



SQUEAC assessment of the ACF and IRC services to treat both moderate and severe acute malnutrition
Former Aweil East County, Northern Bahr-el-Ghazal, the Republic of South Sudan.

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Cover photo: mothers and bystanders congregate for a health and nutrition session at Lieth OTP.

Abbreviations

ACF	Action Contre la Faim Action Against Hunger
BBQ	Boosters, Barriers and Questions
CHD	County Health Department
CHW	Community Health Worker
CMAM	Community based Management of Acute Malnutrition
IRC	International Resuce Committee
MAM	Moderate Acute Malnutrition
MUAC	Mid-upper Arm Circumference
OTP	Out-patient Therapeutic Programme
RRC	Relief and Rehabilitation Committee
RUTF	Ready-to-Use Therapeutic Food
RUSF	Ready-to-Use Supplementary Food
SAM	Severe Acute Malnutrition
TSFP	Targeted Supplementary Feeding Programme
SMART	Standardised Monitoring and Assessment of Relief and Transitions
SQUEAC	Semi-quantitative Evaluation of Access and Coverage
SC	Stabilization Centre
SSP	South Sudanese Pound

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Executive Summary

In **February 2016** a coverage assessment of services to treat both moderate (MAM) and severe (SAM) acute malnutrition was conducted in the former Aweil East County in the Republic of South Sudan. The assessment used the **SQUEAC** (semi-quantitative evaluation of access and coverage) methodology and covered services delivered by Action Against Hunger (ACF) (treatment of SAM and MAM) and the International Rescue Committee (IRC) (treatment of SAM).

The assessment identified a coverage estimation of **35.8% [CI 95%: 23.6%-50.2%]** for the outpatient therapeutic programme (OTP) to treat SAM and **5.6% [CI 95%: 0.9%-10.3%]** for the targeted supplementary feeding programme (TSFP) to treat MAM.

The quantitative and qualitative data analysis revealed a **series of boosters and barriers to access giving us information on what was positively and negatively influencing coverage**. Positive factors included the existence of a community nutrition volunteer network, community based distributors and health staff in clinics that were screening and referring children to treatment services. At community level, leaders were found to be aware of services, which coupled with the general good reputation of the programme, lead to referrals. Finally, a general good awareness of malnutrition and treatment services contributed to children accessing services.

Factors that affect coverage negatively (or barriers) were found to be more numerous. Those that were found to have the greatest impact on coverage included the long distances required to travel in order to get to treatment sites and the lack of available transport. Rejection of cases for admission into the programme was also found to have a strong impact on coverage. This meant that cases made the sometimes long journey to the site, only to be refused admission. Whether this was a correct rejection (not meeting the admission criteria) or incorrect (poor application of protocols) the effect was similar in that it contributed to a bad reputation in the community. One of the most significant reasons for refusal was the stock out of ready-to-use-supplementary foods (for treatment of MAM) which had a strong impact on coverage of MAM treatment services.

The **community aspect of the programme was found to be limited**. Although there was some screening and referral happening at community level, sensitisation on health and nutrition was found to be missing. This mean that the programme was not raising awareness to overcome understanding of malnutrition and treatment that delayed admission. Health seeking behaviour was found to prioritise alternative treatments (such as traditional medicine and local pharmacies) rather than the treatment services available.

At **clinic level, certain areas were found to be in need of improvement**. Poor record keeping and inaccurate application of nutrition protocols meant that defaulters were difficult to track and cases were discharged earlier than they should. The weak interface between some outpatient therapeutic programme (OTP) feeding sites (for SAM treatment) and targeted supplementary feeding programme (TSFP) sites (for MAM treatment) also meant that cases referred from one to the other did not always achieve a strong continuum of care. Lack of awareness over the difference between OTP and TSFP, and MAM and SAM, amongst caregivers also added to the general confusion over the services, and therefore negatively impacting coverage.

In collaboration with IRC, ACF and community health department, **the following recommendations** were developed to address these barriers and build on the boosters:

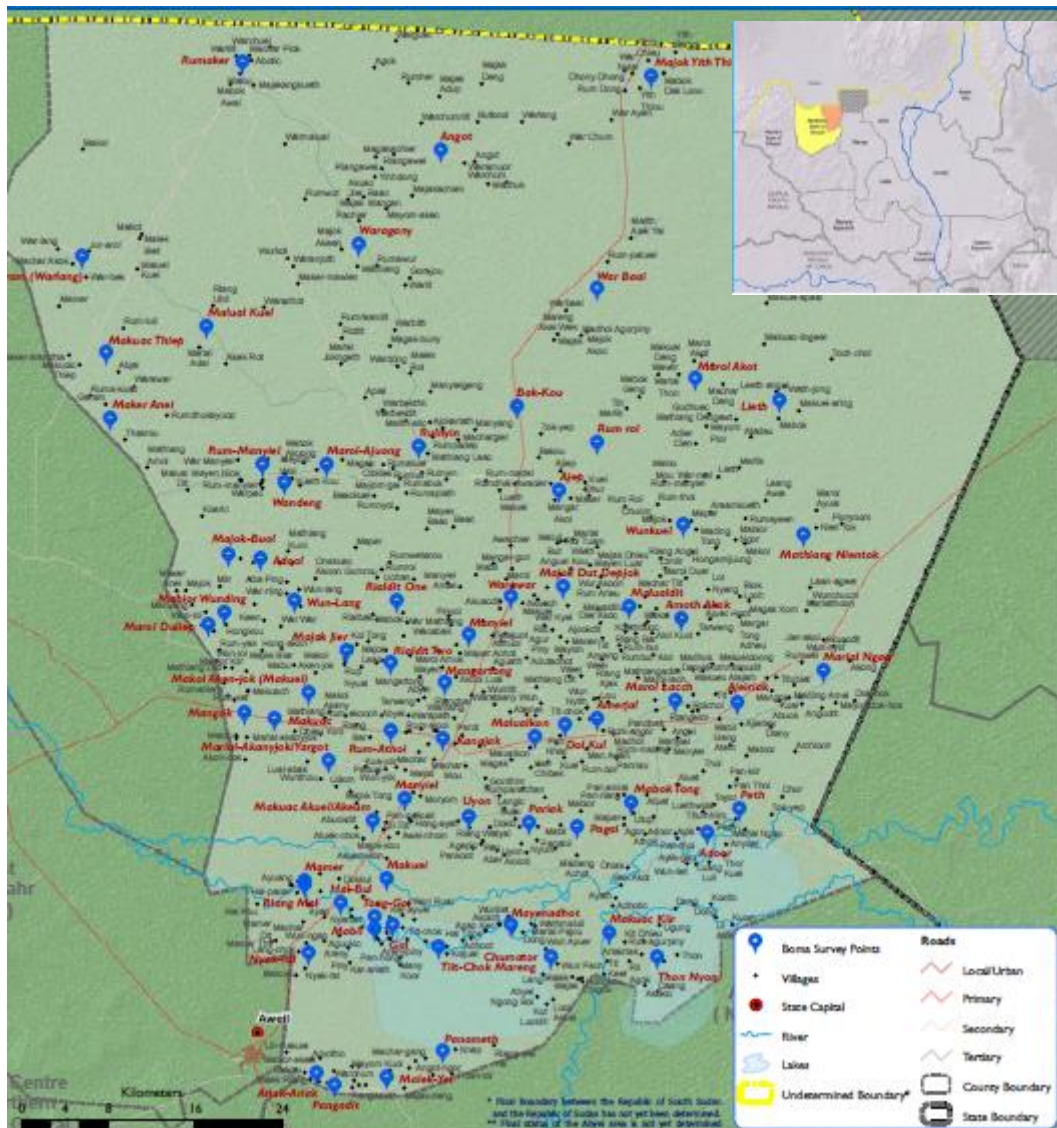
- Improve community mobilisation through better engagement with existing community structures and actors
- Improve the interface between OTP and SFP
- Improve data management and reporting from facility to base level
- Increase the network of people able to screen and refer children
- Increase support provided to caregivers to enable access to the OTP
- Improve efficiency of CMAM sites and reduce overall time spent there for caregivers
- Improve communication and sensitisation strategy and messaging
- Take action to reduce leakage of RUTF/RUSF onto the market

These were coupled with a series of specific actions, those responsible identified and the level of priority in an Action Plan. ACF and IRC staff should ensure the implementation and follow-up of these activities in order to improve access and coverage of SAM and MAM treatment services in the former Aweil East County.

1. Introduction

Action Against Hunger USA (ACF) have been delivering treatment of acute malnutrition in Aweil East County, Northern Bahr-el-Ghazal in the Republic of South Sudan since 2002. Depending on the available funding (which has generally been 6-9 month grants) the number of outpatient therapeutic programme (OTP) or targeted supplementary feeding programme (TSFP) sites has varied. At present this includes the support of 12 OTP sites 10 TSFP sites and 1 inpatient facility in Maluaklon. The International Rescue Committee (IRC) has delivered OTP services since 2013 at 12 additional sites across the former Aweil East County. See Annex 1 for a map showing locations of ACF and IRC sites. Figure 1 shows a map of the former Aweil East County.

Figure 1 Map of the former Aweil East County (Source: IOM Village Assessment Survey 2013)



Although a coverage assessment was conducted every year from 2009-2012, no assessment has been undertaken since. A new funding period will begin in April 2016, giving the programme a significant boost in terms of resources, not least for substantial community mobilisation activities. It is hoped this will result in significant improvements in coverage. Therefore a coverage assessment was deemed appropriate, first to provide a baseline to the upcoming programme period and second to provide analysis on the present programme to inform the new activities. A further reason for the coverage assessment was to collect information on the appropriateness for the former Aweil East County as a research site for the ComPAS (Combined Protocol for Acute Malnutrition Study) project which seeks to

investigate the feasibility of a joint protocol (using only ready-to-use therapeutic food) for the treatment of SAM and MAM¹. A coverage assessment offers an opportunity to identify challenges and opportunities related to the interface between SAM and MAM treatment.

Since not only a coverage estimation is required but also in depth analysis of programme performance and barriers to access, it was decided that a semi-quantitative evaluation of access and coverage (SQUEAC) should be the most appropriate methodology to use.

Therefore the objectives for the assessment were as follows:

1. To estimate coverage of OTP and TSFP
2. Identify factors affecting the uptake of OTP, SC and TSFP services in the former Aweil East County (Barriers and Boosters)
3. Develop in collaboration with ACF, IRC and MoH specific recommendations to improve acceptance and coverage of the Program.
4. Enhance competencies of ACF nutrition technical teams in SQUEAC methodology

2. Methodology

The SQUEAC methodology² was chosen in order to determine the coverage rate in the county and to provide recommendations to improve coverage and a rich body of evidence to underpin them. The SQUEAC took place in the following stages:

Stage 1: An analysis of all quantitative data, collection and analysis of qualitative information and the identification of negative and positive factors effecting coverage.

During Stage 1 more detailed qualitative information (than typically in SQUEACs) was collected in order to develop a community profile and more comprehensive recommendations for community mobilisation.

Stage 2: Development and testing of hypothesis to confirm (or deny) assumptions related to areas of high or low coverage, and to ascertain whether coverage is uniform throughout the county

Stage 3: Wide-area survey to determine county wide coverage estimate using Bayesian techniques

The core SQUEAC team consisted of eight people from Action Against Hunger (ACF-USA), IRC, RRC and the County Health Department (CHD). The majority of the team participated throughout the evaluation, including data collection, analysis and training. An additional team of 18 enumerators were recruited for the wide-area survey.

The assessment took place over the course of three weeks from 3rd-19th February³.

Although largely speaking the assessment took place without major problems, there were certain limitations that should be highlighted. First there were no women at all in the assessment team. Although there were no explicit limitations on men speaking to women, it is likely that the data collected (especially during the qualitative stage) was limited by the fact that we only had men investigators to converse with female informants. Second, the availability and quality of the programme data was limited. For example, ACF had introduced separate data collection for four of the OTP sites (low case load) in November last year (previously they were combined with nearby sites) and IRC were able to provide workable electronic data from September 2015. That said, we were able to overcome this with an analysis of OTP cards that enabled us to assess data quality (and to some extent programme performance) at source.

¹ See XXX for more information.

² M Myatt et al 2012 *Semi-Quantitative Evaluation of Access and Coverage (SQUEAC)/Simplified Lot Quality Assurance Sampling Evaluation of Access and Coverage (SLEAC) Technical Reference*. Washington, DC: FHI 360/FANTA.

³ See Annex 2 for a full work plan

3. Context

3.1. Overview of the Area

The former Aweil East County is one of five counties in the former Northern Bahr-el-Ghazal (NBeG) State. There were formerly 10 states in South Sudan, but recently 28 states have been established. Aweil East is bordered by Aweil South and Aweil Centre to the south, Aweil West and Aweil North to the west, South Darfur State in Sudan to the north, the Administrative Area of Abyei and, Twic County and Gorgrial West County (both Warrap State) to the East. The county is further divided (from top to bottom) into seven Payams. The Payams are divided into Bomas. A boma is selection of villages, of which there a 71 according to the IOM Village Assessment Survey conducted in 2013.⁴

Aweil East would be described as arid, prone to rain shortages, drought and flooding. The southern part of the county, known as the lowlands, is more prone to flooding due the existence of a river that flows from the border with Warrap State to the borders with Aweil South and Aweil West Counties.

3.2. Population

Aweil East has an estimated population of 499,041⁵, 31% of whom are considered as returnees. After the peace agreement of 2005 many people returned having fled during the conflict. Generally speaking these populations are poorer, with less established dwellings and livelihoods. Both returnee populations and host populations are organised into villages each of which has a village leader or gol leader. A group of villages (from 3-7) make up a boma, which is administered by a sub-chief or boma administrator.

The exact number of bomas and villages in the former Aweil East County is uncertain. This is largely due to the various understandings of both village and boma boundaries. The IOM Village Assessment Survey (2013) estimated 71 bomas and 702 villages, whereas population data provided by the RRC indicates 190 bomas and 1731 villages⁶, and the SMART survey in 2015 used 1228 villages. This lack of clarity was also experienced by the assessment team when trying to find sampled villages.

The main ethnic group in the former Aweil East County is the Dinka who are generally Christian however there are also small numbers of Messeryie who are generally Muslim. Whereas the Messeryie are usually traders bringing in goods from outside of the county, the Dinka population tend to have a livelihood of keeping cattle (for consumption and trade), fishing (in lowlands) and small-scale farming.

The availability of reliable water is of the utmost concern to residents in the county. In fact, a recent survey showed that only 6% of respondents have access to reliable drinking water⁷. This was by far the most cited challenge by informants along with the lack of opportunities for work, prevalence of morbidity, the lack of agricultural land as well as tools and seeds, the fluctuating price of food, the lack of available school places and, in some cases, the lack of close health services.

3.3. Nutrition Situation

The SMART survey conducted by ACF in November 2015 showed a GAM rate of 25.6% according to weight-for-height z-scores. This significantly exceeds the WHO emergency threshold of 'critical' (>15%)⁸ therefore requires continued investment in an effective response.

	W/H z-score	MUAC and/or oedema
GAM	25.6 % (CI 95%: 22.3 - 29.3)	6.5 % (CI 95%: 4.2 - 9.8)
MAM	18.5 % (CI 95%: 15.8 - 21.5)	4.7 % (CI 95%: 2.8 - 7.9)
SAM	7.2 % (CI 95%: 5.1 - 9.9)	1.7 % (CI 95%: 0.9 - 3.2)

⁴ IOM Village Assessment Survey 2013

⁵ IOM Village Assessment Survey 2013

⁶ 2008 population census?

⁷ ACF WASH Governance report, May 2015

⁸ WHO, 2003, "The Management of Nutrition in Major Emergencies"

3.4. Nutrition services

In the former Aweil East County there are 35 Primary Health Care Units or Centres (PHCU/C) and 24 OTP sites (12 run by ACF and the other 12 by IRC). 11 of the ACF sites also deliver TSFP, largely once every 2 weeks. Of these 24 OTPs 19 are based at PHCU/C sites. The ACF OTPs have independent structures from which to operate the treatment services and IRC tend to set up the OTP on the PHCU site but not using any of the buildings (under a tree for example). Therefore there are 16 PHCU/C that do not have CMAM services.

Five of the ACF CMAM sites are referred to as 'low case-load' or mobile sites. These sites were added in April 2015 in order to extend the reach of the services into areas that were far from the existing OTP sites. This decision was made based on feedback from community members and mothers that there were large numbers of mothers unable to travel the distance to the CMAM site.

Each IRC OTP has a permanent team that runs the OTP three days/week, community mobilisation on one day and then reporting on the fifth day. Each OTP has two community nutrition workers (CNW) and 10 community nutrition volunteers (CNV). Each OTP team is supported by an OTP supervisor (who looks after three OTPs). The CNVs are tasked with undertaking active case-finding at village level and referring SAM and MAM children to the OTP.

ACF runs different operational model whereby there are three teams that serve all 12 sites, each on one or two days each week. Each team consists of four CNWs and the CNVs are attached to a particular site. There are 105 CNVs and each site has between 5-10 CNVs to conduct active case-finding in the surrounding villages. The level of activity performed by the CNVs is uncertain, and supervision limited, therefore we cannot be sure that they are all active.

It was recently discovered that the INGO BRAC is also operating SAM treatment services in the former Aweil East County. It has been said that they have up to 15 mobile OTP sites throughout the county able to access remote areas since they travel by motorbike. A lack of coordination amongst the three CMAM actors has led to some confusion amongst the population, since different information has been given as to when the next OTP is and where the nearest site can be found (this was witnessed during the assessment). After some initial challenges ACF, IRC and BRAC are now beginning to coordinate their service delivery.

ACF also operates a stabilisation centre (SC) in Maluakon for the treatment of SAM cases with complications on an inpatient basis. There is also an SC (run by MSF) in Aweil town, which is closer than Maluakon for many of the communities in the south of the county.

ACF run water, sanitation and hygiene (hygiene promotion, water point management, bore-hole construction), as well as food security and livelihoods (cash transfer) programming. Largely speaking the nutrition treatment services run in parallel to these other responses.

IRC are running a health programme whereby they support the county health department with integrated community case management (iCCM) of the treatment and prevention of pneumonia, malaria and diarrhoea. At community level this is provided by community based distributors (CBD) who are sometime trained in screening for malnutrition using mid-upper arm circumference (MUAC) tapes and referring malnourished children to the nearest treatment site.

3.5. Previous coverage assessments

There have been four coverage assessments conducted in Aweil East County since the beginning of the programme; two with the CSAS (Centric Systematic Area Sampling) method (2009 and 2010) and two with the SQUEAC method (2011 and 2012). Coverage has not gone below 33% however nor has it reached the SPHERE standard for rural CMAM programmes (50%) achieving a maximum of 45.5% in 2011. Table 1 shows coverage estimations from each year from 2009 to 2012.

Table 1 past coverage estimations for Aweil East County (2009-2012)

	2009 (CSAS)	2010 (CSAS)	2011 (SQUEAC)	2012 (SQUEAC)
point coverage	42.0% (95% CI = 28.2% - 56.8%)	38.6% (95% CI = 26.0% - 52.4%)	45.5% (35.0% - 56.2%)	33.25% (24.0% - 43.8%)

period coverage	69.8% (95% CI = 59.6% - 78.7%)	56.3% (95% CI = 44.7% - 67.3%)	??	60.9% (52.8% - 68.4%)
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These coverage assessments also highlight the most important factors limiting access to treatment and depressing coverage. These are listed in Table 2. For the CSAS these were the most frequent reasons for non-attendance given by carers of uncovered SAM cases found during the survey, however for the SQUEACs these are the barriers identified during Stage 1.

