



**SEMI QUANTITATIVE EVALUATION  
OF ACCESS AND COVERAGE (SQUEAC) SURVEY  
FINAL REPORT**

**CADAADO District- Somalia**

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## ABBREVIATIONS

AWD	Acute Water Diarrhoea
BBQ	Barriers Boosters and Questions
CMAM	Community-based Management of Acute Malnutrition
CNVs	Community Nutrition Volunteers
FGD	Focus Group Discussion
IDPs	Internally Displaced Persons
INGO	International Non-Governmental Organization
KII	Key Informant Interview
INS	Individual Nutrition Support
MUAC	Mid Upper Arm Circumference
OTP	Out-patient Therapeutic Program
RUTF	Ready-to Use Therapeutic Food
SAM	Severe Acute Malnutrition
SCI	Save the Children International
SMART	Standardized Monitoring and Assessment of Relief and Transitions
SQUEAC	Semi-Quantitative Evaluation of Access and Coverage
SSI	Semi-structured Interview
TSFP	Targeted Supplementary Feeding Program
TBAs	Traditional Birth Attendants
WHZ	Weight- for- Height Z scores

## EXECUTIVE SUMMARY

Save the Children International (SCI) has been in operation in Cadaado district implementing lifesaving interventions that include treatment of malnourished children. Nutrition programming started in 2014. Standardized Monitoring and Assessment of Relief and Transitions (SMART) surveys conducted in Cadaado in 2017 indicated high rates of malnutrition-Global Acute Malnutrition (GAM) rate 22.6% (19.9-25.6 95% CI) and proxy coverage indicator estimated low coverage of the program. To ascertain the actual coverage, the SMART survey recommended a standard coverage investigation.

Semi-Quantitative Evaluation of Access & Coverage (SQUEAC) methodology was employed during the investigations. SQUEAC methodology uses three stages to establish coverage of programmes. SQUEAC objective included; assessing point and/or period coverage, Identification of factors (boosters and barriers) affecting the access to the CMAM programme, Developing of specific recommendations to improve acceptance and coverage of the programme. The exercise also resulted in increased capacity of programme staff in undertaking coverage assessments.

### Results

The point coverage for the SQUEAC survey in Cadaado district was found to be 44.6% with credible interval of 36.3%-53.4%). The coverage estimation falls short for the recommended minimum sphere standard of 50% for rural population.

### Conclusions.

The current nutrition program as implemented has achieved coverage below the recommended level as per sphere standard. This achievement means that the impact of the program in achieving reduction in malnutrition rates among population is not at its peak. Addressing the identified barriers hindering program coverage will definitely increase coverage.

### Key Recommendation

Finding/Area of focus	Recommendation
Site location- Uneven distribution of treatment sites	Use the cluster recommended site setup guidelines to set additional sites. If not possible, adopt the mobile team approach. The important thing is to ensure that the treatment programs are within the reach of the community, attaining the sphere standard of a day walk to and from the sites. The cases of some catchment villages seeking treatment as far as 40km observed in some cases are not within the recommended standards.
Weak community component (CNVs and mobilization)- Few Community Nutrition	Active cases finding is a key component of identification of malnutrition cases, there is need to increase the number of the CNVs to allow coverage of entire district. Each CNV need to be given reasonable area to cover, this will allow continuous work of identification of cases.

Volunteers (CNVs) compared to the geographical responsibility	
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# **1 INTRODUCTION**

## **1.0 Context**

Cadaado also known as Adaado is one of the districts in the central Galgaduud region of Somalia. The district has a population of 395,051 as of 2016 and the main economic activity is pastoralism although limited farming is practiced and is mostly rain-fed.

Save the Children International (SCI) has been implementing nutrition programmes in Cadaado since 2014. Currently, SCI is implementing a Community Health and Social Accountability Project (CHASP) in collaboration with the Ministry of Health in three health centers namely Cadaado, Godinlabe and Bahdo.

On the other hand, Cadaado district is experiencing an increasing number of population who have been internally displaced by inter-clan conflict or families hit by drought from parts of Galgaduud region. Maternal mortality rates are exceptionally high - 850/100,000 - compared to the national average of 732/100,000. Only 3.3% of women attend Antenatal Care (ANC), 2.5% attend Prenatal Care (PNC) and only 9.2% of births take place in a health facility attended by skilled birth attendant. In 2011, 70% of children did not receive any vaccination and only 1.4% received all antigens. Acute watery diarrhoea (AWD) and pneumonia are the major causes of morbidity and mortality among children under five, however, only 40% of children with diarrhoea received oral rehydration solution and only 43% of children who sought care for pneumonia received antibiotics<sup>1</sup>.

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<sup>1</sup> From SQUEAC TOR



Figure 1: Map of coverage area

## 1.1 Objectives of the Assessment

The assessment was guided by the following specific objectives:

- To assess single, point and/or period coverage of SAM & MAM treatment in Cadaado district.
- To identify factors (boosters and barriers) affecting the access to the CMAM program in Cadaado district.
- To develop specific recommendations to improve access and coverage of the program

## **2 METHODOLOGY: THE SQUEAC APPROACH**

SQUEAC allows for the regular monitoring of programs at low cost, helps identify areas of high or low coverage and provides explanations for such situations. This information allows development of specific, time bound and concrete action plan to improve the coverage of programme.

The investigation process included the following three main stages;

**Stage 1:** Analysis of quantitative data (routine programme monitoring data compared with sphere standards) and qualitative data was conducted. Staff implementing the program were presented with the data from the program and collectively investigated unusual patterns in admissions, defaulting, performance indicators and special distribution of sites. Additional data included checking on the quality of program records and stock management. Through deep discussions and contextual analysis the teams identified programme boosters and Barriers and also established the hypothesis to be used during stage 2.

**Stage 2:** Confirmation of areas of high and low coverage and other hypotheses relating to Coverage identified in stage 1 using small studies, small surveys and small area surveys was done. Reasons for coverage failure were documented to further bolster understanding of the barriers and boosters to program access and uptake identified in stage 1. These barriers and boosters were the basis of development of the prior. Decision rule on hypothesis testing was based on the sphere standard requirement of 50% coverage for rural population. Additional data gap identified in stage 1 were further gathered through interviews with beneficiaries local leaders, women groups, youth groups and community nutrition workers.

**Stage 3:** Bayesian techniques were used to estimate overall program coverage with a wide area survey using a sample size generated by Bayes SQUEAC software.

**Participants**

The survey team comprised of 10 enumerators of which two were drawn from the three integrated Health centers operating in Cadaado district.

**Duration of the Survey**

The assessment took place over the course of two weeks from 28<sup>th</sup> July- 13<sup>th</sup> August 2018.

### 3 THE SQUEAC INVESTIGATION

#### 3.0 Stage 1: Routine Data and Qualitative data Analysis

This stage involved quantitative data analysis for OTP beneficiaries in the program. Data was collected from standard monthly reporting tools in excel as well as the OTP register. The data analyzed covered the period between June 2017 to July 2018.

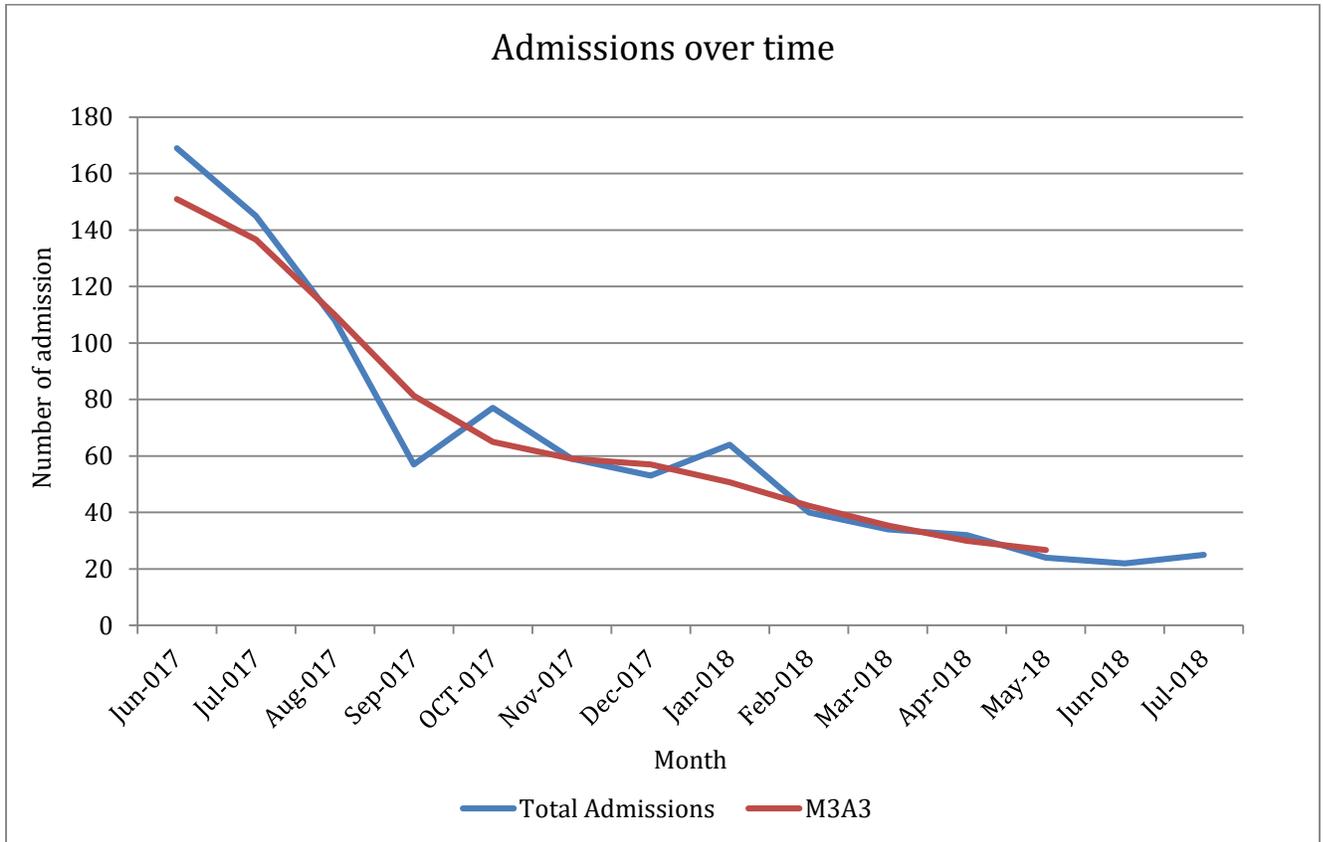


Figure 2: Total Admissions over time

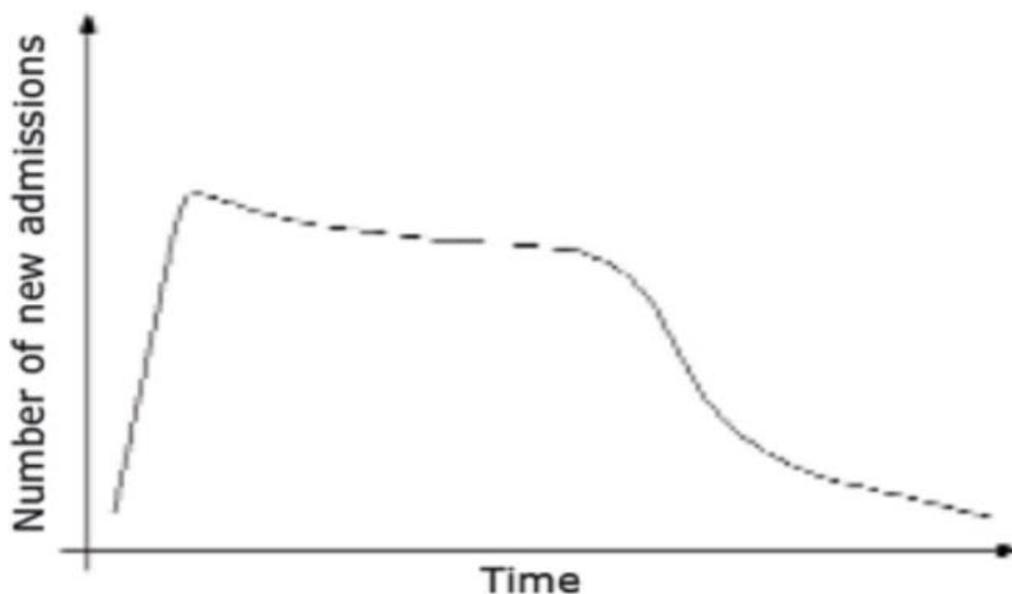
Table 1: Seasonal calendar

	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Climatic conditions														
Dry/rainy season	Yellow	Red	Red	Red	Yellow	Yellow	Yellow	Yellow	Red	Red	Green	Green	Green	Yellow

	Low rainfall	Peak drought	below average rain				dry season			Adequate rain				
Local diseases														
Malnutrition	++	++	++	++	++	++	++	++	++	++	++	++	++	++
AWD	++ +	++	+	+	+	++	++	++		+	++	++	++	++
ARI	++	++	++	++	++	++	++	++	++	++	++	++	++	++
Measles	++	+	+	+	+	+	+	+	+	+	+	+	+	+
Food security														
Food insecurity	Limited pasture and deteriorating food insecurity situation											Plenty of food and pasture		
Outreach programme						IRF outreach programme								

### 3.0.1 Admissions over time

The figure above shows the number of admissions over time for the period June 2017- July 2018 across the three sites Cadaado, Bahdo and Godinlabe. A total of 909 OTP admissions were recorded during this period. The observed trend in admission does not follow the typical trend of standard admissions over time graph. Ideally, it is expected that during the start of a programme, admissions should increase rapidly, slightly fall away and stabilize before finally dropping away as shown in the figure below. In contrast, the programme is struggling with successive months recording significantly lower admissions.



