Nutrition and Mortality Monitoring System (NMS)

Synthesis Report

July 2022- April 2023

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Submitted to:

Caafimaad Plus Consortium,

Action Against Hunger

Mogadishu, Somalia

Submitted by:

Evidence for Change (e4c)

Nairobi, Kenya

The partner organisations involved in the NMS 2022/2023 were:

BRCiS Consortium

- Norwegian Refugee Council (Consortium lead agency)
- GREDO
- IRC
- Save the Children

Caafimaad Plus Consortium

- Action Against Hunger (Consortium lead agency)
- CWW
- IMC
- SOS
- Trocaire

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Acknowledgments

We gratefully acknowledge the participation of the displaced people who contributed the data that was analysed and presented here.

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Introduction

Somalia faced a prolonged and serious drought during 2022 and into early 2023. The effects of this, combined with conflict and outbreaks of infectious diseases, are still being seen at the current time. The emergency continues with long-term impacts on the nutrition and health status of the population.

The Nutrition and Mortality Monitoring System (NMS) 2022/2023 project was funded from July 2022 to provide regular updates about the situation of vulnerable groups that have been internally displaced in southern Somalia. It has done this by identifying and sampling IDP sites in locations where newly displaced populations are known to aggregate in times of crisis. These locations included Kahda and Daynille in Banadir, Baidoa, Dinsoor, Galkayo, Kismayo, and Dollow. The NMS has produced six reports that have tracked the health and nutrition situation of these sampled IDP populations.[1]

The Nutrition and Mortality Monitoring System (NMS) is a health and nutrition sentinel site surveillance system. The NMS approach is based on long-standing good practice in public health and humanitarian response, working with an established network of CHW to conduct household visits and collect data. It uses a network of partners and their CHW to collect data at household level from purposively selected IDP sites. It was first set up in response to the 2017 emergency by UCL and Concern Worldwide. Using this approach, it has been possible to collect and disseminate timely data on the 2017, the COVID-19, and the 2022-2023 emergencies.[2,3,4]

The objectives of the NMS during the 2022-2023 emergency were to:

1. Provide ongoing, near real-time, data on the evolution of the crisis,
2. Detect and describe current and emerging threats to health and nutrition,
3. Determine the coverage and adequacy of the humanitarian response.

In this report we compile the results obtained during the 6 rounds of data collection conducted between July 2022 and April 2023, and present some additional analysis and interpretation.

Methods

Selection of Sites for Inclusion

The process for site selection is summarised in Figure 1. The NMS aims to identify and track population groups that are thought to be particularly vulnerable. This may be for a number of reasons including the IDPs being new arrivals, because the area they are migrating from has been particularly hard hit by drought or conflict, a weak humanitarian response in the area they are settling in, or because they are subject to marginalisation due to their clan or language. The most common reason that is used in site selection is the presence of new arrivals.

[1] The six reports produced during the 2022-2023 surveillance period are available at: https://reliefweb.int/organization/evidence-for-change

[2] IDP Nutrition & Mortality Monitoring System (NMS) Monthly Report 5, Report Issued: 08/11/2017 https://reliefweb.int/report/somalia/somalia-idp-nutrition-mortality-monitoring-system-nms-monthly-report-5-report-issued

[3] Use of verbal autopsy for establishing causes of child mortality in camps for internally displaced people in Mogadishu, Somalia: a population-based, prospective, cohort study (2019) A. J. Seal, M. Jelle, C. S. Grijalva-Eternod, H. Mohamed, R. Ali and E. Fottrell, Lancet Glob Health 2021 Vol. 9 Issue 9 Pages e1286-e1295

[4] Data innovation in response to COVID-19 in Somalia: application of a syndromic case definition and rapid mortality assessment method (2022) A. Seal, M. Jelle, B. Nemeth, M. Y. Hassan, D. A. Farah, F. M. Musili, et al. Glob Health Action 2022 Vol. 14 Issue sup1 Pages 1983106

The initial step in site identification is the use of the CCCM New Arrivals Tracking dashboard to identify areas with high numbers of new arrivals. Once a list of sites has been identified field visits are undertaken by NMS partners and the location of the sites and presence of new arrivals confirmed by observation and taking GPS coordinates. The coordinates are then entered into Google Earth and the location of the potential sites visualised, as shown in Figure 2.

Once the IDP site has been selected all the households present in that site on the day that data collection begins are exhaustively sampled. Data collection has been observed to act as a pull factor as it may be seen as a step in registering people prior to a cash or other type of distribution. People may therefore be encouraged to move into a IDP site by the presence of the NMS data collection team. To reduce this potential population movement the NMS only includes households that are present during the first round of data collection in any site. Households that migrate into the sites at a later time are not included.

Figure 1: Summary of the Site Selection Process

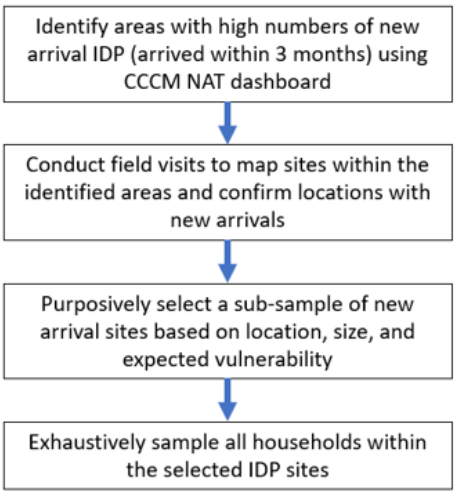
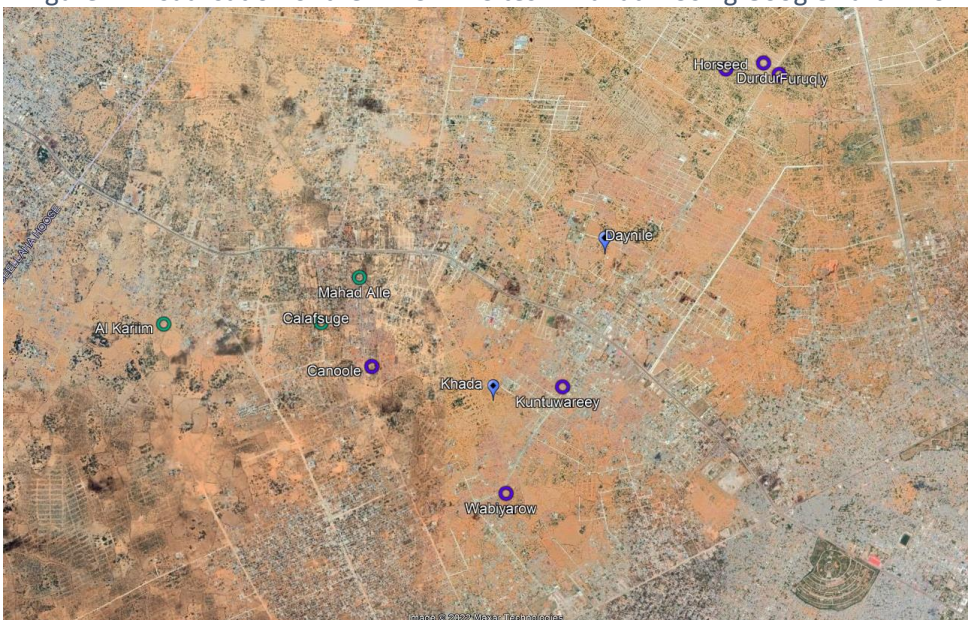


Figure 2: Visualisation of the NMS IDP Sites in Banadir Using Google Earth Pro



Data collection

Data was collected at household level by trained CHW and enumerators. The questionnaire was developed by e4c after consultation with BRCiS and Caafimaad Plus, and other experts working on Somalia. It was developed in English and then translated into Somali. The data collection form was piloted and revised based on the feedback from teams during training sessions. It was coded in Open Data Kit (ODK), and data was uploaded to the ONA Systems server. Data collectors used mobile phones or tablets running the Android operating system.

As summarised in Table 1, data collection took place between July 18th, 2022, and April 20th, 2023. Teams were comprised of two CHW or enumerators, one of which conducted the interviews and one who performed the MUAC measurements. Data collection took approximately 10 minutes for each household and teams averaged 10 households per day.

The questionnaire included questions on household demographics, area of origin and clan affiliation, date of arrival in the IDP site, spoken dialects/languages, household WASH, possession of child-health record cards, vaccination status, morbidity, and mortality. Questions on morbidity included symptoms of measles and acute watery diarrhoea (AWD) experienced during the last 2 weeks. MUAC measurements were taken on children 6-59 months in duplicate and, in the event that the difference in measurements was greater than 0.5 cm, a third measure was taken and the mean of the two measurements with the best agreement was used.

Data management

MUAC measurements and questionnaire data, collected by the CHW and enumerators, were entered into an ODK data form on mobile phones or tablets running the Android operating system. Data was uploaded to a server run by ONA Data after forms were finalised, and an internet connection was available. The data files were then downloaded from the ONA server in .csv format and loaded into Excel and R for data quality checks, cleaning, and analysis. Unique IDs for each household and individual were created during data collection using a unique household identifier number and sequential individual ID numbers within each household. To avoid the creation of duplicate ID numbers a paper 'cluster control sheet' was used to monitor the collection of data by each team. To find households that had been previously interviewed, household identifiers were uploaded to the digital devices so that the household identify could be confirmed at the start of each interview. Data was compiled from the 6 surveys that were conducted.

Data analysis

Data analysis was performed in R. Tree charts and graphs were created in Excel. Sparkline mini graphs were prepared in Excel and added to tables to aid visualisation. The prevalence of GAM and SAM by MUAC was calculated taking in to account the prevalence of nutritional oedema.

The under-five and crude death rates were measured during the first interview using the recall period since a memorable date. In subsequent data collection rounds the recall period used was the time since the previous interview. Household members that joined, left, or died within the recall period contributed half of the recall period to the rate denominator. To cross-check that the date of death fell within the recall period follow-up questions were asked to confirm the number of weeks since the death occurred, and whether the location of the death was consistent with the household's date of arrival in the IDP camp. These were used during analysis to exclude any deaths that occurred outside of the recall period, or deaths that had occurred in a location outside of the IDP camp after the household reported arriving in the camp.

To assess whether conditions within IDP camps are improving or deteriorating over time, bar graphs or tables were prepared to show key indicators for each camp and how they changed between data collection rounds. If the humanitarian response is adequate a positive improvement in performance and outcome indictors is expected as the time since arrival increases.

