



Semi-Quantitative Evaluation of Access & Coverage (SQUEAC)

Gogrial West County
Warrap State

Republic of South Sudan

October 2011



ACRONYMS

ACF	Action Against hunger
CMAM	Community management of acute malnutrition
CSAS	Centric systematic area sampling
CI	Confidence Interval
CNV	Community nutrition volunteer
CNW	Community nutrition worker
ECHO	European Commission Humanitarian Organization
IYCF	Infant and young child feeding
MUAC	Mid upper arm circumference
OTP	Outpatient therapeutic programme
PHCC	Primary health care centre
SAM	Severe acute malnutrition
SQUEAC	Semi quantitative evaluation of access and coverage
RUTF	Ready to use therapeutic food
SD	Standard deviation

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AKNOWLEDGMENTS

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A special thanks to the SSRRC and County Health Manager of Gogrial West County for providing vital information on the population and geographical information, participation and support during the investigation.

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We finally wish to thank the enumerators and individual families who pleasantly allowed the team members to assess their children and provided the investigation team with the information required that made this exercise a success.

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EXECUTIVE SUMMARY

The Gogrial West County coverage investigation using SQUEAC methodology was conducted on 3rd – 21st October 2011. This is the first time ACF – USA South Sudan used the SQUEAC approach, a change from long-time used methodology – CSAS (Centric systematic area sampling). The objectives of the investigation were:

1. Estimating the overall coverage of nutrition programme catchment areas in Gogrial West.
2. Identifying barriers to access and uptake of the CMAM services provided by the nutrition treatment programme in the County
3. Give recommendations to the nutrition treatment programme based on the investigation findings to improve access to the IMAM services and increase programme coverage in the project areas

The evaluation used a simplified version of the standard, 3-stage; Bayesian beta-to-binomial conjugate analysis. CMAM coverage in Gogrial West County was estimated to be:

Point Coverage: 44.7% (34.0% - 56.2%)

The investigation explicitly leads to a number of recommendations, in summary the team recommends:

- Strengthening the community mobilisation strategy through conducting on-going sensitisation/awareness raising meetings with key stake holders i.e. village chiefs, elders and caretakers and continued screening and further by proper mapping of the catchment villages, instituting a mobilization plan and follow up of the mobilization schedule.
- There is observed need to make the two mobile OTPs (Malual and Mayom) permanent to operate throughout the days and also having contracted CNWs manning the OTPs. Further increasing the number of CNWs in OTPs especially those with high admissions to avoid continued use of casuals and finally having more outreaches during the peak of malnutrition.
- Consider standardising and sustaining the motivation strategy for volunteers across all sites
- The program uses both MUAC and W/H criteria to admit children. Admission using weight for height z-score has shown an impact of early detection of cases and thus allows enrolment before a child reaches <115 mm MUAC in most OTPs. However, the case should be adhered to and consistently applied to all beneficiaries; this will deter and misconception from beneficiaries.
- Increased on-job training for CNWs by the OTP supervisor, increased contact with the programme officer and manager.
- As the case load is high, blanket supplementary feeding programme could be helpful in reducing number of severely malnourished cases during the peak season
- Strengthen the linkages and capacity of CNWs, CNVs and outreach services for reducing the negative contributing factors.

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1. BACKGROUND

ACF-USA started implementing nutrition interventions in Gogrial West in June 2007 to save the lives of children and women threatened by hunger and diseases in Warrap state. Areas addressed include nutrition treatment, food security, WASH and nutrition surveillance. The therapeutic feeding programme (TFP) in Gogrial West County admit and treat severely malnourished children in 5 permanent and 2 mobile OTPs as well as those with medical complications at SC level that is located in Alek.

The Gogrial West County is comprised of seven Payams; among which the nutrition treatment programme covers four of the seven. The five permanent OTPs are: Alek, Mankuach, Ngapathian, Keet and Panliet. To compliment the five stationary OTPs, 2 mobile OTPs have been running and these are Malual and Mayom OTPs.

During the fifth population census, the population of the county was estimated at 583,975. The SMART survey conducted by ACF-USA surveillance team in April 2011 showed that the GAM and SAM rates were 22.3 % (18.9 - 26.0 95% C.I.) 4.4 % (3.0 - 6.4 95% C.I) respectively and reported as per the WHO, 2006 standards. The presented facts can give a glimpse of the caseload expected in the County.

The Gogrial West coverage investigation using SQUEAC (Semi-Quantitative Evaluation of Access and Coverage) methodology was conducted on 3rd – 21st October 2011. This is the first time ACF – USA South Sudan mission used the SQUEAC approach changing from its long time methodology - CSAS. The objectives of the investigation were as mentioned in the executive summary.

Briefly, the Semi-Quantitative Evaluation of Access and Coverage¹ (SQUEAC) tool was developed to provide an efficient and accurate method for identifying existing barriers to service access and evaluating coverage in a non-emergency context. The approach places a relatively low demand on logistical, financial and human resources to provide detailed information regarding overall coverage, areas of low and high coverage and the principle factors preventing higher coverage in a given target area. It is therefore possible to implement the method in a medium to long-term programme integrated with national Ministry of Health (MoH) operations rather than a short-lived, NGO funded programme not aiming to achieve long term sustainability. Methods previously available such as the CSAS approach create a far larger demand on resources and therefore cannot be viably integrated into MoH run programmes in the long-term.

The SQUEAC investigation is based on the principle of triangulation. This means that data need to be collected and validated by different sources and different methods. The exercise ends when there is redundancy; i.e. no new information is gained from further investigation using different sources or methods.

SQUEAC achieves its efficiency by using a three stages approach: the development of the *Prior*, the development of the *Likelihood* and the generation of the *Posterior*. The first two stages aim to identify potential barriers and provide two individual estimations of coverage. During the *Prior* building process, existing routine data which have previously been collected and compiled are combined with qualitative data to produce a coverage “picture”; the “picture” can be drawn by hand or by using the xMind software. Building the *Prior* provides a projection of coverage levels for both the entire target area and also specific areas suspected of relatively high or low coverage within the programme’s target zone.

The *Likelihood* is built with data collected during a wide area field survey in randomly selected villages. The *Active and adaptive Case Finding (AACF)* method is used to identify severely

¹ Mark Myatt, Daniel Jones, Ephrem Emru, Saul Guerrero, Lionella Fieschi. SQUEAC & SLEAC: Low resource methods for evaluating access and coverage in selective feeding programs.
<http://www.brixtonhealth.com/SQUEAC.Article.pdf>

malnourished children as well as children enrolled in the programme who are still malnourished or recovering. During the wide area survey, additional qualitative data are collected in order to explain why some severely malnourished children are not enrolled in the OTP.

The last stage, the generation of the *Posterior*, combines the two initial stages and provides the overall coverage estimation, including Confidence Interval² (C.I), by taking into account the “strength” of each component of the equation. The *Posterior* is calculated using the Bayesian calculator.

2. STAGE ONE

The first stage of SQUEAC investigations began with analysis of routine programme monitoring data which included charts of trends in admission, exits, recovery, in-programme deaths, and defaulting and data that was already collected on beneficiary record cards such as admission MUAC and the physical address (home villages) of programme beneficiaries.