This is despite the fact that around this period the entire Galgaduud region was reeling from the consequences of prolonged drought following repeated below average Deyr and Gu' rains. It also coincides with a time when there were cases of AWD outbreaks across Somalia including Galgaduud region.

The observation above could be a result of ineffective community mobilization and limited active case finding. The lack of outreach activities could also limit the admissions. It indicates a problem with limited spatial coverage relying on self-referrals<sup>2</sup>.

### 3.0.2 TSFP Admissions over Time

The figure below shows TSFP admissions from January 2018 to July 2018. Admissions are relatively higher during the first three months before stabilizing and then slowly falling away during the subsequent months. This is due to the fact that area was experiencing prolonged drought following the below average Deyr rainfall. Admissions start to decline following the heavy rains experienced in the region but briefly rise during the month of April as cases of AWD were reported in and around Cadaado town.

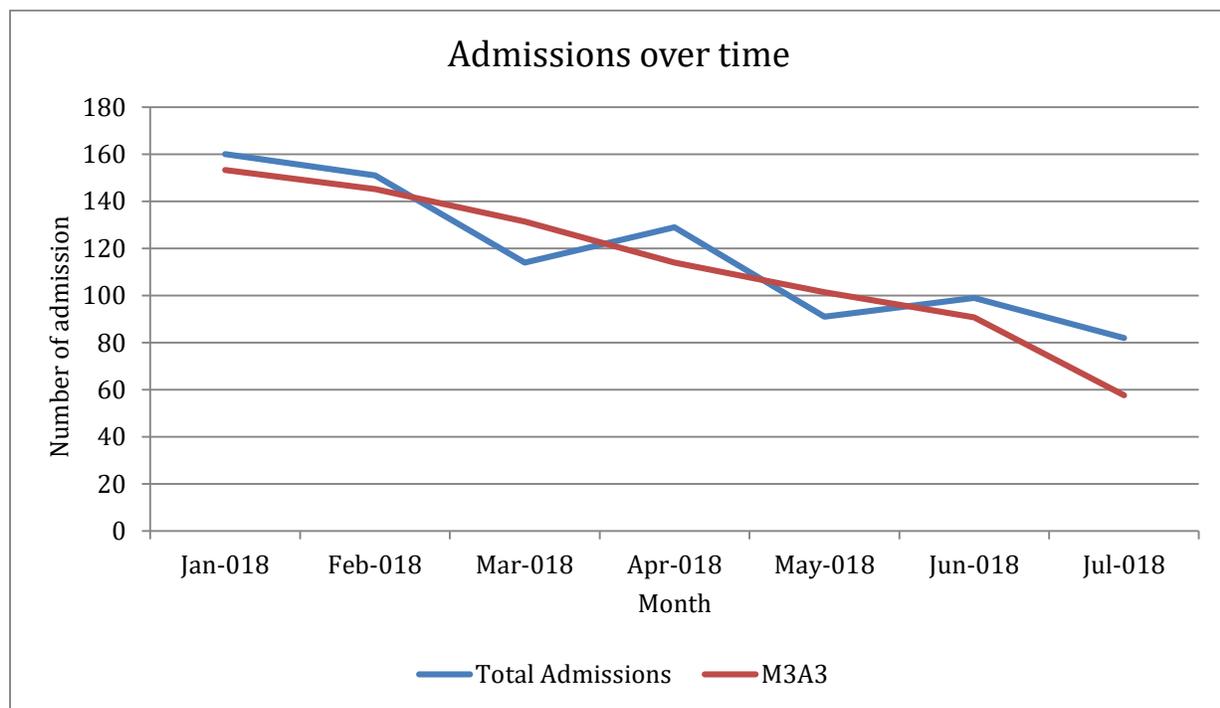


Table 2: Admissions over time

<sup>2</sup> SQUEAC: low resource method to evaluate access and coverage of programmes by Mark Myatt.

### 3.0.3 Admissions per OTP site

Admissions were further analyzed per OTP site to identify potential differences in admissions. Bahdo, records the highest number of admissions with a total of 421 admissions even exceeding Cadaado site, which apparently is located in a more populated area. Interviews further revealed that Bahdo is the only health facility nearby for a maximum of 40 villages surrounding it and is usually the first stop for villagers seeking medical attention.

On the other hand, Godinlabe recorded the lowest number of admissions from the period June 2017-July 2018. Just 177 admissions! This translates roughly to 14 admissions per month.

Save the Children International is the only NGO implementing health and nutrition programme in the whole of Cadaado district. Other NGOs are currently experiencing funding gaps. There are only three sites being run by SCI. Cadaado district being a vast area should have more than just three static sites given the fact the majority of rural population are pastoralists. Use of a mobile outreach programme to reach the rural nomadic population would be more ideal to allow spread of services at a lower cost.

However, the CHASP nutrition programme appears to have some challenges in design. For instance, instead of running the static sites daily to screen and recruit new cases, it would have been more prudent and cost-effective to allocate just one day of the week for the static site and the rest of days in the week to cover outreach areas. There is really no justification for an average of 14 admissions per month in Godinlabe at the peak of the drought, when the same staff in Godinlabe can shore up more admissions in an outreach programme targeting and benefiting the rural population.

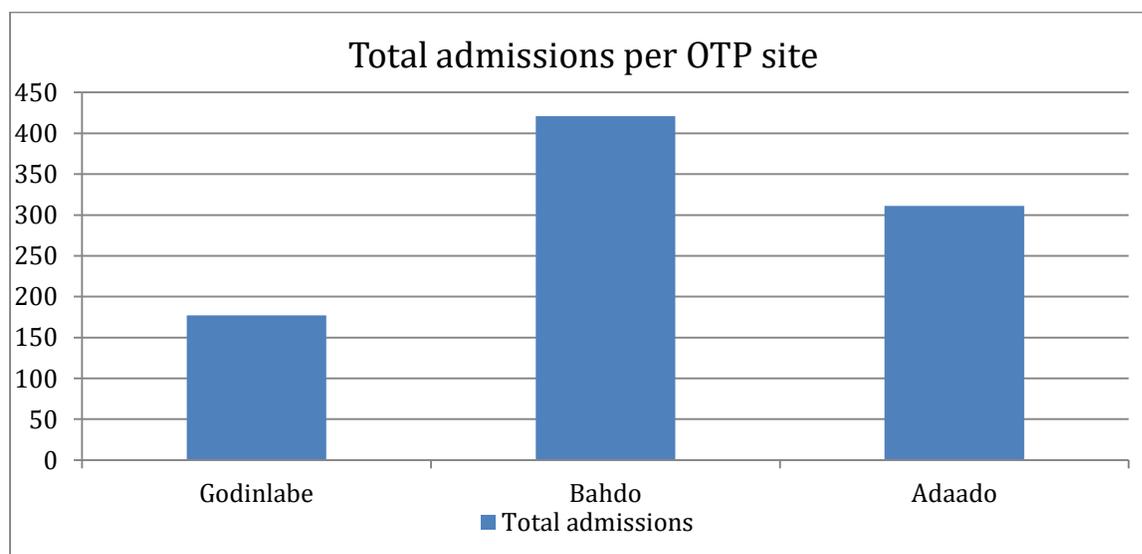
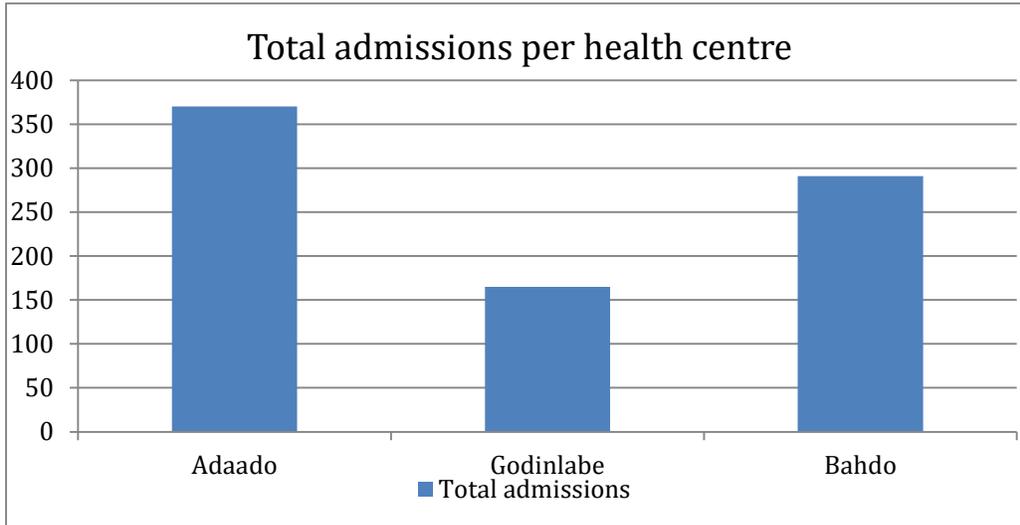


Figure 3: Total Admissions Per OTP site

## Admissions per TSFP site



*Figure 4: Total admissions per health Centre*

The figure above shows TSFP admissions per every health center from January-July 2018. Cadaado recorded the highest number of admissions with 370 cases while Godinlabe has the lowest number of admissions across the three sites with a total of 165 admissions during the same period. As both OTP and TSFP admissions are relatively low in Godinlabe, it can be deduced that the health center has limited active case finding.

### 3.0.4 Discharge Outcomes TSFP

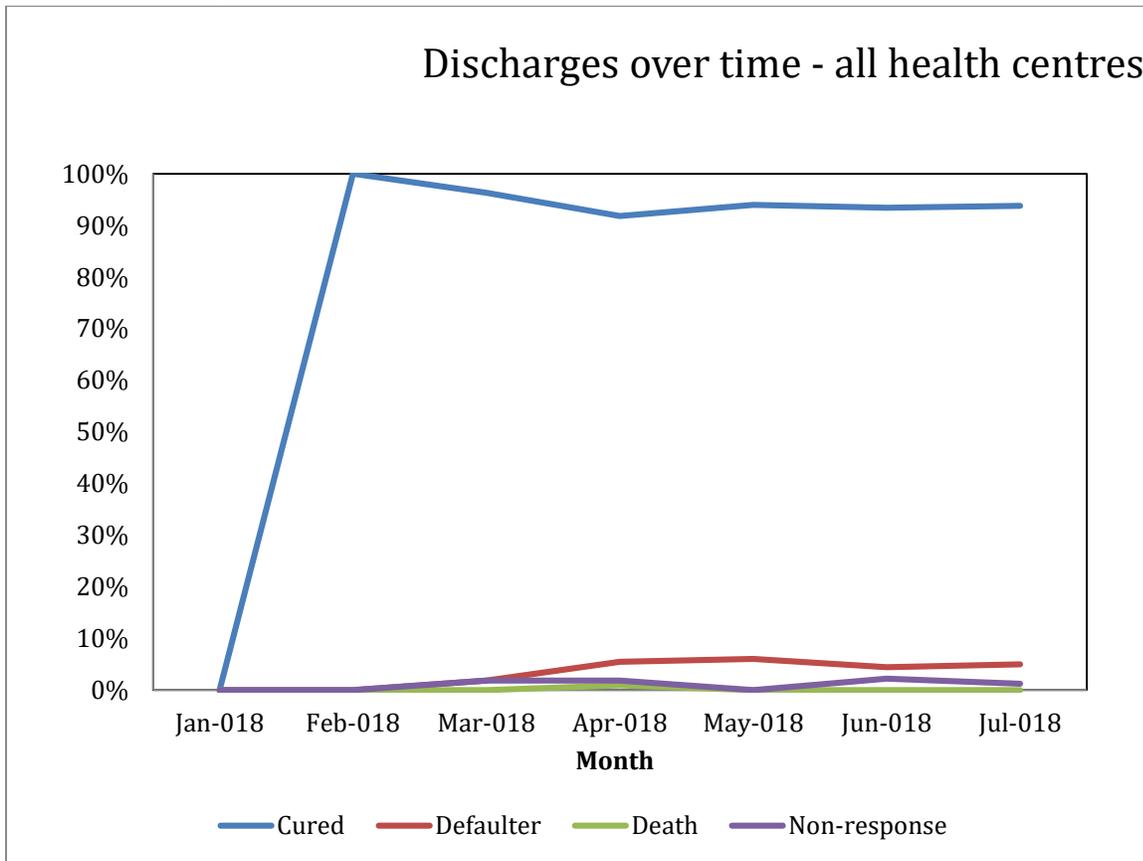


Figure 5: Discharges over time

### 3.0.5 OTP Programme Indicators

From the graph above, it is evident that the overall program indicators are satisfactory for the CMAM TSFP programme in Cadaado district and are well within the SPHERE reference standards. The programme has 22 defaulters, 6 non-response cases and just one death. This is very significant.

