

Integrated Community Case Management in Acute and Protracted Emergencies

Case study for South Sudan

May 2017



International Rescue Committee:
Naoko Kozuki
Katja Ericson
Bethany Marron
Yolanda Barbera

UNICEF:
Nathan Miller

CONTENTS

1. EXECUTIVE SUMMARY	3
2. BACKGROUND	5
Integrated community case management of childhood illnesses	5
IRC's iCCM model in South Sudan (from period of the case study, 2013-2014)	5
Instability in South Sudan	7
3. OBJECTIVES	8
4. METHODS.....	8
Study area and population	8
Qualitative Data Collection	8
Quantitative data collection.....	14
iCCM services prior to emergency.....	17
Effect of the crisis on iCCM programming and subsequent response	20
Recommendations from caretakers, CBDs, and CBD Supervisors	29
Recommendations from policy makers and program teams.....	29
4. DISCUSSION	30
5. CONCLUSION.....	32

1. EXECUTIVE SUMMARY

Background

Pneumonia, diarrhoea, and malaria are the leading causes of death among post-neonatal under-five children. Integrated community case management (iCCM) of childhood pneumonia, diarrhoea, and malaria, has been promoted as a strategy to increase access to life-saving treatment. Large-scale implementation of iCCM in countries affected by conflict or natural disaster may help address the increased burden of morbidity and mortality and decreased access to care in emergency contexts.

In December 2013, conflict broke out in Juba, South Sudan, which eventually spread to Payinjjar County in February 2014. The efforts of the International Rescue Committee (IRC) and other consortium partners to provide life-saving treatments to children in South Sudan became more critical as the conflict intensified. However, it was not clear how the iCCM programs in South Sudan were affected by and responded to the crisis.

The objective of the study was to document the experiences in implementing iCCM in the emergency setting of South Sudan, during the acute emergency in late 2013 / early 2014 and the subsequent protracted emergency context.

Methods

This was a mixed methods case study, conducted in May 2015. 20 key informant interviews with stakeholders such as policymakers, MoH officials, and program staff were conducted, and a total of 13 focus group discussions were conducted with Community-Based Distributor (CBD) Supervisors, community leaders, CBDs, and caregivers. IRC's routine iCCM program data, covering activity from December 2012 to January 2015, were examined to assess the effect of the crisis on key indicators. Quantitative data analysis of routine program data included examination of standard iCCM performance indicators and treatment rates before, during, and after the crisis.

Results

Internally displaced persons nearly doubled the population in Payinjjar from 44,224 to 83,433. Displacement not only included IDPs from outside the county but also displacement within the county, particularly from payams where active conflict took place.

Some CBDs continued to work in communities largely unaffected by the crisis but received IDPs, while other CBDs continued working where they were displaced to, if they were able to take their supplies with them. Despite no formal strategic community mobilization effort specifically aimed at IDPs by the iCCM program management, the information that CBDs had drugs spread widely throughout displaced communities, with large numbers of caregivers subsequently seeking care from the CBD. Displaced CBDs and CBD Supervisors were occasionally tracked down by their home community members to notify them when it was safe for them to return to their home communities. Caretakers preferred seeking care from CBDs over risking an insecure journey to the MoH health facility and/or arriving to a facility they believed may have been destroyed or looted or would not have staff or drugs available for treatments.

The total number of treatments provided per month dropped from the July-December 2013 average of 3226 to the lowest level of 1420 in February 2014, but recovered to 3270 by August 2014. CHW supervisors attempted to continue supervision by utilizing their networks to track

down displaced CHWs and by assessing the security situation prior to visits. The monthly supervision rate dropped from the July-December 2013 average of 93% to the lowest level of 77% in February 2014, but recovered to 91% by August 2014. Several CHWs and community leaders qualitatively validated this claim of sustained supervision. The rates of treatment per child were consistently higher for CBDs than for health facilities, but likely due to restrictions in stock, the CBDs were not able to meet the expected need when considering the estimated influx of IDPs.

Conclusion

During and immediately following the acute crisis in late 2013 / early 2014, the iCCM program in Payinjiar County was able to continue services as evidenced by sustained high rates of reporting among CBD providers and supervisors, a quick recovery in the number of treatments provided by CBDs after an initial drop during the acute crisis. Qualitative information capture from caregivers also noted the availability and access to CBDs during this period. There was no cessation in activity. Many CBDs continued to provide treatment, either in their home communities or in areas where they were displaced to if they were able to bring their supplies and still had drugs.

International donors and humanitarian actors should recognize iCCM as a potentially high-impact humanitarian response. Flexible funding from donors would allow for development of more evidence on iCCM approaches and improvements that can both sustain and enhance programming in acute crisis.

2. BACKGROUND

Integrated community case management of childhood illnesses

Pneumonia, diarrhoea, and malaria are the leading causes of death among post-neonatal under-five children.(1) Despite reductions in under-five mortality globally, 5.9 million children still die each year mostly from preventable causes.(1) A key reason for continually high rates of mortality in many low-income countries is lack of access to primary care for much of the population.(2). Community case management of childhood illness (CCM), and especially integrated community case management (iCCM) of childhood pneumonia, diarrhoea, and malaria, has been promoted as a strategy to increase access to life-saving treatment.(3) The global evidence base of operational research and impact studies around CCM and iCCM is growing. Studies have shown that community health workers (CHW) can provide high quality care, while others have highlighted the need for improved performance.(4-10) Several studies have found substantial reductions in mortality associated with CCM, (11-13) but effectiveness of iCCM at large-scale has shown mixed findings.(14-16)

When CCM programs fail to have the desired impact, it is often due to subpar implementation (4, 17, 18). A bottleneck analysis conducted in six sub-Saharan African countries found that the key challenges to successful scale-up of iCCM were, “1) the deployment, supervision, motivation and retention of community health workers as the backbone of iCCM; 2) maintaining reliable supply chains; 3) demand side barriers to utilization; 4) weak monitoring and evaluation systems, and 5) the need for supportive government policies and engagement to achieve sustainable progress.”(19) Case studies of implementation of iCCM in Senegal and the Democratic Republic of Congo found that important factors for successful implementation of iCCM included 1) a national policy supporting iCCM, 2) strong ownership of iCCM at the central Ministry of Health level, 3) adaptation of the approach to the local context, 4) harmonization of implementation of iCCM, and 5) a sustained focus on the supply chain and quality assurance.(20, 21)

Large-scale implementation of iCCM in countries affected by conflict or natural disaster may help address the increased burden of morbidity and mortality and decreased access to care in emergency contexts. Networks of trained CHWs may provide an efficient and effective platform for delivery of emergency relief interventions in addition to their usual tasks. Furthermore, the establishment of iCCM prior to acute emergencies may strengthen community resilience when crises occur. There have been several experiences with implementation of CCM in emergencies, both in conflict settings and natural disasters, contexts that have unique challenges. However, there is limited documentation of these experiences.

IRC’s iCCM model in South Sudan (from period of the case study, 2013-2014)

South Sudan’s under-five mortality rate remains one of the world’s highest, with a 2015 estimate of 93 deaths per 1,000 live births.(22) The IRC became the first non-governmental organisation (NGO) to introduce iCCM to South Sudan, then Southern Sudan, in 2005. IRC first implemented iCCM programming in Payinjiar County, Unity State, and later in Aweil East County, Northern Bahr Ghazal State with funding from the Canadian International Development Agency; in later years, sustained and scaled up iCCM programming was supported with complementary funding from the Global Fund and the UK’s Department for International Development. As of January 2017, the IRC implements iCCM programming in a total of four counties with upwards of 3,000 community health workers. The IRC served as the technical lead of a consortium of NGO partners—including the IRC, Population Services International, Malaria Consortium, Save the Children, the Bangladesh Rural Advancement Committee, and the Catholic Diocese of Torit —

supporting the South Sudan Ministry of Health (MoH) to expand and harmonize iCCM services in the country.

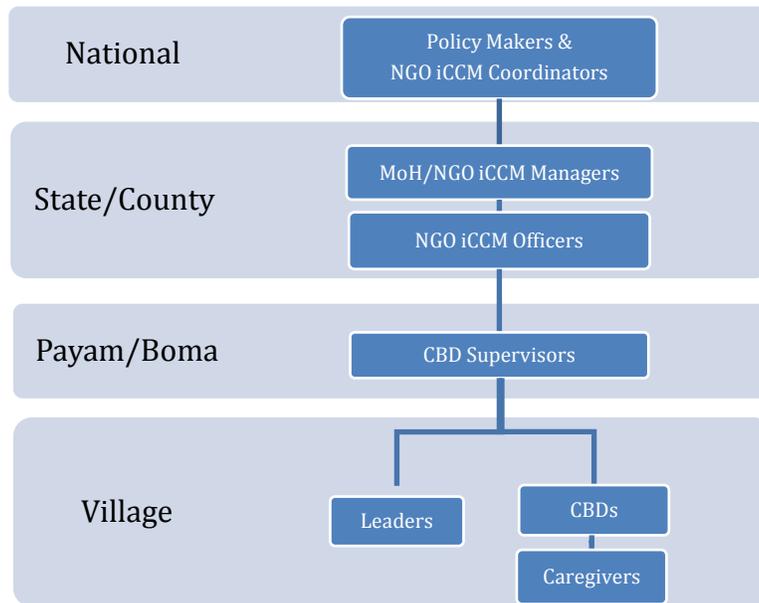
Community-based distributors (CBD) are the CHW cadre used in South Sudan for iCCM. Per MoH guidelines, CBDs are nominated by the leaders and members of communities in which they reside, and during the period the study covers (2013-2014) had received non-monetary (in-kind) incentives for their participation from the implementing agencies and sometimes from their own communities. Literacy is not required to become a CBD. The majority of CBDs in South Sudan are illiterate females from rural communities with pastoral or agricultural livelihoods. For IRC's iCCM program (as of January 2017), approximately 89% of CBDs are females and 83% are illiterate with no formal education; for Payinjar County specifically, rates of female and illiterate CBDs are higher than other counties, with 98% and 93% respectively.¹ There are four core tiers to iCCM in South Sudan. These tiers can be characterized as national, county, payam (equivalent to a sub-county level), and village levels (Figure 1). Each CBD is responsible for between 20 to 40 households within their home community.

All CBDs receive a five-day training course on iCCM. The South Sudan iCCM strategy is a passive system, where caregivers are instructed to approach the CBD at time of child illness, rather than the active surveillance of the community for cases. As part of the national iCCM program model, CBDs assess any sick child between 2-59 months by asking the caregivers the child's age, the presence of fever, diarrhea, and cough or difficulty breathing, the duration of any of those conditions, and by checking for the presence of any of the following danger signs: child's inability to drink or breastfeed; convulsions; stiff neck; chest in-drawing; lethargy; and vomiting. Any child with any danger sign, or with fever, diarrhea, and cough/difficulty breathing beyond a pre-determined number of days, or with bloody diarrhea are immediately referred to a health facility. Children less than two months of age are also referred if they seek care from a CBD. CBDs are only allowed to treat simple cases of fever, diarrhea, and presumed pneumonia for children between 2 and 59 months. CBDs provide artesunate-amodiaquine for the treatment of presumptive malaria (fever); low osmolarity oral rehydration salts (ORS) and zinc for diarrhea, and amoxicillin for presumed pneumonia.

CBD Supervisors are recruited from the communities and catchment areas for which they are assigned to supervise. They are responsible for supervising an average of 15 CBDs (sometimes upwards of 20 depending on the catchment area). Each iCCM Program Officer oversees approximately 10-15 CBD Supervisors and reports to the iCCM Program Manager overseeing the entire iCCM program in each county. The iCCM Coordinator provides strategic guidance, technical assistance and oversight of program implementation to all project sites country-wide. From Officer to Coordinator levels, each are responsible for technical assistance, coordination, and collaboration with equivalent counterparts at the MoH to ensure program implementation maintains elements of capacity building and inclusion.

¹ Data taken from a CBD mapping exercise conducted by IRC in 2015, which collected data on all GPS locations and relevant demographic information of all active CBDs.

