, up from 10.4 percent at baseline, and on average, 93 percent asked about general danger signs at endline, up from 32 percent at baseline.

Table 22. Introduction and Initial Assessment by CHVs

Check for General Danger Signs and Ask for Main Symptoms of Illness	Baseline		Endline		P[⊙]
	N=115	Percent	N=206	Percent	
Welcome and preliminary history from caregiver*					
• CHV welcomed caregiver with a "greeting"	111	96.5	204	99.0	0.192
• CHV asked "name of the child"	109	94.8	202	98.1	0.105
• CHV asked the caregiver to "sit" before taking history	85	73.9	202	98.1	<0.001
CHV asks the following questions*					

Check for General Danger Signs and Ask for Main Symptoms of Illness	Baseline		Endline		P[o]
	N=115	Percent	N=206	Percent	
• Reason for seeking consultation	114	99.1	203	98.5	1.000
• Age of child	112	97.4	204	99.0	0.354
• Relationship of child to caregiver	104	90.4	203	98.5	0.001
• Caregiver has the "mother–child health booklet"	12	10.4	191	92.7	<0.001
CHV documents the following in the sick child recording form*					
• Name of child	110	95.7	202	98.1	0.211
• Age of child	110	95.7	201	97.6	0.342
• Relationship of child to caregiver	86	74.8	200	97.1	<0.001
CHV asked caregiver and looked for the following general danger signs*					
• Convulsions with this illness	38	33.0	197	95.6	<0.001
• Difficulty drinking, feeding, or breastfeeding	54	47.0	202	98.1	
• Not able to drink or eat	34	29.6	202	98.1	
• Vomiting everything	39	33.9	195	94.7	
• Lethargic or unusually sleepy or unconscious	18	15.7	162	78.6	
Caregiver's reason for sick child visit*					
• Diarrhea[#]	28	24.3	42	20.4	<0.001
• Diarrhea and vomiting	7	6.1	16	7.8	
• Fever or malaria	61	53.0	159	77.2	
• Fever and vomiting	10	8.7	17	8.3	
• Fever, diarrhea, vomiting	3	2.6	7	3.4	
• Cough and difficulty breathing	29	25.2	4	1.9	
• Cough and fast breathing	26	22.6	12	5.8	

*Multiple responses allowed - column percent may be more than 100. [o]Difference between baseline and endline. [#]Diarrhea defined as 3 or more loose stools in a day.

Specific Illness History and RDTs for Malaria: CHVs soliciting symptoms of main illnesses improved significantly, with more than 98 percent of CHVs asking caregivers if the sick child had fever, cough, or diarrhea (
Table 23). CHVs did an RDT for malaria in 96.9 percent of children with fever at endline—up from zero at baseline. Correct procedures were followed and RDT results accurately interpreted by all but eight CHVs; these managed the child correctly after a reminder from the assessor.

Table 23. Assessing Symptoms of Illness by CHVs

Assessing Symptoms of Main Illness (Intervention Group Only)	Baseline		Endline		P[o]
	N=115	Percent	N=206	Percent	
Acute respiratory infection					
• CHV asked if child had cough	102	88.7	205	99.5	<0.001
• CHV asked about the duration of cough[*]	82	87.2	139	99.3	
Diarrhea					
• CHV asked if child had diarrhea	86	74.8	203	98.5	<0.001
• CHV asked for duration of the diarrhea illness[*]	37	49.3	61	93.8	
• Asked for presence of blood in the diarrhea[*]	28	37.3	52	80.0	
Fever					
• CHV asked if child had fever	110	95.7	206	100.0	0.006
• CHV asked for duration of fever[*]	81	80.2	195	100.0	

Assessing Symptoms of Main Illness (Intervention Group Only)	Baseline		Endline		P[Θ]
	N=115	Percent	N=206	Percent	
• Performed an RDT test	0.0	0.0	189	96.9	<0.001
• Wiped finger using sterile swab/spirit swab before pricking	0.0	0.0	189	100.0	
• CHV collected blood using capillary tube at 45 degree angle	0.0	0.0	187	98.9	
• CHV added buffer solution drops correctly to test cassette	0.0	0.0	189	100.0	
• CHV timed duration prior to reading the test results	0.0	0.0	188	99.5	
• CHV read RDT test results	0.0	0.0	181	95.8	
• Assessor agreed with CHV interpretation of test result	0.0	0.0	181	100.0	

**Question asked to caregivers whose children had the illness. [Θ]Difference between baseline and endline*

Assess Sick Child—Look, Feel, and Listen for Signs of Illness: Observed assessing sick children, CHVs were seen looking for general danger signs in order to appropriately classify the sick child for management (Table 24). At endline, more than 95 percent of CHVs looked for chest indrawing and edema of both feet and measured the MUAC, up from fewer than 10 percent at baseline. In addition, 74.3 percent assessed for fast breathing by counting breaths over a minute, up from none at baseline. CHVs classified 75.6 percent of children at baseline and 75.7 percent at endline as having no general danger signs. Overall, CHVs correctly assessed for fever in 94.7 percent of examinations, compared with the baseline 20.9 percent; correctly assessed 88.8 percent and 79.1 percent of cough and diarrhea, respectively, compared with 17.4 percent each at baseline; and correctly assessed 92.2 percent of signs of malnutrition, compared with the baseline 2.0 percent.

Table 24. Performance of Assessment of Sick Children by CHVs—Ask, Look, and Feel

Assessment of Sick Child	Baseline		Endline		P***
	N=115	Percent	N=206	Percent	
• CHV looked for the following 5 signs of illness					
• Chest indrawing	3	2.6	198	96.1	<0.001
• Fast breathing by counting breaths in 1 minute	-	-	153	74.3	<0.001
• Unusually sleepy or lethargic or unconscious child	4	3.5	189	91.7	<0.001
• Used color-coded MUAC tape for malnutrition	11	9.6	200	97.1	<0.001
• Used thumbs to press and demonstrate swelling of both feet	2	1.7	201	97.6	<0.001
• CHV assessed three main symptoms of fever, diarrhea, and cough	11	9.6	165	80.1	<0.001[Θ]
• CHV assessed all 3 main symptoms correctly	20	17.4	27	13.1	
• CHV assessed 2 main symptoms correctly	11	9.6	12	5.8	
• CHV assessed 1 main symptom correctly	29	25.2	1	0.5	
• CHV assessed none of the main symptoms correctly	44	38.3	1	0.5	
Missing*					
CHV completed all the 5 assessment tasks for the main symptoms					<0.001
• Cough	9	7.8	153	74.3	<0.001
• Diarrhea	7	6.1	93	45.1	<0.001
• Malaria	5	4.3	188	91.3	
CHV correctly *looked* (assessed) for					<0.001
• Fever	24	20.9	195	94.7	<0.001
• Diarrhea	20	17.4	163	79.1	<0.001
• Cough and difficulty breathing	20	17.4	183	88.8	

Assessment of Sick Child	Baseline		Endline		P***
	N=115	Percent	N=206	Percent	
CHV correctly *looked* (assessed) for signs of malnutrition (edema, MUAC)					
• CHV assessed for both signs	2	1.7	190	92.2	<0.001Θ
• CHV assessed only one sign	11	9.6	11	5.3	
• CHV assessed none of the signs of malnutrition	102	88.7	1	0.5	
• Missing*	-	-	4	2.0	
CHV assessed for general danger signs and classified child					
• Child has no general danger signs	87	75.6	156	75.7	0.923
• Child has general danger signs	17	14.8	47	22.8	0.033

*Missing data because CHV did not assess the child for main symptoms of fever, diarrhea, and cough. ΘDifference between baseline and endline (only one response recorded—non-multiple response). ***p value for difference in proportions for multiple responses between baseline and endline.

Classify and Treat—Home Treatment or Referral of the Sick Child: CHVs' classification of children for treatment or referral improved significantly at endline with 98.7 percent of children correctly classified for home management or referral, compared with 76.9 percent of children seen at baseline ($p<0.001$). At baseline, CHVs did not make any treatment recommendations, as they had not yet been trained in iCCM. At endline, CHVs made treatment recommendations for all conditions to be managed at home, and where treatment was given, the assessors (gold standard) agreed that the dosage was correct for the age of the child (Table 25). Of the 47 children CHVs classified as having general danger signs and recommended for referral, the assessors agreed with the CHV classification in 44 cases (93.6 percent). CHVs also gave written referral notes for 95.7 percent of children referred, compared with only 20.0 percent at baseline, and provided counseling advice to 87.9 percent of caregivers compared with only 32.2 percent at baseline.

Table 25. Classify and Treat—Home Treatment or Referral of Sick Children by CHVs

Home Treatment or Referral of Sick Children	Baseline		Endline		P value
	N	Percent	N	Percent	
Treatment of sick child by CHV					
• CHV classified child for home treatment	N=115	11.3	N=206	75.7	<0.001
• *Assessor agreed CHV classification for home*	13	76.9	156	98.7	0.001
• *treatment*	10		154		
Cough/fast breathing	N=94		N=136		
• Immediate referral for cough and fast breathing	1	1.2	6	4.4	0.229
Fever/malaria	N=101		N=195		<0.001*
• ACT for positive RDT					
• No treatment given	4	4.0	96	49.2	
• No response	19	18.8	99	50.8	
Assessor agrees dosage of ACT was correct for age	78	77.2	-	-	
	4	100	96	100	0.957
Diarrhea	N=74		N=65		<0.001*
• ORS and zinc	-	-	48	73.8	
• ORS alone	-	-	1	1.5	
• Zinc alone	-	-	-	-	
• No response	74	100	-	-	
• *Assessor agreed zinc tablet dosage was correct for age*	-	-	48	100.0	<0.001
• *Assessor agreed ORS treatment was correct for age*	-	-	49	100.0	<0.001

Home Treatment or Referral of Sick Children	Baseline		Endline		P value
	N	Percent	N	Percent	
Referral of sick child	N=115		N=206		
• CHV classifies child with general danger sign(s), and urgent referral needed	17	14.8	47	22.8	0.033
• *Assessor agreed with CHV classification for referral*	2	13.3	44	93.6	<0.001
• CHV recommended the child for referral	7	46.7	43	91.5	<0.001
• CHV wrote referral note and presented to caregiver	3	20.0	45	95.7	<0.001
Point of referral for child	N=7		N=43		
• Dispensary	3	42.9	34	74.5	0.048*
• Health center	--	--	9	17.0	
Counseling advice	N=115		N=206		
• CHV counseled caregiver on when to return	37	32.2	181	87.9	<0.001

**p value for difference in proportions for multiple responses.*

These findings show that with training and supportive supervision, CHVs acquired the competences to implement iCCM. CHVs assessed at endline asked the right questions about symptoms of illness and performed appropriate assessments and RDTs for malaria. They also correctly interpreted results of the RDT and gave the recommended treatment and correct dose based on classification.

CHV Motivation to Deliver iCCM

CHVs were asked about motivation and demotivating factors to provide iCCM services (Table 26). Only CHVs from intervention CUs responded to these questions at baseline; both groups responded at endline. The main motivators for both groups were the satisfaction of accomplishing something worthwhile for communities and the resulting community appreciation. In intervention CUs, most CHVs (40/54) identified lack of remuneration as a demotivating factor, although few CHVs (5/54) were motivated by the monthly stipend. Another demotivating factor was long working hours leading to burnout (19/54). To improve motivation, CHVs recommended remuneration, regular refresher trainings, and provision of adequate medicines and supplies as well as bicycles, gumboots, flashlights and/or replacement batteries, and sturdy bags to facilitate their community-level work (Figure 11).

Table 26. CHV Motivation to Deliver iCCM

CHV Motivation to Deliver iCCM	Baseline		Endline		P[Θ]
	Intervention	Comparison#	Intervention	Comparison	
	N=59	N=62	N=54	N=61	
CHV feels motivated	59	0	53	57	<0.001
Motivating factors*					<0.001
• KSh2,000 monthly stipend	3	0	5	24	
• The opportunity to participate in an income-generating project	1	0	-	5	
• Community appreciation	49	0	30	43	
• Self-satisfaction of accomplishment	56	0	23	35	
• Support from community and CHC	1	0	5	10	
• Support and mentorship from CHEW	0	0	3	14	
• iCCM training received	0	0	7	3	
Reasons for poor motivation*					<0.001
• Lack of remuneration	52	0	40	29	
• Long working hours and burnout	10	0	19	11	
• Inconsistent supply of commodities	1	0	3	16	
• Inability to manage other illnesses	0	0	2	3	
• Community lack of faith in CHV	2	0	1	1	

*Respondents were allowed multiple responses; column total may exceed N (number of CHVs). [Θ]Difference between baseline and endline.

Figure 11. CHVs' Recommendations to Improve Motivation

- Remunerate CHVs for services provided
- Provide CHVs with regular refresher trainings on iCCM
- Ensure all CHVs have adequate medicines and equipment to work with
- Provide CHVs with such **supportive** items as bicycles, umbrella, flashlights (and/or extra batteries), and gumboots to replace worn ones
- Provide CHVs with strong bags to carry medical supplies

CHV Satisfaction with Their Role in Providing iCCM

CHVs demonstrated high competency in following iCCM algorithms to correctly assess and classify sick children for home treatment or referral. When home treatment was provided, CHVs gave the recommended medication at the appropriate doses for the ages of the sick children.

CHVs were asked what gave them satisfaction about their role in their communities (Table 27). CHVs from intervention CUs most commonly mentioned community respect and appreciation as the reason for satisfaction (20/54), followed by a sick child's recovery (12/54) and helping community members when health facilities were closed or distant (10/54). In comparison CUs, CHVs derived their greatest satisfaction from recovery of a sick child they had treated (27/61) or referred to a health facility for treatment (8/61) and from community respect and appreciation (21/61). All CHVs mentioned that availability of medical equipment and medicines, an increase in the stipend and timely payment, and more training would make them even more satisfied.

Table 27. Reasons for CHV Satisfaction with Their Role

CHV Satisfaction	Intervention N=54	Comparison N=61
What gives CHVs greatest satisfaction		
• Sick child treated by CHV recovers from illness	12	27
• Community appreciation and respect	20	21
• Referred child gets treated at the facility and recovers	3	8
• Reduced incidence of illness in the community	5	4
• Assisting the community when health facilities are not open	10	5
• CHV stipend	1	1
• Reduced workload at health facilities	0	1
What would give them more satisfaction		
• Availability of medical equipment and medicines	20	27
• An increase in amount and timely pay of stipend	23	14
• Refresher trainings on iCCM	11	18
• Support, including bicycles, bags, gumboots, flashlights and/or extra batteries, phone minutes	5	4
• Ability to treat children under five	4	0

CHEW Support for iCCM Implementation

CHEW Sociodemographic Characteristics

There were ten CHEWs in the study areas at endline, four in comparison CUs and six in intervention CUs, compared with five each at baseline. All CHEWs were interviewed at baseline and endline (Table 28) and asked about their understanding of common childhood illnesses in the community and their own and CHVs' roles with regard to iCCM. All CHEWs but one had a college-level education. Intervention-area CHEWs had worked in their role for an average 5.8 years, compared with 5.2 years for CHEWs in comparison CUs. All CHEWS in both groups had received iCCM training by endline.

Table 28. CHEW Sociodemographic Characteristics

CHEW Characteristics	Baseline		Endline	
	Intervention N=5	Comparison N=5	Intervention N=6	Comparison N=4
Female CHEW	5	3	4	1
Mean age (SE)	36 (0.33)	32.2 (2.7)	36.8 (3.2)	41.5 (2.6)
Completed college education	5	5	5	4
Mean years worked as CHEW (SE)	4.2 (0.8)	3.2 (0.8)	5.8	5.2
CHEW training received				
• Basic CHV package	3	3	3	2
• Family planning	2	2	3	3
• HIV	1	1	3	3
• iCCM	1	2	6	4
• Multidrug resistant TB	0	3	3	2
• Infant and young child feeding	1	1	3	2
• Malaria case management	4	4	3	3

CHEW's Knowledge and Practice: Assessment, Classification, Treatment, and Referral of Sick Children

Identification and Treatment of Sick Children: At baseline and endline, nearly all CHEWs mentioned malaria/fever as a leading cause of childhood death, followed by diarrhea, malnutrition, and pneumonia. Three CHEWs also mentioned HIV/AIDS. Most CHEWs correctly described the steps in assessing a sick child's illness. At endline, more CHEWs (7/10) indicated less need for referral of sick children to health facilities than at baseline (1/10), as a result of iCCM. There was no difference between baseline and endline in CHEW knowledge of general danger signs and conditions that could be managed at community level.

Referral of Sick Children: Without prompting, all CHEWs were able to state whether sick children with general danger signs should be referred by CHVs to the link health facility. Almost all CHEWs articulated the steps to be followed during referral. Nine out of 10 CHEWs mentioned explaining the reason for referral and writing a referral note, while all 10 had mentioned these protocols at baseline; and only one out of 10 cited giving caregivers specific advice (e.g., continuing to breastfeed or give fluids to children with diarrhea), which had been noted by nine out of 10 at baseline.

Commodity Management: Half of CHEWs in both comparison and intervention CUs reported having experienced stockouts of ACTs, ORS, and zinc at their link facilities. Only one CHEW (who was in the intervention area) reported experiencing RDT stockouts. The primary reason for all stockouts was delayed delivery of commodities from the county government (ORS and zinc) and the Kenya Medical Supplies Agency (ACTs and RDTs). In comparison CUs, where community case management was implemented only for diarrhea, the main challenge faced by CHEWs was managing coexisting illnesses. They noted that even if CHVs could treat diarrhea, they still had to refer children experiencing symptoms like fever, which was common. In intervention CUs, CHEWs mentioned that caregivers were not happy that CHVs could not provide care for sick children older than five or for adults. In addition, some caregivers were not satisfied that when the RDT was negative, they received only paracetamol for their sick child's fever.

Disposal of Used RDTs and Sharps: Diligent medical waste management is required to prevent exposure to infectious or toxic substances and to avoid the substantial associated disease burden. Intervention-group CHEWs reported that CHVs, insufficiently supplied with safety boxes, took to using plastic bottles and cans, which would be carried to a health facility for disposal. For CHEWs, a major challenge was that most facilities lacked incinerators, so filled safety boxes had to be transported to the Bondo County Hospital for incineration. CHEWs noted that CHVs tended to overfill any available safety boxes, making them difficult to seal and increasing the risk of spillage during transport. One intervention CU facility disposed of filled safety boxes by burning them in an open pit and burying the ashes.