Table 2 Key factors found to limit coverage during assessments from 2009-2012. Colours have been used to link reoccurring factors.

2009	2010	2011	2012
Lack of knowledge on the ACF-USA Nutrition program	It is too dangerous to travel /clan conflicts and family	Supplies	Awareness on malnutrition & treatment available
Caretaker lacks time to come to OTP	Distance	Motivation of CNVs	Supply shortages
Rejection in OTP	Do not know where to go	Communication	OTP service provision/ Rejection
Long distance and transport	Waiting times too long	Distance	Distance
	I need to be referred but there is no one to do this	Work materials	Physical barrier
	Traditional healer	Few number of staff at OTP	Social barrier
	Mother/carer sick	Lack of training for CNVs	Community mobilisation
	Other children rejected	Health seeking behaviour	RUTF perception/acceptance
	Care taker lack of time to take children to OTP	Rejection	Stigma
	Child/sibling in OTP but discharged	Follow-up/referral	
	No transport means to OTP/flooding and swamps	defaulting	

There are certain re-occurring issues that are worth highlighting. For example the journey necessary in order to reach SAM treatment was a limiting factor across all assessments. This was not only related to the distance but also to the availability of transport and the accessibility of the roads. Awareness relating to the services available as well as to malnutrition itself appeared in three out of the four assessments. In the later assessments, issues relating to community mobilisation and CNVs were highlighted as limiting factors. Finally, supply shortage also emerged as a factor during the most recent assessments.

4. The Investigation

4.1. Stage 1: Quantitative Analysis

Quantitative data analysis was performed for both OTP and TSFP using both monthly reporting systems collected using Excel data bases and an analysis of admissions cards. ACF and IRC use different reporting systems, and different admissions cards, so in most cases compilation was not possible. Data was analysed, where possible, for January to December 2015.

Data per individual case admitted was available for 7 out of 12 ACF OTPs for the whole of 2015. Reporting for the other 5 OTPs was previously incorporated in nearby sites. Admissions and discharge data for each OTP was also available. For IRC admissions and discharge data for each OTP was available in a compiled database from September to December. Total admissions (for whole County) were however available for most of 2015.

4.1.1. Treatment of SAM (OTP)

Admissions over time

A total number of 11,333 SAM children were admitted from January to November 2015. 5241 for IRC OTPs and 6092 for ACF. The progression from January to November 2015 can be seen in Figure 2.

Figure 2 Admissions over time for both ACF and IRC OTPs from January-November 2015

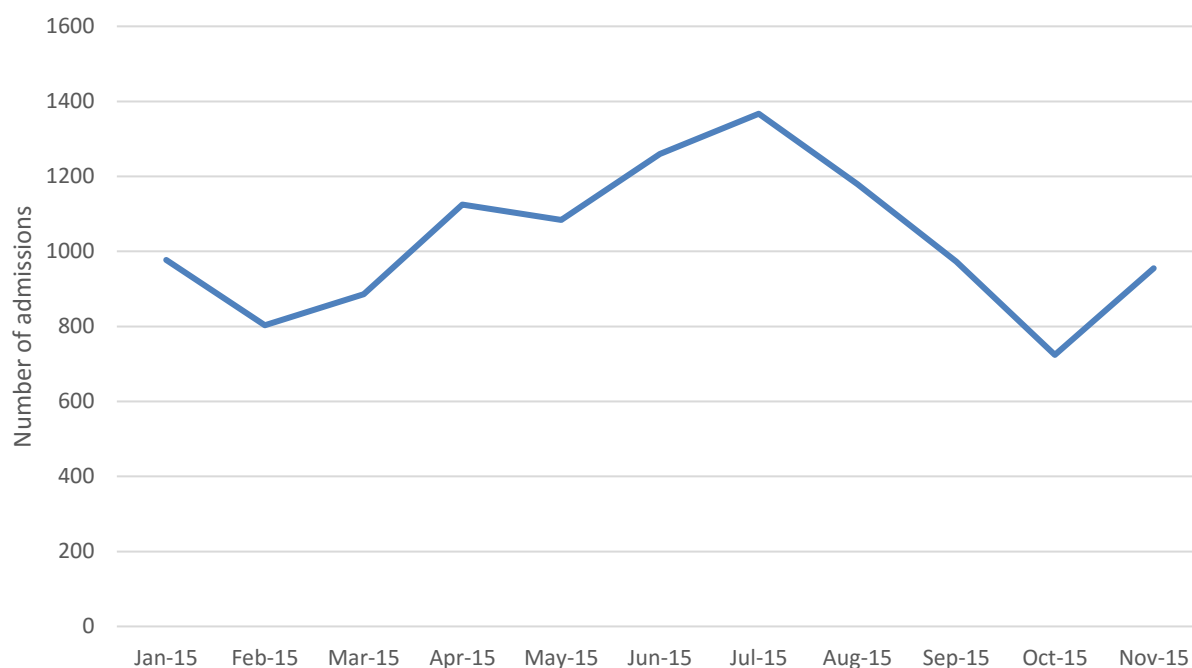
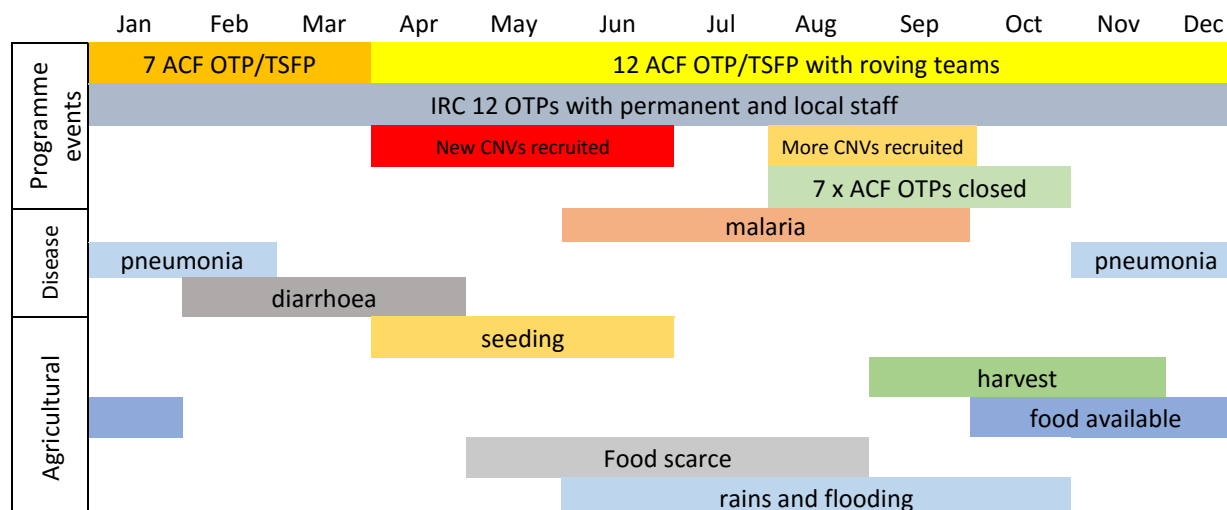


Figure 3 Seasonal calendar constructed during qualitative data collection⁹



We can notice a steady increase from January to July which reflects the recruitment of additional CNVs in April. However a second recruitment of CNVs in August did not have the same effect. This is likely due to the fact 7 ACF OTPs were closed due to heavy rains making access to the OTP sites for staff not possible. When the OTPs were functioning again we see an immediate incline in admissions.

⁹ The programme events calendar was collected during interviews with ACF and IRC staff. The disease and agricultural calendar was triangulated from information collected during 5 focus group discussions (3 men and 2 women) and 4 interviews (2x village leader and 2xmothers).

Up until March 2015 the seven ACF OTPs had permanent teams operating OTPs three days a week, whereas the roving OTPs only operate once per week on each site. So although the number of sites increased from 7 to 12 the decrease in total OTP days (from 21 to 12) means the increase in sites is unlikely to have contributed to increase in admissions. This decrease in total days is down to a cut in funding and therefore human resources dedicated to the nutrition programme.

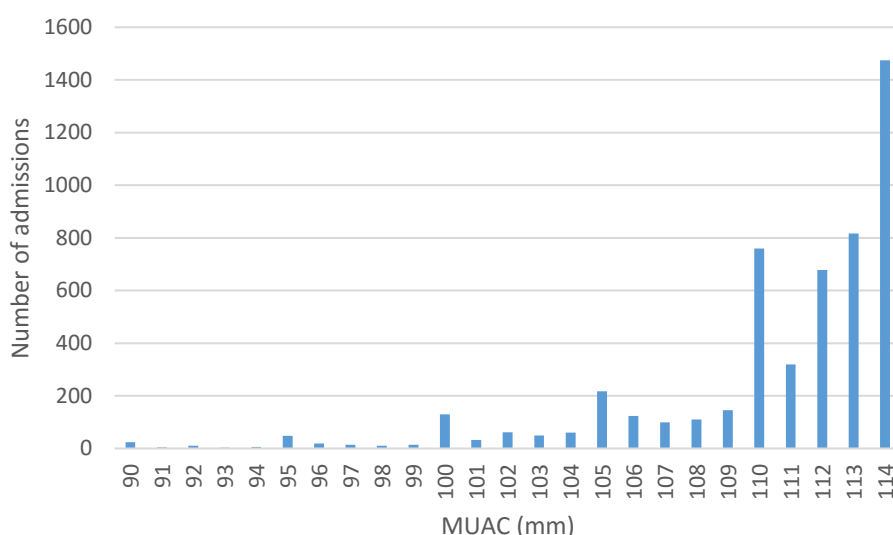
The peak in admissions during from May to August can also be explained by the increased prevalence of malaria. Mothers are more likely to present their child at the health centre when another illness is present and also children with malaria are more likely to develop malnutrition. In addition, this is the period before harvest when food is scarce and therefore the prevalence of malnutrition greater having an upward effect on admissions.

Admissions were also disaggregated by OTP which allowed us to identify any OTPs that had particularly high or low admissions, and then to question why. For example we found that Maluakon OTP makes up a significant proportion of admissions and that admissions for the 'low caseload' OTPs (Wieth Lou, Mabilbiet, War Malual, Marol Ajuong and War Berdit) were not recorded in the current data base until November 2015 which is likely to have depressed the admissions figures.

MUAC on admission

MUAC on admission analysis was conducted for ACF OTPs with electronic data and for a sample of OTP cards from both ACF and IRC. Both analyses revealed similar findings. In both cases only MUAC admissions were analysed.

Figure 4 MUAC on admission for ACF OTP admissions between Jan-Dec 2015 (n=5228)



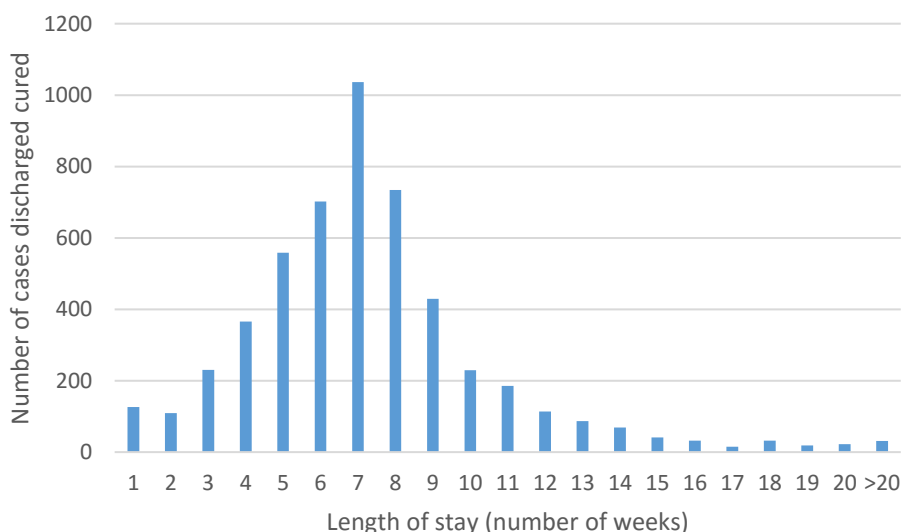
The median MUAC on admission is 112mm, which indicates that generally cases are being admitted early. Figure 3 shows that the majority (77%) of cases were admitted in the early stages of the SAM episode (110-114mm). This is encouraging and shows that SAM cases are usually being admitted before they have the condition has the chance to develop. This could be down to good awareness amongst the caregivers or good case-finding. That said there was also a substantial amount (13% of sample) of admissions that came in late (105-109mm) and others (9%) admitted in a critical condition (MUAC less than 105mm). This indicates that there is still some important work to do in case-finding and increasing awareness amongst the population to ensure that cases are admitted before they develop.

MUAC on admission also allows us to assess the accuracy of MUAC measurements. Here we can see a significant preference for a MUAC of 114mm. This indicates that measurers are pulling the MUAC tape tighter to ensure the case qualifies. In a normal population we would not see such a preference. There is also a preference for measurements of 100, 105 and 110, which indicates measurers are rounding measurements to the nearest multiple of 5.

Length of stay

Length of stay analysis was also conducted for all OTPs via the OTP cards (ACF and IRC) and the electronic data (ACF). The findings from the OTP cards were similar to that of the electronic data presented here. Length of stay is collected for all cured cases and presented in Figure 5.

Figure 5 Graph showing length of stay for cured cases from ACF OTPs in 2015 (n= 5166)



The median length of stay is 7 weeks which complies with both international and national standards. That said there is a significant proportion (13%) of cases under-going treatment over more than 10 weeks. This indicates that the correct treatment protocol is not being followed. For example, the child is not receiving the corrected dosage of RUTF (due to selling or sharing for example) or has other complications (such as diarrhoea). CMAM programmes should endeavour to keep lengths of stay low in order to decrease the likelihood of defaulting and to decrease costs (in RUTF). Therefore if a child is not recovering at an expected rate, programme staff should investigate reasons including a home visit from CNVs.

Discharge Outcomes

Discharge outcomes are an important indicator of performance that allow us to see what proportion of cases recover after treatment. This information was available for all ACF OTPs each month over the course of 2015 (see Figure 6) and per OTP for each IRC OTP from September to December 2015 (see Figure 7).

Figure 6 Discharge outcomes over time for ACF OTPs in 2015

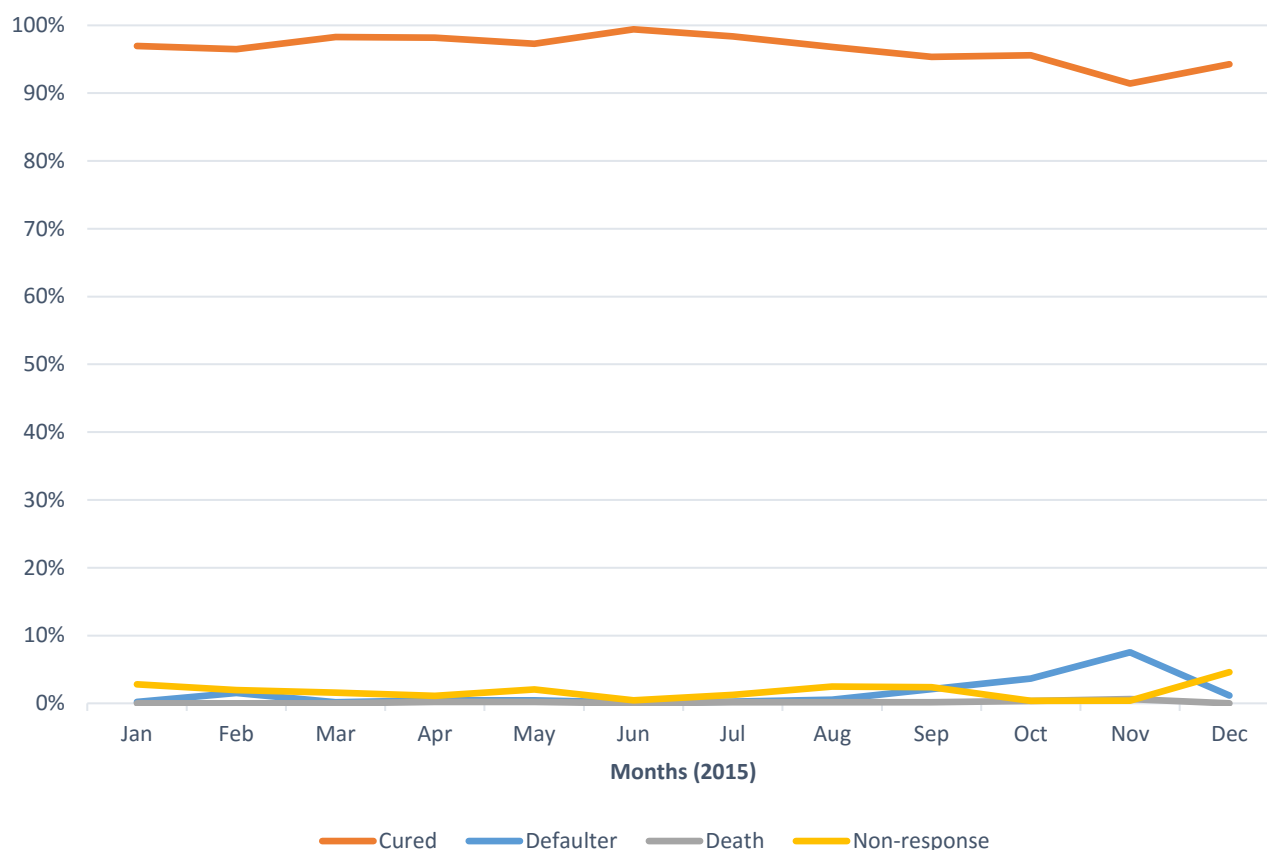
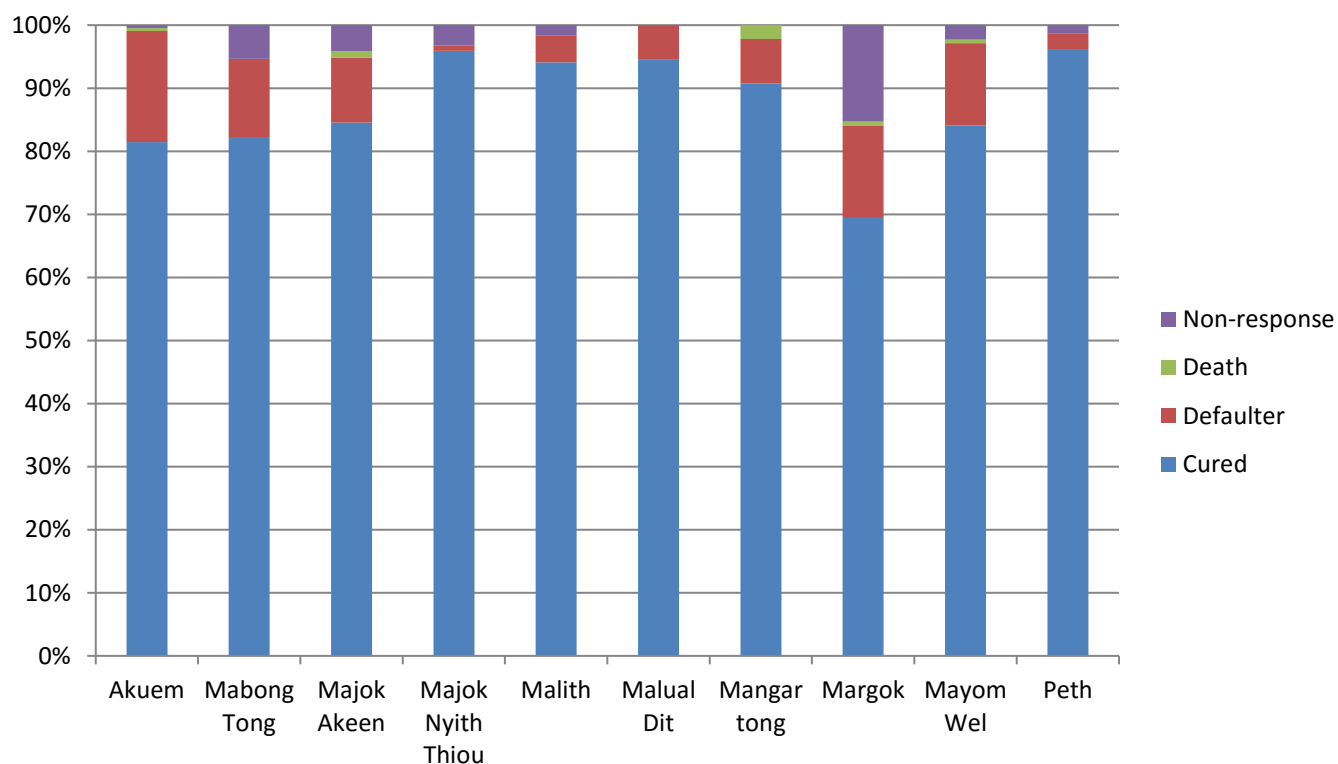


