FINAL REPORT

CMAM Avancé

End of Year 1 Coverage Survey Results

Filingué Health District

Niger

January 2023

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ACRONYMS

CMAM	Community-Based Management of Acute Malnutrition
CRENI	Centre de récupération nutritionnelle intensive (SC)
CRENAM	Centre de récupération nutritionnelle ambulatoire pour modérés (TSFP)
CRENAS	Centre de récupération nutritionnelle ambulatoire pour sévères (OTP)
HQ	Headquarters
IRB	Institutional Review Board
IRC	International Rescue Committee
GAM	Global Acute Malnutrition
MAM	Moderate Acute Malnutrition
MoH	Ministry of Health
MUAC	Mid Upper Arm Circumference
OTP	Outpatient Therapeutic Feeding Program
PCIMA	Protocole National de Prise en Charge de la Malnutrition Aigüe (PCIMA)
PPS	Probability Proportional to Size
RENALOC	National Directory of Localities
RUSF	Ready-to-Use Supplementary Food
RUTF	Ready-to-Use Therapeutic Food
SAM	Severe acute malnutrition
SC	Stabilization Center
SMART	Standardized Monitoring & Assessment of Relief & Transitions
SQUEAC	Semi-Quantitative Evaluation of Access and Coverage
TSFP	Targeted Supplementary Feeding Program
W/H + WHZ	Weight for Height / Weight for Height Z-score

EXECUTIVE SUMMARY

As part of the 3-year CMAM Avancé project, funded by GiveWell, IRC Niger is supporting the treatment of severe acute malnutrition in the health districts of Balleyara, Filingué, and Ouallam. The main objective of the project is to increase the coverage of malnutrition treatment services in a cost-effective manner. Coverage estimates will therefore be important for monitoring the cost-effectiveness of programs. The reasons for suboptimal coverage will be important to guide the program to better address barriers to maximizing coverage during its 3 years of implementation. **This report summarizes the results of quantitative coverage surveys conducted in Filingué Health District January 2023, after 17 months of support by CMAM Avancé.**

The key findings of GAM prevalence and SAM coverage are summarized below.

	Filingué Health District Niger		
	Baseline January 2022 n = 2,806	**End of Year 1** January 2023 n= 2,632	**Conclusions**
Global Acute Malnutrition (MUAC < 125 mm and/or edema)	6,3% (5,0-7,6%)	3.2% (2.2-4.2%)	Significant decrease in GAM prevalence (by MUAC and edema) – EOY1 vs. Baseline
Severe Acute Malnutrition (MUAC <115 mm and/or edema)	1.6% (1,0-2,3%)	0.8% (0.4-1.2%)	No significant change EOY1 vs. Baseline
Point coverage (SAM)	2.2% (0-6.9%)	4.5% (0-14.2%)	No significant change EOY1 vs. Baseline

Table 1 : Key results

We did not detect statistically significant differences in SAM coverage from baseline to EOY1. Fewer than 5% of SAM children eligible for treatment were enrolled at the time of the one-year follow up survey – which took place after, and in many locations during, widespread RUTF stockouts. We note the availability of stock by treatment site in this report.

During the first twelve months of the program (September 2021- August 2022), 10,822 SAM children were newly admitted to the program, which represented 109% of the Year 1 target (115% for Ballayera HD, 110% for Filingué HD, and 105% for Ouallam HD). The admission trends followed typical seasonal trends in Niger, with a drop in admissions following the harvest period (from October to February) when food is more available. However, the increase in admissions typical of the post-harvest period began earlier than usual this year in late February 2022, in comparison to the more typical April or May. This is due to the exceptional drought that affected most of the Sahel countries during this period, as well as active screening and referral systems at the community level. During the lean season from June to August a great increase in admissions was reported to compared to previous years mainly attributable to efforts on mass screening.

The Family MUAC roll-out started with a small group of women in July 2022, and continuous improvements in the approach will be made in the first and second quarters of Year 2. At the time of submission of this report, the Family MUAC videos had been filmed in four local languages and will be disseminated in March 2023. We expect a resulting increase in early detection and referrals by mothers themselves during Year 2 of the project. Coverage surveys are planned to be repeated in all three health districts at the end of Year 2.

KEY TERMS

- **Coverage** refers to the number of children eligible for acute malnutrition treatment who are currently enrolled in treatment.
- **Severe Acute Malnutrition (SAM)** refers to children 6-59 months eligible for the outpatient program according to the criteria defined by national protocols: Weight-for-Height-Z-score < -3 Z or MUAC < 115mm or Presence of bilateral edema.
- **Moderate Acute Malnutrition (MAM)** refers to children 6-59 months eligible for the targeted supplementary feeding program according to the eligibility criteria defined by the national protocols: Weight-for-Height-Z-score ≥ - 3 Z score and < -2 Z-score and absence of bilateral edema or MUAC ≥ 115 mm and < 125 mm and absence of edema.

INTRODUCTION

The main goal of the CMAM programs funded by GiveWell is to increase coverage of malnutrition treatment services in a cost-effective manner. Coverage estimates will therefore be important for monitoring the cost-effectiveness of programs. The reasons for suboptimal coverage will be important to guide the program to better address the various access barriers to maximize coverage during its 3-year implementation.

At the start of the CMAM Avancé project financed by GiveWell, IRC Niger conducted coverage surveys in the health districts of Balleyara, Filingué, and Ouallam to assess the number of eligible children accessing treatment at baseline. These surveys assessed the nutritional status of children aged 6-59 months in the selected clusters, as well as whether children identified as severely acutely malnourished were being managed in the treatment program. An additional questionnaire was administered to caregivers of malnourished children.

The same methodology was applied to the Filingué Health District after approximately one year of programming.

STUDY ZONE

The IRC has been implementing nutrition programs in the Tillaberi region of Niger since 2013. IRC's malnutrition treatment program was interrupted in the Balleyara Health District for the period from July 2020 to May 2021. IRC consistently supported treatment and prevention services with financial support of ECHO until the end of June 2021 in Filingué and Ouallam Health Districts, reducing support to 17 of the 56 hardest to reach health centers from July 2021 onwards in hard-to-reach areas (7 in Filingué and 10 in Ouallam).

Within the framework of the CMAM Avancé Project, IRC decided to support the Ministry of Health to improve coverage and access to treatment of malnutrition in areas not covered by other funding in these three health districts (HDs). This includes the entire HD of Balleyara (12 health centers and 12 health posts), almost the entirety of the Filingué Health District (86% of the population) (18 health centers and 20 health posts), and two thirds of the Ouallam Health District (67% of the population) (21 health centers and 7 health posts).

EOY1 ASSESSMENT: WHY FILINGUÉ

Filingué HD was prioritized for a coverage survey at the end of Year 1 because of the low SAM coverage measured at baseline (2.2%). The results were so low that we received questions on the internal and external validity from key stakeholders in Niger. In a results dissemination workshop, we reviewed the sampling framework and agreed that the results were representative of the context at the time of data collection – high domestic labor related to the cereal harvest, including travel for many families, in an already challenging context, drove low coverage. The End of Year 1 coverage surveys were conducted to monitor the progress after one year of implementation.

TREATMENT PROTOCOL

The acute malnutrition management protocol was revised in early 2023. The admission criteria for children 6-59 months with SAM are currently:

- MUAC < 115 mm
- Presence of bilateral edema
- W/H < -3 Z score

All SAM children are treated with RUTF.

Per protocol, the admission criteria for children 6-59 months with MAM are:

- MUAC ≥ 115 and < 125 mm
- W/H ≥ - 3 Z score and < -2 Z-score

MAM children are treated with RUSF, and supply is made available by World Food Programme.

SEASONALITY

In Niger, there are three distinct seasons:

- **The cold season from October to February**, characterized by cooler temperatures (20-30C), is ideal for growing vegetables (tomatoes, cabbage, lettuce, etc.) and harvesting millet and rice. During this period, a decrease in SAM admissions to health facilities is generally observed due to greater food availability and diversity.
- The **dry season from March to mid-June**, characterized by high temperatures (40 C) that are not conducive to agriculture. Access to staple foods is more challenging during this period, both in household stocks and in markets, resulting in an increase in the number of SAM admissions to health centers.
- The **rainy season from mid-June to September** is characterized by high rainfall, allowing for the cultivation (June-July) and harvesting (September to mid-October in some cases) of cereals (millet, sorghum, corn, etc.). It is during this lean season, combined with the peak of malaria, that peak SAM admissions are recorded.

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Climate												
Dry season	++	++	+++	+++	++	+				+	+	++
Rainy season					+	++	+++	+++	+++	++		
Health & Food Security												
Malaria peak							++	+++	+++	+++	++	
Acute malnutrition peak						+	++	+++	+++	++	+	
Lean season					+	++	+++	+++	++			
Coverage surveys												
Baseline, Dec 2021 –Jan 2022												
SMART Surveys – Tillaberi Region												
End of Year 1, 2023												

Table 2 : Seasonal calendar

This places our survey just after the end of the cereal harvest and at the height of food availability of market garden produce. Accordingly, they are likely to reflect a low point in the prevalence of malnutrition across the year.

WHAT WAS DIFFERENT THIS YEAR?

As we make comparisons to baseline, we address differences between the two surveys which may affect interpretation of results.