Results

Interagency Cooperation

A notable outcome of the NMS project was the extent of cooperation that occurred between the two consortia that were involved and their respective operational agencies, and the donors. This enabled e4c to facilitate a process that resulted in joint data collection, result compilation, combined analysis. The process was streamlined by all organisations involved agreeing to published combined reports and sharing in the production, review, presentation, and dissemination of the results

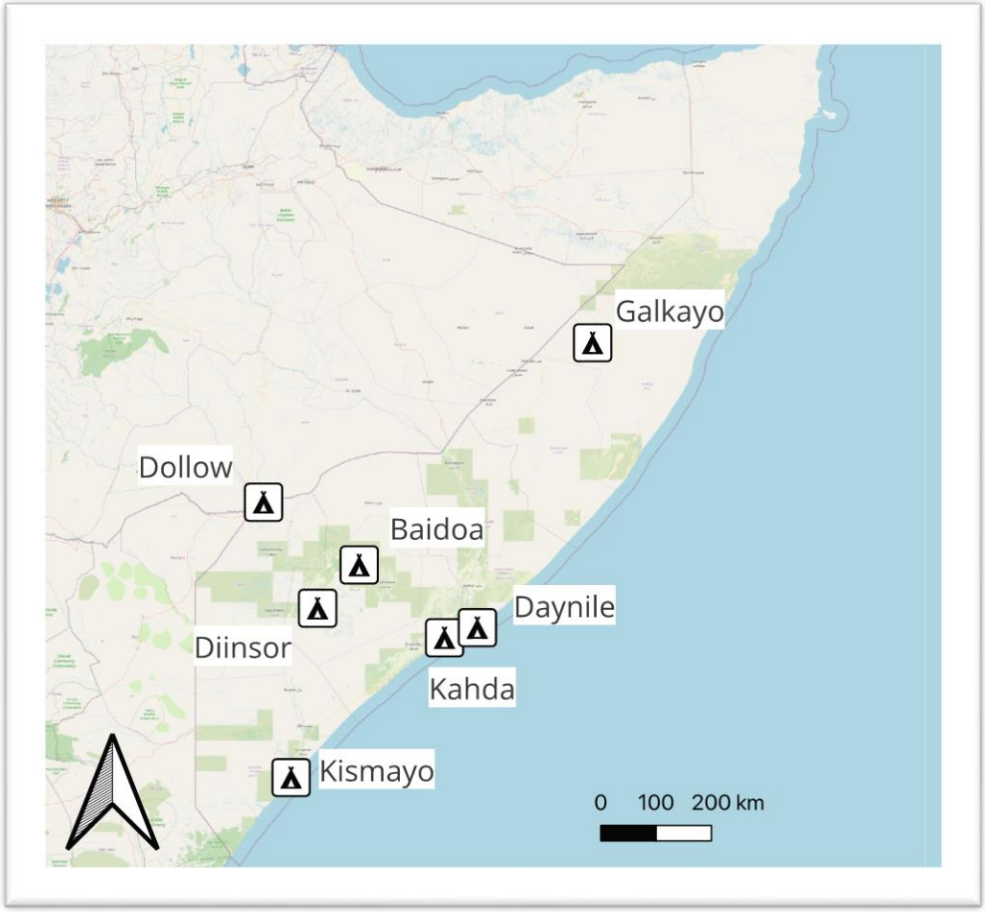
Training of Community Health Workers

One hundred and five CHW, plus supervisors, were trained for data collection during the project. Training sessions were conducted for teams in each area over the 6 rounds of data collection. Sessions were conducted online or f2f in Mogadishu or Baidoa. An attempt to conduct a face-to-face training in Dollow had to be called off when insecurity closed the Dollow airstrip.

Sampling of IDP Sites

The locations included in the NMS are shown in Figure 2. It was intended that the selected locations should include the major urban areas in southern Somalia where IDP are known to migrate to in times of stress. These are Kahda and Daynille in Banadir, Baidoa, Dollow, and Kismayo. There are, of course, many other areas which host IDP and may also contain highly vulnerable populations. However, these five locations were prioritised to allow the NMS to fulfil its intended purposes as a sentinel site, population surveillance monitoring system. Two other locations, Dinsoor and Galkayo, were included in the NMS due to project partners having pre-established operations in these areas.

Figure 3: Location of NMS Surveillance Sites



A photograph of a typical IDP new arrival site is shown below. Families may arrive with materials to build makeshifts or have to acquire essential non-food items on arrival. IDP sites are often managed as a private business by a camp manager, who may act for the landowner or landlord. In some locations the local government authorities may play a role in allocating land for IDP sites.

Figure 4: Photo of IDP site

Photo taken by GREDO data collection team in a camp for newly arrived IDP in Baidoa, August 2022

IDP Sample Characteristics

The characteristics of the samples collected in each area and IDP site across the six rounds of data collection are described in table 1.

It can be seen that the number of locations and IDP camps/site steadily increased during the first 5 rounds, as Caafimaad Plus members joined BRCiS members in data collection activities. In round 6, the number of sites declined when funding was reduced and BRCiS members were unable to continue with data collection.

In total, 4,633 households from 34 camps/sites in 7 locations were sampled. The sampled households contained 25,364 individuals.

The median time since the arrival of new IDP at first interview ranged from less than one month up to 45 months. The longest duration of residence was observed in Galkayo, where there were fewer new arrivals in 2022 and camps were selected for inclusion based on the expected clan membership and language usage, which were thought to be potential vulnerability criteria. In other locations, the main vulnerability criteria used to select camps was the duration of time since arrival, with the newest arrivals considered to be most at risk.

Evidence for Change

Table 1: Sample Summary

Area	Partner	IDP site	Round 1 (18th Jul - 2nd Aug)			Round 2 (21st Aug - 10th Sep)				Round 3 (21st Nov - 11th Dec)				Round 4 (18th Jan - 11th Feb (2023))				Round 5 (27th Feb - 22nd Mar (2023)				Round 6 (3rd Apr - 20th Apr (2023)				Overall Change[2]		Months since arrival[1]	
			Households	Population	Household size	Households	Change	Population	Household size	Households	Change	Population	Household size	Households	Change	Population	Household size	Households	Change	Population	Household size	Households	Change	Population	Household size	HH	Pop.		
Kahda - Banadir	Action Against Hunger	Wabiyarow	198	1,092	5.5	190	-8	1079	5.7	166	-24	935	5.6	144	-22	839	5.8	137	-7	802	5.9	-	-	-	-	-61	-290	9.3	(8,10)
		Kuntuwareey	241	1,310	5.4	227	-14	1283	5.7	220	-7	1,203	5.5	192	-28	1055	5.5	174	-18	1030	5.9	-	-	-	-	-67	-280	10.1	(9,10)
		Canoole	164	680	4.1	144	-20	652	4.5	117	-27	527	4.5	75	-42	344	4.6	66	-9	328	5.0	-	-	-	-	-98	-352	10.2	(8,14)
		Al Karim	-	-	-	-		-	-	57	-	263	4.6	55	-2	299	5.4	-	-	-	-	54	-1	311	4.2	3	48	4.2	(4,5)
		Calafsuge	-	-	-	-		-	-	29	-	145	5.0	35	6	182	5.2	-	-	-	-	33	-2	181	5.5	-4	36	7.0	(6,13)
		Mahad Alle	-	-	-	-		-	-	50	-	298	6.0	42	-8	252	6.0	-	-	-	-	36	-6	230	6.4	14	-68	8.1	(7,9)
Daynille - Banadir	IRC	Durdur	-	-	-	247		1045	4.2	186	-61	898	4.8	173	-13	838	4.8	147	-26	732	-	-	-	-	-	-100	-313	8.4	(8,9)
		Horseed	-	-	-	311		1701	5.5	292	-19	1,690	5.8	247	-45	1419	5.7	230	-17	1312	-	-	-	-	-	-81	-389	7.3	(7,8)
		Furuqly	-	-	-	117		566	4.8	107	-10	579	5.4	100	-7	527	5.3	93	-7	448	-	-	-	-	-	-24	-118	9.2	(8,9)
	CWW	Qoobey	-	-	-	-		-	-	-	-	-	-	-	-	-	-	156	-	659	4.2	146	-10	682	4.7	-10	23	5.3	(5,6)
		Nimco	-	-	-	-		-	-	-	-	-	-	-	-	-	-	91	-	450	4.9	85	-6	419	4.9	-6	-31	1.2	(1,4)
		Alla Qabe	-	-	-	-		-	-	-	-	-	-	-	-	-	-	201	-	790	3.9	202	1	792	3.9	1	2	4.4	(2,8)
Baidoa City	GREDO	Bogey	109	570	5.2	79	-30	571	5.2	109	30	608	5.6	103	-6	599	5.8	74	-29	435	5.9	-	-	-	-	-35	-135	9.3	(9,10)
		Abag Dheere	122	511	4.2	110	-12	482	4.1	58	-52	289	5.0	52	-6	254	4.9	50	-2	198	4.0	-	-	-	-	-72	-313	8.3	(7,9)
		Barbaare	79	511	6.5	63	-16	497	6.4	75	12	521	6.9	67	-8	446	6.7	59	-8	396	6.7	-	-	-	-	-20	-115	11.3	(9,11)
		War Ajiin	126	754	6.0	113	-13	724	6.4	99	-14	637	6.4	96	-3	597	6.2	91	-5	570	6.3	-	-	-	-	-35	-184	10.5	(10,12)
		Garas	-	-	-	149		869	5.8	146	-3	832	5.7	138	-8	842	6.1	121	-17	774	6.4	-	-	-	-	-28	-95	8.3	(7,8)
		Lowfooraar	-	-	-	131		664	5.1	130	-1	750	5.8	130	0	750	5.8	128	-2	761	5.9	-	-	-	-	-3	97	7.2	(6,9)
	SOS	Dee	-	-	-	-		-	-	200	-	1,210	6.1	193	-7	1314	6.8	192	-1	1312	6.8	187	-5	682	6.7	-13	-528	6.5	(6,7)
		Dulmadiid	-	-	-	-		-	-	173	-	1,028	5.9	170	-3	1026	6.0	159	-11	976	6.1	147	-12	419	6.2	-26	-609	6.4	(6,7)
		Bansadiiq	-	-	-	-		-	-	230	-	1,499	6.5	206	-24	1440	7.0	193	-13	1290	6.7	183	-10	792	6.6	-47	-707	16.3	(11,22)
Dinsoor Town	GREDO	Biilale One	119	669	5.6	94	-25	623	5.5	111	17	633	5.7	112	1	648	5.8	112	0	700	6.3	-	-	-	-	-7	31	15.2	(10,17)
		Biilale Two	165	914	5.5	125	-40	864	6.0	143	18	845	5.9	143	0	855	6.0	143	0	854	6.0	-	-	-	-	-22	-60	8.6	(7,15)
		Korkaamare	95	460	4.8	80	-15	423	4.7	90	10	423	4.7	90	0	424	4.7	89	-1	422	4.7	-	-	-	-	-6	-38	9.4	(8,12)
		Tunida	73	441	6.0	64	-9	366	6.0	57	-7	351	6.2	56	-1	369	6.6	42	-14	268	6.4	-	-	-	-	-31	-173	8.3	(7,10)
		Korkaamare 3	-	-	-	-	-	-	-	-	-	-	-	146	-	731	5.0	146	0	728	5.0	-	-	-	-	0	-3	3.1	(2,4)
Galkayo	IMC	Baantu 1	-	-	-	-		-	-	36	-	258	7.2	35	-1	235	6.7	33	-2	187	5.7	32	-1	205	6.4	-4	-53	40.4	(20,64)
		Baxsan 1	-	-	-	-		-	-	77	-	560	7.3	73	-4	491	6.7	68	-5	471	6.9	58	-10	409	7.1	-19	-151	12.8	(10,28)
		Bulojawan 1	-	-	-	-		-	-	114	-	826	7.2	86	-28	671	7.8	77	-9	569	7.5	64	-13	467	7.3	-50	-359	40.2	(6, 100)
Kismayo	SC	Buulo Fatura	-	-	-	-		-	-	-	-	-	-	228		1516	6.6	208	-20	1337	6.4	-	-	-	-	-20	-179	7.1	(4,13)
		Dulcade	-	-	-	-		-	-	-	-	-	-	105		664	6.3	100	-5	626	6.3	-	-	-	-	-5	-38	10.1	(9,10)
		Gargaar	-	-	-	-		-	-	-	-	-	-	114		703	6.2	108	-6	692	6.4	-	-	-	-	-6	-11	16.1	(14,16)
Dollow	Trocaire	Ladan Section 12	-	-	-	-		-	-	-	-	-	-	-	-	-	-	89	-	416	4.7	87	-2	449	5.2	-2.0	33.0	7.6	(5,9)
		Kaharey Section 8	-	-	-	-		-	-	-	-	-	-	-	-	-	-	101	-	591	5.9	96	-5	604	6.3	-5.0	13.0	4.7	(3,8)
		Qurdubey Sec. 11[4]	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

