



**Semi-Quantitative Evaluation of Access and Coverage
(SQUEAC) of the Community-based Management of
Acute Malnutrition (CMAM) Programme in Sinazongwe
District**

12 – 24 April 2010

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Acknowledgements

This SQUEAC investigation was made possible through the generous support of World Vision Zambia. In particular, Dr. Fwasa Singogo, Maternal and Child Health and Nutrition Advisor, graciously facilitated the process. In addition, the World Vision Zambia programme staff from other regions and CMAM programme staff in Sinazongwe led by Mrs. Betty Thewo provided the valuable insights that lent depth and substance to the investigation. The Sinazongwe DHMT through Mrs. Edith Kamenda alongside the RHC staff and community health workers in Sinazongwe, Sinazeze, Sinamalima and Siatwinda are also acknowledged for their tireless commitment to improving the nutrition of children in their communities without whose efforts form the foundation of the programme.

List of Abbreviations

ADP	Area Development Program
ARI	Acute Respiratory Infection
CHW	Community Health Worker
CMAM	Community-based Management of Acute Malnutrition
CSAS	Centric Systematic Area Sampling
DHMT	District Health Management Team
HBC	Home-based Caregiver
HEPS	High Energy Protein Supplement
IMCI	Integrated Management of Childhood Illnesses
IYCF	Infant and Young Child Feeding
MCH	Maternal and Child Health
MUAC	Mid-upper Arm Circumference
OTP	Outpatient Therapeutic Care Programme
OVC	Orphans and Vulnerable Children
RHC	Rural Health Clinic
RUTF	Ready-to-Use Therapeutic Food
SAM	Severe Acute Malnutrition
SC	Stabilisation Centre
SFP	Supplementary Feeding Programme
SQUEAC	Semi-Quantitative Evaluation of Access and Coverage
WVZ	World Vision Zambia

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Introduction

A key aim of Community-based Management of Acute Malnutrition (CMAM) programmes is to achieve and sustain high levels of coverage and this has increasingly been used as the measure of the success of these programmes. As such, determination of programme coverage is a critical task in the monitoring and evaluation of CMAM programmes and ideally should be done regularly.

Coverage and its measurement

Coverage identifies children who have severe acute malnutrition (SAM) and measures what proportion of those are being treated by the CMAM programme being evaluated. Various survey methodologies specific to CMAM have been employed to provide estimates of programme coverage such as the Centric Systematic Area Sampling (CSAS). However, these approaches are resource-intensive which has led to their one-off use as an evaluation tool at the end of the programme cycle rather than as a regular monitoring tool throughout the duration of the programme (Myatt et al., Myatt and Emru, 2008). In response to these limitations, the Semi-Quantitative Evaluation of Access and Coverage (SQUEAC) method has been developed. SQUEAC is a new low resource method which can be used on a regular basis to monitor programme performance, identify barriers to service access and uptake and hence evaluate coverage. SQUEAC is an investigation rather than a survey and uses a combination of quantitative and qualitative data, making use of existing routine data and that collected from small and wide area surveys and also anecdotal information gained from a variety of informants. The method achieves rapidity and low cost by collecting and analysing diverse data *intelligently* before conducting small area surveys. This is different to the traditional and large scale and more *mechanistic* and focused data collection techniques employed by nutrition and coverage survey methods, such as CSAS.

SQUEAC and the Sinazongwe District CMAM programme

In October 2009, with technical support from Valid International, World Vision Zambia (WVZ) in collaboration with the Sinazongwe District Health Management Team (DHMT) setup outpatient therapeutic care programme (OTP) and supplementary feeding programme (SFP) in 4 pilot health centres in the district, a stabilisation centre (SC) in the main district referral hospital and devised a community mobilisation strategy that sensitises the community members on acute malnutrition and identifies and refers acute malnourished children to the respective centres. The OTP, SFP, SC and with community mobilisation as the foundation, formed the components of the CMAM programme in Sinazongwe District.

By April 2010, with monitoring and evaluation of programme quality and effectiveness in mind, a SQUEAC process was proposed as the ideal approach to assessing programme performance of and measuring the coverage reached by the Sinazongwe District CMAM programme.

Objectives

The main objective of this technical support mission was two-fold: (1) to assess the level of coverage reached by the World Vision Zambia (WVZ)-supported Community-based Management of Acute Malnutrition (CMAM) programme in Sinazongwe district through a Semi-Quantitative Evaluation of Access and Coverage (SQUEAC) investigation and in so doing be able (2) to train key WVZ staff and District Health Management Team (DHMT) officials (for a list of trainees, see Annex 1) involved in the implementation and supervision of the programme.

Specifically, the mission aimed to:

- 1) Report an overall coverage estimate across the catchment areas of the 4 rural health clinics (RHCs) that initiated CMAM services provision at the end of October 2009;
- 2) Transfer technical and practical skills required to conduct a SQUEAC investigation to relevant WVZ staff and DHMT officials;
- 3) Identify various factors that affect programme coverage and barriers to service uptake; and
- 4) Recommend appropriate interventions to address identified issues so as to increase programme coverage and service uptake.

Methodology

The training approach utilised was that of *learning-by-doing*. Sessions were organised such that the various steps in conducting a SQUEAC investigation¹ were discussed through classroom theoretical inputs and soon thereafter applied practically with theory and practice always done one after the other.

A total of 11 days were spent on the whole process: 6 days for theoretical input and data analysis, 3 days for qualitative data gathering 2 days for the wide area survey. For the qualitative data collection, 4 villages and 4 RHCs were visited. For the wide area survey, 8 villages were exhaustively sampled.

Results

Following are the results from the SQUEAC investigation conducted in Sinazongwe. Sections 1 to 10 are the outputs from the mind mapping exercise conducted as part of the prior building stage of SQUEAC. A mind mapping exercise is used to synthesise all

¹ For a detailed step-by-step discussion of the SQUEAC methodology as applied in the Sinazongwe investigation, refer to SINGOGO, F., PHIRI, C., MWENDAFILUMBA, M., MHONIE, M., THEWO, B., MWITA, A., MWANZA, I., KAMENDA, E. & KANENE, L. 2010. Training Output for World Vision Zambia Semi-Quantitative Evaluation of Access and Coverage (SQUEAC) Investigation of Community-based Management of Acute Malnutrition (CMAM) in Sinazongwe District, 12-24 April 2010.

quantitative data analysed and qualitative information gathered. The exercise allows for capturing of various information in one format, thereby facilitating discussion and interpretation. The exercise is done by putting together pieces of flip chart paper to create a “wall” to write on. The theme or topic being investigated, which for this case is coverage, is put at the centre of the wall and then sub-topics on positive and negative factors affecting programme coverage based on the various sources of quantitative data and qualitative information are written down branching out from the central theme. A sub-topic is then marked either with a cross or a tick depending on whether it is considered a negative or positive contributor to coverage. A sub-topic is marked with a question if data and information gathered is inconclusive as to its negative or positive contribution to coverage. Corresponding data and information are then written down per sub-theme or topic and the process is continued until all points of investigation are exhausted. The mind mapping exercise can also be facilitated and captured using Xmind², a mind mapping software that allows for the recording of a mind map electronically. A graphical representation of the mind map can be seen in Annex II. Section 11 presents the Bayesian statistical analysis carried out to reach the final coverage estimate for the Sinazongwe CMAM programme.

1. Community Discussions

Informal group discussions were conducted amongst groups of men and women in various villages within the catchment areas of the 4 RHCs. The purpose of the discussions was to get a general idea of the views and perceptions of the community-at-large on issues related to children's health and health care in general and on nutrition in particular. The informal group discussions were conducted with only a guide of topics and issues to ask the community groups and not a formal interview schedule and used open-ended questions so as to allow people to share openly and fully.

1.1 Health-seeking behaviour ?

During the discussions, the community members were asked what types of diseases they consider as most common among children under five in their village. In general, the community members identified the following diseases: malaria, diarrhoea, cough, fever with convulsions, bilharzia, pneumonia, skin infections, conjunctivitis/sore eyes, malnutrition.

Of all these diseases, malaria and diarrhoea were consistently identified as the most common across all the community discussions conducted while malnutrition was not even identified by some groups and those that did, mentioned it as lower in the list.

In Sinazongwe, in one village (Sinazongwe village) the clinic was first choice for treatment because it was near. In another (Simabbula village), the Community Health Worker (CHW) was first choice for treatment then clinic if the condition was not resolved. This was explained as due to the distance of the village from the health clinic, hence distance also plays a factor in deciding whether to bring to the hospital or clinic and is weighed against lost time for work or income activity.

² Xmind can be downloaded free at www.xmind.com.

In Sinazeze, the community members of a nearer village (Kabanda village) also reported that their first choice of treatment is the clinic while in the farther village (Siazwela village) they utilise nearer alternatives before heading to the clinic.

There were also reports of others self-medicating and using home remedies for minor problems while for some cases such as dysentery and eye infections treatment is still sometimes with the use of herbs.

In all areas, men reported that the final responsibility for health issues lies on women. Men have a token role and, according to women, men don't even escort or join them when they go to the clinic unless the condition is serious. However, women didn't require men's permission to bring a child to the clinic.