	Description: Baseline and EOY1	Hypothesized bias
HR/ Staffing	• The CMAM Avancé Niger Sr. MEAL Manager had not yet been recruited during the baseline survey but co-managed the end of year 1 survey. • The EOY1 survey benefited from in-person support from the HQ Technical Team and a TTA from the Chad program during supervisor training, enumerator training, and data collection. • 45% of enumerators during the EOY1 survey had participated in the baseline survey, and the EOY1 training reinforced their baseline knowledge. • 80% of supervisors during the EOY1 survey had been supervisors during the baseline survey, and the EOY1 training was a refresher.	**MINIMAL** The staffing structures were similar for both surveys, with the added efficiencies of previously trained staff.
Zone accessibility	Due to deteriorating security status in Filingué, the HQ technical specialist was unable to directly supervise data collection, but the TTA and IRC Niger supervision team was physically present.	**MINIMAL** Zone accessibility unlikely to have influenced results more at EOY1 compared to baseline.
RUTF availability	RUTF was not available in much of the assessed catchment area prior to and during the surveys. This means caregivers would have been referred very long distances for treatment or asked to wait for stock to be available again.	**HIGH** We expect higher defaulting during and after stockouts.

Table 3 : EOY1 survey context

STUDY OBJECTIVES

OVERALL OBJECTIVE

To assess coverage of the acute malnutrition treatment program (CRENAS) for children aged 6-59 months in the Filingué health district.

SPECIFIC OBJECTIVES

1. Estimate the **treatment coverage** of the acute malnutrition treatment program for the GiveWell catchment area in Filingué health district after approximately one year of programming.
2. Identify **key barriers and enablers** to coverage.
3. Understand the **perceptions of caregivers** (for covered cases) of the treatment services received.
4. Identify the **level of adoption of Family MUAC** within households in areas where the approach has been implemented.

METHODOLOGY

QUANTITATIVE DATA COLLECTION

SAMPLE SIZE

The total number of SAM children required for a representative sample was estimated using the following formula for each district.

$$n = \frac{expected\ coverage\ x\ (1 - expected\ coverage)}{\left(\frac{precision}{1.96}\right)\text{^}2}$$

The number of clusters (villages) to be included was calculated using the following formula:

$$n\ clusters = \frac{n}{average\ size\ of\ each\ cluster\ x\ proportion\ of\ pop.6-59\ months\ x\ prevalence\ of\ malnutrition\ (SAM)}$$

Parameters of sample size calculations are included in APPENDIX 2: SAMPLE SIZE CALCULATIONS.

SAMPLING METHOD

The survey followed the single-stage cluster sampling method, selecting a subset of clusters in each district, and then surveying all children aged 6 to 59 months in the cluster. The sampling frame consisted of the set of administrative villages located in the project intervention zone extracted from the National Directory of Localities (RENALOC) produced by the National Institute of Statistics of Niger. RENALOC was produced following the last general population and housing census in 2012. The population figures are updated annually based on expected growth.

CLUSTER SAMPLING

The list of clusters was compiled in coordination with local stakeholders. The total population and number of households were entered and verified by IRC teams in coordination with local health authorities. All inaccessible villages or villages not covered by the project were identified and removed from the list prior to sampling. This list of villages was stratified by clinic catchment area. A systematic sample was taken from this list. The sampling interval was calculated as below:

$$Sampling\ interval = \frac{Total\ number\ of\ clusters}{Number\ of\ clusters\ to\ be\ surveyed}$$

A random number between 1 and the sampling interval was generated to select the first cluster. The sampling interval was applied until the end of the list.

RESERVE CLUSTERS

Reserve clusters were used if 10% or more of the original clusters were not accessible (insecure or geographically inaccessible) during the survey or if the sample size of children was not reached. The need for reserve clusters was determined once data collection in the initially selected clusters was completed, according to the parameters defined in the SMART methodology.[1]

A new sampling interval was calculated using the remaining clusters and the number of reserve clusters to be selected. A random sampling location was selected using a random number between 1 and the sampling interval. The sampling interval was applied until the end of the list.

COMMUNITY ENTRY PROTOCOL

The community entry protocol (introduction to community leaders, selection, and payment of community guides) was written by the national programs and included in enumerator training. Adherence to the community entry protocol was monitored by IRC Niger during the survey.

[1] SMART methodology.

HOUSEHOLD DEFINITION

A definition of households for the survey was established by reviewing nutrition surveys in the Niger context and agreed upon during enumerator training. During the survey, a household was defined as a group of people, related or not, living together under the same roof, sharing common meals, and recognizing the authority of a person called the head of household.

HOUSEHOLD ENTRY PROTOCOL

Household entry procedures (including informed consent) were drafted by the national programs and included in the terms of reference prior to training of enumerators. The informed consent procedures were included in the IRC ethical approval and supervised by IRC Niger during the survey.

SELECTION OF CHILDREN

An exhaustive sampling of children aged 6-59 months was conducted within each cluster through door-to-door visits using the following steps:

1. All households in the cluster were visited to determine the presence of a child aged 6-59 months. In the villages, a community health volunteer guided the survey teams to ensure that no household was missed. To limit the risk of non-identification of children aged 6-59 months, each household head was asked the number of children under 6 years of age currently living in the household according to the household definition.
2. The age of each child was then verified using the birth certificate or immunization record. If neither of these documents was available, a local calendar of events was used to determine the child's age. No additional questions were asked for children younger than 6 months or older than 59 months.
3. Questions regarding previous training on the Family MUAC approach were administered to all households with a child 6-59 months old;
4. Anthropometric measurements (MUAC and edema) were taken for each child to determine if the children were malnourished (MUAC < 115 mm and/or edema for coverage assessment; RUTF; MUAC<125 mm.
5. The primary caregiver was asked if to find out if the child had received nutritional treatment (RUTF or RUSF) in the last 2 weeks (SAM) or 4 weeks (MAM) to determine if the child was considered covered. Images of RUTF and RUSF were recorded in the CommCare questionnaire.
6. Additional questions regarding health treatment seeking, barriers, and client satisfaction were administered based on the child's coverage status.
7. Referrals were completed for all cases of malnutrition not covered. Caregivers of non-covered cases were advised to go to the nearest health center as soon as possible to receive adequate treatment.

DATA COLLECTION TOOLS

All data was collected directly on tablets using the CommCare platform. Printed paper forms accompanied enumerators in case of issues with mobile data collection.

TEAM COMPOSITION AND TRAINING

A total team of 28 people (20 enumerators and 8 IRC/ health district supervisors) was trained in Niamey. The 6-day training (including a one-day practical test) took place from January 9th – 14th, 2023. The training was conducted by the TTA (Coverage & Nutrition Manager), HQ Nutrition Specialist, and IRC Niger nutrition staff, with support by the Ministry of Health.

ETHICAL CONSIDERATIONS

The following provisions were respected during the survey:

- The survey protocol was approved by the IRC IRB board.
- All relevant authorities, including the Ministry of Health and district management teams, were duly informed of the study by IRC Niger.
- The survey protocol and methodology was approved by the ethics committee of the Ministry of Health in Niger.
- The informed consent script was read to the family caregiver prior to performing any measurements on the child or asking the family caregiver any questions. Primary caregivers were asked any clarifying questions about the study before agreeing or refusing to participate.
- All children aged 6-59 months who were identified as having acute malnutrition and/or other medical conditions were referred to the nearest health center for appropriate treatment.

ANALYSIS

The following definitions of acute malnutrition and coverage were used in the analyses.

Indicator		Definition
Acute Malnutrition	Moderate Acute Malnutrition (MAM) by MUAC	MUAC <125 mm and MUAC >= 115 mm without edema
	Severe Acute Malnutrition (SAM) by MUAC	MUAC <115 mm and/or edema
Point coverage- SAM	SAM -covered	Currently SAM and Enrolled in the program (verified by treatment card, RUTF sachet, and/or parent recall) and Last visit to the treatment center within the last two weeks (not a defaulter)
	SAM- non-covered	Currently SAM and NOT enrolled in the program or Last visit to the treatment service was more than two weeks ago (not a defaulter)
Point coverage- MAM	MAM- covered	Currently MAM and Enrolled in the program (verified by treatment card, RUSF sachet, and/or parent recall) and Last visit to the treatment department within the last four weeks (not a defaulter).
	MAM- non-covered	Currently MAM and NOT enrolled in the program or Last visit to the treatment service was more than four weeks ago (defaulter)

Table 4 : Definitions for Analysis

All prevalence and coverage estimates are weighted for survey design and non-response. Cluster-level weights account for unequal selection probability based on sample design as well as differential household response rates. All counts (n's and N's) are unweighted.

The variance estimates presented are cluster-robust 95% Wald Confidence Intervals. Where the confidence interval included a negative lower bound, we have presented the lower bound as 0.0%. All analyses were performed in RStudio using the srvyr package.[2]

STUDY LIMITATIONS

Our surveys used MUAC and edema to identify children with acute malnutrition; in accordance with community-based screening criteria. Children are also eligible for admission to OTP/TSFP programs per WHZ scores. This means that there will naturally be some difference in point estimates of prevalence between SMART surveys and our surveys. In Niger, our program data through fifteen months suggested 16.8% of children admitted to the program are malnourished by WHZ and not MUAC/ edema, and thus would not be captured by our survey.

The absence of many households was observed at both baseline and EOY1, due to the migration of mothers and their children in this health district after the harvest period to seek work in Niamey. This will continue to be true of any survey conducted during this time of the year, unless livelihood patterns shift.