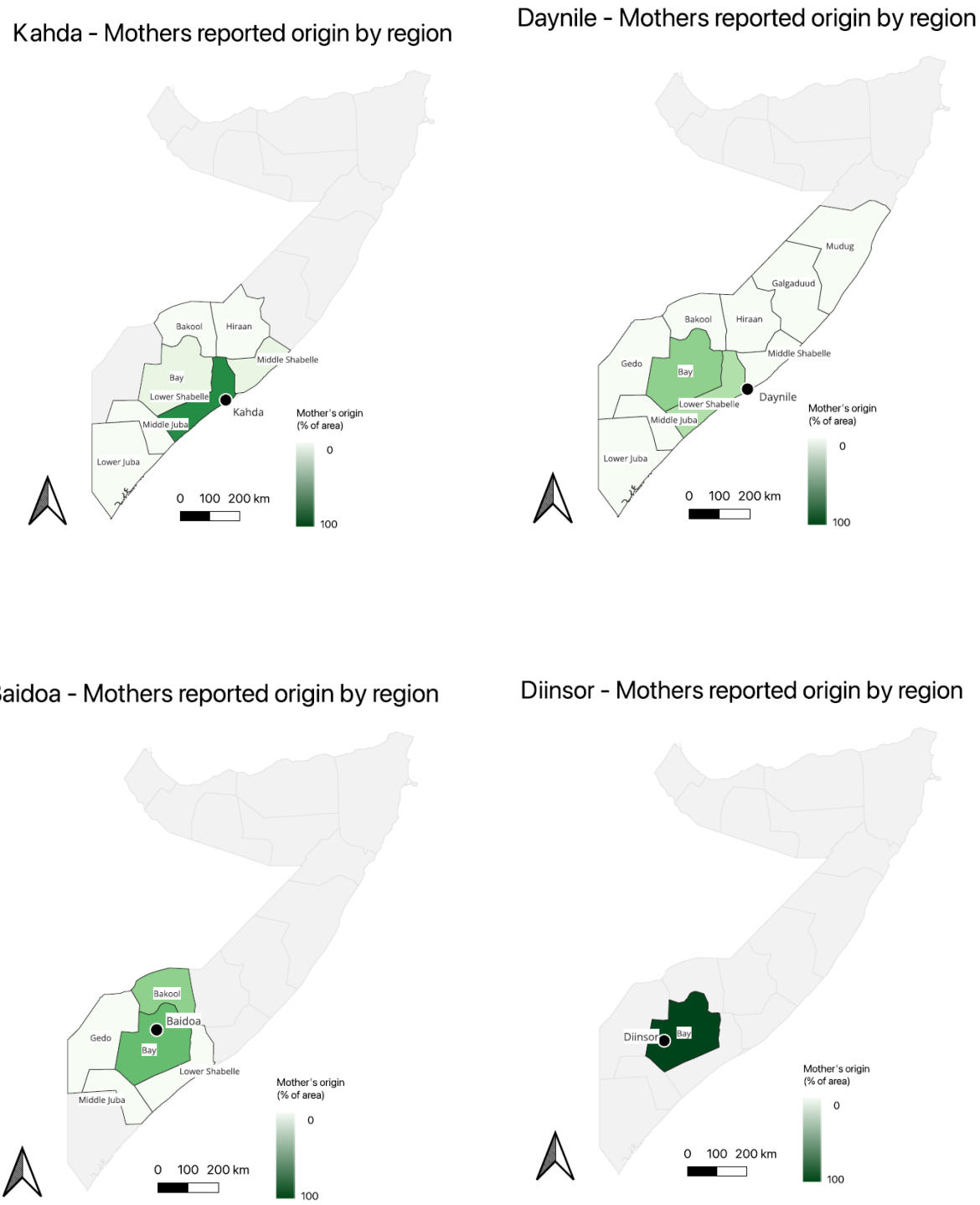
[1] Median and IQR

[2]Change in household number is shown since the previous data collection using red and blue bars, and the overall change in household number and population size since the first round is also given in the columns on the right hand of the table.

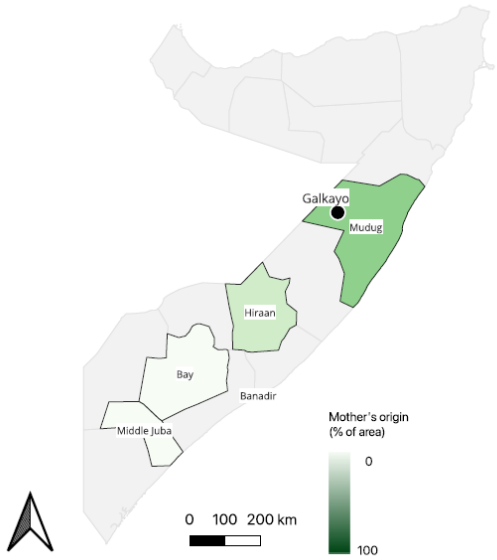
Areas of origin of the IDP population

The IDP originated from a range of different regions and districts. In Figure 5 the regions of origin are shown for IDPs in each area. In areas such as Kahda and Daynille, the population had migrated from a wide geographical area, including most of the regions in south and central Somalia. In Dinsoor, by contrast, all the IDP had migrated from only Bay region.

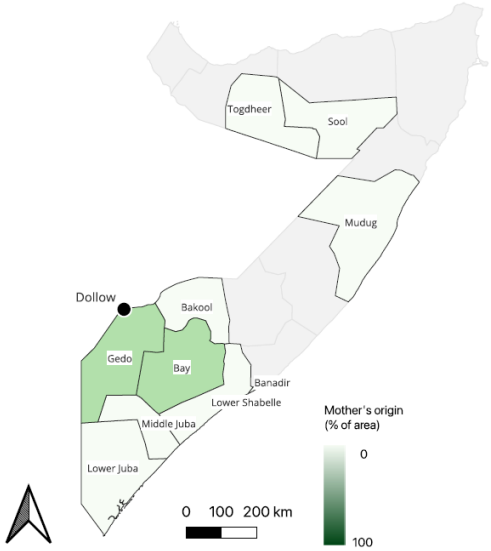
Figure 5: Areas of Origin Reported by IDP Mothers in Different Locations



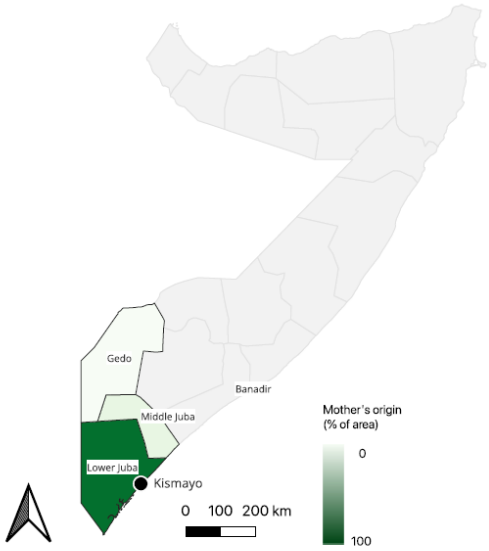
Galkayo - Mothers reported origin by region



Dollow - Mothers reported origin by region



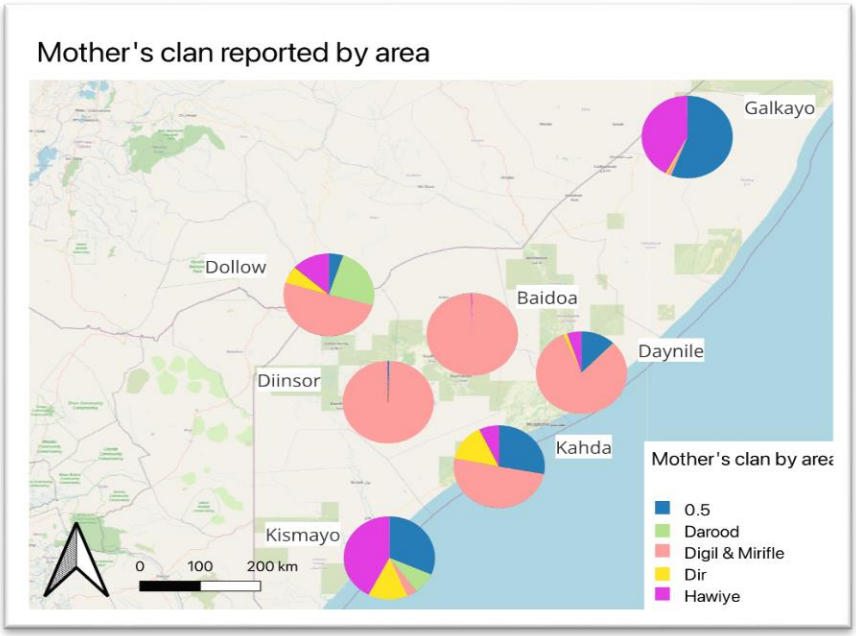
Kismayo - Mothers reported origin by region



Clan Affiliation

Clan identity is a key feature in Somali culture, and membership of a certain clan may provide easier access to social networks in specific locations. Ability to access social networks may be a key factor in determining the ease with which resources may be accessed, or in other situations it may present barriers and challenges. Understanding the clan affiliations of affected populations and the composition humanitarian agency staff is therefore an important aspect of ensuring that the humanitarian system can combat any potential marginalisation that might occur. The IDP clan super family categories of the IDP in the different locations are given in the figure below.