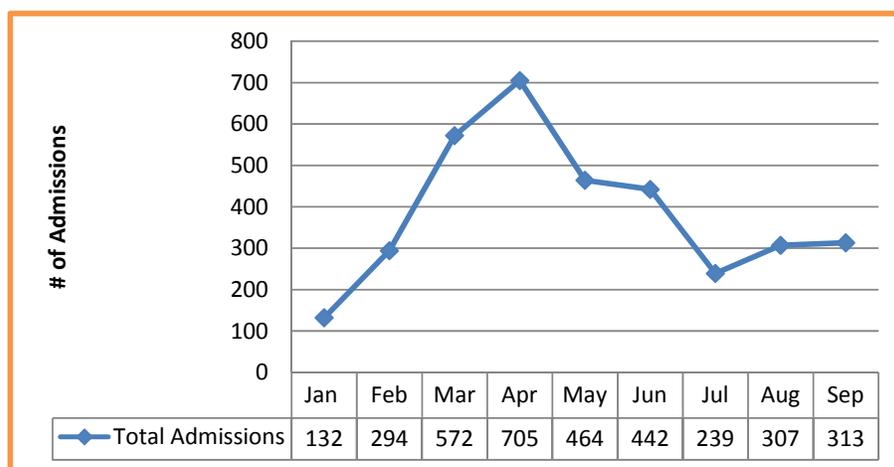
The objective of Stage One is to identify areas of low and high coverage and the reasons for coverage failure using routine programme data or easy-to-collect quantitative and qualitative data.

2.1. Programme Admissions

Since ACF – USA began its operations in Gogrial West County; there are a lot of children that have been treated by the program. The analysis focused on Jan – Sept 2011, in this period the programme admitted 3468 children to its seven operational OTPs.

Evolution of overall admissions is illustrated in Figure 1. A glance at the trend reveals a steady increase in admissions from January up until its peak in April 2011 and a decrease thereafter with a slight come back in August and September. Admissions in January were low and were attributed to the referendum which had caused scale down of activities and at some point the activities were suspended for a period of two weeks and after that there is observed increase in trend. Pronounced peak in admissions in April 2011 was explained by the investigation as the period when the reserve stocks for the household are depleted and that there is migration to the big centres which increases the population in places like Panliet, Alek and Mankuach. The May 2011 drop was partly attributed to RUTF stock-out that lasted for a period of 2 weeks. The drop is further explained by the investigation as caused by movements back to the cultivation areas.

Figure 1: OTP Admissions over Time, Jan - Sept 2011, Gogrial West County

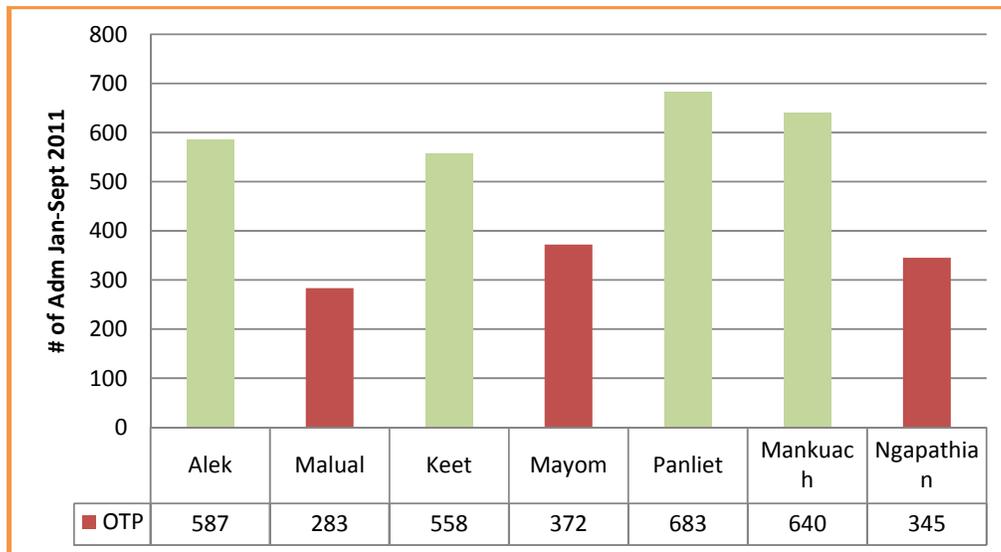


² The Bayesian approach is about beliefs and updating beliefs with data, the estimation interval is called the credible interval.

2.2. Admission by Service Delivery Unit (OTP)

Looking at the overall admission trends, admissions were further analysed by service delivery unit in order to identify potential disparities in admissions across the different facilities.

Figure 2: Total OTP admissions, Jan - Sept 2011, Gogrial West County



The analysis identified a clear difference between the sites whose series is green and those in red as shown in figure 2 above. The investigation concluded this to be the result of the location of the facility near the primary road in the region connecting different centres and further because these are big centres in the region and they experience in-migration during the hunger gap and is also places with primary health care and so receives many cases as the beneficiaries seek medical care. Some of the sites like Mayom and Malual are mobile and do not operate like other sites, which are open for 5 days in a week. The admission trends over time per health facility are illustrated in Figure 3 below.

Figure 3: OTP admissions by health facility over time, Jan - Sept 2011, Gogrial West County

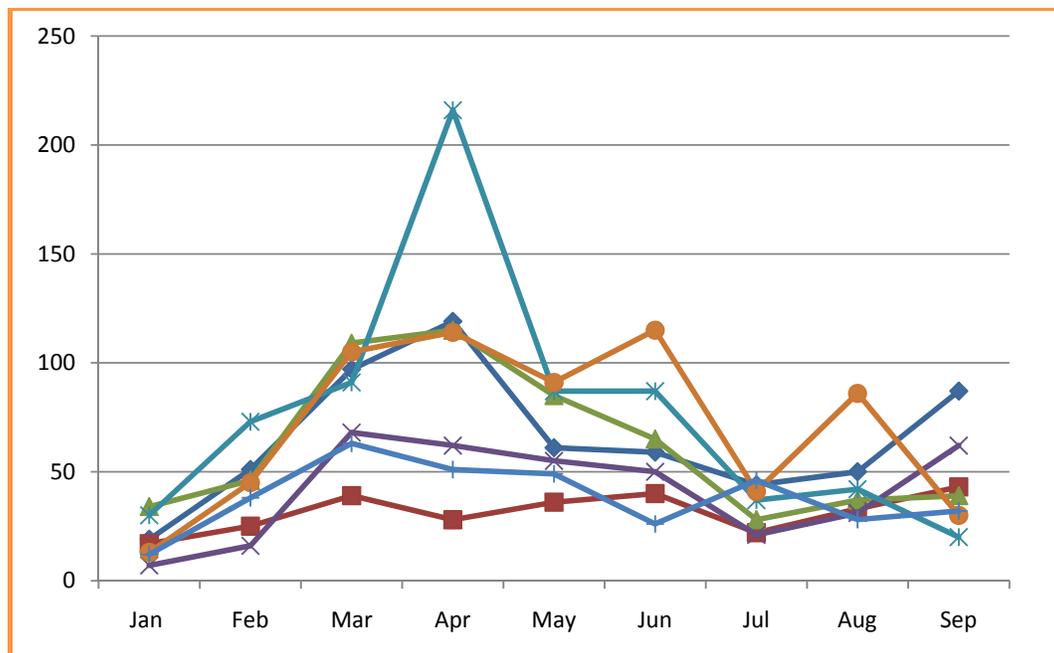


Figure 3 above indicates similar trends over time. All health facilities show an increase between Jan and April and the reasons are as explained above. Panliet shows the highest in April because, the centre is big and populations move to the area during the dry season to put up with relatives till the season improves and cultivation begins then they move back to the rural.

2.3. Admissions vs. Needs

Time bound trends, are clear in the trends of admissions. Seasonal peaks are based on the local seasonal calendar and critical events, which highlights highest food insecurity (i.e. hunger season) and in-migration to big centres peak periods to be between March and April. In linking admission trends and the seasonal calendar, one can see the trends correspond to needs as in Annex 2, though largely based on assumptions as the time frame is not long enough (over years) to illustrate this adequately.

The investigation has also ascertained that admissions drop with increasing agricultural responsibilities. This is twofold; first there is out-migration to the cultivation fields and second the labour intensive nature of cultivation and foreseen benefit does give little chance to seeking OTP services.