Figure 1: iCCM structure in South Sudan



Instability in South Sudan

In 2011, South Sudan gained independence, but has struggled to recover from the devastation of decades of civil war. The country has poor infrastructure and lacks basic health services, and ranks as the second most unstable country in the world according to the 2016 Fragile States Index.(23) On December 15, 2013, heavy military exchanges between government and opposition forces erupted across South Sudan’s capital, Juba. As the conflict in Juba raged, latent historical tensions along tribal lines (primarily between Dinka and Nuer) ignited throughout the nation, and fighting quickly spread to other states. Over 1.35 million people were internally displaced and an additional 460,000 people fled to neighbouring countries. An Integrated Food Security Phase Classification (IPC) report, a standardized classification tool for classifying severity and magnitude of food insecurity, indicated that in September 2014, 2.2 million people were at risk of emergency levels of food insecurity. Global acute malnutrition rates were reported at over 40% in some states. Unity State, where the IRC supports iCCM, was the worst affected, with 44.3% of the population in IPC 3 (crisis) and 4 (emergency) phases.(24) On February 11, 2014, the UN Under-Secretary General for Humanitarian Affairs, Valerie Amos, declared South Sudan as a Level 3 Humanitarian System-Wide Emergency Response, the most severe level of emergency, signifying the scale of the crisis and the multi-sector response required to meet the needs.(24, 25)

The overall crisis began in and around Juba in December 2013, and the conflict entered Payinjiar County on February 7, 2014. The administrative headquarters of Payinjiar County (Payinjiar HQ/Payinjiar Payam) was the only area directly affected by active conflict. As of early March that year, an estimated 35-40,000 internally displaced persons (IDPs) had arrived around Payinjiar County (26); IDPs included both host community members from the county who were displaced to payams other than their home of origin, as well as those displaced from neighbouring states and counties seeking safety in Payinjiar County.

The efforts of the IRC and other consortium partners to provide life-saving treatments to children in South Sudan became more critical as the conflict intensified. However, it was not clear how the

iCCM programs in South Sudan were affected by and responded to the crisis. This was especially of interest given that although iCCM programs country-wide were not actively engaged as part of emergency response efforts in conflict-affected areas; all iCCM consortium partners continued program implementation.

3. OBJECTIVES

General Objectives

1. Document the experiences in implementing iCCM in the emergency setting of South Sudan, during the acute emergency in late 2013 / early 2014 and the subsequent protracted emergency context

Specific Objectives

1. Document bottlenecks in iCCM program implementation in South Sudan prior to breakout of acute emergency
2. Assess the effect of crisis on iCCM programmes in South Sudan and document bottlenecks specific to acute and protracted emergency context
3. Assess the ability of iCCM programmes in South Sudan to continue providing services during emergencies
4. Identify successful approaches used in South Sudan for addressing bottlenecks in iCCM programmes during emergencies

4. METHODS

Partners involved

IRC was responsible for organization of the study; logistics; recruitment, training, and supervision of study personnel; data collection; analysis; and report writing. UNICEF provided funding and technical support for the study, with the IRC leading the implementation and write-up. The study protocol and tools were developed collaboratively by UNICEF and the IRC, with review from MoH officials in South Sudan. Forcier Consulting provided support for data collection.

Study area and population

This was a mixed-methods case study of the impact of the acute emergency in early 2014 on iCCM programming in Payinjiar County, Unity State, South Sudan. Payinjiar County is one of the nine counties in Unity, and had a population of approximately 60,000 in 2014. (27) The population is mainly of the Nuer ethnic group and the County covers 38,837km² in area. Data from Payinjiar, Ganyliel, Pachak, and Thornom payams were used for the study, with a rough host population estimate of 17,511 plus IDP population of 25,039 in 2014. In early 2014, 138 CHWs were being supported by IRC in these four payams, out of the 262 CHWs being supported in the entire county.

Qualitative Data Collection

Semi-structured, key informant interviews (KII) and focus group discussions (FGD) were conducted with key stakeholders involved in iCCM programming. Participants in qualitative interviews were selected across each of the tiers from Figure 1. Informant groups included 1)

policymakers who are knowledgeable about the country context, the health system, and specifically about iCCM in South Sudan, such as MoH officials, UN staff, donors, and NGO representatives, 2) program implementers, including MoH officials and NGO iCCM coordinators, programme managers and officers, 3) CBD supervisors, 4) CBDs delivering iCCM, 5) community leaders, and 6) caregivers of children in areas where iCCM is implemented.

The payams for inclusion in the study were selected by the IRC and UNICEF, in consultation with the iCCM program staff in Payinjiar County and Forcier Consulting. In Payinjiar County, there is a total of ten payams, in eight of which IRC implemented iCCM programming. A scoring system was created to determine the degree to which each payam was affected by the crisis and relevant data were collected to categorize the payams, with a higher score representing less stability: out and in migration of IDPs (max 2 points, 1 per type of IDP movement), active fighting or conflict (1 point), and destruction caused by the conflict (1 point). To capture the different experiences across the county, four payams were purposively selected based on ratings of the four descriptions listed: one with high ratings for all categories (Pachak Payam – rating of 4), one with low ratings for all categories (Ganyliel Payam – rating of 1), two with medium ratings for different reasons – one with out-migrations, fighting and destruction (Payinjiar Payam – rating of 3) and one which experienced significant in-migration (Thornom Payam – rating of 2). See Table 1 below for the scoring.

The two medium-rated payams were selected over other medium-rated payams based on additional criteria. Kol Payam also scored a 3, but was not selected due to prohibitive physical distance from the IRC field office and inaccessible road conditions. Payinjiar Payam was prioritized over Pachienjok Payam because it was the second furthest area after Kol and therefore offered another factor of interest, as well as the “destruction” reported related directly to CBDs supplies being looted and damaged in addition to the community-level destruction of property and homes. Tiap Payam scored a 2 along with Thornom; however Thornom was prioritized due to its higher volume of IDP influx and it having remained a consistent location where IDPs settled over the course of 2014. Lastly, both Ganyliel and Pachar Payam scored a 1; Ganyliel was prioritized due to its score relating to IDP in-migration and this payam having received the largest number of IDPs across all payams at the start of 2014.

Table 1: Description of Payam Rating and Selection Process for targeted study areas

Payam name	Total Score	Migration of IDPs		Active Fighting/ Conflict	Destruction
		Out	In		
Pachak	4	1	1	1	1
Kol	3	1	0	1	1
Pachienjok	3	1	0	1	1
Payinjiar	3	1	0	1	1
Thornom	2	1	1	0	0
Tiap	2	1	1	0	0
Ganyliel	1	0	1	0	0
Pachar	1	0	0	1	0

*Selected payams in bold.

Key informant interviews (KII)

KIIs in Payinjiar were conducted between May 7 – 15, 2015, and the Juba-based interviews from May 1 - 8, 2015. KIIs were conducted with three general categories of informants: 1) policymakers at the national, state, and county level, 2) program implementers at the national, state, or county level, and 3) health workers in referral facilities (Primary Health Care Units, PHCU, or the primary level of care, and Primary Health Care Centers, PHCC, or the secondary level of care).

Respondents were selected purposively by IRC and UNICEF, in consultation with iCCM program staff and local MoH officials, on the basis of the respondents' ability to provide varied and detailed perspectives on research questions. Program implementers at the county level included iCCM program staff, as well as other implementation managers from other IRC sectors working in partnership with the iCCM program. In addition to key iCCM management staff, other staff interviewed included the IRC's Primary Health, Nutrition, and Child Protection Managers.

Separate interview guides were developed for each type of informant, with focus on the following topics:

- Program successes, issues, and challenges in terms of policy, advocacy, funding, ownership, and sustainability and strategies for effective programming during crises (for policymakers);
- Key technical areas of the program, including training and overall resource management, supervision and service delivery, referral system, supply chain, communication, and social mobilization, M&E, and information systems (for program implementers);
- Supports provided to CBDs and how these supports were affected by the conflict (for health workers).

Focus group discussions (FGD)

All FGDs were conducted in Payinjiar between May 7-15, 2015 with the following groups: community leaders, CBD Supervisors, CBDs, and caregivers. All CBD Supervisors working in the county were invited to participate in the FGDs. Ten CBDs from the targeted four payams were randomly selected for each focus group. Caregivers were mobilized by iCCM Officers, County MoH officials, and CBD Supervisors in each selected area, primarily from the local market, on the day of the FGD. Participation in the caregiver FGD required each woman to have utilized CBD services in the recent past and have children under five years of age. Community leader participants were recruited by the iCCM Officer and CBD Supervisors from a central area where leaders congregate in the selected payams.

The focus group guides were developed for each type of informant and focused on the following topics:

- Past and current situation of the iCCM program in the field
- Their opinions on their role in supporting and/or utilizing iCCM services
- For CBD Supervisors: Factors contributing to success and difficulties, as well as consideration about the functionality of the current program and suggestions for the future
- For community leaders: Perspectives on the context and impact of iCCM programming and conflict within the overall community, including any community-level decision-making processes that were enacted during the conflict
- For CBDs: Their successes and difficulties and their assessments of whether they are able to effectively carry out their work
- For caregivers: Opinion of the CBD's work, care seeking behaviors, access to care, their experience during the emergency, and how the program could be improved to better meet their needs

Sample size

The original research plan allowed for a maximum number of KIIs and FGDs based on available resources:

Group	Methods	Sample size	Research topics
Policy makers	Semi-structured IDI	8-10 IDIs (6 NGO partners + 2-4 MoH and donor/agency representatives)	<ol style="list-style-type: none"> 1. The policy environment for iCCM 2. The health system structure and functionality 3. Integration of iCCM into the national health system 4. Sustainability of iCCM 5. Challenges to implementing iCCM in the country 6. How the emergency affected the health system 7. How the emergency affected iCCM support 8. What was done to improve health services in response to the emergency 9. How the program could be adapted to better prepare for or respond to the current emergency or future emergencies
Program implementers	Semi-structured IDI	5-8 IDIs (2-3 IDIs / NGO x 2 NGOs + 1-2 MoH officials)	<ol style="list-style-type: none"> 1. Details of the iCCM program and the challenges they faced 2. How they responded to challenges 3. The impact of the emergency on the population in affected areas 4. The impact of the emergency on the iCCM program and what was done to respond to these challenges 5. How the program could be adapted to better prepare for or respond to the current emergency or future emergencies
Health workers	Semi-structured IDI	2-3 IDIs	<ol style="list-style-type: none"> 1. How the health facility supports iCCM 2. Details of the challenges they faced in supporting iCCM 3. The impact of the emergency on health facility services and support to the iCCM program and what was done to respond to these challenges 4. How to improve health services and support to iCCM in emergencies
CBD supervisors	FGD	2 FGDs 6-8 participants/FGD	<ol style="list-style-type: none"> 1. Details of their work and the challenges they faced 2. The impact of the emergency on their work and what was done to respond to these challenges 3. How the program could be adapted to better prepare for or respond to the current emergency or future emergencies
CBDs	FGD	2 FGDs 6-8 participants/FGD	<ol style="list-style-type: none"> 1. Details of their work and the challenges they faced 2. The impact of the emergency on the community 3. The impact of the emergency on their work and what was done to respond to these challenges 4. How to improve their ability to provide services during the current or future emergencies
Community leaders	FGD	2 FGDs 6-8 participants/FGD	<ol style="list-style-type: none"> 1. Impressions of iCCM services in the community 2. The impact of the emergency on the community 3. The impact of the emergency on availability of iCCM services 4. What was done to improve availability and provision of iCCM services during the emergency 5. How to improve availability and provision of iCCM services during the current or future emergencies

Caregivers	FGD	3 FGDs 6-8 participants/FGD	<ol style="list-style-type: none"> 1. Impressions of iCCM services in the community 2. The impact of the emergency on the community 3. The impact of the emergency on availability of iCCM services 4. What was done to improve availability and provision of iCCM services during the emergency 5. How to improve availability and provision of iCCM services during the current or future emergencies
------------	-----	-----------------------------------	--

Data collection tools

Interview guides were developed for each type of respondent, and for both methods of data collection (KIs and FGDs). The guides were composed in English for translation into Nuer, then back translated to check the accuracy of translation. The guides were subjected to several rounds of pre-testing in early 2015 and revision to ensure their accuracy. A notable modification of the interview guides for community-level respondents was the removal of questions that emphasized chronological sequence of the outbreak of conflict after December 2013. The sectioning of time was not coherent for respondents during the testing phase, as they did not perceive the acuteness of the crisis; the protracted crisis was still ongoing at the time of the pre-testing. Consequently, the respondents were asked simplified questions in relation to time and the effects of the conflict. Questions primarily focused on their perspectives on the present situation and, subsequently, the difference between what was occurring now versus before the conflict began. Additionally, the community faced challenges in understanding the terms “conflict” and “emergency” as static events or periods in time; this largely related to the annual experiences of catastrophic flooding with related displacement and food insecurities, ongoing and periodic community or ethnic violence, and prolonged periods of time with limited goods in the markets and social services. Community members explained that it was difficult to distinguish one particular acute crisis and its impacts in comparison to the cycles of “emergencies” that communities face on an annual basis. This continued to challenge the data collectors as they had to remain consistent with regard to placing and reframing questions in the context of the emergencies that followed the conflict entering Payinjar in February 2014.