CHEW Roles and Responsibilities

Supportive Supervision of CHVs: Both CHEWs and CHVs were supervised during implementation. An on-site MCSP team (a research coordinator and a research assistant) supported the SHMT and CHEWs by providing data-monitoring tools, transportation, and other logistical support. Supervisors collected summary data from CHEWs during supervisory visits and instituted any necessary remedial actions to address emerging challenges. Four out of six intervention-group CHEWs were involved with the 41 CHVs supervised during the quarter preceding the survey (Table 20 and Table 29). Three of four comparison-group CHEWs reported SHMT supervision three or more times over the previous three months, compared with only two out of the six intervention-group CHEWs.

Table 29. Supportive Supervision Conducted by CHEWs

Reported Supervision Visits	Baseline		Endline	
	Intervention	Comparison	Intervention	Comparison
	N=5	N=5	N=6	N=4
CHEW has supervised CHV in the last 3 months	4	5	4	4
CHEW supportive supervision of CHV involved: A review of CHV records Simulated case scenarios with CHV	 3 3	 4 2	 4 3	 3 2
CHEW participated in supervision of CHV together with SHMT or facility in-charge*	4	5	2	3

**CHEW was also supervised by SHMT during these visits*

Responsibilities of CHEWs: In contrast to only three of 10 CHEWs at baseline, all CHEWs at endline mentioned that timely refill of CHV commodities was their core responsibility in supporting iCCM. Other duties they described included building skills and clinical mentorship (9/10), ensuring timely availability of data (7/10), and facilitation of proper linkage and documentation of referrals from the community to health facilities (5/10). Only three of 10 CHEWs considered training of CHVs as a primary responsibility at endline, compared with seven out of 10 at baseline.

Qualities of a Good CHEW: At baseline, CHEWs stated that a good CHEW is nonjudgmental, has good data management skills, and is prepared for life-threatening emergencies. Some also suggested that nurses were best suited to be CHEWs. At endline, similar thoughts were expressed, with all CHEWs indicating that knowledge of childhood illnesses and their management was indispensable. In addition, they stated that CHEWs needed to be trustworthy, good at communicating, respectful of the local community, and, because of their responsibility for overseeing CHVs, good at managing.

"[A CHEW must be] knowledgeable and have necessary training skills . . . know the diseases that affect his community . . . have knowledge of the village . . . respect the community, be a good counselor, be available."
—CHEW#3 (Comparison)

CHEW Perspectives on iCCM

CHEWs stated that iCCM was important for improving child survival in Bondo and the role they played in its implementation gave them satisfaction. They were satisfied with what iCCM had achieved over its 18 months of implementation:

- Continued access to health care via provision of essential treatment, especially over weekends, when primary care health facilities were closed.
- Reduced workload at primary health facilities as a result of CHVs care at community level.
- Reduction in severe illness, because children were treated early, at onset of illness, and recovered.
- A reduction in child deaths.

CHEW Recommendations to Improve iCCM: CHEWs' main recommendations focused on strengthening support for CHVs: increasing their number in underserved areas, strengthening training and clinical mentorship, and ensuring a steady supply of commodities (Figure 12).

Figure 12. CHEW Recommendations for Improving iCCM Implementation

- Increase number of CHVs to ensure equity, especially in underserved areas
- Provide training, clinical mentorship, and regular supportive supervision to ensure quality of care
- Strengthen the referral system by providing transport at link health facilities
- Ensure a steady supply of all medicine and test kits for iCCM
- Institutionalize regular monthly review meetings between CHEWs and CHVs

CHEW Perceptions on Motivators and Causes of Discouragement among CHVs: All four CHEWs from comparison CUs stated that CHVs were motivated by community appreciation for their role and by the mentorship received from CHEWs. Half the CHEWs in the intervention CUs said that the KSh2,000 stipend was a key motivator for CHVs. They also noted that CHVs were motivated by community appreciation for their role and participation in joint income-generating activities.[10] According to CHEWs, inadequate remuneration for services rendered (4/10), inconsistent supply of medicines and commodities (2/10), and inability to manage other childhood illnesses in comparison CUs (2/4) caused discouragement among CHVs. Other discouraging factors included long working hours, lack of bicycles, lack of replenishment of support equipment like gumboots and batteries for flashlights, and failure of some caregivers to comply with treatment or referral advice.

CHEW Recommendations to Improve CHV Motivation: Although CHEWs did not recommend remuneration as a means of motivating CHVs at baseline, at endline they did advise for payment of the government-proposed stipend amount to be made regularly. Other recommendations included:

- Provide support to conduct regular supportive supervision, mentorship, and training for CHVs.
- Provide adequate medical equipment and medicines for iCCM services.
- Provide CHVs with a means of transport (e.g., bicycle or motorcycle), phone minutes, bags to carry supplies, and other tools to facilitate movement and communication within the community.

CHEWs were knowledgeable about iCCM and saw their primary responsibility as mentoring and supervising CHVs implementing iCCM and ensuring that they had sufficient commodities to provide services. CHEWs recommended scaling up and strengthening iCCM implementation by increasing CHV numbers in underserved areas, strengthening training and mentorship, and ensuring a steady supply of commodities.

Community Leadership Support for iCCM

Implementing the CHS is a function that the national and county governments have shared since devolution of governance in 2013. MOH management is expected to guide mechanisms for collaboration, coordination, and partnerships. The national-level Community Health Unit provides the necessary guidance and protocols for CHS implementation, while county governments are expected to coordinate strategy activities within the county. CHCs provide social accountability to community members by attending dialogue days, sharing community issues, and participating in action days. They also participate in annual work plan development at community level (Ministry of Health 2006).

CHC Member Perceptions

Thirty-eight CHC members were interviewed, 19 each from comparison and intervention CUs. Of these CHC members, 29 out of 38 held regular meetings with CHVs and CHEWs in their respective CUs as required by the CHS. These meetings were held monthly (16/29), bimonthly or quarterly (8/29), or every four or more months (5/29). During the meetings, 13 of 29 CHC members reported reviewing iCCM reports prepared by CHVs, compared with nine of 37 at baseline. CHC members who did not hold meetings with CHEWs and CHVs (11/38) indicated that the CHEWs informed them when these meetings would be held. Twenty-four of 38 CHC members reported actively participating in iCCM dialogue days in their communities.

[10] Some CHVs initiated income-generating activities using the stipend as startup money. The project was not involved.

In the intervention group only, 10 of 13 of CHC members who reviewed iCCM reports described reviewing data on malaria, diarrhea, and malnutrition in children under five, while four of 13 reviewed referrals for pneumonia and neonatal illness. Six CHC members did not review iCCM data or reports, and that was the main reason that CHVs did not avail themselves of the records for review and discussions.

Effect of iCCM on Common Childhood Illnesses (Intervention Group Only): CHC members reported that iCCM introduction had a positive effect on the community by reducing illnesses affecting children. They noted that iCCM had enabled children to be promptly tested and treated for malaria and diarrhea at community level. The education provided by CHVs had ensured that community members embraced malaria prevention using mosquito nets, learned to use safe water, and built latrines to improve sanitation. This, they said, had reduced both malaria and diarrhea cases in the community. CHC members appreciated that CHVs could not manage all conditions but identified and referred, in timely fashion, cases of suspected pneumonia and malnutrition as well as sick newborns. Overall, they stated that iCCM had brought services close to the community, enabling prompt diagnosis and treatment of malaria and diarrhea. In addition, iCCM implementation had educated the community on disease prevention and thus improved the health of its children. CHC members did note that inadequate iCCM supplies and medicines needed to treat children at community level could derail the initiative.

Challenges for CHC Members Supporting iCCM Implementation: Because, at the time of the endline, comparison CUs had also been trained on iCCM as part of the county rollout, CHC members from all eight CUs were asked about iCCM implementation challenges. The main one mentioned was lack of clear understanding of their role and expectations of their support for iCCM. CHC members also mentioned not being remunerated like CHVs (13/38), being "sidelined" in iCCM implementation (8/38), not being trained to understand iCCM (5/38), and poor definition of their responsibilities (1/38). Challenges relating to iCCM implementation included lack of a transport allowance, despite the need to cover long distances during community mobilization activities (3/38), lack of confidence in CHV ability to treat sick children, and lack of awareness of iCCM in some villages. Cultural beliefs and practices hindering acceptance of health services and noncompliance with CHV treatment instructions were each mentioned by one CHC member.

"CHCs are CHVs' supervisors in the community, but one can only supervise what she or he knows or understands better than the supervisee."
—CHC #9 (Intervention)

With respect to challenges faced supporting CHVs, it emerged that there was an uneasy relationship between CHVs and CHCs. Fourteen of 38 CHC members felt that CHVs were uncooperative with CHC supervision, on the basis that CHC members, not trained in iCCM, were not qualified to do so. Some CHCs (11/38) stated that this perceived lack of training was the reason for poor communication from some CHEWs and officers in charge of health facilities on supervision activities. Themselves, five out of 38 CHCs lacked confidence in supporting CHVs because of the lack of training on iCCM and lack of remuneration for the work. Five more CHC members mentioned that not having drugs and commodities and unfamiliarity with iCCM among some community members also made it difficult to support CHVs in implementing iCCM.

Chiefs' Views

Sixteen chiefs and assistant chiefs were interviewed from the eight CUs for the baseline survey, nine at endline—four in intervention CUs, five in comparison CUs. Two new chiefs had not familiarized themselves with iCCM and declined to participate.

Chiefs' Roles: During the project implementation period, the main roles played by the chiefs included mobilizing the community and organizing dialogue days—forums where iCCM issues were discussed (Table 30).

Table 30. Role Chiefs Played in iCCM Implementation

Role	N=9	%
Mobilization of the community	7	78%
Provided a forum for information sharing about iCCM to the community (dialogue days)	6	67%
Settling of disputes between CHVs and community members	1	11%
Supervision of CHVs	1	11%
Ensuring referral compliance	1	11%
Guiding CHV to homes in the community	1	11%

All chiefs interviewed at endline indicated awareness of dialogue days, and all had participated in some way in these days, except for one chief, due to schedule conflicts. Roles played during community dialogue days were varied and included ensuring security for the public gathering (3/9), reinforcing messages on health-seeking behavior (3/9), and mobilizing the community and leading the discussions (3/9).

Chiefs' Perspectives on Community Acceptance of iCCM: According to the chiefs, the community's embrace of iCCM was exemplified by: caregivers' use of CHV services (5/9); community members' welcome for CHVs in their homes at any time, both for health visits and to treat a sick child (2/9); and the increase in the number of community members taking their children to a health facility when referred, whether for treatment, regular clinic, or vaccination (2/9).

"[iCCM has] been well received because the caregivers have accepted the services offered by the CHV and they voluntarily go to the health facilities when referred."
—Chief # 8 (Intervention)

Chiefs' Perspectives on the Effect of iCCM on Management of Childhood Illness and Health: Like CHC members, chiefs stated that iCCM had had a positive impact on the health of their communities' children—improving prompt access to health services by early detection and treatment of sick children or referral to hospital. This, they noted, had resulted in a reduction in cases of common illnesses. Chiefs also noted that caregiver education on illness prevention, hygiene, and child care had improved in their communities. The most telling impact of iCCM, mentioned by six of nine chiefs, was that the death rate of young children in the community had dropped, as gauged by a reduction in the number of requests for burial permits for young children.

"[iCCM] has improved health of children because the request for burial permits for children under five has greatly reduced."
—Chief #5 (Intervention)

Challenges for Chiefs: Two chiefs reported that supporting iCCM implementation entailed no challenges. The other seven noted some community doubt about CHVs abilities to treat sick children; lack of awareness of iCCM in some villages; cultural beliefs and practices that hampered access to health services; and a lack of resources to support activities such as community mobilization and supervision—views similar to those expressed by CHC members.

Chiefs perceived CHVs' challenges as: lack of motivation when there was no remuneration (2/9); poor access to villages during the rainy season (2/9); lack of drugs and tools required to test and treat sick children (1/9); noncompliance with instructions (1/9); and conflicts with religious or cultural beliefs (1/9).
Chief-Recommended Improvements: Chiefs registered their sincere appreciation to the iCCM project for improving their communities' health and strongly recommended that the program continue and even be extended to other areas of the sub-county. The chiefs also asked for the local administration to be more engaged during iCCM implementation to ensure success. Recommendations included:

- Ensure timely provision of recommended remuneration for CHVs.
- Provide CHVs with more training and regular updates on treatment of children.
- Encourage regular supervision of CHV activities by CHEWs and health workers.
- Ensure a steady supply of drugs to health facilities and therefore to CHVs.
- Increase the number of CHVs in highly populated villages.

Religious Leaders' Perspectives

Sixteen religious leaders, eight each from intervention and comparison CUs, were interviewed.

Community Acceptance of iCCM: Religious leaders from both intervention and comparison areas noted that iCCM has been well received in their communities: the community appreciated CHVs' role and regularly called on them to treat sick children (14/16); CHVs, as locals, were well received and welcomed to homes (4/16); health standards had improved (2/16); incidence of common diseases had dropped (2/16); and increasing numbers of members were using formal health care services in case of illness (2/16).

"Yes, [iCCM has been well received]. I have [a] CHV in my church who always sensitizes the people. She is loved in the community. Most parents today rush their children to hospital first before coming for prayers. There is a decrease in traditional medicine use."
—Religious Leader #7 (Comparison)

Religious Leaders' Perspective on iCCM's Effect on Management of Childhood Illness and Health: Religious leaders noted that after iCCM introduction, local children's health had improved (Table 31). Improvements focused on an increase in community-level management of common childhood illnesses: treatment for diarrhea (13/16), testing and treatment for malaria (12/16), treatment for malnutrition (8/16), and referral of children with pneumonia (8/16) and of newborns (7/16) to a health facility. The religious leaders also explained that, as a result of these activities, the health of their communities' children under five had improved. Like the chiefs, the religious leaders observed that the reduction of child deaths in the community was iCCM's most notable impact.

Table 31. Religious Leaders' Views on iCCM and Children's Health in Their Communities

What shows that iCCM has improved children's health	Intervention N=8	Comparison N=8
Health services closer to the community are providing prompt treatment or referral to hospital	5	3
Deaths of children in the community have reduced	2	4
Common childhood diseases have reduced	2	3
The community is more enlightened on the importance of taking children to and giving birth in hospitals	-	4
Community has been educated on malaria prevention	-	1

"In my church today, I rarely hear of the death of children under five, [which] means that some good work is being done by CHVs and iCCM. Most women deliver in health facilities."
—Religious Leader #7 (Comparison)

Religious Leaders on Challenges Faced by CHVs: According to the religious leaders, CHVs' biggest challenge in implementing iCCM was resistance to modern medicines and thus to CHVs themselves, fueled

by some religions' beliefs and practices (6/16). Other challenges included the modest or nonexistent remuneration (5/16), caregiver noncompliance with CHV advice (5/16), the need to walk long distances between homes to offer services (5/16), rudeness or hostility by community members (3/16), community expectations that they would work long hours despite their need to generate income to sustain themselves (2/16), and lack of medicines (2/16).

Recommendations for Improvements: Like the chiefs and CHC members, religious leaders appreciated the role that iCCM had played in the community; it was viewed as a good initiative that should continue. Their recommendations were similar to those of chiefs and CHC members—specifically:

- Ensure a regular salary for CHVs.
- Train CHVs on the treatment of all illnesses.
- Providing CHVs with a means of transportation (e.g. bicycles) to facilitate movement from village to village.
- Involve the church in planning and implementation of health issues so they can mobilize communities.
- Ensure CHVs are always provided with sufficient medicines to avoid stockouts.
- Extend treatment services to older children and adults who live with the sick children.
- Enroll more CHVs in geographically larger villages.

Perspectives of the Bondo SHMT

On the SHMT Role: Nine members of the Bondo SHMT were interviewed—all directly responsible for supervising iCCM activities at county level. All interviewed at endline routinely held meetings with CHEWs and officers in charge of health facilities, either monthly (for four SHMT members) or quarterly. During meetings, all SHMT members reviewed data from community health services and discussed action points; five of nine reviewed iCCM supplies, patient referrals, and CHEW monthly reports. Seven of the nine SHMT members carried out supportive supervision or clinical mentorship visits to iCCM implementation sites, where they also reviewed CHV registers and tools and commodity records (Table 32). Two SHMT members were unable to carry out supportive supervision at community level due to constraints on time and financial resources (i.e., insufficient funds for transport).

Table 32. Activities Carried Out by the SHMT during Supportive Supervision

Activities	N=9
• Observe CHEWs clinical mentoring CHVs	3
• Review CHV registers and tools	5
• Review CHVs' commodities usage	5
• Discuss CHC responses to CHVs' implementing iCCM	1
• Review infection control processes	1
• Observe CHVs performing finger pricks to draw blood	1
• Observe CHV management of sick children	1
• Conduct simulated case scenarios	1

SHMT Member Perspectives on iCCM's Effect on Bondo Health Services: SHMT members stated that iCCM was a useful strategy for community health in Bondo because it increased health service provision in underserved areas and ensured prompt management of childhood illnesses. They also noted that identification and prompt referral of suspected pneumonia, severe malnutrition, and illness in neonates had improved, as had community education on child nutrition and messaging to communities on sanitation and hygiene. All SHMT members interviewed agreed that iCCM had supported the delivery of health services for malaria, diarrhea, malnutrition, pneumonia, and neonatal health via early detection and treatment or referral. SHMT members also noted that implementing iCCM in Bondo had created a better understanding of commodity management among all health workers involved.

"[iCCM] has assisted in malaria treatment in hard-to-reach areas. It has provided health education on malaria and facilitated testing with RDTs and treatment in homes. [It also] facilitated the provision of commodities such as zinc and ORS [and] enabled serious cases to be referred to the health facility."
—SHMT Member #6

"[iCCM] sensitized CHVs to lobby for hygiene in the community (i.e., people having toilets). It ensured that all ill neonate cases were referred. It ensured that all the children born at home are taken to hospital as soon as possible."
—SHMT Member #9

Administratively, implementing iCCM had improved the structure of supportive supervision of CHVs by CHEWs and improved service delivery at Level Two health facilities. Overall, implementing iCCM had strengthened collaborations and partnership among stakeholders in Bondo.