### 3.0.6 MUAC at Admission for the OTP programme

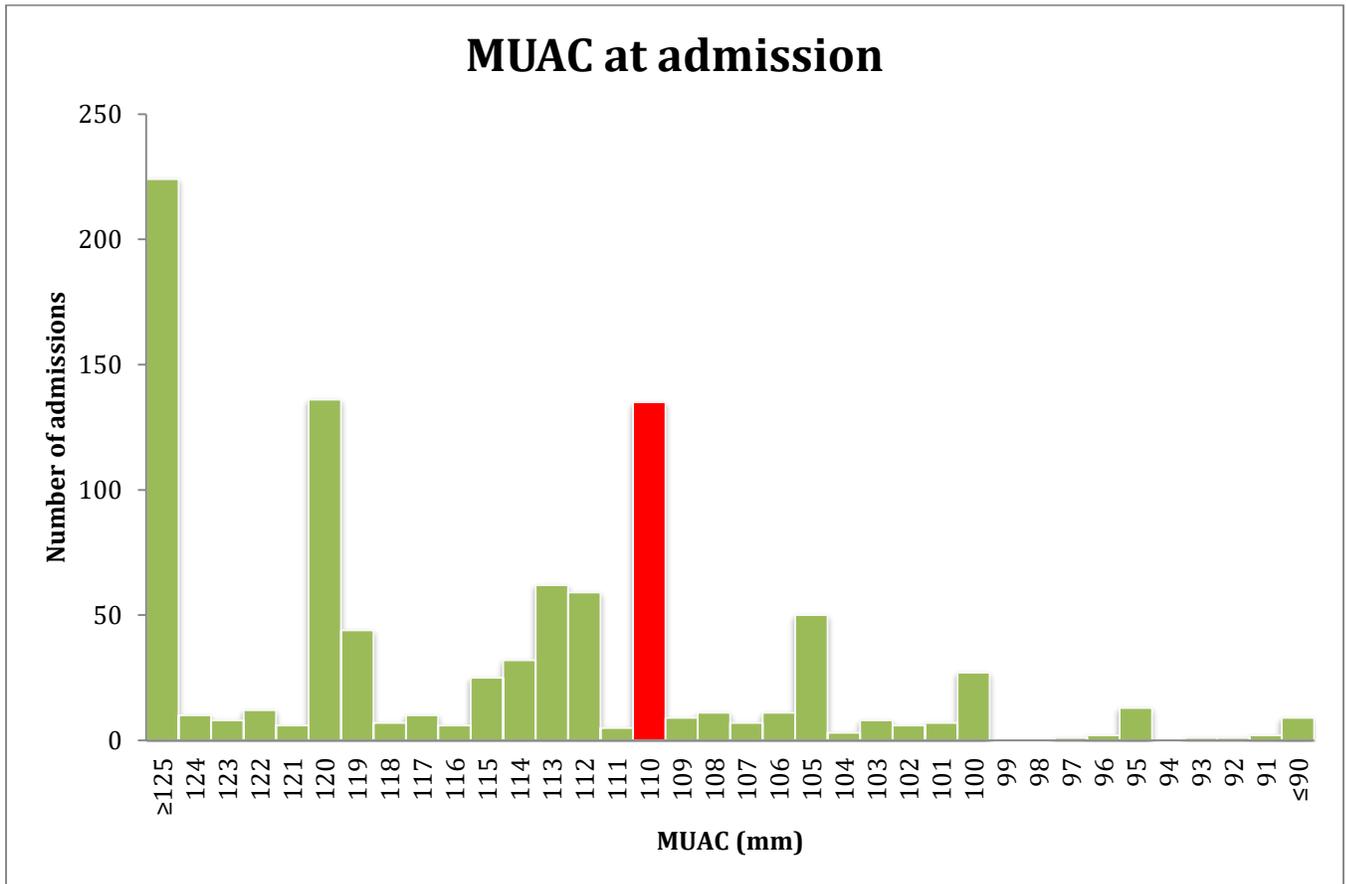
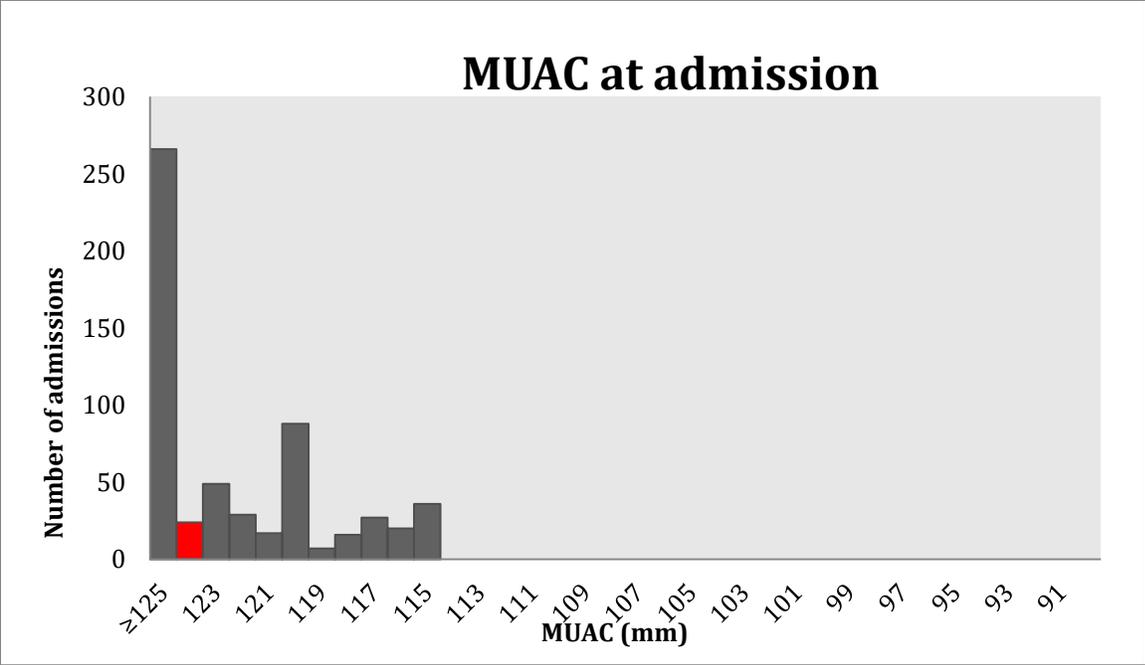


Figure 6: MUAC at Admission

As shown in the figure 6 above, median MUAC at admission was found to be at 110mm it shows that majority of the SAM cases were admitted in the early stages of the SAM period. This is an indicator of a programme that has a good an early health seeking behavior and general community awareness. This is further corroborated by informal interviews with beneficiary mothers in Karama IDP camps in Cadaado town. Mothers from the rural areas come to access CMAM services in Cadaado town and stay in the IDP camps in the entire the duration their child is in the programme.

Additionally, the figure shows that 51% of the cases admitted are not by MUAC but through WH z-score criteria. i.e. between 115-125mm. It also highlights that just 14% of the cases were admitted late into the programme with a MUAC of less than 105mm.

MUAC at Admission TSFP



Analysis of MUAC at admission for the TSFP programme indicates that majority of the admissions (46%) recorded were above the 12.5 criteria. This means that the community has an early health seeking behavior and that MAM cases are captured early in the programme in order to reduce chances of deterioration to SAM. On the other hand, only 18 % of the cases were late admissions i.e. between 11.5-11.9cm.

**3.0.7 Length of Stay before discharge as cured for OTP programme**

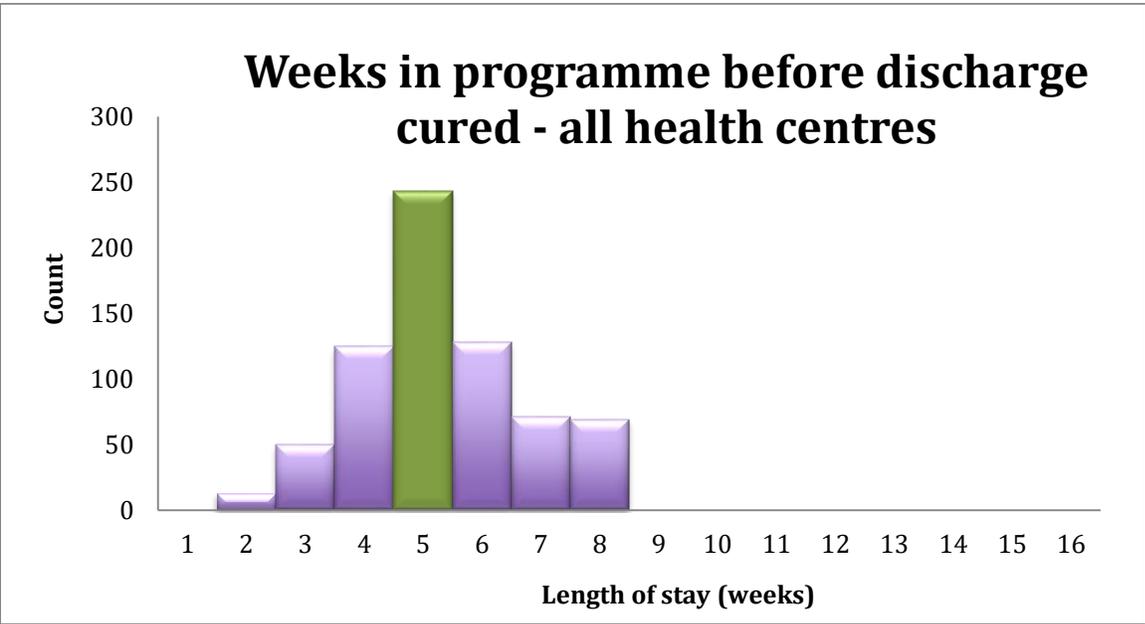


Figure 7: Length of stay before discharged as cured

The length of stay in the OTP before discharge for cured SAM cases is an indicator that reports on the duration of the treatment episode (i.e. the time between admission and discharge). A programme that has poor recruitment strategies-where SAM cases are admitted late-usually leads to longer length of stays greater than 8 weeks. For this programme, analysis of the OTP cards has revealed the median length of stay to be at 5 weeks, which complies with the international SPHERE standards of less than 8 weeks as the prescribed mean length of stay for cases in OTP programme. In general, the overall length of stay for cured cases for the programme is commendable.

### 3.0.8 Length of stay for defaulter cases

The figure below highlights the length stay for default cases. 45.7% of all defaulters defaulted during the first week of admission meaning that these are early defaulters. However the defaulter rates is within acceptable standards. Most defaulters had moved out of the location based on the tracing records.