Training

Qualitative data collectors for this project comprised of two Nuer-native translators from Payinjar County and three international researchers from Forcier Consulting, a private research firm. All training of the data collectors was facilitated by IRC study coordinators and took place over the course of a week. The training focused on understanding the aim of the research study, iCCM programming, healthcare in South Sudan, health in emergencies, community-based programming and dynamics, and logistical and operational concerns for the implementation of the research. The IRC-facilitated training employed a mixture of lectures, classroom-based skills building, and field-level practicum for pre-testing of tools (including the appropriateness of included language and terms) and certification of data collectors. The training also covered the study logistics. Special attention was paid to training the Nuer interpreters on accurate interpretation as well as basic interview facilitation skills. Groups of Nuer-speaking individuals were invited to IRC and Forcier Consulting headquarters in Juba to participate in mock FGDs. The goal of these mock FGDs was to support the research team, the Nuer interpreters in particular, to work on their research and interpretation skills. Four separate mock FGDs were held in addition to three internal mock FGDs with IRC and Forcier Nuer-speaking staff.

Interview process

The interviews and focus groups were conducted by two teams in Payinjiar, each team consisting of an expatriate researcher from Forcier Consulting and a Nuer interpreter. Two IRC representatives (one Nutrition Specialist, one iCCM Coordinator) provided technical oversight of the FGDs for the purpose of quality assurance; they attended only the FGDs that did not feature IRC-funded staff to prevent biasing responses. A Forcier Consulting Project Officer, the third international expatriate researcher, conducted all of the KIIs with national-level informants in Juba. KIIs were conducted in English. IRC representatives were not present for any KIIs either in order to prevent influence on respondents. The original study protocol called for recording of interviews and FGDs to subsequently transcribe and translate. However, the staff expressed concerns regarding the sensitivity of recording conversations in the context of a conflict. Thus, for all the Nuer-language interviews, the Nuer interpreter translated one question to the interviewee / focus group, and back-translated each response into English in real time. Notes were taken by hand by the Forcier researcher, and later typed up. Notes were taken in English by the researcher for the English interviews. At the end of each day of interviews and FGDs, the team debriefed on any challenges faced with the activities, use of the guides, interpretation, probing questions or, as discussed above, specific challenges with the references to conflict, emergency, or reference to time.

Ethical considerations

Consent was obtained at the community and individual level. Accompanied by IRC staff, Forcier researchers met with chiefs, sub-chiefs, elders, local government council members, the community liaison, the governor, and his representatives in order to explain the purpose of the case study and obtain verbal permission to conduct qualitative interviews with community members/caretakers. Caregivers and CBDs were given verbal explanation of the aim of the study in their local language and given the opportunity to decline participation. Caretakers and CBDs who agreed to participate in the study marked their consent by writing their name or a symbol in the case of low-literacy participants. All participants in FGDs were assured confidentiality of their responses and informed that their individual names were not recorded or reported as part of the study or their individual perspectives. All FGDs were held in semi-private spaces and away from crowded market areas; most FGDs were conducted outdoors under trees used for gatherings, community leader meeting spaces, in the compound of the health facility, or in the community's child friendly spaces (part of the IRC's Child Protection programming). Prior to FGDs starting, IRC staff worked with the local community members and leaders to request support to ensure the group meetings could go undisturbed and the space be kept as private as possible. The majority of communities engaged in the study was familiar with group meetings and FGDs from the IRC's iCCM program, so was able to ensure activities could be conducted without interruptions.

Program stakeholders who were identified as potential key informants were provided verbal and written information on the study by Forcier researchers. They were given the opportunity to decline participation or provide consent with their written signature. The KIIs conducted in Juba followed the same process, but in English. All KIIs were conducted in private spaces to ensure safety and confidentiality.

Ethical approval was received from the Institutional Review Board of the Ministry of Health, South Sudan.

Data analysis

Data analysis was done using a combination of deductive and inductive methods. Initial codes were developed to represent higher-level themes based on the research questions. These high-level codes were: 1) background, 2) challenges (of implementing iCCM prior to the crisis), 3) impact (of the conflict on the iCCM program, health system, and population), 4) response (of IRC,

CBDs, population, health system to the challenges created by the conflict), and 5) recommendations (regarding the response to the conflict or general health service provision). Within each of those higher-level themes, sub-themes were identified inductively from the data. The data were coded by hand, once by an IRC focal point and once by a UNICEF focal point independently, and organized into an Excel matrix (row for theme, column for interviewee / FGD). The primary writer of the report used both sources of data to summarize the major themes.

Quantitative data collection

IRC's routine iCCM program data, covering activity from December 2012 to January 2015, were examined to assess the effect of the crisis on key indicators. Quantitative data analysis of routine program data included examination of standard iCCM performance indicators and treatment rates. The indicators were also compared to the routine health information system (HIS) data from health facilities in the same catchment area, which were being supported by the IRC primary health care / system strengthening program.

Data collection

For routine data collection, CBDs enter data into a Patient Register. To accommodate illiterate and low literacy CBDs, the Patient Register uses images and tick boxes that allow the CBD to easily mark relevant sections. The register collects information on name, sex, age (2-<11 months vs. 12-<59 months), assessment and classification of illness, treatment provided, identification of dangers signs, and whether the child was referred to a health facility. Even with the adaptation, many CBDs still rely on their CBD Supervisor to fill the register based on CBD recall during supervisor visits, which occur multiple times throughout the month. Some CBDs also have family members who assist them to complete the register after patient visits. CBD Supervisors use monthly reporting tools that aggregate the data from the CBDs' Patient Registers, as well as their supervision and drug distribution activities for their respective catchment areas. CBD Supervisors also use a monthly supervision form to collect data on general tool and job aid availability, drug stocks, and correct case management by CBDs. CBD Supervisors aggregate all these data from supervision forms on a monthly basis into a compiled report. CBD Supervisor data collection tools include a Caseload Summary Report (aggregated patient and treatment data from each CBD), Supervision Checklist Summary Report (aggregated supervision data including quality of care, supply and tool needs, and stockout information), and a Stock Summary Report (aggregated stock levels and dispensing data in relation to treatments provided).² The supervisors' tools aggregate data per CBD as well as per each supervisor's catchment area.

Following routine monthly data collection by CBD Supervisors, data are reviewed and verified with iCCM Program and Monitoring and Evaluation (M&E) Officers prior to data entry and compilation. iCCM M&E Officers who support implementation areas by county are responsible for final verification and monthly data entry into the program's District Health Information System (DHIS) database. iCCM data managed within the DHIS database can be aggregated up to the facility, payam, county, or state level; however, it can only be disaggregated down to the supervisor level and not the individual CBD level. Program data are verified, cleaned, and analyzed utilizing DHIS by the iCCM M&E Officers, iCCM M&E Manager, and iCCM Program Manager on a monthly basis. On a quarterly basis, county teams hold program review meetings where performance data are analyzed by all senior team members. DHIS is utilized across the

² In South Sudan, all iCCM consortium members are required to use the same data collection tools as provided and designed by PSI; revisions and improvements to tools are conducted collaboratively by the consortium with the technical guidance of IRC as the technical lead. Between 2014-2015, no revisions to tools had been made for some time, however consortium members were advocating for needed changes as weaknesses in the tools and the related data quality issues were identified by many members.

country by all stakeholders as the standard health management and information system platform for both iCCM and health facility data.

Data elements unavailable from the DHIS database but needed for the quantitative analysis were summarized into an Excel sheet. These data include population estimates by payam and county. Health facility data were exported from the IRC's primary health DHIS platform and shared with the iCCM team to compare treatment rates between iCCM services and facility-based services. Health facility DHIS data used were for the same catchment areas as identified for the study, as well as for the county-wide analysis for the overall iCCM program in the same implementation area.

Table 2: Quantitative data elements used for this study

	Data element	Data source
Descriptive statistics	- Year/Month of iCCM implementation	iCCM DHIS
	- State/County/Payam/catchment area	2008 South Sudan Census Report ⁴
	- Estimated total under-five children in catchment area ³	
Routine data	- Number of active CBDs	iCCM DHIS
	- Number of CBDs who submitted a monthly report	iCCM DHIS
	- Number of CBDs who received a supervision visit	iCCM DHIS
	- Number of children seen by CBDs	iCCM DHIS
	- Number of children referred by CBDs to a health facility	iCCM DHIS
	- Treatment for under-five children	
	o CBD	
	▪ Number of ACT treatments given	iCCM DHIS
	▪ Number of ORS treatments given	iCCM DHIS
	▪ Number of zinc treatments given	iCCM DHIS
	▪ Number of amoxicillin treatments given	iCCM DHIS
o Health facility		
▪ Number of treatments given for presumptive malaria	HF DHIS	
▪ Number of treatments given for diarrhea	HF DHIS	
▪ Number of treatments given for pneumonia	HF DHIS	

Monthly data on IRC's Payinjiar County warehouse stock of ACT, ORS, and amoxicillin were also available. The data presented should be viewed with caution, based on programmatic experience with the data. The stockout data that are reported into DHIS can only be disaggregated to a supervisor level so the program lacks reliable methods to capture CBD-level stockout data. The supervisors report stockout data on their Supervision Checklist Reports, which have inherent flaws in the design primarily related to how the questions are asked to the supervisor and the referencing of time periods. Program staff have observed a relationship between the CBD Supervisors perceptions of reporting stockouts as directly linked to their own job performance which leads to inaccurate reporting due to fear of negative performance reviews. Additionally, many supervisors have reported that their interpretation of when to report a stockout is when they are unable to restock the CBD because their own stock is low. A further illustration of the challenges with stockout data was seen in a 2012 household survey that reported that 65% of

³ To estimate under five population targeted by the iCCM program, the IRC uses the estimated population projections (described in footnote 4) and applies a 20% estimate of the total estimated population per payam.

⁴ The last and most reliable census conducted by the South Sudan National Bureau of Statistics was conducted in 2008. No other census was conducted that captured reliable population data; neither does any other population estimates provide population statistics disaggregated to payam level. It is common practice in South Sudan for implementing actors to utilize the 2008 population data as a basis with which to use an annual 3% population growth estimate across years to estimate population demographics in target catchment areas. This estimation is assumed to represent the host population in the county prior to any displacement or migration in 2014.

respondents (mothers of children 2-59 months) whose children were treated for diarrhea received ORS, but only 4.6% reported having received zinc.(28) When the survey data were compared to routine data from the same time period, zero stockouts had been reported by supervisors for both ORS and zinc. For these reasons, the stock data presented here should be viewed with caution.

Data Analysis

Data from DHIS were exported into a Microsoft Excel database. Pivot tables were created for each of the data elements for the study period and summarized by month. In addition to the indicators listed in Table 2, other indicators were created to describe utilization, access, and coverage. The additional indicators are listed in Table 3.

Table 3. Indicators constructed using data from Table 3

Indicator	Numerator	Denominator
CBD reporting rate	Number of CBDs who submitted a monthly report	Number of active CBDs in the catchment area
Estimated number of child contacts with a CBD, per child per year*	Number of under-five children seen by CBDs, times 12 (to derive annual rate)	Estimated total under-five children in catchment area
Treatment rate (treatments per child per year)*	Number of treatments given for presumptive malaria, diarrhea, and/or pneumonia, times 12 (to derive annual rate)	Estimated total under-five children in catchment area
Supervision rate	Number of CBDs who received a supervision visit	Number of active CBDs in the catchment area
Under-five contacts per CBD per month	Number of under-five children seen by CBDs	Number of CBDs who submitted their monthly report
Referral rate	Number of under-five children referred to a health facility	Number of under-five children seen by CBDs in catchment area

*These indicators are reported based on monthly data, but presented as an annual rate, to match routine indicators used in iCCM reporting.