2.4. Spatial Coverage of Admissions

A geographical mapping exercise of admissions, defaulters and volunteers is used to assess the pattern of spatial coverage across the programme area. This is usually followed by a series of small area surveys to test hypotheses of heterogeneity of coverage. However, due to limitations on availability of good quality maps³, the spatial coverage assessment was modified. A pivot table was generated from the database to get villages with corresponding admissions, defaulters and volunteers

Following the overall admission trend analysis, the home locations of admissions were to indicate the spatial coverage of CMAM activities in the seven operational OTPs.

The analysis showed that admissions were higher in communities along the network of roads within the County and from the more densely populated areas. This was a key exercise towards guiding the investigation in the formulation of the hypotheses as indicated in section 2.9.

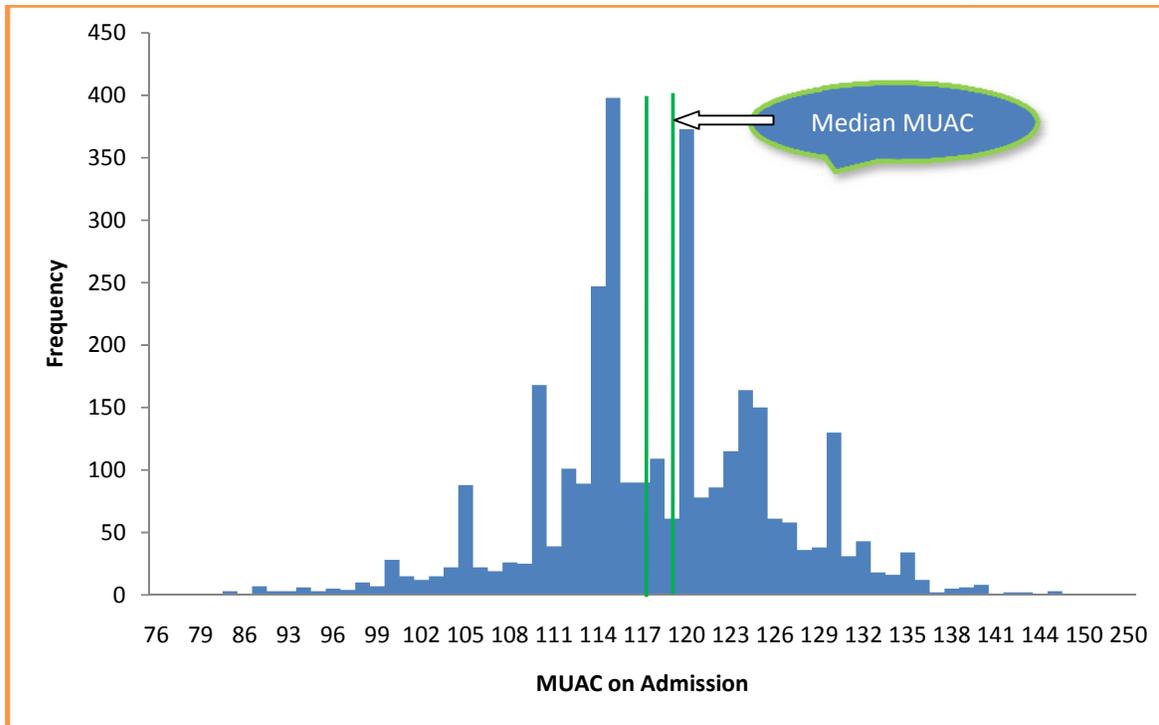
2.5. MUAC at Admission

The measurement of the MUAC at admission is also part of the data available on the individual admission card and as well captured by the database. The compilation of data collected from each OTP site makes it possible to investigate the *timeliness of treatment seeking behaviours*.

In order to further understand whether the programme is reaching SAM children early, the MUAC at admission was plotted for all recorded admissions between Jan – Sept 2011. The results are as shown in the figure 4 below. The median MUAC at admission was 117mm and the mean MUAC was 119.38 mm. The discrepancy is because the programme admission uses weight for height z-score of <-3 and/or MUAC <115 mm. This captures children earlier before they reach a MUAC of <115 mm. One point to note is that the people of this area are tall, thus most of older children >2 years are captured in the programme and may easily be considered to be having low W/H in reference to the standard height.

³ The mapping exercise proved difficult because the available maps did not have villages or settlements on it. It was also difficult for the team to locate most of the villages on the map from the list provided by the programme.

Figure 4: Graph of MUAC on Admissions



Overall, children appear to be arriving in a relatively timely manner for treatment, the median MUAC on admission can be used as an indicator of beneficiaries' treatment-seeking behaviour. More specifically, it reflects how early or late they seek care. The closer to the admission criteria the MUAC on admission the earlier they seek care and the lower the MUAC on admission the later they seek care. A median MUAC on admission of < 115 mm usually indicates late treatment-seeking behaviour. For the above analysis in the Gogrial West IMAM programme, the admission median MUAC is 117 mm shows that the programme is able to capture SAM children early.

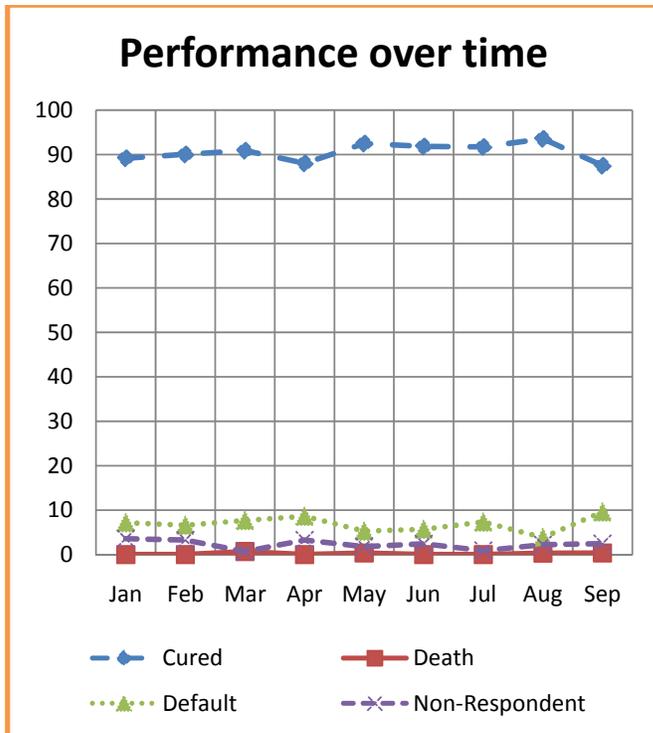
This early arrival seems to be positively influenced by use of z-score in admission criteria, the investigation found out that slightly above two thirds of admission are by z-score. This implies that the children are admitted early before they reach the <115 mm which is the MUAC admission criteria.

2.6. Programme Exits

The following graph and table presents cumulative programme performance indicators Jan – Sept 2011.

Performance Rate	Number	Percentage
Cured	2697	91.2
Death	5	0.2
Default	192	6.5
Non-Respondent	64	2.2
Total Discharge	2958	

Figure 5: Graph of Performance over time



Programme exits were meeting the SPHERE standards⁴, the proportion of discharges from therapeutic care who have died is <10%, recovered is >75% and defaulted is <15%.

2.7. Review of Defaulter Records

To better understand the factors effecting defaulting and potentially affecting coverage, various stages of analysis were conducted specific to defaulting. This was a key exercise towards guiding the investigation in the formulation of the hypotheses on coverage for testing as part of Stage Two. The number of defaulters is examined for signs of worryingly high trends over time.