1.2 Perception of Malnutrition ✕

During the community discussions, respondents were either shown photos of a severely wasted child and a child with oedema or given a description with the physical signs of the same. Then they were asked whether they knew this condition and what name they called it.

Wasting

The majority of respondents called it *masato* which was described as a child who is slim with loose, wrinkly skin, pot belly and with diarrhoea. Some others added that it may also present with diarrhoea. When asked further what causes *masato*, respondents gave the following possible mechanisms of causation:

- a) A mother or a father who has had an extra-marital affair and then holds his or her baby child without first undergoing any form of cleansing with certain herbs will cause the child to have *masato*.
- b) If a mother carrying a baby child passes through a crossroads where bathing/cleansing herbs have been left, the baby will have *masato*. Also, if a mother carrying a baby child passes through an area where an illicit extramarital affair has been committed, the baby will have *masato*. A variation of this is when a mother or father passes through an area where an illicit extramarital affair has been committed, then they will bring with them *luovo* or bad air which they can pass on to their baby child when they get home and hold their child causing the child to have *masato*.
- c) Someone who has come from a funeral and has not done or completed sexual cleansing can pass on *masato* to a baby child that he or she holds.
- d) A baby child (2 months below) placed on the bed where the mother and father sleep (and consummate marital relations) will get *masato*.
- e) A very few respondents say that *masato* can also be caused by a lack of food.

As for treatment of *masato*, majority of respondents report that the only treatment for the condition is the use of herbs and/or roots either self-administered or through a herbalist or

traditional healer and this is what they continue to use up to now. Most believe that the health clinic will not be able to cure *masato* through the use of modern medicine. Only one village (Sinazongwe) reported differently saying that this was what they did before but now they bring these cases to the health clinic.

In some areas, elderly respondents shared that there were systems put in place to prevent *masato*. The elderly do some form of "active surveillance" of infant children and those whom they note as having the signs and symptoms of *masato* are immediately treated by bathing with the appropriate herbs. A man or woman who has committed an illicit extramarital affair can opt to get cleansed with the appropriate herbs and roots prior to coming home and holding their baby so as not to pass the bad air to their child. In one area, a respondent shared that the use of condom by a man whilst having an extramarital affair can also prevent this transmission. Because *masato* is associated with infidelity, it is often hidden away by parents because it is embarrassing and all traditional remedies done for it are kept secret.

Oedema

Almost all of the respondents identified *kunyonkela* as a child who has swollen feet or oedema. *Kunyonkela* is believed to be caused by the following:

- a) Breastfeeding infant child while pregnant or breastfeeding after a child has already been weaned. This is the predominant view and the logic behind this belief is that the breast milk becomes spoiled once a mother becomes pregnant again or after she has stopped breastfeeding during the weaning period.
- b) A very few respondents said that it can be caused by lack of food or poor food intake by the infant child.

Another term used by a group of mothers in Simabbula village in Sinazongwe is *chizimbiyo* which was described as oedema or swollen feet and this was attributed to the child not being given food during the weaning period. Treatment for this condition is also through the use of the appropriate herbs and roots.

Malnutrition

In almost all of the discussions conducted, respondents differentiated *masato* and *kunyonkela* from malnutrition. They reported that although the majority of the signs and symptoms of malnutrition are the same such as thinness or slimness, potbelly, swollen feet; *masato* was said to present with loose or wrinkly skin and with diarrhoea while malnutrition, they noted, does not have these signs. On the other hand, malnutrition was said to occur with changes in hair colour and texture which is not present in *masato*.

In terms of causes, all respondents associated malnutrition with poor diet which is described as eating only one type of food or lack of quantity of food intake. As for treatment, all respondents said that malnutrition could be treated at the clinic through food supplements and by improving the diet through diversification.

1.3 Awareness of CMAM programme ?

In all the villages visited, most community members interviewed didn't know the programme by name (CMAM). However, almost all women and some men knew of the nutrition activities such as weighing of children, high energy protein supplements (HEPS), *chonde* or peanuts (plumpynut). Also, most men didn't know or had not encountered any volunteer going around to measure MUAC (don't even know the MUAC tape). Women however have encountered volunteers and have seen a MUAC tape which some call a ribbon. However, most men and women didn't know the criteria used based on MUAC and for which conditions *chonde* (RUTF) and HEPS are given.

1.4 OTP Staff ✕

In Sinazongwe village, women complained that they are made to wait a long time in the clinic. Also, the clinic closes early even if there are many patients waiting. They shared that the staff are always too busy to attend properly to patients and they perceive some form of unequal treatment or level of service given to different patients.

In Sinazeze (Kabanda village), men have complained about the staff conducting the clinic saying that the staff is very rude to beneficiaries and there is a perception of selective and unequal treatment of different patients.

2. Traditional and Religious Leaders

2.1 Awareness of CMAM programme ?

Most traditional leaders (headmen and committee members) are not aware of the programme. However, they are aware of the volunteers but there doesn't seem to be any specific communication between them regarding the programme. This is despite the fact that most of these leaders are either volunteers themselves or those that have attended sensitisation meetings during the start of the programme.

Most traditional leaders differentiate *masato* from malnutrition and that the former can only be treated through the use of traditional herbs while the latter requires better diet and food intake that are provided through the clinic.

Religious leaders from Sinazongwe village are aware of volunteers and of the nutrition activities that are happening in the village.

2.2 Volunteers ?

There seems to be no regular and updated communication between the leaders and volunteers in relation to the CMAM programme. When asked about when they last discussed with volunteers, they reported November or December 2009 which was the time of the early stages of the programme. After that, there didn't seem to be any other formal contact in relation to the programme.

2.3 OTP Staff ✘

In Kabanda village, leaders complained about the attitude of the clinic staff in the Sinazeze RHC. They reported that the staff is very rude and selective in how she provides treatment.

3. Beneficiaries

3.1 Perception of malnutrition ✘

During discussions with beneficiaries, they have shared very similar perceptions of malnutrition as those from the community discussions with the clear distinction of conditions such as *masato* and *kunyonkela* as different from malnutrition.

In Sinazeze, *masato* was described as a swollen body and limbs, potbelly and diarrhoea and is caused in similar mechanisms described by the general community members. They also shared that the only treatment is through herbs. However, in addition, they shared a condition called *entombe* which presents in the same way as *masato* but is transmitted when a mother or a father passes an area where an aborted child or a stillbirth has been buried and then they come home to hold their child. The treatment for *entombe* is through herbs as well and the use of tattoos.

In Sinamalima, the mothers who the discussions were held with all reported malnutrition as a lack of adequate food and described it as a child who is wasted. They also all responded that malnutrition can and should be treated at the health clinic. However, when they were shown photos of malnourished children, they shared that some still believe and refer to these children as having *masato* and described the condition and its causes in the same way as what others have reported. They further share that these children are still being treated with herbs and not immediately brought to the clinic. This is why they have started advising other mothers who think their children have *masato* to consult the clinic and they use the example of their own children who have or are recovering because of the treatment.

3.2 Source of referral/information ? ✓

In Sinazongwe, the beneficiary interviewed mentioned that a volunteer who checked her child's MUAC referred her to the programme. In Sinazeze, the beneficiaries answered this indirectly by saying that they have been sharing information about the programme when they got back home to their villages and that this is the main way that they are able to get information on or referral to the programme. However, those coming from Kabanda and Vwavwa villages reported that they have been seen by a volunteer in their village and referred to the clinic. In Sinamalima, all the beneficiaries interviewed reported that their children were measured during growth monitoring and were then referred to the clinic.

3.3 OTP staff ? ✘

The most significant findings from beneficiaries regarding OTP staff is that from Sinazeze, where the mothers reported that there are times when the nurse would stop her work and leave them when she gets annoyed by the noise of crying babies and tells the mothers that

she will only come back if their babies become quiet. It was also reported that the nurse sometimes closes the clinic early and then asks remaining beneficiaries to leave and just come back another day.

3.4 Volunteers ?X

In Sinazeze, beneficiaries shared that they only receive health education from volunteers but they do not see them go house-to-house while some others report that they see volunteers going around and checking on children in their villages. Also, some beneficiaries share that the volunteers come with them to the clinic on Fridays. Mothers also reported that there are times when the volunteers are the ones who examine their children and provide them with the RUTF. In Sinamalima, the beneficiaries interviewed shared that they know some of the volunteers because they are going around checking on their children.

3.5 Distance X

In Sinazeze, some beneficiaries shared that because of the distance of the RHC, they have to pay K4,000-5,000 one way to travel and attend the clinic weekly. For some, especially those that come from far areas such as Muziyo and Munzuma, this is an added expense they cannot afford and this has caused them to stop coming or attend irregularly.

3.6 Waiting times ?X

In Sinazeze, the beneficiaries report that they wait the whole day to be seen by the nurse. They arrive at 0800h and wait until 1600h. While waiting, they get health education, chlorine from volunteers and then the treatment. In Sinamalima, the beneficiaries report that they don't have to wait long to be seen by the nurse.