The EOY1 survey took place during/ after RUTF stock-outs, which likely deterred health treatment seeking. While our results are representative of coverage at the time of data collection, we do not believe they are representative of coverage year-round. We will ensure appropriate stock in place before and during EOY2 surveys.

RESULTS

CHARACTERISTICS OF THE SAMPLE

The achievement by survey is detailed in **Table 5**.

Table 5 : Completion by survey

	Overall, N = 9,083	**EOY1 : 2023**, N = 4,399	**Baseline : 2022,** N = 4,684
Visit Result			
Completed	7,659 (84%)	3,755 (85%)	3,904 (83%)
Absent	1,404 (15%)	625 (14%)	775 (17%)
Refused	20 (0.2%)	19 (0.4%)	1 (<0.1%)
Total estimated households		73,645	62,367
% of total households represented by the survey		6.0%	6.3%

[1]n (%)

A total of 3,755 households were interviewed during the EOY1 survey. The refusal rate was 0.4%. The survey sample represented 6.0% of the total estimated population, compared to 6.3% at baseline.

Descriptive statistics for children aged 6 to 59 months are shown in **Table 6**.

[2] Ellis GF, Lumley T, Zoltak T, Schenider B, and PN Krivitsky. (2022). sryvr. R package version 1.1.1. https://cran.r-project.org/web/packages/srvyr/srvyr.pdf

Table 6 : Characteristics of children surveyed: Baseline compared to EOY1

	Overall, N = 5,438	**EOY1 : 2023**, N = 2,632	**Baseline: 2022**, N = 2,806	**p-value**
Male, n%.	2,721 (50%)	1,328 (50%)	1,393 (50%)	0.5
Age in months, mean ± standard deviation	31 +/- 15	31 +/- 15	31 +/- 15	0.9
MUAC in mm, mean ± standard deviation	143 +/- 12	146 +/- 12	141 +/- 12	**<0.001**
Distance to nearest treatment site < 1 hour, n (%)	3,040 (57%)	1,678 (64%)	1,362 (50%)	**<0.001**
Distance to nearest treatment site < 2 hours, n (%)	4,301 (81%)	2,329 (89%)	1,972 (73%)	**<0.001**
Distance (km), mean ± standard deviation[3]		4 +/- 3		

The gender and age distribution of the sample were plausible (see Appendix 1: Data Quality Analysis). The mean MUAC of all children was 146 +/- 12 mm, 5 mm higher than baseline.

Without specifying means of transportation, 64% of caregivers indicated living within one hour of the nearest treatment site. Children sampled lived an average of 4 km from the nearest treatment site.

MALNUTRITION PREVALENCE

Weighted prevalence estimates of acute malnutrition by MUAC and/or edema are included below.

Table 7 : Prevalence of acute malnutrition by MUAC and/or edema, children aged 6-59 months

	Baseline: 2021, N = 2,806	**EOY1**, N = 2,632	**2022 SMART (Tillaberi Region),** N=397
Global Acute Malnutrition (MUAC < 125 mm and/or edema)	6,3% (5,0-7,6%)	3.2% (2.2-4.2%)	5.8% (3.9-8.6%)
Severe Acute Malnutrition (MUAC <115 mm and/or edema)	1.6% (1,0-2,3%)	0.8% (0.4-1.2%)	1.6% (0.5-4.7%)
Edema	0	0	0

According to the IPC classification of the phases of acute malnutrition, Filingué at both baseline was classified as "**Phase II: Alert**" and "**Phase I: Acceptable**" at EOY1.[4]

[3] Not assessed at baseline.
[4] Integrated Food Security Phase Classification.

The most recent estimates of malnutrition prevalence in the project target areas are available from the SMART 2022, which reports prevalence at the regional level (Tillaberi).

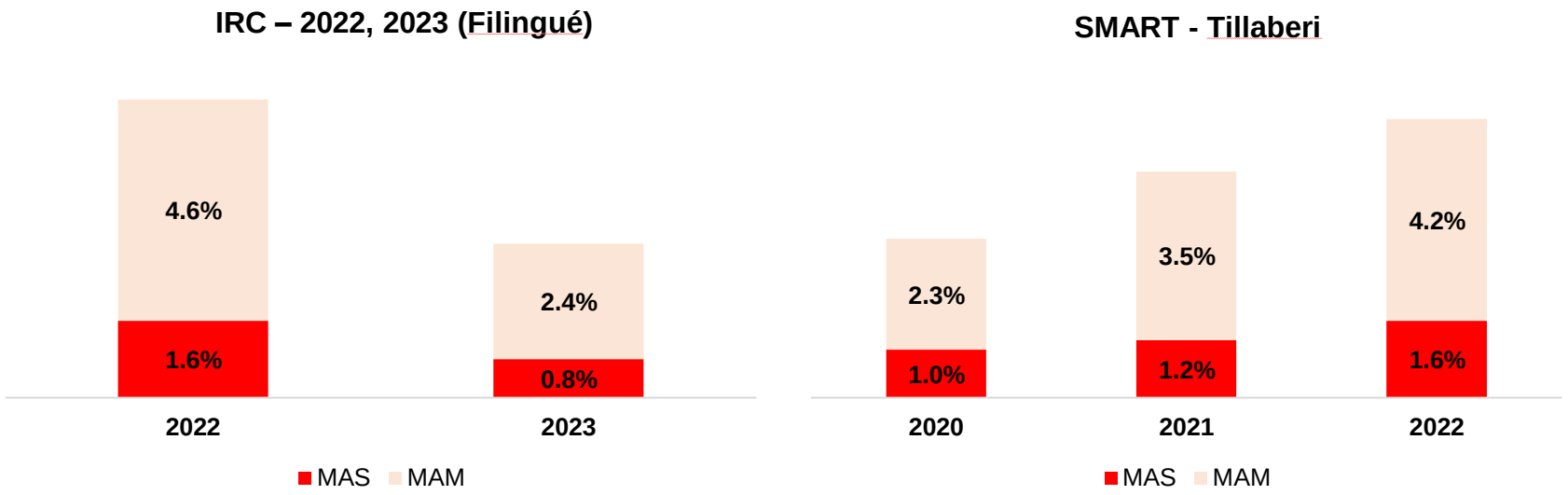


Figure 1 : GAM Prevalence (MUAC + edema): IRC Coverage Surveys & SMART (Tillaberi)

It is important to interpret comparisons of GAM prevalence in the context of seasonality-the SMART survey was conducted during the beginning of the harvest season (August-October); this period is generally characterized by medium to high prevalence of acute malnutrition among children 6-59 months. The sampling frame for the SMART surveys was the entire Tillaberi region, unlike the IRC coverage surveys, which only assess coverage in the Filingué health district covered by the project.

SAM prevalence from the 2023 IRC coverage surveys was not significantly different from the 2022 SMART for the Tillaberi region. GAM prevalence according to the 2023 IRC coverage survey was significantly lower than from the 2022 SMART for the Tillaberi region.

TREATMENT AT BASELINE AND EOY1

Table 8 summarizes the programs implemented in the three districts prior to the CMAM Avancé baseline surveys.

District	Implementation (baseline)	Start of GW-supported IRC treatment	Start of strategies to mobilize/increase coverage, GW	Date of the baseline coverage surveys	Date of the EOY1 coverage surveys
Balleyara	MoH	September 21	January '22	January 3- 10, 2022	
Filingué	IRC (ECHO funds)	September 21	January '22	January 9-14, 2022	January 17-27, 2023
Ouallam	IRC (ECHO funds)	September 21	April '22	December 24-31, 2021	

Table 8 : Treatment at Baseline

Prior to the coverage surveys, IRC was present in the Filingué HDs through support to CRENI (Stabilization Center for SAM with Complications) and CRENAS (Outpatient Therapeutic Program for SAM) with the CMAM Surge approach until August 2021. The baseline coverage surveys were conducted approximately two-three months after the start of project implementation. This slight delay in conducting the survey is within ethical parameters, as outreach activities had not yet started, but treatment was functional to allow all non-covered SAM cases to be referred.

In February 2022, based on our coverage survey results and the low SAM admissions, the IRC team began adapting their strategy to provide malnutrition treatment services at the more local health post level. By the end of August, 38 health posts across the three districts were providing SAM treatment. We also made significant improvements in community-based efforts to screen and enroll malnourished children. Over the course of Year 1 we deployed several approaches: 1) an annual mass screening at HD level for all villages, conducted immediately after the baseline coverage surveys (a more costly approach covering all the project catchment area), 2) punctual micro screenings targeting health zones with low SAM admissions (only in a few areas, but with high impact on admission), and 3) seasonal screening during the four-month round of national chemoprophylaxis campaigns from July to October 2022 (this is a national initiative to be supported without any overlaps with IRC other screening initiatives). Additional screenings were also organized in the first week of nutrition treatment introduced at health posts, as well as during the advanced strategy of vaccination coupled with treatment of malnutrition.

The October to December 2022 quarter was characterized by stockouts in the Filingué Health District. UNICEF delivered only 56 cartons of RUTF and retained a buffer for treatment at the stabilization center (CRENI) for SAM with complications and asked for a reimbursement for a previous loan from Balleyara Health District earlier in the year. In mid-January, 100 cartons of RUTF were delivered. We describe availability of RUTF in November and December 2022, prior to the surveys, and during survey data collection (17-27 January, 2023) in the surveyed clusters below.