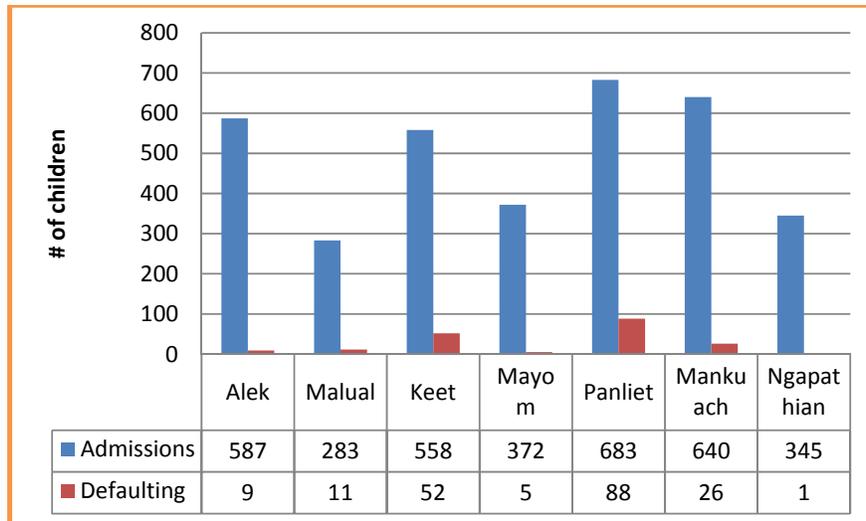
2.7.1. Defaulter versus admission over Time

Health facilities with higher number of admissions also have a higher number of defaulters, such as Panliet, Mankuach and Keet with exception of Alek which is attributed to the awareness of the OTP services and proximity. On the same note, health facilities with lower admissions also have lower defaulting, such as Malual, Mayom and Ngapathian. Such trends suggest a possible correlation between the levels of admissions and the levels of defaulting.

In bringing together admissions and defaulters per health facility it is possible to identify a few trends in the graph below.

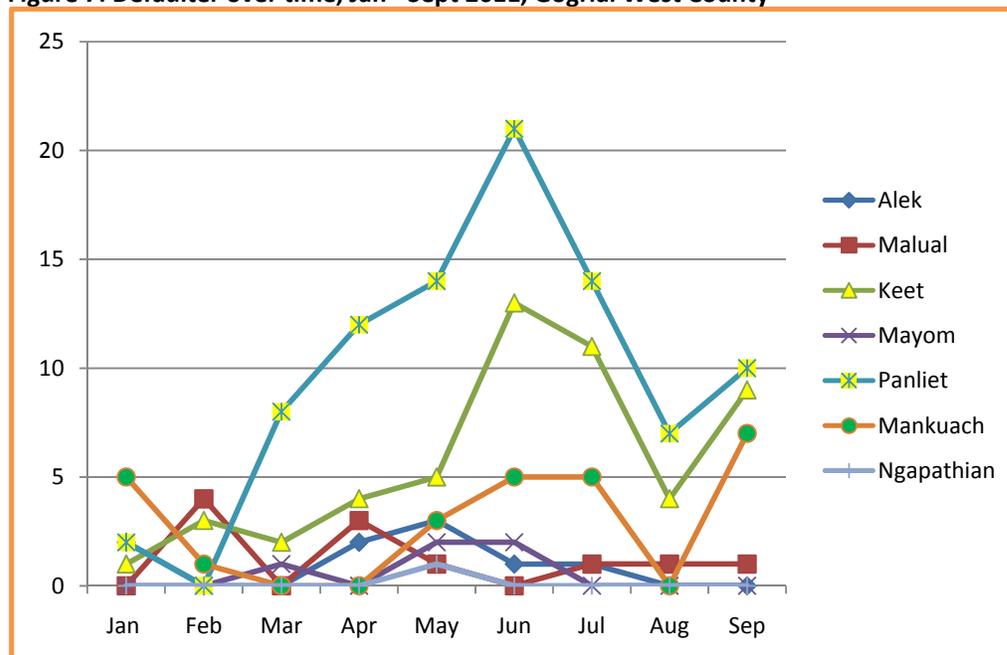
⁴ SPHERE Standards Handbook 2011

Figure 6: Defaulters versus Admissions per OTP, Jan - Sept 2011, Gogrial West County



The potential correlation seems to be corroborated by the trends in defaulting over time by health facility (Figure 7 below) which follows a similar pattern to admissions. The increase in defaulting in May and June could also be a result of out-migrations to the cultivation areas and increased farming activities.

Figure 7: Defaulter over time, Jan - Sept 2011, Gogrial West County



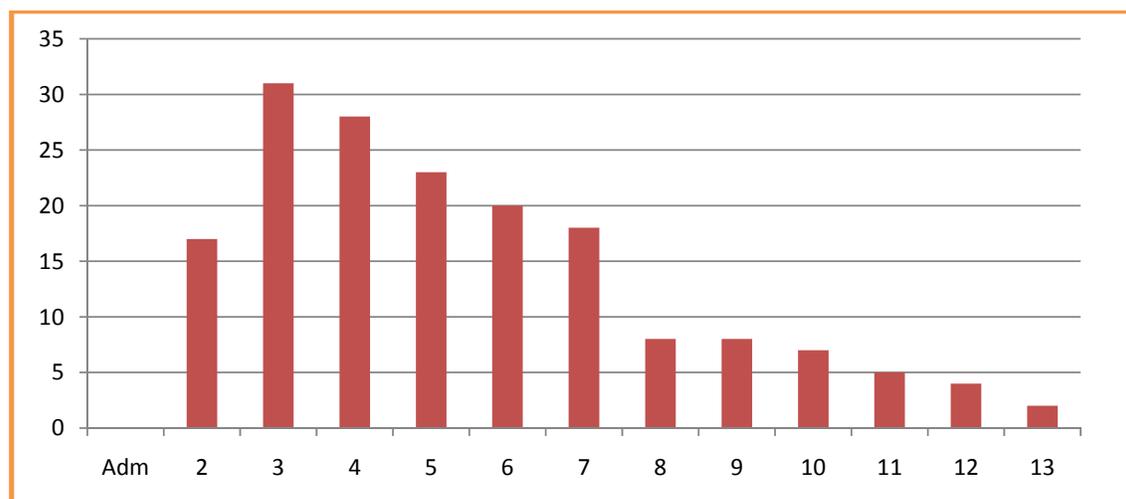
2.7.2. Early versus Late Defaulter

The investigation also analysed the timing of defaulting, in an effort to determine possible reasons behind it⁵. Discharged defaulter cards were gathered and separated into categories according to

⁵ Early defaulters generally suggests; 1) that the child did not recover on its own after (i.e. is affecting coverage) and; 2) it happened most likely for significant reasons. If it happened late it generally means that; 1) the child probably recovered on its own and; 2) it probably happened precisely because “sufficient” progress had been made and cost-benefit balance shifted

number of visits recorded (Figure 8). The analysis concluded that most defaulting is occurring early on, with some defaulters never returning for a single follow-up visit after admission.

Figure 8: Time of defaulting, overall, Jan - Sept 2011, Gogrial West County



2.7.3. Defaulters by Home Location

The investigation also considered the need for locating where the programme has high defaulting by mapping the villages from which defaulters come from.

Generally defaulting was low and most of the villages had 1 – 3 defaulters for the period Jan – Sept 2011. Two villages (Panliet and Anyieny) however showed a high defaulting and are corroborated by the volumes of admissions in Panliet and Keet OTPs. Table 1 below shows the villages with 2 and above defaulters in the catchment areas.