3.7 Feedback on CMAM ✓

In Sinazeze, the beneficiaries report that there was no available RUTF starting on the 19th of March 2010. HEPS was supposedly always there. Beneficiaries have shared that they call the programme "CMAM" and that is made possible by a group of people who want to help which includes World Vision. They shared that it is a good programme and that it should continue. In Sinamalima, the beneficiaries share that they are grateful for the programme because it has saved lives of children and they have shared this with other mothers so that they can choose to come to the clinic if they think their child is malnourished.

3.8 Case Study

In Sinazongwe, a beneficiary was traced and a case history was taken. The mother was interviewed and shared that her daughter was admitted last year (2009) when she was just 16 months old. She noticed that her child looked sick and weak and thin. Because of this, she first tried traditional herbs. When this didn't help, she consulted with a church leader who used herbs to bathe the child for 4 days so that the *luowo* or bad air will dissipate. When this

didn't work, she said she tried every other possible remedy including that for masato treatment. However, none of these helped.

Then, a volunteer saw her child and then advised her to come to the RHC for treatment. There her child was given *chonde* to eat and take home. After a couple of weeks eating *chonde*, she noticed her child getting better and then eventually she was provided HEPS instead of *chonde* for 4 months until she was eventually discharged. The mother reported that the RUTF and HEPS were well tolerated by the child. Also, the mother talked to at least 4 other mothers about her experience regarding the treatment and the programme.

On observation, the child looked well but not quite. There were some signs that the child is still having a poor diet and is at risk of relapsing to her previous condition.

4. MUAC on Admission ✓

The median MAUC on admission can be used as proxy indicator of beneficiaries' treatment-seeking behaviour. More specifically, it reflects how early they seek care. The higher 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 < 10.0 cms generally indicates a late treatment-seeking behaviour.

In all the 4 RHC being investigated, MUAC on admission is 11.2 cms (Figure 1) which suggests that the treatment-seeking behaviour of all cases admitted into the programme is early.

5. Distance to OTP ✗

Data on self-reported distance (in hours) was collected from all children admitted into the programme through their admission cards. In general, travel time of at most 2 hours to the OTP site is considered acceptable while beyond that is long or costly, in terms of time for the beneficiaries (Valid International, 2006).

Figure 2 presents the distance in hours of all admissions to the various RHCs included in the programme. The general pattern for all RHCs is that most admissions come from within 2 hours of the RHC.

The following hypothesis of health-seeking behaviour can be posited based on this:

The nearer areas receive more education and awareness and have easier access to health information for a variety of reasons including having more volunteers or having more volunteer activity hence they are aware of malnutrition and easily access the RHC once they know their child is malnourished. The corollary is also possibly true: the farther areas receive lesser education and awareness and have more difficult access to health information for a

variety of reasons including fewer volunteers or less volunteer activity hence they are less aware of malnutrition and the treatment that is available in the RHC.

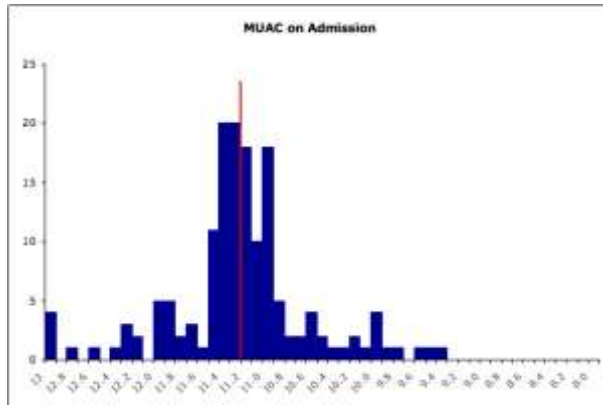


Figure 1: MUAC on Admission

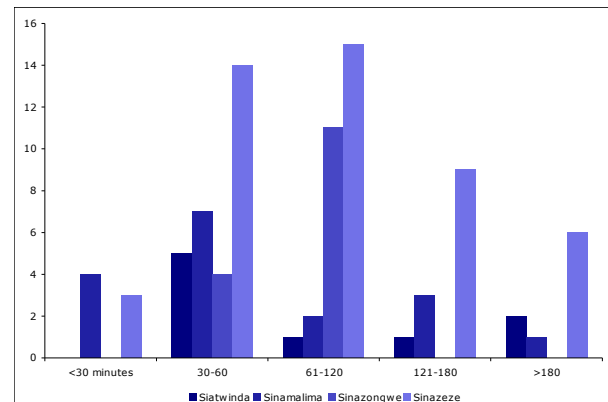


Figure 2: Distance to OTP for all Admissions

6. OTP Staff

6.1 Role and Capacity ?X

In Sinazongwe, only 1 staff was interviewed. Other staff trained on CMAM was not present. The person interviewed was previously trained in Maamba for the stabilisation care of severe acute malnourished (SAM) children. When asked what her role was, the staff shared that she is not aware of this programme and that she has not been trained and that she doesn't know what needs to be done and cannot fill out OTP cards. Because of this, she sent home 2 potential beneficiaries who came for the OTP clinic and told them to come back the next week. The staff shared that only one other nurse knows how to deal with these cases and unfortunately she is not around. She said that this other person "owns" the programme. With regards to the criteria for admission, the staff interviewed shared that she is not fully aware of the criteria but she also believes that not much needs to be done because the patients are already being weighed and the weight is the basis to determine whether they can be admitted or not.

In Sinazeze, only 1 staff was trained on CMAM. The staff is a midwife with maternal and child health (MCH) background and training from which she gained her previous learning on how to manage children with malnutrition. When asked whether she found CMAM challenging compared to what she previously learned regarding malnutrition, she responds that there is not much difference except for the type of food that is given referring to the RUTF. Despite this, however, she feels competent in applying the CMAM approach. When asked what kinds of challenges she faces, she shares that even before CMAM started, she was already inundated with a lot of patients seeking routine care. Now with CMAM, this has further increased. Also, she says that it has been quite difficult to explain to those who come to the clinic thinking that the CMAM is for everyone and expecting that they will be given food as well.

In Sinamalima, only 1 staff was trained on CMAM. The staff is a midwife and just shortly prior to the CMAM training and setup, she was moved from Sinazongwe RHC to

Sinamalima as a temporary relief appointment. She has just recently been confirmed on permanent status in the Sinamalima RHC but she shares that she will be leaving this post very soon. She prides herself in her skills as a midwife and how pregnant women even from other areas outside Sinamalima prefer to come to her to deliver their children. When asked how she felt about her role in the CMAM programme, she said that she sees it as just part of her routine work. In terms of capacity, there seems to be some misunderstanding on her part on the discharge criteria. Based on the OTP admission cards, it seems that her decision to discharge a patient is based entirely on minimum stay of 4 weeks in the OTP despite MUAC and weight gain criteria not reached yet. When asked about this, she confirms that this is how she has been discharging patients.

In Siatwinda, only 1 staff was trained on CMAM but this trained nurse took the initiative to train his other fellow nurse in the clinic so that they can help each other in managing the SAM patients. Also, in order to help him manage all the patients, he identified some volunteers whom he think will be capable of filling out OTP cards and trained them on what they need to do with those coming for OTP and what types of information needs to be recorded on the cards.

6.2 Perception of malnutrition ✓

In Sinazongwe, the staff interviewed shared that malnutrition is caused by hunger and disease and is secondary to diarrhoea and sickle cell anaemia. When asked if she knew of the local name, she said that she is unaware of the term but knew of the local belief that children who have this condition are bewitched and they present late in the clinic because they are brought to the herbalist first. In Sinamalima, the staff shares that most people still believe that malnutrition is caused by witchcraft and hence can only be treated by traditional methods using herbs. However, she says that she ensures that those who get admitted to the clinic are given correct information about the causes and treatment of malnutrition.

6.3 Referrals ?

In Sinazongwe, the staff interviewed reported that the majority of referrals for OTP are from volunteers and the rest are from routine screening and growth monitoring.

In Sinazeze, the clinic staff reported that the main source of referrals of SAM children are the volunteers although more and more, mothers are coming to the clinic after hearing about the programme from other mothers who have benefited from the programme. She also reported that most volunteers accompany those that they refer to the clinic. When asked regarding wrong referrals, the staff mentioned that this was common in the beginning but currently this has been less. In terms of referral to the SC, she uses the standard hospital referral slips used for any case which the patient takes with them when they go to Maamba Hospital. Then, the patients are referred back to the clinic once stabilised with a return referral slip from the hospital. She reports that all the patients that she referred to SC came back to the clinic and continued treatment under the OTP.

In Sinamalima, the staff reported that most referrals are from volunteers who are able to identify the cases during routine growth monitoring. Other cases are mostly identified during routine health screening at the clinic.

In Siatwinda, the staff shared that they work hand-in-hand with the community to identify SAM children with most referrals coming from volunteers. Also, he reported that the volunteers come with their referrals during clinic days and that they help with running the OTP every week. Currently, self-referrals are becoming common and he attributes this to mothers who have already been advised by volunteers that they do not qualify for the programme according to the MUAC but who want to make sure that this is true by verifying it with the clinic staff. He has not referred any patients to SC.

