NUTRITION SURVEYS

DADAAB REFUGEE CAMPS

Hagadera, Ifo, and Dagahaley camps
&
Dagahaley outskirts

Surveys conducted: August / September 2011

Report finalised: November 2011

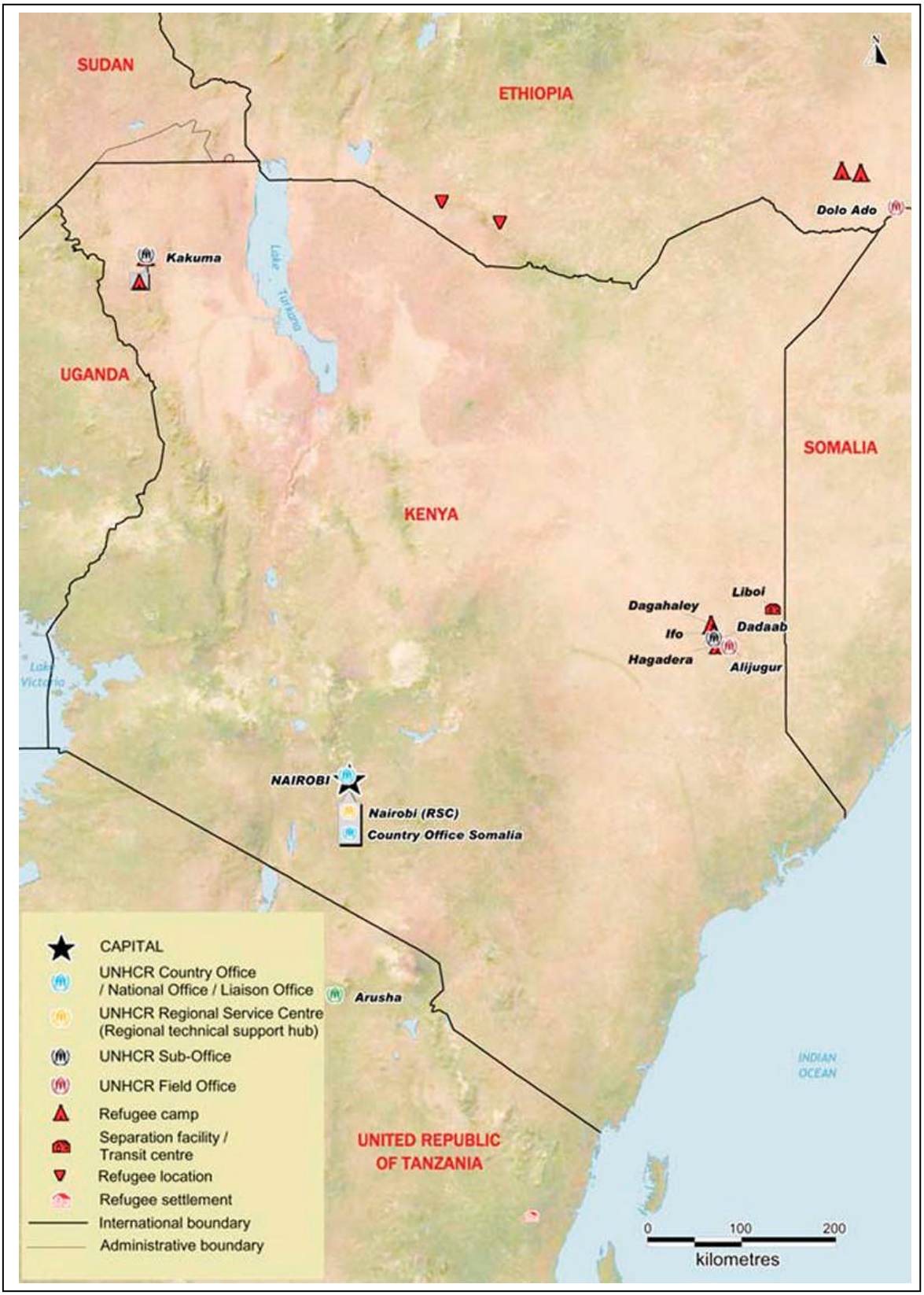
UNHCR

IN COLLABORATION WITH

ENN

IRC, GIZ, MSF-CH, ADEO

WFP, UNICEF


SUDAN
ETHIOPIA
Dolo Ado
Kakuma
Lake Turkana
UGANDA
SOMALIA
KENYA
Liboi
Dagahaley
Dadaab
Ifo
Hagadera
Alijugur
Lake Victoria
NAIROBI
Nairobi (RSC)
Country Office Somalia
Arusha
INDIAN OCEAN
UNITED REPUBLIC OF TANZANIA
CAPITAL
UNHCR Country Office / National Office / Liaison Office
UNHCR Regional Service Centre (Regional technical support hub)
UNHCR Sub-Office
UNHCR Field Office
Refugee camp
Separation facility / Transit centre
Refugee location
Refugee settlement
International boundary
Administrative boundary
0
100
200
kilometres

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ACRONYMS AND ABBREVIATIONS

ANC	Ante Natal Clinic
ADEO	African Development and Emergency Organization
CDR	Crude Death Rate
CI	Confidence Interval
CHWs	Community Health Workers
CSB	Corn-Soya Blend
CTC	Community Therapeutic Care
DEFF	Design effect
ENA	Emergency Nutrition Assessment
ENN	Emergency Nutrition Network
EPI	Expanded Programme on Immunization
Epi Info	Name of CDC software for epidemiological investigations
FSNAU	Food Security and Nutrition Analysis Unit
GAM	Global Acute Malnutrition
GFD	General Food Distribution
GFR	General Food Ration
GPS	Global Positioning System
GIZ	German Development Cooperation
HAZ	Height-for-Age z-score
Hb	Haemoglobin
HH	Household
HIS	Health Information System
IPs	Implementing Partners
LLINs	Long-Lasting Insecticidal Nets
IYCF	Infant and Young Child Feeding
IRC	International Rescue Committee
Lpppd	Litres Per Person Per Day
LNS	Lipid-based Nutrient Supplement
MAM	Moderate Acute Malnutrition
MCH	Maternal and Child Heath
MOH	Ministry of Health
MSF	Médecins sans Frontières
MUAC	Middle Upper Arm circumference
NCHS	National Centre for Health Statistics
OTP	Out-patient Therapeutic Programme
PDM	Post Distribution Monitoring
PPS	Probability Proportional to Size
ProGres	UNHCR registration database for refugees
RTI	Respiratory Tract Infection
SAM	Severe Acute Malnutrition
SC	Stabilization Centre
SCUK	Save the Children - UK
SD	Standard Deviation
SFP	Supplementary Feeding Programme
SMART	Standardised Monitoring & Assessment of Relief & Transitions
TFP	Therapeutic Feeding Programme
U3	Children under 3 years old
U5	Children under 5 years old
U5DR	Under-5 Death Rate
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Funds
WASH	Water Sanitation and Hygiene
WAZ	Weight-for-Age z-score
WHZ	Weight-for-Height z-score
WFP	World Food Programme
WHO	World Health Organization

ACKNOWLEDGMENTS

UNHCR commissioned and coordinated the surveys with technical support from ENN. We gratefully acknowledge the important contributions made by so many that made these surveys possible.

We would like to acknowledge all agencies involved in planning and executing the surveys. We thank IRC, GIZ, MSF-CH and ADEO for providing staff for the entire duration of the exercise. Thanks to IRC staff with special thanks to Millicent Kavosa for organizing the logistics, equipment and printing for the surveys and for all the participants who engaged in data collection and data entry. Thanks to WFP and UNICEF for the training and supervision support. Thanks to all drivers. A list of names of all people involved in the completion of this exercise is provided in **Appendix 1**.

Finally, we thank members of the refugee population for consenting to participate.

EXECUTIVE SUMMARY

The nutrition situation in Dadaab refugee camps had remained precarious over the past few years, however, in 2010 the prevalence levels of acute malnutrition fell below the WHO critical threshold of 15%. This year, the situation changed dramatically with the rapid influx of refugees from southern Somalia escaping famine due to drought and conflict. Several rapid assessments conducted in the camp outskirts occupied by the new arrivals in June-July 2011 showed a very high prevalence of acute malnutrition that were similar to those being reported in Somalia (> 30% GAM and >10% SAM among children aged 6-59 months).

UNHCR, with technical support from ENN, and in collaboration with WFP, UNICEF, and its implementing partners, GIZ, IRC, MSF-CH, and ADEO, carried out a nutrition survey in each of the three main camps of Dadaab: Dagahaley, Hagadera, and Ifo, and one survey in Dagahaley outskirts (clusters 1-9 and G1-G2 extension). The four surveys took place between 22nd August and 6th September 2011, with the overall aim of establishing the extent and severity of malnutrition and mortality in different age groups and to monitor selected indicators of programme performance. The survey objectives were as follows:

1. To determine the prevalence of acute malnutrition among children 6-59 months.
2. To determine the prevalence of stunting among children 6-59 months.
3. To investigate IYCF practices among children 0-23 months.
4. To assess the prevalence of anaemia among children 6-59 months and non-pregnant women of reproductive age (15-49 years).
5. To assess the period prevalence of diarrhoea among children under five years.
6. To determine the coverage of measles vaccination among children 6-59 months.
7. To determine the coverage of deworming and vitamin A supplementation in the last six months among children 6-59 months and postnatal women.
8. To assess the coverage of selective feeding programmes for children 6-59 months.
9. To assess the coverage of blanket feeding programmes for children 6-23 months.
10. To assess the prevalence of undernutrition in women using MUAC.
11. To determine the coverage of iron supplementation in pregnant women.
12. To determine the prevalence of undernutrition in children 5-9 years using MUAC.
13. To assess access and use of the GFD ration and coping mechanisms.
14. To determine the population's access to, and use of, improved water, sanitation and hygiene facilities.
15. To assess crude and under-five mortality rates in the camps in the last three months.
16. To establish recommendations on actions to be taken to address the situation.

The Standardized Monitoring and Assessment of Relief and Transitions (SMART) methodology (Version 1 April 2006) was used to collect and analyse data on child anthropometry, and mortality in the whole population. UNHCR's newly developed Standardised Nutrition Survey Guidelines for Refugee Populations (Version 1.2 June 2011) was used to collect information on anaemia in children, anaemia in women, and WASH indicators. Additional questionnaires were designed for other components. A total of 35 clusters were randomly selected in the three main camps and 30 clusters were randomly allocated in Dagahaley outskirts using probability proportional to size. UNHCR population figures from ProGres were used for cluster allocation after adjustment for population movements.

Six independent samples were included in each survey. Four population groups: children 6-59 months (n=570-595), children 5-9 years (n=390-455), infants 0-5 months (n=90-105) and women of reproductive age 15-49 years (n=240-280) were included and indicators on food security, WASH and mortality were measured in a sample of households (n=300-525). In the main camps, clusters were allocated to blocks in stage 1 and proximity sampling was used to randomly select households to survey in stage 2 sampling. In Dagahaley outskirts, the perimeter was mapped using a GPS and the tracks and waypoints uploaded and visualised using Google Earth v6. Random spatial clusters were then allocated to the outskirt areas using a grid overlay. Cluster start points were subsequently located by survey teams using GPS handsets and second-stage sampling proceeded using proximity sampling.

A total of five survey teams composed of four members each were included in each survey. A standardised training lasting four days was provided followed by a one-day pre-test. Each survey teams were supported by a team of supervisors and coordinators throughout the duration of data collection. Data for children 6-59 months and mortality were entered using ENA for SMART software (Delta version, June 20th 2011) by the supervisors and coordination team. All other data were doubled entered by four clerks using Epi Info Software (Centers for Disease Control, version 3.5.1). Data analysis was done using ENA for SMART and Epi Info software.

Summary of results

Surveyed area	Camps				Classification of public health significance or target (where applicable)
	Hagadera (excluding outskirts)	Ifo (excluding outskirts)	Dagahaley (excluding outskirts)	Dagahaley Outskirts	
Date of survey	**August 22nd-28th**	**August 22nd-28th**	**September 1st-7th**	**September 1st-6th**	
CHILDREN (6-59 months) % (95% CI)					
Acute Malnutrition (WHO 2006 Growth Standards)					
Global Acute Malnutrition (GAM)	17.2 (13.2-22.1)	22.4 (17.4-28.3)	23.2 (18.4-28.9)	38.3 (32.1-44.8)	Critical if ≥ 15%
Moderate Acute Malnutrition (MAM)	12.6 (9.8-16.2)	15.5 (11.6-20.5)	15.0 (11.8-18.9)	19.5 (16.2-23.2)	
Severe Acute Malnutrition (SAM)	4.6 (2.7-7.6)	6.8 (4.2-11.0)	8.2 (5.4-12.2)	18.8 (14.7-23.6)	
Oedema	0.2	0	0	0.2	
Stunting (WHO 2006 Growth Standards)					
Total stunting	21.8 (18.0-26.0)	23.2 (18.4-28.8)	20.7 (15.3-27.3)	27.7 (21.9-34.3)	Critical if ≥ 40%
Severe stunting	6.3 (4.7-8.3)	8.1 (5.8-11.2)	5.4 (3.1-9.2)	11.1 (7.7-15.8)	
MUAC					
At risk of malnutrition (12.5-13.4 cm)	14.3 (11.3-17.2)	22.9 (18.4-27.3)	19.1 (15.0-23.2)	26.9 (23.2-30.5)	
Moderate malnutrition (11.5-12.4 cm)	5.0 (2.8-7.1)	7.5 (4.3-10.7)	5.2 (3.0-7.5)	14.7 (11.5-17.8)	
Severe malnutrition (<11.5 cm)	1.8 (0.7-3.0)	1.3 (0.4-2.1)	1.9 (0.7-3.0)	9.7 (6.3-13.1)	
Anaemia (6-59 months)					
Total Anaemia (Hb <11 g/dl)	45.3 (40.4-50.2)	54.4 (49.5-59.2)	47.6 (42.9-52.2)	*Not included*	High if ≥ 40%
Mild (Hb 10-10.9)	24.2 (20.4-28.1)	27.5 (23.0-31.9)	27.3 (23.1-31.4)	*Not included*	
Moderate (Hb 7-9.9)	20.6 (16.7-24.5)	26.0 (21.4-30.6)	20.0 (16.3-23.6)	*Not included*	
Severe (Hb<7)	0.5 (0-1.1)	0.9 (0.1-1.7)	0.3 (0-0.8)	*Not included*	

Surveyed area	Camps				Classification of public health significance or target (where applicable)
	Hagadera (excluding outskirts)	Ifo (excluding outskirts)	Dagahaley (excluding outskirts)	Dagahaley Outskirts	
Date of survey	**August 22nd-28th**	**August 22nd-28th**	**September 1st-7th**	**September 1st-6th**	
Anaemia (6-23 months)					
Total Anaemia (Hb <11 g/dl)	63.4 (56.0-70.8)	66.8 (58.6-75.1)	62.8 (55.4-70.1)	*Not included*	
Mild (Hb 10-10.9)	32.2 (25.7-38.7)	29.3 (21.2-37.5)	29.4 (22.0-36.9)	*Not included*	
Moderate (Hb 7-9.9)	31.2 (24.5-38.0)	37.0 (28.0-45.9)	32.2 (24.0-40.4)	*Not included*	
Severe (Hb<7)	0 (0-0)	0.5 (0-1.7)	1.1 (0-2.7)	*Not included*	
Programme coverage					
OTP (based on all admission criteria WHZ, oedema and MUAC)	37.5 (21.7-53.3)	24.4 (8.1-40.6)	10.4 (1.0-19.9)	27.4 (17.9-36.9)	Target of >= 90%
OTP (based on MUAC / oedema *only*)	83.3 (56.8-100)	71.4 (26.3-100)	40.0 (2.2-77.8)	34.5 (21.0-48.1)	
SFP (based on all admission criteria WHZ and MUAC)	18.3 (10.9-25.6)	17.3 (9.7-25.0)	6.2 (1.3-11.1)	7.5 (1.7-13.3)	Target of >= 90%
SFP (based on MUAC *only*)	56.7 (40.0-73.4)	45.2 (25.7-64.8)	20.7 (2.6-38.7)	19.5 (10.1-28.9)	
Currently receiving Nutributter® (6-23 months)	48.9 (39.5-58.3)	31.3 (22.2-40.3)	47.5 (35.0-59.9)	16.6 (7.9-25.2)	
Currently have a fresh Food Voucher (6-12 months)	56.4 (46.2-66.6)	65.0 (52.1-77.9)	49.4 (34.0-64.7)	40.0 (25.4-54.6)	
Measles vaccination with card (9-59 months)	42.7 (36.2-49.2)	28.5 (19.1-37.8)	28.4 (21.3-35.5)	12.1 (5.7-18.6)	Target of >= 95%
Measles vaccination with card or recall (9-59 months)	89.2 (85.2-93.3)	89.1 (84.0-94.3)	84.3 (75.9-92.6)	83.9 (73.7-94.0)	
Vitamin A supplementation coverage with card, within past 6 months (6-59 months)	20.9 (13.6-28.2)	14.5 (6.8-22.2)	18.3 (9.9-26.7)	10.6 (4.1-17.0)	Target of >= 90%

Surveyed area	Camps				Classification of public health significance or target (where applicable)
	Hagadera (excluding outskirts)	Ifo (excluding outskirts)	Dagahaley (excluding outskirts)	Dagahaley Outskirts	
Date of survey	**August 22nd-28th**	**August 22nd-28th**	**September 1st-7th**	**September 1st-6th**	
Vitamin A supplementation coverage with card or recall, within past 6 months (6-59 months)	86.8 (82.1-91.5)	85.5 (79.5-91.6)	78.8 (69.5-88.2)	72.8 (62.6-83.0)	
Deworming coverage with card, within past 6 months (24-59 months)	5.8 (1.5-10.2)	4.6 (1.4-7.8)	13.6 (5.4-21.8)	2.1 (0-4.3)	
Deworming coverage with card or recall, within past 6 months (24-59 months)	81.7 (74.9-88.5)	79.6 (71.6-87.6)	77.1 (68.6-85.7)	42.6 (29.7-55.6)	
Morbidity					
Diarrhoea in past 2 weeks	13.5 (9.2-17.8)	17.6 (13.1-22.2)	8.8 (5.1-12.4)	15.5 (9.1-21.9)	
CHILDREN 0-23 MONTHS % (95% CI)					
Infant and Young Children Feeding Practices					
Children ever breastfed	99.3 (98.4-100)	97.7 (95.9-99.5)	97.2 (94.6-99.7)	92.1 (87.2-97.0)	
Early initiation of breastfeeding	83.3 (77.3-89.3)	90.1 (85.1-95.2)	79.9 (71.9-87.9)	32.8 (20.5-45.0)	
Exclusive breastfeeding under 6 months	47.1 (35.9-58.4)	43.0 (30.8-55.2)	34.3 (22.0-46.7)	41.2 (29.7-52.7)	
Continued breastfeeding at 1 year	62.5 (47.3-77.7)	72.7 (58.5-87.0)	70.0 (54.6-85.4)	76.2 (50.0-100)	
Continued breastfeeding at 2 years	13.3 (2.4-24.2)	33.3 (9.3-57.4)	31.0 (9.3-52.8)	33.3 (6.1-60.6)	
Introduction of solid, semi-solid or soft foods	83.3 (72.6-94.1)	61.9 (38.8-85.1)	82.1(66.2-98.1)	70.5 (52.0-88.9)	
Children bottle fed	8.1 (3.8-12.4)	11.6 (6.9-16.3)	15.0 (8.6-21.3)	17.9 (8.8-27.0)	
Children given infant formula	22.0 (15.2-28.7)	18.2 (11.5-24.9)	26.0 (19.6-32.4)	9.4 (3.8-15.0)	

Surveyed area	Camps				Classification of public health significance or target (where applicable)
	Hagadera (excluding outskirts)	Ifo (excluding outskirts)	Dagahaley (excluding outskirts)	Dagahaley Outskirts	
Date of survey	**August 22nd-28th**	**August 22nd-28th**	**September 1st-7th**	**September 1st-6th**	
CHILDREN 5-9 YEARS % (95% CI)					
MUAC					
<15 cm	25.3 (20.4-30.3)	40.1 (32.4-47.9)	28.2 (22.1-34.3)	42.7 (34.6-50.8)	
14-14.9 cm	18.5 (14.9-22.2)	27.9 (21.9-34.0)	20.2 (15.6-24.7)	24.3 (19.6-29.1)	
<14.5 cm	13.8 (9.2-18.4)	25.9 (20.1-31.8)	15.0 (9.8-20.1)	29.6 (22.0-37.2)	
<14 cm	6.8 (4.6-9.1)	12.2 (8.2-16.2)	8.0 (4.6-11.5)	18.3 (12.5-24.2)	
<13.5 cm	1.9 (0.6-3.2)	6.0 (3.3-8.7)	3.7 (1.5-5.9)	11.8 (7.1-16.5)	
Oedema	0	0	0	0	
WOMEN 15-49 YEARS % (95% CI)					
Anaemia (non-pregnant women)					
Total Anaemia (Hb <12 g/dl)	43.3 (35.6-50.9)	50.9 (42.8-59.0)	49.8 (41.3-58.3)	*Not included*	High if ≥ 40%
Mild (Hb 11-11.9)	24.9 (19.4-30.4)	18.3 (12.2-24.4)	22.1 (16.5-27.7)	*Not included*	
Moderate (Hb 8-10.9)	17.6 (12.1-23.0)	28.7 (21.6-35.8)	24.9 (17.1-32.7)	*Not included*	
Severe (Hb<8)	0.8 (0-2.0)	3.9 (0.5-7.3)	2.8 (0.8-4.8)	*Not included*	
MUAC (pregnant and lactating women)					
Moderate malnutrition (18.5-20.9 cm)	2.5 (0-6.1)	4.3 (0-10.4)	0	6.0 (0-12.9)	
Severe malnutrition (<18.5 cm)	0	0	0	0	