Figure 7 Discharge outcomes per OTP (IRC, Sept-Dec 2015)

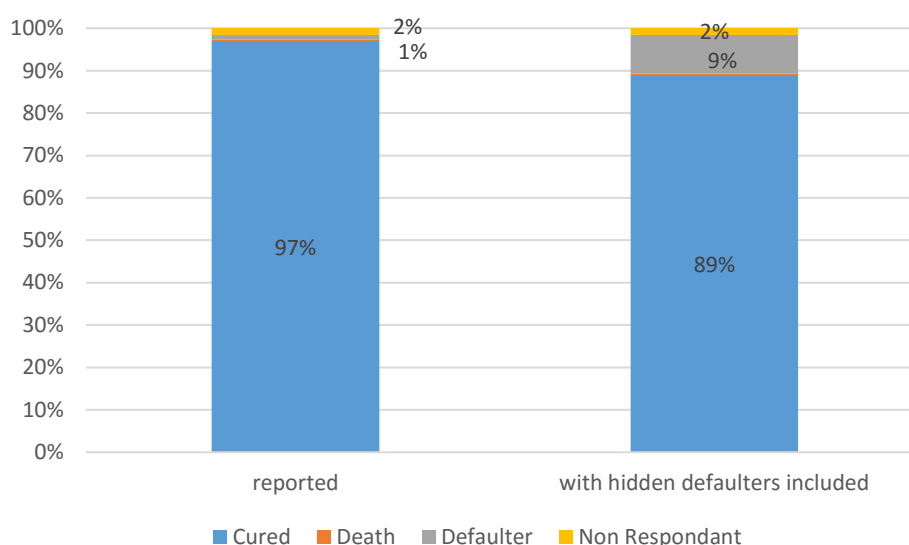


Both charts show that largely speaking ACF and IRC manage to achieve cure rates above Sphere standards (75%). In terms of IRC there we can see an exception in Margok OTP where there is a particularly high non-response rate. Further

investigation found no reason that was specific to Margok, but a more pronounced challenge in terms of poor compliance to treatment protocol on the part of the mother (not giving correct dose for example). Figure 6 shows a steady cure rate for ACF OTPs until November when there is a peak in defaulting. This is addressed below.

Further analysis of ACF's electronic data of individual cases found that often cases were discharged and declared 'cured' before the child had actually reached the discharge criteria. This meant that in fact the defaulter rate should have been 9% rather than the reported 1%. In some cases these children were in the recovery phase (i.e. no longer SAM) so not at serious risk, however in many cases they were being declared 'cured' when still severely malnourished. This demonstrates a lack of compliance with the discharge protocols from programme staff. Therefore a more accurate recovery rate is 89%, with defaulting at 9%, non-recovery at 2% and death at 0%. The incorrect application of the discharge criteria was triangulated with the OTP card analysis which also found cases being declared cured before reaching the discharge criteria.

Figure 8 Chart showing reported discharge outcome vs discharge outcomes with hidden defaulters counted (ACF) (n=6545).



Defaulting

Although according to reported discharges defaulting is not seen as a major problem, the level of hidden defaulters suggests that it is greater, and therefore a deeper analysis of defaulting is required. To this end numbers of defaulters over time (Figure 9), time to default (Figure 10) and MUAC on default (Figure 11) were analysed.

Figure 9 Chart showing numbers of defaulters over time for ACF OTPs

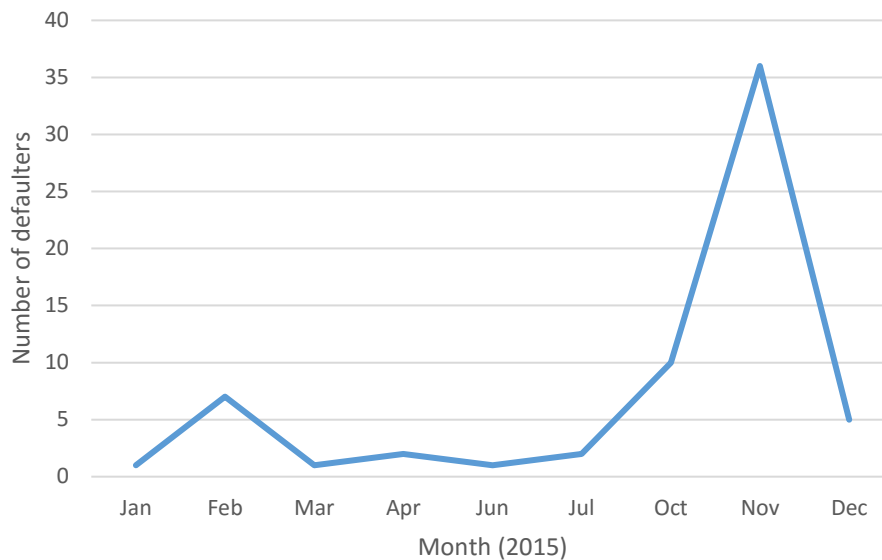


Figure 9 shows a low level of defaulters until November when we see a rapid rise. This peak does not correlate with a peak in admissions (See Figure 2) however it does correlate with the harvest which could explain why mothers cease to take their children for treatment during this time, since mothers are required to help with harvest.

Figure 10 Length of stay before default analysis for those cases recorded as default (n=63)

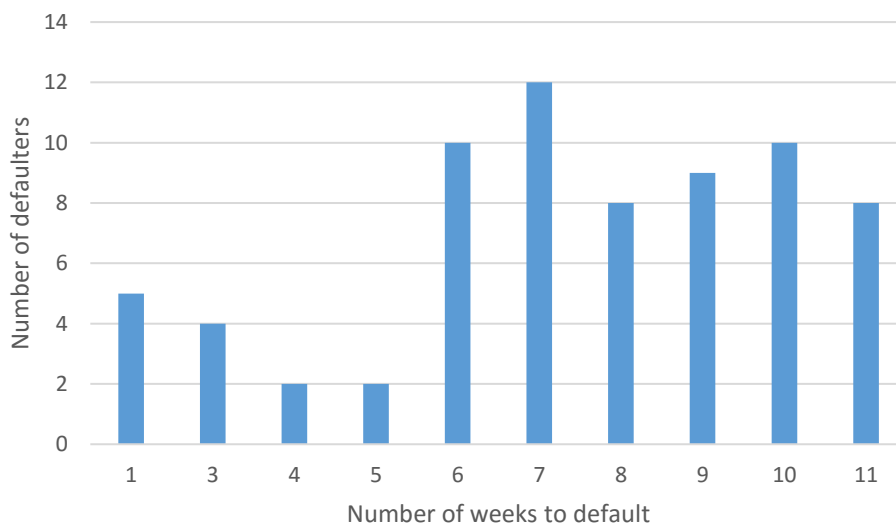
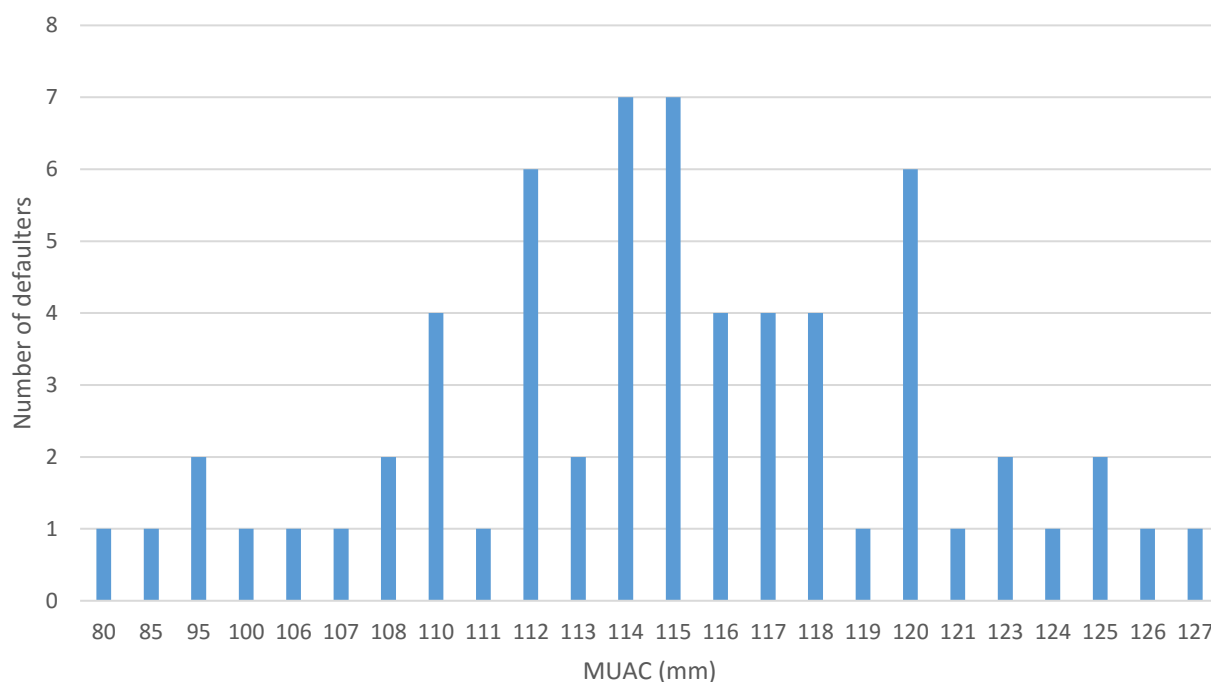


Figure 10 shows that most defaulting happens after undergoing treatment for at least 6 weeks. This indicates that mothers, having seen an improvement in their child's condition, cease to go to the OTP. This interplays with the long length of stay seen with some cases. The longer the stay (potentially due to poor compliance) the more likely we are to see defaulting happen. So if length of stay is reduced then defaulting is likely to as well.

A further look at defaulting cases, this time in terms of their MUAC on the last visit, allows us to see at what stage in the treatment cases are defaulting. In Figure 11 we can see that 46% of the cases defaulted when they were still SAM and 48% before that had developed out of MAM. Both figures are concerning since these children remain at risk and should be either being discharged healthy or referred to TSFP.

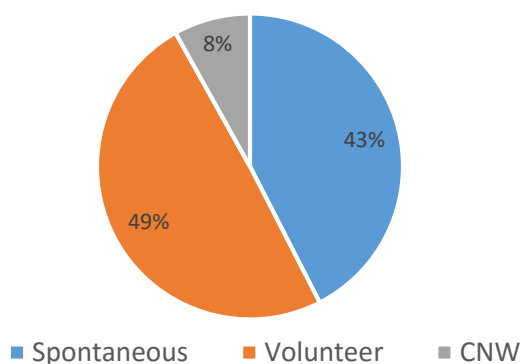
Figure 11 MUAC on discharge for defaulting cases of ACF OTP (n=63)



Type of referral

ACF electronic data also recorded the type of referral. This is useful information (illustrated in Figure 12) to see why cases came to the OTP.

Figure 12 Chart showing type of referral for all ACF OTP admissions in 2015 (n=5931)



This data shows that a large proportion (49%) of admissions come from CNVs ('volunteers'). This is encouraging as it indicates that CNV activity is having a significant effect on admissions. It is likely that lots of the spontaneous admissions were in fact referrals from the PHCU/C. This was witnessed during the qualitative but since it is not an option to record on the admissions care would not be reflected here.

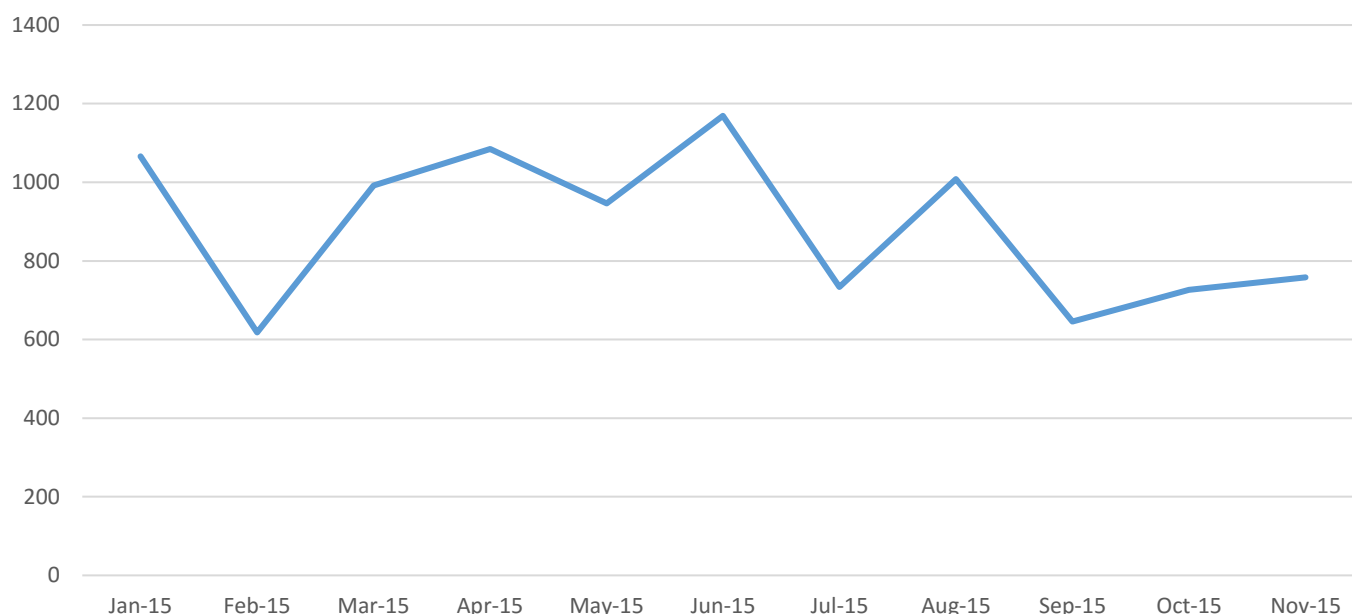
4.1.2. Treatment of MAM (TSFP)

Admissions over time

When plotting admissions over time for MAM cases we can see a similar pattern to that found in SAM admissions. For example we see a rise in admissions from March to June which more or less coincides with the period before harvest when food is scarce. In addition the expansion from 7 to 12 CMAM sites in April, although a reduction in total days, is likely to have had an upward effect on admissions. Although not recorded here, we would have also see a rapid drop

in admissions from December 2015 to January 2016 when the programme experienced a stock out of ready-to-use-supplementary food (RUSF) from WFP due to a delay in signing the funding contract.

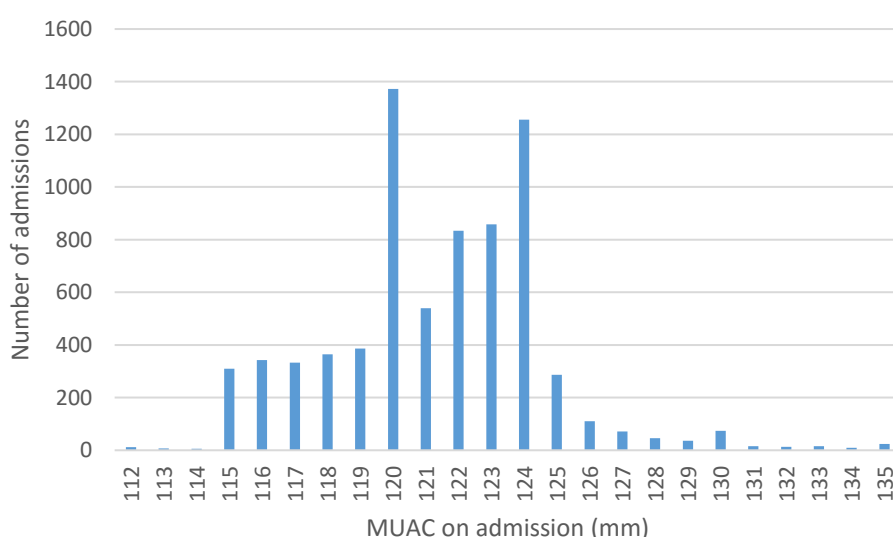
Figure 13 TSFP admissions over time (2015) (n=9748)



MUAC on admission

The MUAC on admission analysis was again done for only cases admitted on MUAC. First we can see a build-up of admissions at 124mm. This indicates that CHWs may be pulling the MUAC band tight in order to ensure admission. There is no other reason why we would see a disproportionate amount of admission at this MUAC measurement. Also there are a significant amount of admissions over 124mm (*NB* this analysis does not include weight-for-height only admissions). These cases should not qualify for admission suggesting a lack of understanding over the admission criteria.

Figure 14 MUAC on admission for TSFP (n= 7359)

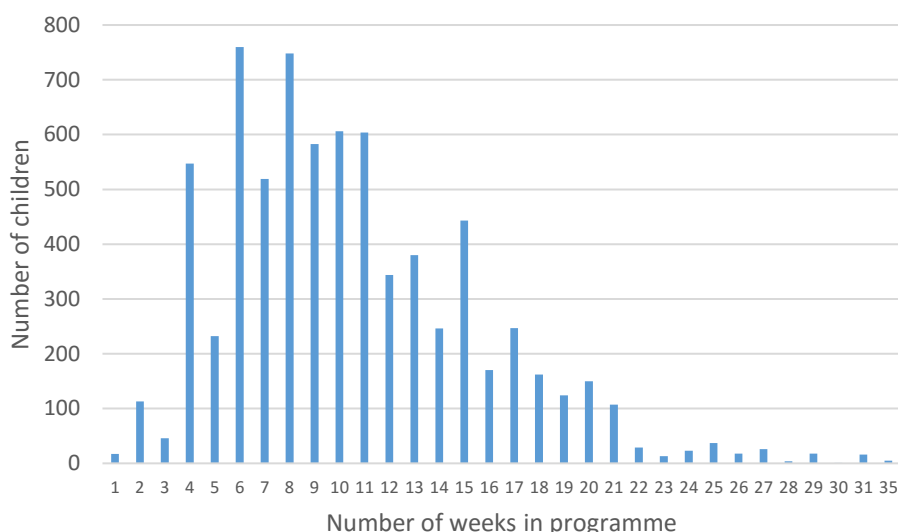


Length of stay

The length of stay analysis demonstrates that the maximum length of stay criteria (of 13 weeks) dictated by the TSFP ready pack is not being adhered to. This indicates that there are underlying reasons causing the child not to recover, and this is what should be addressed. This is likely to be that they are not receiving the dosages recommended or there

are accompanying problems with hygiene and morbidity. For example, during the qualitative research it was found that selling of RUSF was rampant.