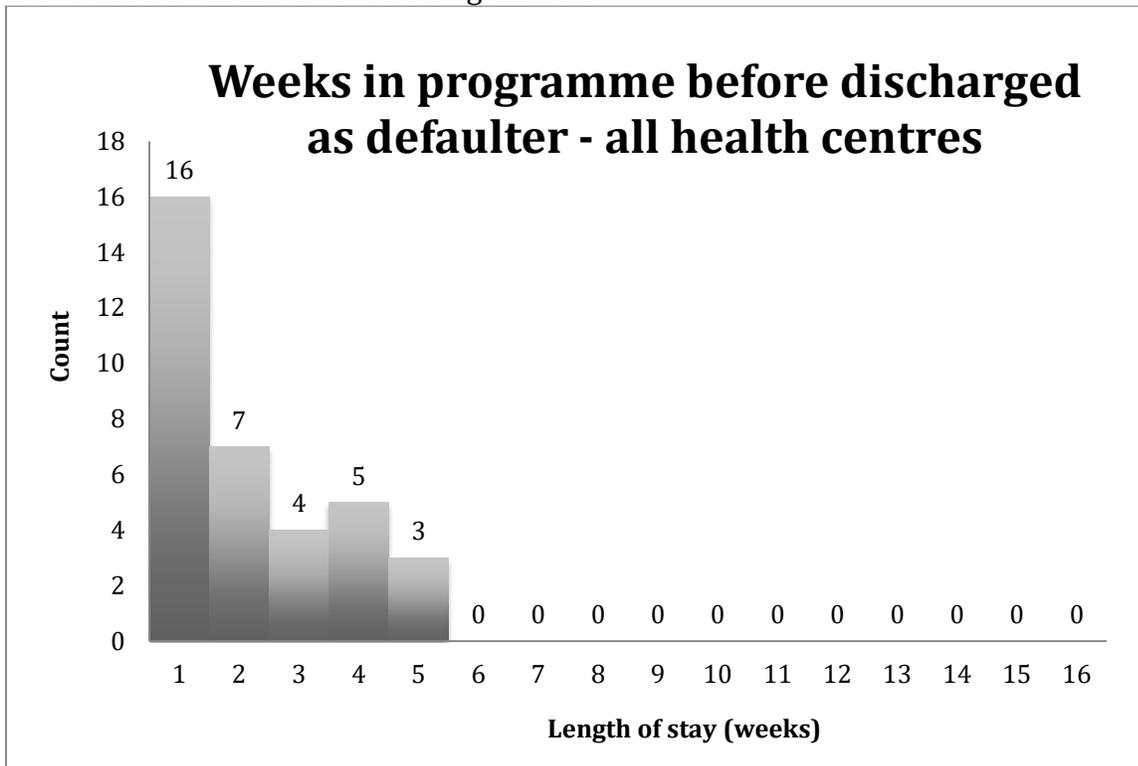


Figure 8: Length of stay before defaulting

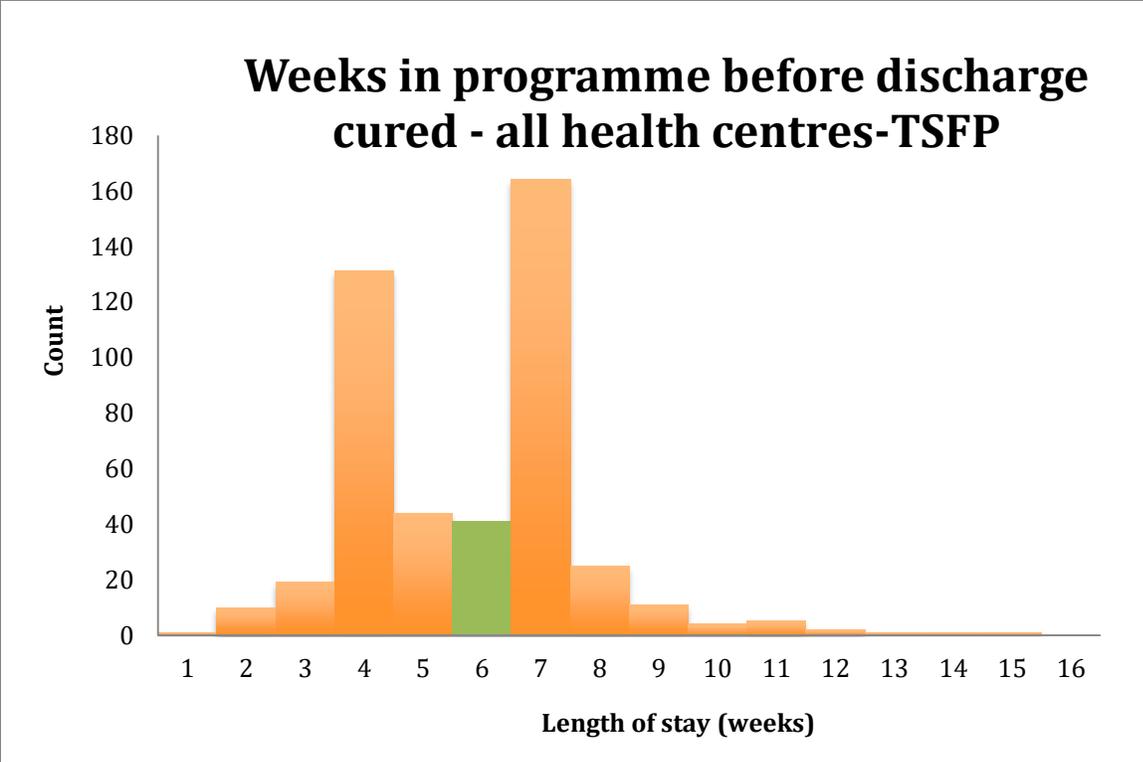


Figure 9: Length of stay before discharge cured Length of stay before defaulting

The figure above shows the length of stay in weeks for the TSFP programme in Cadaado district. The median length of stay in the programme is 6 weeks, which is within the recommended 8 weeks as per the SPHERE Standards. It also indicates that there are very few cases of longer length of stays in the programme.

**3.0.9 Overall admissions by distance travelled to health center**

The figure below shows the distance travelled by beneficiaries in order to access CMAM services in the three health centers. Majority of the beneficiaries come from within 5km radius to the nearest health centers. However, some beneficiaries come from as far as more than 21km and this highlights that the community in Cadaado has a good understanding of the benefits of a CMAM programme. It also shows a programme in need of an outreach services.

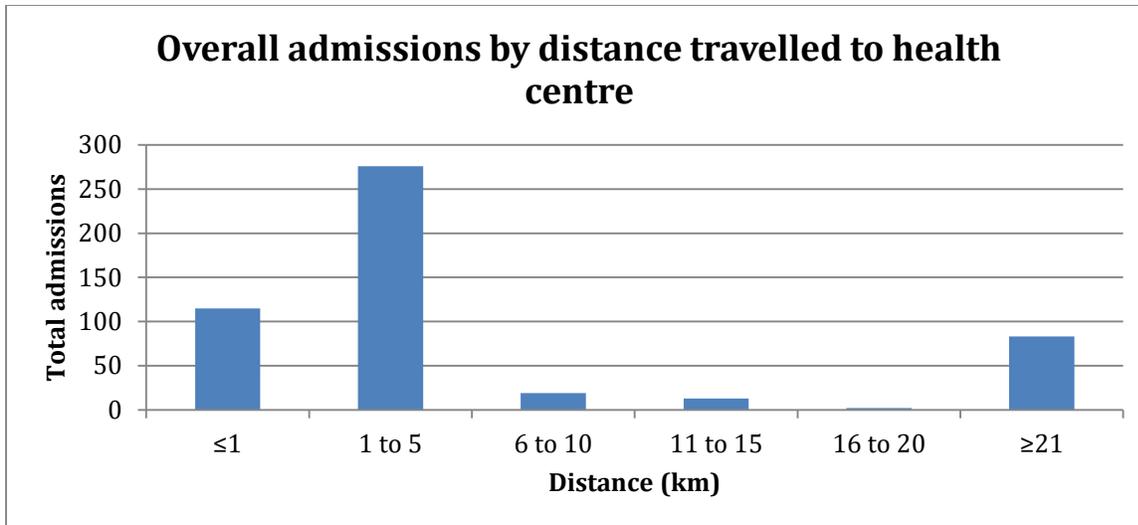


Figure 10: Overall admissions by distance travelled

### 3.1 Qualitative data analysis

Qualitative assessment was conducted for a period of three days in order to complement data already obtained from quantitative routine data. Qualitative data collection was carried out according to the “qualitative sampling matrix” developed in collaboration with key members of the assessment team. Proper sampling was done to ensure the representativeness of all zones as well as the unbiased participation of all key informants.

#### 3.1.1 Sampling

The first step during this process was identifying the program stakeholders that would take part in the qualitative assessment. The stakeholders identified included beneficiary caregivers, village leaders, religious leaders, traditional healers, men and women from the community, nutrition team, traditional birth attendants as well as community nutrition volunteers.

To ensure representativeness, all the three Nutrition sites were selected. Further, catchment villages under the 3 main OTP sites were also selected based on their relative distance to Nutrition sites. For instance, both near and far locations were selected.

#### 3.1.2 Methodology

A full-day training on qualitative data collection was done for the 10-member survey team. The teams were paired into two and trained on how to conduct key informant interviews as well as focus group discussions using coverage monitoring interview guides. The survey manager closely supervised the teams during the entire two days of data collection. A total of 12 different interviews were conducted in the three OTP sites as well as 10 catchment areas under their jurisdiction.

Table 3: List of Source, Methods and number of interviews conducted during qualitative assessment

Source	Total number of interviews	Method	
		Semi- structured interview KII	FGD
Beneficiaries	26	24	2
Local leaders	6	6	0
Community laymen/women	52	50	2
TBAs	3	3	0
Imams	6	6	0
CNVs	6	6	0
Nutrition staff	6	5	1

### 3.1.3 Barriers, Boosters and Questions

Findings from the programme monitoring complemented by the qualitative assessment were summarized and categorized into boosters and barriers as shown in the table below.

Table 4: Boosters and Barriers Identified in Cadaado

No	Barriers	Description	Sources	Method
1	Distance	This is a major barrier affecting the programme. Since there are no outreach activities some beneficiaries come from as far as 40Km	Beneficiaries, community laymen/women, local leaders	SSI, KII and FGD
2	Care givers/mothers competing priorities.	Beneficiary mothers mentioned that sometimes the caregivers fall sick, others mentioned that they don't get someone to look after the other children. It also happens that two children from the same family are in the programme and since the caregiver can only carry one child, the healthier of the two is left out. This is often the case when it involves trekking to the health center.	Beneficiaries	KII and FGD

3	Absence of mobile outreach programmes.	The programme is operating just three health centers with static nutrition sites. Admissions in these health centers are comparatively low and this could be the reason for those lower admissions. The programme lacks the ability to access a bigger catchment area. Beneficiaries from far away villages come settle in the IDP camps of Cadaado town in order to access CMAM programme services.	Beneficiaries	KII
4	Limited active case finding.	Most admissions are by self-referrals. CNVs recruited late into the programme-Feb this year-lack ability to move around and bring cases to the site since settlements are scattered across a wide radius.	Community laywomen, TBAs	SSI and KII
5	Very few nutrition sites; just three in the whole district	SCI is the only implementing partner with active nutrition project in the whole of Cadaado district. Other partners appear to be having a funding gap. This does have a multiplier effect on the malnutrition situation in the district	Community men and women, local leaders	SSI and KII
6	Seasonal migration affecting program access	Some of the programme beneficiaries are from the pastoralist community who move from one place to another-especially those who come from far-flung villages.	Beneficiaries, community laymen/women, local leaders	SSI, KII and FGD
7	Community sensitization and knowledge about CMAM limited.	CNVs are very few and were recruited in February 2018. Cases of caregivers refusing to refer their children to the health center abound.	Community members, CNVs, local leaders	SSI, KII
9	Demotivated CNVs due to poor remuneration	CNVs were complaining about their meager incentives. They indicated that the Current 70 USD not enough for them to exclusively concentrate on recruitment of cases and	OTP staff, CNVs	KII, FGD

		sensitization of the community		
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No.	BOOSTERS	Description	Method	Source
1	Good understanding of the CMAM programme. MUAC uses	The community in Cadaado district is generally aware of the CMAM programme. Interviews with community lay men and women, Imams, Local leaders indicated that they understand how the programme admission with specific reference to the red and yellow colors of the MUAC tape	Community laymen/women, TBAs, Imams, traditional healers	SSI, KII, FGD
2	Presence of the INS programme.	The individual nutrition support (INS) programme is meant for children cured from OTP and are admitted into the programme for additional two months. This has really reduced cases of relapse.	Community laymen/women, Beneficiaries, local leaders	KII, FGD
3	Early treatment seeking behavior of beneficiaries as indicated by the number of self-referrals	Data from the OTP and TSFP registers show that most admissions are by self-referrals. This information is further corroborated by the fact that mothers from far flung villages often come to settle in the IDP camps of Cadaado town and Godinlabe in order to access CMAM services and only leave when their child is completely cured. By extension most of the admissions are by z-scores indicating that beneficiaries come to the health center early in order to access services.	Beneficiaries	KII, FGD
4	Active and dedicated CNVS.	CNVs recognized for their roles in the community. Some even mentioned by name by the beneficiaries as well as the community members when asked who regularly screens children in their village.	CNVs, OTP staff, beneficiaries, community laymen/women	KII, SSI and FGD