Surveyed area	Camps				Classification of public health significance or target (where applicable)
	Hagadera (excluding outskirts)	Ifo (excluding outskirts)	Dagahaley (excluding outskirts)	Dagahaley Outskirts	
Date of survey	**August 22nd-28th**	**August 22nd-28th**	**September 1st-7th**	**September 1st-6th**	
MUAC (non-pregnant, non-lactating women)					
Moderate malnutrition (16-18.4 cm)	0.5 (0-1.5)	0	0.5 (0-1.4)	1.7 (0-4.3)	
Severe malnutrition (<16 cm)	0	0	0.5 (0-1.4)	0	
Programme coverage, pregnant and lactating					
Pregnant women currently enrolled in ANC with card	42.4 (19.9-64.9)	31.3 (4.5-58.0)	57.1 (36.4-77.9)	52.2 (28.3-76.0)	
Pregnant women currently enrolled in ANC with card or recall	42.4 (19.9-64.9)	62.5 (40.9-84.1)	67.9 (48.4-87.3)	60.9 (41.0-80.8)	
Pregnant women currently receiving iron-folic acid pills	48.4 (24.7-72.1)	31.3 (2.1-60.4)	61.5 (40.9-82.2)	60.0 (34.8-85.2)	
Post-natal women who received vitamin A supplementation since delivery with card	16.3 (2.4-30.2)	14.8 (0.3-29.3)	31.3 (11.4-51.1)	28.1 (8.3-47.9)	
Post-natal women who received vitamin A supplementation since delivery with card or recall	32.7 (15.1-50.2)	51.9 (29.5-74.2)	81.3 (64.0-98.5)	46.9 (25.7-68.1)	
WATER SANITATION AND HYGIENE					
Soap distribution % (95% CI)					
Proportion of HH that received soap during last two distribution cycles or at reception	2.0 (0-4.1)	4.0 (1.2-6.9)	29.5 (17.2-41.9)	26.0 (13.7-38.3)	Provision of soap target: >250 g per person per month

Surveyed area	Camps				Classification of public health significance or target (where applicable)
	Hagadera (excluding outskirts)	**Ifo (excluding outskirts)**	**Dagahaley (excluding outskirts)**	**Dagahaley Outskirts**	
Date of survey	**August 22nd-28th**	**August 22nd-28th**	**September 1st-7th**	**September 1st-6th**	
Water quality % (95% CI)					
Proportion of households using an improved drinking water source	100	100	100	99.0 (96.9-100)	
Proportion of households that use a covered or narrow necked container for storing their drinking water	97.4 (95.4-99.3)	79.9 (69.2-90.7)	68.6 (56.9-80.3)	71.5 (59.7-83.2)	
Water quantity, % (95% CI)					
Litres per person per day Average lpppd	24.8	20.6	24.8	18.8	Average quantity of water available per person/day: > or = 20 litres
Proportion of households that access: **≥ 20 lpppd** **15-<20 lpppd** **10-<15 lpppd** **<10 lpppd**	 53.9 (45.8-62.1) 14.8 (10.0-19.7) 20.8 (14.4-27.3) 10.4 (6.3-14.5)	 43.2 (35.9-50.6) 14.4 (10.8-18.0) 26.2 (20.3-32.0) 16.2 (10.7-21.6)	 52. 1 (43.9-60.4) 15.6 (11.2-20.0) 22.8 (17.7-27.9) 9.4 (6.0-12.9)	 43.4 (35.3-51.5) 14.9 (10.4-19.4) 22.9 (17.2-28.7) 18.8 (11.9-25.6)	
Proportion of households that take less than 30 minutes to collect their main drinking water	9.5 (5.6-13.4)	39.5 (29.0-49.9)	22.4 (10.2-34.5)	12.9 (4.5-21.2)	
Satisfaction with drinking water supply, % (95% CI)					
Proportion of households that say they are satisfied with the drinking water supply	89.7 (82.0-97.4)	85.2 (78.0-92.4)	89.7 (83.2-96.3)	59.2 (44.3-74.2)	

Surveyed area	Camps				Classification of public health significance or target (where applicable)
	Hagadera (excluding outskirts)	Ifo (excluding outskirts)	Dagahaley (excluding outskirts)	Dagahaley Outskirts	
Date of survey	**August 22nd-28th**	**August 22nd-28th**	**September 1st-7th**	**September 1st-6th**	
Safe excreta disposal, % (95% CI)					
Proportion of HH using an improved excreta disposal facility (improved toilet facility, not shared)	47.6 (40.3-54.8)	51.3 (41.4-61.2)	58.3 (49.2-67.4)	0.4 (0-1.1)	
Proportion of HH using a shared family toilet	23.9 (18.5-29.4)	26.1 (19.5-32.7)	25.1 (17.0-33.3)	1.1 (0-2.3)	
Proportion of HH using a communal toilet	26.8 (19.8-33.8)	18.8 (12.4-25.1)	8.3 (3.3-13.3)	31.3 (19.6-43.0)	
Proportion of HH using an unimproved toilet	1.7 (0.2-3.3)	3.8 (0-7.8)	8.3 (3.5-13.0)	67.3 (55.5-79.0)	
Proportion of HH with children under-3 that dispose of faeces safely	93.0 (89.0-97.1)	97.5 (94.1-100)	95.0 (90.8-99.2)	41.6 (29.9-53.3)	
FOOD SECURITY					
Proportion of HH with a ration card % (95% CI)	99.4 (98.6-100)	99.4 (98.6-100)	100	100	
Average number of days GFR lasts	10.4	10.6	10.2	10.3	
Average number of days food from reception centre lasts	*Not included*	*Not included*	*Not included*	10.2	
RETROSPECTIVE MORTALITY OCURRING WITHIN CAMPS (~3 MONTH RECALL)					
Crude Death Rate (CDR) Deaths/10,000 /day (95% CI)	0.14 (0.04-0.46)	0.41 (0.21-0.80)	0.14 (0.05-0.36)	1.23 (0.73-2.06)	Very serious if ≥1
U5 Death Rate (U5DR) Deaths/10,000 /day (95% CI)	0.33 (0.08-1.36)	0.94 (0.45-1.98)	0.28 (0.07-1.17)	3.02 (1.72-5.24)	Very serious if ≥2

Interpretation

- The overall nutritional situation in the Dadaab main camps is of concern and indicates a recent critical food insecurity situation coupled with high levels of diarrhoea and low levels of exclusive and prolonged breast feeding practices. The prevalence of acute malnutrition in children aged 6-59 months in all three main camps is at a level indicative of a crisis, being above WHO threshold of 15%.

- Children aged 6-59 months and 5-9 years from the new arrival settlements of Dagahaley outskirts are much more affected than children in the main camps with GAM in children 6-59 months reaching extremely high levels combined with high mortality. Children tend to be much more malnourished in the first three months upon arrival in the camp. However, the GAM prevalence remains at high levels in these children even after six months of living in the camp.

- The death rates (both crude and U5) are within acceptable levels in the main camps but above emergency levels among the new arrival settlements in Dagahaley outskirts who have now been settling in Ifo extension. The situation of the other new arrivals who originally settled in Ifo outskirts and Hagadera outskirts can be assumed to be similar.

- The coverage of SFP and OTP programmes deteriorated in 2011 and was well below the Sphere Standards target of 90%.

- In the main camps, stunting prevalence has remained unchanged as compared the past years. The age groups 18-29 months and 30-41 months appear to be the most affected in all three main camps and the outskirts.

- In the main camps, the coverage of measles vaccination, vitamin A supplementation and deworming (with card or recall) were close to or above 80% but the coverage of vaccination cards decreased as compared to 2010 affecting the reliability of these results; the coverage of measles vaccination and vitamin A supplementation was similar in the outskirt survey as compared to the main camps, however the coverage of deworming was much lower in the outskirts as compared to the camps (around 43%).

- Anaemia levels in children aged 6-59 months and non-pregnant women of reproductive age (15-49 years) reduced significantly in 2011, although levels are still above the WHO cut-off of 40% for defining a high public health problem. Children aged 6-23 months are much more affected by anaemia.

- Although early initiation of breastfeeding was found to be relatively high in the three main camps, less than half of the babies surveyed were exclusively breastfed for six months while only about a third were breastfed up to two years. These results are comparable with 2010. Introduction of solid, semi-solid or soft foods in infants 6-8 months was also comparable to 2010 in all main camps. Bottle feeding and use of infant formula were found to be relatively high in all four surveys.

- A very high number of households (~79-82%) reported that the food from the general ration did not last the entire cycle of 15 days, the main reason being that the food was not enough. The most important coping strategy that was reported to be used to fill the gap when the food from the general ration ran out was to borrow from neighbors or relatives and get credit to buy food.

- Between ~38-55% of households reported selling or exchanging food ration items. The most common food item to be bought was sugar, followed by vegetables, milk, rice, pasta, potatoes, and meat.

- The lack of soap in the general distribution could be a contributing factor to the high prevalence of diarrhoea reported by caregivers during the two weeks preceding the surveys.

- The water quantity in more than half of the surveyed households was sub-standard at less than 20 litres per person per day.

- It can be assumed that new arrivals exerted pressure on hosting families in terms of food and water quantity.

- In the three main camps, households having access to communal toilets is still too high; improved or shared family toilets are preferred as they are easiest to keep clean. Hygiene practices were much poorer in the outskirts with a high proportion of households using unimproved toilets and not safely disposing of U3 children excreta.

Recommendations

Immediate term

1. Existing nutrition programmes should be continued and linkages between the programmes should be strengthened; including selective feeding programmes for malnourished children and chronic medical cases as well as blanket feeding for pregnant and lactating mothers.

2. WFP to continue the blanket supplementary feeding programme for children 6-59 months of age until the prevalence of GAM decreases to internationally acceptable levels. Ensure increased awareness and sensitisation for proper use of the supplementary foods in the target group.

3. Enhance the nutrition programme for children aged 5-9 years: Heath and nutrition agencies to scale up case finding and plan accordingly for the increased case- load; WFP to provide supplementary food to moderately malnourished children aged 5-9 years while UNICEF/UNHCR to provide therapeutic food supplies.

4. Strengthen the food distribution monitoring system including the introduction of on-site food basket monitoring to monitor the efficiency and equity of the general ration distribution system, and conduct/analyse regular post-distribution monitoring assessments.

5. Investigate the reasons for low coverage of SFP and OTP, and urgently identify and put in place strategies to increase the coverage to meet Sphere standards.

6. Increase MUAC screening cut-off at community level for children 6-59 months to 13.5 cm in order to refer all children at-risk of malnutrition for further assessment and conduct quarterly mass MUAC screening to improve coverage and monitor the nutritional situation.

7. Increase the ratio of Community Health Workers to 1:500 in the newly established camps (Ifo extension and Kambioss) to enhance active case finding of malnourished children and uptake of nutrition programme services by the refugee community.

8. Reconfigure the current community health worker activities and methods to better respond to the specific needs of the new arrivals who exhibit very poor health seeking behaviours and a limited understanding of health triggers and household management of basic illnesses.

9. Review the community health structure with the aim of strengthening the community health programme, and rationalizing the role of Community Health Workers to focus on Priority interventions. This includes active case finding for sick and malnourished persons, identification of new arrivals to educate on availability of services, identification of pregnant women, disease surveillance and mortality surveillance.

10. Heath agencies to recruit and train specialised Community Nutrition Workers to support strengthening of community nutrition outreach, community management of acute malnutrition and support to infant and young child nutrition.

11. Strengthen the awareness, promotion, and protection of Infant and Young Child Feeding through baby tents, expanded mother to mother support groups, and the hiring of a professional to undertake relactation counselling in the nutrition programmes and by accelerating sensitisation and awareness creation on appropriate breast-feeding and complementary feeding practices. Investigate the factors determining use of breast milk substitutes and bottle feeding and provide appropriate support for safe breast milk substitute utilisation where needed as well as promote breast feeding in the non-breast feeding population.

12. Health agencies to strengthen routine measles vaccination, vitamin A supplementation and de-worming in children 6-59 months through defaulter tracing at block level and house to house checking of immunisation status by Community Health Workers. Improve the supply and retention of health record cards for children, and enhance the recording of key information.

13. UNHCR to ensure adequate soap distribution on a monthly basis.

14. Scale-up of hygiene promotion activities. This is to include effective messaging and dissemination on latrine usage and maintenance and hand-washing at the community level, at schools and at

communal places, and ensuring adequate number of hygiene promoters to meet standards (1 hygiene promoter:500).

15. Review the distribution network of water to ensure equity among all blocks in the camps and to ensure adequate water supply.

16. Ensure water quality through effective chlorination and monitoring.

Medium term

1. UNHCR to conduct nutrition surveys in all camps in six months time (i.e. March 2012).

2. WFP and UNHCR to conduct an expanded food security assessment to understand the causes of food insecurity at the household level and, where appropriate, design food security interventions that can support, complement or alternatives to GFD e.g. food vouchers, cash transfers or vouchers for non-food items.

3. Health agencies to conduct qualitative assessments on health-seeking behavior with the aim of improving uptake of services.

4. UNHCR to finalize the Dadaab anaemia reduction strategy and intervention package targeting children under two years of age and pregnant women. Consideration will be given to including supplementation of all women of child-bearing age with an acceptable micronutrient formulation.

5. Improve coverage and maintenance of household latrines over the next year (1 latrine for 1 to 2 families).

6. Conduct an in-depth assessment of household water containers to examine adequacy of water containers, and water storage practices and knowledge.

Longer term

1. Develop operational research for children 5-9 years in all camps to guide MUAC screening cut-off points for this age group.

2. Improve and scale up the livelihood opportunities for the refugees through developmental-oriented initiatives to improve their economic status.

INTRODUCTION

This report presents the outcomes of four nutrition surveys conducted in Hagadera, Ifo, Dagahaley and Dagahaley outskirts within Dadaab Refugee Camp. The surveys were commissioned by UNHCR and were conducted from 22nd August to 6th September 2011. At the time of writing this report, the majority of the refugees from Dagahaley outskirts had been relocated to newly established camps.

This report is divided into the following sections:

- *Background*: In this section the background information related to the health, nutrition and food security situation is reported for the Dadaab Camp as a whole.
- The *methodology* for the surveys was similar in the three camps but differed in the outskirt survey.
- The *results* are reported separately for each of the four surveys. **Appendix 3** includes combined, weighted results for all camps for key indicators.
- The *discussion* refers to all three main camps and the outskirt survey. There were major differences found between the main camps and the outskirts whereas there were no major inter-camp differences found. The discussion highlights similarities and differences between the camps and the outskirts.
- *Recommendations* are made for Dadaab Camp as a whole because of the limited variation in the findings between the three main camps. Recommendations are also made for the newly established camps where the majority of new arrivals from the outskirt survey have now settled.

BACKGROUND

The Town of Dadaab is situated in Garissa County, a semi-arid part of North Eastern Kenya, which has a fragile ecological system. Approximately 500 km from Nairobi and 80 km from the Somali border, the Dadaab Refugee Complex has three main refugee camps (Ifo, Hagadera, Dagahaley), which cover a total area of 50 sq. km within an 18 km radius of Dadaab Town. The region surrounding Dadaab is a semi-arid desert with sparse vegetation and no surface water. Before the establishment of the camps, the area was used as rangeland by nomadic livestock owners

The camps were established in 1991/92 to cater for influx of refugees from Somalia. At the time of the survey, Kenya was bearing the burden of humanitarian crises caused by the worst famine affecting the Horn of Africa in 60 years. As a result, 148,297 refugees had crossed into Dadaab from January 2011 bringing the total registered population to 453,277 by the end of September. To accommodate the influx and reduce congestion, two more sites – Ifo extension and Kambioss were allocated, bringing the number of camps to five.

Somali refugees make up 97.5% of the entire refugee population in the Dadaab camps. Dadaab also hosts other nationalities, including Ethiopians, Sudanese, and Congolese, as well as some refugees from Burundi, Uganda, and Eritrea. Islam is the dominant religion while Christianity is largely practiced by non-Somali refugees. Although the Somali refugee population comprises mainly of nomadic pastoralists, this population also includes farmers from areas along the Southern Juba River valley, former civil servants, and traders.

The United Nations High Commission for Refugees (UNHCR) and the World Food Programme (WFP) have been working together, in partnership, to ensure that food security and related needs of the refugees are adequately addressed. WFP is responsible for the provision of the general food ration while UNHCR and its Implementing Partners provide health services, water and sanitation, shelter, and basic non-food items.

Table 1 Monthly new arrival statistics - 2011

	All new arrivals	Monthly arrival average	Registered new arrivals
January to August	116,688	14586	114679
September	31,609	16477	29031
October	8253	15655	8559
Total	156,550	46718	152269

Food Security Situation

Prevailing drought conditions in Somalia decimated this year's crop and livestock production causing food prices to soar dramatically. Prolonged insecurity also led to significant reduction in food assistance, thus causing Somalis to face numerous hurdles to reach Dadaab camps.

Refugees in Dadaab camps have limited access to additional sources of income or employment opportunities. The distance from economic centres in Kenya and the encampment policy of the Government limits movement outside the designated areas and restricts them from keeping animals or getting involved in agricultural activities.

The majority of the refugee population is thus largely dependent on the general food ration distributed by WFP as their source of food. At the time of the survey, the General Food Distribution (GFD) provided to all registered refugees comprised of 560g of food items per person per day which provides slightly above 2,100 kcal/day (Table 2).

Table 2 Contents of the general food ration – Dadaab refugee camps

Food item	Grams/person/day	Kilo-calories	Energy Provided (%)
Maize	210	735	34.7
Wheat flour	210	735	34.7
Pulses	60	205	9.6
Vegetable Oil	30	266	12.5
CSB	45	180	8.5
Salt	5	0	0
	560	**2117**	

Recommended daily minimum kcal is 2,100

Health Situation

Despite low and stable mortality rates being recorded by the Health information System (HIS) in the Dadaab camps for several years, the continuing large influx of refugees and their poor nutrition and health state has resulted in an increase in mortality rates since January 2011 (Figure 1). Overall, crude mortality rates were 0.2/1000/month for May 2011 compared to an average of 0.1 for 2010 (doubling of baseline). In under-five year olds, there was at least a threefold increase in death rates compared to the baseline rate of January to September 2010.

The main causes of illness in 2011 were upper respiratory tract infections, lower respiratory tract infections, watery diarrhoea and acute malnutrition (Figure 2). Heath services are available in the camps with three hospitals and health posts providing primary health care services including management of common illnesses, antenatal care and post natal care, immunization and supplementary feeding.

Figure 1 Crude and under-five death rates from August 2010 to August 2011 (UNHCR Health Information System)

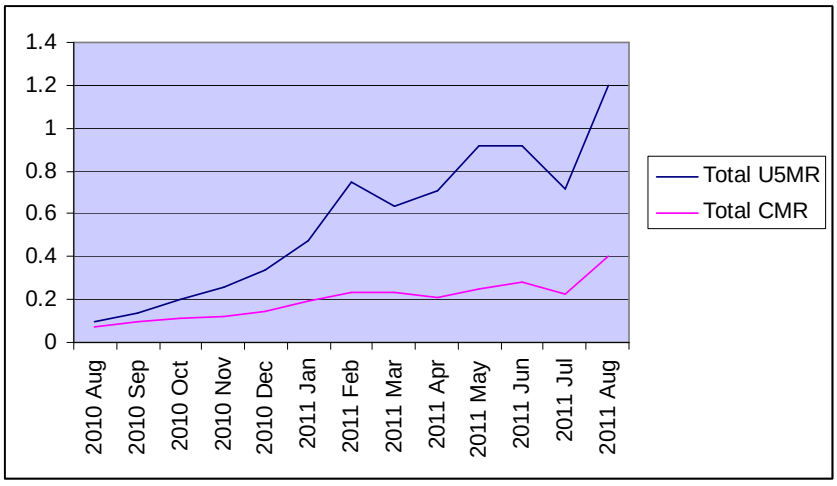
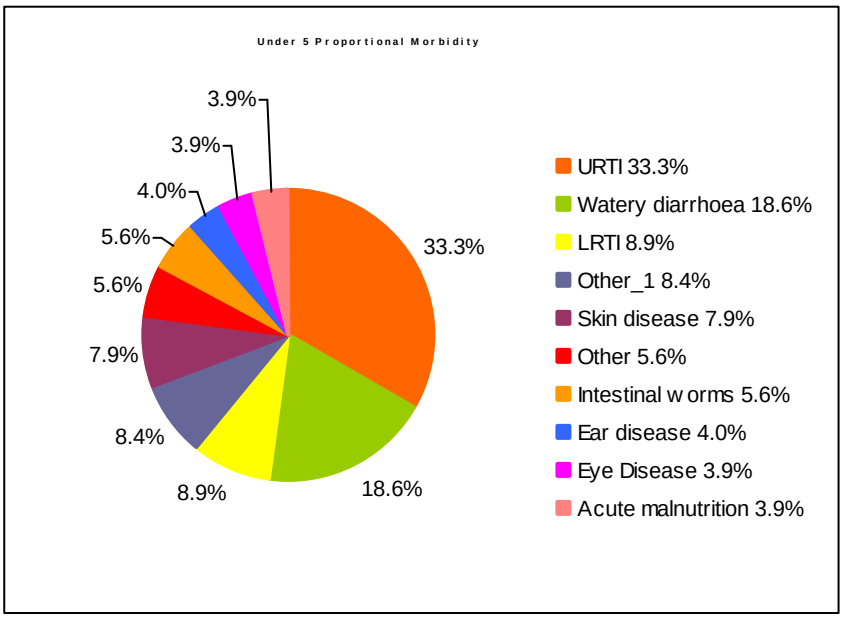


Figure 2 Under-five proportional morbidity from August 2010 to August 2011 showing (UNHCR Health Information System)



Nutrition Situation

The nutrition situation in Dadaab improved significantly from 2005 until 2010, with the prevalence of malnutrition in under five year old children falling below 15% (the level which denotes a public health emergency) for the first time in 2007[1]. The situation continued to improve until 2010 but, the situation reversed in 2011 with the influx of new arrivals from Somalia in a poor nutritional state. The long stay refugee's coping mechanisms appear to have also been negatively impacted as a result of hosting and sharing resources with the new comers.