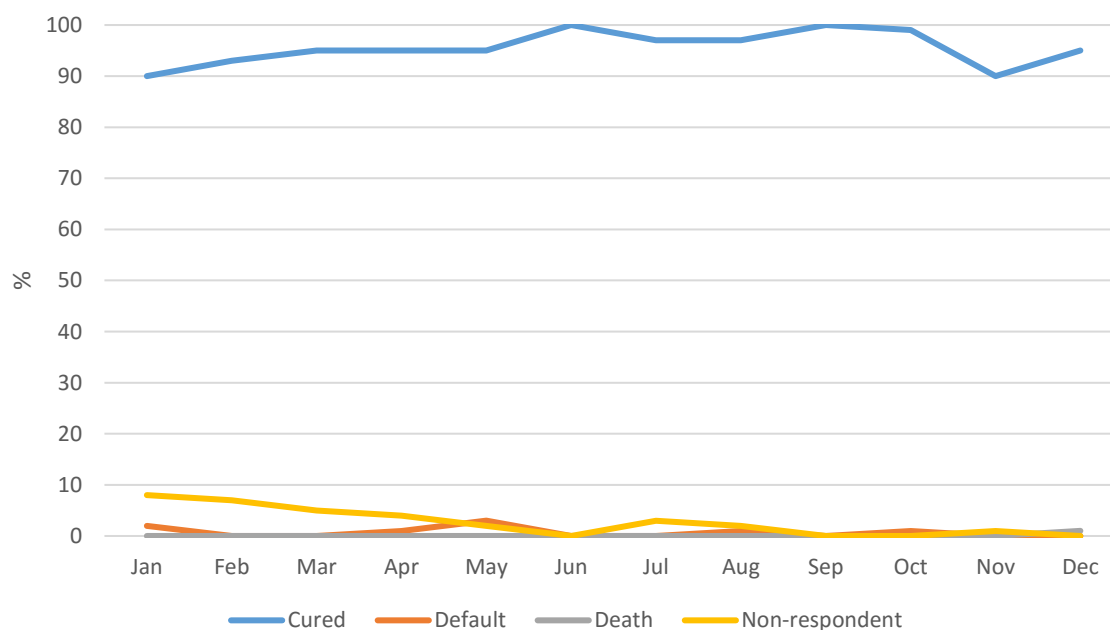
Figure 15 Length of Stay for TSFP (n=7359)



Discharge outcomes

As with the OTP discharge outcomes for TSFP were distorted due to the under-reporting of defaulters. Cases were being declared cured in the data base when in fact they were still MAM. In the case of TSFP this meant that defaulters were reported at 1% but were in fact 4%. Despite this the recovery rate of 94% was achieved during 2015 which complies with SPHERE standards. Overall, the non-response rate was 2%, and death almost 0%, which is to be expected in TSFP.

Figure 16 Discharges for SFP (with hidden defaulters) January-December 2015 (n=7632)



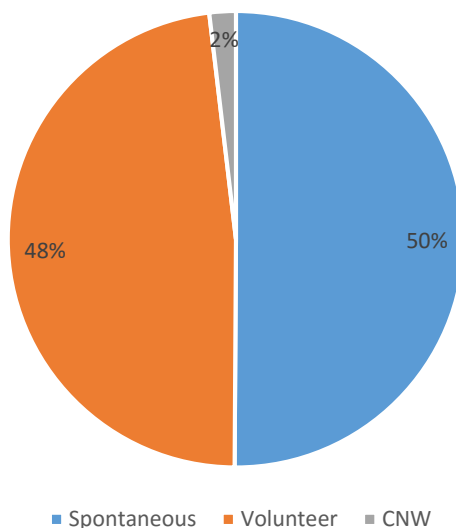
When looking at discharge outcomes for TSFP over time we do not see any remarkable patterns with the exception of the months of November and December when we see that they sum of the four key discharge outcomes is not 100%. This is because transfers to OTP/SC have been counted as a discharges. This is incorrect as these cases are technically

not leaving the programme as they are continuing treatment elsewhere. Including these cases can have a distorting effect on the key indicators. These cases should still be monitored however not included when calculating discharge outcomes.

Type of referral

When looking at the type of referral for MAM cases we can see that almost half are coming as a result of referral by CNWs (volunteers). As with OTP, this is encouraging as it suggests that CNVs are able to screen and refer cases, and that they are doing it.

Figure 17 Type of referral to TSFP (n= 7358)



4.1.3. General analysis of monitoring system and data records

An analysis of ACF OTP (n=262 from 5 different sites from August-December), IRC OTP (n=81 from 6 different sites from October to December) and ACF TSFP (n=92 from 4 different sites from August-October) admissions cards was conducted in order to triangulate findings from the electronic data (MUAC on admission for example) and to evaluate the quality of data records from the source, as well as adherence to protocols. A number of observations were made which can be integrated into on-going improvements of the monitoring system.

Largely speaking the admission and discharge criteria, adjusted in May 2015¹⁰, adhere to international standards (see Annex 3 for the full details), however the following elements are less typical and should be taken into account:

- Cases must only be discharged (from OTP or TSFP) when they satisfy *both* the weight-for-height (W/H) z-score criteria and the MUAC criteria for 2 consecutive weeks.
- When there is a TSFP present cases should be discharged from OTP when W/H is ≥ -3 Z score MUAC is ≥ 115 mm otherwise they should follow the 'Expanded Criteria' (MUAC ≥ 125 mm and W/H ≥ -2 z-score)
- There is also a specified 6 week minimum stay and 13 weeks maximum for TSFP and 8 week maximum stay for OTP. When this is reached they are discharged as non-respondent.

The analysis revealed confusion on discharge criteria in both SFP and OTP at ACF and IRC sites. Often cases are being discharged before they have met the criteria, sometimes after 1 week of meeting the criteria, rarely after achieving both for 2 weeks and sometimes cases are kept in beyond the discharge criteria. This shows a lack of clarity over when cases are being discharged which leads to confusion amongst mothers as well since staff are unable to give consistent messages to them.

¹⁰ CMAM TWG Recommendations, May 2015

There is also a deficit in W/H monitoring. In many cases, even in cases when a child was admitted on W/H, weekly monitoring of W/H measurements were not recorded. Observations of OTPs showed that in some cases there were no height boards present and some cases no scales. It does not help matters that one of the types of admission cards used did not have a space for recording height and weight measurements each week or even each month. In addition, some cards showed a recording of the child's weight and height, but did not show what the z-score was. This indicates that teams do not have the z-score chart or are unable to use it. Even when all the equipment is available teams often do not take weight and height measurements since it is considered too time consuming.

In terms of a minimum or maximum stay used, results were mixed. For example it appeared that ACF is sometimes discharging non-respondent at 8 weeks. Although this complies with the protocol it is concerning as some were discharged even when still severely malnourished (<105mm). Further investigation during the qualitative research revealed that there was no real protocol in place, such as home visits, to first mitigate such situations, and second to establish the reason for the non-respondent and then find a solution. On the other hand, IRC appear to be using a protocol of discharging non-respondent at 16 weeks.

Generally admission criteria was well understood with admissions within the admission criteria for both MUAC and W/H. However in a significant amount of cases it was found that TSFP cases with a MUAC over 124mm with no W/H z-score recorded were admitted. The absence of filling out information was a recurring problem across the admissions making the tracking of certain indicators and information difficult. For example, the date, admission criteria and village of origin, and chosen discharge criteria were frequently overlooked.

The ACF cards were shown to not reflect absent weeks, i.e. the following column was filled out with the details of the next visit rather than leaving a gap and noting that they are absent. This was less of an issue with the IRC cards that did not display many absent cases. This suggests that mothers understand well the necessity to return each week.

Possibly the most important finding from the admission card analysis was that there is little evidence to suggest that cases that are discharged from IRC OTPs are transferred to an TSFP. Whereas IRC cards were generally quite consistent and up-to-date with the use of the revised OTP discharge criteria, there is a concern that children are being discharged at 115mm MUAC or >-3 z-scores but not continuing treatment at a TSFP site. In addition, there is no record of OTP to TSFP transfers in the electronic data base. This was triangulated during visits to IRC OTPs where CNWs did not convincingly demonstrate that they were referring cases and a referral and counter referral system was not found to be in place to ensure that they do arrive at the ACF TSFP.

The author is of the opinion that these cases from IRC should not be discharged when they reach 115mm MUAC or >-3 z-scores but rather should be using the 'extended criteria'. This is a misinterpretation of the CMAM TWG Recommendations that say; *'When there is no TSFP, necessary procedure should be follow to apply the Expanded Criteria.'* There may well be a TSFP in the same county but there is not at the same site. The challenge to keep mothers in treatment from admission to discharge is great enough. To then ask mothers to transfer to another (usually much further, for example the nearest TSFP site to Malith OTP is Warawar, a 10 hour walk) site to finish treatment is introducing potential confusion and risk that the child does not complete treatment, and relapses into a state of SAM in the near future.

Finally, for both OTP and TSFP, the only discharge criteria that should be included in the discharge outcomes are cured, death, default and non-responder. When reporting discharge outcomes other indicators (such as refer to OTP or refer to inpatient) should not be included, since these cases are not leaving treatment. If included this has the effect of distorting the key indicators downwards.

The poor quality of the reporting at CMAM site level makes accurately following progress and performance on a monthly and site level challenging. For example the under reporting of defaulting will mean that a false picture is given and necessary reform not taken. It is paramount that reporting at this level is improved in order to feed the reporting system with reliable and complete data.

4.2. Stage 1: Qualitative Data Collection and Analysis

In order to compliment the information taken from the quantitative data sources, the team set out to collect qualitative data.

Sampling

To start with the programme stakeholders were identified. These included programme participants (carers of SAM and MAM children), community members (village leaders, church leaders, CBDs, witch doctors, men, women) and programme staff (management staff, CNWs, CNVs).¹¹

Both OTP/TSFP sites and residential locations were chosen for the qualitative research. Residential locations for the qualitative data collection were chosen based on the following factors; to ensure a good spatial coverage throughout county, locations in both the lowlands and highlands, and locations close and far from a OTP and TSFP sites. OTP/TSFP sites were chosen to ensure both IRC and ACF, both TSFP and OTP, and both permanent and 'mobile' sites were chosen.

Methodology

A day of was spent training the team in qualitative research techniques including focus group discussions and key informant interviews. Six different interview guides were used and the team were collectively trained to use them all. For the first day of qualitative data collection all the team went to the same village to allow for close supervision from the survey lead and on-the-job training and feedback. An additional 3 days of qualitative research was conducted.

The team worked in pairs allowing for one person to pose the questions and manage the discussion and the other to take notes. At the end of each day, the teams return to discuss their findings which were recorded and organised by type of informant.

In all, 38 different interviews were conducted in seven different villages and five different OTP/TSFP sites¹²
Understanding of malnutrition (lack of knowledge of difference between SAM/MAM, terms for malnutrition)

Understanding of malnutrition

The awareness of the existence of malnutrition as a condition associated with thinness (*dor*) in Aweil East County is generally good amongst all types of informant. Most informants were also able to cite at least some signs and causes of the condition, but knowledge on the effects of malnutrition were more limited. All the terms used to describe malnutrition or the treatment programme were collected and are presented in Table 3.

It was found that most informants do not consider malnutrition as an illness in the same way that they do malaria and diarrhoea (for example) and therefore was not listed as one of the more important illnesses in the county despite the high prevalence and knowledge of the condition.

Those that knew about malnutrition were generally able to identify some of the signs for malnutrition such as low weight (*jiec guop thiin*) or thinness (*ngueet*). Kwoshiorkor, being a much rarer condition, was less cited however was identified by some as *buut* and also abdominal extension (*jot yac bei*) as a sign of malnutrition.

Informants were usually able to identify at least one cause of malnutrition such as lack of food, lack of vitamins or diarrhoea. Causes related to general morbidity or poor care and hygiene practices were not well known. The effects of malnutrition were not well known either. For example it was not known that malnutrition leads to inhibited physical and cognitive development. Village leaders were able to indicate that a possible outcome, if not treated, is death. The lack of awareness related to the possible effects amongst mothers is likely to underpin their willingness to sell the RUTF/RUSF.

One common misconception was the link drawn between malnutrition and the period when a mother is pregnant or lactating. There is an understanding that if a couple have sex whilst the mother is pregnant or lactating this leads to malnourished child. This is clearly incorrect and could lead to the wrong actions being taken to prevent malnutrition. A potentially more damaging effect of this understanding is that the mother is the one to blame, although clearly sex requires the efforts of the father as well. This can lead to shame in the mother and could lead to her being stigmatised in the community have a negative effect on her willingness or ability to seek the correct treatment.

¹¹ See Annex 3 for a full list of the key informants interviews performed

¹² *ibid*

A more unusual understanding for the cause of malnutrition that appeared on a number of occasions was that a mother had a malnourished child because when she was pregnant she helped a widower carry water. There were slight variations but the connection between pregnancy and helping a widower was understood to be the key cause.

Naturally, amongst OTP/TSFP staff knowledge of the signs, causes and effects of malnutrition were much superior to the other informants.

Table 3 Terms associated with malnutrition and the treatment of malnutrition collected and triangulated during qualitative research.

	Dinka	Use	Further explanation/literal translation
	dor	malnutrition	lack of the correct and enough food
	guak	malnutrition	lack of the correct and enough food
	chok	hunger	
Signs and symptoms	jiec guop thiin	loss of body weight	
	buut	kwashiorkor	swelling
	jot yac bei	abdominal extension	swollen tummy
	nguem thii	small buttocks	
	nyin thin	sunken eyes	
	chala	the skin has changed colour	
	guop thook rim	the body is lacking in blood	
	nhiem achi	decloured hair	
	ngueet	very thin	
	nyuin	thin and resembles an old man	
	guop thot	a body that has lost weight	
	juet	body has lost weight	due to lack of food (not other illness)
Causes	acin cak thin	lack of breast milk	
	nguet	starvation	
	chok	hunger	
	ku miith juac	not enough variety of food	
	thiang gak	diarrhea	
Programme related terms	Kei yié mith theem kok	MUAC	measure the child's arm
	muguak mith ador	RUTF/RUSF	ground nut paste for malnourished children
	dakoa	RUTF/RUSF	ground nut paste
	mith ador them kok	CNV/CHW	person who looks after malnourished children
	Pan akin ador	OTP/SFP	the place for treating malnourished children

Understanding of CMAM programme

The existence of the treatment programme was generally well known amongst the informants, however was more limited amongst men (although not village leaders). Most informants had the basic understanding that there is a location that gives out RUTF/RUSF (*muguak mith ador*) for malnourished children and they also recognised the packets. It is encouraging that largely speaking village leaders were aware of the programme since they are often involved when a child is very ill.

Knowledge related to the admission criteria were found however to be weak. Mothers did not have a good understanding as to why some children were admitted and others not, and that some sites were known to tell mothers to come back another day. This could be related to stock-outs of either RUTF or RUSF or on the other hand the existence (or not) of TSFP. This indicates the disruption to the programme and understanding that stock-outs bring and why they are so damaging. Mothers that were told to come back on another day were not able to say why but explained how frustrating it was to make the journey to the site without receiving anything.

The complex and poorly communicated CMAM timetable is likely to also have a bearing on this confusion and frustration. Although all 12 of ACF sites are operative on at least one day each week, TSFP is only provided on a bi-weekly basis. Therefore if a MAM child arrives on one of the weeks with known TSFP the mother is told to come back the following week. This causes unnecessarily reputational damage and since the team is present it is unclear why they do not provide TSFP care at that time as well. Teams should carry a basic ration of both RUTF and RUSF in order to admit new arrivals regardless of whether it is a TSFP or OTP day, to avoid the damaging practice of turning caregivers away.

When children are not admitted, even though it may be done correctly (not meeting admission criteria or stock-out for example) it is paramount that a full and justified explanation is given. Of course everything should first be done to decrease the possibility that a mother can make the effort to go to the CMAM site in vain (sensitisation at village level for example), but in case that she does and cannot receive treatment, the time must be taken to give a full explanation.

Although knowledge of the difference between MAM/SAM and OTP/TSFP was not good, on two occasions, mothers were able to explain the significance of the colours on the MUAC tape highlighting that the green means the child is healthy, the yellow means they need the yellow packet and the red means they need the red packet. This is encouraging and shows that such logical and visual explanations can help.

Mothers who had experience in the programme generally had a good knowledge of how to treat their children (wash hands, give water, frequency of consumption etc.) however it was clear that mothers are frequently selling RUTF/RUSF on the market. This cannot necessarily be put down to a lack of knowledge but more indicative of the competing priorities a mother has. This is addressed in more detail below.

Finally, although knowledge about the functioning of the programme and the difference between SAM/MAM and OTP/TSFP amongst CNWs and CNVs was generally found to be good, confusion related to the discharge criteria was observed. Some CNWs indicated that OTP discharge criteria (in terms of MUAC) is 125mm but others 115mm. More concerning, was the lack of a reliable referral system from OTP to TSFP from IRC CMAM sites. IRC staff were adhering to the new guidelines by discharging at 115mm but were not always referring to an ACF TSFP. Even in cases where it was being done, there was no system in place to ensure their arrival.

Screening and referral

Informants were asked whether they had seen the MUAC tape in the community in order to determine the occurrence and likely frequency of screening at community level. Only on two occasions did informants report on seeing CNVs in their village with a MUAC tape. And most informants said that they had only ever seen the MUAC tape at the CMAM site. Furthermore, the CNVs that were interviewed expressed dissatisfaction with the level of supervision and motivation that they receive. That said they were able to clearly describe the process for screening including the organisation of villages and number of days they spend doing screening.

In theory, for IRC each OTP team does screening once a week. Meaning the CNW and the CNVs go to villages together to conduct screening. Although it was well reported which villages have CNWs and which ones do not, we were unable to obtain clarity on where screening had been conducted and when. IRC have two community outreach workers that support the 12 OTP sites and their accompanying CNVs. In the case of ACF, CNVs are based in a village and are required to conduct screening 3 days a week. It however is difficult to say where the CNVs are active since there is no clarity on which villages have CNVs and which do not. Furthermore, CNVs expressed frustration that they do not get regular supervision and support. One CNV said that she had not seen a supervisor for 3 months.

Although there is evidence indicating that screening is conducted at community level, the lack of supervision of CNVs and lack of clear information about activity indicates that there is space for a more coordinated and systematic effort at community level screening to ensure that all villages are covered (and therefore households) allowing children to be screened every three months.

There were also reports that the Community Base Distributors (the IRC supported integrated community case management programme) possessed MUAC and conducted screening. Although evidence of this was not widespread

the numbers of active CBDs are much greater than CNVs. The CBDs present a great opportunity to increase screening at community level.

Interviews with staff revealed that PHCU/C level there does not appear to be passive (or systematic) screening by MUAC taking place. Few of the health centres visited possessed MUAC tapes. Treatment of malnutrition (including screening) is considered to be the role of the CMAM programme. That said, referral from the PHCU/C to the CMAM programme does happen when there is a CMAM site present. Therefore the indication is that in the 16 PHCU/Cs that do not have a CMAM site present referral does not happen. Although this would need to be investigated further. Even in cases where there is a CMAM site, sometimes it only takes place once a week, meaning that staff may ask mothers to return on another day, potentially only to be screened. This could result in unnecessary refusal and could be avoided if staff were able to screen.

