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Bondo iCCM Study: Key Findings and Recommendations

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Table of Contents

In Kenya, where approximately 189,000 children die annually, a significant number of deaths among children under 5 years of age are preventable, including those resulting from diarrhea, malaria, and pneumonia—the three leading causes of death among children in this age group. 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. In 2006, aiming to deliver high-impact health interventions to such communities, the government of Kenya created the Community Health Strategy (CHS) to support the provision of the Kenya Essential Package for Health at the 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 it was revised in 2012–2013, the CHS gave CHVs the additional function of case management for diarrhea, malaria, pneumonia, malnutrition, and newborn health, in keeping with the integrated community case management (iCCM) protocol. This protocol gives guidance on how to address the following symptoms or population:

- *Fever*—Rapid diagnostic tests (RDTs) for malaria and artemisinin-based combination therapy (ACT) when the test is positive
- *Diarrhea*—Oral rehydration solution (ORS) and zinc
- *Suspected pneumonia and cough or short rapid breaths*—Assessment with respiratory timer and referral of suspected pneumonia cases
- *Malnutrition*—Measurement of mid upper arm circumference and referral
- *Newborn*—Specifically, assessment with a checklist and referral as needed

At the time the CHS was revised, the government of Kenya also developed an implementation plan: the *iCCM Roadmap 2013–2018*.[1]

The Bondo iCCM Implementation Study

In 2013, in collaboration with the Kenya Ministry of Health (MOH), the Maternal and Child Health Integrated Program (MCHIP), which was supported by the United States Agency for International Development, initiated an implementation research study to inform the MOH and its partners about the feasibility of, factors for success in, and challenges of implementing iCCM. The study was completed by MCHIP's successor, the Maternal and Child Survival Program. This brief summarizes key study findings, implications, and possible next steps for iCCM implementation in Bondo Subcounty and in Kenya.

Specific Objectives

- Determine changes in community knowledge and practices, including care-seeking behavior, in intervention and comparison community units (CUs) during the iCCM implementation period.
- Document the feasibility of iCCM implementation through the assessment of CHV performance and challenges during implementation.
- Document the extent to which CHEWs provide support to CHVs, and the challenges CHEWs face.
- Document the extent to which subcounty health management leaders could support implementation of the iCCM packages, and document the challenges the leaders faced.
- Document the cost of implementing iCCM in Bondo Subcounty over an 18-month implementation period.

[1] Kenya Ministry of Health. 2013. A national framework and plan of action for the implementation of integrated case management (iCCM) in Kenya, 2013–2018. Kenya Ministry of Health Website. http://pdf.usaid.gov/pdf_docs/PA00JTDF.pdf. Accessed September 12, 2016.

Intervention

The primary intervention was to train and mentor 58 CHVs in four CUs to provide iCCM at the community level over 18 months. CHVs in the intervention groups were trained, mentored, and given resources to assess, classify, and treat or refer children with fever or diarrhea. Sick children presenting with cough or suspected pneumonia were referred to a health facility. The CHVs received RDTs to aid in diagnosing malaria.

Methodology

The study design was quasi-experimental. Preimplementation and postimplementation household surveys were conducted: a baseline survey in September 2013; a midline survey 6 months into iCCM implementation; and an endline survey in June 2015. In addition, data were collected in structured interviews with CHVs, CHEWs, subcounty health management team (SHMT) members, chiefs, community health committee (CHC) members, and religious leaders. Finally, during their consultations with sick children, CHVs were observed to assess their clinical skills.