The level of anaemia has remained high in the refugee camp and has not shown any improvement over the years until the notable reduction in the current surveys. The level of anaemia among children under-five years and women has remained much higher than 40%, the level considered to be a serious public health concern according to WHO guidelines.

Current Nutrition Services and Activities

- Targetted supplementary feeding programmes for moderately malnourished under 5s, pregnant and lactating women and patients with chronic illnesses such as TB and HIV
- Outpatient and inpatient therapeutic feeding programmes for severely malnourished children
- Blanket supplementary feeding programme for all under-fives
- Fresh food vouchers for 6-12 months
- Infant and young child feeding support and promotion programme
- Anaemia reduction and control programme
- Biannual Vitamin A supplementation and deworming for U5's
- Routine and quarterly mass MUAC screening of children 6-59 months

In 2011, the selective feeding programmes recorded a high number of admissions which was attributed to the influx of new arrivals. As shown in Figures 3 and 4 below, admissions to the selective feeding programmes began to increase sharply from January 2011 with about 50% being new arrivals from Somalia.

[1] Dadaab Nutrition Survey, 2007

Figure 3 Admissions to community therapeutic care August 2010 to August 2011 (Health Information System)

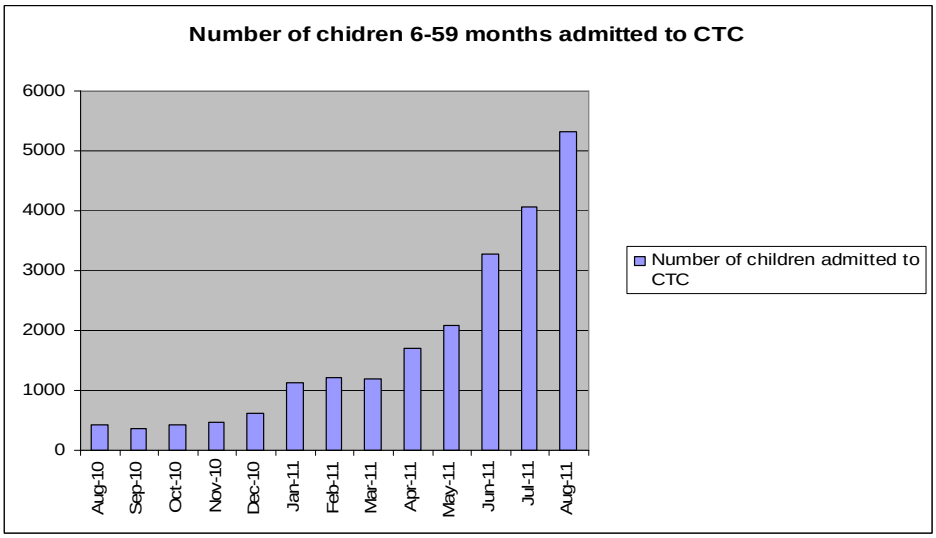
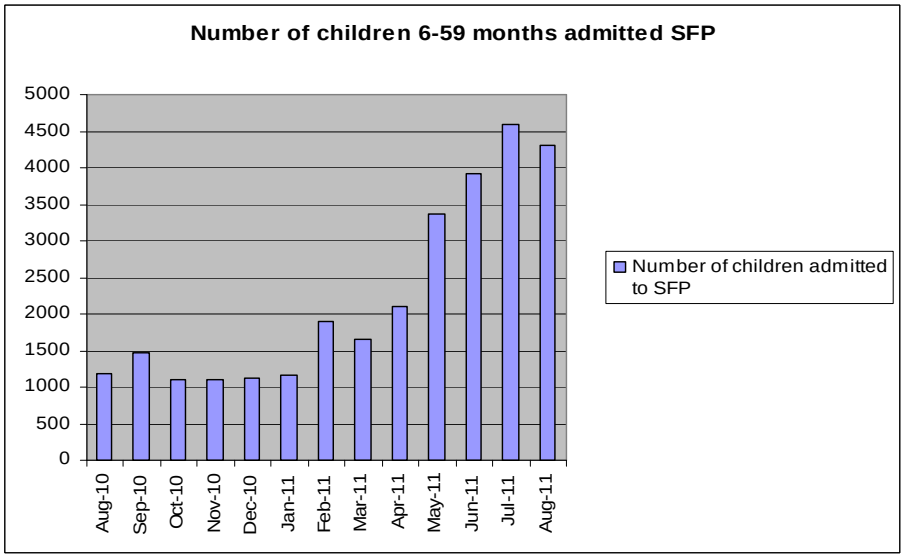


Figure 4 Admissions to Targetted SFP August 2010 to August 2011 (Health Information System)



Rapid Nutrition Assessments Carried in Out in 2011

MSF Switzerland conducted a rapid assessment in Dagahaley camp outskirts (New arrival section) in June 2011. The prevalence of Global Acute Malnutrition was found to be 37% with SAM at 18.8% in the 2700 children aged 6-59 months who were screened using weight-for-height z-scores.

MSF Spain also conducted a rapid nutritional assessment in the outskirts of Ifo from 15th to 18th of June (New arrival section). GAM was found to be 29% and SAM was found to be 14% among children aged 6-59 months screened using MUAC.

A mass MUAC screening conducted from 18th to 20th July 2011 by UNHCR, GIZ and IRC established a GAM and SAM prevalence of 29% and 6.9% respectively in Ifo camp, with SAM of 5.4% among the old caseload and 9.9% among the new arrivals. In Hagadera camp, GAM and SAM prevalence were found to be 9.7% and 1.8% respectively, with SAM of 1.1% among the old caseload and 4.4% among the new arrivals.

An exhaustive survey conducted by Epicentre in August 2011, of the outskirts of Dagahaley showed a GAM of 13.3% and SAM of 2.9% by MUAC. CDR was 1.2/10,000/day and U5DR was 2.4/10,000/day.

The results from the new arrivals mimic the situation in Somalia found in surveys conducted by FSNAU that showed a GAM above 30% based on weight-for-height.

SURVEY OBJECTIVES

1. To determine the prevalence of acute malnutrition among children 6-59 months.
2. To determine the prevalence of stunting among children 6-59 months.
3. To investigate IYCF practices among children 0-23 months.
4. To assess the prevalence of anaemia among children 6-59 months and women of reproductive age (non-pregnant, 15-49 years).
5. To assess the period prevalence of diarrhoea among children under five years.
6. To determine the coverage of measles vaccination among children 6-59 months.
7. To determine the coverage of deworming and / or vitamin A supplementation in the last six months among children 6-59 months and postnatal women.
8. To assess the coverage of selective feeding programmes for children 6-59 months.
9. To assess the coverage of blanket feeding programmes for children 6-23 months.
10. To assess the prevalence of undernutrition in women using MUAC.
11. To determine the coverage of iron supplementation in pregnant women.
12. To determine the prevalence of undernutrition in children 5-9 years using MUAC.
13. To assess access and use of the GFD ration and coping mechanisms.
14. To determine the population's access to, and use of, improved water, sanitation and hygiene facilities.
15. To assess crude and under-five mortality rates in the camps in the last three months.
16. To establish recommendations on actions to be taken to address the situation.

METHODOLOGY

Sample size

Two stage cluster surveys were conducted in all of the three main camps in Dadaab and in Dagahaley outskirts (clusters 1-9 and G1-G2 extension).

Due to the crisis and the high influx of new arrivals, there was a significant backlog of unprocessed registrations in the UNHCR ProGres database at the time of the survey planning in early August 2011. A large number of new arrivals were settling in the outskirts of the three main camps, while others were settling in the main camps within the compounds of the blocks while waiting for registration or relocation to new camps that were under construction. The number settling within the main camps was not known but was thought to range between 10-20% of the new arrivals. These uncertainties in population figures coupled with the limited time available for survey planning made it difficult to gather accurate population figures and derive demographic data for survey planning, including the percentage of under-5. It was therefore decided that a *quota* sampling method would be more efficient to use for sampling the population sub-groups to be included in these surveys, rather than a *fixed household* sampling method.

Sample size was calculated for the four population groups to include in the surveys: 1) children 6-59 months, 2) children 5-9 years, 3) infants 0-5 months and 4) women of reproductive age 15-49 years and for mortality. A sample size of households was chosen for assessing WASH and food security indicators based on logistic feasibility. The anaemia sample size in children aged 6-59 months was the same as the sample size for GAM as is recommended in UNHCR Standardised Nutrition Survey Guidelines when there is a need to assess the impact of an anaemia reduction intervention. Anaemia was not measured in the outskirt survey because it was not a priority indicator to measure given the emergency situation.

A CHW head count from Hagadera from July 2011, along with a few visits to households in the camps, were used to derive the average household size of 6 which was used to calculate the number of households to sample for the mortality assessment. The average household size was found to be 5.5 in the malaria surveys conducted in December 2010 in all Dadaab camps. Because some new arrivals were settling within the camps with relatives, the average household size was expected to have increased. ProGres average HH size (~3.5) could not be used because the definition of the household in ProGres is based on ration card sharing whereas in the nutrition survey, it is based on "a group of people who live together and routinely eat out of same pot". For example, a household as defined in the nutritional surveys can share more than one ration card. Hence, if several families shared the same pot and had more than one ration card, they were assessed as one household. This is the definition of the households that has been used in Dadaab in previous nutrition surveys.

The sample size justification, assumptions and rationale used for the household-level and individual-level indicators are summarised separately in the tables below (Tables 3-5).

Table 3 Sample size justification for household-level indicators

Indicator	Camp	Assumptions	Assumed current value	Desired precision	Assumed DEFF	Sample size needed (households)	Final sample size with non-response rate	Total number of HH per cluster
Mortality in the whole population	Main camps	Rate based on CDC mortality study of new arrivals and assessment of HIS for mortality [August 2011]. Average HH size of 6 used based on CHW count and random household visits.	0.5/10,000/d Recall period of 86-97 days	±0.35 /10,000/d	1.5	496	551 (10% NRR)	15/cluster
	DAG-OS	Results from Epicentre exhaustive survey [August 2011]: CDR: 1.2/10,000/d U5MR: 2.4/10,000/d. Average HH size of 5.5.	1.5/10,000/d Recall period of 97 days	±0.75 /10,000/d	1.5	314	369 (15% NRR)	15/cluster
WASH and food security indicators	Main camps	Use one fixed household sample based on feasibility	-	-	-	-	350	10/cluster
	DAG-OS	Use one fixed household sample based on feasibility	-	-	-	-	300	10/cluster

Abbreviations: DAG-OS: Dagahaley outskirts; DEFF: design effect; NRR: non-response rate

Table 4 Sample size justification for individual-level indicators

Survey target group and indicator	Camp	Prevalence (%) from previous surveys or assumptions	Assumed current value	Desired precision	Assumed DEFF	Sample size needed (individuals)	Final sample size with NRR	Total number of individuals per cluster
Acute malnutrition in children 6-59 months	Main camps	See Table 5 below	IFO & DAG: 20% HAG: 15%	IFO & DAG: ±5% HAG: ±4.5%	2.0	IFO and DAG: 535 HAG: 527	600 for all camps (10% NRR)	17/cluster
	DAG-OS	See Table 5 below	30%	±6%	2.0	488	574 (15% NRR)	19/cluster
Exclusive breastfeeding in infants 0-5 months	Main camps	DAG: 37.2% IFO: 42.4% HAG: 39.1%	40%	±10%	1.0	100	112 (10% NRR)	3/cluster
	DAG-OS	Assumed would be lower than main camp as not exposed to BCC activities.	35%	±12%	1.0	66	77 (15% NRR)	3/cluster
IYCF in children 6-24 months	Main camps & DAG-OS	Convenient sample determined by 6-59 months sample sizes	-	-	-	-	-	-
Undernutrition in children 5-9 years	Main camps	-	20%	±5%	1.5	401	446 (10% NRR)	13/cluster
	DAG-OS	-	25%	±6%	1.5	327	385 (15% NRR)	13/cluster
Undernutrition and / or anaemia in women 15-49 years	Main camps	Based on anaemia in non-pregnant women. Assumed pregnancy and lactation prevalence of 30% hence sample size multiplied by 1.3	65%	±10%	2.0	247	274 (10% NRR)	8/cluster
	DAG-OS	Based on undernutrition	30%	±7%	1.0	179	210 (15% NRR)	8/cluster

Abbreviations: DAG: Dagahaley camp; DAG-OS: Dagahaley outskirts; DEFF: design effect; HAG: Hagadera camp; NRR: non-response rate

Table 5 Sample size justification and rationale for acute malnutrition in children 6-59 months (main survey outcome)

Camp	Description	Nutrition surveys August 2010	Estimated prevalence, desired prevision and DEFF	Sample size with NRR
HAG (Survey 1)	Results from exhaustive mass screening (camp + outskirts) based on MUAC in children 6-59 months (65-110 cm) [July 18-20 2011] GAM MUAC old stayers: 7.8% GAM MUAC new arrivals (<3 mo): 17.6%	GAM 5.6% (3.6-8.7 95% CI)	15%, ±4%, DEFF 2	667 (741 with 10% NRR) Number is too high and not feasible, compromise on precision in final sample size calculation.
IFO (Survey 2)	Results from exhaustive mass screening (camp and outskirts) based on MUAC in children 6-59 months (65-110 cm) [July 18-20 2011] GAM MUAC old stayers: 22.6% GAM MUAC new arrivals (< 3 mo): 42.4%	GAM 7.6% (5.7-10.2 95% CI)	20%, ±5%, DEFF 2	535 (594 with 10% NRR)
DAG (Survey 3)	-	GAM 10.7% (8.1-14.0 95% CI)	20%, ±5%, DEFF 2	535 (594 with 10% NRR)
DAG-OS (Survey 4)	Results from rapid assessment in children 6-59 months [MSF Switzerland, July 2011]: GAM WHZ: 37% GAM MUAC: 24% Results from Epicentre exhaustive survey in Dagahaley outskirts based on MUAC and oedema [August 2011] GAM MUAC: 13.3%	-	30%, ±6%, DEFF 2	488 (574 with 15% NRR)
Rationale	Expectation that prevalence estimate based on WHZ will give a higher prevalence than that based on MUAC. Expectation that GAM in new arrivals will be higher than GAM in old stayers. Expectations that GAM in old stayers will have increased compared to last year's August nutritional surveys due to increase in sharing, hosting new arrivals and disruption of camp services. Expectation that there is significant heterogeneity in malnutrition within the camps, hence the use of a design effect of 2.			

Abbreviations: DAG: Dagahaley camp; DAG-OS: Dagahaley outskirts; DEFF: design effect; HAG: Hagadera camp; NRR: non-response rate

Sampling procedure: selecting clusters

Due to the large number of indicators and based on the pre-testing of the questionnaires, it was estimated that no more than 15 households could be surveyed in one day by each team. Hence, a total of 35 clusters were randomly selected in the three main camps using probability proportional to size (PPS).

Due to the different geographical configuration of the households, the sampling procedure differed between the three main camps and Dagahaley outskirts. In the main camps, clusters were allocated to blocks. In Dagahaley outskirts this was not possible as the area had not been recently mapped and the extent of the area and the population size was uncertain. Therefore, it was decided to map the perimeter of the self-settlement outskirt area using a GPS and the resulting tracks and waypoints were downloaded into Google Earth v6 and visualised. Random spatial clusters were then allocated to the survey areas using an overlaid grid and x,y coordinates randomly generated in an Excel spreadsheet.

For the outskirt survey, the initial sampling design included the north-eastern outskirts in addition to the main outskirts and the southern outskirts (also known as G1-G2 extension) (see **Appendix 6** for maps). Thirty-five clusters were originally allocated to this target population in these three areas defined as camp outskirts. However, after further assessment work on the ground it was decided exclude the north-eastern outskirts as the characteristics of this population group were likely to differ significantly from the other outskirts areas and the cluster number was brought down to 30.

Adjusted population data from UNHCR ProGres was used for cluster selection in the three main camps and in the initial allocation of clusters in the outskirt areas of Dagahaley camp. Initial assessments indicated that the registration data did not accurately reflect where many of the new arrivals were actually living and, in addition, it was not possible to physically locate some of the locations recorded in the ProGres database. To

overcome these constraints the population figures for areas adjacent to the outskirts in the three camps were adjusted to account for the estimated number of new arrivals that had been registered in the pre-existing camp blocks but had, in reality, settled in the outskirts due to overcrowding. These adjusted estimates were used in cluster allocation calculations conducted in ENA for SMART. The resulting allocations are given in **Appendix 5**.

Sampling procedure: selecting households and individuals

In the Dadaab camps, blocks are usually rectangular in shape with narrow paths going across them households live mainly in large compounds surrounded by fences made of wood and other building material. Hence, in the three main camps, second stage sampling was performed using an adapted version of the standard EPI (spin the pen) method to select the households to survey. To select the first household to survey, survey team walked around the block and assigned a number to each path entering the block. They then randomly selected a path using random numbers. Once a path was selected, they walked down that path assigning a number to each compound door found on the left and on the right until the end of the path was reached or until the first intersection with other paths. They then randomly selected the first household to survey using random numbers. The subsequent households were selected by walking out of the same compound door, turning left out of the household and following the path and selecting the next house on the left side.

In Dagahaley outskirts, the new arrivals had mainly settled in shelters with no organised structure. Hence, the teams selected the first household to survey by going to the one closest to the GPS start point in a 360 degree angle. Subsequent households were selected by going to the nearest household within a 360 degree radius from the last household surveyed. When it was difficult to determine which household was closest to the last household surveyed, teams counted the number of footsteps in between households to assess which one was the closest.

In all four surveys, standardised procedures were followed by all teams. All households were selected, whether or not they had an eligible individual, until the quota for the household indicator was reached. All eligible individuals within the selected households were measured until the quota for the target group was reached. When a household was visited to get the last individual for the target group quota and there were several eligible individuals in the household, all were measured and included in the sample.

If an individual or an entire household was absent, the teams were instructed to return to the absent household or revisit the absent individual up to two times on the same survey day. If they were unsuccessful after this, the individual or the household were recorded as an absence and they were not replaced with another household or individual.

If an individual or an entire household refused to participate, then it was considered a refusal and the individual or the household were not replaced with another household or individual.

If a selected household was abandoned, the household was replaced by another household.

If a selected child was disabled with a physical deformity preventing certain anthropometric measurements, the child was still included in the assessment of the other indicators.

Questionnaires

The questionnaires are included in **Appendix 7.**

The questionnaires were prepared in English language and administered in Somali language via translators. The questionnaires were pre-tested before the survey.

Seven module questionnaires were designed to provide information on the relevant indicators of the different target groups as indicated in the survey objectives. It was decided not to determine long-lasting insecticidal net (LLIN) coverage in the persent surveys because a survey conducted in December 2010 showed relatively high coverage and HIS reported minimal malaria cases among children U5. Data on time of arrival in the camp (by month since January 2011) and ethnicity were collected in the different modules.

The seven module questionnaires covered the following areas and the following measurements:

Module 1*: Mortality*- This included questions related to mortality in the last three months among the whole population.

***Module 2**: Food Security*- This included questions on access and use of the GFD ration and coping mechanisms when the GFR ran out ahead of time. The number of days the food ration from the reception centre lasted was assessed in the outskirts only.

***Module 3**: WASH*- This included questions on availability of jerry-cans, access to improved drinking water source, storage of water, quantity of water used per household, time to collect water, satisfaction with the water supply, type and quality of excreta disposal facilities in use, safe disposal of young children's stools and soap distribution coverage.

***Module 4:** Women 15-49 years*- This included questions and measures on women aged 15-49 years. Information was collected on women's pregnancy and lactating status, coverage of iron-folic acid pills and post-natal vitamin A supplementation, MUAC measurements for all women and haemoglobin assessment for non-pregnant women only (except in the outskirts).