				RUTF Stockout		
CSI (Fixed Health Facility)	**Cluster name**	**Est. population**	**Cluster number**	**Nov-22**	**Dec-22**	**Jan-23**
Filingué	Binkane	698	1		18- 31 Dec. (13 days)	1- 17 Jan (17 days)
	Gao Zanguina	250	2			
	Dogon banza1	140	3			
Louma	Goulla	583	4			
	Sabon yayi	360	5			
Gao	Makani	893	6			2-13 Jan (12 days)
	Massamey	335	7			
Bakin Toullou	Garin saraye	786	8			
Talcho	Daroji	376	9			
	Garin kimba/Tchoudi	111	Reserve 1			
Diguina	Diguina (Saguia+Tfagate)	3283	10			
	Morakan2	715	11			
Bonkoukou	Chiwil	1188	12	Stock available at CSI but health posts not supplied (entire three month period)		
	Oga	546	13			
	Jami	239	14			
Chical	Magaria	1201	15			15-19 Jan (4 days)
	Toudou wada	719	16			
	Garin maiyaki	133	17			
Fandou	Goumbi banda/Goumbi beri	978	18			24-31 Jan (8 days)
	Maourey	553	19			
	Banizoumbou	484	Reserve 2			
Attaloga	Kamadjé koira	7053	20	**Unable to verify.**		
	Boukou hima	1272	21			
	Goumizé	275	22			
Itchiguine	Sabon yayi	3015	23		12-31 Dec. (19 days)	1-19 Jan (19 days)
	Arawa	944	24			
Schett	Shett tondibanda	2597	25		20-31 Dec (11 days)	1-31 Jan (31 days)
	Koh	232	26			
Eghrou	Siguirado	954	27		15-31 Dec (15 days)	1-31 Jan (31 days)
	Dey tegui	251	28			

	Tabatol	348	29			
	Kande bata	328	Reserve 3			
Kore sania	Illela	340	30	** Health post Tidani & Sabon out of stock**		
	Garin galo	430	31			
Damana	Faria maourey	2291	32		2-7 Dec (6 days); 23-31 Dec (8 days)	1-17 Jan (17 days)
	Gabda fandou	964	33			
	Boudé	424	34			
	Sidibeye	140	35			
	Kandoun	832	36			
Tibewa	Tombo	912	37			18-31 Jan (13 days)
	Fantouyan	455	38			
	KaTanga	228	Reserve 4			
	Mobangou	153	39			

Table 9 : Stock Availability at Surveyed Clusters

At the time of data collection, only 25.6% of selected clusters were in a catchment area with current availability of RUTF. An additional 7.0% were in the catchment area of a CSI with RUTF stock, but the associated health posts (decentralized treatment) were out of stock. Caregivers at these health posts would have been referred to the CSI. One health facility (7% of selected clusters) could not be verified.

COVERAGE OF MALNUTRITION TREATMENT SERVICES

MEASURED COVERAGE

IRC recommends and reports point coverage estimators for malnutrition treatment programs that use data for currently SAM cases only. The difference between point coverage, period coverage, and single coverage estimates with a correction factor is included in an accompanying memo entitled "Coverage Definitions."

Table 10 : Coverage of malnutrition treatment among children aged 6-59 months with SAM : Baseline vs. EOY1

	Baseline			EOY1
	Balleyara, N=53	**Ouallam,** N=90	**Filingué**, N=44	**Filingué**, N=21
Point coverage (SAM)	13.5% (2.9-24%)	15.4% (4.9-25.9%)	2.2% (0-6.9%)	4.5% (0-14.2%)
	N=56	N=102	N=53	N=27
Period coverage (SAM)	24.5% (10.6-38.4%)	36.0% (16.9-55.2%)	16.7% (3.1-30.3%)	26.9% (6.1-47.7%)

[1]Weighted

Coverage of SAM children was 4.5% (0-14.2%) after one year of programming, compared to 2.2% at baseline. The change in SAM point coverage was not significant at a 95% confidence level.

Period coverage was 26.9% (6.1-47.7%, 95% CI) after one year of programming, compared to 16.7% at baseline. The change in SAM period coverage was not significant at a 95% confidence level.

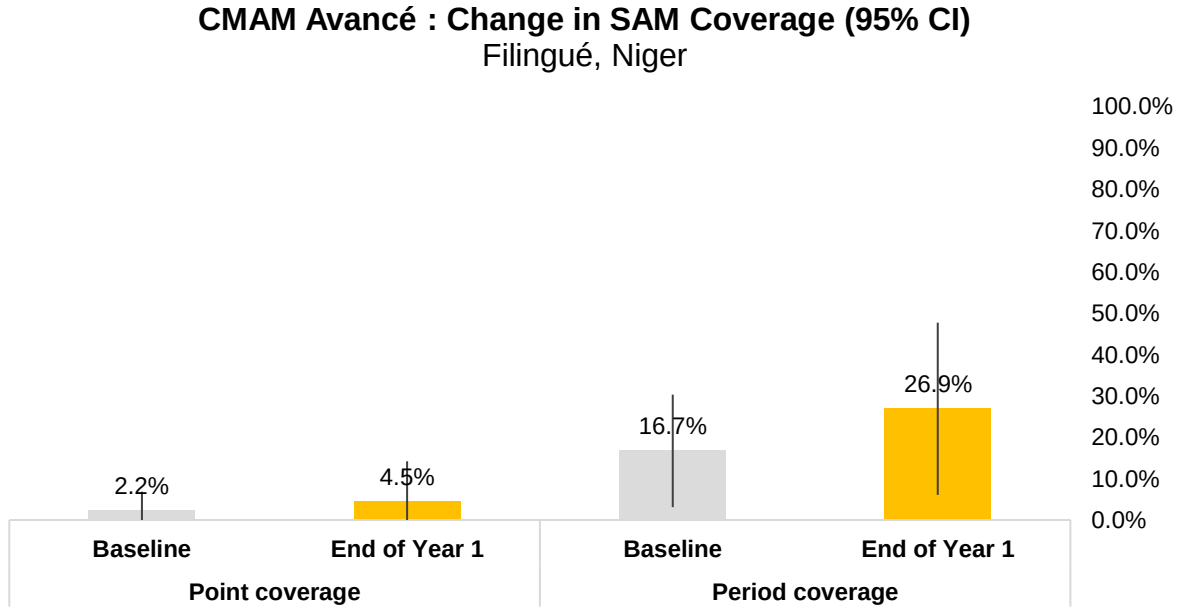


Figure 2 : SAM coverage: Filingué Health District

Interestingly, our coverage surveys indicated that enrollment rates were much higher than the coverage rates – as 20% of non-covered children were enrolled but had technically defaulted. We explore barriers for non-covered children in "Treatment Pathways."

Table 11 : Defaulting among non-covered SAM children, Baseline vs. EOY1

	Baseline, N=43	**EOY1,** N=20
Not enrolled	39 (91%)	16 (80%)
Defaulter		
Last visit three weeks prior	1 (2.3%)	0
Last visit 4 weeks prior	1 (2.3%)	0
Last visit more than 4 weeks prior	2 (4.7%)	4 (20%)

We assess availability of RUTF in the months prior and during data collection for non-covered SAM children, to understand how many of these children had access to RUTF at the time of data collection.

Table 12 : Availability of RUTF at CSI: Non-covered SAM Children, EOY1

	All non-covered SAM, N=20	**Never enrolled,** N=16	**Last visit more than 4 weeks ago,** N=4
November 2022			
Yes	90.0%	93.8%	75%
Yes- Health posts stocked out	5.0%	0	25%
Unknown	5.0%	6.3%	0%
December 2022			
Yes	25.0%	31.3%	0%
Yes- Health posts stocked out	5.0%	0%	25.0%
2-week stockout	55.0%	56.3%	50.0%
3-week stockout	10.0%	6.3%	25.0%
Unknown	5%	6.3%	
January 2023			
Yes	15.0%	18.8%	0.0%
Yes- Health posts stocked out	5.0%	0.0%	25.0%
Less than 1-week stockout	10.0%	12.5%	0.0%
2-week stockout	25.0%	25.0%	25.0%
3-week stockout	15.0%	12.5%	25.0%
Unknown	5.0%	6.3%	6.3%

The majority (95%) of non-covered SAM cases lived in the catchment area of a CSI with RUTF availability in November 2022. The percentage drops to 25% in December 2022, and 15% in January 2023. All defaulters lived in a catchment area of a CSI or health post with RUTF stockouts in December 2022 and January 2023.

MAM treatment is supported by WFP/ PAM in Filingué Health District. MAM supplies were available at all health centers/ CSI's at the time of data collection. MAM supplies were not available at the health posts at the time of data collection. Coverage of MAM children was 8.5% at EOY1, compared to 2.9% at baseline. The change in coverage was not significant at a 95% confidence level.