"iCCM cuts across a number of departments, which now come and work together."
—SHMT Member #8

"It has improved partnership between implementers and the government and has improved partnership between [the Ministry of Health] and the Ministry of Education."
—SHMT Member #4

SHMT Challenges in Supporting CHEWs and CHVs mentioned:

- Frequent stockouts of medicines and malaria test kits interrupting service delivery.
- Inadequate money for supportive supervision of CHEWs by the SHMT and of CHVs by CHEWs.
- Inadequate capacity of CHEWs to mentor and supervise CHVs (not all CHEWs have a clinical background so they are unable to provide clinical mentorship).
- Lack of transportation for CHEWs and CHVs, hampering efficient service delivery.
- The need for CHVs to engage in other activities to generate income competing with the need to provide health care services.
- Insufficient funds for training and refresher training for CHVs—some CHVs are relatively elderly (50–60 years) and slow to learn new skills.

SHMT Recommendations to Strengthen iCCM Implementation: The Bondo SHMT members stated that iCCM was a good initiative that saved lives and should be adopted by all county governments to serve hard-to-reach populations. They also shared suggestions on ways to improve iCCM implementation.

"It [iCCM] has been useful. It has reduced workload at the health facility and there has been improvement in treatment seeking behavior by the community."
—SHMT Member #4

"iCCM ensures equity in service provision and a wide coverage of health services. iCCM takes health services closer to the people."
—SHMT Member #6

These suggestions, some of which are within the responsibilities of the SHMT, are as follows:

- Strengthen SHMT and CHEW capacity (e.g., via resources and training) to undertake supportive supervision.
- Mobilize resources for trainings and refresher trainings for CHVs, CHEWs, and health workers sufficient to ensure successful iCCM implementation.
- Implement the recommended remuneration for CHVs in the whole county as iCCM is scaled up.

Ensure a regular supply and proper management of medical supplies, equipment, and reporting tools by, for example, allowing CHEWs to order commodities for primary care health facilities when stocks are low.

"The flow of commodities has been made better and strengthened right from the pharmacy to CHEWs to CHVs and finally to the client."
—SHMT member #1

"[iCCM] helped redistribute commodities (i.e., from areas that had excess of those commodities to those that lacked them). And it has facilitated the appointment of people to manage this redistribution."
—SHMT member #6

iCCM Implementation Costs

Although implementation of iCCM encompasses a broad range of costs, the tool used to capture costs in this study was limited to tracking the operational costs and expenses incurred by MCHIP/MCSP (Table 33). No mechanism was in place to track costs incurred by the Kenya Ministry of Health or county to support iCCM in Bondo, such as for salaries; iCCM commodities (e.g., for RDTs); infrastructure maintenance (e.g., for buildings and equipment); and transportation and communication—to list just the major ones. Consequently, the project costing tool did not capture health system costs related to iCCM implementation, and the study was not able to document the cost of implementing iCCM over the 18-month implementation period in a comprehensive way.

Costs Contributed by MCSP

MCSP costs to train CHVs and CHEWs, provide CHV kits, supervise, mentor, and compensate 58 CHVs were:

- *Training:* A multicountry analysis of iCCM implementation costs found that per-provider training costs, for example, averaged US$202 to US$352 or even up to US$1,000, depending on training duration, whether it was residential, and how many CHVs were trained (Collins et al. 2014). For this project, the complete training costs were US$45,660. This reflects the average cost of a six-day iCCM training/competency building for a single CHV, including: venue, transport refunds for CHVs, allowances and per diems for trainers, and transport from venue to practical site, as well as the cost of training trainers and supplementary trainings in behavior change communication, integrated management of childhood illness (IMCI), and commodities management.
- *Clinical mentorship, supportive supervision, and performance monitoring*—US$177 per CHV. This includes fuel, lunch allowances, etc., over the 18-month period.
- *CHV kits:* US$70. The kits were assembled at the health facility and required a bag with MUAC tape, a respiratory timer, a thermometer, a pair of gumboots, a T-shirt, and a flashlight. MCHIP contributed about a third of the cost—the rest of the materials were paid for by the MOH and UNICEF.
- *Monthly stipend:* US$23 per CHV.

Table 33. Summary of iCCM Program Implementation Costs

Expenditure Category			Cost (USD)
CHV stipends (58 CHVs for five months @US$23/month) *			$6,670
Training service providers and trainers as noted below			$45,660
	INITIAL TRAINING	COST	
	Training of trainers (14 trainers @US$1,161.83 each)	$16,266	
	CHVs and CHEWs (74 @ US$195.54 each)	$14,470	
	Clinicians and health care workers (eight @ US$771.35 each)	$6,171	
	ADDITIONAL TRAININGS		
	CHVs and CHEWs in behavior change communication (74 @US$34.91 each)	$2583	
	CHEWs in IMCI (eight @ US$191.87 each)	$1,535	
	Health care workers (clinicians and CHEWs) in commodities management (60 @ US$77.26 each)	$4,636	
Clinical mentorship and performance review (by CHEWs, sometimes joined by SHMT members)[Θ]			$10,266
Coordination, supervision, and quality assurance (by CHEWs and SHMT)*			$10,702
Logistics (mainly photocopying various tools)			$8,420
TOTAL			**$81,718**

* As noted, when MCHIP initiated the study in 2013, the CHVs in 26 CUs had been trained on the basic package, and MCHIP was paying their monthly stipend, as had been done since the earlier RED for PMTCT demonstration project. During the study, MCSP paid stipends to CHVs only in the four participating intervention CUs and only for the study's first five months. [Θ]Done in conjunction with SHMT but paid for by MCHIP/MCSP.

Costs Contributed by the Ministry of Health and County Health Department

The Kenya Ministry of Health and the County Health Department provided iCCM commodities, reporting tools, support for CHEW supervision, and health personnel costs. For all eight CUs, the County Health Department budgeted for and took over CHVs' remuneration during the last months of implementation and has continued paying CHVs since then. In addition, because the county integrated iCCM coordination,

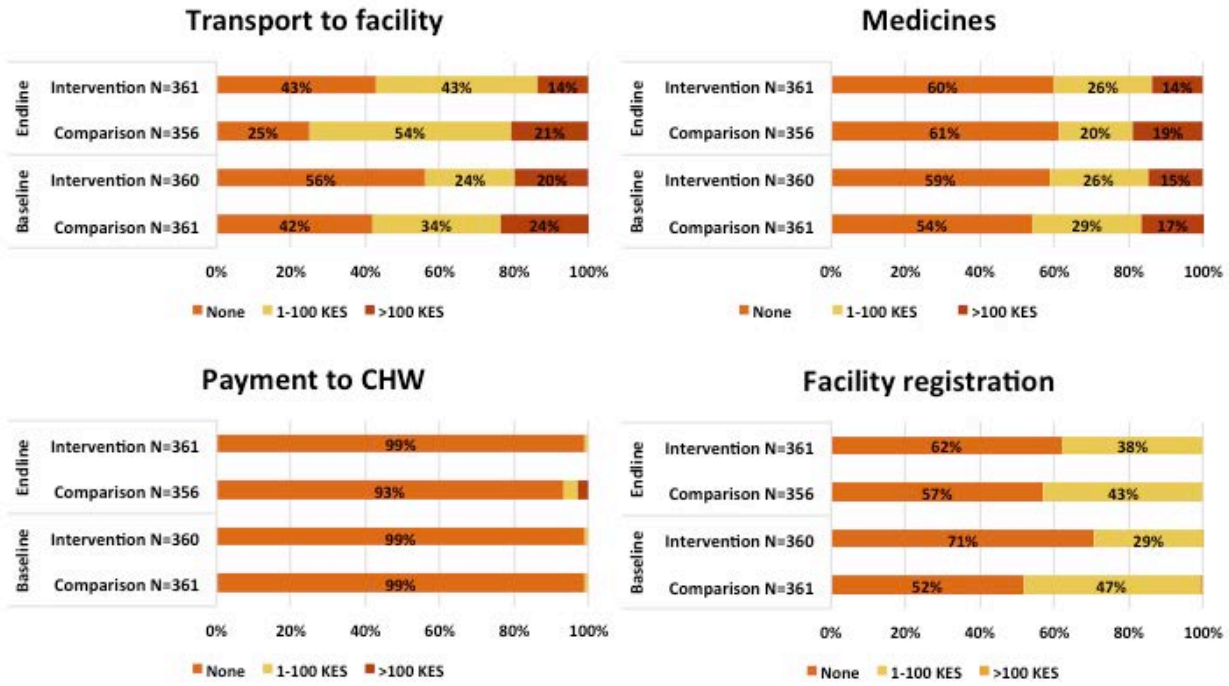
supervision, and M&E into existing activities along established budget lines, provision of iCCM has continued since the study ended. The only iCCM-related support the county received from partners other than MCSP was a one-time disbursement to support county-wide CHV training in iCCM. CHV stipends potentially constitute the highest-expense item in iCCM implementation, and because the county is already covering it, assimilation of other, lesser costs associated with iCCM into routine county operations is expected to be feasible.

Household Costs Associated with Treatment Seeking

Time Spent Caring for Sick Children: At baseline, the mean duration of caregivers' attention to their sick children in all CUs was about five days; at endline, it was four days in comparison CUs and three days in intervention CUs. The difference in time spent between baseline and endline was not statistically significant. Therefore, where iCCM was implemented, caregivers averaged less time caring for sick children.

Out-of-Pocket Costs: Out-of-pocket costs for transportation, registration at health facilities, medicines, and meals associated with seeking care for sick children were recorded in Kenyan shillings (Figure 13) and did not differ between baseline and endline. The range was between KSh10 ($0.01) and KSh100 ($1.00). Only four caregivers in intervention CUs (1 percent) mentioned paying a CHV for a consultation (and this CHV had been discharged by endline); in comparison CUs, 25 caregivers (7 percent) reported paying CHVs. During the survey, it was found that some CHVs in the comparison CUs provided and charged for injections; this was reported to the SHMT for action.

Figure 13. Household Costs Associated with Care Seeking for Sick Children



Discussion and Conclusions

The endline assessment focused on enabling the research team to determine feasibility of implementing iCCM in the context of Kenya's existing CHS platform. The assessment measured changes in community care-seeking practices for children under five, competencies of CHVs and their ability to correctly manage sick children, and health and community systems to support implementation during project implementation. This study documented challenges that may affect the success of iCCM implementation in the Kenya context. Most are related to health systems and affect service delivery in general—they are not confined to provision of child health services. Health planners should consider ways to mitigate these challenges when implementing iCCM.

Overall, implementing iCCM was found to be valuable and feasible in the context of CHS in Bondo. The success was possible with health system support at county level by MCSP, ownership by the SHMT, an SHMT-facilitated supportive supervision process, clinical mentoring of CHVs, and institutionalization of CHV stipend payment. Community leadership and governance created social belonging and cohesion that built credibility of CHVs and increase iCCM acceptance.

As noted, community-level pneumonia treatment was not part of iCCM in Kenya during the project. CHVs referred children with suspected pneumonia to a health facility.

Community Knowledge and Care Seeking

Trained CHVs were well known by caregivers of children under five in the community, and after iCCM introduction, caregiver awareness of CHV treatment roles increased significantly across all CUs. The proportion of caregivers first seeking treatment from a CHV increased from almost none at baseline to about a third, with an associated reduction in the proportion of caregivers reporting a health facility worker attending to their sick child during the two-week period preceding the survey. This reduction was higher in CUs where iCCM had been implemented and is consistent with midline survey findings of a reduction in iCCM conditions seen at intervention-area health facilities over the previous year. Although expected episodes of illness were not calculated for the endline survey, the increase from 2.1 to 31.1 percent of CHVs as first source of care for sick children in intervention CUs after only 18 months of implementation can be considered a good achievement. In addition to existing community mobilization activities to create awareness of iCCM, some caregivers were also told by health facility workers to seek care for sick children from a CHV before going to a health facility. The similarity in knowledge and care seeking for sick children between intervention and comparison CUs (where iCCM was introduced in the last three months of the project) suggests that uptake of iCCM services can be rapid.

Fever Management

Recommended malaria case management, with testing followed by treatment with an ACT for those testing positive—well established at baseline—improved in both intervention and comparison CUs by endline. Implementation of iCCM resulted in CHVs managing about a third of cases of fever among children under five. Overall, diagnosis and treatment of malaria within 24 hours of fever onset improved significantly, although less in intervention CUs than in comparison CUs, despite most of the comparison CHVs not being able to test for and treat malaria at community level. The difference may have resulted from continuous community education and prompt referral of fever cases to health facilities. By contributing to appropriate diagnosis and treatment of malaria and prompt treatment seeking for fever, CHVs can effectively help save the lives of children under five.

Diarrhea Management

Treatment of sick children with diarrhea using ORS and zinc increased significantly in intervention CUs after the iCCM introduction; caregivers also gave sick children more fluids during diarrheal illness. At endline, half of children with diarrhea were treated with both ORS and zinc, up 42.8 percentage points from baseline.

Diarrhea treatment also improved in comparison CUs, from 42.9 to 62.7 percent, with CHVs treating 22.0 percent of the cases. This was another surprise finding, although comparison CUs were doing better at baseline than intervention CUs. Further probing revealed that CHVs in comparison CUs had been actively participating in clean water and sanitation activities with the County Health Department and UNICEF during the study, and these WASH activities, prioritized in those CUs, may also explain why the improvement in breastfeeding during diarrheal illness and the use of both ORS and zinc tablets to treat diarrhea were both higher in comparison CUs at both baseline and endline.

Treatment Seeking for Cough/Suspected Pneumonia

As per national policy, management of suspected pneumonia was not implemented at community level during this project; all children with suspected pneumonia were referred to a health facility for care. Although the proportion of caregivers who first sought treatment for cough from CHVs increased, from 1.2 percent in all CUs to 17.4 percent in intervention CUs, and from zero to 9.4 percent in comparison CUs, the number of cases was still low. This could possibly be because CHVs were not providing treatment for cough or suspected pneumonia, so that caregivers took children straight to a health facility. About half of caregivers of sick children referred by CHVs to health facilities were compliant; suspected pneumonia (cough with fast breathing) was a key indication for referral. The lack of compliance and delayed compliance in cases of suspected pneumonia, reported by CHVs as a source of job frustration, needs further exploration.

Caregiver Attitudes and Perceptions Toward iCCM

Implementation of iCCM in intervention CUs resulted in an increase in the number of caregivers knowing a CHV working in their community and his or her role. Caregivers also had confidence in CHVs treating sick children, revealed by an increase in the number of caregivers who first sought care from CHVs for fever, diarrhea, and cough (although cough treatment was not part of the care package). Caregivers described CHVs as caring, available, and interested in treating their sick children. Although CHVs visited client homes to follow up on sick children, caregivers sometimes went to the CHVs' own homes to seek care. Interruptions in the supply of malaria test kits and medicines discouraged caregivers from seeking treatment from CHVs. At both baseline and endline, sick children's recovery after treatment or referral was the most important source of caregiver satisfaction.

CHV Performance

This intervention addressed a fundamental question about iCCM—namely, "Can lay health providers in Kenya acquire the skills to correctly identify, assess, classify, and treat sick children, referring to a health facility those who are either too sick or suffering from health conditions not included in the iCCM package?"

In Bondo it is possible. The endline assessment revealed that, with appropriate training and supervision, CHVs can acquire the competencies to implement iCCM in hard-to-reach areas. CHV knowledge and recognition of causes of death in young children increased significantly—in particular, of cough and difficulty breathing. CHVs correctly followed the iCCM algorithm from identifying signs to classifying illness and recommending home treatment or referral. Performance of assessment tasks improved significantly, including counting breaths and asking/looking for general danger signs. The greatest advance was in performing and interpreting RDTs for malaria: 96.9 percent of tests were performed and interpreted correctly. All CHVs provided medicines at the *correct dose for age* when treating children with ACTs for malaria or ORS and zinc for diarrhea. Whereas knowledge of some general danger signs was low, assessments for these signs had increased during the study with the exception of child vomiting everything.

Overall, as a result of iCCM introduction, the number of children with iCCM conditions managed at community and health facility levels increased more than 100 percent from 2,367 cases during the period January to June 2013 to 4,868 cases for the period January to June 2014, with a corresponding decrease in the number of cases seen at health facilities during the same period—confirmation of reports of reduced workload at health facilities. During the 18 months of project implementation, CHVs attended to 7,658

children, 1,271 of them (17 percent) were immediately referred to health facilities. This points to an improvement in overall care seeking and access to effective treatment for children under five in this population. The "additional cases" reflected in the increase comprise either those who would previously have been taken to "alternative providers" (e.g., traditional healers and drug shops) or treated by self-medication, or would have received no health care at all.

Fever was the most common condition managed by CHVs, with about 80 percent of these cases confirmed as malaria and treated with artemether-lumefantrine. Cases fluctuated seasonally, with increases from April to July. Overall, there was also a downward trend in fever cases seen by CHVs, which could be explained by reported stockouts of medicines.

CHVs also demonstrated ability to manage commodities stocks, supplied through their link facilities. At endline, CHVs in both intervention and comparison CUs reported having experienced stockouts of ACTs, RDTs, ORS, and zinc during implementation. Approximately 80 percent of CHV stockouts (77.0 percent in intervention groups and 82.0 percent in comparison groups) resulted from lack of commodities at a link health facility. ACTs were the most common stockout in intervention areas (66.7 percent), with zinc tablets second (27.8 percent).

Nearly all CHVs across all CUs were proud of their role in the community, motivated to implement iCCM, and felt the greatest satisfaction when the sick children they treated recovered, as well as from community appreciation and respect of their services. Ensuring a consistent supply of commodities for iCCM and regular payment of stipends would make CHVs even more satisfied.