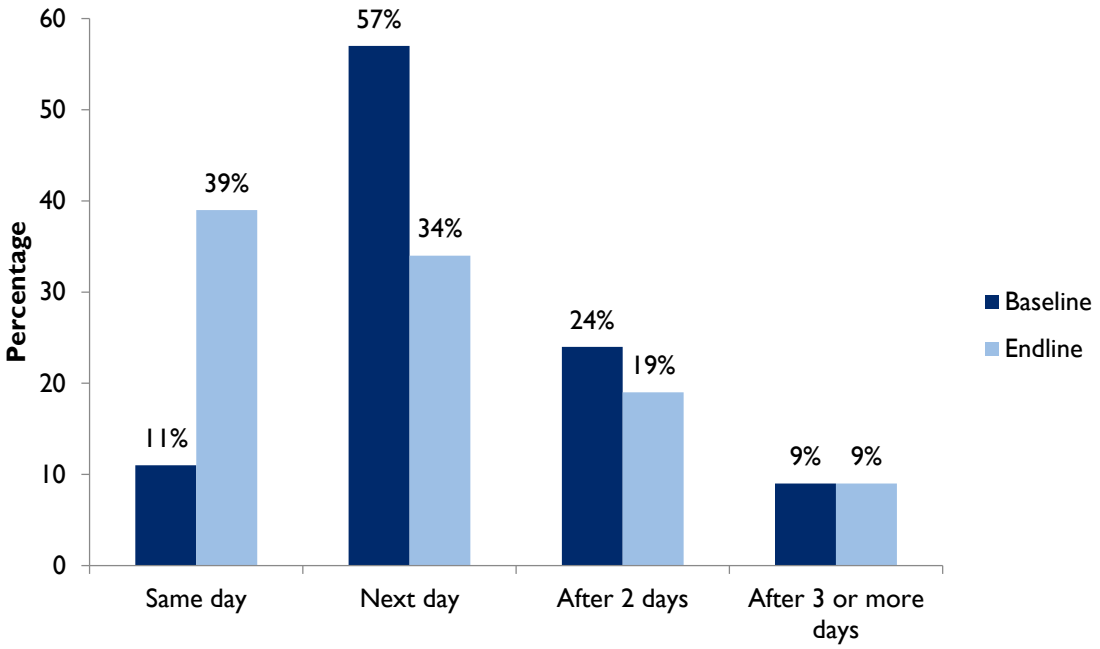
Key Findings

Care-Seeking: Knowledge and Practice

Communities' confidence in CHVs' ability to deliver iCCM resulted in modification of care-seeking behavior. Introduction of iCCM resulted in more than 100% increase in the iCCM cases managed in the intervention group study area within the first 6 months: from 2,367 during January through June 2013 to 4,868 during January through June 2014. CHVs managed 56% of the cases, reducing the workload of catchment-area health facility staff. This points to improvement in overall care-seeking and access to effective treatment for children under 5 years of age in this population. The "additional cases" reflected in the increase are those who would previously have been taken to "alternative providers" (e.g., traditional healers and drug shops), who would have been treated by self-medication, or those who 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 30%.

Fever was the most common reason for seeking care at endline. Prompt diagnosis of malaria and treatment with ACT on the same day the fever began increased from about 11% at baseline to 39% in the intervention CUs (Figure 1). However, for all child illnesses, adherence to CHVs' referral advice was only 40%, with a demonstrated caregiver preference for alternative sources of care over health facilities. The implication of lack of compliance and delayed compliance in cases of suspected pneumonia needs further exploration.

Figure 1. Time taken to malaria testing and treatment after onset of fever, intervention group



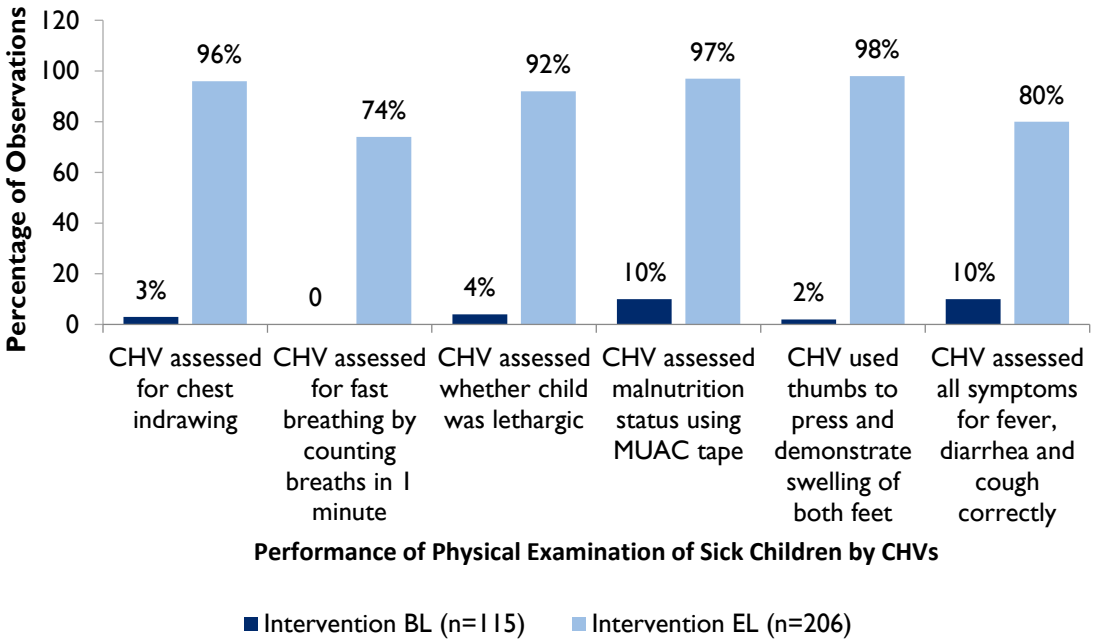
The proportion of sick children with diarrhea who were correctly managed using zinc and ORS increased significantly after iCCM introduction, from 8% to 53% in intervention CUs. Caregivers also gave these sick children more fluids, and, overall, managed diarrhea better.