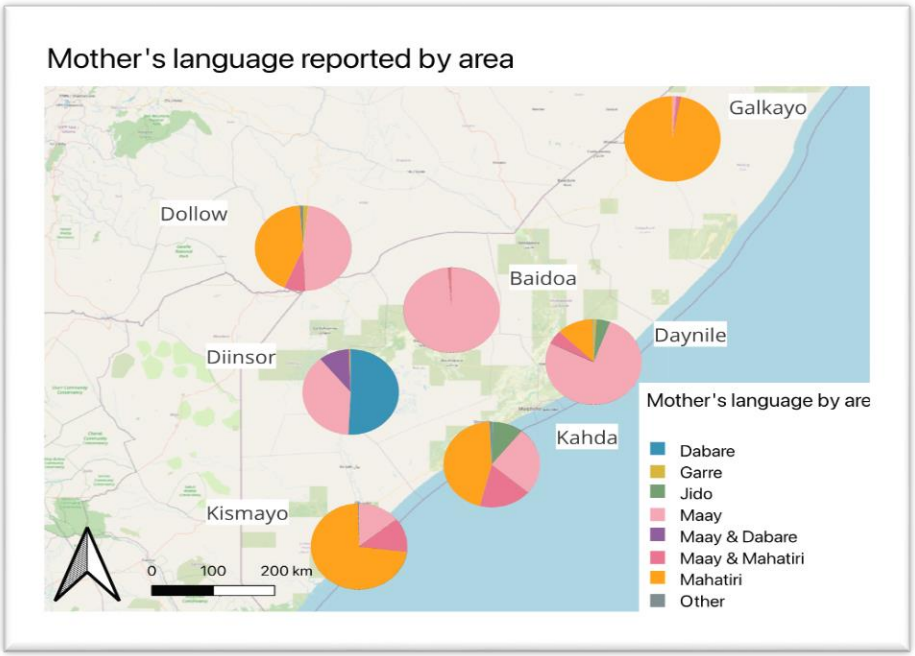
Figure 6: Clan Membership Reported By Area



Language

The importance of language, as a possible barrier to accessing humanitarian services, is starting to gain more attention in Somalia.[5]

Figure 7: Spoken Languages Reported By Area



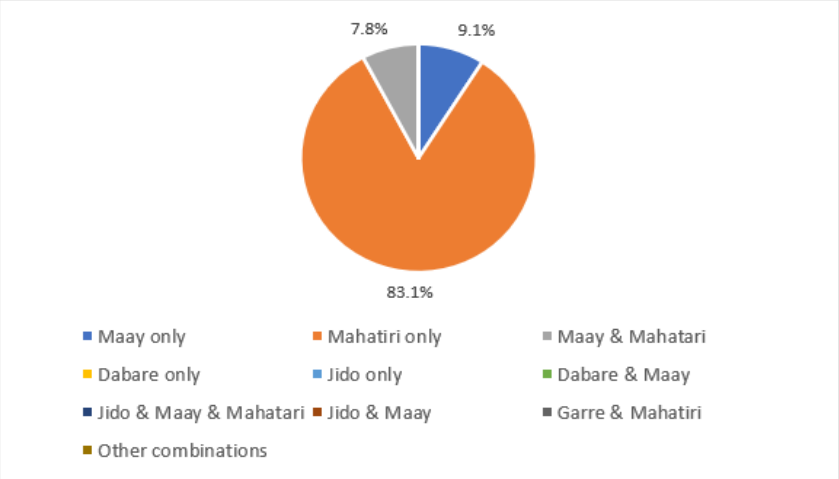
[5] How can we speak the truth if they can't understand us? (April 2023) CLEAR Global https://reliefweb.int/report/somalia/how-can-we-speak-truth-if-they-cant-understand-us-april-2023

Language is a key factor in being able to communicate with service providers, understand how to access services, and provide complaints and feedback. Understanding how languages are distributed and used by different groups within Somali culture is therefore a critical issue for the humanitarian sector.[6] The data indicates that in many areas Mahatiri (the official form of Somali) is not spoken by a majority of IDP. Indeed, in some areas, such as Baidoa, only a small minority reported speaking Mahatiri. This finding emphasises the importance of staff within humanitarian organisations being able to speak a range of languages so that effective communication with beneficiaries is possible.

We observed a surprising lack of Bantu languages, such as Mushunguli, being reported in areas such as Galkayo, where the 0.5 clans were the majority residents or present in a large proportion. Further work to understand if this actually the case in Galkayo or if these languages are being underreported for some reason, is recommended. Below, we provide an analysis of the languages being reported by different categories of clan family.

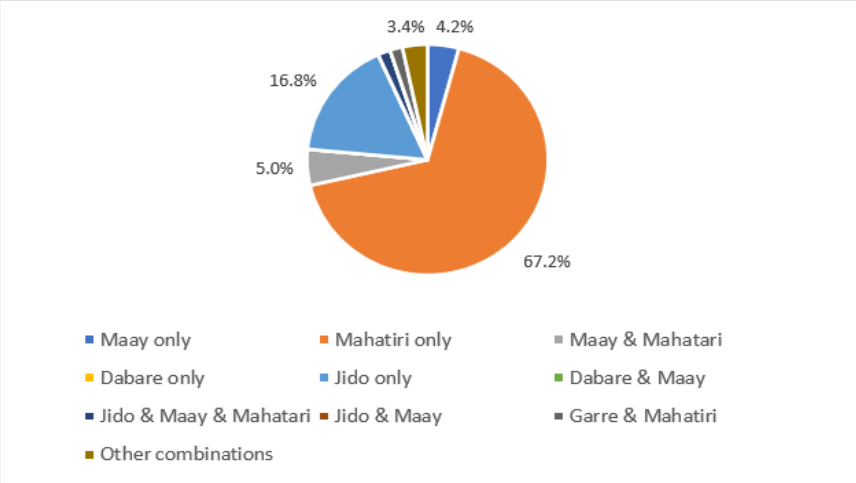
Figure 8: Spoken Languages Reported According To Clan Membership

(a) Darood

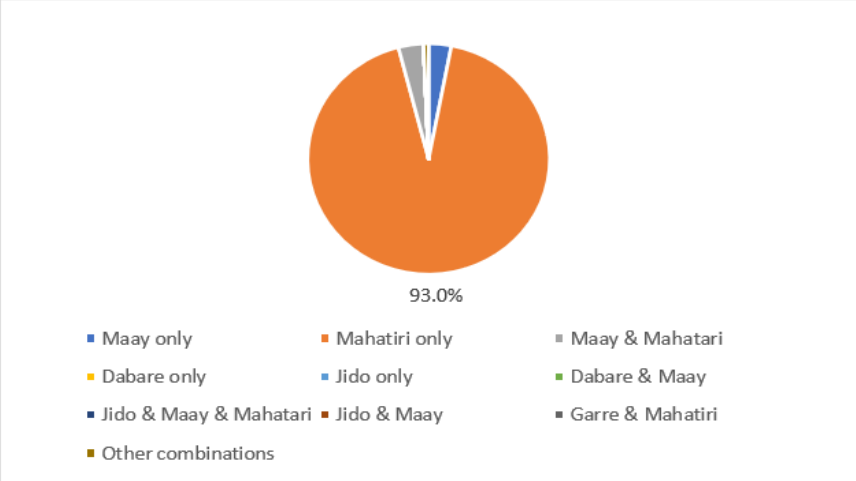


[6] Language use in Somalia: Quantitative research findings (May 2023) CLEAR Global https://reliefweb.int/report/somalia/language-use-somalia-quantitative-research-findings-analysis-language-data-collected-reachs-assessment-hard-reach-areas-march-2023

(b) Dir



(c) Hawiye



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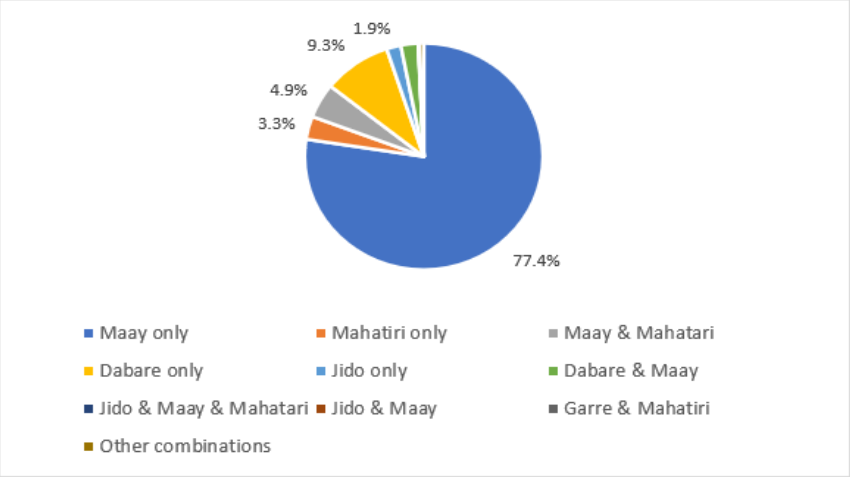
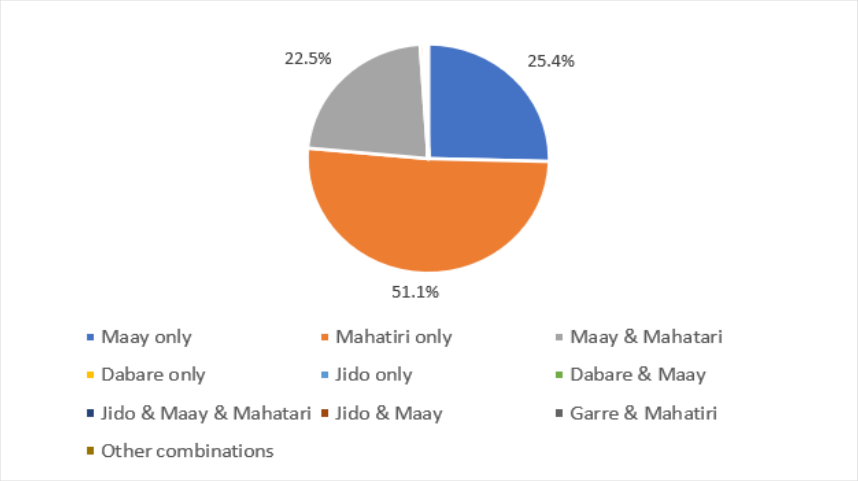


(e) 0.5



Malnutrition

As explained above, the NMS purposively samples IDP camps from a selected area based on their expected vulnerability. The selection of the camps happens sequentially over different data collection rounds. Therefore, the results have to be interpreted with both the spatial and temporal selection in mind. In the figure below, the camps in Baidoa that were recruited in each round of data collection are shown. In round 1, 3 camps in the southwest of the city were selected and 1 in the north (red dots). In round 2, two additional camps were selected from these areas, and in round 3, three camps from the north and east were added. Data from these different camps is analysed separately and camp-level GAM and SAM prevalence data is shown in Figure 10, for Baidoa and all other areas.