***Module 5**: Children 6-59 months*- This included questions and measures on children aged 6-59 months. Information was collected on anthropometric status, oedema, enrolment in selective feeding programmes and blanket programmes (Nutributter® and Fresh Food Voucher), immunisation (measles and PENTA), vitamin A supplementation and deworming in last six months, morbidity from diarrhoea in past two weeks, haemoglobin assessment for all children (except in the outkirts) and feeding practices for children aged 6-24 months only.

***Module 6**: Children 5-9 years*- This included oedema assessment and anthropometric measurement by MUAC only on children aged 5-9 years.

Module 7: *Infant 0-5 months*- This included questions on infant feeding for children aged 0-5 months.

Measurement methods

Household-level indicators

Mortality: An individual-level mortality form was adapted from a version used by FSNAU and used to collect mortality occurring within the camps and Dagahaley outskirts. Data entry and analysis was done in ENA for SMART with the household-level summary data derived from the form.

Food security: The questionnaire used was similar to the ones used in previous nutrition surveys in Dadaab.

WASH: The questionnaire used was an adapted version of the one recommended in UNHCR's newly developed Standardised Nutrition Survey Guidelines for Refugee Populations (Version 1.2 June 2011).

Individual-level indicators

Sex of children: Gender was recorded as male or female.

Birth date or age in months for children 0-59 months: The exact date of birth (day, month, year) was recorded from either an EPI card, UNHCR manifest, child health card or birth notification if available. If no reliable proof of age was available, age was estimated in months using a local event calendar or by comparing the selected child with a sibling whose ages were known, and was recorded in months on the questionnaire. If the child's age could absolutely not be determined by using a local events calendar or by probing, the child's length/height was used for inclusion; the child had to measure between 65 cm and 110 cm.

Age of children 5-9 years and women 15-49 years: Unlike small children, the exact date of birth of children 5-9 years or women were not recorded. Reported age was recorded in years.

Weight of children 6-59 months: Measurements were taken to the closest 100 grams using an electronic scale (SECA scale) with a wooden board to stabilise it on the ground. Most children were weighed with clothes. Previous experience in Dadaab has shown that it is very difficult to convince caregivers to remove clothes from children during weighing in nutrition surveys. Hence, samples of typical clothes from children aged 6 months to 5 years were weighed and the mean weight of 117 grams was taken into consideration during data analysis.

Height/Length of children 6-59 months: Children's height or length was taken to the closest millimetre using a wooden height board (Shorr Productions). Height was used to decide on whether a child should measured lying down (length) or standing up (height). Children less than 87cm were measured lying down, while those greater than or equal to 87cm were measured standing up.

Oedema in children 6 months-9 years: bilateral oedema was assessed by applying gentle thumb pressure on to the tops of both feet of the child for a period of three seconds and thereafter observing for the presence or absence of an indent. All oedema cases reported by the survey teams were verified by the survey coordinators and were referred immediately.

MUAC of children 6 months-9 years and women 15-49 years: MUAC was measured at the mid-point of the left upper arm between the elbow and the shoulder and taken to the closest millimetre using a standard tape. MUAC was recorded in centimers for children and millimetres for women.

Child enrolment in selective feeding programme for children 6-59 months: Selective feeding programme coverage was assessed for the outpatient therapeutic programme and for the supplementary feeding programme using the direct method.

Haemoglobin concentration in children 6-59 months and women 15-49 years: Hb concentration was taken from a capillary blood sample from the fingertip and recorded to the closest gram per decilitre by using the portable HemoCue Hb 301 Analyser (HemoCue, Sweden). If severe anaemia was detected, the child or the woman was referred immediately.

Measles vaccination in children 6-59 months: Measles vaccination was assessed by checking for the measles vaccine on the EPI card if available or by asking the caregiver to recall if no EPI card was available.

PENTA vaccination in children 6-59 months: The PENTA vaccination includes five components: Diptheria, Pertussis, Tetanus, Hepatitis B, Haemophilus Influenzae Type b and is given in three doses on three different occasions. PENTA vaccination was assessed by checking for the first, second or third PENTA dose and was only assessed with card.

Vitamin A supplementation in last 6 months in children 6-59 months: Whether the child received a vitamin A capsule over the past six months was recorded from the EPI card or health card if available or by asking the caregiver to recall if no card is available. A vitamin A capsule was shown to the caregiver when asked to recall.

Deworming in last 6 months in children 6-59 months: Whether the child received a deworming pill over the past six months was recorded from the EPI card or health card if available, or by asking the caregiver if no card was available.

Diarrhoea in last 2 weeks in children 0-59 months: Caregivers were asked if their child had suffered from diarrhoea in the past two weeks and were asked about the feeding practices during diarrhoea.

ANC enrolment and iron and folic acid pills coverage: If the surveyed woman was pregnant, it was assessed by card or recall whether she was enrolled in the ANC programme and was receiving iron-folic acid pills.

Post-natal vitamin A supplementation: If the surveyed woman was lactating (i.e. delivered a baby in the last six months and was lactating), it was assessed by card or recall whether she had received vitamin A supplementation.

Infant and young child feeding practices in children 0-23 months: Infant and young child feeding practices were assessed based on standard WHO recommendations (WHO 2007) as was used in previous years in Dadaab.

Referrals: Children aged 6-59 months were referred to health post for treatment when MUAC was < 12.5 cm, when oedema was present, or when haemoglobin was < 7.0 g/dL. Children aged 5-9 years were referred to health post for screening when MUAC was < 14.0 cm or when oedema was present. Women of reproductive age were referred to the hospital for treatment when MUAC was below 16.0 cm or haemoglobin was < 6.0 g/dL.

Case definitions and calculations

Mortality: The crude death rate (CDR) and the U5 death rate (U5DR) were expressed as the number of deaths per 10,000 people per day. The formula below was applied:

Crude Death Rate (CDR) = 10,000/a*f/ (b+f/2-e/2+d/2-c/2)
Where:
a = Number of recall days
b = Number of current household residents
c = Number of people who joined household during recall period
d = Number of people who left household during recall period
e = Number of births during recall period
f = Number of deaths during recall period

Malnutrition in children 6-59 months: Acute malnutrition was defined using weight-for-height index values or the presence of oedema and classified as show in Table 6. Main results are reported after analysis using the WHO 2006 Growth Standards. Results using the NCHS 1977 Growth Reference are reported in **Appendix 2**.

Table 6 Definitions of acute malnutrition using weight-for-height and/or oedema in children 6–59 months

Categories of acute malnutrition	Percentage of median (NCHS Growth Reference 1977 only)	Z-scores (NCHS Growth Reference 1977 and WHO Growth Standards 2006)	Bilateral oedema
Global acute malnutrition	<80%	< -2 z-scores	Yes/No
Moderate acute malnutrition	<80% to ≥70%	< -2 z-scores and ≥ -3 z-scores	No
Severe acute malnutrition	>70%	> -3 z-scores	Yes
	<70%	< -3 z-scores	Yes/No

Stunting, also known as chronic malnutrition was defined using height-for-age index values and was classified as severe or moderate based on the cut-offs shown in Table 7. Main results are reported according to the WHO Growth Standards 2006. Results using the NCHS 1977 Growth Reference are reported in **Appendix 2**.

Table 7 Definitions of stunting using height-for-age in children 6–59 months

Categories of stunting	Z-scores (WHO Growth Standards 2006 and NCHS Growth Reference 1977)
Stunting	<-2 z-scores
Moderate stunting	<-2 z-score and >=-3 z-score
Severe stunting	<-3 z-scores

Underweight was defined using the weight-for-age index values and was classified as severe or moderate based on the cut-offs shown in Table 8. Main results are reported according to the WHO Growth Standards 2006. Results using the NCHS 1977 Growth Reference are reported in **Appendix 2**.

Table 8 Definitions of underweight using weight-for-age in children 6–59 months

Categories of underweight	Z-scores (WHO Growth Standards 2006 and NCHS Growth Reference 1977)
Underweight	<-2 z-scores
Moderate underweight	<-2 z-scores and >=-3 z-scores
Severe underweight	<-3 z-scores

Mid Upper Arm Circumference (MUAC) values in children 6-59 months were used to define malnutrition according to the cut-offs shown in Table 9.

Table 9 Classification of acute malnutrition based on MUAC in children 6-59 months (WHO)

Categories of Malnutrition	MUAC Reading
At risk of malnutrition	≥ 12.5 cm and <13.5 cm
Moderate malnutrition	≥ 11.5 cm and <12.5 cm
Severe malnutrition	< 11.5 cm

Child enrolment in selective feeding programme for children 6-59 months: selective feeding programme coverage was assessed using the direct method as follows:

Coverage of SFP programme (%) =
100 x No. of surveyed children with MAM according to SFP admission criteria who reported being registered in SFP
No. of surveyed children with MAM *according to SFP admission criteria*

Coverage of OTP programme (%) =
100 x No. of surveyed children with SAM according to OTP admission criteria who reported being registered in OTP
No. of surveyed children with SAM *according to OTP admission criteria*

Infant and young child feeding practices in children 0-23 months: Infant and young child feeding practices were assessed as follows based on standard WHO recommendations (WHO 2007).

WHO core indicator 1. Early initiation of breastfeeding:
Proportion of children born in the last 24 months who were put to the breast within one hour of birth.
Children born in the last 24 months who were put to the breast within one hour of birth
Children born in the last 24 months

WHO core indicator 2. Exclusive breastfeeding under 6 months:
Proportion of infants 0–5 months of age who are fed exclusively with breast milk: including milk expressed or from a wet nurse, ORS, drops or syrups (vitamins, breastfeeding minerals, medicines)
Infants 0–5 months of age who received only breast milk during the previous day
Infants 0–5 months of age

WHO core indicator 3. Continued breastfeeding at 1 year:
Proportion of children 12–15 months of age who are fed breast milk.
Children 12–15 months of age who received breast milk during the previous day
Children 12–15 months of age

WHO core indicator 4. Introduction of solid, semi-solid or soft foods:
Proportion of infants 6–8 months of age who receive solid, semi-solid or soft foods.
Infants 6–8 months of age who received solid, semi-solid or soft foods during the previous day
Infants 6–8 months of age

WHO optional indicator 9. Children ever breastfed:
Proportion of children born in the last 24 months who were ever breastfed.
Children born in the last 24 months who were ever breastfed
Children born in the last 24 months

WHO optional indicator 10. Continued breastfeeding at 2 years:
Proportion of children 20–23 months of age who are fed breast milk.
Children 20–23 months of age who received breast milk during the previous day
Children 20–23 months of age

WHO optional indicator 14. Bottle feeding:
Proportion of children 0-23 months of age who are fed with a bottle
Children 0–23 months of age who were fed with a bottle during the previous day
Children 0–23 months of age

Diarrhoea: Three or more loose or watery stools in a 24-hour period.

Continued feeding during diarrhoea: Breastfeeding or food offered at about the same or greater frequency during diarrhoea as before diarrhoea started (FANTA 1999).

Undernutrition in women of reproductive age: Mid Upper Arm circumference (MUAC) in women was classified according to cut-offs shown in Table 10.

Table 10 Classification of undernutrition based on MUAC in women of reproductive age (Kenya National Guidelines for integrated management of acute malnutrition, 2009)

Categories of Malnutrition	MUAC Reading
Pregnant and lactating women	
Moderate malnutrition	≥18.5 cm and <21 cm
Severe malnutrition	<18.5 cm
Non-pregnant, non-lactating	
Moderate malnutrition	≥16.0 cm and <18.5 cm
Severe malnutrition	<16.0 cm

Anaemia in children 6-59 months and women of reproductive age: Anaemia was classified according to the cut-offs in children 6-59 months and non-pregnant women of reproductive age shown in Table 11. Anaemia cut-offs for pregnant women should be adjusted depending on the stage of pregnancy (gestational age). Pregnant women are not included in routine UNHCR nutrition surveys for the assessment of anaemia due sample size issues (usually a small number of pregnant women is found) as well as the difficulties in assessing gestational age in pregnant women.

Table 11 Definition of anaemia (WHO 2000)

Age/Sex groups	Categories of Anaemia (Hb g/dL)			
	Total	Mild	Moderate	Severe
Children 6 - 59 months	<11.0	10.9 - 10.0	9.9 - 7.0	< 7.0
Non-pregnant adult females 15-49 years	<12.0	11.9 - 11.0	10.9 - 8.0	< 8.0

Classification of public health problems and targets

Mortality: The thresholds used for mortality are shown in Table 12.

Table 12 Mortality benchmarks for defining crisis situations (NICS, 2010)

Emergency threshold
CDR > 1/10,000 / day: 'very serious' CDR > 2 /10,000 /day: 'out of control' CDR > 5 /10,000 /day: 'major catastrophe' (double for U5MR thresholds)

Anthropometric data: UNHCR Strategic Plan for Nutrition and Food Security (2008-2012) states that the target for the prevalence of global acute malnutrition (GAM) for children 6-59 months of age by camp, country and region should be < 5% and the target for the prevalence of severe acute malnutrition (SAM) should be <1%. Table 13 shows the classification of public health significance of the anthropometric results for children under-5 years of age according to WHO.

Table 13 Classification of public health significance for children under 5 years of age (WHO 1995, 2000)

Prevalence %	Critical	Serious	Poor	Acceptable
Low weight-for-height	≥15	10-14	5-9	<5
Low height-for-age	≥40	30-39	20-29	<20
Low weight-for-age	≥30	20-29	10-19	<10

Selective feeding programmes: UNHCR Strategic Plan for Nutrition and Food Security 2008-2012 includes the following indicators:

- % of supplementary feeding programmes that meet SPHERE standards for performance: recovery >75%, case fatality <3%, defaulter rate <15%, and coverage >50% for rural areas, >70% for urban areas and >90% for camps – by camp and country.
- % of programmes for management of SAM that meet SPHERE standards for performance and adhere to standard treatment protocols: recovery >75%, case fatality <10%, defaulter rate <15%, and coverage >50% for rural areas, >70% for urban areas and >90% for camps regardless of whether facility based or community based – by camp or facility (if non camp-based).

Measles vaccination coverage: UNHCR recommends target coverage of 95% (same as Sphere Standards).

Vitamin A supplementation coverage: UNHCR Strategic Plan for Nutrition and Food Security (2008-2012) states that the target for vitamin A supplementation coverage for children aged 6-59 months by camp, country and region should be >90%.

Anaemia data*:* UNHCR Strategic Plan for Nutrition and Food Security (2008-2010) states that the targets for the prevalence of anaemia in children 6-59 months of age and in women 15-49 years of age should be low i.e. <20%. The severity of the public health situation should be classified according to WHO criteria as shown in Table 14.

Table 14 Classification of public health significance (WHO 2000)

Prevalence %	High	Medium	Low
Anaemia	≥40	20-39	5-19

WASH: Diarrhoea caused by poor water, sanitation and hygiene accounts for the annual deaths of over two million children under five years old. Diarrhoea also contributes to high infant and child morbidity and mortality by directly affecting children's nutritional status. Refugee populations are often more vulnerable to public health risks and reduced funding can mean that long term refugee camps often struggle to ensure the provision of essential services, such as water, sanitation and hygiene. Hygienic conditions and adequate access to safe water and sanitation services is a matter of ensuring human dignity and is recognised as a fundamental human right. The standards (amongst others) shown in Table 15 apply to UNHCR WASH programmes.

Table 15 UNHCR WASH Programme Standards

UNHCR Standard	Indicator
Average quantity of water available per person/day	> or = 20 litres
Latrine provision	20 people/latrine
Soap provision	> 250 g per person per month

Training, coordination and supervision

The surveys were coordinated by two UNHCR nutritionists (Gloria Kisia, Terry Theuri) with technical support from an ENN team of three consultants (Mélody Tondeur, Sarah Style, and Andrew Seal,) and assistance from the IRC Nutrition Manager (Millicent Kavosa), GIZ Nutrition Coordinator (Sarah Oteri), MSF-CH outreach Officer (Daud Shimbir), ADEO Nutrition Officer (Mary Orwenyo), two WFP nutritionists (Colin Bulleti, Sahar Nejat) and one UNICEF nutritionist (Francis Kidake).

The surveys were undertaken by 20 teams (five teams per camp). Each team was composed of four members; a team leader, a translator and two measurers. The supervision of data collection was conducted by the nutritionists from the agencies mentioned above in addition to two supervisors per camp. The teams were supervised on a daily basis. The team leader was the interviewer for all questionnaires and was the one responsible for taking the haemoglobin measurements. This was a change from pervious surveys in Dadaab where other team members took haemoglobin measurements. The team leader worked with the translator at all times. The rest of the team members took the anthropometric measurements and assisted with sampling, age determination and reading of health/vaccination cards or birth certificates. The team leaders were from IRC, GIZ, MSF-CH, SC-UK, ADEO and MOH while the rest of the team members were largely drawn from community health workers. Each of the survey workers had minimum O'level qualification plus previous experience conducting nutrition surveys. Each of the team-leaders and supervisors had minimum college level education with previous experience conducting and supervising nutrition surveys.

The training lasted four days followed by a one day pre-test. For Hagadera and Ifo, the training lasted from August 15th-18th and the pre-test was on August 20th. For Dagahaley and outskirts, the training lasted from August 24th-27th and the pre-test was on September 30th. The training focused on: the purpose and objectives of the survey; roles and responsibilities of each team member, familiarization with the questionnaires by reviewing the purpose for each question; interviewing skills and recording of data; interpretation of calendar of events and age determination; how to take anthropometric measurements and haemoglobin measurements and common errors; and a practical session on sampling procedures. The practical session on anthropometric measurements involved volunteer children for practice as well as a standardisation test. The practical session on haemoglobin measurements involved the trainees and trainers themselves as well as a standardisation test.

For the pre-test, three-five households were selected by each of the teams who administered the questionnaires and took the required measurements. The data collection tools were then reviewed based on the feedback from the field pre-test.

Data collection lasted seven days from 22nd – 28th August 2011 in Hagadera and Ifo. In Dagahaley outskirts and Dagahaley main camp the data collection ran concurrently from September 1st to 7th 2011. Each survey team explained the purpose of the survey and issues of confidentiality and obtained verbal consent before proceeding with the survey in the selected households. The informed consent form is shown in **Appendix 6**.

Data analysis

Data entry was completed at UNHCR sub-office in Dadaab town and was done as the surveys were on-going. All questionnaires were manually checked for completeness, consistency and range before data entry by the supervisors and coordination team. This check was also used to provide feedback to the teams to improve data collection as the survey progressed.

Data for children 6-59 months and mortality were entered using ENA for SMART software (delta version June 20th 2011) by the supervisors and coordination team. After completion of the survey data entry, all entries were double checked one by one with the original questionnaire to ensure there were no data entry errors.

Data for children 5-9 years, infants 0-5 months, women 15-49 years, WASH and food security indicators were doubled entered by four clerks using Epi Info Software (Centers for Disease Control, version 3.5.1). The < Data Compare> function in Epi Info was used to merge double-entered data files and check for data entry errors.

All data files were cleaned before analysis. Analysis was performed using ENA for SMART and Epi Info software. The SMART Plausibility Report was generated for each survey in order to check the quality of the anthropometric data and a summary of the key quality criteria is shown in **Appendix 4**.

For cleaning the anthropometric data, nutrition surveys conducted in recent years (2009-2010) in Dadaab have used a fixed cleaning criteria of +/- 4 SD from the reference mean for nutritional indices. Values lying outside this acceptable window have been considered as outliers and excluded during data analysis. The nutritional indices from this year's surveys have been cleaned using a flexible cleaning criteria from the observed mean (also known as SMART flags in the ENA for SMART software), rather than the reference mean (also known as WHO flags in the ENA for SMART software). This flexible cleaning approach is one that is recommended in the UNHCR Standardised Nutrition Survey Guidelines (Version 1.2, June 2011) in accordance with SMART recommendations. For the weight-for-height index, a cleaning window of +/- 4 SD was used instead of the default +/- 3 SD value contained in the SMART for ENA software. This wider cleaning window was selected as it was considered that the target population in the refugee camps and the new arrivals were (1) likely to be suffering from high levels of severe acute malnutrition, and (2) the population was likely to be heterogeneous, with some sub-groups more badly affected than others. In situations such as this one, the use of the default +/- 3 SD cleaning window is likely to lead to the exclusion of some true cases of severe acute malnutrition.

RESULTS FROM HAGADERA

INDIVIDUAL-LEVEL INDICATORS-CHILDREN 6-59 MONTHS, 0-23 MONTHS, AND 5-9 YEARS, AND WOMEN OF REPRODUCTIVE AGE 15-49 YEARS-HAGADERA CAMP, DADAAB (AUG 2011)

Table 16 shows the different population groups and the total number of individuals who were sampled within each group. 35 clusters were sampled for all indicators.

Table 16 Target sample size and actual number captured during the survey-Hagadera camp, Dadaab (Aug 2011)

Target group	Target sample size	Subjects measured/interviewed during the survey	% of the target
Children 6-59 months	595	604	101.5
Children 0-5 months	105	104	99.0
Children 5-9 years	455	470	103.3
Women 15-49 years	280	287	102.5

CHILDREN 6-59 MONTHS-HAGADREA CAMP, DADAAB (AUG 2011)

In Hagadera, the majority of the surveyed children aged 6-59 months were Somalis, followed by the Somali Bantus. New arrivals in the camps for less than three months represented 11.2% of the sample. The majority of children 6-59 months joining the camp in the past six months came from Lower Juba, followed by Mille Juba.