5. RESULTS

For Payinjar County (including the payams outside the research study) during this period, a monthly average of 262 CBDs were documented as active. Active is defined as trained, working, and reporting at least once in a four-month period. A total monthly average of 239 CBDs reported data between December 2012 and January 2015, with an average monthly reporting rate of 92%. For the four payams selected for this study (Ganyliel, Pachak, Payinjar, and Thornom) a total monthly average of 123 CBDs submitted monthly reports out of a total 136 active CBDs, with an average monthly reporting rate of 91%.

Table 4 summarizes the qualitative data collected for the study.

Table 4: Description of qualitative data collected

Participant Type	Key informant interviews	Focus group discussions
------------------	--------------------------	-------------------------

National Level		
Policymakers (NGO implementing partners)	6	
Policymakers (National-level MoH, Donors)	2	
State/County Level		
Unity State MoH officials	1	
County MoH staff	1	
CBD supervisors	3	2
IRC field-based program staff	5	
Health workers at the local PHCU	2	
Field Level		
Community leaders		4
CBDs		3
Caregivers		4
Total Sample Size	20	13

iCCM services prior to emergency

Access to and utilization of iCCM services

In the period between December 2012 and December 2013, an average of 138 trained CBDs were available in our study area, of whom a mean of 93% submitted monthly reports. Each month, there were on average 2,043 under-five contacts, or an average of 16 under-five contacts per reporting CBD per month. An under-five child contacted a CBD on average 7.1 times per year. This rate was nine-fold higher than contacts provided at health facilities (average 0.8 contacts per child per year). A total of 40,795 treatments (pneumonia, diarrhea, malaria combined) were distributed over 26,543 CBD contacts in the period between December 2012 and December 2013 in the four payams. The data from the four payams reflected the county as a whole. During this period, across all eight payams where iCCM was implemented, an average of 262 CBDs were active, also with a 93% average reporting rate. In total the county provided 71,463 treatments over a total of 47,612 contacts at an average rate of 5.8 contacts per child per year.

Several caregivers expressed their satisfaction toward CBD services, particularly in terms of their availability and commitment to the communities they serve. One reported, “What we like is whether [you are] going [to the CBD] at night, when you bring sick child they [the CBDs] are not exhausted.” Another mentioned, “Our CBDs are cooperative. When [you] go at night, [they] treat children, when [they are] working, [they] leave [their work] to treat children.” A CBD supervisor also indicated, “The community trusts the CBD because the drugs are free, also they can go anytime, the CBDs are always available, day or night, even when it’s rainy.” Services given by CBDs were perceived as “very important and helping children” among caretakers as well as by CBDs themselves. Several CBDs expressed pride in their own work, with some referring to themselves as “doctors” in their communities and attributing children’s lives saved to their services, despite not receiving monetary compensation. Additionally, many caregivers indicated that they preferred CBDs’ services for reasons related to the long distances they have to travel on foot to the nearest health facility.

Other respondents, however, noted that CBD availability was insufficient in many areas, an issue exacerbated during the rainy season (roughly May through October) when CBDs themselves may be displaced, and also during times of food shortage and insecurity. In these times, CBDs would be outside their homes more often, searching for food for their own households. Supervisors also had difficulties accessing CBDs for supervision visits, especially with the supervisors expected to cover a vast geographic area with accessibility issues; the majority of supervisors traveled many

hours on foot in all weather conditions to visit CBDs, as well as to go to the IRC's field office for supplies, drugs, and reporting. A senior IRC staff member reported that the biggest challenge to utilization is lack of access to CBDs or drug stockouts. Another IRC staff member also reported their concern regarding low utilization amongst younger children (infants) compared to older children, stating, "There may be a cultural barrier; they don't like to show sick babies to us." Further concern over availability and accessibility were acknowledged by IRC program staff based on "ongoing insecurity related to renowned frequent cattle raids" during dry season and the reality that Payinjar remains a rebel-held area, subject to recurrent fighting as well as revenge killings among clans and families.

IRC staff highlighted that literacy levels can be an issue, reporting that, "The program design takes into account low levels of literacy, but CBDs often need lots of refresher training and we need to find creative ways to help them remember their training." Another IRC staff noted, "The low education, general capacity here – none of the CBDs can read or write – even among supervisors is low. For CBDs even they can't write X or a check. The illiteracy rate is at 98%. [That] creates huge challenges for training."

Coverage of treatment

The rates of treatment by CBDs were 0.8 pneumonia treatments, 4.4 diarrhea treatments, and 5.6 presumed malaria treatments per under-five child per year, using as the denominator available data on the catchment population. If we consider an estimated annual incidence among under five children of 0.5 pneumonia episodes, 3.4 diarrhea episodes, and 4 fever episodes per child per year,(29) the iCCM treatment rates exceeded or met the expected burden of disease for all three conditions, regardless of the availability of health facility services in the same catchment areas. When comparing the volume of CBD treatments in comparison to the health facility treatments, the results show that the CBDs are treating the majority of these cases for children under five.

Supply chain

Several interviewees expressed issues of transport in relation to rain and roads. Due to the swampy nature of the county's geography, many areas throughout the county become inaccessible due to flooding in the rainy season. For many payams, the only transport possible for upwards of four to six months out of the year is on foot, often in waist-high swamp waters. An IRC staff member described how drugs and supplies are pre-positioned before the rainy season. He reported, "We identify hard-to-reach areas before the rains start and deliver enough supplies to last through the rainy season. The good thing is that CBDs are part of the communities they work in, so they can continue their work when accessibility is difficult as long as they have their supplies. Access from Juba to the field can also be difficult." CBD Supervisors also reported the difficulties in accessing their CBDs because of rains, lack of roads, and distance, whether for restocking of CBDs' drugs or for supervision. Issues with financial costs were highlighted by an implementer; drug distribution is expensive when implementers do not have access to humanitarian logistical support mechanisms that are often engaged during an emergency response, such as the UN's logistics cluster. Such logistical support cannot be used during non-emergency times; however even in emergency times, such mechanisms are prioritized for cargo linked to emergency interventions of which iCCM was not considered.

Several community members expressed their experiences with stockouts at the CBD level. A community leader indicated that drugs appear to finish quickly and that "it would be better if drugs could be brought in 4 or 5 week amounts" to the CBDs. A caregiver also mentioned that "if the CBD runs out of drugs, she sends us to buy our drugs from the market, but if there is no money, the child dies." However, due to challenges with collecting drug supply stockout data described

above, perceptions of stockouts may vary per respondent during similar times of inquiry. As such, the full extent and effect of stockouts are unclear.

Supervision

Issues of physical access, communication, and transport were also reiterated in the context of supervision, both for CBDs having access to CBD Supervisors, and CBD Supervisors having access to their supervising program officers. One CBD Supervisor described the context, “No roads. It is difficult to move, especially when carrying drugs. When it is flooded, we can’t move. There is a lack of communication with our supervisors. We must travel very far [up to 2-3 hours] to speak with them face to face.”

CBD workload and motivation

On average, each reporting CBD was contacted by 16 caregivers per month. Several CBDs expressed dissatisfaction toward their work burden in light of the lack of monetary compensation versus in-kind. One CBD reported, “We feel like we are doctors. The doctors here get paid. Why is it that we don’t get support? We provide the same services. Is it because we are working in the homes down there with nowhere to sit?” One CBD reported that their CBD Supervisor recognized the work burden on the CBDs and attempted to mobilize the community to provide assistance, only for the community to deny the request. Others reported that sorghum would be collected by the community to provide to the CBD as in-kind support. Several community leaders acknowledged and sympathized with the issue; one leader mentioned, “The CBDs do a lot of activity, they carry the drugs alone, they work alone, we see that they are not being motivated to keep working so hard. They don’t get money. They don’t get anything.” However, there was no indication that the community leaders felt it was their obligation to assist with supporting the CBDs, and the CBDs perceived that. Two caregivers noted that there was an agreement within their communities to collect sorghum to provide to the CBDs, with one reporting that it occurred once a year and the other reporting that the plan was never executed. A representative of the Ministry of Health mentioned, “People don’t want to work as a volunteer for a long time. They have lots of commitments and needs. This causes a high attrition of CBDs at 15% and this in turn has cost implications because more CBDs need to be trained regularly.” Program records indicate that regardless of the many challenges CBDs face as volunteers, the IRC has experienced low attrition rates over the 10 plus years of implementing iCCM in South Sudan. In a data analysis exercise in 2015, the IRC found its attrition rate to be 2.7% with many CBDs having worked since the first recruitment and hiring performed in their respective counties.⁵ For Payinjiar County, the attrition rate in 2014 was 3% and found to be in line with the average attrition rates calculated for Aweil East County, an area also with a long implementation history of over 10 years; IRC’s newer areas of implementation were found to have lower attrition rates of 0% and 1% in Aweil South and Aweil North counties respectively over that period of time.

Another CBD placed the compensation issue in the context of gender relations. She stated, “Men don’t believe our jobs are important because we don’t receive compensation. If we got money, it would belong to us and men would see that we have power also.” Another also expressed concerns in the context of some CBDs widowed during the conflict, with request for compensation in light of the breadwinner passing away.

Health system

⁵In 2015, the IRC iCCM monitoring and evaluation team conducted a data analysis exercise using routine programmatic data to estimate attrition rates. The program looked at data collected across the four quarters of 2014 and utilized data on CBDs whose supervisors reported CBD status information on their monthly reports. Status information included CBDs deemed to be inactive (defined as not having reported in four consecutive months), have moved away or migrated from their place of origin, had submitted an official resignation, or had passed away. 2014 data for Payinjiar County showed attrition rates as follows: 3% Q1, 5% Q2, 3% Q3, 0% Q4 with an average of 3% for the year.

iCCM is not yet institutionalized into the MoH health system in South Sudan, and no money has been allocated from the national budget for iCCM. The iCCM program is dependent on NGO management and funding. A national-level MoH staff member indicated that the iCCM program is donor-driven; “Once the funding is not there, organizations leave and structures are left hanging.” Initially, there was government resistance toward iCCM, as there was a belief that health care should be provided by trained professionals. However, such resistance has abated over time, and there is increasing involvement from the MoH in iCCM programming with gradual recognition that such an approach to healthcare delivery can impact child mortality and morbidity rates in rural and isolated regions of the country. Around the time of the interviews, tools and job aides, as well as incentives for CBDs, were harmonized within the iCCM consortium with joint efforts between IRC as the technical lead and the new child health unit of the MoH. Annual CBD incentives included gumboots, rain ponchos, umbrellas, torches, t-shirts, and plastic chairs. iCCM implementing agencies operating outside the consortium, though, were not all involved in efforts to standardize the approach to iCCM across the country. However, starting in 2014, as the MoH officially prioritized iCCM in the new strategy of health service delivery, there were more active efforts to harmonize these issues through the creation of an iCCM technical working group that included implementing partners under different funding streams, UNICEF, and the MoH.

CBDs are instructed to refer children to MoH health facilities for severe cases. However, there are major barriers to referral completion such as poor roads or lack of roads, no transportation, long distances, and flooding. Additionally, at the time of the study, the majority of primary health facilities were still under the operational support of NGO actors supporting the MoH through a large-scale health systems strengthening program. Because the MoH was not able to fully support all health facilities, and funding was insufficient to open and operate all facilities, a limited number of health facilities were available to large catchment areas. In the study payams during 2012 and 2013, only two of the four payams had two PHCUs operational for the entire population, whereas one payam had only one, and the last had none. By mid-2013 two of the four payams had one operational PHCU each, and two payams had zero; only one PHCC in Ganyliel was able to provide more advanced primary health services in the entire county.⁶ One community leader noted, “Taking them to Ganyliel can cause delays, it is very far from here. The mother is the one who will take them so it is difficult for her, there is not enough transport, she will have to leave other children at home and the sick child may die before reaching Ganyliel.” There are also circumstances in which health facilities do not have adequate drugs and supplies, creating a situation in which households travel far only to receive no treatment. Health facilities provided free child health treatments. In addition to barriers faced by caregivers and facility providers, an IRC staff member suggested that the “referral rate is very low; there is under-referral perhaps because CBDs are [mistakenly] treating severe cases or because referrals are not being recorded.” The quality of linkages between iCCM and the MoH health system was not fully understood.