Communication and sensitisation on malnutrition and programme (community and CMAM site)

In order for good coverage to be maintained communities need to know at minimum when a child is malnourished and where to refer the child. Typically, this is ensured through communication (for example mass media) and sensitisation (for example with mother to mother support groups or sensitisation sessions at health centres). In Aweil East County sensitisation is limited to sessions at the CMAM site and referral information in the community.

At the CMAM site level, health and nutrition sensitisation sessions take place every OTP day with a group of mothers. These were observed on two occasions and did not appear to be very effective. They were short (taking no more than 10 minutes) and one-directional. The CNW conducting the session sped through each issue and spoke at the mothers without ensuring that the information had been understood. That said, this was also accompanied by explanations to each mother on how to treat the child with the RUTF/RUSF and when to return. The commonness in the confusion over refusals however suggests that staff are not doing enough to inform mothers of the reason for refusal.

At community level sensitisation is limited to the CNWs simply informing the mother that the child is malnourished and that they must go to the clinic. Informants did not report any other information sharing or communication from programme staff. However it was frequently reported that information on malnutrition and the programme is received from neighbours and community members. This is encouraging as it indicates that the programme has a good reputation and that communication strategies can be developed to take advantage of this word-of-mouth information sharing.

Distance

Distance was found to be an important factor affecting coverage. Despite there being 24 CMAM sites throughout Aweil East there are still villages up to (and likely over) 10 hours walk away. And despite this, mothers do make the effort. In one example a women travel for 6 hours, slept in the bush and travelled another 4 hours the following day. The long distance is compounded by the rain during the rainy season when roads become impassable. The distance required to travel to the CMAM site was found to be the main factor that mothers consider when going to the clinic. The further the site and the longer it takes to get there, the less likely they are to go and the more likely they are to default.

Mother's workload and lack of involvement of fathers

The workload of the mothers was raised as an important reason why they have difficulty going to the CMAM site especially if the site is far. Interviews revealed that mothers take care of a large bulk of the work load at household level. This includes care for the children, housework, collection of fire wood and construction. Even if a mother is required to spend 8 hours (for example) travelling to a CMAM site, she is still required to fulfil her other responsibilities at home, with no extra support from the father of the household. This makes it harder for the mother to access the clinic and therefore has a negative effect on coverage.

Quality of CMAM care

In order to ensure good coverage it is essential that a programme endeavours to reduce any factor that might prevent or dissuade a mother from seeking care at the CMAM site. This means ensuring mothers have a pleasant experience so that they are willing to return and also that they speak highly of the programme in the community.

All mothers interviewed indicated that they were happy with their experience at the CMAM site, however the time spent waiting at the site was frequently raised. This was witnessed during observations of the CMAM sites as well.

CMAM sites were found to have a less than efficient process for dealing with each case as they arrived. The main challenge being that CHWs waited for all (or most) mothers to arrive each morning before starting any activity. The justification for this was that each day started with the health and nutrition information session with all mothers present. Then screening takes place collectively and once screen is done dosage of RUTF/RUSF are distributed. The reason for this arrangement is that there is lack of staff (sometimes as little as two) which means that they have to fulfil all roles. Even though the national guidelines stipulate that an OTP should have eight staff, the process could be made more efficient by eliciting the support of CNVs for some tasks (those that do not require literacy) and dealing with each mother (or small group of mothers) as they arrive.

Another cause of long waiting times was due to the late starting of CMAM activities. It is unacceptable that mothers are told to arrive at the CMAM site at the beginning of the day (around 9am) when activities do not start until 11am or even midday. Mothers should be given as detailed information as possible to ensure she can minimise the time

Figure 18 A focus group discuss with mothers of children in the programme spent at the CMAM site. conducted at Akuen OTP



Rejection/refusal from CMAM site

The qualitative research as well as responses from non-covered cases during the small-area survey found that refusal from a CMAM site is an important reason for dissuading mothers from seeking treatment. Refusal was found to be down to a number of reasons including; child not reaching admission criteria, stock-out of RUTF/RUSF or that there is no TSFP present. In all cases, a mother has made the effort to go to the clinic (either referred by a CNW, or self-referral, or returning for treatment) but has left the CMAM site empty handed. In all cases programmes must do all they can to first reduce the likelihood this is going to happen and second when it

does to sufficiently inform the mother of the reason for refusal. The perception that a child might be refused (based on shared experiences in the community) was found to be an important reason for not going to a CMAM site, and therefore having a negative effect on coverage. This was triangulated during the small area survey since this was found to be a reason for some of the uncovered cases.

Health seeking behaviour

It is important to investigate health seeking behaviour, since if treatment for SAM cases is not immediately sort from the CMAM programme this indicates low coverage. In Aweil East alternative health seeking behaviour was found to be important. The two main alternatives found were traditional medicine and local pharmacies.

Traditional healers are consulted for a range of ailments and often treat children with malnutrition. Treatments for most ailments (including malnutrition) involve boiling certain leaves or bark and giving this to the children to drink. Often this treatment is followed until there is not improvement and the gravity of the condition warrants the (costly) journey to the health centre. Local pharmacies are found in many villages, particularly those far from health centres. Whereas there is no evidence to suggest that pharmacies treat malnutrition, the fact that mothers go directly to the local pharmacy is important to highlight as this offers an opportunity for screening and referral. Informants said that the pharmacy can be expensive but still sometimes cheaper than making the journey to the health centre.

That said many informants said that when a child is ill they go straight to the local PHCU/C. This is encouraging providing there is a reliable mechanism for referring children to the CMAM programme. It was also noted that often religious leaders discourage the use of traditional medicine and promote treatment at the health centres. Collaboration with the religious leader presents an opportunity in promoting the CMAM services in the community.

Availability of RUSF/RUTF on the market

During the assessment five different markets were visited and in all of them there were stalls selling RUTF and RUSF. This could either be coming from mothers selling their ration or leaking from the supply chain. The evidence suggests that it is both.

Mothers who had experience in the programme generally had a good knowledge of how to treat their children (wash hands, give water, frequency of consumption etc.) however it was clear that mothers are frequently selling RUTF/RUSF on the market. This was triangulated through interviews with village leaders, mothers and CMAM staff as well as seeing some of the packets in many different stalls in five different markets.

This indicates that mothers may not know the ultimate effects of not treating a malnourished child however it also highlights the level of poverty amongst the population. The need for a mother to balance a number of competing priorities (health of children, income generation, feeding the rest of the family, house work) may draw her to sell some of the RUTF or RUSF dose in order to pay for food. For example, one market stall owner told us that if a mother has RUTF but not enough money, he exchanges RUTF for sugar or other food products. The exchange value of a packet is 3 SSP however is usually sold at around 5SSP.

Interviews with market sellers also revealed that it is not only mothers selling individual packets of RUTF/RUSF but also men selling boxes. Clearly they were reluctant to say who, knowing that the practice is illegal, but this indicates that there is a serious concern with supply chain leakage. Further investigation needs to be made to determine if this is being stolen from storage or leaked by programme staff or both.

This does not have a direct effect on coverage but does reduce the programmes possibility of covering additional children (since RUTF is inappropriately used) and also will mean that a child under-going treatment will have an extended treatment period.

RUTF/RUSF stock outs

Stock-outs of both RUTF and RUSF were reported by community members. Programme staff were able to reveal that this has only been RUSF during 2015 at county level. Meaning that ACF have only run out of RUSF in the county and neither agencies have been depleted of RUTF. However, a stock break of RUTF was experienced during the qualitative research at one CMAM site (Akuem). At this site RUTF supplies finished before all patients had been seen and given their weekly treatment. There did not appear to be any system or protocol in place to deal with this and the CNWs were ready to inform the remaining mothers that they must return next week since RUTF had finished¹³.

This suggests that there is not a performant stock tracking system to ensure enough supplies are at each OTP site and that in fact reported supply breaks could have been for either RUTF or RUSF even if both were available in the county. Causing mothers to come to a CMAM site and return empty handed must in all cases be avoided. This contributes to a bad reputation on the programme having a negative effect on the willingness of mothers to attend a CMAM site. This poor reputation, and the fact that children are missing weeks of treatment and therefore lengthening the duration of treatment, will have a profoundly negative effect on coverage.

4.3. Stage 2

Stage 2 is intended to first determine whether we are on the right track in terms of what we think about coverage in the survey area and second, to ensure coverage is likely to be homogenous. It is important that there are no factors likely to cause coverage to be heterogeneous (or 'patchy') in order for us to conduct the wide-area survey. In addition, Stage 2 also provides useful information to add when building the prior.

OTP

The team collectively decided that coverage was likely to be poor (<50%) across the survey area however believed that if there was any factor that would cause coverage to be better or worse, it would be distance to the OTP site. Therefore it was decided that the following hypothesis should be tested:

Hypothesis for OTP: Villages near to an OTP site (IRC and ACF sites) have high coverage and villages far from OTP sites have low coverage.

¹³ Since the OTP was only a 30 minute drive from the IRC/ACF offices the survey team sent their car to collect additional RUTF

For TSFP the team collectively decided that coverage would also be poor (<50%) but likely to be much worse than the OTP given that there are only 11 TSFP sites, compared to 24 OTP sites, and a much higher caseload. As with OTP, it was decided that if coverage was likely to be varied it would be between villages close (where coverage would be higher) and those far from the TSFP sites (where coverage would be low). Therefore it was decided the following hypothesis would be tested:

Hypothesis for TSFP: *Villages near a TSFP site (ACF sites) have high coverage and villages far from TSFP site have low coverage*

Justification

Distance was chosen as an important factor as more remote villages showed lower admissions and was frequently cited by informants as a reason for not going to the clinic. Whether or not the village was covered by an active CNV was also a factor that was thought to have an important effect on coverage. However we were unable to test this since we did not have complete information on which villages were covered by CNVs for ACF sites.¹⁴

Sampling

Sampling was done in 2 stages. First the sampling of villages and second the sampling of SAM and MAM children in each village

7 villages were selected that allowed for the satisfaction of 4 different criteria and therefore the testing of the 2 hypotheses above. That being, near to OTP, far from OTP, near to TSFP, and far from TSFP. Far villages were categorized as being over 5 km from a site.

Methodology

A team of 16 people (seven from the core team and nine additional enumerators) sampled the seven villages over the course of two days. In each village door-to-door case finding of SAM and MAM children, as well as children undergoing treatment in the OTP or TSFP, was conducted to ensure that all malnourished children (and children in either programme) in each village were found. All team members were experienced in MUAC and oedema screening, however they were re-trained in these diagnostic measurements and also trained in how to ensure all cases are found. Teams were also given packets of RUTF and RUSF to facilitate identification of recovering cases.

The case-definitions in Table 4 were used.

Table 4 Case definition for SAM and MAM children (6-59 months)

SAM child	Bilateral pitting oedema or MUAC <115mm
SAM recovering case	MUAC >115mm but still undergoing OTP treatment
MAM child	MUAC ≥115mm and <125mm
MAM recovering case	MUAC ≥125mm but still undergoing TSFP treatment

Since the discharge criteria for OTP is 2 weeks MUAC ≥115mm some non-SAM cases may still be receiving OTP treatment. This is referred to as a recovering cases. This also applies for TSFP since the discharge criteria is MUAC ≥125mm for 2 consecutive weeks.

Since admissions can also be made on the basis of weight-for-height z-scores in South Sudan, the team considered whether a case definition with this criteria should also be used. An analysis of criteria for admission was performed (see Figure 18 for OTP and Figure 19 for TSFP) which demonstrated that only 9% of admissions in 2015 were admitted on weight-for-height only. Therefore if we were to exclude weight-for-height then the effect on the coverage estimation would be minimal. It could also be that weight-for-height was simply not performed (therefore producing

¹⁴ IRC were able to provide this information.

less admissions) however this was disproved during Stage 1 where observations and interviews with OTP staff demonstrated that it was performed for all new cases. The inclusion of weight-for-height screening during case-finding would have meant time in villages to be significantly increased and would therefore mean less villages could be visited, and hence not allow for us to achieve the desired SAM case-load.

Figure 19 Pie chart showing admission criteria met by each admission to the ACF OTP between Jan-Dec 2015 (n=5905)

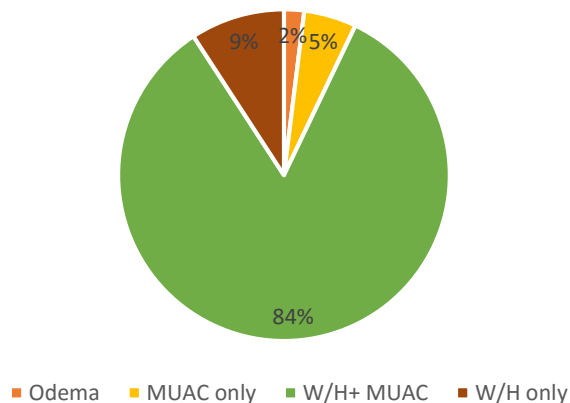
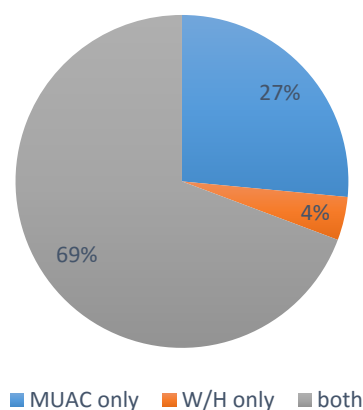


Figure 20 Pie chart showing admission criteria met by each admission (where W/H and MUAC were recorded) to the ACF TSFP between Jan-Dec 2015 (n=1068)



Results

OTP

A total of 14 SAM cases and two recovering cases were found across the five villages near to OTP and the two villages far from the OTP. The results are presented in Table 5.

Table 5 Results from small area survey for OTP

Village	Near (N) and far from (F) OTP	Total SAM	SAM uncovered	SAM covered	Recovering Cases
War Ayen	N	4	4	0	0
Adool	N	1	1	0	0
Pariak	N	1	0	1	1
Rulnyin	N	0	0	0	0
Makuac Kiir	F	5	4	1	0

Mathiang Nientok	F	1	0	1	0
Akuem	N	2	1	1	1
Total		14	10	4	2

TSFP

A total of 52 MAM cases and two recovering cases were found across the two villages near to TSFP site and the five villages far from the TSFP Site. The results are presented in Table 6.

Table 6 Results from small area survey for OTP

Village	Near (N) and far from (F) TSFP	Total MAM	MAM uncovered	MAM covered	Recovering Cases
War Ayen	F	6	6	0	0
Adool	F	0	0	0	1
Pariak	N	9	9	0	0
Rulnyin	N	7	5	2	1
Makuac Kiir	F	8	7	1	0
Mathiang Nientok	F	2	2	0	0
Akuem	F	20	20	0	0
Total		52	49	3	2

Analysis

For the analysis of the results simplified lot quality assurance sampling (LQAS) was done in order to obtain a classification of coverage, and to determine whether the hypotheses were confirmed or denied. The SPHERE standard for coverage of CMAM programmes in rural of 50% was used.

The following formula was used to determine the decision rule for the hypothesis:

$$d = \left\lceil n * \frac{p}{100} \right\rceil$$

d = decision rule

n= number of cases found

p= coverage standard defined.

Far from OTP (SAM cases only)		Conclusion	Near to OTP (SAM cases only)		Conclusion
n=	6	Decision rule not met therefore coverage classified as being below the standard	n=	8	Decision rule not met therefore coverage classified as being below the standard
d=	3		d=	4	
covered cases	2		covered cases	2	
Meets d?	No		Meet d?	No	

Therefore the hypothesis for OTP (*Villages near to an OTP (IRC and ACF sites) have high coverage*) is denied since villages near to OTP sites had low coverage as did villages far from OTP sites.

Far from TSFP (MAM cases only)		Conclusion	Near to TSFP (MAM cases only)		Conclusion
n=	36	Decision rule not met therefore coverage classified as being below the standard	n=	16	Decision rule not met therefore coverage classified as being below the standard
d=	18		d=	8	
covered cases	1		covered cases	2	
Meets d?	No		Meet d?	No	

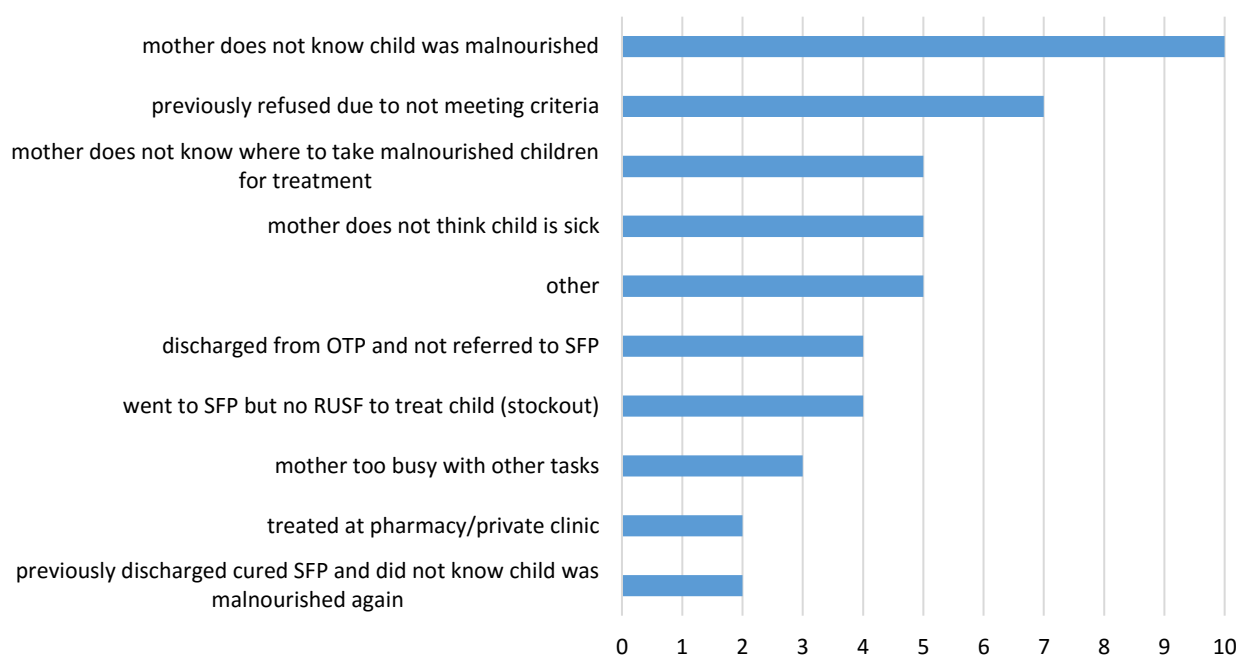
Therefore the hypothesis for TSFP (*Villages near a TSFP (ACF sites) have high coverage*) is denied since villages near to TSFP sites had low coverage as did villages far from TSFP sites.

We can then conclude that for both OTP and TSFP that since the coverage standard is not met in either case that distance does not have a significant effect on coverage and that coverage is therefore likely to be uniformly low across the whole survey area. It was therefore concluded that we can proceed with the wide area survey knowing that coverage is uniform across the survey area.