6.4 Defaulters ?

In Sinazongwe, the staff interviewed couldn't differentiate between an absentee and a defaulter and because of this she couldn't say how many have defaulted from the programme. In terms of reasons, she thinks that the rainy season provides a challenge for beneficiaries to come back for the weekly follow-up at the clinic. Also, there are cases of families migrating to another location based on the season so as to be able to farm.

In Sinazeze, the staff shared that distance is the main reason why some patients stop attending the clinic on their follow-up days. When asked what she does when a patient is absent or has defaulted, she responds that she informs the volunteer who referred the patient or who is near the patient's location to visit and check. Also, she mentions that some volunteers take the initiative to check on the register the patients who are absent or has defaulted and then visit them at their homes to check what has happened.

In Sinamalima, the staff shared that she doesn't have any defaulters in the programme this despite the far places where the patients are coming from and even after the flooding that happened in February and March.

The same is true in Siatwinda although the staff shared that there have been some absentees during the months of February and March due to the floods but they reported back as soon as they are able to access the clinic. Also, in order to minimise the impact of distance and difficulties with access, those patients that come from far distances or from areas that get affected with floods, he has provided with 2 week ration of RUTF and instructed them to come back as soon as possible if they notice any of the danger signs.

6.5 Communication with volunteers ✕

In Sinazongwe, there is no regular feedback to volunteers regarding the progress of the programme and with regards to which beneficiaries have absented or defaulted. In Sinazeze, the staff mentioned that she sees the volunteers weekly and holds meetings with them every time to discuss how many cases are in the programme and the patients that need to be visited for follow-up. In Siatwinda, there are no regular meetings per se but the nurse calls for meetings whenever he deems it necessary. He also provides feedback to the volunteers whenever they come to the clinic with their referrals and lets them know whether they have

done correctly in referring. If they do not come with their referrals, he tells the mother to give the feedback to the volunteer.

7. Volunteers

7.1 Roles and Capacity

In Sinazongwe, 6 volunteers were interviewed (3 males and 3 females) out of the 21 trained at the beginning of the programme. When asked how many of the trained volunteers are still active, they report that only 10 of the 21 are still active.

On average, the volunteers interviewed had about 7 years of experience functioning in various roles such as community health workers, home-based care (HBC) volunteer, pump minder, chlorine distributor, orphans and vulnerable children (OVC) care volunteer, caregiver (*kwelakasasa*), sponsorship, trained traditional birth attendant (TTBA) to name a few. In general, a volunteer functions in more than one role in the communities.

During the discussion, there was some indication that they were not integrating these multiple functions that they are performing. For example, when the malaria detector and OVC carer were asked whether they measure the MUAC of the children that they encounter when doing malaria detection or OVC care, they report that they don't.

In Sinazeze, 16 volunteers participated in the discussion (11 males, 5 females). They shared that there were 19 volunteers trained for the programme but only 12 come to the clinic every Friday.

On average, the volunteers in Sinazeze have about 11 years of experience working on various roles such as conducting health education, working with orphans, HIV/AIDS sensitisation, psychosocial support, neighbourhood committee, hygiene and sanitation, HBC, TBA and working with the chronically ill to name a few. As with Sinazongwe, in general, volunteers perform more than one role in the communities.

In Sinamalima, 10 volunteers participated in the discussion (3 females, 7 males). In total, there were 22 volunteers from Sinamalima who were trained. As with the others, the volunteers in Sinamalima perform a variety of functions in the community and have served their communities as volunteers for an average of 7 years. In terms of capacity, when asked to perform MUAC measurement, not all were willing to do it and those who did didn't seem confident in taking the measurement. Those who brought their MUAC tapes had tapes that were very clean and hardly used. Also, some report that they don't have MUAC tapes.

In Siatwinda, 10 volunteers participated in the discussion (3 males, 7 females). In total there were 22 volunteers from Siatwinda who were trained. These volunteers perform various functions and roles in their communities.

7.2 Frequency and area of activity ?

In Sinazongwe, volunteers report that at the start of the programme, they would actively look for the cases to refer to the clinic with some reporting that they visited about 5-6 houses per day and would spend about 3 hours a day working on finding cases. However, currently they just wait for the mothers to come to them because they are already well known and that mothers already know that they need to come to them for cases of malnutrition. Most also report that currently, they don't even have to use a MUAC because they already know if a child is malnourished or not just by looking at them.

In Sinazeze, some report that they would actively look for cases at least once or twice depending on the situation and they would only go to a nearby village. If there is a need in other villages that are not nearby, then they would go there. This is because the villages are scattered and it is much easier to go to the near villages only. Most of the time, they only do regular screening at the health posts during growth monitoring. For others, they say that looking for malnourished cases is a daily routine and that he goes to a different place daily so that he can refer cases to the clinic. A few report that they have other jobs and because of that have little time to do active case finding hence they do active case finding alongside other things they do. For some others report that because they have done so much case finding, the community knows what they are looking for already and that the potential beneficiaries come to them on their own.

In terms of area, volunteers report that they divide the work amongst each other in terms of locations with most of them assigned particular areas or villages. Table 1 under section on spatial coverage shows this division of locations.

In Sinamalima, most volunteers perform their work in more than one village. Only a few do work in one specific village.

7.3 Referrals and Follow-up ? ✓

In Sinazongwe, when they refer cases to the clinic, some of them issue referral slips that the caregiver can bring to the clinic while others simply accompany their referrals themselves. For others, they go to the houses of those they have referred in the afternoon of the clinic day to check whether they have been admitted or not and to see what they have received. Currently, they say that because mothers know about the programme already, some of them come to the clinic themselves without any formal referral in the hope that they can be provided with the services.

The volunteers also shared that there are some mothers who refuse to go because they associate this programme with those who have HIV while others believe that those taking the MUAC measurements are satanic and that they go around to get blood from children because of the red colour on the MUAC tapes.

In Sinazeze, the volunteers shared that their decision for referral to the clinic was based on what they get on the MUAC tape and based on the weight of the child using the scales. If the MUAC tape indicates a reading of <11.5 cms, then the child is referred to the clinic to receive RUTF or *chonde*. If the MUAC tape shows a reading of 11.5 up to <12.5 cms, the

child is referred as well to the clinic to receive HEPS. When asked whether they did oedema check, the volunteers report that they do and they demonstrated how they did it. Furthermore, the volunteers shared that whenever they refer to the clinic, they come along with them during the admission day.

In Sinamalima, the volunteers share that they would determine whether a child could be referred to the clinic using a MUAC and explain to the mother what the colours on the tape means. Some volunteers report that sometimes they don't even have to use the MUAC. Because of experience, they already know whether the child will qualify or not. When asked whether there are cases of children who are in yellow or red who refuse to come to the clinic for treatment, they say that they don't refuse.

In Siatwinda, the volunteers share that they identify children either during routine growth monitoring or during their other routine/regular work. They come along with their referrals during clinic days while some just instruct the mother when to go. The volunteers also report that for some, they still consider this condition as *masato* so they have to convince these mothers to come to the clinic by showing them examples of those who have been treated successfully. The volunteers say that there are mothers who complain when they are told they are not eligible for the programme and for these cases, they need to explain again regarding how the MUAC is able to detect or identify who can benefit from the programme and who can't.

7.4 Defaulters ?

In Sinazeze, some volunteers define defaulters as those who stop coming from growth monitoring. When asked whether they know if there are beneficiaries who default, they share that there are and they are able to know because they track them using the register. As for reasons of defaulting, they share that distance is a key issue causing this because some come from distant areas and to come to the clinic will cost them K8,000 return trip. When asked how they monitor or follow-up defaulters, they share that they haven't been told formally by the nurse to follow-up a child. But they do so based on their own initiative by looking at the register to see who is attending and who is not attending. In terms of how to encourage mothers to come back to the clinic to follow-up, they use the positive examples of children who have gotten better after consistent treatment. Also, they explain to the mothers that because the child's condition may lead to death it is important that they continue the treatment to prevent death.

In Sinamalima and Siatwinda, there was nothing to say about this because there are no defaulters from those admitted in these clinics.

7.5 Messages ?X

In Sinazongwe, when asked about how the MUAC is able to detect malnutrition, the volunteers report that if the tape shows red, then this is *masato* and should be referred to the clinic to receive RUTF. If the tape shows yellow, then this is malnutrition and should be referred to the clinic to receive HEPS. If the tape shows green, then the child is okay. In terms of how they explain this to the mothers, one volunteer shared that they compare it to

a garden. They say to mothers that when the tape is in red, the vegetables and plants in the garden are in bad condition and are almost dying. When the tape is in yellow, the vegetables and the plants are in between health and not healthy and can still be brought back to life or good health. After explaining this to the mothers, they reassure them that if their children are in red or yellow and they come to the clinic, the treatment that will be given to them such as the *chonde* will help their children get back to health.