Table 1: Defaulters mapped by village of origin (Those with ≥2 defaulters)

Village	#	Village	#	Village	#	Village	#
Malual-awan	2	Ajiing	2	nyok thiang	2	mabior	3
Aci-but	2	Kuel	2	Makuac	2	Manyiel	3
lang	2	Nyath	2	War-chum	2	Panyuom	3
Dut-kuac	2	Wun-but	2	Ajogo	2	Mankuac	4
Nyor-kajang	2	Tiit	2	Malek-ngok	2	Malek	4
Adeer	2	Wai	2	Machar	2	Anyieny	10
Mangok	2	Mathiang	2	wajang	3	Panliet	24

2.8. Qualitative Data

2.8.1. Synthesis of Quantitative and Qualitative Data

During this SQUEAC investigation, a mind mapping exercise was used to synthesise all quantitative data analysed and qualitative information gathered. The exercise allowed the investigation team to collate all the data and facilitated discussion and interpretation. The exercise was done by putting together pieces of flip chart paper to create a “wall” to write on. The theme or topic being investigated, which in this case was coverage, was put at the centre of the wall and then sub-topics based on the various sources of quantitative data and qualitative information were written down branching out from the central theme. Corresponding data and information were then written down per sub-theme or topic and the process continued until all points of investigation were exhausted.

The mind mapping exercise can also be facilitated and captured using XMind⁶, a mind mapping software that allows for the recording of a mind map electronically. Annex 1 shows the XMind version of the mapping exercise for the Gogrial West SQUEAC.

2.8.2. Understanding of Malnutrition

Malnutrition is not recognized in Gogrial West communities as a distinct and easily recognisable condition, which can affect early detection. The mothers cannot at the first instance think of malnutrition when the child is unwell. In listing the common diseases in the community, malnutrition was not mentioned as a disease.

The terms used to refer to malnutrition are: *Dor* which means thin; *Thiang* which refers to a child who is thin, vomiting and has diarrhoea and *Chala* – thin and lacks appetite. The community recognizes that malnutrition is caused by: Lack of food/balanced diet, Poor care by mothers, Diseases, Poor Feeding and ignorance of good feeding practices and generally malnutrition.

2.8.3. Health Seeking Behaviour

During the community discussions, the respondents were asked what they do when their children are sick so as to assess their health or treatment seeking behaviour. Overall, these informal discussions revealed a complex health seeking behaviour across the programme area.

The majority start with home remedies by giving local herbs and when this does not work then they go to health facilities. The home remedies administered include: Local herbs-*Adhot, Nyibut*; Ajuet-lack off appetite and general sickness; Bhang-used for treating malaria and meningitis; Royal whisky-treating malaria, Grains roots and Facial cuts. The facial cuts are believed to be able to remove the sick blood.

When the situation becomes very serious, the child will then be taken to the PHCC, where they receive nutritional advice and medication for other identified illnesses. Some of the cases are brought to the health facility too late even after the start of CMAM activities.

Reasons given by the respondents as to why they begin with home remedies are: the distance which in some villages is five hour walk, the costs in PHCC, Lack of drugs /medication /especially injection and belief that tablets do not cure and prefer injection. The community is aware of drug shortages in the health facilities and in most cases they have always been referred to buy drugs from the shops and pharmacies in the market this has effect since they would prefer home remedies to coming to the PHCCs and the worse scenario is the belief that they must get injection because according to them that is what can cure.

2.8.4. Barriers to Access

In order to understand health seeking behaviours in Gogrial West, a series of cultural and programmatic factors linked to malnutrition were reviewed. The table 2 below summarizes key findings on possible reasons for defaulting and non-attendance.

Table 2: Reason for Defaulting and non-attendance

<p>Awareness on malnutrition & treatment available</p>	<p>Malnutrition is not recognized as a distinct disease by communities. Thus, when a child presents malnutrition signs and symptoms, caregivers begin home medication first and when it is not improving they go to the PHCC and from there is when they get to the OTP. There is still need for continued mobilization and awareness creation of malnutrition. The programme is known and accepted, however this is the case for villages around the OTP; those distant are still having a challenge coming to the OTP and mobilization activities have not reached them</p>
<p>OTP service provision</p>	<p>The OTP services are well accepted and mothers are happy about it, however some complaints of rejection (wrongly referred cases), favoritism, OTP staff eating and selling PlumpyNut were reported. This may have an impact where mothers will think RUTF is food and also the communication they take back may impact the uptake of the services.</p>

⁶ XMind can be downloaded free at www.xmind.com.

Distance	A common barrier to accessing OTP services is distance. Since the settlement structures in Gogrial West are clustered they tend to be spread far from one another. Some villages are very far from the OTP with almost 2 – 4 hours walking to reach the OTP where CMAM services are provided.
Physical Barrier	During the rainy season, seasonal rivers become a main barrier to access. In addition, road networks also become worse, limiting access during the rainy season. In some sites flooding becomes the main barrier
Community Mobilization	Most of the villages visited away from the OTP reported having not seen someone doing the screening in their villages. This was further corroborated by the CNVs focus groups that complained of distance to the villages and were asking for transportation during mobilization days. The CNW also reported issues of follow up by the community mobilize in confirming whether it is taking place
Rejection	This is evident in most OTPs; it has been caused by wrong referrals by the CNVs. The mothers at some point feel they are rejected because they are not related or known to the CNWs. The impact of this is that even when the child becomes malnourished the mother will not return since she was rejected. In one of the village (Abyei), the nutrition program had a child who was malnourished but because the child was rejected previously the mother was not willing to go back to the OTP.
RUTF Perceptions / Acceptance	Some community members refer to RUTF as food, which can have implication in that caregivers will attend the health facility without understanding the admission criteria/malnutrition treatment, be rejected and relay this information back to communities. Others refer to it as medicine and have attested that it cures and the child improves very fast, just a few weeks after being put on RUTF.

Areas of High and Low Coverage

Based on the information collected and analyzed in Stage One, there were observations of high and low coverage as seen in the admissions per home location. The investigation concluded that coverage is likely to be relatively low in some villages in the county but high admissions were observed in villages around the big centres and with road network.

The hypothesis was therefore that:

- **Coverage is high** in areas around the big centres such as Alek, Panliet and Mankuach

To test this hypothesis, eight areas were selected, based on the investigation, as the most representative of the hypotheses. The second stage is then undertaken to confirm the hypothesis.

3. STAGE TWO

The objective of Stage Two was to confirm the locations of areas of high and low coverage as well as the reasons for coverage failure identified in Stage One (above) using small area surveys.

Eight villages were sampled where four were hypothesised as having high admission and the others with low admissions. Four teams were formed for the small area survey which was conducted in two days.

3.1. Active and Adaptive case Finding

Active = Target SAM cases instead of doing house to house screening

Adaptive = Use key informants to help find SAM cases

= Key informants:

- Village leader/elder
- Traditional healer
- Senior women and elders
- Religious leaders
- Beneficiaries

3.2. The Definition of a Case

The case was defined as children aged 6 – 59 months with either:

- MUAC less than 115 mm
- Pitting Bilateral oedema
- <-3 Z-score; in this investigation, the criterion of Z-score was not considered to identify cases since it is a criterion generally used at the health facility level only and this measurement is not part of the community based approach.⁷

The local terms used were as defined in section 2.8.2. Based on the information collected, coverage was classified against a threshold of 50%⁸. A decision rule (d) was calculated using the following formula:

$$d = \left[n \times \frac{p}{100} \right]$$

n = total number of cases found
p = coverage standard set for the area

3.3. Stage Two – Small Area Survey

In the test of hypothesis exercise for high coverage areas, the following results were found and calculations made in order to classify coverage as follows.

3.3.1. High coverage areas

Total SAM found = 13; IN programme = 7; NOT in programme = 6; D = 50/100*13=6.5=6

Since 7>6, then coverage is above 50% and the hypothesis was accepted.

3.3.2. High coverage areas

Total SAM = 15; IN programme = 6; NOT in programme = 9; D = 50/100*15=7.5=7

Since 6<7, then the coverage is below 50%.

The actual numbers for each village are represented in the table 3 below.