Table 13 : Coverage of malnutrition treatment among children aged 6-59 months with MAM: Baseline vs. EOY1

	Baseline			**EOY1**
	Balleyara, N=140	**Ouallam,** N=203	**Filingué,** N=128	**Filingué,** N=57

	Baseline			EOY1
	Balleyara, N=140	**Ouallam**, N=203	**Filingué**, N=128	**Filingué**, N=57
Point coverage (MAM)	2.1% (0-4.3%)	6.8% (3.3-10.4%)	2.9% (0-7.3%)	8.5% (0-17.0%)
	N=142	N=211	N=128	N=60
Period coverage (MAM)	3.5% (0.2-6.9%)	10.3% (5.5-15.2%)	2.9% (0-7.3%)	12.8% (2.8-22.8%)

[1]Weighted

COVERAGE: FAMILY MUAC

FAMILY MUAC- ACTIVITIES AT BASELINE

The Family MUAC approach was already implemented in the intervention area and scaled up in 2018 to cover all women of childbearing age. There was a funding gap for the approach between May 2020 and start of the CMAM Avancé project. Year One's Family MUAC activities were only under preparation phase (i.e. purchase of MUAC tapes); around 100 women were trained end of August 2022 across the three health districts, including 53 in Filingué.

This approach will target women of childbearing age in the three HDs. Unlike the previous approach with ECHO funding, which relied on trainings by community health volunteers to groups of women in their communities, the Family MUAC training under CMAM Avancé will be done using a video in local language, beginning in March 2023.

MEASURED COVERAGE

Table 14 : Family MUAC coverage

	Baseline			EOY1
	Balleyara, N=3,091	**Ouallam**, N=3,430	**Filingué**, N=2,447	**Filingué**, N=2,157
Family MUAC- % of households previously trained	9.9% (6.8-13.0%)	25.3% (21.4-29.3%)	4.6% (1.6-7.7%)	12.9% (7.6-18.2%)
	N=311	N=870	N=108	N=50
% who still have the MUAC tape	52.2% (33.0-71.3%)	51.8% (4.9-6.8%)	51.1% (29.6-72.5%)	17.6% (7.2-28.0%)
% who have previously measured their child with the MUAC tape	42.8% (25.6-59.9%)	60.8% (47.3-74.3%)	41.5% (21.0-61.9%)	58.5% (44.5-72.4%)

[1] Weighted.

Coverage of the Family MUAC approach after one year of programming was not significantly different than at baseline- 12.9%, compared to 4.6%. Among households who had previously been trained, significantly fewer households still had their MUAC tape. Among those who still had their MUAC tape, 58.5% had previously measured their child.

RISK FACTORS: COVERED AND NON-COVERED CHILDREN

Differences between covered, recovering, and non-covered SAM children were explored. In Filingué, a total of 27 SAM children at EOY1 and 52 SAM children at baseline were identified.

	EOY1						Baseline					
	N	**Overall**, N = 27	**Covered**, N = 1	**Covered: SAM in recovery,** N = 6	**Non-covered**, N = 20	p-value[2]	N	**Overall,** N = 52	**Covered,** N = 1	**Covered: SAM in recovery,** N = 8	**Non-covered**, N = 43	**p-value[1]**
Male, n (%)	27	10 (37%)	0 (0%)	3 (50%)	7 (35%)	0.8	52	21 (40%)	1 (100%)	1 (12%)	19 (44%)	0.082
Household Status: Resident	27	100%	100%	100%	100%							
Age in months, mean +/- SD	27	12 +/- 5	8 +/- NA	14 +/- 5	11 +/- 5	0.2	52	14 +/- 9	11 +/- NA	16 +/- 7	14 +/- 10	0.6
Child MUAC (mm), mean +/- SD	27	111 +/- 10	104 +/- NA	122 +/- 5	107 +/- 8	**<0.001**	52	109 +/- 7	94 +/- NA	118 +/- 3	108 +/- 7	**<0.001**
Has anyone in your household ever been trained to take MUAC measurements? n (%)	27	7(26%)	1(100%)	3(50%)	3(15%)	**0.050**	52	2 (3.8%)	0 (0%)	2 (25%)	0 (0%)	**0.027**
Previously enrolled (aside from this enrollment)	27	5(19%)	0(0%)	1 (17%)	4 (20%)	>0.9	52	15 (29%)	0 (0%)	4 (50%)	11 (26%)	0.3
Distance to nearest treatment site less than 1 hour, n (%)	27	17 (63%)	1 (100%)	5 (83%)	11 (55%)	0.5	50	18 (36%)	0 (0%)	1 (12%)	17 (41%)	0.2
Distance to nearest treatment site less than 2 hours, n (%)	27	22 (81%)	1 (100%)	6 (100%)	15 (75%)	0.4	50	28 (56%)	0 (0%)	5 (62%)	23 (56%)	0.7
CSI stockout of RUTF at the time of the survey (Jan 17-27, 2023)	27	17 (63%)	0 (0%)	2 (33%)	15 (75%)	**0.024**						

[1]Default tests are Kruskal-Wallis test for continuous variables, chi-square for categorical variables with all expected cell counts >=5, and Fisher's exact test for categorical variables with any expected cell count <5. https://www.rdocumentation.org/packages/gtsummary/versions/1.2.1/topics/add_p

Table 15 : Characteristics of covered and non-covered SAM children, Baseline vs. EOY1

Approximately 40% of SAM children at EOY1 and baseline were male. According to our program data, 47.5% of newly admitted SAM children to date are male. It should be noted that program admissions include children admitted by weight-for-height z-score; therefore, our surveys may be detecting a slight trend in sex distribution in SAM children detected by MUAC. According to our SAM admissions to date, 16.7% of all male admissions were by weight-for-height and not MUAC, compared to 12.9% of female admissions. No significant differences were measured for age between covered, recovering, and non-covered SAM cases.

MUAC was significantly higher for recovering cases than covered and non-covered cases, as we would expect by definition. The covered SAM cases and 50% of recovering SAM cases identified at EOY1 had been trained to take MUAC measurements, compared to only 15% of non-covered cases. Nineteen percent of SAM children reported a previous enrollment at EOY1, compared to 29% at baseline. Only 55% of non-covered SAM children lived within one hour of the nearest treatment site, compared to 83% of recovering cases and 100% of covered cases.

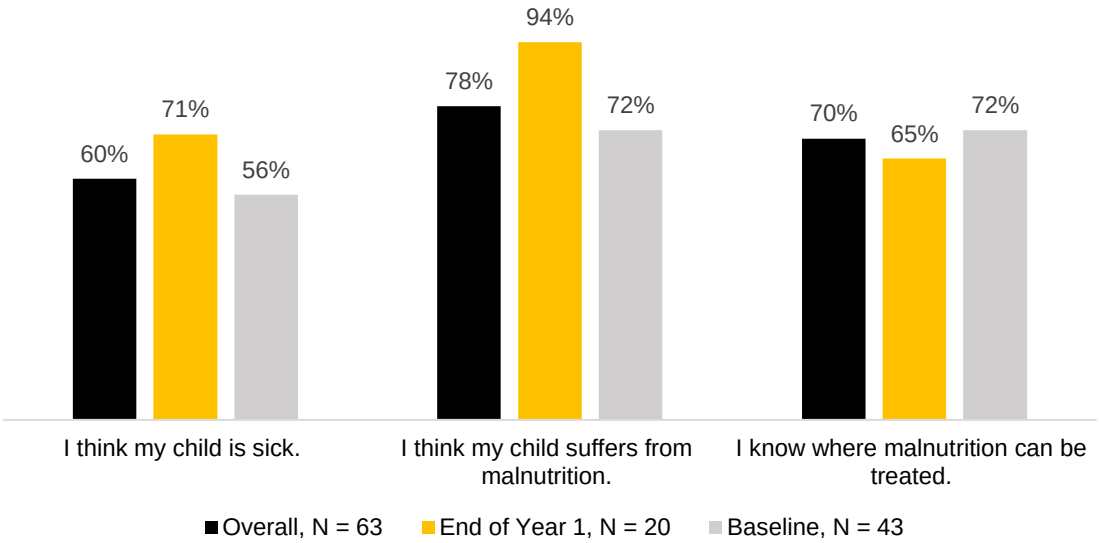
Seventy-five percent of non-covered SAM cases lived in the catchment area of a CSI with an RUTF stockout at the time of data collection. The same was true of thirty-three percent of recovering SAM children – placing them at risk of default – and was not true of the one covered SAM case identified.

TREATMENT PATHWAYS

TREATMENT PATHWAY FOR ACUTE MALNUTRITION

Caregivers of non-covered SAM children were asked about their perceptions of acute malnutrition. Caregivers could answer "I don't know" or "I don't want to answer" if appropriate.

Figure 3 : Perceptions of acute malnutrition among caregivers of SAM children who are not enrolled in treatment: Filingué Health District



A higher percentage of caregivers thought their child suffered from malnutrition, as opposed to being sick.