In Sinazeze, the volunteers shared that a typical day of case finding involves them going to the field, introducing themselves to mothers and explaining the purpose of their visit in order to gain the confidence and trust of the mother. Then, MUAC measurement is taken and based on the criteria mentioned earlier, they advise the mother accordingly. Aside from this, they provide health and hygiene education to the mothers. The volunteers were then asked what they did when the mothers refuse treatment. They share that they pursue the mother so as to convince her to bring the child for treatment. They report that based on their experience, no one refuses and that they immediately go even those not eligible. When asked further whether they have encountered mothers who refuse treatment because they believe the condition is *masato*, some shared that they have and what they do is they ask the mothers to compare the effect of the traditional remedy with that of the treatment in the clinic and see for themselves. They also explain based on the MUAC and what the MUAC indicates. Based on these, they try to clarify the mothers' beliefs. However, volunteers think that the *masato* belief is already fading and that they see this condition now as malnutrition caused by lack of food.

Despite this, some volunteers also share that that they do not tell the mothers that the condition of the child is malnutrition either. The reason for this is that they've noticed mothers shying away from them or refusing the treatment and any explanation regarding it. The volunteers explain that this is the case because the mothers do not accept or refuse to accept that their child's condition is because of lack of food and these mothers insist that they provide adequate food for their children.

In Sinamalima, some volunteers share that they talk about the programme at their church and discuss malnutrition, its causes and effects to their fellow churchgoers.

7.6 Communication with OTP staff ✕

In Sinazongwe, volunteers report that they do not have any regular meetings with OTP staff. One meeting was scheduled in February/March but due to rains this didn't push through. Since the start of the programme, only one meeting has been called between OTP staff and volunteers.

In Sinazeze, volunteers shared that they get the chance to meet and talk with the staff every Friday when they come to the clinic. However, some say that they do not necessarily get information regarding the patients from the midwife. Instead, they get information themselves using the register and this is how they know how many patients are currently in the programme and those who are absentees and those who are defaulting.

In Sinamalima, volunteers say that there are no regular or scheduled meetings between them and the OTP staff. The only time that a meeting was every scheduled was because a visitor was coming but other than that, no meetings are organised.

7.7 Feedback from community ✓

In Sinazeze, volunteers shared that the mothers appreciate the treatment but they have also complained about the occasions when the RUTF ran out and was not available. Because of this, some mothers stopped coming, especially those who live far away. The volunteers also share about how some children refused taking their usual food after being discharged from the RUTF treatment because they prefer to eat the *chonde*. One of the key reasons why the community appreciates the benefits of the programme is when they saw how one child who was referred to Maamba and then continued treatment in the clinic survived and quickly recovered. Because of this, most recognise malnutrition already. The mothers call the programme 'treatment for malnutrition' while some others call it the CMAM programme.

In Siatwinda, volunteers report of how the communities have accepted the programme because of how it has been able to save the lives of children whom they have thought would have died. The communities have begun to call the MUAC tape as *senda* or detector and the children who are in the programme as *bania ba CMAM* which translates to “children of CMAM”.

7.8 Challenges/Improvements

In Sinazongwe, the volunteers state the need for transport support in the form of bicycles to travel to far areas to find cases. They also request for food to be provided to them during clinic days particularly lunch. For others, they feel it is important to be able to have something to show that they are volunteers of this programme such as a t-shirt, cap, etc.

In Sinazeze, they mention as well the need for transport support such as bicycles to travel to far areas to find cases, food during clinic days and any other form of motivation to keep them active in this work. They also highlight the issue of stocks and the need for the RUTF and HEPS to always be there.

In Sinamalima, the volunteers share that the distance they have to cover to identify cases is challenging because the areas are far apart. They would like to be supported with bicycles that will help them move from one location to the other to look for children who need to be referred. Some would like to have their own MUAC tapes while others would like to have supplies of stationeries to use for their registration of cases they identify.

In Siatwinda, the volunteers share the same sentiments as the volunteers in other areas. They require more support in terms of transport so that they can cover farther areas and would need some motivation so that they will be able to continue the work.

8. Defaulter and Death Investigation

In Sinazongwe, 1 defaulter was traced and the caregiver interviewed. The mother was the second wife and the daughter who was admitted was her second child. The child was admitted in October 2009 with a MUAC of 11.4 and weight of 5.9 kgs. The mother reported that at that time, she did think that the child was sick. She was given 15 sachets of RUTF and then told to come back. However, the mother reported that she left for Choma together with her daughter that's why she didn't come back the following week. When she arrived back in Sinazongwe a week after, she was too lazy to come back the following week because of the distance she needed to travel to get to the RHC. She only attended the clinic on the first week of admission. The mother also shared that after the RUTF has finished, she bought peanut butter for her child to eat in the thinking that this was the same as what was in the sachets. When asked about what the most suitable frequency of visits is for her, she said that a twice-monthly follow-up is more convenient.

In terms of deaths, it was found out that one of the deaths that occurred in Sinazongwe was initially referred to SC and then after discharge from the hospital, the beneficiary didn't come back to the OTP. The child then became sick again and that's when they came back to the clinic. The child needed to be referred again to the SC but the mother refused.

9. Routine Programme Data

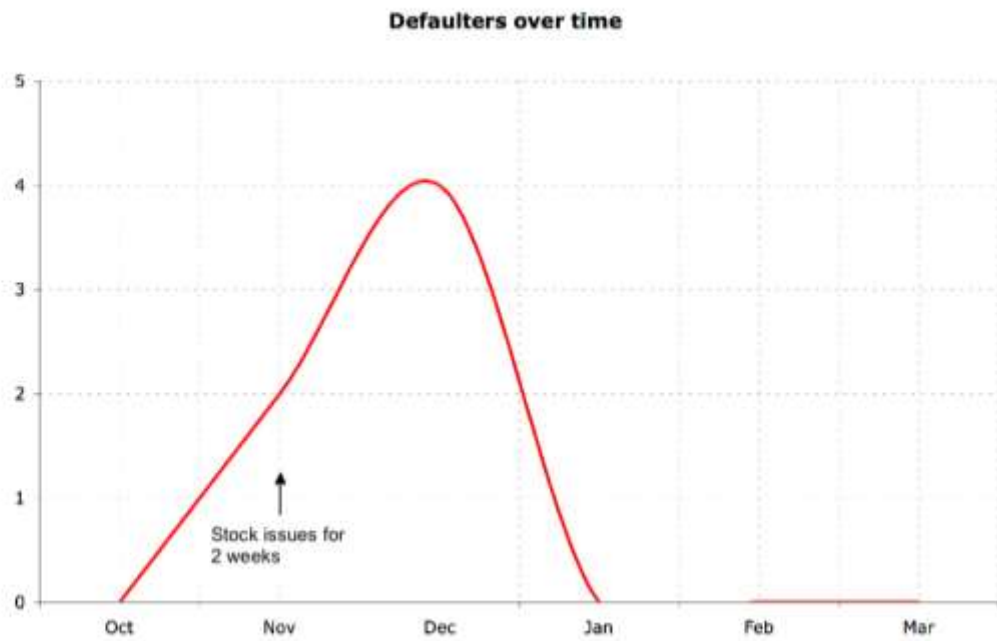
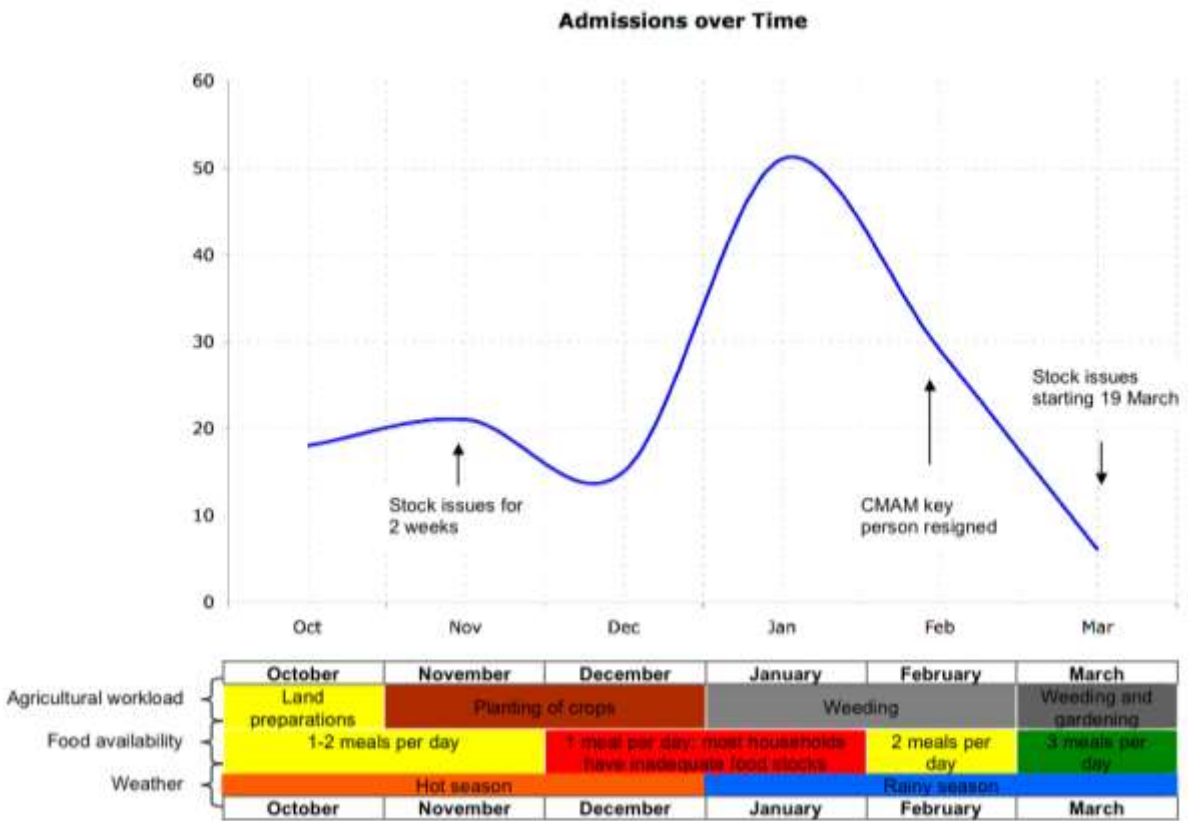
9.1 Admissions and Defaulters over Time ?