Community Health Extension Worker Support

The study found that CHEWs—directly responsible for supervision and clinical mentorship of CHVs—were knowledgeable about iCCM and appreciated these primary responsibilities. CHEWs also linked to facility pharmacy stores, entrusted with ensuring that the CHVs had sufficient commodities to provide services. Supervision and clinical mentorship involved reviewing commodity management, CHV registers, and simulated iCCM cases. Implementation of iCCM strengthened the quality of supportive supervision, evidenced by the significant increase in the proportion of CHVs for whom supervision regularly involved reviews of simulated cases.

CHVs in intervention CUs met monthly with their CHEWs to review records and commodity stocks and during these meetings had clinical mentorship in the form of discussions of simulated iCCM case scenarios. CHEWs—in particular those also offering curative services at link health facilities—were unable to additionally conduct CHV field supervision visits. Increasing the CHEW-to-CHV ratio from two CHEWs per 50 CHVs to five CHEWs per 50 CHVs has been proposed, and it is hoped that the County Health Department will implement this plan.

Lessons learned from intervention CUs were implemented in comparison CUs when the SHMT rolled out iCCM. At endline, CHV supervision was stronger in comparison CUs than in intervention, evidenced by numbers supervised in the quarter preceding the survey. This could have been due to iCCM introduction in comparison CUs and an SHMT focus on supervision to ensure successful rollout.

SHMT and Community Leadership Support

Community leaders supported iCCM implementation and perceived iCCM as valuable and positively impacting the health of communities' children by improving access to services, prompt treatment for sickness, and caregiver knowledge of illness prevention. The county and SHMT supported iCCM as a strategy and, by study end, had begun expanding iCCM to other villages outside the original group.

During the study's last six months, the MCSP research team developed and shared an "exit strategy." SHMT and MCSP staff had carried out joint quarterly supportive supervision during implementation, with MCSP

facilitating by providing transport; the SHMT took over this supervision and CHEWs and CHVs met monthly for data analysis and mentorship without MCSP.

Community Leaders

CHC members, chiefs, and religious leaders all felt that iCCM had positively affected their communities' children's health by improving speed of access to health services and caregiver knowledge of hygiene, child care, and illness prevention. According to the chiefs and religious leaders, the number of cases of common illness had dropped and so had local child mortality, evidenced by a reduction in requests for burial permits and funeral services. Like caregivers, leaders were initially apprehensive about CHVs treating sick children and had strongly recommended training and close supervision. At endline, they were satisfied that trained CHVs were sufficiently competent to implement iCCM and recommended expanding iCCM throughout their communities, emphasizing training and close supervision with the caveat that iCCM would not be beneficial without regular supplies of medicines.

Other community leaders' roles and responsibilities in supervising CHVs, particularly of CHC members, had not been clarified after adding iCCM to the community package. CHC members said they could not supervise CHVs because they lacked training and knowledge of iCCM. However, the CHS clearly articulates CHC roles: social mobilization of community members to support implementation of services and identification of areas in need of services, and directing CHVs and other resources to these areas (Ministry of Health 2006). CHC members are, in effect, community advocates for equitable health services, and their supportive role to CHVs in implementing iCCM needs to be emphasized while clarifying that it does not include evaluating CHVs' clinical skills.

Sub-County Health Management Team

Members called iCCM a good strategy for community health, ensuring increased access to treatment in hard-to-reach areas and prompt management of childhood illnesses and, in turn, reduced workloads at health facilities. (This was also a finding of the iCCM midline survey.) The SHMT began a phased expansion of iCCM to other CUs in the sub-county before the endline survey, noting that iCCM implementation had helped them to structure an approach to supportive supervision of CHVs by CHEWs and, via regular project progress meetings, to strengthen collaboration among sub-county health stakeholders. However, despite the positive assessment of iCCM as a strategy and the study in contributing to improving supervision, the SHMT did not communicate their plans to scale-up iCCM.

ICCM Costs

Cost data collected under this study are insufficient to inform discussion of cost-efficiency and cost savings achieved as result of iCCM implementation. However, the following information could be elucidated:

Project Implementation Costs

Implementing iCCM requires inputs that entail costs: training for CHVs, commodities and supplies, supportive supervision visits, and the like. The government contributed to implementation costs by providing medicines and supplies and, during the project's final months, paying CHV stipends. One other stakeholder, UNICEF, provided CHVs with respiratory timers. The cost of the six-day iCCM training for 60 CHVs and 14 CHEWs was US$45,660

Costs Associated With Treatment Seeking

Costs associated with treatment seeking for sick children in the study area were moderate for the context, ranging from KSh10 (US$0.01) and KSh100 (US$1.00), mainly after referrals—specifically, for transportation to the health facility and facility registration fees. It can be inferred that at household level, provision of iCCM services removes the cost of transportation to seek care and where drugs are available from CHVs, removes the cost of recommended drugs from family budgets. Although iCCM was provided free, 25 caregivers in comparison CUs and four in intervention CUs reported being asked to pay for services. The Bondo SHMT took such reports seriously and took disciplinary action against some CHVs

iCCM Implementation Challenges and Study Limitations

All household survey respondents were asked about challenges faced when implementing or utilizing iCCM services and for recommendations to address those challenges. Sixty-one percent of caregivers in intervention CUs reported no challenges; others reported CHV lack of medicines; CHV not at home (usually conducting home visits); and CHV inability to treat children older than five (per the iCCM protocol).

Challenges of Implementing iCCM

Service Delivery

- Stockouts of RDTs and other commodities affected CHVs' ability to deliver services; they had no buffer stocks to rely on when the link health facilities that supplied them had stockouts.
- Caregiver noncompliance with referral discouraged CHVs.

Management and Administration

- Resources for SHMT and CHEWs to carry out trainings and supportive supervision of CHVs were insufficient.
- Low remuneration or none was demotivating; some CHVs opted out of participation.
- CHVs' need to engage in activities to generate income competed for their time and led some to illegally charge consultation fees.
- The number of CHEWs was inadequate, as some also served as facility health workers. Some CHEWs, lacking clinical background, could not perform CHV clinical mentoring and supervision and themselves required close supervision.

Community

- CHC members' changing roles and responsibilities for iCCM implementation oversight needed clarifying.
- Cultural beliefs and practices hinder health service acceptance or made caregivers noncompliant.
- Access to some villages was poor during the rainy season.

Study Limitations

- Co-occurring activities diminished differences between intervention and comparison groups at endline: during the last three months of the study, iCCM was implemented in comparison CUs by the Siaya County government, and from 2013 to 2015, some villages in comparison CUs were involved in a malaria incidence and surveillance cohort study sponsored by another organization. Co-occurring WASH activities funded by UNICEF in some comparison CUs also confounded study results.
- The project did not assess changes at endline in health facility attendance by children with iCCM conditions and the impact of reported reduction in workloads there on the quality of care provided.
- iCCM implementation costs focused on MCSP/USAID contributions and did not capture health system and MOH-related costs over the implementation period. Thus, the costing data presented is not comprehensive.

Lessons Learned and Implications for Scale-Up

Designing iCCM Services

The Kenya study team was also part of the National iCCM Technical Working Group, a forum for sharing emerging local evidence on iCCM implementation. The learning in Bondo was complemented by lessons from other iCCM studies, like the UNICEF-supported study in Homa Bay. In some regions in Kenya, iCCM may be the most effective strategy to increase access to timely and quality treatment for sick children. In other regions, that may not be the case. While not clearly quantified in this study, additional local resources are required to ensure iCCM success and sustainability. Counties that most need iCCM may have less capacity and fewer development partners to provide these resources. A thorough analysis of iCCM and the context as well as extensive conversation among stakeholders are recommended at county level before iCCM is implemented. Given these promising results, iCCM could possibly be recommended for all communities. Since devolution, the challenge for counties is to resist adopting iCCM until there has been sufficient analysis to determine whether it is appropriate to the context.

Service Delivery and Implications for Scale-up

- iCCM implementation at scale is stronger when aligned to a functioning health system that can ensure that clinical mentoring and supportive supervision are conducted, that drugs and supplies are available, that the referral system from community to facilities and back is working, and that communities are engaged and demand generated. In Bondo, stockouts of medicines and supplies, including RDTs at primary health facilities, affected CHVs' ability to deliver services. Their inability to deliver services in turn reduced caregivers' confidence in CHVs as a source of care for sick children. Constant availability of medicines is key to sustaining the increase in care seeking after iCCM introduction. Poor linkage of sick children referred from community to link health facilities was another challenge: because children referred from the community were seen as new visits, the health facility nurse would initiate the consultation process afresh—a missed opportunity to underscore the role of CHVs and to build caregiver confidence in their skills and value.
- Caregiver noncompliance with CHVs' referrals of a sick child to a health facility for further management diminishes the benefits of iCCM and raises questions about the current policy of referring suspected pneumonia cases to a health facility rather than allowing trained, supervised CHVs to themselves administer the necessary curative antibiotics. Several factors influenced caregivers' decisions around referral compliance, including health facilities' reputation for drug stockouts, perceived lack of severity of the child's illness, and easy access to recommended (or alternative) drugs from shops in the community.[11]

Health Systems Support

- Inadequate resources for SHMTs and CHEWs to carry out regular supportive supervision of CHVs can severely undermine iCCM implementation. The project funded allowances for CHEWs to carry out regular CHV supervision. In the absence of regular funding, SHMTs accumulate unpaid allowances to CHEWs, who perform work expecting to be paid later. If the allowances are not paid in good time, the CHEWs are demotivated. While most CHVs enjoyed the status that providing iCCM gave them in their communities, they said that the US$23 per month was not enough to meet their basic needs, and that their concomitant need to engage in other activities to generate income competed for their time to provide health care services. Unlike health promotion activities that they themselves could schedule,

[11] The study documented availability of drugs in the community as one reason for noncompliance. Per contextual knowledge of the study staff, these are often obtained from poorly regulated drugstores that freely sell antibiotics to people without prescriptions.

CHVs' provision of case management had proved disruptive to their lives. Sustaining a workforce of CHVs to guard the investment in training calls for more innovative approaches to incentives.

- According to the SHMT, the number of CHEWs was inadequate to support iCCM, as some CHEWs are also health workers who offer services in health facilities. CHEWs who also work as health-facility clinicians lack the time to mentor and supervise CHVs. Additionally, some CHEWs lack a clinical background and thus lack the capacity to mentor and supervise CHVs without close supervision. Scaling up iCCM in Kenya will require reviewing the basic competencies required of a CHEW.

Community Support

Although the CHS provides a strong community support structure, CHC members' roles with respect to overseeing CHVs requires clarification. Before iCCM implementation, CHC members were tasked with bringing issues relating to any CHV to the attention of the appropriate responsible party (e.g., health facility nurse) in addition to general community mobilization around health. After CHVs were given the additional responsibility for iCCM implementation, the question arose as to whether CHC members needed clinical skills to play this quasi-supervisory role—a question that needs to be resolved to smooth future iCCM implementation, with CHS guidelines changed to reflect the additional exploration.

Recommendations

The following recommendations cover iCCM policy, service delivery, health systems support (specifically for management and administration), and community engagement. Implementation of these recommendations requires collaboration by multiple stakeholders. However, most will require planning, budgeting, funds allocation, and implementation on the part of the SHMT.

County and Sub-County (SHMTs)

- *Expand iCCM services*—Expand iCCM to all underserved communities to increase access to timely, effective treatment for childhood illnesses. Especially in underserved high-population areas, recruit more CHVs to ensure that someone is readily available when a child falls sick and to ensure follow-up visits. Add CHEWs to facilitate adequate CHV support. Ensure a steady supply of medicines, including for fever, to remove the need to visit a health facility to obtain them following the CHV visit.
- *Referral systems*—Strengthen the community–facility referral system to ensure that referred clients are seen promptly; at link health facilities, provide transport to hospitals for patients who have been referred out and ensure that emergency triage assessment and treatment (ETAT) is implemented in all referral hospitals.
- *In facilities*—Conduct an analysis of the reduced workload at health facilities following iCCM introduction. Identify opportunities to strengthen facility-based care.
- *Community engagement and mobilization*—Strengthen community mobilization activities to heighten awareness of iCCM services; continue engaging local leaders in iCCM planning, social mobilization, and implementation.
- *Data use*—Foster the use of service delivery data, including data for iCCM, to judge the quality, reach, and benefits of iCCM implementation.
- *Motivating CHVs*—Revisit CHV incentives, including investment of their stipend money into cooperatives, for example, which might generate more than the US$23 monthly stipend. Also important: pay stipends regularly. Offer routine trainings and refreshers to keep CHVs updated on sick child care and availability of other community health services. Provide medicines, equipment, strong bags to carry medical supplies, and facilitator items (e.g., bicycle, umbrella, flashlight and/or extra batteries, gumboots). Bicycles are critical to facilitate CHV visits to hard-to-reach areas.
- Develop and use appropriate tools to capture all iCCM implementation costs.

National Level

- *Flexibility*—Adapt the iCCM strategy, including the suspected pneumonia referral policy, to different regions of Kenya; support introduction and/or scale-up of county-appropriate iCCM models.
- *Technology*— To address the shortage of CHEWs to provide clinical mentorship, the MOH should support testing of eHealth/mHealth (mobile health) technology to enhance the support provided to CHVs and, by substituting some in-person supervisory visits with remote interaction, reduce some costs.
- *Financial resources*—Mobilize resources, both domestic and external, to strengthen the health system support functions of the SHMT in general; to enable CHEWs to undertake regular supportive supervision and mentorship; to facilitate CHV refresher trainings as needed; and to increase drug procurement and supply chain management.
- *Clarification*—Clarify the CHC roles and responsibilities outlined in the CHS implementation guide in view of iCCM; support counties and SHMTs to reorient CHC members on their roles and responsibilities.

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Annexes

Ethics Approvals

FWA #00000287

Institutional Review Board Office

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INITIAL APPLICATION APPROVAL NOTICE

Date: September 13, 2013

To: Mark Kabue, PhD
Jpiego

From: Elizabeth A. Skinner, MSW
Chair, IRB-X

Re: **Study Title**: "Feasibility Study of the Implementation of Integrated Community Case Management (ICCM) in Bondo District, Kenya – Leveraging Existing Systems"
IRB No: 00005073

The **JHSPH IRB-X** voted to approve the above referenced application at its meeting on **July 18, 2013**. **The Board made the following determinations:**

Approval of the research is for the period of **July 18, 2013** to **July 17, 2014**. A Progress Report for continuing review must be submitted to the IRB Office no later than six weeks prior to the approval lapse date of **July 17, 2014.**

Single Reviewer ☐ **Convened** ☒ DHHS 46.110 . . ☒ DHHS..... ☐ FDA 56.110 . . . ☐ FDA..... ☐ Category: 7 **GWAS** ..... ☐	**Consent/Parental Permission Required From:** Adult Participant ..... ☒ LAR ..... ☐ One Parent ..... ☒ Two Parents..... ☐ Legal Guardian ..... ☐ (Foster Care Children)	**Form of Consent/Permission:** Written Consent..... ☒ Waiver of Signature..... ☐ (Oral Script) Waiver of Informed Consent.... ☐ HIPAA Authorization..... ☐ HIPAA Waiver..... ☐ No Longer Enrolling..... ☐	**Study Site(s):** U.S. ☐ International ☒ **List Country(ies):** Kenya
Vulnerable Populations: Children ..... ☒ Foster Care Children ..... ☐ **DHHS** **FDA** 46.404 . . . . ☒ 50.51 ..... ☐ 46.405. . . . ☐ 50.52 ..... ☐ 46.406 . . . . ☐ 50.53 ..... ☐	**Assent Required From:** No children (waived) <6yr ☒ Children aged:_____ ☐ **Form of Assent:** Written ..... ☐ Oral..... ☐ Assent Statement in Parent Permission..... ☐	**Pregnant Women/Fetuses** 46.204 ..... ☐ **Neonates** 46.205 ..... ☐ **Prisoners** 46.305 ..... ☐ 46.306 ..... ☐ Epidemiological Research.... ☐	**Sample Size:** (screened plus enrolled) 2,520 **Final Enrollment:** **Secondary Data Analysis**: (# specimens/participants)

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Ref: KNH-ERC/A/292

13th September, 2013

Dr. Mark Kabue
Principal Investigator
Jhpiengo
Monitoring Evaluation & Research
P O BOX 66119-00800
NAIROBI

KENYATTA NATIONAL HOSPITAL
APPROVED
13 SEP 2013
ETHICS & RESEARCH COMMITTEE

Dear Dr. Kabue

RESEARCH PROPOSAL: FEASIBILITY STUDY OF THE IMPLEMENTATION OF INTEGRATED COMMUNITY CASE MANAGEMENT(iCCM) IN BONDO DISTRICT – LEVERAGING EXISTING SYSTEMS (P286/05/2013)

This is to inform you that the KNH/UoN-Ethics & Research Committee (KNH/UoN-ERC) has reviewed and **approved** your above proposal. The approval periods are 13th September, 2013 to 12th September 2014.

This approval is subject to compliance with the following requirements:

a) Only approved documents (informed consents, study instruments, advertising materials etc) will be used.
b) All changes (amendments, deviations, violations etc) are submitted for review and approval by KNH/UoN ERC before implementation.
c) Death and life threatening problems and severe adverse events (SAEs) or unexpected adverse events whether related or unrelated to the study must be reported to the KNH/UoN ERC within 72 hours of notification.
d) Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH/UoN ERC within 72 hours.
e) Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. (*Attach a comprehensive progress report to support the renewal*).
f) Clearance for export of biological specimens must be obtained from KNH/UoN-Ethics & Research Committee for each batch of shipment.
g) Submission of an *executive summary* report within 90 days upon completion of the study
This information will form part of the data base that will be consulted in future when processing related research studies so as to minimize chances of study duplication and/or plagiarism.