Effect of the crisis on iCCM programming and subsequent response

Population displacement

With the onset of the crisis, Payinjar County experienced a significant influx of internally displaced persons (IDPs) beginning in December 2013 and primarily lasting through the first quarter of 2014. For the calendar year of 2014, the estimated number of IDPs entering the county totalled approximately 39,209.⁽³⁰⁾ The influx of IDPs nearly doubled the estimated population in the county from 44,224 to a total of 83,433. Accordingly, the under-five children in the county also increased drastically from an estimated 8,845 to a total of 16,687. Displacement not only included

⁶ Data derived from IRC primary health program data (personal communication, Ganyliel Health Manager)

IDPs from outside the county but also displacement within the county, particularly from payams where active conflict took place.

Caretakers, CBDs, and CBD Supervisors shared painful accounts of violent attacks and insecurity, high loss of life, including young children, mass migration and displacement, and related suffering immediately following the acute emergency which began in Juba in December 2013 and spread to a wider geographic region in February. One caregiver recounted, “I moved with the healthy children when the fighting came, we left the lame and sick children behind. We all lost family, people starved to death, things were burned, we fled our homes. We left with nothing, now we have nothing.” Another caregiver shared “people died from hunger, even if you managed to run with your child, many [later] died from hunger. There are also other dangers, for example from wild animals. Many people died.” CBDs endured similar hardship and also fled violence, reporting that “last year, when [Chuk] burned, we migrated because there was shooting, [their supply] drugs and box burned, [so] children died in that time.” An IRC staff member described the post-acute, protracted conflict environment: “Displacement has been a problem in Payinjiar, where lots of IDPs came from other counties around Unity. The communities would host the IDPs and tried to integrate them into the communities. This put a lot of strain on resources such as food, water, and sanitation facilities.”

Additionally, during 2014 and most of 2015, Payinjiar County was consistently classified at critical levels of food insecurity and poor nutritional levels with phase 3 (crisis) or phase 4 (emergency) classifications.⁽³⁰⁾ CBDs appeared to spend more time outside the home in search of food and water for their own households. An IRC program staff reported, “Issue of food security was drastically affected by conflict. People were not able to cultivate, had to travel farther to find food, CBDs are not at home.” CBDs recalled an increase in the number of malnourished children they identified while caregivers reported that “before conflict, children were fed cow milk, now cows [have been] taken and died. Children eat without milk, [which is] causing a lot of diseases... Another [is] we don’t have enough food, [we are] now eating grass.” CBD Supervisors faced challenges finding CBDs for regular supervision visits as they were more frequently away from home.

Continued care through displacement

Some CBDs continued to work in communities largely unaffected by the crisis but received IDPs, while other CBDs continued working where they were displaced to, if they were able to take their supplies with them. One CBD reported, “We were with new people where we ended up and we continued giving our services as CBDs. Those new people also appreciated our services. They didn’t want us to return home...The community where we ended up when we were displaced knew we were CBDs because we told them. They knew what that meant; they had CBDs before.” Another CBD reported that after identifying a sick child in the community and inquiring why they had not seen a CBD, a caregiver reported that they were unaware that the CBD had drugs available. Despite no formal strategic community mobilization effort specifically aimed at IDPs by the iCCM program management, the information that CBDs had drugs spread widely throughout displaced communities, with large numbers of caregivers subsequently seeking care from the CBD. Further recognizing the impact of displacement, one CBD expressed, “Population increase has affected our work because many new people are here and they travelled from far. The drugs get finished easily.” Some CBDs referred children to one another if they did not have enough supplies to treat.

Displaced CBDs and CBD Supervisors were occasionally tracked down by their home community members to notify them when it was safe for them to return to their home communities. A CBD Supervisor reported, “The community worried a lot about their children when the CBD ran away...No iCCM activities continued until they came back. Only CBDs know how to treat a child.”

Caretakers mentioned CBDs' mobility as a positive advantage over the services and treatment offered at the PHCU since "the PHCU does not have a box (of supplies)." A key informant within the national MoH recognized, "The availability of the iCCM services was not affected so much by the conflict. CBDs tend to move with their communities when these move and they take their boxes with them. Wherever the community settles, the CBDs continue to provide services to their communities."

Preference for CBD care

Caretakers preferred seeking care from CBDs over risking an insecure journey to the MoH health facility and/or arriving to a facility they believed may have been destroyed or looted or would not have staff or drugs available for treatments. Many caretakers believed that MoH facilities were non-functioning; one caretaker mentioned, "the PHCU has been closed, the health workers all left, they did not want to be on the front lines." Based on available programmatic data, this was not entirely accurate; some facilities were closed prior to the start of the crisis and many remained open throughout even if operating at lower capacity. A majority of caretakers believed that CBDs were their best option for care and continued to trust them for care, as they had before the onset of crisis. Both community leaders and caregivers, as well as CBDs themselves, reported placing pressure on CBDs to provide treatment for the population beyond the age of five during the emergency phase. A CBD referred to this challenge, saying "only challenges is drugs [are given only for children] under five years downward. Big challenge is 16 [years] and above, [they] come to us when sick, [saying] 'Why are you not giving us [drugs]?'". Similarly, a caretaker criticized that "the CBD can help, but they only help children, not us older people."

CBD activity

The reporting rate of CBDs dropped from 93% in December 2013 to the lowest value of 77% in February 2014, but a majority of the CBDs reported activity through the crisis period.

The total number of under-five contacts by CBDs per year also hit its lowest value in February 2014, but increased back up to pre-conflict levels within two months.

Using the number of under-five children in the host population as the denominator, an under-five child was contacted by a CBD on average 5.7 times per year in December 2013. This dropped to the lowest value in February 2014, with 3.3 CBD contacts per child per year, but recovered to 5.6 CBD contacts per child per year by May 2014. When accounting for the influx of

Figure 2: Proportion of CBDs who submitted a monthly report in four payams

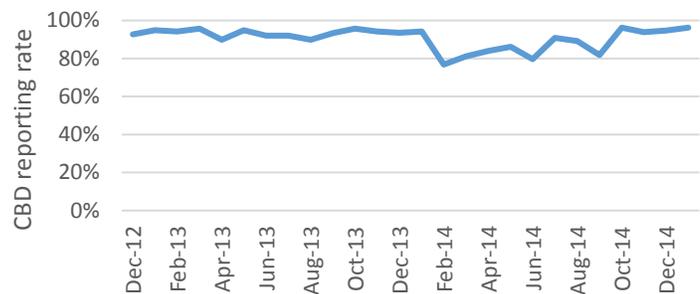


Figure 3: Estimated number of child contacts with a CBD in four payams

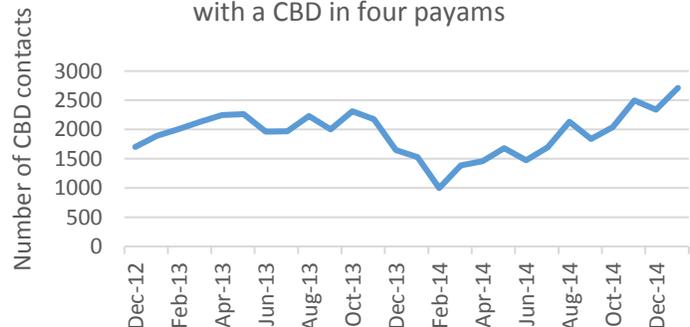
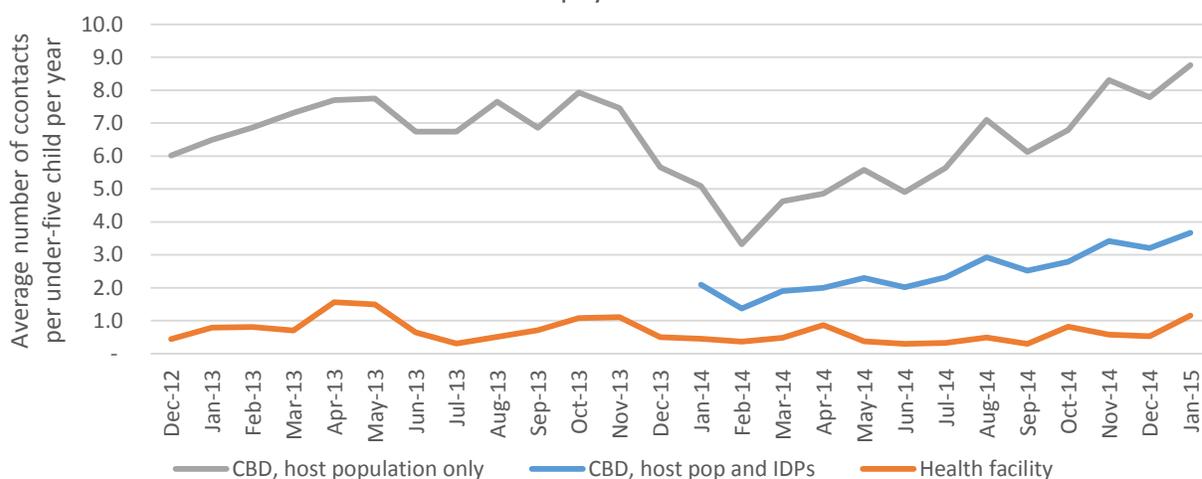


Figure 4: Average number of contacts per under-five child per year in four payams



internally displaced children in the denominator, the rate was the lowest in February 2014 at 1.4 CBD contacts per child per year, and recovered on an upward trend from there. The number of contacts per child was consistently higher for CBDs than for health facilities.

The total number of treatments provided by CBDs is displayed below. While a drop in the number of treatments is seen around February 2014, the total number recovered to pre-crisis levels within a few months.

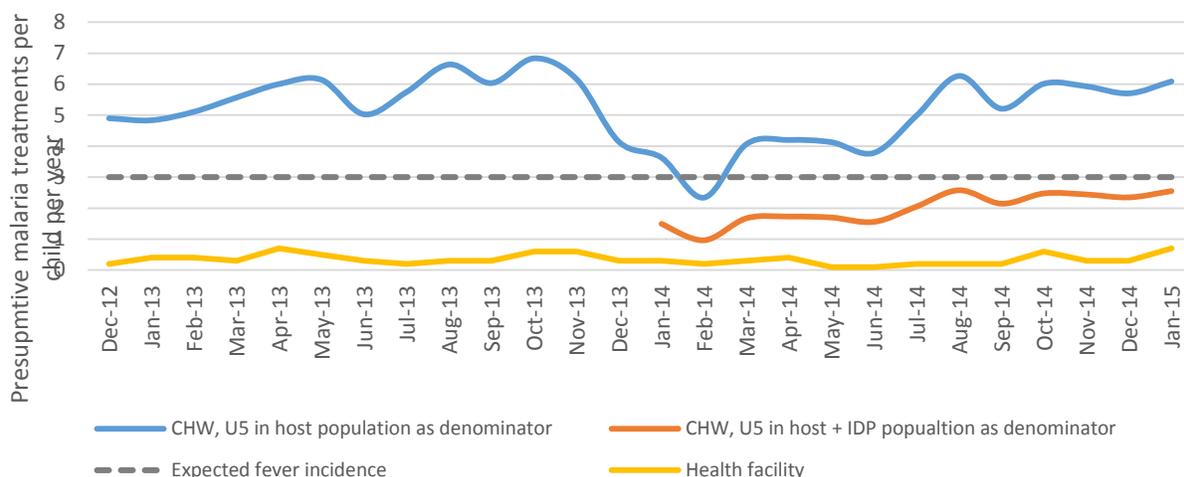
Figure 5: Total number of treatments provided to under-five children by CBDs in four payams