The pattern of admissions in a developmental (non-emergency) setting should vary over the course of the year and is dependent on factors that increase or decrease the incidence of SAM. Hence, analysis of admission patterns requires information on seasonal patterns of food availability and diseases associated with SAM such as diarrhoea and acute respiratory infections (ARI). If admissions increase or decrease when the incidence of malnutrition is expected to be high or low based on these seasonal factors, then the programme can be said to be responding to need. In general at the start of a programme admissions should be high and be maintained. Any early sharp drop or early downward trend should be investigated.

Figure 3 presents the admissions and defaulters over time for the 4 RHCs and is plotted against the various timelines for seasons, labour demands and food availability.

In October during the first month of the programme, admissions were at a modest level and this is mostly due to the fact that the programme started during the last week of the month. It is therefore surprising that only a slight increase in admissions was recorded for November and a decrease was even noted for December considering that these were full months of programme operations. By January, however, admissions peaked quite steeply and reached the highest level throughout the past 6 months with more than double that of December. By the month of February, the admissions went down to about half of that in January and then further dropped in March to a level even lesser than the admissions during the first three months.

Figure 3: Admissions and Defaulters over Time



Looking at the seasonal calendar and food security situation, the possible explanation is that the months of October and November were periods of relative food security and then beginning to be more insecure by December to January hence increasing the numbers of SAM children in the villages. January is also the start of the rainy season which brings along with it increase in malaria and diarrhoea cases (as reported by clinic staff and by the community). These diseases in turn can lead to increased incidence of malnutrition. By February and March, however, food availability has increased which can possibly explain the drop in admissions during this month. Another reason that seems to have caused a drop in admissions is the extreme rainy weather experienced in Sinazongwe in February to March which may have prevented more SAM children from coming to the clinics for treatment.

On the other hand, there are certain programme events that may have a temporal correlation with the pattern of admissions. Stockouts of RUTF were reported to have happened sometime in November and in March. These were also the times when admissions decreased and a corresponding increase in defaulters. Another event that may have led to decreased programme admissions is in February when a key CMAM staff left the organisation.

In terms of defaulters, the absolute numbers are quite small (6 in total) so in relative terms, the peaks in defaults shown in the chart are deceptive and should be taken in context. However, just looking at the trends, the numbers began to rise in November and peaked in December which can possibly be explained by the increased labour demands on the caregivers during the land preparation and planting periods of October, November and December. Also, as mentioned above, stockouts seem to have a temporal correlation with the increase in defaulters in November.

Overall, it seems that the patterns of admissions and defaulters are corresponding to what can be expected seasonally in terms of the patterns of increase and decrease in SAM incidence over time. However, the abovementioned explanations should be taken not as absolute truths but more as potential explanations. To truly be able to determine seasonality, at least one full year of admissions and defaulters data should be analysed against the seasonal calendar, food security patterns and labour demands.

9.2 Discharge Outcomes over Time

Discharge outcomes assess how responsive the programme is to the need and illustrate how the programme is performing in both the clinical aspects and the community mobilisation/sensitisation components. The indicators for discharge outcomes are cure rates, default rates and death rates. The standards by which they are assessed are the Sphere standards which prescribe cure rates as $> 75\%$, defaulter rates $< 15\%$ and death rates $< 10\%$ (The Sphere Project, 2004).

Looking at Figure 4, which shows discharge outcomes over time, it can be observed that death rate was at its highest in November and then decreased by December eventually reaching very low, stable levels starting January up to March. The peak in deaths in November can be explained in two ways. First, this may indicate possible admissions into OTP of cases that should have been referred to SC but either refused transfer or the admitting OTP staff has not detected the accompanying medical complications which would

have necessitated SC referral. These occurrences in the first few weeks from programme initiation reflect the fact that there hasn't been a CMAM treatment option and that the treatment-seeking behaviour for malnutrition tends to be late because the first line of care is not the clinic or hospital but traditional healers and self-remedies with herbs. The second concurrent explanation for this is purely statistical. Since the calculations of discharge outcomes over time are based on total exits at a given period of time, any deaths in the first few weeks of the programme will almost always show as high percentage-wise because during this period, there wouldn't have been many discharged cured yet because of the minimum stay criteria. Hence, it is important to see the entire trend in the following months and determine whether this high death rate pattern persists. For the Sinazongwe programme, death rates reached low acceptable levels by January up to March which may indicate the programme stabilising and cases that are being detected are not as severe so those that have been admitted at the start. The same pattern can be seen for defaulters with the rates increasing starting in November to December and then dropping to 0% by January to March. By definition, defaulting can only happen at the earliest the 4th week of the programme as it takes 3 weeks of absences before a child is considered a defaulter. Hence, a rise by November indicates that cases admitted during the first and second week of programme implementation have stopped coming. These are classified as "early defaulters" whose most probable reasons for not coming for follow-up are social reasons rather than medical or the perception that they are already well. As for cured rates, they started rising by November and then peaked by January and this high level maintained up to March and well above the Sphere standards of > 75%.

In order to contextualise the time trend of discharge outcomes, it would also be important to analyse the total discharge outcomes as show in Figure 5. This gives a picture of how each exit category fares against the total number of exits which illustrates overall programme responsiveness. As can be noted, the death rates overall are at 14% which is still at a level unacceptable by Sphere standards.

Figure 4: Discharge Outcomes over Time

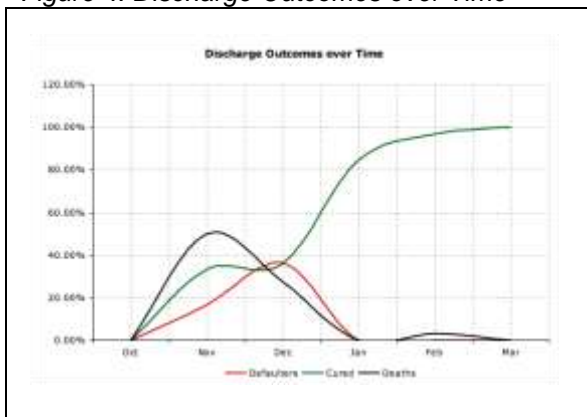
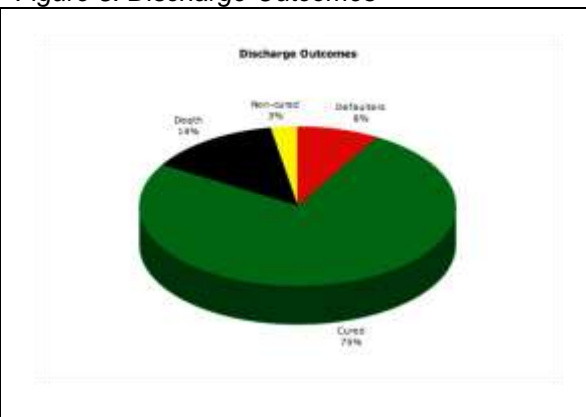


Figure 5: Discharge Outcomes



10. Spatial Coverage ?

Spatial coverage is assessed through a geographical mapping of where admissions, defaulters and volunteers are coming from. This procedure requires a good size and detailed map up to the village level. However, this was unavailable for the exercise. Hence, a simple tabular listing of admissions, defaulters and volunteers matched against the full set of villages within the catchment area of each of the OTP sites was done instead. Tables 1, 2, 3 and 4 depict the results of this exercise for each of the RHC.

This mapping exercise seems to confirm the hypothesis made regarding the treatment-seeking behaviour of beneficiaries in relation to distance from the RHC in that areas near or medium distance from the RHC tend to have more admissions than those that are far. Also, it should be noted that a greater number of areas that are far do not have any admissions at all and seem to be without access to a volunteer who theoretically should be the bearer of information about the programme and the agent for its dissemination. This points to the possibility of programme coverage being unequally spread based on a distance gradient. A hypothesis was reached that across all the 4 RHCs providing CMAM services, coverage was below the 50% threshold that is considered acceptable for rural areas such as Sinazongwe. Ideally, this should have been tested through purposive sampling small area surveys. However, due to time limitations this was not done. Despite this, there does not seem to be any indication that the overall coverage between RHC catchment areas is hugely different or patchy.