For more details consult the KNH/UoN ERC website **www.uonbi.ac.ke/activities/KNHUoN.**

Data Collection Tools (1. HH questionnaire)

SECTION A: INTRODUCTION AND SCREENING			
No.	**Questions and Filters**	**Coding categories**	**Skip**
1.	Is there a child or children in this household who is below five years of age AND has been sick in the last two (2) weeks? (Tick the box which applies-**If "No", then stop the Interview, thank the respondent and move to the next household**)	YES ☐ NO ☐ → **STOP** ↓ ***Proceed to Qn.* 2**	**Q3**
2.	Are you the caregiver of child/children under five years in this household?	NO ☐ YES ☐ → **Q4** ↓ ***Proceed to Qn.* 3**	
3.	If NO to Qn.2, Is the caregiver to child/children below 5 years available? (If YES, ask to see the caregiver, If NO, STOP the interview, thank the respondent and move to the next household)	YES ☐ NO ☐ → **STOP** ↓ ***Proceed to Qn.* 4**	
4.	If Yes, Could you please tell me the following:	Your Age in complete Years ☐☐ Your Occupation (Specify)…… ……	
5.	If Yes to Qn2, What is your relationship to the sick child/children in this household? ***(Circle the answer which applies)***	Mother…….. 1 Father…….. 2 Grandmother…….. 3 Uncle…….. 4 Auntie…….. 5 Cousin…….. .6 Niece…….. 7 Brother……..8 Sister…….. 9 Other, (specify)	

IRB 5073_iCCM Study_Household Questionnaire-TOOL 1.v3_Aug 14, 2013

		…….. 10	
6.	What are the Ages and Sex of the Children who are aged less than five (5) years in this household? ***(Write age in completed years, starting with the oldest to the youngest; Sex is either (M) for male or (F) for Female)***	Child 1 Age ☐ Sex ☐ Child 2 Age ☐ Sex ☐ Child 3 Age ☐ Sex ☐ Child 4 Age ☐ Sex ☐ Child 5 Age ☐ Sex ☐	
7.	Who among these children that you have mentioned has been sick in the last two weeks?	Child 1 ☐ Child 4 ☐ Child 2 ☐ Child 5 ☐ Child 3 ☐	

SECTION B: FIRST SOURCE OF CARE AFTER RECOGNITION OF ILLNESS IN THE CHILD BY CAREGIVER			
No.	**Questions and Filters**	**Coding categories**	**Skip**
8.	WHERE did you **FIRST** seek advice on care or treatment for the youngest child who fell sick?, ***(Circle only ONE answer)***	**Public sector:** Government Hospital……..……..1 Health centre…….. 2 Dispensary……..…….. 3 Outreach Site……4 Community Health Worker…….…… 5	

		Others Public…….. 6 **Private Medical Facility:** Private clinic…….. 7 Private Hospital……..8 Pharmacy……9I Private Outreach clinic…… 10 **Other:** Shop……11 Traditional practitioner……12 Home management…….. 13 Other (specify) …….. 14	
9.	Do you know of any Community Health Worker (CHW) working in the area where you live in?	YES ☐ NO ☐ → Qn15 ↓ ***Proceed to Qn.* 10**	
10.	If Yes to Question 9 , Can you tell me the ROLES of this CHW (with respect to children) in your area? ***(circle all the responses the caregiver mentions; Encourage respondent to give as many responses as possible)***	Assess the sick child for referral……..1 Assess Nutrition status of Child……2 Assess the immunization status of the child……3 Provide home treatment to the sick child……4 Perform growth measurements ……5 Perform weight measurements……6 Follow up sick children ontreatment……7 Referral of the sick child……8 Conduct tests to look for disease in children……9	

		Others (Specify)……..10	
11.	Did you seek care or advice from your local area CHW in the last sickness of this child (Name of youngest child who was sick) ?, (Tick the box which reflects the correct response)	YES ☐ NO ☐ → Qn.15 ↓ ***Proceed to Qn.* 12**	Qn.15
12.	What advice were you given by the CHW? ***(circle all that apply)***	To take child to a health facility when the child becomes sicker…….. 1 To give medication for all the days……..2 To take child to a health facility if they vomit everything……..3 To take the child to the facility …If they develop a fever……..4To take the child to the facility …If they have a convulsion……..5 To take the child to the facility If they are not able to eat anything or stopped breast feeding (if less than 6month)……..6 To take the child to the facility if they had bloody loose stool……..7 To take the child to a facility if they had difficulty in breathing……8 To take the child to the facility if they had both swollen legs……..10 Other advises (Specify)……11	
13.	Did the CHW REFER you and the sick child to see a health care worker at the nearest health facility?	YES ☐ → QN14 NO ☐ → Qn 15	

14.	Where did the CHW <u>strongly recommend</u> you to take the sick child (NAME) after assessing her/him? ***(circle only one response)***	**Public sector:** Government Hospital……..1 Health centre……..2 Dispensary……..3 Outreach Site……..4 Community Health Worker……..5 Others Public……..6 **Private Medical Facility:** Private clinic…… 7 Private Hospital…… 8 Pharmacy,…… 9 Private Outreach clinic…… 10 **Other:** Shop…… 11 Traditional practitioner …… 12 Other (specify) …… 13	

SECTION C: ASSESSMENT FOR RECOGNITION OF SIGNS OF SICKNESS BY CAREGIVER			
No.	**Questions and Filters**	**Coding categories**	**Skip**
15.	Did you take the (NAME) to see a health care worker?	YES ☐ NO ☐ → ***Proceed to Qn.* 16**	Qn 17
16.	What MAIN abnormal things/ occurrence/ sign(s) did you see in the sick child that made you seek care IMMEDIATELY from a health care worker?	Fever…… 1 Cough and difficulty in breathing…… 2 Cough and visible fast breathing…… 3 Diarrhea…… 4	

	(Circle ALL that apply)	Unusually sleepiness or lethargy…… 5 Vomiting…… 6 Vomiting everything…… 7 Not able to drink …… 8 Not able to feed or breast feed….. 9 Unconsciousness in a child…….. 10 Convulsions in a child…….. 11 Swelling of both feet…….. 12 Other …… 13	
17.	Can you tell me the reason (s) why you did not take the sick child to see a health care worker? ***(Circle the most appropriate response)***	Very sick child to travel. …… 1 Perceived poor care at facility…….. 2 Long distance to health facility.…… 3 Not enough money to take child …….. 4 Father refused…….. 6 Father was absent……7 Our religion disallows this……..8 Others (Specify)……..9	

SECTION D: MALARIA (FEVER/HOTNESS OF THE BODY)			
Notes to interviewer - Interviewer must ASK to confirm if the child has had symptoms of fever (Hotness of the body), if not then proceed to questions in Section E, beginning from QN 32			
No.	**Questions and Filters**	**Coding categories**	**Skip**
18.	Has (Name of child) been ill with fever (hotness of the body) at any time in the last 2 weeks? ***(Circle only ONE which applies)***	YES……1 → NO……2 → Don't Know …… 9	Qn19 Qn 32

19.	Did you seek advice or treatment for the fever? ***(Circle the one that applies)***	YES…… 1 → Qn 20 NO…… 2 → Qn 21 CAN'T REMEMBER…… 9	
20.	Where did you FIRST seek care or treatment for the fever? ***(Circle only ONE which applies)***	**Public sector:** Government Hospital…… 1 Health centre…… 2 Dispensary…… 3 Outreach Site…… 4 Community Health Worker…… 5 Others Public…… 6 **Private Medical Facility:** Private clinic…… 7 Private Hospital…… 8 Pharmacy…… 9 Private Outreach clinic…… 10 **Other:** Shop…… 11 Traditional practitioner …… 12 Other (specify) …… 13	
21.	Can you tell me the reason (s) why you did not seek care for the sick child during this illness? ***(Circle all responses which apply)***	Very sick child to travel. …… 1 Perceived poor care…… 2 Long distance to hospital…… 3 Not enough money to take child …… 4 Father refused……6 Our religion disallows this…… 7 Others (Specify)…… 8	

22.	From whom did you FIRST seek advice or treatment for the fever? ***(Circle only ONE response)***	Facility healthcare worker…… 1 Community Health Worker…… 2 Private Clinic health worker…… 3 Private Doctor…… 4 Private Pharmacy worker…… 6 Local Shop with Drugs…… 7 Others (Specify)…… 8	
23.	How many days after the fever began did you FIRST seek treatment for (Name of child)? ***(Circle only ONE response)***	Same Day…… 1 Next day…… 2 After Two (2) days…… .3 After Three (3) days……4 After Four(4) days……5 After more than four days…… 6	
24.	During this illness, did (Name) have blood taken from his/her finger or heel for testing? ***(Circle only <u>ONE</u> response which applies)***	Yes…… 1 No…… 2 Don't Know…… 9	
25.	During this illness did (Name) take any medicines for the fever?	Yes…… 1 → No…… 2 Don't Know….. 9	Qn 26
26.	What medicines did (Name of Child) take? ***(Circle ALL which apply)***	**ANTIMALARIALS** ACT……..1 AMODIAQUIN……2 QUININE……3 SP/FANSIDAR……4 **OTHER MEDICATIONS** PARACETAMOL……5	

		BRUFEN……6 ASPIRIN……7 OTHER……8 DON'T KNOW……9	
27.	How long after the fever began did [Name of child] take the medication? ***(Use the code below to circle applicable medication)*** ***SAME DAY----1*** ***NEXT DAY AFTER THE FEVER----2*** ***TWO DAYS AFTER THE FEVER----3*** ***THREE DAYS AFTER THE FEVER--4*** ***MORE THAN THREE DAYS AFTER THE FEVER----5*** ***DON'T KNOW-------9)***	ACT……1 2 3 4 5 9 AMODIAQUIN……1 2 3 4 5 9 QUININE……1 2 3 4 5 9 SP/FANSIDAR……1 2 3 4 5 9 **OTHER MEDICATIONS** PARACETAMOL……1 2 3 4 5 9 BRUFEN……1 2 3 4 5 9 ASPIRIN……1 2 3 4 5 9 OTHER……1 2 3 4 5 9 DON'T KNOW……1 2 3 4 5 9	
28.	Who provided the medicine taken by (Name of Child)?	Mother/Caregiver…… 1 Health worker…… 2 CHW…… 3 Other (Specify)…… 4 Don't Know……9	
29.	Who was present when (Name of child) took the FIRST dose of the medicine? ***(circle all that apply)***	Mother/Caregiver…… 1 Health worker…… 2 CHW…… 3 Other (Specify)…… 4 Don't Know……9	
30.	Did the CHW visit you and (NAME of child) at home after the child received treatment? ***(Circle only ONE which applies)***	YES…… 1 → Qn 31 NO……2	

31.	How many days after the Child (Name) received treatment did the CHW FIRST visit you at home? ***(Circle only ONE which applies)***	Same Day……..1 Next Day…… 2 2 days later…….. 3 3 days later…….. 4 4 days later…….. 5 5 or more days later…….. 6 Don't Know…….. 7	

SECTION E: DIARRHEA (3 or more loose stool within 24hours)

Notes to interviewer-Interviewer must confirm if the child has had symptoms of diarrhea, if not then proceed to Section F and start asking questions as from Qn 49.

No.	Questions and Filters	Coding categories	Skip
32.	Has (Name of Child) had diarrhea (3 or more loose stools within 24hours) in the last two weeks?	YES…….. 1 → Qn 33 NO…….. 2 → Qn 49 Don't Know …….. 9	
33.	How many episodes of Diarrhea (loose stools) did this Child (Name) have in a day during the last illness? (circle the one that applies)	More than 6 episodes in a day…….. 0 6 episodes of loose stools in a day…….. 1 5 episodes of loose stools in a day…….. 2 4 episodes of loose stools in a day …….. 3 3 episodes of loose stools in a day …….. 4 2 episodes of loose stools in a day …….. 5 1 episode of loose stool in a day……..6	
34.	Did you seek treatment for child (Name) during the latest episode of diarrheal illness?	YES…….. 1 → Qn35 NO…….. 2	

		(List the most important reasons why you did not take the child to seek treatment) *……* *……* *……* *……* *……* *……* DON'T KNOW …….. 9	
35.	Where did you FIRST seek care or treatment for the fever? ***(Circle only ONE which applies)***	**Public sector:** Government Hospital…….. 1 Health centre…….. 2 Dispensary…….. 3 Outreach Site…….. 4 Community Health Worker…….. 5 Others Public…….. 6 **Private Medical Facility:** Private clinic…….. 7 Private Hospital…….. 8 Pharmacy…….. 9 Private Outreach clinic…….. 10 **Other:** Shop…….. 11 Traditional practitioner …….. 12 Other (specify) …….. 13	
36.	From whom did you FIRST seek care or treatment for this latest diarrheal illness? ***(Circle only ONE response)***	Facility healthcare worker…….. 1 Community Health Worker…….. 2 Community Health Extension Worker….3	

		Private Clinic health worker…….. 4 Private Doctor…… 5 Private Pharmacy worker…… 6 Local Shop with Drugs…….. 7	
37.	Was (Name of Child) given any medicine to treat the diarrhea illness at the FIRST point of care? (***Circle only ONE response)***	YES…….1 NO…..2 → ↓ ***Proceed to Qn 38***	Qn 40
38.	What medicine was (NAME of child) given to treat the diarrhea during the last episode? ***(Circle all which apply)***	Home-made Fluids…… 1 ORS powder only……..…. 2 Zinc tablets only…… 3 Both ORS and Zinc …… 4 INJECTION of drug……5 INTRAVENOUS(fluid through the veins)…… 6 Home remedies/Herbal Medicines…. 7 OTHER (SPECIFY)……..8	
39.	Who provided the medicine/remedy? ***(Circle the answer provided)***	CHW …… 1 Health Facility Health Workers…….. 2 Pharmacy…….. 3 Others (Specify)…….. 4 Mother in Law……..5 DON'T KNOW…… 9	
40.	Did the CHW visit (NAME of child) at home after start of treatment during this last illness? ***(Circle ONE response)***	YES……..1 → NO…… 2 → CAN'T REMEMBER……3 DON'T KNOW……9	QN 41 Qn 42

41.	How many days after the start of treatment to (Name of Child) did the CHW visit during this illness? ***(Circle ONE response)***	Same Day……1 Next Day…….. 2 After 2 Days …….. 3 After 3 Days …….. 4 After4 Days …….. 5 More than 4 Days later…… 6 DON'T KNOW…….. 7	
42.	When (NAME of child) was sick with diarrhea, did you FEED/ BREASTFEED him or her less than usual, about the same amount, or more than usual? *(Breast feeding applies to children less than 6 months on exclusive breast feeding)*	LESS than usual…….. 1 About the SAME amount…… 2 MORE than usual…….. 3 CHILD NOT BREASTFED……. 4 DON'T KNOW…….. 9	
43.	When (NAME) was sick with diarrhea, was he or she offered less than usual to DRINK, about the same amount, or more than usual to drink?	LESS than usual…….. 1 About the SAME amount …… 2 MORE than usual…….. 3 CHILD NOT BREASTFED……. 4 DON'T KNOW…….. 9	
44.	Have you heard of Oral Rehydration Solution (ORS)? ***(Interviewer must confirm again if caregiver has heard about ORS solution-Circle the correct response)***	YES ……..1 → Qn 45 NO……..2 → Qn 47	
45.	Were you given ORS to give (Name of Child) during this latest episode of diarrhea?	YES ……..1 → Qn 46 NO……..2	

46.	Please DESCRIBE the process of ORS preparation to me ***(Interviewer will ask mother to describe the preparation for you).* A *correct description is given below)*** *(Pour clean drinking water into* ***one half liter*** *container (same as one clean 500mls soda bottle); Pour the water into a clean cup and Add the contents of 1 packet of ORS, Stir with spoon until ORS powder is fully dissolved, give sips of the ORS solution to child from a cup or using a clean spoon).*	DESCRIBED CORRECTLY…….. 1 DESCRIBED IN-CORRECTLY…… 2	
47.	Are you aware of some medicine/ tablets called ZINC given to your child for treatment of this last diarrhea illness?	YES ……..1 ⟶ NO, NEVER HEARD OF ZINC….2	Qn 48
48.	Did you give child (Name) medicine tablet called ZINC during the last diarrhea illness?	YES, I gave Zinc…….. 1 NO, I did not give ZINC…….. 2 ⟶	Qn 49

SECTION F: ARI/PNEUMONIA
(*Notes to interviewer-Interviewer must confirm if the child has had COUGH, if not write NOT APPLICABLE HERE and then proceed to Section G*).