Coverage of treatment

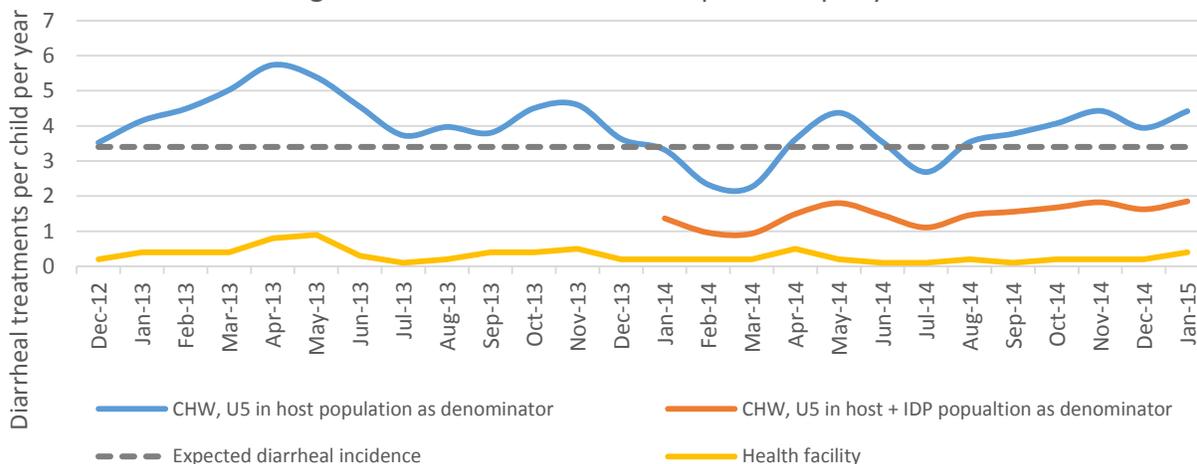
Treatment rates (number of treatments provided per under-five child per year) are displayed in Figures 6a-c, plotted against expected incidence per child (3 fever cases, 3.4 diarrhea cases, 0.5 pneumonia cases per under-five child per year respectively).⁽²⁹⁾ Assuming a catchment area only consisting of the host population, CBDs' treatment rate of presumed malaria dropped below the expected incidence of fever from December to March 2014, but otherwise recovered to rates above the expected incidence. When accounting for the influx of IDPs, CBDs did not provide enough treatments to cover the expected incidence. Nevertheless, CBD treatment rates consistently remained higher than health facilities.

Figure 6a: Presumptive malaria treatments per child per year



A similar pattern was observed for diarrhea. Assuming a catchment area only consisting of the host population, CBDs' treatment rate of diarrhea dropped below the expected incidence around February 2014 and again around July 2014 (perhaps due to ORS stockout in preceding months, see Table 5), but otherwise remained above the expected incidence. When accounting for the influx of IDPs, CBDs did not provide enough treatments to cover the expected incidence; an average of 1.5 treatments per year was being provided in the period between January 2014 and January 2015 when including IDPs. CBD treatment rates consistently remained higher than health facilities.

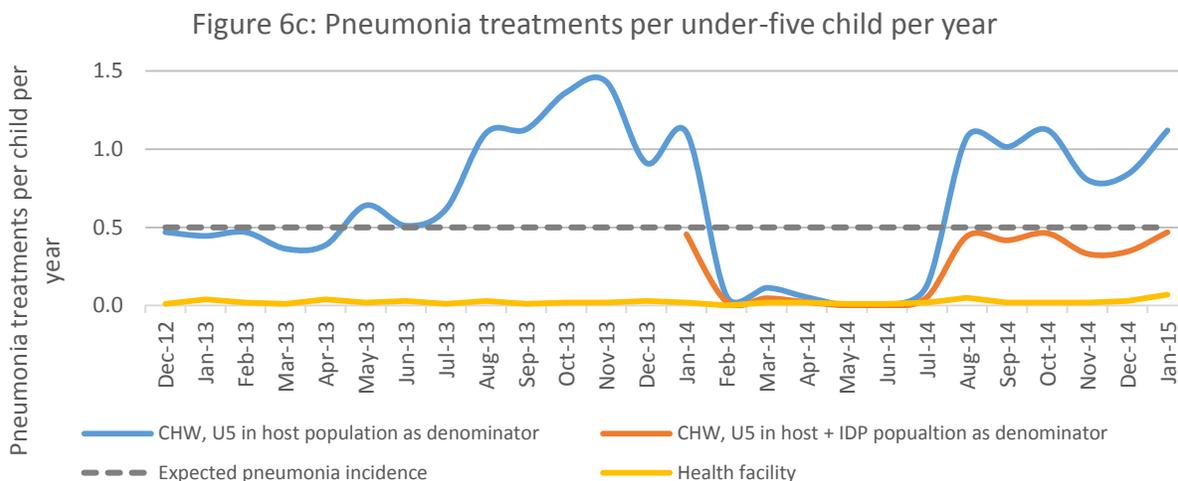
Figure 6b: Diarrheal treatments per child per year



*Expected diarrheal incidence: 3.4 cases per child per year

For pneumonia, there was a period following the crisis at which point almost no treatments were being provided. The average number of treatments provided by CBDs before December 2013 was 0.74 treatments, above the expected incidence of 0.5 cases per under-five child per year. From January to July 2014, this number dropped to 0.21 when accounting only for the host population or 0.09 when including IDPs. For August 2014-January 2015, the CHW treatments recovered to 1.0 when accounting for the host population and 0.4 when including IDPs. Again, the CBD treatment rates are generally higher than health facility rates. Of importance to note, the drop in pneumonia treatments between February and August also coincide with the county's

experience with a widespread stockout of amoxicillin at all levels of the program. Routine stock data show that starting December 2013 through July 2014, the main drug warehouse was completely out of amoxicillin and the conflict interfered with the IRC's ability to receive new shipments. Based on past experience, we can assume that stock previously distributed to CBD supervisors for regular distributions to the community level ran out by February. After stock was received in July 2014 and distributed accordingly, treatment rates began to rise starting in August.



*Expected pneumonia incidence: 0.5 cases per child per year.

Supply chain

Several interviewees reported the negative impact of crisis on drug stock. One CBD supervisor reported that drugs used to be stored in large quantities in Ganyiel, but they no longer felt secure in doing so with the threat of damage or looting. Many CBD supervisors maintained a practice of storing their individual stocks for their catchment areas in the local health facilities or in their homes where they could easily access the supplies for regular distributions. Supervisors perceived storage options as riskier during high level of insecurity. The IRC's drug warehouse in Ganyiel, Payinjiar County was not looted during any period examined for this study. Drug stockouts at the warehouse level, caused by the program's inability to receive resupplies from Juba, resulted in periods of time when essential iCCM drugs were out of stock for months at a time. However, according to warehouse data, the stock for ACT and ORS recovered within a few months, while zinc and amoxicillin stock remained low or was out. Warehouse data were not available for months of July and August 2013. See Table 5.

Table 5: Closing drug balance in warehouse

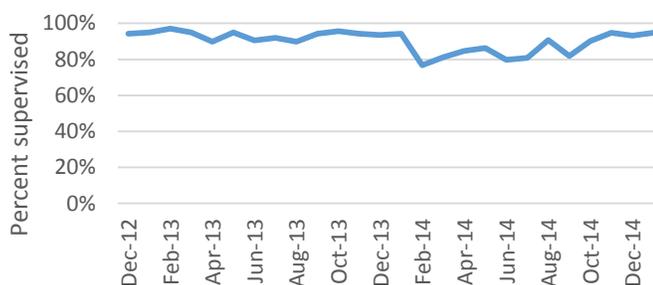
	ACT	amoxicillin	zinc	ORS
Apr-13	13320	1525	27750	11426
May-13	7486	1525	23564	0
Jun-13	5249	722.5	420	15840
Jul-13	0	0	0	0
Aug-13	0	0	0	0
Sep-13	9716	25080	0	18867
Oct-13	9338	18303	0	11763
Nov-13	616	14373	0	3763
Dec-13	616	9753	0	2763
Jan-14	7630	0	0	0
Feb-14	17005	0	0	0
Mar-14	18165	0	10000	0
Apr-14	15575	0	4900	6318
May-14	10200	0	900	0
Jun-14	6860	0	580	0
Jul-14	27335	1920	3950	24500
Aug-14	22455	210	420	9945
Sep-14	21856	66	2640	19000
Oct-14	17756	66	0	22417
Nov-14	12876	66	0	10922
Dec-14	15846	846	0	12820
Jan-15	11384	84	0	4417

Numerous interviewees reported an increase in demand for CBD services with the influx of IDPs, which subsequently led to increased pressure on supplies. One CBD reported, “Because the number of households has gone up, we run out of drugs faster. They come from Bentui, Juba, and Leer. Increased (number of) households make our job harder. I used to have 33 households, now 40-50.” Several CBD Supervisors verified this information by indicating that stockouts were more frequent among CBDs working in areas with IDPs. Several CBDs, CBD Supervisors, and caregivers indicated that stockouts were not a major concern prior to the start of the crisis. An implementing partner noted that they made efforts to distribute commodities directly to the counties rather than to a central store in state HQ during the crisis. With increased frequency of CBD stockouts, some CBDs referred children to other CBDs who had drugs left. One caregiver reported that their CBD offered to accompany the caregiver and the child to visit another CBD.

Supervision

CBD Supervisors faced several difficulties in continuing supervision, due to concerns of physical security and CBD displacement. A CBD Supervisor reported, “The insecurity is the big problem. Before, I could move freely. Every day it takes a lot of time because I must first assess the situation before I can go anywhere.” Another CBD Supervisor stated, “Now we fear for our safety when we move and that the drugs will be destroyed by fighting.” CBD Supervisors attempted to continue supervision by utilizing their networks to track down displaced CBDs and also to assess the security situation prior to making supervisory visits and restocking CBDs with drugs. Several CBDs and community leaders validated this claim of sustained supervision when the security situation allowed them to do so. Despite the challenges, the rates of supervision generally stayed in the 80th and 90th percentiles based on routine data. Supervision rates showed a drop in the immediate period after the crisis, with the lowest rate being 77% in February 2014.

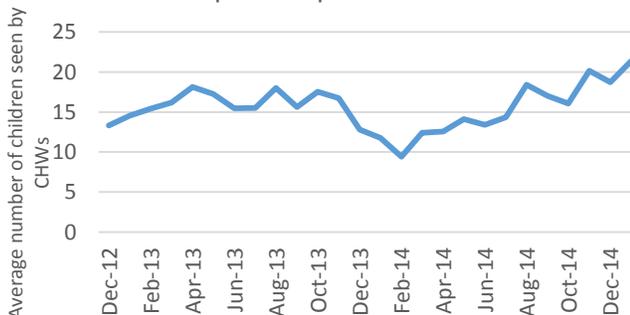
Figure 7: Proportion of CBDs who received a supervision visit



CBD workload

The average number of children seen (different from number of contacts made) by each reporting CBD dropped to approximately 10 children per month around the time of the onset of the conflict. The lowest caseload occurred during the month of February 2014. The number continued to increase with time, with roughly 21 children being seen per month by each active CBD in January 2015.

Figure 8: Average number of under-five seen per CBD per month

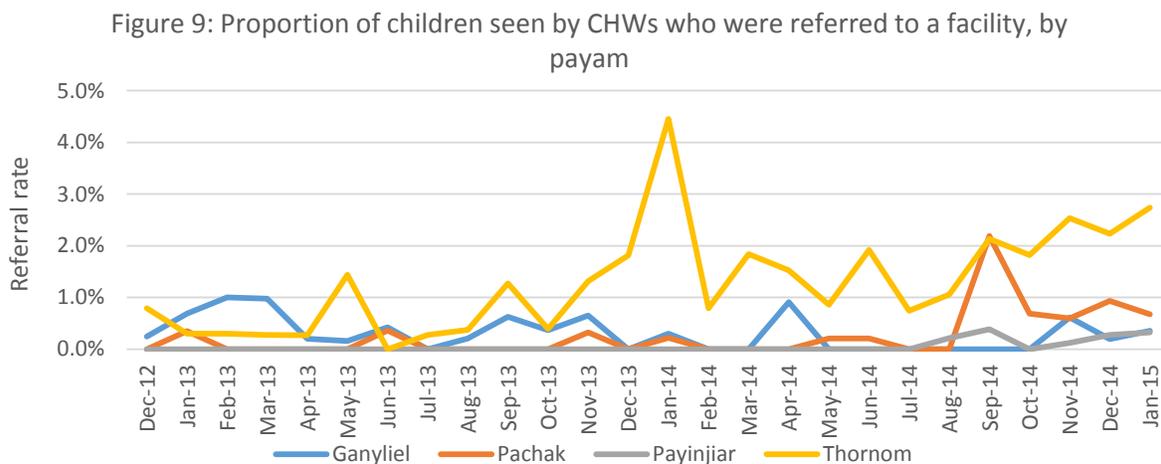


Health system

The MoH’s inability to sustain health services was a key theme. Health facilities were severely affected, with looting and damaging of equipment and supplies. A member of MoH of Unity State

reported, “In Unity, during the crisis many health centers lost all equipment and facilities and some were burnt down. Human resources were strained, many health centers lost staff as people fled the area. In Bentiu, the state hospital was not functioning as it was looted and burnt down. The situation was very bad in terms of human resources, equipment and supplies, the facility lost four staff.” Even facilities that remained opened or eventually reopened as part of emergency response efforts or with rehabilitation experienced major stockouts of supplies. The ability to move drugs by car or by canoe was largely affected by rains and related flooding, leading to dependence on mobilization of supplies by foot during a time of insecurity. The drugs that were pre-positioned in nearby PHCUs or in restocking facilities for the rainy season were also largely looted or destroyed, and many interviewees expressed ongoing concerns regarding the storage of drugs. A caregiver mentioned that some health facilities remained without drugs even after reopening and that “we find out by walking there that there are no drugs, that is the only way to be sure.”