Table 17 Demographic information-Hagadera camp, Dadaab (Aug 2011)

	Number/total	%
Nationality		
Somali	538/600	89.7
Somali Bantu	60/600	10
Others	2/600	0.3
Arrival in camp		
<3 months	67/599	11.2
3-6 months	14/599	2.3
>6 months	518/599	86.5
Region of origin for children in camp for <6 months		
Lower Juba	35/76	46.1
Middle Juba	17/76	22.4
Gedo	6/76	7.9
Bay	3/76	3.9
Bakool	0	0
Lower Shabelle	0	0
Middle Shabelle	3/76	3.9
Hiraan	3/76	3.9
Mogadishu/Banadir	4/76	5.3
Other	5/76	6.6

Anthropometric results (based on WHO Growth Standards 2006)

Anthropometric results based on NCHS 1977 Growth Reference are shown in **Appendix 2**.

The coverage of age documentation was low with 54% of children having an exact birth date. The age group 54-59 months was slightly under-represented as compared to the other age groups which is often the case in surveys where there are limited proofs of age as caregivers tend to recall best the birth date of smaller children.

The overall sex ratio was 1.0 (sex ratio should be between 0.8-1.2), which confirms that both sexes were equally distributed.

Table 18 Distribution of age and sex of sample-Hagadera camp, Dadaab (Aug 2011)

	Boys		Girls		Total		Ratio
AGE (mo)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy:girl**
6-17	73	50.3	72	49.7	145	24.0	1.0
18-29	65	47.8	71	52.2	136	22.5	0.9
30-41	73	50.0	73	50.0	146	24.2	1.0
42-53	75	55.6	60	44.4	135	22.4	1.3
54-59	21	50.0	21	50.0	42	7.0	1.0
Total	307	50.8	297	49.2	604	100.0	1.0

There was no difference between boys and girls in the prevalence of acute malnutrition.

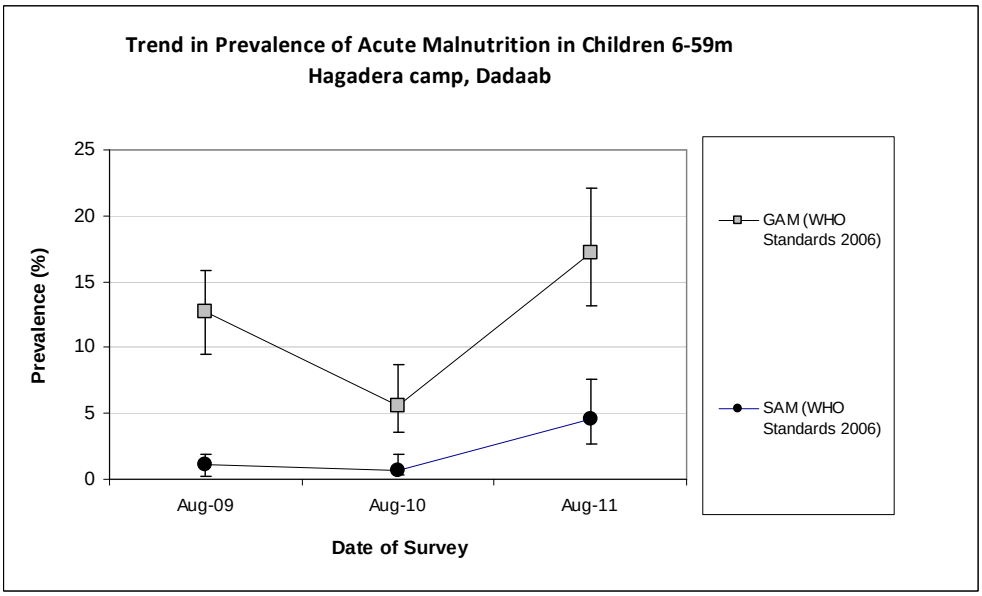
Table 19 Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex-Hagadera camp, Dadaab (Aug 2011)

	All n = 593	**Boys** n = 299	**Girls** n = 294
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(102) 17.2 % (13.2 - 22.1 95% CI)	(56) 18.7 % (13.8 - 24.9 95% CI)	(46) 15.6 % (11.0 - 21.8 95% CI)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(75) 12.6 % (9.8 - 16.2 95% CI)	(44) 14.7 % (10.7 - 20.0 95% CI)	(31) 10.5 % (7.3 - 15.1 95% CI)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(27) 4.6 % (2.7 - 7.6 95% CI)	(12) 4.0 % (2.0 - 7.8 95% CI)	(15) 5.1 % (3.0 - 8.6 95% CI)

The prevalence of oedema is 0.2 %

Comparison with results from 2010 shows a significant increase in GAM and SAM among children 6-59 months ($p<0.05$).

Figure 5 Nutrition survey (GAM, SAM) results since 2009-Hagadera camp, Dadaab (Aug 2011)



Since 11.2% of the survey sample were new arrivals (arrived in the camp in the past three months as per UNHCR definition) (Table 17 above) and most likely to be more affected by malnutrition, the prevalence of acute malnutrition in the camp was calculated excluding them from the overall analysis. Results shown below demonstrate no major difference in acute malnutrition when excluding the new arrivals.

Table 20 Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex excluding new arrivals in camp for less than 3 months -Hagadera camp, Dadaab (Aug 2011)

	All n = 524	**Boys** n = 264	**Girls** n = 260
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(86) 16.4 % (12.3 - 21.6 95% CI)	(51) 19.3 % (13.9 - 26.1 95% CI)	(35) 13.5 % (9.1 - 19.5 95% CI)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(64) 12.2 % (9.1 - 16.2 95% CI)	(39) 14.8 % (10.3 - 20.7 95% CI)	(25) 9.6 % (6.3 - 14.4 95% CI)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(22) 4.2 % (2.3 - 7.7 95% CI)	(12) 4.5 % (2.3 - 8.7 95% CI)	(10) 3.8 % (1.8 - 7.9 95% CI)

The prevalence of oedema is 0.2 %

The youngest (6-17 months) and the oldest (54-59 months) age groups tend to be affected the most by wasting.

Table 21 Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema- Hagadera camp, Dadaab (Aug 2011)

		Severe wasting (<-3 z-score)		**Moderate wasting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	142	8	5.6	25	17.6	109	76.8	0	0.0
18-29	133	3	2.3	15	11.3	114	85.7	1	0.8
30-41	145	5	3.4	11	7.6	129	89.0	0	0.0
42-53	131	7	5.3	15	11.5	109	83.2	0	0.0
54-59	42	3	7.1	9	21.4	30	71.4	0	0.0
Total	593	26	4.4	75	12.6	491	82.8	1	0.2

Figure 6 Trends in the prevalence of wasting by age in children 6-59 months- Hagadera camp, Dadaab (Aug 2011)

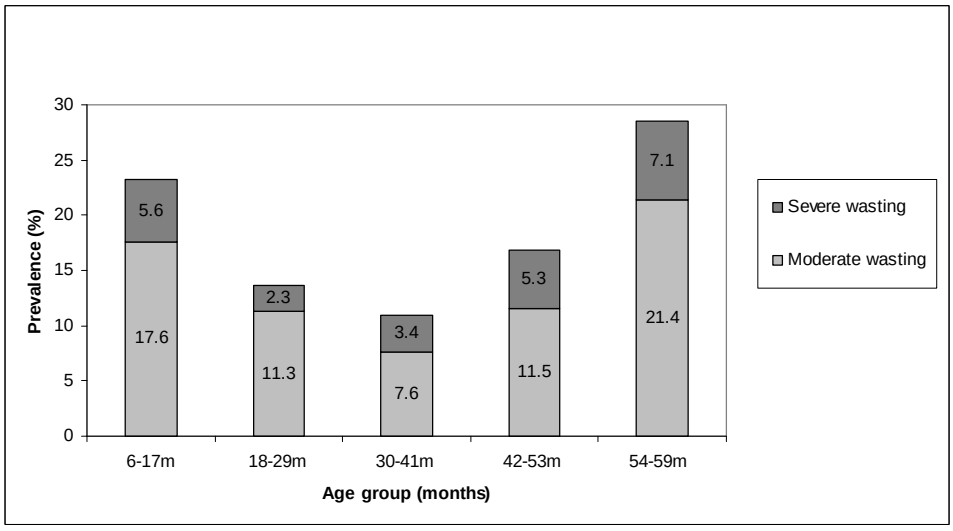


Table 22 Distribution of severe acute malnutrition and oedema based on weight-for-height z-scores-Hagadera camp, Dadaab (Aug 2011)

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 1 (0.2 %)
Oedema absent	Marasmic No. 26 (4.4 %)	Not severely malnourished No. 566 (95.4 %)

Figure 7 shows that the weight-for-height z-score distribution is shifted to the left, illustrating a poorer status than the international WHO Standard population of children aged 6-59 months.

Figure 7 Distribution of weight-for-height z-scores (based on WHO Growth Standards; the reference population is shown in green) of survey population compared to reference population-Hagadera camp, Dadaab (Aug 2011)

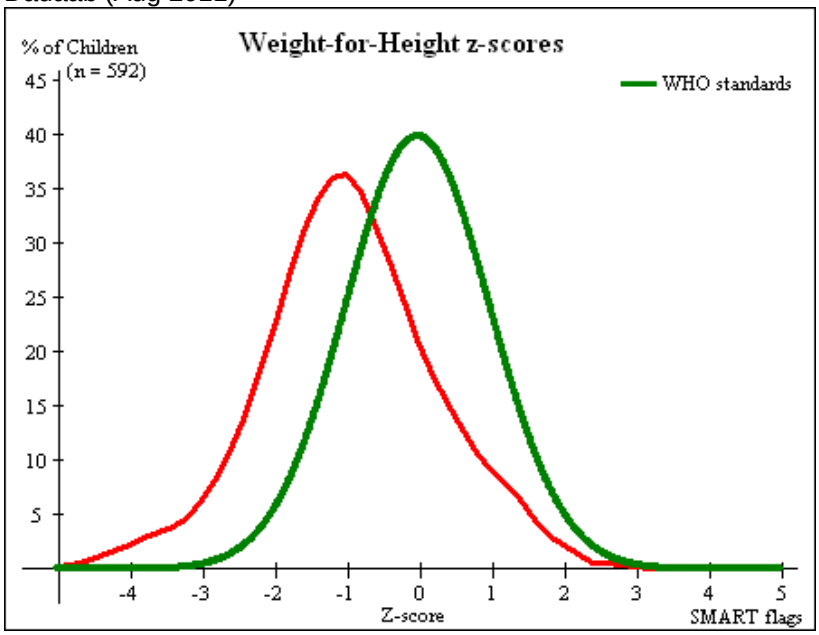


Table 23 Prevalence of stunting based on height-for-age z-scores and by sex-Hagadera camp, Dadaab (Aug 2011)

	All n = 574	**Boys** n = 288	**Girls** n = 286
Prevalence of stunting (<-2 z-score)	(125) 21.8 % (18.0 - 26.0 95% CI)	(69) 24.0 % (19.1 - 29.6 95% CI)	(56) 19.6 % (14.8 - 25.4 95% CI)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(89) 15.5 % (12.5 - 19.1 95% CI)	(48) 16.7 % (13.2 - 20.8 95% CI)	(41) 14.3 % (10.3 - 19.5 95% CI)
Prevalence of severe stunting (<-3 z-score)	(36) 6.3 % (4.7 - 8.3 95% CI)	(21) 7.3 % (5.2 - 10.2 95% CI)	(15) 5.2 % (3.2 - 8.4 95% CI)

Children in the age groups 18-29 and 30-41 months tend to be the most affected by stunting as compared to the other age groups.

Table 24 Prevalence of stunting by age based on height-for-age z-scores-Hagadera camp, Dadaab (Aug 2011)

		Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	133	3	2.3	19	14.3	111	83.5
18-29	128	12	9.4	28	21.9	88	68.8
30-41	141	10	7.1	23	16.3	108	76.6
42-53	130	6	4.6	17	13.1	107	82.3
54-59	42	5	11.9	2	4.8	35	83.3
Total	574	36	6.3	89	15.5	449	78.2

Figure 8 Trends in the prevalence of stunting by age in children 6-59 months- Hagadera camp, Dadaab (Aug 2011)

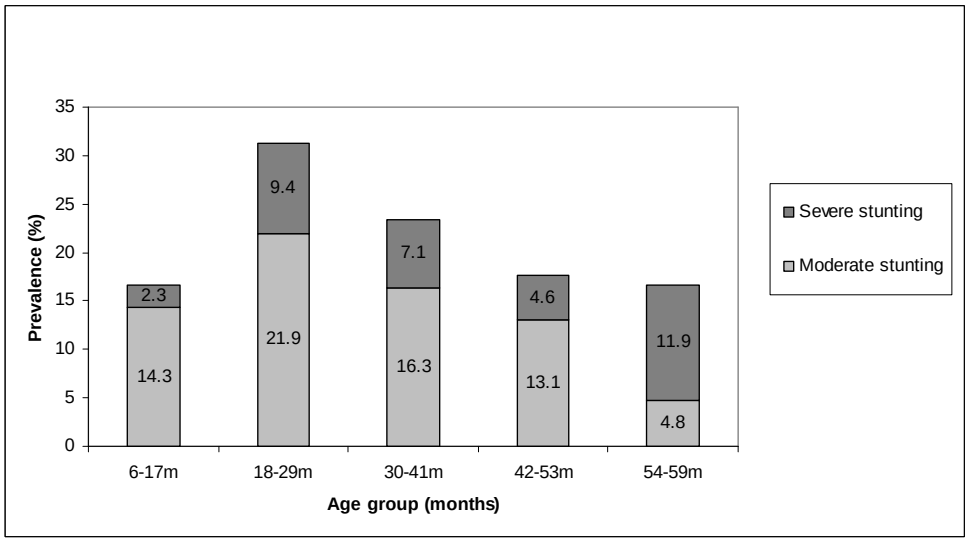


Table 25 Prevalence of underweight based on weight-for-age z-scores by sex-Hagadera camp, Dadaab (Aug 2011)

	All n = 593	**Boys** n = 299	**Girls** n = 294
Prevalence of underweight (<-2 z-score)	(141) 23.8 % (19.6 - 28.6 95% CI)	(73) 24.4 % (19.2 - 30.5 95% CI)	(68) 23.1 % (17.3 - 30.2 95% CI)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(106) 17.9 % (14.0 - 22.5 95% CI)	(52) 17.4 % (12.8 - 23.2 95% CI)	(54) 18.4 % (13.3 - 24.9 95% CI)
Prevalence of severe underweight (<-3 z-score)	(35) 5.9 % (4.0 - 8.6 95% CI)	(21) 7.0 % (4.5 - 10.9 95% CI)	(14) 4.8 % (2.7 - 8.2 95% CI)

Table 26 Mean z-scores, Design Effects and excluded subjects -Hagadera camp, Dadaab (Aug 2011)

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	592	-0.96±1.20	2.03	5	7
Weight-for-Age	593	-1.21±1.11	1.60	3	8
Height-for-Age	574	-1.02±1.23	1.31	4	26

* contains for WHZ and WAZ the children with oedema.

MUAC is being used in the community for screening and admission to therapeutic and supplementary feeding programmes.

Table 27 Prevalence of malnutrition based on MUAC-Hagadera camp, Dadaab (Aug 2011)

	All n = 603
At risk of malnutrition (≥ 125mm and <135 mm)	(86) 14.3 % (11.3-17.2 95% CI)
Moderate malnutrition (≥ 115mm and <125 mm)	(30) 5.0 % (2.8-7.1 95% CI)
Severe malnutrition (< 115mm)	(11) 1.8 % (0.7-3.0 95% CI)

Similar to the weight-for-height z-score analysis, the prevalence of malnutrition based on MUAC was calculated excluding the new arrivals (arrived in the camp in the past three months) from the overall analysis. Results shown below demonstrate no major difference in malnutrition when excluding the new arrivals.

Table 28 Prevalence of malnutrition based on MUAC excluding new arrivals in camp for less than 3 months-Hagadera camp, Dadaab (Aug 2011)

	n = 531
At risk of malnutrition (≥ 125mm and <135 mm)	(70) 13.2 % (10.3-16.1 95% CI)
Moderate malnutrition (≥ 115mm and <125 mm)	(25) 4.7 % (2.7-6.7 95% CI)
Severe malnutrition (< 115mm)	(11) 2.1 % (0.7-3.4 95% CI)

The case load for the selective feeding programmes was estimated to aid in programme planning. The Hagadera population used during the survey was 122,741. Based on the survey results, 21.6% children were found to be under 5 years (total of 26512 children) and hence a total of 23861 children were estimated to be between 6-59 months (assuming that 10% of under-5 are 0-5 months).

Table 29 Estimated number of malnourished children aged 6-59 months eligible to be enrolled in a selective feeding programme at the time of the survey (based on all admission criteria)-Hagadera camp, Dadaab (Aug 2011)

	Total/number	% (95% CI)	N (LCI-UCI)*
Eligible for therapeutic feeding programme**	32/603	5.3 (2.7-7.9)	1265 (644-1885))
Eligible for supplementary feeding programme**	82/603	13.6 (10.5-16.7)	3245 (2505-3985)

*LCI=Lower Confidence Interval; UCI: Upper Confidence Interval
**WHZ flags excluded from analysis

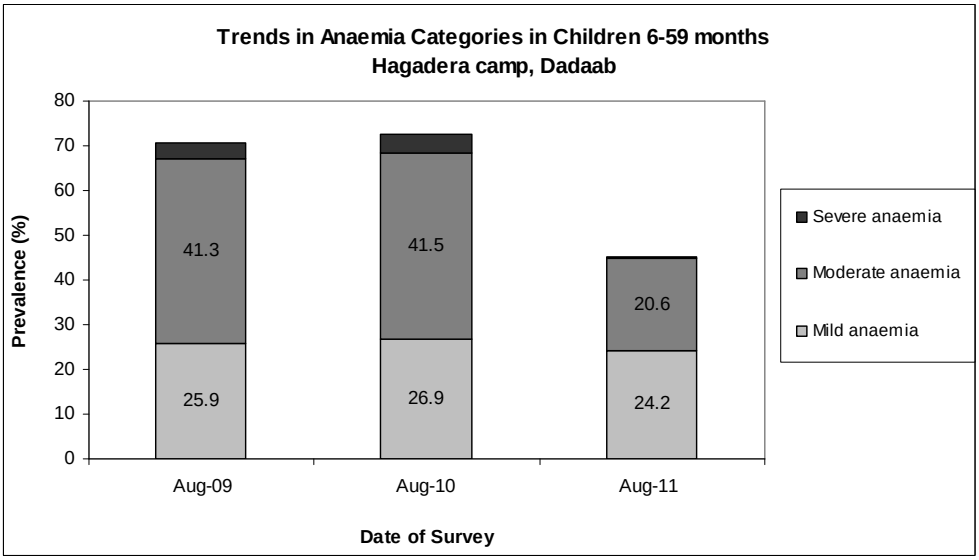
Anaemia results

Table 30 Prevalence of anaemia and haemoglobin concentration in children 6-59 months of age -Hagadera camp, Dadaab (Aug 2011)

Anaemia – Children 6-59 months	**All** n = 598
Total Anaemia (Hb<11.0 g/dL)	(271) 45.3 % (40.4-50.2 95% CI)
Mild Anaemia (Hb 10.0-10.9 g/dL)	(145) 24.2 % (20.4-28.1 95% CI)
Moderate Anaemia (7.0-9.9 g/dL)	(123) 20.6 % (16.7-24.5 95% CI)
Severe Anaemia (<7.0 g/dL)	(3) 0.5 % (0-1.1 95% CI)
Mean Hb (g/dL)	11.0 g/dL (10.8-11.1 95% CI) [5.5min,14.5 max]

Comparison with results from 2010 shows a significant decrease in anaemia among children 6-59 months ($p<0.05$).