Reasons for non-attendance

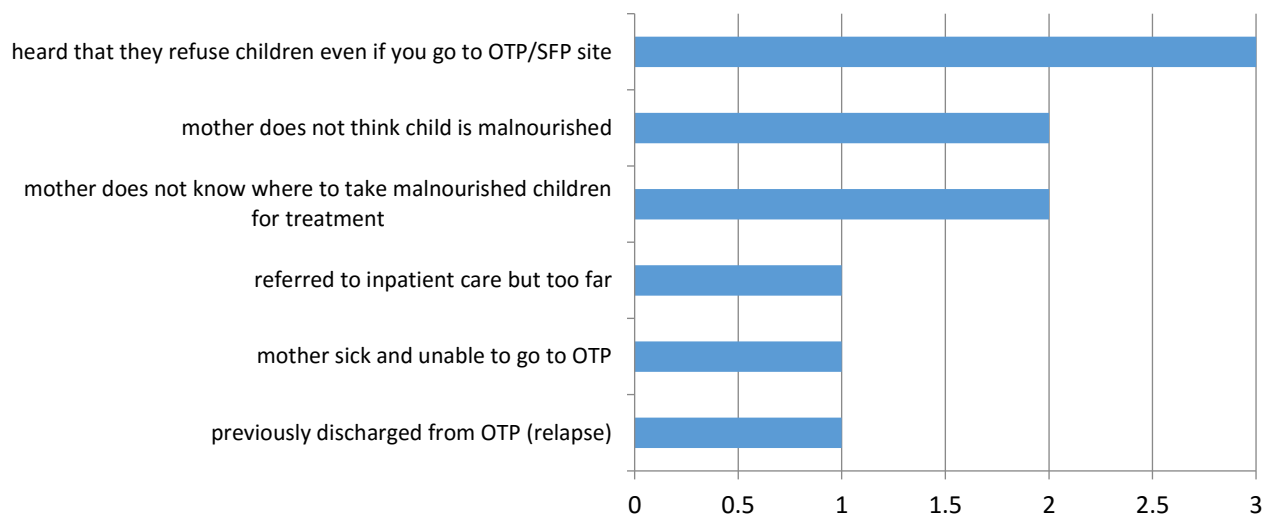
A simple questionnaire was also administered to all SAM and MAM cases found. The cases currently undergoing treatment were given the 'covered' questionnaire and the cases not under-going treatment were given the 'uncovered' questionnaire¹⁵. Figures 20 (MAM) and 21 (SAM) illustrate the reasons cited.

Figure 21 Reasons for non-attendance as sighted by mothers of uncovered MAM cases (n=47)



¹⁵ See Annex XX and XX for the questionnaires

Figure 22 Reasons for non-attendance for uncovered SAM cases found during the small-area survey (n=10)



Reasons related to awareness about the child's condition or the existence of the treatment were the most prevalent. Also shortfalls in the operation of the programme were also important, including discharged from OTP and not referred to TSFP and stock out of RUSF. Those listed under 'other' were reasons that appeared only once, including distance too far, refused and told to return the next day (due to wrong day of TSFP), TSFP closed, use of traditional medicine and finally mother heard that they refuse children when you go. This final reason relates to awareness and was also important (n=3) amongst the reasons for non-attendance for OTP.

Misunderstandings about how the programme works were the basis for a number of reasons for non-attendance. Mothers were sometimes unaware as to why children were being refused, indicating that a full explanation is not given by OTP/TSFP staff. In addition some cases made the journey to the site but were turned away since the OTP or TSFP was closed. Indicating a deficiency in communication relating to the OTP/TSFP schedule. Mothers also (n=7) were unaware that their child could be malnourished even having been previously refused. This relates also to a lack of understanding about recognising when a child is malnourished. This was more significant for MAM cases, which are less easy to recognise.

Reasons for attendance

The covered cases (n=15) were also given a different questionnaire. When asked how they first knew that the child was malnourished and how they knew about the programme the most frequent responses were 'referred by CNV' (n=5) and 'referred by clinic/hospital' (n=6). Although small in number this shows that CNVs do have an effect on coverage and also that the PHCU/Cs are referring children, in some cases, to the OTP/TSFP. The other cases either self-referred or were told by friends/family. The final question related to whether they treated their child before coming to the OTP/TSFP whereas n=7 said no, the remaining cases cited other treatments such as traditional medicine, local pharmacy and local PHCU/CC.

4.4. Building of the Prior

A prior belief of coverage was developed using all the information collected during Stages 1 and 2. This was done separately for both OTP and TSFP using three different methods for each; unweighted boosters and barriers, weighted boosters and barriers and histogram of belief.

OTP

Histogram prior

A histogram prior was developed collectively in the classroom as a starting point for the prior development. Each coverage value (x axis) was discussed and a belief of whether coverage is likely to be that value determined (y axis). A prior mode (most likely value for coverage) was determined at 34%.

Simple scoring of boosters and barriers

$$\begin{aligned} \text{prior mode} &= \frac{35 + (100 - 75)}{2} \\ &= 30\% \end{aligned}$$

A man with a shaved head, wearing a striped short-sleeved shirt, is pointing his right index finger at a list of names under the heading 'RAPERS'. The list is written on a piece of paper pinned to a wall. To the left of this paper is another paper with the heading 'BOOSTERS' and a list of names. To the right is a third paper with the heading 'Q' and a list of names. The man is looking at the 'RAPERS' list. The background is a light-colored wall.

Table 7 Boosters and barriers to access OTP services with sources and scores

<i>Positive Factors (Boosters)</i>	Scores		Sources	<i>Negative Factors (Barriers)</i>	Scores		Sources
	Simple	Weighted			Simple	Weighted	
CNV network functional (screening and referral)	5	3	G1, F1, 4, H1, C1, A1	Distance to travel to OTP too far and lack of transport available	5	4	5, A2, C2, C1, B, H1, G1, H1, 9
community leaders aware of programme and inform others	5	2	A1, A2, B1	Poor roads making OTP inaccessible during rainy season	5	3	H1, 4, A2, C2, C1
good awareness of malnutrition treatment services	5	3	A1, A2, B2, C1, C2	ACF OTP sometimes closed due to flooded roads and operational model	5	3	H1, 4, A2, C2
good awareness of malnutrition	5	3	A1, A2, B2, C1, C2, I1	mothers busy with other domestic and income generating tasks	5	3	B2, C2, B8
CBD do screening and referral	5	2	A1, C1, H1	Long waiting times at OTP	5	3	7, C2, C8
referral of suspected cases to OTP by PHCC/U staff at OTP sites	5	2	F1, 4, 7	Limited and ineffective health and nutrition education at OTP level	5	3	7, F1, C2, C1,
good reputation of programme leading to referrals by community members	5	3	C8, A2, C1, B2	Lack of effective sensitisation on health and nutrition at community level	5	4	7, G1, G2, A2, B2, B1, C1, C2
				alternative health seeking behaviour	5	4	A2, B1, B2, C1, C2, D2, 4, 6, I1
				stigmatisation of mothers with malnourished children	5	1	A2, D2, B1
				bad reputation of programme due to refusal of cases	5	4	B8, B1, B2, D2, A2, A1
				early discharge (hidden defaulter) from OTP	5	2	3, 4
				Wrong or no information given to mother on opening times so OTP closed upon arrival	5	1	B8, B2
				Selling of RUTF	5	2	7, F1, G1, H1
				Perception that RUTF is a food leading to sharing with other children	5	3	B2, D2, C1, C2
				Lack of knowledge of difference between SAM/MAM and OTP/SFP	5	2	B2, B1, C1, C2
Totals	35	18			75	42	

Table 8 Legend for triangulation of boosters and barriers

	Source		Methodology
A	Community leaders (village leader, go-leader, boma)	1	Semi-structured interview
B	Mothers with children not in the programme	2	Informal group discussion
C	Mothers of SAM/MAM children in the programme	3	OTP cards analysis
D	Men	4	Routine programme data analysis
F	Community nutrition workers	5	Mapping
G	Community nutrition volunteers	6	Secondary sources
H	IRC and ACF programme management staff	7	Observation
I	Witchdoctor/spearleader	8	Structured interview
		9	Small area survey

Weighted scoring of booster and barriers

The final method to calculate the prior took the same list of barriers and boosters but were given a weighted score (between one and five) depending their relative importance. The team worked together having analysed all the evidence from Stage 1 and 2 to allocate a score that represented the relative effect that factor has on coverage. The team considered the following questions: How prevalent is this issue? Does it relate to only certain areas or is it applicable across the entire survey area? How much of an effect does the factor have on coverage? How strong is the evidence? The team reflected on all the evidence presented in the mindmap in order to allocate a suitable score. Using the total scores of the positive factors (18) and the negative factors (75) the same formula as above was used to calculate a prior mode:

$$\begin{aligned} \text{prior mode} &= \frac{18 + (100 - 42)}{2} \\ &= 38\% \end{aligned}$$

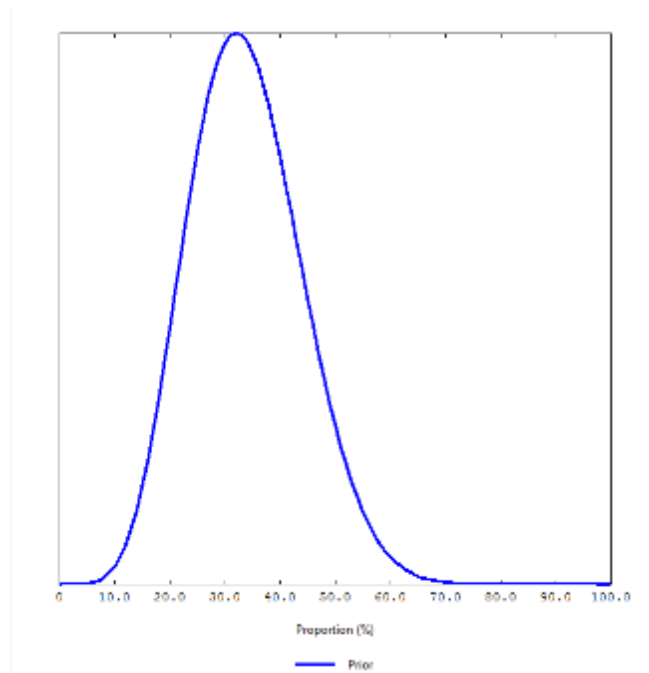
The prior mode for OTP was then calculated by taking the mean of the above four modes.

$$\begin{aligned} \text{final prior mode} &= \frac{34 + 30 + 38}{3} \\ &= 34\% \end{aligned}$$

Typically, with a programme that has already conducted a coverage assessment a credibility interval of 20% would be used, since it is thought that ideas about coverage would be more certain. However since the last assessment was conducted in 2012 since which time the programme has under-gone significant changes (numbers of sites and funding arrangements) we thought it wise to use a credibility interval of 25%.

With a mode of 34% and a credibility interval of 25%, $\alpha = 7.1$ and $\beta=13.9$ shape parameters were calculated. Using the BayesSQUEAC calculator our estimation of coverage, based on our prior information, is represented by the following curve:

Figure 24 Representation of the prior probability for the OTP



TSFP

Histogram prior

A histogram prior was developed in the same way for TSFP. A prior mode (most likely value for coverage) was determined at 20%.

Simple scoring of boosters and barriers

A prior was also calculated through simple scoring of boosters and barriers in the same way. Table 9 lists the boosters which make a total score of 35 and the barriers which make a total score of 85. The same formula as above was used to calculate the prior mode:

$$\begin{aligned} \text{prior mode} &= \frac{35 + (100 - 85)}{2} \\ &= 25\% \end{aligned}$$

Table 9 Boosters and barriers to access TSFP services with sources and scores

<i>Positive Factors (Boosters)</i>	Scores		Sources	<i>Negative Factors (Barriers)</i>	Scores		Sources
	Simple	Weighted			Simple	Weighted	
CNV network functional (screening and referral)	5	3	G1, F1, 4, H1, C1, A1	Stockout of RUSF	5	5	A2, F1, G1, 4, H1, 3
community leaders aware of programme and inform others	5	2	A1, A2, B1	Distance to travel to SFP to far and lack of transport available	5	5	5, A2, C2, C1, B, H1, G1, H1, 9
good awareness of malnutrition treatment services	5	3	A1, A2, B2, C1, C2	Poor roads making SFP inaccessible during rainy season	5	4	H1, 4, A2, C2, C1
good awareness of malnutrition	5	3	A1, A2, B2, C1, C2, I1	ACF SFP sometimes closed due to flooded roads and operational model	5	4	H1, 4, , A2, C2
CBD do screening and referral	5	2	A1, C1, H1	mothers busy with other domestic and income generating tasks	5	3	B2, C2, B8
referral of suspected cases to SFP by PHCC/U staff at SFP sites	5	2	F1, 4, 7	Long waiting times at SFP	5	3	7, C2, C8
good reputation of programme leading to referrals by community members	5	3	C8, A2, C1, B2	Limited and ineffective health and nutrition education at SFP level	5	3	7, F1, C2, C1,
				Lack of effective sensitisation on health and nutrition at community level	5	4	7, G1, G2, A2, B2, B1, C1, C2
				alternative health seeking behaviour	5	3	A2, B1, B2, C1, C2, D2, 4, 6, I1
				Stigmatisation of mothers with malnourished children	5	1	A2, D2, B1
				bad reputation of programme due to refusal of cases	5	4	B8, B1, B2, D2, A2, A1
				early discharge (hidden defaulter) from SFP	5	2	3, 4
				Wrong or no information given to mother on opening times and also mothers for SFP referred to SFP, so SFP closed upon arrival or at different site	5	3	B8, B2
				Poor interface between IRC OTP and ACF SFP and limited SFP sites	5	5	F1, 3, 4, 7,
				Selling of RUSF	5	2	7, F1, G1, H1
				Perception that RUSF is a food leading to sharing with other children	5	3	B2, D2, C1, C2
				Lack of knowledge of difference between SAM/MAM and OTP/SFP	5	2	B2, B1, C1, C2
Totals	35	18			85	56	

Weighted scoring of booster and barriers

Weighted scores were also given to each booster and barrier for the TSFP. Using the total scores of the positive factors (18) and the negative factors (56) the same formula as above was used to calculate a prior mode:

$$\begin{aligned} \text{prior mode} &= \frac{18 + (100 - 56)}{2} \\ &= 31\% \end{aligned}$$

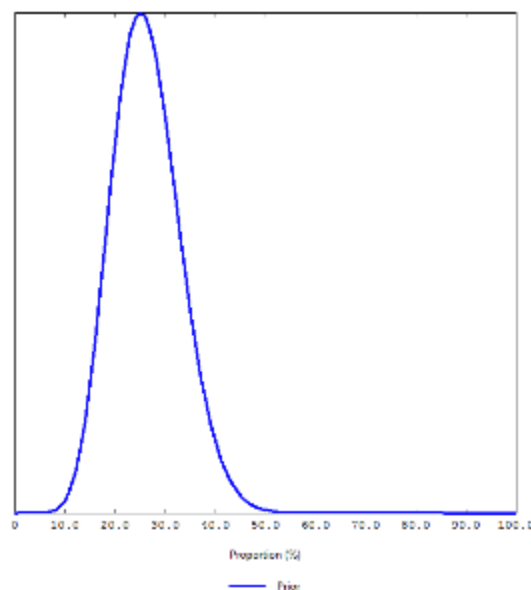
The prior mode for TSFP was then calculated by taking the mean of the above four modes.

$$\begin{aligned} \text{final prior mode} &= \frac{20 + 25 + 31}{2} \\ &= 25.33\% \end{aligned}$$

Since this is not the first SQUEAC that has been conducted in this CMAM programme, and therefore we have greater certainty that coverage will be around this level, we used a credibility interval of 25% is used.

With a mode of 25.33% and a credibility interval of 25%, $\alpha = 10.9$ and $\beta = 30.6$ shape parameters were calculated. Using the Bayes SQUEAC calculator our estimation of coverage, based on our prior information, is represented by the following curve:

Figure 25 Representation of the prior probability for the TSFP



4.5. Stage 3

The principal objective of Stage 3 is to provide an estimate for coverage across the county. This firstly requires the development of a *likelihood* by way of a wide area survey, and then, using a Bayesian conjugate analysis, combine the prior and the likelihood to produce the *posterior* coverage estimate.

A wide area survey was conducted in throughout the survey area for both TSFP and OTP. A total of 22 villages were visited

Sample size calculation

For the OTP prior described above, and a precision of 11%, the Bayes SQUEAC calculator specified a minimum sample size of **n=46** SAM children was needed.

For the TSFP prior described above, and a precision of 10%, the Bayes SQUEAC calculator specified a minimum sample size of **n=40** MAM children was needed.

Since MAM cases are in all cases more numerous than SAM cases the sampling of villages was done based on the need to find 47 SAM cases since we would be sure to find at least 40 MAM cases as well.

The following calculation was used to determine how many villages we were required to visit in order to achieve a sample size of 47:

$$n \text{ villages} = \left\lceil \frac{n}{\text{average population per village} \times \frac{\% \text{ population 6 – 59 months}}{100} \times \frac{(\text{prevalence of SAM})}{100}} \right\rceil$$

- n = 46
- % population 6-59 months = 20%¹⁶
- Prevalence of SAM = 2.45%¹⁷
- Average population of each village = 438¹⁸

$$\begin{aligned} n \text{ villages} &= \left(\frac{46}{438 \times .0245 \times .2} \right) \\ &= 21.4 \\ &= 22 \end{aligned}$$

Practically speaking it was possible to sample 22 villages during the allotted time. In addition, during case-finding in Stage 2, we did not face any great difficulties in finding SAM children (seven villages, 14 cases) so felt that although we would not want to reduce the number of villages, 22 would suffice to find 47 cases. Furthermore, we also knew from the Bayes SQUEAC calculator that even with a sample size of 19 we would still be able to achieve an acceptable precision of 15%.

Sampling framework

A two stage sampling method was used, the first stage ensured the selection of a spatially representative sample of villages throughout Aweil East County, and the second stage employed door-to-door case finding to find all SAM and MAM children in each village selected.

First Stage: The 22 villages were selected using the spatially stratified sampling method (or list method). Although there was a recent map available from IOM, the SQUEAC team did not think that it was complete nor reliable. In addition we had another list of villages (provided by RRSC) that had 1731 villages listed, whereas the map only had 702. It is likely that there are discrepancies around the definition of a village and also the naming as we found during when visiting the villages throughout the assessment.

The map in Annex 1 shows the villages that were eventually selected and demonstrates a good spatial representivity.

Second Stage: In each village a sampling process identical to that employed in the small area survey was employed. Door-to-door sampling was employed to ensure all children meeting the case definition (SAM and MAM children) were found. The local language used for describing malnutrition was used by the survey team.

¹⁶ No up-to-date and reliable information available therefore 'rule of thumb' proportion of population used.

¹⁷ The MUAC estimation from the SMART November 2015 of 1.7% (CI 95%: 0.9-3.2) was taken and the mid-point between the estimation and the upper confidence interval, 2.4%, was used. This is because November is known to be a period of relatively low prevalence and good food availability, therefore 1.7% is likely to have underestimated prevalence in February. In which case taking the midway point between the estimate and the upper confidence interval is recommended.

¹⁸ Reliable and up-to-date population figures are not readily available for South Sudan therefore an estimation was made based on SMART 2015 population data and having removed extreme values

A questionnaire for both covered and non-covered cases was employed in order to ascertain the reasons for both cases. The questionnaires can be found in Annex 5 and 6 respectively.

The wide-area survey was done six teams of four over the course of four days. Each team was able to cover one village per day. If it was found that the village was very small and there was still time for more case finding, the neighbouring village was also sampled. Conversely, when the village was found to be too large to cover in a whole day, it was segmented and a segment selected randomly. The villages were generally very sparse resulting in long days and lots of walking (See Figure 26).

Figure 26 Door-to-door case finding during the wide-area survey



Results of the wide-area survey

The wide-area survey found a total of 23 SAM cases and 76 MAM cases. The total cases found are presented below, and the cases found by village can be found in Annex 7.