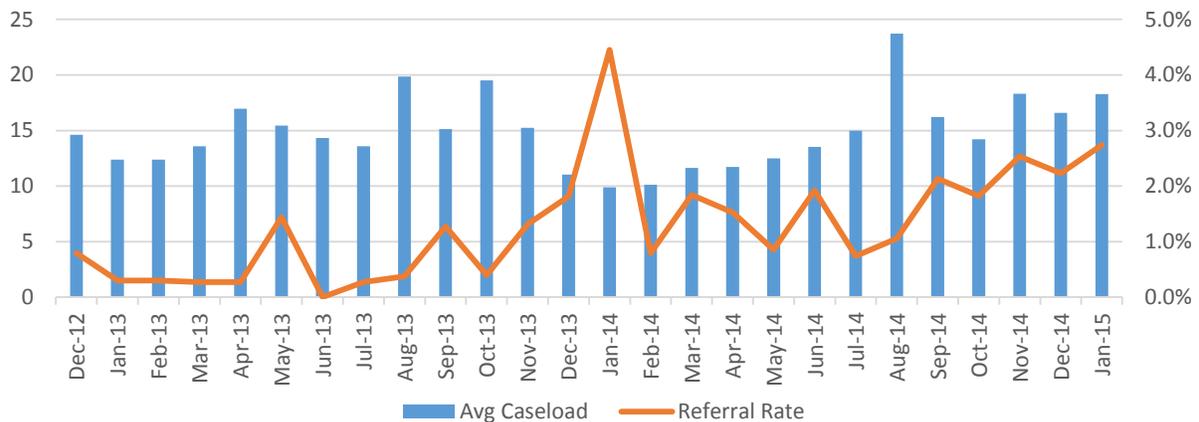
The qualitative data suggested that CBDs referred children less and caregivers appeared less likely to adhere to a referral because of their concern that the referral facility would not be operating or would not have the appropriate supplies after making a long trip to reach the facility. There were concerns expressed by caregivers of leaving other children behind in an insecure situation while taking the sick child to the facility. Quantitative data showed that an average of 0.2% of the children seen by the CBD network were being referred to the health facilities from December 2012 to November 2013. The referral rate increased to 0.6% from January 2014 to January 2015. Figure 10 shows the proportion of children seen by CHWs who were referred to a health facility, disaggregated by payam. The change in the referral rate appears to be driven by Thornom Payam.



Thornom Payam is a catchment area that is in close proximity to the PHCC in Ganyliel, and is one of the central areas where large numbers of IDPs congregated in the county. It is generally consistently accessible for restocking of supplies, and is also where a new mobile clinic was opened in July 2014 as part of the IRC’s emergency response efforts. Furthermore, in November 2014 the CBDs in Thornom began screening all sick children and referring those with signs of severe acute malnutrition. These factors may have largely impacted the gradual increase in referral rates. The fluctuations and gradual increase in referral rates also coincides with the increase in monthly average CBD caseloads treated (see Fig 11 below). Prior to the onset of crisis (Dec 2012 – Nov 2013), Thornom’s average patient caseload was approximately 15 children per CBD per month. The referral rate was approximately 0.6%, or roughly 2.5 children receiving a referral each month. During the acute phase of the emergency (Dec 13 – Feb 14) Thornom’s monthly average caseload dropped to its lowest point of 10; at the same time Thornom’s referral rate reached its highest peak of 4.5% in the month of January, and by February referral rates had

dropped to 0.8%. From March 2014 onwards the average caseloads and referral rates gradually returned to the payam's previous average of 15 per CBD per month with the highest peak of 24 patients again in the month of August 2014 (similar to the previous year). Between February 2013 and January 2015, the monthly total number of children seen in Thornom increased by 88% (253 to 475) but the number of active CBDs remained between 25 and 28. Over the course of the same period, the referral rates increased from 0.8% to 2.7%, with the total number of children receiving a referral reaching an average of 7, never going above a total of 13. Increased caseloads from August onwards may be attributed to the availability of iCCM drugs; by August 2014, drugs that were previously out of stock in the IRC's warehouse were subsequently distributed to all CBDs. No data were available on referral completion rates.

Figure 10: Thornom Payam's average CBD caseload and referral rates



Funding

Two donors funded the consortium under which IRC operates its iCCM programming. Different perspectives on the effect of the crisis on donor funding was conveyed during the interviews. Staff from IRC reported that at the onset of the crisis, there was a donor request to stop spending funds for iCCM programming, potentially as a political move to pressure the government and the opposition. The funds started flowing again 2-3 months later when observing that the hiatus did not function successfully as political pressure, but in the meantime, the IRC program continued at a small scale using funding from private donors. Staff from another implementing agency indicated that a donor was quite flexible; “They were keen to see how iCCM as a programme continued and expanded with the conflict. They considered the programme to be life-saving and wanted to show what duty of care NGOs had towards their own staff. [The donor] never told implementing partners to stop the work. They required more information in order to move forward. [The donor] was a very flexible donor to context, allowing the program to continue and trusting the implementing partners’ judgement to get things done. There were no other donors for this particular consortium which helped in allowing this flexibility.” A third implementing agency indicated that “funding did not significantly change despite the increased program needs and overburdening in some cases. It didn’t stop, which allowed the program to continue, but it also did not increase given the increased demand.” An implementing partner commented that, “The main challenge to the sustainability of the iCCM program was donor funding. Insecurity has been a major concern and where there is insecurity, donors may decide to stop the funding.” No donor representatives were available to participate in the study to share direct views on their priorities or perspectives of funding iCCM programming after or during the crisis to confirm any opinions shared.

Recommendations from caretakers, CBDs, and CBD Supervisors

Caretakers, CBDs and CBD Supervisors made supply-side suggestions that could improve iCCM programming during normal program periods and during times of crisis. In particular, caretakers recalled times they visited CBDs who did not have drugs to treat their children. Caretakers implied that by increasing the supply of drugs directly to CBDs, more children would have regular access to treatment. Caretakers also suggested increasing the CBD cadre by hiring and training additional staff in more villages as well as providing them appropriate incentives to continue their work, although they did not propose in-kind support direct from their communities. Several caretakers expressed their desire to see the CBD treatment menu expanded. Caretakers did not propose any changes to the CBD selection process or mention the need for activities to sensitize their community to the CBDs' work.

CBDs themselves emphasized re-evaluating the incentives they receive in order to continue their work as well as the drug supply they receive from CBD Supervisors. Suggestions included monetary incentives in order to professionalize their status among the community and family members, as well as in-kind support such as food from community members in order to feel a deeper sense of appreciation and ownership by the community for their role. CBDs recommended additional drug deliveries by supervisors in order to meet perceived demand from their communities. However, as mentioned above, the exact levels of 'stockouts' and numbers of untreated illnesses are not fully known. Finally, CBDs expressed willingness to attend additional trainings as well as take on more responsibilities such as expanding their treatment offerings.

CBD Supervisors and other field-based IRC program staff agreed that supervision and re-supply activities could be improved by better transportation mechanisms such as bicycles and/or equipment like flashlights. Supervisors also recommended better equipment such as satellite phones to communicate with CBDs when travel is not possible; they believed communication would ensure timely reporting and accurate re-supplying since there would be no delays in reporting caseloads. Some supervisors urged IRC to increase the drug stocks they were receiving from Juba to ensure more stocks were available in the county. They also suggested pre-positioning drugs and supplies in restocking facilities in various locations in the county for when they need to restock the supplies stored in their homes, which are then used to re-supply CBDs in their areas. CBD Supervisors advocated for higher salaries for their work. Finally, supervisors proposed expanding the cadre of CBDs as well as the entire iCCM program into other areas in the county and acknowledged the necessity for strengthening program linkages with local health facilities.

Recommendations from policy makers and program teams

Both government representatives and implementing partners suggested the strengthening of community involvement in iCCM programs, as they perceived ownership by the community to be weak. Strengthening this link can allow for maintenance of services despite disruptions. Formalization of the CBD role may also assist in retaining CBDs during times of crisis. Another MoH staff member highlighted other local structures such as local chiefs, village elders, and church leaders needing to be engaged in the day-to-day running of the program. Many of these recommendations applied both to general improvement of iCCM and to making the iCCM program more resilient in the case of emergency.

Several implementing partners suggested expanding the iCCM program to include additional components if iCCM were to be continued in the context of future emergencies. The suggested components include rapid diagnostic tests for malaria, vitamin A supplementation, and deworming. An implementing partner also suggested a mobile intervention unit comprised of

individuals who are trained with the same treatment protocol as CBDs. CBD Supervisors also proposed the concept of mobile teams for training new CBDs during the emergency period, since mobility was constrained, challenging recruitment and training. A few CBD Supervisors also requested the provision of walkie talkies or satellite phones to allow for continued communication during crisis.

The need for donor flexibility was emphasized by an implementing partner, in that donors need to recognize the balance of financial risk and provision of services in fragile contexts. Donors need to be willing to pre-position supplies for emergencies, with the expectation that some may be lost. In regards to supplies, there was also a suggestion of bringing storage facilities to the payam level for pre-positioning.

6. DISCUSSION

The IRC has actively been engaged in iCCM programs in South Sudan since 2005. Prior to the start of the acute crisis, CBDs supported by IRC consistently provided treatment coverage that met the expected incidence of presumed malaria, diarrhea, and pneumonia, and provided a greater volume of treatment for those illnesses than health facilities. During and immediately following the acute crisis in late 2013 / early 2014, the iCCM program in Payinjiar County was able to continue services as evidenced by sustained high rates of reporting among CBD providers and supervisors, a quick recovery in the number of treatments provided by CBDs after an initial drop during the acute crisis. Qualitative information capture from caregivers also noted the availability and access to CBDs during this period. There was no cessation in activity. Many CBDs continued to provide treatment, either in their home communities or in areas where they were displaced to if they were able to bring their supplies and still had drugs.

Adaptability of the iCCM model

The sustained provision of care and resilience of the CBD system and its supervisory mechanism during a time of crisis highlighted the value of investing in community-based health systems, both for times of stability and pre-emptively for times of acute crisis. Furthermore, the structure of iCCM, which relies on being imbedded within the community it serves, appeared to lend itself to quick adaptation to a population's needs and/or changes the population experiences. The trust of CBDs in the community as well as their accessibility continued to draw demand for health services at a time when facilities were either inaccessible, not operating, or viewed with caution due to potential closure or stockouts, although this preference for CBDs appeared to exist prior to the emergency as well. CBD services were even in high demand by IDPs who did not know the local CBD because they weren't from the same community, but were informed of CBD presence by community members. Adequate supplies, including buffer stocks, flexible supervision and potential to increase CBDs if needed in response to changes in demand would be necessary in order to meet beneficiary needs with quality service delivery. If supported appropriately, there is also potential for adapting the iCCM model to include other service packages that address beneficiaries' needs in emergency settings.