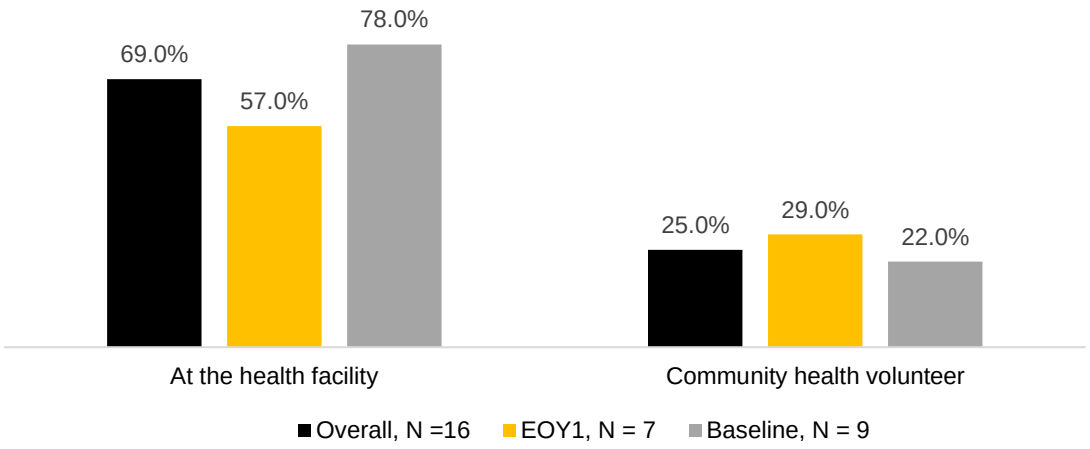
A majority of caregivers of non-covered children knew where malnutrition could be treated (65% at EOY1 and 72% at baseline). This suggests that knowledge of available services may be less of a barrier in Niger than, for example, Somalia, although more than 3 in 10 caregivers of non-covered children are still unaware of treatment options.

There are several ways to diagnose and refer a malnourished child, according to the Niger protocol:

- Screening by the caregiver (Family MUAC). The child is taken to the health facility, where the health workers confirm the child's malnutrition status by measuring the MUAC and calculating the weight to height ratio.
- Screening by community health volunteer during micro-screening and mass screening under the supervision of health agents and the IRC. All cases detected as yellow or red MUAC are referred to the health centers for confirmation of the diagnosis by health workers.
- In case of systematic passive screening in health centers by health workers, malnourished children are directly admitted to the treatment program.

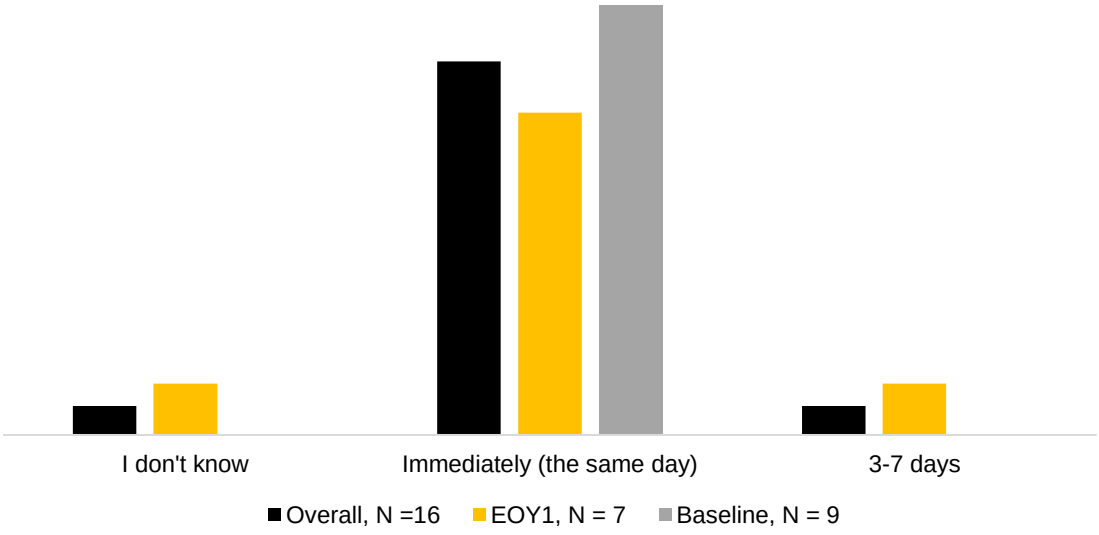
During year 1 of the project, we used several screening methods within the same communities and noted promising results for enrollment.

Figure 4 : Screening (or diagnostic) for malnourished children (SAM) who are enrolled in treatment



Children enrolled in the program in Filingué Health District reported being screened at the health facility or by a community health volunteer. These percentages should be interpreted with caution, as only 16 covered and recovering SAM children were identified at baseline and EOY1.

Figure 5 : Time between screening and care-seeking among SAM children currently enrolled in treatment: Filingué Health District



The self-reported delay between screening and care seeking among covered children was less than 1 week all children in this health district, at baseline and EOY1. It's interesting to note this trend despite the known distance barrier in Filingué Health District. All percentages should be interpreted with caution, as only 16 SAM children were detected as covered in the survey

Caregivers were asked to list the reasons why their child was not enrolled in the treatment program at the nearest site; barriers to treatment were categorized as below.

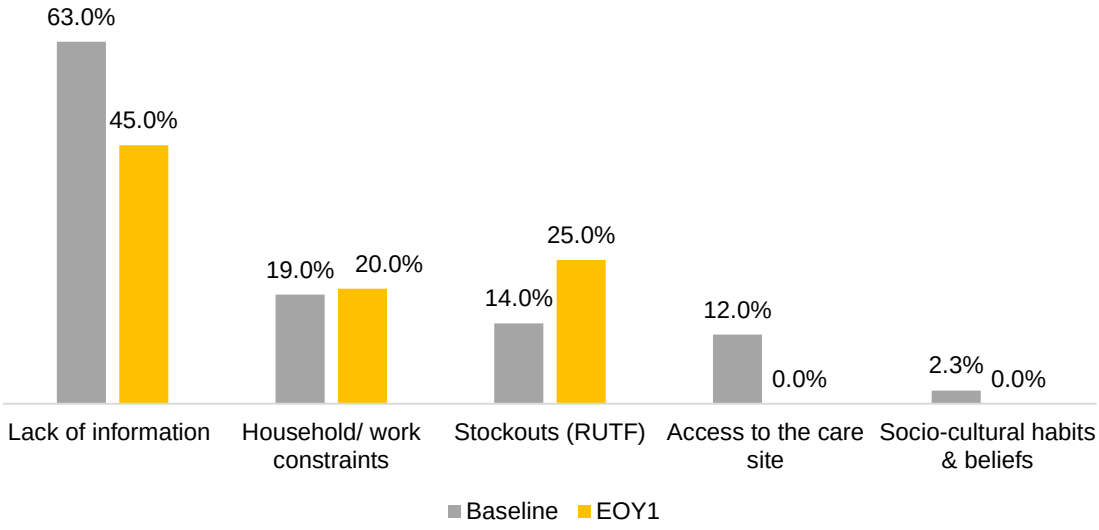


Figure 6 : Barriers to treatment reported by caregivers of children who were not enrolled in treatment: Filingué Health District

The most common reasons for not seeking treatment were related to lack of information (specifically, the family caregiver's lack of knowledge that their child was malnourished). A quarter of caregivers who were not enrolled in treatment cited stockouts as a deterrent.

The 5-point Likert scale was used to capture the satisfaction of caregivers of children in the treatment program.

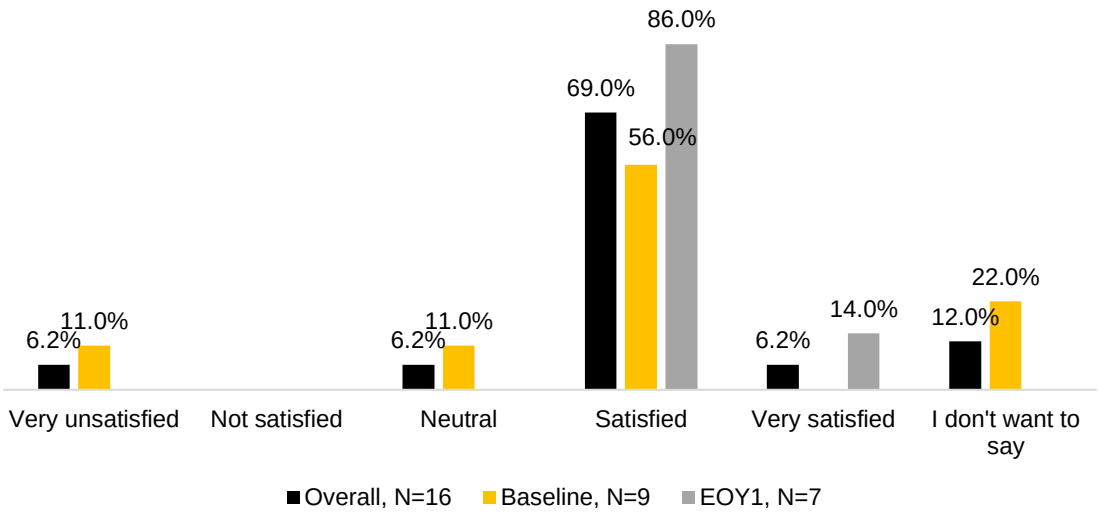
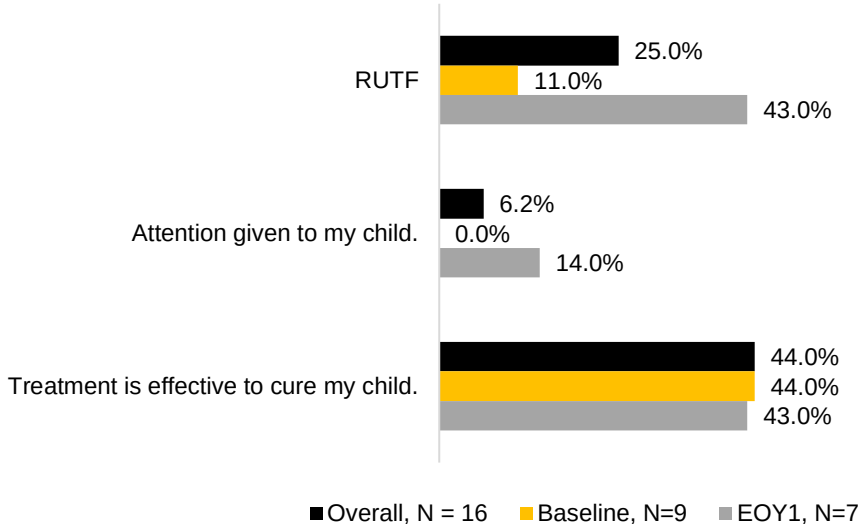


Figure 7 : Client satisfaction among family caregivers of malnourished children in the treatment program: Filingué Health District

Most family caregivers indicated satisfaction in the treatment program.