4.5.1. Coverage estimations

The most reliable, and widely suited, coverage estimator currently available is the single coverage estimator¹⁹ and should be used for estimating both OTP and TSFP coverage²⁰ estimates coverage using SAM/MAM cases as well as recovering cases still being treated (as found during the assessment) and estimates recovering cases not being treated. The following formula is used where C_{in} = covered SAM/MAM cases, C_{out} = uncovered SAM/MAM cases, R_{in} = recovering cases in the program and R_{out} = recovering cases not in the programme:

$$Single\ Coverage = \frac{C_{in} + R_{in}}{C_{in} + C_{out} + R_{in} + R_{out}}$$

The C_{in} , C_{out} and R_{in} are all collected during the wide-area survey however R_{out} must be estimated. The number of recovering cases not in the programme (R_{out}) is calculated using the formula below. A critical element of this is a correction factor (3) that has been with knowledge of the length of time an untreated case of SAM or MAM takes to recover.

¹⁹ For more information see Myatt, M et al, (2015) *A single coverage estimator for use in SQUEAC, SLEAC, and other CMAM coverage assessments*, p.81 Field Exchange 49.

²⁰ MAM/Single coverage piece forthcoming

$$R_{out} \cong \frac{1}{3} \times (R_{in} \times \frac{C_{in} + C_{out} + 1}{C_{in} + 1} - R_{in})$$

OTP

Table 10 presents the cases found during the wide area survey and the calculation of R_{out} .

Table 10 Total SAM cases found during the wide-area survey

<i>Type of case</i>	<i>Number found</i>
SAM cases not in the programme (C_{out})	15
SAM cases in the programme (C_{in})	8
Recovering cases in the programme (R_{in})	2
Recovering cases not in the programme (R_{out})	1
Total cases	26

With single coverage the sample size required includes recovering cases (both in an out). Therefore the total sample achieved (the denominator) was 26 (15+8+2+1). This falls short of the desired 46, however with 26 we can still estimate coverage with an acceptable precision (14%) as calculated using the Bayes SQUEAC calculator.

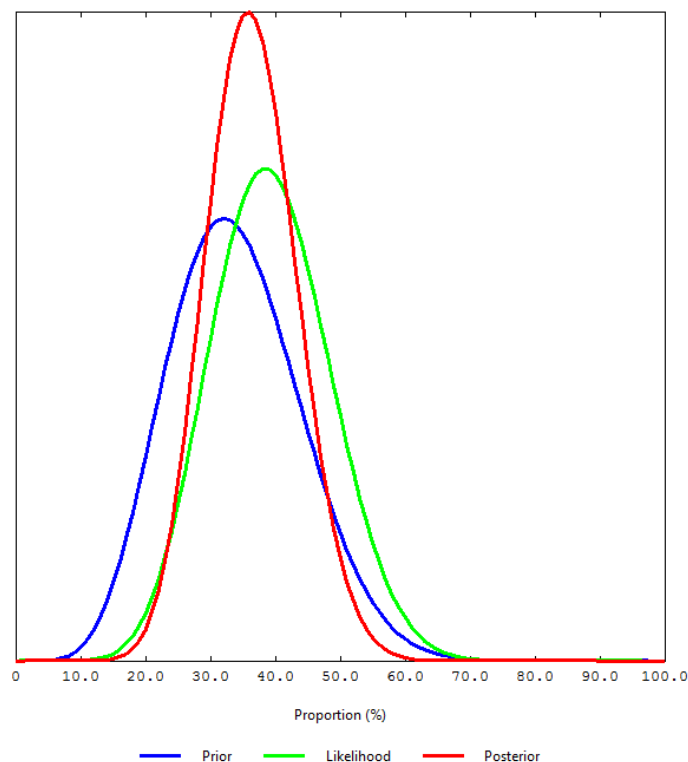
With these figures the single coverage was also calculated through the Bayes SQUEAC calculator that combines (with a conjugate analysis) the information from the prior and the likelihood and produced the following result:

$$35.8\% [CI\ 95\%: 23.6\% - 50.2\%]$$

This coverage estimation is well below the SPHERE standard for rural community based SAM treatment programmes (50%).

The Bayse SQUEAC calculator presents the following posterior curve (red), based on both the prior (blue) and the likelihood (green) information (through a Baysien conjugate analysis).

Figure 27 Graphic representation of the single coverage estimate for OTP including the prior, likelihood and posterior information



The conjugate analysis does not present any conflict between the prior and the likelihood, meaning they both provide a similar estimation. Therefore the prior is in accordance with the likelihood and we can accept these results.

TSFP

Table 11 presents the number of MAM cases found during the wide area survey and the calculation of R_{out} .

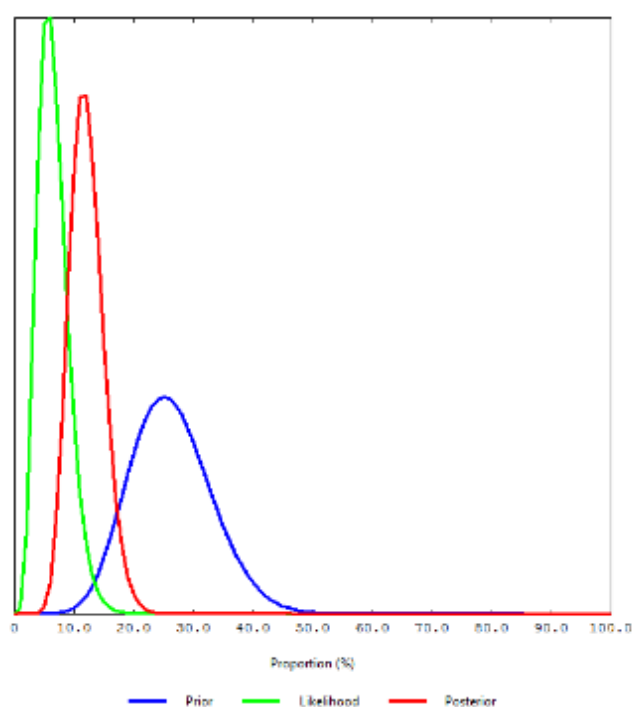
Table 11 Total MAM cases found during the wide-area survey

<i>Type of case</i>	<i>Number found</i>
MAM cases not in the programme (C_{out})	73
MAM cases in the programme (C_{in})	3
Recovering cases (R_{in})	2
Recovering cases not in the programme (R_{out})	12
Total cases	90

Therefore the total sample achieved (the denominator) was 90 (73+3+2+12). As expected this exceeds the required sample size of $n=40$ in order to estimate coverage with a precision of 10%.

As with OTP, single coverage was calculated through the Bayes SQUEAC calculator combining information from the prior (Stage 1 and 2) and the likelihood (Stage 3). The following posterior curve (red), based on both the prior (blue) and the likelihood (green) information (through a Bayesian conjugate analysis) was produced:

Figure 28 Graphic representation of the single coverage estimate for TSFP including the prior, likelihood and posterior information



The conjugate analysis presents conflict between the prior and the likelihood. There is very little overlap between the prior estimation of coverage (the blue curve) and the likelihood (the green curve). This means that there is not sufficient coherence between what we thought about coverage based on our analysis in Stage 1 and 2, and the estimation indicated with the data from the wide area survey. This conflict is indicated by the Bayes SQUEAC calculator in terms of a p value. The $p = 0.0014$ and when $p < .05$ the conflict is too great to accept. Therefore we cannot use the precise estimation provided confidently.

That said, since the sample size achieved ($n=90$) is significant we can estimate coverage reliably with acceptable errors and confidence intervals using only the likelihood information.

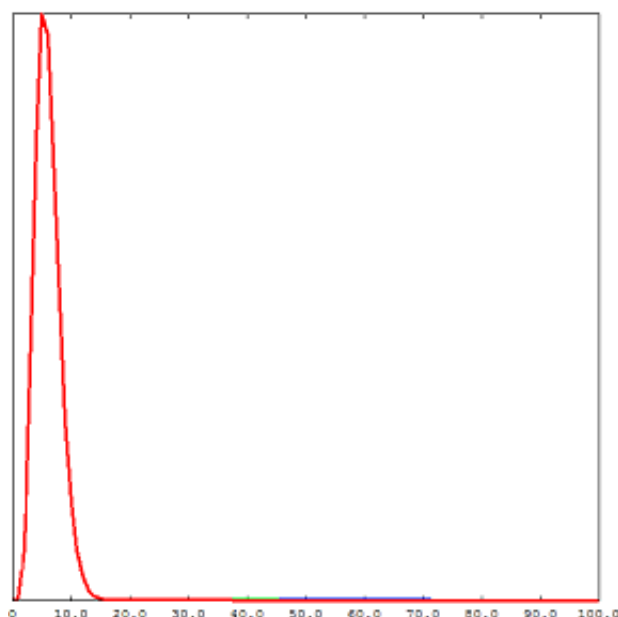
The required sample size was calculated using the following calculator <http://www.raosoft.com/samplesize.html> and information:

- MAM population = total population x % 6-59 months x MAM rate
= 499,041 x 20% x 4.7 % = 4691
- Acceptable margin of error: 11%
- Confidence interval: 95%

A necessary sample size of n=76 was calculated. 10% margin of error would require n=95 therefore we can be certain that n=90 gives us between 10% and 11%.

Therefore coverage of MAM services = 5/90 = **5.6% [95% CI 0.9-10.4]** and is illustrated in graphic form in Figure 29.

Figure 29 Graphic representation of the single coverage estimate for TSFP using only survey information



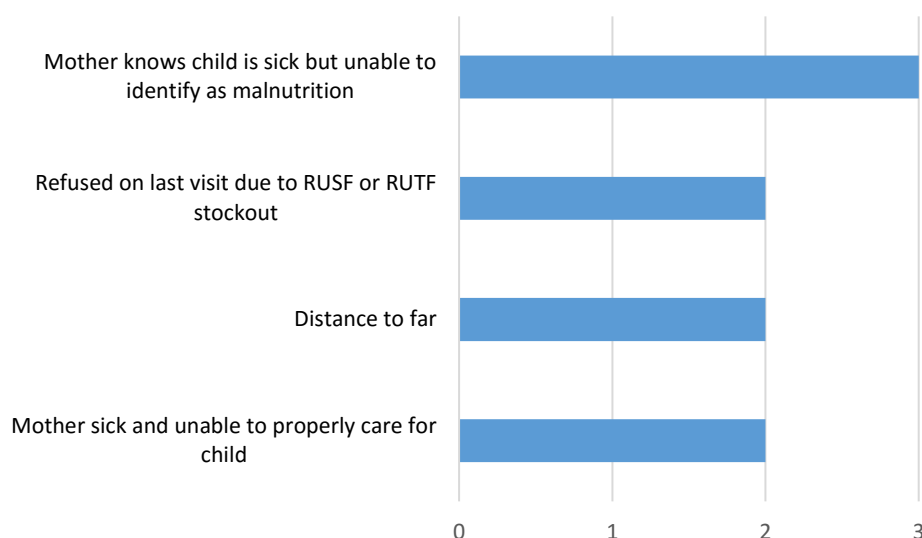
In order to calculate the upper and lower credibility the following formula was used:

$$\text{Lower and upper credibility intervals} = \text{coverage} \pm 1.96 \times \sqrt{\frac{\text{coverage} \times (1 - \text{coverage})}{\text{Total cases } (C_{in} + C_{out} + R_{in} + R_{out})}}$$

4.5.2. Reasons for non-attendance

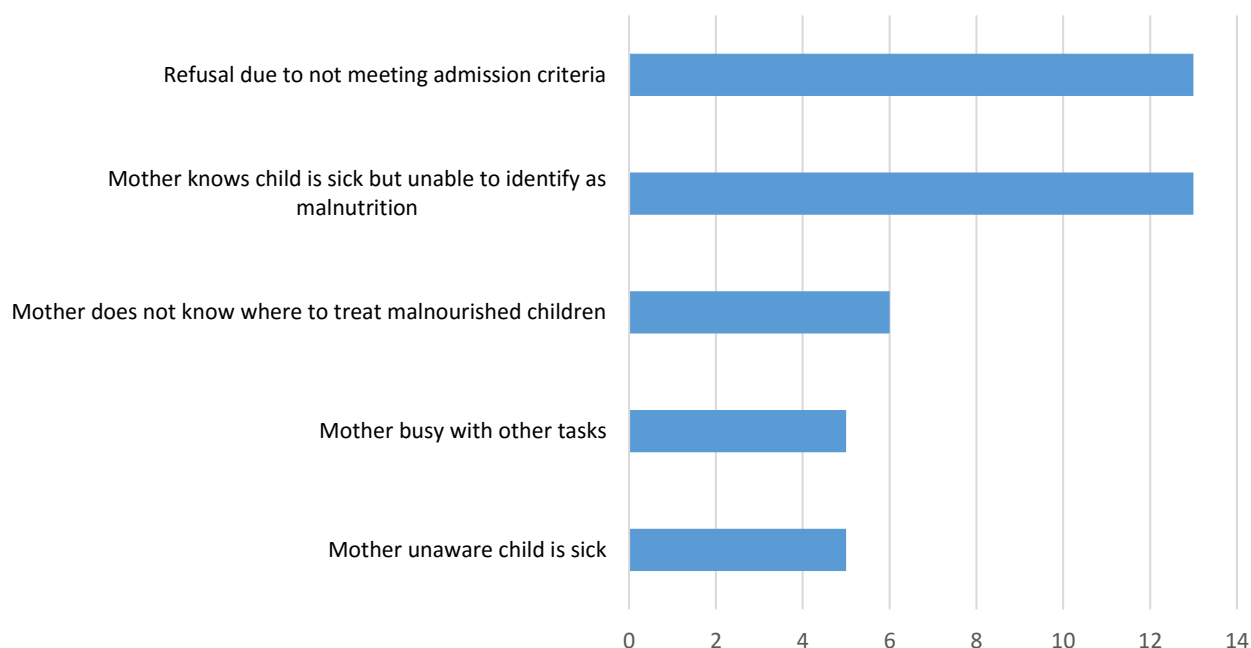
As with the small area-survey the mother of each uncovered case (both MAM and SAM) was administered with a questionnaire in order to determine the reason why they were not under going treatment. Figures 26 and 27 illustrate the most important reasons

Figure 30 Top 4 reasons for non-covered SAM cases found during the wide-area survey



Other reasons that only appeared once were that the mother did not know where to treat children, that the mother heard the OTP refuses children so did not want to go, child refused previously due to not meeting discharge criteria and mother went to the OTP but it was closed.

Figure 31 Top 5 reasons for non-covered MAM cases found during the wide-area survey



Other important reasons for the child not being covered include defaulting due to lack of RUSF (n=3), previous discharge and did not know child could be admitted again (n=2) and the TSFP site being too far (n=2). Other reasons that appeared only once were; mother previously travelled to the site but the team were not there, mother heard that they refuse children so was reluctant to go, CNV recently screened child and declared her not malnourished, mother busy with other tasks, mother went but told by staff there was no more forms to admit new cases and the mother sick and unable to care for the child.

5. Conclusions

The assessment estimates that coverage of SAM treatment (OTP) in the former Aweil East County is **35.8% [CI 95%: 23.6%-50.2%]**. For MAM treatment (TSFP) coverage was estimated at **5.6% [CI 95%: 0.9-10.3]**. For TSFP the prior belief of coverage, developed during the qualitative and quantitative data analysis over estimated coverage (25%) and therefore there is a conflict between the prior and the likelihood (developed with information from the wide-area survey). But because we were able to find 90 MAM cases (significantly exceeding the minimum sample size) we were able to estimate coverage using only the likelihood. Therefore coverage of both programmes is well below the SPHERE standard of 50% for rural CMAM programmes and therefore indicates the need to invest in reform to improve coverage.

The assessment was able to not only identify the main barriers to access but also to investigate these in more depth, allowing for the development of recommendations and actions to overcome the barriers and to build on the boosters.

During the assessment both IRC and ACF delivery mechanisms were assessed independently, but the community was assessed in the same way. After all both programmes work with the same community of Aweil East County. Therefore where necessary differentiation in the analysis and recommendations has been made between programmes but when not mentioned the findings refer to the community or to both programmes.

Awareness of malnutrition and the programme is typically a key reasons for low coverage in CMAM programmes. Aweil East County is no exception. That said there was a basic awareness of malnutrition and the existence of the CMAM programme, but the details were found to be lacking. This indicates the need for a communication and sensitisation strategy that responds to the specific misunderstandings and builds on nuances in understanding. The effects of malnutrition (potential death and growth inhibition) should be more strongly promoted to increase prioritisation of treatment. Malnutrition needs to be promoted as an illness, with consequences that needs to be correctly treated. This should all be done with the aim of facilitating early identification and referral and increasing the priority for treatment amongst caregivers. Programme awareness is largely limited to knowledge of a place that gives out *muguak mith ador* (RUTF/RUSF). A lack of knowledge on functioning of programme and reasons for rejection were found to be an important area of deficit in awareness. When mothers do not have a clear understanding of why children are turned away this can be damaging for reputation of programme.

The closure of CMAM sites during the rainy season will be partly overcome with new permanent CMAM site staff, however rains will still affect ability of caregivers to travel to sites. Programme staff will need to investigate how they can ensure the continuation of treatment even when the rains come. Whether this be pre-positioning of stocks or anticipating limits on movement by giving larger dosages (2 weeks for example) to caregivers.

Data quality was also found to be a challenge. This is concerning in terms of individual patients and also in terms of having the necessary information to make the necessary adjustments to programming. For example if defaulting is under reported the information does not exist to take the necessary action. Specifically the following needs to be addressed with urgency; accuracy in allocating discharge status, (recording of those deaths, defaulting and avoiding hidden defaulters), source of referral (referral from PHCU) and weight-for-height monitoring.

Activities in order to reduce defaulting needs to be taken more systematically. In order for this to be done contact details for each caregiver need to be taken, absent weeks recorded, and caregiver followed up after first absent week (thereby catching them before they default). If cases do default, reasons must be recorded and analysed to inform necessary action.

The availability of RUTF/RUSF on the market is a serious problem. Deeper investigation of sources needs to be conducted and if leaking from supply chain collaboration with authorities needs to be pursued. If mothers are selling, sensitisation and collaboration with influential community leaders needs to be followed to persuade caregivers to not sell. Programme staff should avoid taking a 'hard' approach with caregivers as this will only make CMAM sites a hostile place to be and therefore having a negative effect on coverage.

The assessment found that there is room for improvement in the quality of CMAM care provided as well. This includes adherence to admission and discharge criteria as well as improvements to the caregiver experience at the CMAM site.

The reduction in waiting times and improvements in information sharing during the visit were found to be areas that would make significant improvements to caregiver experience.

ACF has recently started a new phase of funding including on site permanent CMAM staff and additional community mobilisation activities. This presents a great opportunity to put actions in place to overcome the presented challenges. IRC and ACF should work together, particularly on the development of a community mobilisation strategy, in order to improve the coverage of SAM and MAM in Aweil East County. The following section makes a series of recommendations with accompanying activities.