5	Indicating Phone numbers on OTP cards to help contact beneficiaries in advance and help in defaulter tracing	This helps CNVS and the nutrition staff to easily keep track of would-be defaulters and trace them in time through the phone contracts. This probably explains why this programme has very few defaulters.	Local leaders, OTP staff	KII
6	Peer to peer as beneficiary influence to others on the benefits of CMAM	Caregivers have indicated that they share information when they find the sickly children of their neighbors and help them come to the health center	Beneficiaries, OTP staff	KII and FGD
7	Beneficiary speaking highly about the programme after their malnourished children are successfully cured	Beneficiaries praised the CMAM programme's ability to treat their malnourished children.	Beneficiaries	KII and FGD
8	Favorable Program indicators	High percentage cured above SPHERE standards Low defaulter Lower deaths	Routine data	KII

### 3.1.4 Mind-mapping

This is a summarized graphical illustration of the SQUEAC coverage findings. It particularly indicates the positive factors (Boosters) as well as the negative factors affecting coverage access and uptake in Cadaado District.



Figure 11: Mind Map of Findings in Cadaado

## 3.2 STAGE TWO: HYPOTHESIS TESTING

Based on the analysis made from the routine data as well as the qualitative information collected in stage 1, areas where coverage was either high or low were identified. Equally, the data also highlighted key barriers to service access and uptake. This data was used to formulate hypothesis, which was then tested during the small area survey

### 3.2.1 Hypothesis

From the routine data, it was obvious that some health facilities have high admissions while others recorded potentially lower admissions.

Respective catchment villages under each of the three health facilities were then drawn in a chart. The team then selected four catchment villages hypothesized to have high admissions and four others with potentially lower admissions.

Further information collected during the qualitative assessment indicated that distance was a major factor affecting coverage. Therefore, it become more imperative to use distance as the basis around which the hypothesis will be formulated.

Hypothesis: **Coverage is high** in areas around the three Health centers such as Cadaado, Bahdo and Godinlabe

### 3.2.2 Small Area Survey

A small area survey was conducted in 7 catchment villages strategically sampled from the 3 Health centers. This comprised four villages, which were perceived to have high admissions and other three villages which were hypothesized to have lower admissions.

### 3.2.3 Case finding

Both active and adaptive case finding methods were used to find SAM and MAM cases in all the villages selected. The case definition criteria included the following;

- A child between the age of 6 and 59 months
- A child with a MUAC level below 11.5 cm for SAM cases
- A child with a MUAC level below 12.5 cm for MAM cases
- A child with bilateral pitting oedema

Besides these standard criteria, survey teams used local malnutrition terminologies to increase sensitivity of the case finding method.

The steps for testing a hypothesis/making a classification using SQUEAC small area survey data were:

(a) Set the standard ( $p$ ): The standard ( $p$ ) was set according to SPHERE minimum standards for therapeutic programs in rural setup (minimum 50% for rural areas)

(b) Carry out the small area survey

(c) Use the total number of cases found ( $n$ ) and the standard ( $p$ ) to calculate the decision rule. For example, if  $n = 9$  and  $p = 50\%$  then:  $d = n \times p / 100 = 9/2 = 4.5 = 4$

(d) Apply decision rule: if the number of cases in the program is  $> d$  then the coverage is classified as HIGH (otherwise it is classified as LOW).

### 3.2.4 Findings from the Small Area Survey

*Table 5: Small Area Survey results in High Coverage Villages*

High Coverage villages	SAM Case in Programme	SAM Cases not in Programme	MAM Case in Programme	MAM Cases not in Programme
Kaah	3	0	6	1
Taalo	3	0	8	1
Karaama	4	0	4	6
Horseed	1	0	8	3
Total	11	0	26	11

Total SAM cases = 11

$d=n/2=11/2= 5.5 = 5$  cases need to be in the programme

More than 5 cases need to be in the programme for coverage to be greater than 50%. 11 cases were found to be in programme and since  $11>5$  this part of the hypothesis was confirmed.

Total MAM cases =  $26+11=39$

$d=n/2=39/2= 19.5 = 19$  cases need to be in the programme

More than 19 cases need to be in the programme for coverage to be greater than 50%. 26 cases were found to be in programme and since  $26>19$  this part of the hypothesis was also confirmed.

*Table 6: Small Area Survey results in Low Coverage Villages*

Low Coverage villages	SAM Case in Programme	SAM Cases not in Programme	MAM Case in Programme	MAM Cases not in Programme
Waaberi-Godinlabe	0	0	1	5
Bakiin	2	1	4	9
Waberi	1	1	0	7
Total	3	2	5	21

Total SAM Cases=  $3+2=5$

$d=n/2=5/2=2.5=2$

More than 2 cases needed to be in the programme for coverage to be less than 50%. 3 cases were found to be in the programme and since  $3 > 2$  this part of the hypothesis was NOT confirmed; villages far from OTP sites don't necessarily have low coverage

Total MAM Cases=  $5+21=26$   
 $d=n/2=26/2=13$

More than 13 cases needed to be in the programme for coverage to be less than 50%. 5 cases were found to be in the programme and since  $5 < 13$  this part of the hypothesis was confirmed; those three villages have lower admissions.

Reason for not attending the programme

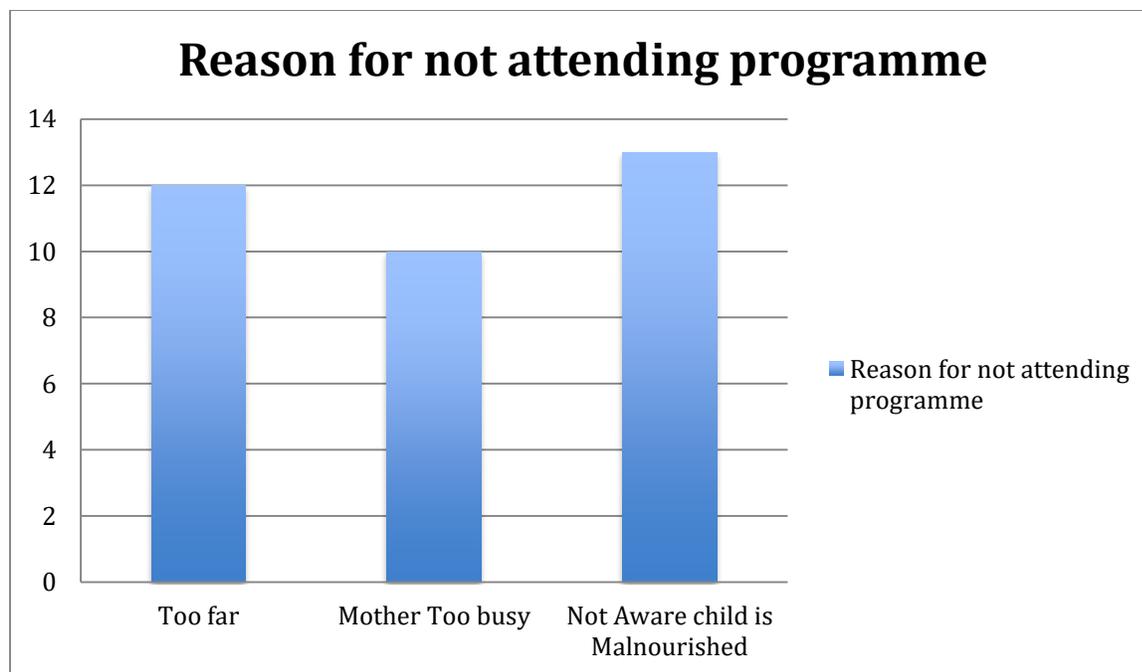


Figure 12: Reasons for not attending the programme

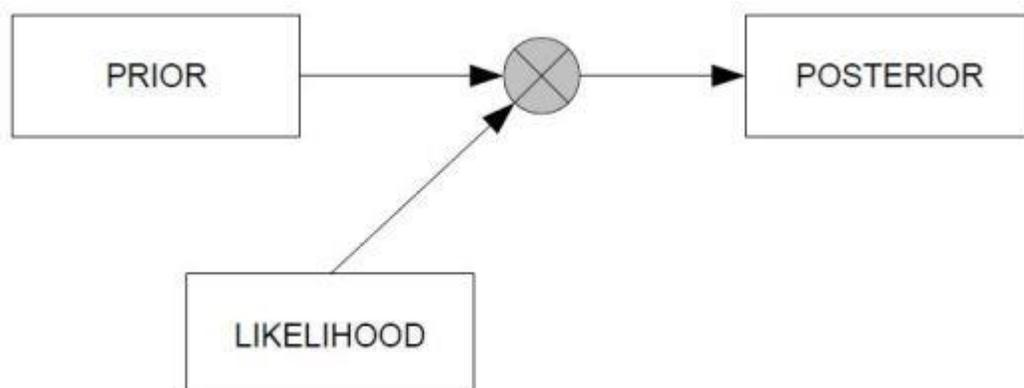
### 3.3 STAGE 3: WIDE AREA SURVEY

The wide area survey was carried out to estimate the overall program coverage. This stage involved the following three main steps.

#### 3.3.1 Building the Prior

The “prior” or “Mode” for the wide area survey is generally estimated on the available information from the stage one and two of the survey. This helps to assume possible coverage of the program and then it is expressed as a probability density. Using a Bayesian technique known as a *conjugate analysis*, the prior is combined with new survey data

collected during Stage 3 known as the **likelihood** to come up with the **posterior**, the final coverage estimate as shown in the figure below.



*Figure 13: Conjugate analysis showing the relationship between the prior, likelihood and posterior*

In this survey, the prior was calculated from the average of four coverage estimates based on the following three SQUEAC tools:

1. Simple Barriers Boosters and Questions (BBQ) tool- this is the simplest approach to deciding the mode of the prior from the list of the barriers and boosters since it involves allocating equal scores to each and every barrier. In this survey, a score of 5 was assigned to each barrier and booster. Total score of barriers were deducted from 100% while total score of the boosters were added to 0%
2. Weighted BBQ tool- in this approach, scores or weights are attributed to each element that reflect the relative the likely effect on coverage. Scores range on a scale from 1 to 5 and denotes the importance of each finding.
3. Histogram of belief- The average of beliefs on programme coverage was calculated by the programme team and enumerators and the histogram prior was estimated to be 55% and 50.5% for OTP and TSFP respectively.