Figure 9: Recruitment of Camps in Baidoa by Data Collection Round

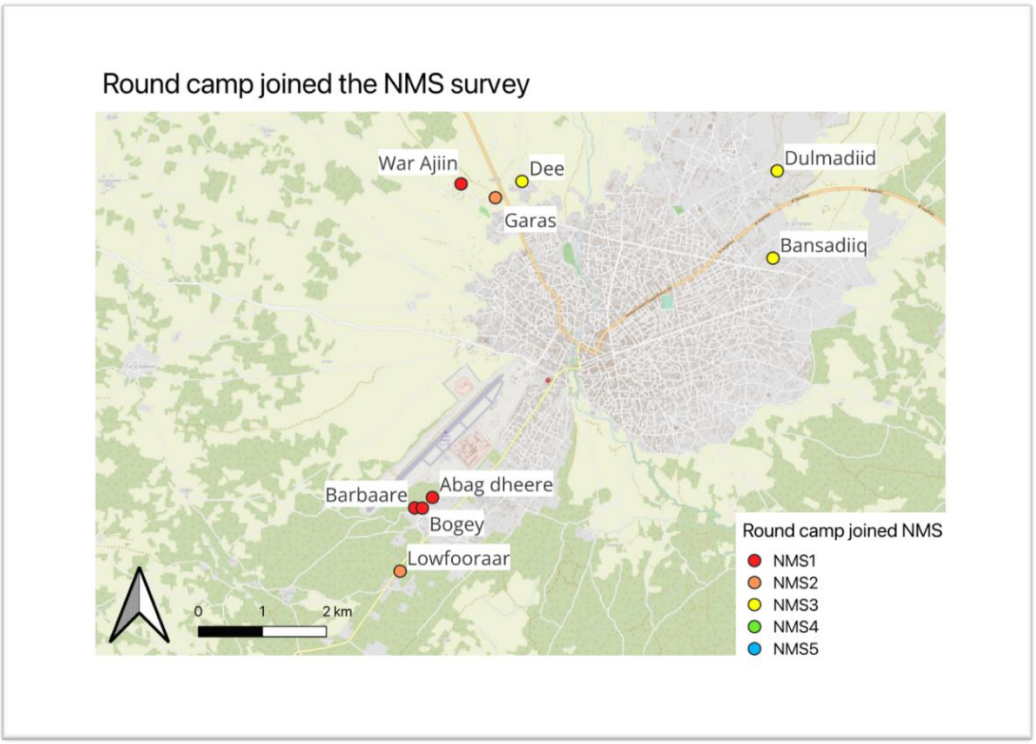
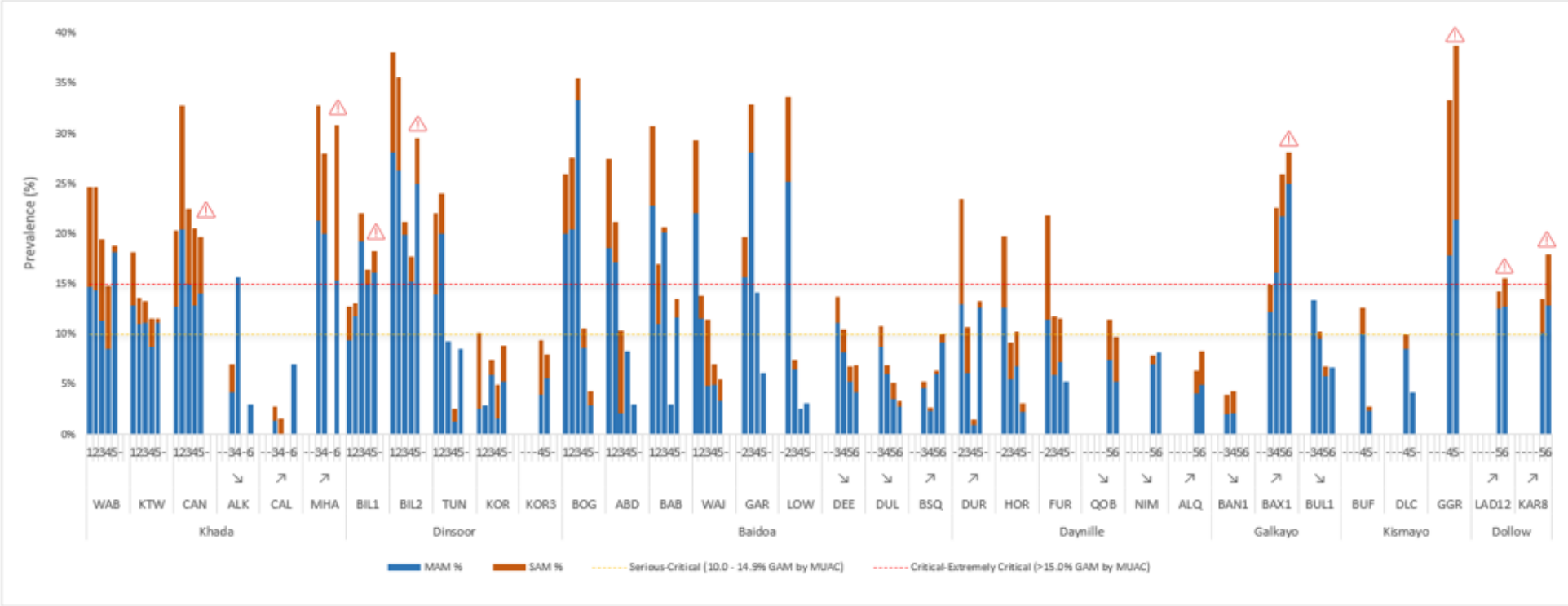


Figure 10: Trends in GAM by MUAC in Individual IDP Camps



[1] An increase or decrease in prevalence since the last data collection round is indicated by an up or down arrow for the camps included in R6. A warning exclamation mark is shown when the last measured prevalence of GAM by MUAC exceeded 15%.

2 Red and yellow dotted lines indicate the IPC thresholds for 'Critical-Extremely Critical' (>15%) or 'Serious-Critical' (>10% to <15%) GAM by MUAC prevalence.

Camp/Site Names and Abbreviations

Abag dheere	ABD	Biilale One	BIL1	Dee	DEE	Horseed	HOR	Mahad Alle	MHA
Al Kariim	ALK	Biilale Two	BIL2	Dulcade	DLC	Kaharey Section 8	KAR8	Nimco	NIM
Alla Qabe	ALQ	Bogey	BOG	Dulmadiid	DUL	Korkaamare	KOR	Qoobey	QOB
Baantu 1	BAN1	Bulojawan 1	BUL1	Durdur	DUR	Korkaamare Area 3	KOR3	Qurdubey Section 11	QDB11
Bansadiiq	BSQ	Buulo Fatura	BUF	Furuqly	FUR	Kuntuwareey	KTW	Tunida	TUN
Barbaare	BAB	Calafsuge	CAL	Garas	GAR	Ladan Section 12	LAD12	Wabiyarow	WAB
Baxsan 1	BAX1	Canoole	CAN	Gargaar	GGR	Lowfooraar	LOW	War Ajiin	WAJ

In figure 11, the prevalence data from the camps recruited in different data collection rounds within Baidoa has been combined, and the trend in the data is illustrated. The camps recruited in each round show a similar pattern, with declining GAM prevalence, that falls from July 2022 until the start of 2023, when it appears to plateau, remaining elevated at alert levels until the end of data collection in April.

The figure also illustrates an important observation that we have seen across all areas during the current emergency, that is, that the levels of malnutrition indicators tend to be at their worst when IDP first arrive in the camps. Improvements in nutritional status are generally observed to occur rapidly during the first few months after migration to the IDP sites, indicating that conditions with within the camps are significantly better than those they encountered during their migration to the camps, and/or before they left their site of origin. This observation suggests that the humanitarian response has been effective, at least to some extent. However, it is also worth noting that the rate of decline in malnutrition, as well as other indicators of poor health, has been slower that that observed during NMS data collection during the 2017 emergency, suggesting that the response during the 2022/2023 emergency has been a weaker and/or slower that the one mounted in 2017.

Another important observation is that the peak severity was observed during the first data collection round. It is very possible that the situation prior to July 2022 was worse than the prevalence measured during July. However, it should also be noted that the peak severity measured by the NMS in 2022 was not as bad as that observed during the 2017 emergency. During June and July 2017, we observed a prevalence of GAM in new arrival camps in the Afgooye Corridor of up to 74% GAM by MUAC. This extremely severe level of malnutrition was not observed in any areas during 2022. Nonetheless, the prevalence of GAM rose above 30% (IPC Phase 5) in 8 out of 34 camps during 2022/2023, indicating a very serve situation.

In figure 12, the trend in malnutrition is shown across all the surveillance areas. The general pattern of declining malnutrition, that we observed in Baidoa, is seen across all areas during 2022. However, the trend appears to start reversing in 2023, with an increase in prevalence between February and April. It is also worth noting the sharp rise in malnutrition that we observed in Dollow between Feb and April.

Figure 11: Trends in GAM by MUAC in Baidoa

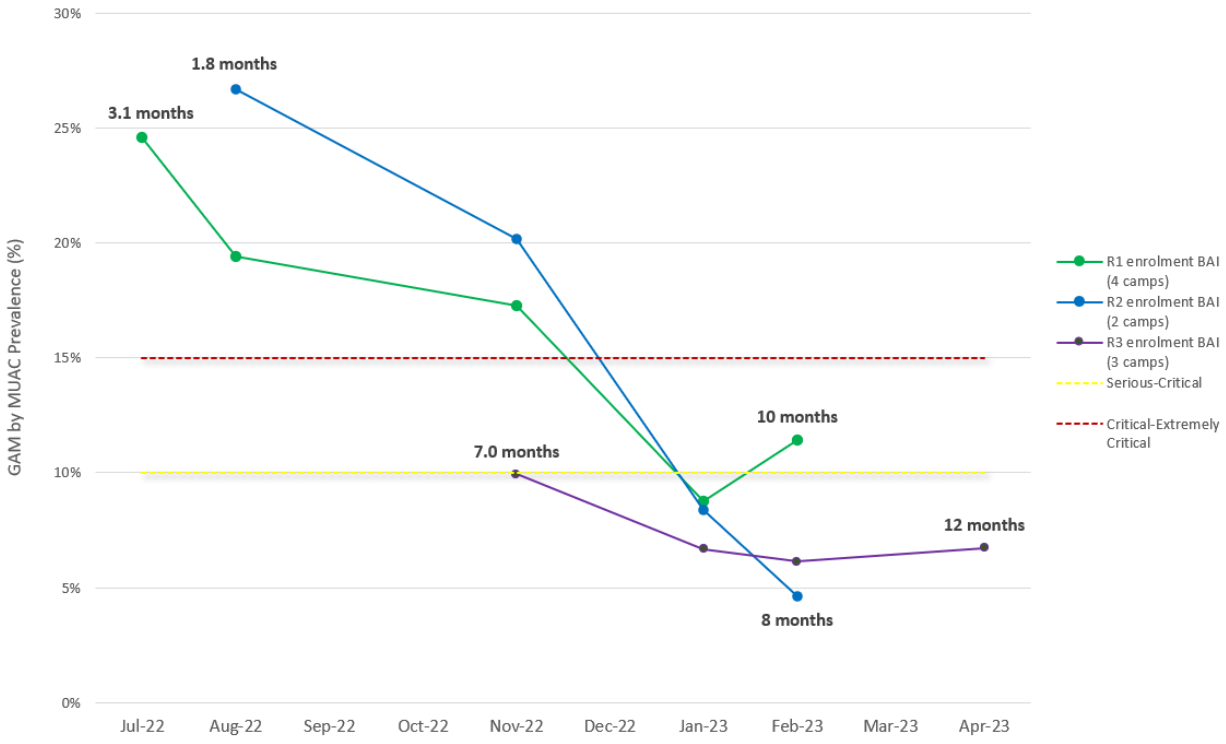
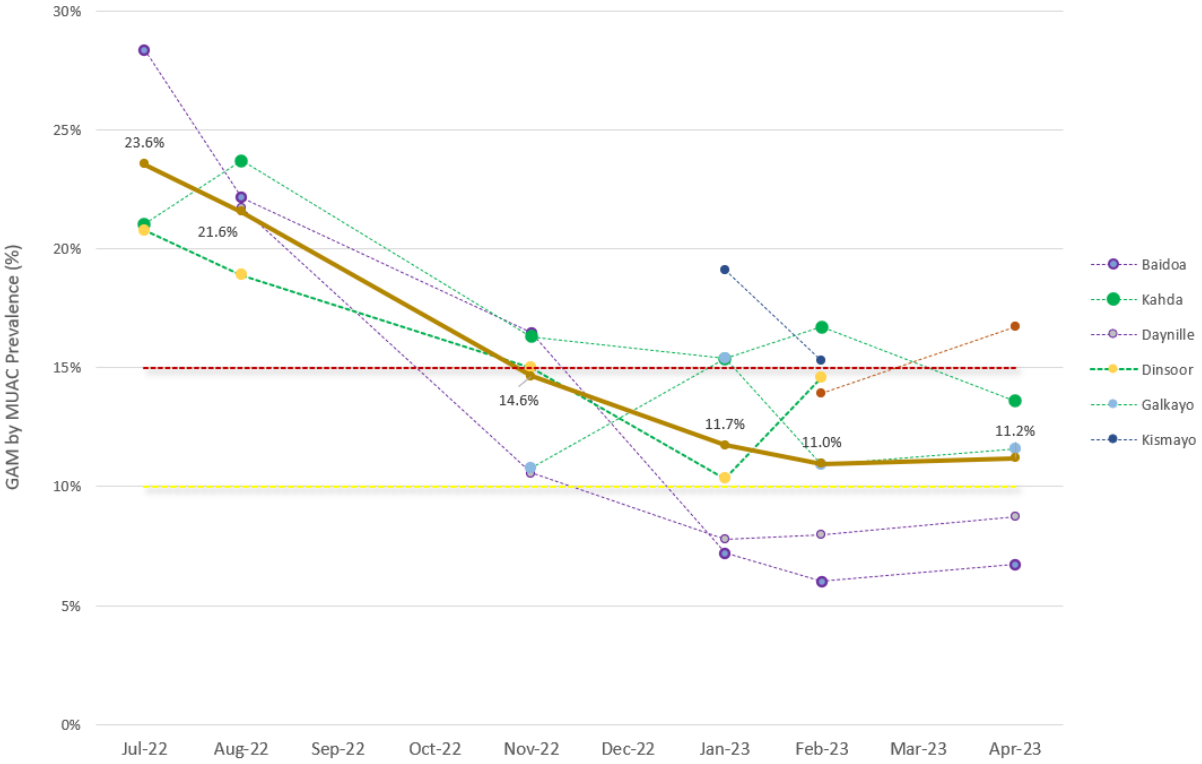