Figure 8 : Reported source of caregivers' satisfaction with the treatment program



The main sources of satisfaction in the malnutrition treatment program for the SAM cases covered were the effectiveness of the treatment, followed by the RUTF.

CONCLUSION

The results of the baseline and EOY1 surveys support the need for scaling up SAM and MAM treatment services in this CMAM Avancé catchment area of Niger. The EOY1 survey highlights the difficulty scaling treatment in this area- and our need to improve continuity of services in this extremely challenging context. Coverage for acutely malnourished children remains well below the SPHERE standards for acceptable coverage- defined as greater than 50 percent in rural areas.[1]

Most SAM cases reported being screened at the health facility, as opposed to community-based screening. No children reported being screened by Family MUAC. While significant differences in distance were not identified in the survey, distance is a known barrier in this health district. Our findings linking stock availability to non-coverage indicate the devastating consequences of disrupted care in this setting.

Through the end of Year 1 (August 2022), IRC Niger had reached 109% of the Year 1 target, and 110% for Filingué Health District.

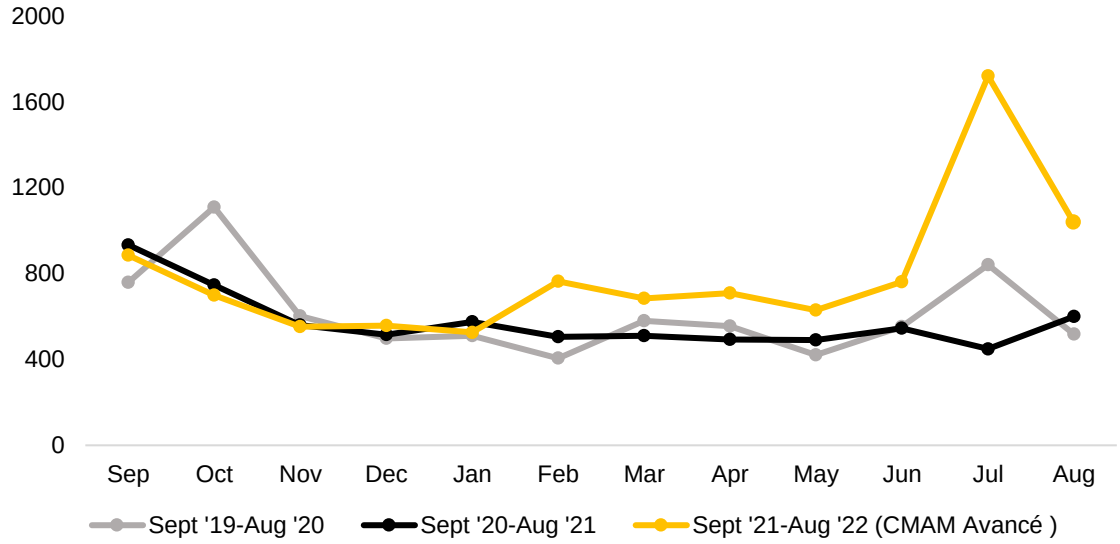


Figure 9 : Niger OTP Admission Trends by Month

The admission trends **(Figure 9)** in the last 12 months follow typical seasonal trends in Niger, with a drop in admissions following the harvest period (from October to February) when food is more available. However, the increase in admissions typical of the post-harvest period began earlier than usual this year in late February 2022, in comparison to the more typical April or May. This is due to the exceptional drought that has affected most of the Sahel countries this year, as well as active screening and referral systems at the community level. During the lean season from June to August a great increase in admissions was reported to compared to previous years mainly attributable to efforts on mass screening.

Coverage for SAM children did not change between baseline and EOY1. Treatment continuity remains a major challenge, as 20% of non-covered cases were enrolled, but had defaulted. While we believe that the RUTF stockouts contributed to the coverage that we measured in the EOY1 survey, we will continue to refine coverage increasing strategies to include closer follow up of defaulting cases, as well as more localized treatment at health posts, in addition to strengthened supply chain and continuity of care.

RECOMMENDATIONS

Based on the findings of the coverage surveys, the following recommendations were formulated at baseline.

Exploration of additional risk factors: Partially addressed

At baseline, hypothesized risk factors, such as sex, age, and distance to the facility were found to be equally common in covered and non-covered populations. Future surveys will assess additional potential risk factors for non-coverage, including: 1) the mobility of populations far from their homes and health facilities in relation to their seasonal work, 2) the distance between households and all types of facilities offering treatment of malnutrition (health posts, advanced vaccination strategy coupled with treatment of SAM), 3) presence of an active community health volunteer in the community.

At EOY1, we added questions about household status for all SAM cases (covered, recovering, and non-covered). All SAM cases were residents, as opposed to refugees or IDP's. We differentiated distance in KM as well as time to the nearest treatment site, and we did not detect significant differences between covered and non-covered cases.

Family MUAC roll-out: Partially addressed

According to the results of the surveys, screening coverage by the Family MUAC program remains very low, with very few trained respondents. A revision of the Family MUAC training and follow-up approach is necessary to target a larger number of households and encourage better adherence to the approach by the communities. At the time of the End of Year 1 survey, we had finalized the Family MUAC videos but not yet conducted trainings. Trainings will be conducted beginning March 2023.

Innovations in screening: Addressed

IRC aimed to maintain a system of regular community screening with the community health volunteers in addition to the national malaria chemoprophylaxis campaigns, prioritizing areas with low admissions. Screening during national malaria campaigns was deprioritized by the Ministry of Health, but IRC scaled up active screenings at community-level. These active screenings were accompanied by active case finding measures (tally sheet, home visit by the community health volunteers), to ensure that all children screened for SAM were admitted to the program. Thanks to a referral ticket system with serial numbers, we were able to determine what proportion of referrals were successfully admitted in the program- but we will continue to improve our internal monitoring systems. Active case finding is organized for children who were referred but did not seek treatment within one week.

In addition to continued follow-up on the above, we recommend the following:

- **We need to establish new ways of maintaining buffer RUTF stock**. We experienced a shortage in buffer RUTF stock in January due to lapses in reimbursement by UNICEF and insufficient funds for IRC's own buffer stock. Moving forward, we must obtain funding to maintain and increase our own buffer supplies, noting the negative effects on treatment coverage in the EOY1 survey.
- **We need a better monitoring system for children who are on track to default from the program**. While home visits for defaulters are normally conducted by CHV's, many lack incentives or financial means to make these visits. Internally, we need to strengthen our surveillance systems for both identifying children on track to defaulting, as well as understanding reasons for defaulting.
- **De-centralize treatment.** Further innovations at community-level are not well supported by MoH, and we will continue to advocate for more localized treatment options. We note that RUTF stock was typically deprioritized in health posts if constrained at the CSI level. We will investigate how this information is shared with caregivers in the case that stock is not available, and how to communicate availability of stock.
- **Continue to investigate other reasons of low coverage in Filingué.** We conducted qualitative research at baseline across Filingué and Balleyara health districts, which identified important perceptions and treatment pathways for malnutrition. We learned about the important roles of spiritual leaders in malnutrition treatment, and dangerous misconceptions that malnutrition treatment requires payment. We have adapted semi-structured interviews with the caregivers of non-covered and defaulting children identified during the survey, to help us understand more precisely what recruitment and retention strategies could be adapted for this health district.

APPENDICES

APPENDIX 1: ANALYSIS OF DATA QUALITY

Validation conditions were programmed into CommCare for implausible data in certain fields (i.e. MUAC <40 or > 250 mm).

PowerBi dashboards were configured with CommCare for rapid feedback to survey managers. Additional analysis was performed in RStudio (2-3 days per week), focusing on subsets of variables for malnutrition cases. Daily feedback was provided to survey managers via email and WhatsApp groups. Monitored fields included plausibility checks at the cluster and individual level.