*Table 7: Weighted Boosters and Barriers*

No.	Boosters	Simple (OTP)	Weighted (OTP)	Simple (TSFP)	Weighted (TSFP)
1	Community have good understanding of CMAM program	5	3	5	3
2	Early treatment seeking behavior of beneficiary as indicated by the number of self-referrals as well as admissions by	5	4	5	3.5

	z-scores.				
3	Health Seeking Behavior of beneficiaries as indicated by self-referrals	5	4	5	
4	Active and dedicated staff	5	5	5	5
5	Indicating Phone numbers on OTP cards to help contact beneficiaries in advance and help in defaulter tracing	5	3.5	5	3.5
6	Program indicators High percentage cured above SPHERE standards Low defaulter Lower deaths	5	5	5	3
7	Peer to peer referral..some mothers indicated that they refer children of their neighbours or friends that they deem malnourished	5	3	5	3.5
8	Presence of INS and TSFP programmes helps reduce cases of relapse	5	4	5	2.5
9	Beneficiary speaking highly about the programme after their malnourished children are successfully cured	5	3.5	5	2
Total		45	35	45	26

No.	Barriers	Simple	weighted	Simple	Weighted (TSFP)
1	Distance to OTP sites a major challenge. Some beneficiaries come from far areas as far as 40km	5	5	5	5
2	Cost opportunity. Most beneficiaries have competing priorities and are often busy.	5	4	5	4
3	Absence of mobile outreach nutrition services	5	4	5	4
4	Limited and Demotivated CNVs due to poor remuneration as well	5	4.5	5	4
5	Limited active case finding. Most admissions are by self-referrals. CNVs lack ability to move around and bring cases to the site since settlements are scattered across a wide radius	5	5	5	3

6	Very few nutrition sites just three in the whole district	5	4	5	4
7	Seasonal migration affecting program access	5	3	5	3
8	Community sensitization about CMAM limited. CNVs few and far between and recruited in February 2018	5	3.5	5	3
9	Caregiver beliefs that trekking more than 5km to receive 14 pieces of RUTF is not worth their time	5	3	5	3
10	No transport for team to do outreach services	5	3	5	3
	Total	50	39	50	36

1. Scoring of simple (un-weighted) boosters and barriers for both OTP and TSFP

OTP: Prior un-weighted/simple =  $((0\%+45\%) + (100\%-50\%))/2 = 47.5\%$

TSFP: Prior un-weighted/simple =  $((0\%+45\%) + (100\%-50\%))/2 = 47.5\%$

2. Scoring of weighted boosters and barriers

OTP: Prior weighted =  $((0\%+35\%) + (100\%-39\%))/2 = 48$

TSFP: Prior weighted =  $((0\%+26\%) + (100\%-36\%))/2 = 45$

3. Histogram of belief- the programme staff and the survey team

Histogram OTP:  $62+56+55+47=55\%$

Histogram SFP:  $50+44+56+52= 50.5$

Therefore, the average prior was estimated to be:

Average Prior (OTP) =  $48+47.5+55=50.2\%$

Average Prior (TSFP) =  $45\%+47.5+57= 49.8\%$

There is always uncertainty in the value of the prior. The amount of uncertainty about the prior is same as the probable range of the values (minimum and maximum) of the coverage and that is constant with the prior information. The following are the minimum and maximum probable values through considering  $\pm 25$  uncertainty value in assumed 50.2% coverage:

- The minimum probable value of the coverage for OTP is =  $50.2\%-25\% = 25.2\%$
- The maximum probable value of the coverage for OTP is =  $50.2\%+25\% = 75.2\%$ .

On the other hand, the minimum and maximum probable for TSFP coverage were calculated as 24.8% and 74.8 % respectively

The alpha and beta priors were calculated using the following formulae:

$$\frac{\text{minimum} + 4 \times \text{Mode} + \text{maximum}}{6}$$

$$\sigma = \frac{\text{maximum} - \text{minimum}}{6}$$

$$\alpha \text{ prior} = \mu \times \left[ \frac{\mu \times (1 - \mu) - 1}{\sigma^2} \right]$$

$$\beta \text{ prior} = (1 - \mu) \times \left[ \frac{\mu \times (1 - \mu) - 1}{\sigma^2} \right]$$

Thereafter, the values were expressed as proportions for using them in the formulae mentioned above

$$\text{Proportion} = \frac{\text{Percentage}}{100}$$

By using above formulae, the  $\alpha$  prior and  $\beta$  prior for both OTP and TSFP were calculated as

OTP:  $\alpha$  prior=19.0 and the  $\beta$  prior to be 19.1

TSFP:  $\alpha$  prior=18.1 and the  $\beta$  prior to be 19.8

These values  $\alpha$  prior,  $\beta$  prior and  $\pm 10$  precision was used in Bayesian Software; the sample size was calculated as **54 for both SAM and MAM cases**. Minimum 54 SAM cases as well as 54 MAM cases (In program and not in program) was required to be identified in the wide area survey for the estimation of coverage.

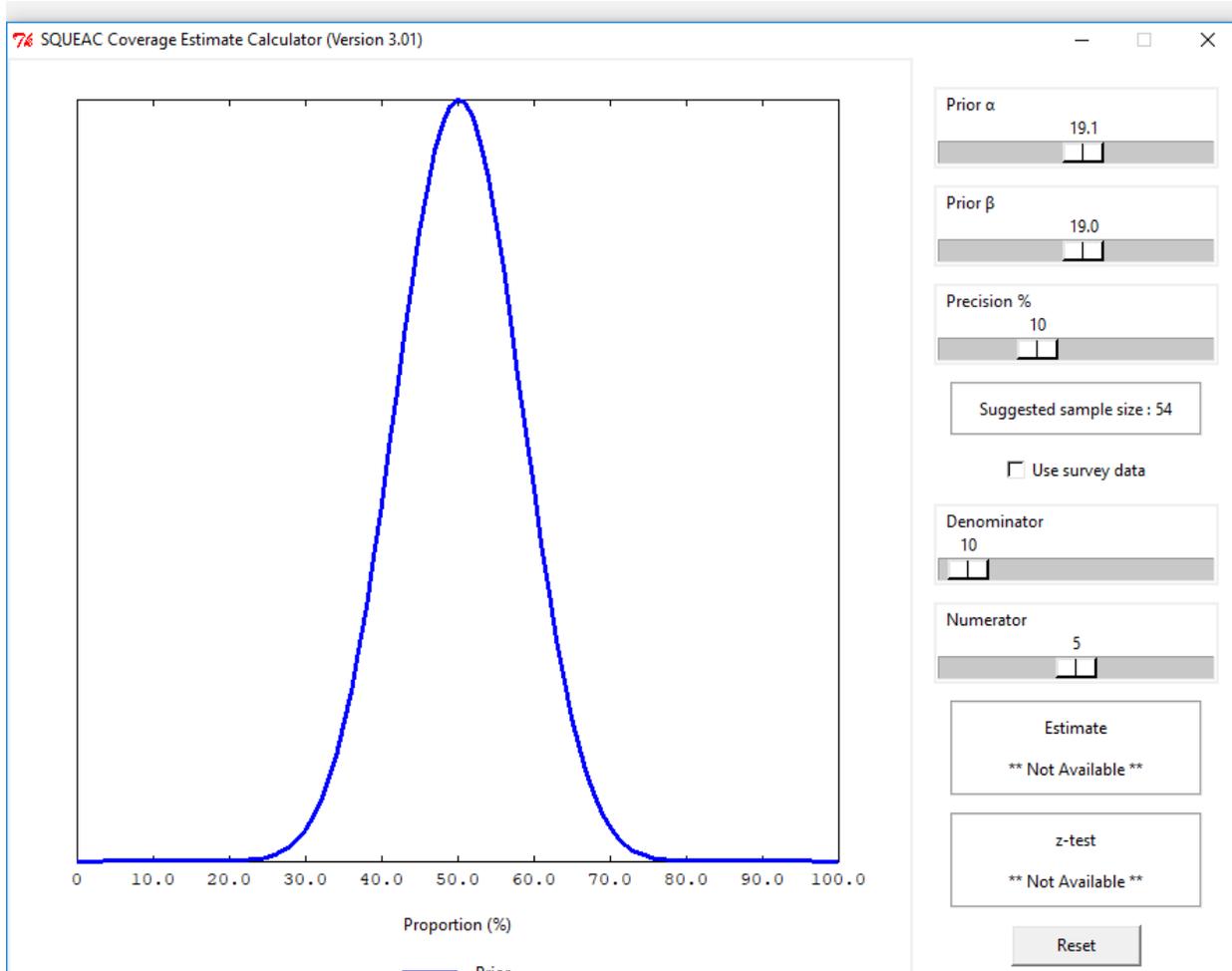
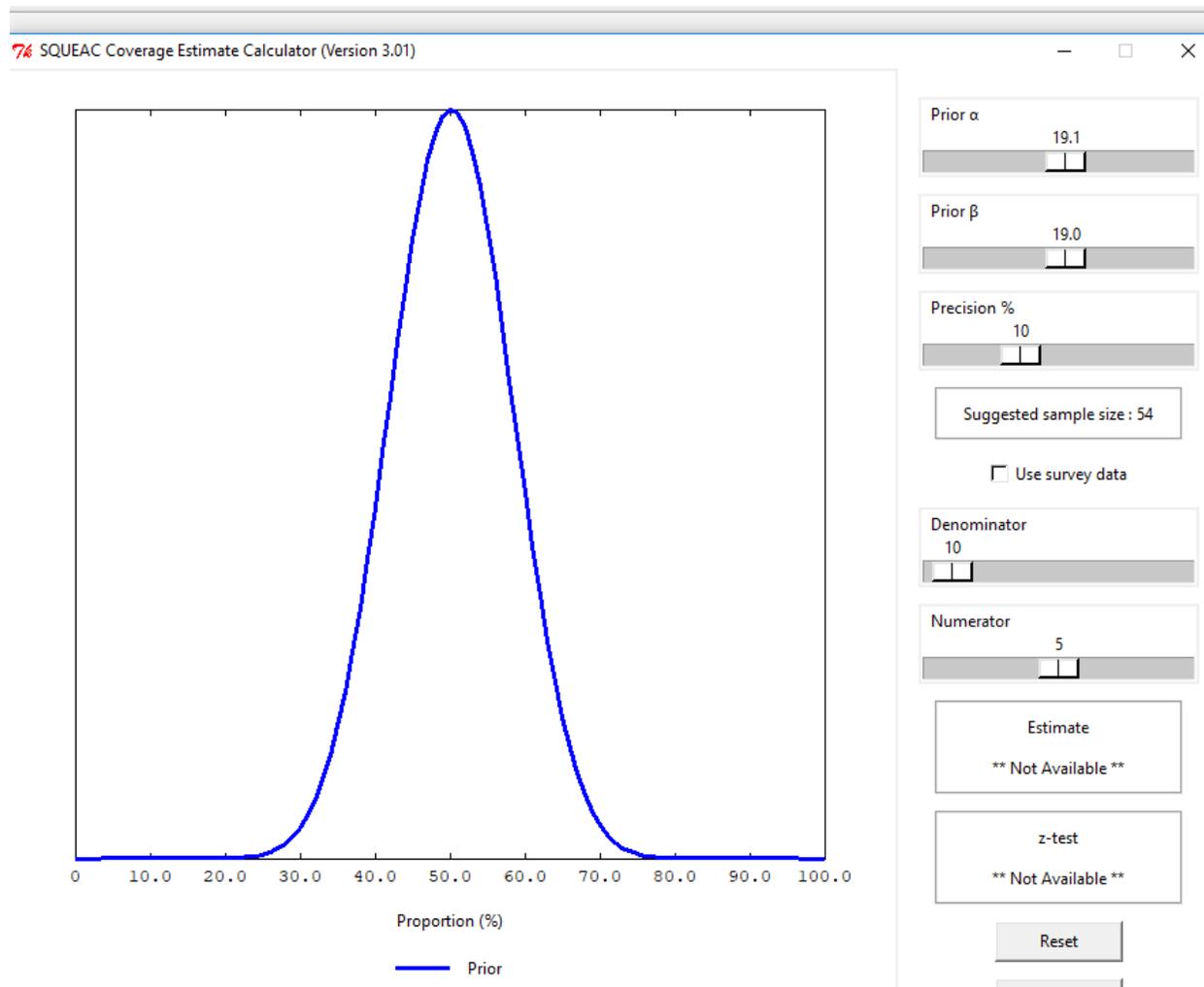


Figure 14: Representation of the prior probability for the OTP



Representation of the prior probability for the TSFP Programme

### 3.3.2 Likelihood Survey

The sample of minimum 54 SAM children aged between 6-59 months was generated by using Bayesian software and the probability sampling method was used to select the villages for active case finding. Through the Probability proportional to size Sampling (PPS) each village had an opportunity to be selected.

The investigation sample size of 54 was then used to calculate the number of villages for the wide area survey using the formula;

Table 8: Parameters on number of required villages in the Likelihood Survey

	Cadaado district
Target Sample size	54
Average village population	400
Prevalence of SAM	2.2%
% children 6-59 months old	20%

$$n_{\text{villages}} = \left[ \frac{n}{\text{Average village pop.} \times \frac{\% \text{ of the population}_{6-59 \text{ months}}}{100} \times \frac{\text{SAM prevalence}}{100}} \right]$$

$$\frac{54}{400 \times 0.2 \times 0.022}$$

= 30.68= 31 villages for OTP

	Cadaado district
Target Sample size	54
Average village population	400
Prevalence of SAM	8.2%
% children 6-59 months old	20%

$$\frac{54}{400 \times 0.2 \times 0.082}$$

= 8.23=8 villages for TSFP programme

Using the above formula, the number of villages to be sampled was calculated as 30. It was found that entire catchment area for Cadaado OTP does not have 30 catchment villages. Therefore, the team could only sample 19 villages from all the three health centers catchment area and this was used as the likelihood survey for both OTP and TSFP programme so as to find the 54 cases required by both programmes.