Table 3: Results of the small area survey

	Villages	SAM cases	Cases In Program	Cases Not in Program
High Coverage villages	Mankuac	3	2	1
	Panliet	3	1	2
	Mayom	5	3	2
	Alek	2	1	1
Low Coverage villages	Moto	3	0	3
	Abyei	1	0	1
	Malek	7	3	4
	Mathiang	4	3	1
Total		28	13	15

⁷ Duffield A, & Myatt M, 2007, Weight-for-height and MUAC for estimating the prevalence of acute under-nutrition: a review of survey data.

⁸ Threshold was set at 50% based on the SPHERE minimum standard for coverage in rural areas.

4. STAGE THREE

The objective of Stage three was to provide an estimate of overall programme coverage using Bayesian techniques. To do this, the evaluation relied on the standards Bayesian beta to binomial conjugate analysis.

4.1. Developing a Prior

All the positive and negative factors identified as affecting the coverage are listed, ranked and weighted according to their relative contribution to the overall coverage. Positive and negative factors ranked highest are automatically given a $\pm 5\%$ weight while lowest ranked factors are weighted $\pm 1\%$. Factors ranked in between were given weights of between $\pm 2\%$ to $\pm 4\%$ according to their perceived positive or negative contribution to the coverage. The weights are then summed for the positive factors as well as the negative factors.

All positive factors were added to the minimum possible coverage (0%) while all the negative factors were subtracted from the highest possible coverage (100%).

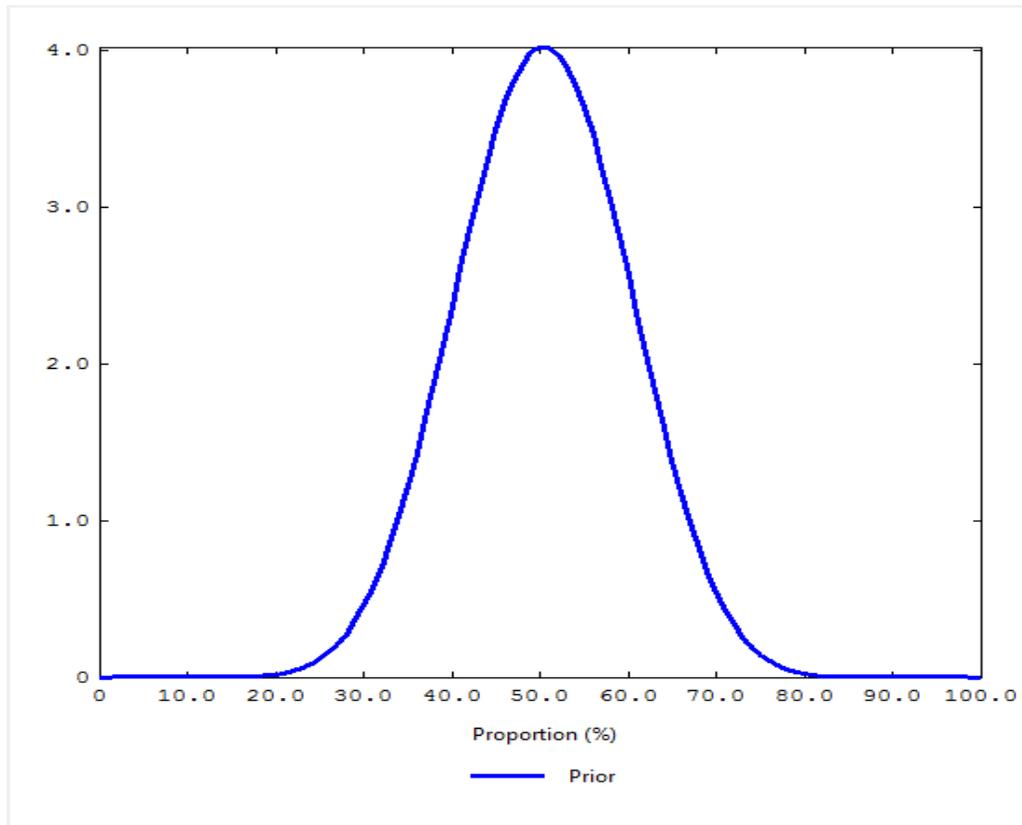
Table 4: Measuring Contributing Factors (Prior)

Positive Factors	Value		Negative Factors
Understanding of Malnutrition	4	4	Health seeking behaviour
CMAM services	2	2	CNVs motivation
Acceptance of CMAM	3	2	MUAC on admission
Admission versus need	3	4	Community mobilization
Discharge outcomes	4	1	Rejection
Standard of service	4	4	Distance
		1	Supply stock outs
		1	CNVs low skills
Added to Minimum Coverage (0%)	20	19	Subtracted from Maximum Coverage (100%)
Median	50.5		
α value	13.1	12.9	β value

The distribution of prior coverage estimate was determined through a beta distribution of the belief of perceived coverage estimates. This was done by using the Bayes SQUEAC calculator⁹ to plot the mode and all the perceived other possible coverage proportions. An average was calculated and used as the median for a trial distribution curve (Prior) plotted using the Bayes SQUEAC Calculator. The final curve that was generated is as shown in figure 9.

⁹ Software specifically designed and developed for SQUEAC investigations and can be downloaded free at www.brixtonhealth.org

Figure 9: Prior (Programme Coverage)



4.2. Sampling Methodology

4.2.1. Minimum Sample Size

To estimate the minimum number of cases (children) needed in the small area survey (n), the following formula is used:

$$n = \left\lceil \frac{\text{mode} \times (1 - \text{mode})}{(\text{precision} / 1.96)^2} - (\alpha + \beta - 2) \right\rceil$$

Using α (13.1) and β (12.9) values and a mode of 50.5% (see section 3.1), the following minimum sample is as follows:

$$\begin{aligned} n &= \lceil (0.505 \times (1 - 0.505) / (0.12^{10} / 1.96)^2 - (13.1 + 12.9 - 2)) \rceil \\ n &= (0.249975 / 0.003748) - 24 \\ n &= 66.68778 - 24 \\ n &= 42.68778 \\ \mathbf{n} &= \mathbf{43} \end{aligned}$$

In order to achieve a confidence of +/- of 10%, a minimum of 43 cases needed to be identified.

¹⁰ The precision was put at 12% instead of 10% since the sample size was hard to reach

4.2.2. Minimum number of villages

The minimum number of villages to be sampled was then calculated with the use of the following values.

Target Sample Size:	43
Average village population:	1124
Prevalence of SAM:	2.0%
% Children aged 6-59 months:	20%

Values were used in the following formula

$$n_{\text{villages}} = \frac{n}{\text{average village population}_{\text{all ages}} \times \frac{\text{percent of population}_{\text{6-59 months}}}{100} \times \frac{\text{prevalence}}{100}}$$

$$n_{\text{villages}} = 43 / (1124 \times 0.2 \times 0.02)$$

$$n_{\text{villages}} = 43 / 4.496$$

$$n_{\text{villages}} = 9.56$$

$$n_{\text{villages}} = 9$$

As a result, a minimum of 9 villages was to be sampled in order to reach the minimum sample size of children.

4.2.3. Spatial Representation

In order to achieve spatial representation, the Stage Three investigation involved a two-stage sampling:

1) Village selection: First, a list of all the villages in the catchment areas was generated and from that the team had to exclude few villages that were inaccessible¹¹ due to flooding which had affected transport by car. The simple random sampling approach was used in selecting the 16 required villages.

2) Within-community sampling method: a combined active & adaptive case-finding & mass screening approach was used in Stage Three to ensure selected communities were sampled exhaustively. The wide area survey was carried out over four days (Oct 17th – 20th) by four teams of four people, each composed of three enumerators and was overseen by the surveillance and Nutrition programme officers and Surveillance programme manager. Case definition used in Stage Two was reviewed with field teams and replicated in this stage of the process.

4.3. Wide Area Survey Results

Main results for the wide area survey are summarised in Table 5.