CHV Competency and Performance

This study's inquiry 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 children to a health facility who are either too sick or suffering from health conditions not included in the iCCM package?"

The answer for Bondo is that it was possible. Fifty-eight CHVs underwent a 6-day didactic training in iCCM, followed by 4 weeks of on-site coaching in health facilities. They were coached to diagnose and treat children under 5 years of age with diarrhea using ORS and zinc; diagnose malaria with RDT kits and treat the disease with ACT; assess nutritional status and refer cases of malnutrition; identify and refer cases of suspected pneumonia; and refer sick newborns. This training, which was supplemented by clinical mentoring and supportive supervision by CHEWs and health managers, gave CHVs the skills to implement iCCM services. Trained CHVs demonstrated competence in asking about symptoms, looking and feeling for signs of illness, classifying and recommending treatment, performing RDTs for malaria, interpreting RDT results, and providing correct dosage for recommended medicines.

Figure 2. CHV competencies: Assessing sick children for signs of illness



At endline, 54 CHVs from intervention CUs were observed managing 3–4 sick children with fever, diarrhea, or cough. Compared to baseline, they demonstrated a significant increase in their ability to correctly follow the iCCM algorithm: ability to assess all signs of illness increased from 10% to 80% and the ability to assess whether a child was lethargic (a general danger sign) increased from 4% to 92% ($p<0.001$) (Figure 2). CHVs prescribed the correct dosage of ACT for all children with a positive RDT for malaria (Table 1).

Table 1. CHV competencies: Treating and referring sick children

Treatment or referral of sick children	Baseline		Endline		
	N	Percent	N	Percent	P value
Fever/malaria	N=101		N=195		
ACT for positive RDT			96	49.2	<0.001
Validator agrees dosage of ACT was correct for age	N/A	N/A	96	100	
Diarrhea	N=74		N=65		
ORS and zinc	—	—	48	73.8	<0.001
ORS alone	—	—	1	1.5	
Zinc alone	—	—	—	—	
Validator agreed zinc tablet dosage was correct for age	—	—	48	100	<0.001

Treatment or referral of sick children	Baseline		Endline		P value
	N	Percent	N	Percent	
Validator agreed ORS treatment was correct for age	—	—	49	100	<0.001
Referral of sick child	N=115		N=206		
CHV classifies child with general danger sign(s) and provides urgent referral	17	14.8	47	22.8	0.033
Validator agreed with CHV classification for referral	2	13.3	44	93.6	<0.001

Note: "—" means either that the finding was zero or that that activity was not done.

CHVs were able to manage their stocks and replenish them as necessary through the CHEWs. Lack of commodities at link health facilities[2] accounted for 80% of stock-outs at the community level. Where RDTs were used, CHVs appropriately stored them and disposed the sharps at link health facilities, as trained.

Although most CHVs enjoyed the social status that providing iCCM gave them in their communities, they said that $23 per month was not enough to meet their basic needs, so their concomitant need to engage in other activities to generate income competed with their time and desire to provide health care services. Unlike health promotion activities that they themselves could schedule, provision of case management was disruptive to their work lifestyle, i.e., they needed to have other work to make a living.

Health System and Community Support

Successful iCCM implementation in Bondo was built on health system and community support established under the CHS by SHMT, CHEWs, and community leaders. SHMT and CHEWs provided supportive supervision and supplied medicines and reporting forms; CHVs met monthly with their assigned CHEW for mentorship and to review records and commodity stocks. In the 3 months preceding the endline survey, the content of supervision changed, where a greater focus was placed on strengthening clinical skills. At endline, CHVs reported that in 88% of the visits, the supervisor used simulated case scenarios to mentor them on clinical skills, an increase from the 11% at baseline ($p<0.05$).

A number of factors contributed to the success of iCCM implementation in Bondo Subcounty. CHV supervision fell primarily to CHEWs. However, 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 (many lacking a clinical background and the capacity to mentor or supervise). Nonetheless, supportive supervision of CHVs by the SHMT increased from 2% at baseline to 29% at endline. The SHMT also ensured a regular supply of medicines and commodities, although stock-outs occurred when linked health facilities did not receive supplies from the national medical store. The SHMT also successfully advocated with the county government, so the government assumed the monthly stipend payment from the project in May 2014, before the study's end.

However, despite the SHMT commitment to iCCM implementation, challenges arose. These included the lack of money from the county sufficient to ensure regular supervision, insufficiency of drugs procured and supplied from national medical stores 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 medicine.