Door to door case finding method was used and all children between 6 and 59 months were screened using both MUAC measurement and oedema.

### 3.3.3 Findings of the wide area Survey and Coverage Estimation

A wide area survey was conducted in the 19 villages sampled by the team. A total of 41 SAM cases were found of which 12 were in the program and 29 were not in the program. Further, a total of 40 recovering cases in the program were also found.

*Table 9: Likelihood Survey Results for SAM cases*

Type	Cadaado
SAM cases in the program	12
SAM cases not in the program	29
Recovering cases in the program	40

*Table 10: Likelihood Survey Results for MAM cases*

Type	Cadaado
MAM cases in the program	40
MAM cases not in the program	52

A single coverage was done for the OTP programme in Cadaado while a point coverage was done for the TSFP programme.

For the single coverage, the recovering cases not in the program was calculated in the SQUEAC/SLEAC software below which also generated the numerator as 52 and the denominator as 110.

For point coverage, the numerator generated was 40 and the denominator as 92. Both these parameters were inserted into the SQUEAC Coverage Estimate Calculator version 3.01

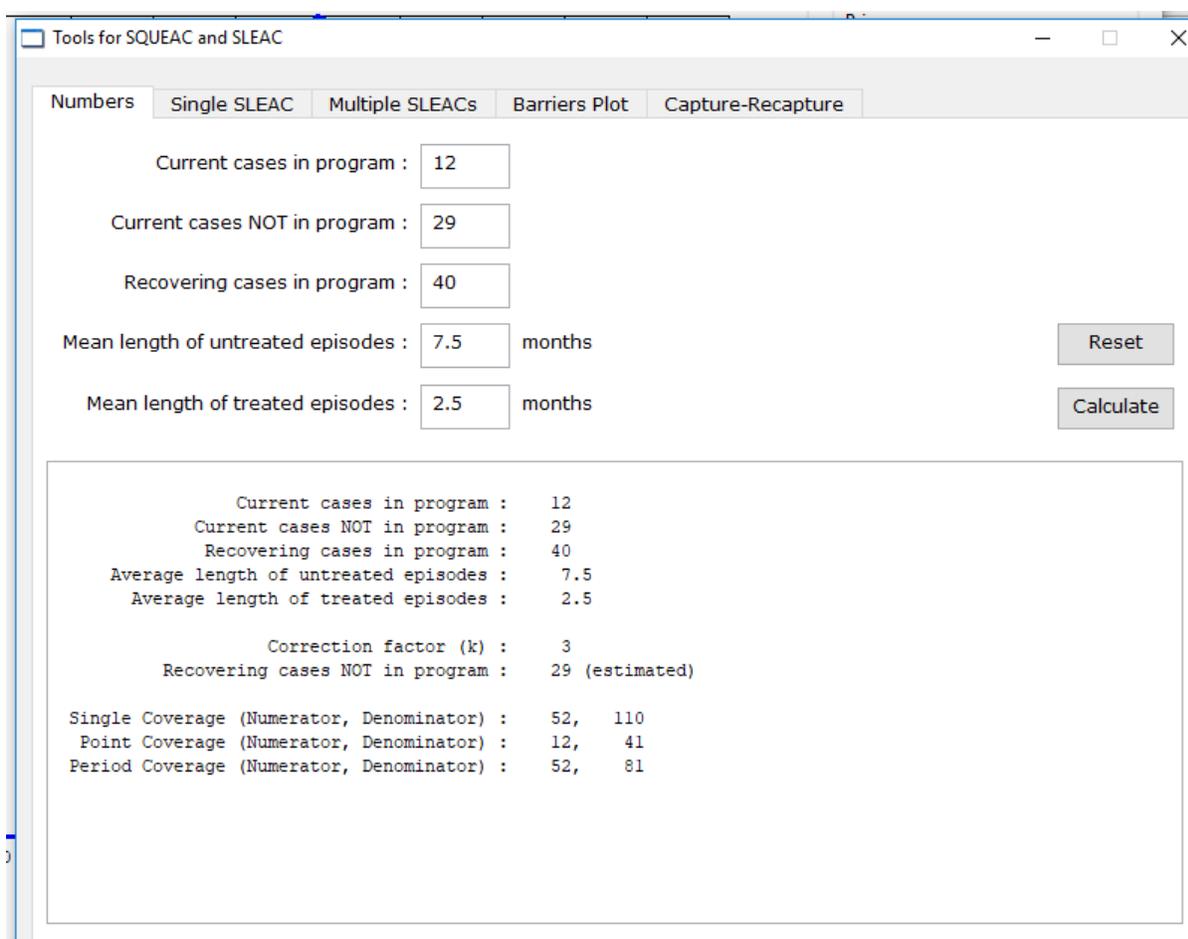
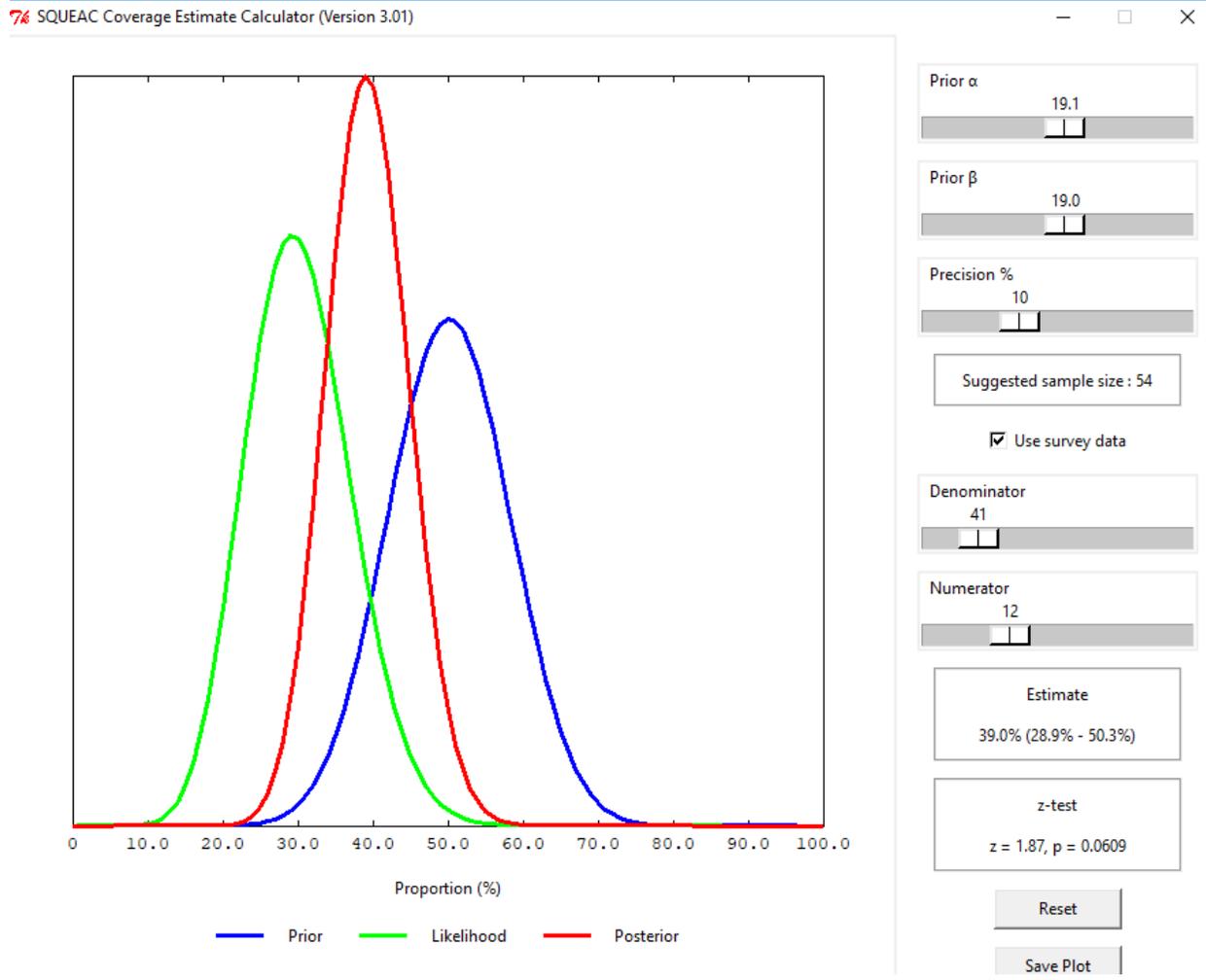


Figure 15: Single Coverage Calculation, Cadaado District OTP

### 3.3.4 Point coverage Estimate for OTP

Point coverage for the OTP Programme in Cadaado was computed by the Bayes SQUEAC Coverage Estimator and Was found to be 39.0% with a credible interval of between 28.9%-53.0%.



Representation of the Point Coverage Estimate for the OTP programme in Cadaado

### 3.3.5 Single Coverage

To calculate the single coverage, the single coverage estimator was used. Using a mean length of untreated episode 7.5 and mean of length of treated episodes 2.5 the denominator 110 and numerator 52 were inserted in Bayesian SQUEAC software with  $\alpha$  prior 19.0,  $\beta$  prior 19.1 and  $\pm 10\%$  precision values. The “Single” coverage of the program is **48.0%** with credible value of (CI 40.1% - 56.0%) at  $\pm 10\%$  precision and P-value= 0.7649.

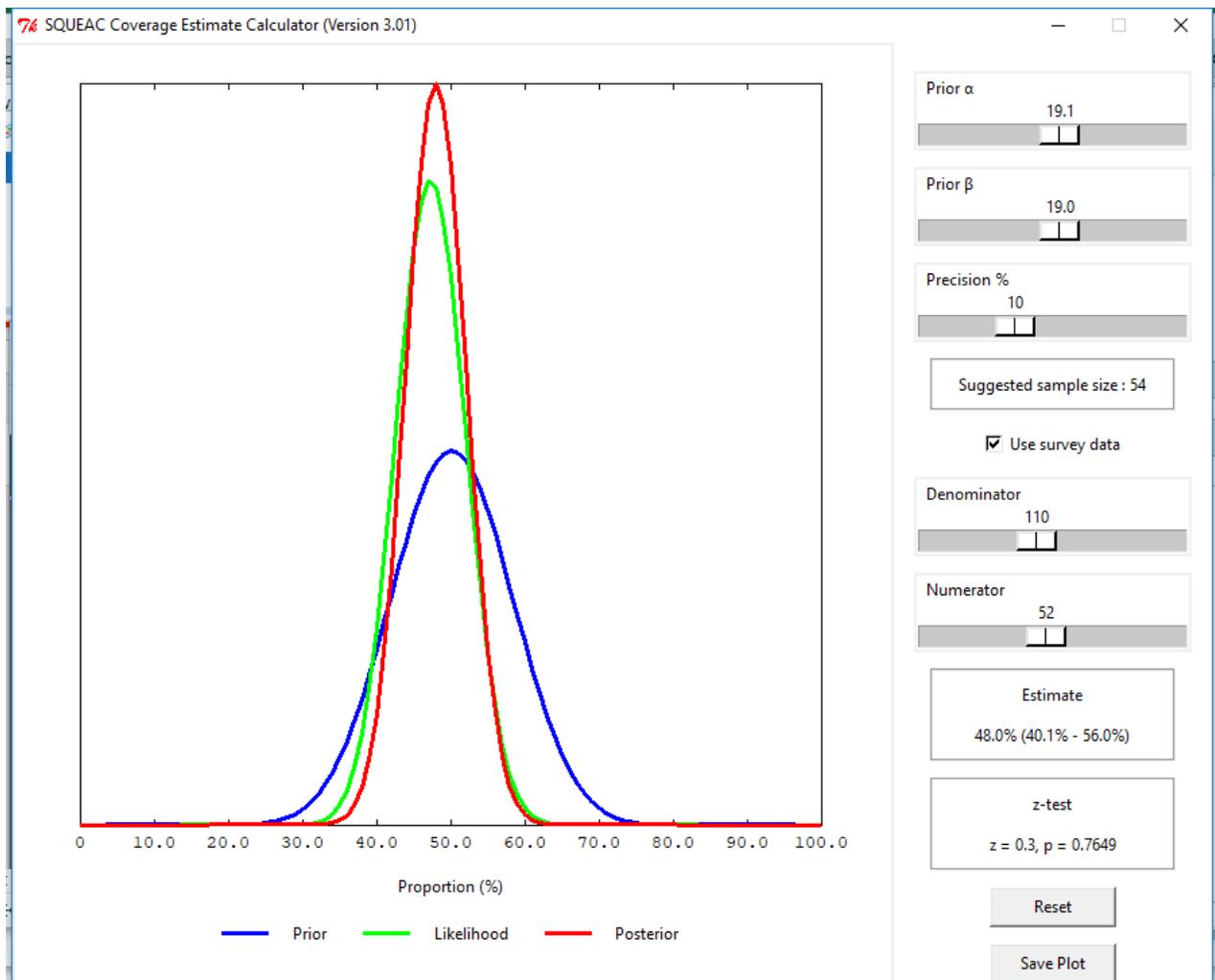


Figure 16: Representation of Single Coverage estimate, Cadaado district OTP

### 3.3.6 Point Coverage

The figure below shows the point coverage estimation for the TSFP programme. Point coverage reflects the ability of the programme to find and recruit cases. Therefore, the point coverage for the SQUEAC survey in Cadaado district is 44.6% with credible interval of 36.3%-53.4%)