Table 5: Stage Three (wide area survey) Main Findings

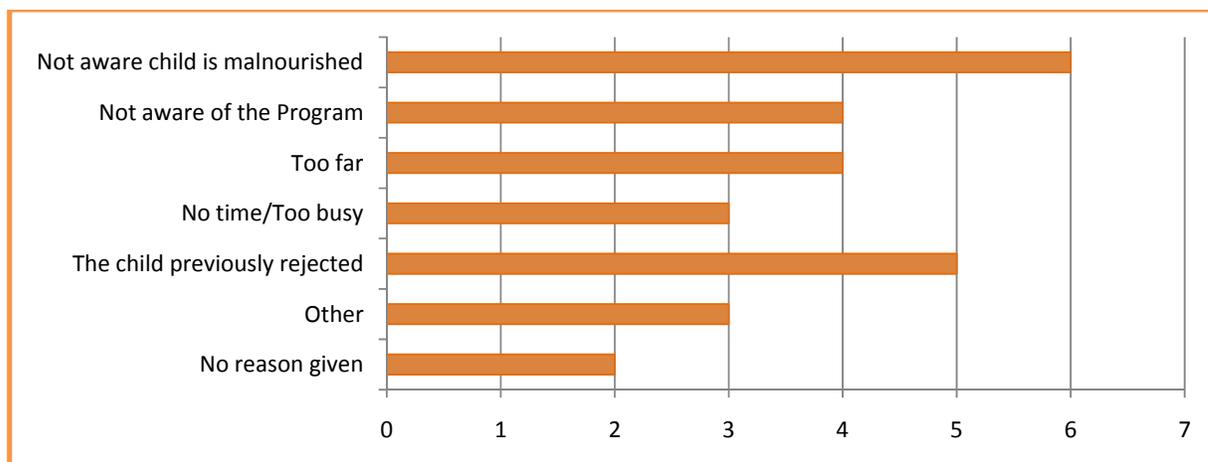
Types of Cases	Number of cases
Number of current (SAM) cases	50
Number of current (SAM) cases attending the programme	21
Number of current (SAM) cases not attending the programme	29
Number of recovering cases attending the programme.	39

The main reasons for not attending CMAM services available are summarised.

¹¹ The investigation acknowledges the fact that excluding inaccessible areas as mention in 1 above has the potential to introduce a bias into the analysis. However this does not affect the power and reliability of the result.

Main reasons for Non-Attendance

Figure 10: The graph showing prior, likelihood and posterior curves.



4.4. Overall Coverage Estimation (Point Coverage)

Point coverage is presented as it provides a more accurate picture of the actual coverage of SAM cases at the time the investigation was conducted. This is corroborated by the fact distance is a massive issue, and case finding is weak and further the investigation sampled those villages that were accessible. Period coverage¹² is as shown in the foot note 12.

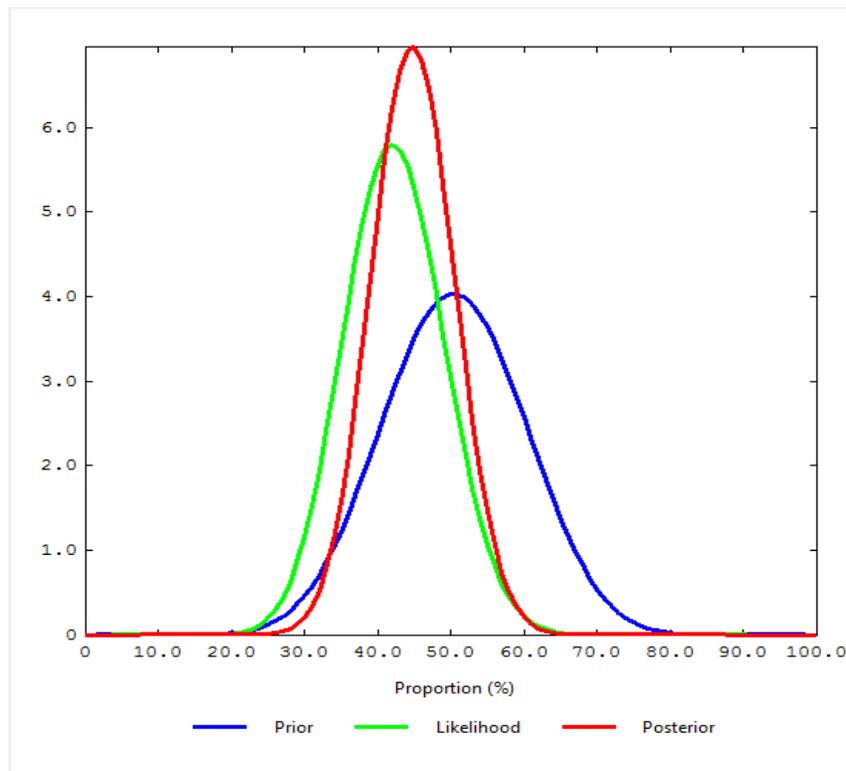
Point coverage provides a snapshot of programme performance and places strong emphasis on the coverage and timeliness of case-finding and recruitment. To calculate point coverage, the numerator and the denominator were selected from the results for the wide area survey using the formula

$$\frac{\text{No. of current (SAM) cases attending the programme}}{\text{No. of current (SAM) cases}}$$

Selected data was used as a denominator (50) and numerator (21) when inputted into the Bayes SQUEAC Calculator.

¹² Period Coverage = 63.8% (54.4% - 71.9%)

Figure 11: Prior, likelihood and posterior curves.



Based on the existing prior and wide area survey (likelihood) **point coverage** was estimated to be **44.7% (34.0% - 56.2%)**¹³