Figure 9 Nutrition survey results (anaemia in children 6-59 months) since 2009-Hagadera camp, Dadaab (Aug 2011)



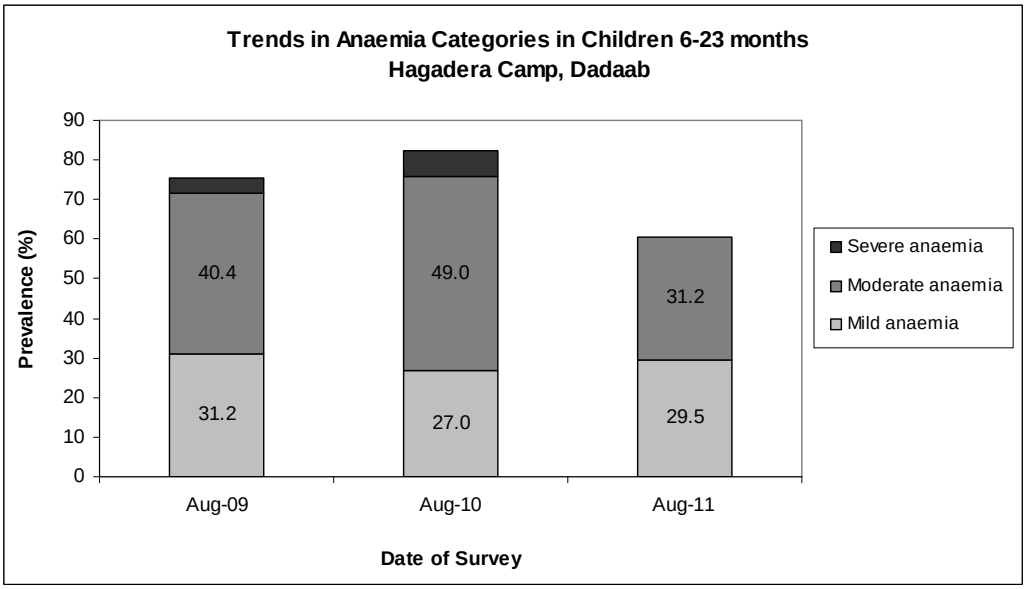
The 6-23 months age group had the highest prevalence of anaemia of 63.4%; prevalence of anaemia declined with increasing age. These age trends are similar to those seen in 2009 and 2010.

Table 31 Prevalence of anaemia by age-Hagadera camp, Dadaab (Aug 2011)

		Severe Anaemia (<7.0 g/dL)		Moderate Anaemia (7.0-9.9 g/dL)		Mild Anaemia (Hb 10.0-10.9 g/dL)		Total Anaemia (Hb<11g.0 g/dL)		Normal (Hb≥11.0 g/dL)	
Age (mths)	**Total no.**	**No.**	**%** (95% CI)	**No.**	**%** (95% CI)	**No.**	**%** (95% CI)	**No.**	**%** (95% CI)	**No.**	**%** (95% CI)
6-23	205	0	0 (0-0)	64	31.2 (24.5-38.0)	66	32.2 (25.7-38.7)	130	63.4 (56.0-70.8)	75	36.6 (29.2-44.0)
24-35	131	1	0.8 (0-2.3)	34	26.0 (16.8-35.1)	32	24.4 (16.4-32.4)	67	51.1 (38.4-63.8)	64	48.9 (36.2-61.6)
36-59	258	2	0.8 (0-1.9)	25	9.7 (5.7-13.7)	46	17.8 (12.9-22.8)	73	28.3 (23.4-33.1)	185	71.7 (66.9-76.5)
Total	**594**	3	0.5 (0-1.1)	123	20.7 (16.8-24.6)	144	24.2 (20.3-28.1)	270	45.5 (40.5-50.4)	324	54.5 (49.6-59.5)

Figure 10 below shows the anaemia prevalence from nutrition surveys in children aged 6-23 months since 2009. This Figure was drawn to aid in the assessment of the impact of Nutributter® to reduce anaemia in children 6-23 months. For comparison purpose, children who joined the camp in 2011 were excluded from analysis because they may not have been exposed to Nutributter® as of 6 months of age or may have been malnourished before joining the camp. Comparison with results from 2010 shows a significant decrease in anaemia among children 6-23 months ($p<0.05$).

Figure 10 Nutrition survey results (anaemia in children 6-23 months) since 2009-Hagadera camp, Dadaab (Aug 2011)



Programme coverage

Selective feeding programme

Table 32 Nutrition treatment programme coverage based on all admission criteria (weight-for-height, MUAC, oedema) -Hagadera camp, Dadaab (Aug 2011)

	Number/total	% (95% CI)
Proportion of children aged 6-59 months with severe acute malnutrition currently enrolled in therapeutic feeding programme*	12/32	37.5 (21.7-53.3)
Proportion of children aged 6-59 months with moderate acute malnutrition currently enrolled in supplementary feeding programme*	15/82	18.3 (10.9-25.6)

*WHZ flags excluded from analysis

Table 33 Nutrition treatment programme coverage based on MUAC and oedema only-Hagadera camp, Dadaab (Aug 2011)

	Number/total	% (95% CI)
Proportion of children aged 6-59 months with severe acute malnutrition currently enrolled in therapeutic feeding programme	10/12	83.3 (56.8-100)
Proportion of children aged 6-59 months with moderate acute malnutrition currently enrolled in supplementary feeding programme	17/30	56.7 (40.0-73.4)

Vaccination and supplementation programmes

The coverage of vaccination card was found to be low at 50.8% (43.9-57.7 95% CI).

Measles vaccination coverage

Table 34 Measles vaccination coverage for children aged 9-59 months (n= 557) -Hagadera camp, Dadaab (Aug 2011)

	Measles (with card) n=238	**Measles (with card or confirmation from mother) n=497**
YES	42.7 % (36.2-49.2 95% CI)	89.2 % (85.2-93.3 95% CI)

Due to an outbreak of measles in the camps, a mass measles vaccination campaign was conducted among children aged 6-59 months prior to the nutrition survey. The coverage results are presented below.

Table 35 Measles vaccination coverage for children aged 6-59 months (n=591) -Hagadera camp, Dadaab (Aug 2011)

	Measles (with card) n=248	Measles (with card or confirmation from mother) n=516
YES	42.0 (35.6-48.3 95% CI)	87.3 (82.6-92.0 95% CI)

PENTA vaccination coverage

PENTA vaccination coverage was measured in light of a potential outbreak of pertussis (whooping cough).

Table 36 PENTA vaccination coverage for children aged 6-59 months (n=600) -Hagadera camp, Dadaab (Aug 2011)

	PENTA 1 n=1	PENTA 2 n=19	PENTA 3 n=234
YES	0.2% (0-0.5 95% CI)	3.2% (1.2-5.1 95% CI)	39.0% (32.5-45.5 95% CI)

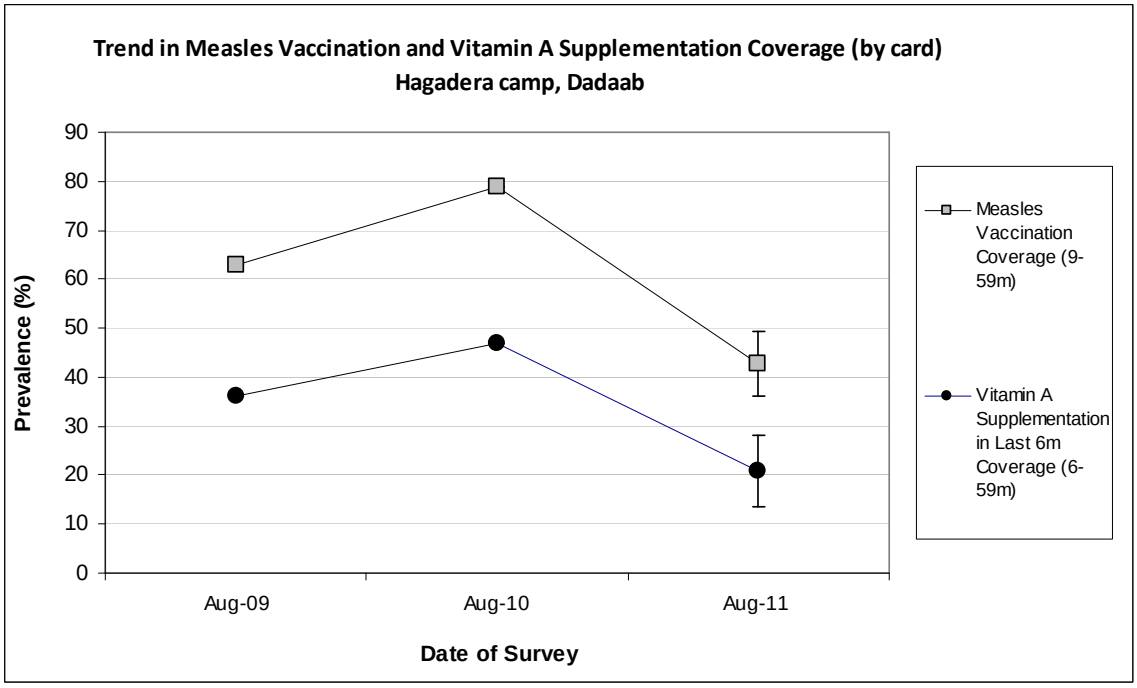
Vitamin A supplementation coverage

Table 37 Vitamin A supplementation for children aged 6-59 months within past 6 months (n=598) -Hagadera camp, Dadaab (Aug 2011)

	Vitamin A capsule (with card) n=125	Vitamin A capsule (with card or confirmation from mother) n=519
YES	20.9 % (13.6-28.2 95% CI)	86.8 % (82.1-91.5 95% CI)

Comparison with results from 2010 shows a decrease in measles vaccination and vitamin A supplementation (within past six months) coverage *with card* among children 6-59 months.

Figure 11 Nutrition survey results (measles vaccination and vitamin A supplementation within past 6 months with card) since 2009-Hagadera camp, Dadaab (Aug 2011)



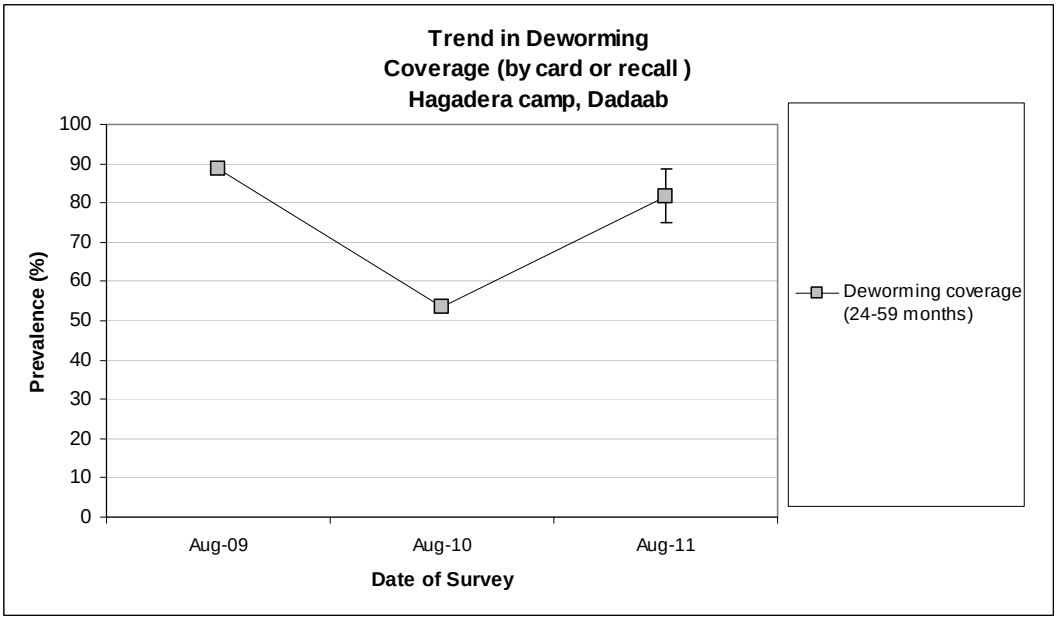
Deworming coverage

Table 38 Deworming for children aged 24-59 months within past 6 months (n=397) -Hagadera camp, Dadaab (Aug 2011)

	Deworming (with card) n=23	Deworming (with card or confirmation from mother) n=322
YES	5.8 % (1.5-10.2 95% CI)	81.7 % (74.9-88.5 95% CI)

Comparison with results from 2010 shows an increase in deworming (within past six months) coverage *with card or recall* among children 24-59 months. Note that in surveys in 2009 and 2010, only coverage by recall was measured.

Figure 12 Nutrition survey results (deworming for children aged 24-59 months within past 6 months) since 2009 – Hagadera camp, Dadaab (Aug 2011)



Nutributter® and Food Voucher programmes

Table 39 Nutributter® programme for children aged 6-23 months-Hagadera camp, Dadaab (Aug 2011)

	Number/total	% (95% CI)
Currently receiving Nutributter®	91/186	48.9 (39.5-58.3 95% CI)

Of those receiving Nutributter®, the average number of sachets collected the last time they collected Nutributter® was **29.4 sachets** (range: 14-35 sachets). When asked if Nutributter® was shared with others in the family, **53.9%** (39.0-68.8 95% CI) reported that it was shared.

Table 40 Food Voucher programme for children aged 6-12 months-Hagadera camp, Dadaab (Aug 2011)

	Number/total	% (95% CI)
Currently have a Food Voucher	44/78	56.4 (46.2-66.6 95% CI)

Morbidity from diarrhoea and feeding during diarrhoea

Table 41 Prevalence of reported diarrhoea in the two weeks prior to the interview -Hagadera camp, Dadaab (Aug 2011)

	Number/total	% (95% CI)
Diarrhoea in past 2 weeks	81/600	13.5 (9.2-17.8 95% CI)

Table 42 Feeding during diarrhoea episodes -Hagadera camp, Dadaab (Aug 2011)

	n=80
Less than normal	(40) 50.0% (37.2-62.9 95% CI)
Same as normal	(25) 31.3% (20.3-42.2 95% CI)
More than normal	(10) 12.5% (2.7-22.3 95% CI)
No food	(5) 6.3% (0-13.5 95% CI)

CHILDREN 0-23 MONTHS-HAGADREA CAMP, DADAAB (AUG 2011)

In Hagadera, the majority of the surveyed children aged 0-23 months were Somalis, followed by the Somali Bantus. New arrivals in the camps for less than three months represented 9.8% of the sample.

Table 43 Demographic information -Hagadera camp, Dadaab (Aug 2011)

	Number/total	%
Nationality		
Somali	265/298	88.9
Somali Bantu	32/298	10.8
Others	1/298	0.3
Arrival in camp		
<3 months	29/297	9.8
3-6 months	6/297	2
>6 months	262/297	88.2

Table 44 Prevalence of Infant and Young Child Feeding Practices indicators-Hagadera camp, Dadaab (Aug 2011)

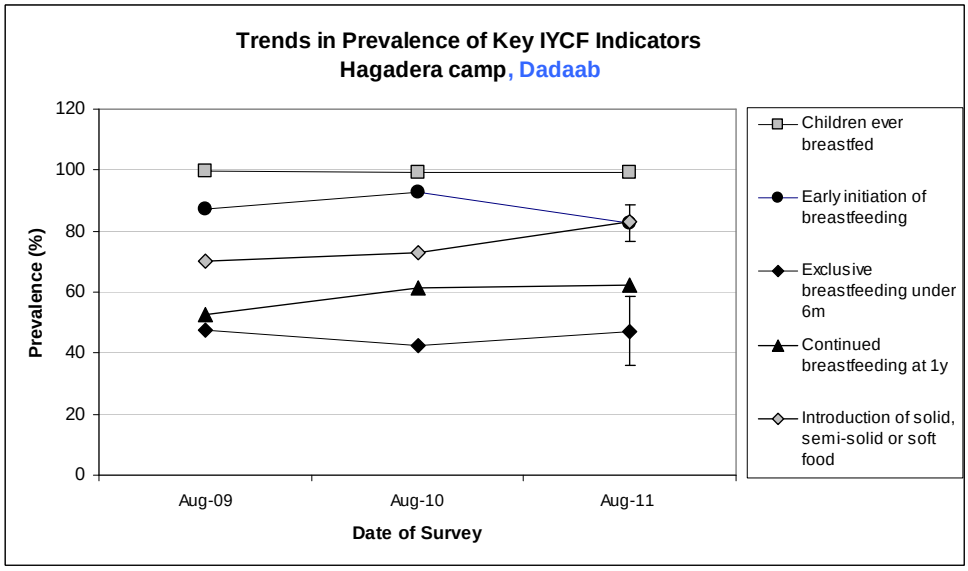
Indicator	Age range	Number/total	Prevalence (%)	95% CI
Children ever breastfed	0-23 months	296/298	99.3	(98.4-100)
Early initiation of breastfeeding	0-23 months	245/294	83.3	(77.3-89.3)
Exclusive breastfeeding under 6 months	0-5 months	49/104	47.1	(35.9-58.4)
Continued breastfeeding at 1 year	12-15 months	30/48	62.5	(47.3-77.7)
Continued breastfeeding at 2 years	20-23 months	4/30	13.3	(2.4-24.2)
Introduction of solid, semi-solid or soft foods	6-8 months	30/36	83.3	(72.6-94.1)
Children bottle fed	0-23 months	24/296	8.1	(3.8-12.4)
Children given infant formula	0-23 months	65/296	22.0	(15.2-28.7)
Reported prevalence of diarrhoea	0-23 months	63/298	21.1	(15.2-27.1)
Continued feeding during diarrhoea	0-23 months	30/63	47.6	(33.3-61.9)

The confidence intervals are an integral part of the results when analysing trends over the years[2]. When IYCF indicators are collected in nutritional surveys, it is not feasible to achieve a large enough sample size for some of the indicators to be estimated as precisely as desired, especially for indicators covering a very narrow age range (e.g. 12-15 months, 6-8 months). Hence, trend analyses need to be interpreted with caution. Nevertheless, trend analyses are useful for assessing the situation and major differences seen from year to year should warrant further investigation.

Comparison with results from previous years shows a declining trend in early initiation of breastfeeding and an increasing trend in introduction of solid, semi-solid or soft food. Note that confidence intervals could not be obtained from IYCF indicators collected in previous nutrition surveys.

[2] The 'precision' of the estimate is measured by a statistical term known as the *confidence interval (CI)*. This reflects the error introduced by the sampling method and the sample size. Confidence intervals are usually associated with a probability of 95 per cent, which is equivalent to saying that if the survey is done 100 times the true population value will be within the range of the confidence interval 95 times out of 100.

Figure 13 Nutrition survey results (key IYCF indicators) since 2009-Hagadera camp, Dadaab (Aug 2011)



CHILDREN 5-9 YEARS-HAGADREA CAMP, DADAAB (AUG 2011)

In Hagadera, the majority of the surveyed children aged 5-9 years were Somalis, followed by the Somali Bantus. New arrivals in the camps for less than three months represented 8.1% of the sample.

Table 45 Demographic information-Hagadera camp, Dadaab (Aug 2011)

	Number/total	%
Nationality		
Somali	424/470	90.2
Somali Bantu	44/470	9.4
Others	2/470	0.4
Arrival in camp		
<3 months	38/469	8.1
3-6 months	12/469	2.6
>6 months	419/469	89.3

None of the children 5-9 years were found to be above 140cm in height. A similar number of boys and girls were surveyed. The children 5 and 9 years of age were slightly under-represented as compared to the other ages.

Table 46 Age and sex distribution of the sampled children, 5-9 years-Hagadera camp, Dadaab (Aug 2011)

Age (years)	Boys		Girls		Total		Ratio
	no.	%	no.	%	no.	%	Boy:girl
5	37	46.8	42	53.2	79	16.8	0.9
6	45	43.7	58	56.3	103	22.0	0.8
7	49	49.5	50	50.5	99	21.1	1.0
8	58	53.2	51	46.8	109	23.2	1.1
9	36	45.6	43	54.4	79	16.8	0.8
Total	225	48.0	244	52.0	469	100.0	0.9

Table 47 Prevalence of low MUAC or oedema in children 5-9 years and by sex-Hagadera camp, Dadaab (Aug 2011)

MUAC (cm)	All n=470	Boys n=226	Girls n=244
<15.0	(119) 25.3 % (20.4-30.3 95% CI)	(58) 25.7 % (19.4-31.9 95% CI)	(61) 25.0 % (17.6-32.4 95% CI)
14.0-14.9	(87) 18.5 % (14.9-22.2 95% CI)	(43) 19.0 % (13.9-24.1 95% CI)	(44) 18.0 % (12.1-24.0 95% CI)
<14.5	(65) 13.8 % (9.2-18.4 95% CI)	(32) 14.2 % (8.2-20.1 95% CI)	(33) 13.5 % (7.8-19.3 95% CI)
<14.0	(32) 6.8 % (4.6-9.1 95% CI)	(15) 6.6 % (3.1-10.1 95% CI)	(19) 7.0 % (3.7-10.3 95% CI)
<13.5	(9) 1.9 % (0.6-3.2 95% CI)	(5) 2.2 % (0.3-4.2 95% CI)	(4) 1.6 % (0-3.3 95% CI)

The prevalence of oedema is 0%

Since 8.1% of the survey sample were new arrivals (arrived in the camp in the past three months) (Table 45 above) and most likely to be more affected by malnutrition, the prevalence of low MUAC was calculated excluding them from the overall analysis. Results shown below demonstrate no major difference in the prevalence of low MUAC when excluding the new arrivals.