Table 1: Sinazongwe RHC Catchment Area Mapping

Village	Admissions	Defaulters	Volunteers	Distance ³		
				Near	Medium	Far
Egypt	0	0	0		✓	
Malozilozi	1	0	3	✓		
Malyango	0	0	2			✓
Sinazongwe	1	0	3			✓
Tusombane	0	0	1		✓	
Nzenga	1	0	3		✓	
Siamaambo	3	0	2			✓
Salaula	1	0	1		✓	
Natomba	0	0	1			✓
Kagwamina	0	0	1			✓
Mujunda	0	0	0			✓
Muvumbo	0	0	2			✓
Mweezya	0	0	1			✓
Maila	2	0	0			✓
Nambisya	1	0	0			✓
Siakangwende	1	1	0			✓
Siluwe	0	0	2			✓

³ Distance categories were defined as follows: near – within 1 hour or less from the OTP; medium – within 1 to 2 hours from the OTP; far – greater than 2 hours from the OTP.

Sinachikuyu	0	0	0			✓
Sinankalange	0	0	0			✓
Syachisyu	0	0	0			✓
Kabyolo	0	0	1		✓	
Simuzila	3	1	1			✓
Sinatadabale	0	0	0			✓
Simmabula	0	0	1			✓
Siabaula	1	0	1			✓
Boma/Fisheries	1	0	3	✓		
Simumpande	0	0	1	✓		
Ndungu	2	0	0			✓

Table 2: Sinazeze RHC Catchment Area Mapping

Village	Admissions	Defaulters	Volunteers	Distance		
				Near	Medium	Far
Kabanda	17	1	3	✓		
Sinazeze	6	0	1	✓		
Siankuku	6		1		✓	
Sindebuka	1	0	1		✓	
Vwavwa	2	0	1			✓
Siapaka	0	0	0			
Siakabbila	0	0	0		✓	
Simapumba	0	0	1		✓	
Siazwela	5	1	1		✓	
Siampande	0	0	1		✓	
Siansimuna	0	0	2		✓	
Fodwi	0	0	1	✓		
Siankumba	0	0	1	✓		
Mazyamuna	2	0	1		✓	
Sikalabula	0	0	1		✓	
Siamagande	0	0	1		✓	
Siamajele	13	1	1		✓	
Sintandabale	1	0	1		✓	
Syabunyangu	0	0	0			
Chiyabi	5	0	1			✓
Chamukawapulo	0	0	0			
Luumuno	0	0	0			
Nanayangu	0	0	0			✓
Malabbali	0	0	1			✓
Chibelele	0	0	1			✓
Kaumba	0	0	0			
Muziyo	11	0	1			✓
Munzuma	2	0	1			✓
Chinywang'ombe	0	0	0			
Kassika	0	0	0			

Nyati	0	0	0			
Chikonkomane	0	0	0			
Mungulu	0	0	0			
Mubanga	0	0	0			
Kansensa	0	0	0			
Siatulongo	0	0	0			
Chikuni	0	0	0			
Chitongo	0	0	0			

Table 3: Siatwinda RHC Catchment Area Mapping

Village	Admissions	Defaulters	Volunteers	Distance		
				Near	Medium	Far
Sikuteka	3	0				
Siyamucaala	0	0				
Mugonko	1	0				
Simankawa	3	0				
Siabaswi	3	0				
Chikandula	0	0				
Chisuwo	0	0				
Siankazi	0	0				
Muuka	0	0				
Kanyemba	2	0				
Mweemba	0	0				
Siatwiinda	1	0				
Syachisandu	0	0				
Syamwinde	0	0				
Chimonselolo	1	0				
Mvulula	0	0				
Chikoyo	0	0				
Nzambale	2	0				
Siafwila	0	0				
Matambo	0	0				
Sigombela	1	0				
Siapolo	1	0				
Siavuwa	0	0				
Chilele	1	0				
Jomezya	0	0				
Nyanga	2	0				

Table 4: Sinamalima RHC Catchment Area Mapping

Village	Admissions	Defaulters	Volunteers	Distance		
				Near	Medium	Far
Mabbula	0	0				
Munyati	0	0				
Chilele	1	0				
Chande	1	0				
Ntobonse	0	0				
Syamwemu	2	0				
Bulimi	1	0				
Chagobola	0	0				
Syachinda	0	0				
Sinanjola	1	0				
Mukalanga	0	0				
Syamutuna	2	0				
Sinalulongwe	2	0				
Sinakaindi	0	0				
Bbune	4	0				
Mwanamwalu	1	0				
Chinkumbe	1	0				
Sinamalima	1	0				
Manyonga	2	0				
Sinalilongwe Fishing Camp	0	0				
Siankwazi	1	0				
Mukambalika	2	0				
Sikuteka	1	0				
Maakula	1	0				
Sianyuka	1	0				
Mwabune	1	0				
Muvwali	1	0				

11. Bayesian Analysis

11.1 Prior Building

The prior is the belief of or the perceived coverage achieved by the programme. It is developed through a two-stage process of: 1) determining the *range* and *mode* of the possible coverage value; and 2) determining the distribution of this prior belief.

Determining the Prior Coverage Estimate – Range and Mode

All the positive and negative factors to coverage identified as a result of the investigation presented above are listed, ranked and weighted according to their relative contribution to overall coverage (Table 5). Positive or negative factors ranked highest were automatically

given a $\pm 5\%$ weight accordingly while lowest ranked factors were 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 coverage. The weights are then summed for the positive factors as well as the negative factors.

Table 5: Positive and Negative Factors to Coverage

Rank	Positive Factors	Weight	Rank	Negative Factors	Weight
1	Acceptance of the programme (treatment and benefits) by community	+5%	1	Malnutrition not seen as a priority/important health problem	-5%
2	Level of awareness of programme allows for beneficiaries to access services	+4%	2	Perception of malnutrition leading to late treatment-seeking behaviour	-4%
3	Good referral system (volunteers to OTP, OTP to SC, SC to OTP)	+4%	3	Communication between OTP staff and volunteers	-4%
4	Women have full authority and responsibility for health services	+3%	4	Stigma associated with condition	-3%
5	Programme responsive to need based on discharge outcomes and feedback from beneficiaries	+3%	5	Distance contributing to late-treatment seeking behaviour	-2%
6	Building of rapport, trust and confidence of community	+3%	6	Attitude of OTP staff	-2%
7	Volunteers who are active are identifying cases	+2%	7	Areas inaccessible to volunteers/health services due to religious beliefs/myths	-1%
8	Volunteers follow-up and ensure beneficiaries stay in the programme	+1%			
	TOTAL	+25%		TOTAL	-21%

Using knowledge of coverage results from CSAS surveys of CMAM programmes previously implemented in other countries, 20% and 80% were selected as the two extremes or endpoints of possible coverage from which the summed weights of positive and negative factors will be added to or subtracted from respectively. The resulting values constitute the lower and higher *range of the prior coverage estimate* and the mid-point the *mode* (Table 6).

Table 6: Range and Mode of Prior Coverage Estimate

Mode: 52% (45% - 59%)			
Lower Threshold	20%	80%	Upper Threshold
Total Weight – Positive Factors	+25%	-21%	Total Weight – Negative Factors
Lower Range	45%	59%	Upper Range

Determining Distribution of Prior Coverage Estimate

The distribution of prior coverage estimate is determined through a beta distribution of the belief of or perceived possible coverage estimates. This is done by using the BayesSQUEAC calculator⁴ in plotting the mode identified above and all the perceived other possible coverage proportions.

11.2 Likelihood

In order to improve on the prior, a wide area survey was conducted in 8 villages (2 per catchment area of each RHC) to actively find children who are in the programme (irrespective of their nutritional status) and severe acute malnourished children who are not covered by the programme. The results of the wide area survey can be found below (Table 7).

Table 7: Wide Area Survey Results

Villages	Total No. of SAM cases found	SAM cases in programme	Cases in programme but recovered
Natomba	0	0	0
Siluwe	1	1	0
Syamutuna	2	1	0
Chinkumbe	2	0	0
Siapaka	1	0	0
Fodwi	0	0	0
Syachisandu	0	0	0
Singombela	0	0	0
Total	6	2	0

⁴ Software specifically designed and developed for SQUEAC investigations and can be downloaded free at www.brixtonhealth.org

The likelihood was then calculated using the following standard formula for point and period coverage:

$$\text{Point Coverage} = \frac{\text{SAM cases in programme}}{\text{Total SAM cases found}}$$

$$\text{Period Coverage} = \frac{\text{SAM cases in programme} + \text{Cases in programme but recovered}}{\text{Total SAM cases found} + \text{Cases in programme but recovered}}$$

The likelihood point and period coverage for the Sinazongwe CMAM is shown in Table 8.