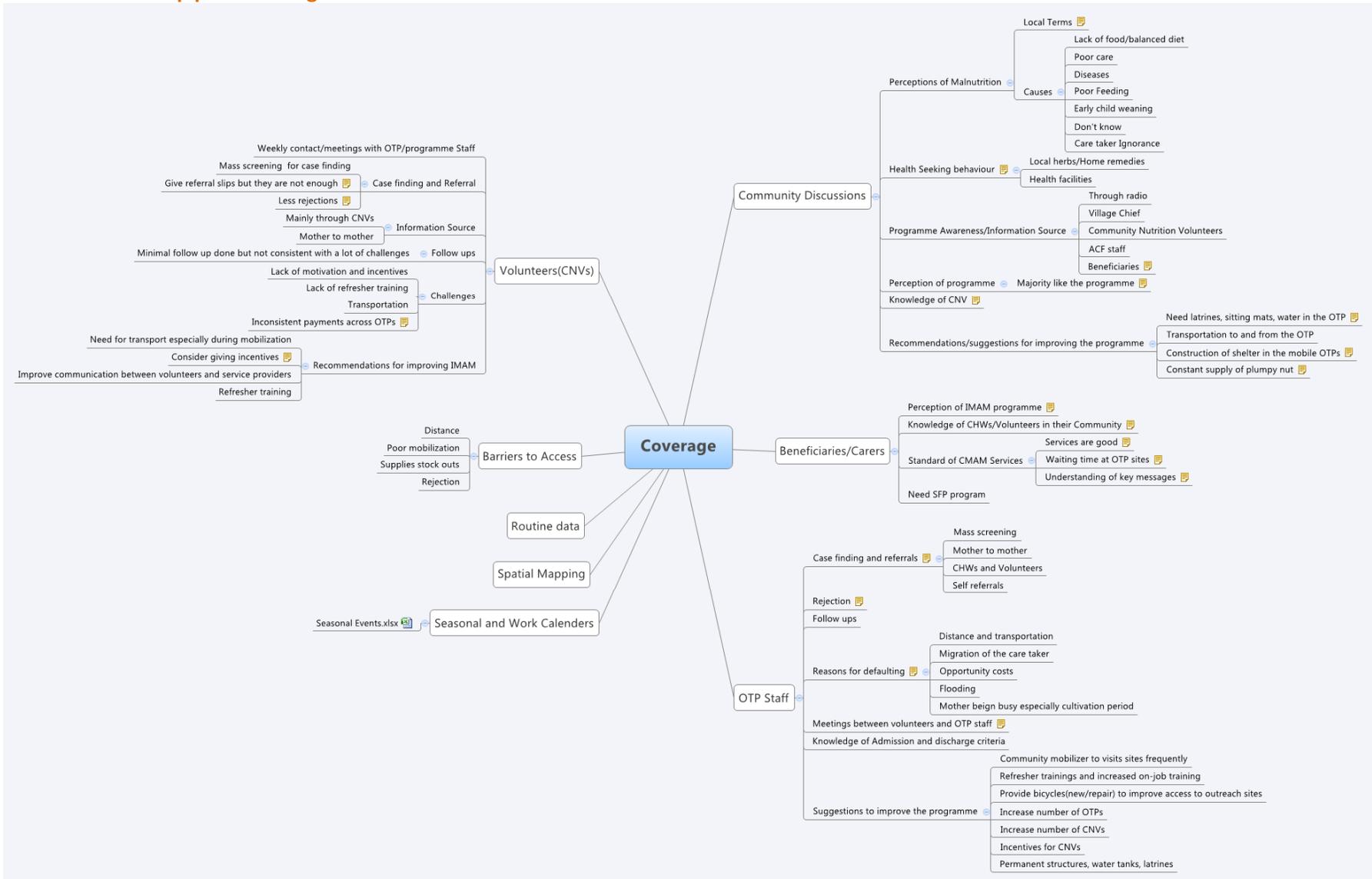
4. CONCLUSIONS & RECOMMENDATIONS

- Strengthening the Community Mobilisation Strategy through Conducting on-going sensitisation/awareness raising meetings with key stake holders i.e. village chiefs, elders and caretakers and continued screening:
 - Village mobilization plan per OTP catchment area, follow up and spot check to be conducted by the community mobilizer on areas that have been mobilized and identify villages that have not been visited and plan.
 - Volunteers' need to be spread across the catchment and thus selection of volunteers from villages near the OTP should be taken into consideration.
- A large number of children have been admitted and treated in the OTPs; 3468 children in a period between Jan – Sept 2011, There is therefore need to:
 - make the mobile OTPs permanent to operate throughout the week and also ensuring the CNWs manning the OTPs are contracted staff
 - Increase the number of CNWs in OTPs especially those with high admissions to avoid continued use of casuals
 - Having more outreaches during the peak of malnutrition to capture more children and reduce distance travelled by the beneficiaries. The impact may be two-fold: first, access is improved and second, further decentralization can make caseload more manageable for overcrowded facilities.

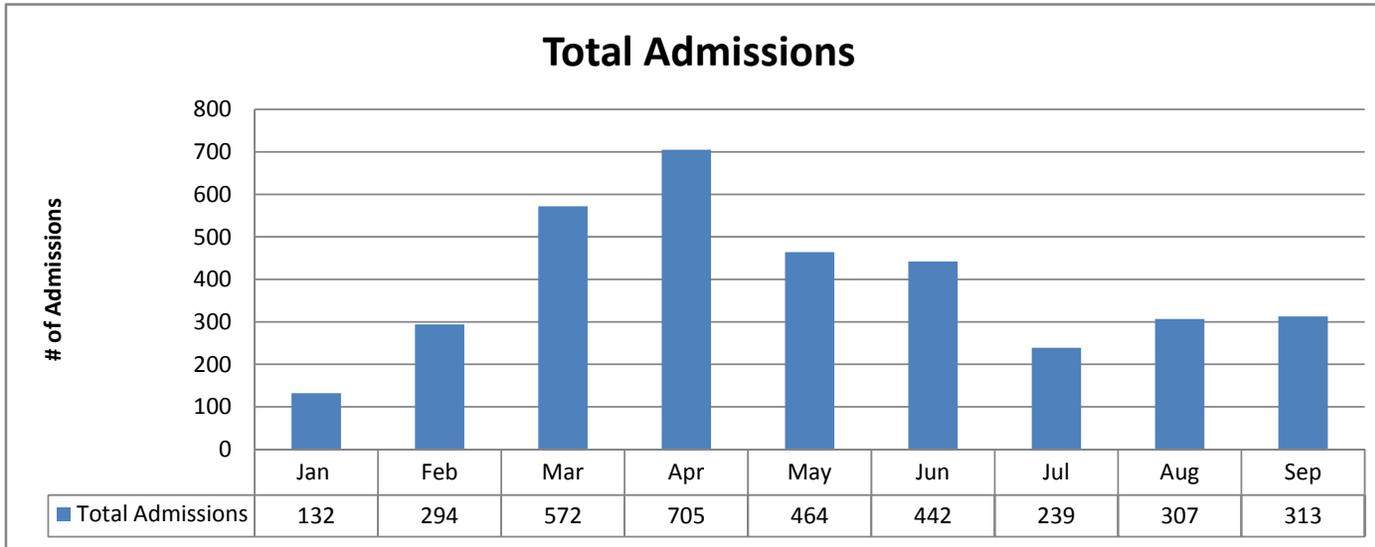
¹³ All values were calculated using the Bayes SQUEAC calculator.

- Consider standardising and sustaining the motivation strategy for volunteers through;
 - CNVs motivation and incentives being standard across all CNVs and OTPs
 - Refresher trainings
 - Provision of incentives e.g. t-shirts, caps, raincoats etc.
 - Transportation during mobilization days
- Admission using weight for height z-score has shown an impact of early detection of cases and thus allows enrolment before a child reaches <115 mm MUAC in most OTPs. However, the case should be adhered to and consistently applied to all beneficiaries.
- Increased on-job training for CNWs by the OTP supervisor, increased contact with the programme officer and manager. This is both motivational and has an impact of streamlining the short comings of the CNWs in manning of OTPs, handling of referrals and monthly reporting.
- As the case load is high, BSFP could be helpful in reducing number of severely malnourished cases during the peak season
- Strengthen the linkages and capacity of CNWs, CNVs and outreach services for reducing the negative contributing factors.

Annex 1: Mind Map picture using xMind Software



Annex 2. Admissions versus Seasonal & main events calendar, Gogrial West County



	Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec
Seasonal Illness						Malaria						
				Diarrhoea								
	ARI											
Food security							Hunger Season					
					Cultivation							
						Weeding						
							Rains			Rains		
	Burning of Bushes											
		Fishing										
		Drought										
Other Important seasonal events								Flooding				
	Migration											



Annex 3. List of Villages Sampled for the Wide area Survey

Villages	Sampling Number	OTP
Bul-Deng	44	Alek
Gaijang	57	Alek
Roth-weng	186	Alek
Alek	x ¹⁴	Alek
Paduol	92	Malual
Jokngar	80	Malual
Mathaing-thel	x	Malual
Majok-gir	100	Mankuach
malith	122	Mankuach
Mangok	203	Mankuach
Mankuach	x	Mankuach
Abak amol	3	Mayom
Anguoth	33	Mayom
Buonkuac	49	Mayom
Mot-mot	x	Mayom
Mayom	x	Mayom
Atongar	123	Ngapathian
Gaaikou	174	Ngapathian
Rum kur	188	Ngapathian
Abyei	x	Ngapathian
Maliul	110	Panliet
Malek	x	Panliet
Panliet	x	Panliet
Paleng	166	Panliet

The sampling of the 16 villages was by use of simple random sampling. The first stage was to assign all the villages numbers and secondly generating 16 numbers using the random number generator. The numbers generated are as shown in annex 3 referred to as sampling number.

¹⁴ Villages purposively selected for the small area survey