6. Recommendations

	Recommendation	Findings	Actions	Responsible people ²¹	Level of priority
1	Improve community mobilisation through better engagement with existing community structures and actors	- Community mobilisation activities limited to CNV screening - Limited engagement with community leaders - Lack of community mobilisation strategy	- Develop comprehensive community mobilisation plan with community figures that includes communication and sensitisation, screening and referral, defaulter/absent follow-up and caregiver support.	Nutrition Coordinator and Nutrition PM	High
			- Identify key influencers (e.g. village leader, goleader, religious leaders) at community level to promote programme and raise awareness of malnutrition	I Nutrition PM and Community Mobilisers	High
			- Utilise existing groups such as church groups and youth groups to promote programme and raise awareness	Nutrition PM/Community Mobilisers	High
			- Map CNV coverage (by village) and maintain up to date records on activity	Nutrition PMs	Medium
			- Provide regular support and supervision to CNVs	Community Mobilisers	Medium
			- Introduce referral follow-up system, and improve absentee follow-up including recording of reasons for default	Nutrition PM/Nutrition Coordinator	Medium
2	Improve the interface between OTP and SFP	- Children not systematically referred from OTP to SFP - MAM children not always referred directly to TSFP from community - Knowledge of difference between TSFP/OTP and MAM/SAM low amongst caregivers	- (even if there are specified OTP or TSFP days for returning caregivers)	ACF Nutrition Coordinator	High
			- In the absence of TSFP at IRC sites ensure IRC staff including CNVs have clarity TSFP schedule and nearest site to enable CNVs to refer MAM cases straight to TSFP.	IRC	High
			- When there is no TSFP (all IRC OTPs) at the site use extended discharge protocol	IRC	High

²¹ Unless stated these refer to both ACF and IRC staff

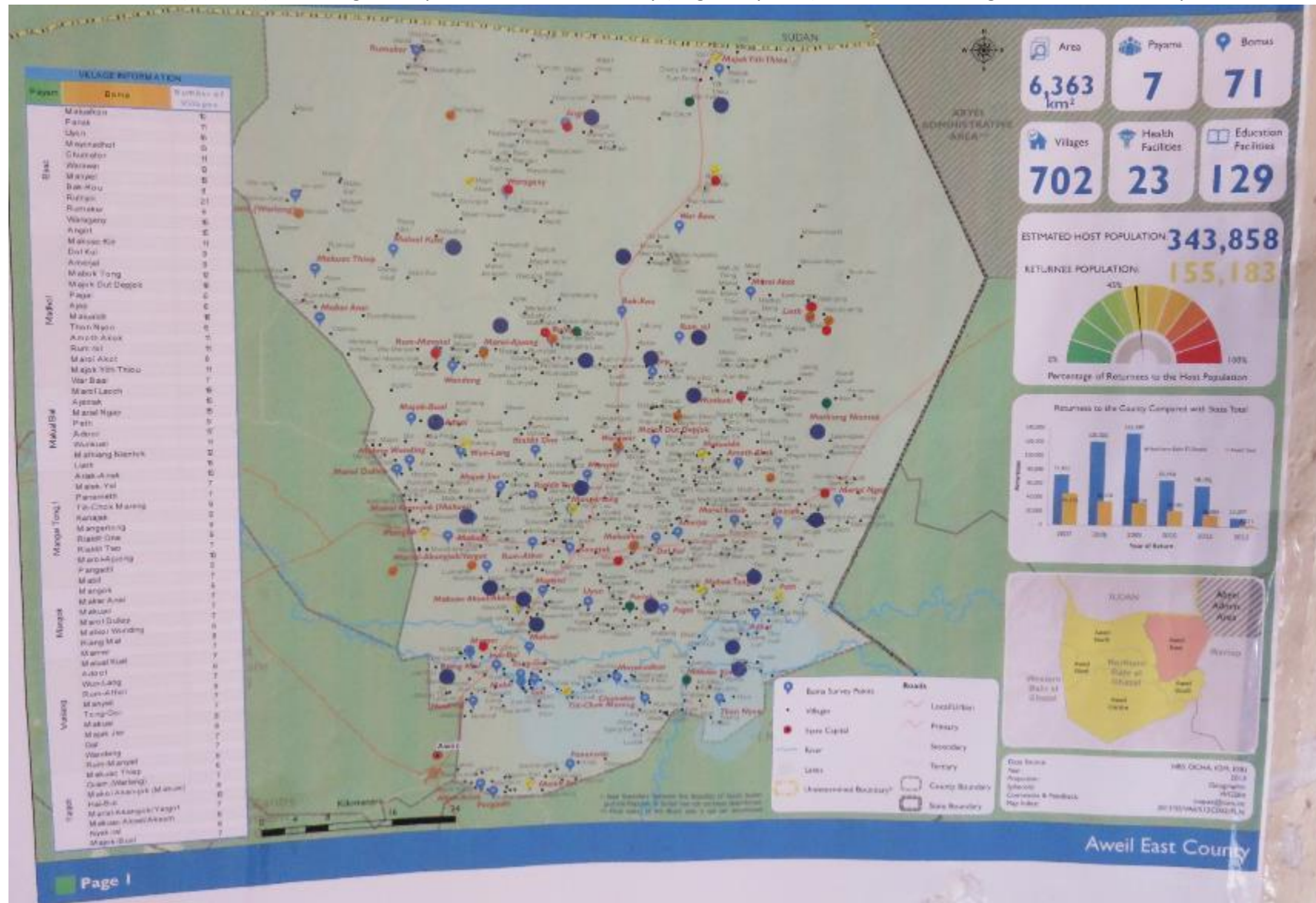
			- Ensure staff clearly explain to care-givers the difference in SAM and MAM, OTP and SFP.	IRC and ACF	High
3	Improve data management and reporting from facility to base level	- CMAM site level data quality poor - Early discharge of children - Low accuracy in discharge recording	- Retrain all CNWs in data management including updates on admission and discharge criteria	Nutrition PM	Medium
			- Supervisors to check sample of OTP cards on a regular basis (weekly) and provide feedback to OTP team	Nutrition Supervisors	Medium
			- Nutrition Coordinator to regularly check compilation reports (OTP cards to base compilation) to ensure accuracy and provide feedback to Nutrition PM	Nutrition Coordinator/Nutrition PM	Medium
			- Ensure only cured, default, non-response and death are recorded as discharge outcomes.	Nutrition Coordinator/Nutrition PM	Medium
			- Improve tracking of RUTF at facility level and if necessary request re-stocking at the beginning of the day	Nutrition PM/Supervisor/CNW	Medium
			- All private clinics and to be trained and given MUAC tapes for screening. CNVs to help identify	Community mobilisers and CNVs	High
4	Increase the network of people able to screen and refer children	- Limited number of screeners at community level (CNVs and CBDs) - Opportunities exist for engaging a wide variety of actors	- Train and equip traditional healers/witch doctors/spear masters with MUAC tapes. CNVs to help identify.	Community mobilisers and CNVs	High
			- Train and equip church leaders with MUAC tapes for screening. CNVs to help identify.	Community mobilisers and CNVs	High
			- All PHCU/C, hospital staff (midwives, nurses and doctors) and EPI vaccinators to be equipped and trained in MUAC screening	CHWs	High
			- Train mothers at the facility level to screen and monitor children (theirs and others) during first visit. This will also facilitate understanding of treatment.	CHWs	High
			- train CNVs to support caregivers when they have difficult in attending the OTP/TSFP	Nutrition PM	Medium
5	Increase support provided to caregivers to enable access to the OTP	- Mothers unable to access OTP due to opportunity cost of attending especially during harvest period	- investigate opportunities for collaboration amongst mothers to pay for transport	CNV	Medium

		- Low level of implication of fathers and husbands - Rains limiting access to CMAM sites for staff and for caregivers	- involve key community figures to determine how travel to OTP site can be facilitated	CNV	Medium
			- Engage with fathers and husbands to ensure they provide support to mothers in accessing CMAM site and ensure care of children remains a high priority.	CNV	Medium
			- Investigate pre-positioning stocks and/or giving large dosages to caregivers during rainy season.	Nutrition PM/CNW	Medium
6	Improve efficiency of CMAM sites and reduce overall time spent there for caregivers	- Long waiting times and disorganised OTP sites - Lack of information given to caregivers during OTP.	- Ensure consistent information sharing on progress of treatment	CNW	Medium
			- Ensure organisation of CMAM site that does not require all mothers to wait for all mothers to be present	CNW	Medium
			- Conduct sensitisation sessions with smaller groups (4-5)	CNW	Medium
			- Increase number of staff (including CNVs) to support CMAM sites.	Nutrition PM	Medium
			- Ensure CMAM activities begin as close to 9am as possible.	Nutrition PM	Medium
7	Improve communication and sensitisation strategy and messaging	- Poor understanding of OTP and TSFP amongst caregivers - Poor compliance with protocols (sharing/selling)	- Develop messaging that responds to specific challenges (sharing and selling)	Nutrition PM	High
			- Sensitise mothers on key messages during each visit to CMAM site and ensure good understanding	CNW	High
			- Utilise existing groups (church groups) to share messages	CNW/Community Mobilisers/CNV	High
			- Utilise influential community figures (e.g. village leaders) to share messages on a regular basis.	CNW/Community Mobilisers/CNV	High
8	Take action to reduce leakage of RUTF/RUSF onto the market	- Long length of stay - Observations of RUTF/RUSF in markets	- Investigate reasons for leakage	FieldCo/Nutrition PM	Medium
			- Develop strategy with CHD and local/traditional authorities to limit leakages (through surveillance and pressing charges)	FieldCo/Nutrition PM and CHD	Medium
			- Conduct mass communication campaign to discredit selling of RUTF/RUSF and promote as medicine for lethal condition	FieldCo/Nutrition PM	Medium

			- Increase sensitisation on not selling RUTF at facility level	Nutrition PM	Medium
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7. Annexes

Annex 1 Photo of map of Aweil East County used during assessment ACF CMAM sites (orange dots), IRC CMAM sites (yellow dots), villages visited during the qualitative research (red dots) and villages sampled for wide-area survey (large navy dots). Source: IOM Village Assessment Survey 2013



Annexe 2 Work plan of SQUEAC assessment in Aweil East County February 2016

	03-Feb	04-Feb	05-Feb	06-Feb	07-Feb	08-Feb	09-Feb	10-Feb	11-Feb	12-Feb	13-Feb	14-Feb	15-Feb	16-Feb	17-Feb	18-Feb	19-Feb
	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri
SQUEAC and Coverage Training + getting to know the programme																	
Quantitative Data Analysis and collection of extra data																	
Qualitative Research Training																	
Qualitative Data Collection and Analysis																	
Analysis of Stage 1 data + Stage 2 (Formulation of Hypothesis and planning)																	
Enumerator Training																	
Stage 2: Small Area Survey + Small Study																	
DAY OFF																	
Hypothesis analysis and Formulation of Prior and Stage 3 preparation for Wide Area Survey (Sampling, Log etc.)																	
Stage 3: Wide area survey																	
Extra Small study on SFP/OTP																	
Development of Posterior, Recommendations and Action Plan																	

Annex 3 CMAM TWG Recommendation for OTP and TSFP admission and discharge criteria in for Children 6-59 months

ADMISSION CRITERIA FOR CHILDREN 6-59 WITH SAM	DISCHARGE
- Weight-for-height/length is ≤ -3 Z score, or - MUAC is < 115 mm, or - Presence of bilateral pitting Oedema AND - Appetite test passed - No medical complications - Child clinically well and alert	The anthropometric indicator (during admission) that is used to confirm SAM should also be used to assess whether a child has reached nutritional recovery (during discharge) - Weight-for-height/length is ≥ -3 Z score and no oedema for at least 2 consecutive visits. And - MUAC is ≥ 115 mm and no oedema for at least 2 consecutive visits. - Children admitted with only bilateral pitting oedema should be discharged from treatment based on no presence of oedema and the anthropometric indicator routinely used in the program (MUAC or WHZ). % weigh gain should not be used as a discharge criterion. NB: <i>When there is no TSFP, necessary procedure should be follow to apply the Expanded Criteria.</i>
ADMISSION CRITERIA FOR CHILDREN 6-59 WITH MAM	DISCHARGE
MUAC is ≥ 115 mm - < 125 mm AND/OR	The anthropometric indicator that is used to confirm SAM (during admission) should also be

- Weight-for-height/length is ≥ -3 Z to < -2 Z score AND - Appetite - Clinically well - Alert ALSO - Children discharge from the therapeutic feeding programme	used to assess whether a child has reached nutritional recovery (during discharge). - MUAC ≥ 125mm for two consecutive visits AND ≥ -2 z-score AND 6 weeks minimum stay in TSFP % weigh gain should not be used as a discharge criterion.
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ADMISSION CRITERIA FOR PLW	DISCHARGE PLW TSFP
- Pregnant Women (second or third trimester – or visible pregnancy) If MUAC < 210 mm OR - Lactating women with an infant < 6 months If MUAC < 210 mm AND/OR - Lactating women with an infant < 6 months if they have breastfeeding problems or if the infant is not gaining weight adequately.	- If MUAC is > 210 mm - Or until the baby reaches 6 months of age

Annex 3 List of interviews and focus groups conducted during the qualitative research

Date	Village	Type of informant	# de participants
06/02/2016	Majak	Older men	5
06/02/2016	Majak	village leader	1
06/02/2016	Majak	Young women (age 16-30)	7
06/02/2016	Majak	Young women (age 20-40)	5
06/02/2016	Majak	Young women (age 20-45)	6
07/02/2016	Mamer	Village elders (executive chief, village elders, Goleader)	7
07/02/2016	Mamer	Pharmacist	1
07/02/2016	Mamer	Young men (all under 40 years old)	10
07/02/2016	Rum Manyiel	Village elders (executive chief, Boma secretary, goleader, teacher)	8
07/02/2016	Rum Manyiel	Women (including a TBA)	1
07/02/2016	Rumwel	Spearmaster	1
07/02/2016	Rumwel	Mother of uncovered MAM child	1
07/02/2016	Rumwel	Village elders (including sub-chiefs and goleaders)	6
07/02/2016	Rumwel	TBA	1
08/02/2016	Malith OTP	CNW	1
08/02/2016	Malith OTP	Mothers of covered SAM children	4
08/02/2016	Malith OTP	Mothers of covered SAM children	3
08/02/2016	Angot	Women	3
08/02/2016	Angot	CNVs	2
08/02/2016	Angot	Village leaders	6

08/02/2016	Akuem OTP	Mothers of SAM children (covered)	6
08/02/2016	Akuem OTP	CNW	2
08/02/2016	Akuem OTP	CNV	2
09/02/2016	Omduraman OTP	CNW	1
09/02/2016	Omduraman OTP	Nurse at PHCU	1
09/02/2016	Omduraman OTP	CNV	1
09/02/2016	Omduraman OTP	Mothers of covered SAM children	4
09/02/2016	Leith OTP	Mothers of SAM children (covered)	6
09/02/2016	Leith OTP	CNW	3
09/02/2016	Malbilbiet OTP/SFP	CNV	5
09/02/2016	Malbilbiet OTP/SFP	CNW	4
09/02/2016	Malbilbiet OTP/SFP	Women	4
09/02/2016	Wargarang	Spearmaster	1
09/02/2016	Wargarang	Village elders (1x goleader and 3 old men)	4
09/02/2016	Wunkuel	Village elders	17
09/02/2016	Wunkuel	church leaders (1 women and 2 men)	3
09/02/2016	Wunkuel	Women	12
09/02/2016	Wunkuel	witch doctor (women)	1
15/02/2016	Akuem	Market seller	1
16/02/2016	Majok	Market seller	1

Annex 4 Questionnaire used for covered SAM or MAM cases found during the small and wide area surveys

Date: _____ Name of Child: _____

Boma : _____ MUAC (cm): _____

Name of Caregiver : _____ Odemea? (+, ++, +++): _____

Village of Caregiver: _____ Sex of child (circle): Male Female

Enumerator/Supervisor name : _____ Age of child (months): _____

OTP or SFP (circle answer)

Proof that child is in the programme: (circle answer) RUTF RUSF ration card (date of last visit: _____)

Which OTP/SFP is the child enrolled in? (circle answer)

Warawar	Lieth	Mabil-Biet	Mabok tong	Wieth-Lou	Mayom Well
Omduruman	Wargeng	War-Malual	Titchok	Maluakon	Mangok
Malual-bai	Yargot	Marol-Ajuong	Wunlang	Majok Akeen	Mangartong
War-Bekdit	Akuem	Malualdit	Peth	Majok Nyinthou	Malith

1. How did you first know that your child was malnourished?

(include information about who told them and when they found out)

2. How did you hear about the programme?

(include information about who told them and when they found out)

3. Did you treat your child before coming to the health facility/OTP?

☐ No

☐ Yes ; How?

And why did you then go to the health facility?

USE LOCAL TERMS AND UNDERSTANDING OF MALNUTRITION

Annex 5 Questionnaire used for non-covered SAM or MAM cases found during the small and wide area surveys

Date: _____

Boma : _____

Name of Caregiver : _____

Village of Caregiver: _____

Enumerator/Supervisor name : _____

Name of Child: _____

MUAC: _____ SAM or
MAM

Odemea? (+, ++, +++): _____

Sex of child (*circle*): Male Female

Age of child: _____

1. Do you think there is a problem with your child?

☐ Yes ; what problem ?

☐ No

2. Do you think your child is sick ?

☐ Yes ; which illness is your child suffering from? (IF MALNUTRITION MENTIONED LIST DINKA WORDS USED) _____

☐ No

3. Do you think your child is malnourished?

☐ Yes: what are the causes of the malnutrition? (LIST DINKA WORDS USED)

☐ No → skip to question 6

4. Do you know where you can take your child to be treated (for malnutrition)?

☐ Yes ; what is the name of the programme, where is it and how do they treat malnutrition?

☐ No → STOP

5. Why have you not taken your child to the OTP/SFP?

6. Has your child previously received treatment from the OTP or SFP or SC? (circle appropriate)

☐ Yes ; why are they no longer in the programme ? _____

☐ No → STOP

☐ 1. Defaulter ; when ? _____ why ? _____

☐ 2. Discharged cured ; when ? _____

☐ 3. Discharged non-respondent ; when ? _____

☐ 4. Transferred from SFP/OTP/SC : _____

Thank the carer and provide with a referral slip and place and time of OTP/SFP.

Any additional comments/observations :

Annex 6 List of villages sampled during wide-area survey and SAM, MAM and recovering cases found

Boma/Village	Total SAM	SAM uncovered	SAM covered	Recovering Cases	Total MAM	MAM uncovered	MAM covered	Recovering Cases
Rumdier and Rumkuel	3	2	1	0	6	6	0	2
Manyom Akot	0	0	0	0	3	3	0	0
Muokabiik	2	2	0	0	6	6	0	0
Abany	0	0	0	1	5	5	0	0
RIANG ADHEN	0	0	0	0	5	5	0	0
MAPER AGOOR	0	0	0	1	6	6	0	0
LIETNHOM	1	1	0	0	6	6	0	0
HONGWETYAK	0	0	0	0	3	3	0	0
WAR APIL	0	0	0	0	3	3	0	0
UDOOM	0	0	0	0	1	1	0	0
NYORIC (Malik Aber and Malual Angeng)	3	2	1	0	2	2	0	0
HONGADIOR	3	2	1	0	5	4	1	0
MANYIEL AKOK	0	0	0	0	2	2	0	0
RIANG AWULUEI	2	2	0	0	4	4	0	0
RIANGAMET	2	1	1	0	2	1	1	0
MAJAKRUP	0	0	0	0	0	0	0	0
BADOT	3	1	2	0	6	6	0	0
KUELABUOK	1	1	0	0	1	1	0	0
THOC AJUONG	0	0	0	0	3	2	1	0
MAJOKKUACH	1	1	0	0	3	3	0	0
WUNCUM	0	0	0	0	2	2	0	0
ABIEI	2	0	2	0	2	2	0	0
Total	23	15	8	2	76	73	3	2