No.	Questions and Filters	Coding categories	Skip
49.	Has (Name of child) had any COUGH at any time in the last two weeks?	YES…….. 1 NO…….. 2 CAN'T REMEMBER……..9	
50.	When (Name of child) had a COUGH illness, did he/she have difficulty in breathing or Fast breathing than usual?	YES…….. 1 ⟶ NO…….. 2 CAN'T REMEMBER…….. 9	Qn 51

51.	Did you seek care or treatment for this illness for (Name of child)? ***(circle ONE response and ask respondent to list reasons if response is a NO)***	YES…… 1 → NO…… 2 ***(List the most important reasons for not seeking treatment for (Name of Child)*** …… …… …… …… …… ……	Qn 52
52.	Where did you FIRST seek care or treatment for the fever? ***(Circle only ONE which applies)***	**Public sector:** Government Hospital…….. 1 Health centre…….. 2 Dispensary…….. 3 Outreach Site…….. 4 Community Health Worker…….. 5 Others Public…….. 6 **Private Medical Facility:** Private clinic…… 7 Private Hospital…….. 8 Pharmacy…….. 9 Private Outreach clinic…….. 10 **Other:** Shop…… 11 Traditional practitioner …….. 12 Other (specify) …….. 13	
53.	How long after you noticed (Name of child) cough and fast breathing did you seek	SAME DAY……..0 NEXT DAY……..1	

	treatment?	TWO DAYS……..2 THREE DAYS……..3 FOUR DAYS……4 MORE THAN 4 DAYS……..5	
54.	Did the CHW visit (Name of child) at home after she was started on treatment with medicines for this latest COUGH illness?	YES…….. 1 NO…… 2 CAN'T REMEMBER…… 9	
55.	How long after (Name of Child) was started on medicines for this COUGH illness did the CHW visit (Name of child)?	SAME DAY……1 NEXT DAY…… 2 After 2 DAYS …….. 3 After 3 DAYS …… 4 After 4 DAYS …….. 5 After 5 DAYS …… 6 More than 5 days later…….7 CAN'T REMEMBER…… 9	
SECTION G: OUT OF POCKETS COSTS FOR iCCM CONDITIONS' MANAGEMENT AND OPPORTUNITY COST (TIME)			
No.	**Questions and Filters**	**Coding categories**	**Skip**
56.	What was the cost of the following: (Write the actual transport costs in Kenya shillings)	**State:** **a) Cost of transport from Home to nearest Facility and back (Kshs)** **……** **b) Costs of Medicines in Shillings**	

		…… **c) Cost Meals during transport to and back** …… **d) Costs incurred in respect of any payment to the CHW** …… **e) Cost related to Facility registration fees** …… **f) Any other costs or payments (Specify type and amount)** …… ……	
57.	How much time did it take you to care for your child during this illness? IN DAYS OR HOURS, MINUTES etc.	Write the actual number of hours or days spent in total to take care of th illness for this child (from day 1 to the last day she perceived the illness was over). _____ ----------	

SECTION H: QUALITATIVE INTERVIEW ON CLIENT SATISFACTION

Instruction: ***This discussion is to be done only with those caregivers (mothers/fathers or guardians) who have had one or more contacts with a CHW during a sick child consult in the community. Write responses in a SEPARATE PIECE OF PAPER AND ATTACH IT TO THE MAIN QUESTIONNAIRE.***

NO.	QUESTIONS
SATISFACTION WITH INITIAL COMMUNICATION BY CHW - WELCOMING REMARKS	

1.	Can you please explain to me how the CHW COMMUNICATED to you at the FIRST and SUBSEQUENT contact? (Respectfully, Were you welcomed humanely, warmly? Probe for signs of approachability; whether there was empathy; find out if there was a harsh tone used during the interview was CHW happy to see the caregiver?
2.	Explain to me how you felt when the CHW spoke to you this way? Ask questions on the feelings of caregiver, and conclusions by the client about how the consultation went; probe if she was satisfied that she was given a keen ear;
3.	Tell me what things you liked most about your FIRST few minutes of contact with the CHW. Probe for whether CHW was Asking questions in a polite way; whether CHW looked at (ASSESSED) Child; whether it was the listening, counseling, counting breathing, reassurance; did she like the referral or not?
SATISFACTION WITH CHW ATTITUDE AT SICK CHILD CONSULT	
4.	Can you describe to me what you felt was the prevailing mood of the CHW during your contact (s) (refers to rudeness, politeness, cheerful, sympathetic, empathetic, encouraging….)
LISTENING TO CAREGIVER'S NARRATION OF ILLNESS	
5.	Explain to me how you knew that the CHW was listening to you as you explained the child's illness to him/her. (was CHW attentive, or was he/she writing at the same time, talking over the phone; was CHW giving a chance to caregiver to explain the child's problem;)

SATISFACTION WITH ASSESSSMENT OF /'TREATMENT GIVEN TO / OR 'REFERRAL OF' THE CHILD	
6.	Explain to me how the CHW looked at and assessed your sick child's illness if you can remember? Did the CHW expose the child, feel the child with the hands, look at the breathing? Did the CHW use any tools to assess the child-a tape around the upper arm (MUAC), a timer, weight measure? Was CHW happy with the decision, and why? Ask the caregiver to explain the answer given.
7.	Can you explain what you thought about his/her effectiveness/skills at the treatment of your child? In your assessment, how did the CHW perform, and do you think she needed more training etc
8.	How were you convinced that the CHW gave you the right management (treatment or referral) for your child? What made you think so? Explain the reasons that makes you think or conclude this.
SATISFACTION WITH COUNSELLING ON FOLLOW UP	
9.	Can you explain whether the advice given to you on how to handle the child at home, and when to return or go to the facility was convincing and important? Why do you think so?
OVERRAL SATISFACTION	

10.	Explain to me what you feel about your contact with the CHW's during the consultation in general. Whether you are happy with the services? What aspects were wrong, Where CHWs can or should improve.
11.	Tell me any challenges which you had as you went to seek care from the CHW? Costs, transport, confidence, etc. (Probe for more challenges)
12.	Do you have anything else to add about your experience with CHWs?

Thank the participants and end the discussion

Approved: July 18, 2013 **IRB No.**: 5073

TOOL 2A: COMMUNITY HEALTH WORKER INTERVIEW

Integrated Community Case Management Study

QUESTIONAIRE SERIAL NO.: _____ **STUDY ID: _____**

COMMUNITY UNIT NAME: _____ **COMMUNITY UNIT CODE: _____**

NAME OF LINK HEALTH:_____ **HEALTH FACILITY CODE: _____**

INTERVIEWER NAME: _____ **DATE OF INTERVIEW: …./…../……** (dd/mm/yyyy)

SECTION A: BACKGROUND INFORMATION

(Circle the most appropriate response)

No.	QUESTION	CODING CATEGORIES	CODE
1	Sex of Respondent	Male	1
		Female	2
2	How old are you?	Age in completed years_____	
3	What is your highest educational level completed?	College Level	1
		High School level	2
		Primary School level	3
		Other, specify	4
4	How long have you been working as a CHW?	_____ Years _____ Months	
5	Which CHW training have you received? (Circle all that apply)	Basic CHW Package	1
		Family Planning	2
		HIV	3
		iCCM	4
		Multidrug resistant TB	5
		Infant & young child feeding	6
		Other, specify	7

SECTION B: ABILITY TO CORRECTLY DIAGNOSE, TREAT & REFER SICK CHILDREN

No.	QUESTION	CODING CATEGORIES	CODE
6	What are the common causes of death in children under-5 years in the community? **Interviewer:** ***(Probe for more options; circle all that are mentioned)***	Fever/Malaria	1
		Diarrhoea (many loose stools per day)	2
		Cough and difficulty in breathing/Pneumonia	3
		Malnutrition	4
		Neonatal illnesses	5
		Other, specify	6

No.	QUESTION	CODING CATEGORIES	CODE
7	What are the assessment steps in identifying a child's problems from a caregiver in the community? **Interviewer:** ***(Circle all that are mentioned)***	ASK the caregiver	1
		LOOK at the child for signs of illness	2
		RECORD in the sick child recording card	3
		TREAT children who are sick but with no danger sign	4
		REFER all children with danger signs	5
8	What are the danger signs in a child under-5 years? **Interviewer:** ***(Circle all that are mentioned)***	Cough >14days or more	1
		Diarrhoea for 14 days or more	2
		Blood in stool	3
		Fever for > 7days	4
		Convulsions	5
		Not able to breastfeed	6
		Not able to drink or feed	7
		Vomits everything	8
		Chest in drawing	9
		Difficulty in Breathing	10
		Unusually sleepy or unconscious	11
		Red MUAC	12
		Swollen feet	13
		Other, specify	14
9	Which child under- 5 sick conditions do you currently treat at home? **Interviewer:** ***(Probe and circle all that are mentioned)***	Fever (less than 7 days) RDT +ve and no danger sign **with ACT**	1
		Fever (less than 7 days) no RDT but in a malaria endemic area and no danger sign **with ACT**	2
		Yellow on MUAC with no danger sign **with Ready-to Use Therapeutic Feeds (RUFTs)**	3
		Non-bloody Diarrhoea (less than 14 days) with no danger sign **with ACT**	4
		Other, specify	5
10	What are the signs of pneumonia in child? **Interviewer:** ***(Circle all that are mentioned)***	Cough	1
		Fast Breathing	2
		Chest in-drawing	3
		Other, specify	4
11	How do YOU identify children with malnutrition IN THE COMMUNITY? **Interviewer:** ***(circle all that are mentioned)***	Yellow MUAC	1
		Red on MUAC Tape	2
		Weight	3
		Skin	4
		Other, specify	5

No.	QUESTION	CODING CATEGORIES	CODE
12	Under iCCM what conditions, in the community, would you refer to the nearest health facility? **Interviewer:** ***(Circle all that are mentioned)***	Cough >2 weeks	1
		Diarrhoea for 14 days or more	2
		Blood in stool	3
		Fever for > 7days	4
		Convulsions	5
		Not able to breastfeed	6
		Not able to drink or feed	7
		Vomits everything	8
		Chest in drawing	9
		Difficulty in Breathing	10
		Unusually sleepy or unconscious	11
		Red MUAC	12
		Swollen feet	13
		Other, specify	14
13	What are the correct steps for referring a child from the community to a link health facility? **Interviewer:** ***(Probe and circle all that are mentioned)***	Explain to the caregiver why child needs to go to the facility	1
		If child has diarrhea and can drink, begin giving ORS solution right away	2
		For any sick child who can drink, advice to give more fluids and continue feeding or breastfeeding	3
		Advice to keep the child warm if child does not feel hot on touch.	4
		If child has fever, give **first dose** of **Paracetamol** and ask the mother to remove extra clothing.	5
		If convulsing now, show care giver how to position the child. Do not put any object in the mouth.	6
		Write a Referral not	7
		Support transportation and help solve other difficulties in referral.	8
		Follow up the child on return at least once a week until the child is well.	9
		Explain to the caregiver why child needs to go to the health facility	10
14	What are the main difficulties you have had in managing children under-5 children in the community? **Interviewer:** ***(Circle all that apply)***	Lack of medical supplies e.g.ORS, zinc	1
		Lack of equipment e.g RDT kit	2
		Failures in equipment	3
		Do not feel sufficiently trained	4
		Do not feel sufficiently supported / mentored by CHEWs	5
		Poor linkage of clients to health facility on referral from the community	6
		Do not have enough time to attend to clients	7
		Other: specify	8

No.	QUESTION	CODING CATEGORIES	CODE
15	What gives you the greatest satisfaction carrying out this approach of management of common conditions of sick children in the community? _____ _____ _____ _____		
16	What would make you even more satisfied in managing common childhood illnesses at community level? _____ _____ _____		

SECTION C: COMMODITY STOCKS MANAGEMENT

No.	QUESTION	CODING CATEGORIES	CODE	SKIP
17	Have you experienced any stock out of ACTs?	Yes	1	Go to 18
		No	2	Go to 19
18	What are the reasons for the stock out of medications? **Interviewer: *(Circle all that apply)***	Poor recording of commodity inventory tool	1	
		Delay in CHEW to refill medications	2	
		Lack of medications at the health facility	3	
		Other, specify	4	
19	Have you experienced any stock out ORS?	Yes	1	Go to 20
		No	2	Go to 21
20	What are the reasons for the stock out of ORS medications? **Interviewer: *(Circle all that apply)***	Poor recording of commodity inventory tool	1	
		Delay in CHEW to refill medications	2	
		Lack of medications at the health facility	3	
		Other, specify	4	
21	Have you experienced any stock out of Zinc?	Yes	1	Go to 22
		No	2	Go to 23
22	What are the reasons for the stock out of medications? **Interviewer: (*Circle all that apply)***	Poor recording of commodity inventory tool	1	
		Delay in CHEW to refill medications	2	
		Lack of medications at the health facility	3	
		Other, specify	4	
23	Have you experienced any stock out of RDT?	Yes	1	Go to 24
		No	2	Go to 25
24	What are the reasons for the stock out of the RDT Kit? **Interviewer: *(Circle all that apply)***	Poor recording of commodity inventory tool	1	
		Delay in CHEW to re-supply the Kit	2	
		Lack of RDTs at the link health facility	3	
		Other, specify	4	

No.	QUESTION	CODING CATEGORIES	CODE	SKIP
25	How do you dispose sharps after RDT testing	Needle disposal bin from hospital	1	
		Dispose in pit latrine	2	
		In the bush	3	
		Other, specify	4	
26	What challenges are you facing with the disposal of sharps used in RDT? _____ _____ _____			
27	What other challenges are you facing with management/treatment of sick children using the commodities available in the community? _____ _____ _____			
28	What are your recommendations for the improvement of medications (ORS, Zinc, ACTs) and RDT stocking for management of children less than five years? _____ _____ _____			

SECTION D: ASSESSMENT OF CHW MOTIVATION

No.	QUESTION	CODING CATEGORIES	CODE	SKIP
29	Do you feel motivated to deliver the iCCM package to children less than five years in the community?	Yes	1	Go to 30
		No	2	Go to 31
30	What motivates you to do this work in the community? **Interviewer: (*Circle all that apply)***	Kshs.2,000 monthly stipend	1	
		Being part of an CHW income generating project	2	
		Community appreciation for treating childhood conditions	3	
		I am satisfied that I accomplish something worthwhile in treating and or referral of sick children	4	
		Support from community & CHC	5	
		Support and mentorship from CHEW	6	
		Other, specify	7	
31	In your opinion, what are the reasons for poor motivation to deliver the iCCM package to sick children under five in your community? **Interviewer: *(Circle all that apply)***	Poor or Lack of remuneration	1	
		Burnout	2	
		Long work hours	3	

No.	QUESTION	CODING CATEGORIES	CODE	SKIP
		Inadequate supervision by CHEWs	4	
		Inconsistent supply of medications & commodities	5	
		Community doesn't have faith in CHW ability to manage iCCM conditions	6	
		Inability to manage other childhood illnesses	7	
		Other, specify	8	

SECTION E: CHW SUPERVISION DURING THE LAST THREE (3) MONTHS

No.	QUESTION	CODING CATEGORIES	CODE	SKIP
32	Have you ever been routinely supervised in the last 3 months?	Yes	1	Go to 33
		No	2	Go to 38
33	Who supervised you on treatment, counselling and referral of childhood conditions in the last 3 months? **Interviewer:** ***Probe for more options; circle all that are mentioned***	District Health Management Team	1	
		A member of District Health Management Team	2	
		County Health Management Team	3	
		A members of the County Health management team	4	
		A member from the national level	5	
		Community Health Extension Worker	6	
34	How many times in the last 3 months have you been supervised?	Once	1	
		Twice	2	
		Thrice	3	
		>3 times	4	
35	Did any supportive supervision involve review of your records?	Yes (specify which records were reviewed with CHEW) _____ _____	1	
		No	2	
36	Did your supportive supervisions involve clinical imitations of iCCM cases?	Yes, (specify which cases were simulated with CHEW) _____ _____	1	
		No	2	

No.	QUESTION	CODING CATEGORIES	CODE	SKIP
37	Did your supportive supervisions involve clinical imitations of iCCM cases at link health facility with your CHEW?	Yes, (specify which clinical cases scenarios were mentored on with CHEW at link health facility) _____ _____	1	
		No	2	
38	Why do you think you have not had any supportive supervision in the last 3 months	CHEW unavailable	1	
		I have been unavailable due to personal reasons	2	
		Other competing health activities in the community	3	
		I don't know	4	
		Other reasons (specify) _____ _____ _____	5	

39. What do you think are the important qualities for a CHW to have in order to manage sick children less than five years in the community?

_____

_____

_____

_____

40. What are your recommendations to improve CHW motivation in the treatment, referral and counselling of sick children under five years in the community as per your training package?

_____

_____

_____

_____

Any other comments

_____

_____

_____

_____

Interviewer: Thank the respondent and end interview.

z

Approved: October 1, 2013 **IRB No.**: 5073

TOOL 2B: CHW SICK CHILD OBSERVATION CHECKLIST

Integrated Community Case Management Study

Questionnaire Serial No: _____ **Study ID: _____**

Date of Observation (dd/mm/yyyy) ____/_____/_____

(This tool should be completed by an iCCM/IMCI trained observer, and validation done at the same time. The expert observer should circle the most appropriate response for each item; sections B - G)

SECTION A: COMMUNITY HEALTH WORKER IDENTIFICATION DETAILS

ITEMS	DETAILS
Health Facility Name	
Health Facility Code	
CHW Code	
Community Unit Name	
Expert Observer's Name	
Interview start time :	Interview End time:

SECTION B: ASSESSING COMMUNICATION SKILLS OF THE CHW

No	Questions and Filters	Response & Coding	Skip
CHW COMMUNICATION SKILLS FOR WELCOMING CLIENTS			
1.	Did the CHW welcome the client with a "G*REETING"?*	YES ---------1 NO----------0	
2.	Did the CHW ask the "*Name of the child" ?*	YES ---------1 NO----------0	
3.	Did the CHW ask the caregiver to "*sit comfortably before proceeding with asking about the Child's illness*"?	YES ---------1 NO----------0	

No	Questions and Filters	Response & Coding	Skip
4.	Does the CHW ASK the caregiver "for what reason the child is being brought to him/her.?	YES ---------1 NO----------0	
5.	Does the CHW ASK about the following? (Code Yes…1 and No….2) A. Age of child in Months and or Years? Yes/No B. Relationship to Caregiver? Yes / No **C.** Whether caregiver has the child's MOTHER CHILD HEALTH (MCH) BOOKLET?	YES ---------1 NO----------0 YES ---------1 NO----------0 YES ---------1 NO----------0	
6.	Does the CHW DOCUMENT (write down) these details in Qn 5 above in the SICK CHILD RECORDING FORM? **(Validate by checking documentation in recording form, and Circle 1 if Yes or 0 if response is No)** A. Name of Child? B. Age of child in Months and or Years? C. Relationship to Caregiver? D. Whether caregiver has the child's Mother Child Booklet/Card?	YES ---------1 NO----------0 YES ---------1 NO----------0 YES ---------1 NO----------0 YES ---------1 NO----------0	

IDENTIFYING CHILD's PROBLEMS & USING THE SICK CHILD RECORDING FORM (ASKING & LOOKING)

SECTION C: IDENTIFYING CHILD's PROBLEMS- ASKING THE CHILD'S PROBLEMS

No.	Questions and Filters	Response & Coding	Skip
7.	What reason does the caretaker give the CHW for bringing the child to seek care? **(Circle all that apply)**	Diarrhea (3 or more loose stool in 24 hours)**……..1** Diarrhea (3 or more loose stool in 24 hours) and Vomiting……**……..2**	

No	Questions and Filters	Response & Coding	Skip
		Fever (Hotness of the body) or malaria……..**3** (Fever) Hotness of the body and Vomiting……..**4** Hotness of the body (Fever) & (3 or more loose stool in 24 hours) and Vomiting……..**5** Cough and difficulty in breathing or pneumonia……..**6** Cough and fast breathing……..**7** Others (Specify)……..**8**	
8.	Does the CHW ASK the care giver about the presence of any of the following GENERAL DANGER SIGNS in the sick child (Circle either 1 for Yes or 0 for No) • If child has had or is having a Convulsion in this illness? • If child is having difficulty in drinking fluids or feeding/breastfeeding? • If child is not able to drink or feed anything? • If child is vomiting everything? • If child is lethargic or unusually sleepy or unconscious?	YES ---------1 NO----------0 YES ---------1 NO----------0 YES ---------1 NO----------0 YES ---------1 NO----------0 YES ---------1 NO----------0	
9.	Does the CHW ask about the presence of COUGH? (Circle 1, if YES or 0, if response is NO)	YES----------1 NO----------0	Go To 10 Go To 12