Table 48 Prevalence of low MUAC or oedema in children 5-9 years and by sex excluding new arrivals in camp for less than 3 months-Hagadera camp, Dadaab (Aug 2011)

MUAC (cm)	All n=431	Boys n=209	Girls n=222
<15.0	(104) 24.1% (18.8-29.4 95% CI)	(50) 23.9% (17.7-30.2 95% CI)	(54) 24.3% (16.4-32.2 95% CI)
14.0-14.9	(76) 17.6% (13.7-21.5 95% CI)	(37) 17.7% (12.7-22.7 95% CI)	(39) 17.6% (11.4-23.7 95% CI)
<14.5	(55) 12.8% (7.8-17.7 95% CI)	(26) 12.4% (6.2-18.7 95% CI)	(29) 13.1% (6.8-19.3 95% CI)
<14.0	(28) 6.5% (4.1-8.9 95% CI)	(13) 6.2% (2.4-10.0 95% CI)	(15) 6.8% (3.5-10.0 95% CI)
<13.5	(9) 2.1% (0.7-3.5 95% CI)	(5) 2.4% (0.3-4.5 95% CI)	(4) 1.8% (0-3.6 95% CI)

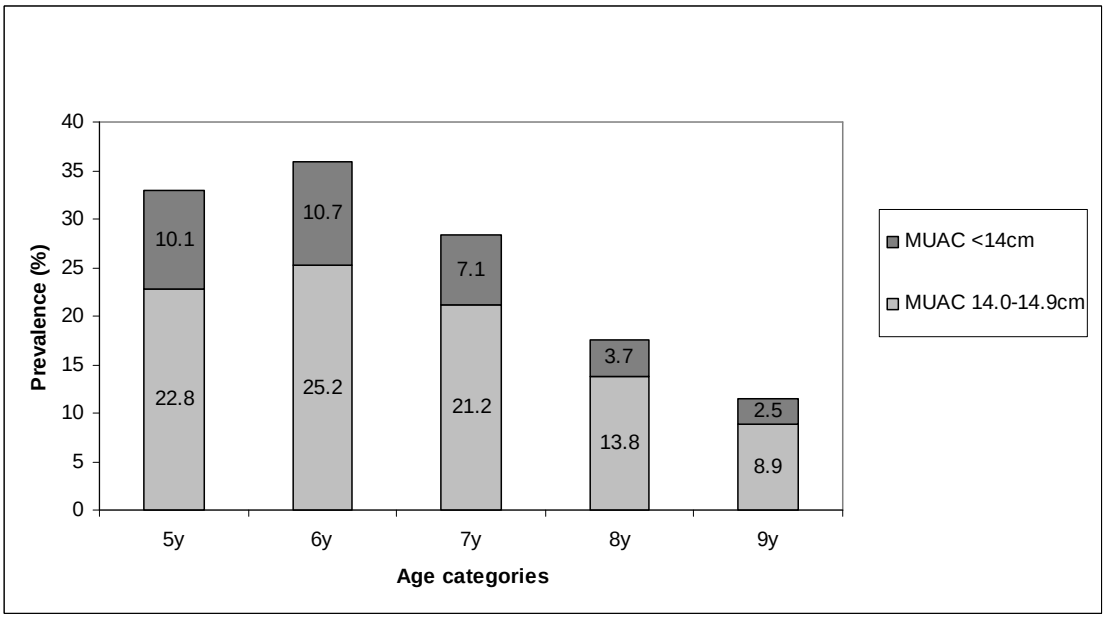
The prevalence of oedema is 0%

The younger ages (5-7 years) tend to have a higher prevalence of low MUAC as compared to the older ages (8-9 years).

Table 49 Prevalence of low MUAC or oedema by age in children 5-9 years-Hagadera camp, Dadaab (Aug 2011)

		MUAC < 13.5 cm		MUAC < 14.0 cm		MUAC <14.5 cm		MUAC 14.0 – 14.9 cm		MUAC > 15.0 cm		Oedema	
Age (years)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
5	79	3	3.8	8	10.1	13	16.5	18	22.8	53	67.1	0	0
6	103	0	0	11	10.7	24	23.3	26	25.2	66	64.1	0	0
7	99	4	4.0	7	7.1	14	14.1	21	21.2	71	71.7	0	0
8	109	1	0.9	4	3.7	10	9.2	15	13.8	90	82.6	0	0
9	79	1	1.3	2	2.5	4	5.1	7	8.9	70	88.6	0	0
Total	469	9	1.9	32	6.8	65	13.9	87	18.6	350	74.6	0	0

Figure 14 Trends in the prevalence of low MUAC by age in children 5-9 years- Hagadera camp, Dadaab (Aug 2011)



WOMEN 15-49 YEARS-HAGADREA CAMP, DADAAB (AUG 2011)

In Hagadera, the majority of the surveyed women aged 15-49 years were Somalis, followed by the Somali Bantus. New arrivals in the camps for less than three months represented 8.3% of the sample.

Table 50 Demographic information-Hagadera camp, Dadaab (Aug 2011)

	Number/total	%
Nationality		
Somali	263/286	92.0
Somali Bantu	23/286	8.0
Others	0	0
Arrival in camp		
<3 months	24/287	8.4
3-6 months	6/287	2.0
>6 months	257/287	89.6
Physiological status		
Pregnant	35/285	12.3
Lactating (until 6 months post-natal only)	45/285	15.8
Neither lactating nor pregnant	205/285	71.9

The mean age of the women sampled was 26.5 years (range: 15-49).

Table 51 Prevalence of anaemia and haemoglobin concentration in non-pregnant women of reproductive age (15-49 years) -Hagadera camp, Dadaab (Aug 2011)

Anaemia – Non-pregnant women of reproductive age 15-49 years	**All** n = 245
Total Anaemia (<12.0 g/dL)	(106) 43.3% (35.6-50.9 95% CI)
Mild Anaemia (11.0-11.9 g/dL)	(61) 24.9% (19.4-30.4 95% CI)
Moderate Anaemia (8.0-10.9 g/dL)	(43) 17.6 % (12.1-23.0 95% CI)
Severe Anaemia (<8.0 g/dL)	(2) 0.8% (0-2.0 95% CI)
Mean Hb (g/dL)	12.1g/dL (11.9-12.4 95% CI) [7.7min, 16.3max]

Comparison with results from 2010 shows a significant decrease in anaemia among non-pregnant women of reproductive age ($p<0.05$). Trends in the decrease of anaemia categories (severe, moderate, mild) could not be assessed with previous years due to differences in the classification of anaemia categories.

Figure 15 Nutrition survey results (anaemia) since 2009-Hagadera camp, Dadaab (Aug 2011)

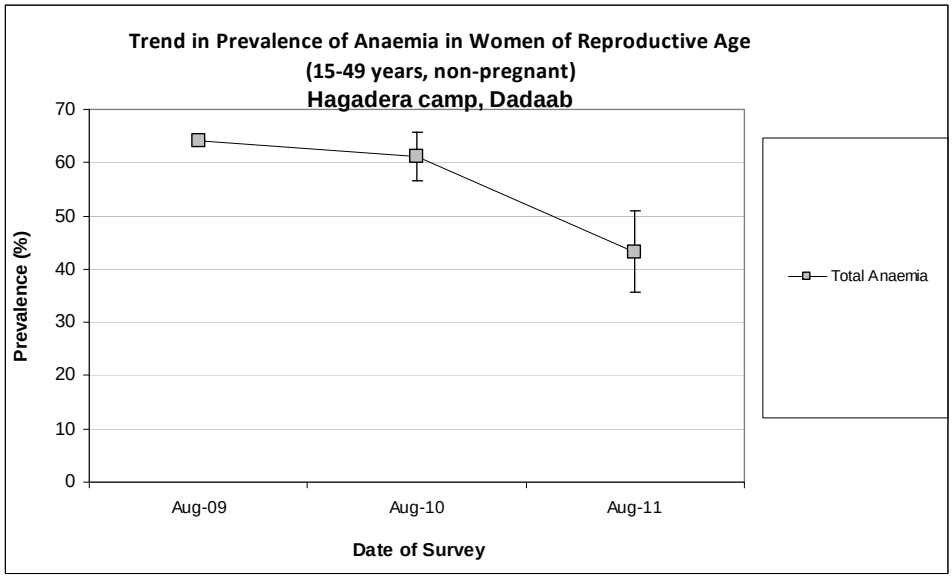


Table 52 Undernutrition based on MUAC-Hagadera camp, Dadaab (Aug 2011)

Pregnant and lactating women	**Number/total**	**% (95% CI)**
Moderate undernutrition (18.5-20.9 cm)	2/80	2.5 (0-6.1)
Severe undernutrition (<18.5 cm)	0/80	0
Non-pregnant women and non-lactating		
Moderate undernutrition (16.0-18.4 cm)	1/205	0.5 (0-1.5)
Severe undernutrition (<16.0 cm)	0/205	0

ANC enrolment and iron-folic acid supplementation coverage

Table 53 ANC enrolment and iron-folic acid pills coverage among pregnant women (15-49 years) -Hagadera camp, Dadaab (Aug 2011)

	Number/total	**% (95% CI)**
Currently enrolled in ANC programme with card	14/33	42.4 (19.9-64.9)
Currently enrolled in ANC programme with card or recall	14/33	42.4 (19.9-64.9)
Currently receiving iron-folic acid pills	15/31	48.4 (24.7-72.1)

Table 54 Post-natal vitamin A supplementation among women (15-49 years) - Hagadera camp, Dadaab (Aug 2011)

	Number/total	% (95% CI)
Received vitamin A supplementation since delivery with card	8/49	16.3 (2.4-30.2)
Received vitamin A supplementation since delivery with card or recall	16/49	32.7 (15.1-50.2)

HOUSEHOLD-LEVEL INDICATORS-WASH, FOOD SECURITY AND MORTALITY- HAGADERA CAMP, DADAAB (AUG 2011)

Table 55 shows the different indicators and the total number of households who were sampled for each household-level indicator. All households were considered whether tor not hey had eligible individuals for the individual-level measurements.

Table 55 Target sample size and actual number captured during the survey-Hagadera camp, Dadaab (Aug 2011)

Indicator	Target sample size	Household interviewed during the study	% of the target
WASH	350	347	99.1
Food security	350	347	99.1
Mortality	525	514	97.9

WATER, SANITATION AND HYGIENE-HAGADREA CAMP, DADAAB (AUG 2011)

In Hagadera, new arrival households in the camp for less than three months represented 6.3% of the household sample with WASH data. 16.5% of the surveyed households for WASH indicators had members who joined their household in the last three months.

Table 56 Demographic information-Hagadera camp, Dadaab (Aug 2011)

	Number/total	%
Date of arrival of household in camp		
<3 months	22/347	6.3
3-6 months	6/347	1.7
>6 months	319/347	91.9
Proportion of surveyed HH who had one or more members who joined within last 3 months	57/345	16.5

Table 57 Ownership of water containers-Hagadera camp, Dadaab (Aug 2011)

	Number/total	% (95% CI)
Proportion of households that say they have water containers to collect water	330/337	97.9 (96.0-99.8)

Among the households reporting not to have water containers, one household reported they did not go to the reception centre or were not registered, one household reported that they did not receive any during reception and three households reported they did not receive any after registration.

Table 58 Water Quality-Hagadera camp, Dadaab (Aug 2011)

	Number/total	% (95% CI)
Proportion of households using an improved drinking water source	341/341	100.0 (100-100)
Proportion of households that use a covered or narrow necked container for storing their drinking water	334/343	97.4 (95.4-99.3)

The mean litres of water per person per day was found to be 24.8 lpppd with a range of 4.5-240 lpppd.

Table 59 Water Quantity 1: Amount of litres of water used per person per day-Hagadera camp, Dadaab (Aug 2011)

Proportion of households that access:	Number/total	% (95% CI)
≥ 20 litres	171/317	53.9 (45.8-62.1)
15 – <20 litres	47/317	14.8 (10.0-19.7)
10-<15 litres	66/317	20.8 (14.4-27.3)
<10 litres	33/317	10.4 (6.3-14.5)

Table 60 Water Quantity 2-Hagadera camp, Dadaab (Aug 2011)

	Number/total	% (95% CI)
Proportion of households that take less than 30 minutes to collect their main drinking water source	31/326	9.5 (5.6-13.4)

Table 61 Satisfaction with water supply-Hagadera camp, Dadaab (Aug 2011)

	Number/total	% (95% CI)
Proportion of households that say they are satisfied with the drinking water supply	305/340	89.7 (82.0-97.4)

Table 62 Soap distribution-Hagadera camp, Dadaab (Aug 2011)

	Number/total	% (95% CI)
Proportion of households that received soap during the last two distribution cycles or at reception	7/344	2.0 (0-4.1)

Table 63 Safe Excreta disposal-Hagadera camp, Dadaab (Aug 2011)

	Number/total	% (95% CI)
Proportion of households using an improved excreta disposal facility (improved toilet facility, not shared)	165/347	47.6 (40.3-54.8)
Proportion of households using a shared family toilet	83/347	23.9 (18.5-29.4)
Proportion of households using a communal toilet	96/347	26.8 (19.8-33.8)
Proportion of households using an unimproved toilet	6/347	1.7 (0.2-3.3)
The proportion of households with children under three years old that dispose of faeces safely.	214/230	93.0 (89.0-97.1)
Proportion of households with a household or shared family toilet in use	247/247	100.0 (100-100)

FOOD SECURITY-HAGADREA CAMP, DADAAB (AUG 2011)

In Hagadera, new arrival households in the camp for less than three months represented 5.5% of the household sample with food security data. 17.5% of the surveyed households for food security indicators had members who joined their household in the last three months.

Table 64 Demographic information - Hagadera camp, Dadaab (Aug 2011)

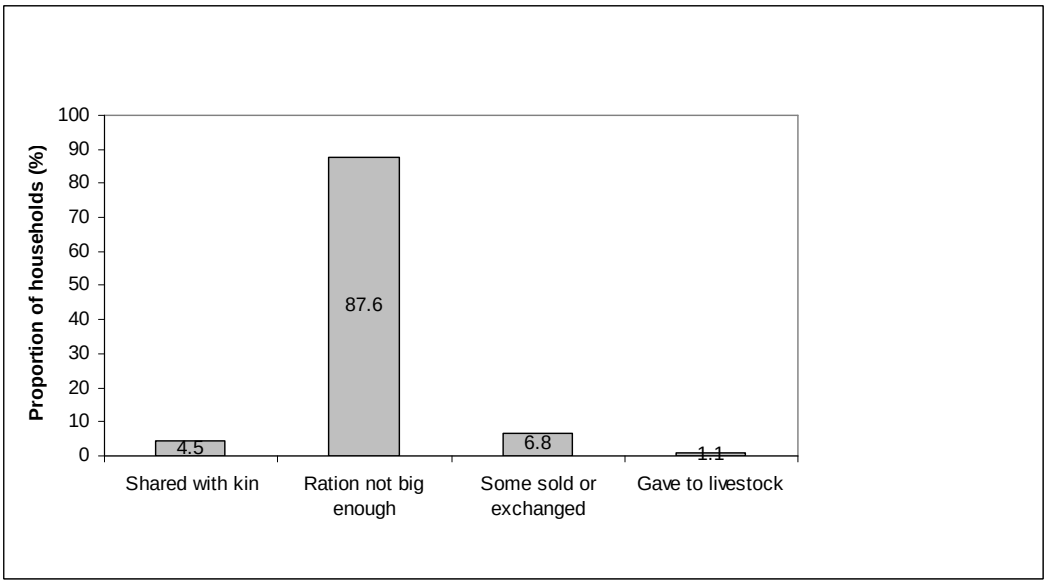
	Number/total	*%*
Date of arrival of household in camp		
<3 months	19/347	5.5
3-6 months	5/347	1.4
>6 months	323/347	93.1
Proportion of surveyed HH who had one or more members who joined within last 3 months	61/345	17.7

Table 65 Ration card coverage and duration of general food ration - Hagadera camp, Dadaab (Aug 2011)

	Number/total	% (95% CI)
Proportion of households with a ration card	343/345	99.4 (98.6-100)
Proportion of households reporting that the GFR lasted <15 days	270/339	79.6 (74.1-85.2)
Average number of days GFR lasts	-	10.4 days (range: min 2-max 17)

When asked why the general good ration did not last the entire cycle, the main reason given by the surveyed households was that the ration was not big enough.

Figure 16 Main reason given by each household for why general good ration did not last 15 days - Hagadera camp, Dadaab (Aug 2011)



As shown in Figure 17 below, the most important coping strategy that was reported to be used to fill the food gap was to borrow from neighbours or relatives or get credit, followed by buying of food.

Figure 17 Most important coping strategies used to fill the food gap when general food ration runs out - Hagadera camp, Dadaab (Aug 2011)

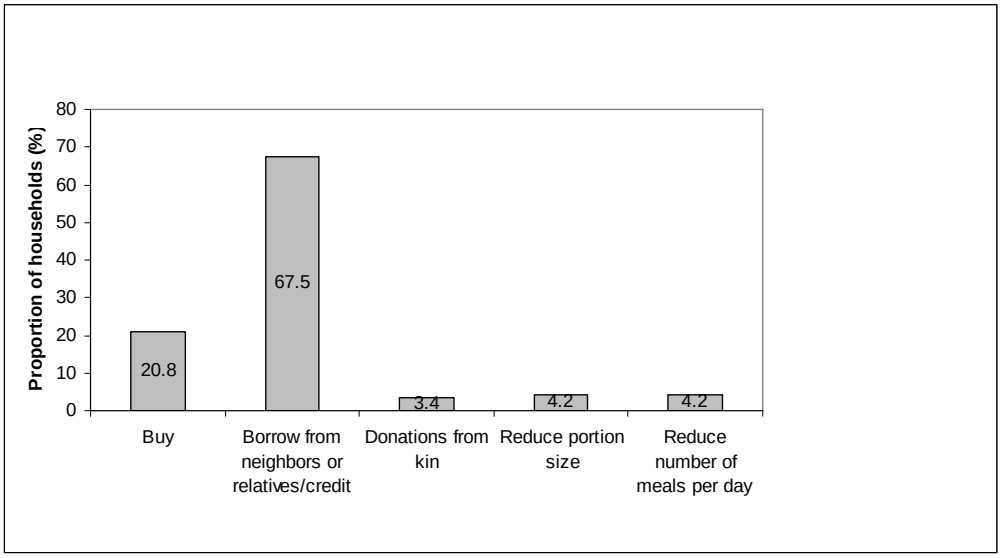
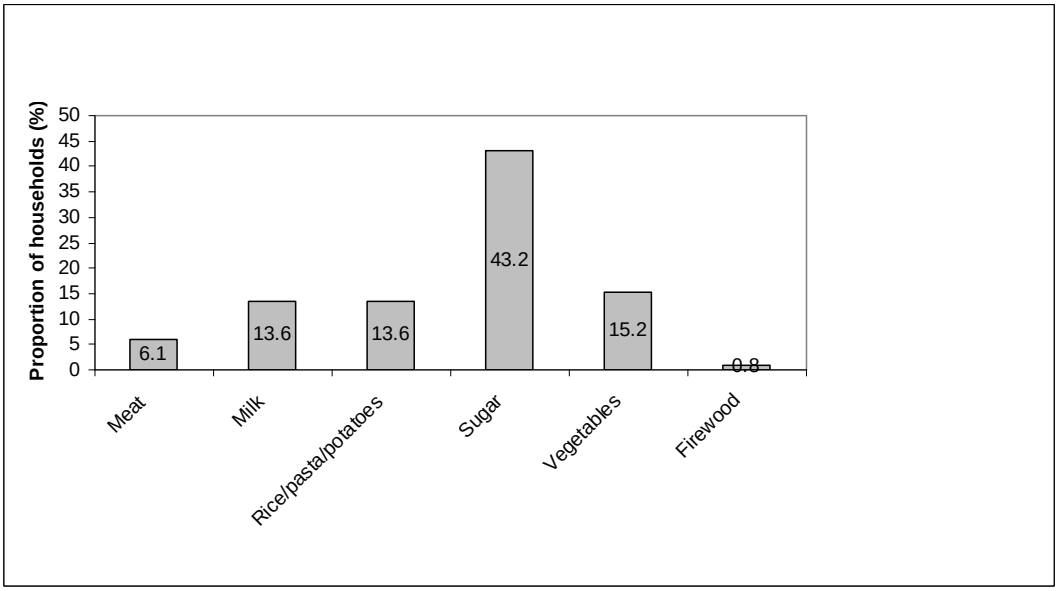


Table 66 Sell or exchange of food from the general ration - Hagadera camp, Dadaab (Aug 2011)

	Number/total	% (95% CI)
Proportion of households selling or exchanging food ration items	132/347	38.0 (28.8-47.3)

As shown in Figure 18 below, when food from the general ration was sold or exchanged, the most common item reported to be bought was sugar, followed by vegetables, milk and rice / pasta / potatoes.

Figure 18 Most common items bought when general ration is sold or exchanged -Hagadera camp, Dadaab (Aug 2011)



MORTALITY-HAGADREA CAMP, DADAAB (AUG 2011)

Retrospective mortality data was collected over the past three months. More specifically, the recall period was 86 days and started at the end of May also known as Jamadul Akhir in the Somali calendar or Bisha Shanaad in the Arabic calendar. Demographic data was also derived from the mortality data as presented below.