Table 8: Likelihood point and period coverage

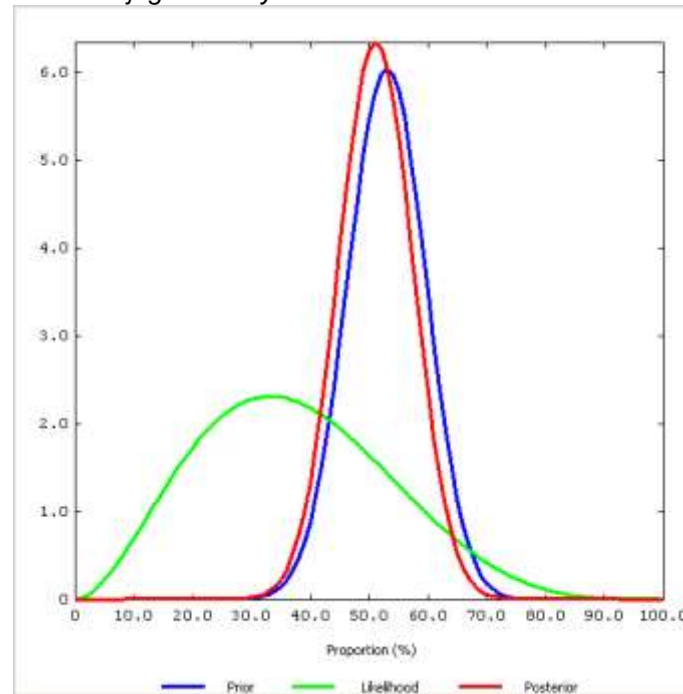
Point Coverage	Period Coverage
2/6	2/6

11.3 Posterior

In order to come up with a final coverage estimate or the *posterior*, the prior and the likelihood values are reconciled using the BayesSQUEAC calculator to perform a *beta binomial conjugate Bayesian analysis*. Figure 6 illustrates the results of this analysis. The prior is plotted on the calculator (blue line) and the survey data for point coverage⁵ in Table 7 is inputted (calculator generates the likelihood curve represented by the green line) resulting in the posterior distribution (red line) that provides the final coverage estimate including the corresponding credibility intervals.

⁵ Given that the likelihood point and period coverage have the same values, only the point coverage is reported as this value provides information on current coverage.

Figure 6: Beta Binomial Conjugate Analysis



Point Coverage: 51.1% (CI = 38.6% - 63.3%)

Discussion

Factors to Coverage

It can be said that good CMAM programme coverage can be achieved by identifying as many of the SAM children in the area of coverage and getting them into the programme; and by ensuring that SAM children who are admitted stay in the programme until they are cured. Results from the SQUEAC investigation indicate that the Sinazongwe programme has performed well in keeping admitted SAM children in the programme. Routine programme data show that defaulter rates are low with some areas not even having defaulters and this is mainly due to efforts made by both the clinic staff and the volunteers to follow-up on and ensure that current beneficiaries continue in the programme. Also, there are several anecdotal evidence from the clinic staff, volunteers and beneficiaries that show an overwhelming acceptance of the programme by those who have been admitted into it to the point that despite issues that would commonly cause beneficiaries to dropout or abscond such as RUTF stockouts, bad weather and long distances they continue to come to complete the treatment.

However, as indicated by the final coverage estimate, these efforts contribute to a little over half of the SAM children that need to be admitted into and treated by the programme. Work needs to be done to find the SAM children who are still not benefiting from the programme and the SQUEAC investigation points to factors such as the majority of people's persistent perception of malnutrition as caused by infidelity or witchcraft which adds stigma and thereby influences the treatment-seeking behaviour for this condition. To a lesser extent,

distance also contributes to this as there are some areas that are far from the RHC where no admissions have been recorded.

Statistical Analysis

From a statistical point of view, one of the advantages of the SQUEAC methodology is that it doesn't require as big a sample size as traditional frequentist statistical analysis. For this investigation, a sample size of about 38 SAM children was calculated. In order to reach this sample size, at least 21 villages needed to be surveyed exhaustively across the 4 catchment areas of each RHC. This was calculated based on a SAM prevalence rate of 1.8% (Zambezi et al., 2009) and an estimated median population size of 500 for each village⁶. However, this target sample size was not achieved during the wide area survey conducted for the following reasons: 1) there was not enough time to conduct a wide area survey in 21 villages; and 2) even if 21 villages were sampled, it would have been highly likely that the sample size of 38 would still not have been reached. The latter reason is mainly due to the low prevalence of SAM in Sinazongwe district in the background of a decreasing seasonal pattern of admissions.

Despite these limitations, the Bayesian statistical analysis is still able to provide a highly credible final coverage estimate of 51.1% with a $\pm 91\%$ credibility interval ($\pm 9\%$ level of errors) of 38.6% to 63.3%. This level of credibility is possible because other than the survey data, the analysis takes into account the data generated from the prior building. In a frequentist approach, this low sample size would have automatically rendered any statistical analysis as insignificant.

Conclusion

The Sinazongwe CMAM programme coverage is at 51.1% which, by Sphere standards, is considered acceptable. In addition, the SQUEAC process has elucidated the programme's strength as its ability to keep in the programme SAM children who have already been admitted as evidenced by the low level of defaulting with some clinics even reporting no defaulters. However, the challenge facing the programme is getting the other SAM children who are not in the programme to access the services. Factors that bring about this challenge are 1) the predominant perception of malnutrition as caused by infidelity or witchcraft creating stigma and leading to late treatment-seeking; 2) that malnutrition is not seen as a priority or important health problem by most members of the community; and 3) far distances of some areas from the clinic making access difficult and costly.

⁶ For explanation of sample size calculations, see Ibid.

Recommendations

Continuous Community Mobilisation and Sensitisation

It needs to be emphasised that community mobilisation and sensitisation should be a continuous process and should be adapted and re-adapted depending on the prevailing context of the programme and the dominant perceptions of the target communities regarding malnutrition and health in general. The SQUEAC investigation provides a good assessment of what these are currently from which specific messages can be identified, crafted and disseminated accordingly. Following are messages that need to be included in community mobilisation and sensitisation:

- Definition of malnutrition, signs and symptoms, causes and treatment
- *Chonde* or plumpynut is medicine
- All relevant topics on breastfeeding such as the importance and value of breast milk, breast milk and its relation to pregnancy, sexual activity and abortion and any other factor or condition that people associated with breast milk viability, weaning and complimentary feeding

The community mobilisation and sensitisation should target as broad an audience as possible and can use various methodologies other than the usual meetings or discussions. This may include the use of theatre, drama, music, roleplay and mother-to-mother groups formed by those who have had experience with the programme and others who have not. The dissemination of these messages should also be integrated into existing health education of related health programmes such as the Integrated Management of Childhood Illnesses (IMCI), Maternal and Child Health (MCH) and Infant and Young Child Feeding (IYCF).

Volunteers as Change Agents

The current level of coverage reached by the Sinazongwe CMAM programme is partly attributable to the work that existing active volunteers have been and are doing. However, as the volunteers themselves have said, they need to be recognised for their work and supported accordingly. Whilst it is true that they are expected to be doing this as part of their commitment and contribution to their communities, they are functioning in roles that no others are willing or able to do because it involves a lot of time and effort, requires many responsibilities and most significantly bears a lot of expectations on good performance to ensure programme success. It is therefore ironic that for the most part, these volunteers are not receiving anything. It is not a question anymore of whether or not they should be compensated for the work that they do. The health system in the whole of Zambia is very much anchored on an active and well-motivated cadre of community health workers and volunteers and the Zambian experience shows that this can be achieved only when they are provided a package of support that is commensurate to the work that they perform. The challenge is for this package of support to be institutionalised as official and standard and that it serves to compensate active and well-performing volunteers that function not as specialised, one programme agents but rather as multi-functional and general community health workers. This is a challenge that is quite daunting and cannot be achieved by World Vision Zambia alone. Hence, the need for WVZ to take an active role in coordinating and

facilitating multilateral discussions among both government and non-governmental agencies that utilise volunteers so as to either create policies or change existing ones specific to the role, functions and compensation of community health workers.

Increase DHMT and RHC staff capacity

Whilst the overall clinical performance of the programme is satisfactory, there are certain issues in relation to RHC clinical staff capacity and also DHMT staff capacity that need to be addressed. Clinical knowledge on CMAM should be further disseminated to all relevant DHMT and RHC staff. The skills and knowledge should not only be with those that were originally trained during programme setup. In order for the programme to continue to be responsive to the needs, there needs to be a critical mass of well-trained and knowledgeable health staff that can perform the clinical skills required for CMAM, supervise the daily running and manage the overall implementation and conduct of the programme. Hence, a DHMT-wide series of trainings should be planned and coordinated such that relevant staffs are given tailored trainings specific to their role and function related to the programme. These include monitoring and supervision skills for those that supervise the programme and data analysis skills for those that collect the data and statistics of the programme.

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Annexes

Annex 1: SQUEAC Participants

Name	Designation	Organisation
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Edith Kamenda	Maternal and Child Health Officer	Sinazongwe District Health Management Team
Leah Kenene	Community Mobilisation Officer	Lusaka District Health Management Team

Annex 2: Sinazongwe Mind Map