Community leadership created the social belonging and cohesion needed to build CHV credibility and increase acceptance of iCCM. Leaders acted as brokers between community members and CHVs to promote household behaviors that would improve local children's health. 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. CHCs

[2] A link health facility is a health center or a dispensary where the CHW reports when they experience stock-outs or need to report data. This facility links community services with the overall health system.

debated the data with community members and promoted household preventive and care-seeking behaviors to improve child health.

CHC members supported iCCM as a strategy to increase access to treatment services for children. Chiefs and religious leaders all felt strongly that by improving prompt access to treatment services and by improving the knowledge of caregivers on hygiene, child care, and illness prevention, iCCM implementation had a positive impact on the health of children in their community. They reported that iCCM had resulted in a reduction of child deaths in the community, as evidenced by a drop in requests for burial permits and funeral services.

Implementation Costs[3]

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, during the project's last months, disbursing the approximately $23-a-month CHV stipend. The project provided basic CHV kits at about $70-a-kit (covering about one-third of the costs, with the rest provided by MOH and UNICEF), a 6-day iCCM training/competency-building for CHV and CHEWs, and a training of trainers; the total training cost was $45,659[4], with an additional cost of approximately $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 the 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 costs of:

- Supervision of and support for the additional workforce—CHVs by SHMT and CHEWs
- Ensuring that regular refresher training or mentorship occur to maintain CHV clinical skills
- Increasing the stocks of drug and supplies to meet increased demand resulting from greater care-seeking stimulated by iCCM services
- Monitoring the implementation and the quality of service provided
- Replacing CHV kits when they wear out, and similar upkeep costs

[3] The study team intends to conduct additional analysis of the costs of implementing iCCM in Bondo and the implications for scale-up.
[4] The training cost included transport and meals for participants, room and board for the participants, and resource fees for the trainers.

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 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 the county level before iCCM is implemented.

Service Delivery

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, 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 linked health facilities was another challenge: because children referred from the community were seen as new visits, health facility nurses would initiate a new consultation process, thereby missing the opportunity to build upon the CHVs' role and further build caregiver confidence in their skills and value.

Caregiver noncompliance with CHV referrals of sick children to heath facilities 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 administer the recommended antibiotics. Several factors influenced caregivers' decisions around referral compliance, including health facilities' reputation for drug stock-outs, perceived lack of severity of the child's illness, and easy access to recommended (or alternative) medicines from shops in the community.[5] Given the increased risk of death when caregivers do not take their children with suspected pneumonia to a health facility as referred, the question arises as to whether the policy on referral should be revised to allow CHVs to treat these children on site with antibiotics.

iCCM implementation-at-scale is stronger when aligned to a functioning health system that can ensure that clinical mentoring and supportive supervision are conducted, medicines and supplies are available, the referral system—from the community to the facility and back to the community—is working, communities are engaged, and demand for CHV services is generated.

Health Systems Support

Inadequate resources for SHMTs and CHEWs to carry out regular supportive supervision of CHVs can severely undermine iCCM implementation. To maintain skills, CHVs will need ongoing mentoring by nurses and CHEWs. The project funded allowances for CHEWs to carry out regular CHV supervision. In the absence of funding, SHMTs accumulate claims for unpaid allowances that they cannot fulfill, which has a demotivating effect on CHEWs.

While there were some nonmonetary CHV benefits expressed, such as status, the stipend was found to be insufficient for the commitment. Guarding investments of training by sustaining a workforce of CHVs requires more innovative approaches about incentives.

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

It was also found that the number of CHEWs was inadequate to support iCCM, as some CHEWs had competing priorities and lacked the background required to supervise and mentor sufficiently. 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 bringing issues relating to general community mobilization around health. After CHVs were given the additional responsibility for iCCM implementation, some queried whether CHC members needed clinical skills to perform this quasi-supervisory role—a question that needs to be resolved to smooth future iCCM implementation. This support, not introduced by the project but institutionalized in the Kenya CHS, is key to long-term iCCM success.

Recommendations

The following recommendations cover iCCM policy, service delivery, health systems support (specifically for management and administration), and community engagement.

County and Subcounty (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 the community to the facility and back to the community, so referred clients are seen promptly and those discharged are supported by CHVs.
- *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 on an ongoing basis, 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 $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. The strategy should be adapted after a thorough analysis of iCCM and the context, which includes extensive conversation among stakeholders.
- *Technology*—Support testing of eHealth and mHealth to enhance support for CHVs and, by substituting some in-person supervisory visits with remote interaction, reduce some costs.
- *Financial resources*—Mobilize resources, both domestic and foreign, to strengthen the health system support functions of the SHMT, in general, to enable CHEWs to undertake regular supportive supervision and mentorship, facilitate CHV refresher trainings as needed, and increase drug procurement and supply-chain management.
- *Clarification*—Clarify the CHC roles outlined in the CHS implementation guide in light of iCCM; support counties and SHMTs to reorient CHC members on their newly articulated roles.