CLUSTER-LEVEL	CHILD LEVEL
# clusters visited	Sex distribution
Number households visited	Age in months- rounding
Household response rate	Age in months- % with estimated age instead of birth certificate
Child response rate	Among those with estimated age, % estimated with local events calendar
# revisits	MUAC- rounding
# SAM/ MAM (Niger + Somalia) children measured	Interview duration
# SAM/ MAM cases interviewed- covered	GPS
# SAM/ MAM cases interviewed- noncovered	# cases edema + photo evidence
By enumerator, # children measured	Free text- periodic checks against listed options
Prevalence of SAM- # SAM/ # all children measured	
Prevalence of GAM- # GAM/ # all children measured	

Table 16 : Daily plausibility checks

Plausability check with ENA software

The SMART plausibility check shows the distribution of the sample against that expected if the subjects are properly sampled, the amount of missing and implausible data and a series of statistical tests examining the internal structure of the survey data against that which would be expected to occur in a well conducted anthropometric survey. The results of the plausibility check follow:

Qualité globale des données

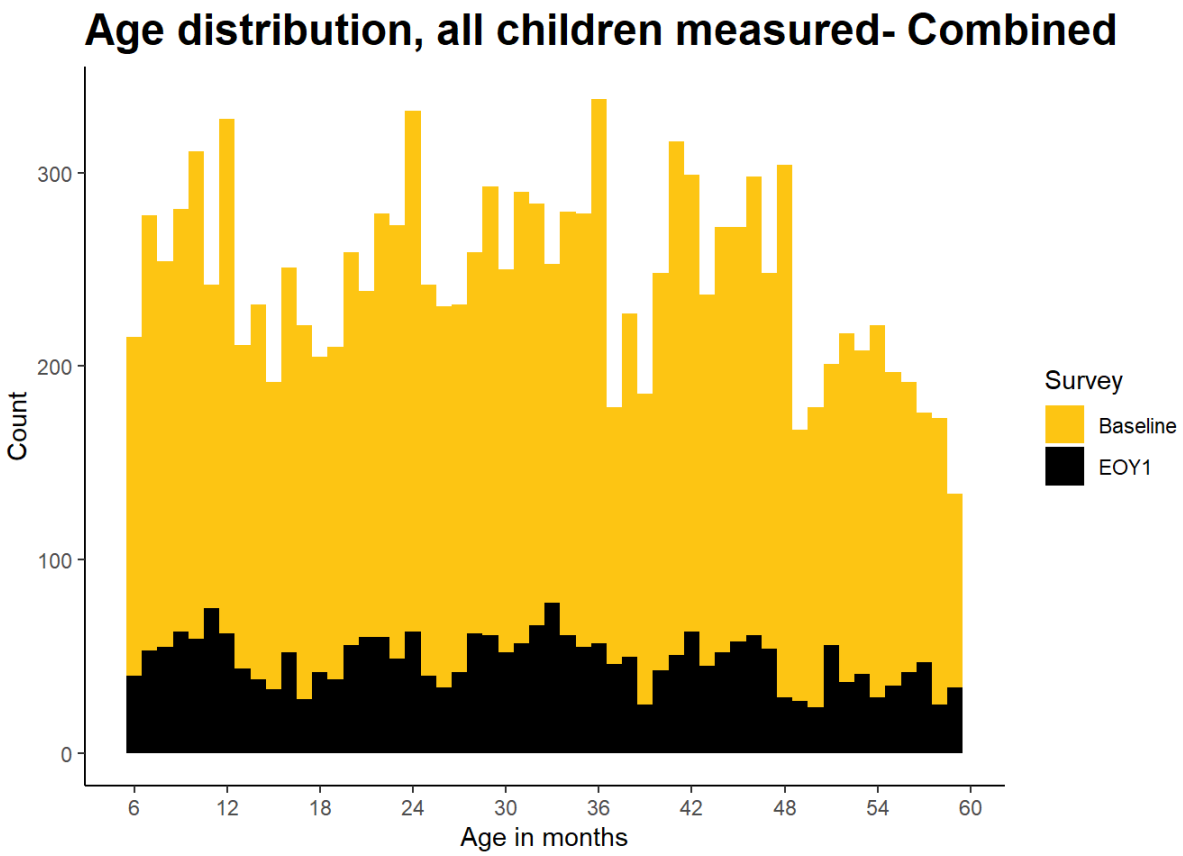
Critères	Flags*	Unité	Excel.	Bon	Accept	Problématique	**Score**
Données hors-normes (% de sujets dans la fourchette)	Incl	%	0-2.5 0	>2.5-5.0 5	>5.0-7.5 10	>7.5 20	**0** (%)
Sexe ratio global (Chi carré significatif)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<=0.001 10	**0** (p=0.640)
Distrib age 6-29/30-59 (Chi carré significatif)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<=0.001 10	**0** (p=0.647)
Score préf num- PB	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	**0** (4)

À cet instant le score global de cette enquête est de 0 %, ce qui est excellent.

AGE DISTRIBUTION

The age distribution of all children 6 to 59 months is shown below.

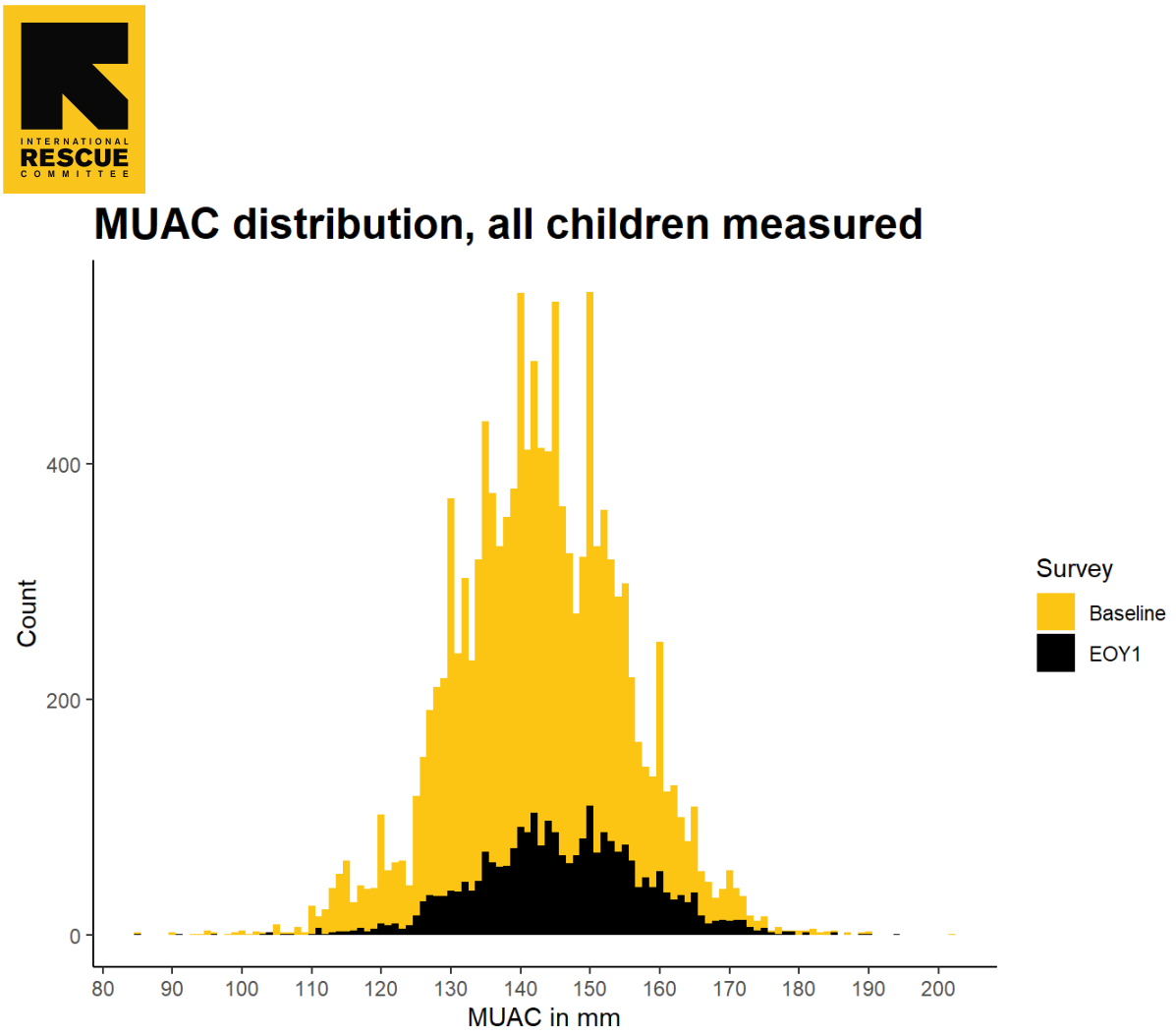
Figure 10 : Age distribution



MUAC DISTRIBUTION

The MUAC distribution of all children 6-59 months is below.

Figure 11 : MUAC distribution


MUAC distribution, all children measured
Count
400
200
0
80
90
100
110
120
130
140
150
160
170
180
190
200
MUAC in mm
Survey
Baseline
EOY1

APPENDIX 2: SAMPLE SIZE CALCULATIONS

For each survey, the following figures were considered:

Indicator	EOY1	Justification/ Source	Baseline
Expected coverage (SAM)	6.9%	Upper-bound: Measured coverage, baseline	25%
Expected nonresponse	5%	Minimum expected non-response	5%
Precision	5%	Desired precision < 15%; feasible sample size	10%
Prevalence of SAM by MUAC <115 mm and/or edema	1.6%	IRC Coverage Survey 2022	1.0%
Average household size	5.7	SMART 2020 Report Niger (Tillaberi)	5.7
Average cluster size	1,059	Total population/ number of villages	1081
Percentage of population 6-59 months	15.8%	SMART 2020 Report Niger (Tillaberi)	16.6%
Sample size - SAM	99	See sample size calculation; children	72
Estimated number of clusters to visit	39	See sample size calculation; clusters	35
Number of reserve clusters	4	Guidelines, SMART methodology	4

Table 17 : Sample size calculations