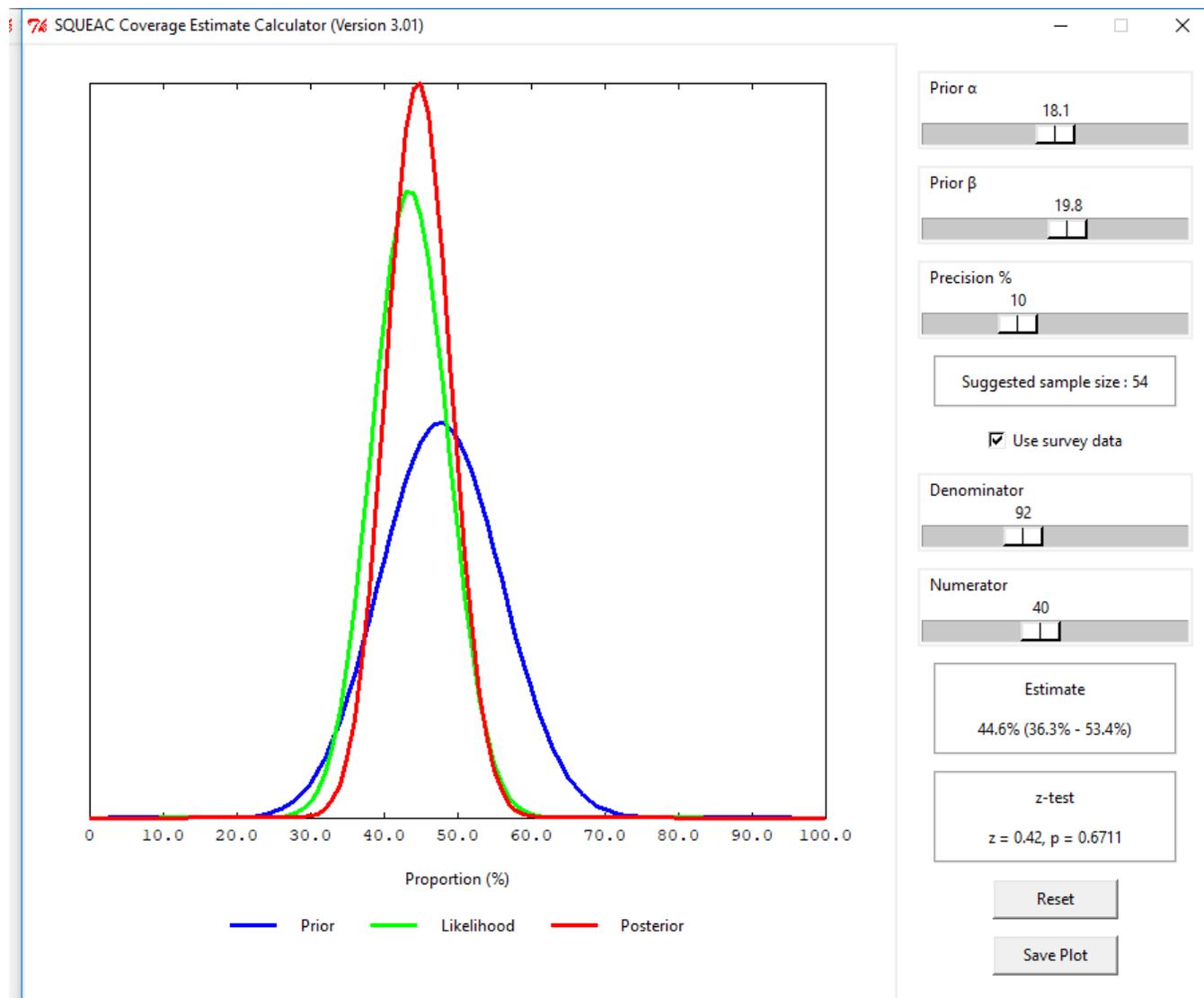


Figure 17: Representation of Point Coverage Estimate, Cadaado District TSFP Programme

### 3.3.7 Single Coverage Estimate for TSFP

The figure below shows the single coverage estimate for the TSFP programme in Cadaado district. The results as per the Single Coverage Estimator was found to be 47.7% with a credible interval of between 39.8%-55.95. There is a slight difference of just 3% between the single coverage and the point coverage estimates.

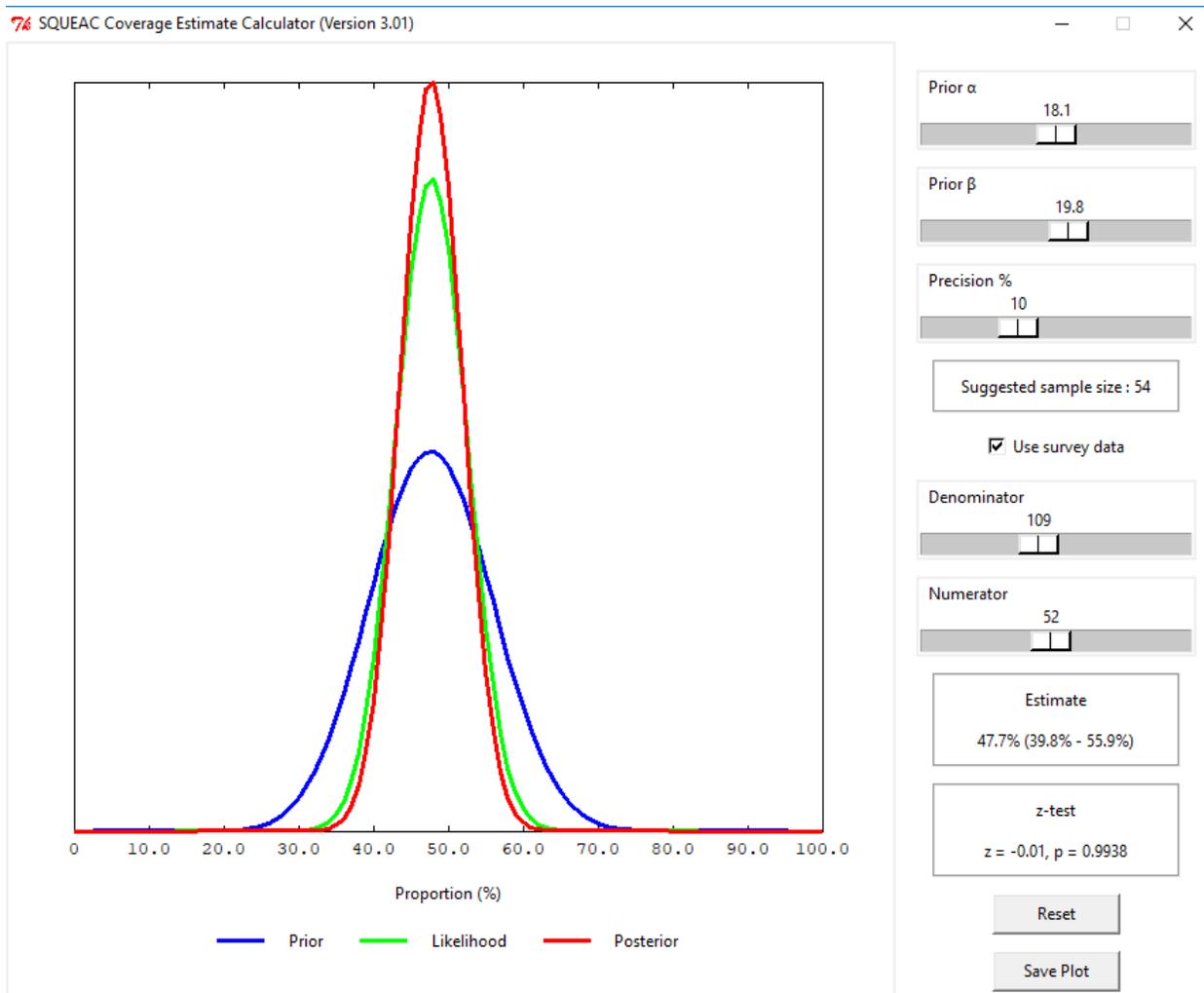


Figure 18: Representation of Single Coverage estimate, Cadaado district TSFP

## 4 DISCUSSIONS

The SQUEAC investigation pointed to 3 key areas of interest that needed further discussions.

The limited number of nutrition treatment sites is a huge contributor to the low coverage. As observed in hypothesis testing, there is evidence to show that coverage is high in areas closer to the sites. The standard recommended distance to treatment site should be less than 4 hours return walk, the investigation showed in some instances beneficiaries walking up to 8 hours. The challenge here goes beyond SCI, there is need for coordination with all stakeholders especially cluster leadership to ensure that the district is allocated additional sites to cater for the populations currently living far from existing sites.

The program design seems to be having challenges in capturing the dynamics of the context. Somalia remains one of the humanitarian environments that is difficult to access. In the recent years, program design has adopted outreach approach where, a team comprising of specialized personnel takes the services to the people instead of waiting for beneficiaries to appear in permanent sites. This approach if adopted in this context will work well. Another option would be to reduce nutrition treatment operational days in the facilities and use these days to take services to the communities.

A strong community component is an essential component of any nutrition program. Although the program has a community component, there is need to improve in specific areas. Coverage of the current CNVs is limited to some areas, leaving a large area of the district not covered. The above situation has weakened the effectiveness of active case finding, leaving self-referrals to be the highest contributor of admitted cases. There is need to critically look into this and re-align the strategy of CNVs in the community. Apart from CNVs distribution, capacity is important, there is need to set up a program to train and support the CNVs to attain the practical capacity to effectively identify and refer cases from the community.

## 5 RECOMMENDATIONS

Findings	Recommendations	Actions to be taken	Timeline	Responsible persons
Challenge of distance to healthcare center is evident. This is partly contributed to the fact that there are only 3 sites covering the entire district.	Ensure the district is served with adequate nutrition treatment sites.	Open new treatment sites ensuring the distance between beneficiaries and treatment sites adhered to sphere standards.	Immediately	SCI, other NGOS, Nutrition Cluster
Absence of mobile outreach nutrition services which would be ideal to cover the areas with no permanent sites.	Use hybrid approach where both outreach teams and permanent sites exists serving populations of close proximity and those far away.	Set up outreach teams to cover population living far away from the existing sites.	Immediately	SCI in collaboration with NGOS working in the district, Nutrition Cluster
Limited number and demotivated CNVs due to poor remuneration as well. CNVs responsible for active case finding have limited resources to cover the vast area.	CNVs need training and facilitation to cover a larger area of active case finding. Apart from training, they need to be motivated adequately.	Conduct training for CNVs focusing on mobilization skills. Support CNVs movement Recruit additional CNVs and allocate reasonable geographical area of focus.	Short-term	SCI, other NGOs, Nutrition Cluster
Community sensitization about CMAM limited. Limited understanding of importance of treatment in the community with mothers not willing to sacrifice over 4km walk for	Combine the recruitment of CNVs, training and positioning to cover uncovered areas.	Develop a sensitization schedule showing information flow to the community Capacity build community leaders to	Short-term	SCI

treatment.				
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## **6 ANNEXES**

### **6.0 Annexes I**

1. SQUEAC TOR

<https://somalijobs.net/index.php/jobs/chasp-squeac-survey-consultancy-in-adado-afmadow-and-kismayo1863/>

# 6.1 Annexes II