Figure 12: Trends in GAM by MUAC in Different Areas Over Time

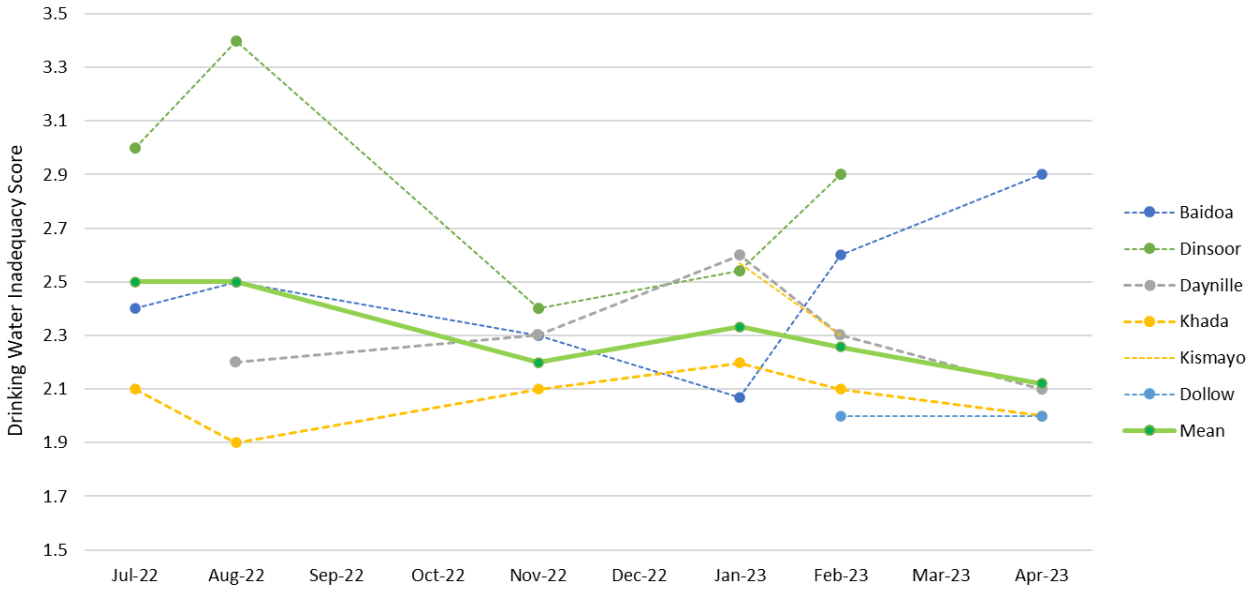


WASH

Water Supply

The household experience of water supply and usage was assessed using two questions. The frequency of experiencing inadequate drinking water over the last 4 weeks was assessed using 5 descriptive categories, ranging from never inadequate (1 score point) to always inadequate (5 score points). Scores were calculated by taking the average points for households within an area and the results are shown in the figure below.

Figure 13: Household Drinking Water Inadequacy Score



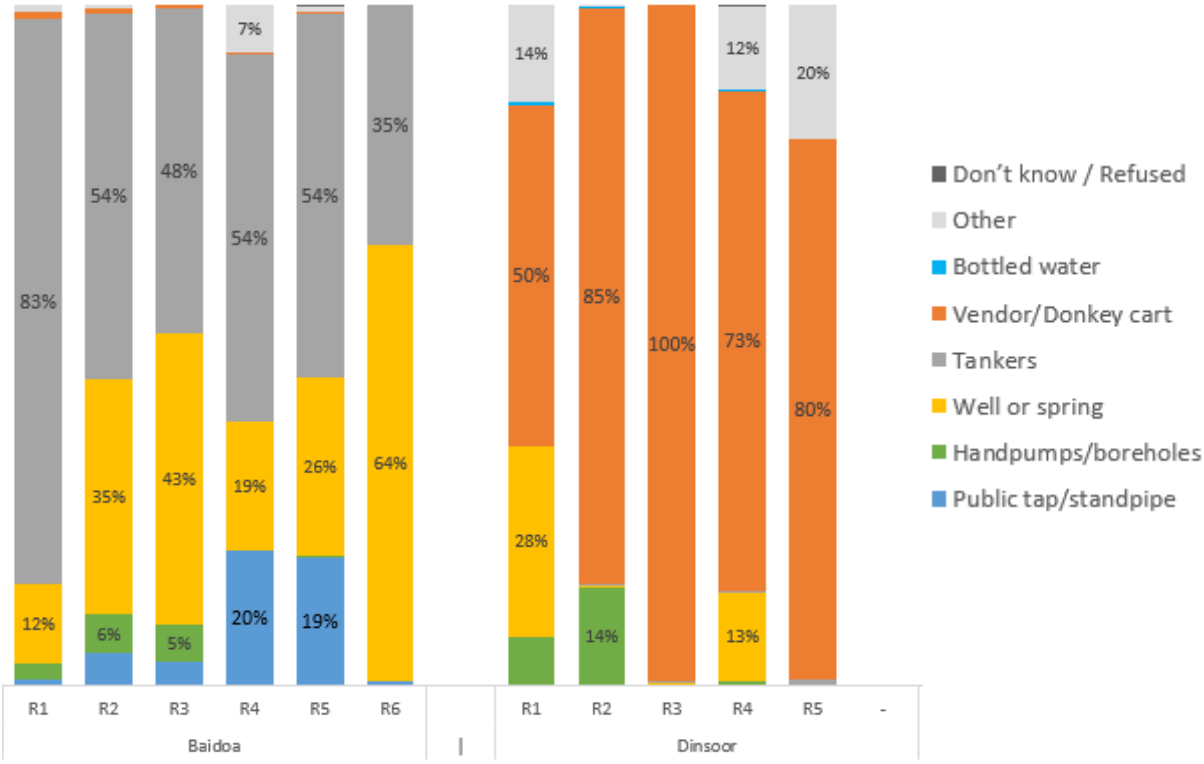
The average drinking water inadequacy score decreased over the surveillance period, indicating a small, average, improvement in drinking water availability. However, there were two areas where inadequacy has risen to high levels as time progressed. In Dinsoor, inadequate drinking water was very high during the first 2 data collection rounds, it then fell but rose again in round 5. In Baidoa, the initial adequacy levels were below 2.5 but inadequacy increased markedly in rounds 5 and 6.

The respondent was also asked to identify the main source of household drinking water used during the last 4 weeks. The full results from this question are shown across the 6 data collection rounds in the Round 6 report.[7] Here, we show the data from Baidoa and Dinsoor, the 2 areas with the worst drinking water adequacy. The figure below illustrates that, in Baidoa, the decreasing adequacy of drinking water is associated with people becoming more reliant on springs and wells, due to a reduction in tankering and use of boreholes. In Dinsoor, the high levels of inadequacy are associated with no public standpipes and a very high use of donkey cart vendors across all 6 rounds of data collection. However, the worsening situation in rounds 4 and 5 is associated with increasing use of well or springs, and a reduction in the use of donkey cart vendors.

[7] BRCiS & Caafimaad Plus: Nutrition and Mortality Monitoring in IDP Populations: Report on Round 6 - April 2023 https://reliefweb.int/report/somalia/brcis-caafimaad-plus-nutrition-and-mortality-monitoring-idp-populations-report-round-6-april-2023-report-issued-31042023

There may be many reasons underlying the changing use of different water sources and these changes may impact household water security in many different ways. Further qualitative and quantitative studies to fully described and explain our observations are recommended.