No	Questions and Filters	Response & Coding	Skip
10.	If Yes to Qn 9 and caregiver confirms presence of cough above, does the CHW ask about the DURATION of Cough?. If YES, GO to Qn 11, if NO, GO TO Qn 12	YES ----------1 ⟶ NO----------0 ⟶	Go To 11 Go To 12
11.	If YES to Qn 10, Does CHW ask about the duration of the cough as follows? (Circle the correct response)	Cough for <14days…….**1** Cough for >14days……..**2** Asks, but not in this format of greater than or less than 14days……..**3**	
12.	Does the CHW ask about diarrhoea or Loose stools -3 or more loose stool in 24hours (Diarrhea)?	YES……1 ⟶ NO……..2 ⟶	Go To13 Go To15
13.	If caregiver confirms presence of diarrhea, Does the CHW ASK about the DURATION of the diarrhea illness?	YES……..1 ⟶ NO……2	Qn 14
14.	If YES to Qn 13, does CHW ask about duration of Diarrhea (3 or more loose stool in 24 hours) in terms of number of days as follows? (Circle all which apply, Yes-1 , No-2 or Not applicable-9) Diarrhea for less than 14 days Diarrhea for greater than 14 days Asks, but not in this format of greater than or less than 14days	YES ---1 NO----2 N/A----9 YES ---1 NO----2 N/A----9 YES ---1 NO----2 N/A----9	
15.	If YES, to Qn 12, Does CHW ask about presence of Blood in diarrhea? (Circle **1**, if response is YES , and **0** if response is NO)	YES -------- 1 NO -------- 0	

No	Questions and Filters	Response & Coding	Skip
16.	Does the CHW ASK about Hotness of the Body (FEVER)? (Circle 1, if response is YES , or 0 if response is NO)	YES----------1 NO----------0	Go To Qn 17-19 Go To Qn 20
17.	If the Caregiver says there is fever, Does the CHW ASK about the DURATION of FEVER (Hotness of the body) ?	YES ----------1 NO ----------0	Go to 18 Go to 27
18.	Does the CHW ask about the Duration of fever as being " <u>for the last 7days or for more than 7 days</u>"? (Circle **1**, if response is <u>Yes</u> , **2**, if response is YES, but Does not ask in any of the stated formats and if response is <u>No</u> or 0, if not asked at all)	YES----------1 YES, but NOT in the stated format----------2 NO----------0	
19.	If Yes to question 17, Does the CHW perform an RDT Test on the Child (Name)? (Circle **1**, if response is <u>Yes</u> , or 0 if response is No, or not applicable if there child has no fever)	YES ----------1 NO ----------0 Not Applicable------9	
	THE OBSERVER MUST VALIDATE OR QUALIFY THAT THE TECHNIQUE OF BLOOD SAMPLE COLLECTION AND RDT TESTING IS CORRECT. (Note that: the angle of blood collection from finger is for the test is 45 degrees to the finger, the sample is buffered using buffer solution and the test is read after 15 minutes)		
20.	Does the CHW WIPE the FINGER using a STERILE SWAB or CLEAN Cotton swab with spirit before pricking?	YES ----------1 NO ----------0 Not applicable-----9	
21.	Does the CHW Collect blood using the capillary tube at an angle of 45 degrees?	YES ----------1 NO ----------0 Not applicable------9	
22.	Does the CHW put the buffer solution drops on to the test cassette?	YES ----------1 NO ----------0	

No	Questions and Filters	Response & Coding	Skip
		Not applicable------9	
23.	Does the CHW TIME the duration taken for the test before reading the test results? (Recommended time is 15 minutes)	YES ----------1 NO ----------0 Not applicable------9	
24.	If the CHW PERFOMS an RDT test in Qn 19, Does he or she READ the results of the RDT test? (Circle **1**, if response is Yes , and **0** if response is NO)	YES ----------1 → Go To Qn 19 NO----------0 → Go To Qn 20 Not ABLE to read results……..2 Not applicable-------9	
25.	Does the Assessor AGREE with the CHW on the RESULT of the RDT test? (Assessor waits for 15 minutes after the start of the test then asks the CHW to read this, and he/she VALIDATES the result)	YES, Test read CORRECTLY----------1 NO, Test read INCORRECTLY----------0 Not applicable----------9	
26.	Does the CHW ask about OTHER Problems the child has? **(Circle the one which applies)**	YES ----------1 NO ----------0	

SECTION D: IDENTIFYING CHILD's PROBLEMS- LOOKING FOR SIGNS OF ILLNESS (ASSESS AND CLASSIFY)			
No.	**Questions and Filters**	**Response & Coding**	**Skip**
27.	Does the CHW LOOK for the following signs of childhood illness? Chest indrawing Fast breathing by counting breaths in 1 minute (Yes means that breathing rate count is correct as validated by observer)	YES ------1 NO----0 YES ------1 NO----0	

No	Questions and Filters	Response & Coding	Skip
	Unusually sleepy child (lethargic) or unconscious. Malnutrition Using the MUAC tape color code Malnutrition by using the thumbs to press and demonstrate swelling of both feet	YES -------1 NO----0 YES -------1 NO----0 YES -------1 NO----0	
SECTION E: VALIDATION OF CHW'S ASSESSMENT AND CLASSIFICATION **Note to expert observer: In the sick child recording form, CHW's are taught to TICK a sign or symptom that is present and to CIRCLE one which is not present).**			
28.	Does the CHW ASSESS the 3 main symptoms, i.e. Diarrhea, Hotness of the Body and 'cough and difficulty in breathing' CORRECTLY? • Assesses ALL THREE main symptoms CORRECTLY • Assesses only TWO main symptoms CORRECTLY • Assesses ONE main symptom CORRECTLY • None of them assessed	YES -------1 NO------0 YES -------1 NO------0 YES -------1 NO------0 Yes--------1 No---------0	
29.	Are all the 5 ***assessments tasks*** completed for the main symptoms? (Completes the technique upto decision) (ASK,LOOK,RECORD,CLASSIFY,TREAT and/or REFER) • Cough …….. • Diarrhea…….. • Malaria……..	YES…….1 NO……..0 YES…….1 NO……..0 YES…….1 NO……..0	
30.	Does the CHW Assess and classify (child Name) as either: having a general danger sign or	YES……..1	

s

No	Questions and Filters	Response & Coding	Skip
	Not having general danger sign (s)?	NO……..0	
31.	Does the CHW Assess and Classify the Child (Name) as having all or some of the GENERAL DANGER SIGNS? (Circle the response that is right. Refer to column of the sick child recording form written 'ANY Danger Sign?' and document all TICKED in the recording form) • All danger signs • 10 danger signs • 9 danger signs • 8 danger signs • 7 danger signs • 6 danger signs • 5 danger signs • 4 danger signs • 3 danger signs • 2 danger signs • 1 danger signs • 0-NO Danger sign	……..1 ……..2 ……..3 ……..4 ……..5 ……..6 ……..7 ……..8 ……..9 ……..10 ……..11 ……..12 ……..13	
32.	Did the CHW correctly LOOK (Assess) for these symptoms: (Does not go to the extent of treatment or referral as in Qn 29 above). • Fever? • Diarrhea? • Cough and difficulty in breathing?	Yes------1 NO-----0 Yes------1 NO-----0 Yes------1 NO-----0	

No	Questions and Filters	Response & Coding	Skip
33.	Did the CHW CORRECTLY LOOK (ASSESS) for the signs of Malnutrition? (Using a MUAC tape to look for color codes and checking for swelling of both feet using both his or her thumbs)	No----------0 Yes (ALL, 2 Signs)---------1 YES, One (1) Sign----------2	

SECTION E: DECISION TO REFER OR TREAT THE CHILD			
No.	**Questions and Filters**	**Response & Coding**	**Skip**
34.	Does the CHW classify the child (Name) subsequent to asking and looking for signs of common illnesses – As having "ANY DANGER SIGN and thus for URGENT referral" ? (Filing in danger sign without any tick in decision box is a 'no response') (Filling decision box without any danger sign ticked is also a no response)	YES----------1 → NO----------0 → No Response.-----2 →	Go to Qn 35 Go to Qn 36 Go to 36
35.	**(Assessor's Validation question)** If Yes to Qn 35, Does the Validator agree with the CHW CLASSIFICATION and DECISION of child having "ANY DANGER SIGN and thus for URGENT referral"?	YES, I agree……1 → No, I don't agree……0 Not Applicable……..9	Go to 38
36.	Does the CHW CLASSIFY the Child (Name) subsequent to Asking and Looking at the Child's (Name) signs of common illnesses –As having "NO DANGER , thus for HOME TREATMENT and ADVICE to caregiver "?	YES----------1 → NO----------0 No response----------2	GO to Qn 37

No	Questions and Filters	Response & Coding	Skip
37.	**(Assessor's Validation question)** Does the Validator agree with the CHW CLASSIFICATION and DECISION of child having "NO DANGER SIGN and thus for HOME TREATMENT and ADVICE to caregiver"?	YES----------1 NO----------0 Not Applicable----------9	Go to 41
38.	If Yes to Qn 35, Did the CHW recommend the Child for Referral? (CHW should tick and explain to the caregiver the need for referral-use the tick)	YES----------1 NO----------0	Go To Qn 39
39.	Has the CHW Referral note been written and presented to the Child's (Name) caregiver? **(Assessor to verify if Referral Note has been written)**	YES----------1 NO----------0	Qn 40
40.	If Child (Name) is recommended for Referral, to where is the child (Name) referred to? (Circle that which applies from the list below)	**Public Health Facility** GOK Hospital……..1 Health centre……..2 Dispensary……..3 Outreach Site……..4 Community Health Extension Worker……5 Another CHW……..6 Others Public……7 **Private Medical Facility**: Private clinic……..8 Private Hospital…….9 Pharmacy……11 Private Outreach clinic…..12 Private Faith based	

No	Questions and Filters	Response & Coding	Skip
		Hospital……..13 Other, specify…….. 14	

SECTION F: CHECKING COMPETENCE IN TREATMENT ADMINISTERED BY CHW			
No.	**Questions and Filters**	**Response & Coding**	**Skip**
41.	If Yes to Qn 37, what management/treatment does the CHW recommend and administer?	Immediate referral for Cough and Fast breathing (Pneumonia)----------1 ORS and Zinc for diarrhea of less than 14 days----------2 ORS Alone for diarrhea of less than 14 days ----------3 Zinc Alone for diarrhea of less than 14 days ----------5 Artemisinin Combination Therapy (ACT) for fever of less than 7days in a malaria area (Malaria) ?----------6 Immediate referral for severe malnutrition based on RED on MUAC tape----------7 No treatment given----------8 No response……..9	

SECTION G: VALIDATION OF TREATMENT/MANAGEMENT GIVEN TO SICK CHILD BY CHW			
No.	**Questions and Filters**	**Response & Coding**	**Skip**
42.	Is the treatment given in Qn. 41 above for DIARRHEA correct? (Circle **1**, if response is YES , and **0** if response	Yes----------1 No----------0	

No	Questions and Filters	Response & Coding	Skip
	is NO)-(Question applies if classification is Diarrhea with NO DANGER SIGN)	No Response……..2	
43.	Is the treatment given in Qn. 41 above for Hotness of the Body (Fever/Malaria) correct? (Circle **1**, if response is Yes , or **0** if response is No) - (Question applies if classification is FEVER with NO DANGER SIGN)	Yes----------1 No----------0 No response……..2	
44.	**(Validator checks for appropriate drug dosage for age; one can use package inserts for recommended dosages)** If Yes to Qn 41, Is the DOSAGE for the treatment given by the CHW for the classified illness CORRECT FOR THE AGE of the child? (Circle one response for each question) **A**. Treatment for Malaria (using ACT) correct for AGE? **B**. Treatment for diarrhea (using Zinc tablets) correct for AGE? **C**. Treatment for diarrhea (using ORS sachets) correct for AGE?	YES ---1 NO----0 N/A----9 YES ---1 NO----0 N/A----9 YES ---1 NO----0 N/A----9	
45.	Does the Assessor agree with the treatment given by the CHW for the classification in question 44? (Assessor to verify this by checking the sick child recording form)	YES- (I agree) ----------1 NO (I don't agree)----------0 Not Applicable----------9	
46.	Does the CHW give the Caretaker COUNSELLING INFORMATION on home care.? (Extra feeds/breastfeeding, Extra fluids, Take full dosage of drugs and When to return advice)	YES……1 NO……..0	

Any other comments/ Observations

_____

_____

_____

_____

_____

_____

Thank the Caregiver for agreeing to participate in the observation session and release them.

Approved: July 18, 2013 **IRB No.**: 5073

TOOL 3A: KEY INFORMANT INTERVIEW – DHMT

Integrated Community Case Management Study

SERIAL NO.: _____ **STUDY ID: _____**

NAME OF LINK HEALTH:_____ HEALTH FACILITY CODE: _____

COMMUNITY UNIT NAME: _____ COMMUNITY UNIT CODE: _____

INTERVIEWER NAME: _____ DATE OF INTERVIEW: …./…../……. (dd/mm/yyyy)

Question 1: How does the DHMT support CHWs and CHEWs in the implementation of the iCCM strategy in Bondo?

	Indicator / Key areas	Response	Code (Skip)
a)	Did the DHMT hold review meetings with the CHEWs and health facility in charges? **Interviewer:** ***(Circle only one response)***	Yes	1
		No	2 **(skip to qn. "c")**
b)	How frequently did the DHMT hold review meetings with the CHEWs and health facility in charges? **Interviewer:** ***(Circle only one response)***	Monthly	1
		Every two months	2
		3 monthly (Quarterly)	3
		>3 months apart	4
		Never held review meetings	5
c)	Did the DHMT review data from iCCM sites and discuss action points with the CHEWs and health facility in charges? **Interviewer:** ***(Circle only one response)***	Yes	1
		No	2 **(skip to qn. "e")**
d)	What data did the DHMT review from the iCCM sites? **Interviewer:** ***(Probe for more options; circle all that are mentioned)***	Commodity data	1
		Medical supplies data	2
		Patient referral data	3
		CHEW supervisory report data	4
		Under-5 morbidity data from iCCM sites	5

	Indicator / Key areas	Response	Code (Skip)
		Under-5 mortality data from iCCM sites	6
		Other data, specify	7
		Never reviewed data	8
e)	Why didn't the DHMT hold review meetings with the CHEWs and health facility in charges? **Interviewer:** ***(Probe for more options; circle all that are mentioned)***	Lack of time	1
		Lack of financial resources	2
		Not within the mandate of the DHMT to hold such review meetings	3
		Other, specify	4
f)	Why didn't the DHMT review data from iCCM sites and discuss action points with the CHEWs and health facility in charges? **Interviewer:** ***(Probe for more options; circle all that are mentioned)***	Lack of time	1
		Lack of financial resources	2
		Not within the mandate of the DHMT to hold such review meetings	3
		Other, specify	4
g)	Did the DHMT carry our any supportive supervision / observation/ mentorship visits to the iCCM targeted sites / CU? **Interviewer:** ***(Circle only one response)***	Yes	1
		No	2 **(skip to qn. "i")**
h)	What did the DHMT observe/supervise / mentor on while in the iCCM targeted sites / CU? **Interviewer: (*Probe for more options; circle all that are mentioned)***	CHEWs mentoring CHWs	1
		CHW Registers & Tools	2
		CHW usage of commodities e.g. RDT and ORS	3
		CHC response to CHW implementing iCCM	4
		Infection control (disposal of sharps)	5
		Other, specify	6
i)	Why didn't the DHMT carry our any supportive supervision / observation/ mentorship visits to the iCCM targeted	Lack of time	1
		Lack of financial resources	2

	Indicator / Key areas	Response	Code (Skip)
	sites / CU? **Interviewer:** ***Probe for more options; circle all that are mentioned***	Not within the mandate of the DHMT to hold such review meetings	3
		Other, specify	4

Question 2: How did iCCM strategy support specific health services in Bondo District in the following areas?

(Ask about: Malaria, Diarrhoea, Pneumonia, Malnutrition, Neonatal Illnesses).

Illness/ Health Service area	Responses on specific support on health services
a) Malaria	
b) Diarrhea	
c) Pneumonia	
d) Malnutrition	
e) Neonatal	

Question 3: Is the iCCM strategy a useful and important strategy for community case management of childhood illness? If yes please elaborate with specific examples

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Question 4: What challenges did DHMT face in supporting the CHEWs to implement the iCCM strategy in Bondo?

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Question 5: What challenges did DHMT face in supporting the CHWs to implement the iCCM strategy in Bondo?

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Question 6: Do you (DHMT) have any recommendations to improve iCCM implementation in Bondo?

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Question 7: How has iCCM strategy strengthen the following areas:

i. Commodity Management

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Administrative support and supportive supervision

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Collaboration and partnership in Bondo

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Question 8: Any other comments?

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Wrap-up: Review all the activities, what has been the shared/learned, the issues raised. Thank participant(s) for her/his time and input and say that all information will be used to improve iCCM implantation in the region and in other regions in Kenya

Approved: July 18, 2013 **IRB No.**: 5073

TOOL 3B: KEY INFORMANT INTERVIEW – COMMUNITY HEALTH COMMITTEE (CHC)

Integrated Community Case Management Study

SERIAL NO.: _____ **STUDY ID: _____**

NAME OF LINK HEALTH:_____ HEALTH FACILITY CODE: _____

COMMUNITY UNIT NAME: _____ COMMUNITY UNIT CODE: _____

INTERVIEWER NAME: _____ DATE OF INTERVIEW: …./…../……. (dd/mm/yyyy)

Question 1: What was the effect of implementation of the iCCM on the management of the following: Malaria, Diarrhea, Pneumonia, Malnutrition, and Neonatal Illnesses for children under-5?