Stockout and supply chain issues

Quantitative and qualitative data revealed a significant limiting factor in the CBDs' ability to service their communities after IDP influx: insufficient drug stock. Despite CBD's intention to provide care, CBD treatment coverage did not meet the surge in demand following the acute crisis when accounting for the over two-fold increase in catchment population, driven by IDPs. Workload did gradually increase for CBDs following the conflict, but even at its peak, CBDs were seeing on

average of 21 under-five children per month, or less than one child per day. Analysis of warehouse stockout data confirms that the absolute number of distributed drug did not change despite the increased needs of a larger catchment population. Qualitative data revealed that CBD stockouts appeared directly and proportionately linked to changes in population. Such data highlight the current program's inability to respond to acute changes in service demands.

Routine data collection procedures lacked swift feedback mechanisms to capture and report true demand, including changes in utilization and service delivery. There were no stockout data of sufficient quality that can be analysed alongside treatment data, and it is unknown how many under-five children sought services but did not receive treatment due to stockouts. Moreover, qualitative feedback is not currently used to support analysis of routine data in order to influence programmatic decision making. If contingency plans were put into place to organize, equip, and dispatch existing CBDs during acute crisis, coverage of care for vulnerable children may improve. However, CBDs would need a way to rapidly communicate changes in demand for treatment in order to ensure adequate re-supply, and that sufficient stock is available to respond to the surge in demand. We also noted earlier the prior programmatic knowledge of the poor quality data on stockouts; data collection procedures on stock need to be formally evaluated and enhanced to capture better data.

Funding for iCCM in Emergencies

iCCM is traditionally considered as a development program and not as a mechanism for humanitarian response in emergency settings. Implementing agencies have failed to advocate effectively for funding iCCM in an emergency, partially, because little evidence exists to support the implementation of iCCM in an active conflict or emergency setting. iCCM implementing agencies in South Sudan also did not adapt their own perspectives on the standard, static programming model of iCCM.

While the existing iCCM funding largely remained intact, iCCM programming did not receive additional funding despite the increased staffing and drug stock needs demonstrated by the influx of IDPs in certain areas of the country. According to one respondent, some iCCM programming faced a threat of termination that was avoided with assistance from other sources of funding. Another respondent said there were donor conversations regarding potential reductions to the grant to divert some of the iCCM funding to other acute needs. Based on the findings of this study, donors should recognize the potential of iCCM to prevent under-five deaths during acute and protracted emergencies and the resilience of existing networks of CBDS to offer life-saving services if they are equipped and supported

Varying perspectives and understanding of iCCM in South Sudan

It was evident in many interviews with national-level stakeholders that there is a variety of perspectives on the realities of program implementation at the field level, of understanding of the role of iCCM in relation to the true capacity of the health system in South Sudan, and of experiences of the iCCM program in response to the onset of emergency. Perspectives from MoH representatives may vary as a result of their lower involvement in the program's implementation and how such implementation varies across partners, counties, and in relation to the local MoH participation. For example, the humanitarian health interventions, rapid response mechanisms, or the country-wide health systems strengthening project all operate differently from iCCM partners. Varying perspectives of implementing partners may relate to their level of involvement in implementing programming in emergency areas of the country versus implementation areas virtually unaffected by the crisis. The differences in perspectives highlight the importance for stakeholders to prioritize more effective coordination and information sharing, stronger technical leadership, and more strategic MoH involvement to drive commitment for sustainable participation

at all levels in the program. Without more of a shared perspective, iCCM faces challenges to respond to anticipated and even increased needs in times of crisis.

Limitations

While we expect the quality of routine program data to be sufficient to capture trends, we expect the data from early 2014 to have some quality issues related to the acute emergency time period when movement was limited, challenging data collection, reporting, and supervision activities. During qualitative data collection, cultural sensitivities and available resources prevented the team from obtaining recordings and thus full transcripts of the interviews, which in turn reduced the ability to collect nuanced and complex data.

We expect the recollections of the interviewees to have been impacted by several factors. One, the data collection occurred approximately one and a half years following the onset of the emergency, which may have introduced recall bias. Two, there may have been trauma associated with the events of the acute emergency period that prevented some interviewees from sharing their experiences; such trauma may also have been related to recent experiences as the county faced ongoing emergency level impacts associated with wide-spread food insecurities, displacement, and general inability of families to meet their basic needs. It was observed during the piloting of the research guides that interviewees did not necessarily distinguish the acute emergency phase from the protracted emergency phase, meaning that while we sought to focus on the implications for acute emergencies, the conclusions we draw were derived from a longer period. Also, data collection tools were simplified to meet the needs of the data collection team and the respondents, which may have led to loss in nuance.

As discussed previously in the report, the iCCM program suffers from poor routine data on CBD level drug stockouts. This challenge can be attributed to several factors including the poor design of the routine data collection tools used by CBD Supervisors, the capacity of supervisors to implement the tool correctly and consistently, as well as the work culture beliefs and perceptions that link CBD stockouts to supervisor performance. All factors work to reinforce and challenge program staff's efforts to change behavior, understandings, and skills related to stockout data collection and reporting. Without quality, realistic quantitative stockout data, comparisons of routine data to qualitative data for the purpose of analysis are limited. This limitation is significant, considering that routine data generally reports very low to no stockouts at the CBD level, whereas qualitative data consistently reports widespread and frequent stockouts in the communities.

7. CONCLUSION

The iCCM program in South Sudan demonstrated resilience during an acute crisis, with continued provision of life-saving commodities to children under-five. International donors and humanitarian actors should recognize iCCM as a potentially high-impact emergency preparedness and humanitarian response intervention and advocate for flexible funding from donors in order to develop iCCM approaches and improvements that can both sustain and enhance programming in emergency settings during acute crisis. Although such donor support will require a higher risk tolerance with regard to supporting pilot projects and studies to further build the evidence base for using iCCM in emergencies, the sustained performance and natural adaptability of the CBDs' services at the community level in South Sudan demonstrated such potential.

Bibliography

1. Liu L, Oza S, Hogan D, Perin J, Rudan I, Lawn JE, et al. Global, regional, and national causes of child mortality in 2000-13, with projections to inform post-2015 priorities: an updated systematic analysis. *Lancet*. 2015;385(9966):430-40.
2. Victora CG, Wagstaff A, Schellenberg JA, Gwatkin D, Claeson M, Habicht JP. Applying an equity lens to child health and mortality: more of the same is not enough. *Lancet*. 2003;362(9379):233-41.
3. UNICEF and WHO. Joint Statement: Integrated Community Case Management (iCCM). Geneva, New York; 2012.
4. Kelly JM, Osamba B, Garg RM, Hamel MJ, Lewis JJ, Rowe SY, et al. Community health worker performance in the management of multiple childhood illnesses: Siaya District, Kenya, 1997-2001. *Am J Public Health*. 2001;91(10):1617-24.
5. Mukanga D, Babirye R, Peterson S, Pariyo GW, Ojiambo G, Tibenderana JK, et al. Can lay community health workers be trained to use diagnostics to distinguish and treat malaria and pneumonia in children? Lessons from rural Uganda. *Trop Med Int Health*. 2011;16(10):1234-42.
6. Kalyango JN, Rutebemberwa E, Alfven T, Ssali S, Peterson S, Karamagi C. Performance of community health workers under integrated community case management of childhood illnesses in eastern Uganda. *Malar J*. 2012;11:282.
7. Hamer DH, Brooks ET, Semrau K, Pilingana P, MacLeod WB, Siazeele K, et al. Quality and safety of integrated community case management of malaria using rapid diagnostic tests and pneumonia by community health workers. *Pathog Glob Health*. 2012;106(1):32-9.
8. Gilroy KE, Callaghan-Koru JA, Cardemil CV, Nsona H, Amouzou A, Mtimuni A, et al. Quality of sick child care delivered by Health Surveillance Assistants in Malawi. *Health Policy Plan*. 2013;28(6):573-85.
9. Druetz T, Siekmans K, Goossens S, Ridde V, Haddad S. The community case management of pneumonia in Africa: a review of the evidence. *Health Policy Plan*. 2015;30(2):253-66.
10. Miller NP, Amouzou A, Tafesse M, Hazel E, Legesse H, Degefie T, et al. Integrated community case management of childhood illness in Ethiopia: implementation strength and quality of care. *Am J Trop Med Hyg*. 2014;91(2):424-34.
11. Sazawal S, Black RE, Pneumonia Case Management Trials G. Effect of pneumonia case management on mortality in neonates, infants, and preschool children: a meta-analysis of community-based trials. *Lancet Infect Dis*. 2003;3(9):547-56.
12. Theodoratou E, Al-Jilaihawi S, Woodward F, Ferguson J, Jhass A, Balliet M, et al. The effect of case management on childhood pneumonia mortality in developing countries. *Int J Epidemiol*. 2010;39 Suppl 1:i155-71.
13. Ratnayake R, Ratto J, Hardy C, Blanton H, Miller L, Choi M, et al. The Effects of an integrated community case management strategy on appropriate treatment of children and child mortality in Kono District, Sierra Leone: a program evaluation. *American Journal of Tropical Medicine and Hygiene* 2017, In Press.
14. Amouzou A, Hazel E, Shaw B, Miller NP, Tafesse M, Mekonnen Y, et al. Effects of the integrated Community Case Management of Childhood Illness Strategy on Child Mortality in Ethiopia: A Cluster Randomized Trial. *Am J Trop Med Hyg*. 2016;94(3):596-604.
15. Amouzou A, Kanyuka M, Hazel E, Heidkamp R, Marsh A, Mleme T, et al. Independent Evaluation of the Integrated Community Case Management of Childhood Illness Strategy in Malawi Using a National Evaluation Platform Design. *Am J Trop Med Hyg*. 2016;94(6):1434-5.
16. Munos M, Guiella G, Roberton T, Maiga A, Tiendrebeogo A, Tam Y, et al. Independent Evaluation of the Rapid Scale-Up Program to Reduce Under-Five Mortality in Burkina Faso. *Am J Trop Med Hyg*. 2016;94(3):584-95.
17. Bhutta Z, Lassi Z, Pariyo G, Huizho L. Global Experience of Community Health Workers for Delivery of Health Related Millenium Development Goals: A Systematic Review, Country Case Studies, and Recommendations for Integration into National Health Systems. Geneva; 2010.

18. Bryce J, Victora CG, Habicht JP, Black RE, Scherpbier RW, Advisors M-IT. Programmatic pathways to child survival: results of a multi-country evaluation of Integrated Management of Childhood Illness. *Health Policy Plan*. 2005;20 Suppl 1:i5-i17.
19. Oliver K, Young M, Oliphant NP, Diaz T, Kim J. Review of Systematic Challenges to the Scale-up of Integrated Community Case Management. UNICEF; 2012.
20. MCHIP. Integrated Community Case Management of Childhood Illness: Documentation of Best Practices and Bottlenecks to Program Implementation in Senegal. Washington, DC; 2012.
21. MCHIP. Integrated Community Case Management of Childhood Illness: Documentation of Best Practices and Bottlenecks to Program Implementation in the Democratic Republic of the Congo. Washington, DC; 2012.
22. UN Inter-agency Group for Child Mortality Estimation. Child Mortality Estimates 2015 [Available from: <http://www.childmortality.org/>].
23. Fund for Peace. Fragile States Index 2016. 2016.
24. UN Office for the Coordination of Humanitarian Affairs. South Sudan Crisis Situation Report No. 55. 2014.
25. IPC Technical Working Group. Integrated Food Security Phase Classification, Republic of South Sudan, Communication Summary, September 2014. 2014.
26. ACAPS. Disaster Needs Analysis - South Sudan 2014 [Available from: http://reliefweb.int/sites/reliefweb.int/files/resources/south_sudan_upper_nile_unity_and_jonglei_conflict_may_2014.pdf].
27. Amin L, Dessie M. Semi-Quantitative Evaluation of Access and Coverage (SQUEAC) International Rescue Committee (IRC) Panyijiar County, Unity State South Sudan Comprehensive Emergency Response in South Sudan. 2014.
28. International Rescue Committee. South Sudan Mortality Survey. 2012.
29. Guenther T, Lainez YB, Oliphant NP, Dale M, Raharison S, Miller L, et al. Routine monitoring systems for integrated community case management programs: Lessons from 18 countries in sub-Saharan Africa. *J Glob Health*. 2014;4(2):020301.
30. Coordinated Assessments. Inter-agency Initial Rapid Needs Assessment, Ganyliel, Payinjiar County. 2014.