Figure 14: Main Household Source of Drinking Water in Baidoa and Dinsoor



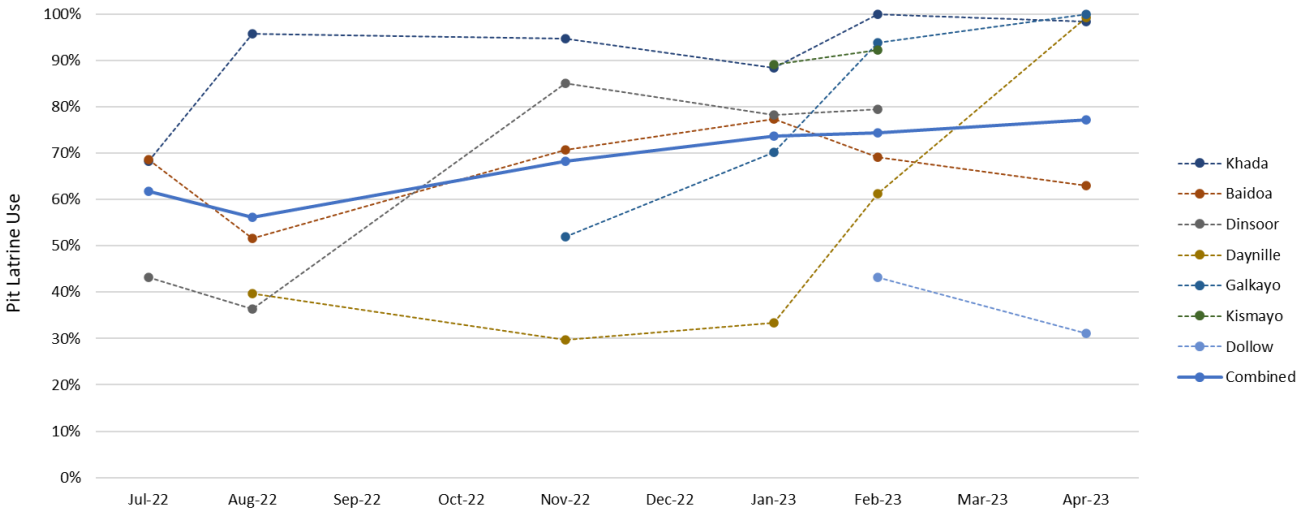
Latrine Use

Provision and usage of latrines has been a major challenge in the response over the last year. In round 2, the number of latrines and their location was recorded. Field teams mapped the location of all toilets, and recorded the type of structure and their GPS coordinates. It was found that the average number of toilets per camp was 5.4. Four camps had no toilets at all and the average number of people per toilet, overall, was 153. This compares to the Sphere Standard of a maximum of 20 people per toilet.[8]

Pit latrine use (including latrines with and without a slab) was monitored in each round and the trend is shown in the figure below. Overall, usage only increased modestly, from 63% in July 2022 up to 77% in April 2023. It is notable that reported usage fell in both Baidoa and Dollow between January and April this year.

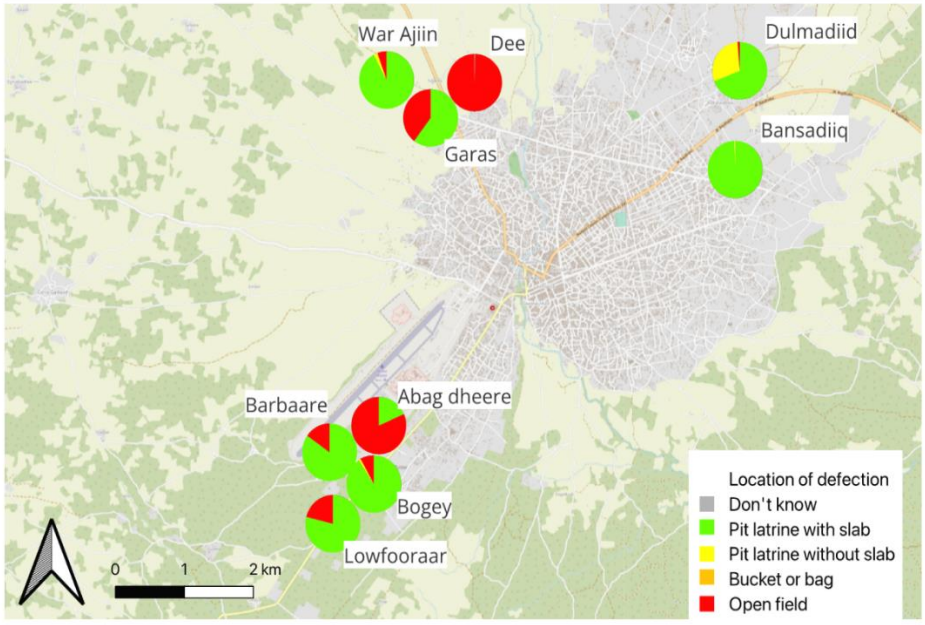
[8] Sphere Standards indicator Excreta management standard 3.2: Access to and use of toilets. https://handbook.spherestandards.org/en/sphere/#ch006_005_002

Figure 15: Pit Latrine Use by Area



Open defecation has been, and remains, a major public health issue during the current response. To explore this issue in more depth we mapped the patterns of reported defecation in Baidoa, as shown below. This revealed large differences between sites as well as large variations between data collection rounds.

Figure 16: Patterns of Household Defecation by Site in Baidoa in Round 5



By mapping indicators such as defecation practicies to each IDP camp/site, the spatial variation in sevice provison can be easily visualised. In this example we can see that all of the households in Dee

reported practicing open field defication in round 5, flagging up the urgent need to carry out a site assessment to check if latrines need de-sludging or have become unusable for another reason.

Vaccination Coverage

Measles vaccination coverage has, overall, slowly but steadily improved in almost all areas. From the data we can see that there are a number of factors that are associated with the level of coverage that has been achieved. Firstly, the area is very important – for example, the last coverage measurement was only 34% in Dinsoor but nearly 90% in Baidoa. This indicates the geographical variation in programme performance that has been achieved during the last year. While this uneven performance may have resulted from appropriate humanitarian targeting, with greater health inputs being assigned to the highest need areas, it does also flag up the challenge of ensuring all areas receive adequate assistance. Secondly, the duration of residence in the camp/site is also a significant predictor, with coverage increasing with increasing duration of residence. This observation is encouraging, as it shows that service uptake increases the longer IDP are resident in the camps.

We performed some initial analysis to explore the association of clan and language with service uptake. However, due to the highly correlated nature of variables such as clan, language, area, and duration, it was not possible to reach any conclusions. Further work to assess the impact of clan and language on service provision and utilisation is needed.

Figure 17: Measles Vaccination Coverage By Area

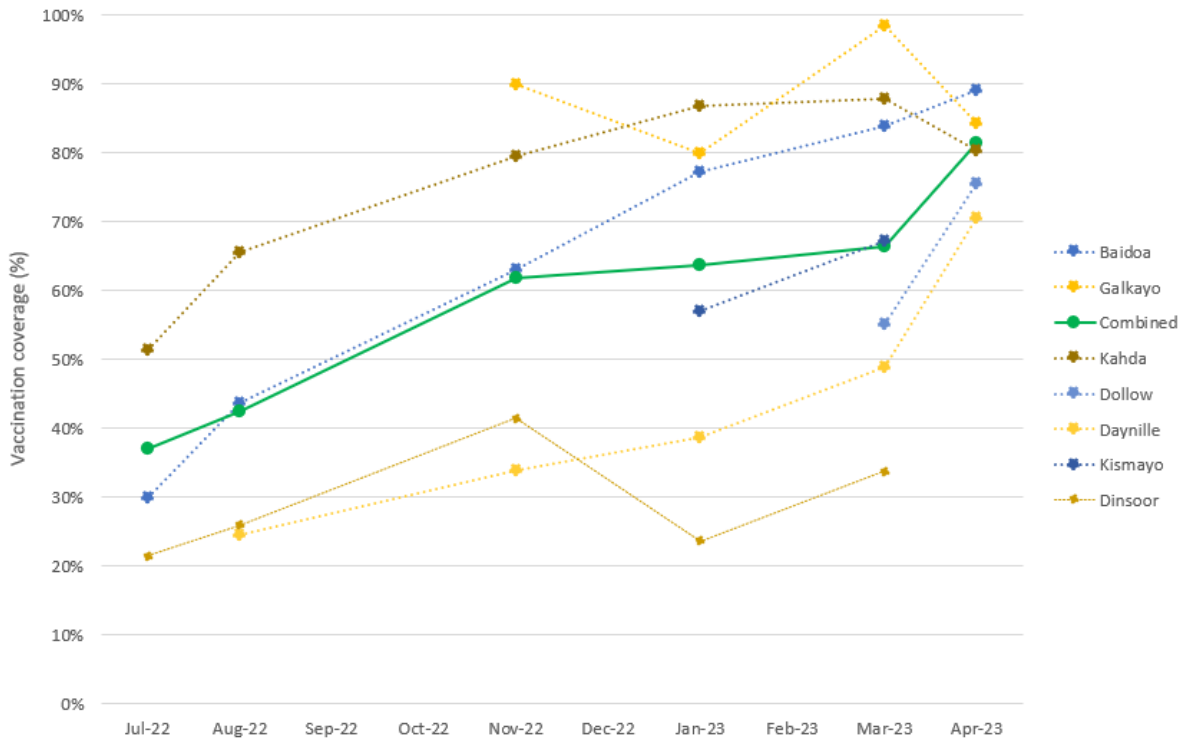
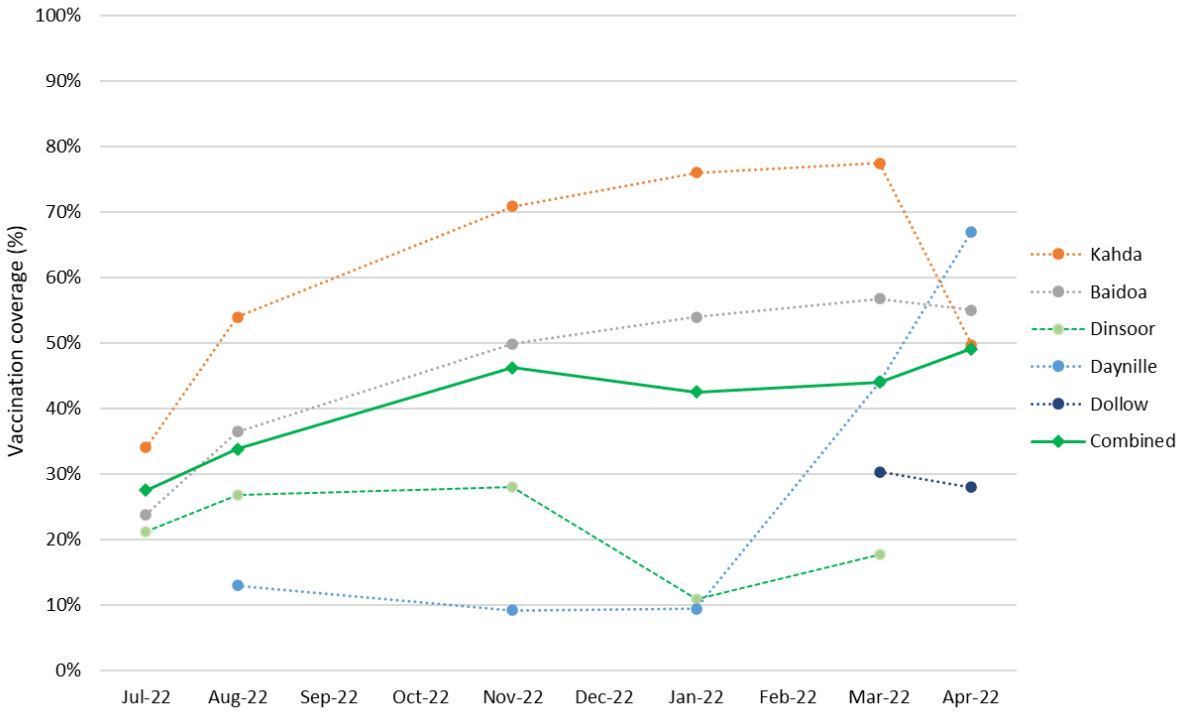


Figure 18: Oral Cholera Vaccination Coverage By Area



Trends in Morbidity

In general, the period prevalence of suspected measles fell steadily over the last year. A notable exception occurred in round 6 when an outbreak was observed in the camps in Kahda. The overall decrease in measles infection was associated with an increasing coverage in measles vaccination (see above).