Illness/ Health Service area	Responses on what iCCM specifically delivered in the villages that CHC supported
a) Malaria	
b) Diarrhea	
c) Pneumonia	
d) Malnutrition	

e) Neonatal	

Question 2: Tell us about the support the CHC provided for CHWs in the implementation of the iCCM strategy in Bondo district.

Indicator / Key areas	Response	Code
a) Did the CHC hold review meetings with the CHWs and CHEWs?	Yes	1
	No	2 **(skip to "c")**
b) How frequently did the CHC hold review meetings with the CHWs and CHEWs? **Interviewer:** ***Probe for more options; circle all that are mentioned***	Monthly	1
	Every two months	2
	3 monthly (Quarterly)	3
	>3 monthly	4
	Never	5
c) Did the CHC review data from iCCM sites and discuss action points with the CHW/CHEWs?	Yes	1
	No	2 **(skip to "e")**
d) What data did the CHC review from the iCCM sites with the CHWs/CHEW? **Interviewer:** ***Probe for more options; circle all that are mentioned***	CHEW supervisory report data	1
	Under 5 data on Malaria, Diarrhea and Malnutrition from iCCM sites	2
	Data on referrals for Pneumonia and Neonatal illness	3
	Other data	4
	Never reviewed data	5
e) Why didn't the CHC hold review meetings with the CHEWs and health facility in charges? **Interviewer:** ***Probe for more options; circle all that are mentioned***	Lack of time	1
	Lack of financial resources	2
	Not within the mandate of the CHC to hold such review meetings	3
	Other, specify	4
f) Did they participate in any dialogue day iCCM targeted CUs?	Yes	1
	No	2

Question 3: Has the iCCM strategy been an important strategy for care of sick children under 5yrs? If yes, please elaborate with specific examples.

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Question 4: What challenges did CHC face in supporting the implementation of iCCM in the villages that you support in Bondo?

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Question 5: What challenges did CHC face in supporting the CHWs to implement the iCCM strategy in Bondo?

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Question 6: Do you (CHC) have any recommendations to improve iCCM implementation in Bondo?

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z ***IRB 5073_iCCM Study_CHC- Key Informant Interview-TOOL 3B_v2_Aug 14_2013***

Question 7: Any other comments?

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Wrap-up: review all the activities, what has been the shared/learned, the issues raised. Thank participant(s) for her/his time and input and say that all information will be used to improve iCCM implantation in the region and in other regions in Kenya

Approved: July 18, 2013 **IRB No.**: 5073

TOOL 3C: KEY INFORMANT INTERVIEW—CHIEF

Integrated Community Case Management Study

SERIAL NO.: _____ **STUDY ID: _____**

NAME OF LINK HEALTH:_____ HEALTH FACILITY CODE: _____

COMMUNITY UNIT NAME: _____ COMMUNITY UNIT CODE: _____

INTERVIEWER NAME: _____ **DATE OF INTERVIEW: …./…../……..**
(dd/mm/yyyy)

Question 1: What was the effect of implementing iCCM in the community, on the management of the following Malaria, Diarrhea, Pneumonia, Malnutrition, and Illnesses in newborn for children under-5 in the village that you serve as Chief?

Illness/ Health Service area	Responses on what iCCM specifically delivered in the villages that CHC supported
a) Malaria	
b) Diarrhea	
c) Pneumonia	
d) Malnutrition	

Illness/ Health Service area	Responses on what iCCM specifically delivered in the villages that CHC supported
e) Neonatal	

Question 2: Tell us about the role of the Chief in the implementation of the iCCM strategy in area you oversee as chief:

Indicator / Key areas	Response	Code
a) Did the Administration play any role in the implementation of iCCM in Bondo district?	Yes	1
	No	2 **(skip to "c")**
b) What specific role did the administration play? Interviewer: Probe for more options; circle all that are mentioned	Mobilization of the community	1
	Providing a forum (chief's barazas) for information sharing about iCCM to the community	2
	Resource to transport patient's referred from the community to Health facility	3
	Settling of disputes between CHWs and community members	4
	Other, specify	5
c) Did the administration participate in any community dialogue day in the iCCM targeted CUs?	Yes	1 **(skip to "e")**
	No	2
d) Why didn't the administration participate in any community dialogue day in the iCCM targeted CU? Interviewer: Probe for more options; circle all that are mentioned	Lack of time	1
	Lack of financial resources	2
	Not within the mandate of the CHC to hold such review meetings	3
	Other, specify	4
	Provision of security	1

Indicator / Key areas	Response	Code
e) What was the administration's role during the community dialogue days? Interviewer: Probe for more options; circle all that are mentioned	Re enforce health seeking behavior that will improve health	2
	No role	3
	Other, specify	4

Question 3: Has the implementation of iCCM in your village improved the health outcomes of under-5 children in your village? If yes, please elaborate. ***(interviewer to probe for reasons and explanations)***

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Question 4: What challenges have you faced in a bid to support iCCM implementation in your village?

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Question 5: What challenges have you faced with the CHWs implementing iCCM in the villages that you support in Bondo?

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Question 6: Has the iCCM strategy been well received by the people in your village? Please elaborate (interviewer to probe for reasons and explanations)

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Question 7: Do you have any recommendations to improve iCCM implementation in Bondo?

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Question 8: Any other comments?

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Wrap-up: review all the activities, what has been the shared/learned, the issues raised. Thank participant(s) for her/his time and input and say that all information will be used to improve iCCM implantation in the region and in other regions in Kenya

Approved: July 18, 2013 **IRB No.**: 5073

TOOL 3D: KEY INFORMANT INTERVIEW—RELIGIOUS LEADER

Integrated Community Case Management Study

SERIAL NO.: _____ **STUDY ID: _____**

NAME OF LINK HEALTH:_____ HEALTH FACILITY CODE: _____

COMMUNITY UNIT NAME: _____ COMMUNITY UNIT CODE: _____

INTERVIEWER NAME: _____ **DATE OF INTERVIEW: …./…../……..**
(dd/mm/yyyy)

Knowledge, perception and satisfaction of iCCM package in the community

Indicator / Key areas	Response	Code
Question 1: What was the effect of implementing iCCM on the management of the following Malaria, Diarrhea, Pneumonia, Malnutrition, and Neonatal Illnesses for children under-5 in this community? **Interviewer:** ***Probe for more options; circle all that are mentioned***	Testing and treatment of malaria	1
	Treatment of diarrhea	2
	Treatment of malnutrition	3
	Referral of children with pneumonia	4
	Referral of newborns	5
	I don't know	6

Question 2: Do you think the implementation of iCCM has improved the health outcomes of children under-5 in your village? If yes, please elaborate. ***(*Interviewer: *probe for reasons and explanations)***

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Question 3: Has the iCCM strategy been well received by the people in your village? If yes, please elaborate how and why. ***(*Interviewer: *probe for reasons and explanations)***

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Question 4: What challenges do you think the CHWs face in implementing iCCM in your villages?

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Question 5: Do you have any recommendations to improve iCCM implementation in Bondo

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Question 6: Any other comments?

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Wrap-up: review all the activities, what has been the shared/learned, the issues raised. Thank participant(s) for her/his time and input and say that all information will be used to improve iCCM implantation in the region and in other regions in Kenya

Approved: July 18, 2013 **IRB No.**: 5073

TOOL 4: COMMUNITY HEALTH EXTENTION WORKER (CHEW) INTERVIEW

Integrated Community Case Management Study

QUESTIONAIRE SERIAL NO.: _____ **STUDY ID: _____**

COMMUNITY UNIT NAME: _____ COMMUNITY UNIT CODE: _____

NAME OF LINK HEALTH:_____ HEALTH FACILITY CODE: _____

INTERVIEWER NAME: _____ DATE OF INTERVIEW: …./…../…… (dd/mm/yyyy)

SECTION A: BACKGROUND INFORMATION

(Circle the most appropriate response)

No.	QUESTION	CODING CATEGORIES	CODE
1	Sex of Respondent	Male	1
		Female	2
2	How old are you?	Age in completed years_____	
3	What is your highest educational level completed?	College Level	1
		High School level	2
		Primary School level	3
		Other, specify	4
4	How long have you been working as a CHEW?	_____ Years _____ Months	
5	Which CHEW training have you received? (Circle all that apply)	Basic CHW Package	1
		Family Planning	2
		HIV	3
		iCCM	4
		Multidrug resistant TB	5
		Infant & young child feeding	6
		Other, specify	7

SECTION B: ABILITY TO CORRECTLY DIAGNOSE, TREAT & REFER SICK CHILDREN

No.	QUESTION	CODING CATEGORIES	CODE
6	What are the common causes of death in children under-5 years in the community? **Interviewer:** ***(Probe for more options; circle all that are mentioned)***	Fever/Malaria	1
		Diarrhoea (many loose stools per day)	2
		Cough and difficulty in breathing/Pneumonia	3
		Malnutrition	4
		Neonatal illnesses	5
		Other, specify	6
7	What are the assessment steps in identifying a child's problems from a caregiver in the community? **Interviewer:** ***(Circle all that are mentioned)***	ASK the caregiver	1
		LOOK at the child for signs of illness	2
		RECORD in the sick child recording card	3
		TREAT children who are sick but with no danger sign	4
		REFER all children with danger signs	5
8	What are the danger signs in a child under-5 years? **Interviewer:** ***(Circle all that are mentioned)***	Cough >14days or more	1
		Diarrhoea for 14 days or more	2
		Blood in stool	3
		Fever for > 7days	4
		Convulsions	5
		Not able to breastfeed	6
		Not able to drink or feed	7
		Vomits everything	8
		Chest in drawing	9
		Difficulty in Breathing	10
		Unusually sleepy or unconscious	11
		Red MUAC	12
		Swollen feet	13
		Other, specify	14
9	Which child under- 5 sick conditions does a CHW treat at home? **Interviewer:** ***(Probe and circle all that are mentioned)***	Fever (less than 7 days) RDT +ve and no danger sign **with ACT**	1
		Fever (less than 7 days) no RDT but in a malaria endemic area and no danger sign **with ACT**	2
		Yellow on MUAC with no danger sign **with Ready-to Use Therapeutic Feeds (RUFTs)**	3
		Non-bloody Diarrhoea (less than 14 days) with no danger sign **with ACT**	4
		Other, specify	5
10	What are the signs of pneumonia in child? **Interviewer:** ***(Circle all that are mentioned)***	Cough	1
		Fast Breathing	2
		Chest in-drawing	3
		Other, specify	4

No.	QUESTION	CODING CATEGORIES	CODE
11	How does a CHW identify children with malnutrition IN THE COMMUNITY? **Interviewer:** ***(circle all that are mentioned)***	Yellow MUAC	1
		Red on MUAC Tape	2
		Weight	3
		Skin	4
		Other, specify	5
12	Under iCCM what conditions, in the community, would a CHW refer to the nearest health facility? **Interviewer:** ***(Circle all that are mentioned)***	Cough >2 weeks	1
		Diarrhoea for 14 days or more	2
		Blood in stool	3
		Fever for > 7days	4
		Convulsions	5
		Not able to breastfeed	6
		Not able to drink or feed	7
		Vomits everything	8
		Chest in drawing	9
		Difficulty in Breathing	10
		Unusually sleepy or unconscious	11
		Red MUAC	12
		Swollen feet	13
		Other, specify	14
13	What steps would a CHW follow in referring a child from the community to a link health facility? **Interviewer:** ***(Probe and circle all that are mentioned)***	Explain to the caregiver why child needs to go to the facility	1
		If child has diarrhea and can drink, begin giving ORS solution right away	2
		For any sick child who can drink, advice to give more fluids and continue feeding or breastfeeding	3
		Advice to keep the child warm if child does not feel hot on touch.	4
		If child has fever, give **first dose** of **Paracetamol** and ask the mother to remove extra clothing.	5
		If convulsing now, show care giver how to position the child. Do not put any object in the mouth.	6
		Write a Referral not	7
		Support transportation and help solve other difficulties in referral.	8
		Follow up the child on return at least once a week until the child is well.	9
		Explain to the caregiver why child needs to go to the health facility	10
14	As a CHEW what is your role in ensuring delivery of the iCCM package to children less than 5yrs in the community? **Interviewer:** ***(Circle all that apply)***	Training of CHWs on iCCM package	1
		Skills building (CHEW should give examples eg. Communication, clinical examination, referral) through mentorship	2

No.	QUESTION	CODING CATEGORIES	CODE
		Ensuring timely and correct data collection by CHWs	3
		Timely refill of commodities and medications	4
		Facilitate and ensure good linkage of referrals from the community to link health facilities	5
15	What difficulties do you face in supporting CHWs to deliver the iCCM package to children under 5ys in the community? **Interviewer: *Circle all that apply***	Lack of medical supplies eg. ORS, zinc	1
		Lack of equipment e.g. RDT kit	2
		Failures in equipment	3
		Lack of time to carry out supportive supervision	4
		Lack of resources to carry out Supportive Supervision	5
		Lack of support from Link Health Facility	6
		Poor data collection and completion of registers	7
		Do not capable to sufficiently mentor the CHWs	8
		Other, specify	9
16	What gives you the greatest satisfaction carrying out this approach of management of common conditions of sick children in the community? _____ _____ _____ _____		
17	In what ways can managing common childhood illnesses at community level be improved? _____ _____ _____		

SECTION C: COMMODITY STOCKS MANAGEMENT

No.	QUESTION	CODING CATEGORIES	CODE	SKIP
18	Have you experienced any stock out of ACTs?	Yes	1	Go to 19
		No	2	Go to 20
19	What are the reasons for the stock out of medications? **Interviewer: *(Circle all that apply)***	Poor recording of commodity inventory tool	1	
		Delay in CHEW to refill medications	2	
		Lack of medications at the health facility	3	
		Other, specify	4	
20	Have you experienced any stock out ORS?	Yes	1	Go to 21
		No	2	Go to 22

No.	QUESTION	CODING CATEGORIES	CODE	SKIP
21	What are the reasons for the stock out of ORS medications? **Interviewer:** ***(Circle all that apply)***	Poor recording of commodity inventory tool	1	
		Delay in CHEW to refill medications	2	
		Lack of medications at the health facility	3	
		Other, specify	4	
22	Have you experienced any stock out of Zinc?	Yes	1	Go to 23
		No	2	Go to 24
23	What are the reasons for the stock out of medications? **Interviewer: (*Circle all that apply)***	Poor recording of commodity inventory tool	1	
		Delay in CHEW to refill medications	2	
		Lack of medications at the health facility	3	
		Other, specify	4	
24	Have you experienced any stock out of RDT?	Yes	1	Go to 25
		No	2	Go to 26
25	What are the reasons for the stock out of the RDT Kit? **Interviewer:** ***(Circle all that apply)***	Poor recording of commodity inventory tool	1	
		Delay in CHEW to re-supply the Kit	2	
		Lack of RDTs at the link health facility	3	
		Other, specify	4	
26	How do you dispose sharps after RDT testing	Needle disposal bin from hospital	1	
		Dispose in pit latrine	2	
		In the bush	3	
		Other, specify	4	
27	What challenges are you facing with the disposal of sharps used in RDT? _____ _____ _____			
28	What other challenges are you facing with management/treatment of sick children using the commodities available in the community? _____ _____ _____			
29	What are your recommendations for the improvement of medications (ORS, Zinc, ACTs) and RDT stocking for management of children less than five years? _____ _____ _____			

SECTION D: ASSESSMENT OF CHW MOTIVATION

No.	QUESTION	CODING CATEGORIES	CODE	SKIP
30	**As a CHEW you mentor and supervise CHWs** who deliver iCCM package to children in the community Do you think CHWs arel motivated to carry out management (treatment, referral and counselling) of children less than five years in the community?	Yes	1	Go to 30
		No	2	Go to 25
31	What motivates CHWsto do their work in the community? **Interviewer: (*Circle all that apply)***	Kshs. 2,000 monthly stipend	1	
		Being part of an CHW income generating project	2	
		Community appreciation for treating childhood conditions	3	
		I am satisfied that I accomplish something worthwhile in treating and or referral of sick children	4	
		Support from community & CHC	5	
		Support and mentorship from CHEW	6	
		Other, specify	7	
32	In your opinion, what are the reasons for poor motivation of CHWs in the community to do treatment, counselling and /or referral of sick children under five in your community? **Interviewer: *(Circle all that apply)***	Poor or Lack of remuneration	1	
		Burnout	2	
		Long work hours	3	
		Inadequate supervision by CHEWs	4	
		Inconsistent supply of medications & commodities	5	
		Community doesn't have faith in CHW ability to manage iCCM conditions	6	
		Inability to manage other childhood illnesses	7	
		Other, specify	8	

SECTION E: CHW SUPERVISION DURING THE LAST THREE (3) MONTHS

No.	QUESTION	CODING CATEGORIES	CODE	SKIP
33	Have you routinely supervised CHWs in the last 3 months?	Yes	1	Go to 33
		No	2	Go to 38
34	How many times in the last 3 months have you been supervised?	Once	1	
		Twice	2	

No.	QUESTION	CODING CATEGORIES	CODE	SKIP
		Thrice	3	
		>3 times	4	
35	Did any supportive supervision involve review of your records?	Yes	1	
		No	2	
36	Did your supportive supervisions involve simulated case scenarios?	Yes, (specify which cases were simulated with CHW) _____	1	
		No	2	
37	Did your supportive supervisions involve clinical case scenarios at link health facility with your CHW?	Yes, (specify which clinical cases scenarios were mentored on with CHEW at link health facility) _____	1	
		No	2	
38	Why do you think you have not had any supportive supervision in the last 3 months	CHW unavailable	1	
		I have been unavailable due to personal reasons	2	
		Other competing health activities in the community	3	
		I don't know	4	
		Other reasons (specify) _____ _____	5	
39	Have you had supervisory sessions with Link Facility in charge or sub county focal person?	Yes (specify the type - record review, sick child visit or case simulation scenario) _____	1	
		No, (give reasons why) _____	2	

40. What do you think are the important qualities for a CHEW to have in order to manage sick children less than five years in the community?

_____

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41. What are your recommendations to improve CHW motivation in the treatment, referral and counselling of sick children under five years in the community as per your training package?

_____

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_____

Any other comments

_____
_____
_____

Interviewer: Thank the respondent and end interview.