Table 2: Two Week Period prevalence Suspected Measles in Children 6-59 mo.

Area	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Trend	Overall Change
Kahda	9.8%	4.3%	2.0%	2.0%	2.4%	12.9%		3.1%
Baidoa	6.9%	4.6%	1.7%	0.9%	1.5%	0.3%		-6.6%
Dinsoor	1.0%	0.4%	5.1%	5.4%	0.2%			-0.8%
Daynille		4.0%	4.4%	2.6%	5.6%	2.2%		-1.8%
Galkayo			10.2%	2.8%	0.9%	1.2%		-9.0%
Kismayo				2.9%	1.7%			-1.2%
Dollow					1.5%	2.4%		0.9%
Combined	6.5%	3.6%	3.2%	2.4%	2.4%	2.3%		-4.2%

The trend in AWD showed a similar pattern to measles. While the, overall, decreasing trend in AWD period prevalence is encouraging, we also note reports of an uptick in cases of cholera and reports of

other diarrhoeal cases following the widespread flooding seen during the Gu rains in 2023. The data captured in round 6 (April 20023) took place before the peak in this increase and would therefore have not captured the impact of this uptick on the IDP camps being monitored.[9]

Table 3: Two Week Period Prevalence of Acute Watery Diarrhoea in Children 0-59 mo.

Area	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Trend	Overall Change
Kahda	21.8%	7.8%	10.4%	7.4%	3.0%	5.4%		-16.4%
Baidoa	26.9%	20.0%	12.3%	1.9%	1.9%	0.7%		-26.2%
Dinsoor	6.2%	10.7%	10.2%	5.0%	8.3%			2.1%
Daynille		15.0%	6.6%	5.2%	12.8%	13.0%		-2.0%
Galkayo			3.8%	16.0%	0.0%	7.1%		3.3%
Kismayo				13.1%	5.9%			-7.2%
Dollow					5.3%	10.2%		4.9%
Combined	18.8%	13.6%	10.1%	6.1%	5.9%	6.1%		-12.7%

Mortality

In 2022 death rates had risen sharply from baseline levels, and between July and August were at emergency levels/IPC Phase 4 (Table 4). By round 3 (Nov 2022) the CDR had fallen below emergency level and death rates continued to fall through to April 2023. Despite the high level of mortality seen in the middle of 2023, the peak death rates observed in 2002 did not reach the levels seen in NMS data collected during 2017. In that emergency, the U5DR rose to 6 death/10,000/day, indicating a situation out of control/IPC Phase5.[10]

Table 4: Crude Death Rate (CDR) and Under-five Death Rate (U5DR) in the combined Areas

Indicator	Combined Areas						
	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Overall Change
Persons under observation	8,029	12,400	17,808	20,317	20,946	8,033	
Average recall period (days)[1]	30.4	41.8	78.6	65.3	43.3	34.8	
Person days of observation	244,082	514,878	1,388,362	1,325,871	882,524	279,166	
Total deaths reported	23	32	58	39	19	5	
Deaths in children <5 years	17	24	43	27	16	4	
Crude Death Rate[2] (CDR) deaths/10,000/day	0.9	0.6	0.4	0.3	0.2	0.2	-0.7
Under Five Death Rate[3] (U5DR) deaths/10,000/day	3.0	2.2	1.5	1.1	0.9	0.6	-2.4

[9] Weekly Cholera/AWD Situation Report - Somalia, Epidemiological Week 21 (22-28 May 2023) https://reliefweb.int/report/somalia/weekly-choleraawd-situation-report-somalia-epidemiological-week-21-22-28-may-2023

[10] Somalia: IDP Nutrition & Mortality Monitoring System (NMS) Monthly Report, 08/11/2017 https://reliefweb.int/report/somalia/somalia-idp-nutrition-mortality-monitoring-system-nms-monthly-report-5-report-issued

[1] The recall periods/days of exposure were set at a fixed one month (30.4 days) for each household in round 1 but were calculated for each household individually during susequent rounds. We used memorable dates to define the recall period for households that were newly recruited in each round: round - 2 Jul 9th; round 3 - the end of Mowlid, Oct 9th; round 4 - the Zobe 2 explosion on Oct 29th; and in round 5 - Jan 1st 2023. For household that had been recruited in a previous data collection round we used the date of the last interview to define the recall period. In Round 6 no new camps were included so the recall period for all participants was the time since the previous interview.

[2] Threshold levels for CDR are: 1/10,000,day = Emergency; 2/10,000/day = Out of control

[3] Threshold levels for U5DR are: 2/10,000,day = Emergency; 4/10,000/day = Out of control

Source: Humanitarian Charter and Minimum Standards in Humanitarian Response; Essential health services standard http://www.spherehandbook.org/en/essential-health-services-standard-1-prioritising-health-services/ and Interpreting and using mortality data in humanitarian emergencies, Checchi and Roberts (2005) http://odihpn.org/wp-content/uploads/2005/09/networkpaper052.pdf

Conclusions

Analysis of data from the six rounds of data collection conducted between July 2022 and April 20023, indicated a marked improvements in a number of indicators. However, the latest available data indicates that the improvements seen for acute malnutrition and morbidity may have plateaued at the beginning of 2023, remaining at worryingly high levels. Indeed, there was a sharp rise in suspected measles in Kahda during April and an increase in AWD in 4 out of 5 locations included in that last round of data collection.

While measles vaccination coverage increased steadily over the surveillance period, none of the locations achieved a coverage of over 90%, indicating the failure to achieve Sphere Standards in this high priority intervention. As expected, the coverage of oral cholera vaccine was lower than that achieved for measles. This may be explained on part due to the targeting of this vaccine to areas at a high risk of outbreaks. However, it is worth noting that outbreaks of cholera have continued to occur in Somalia with a wide distribution throughout the surveillance period.

In general, the adequacy of drinking water slowly improved, although there was a worrying deterioration in Baidoa and Dinsoor at the start of 2023. The use of different water sources and their adequacy deserve close monitoring as the dry season starts to reduce availability. Provision and usage of latrines has continued to be a major challenge in the response over the last year and only small gains were observed.

Data on mortality shows a steady decrease in death rates since the start of the surveillance period in July 2022. However, it is worth noting that peak death rates, as well as peak GAM and morbidity prevalence, may have occurred prior to July 2022. The lack of NMS data collection before that point prevents us from being able to provide a full picture of the evolving crisis, and when it was at its peak in the IDP population.

In summary, despite notable improvement, displaced populations are continuing to experience a serious nutrition and public health situation, which is expected to continue through the rest of 2023. The outlook for the remainder of 2023 remains worrying due to the possibility of renewed, conflict-associated, displacements, large numbers of people still remaining displaced after previous movements, and continuing outbreaks of cholera. In addition, there are the residual impacts on livelihoods of last year's drought and the floods that took place during the Gu rains in 2023.

Comparison of the NMS indicators from 2022-2023 with those collected during the 2017 emergency allow three general observations to be made. Firstly, the peak severity in malnutrition and mortality was lower in 2022-2023 than what we observed in the Afgooye Corridor in 2017. In 2022-2023, the

U5DR never crossed the extreme emergency threshold of 4 deaths/10,000/day, while in 2017 it reached 6. Secondly, while the peak severity of the emergency appeared to be higher in 2017, the decline from the peak and recovery took place over a few months. In contrast, during 2022-2023 the elevations in malnutrition and morbidity persisted for longer. Thirdly, the improvements in key programme performance indicators, such as vaccination coverage, improved more slowly in 2022-2023, suggesting the response in 2017 was better organised and implemented.

The NMS exists within the information 'ecosystem' that has been built up around the humanitarian operation in Somalia for many decades. The NMS provides one source of information to help understand part of what is happening before, during, and after a crisis. It lies within an information system that includes, amongst other things, FSNAU surveys, IPC classifications of current and projected, Cluster information systems, and the increasing involvement of federal and state-level governments. While the NMS approach inherently has a number of limitations, its strengths include speed, flexibility, purposive sampling, independence, and relatively low cost – complementing the other, more institutionalised, systems.

The Future of the NMS

It is hoped that it will be possible to continue NMS data collection to track the continued evolution of the 2022-2023 emergency. With support or partners and donors, we would also like to establish a long-standing surveillance system that includes five key IDP aggregation sites: Kahda and Daynille in the Afgooye Corridor, Baidoa, Dollow, and Kismayo. This would meet the requirements of a sentinel site surveillance system that is timely, agile, and flexible, and can provide regular information on IDP health and nutrition and can provide early warning of emerging crises and their causes. We would also like to develop approaches to integrate NMS data collection with methods developed by REACH and others to gain information on the humanitarian situation of populations in hard to reach areas.

Determining the causes of death during humanitarian emergencies is essential to the design and evaluation of interventions. Ascertaining causes during 2022-2023 has been performed by asking the care giver to report their perceived cause from a list of common causes. This has limitations. In previous studies in 2017, the Verbal Autopsy (VA) method was utilised to provide a more systematic and reliable method to estimate the contribution of different causes of death to overall mortality.[11] Moving forward, the approach to determining the causes of death that we have used in 2022-2023 could be improved by re-introducing the use of VA. This approach would become more feasible when a smaller number of surveillance locations and partners are included within the NMS, as additional training and support for the VA data collectors is required, above and beyond that needed for the core data collection team.

We would like to improve the detection and monitoring of new IDP settlements and population influx and movement, by utilising commercially available satellite imagery, combined with visual and algorithmic analysis. This approach would allow for faster ways of detecting population movements and, when combined with ground truthing field visits, would provide a means of reliable verification. As such, it may provide several advantages over current practice, including mechanisms to assist with improving transparency and accountability, and monitoring the issues of exclusion and marginalisation.

[11] 'Use of verbal autopsy for establishing causes of child mortality in camps for internally displaced people in Mogadishu, Somalia: a population-based, prospective, cohort study' (2019) A. J. Seal, M. Jelle, C. S. Grijalva-Eternod, H. Mohamed, R. Ali and E. Fottrell, Lancet Glob Health 2021 Vol. 9 Issue 9 Pages e1286-e1295

The aim of the NMS team is to continue to enhance the utility of the data reporting and dissemination process for operational agencies, donors, and decision makers. A constant, reflective, and iterative process is therefore required to ensure that opportunities are not missed to build on the success achieved so far. We will continue to explore ways in which the results and recommendations can be better linked to action. This might involve an extra process of engagement and discussion with stakeholders prior to release of the report, or other mechanisms. However, the timeliness of reporting will remain a key requirement, and future developments would need to ensure that any process could be organised and implemented without excessively delaying publication of results.

Lastly, it is worth noting that the NMS approach can be adapted to look at issues such as health service coverage and to monitor the impact of interventions in a cost-effective way.[12]

[12] Seal A, Jelle M, Hassan MY, et al. COVID-19 Prevention Behaviours and Vaccine Acceptability, and Their Association with a Behaviour Change Campaign in Somalia: Analysis of a Longitudinal Cohort. Vaccines (Basel). 2023 May;11(5):13.