Table 67 Demographic and retrospective mortality within camp-Hagadera camp, Dadaab (Aug 2011)

Demographic data	
Number of HH surveyed	514
Average HH size	6.9
% U5	21.6%
Retrospective mortality	
Number of current HH residents	3526
Total number U5	764
Number of people who joined HH / camp	275
Total number U5 who joined HH / camp	74
Number of people who left HH / camp	70
Total number U5 who left HH / camp	8
Number of births during recall	56
Number of deaths during recall	4
Total number U5 deaths during recall	2
Crude Death Rate (total deaths/10,000 people / day)	0.14 (0.04-0.46 95% CI)
U5 Death Rate (deaths in children under five/10,000 children under five / day)	0.33 (0.08-1.36 95% CI)

RESULTS FROM IFO

INDIVIDUAL-LEVEL INDICATORS-CHILDREN 6-59 MONTHS, 0-23 MONTHS, AND 5-9 YEARS, AND WOMEN OF REPRODUCTIVE AGE 15-49 YEARS-IFO CAMP, DADAAB (AUG 2011)

Table 68 shows the different population groups and the total number of individuals who were sampled within each group. 35 clusters were sampled for all indicators except for the 6-59 months group where only 34 clusters were sampled. The data from this age group was not included from one cluster on the first day of the survey due to the team performing very poorly. Additional training and supervision was provided which allowed the team to resume work, but time constraints prevented the resampling of their first cluster.

Table 68 Target sample size and actual number captured during the survey-Ifo camp, Dadaab (Aug 2011)

Target group	Target sample size	Subjects measured/interviewed during the survey	% of the target
Children 6-59 months	595	561	94.3
Children 0-5 months	105	100	95.2
Children 5-9 years	455	451	99.1
Women 15-49 years	280	258	92.1

CHILDREN 6-59 MONTHS-IFO CAMP, DADAAB (AUG 2011)

In Ifo, the majority of the surveyed children aged 6-59 months were Somalis, followed by the other nationalities (not including the Somali Bantus). New arrivals in the camps for less than three months represented 7.1% of the sample. The majority of children 6-59 months joining the camp in the past six months came from Lower Juba, followed by other regions of Somalia not listed below.

Table 69 Demographic information-Ifo camp, Dadaab (Aug 2011)

	Number/total	%
Nationality		
Somali	502/544	92.3
Somali Bantu	17/544	3.1
Others	25/544	4.6
Arrival in camp		
<3 months	40/561	7.1
3-6 months	4/561	0.7
>6 months	516/561	92.2
Region of origin for children in camp for <6 months		
Lower Juba	22/43	51.2
Middle Juba	4/43	9.3
Gedo	2/43	4.7
Bay	0	0
Bakool	1/43	2.3
Lower Shabelle	0	0
Middle Shabelle	0	0
Hiraan	2/43	4.7
Mogadishu/Banadir	3/43	7.0
Other	9/43	20.9

Anthropometric results (based on WHO Growth Standards 2006)

Anthropometric results based on NCHS 1977 Growth Reference are shown in **Appendix 2**.

The coverage of age documentation was low with 45% of children having an exact birth date. The age groups 6-17 and 30-41 months were slightly over-represented while the age group 54-59 months was slightly

under-represented as compared to the other age groups. Under-representation of the latter age group often happens in surveys where there are limited proofs of age as caregivers tend to recall best the birth date of smaller children.

The overall sex ratio was 1.0 (sex ratio should be between 0.8-1.2), which confirms that both sexes were equally distributed

Table 70 Distribution of age and sex of sample-Ifo camp, Dadaab (Aug 2011)

	Boys		Girls		Total		Ratio
AGE (mo)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy:girl**
6-17	65	46.8	74	53.2	139	25.0	0.9
18-29	65	54.6	54	45.4	119	21.4	1.2
30-41	71	47.3	79	52.7	150	27.0	0.9
42-53	60	53.6	52	46.4	112	20.1	1.2
54-59	12	33.3	24	66.7	36	6.5	0.5
Total	273	49.1	283	50.9	556	100.0	1.0

There was no difference between boys and girls in the prevalence of acute malnutrition.

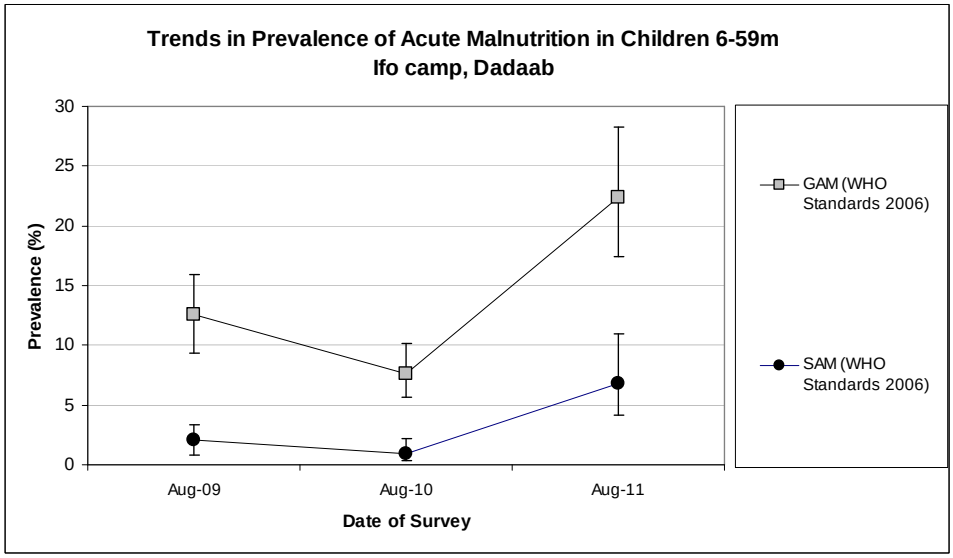
Table 71 Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex-Ifo camp, Dadaab (Aug 2011)

	All n = 541	**Boys** n = 265	**Girls** n = 276
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(121) 22.4 % (17.4 - 28.3 95% CI)	(55) 20.8 % (15.1 - 27.8 95% CI)	(66) 23.9 % (17.6 - 31.7 95% CI)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(84) 15.5 % (11.6 - 20.5 95% CI)	(39) 14.7 % (9.8 - 21.6 95% CI)	(45) 16.3 % (11.8 - 22.1 95% CI)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(37) 6.8 % (4.2 - 11.0 95% CI)	(16) 6.0 % (3.6 - 9.9 95% CI)	(21) 7.6 % (3.9 - 14.4 95% CI)

The prevalence of oedema is 0.0 %

Comparison with results from 2010 shows a significant increase in GAM and SAM among children 6-59 months ($p<0.05$).

Figure 19 Nutrition surveys (GAM, SAM) results since 2009-Ifo camp, Dadaab (Aug 2011)



Since 7.1% of the sample were new arrivals (arrived in the camps in the past three months as per UNHCR definition) (Table 69) and most likely to be more affected by malnutrition, the prevalence of acute malnutrition in the camp was calculated excluding them from the overall analysis. Results shown below demonstrate no major difference in acute malnutrition when excluding the new arrivals.

Table 72 Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex excluding new arrivals in camp for less than 3 months -Ifo camp, Dadaab (Aug 2011)

	All n = 502	**Boys** n = 245	**Girls** n = 257
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(110) 21.9 % (16.9 - 27.9 95% CI)	(48) 19.6 % (14.2 - 26.4 95% CI)	(62) 24.1 % (17.5 - 32.3 95% CI)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(75) 14.9 % (10.9 - 20.1 95% CI)	(32) 13.1 % (8.2 - 20.1 95% CI)	(43) 16.7 % (12.1 - 22.8 95% CI)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(35) 7.0 % (4.2 - 11.4 95% CI)	(16) 6.5 % (3.9 - 10.8 95% CI)	(19) 7.4 % (3.6 - 14.7 95% CI)

The prevalence of oedema is 0.0 %

All age groups tend to be affected by wasting to a similar extent with the oldest age groups (54-59 months) appearing to be affected the most.

Table 73 Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema-Ifo camp, Dadaab (Aug 2011)

		Severe wasting (<-3 z-score)		**Moderate wasting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	134	9	6.7	19	14.2	106	79.1	0	0.0
18-29	117	9	7.7	16	13.7	92	78.6	0	0.0
30-41	146	11	7.5	24	16.4	111	76.0	0	0.0
42-53	109	7	6.4	17	15.6	85	78.0	0	0.0
54-59	35	1	2.9	8	22.9	26	74.3	0	0.0
Total	541	37	6.8	84	15.5	420	77.6	0	0.0

Figure 20 Trends in the prevalence of wasting by age in children 6-59 months- Ifo camp, Dadaab (Aug 2011)

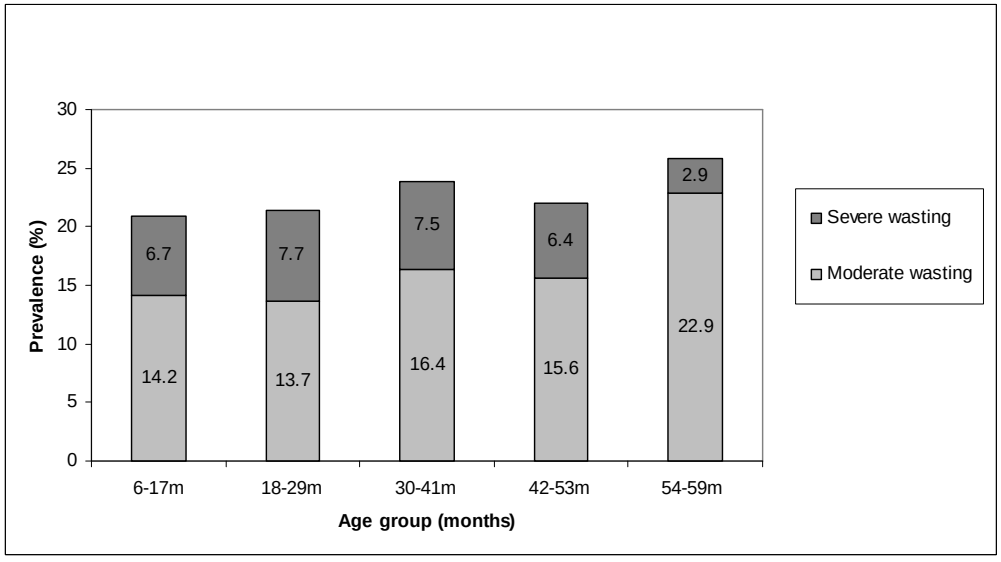


Table 74 Distribution of severe acute malnutrition and oedema based on weight-for-height z-scores-Ifo camp, Dadaab (Aug 2011)

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 37 (6.8 %)	Not severely malnourished No. 504 (93.2 %)

Figure 21 shows that the weight-for-height z-score distribution is shifted to the left, illustrating a poorer status than the international WHO Standard population of children aged 6-59 months.

Figure 21 Distribution of weight-for-height z-scores (based on WHO Growth Standards; the reference population is shown in green) of survey population compared to reference population-Ifo camp, Dadaab (Aug 2011)

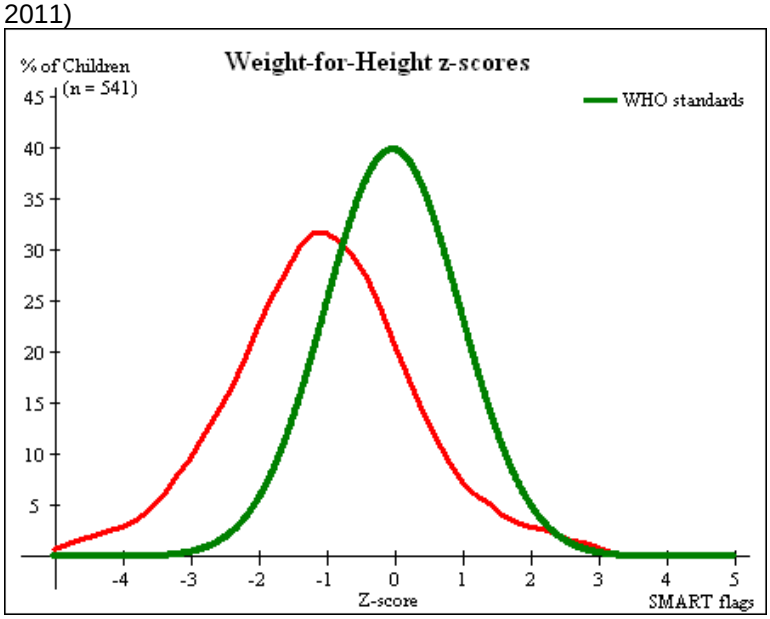


Table 75 Prevalence of stunting based on height-for-age z-scores and by sex-Ifo camp, Dadaab (Aug 2011)

	All n = 504	**Boys** n = 245	**Girls** n = 259
Prevalence of stunting (<-2 z-score)	(117) 23.2 % (18.4 - 28.8 95% CI)	(54) 22.0 % (15.9 - 29.7 95% CI)	(63) 24.3 % (18.0 - 31.9 95% CI)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(76) 15.1 % (11.5 - 19.6 95% CI)	(34) 13.9 % (9.1 - 20.7 95% CI)	(42) 16.2 % (11.6 - 22.3 95% CI)
Prevalence of severe stunting (<-3 z-score)	(41) 8.1 % (5.8 - 11.2 95% CI)	(20) 8.2 % (5.0 - 13.1 95% CI)	(21) 8.1 % (5.1 - 12.6 95% CI)

Children in the age groups 18-29 and 30-41 months tend to be the most affected by stunting as compared to the other age groups.

Table 76 Prevalence of stunting by age based on height-for-age z-scores-Ifo camp, Dadaab (Aug 2011)

		Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	124	10	8.1	15	12.1	99	79.8
18-29	108	10	9.3	22	20.4	76	70.4
30-41	132	14	10.6	21	15.9	97	73.5
42-53	105	6	5.7	13	12.4	86	81.9
54-59	35	1	2.9	5	14.3	29	82.9
Total	504	41	8.1	76	15.1	387	76.8

Figure 22 Trends in the prevalence of stunting by age in children 6-59 months-Ifo camp, Dadaab (Aug 2011)

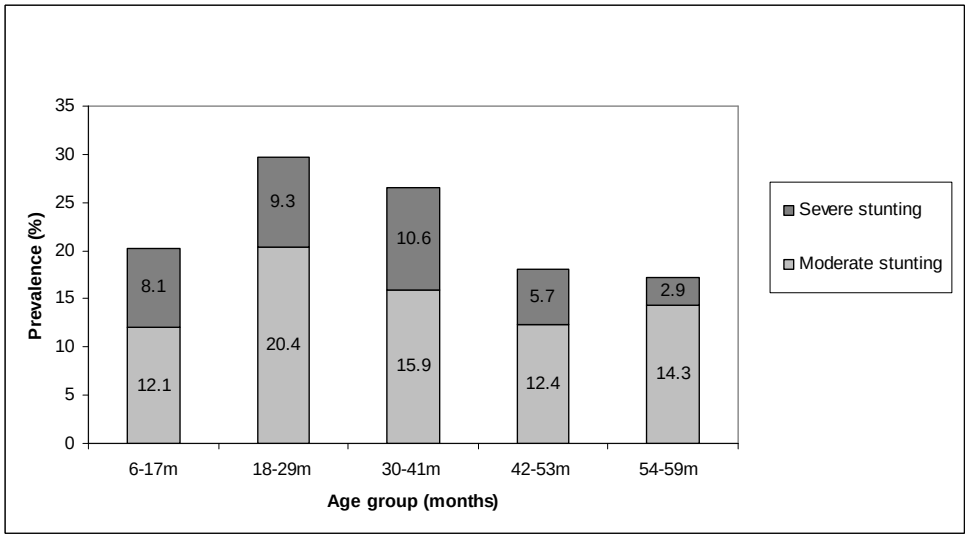


Table 77 Prevalence of underweight based on weight-for-age z-scores by sex-Ifo camp, Dadaab (Aug 2011)

	All n = 539	**Boys** n = 268	**Girls** n = 271
Prevalence of underweight (<-2 z-score)	(151) 28.0 % (22.4 - 34.4 95% CI)	(72) 26.9 % (19.6 - 35.7 95% CI)	(79) 29.2 % (22.7 - 36.5 95% CI)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(109) 20.2 % (16.0 - 25.3 95% CI)	(50) 18.7 % (13.6 - 25.0 95% CI)	(59) 21.8 % (16.8 - 27.8 95% CI)
Prevalence of severe underweight (<-3 z-score)	(42) 7.8 % (5.5 - 10.9 95% CI)	(22) 8.2 % (5.2 - 12.6 95% CI)	(20) 7.4 % (4.6 - 11.7 95% CI)

Table 78 Mean z-scores, Design Effects and excluded subjects -Ifo camp, Dadaab (Aug 2011)

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	541	-1.05±1.34	2.25	5	11
Weight-for-Age	539	-1.37±1.11	2.37	1	17
Height-for-Age	504	-1.08±1.30	1.83	4	49

* contains for WHZ and WAZ the children with oedema.

MUAC is being used in the community for screening and admission to therapeutic and supplementary feeding programmes.

Table 79 Prevalence of malnutrition based on MUAC-Ifo camp, Dadaab (Aug 2011)

	All n = 560
At risk of malnutrition (≥ 125mm and <135 mm)	(128) 22.9% (18.4-27.3 95% CI)
Moderate malnutrition (≥ 115mm and <125 mm)	(42) 7.5% (4.3-10.7 95% CI)
Severe malnutrition (< 115mm)	(7) 1.3% (0.4-2.1 95% CI)

Similar to the weight-for-height z-score analysis, the prevalence of malnutrition based on MUAC was calculated excluding the new arrivals (arrived in the camp in the past three months) from the overall analysis. Results shown below demonstrate no major difference in malnutrition when excluding the new arrivals.

Table 80 Prevalence of malnutrition based on MUAC excluding new arrivals in camp for less than 3 months - Ifo camp, Dadaab (Aug 2011)

	n = 520
At risk of malnutrition (≥ 125mm and <135 mm)	(111) 21.3% (16.9-25.8 95% CI)
Moderate malnutrition (≥ 115mm and <125 mm)	(39) 7.5% (4.6-10.4 95% CI)
Severe malnutrition (< 115mm)	(7) 1.3% (0.4-2.3 95% CI)

The case load for the selective feeding programmes was estimated to aid in programme planning. The Ifo population used during the survey was 115,864. Based on the survey results, 22.7% children were found to be under 5 years (total of 26301 children) and hence a total of 23671 children were estimated to be between 6-59 months (assuming that 10% of under-5 are 0-5 months).

Table 81 Estimated number of malnourished children eligible to be enrolled in a selective feeding programme at the time of the survey (based on all admission criteria)-Ifo camp, Dadaab (Aug 2011)

	Number/total	**% (95% CI)**	**N (LCI-UCI)***
Eligible for therapeutic feeding programme**	41/561	7.3% (3.7-11.0)	1728 (876-2604)
Eligible for supplementary feeding programme**	98/561	17.5% (12.8-22.1)	4142 (3029-5231)

*LCI=Lower Confidence Interval; UCI: Upper Confidence Interval
**WHZ flags excluded from analysis

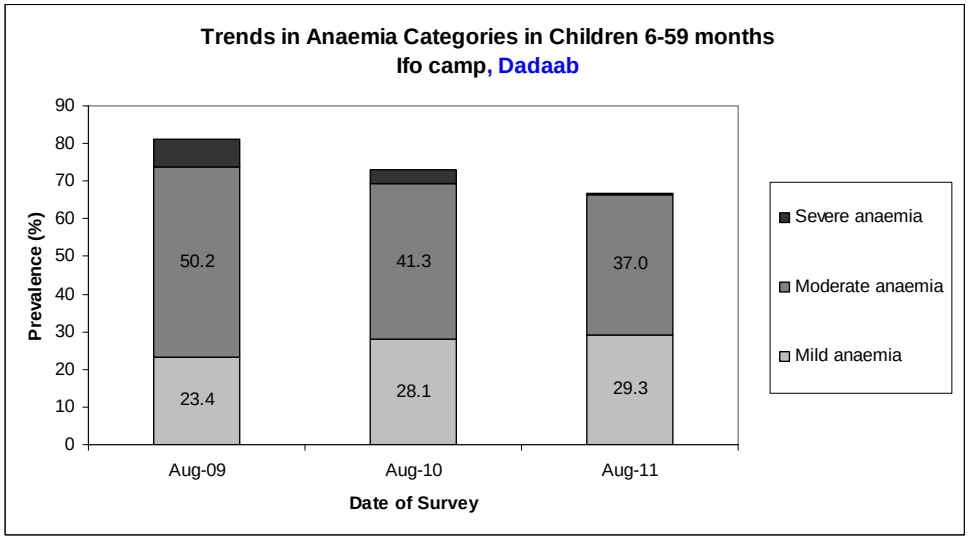
Anaemia results

Table 82 Prevalence of anaemia and haemoglobin concentration in children 6-59 months of age -Ifo camp, Dadaab (Aug 2011)

Anaemia – Children 6-59 months	**All** n = 550
Total Anaemia (Hb<11.0 g/dL)	(299) 54.4% (49.5-59.2 95% CI)
Mild Anaemia (Hb 10.0-10.9 g/dL)	(151) 27.5% (23.0-31.9 95% CI)
Moderate Anaemia (7.0-9.9 g/dL)	(143) 26.0% (21.4-30.6 95% CI)
Severe Anaemia (<7.0 g/dL)	(5) 0.9% (0.1-1.7 95% CI)
Mean Hb (g/dL)	10.7g/dL (10.6-10.9 95% CI) [6.1 min,14.1 max]

Comparison with results from 2010 shows a significant decrease in anaemia among children 6-59 months ($p<0.05$).

Figure 23 Nutrition survey results (anaemia in children 6-59 months) since 2009-Ifo camp, Dadaab (Aug 2011)



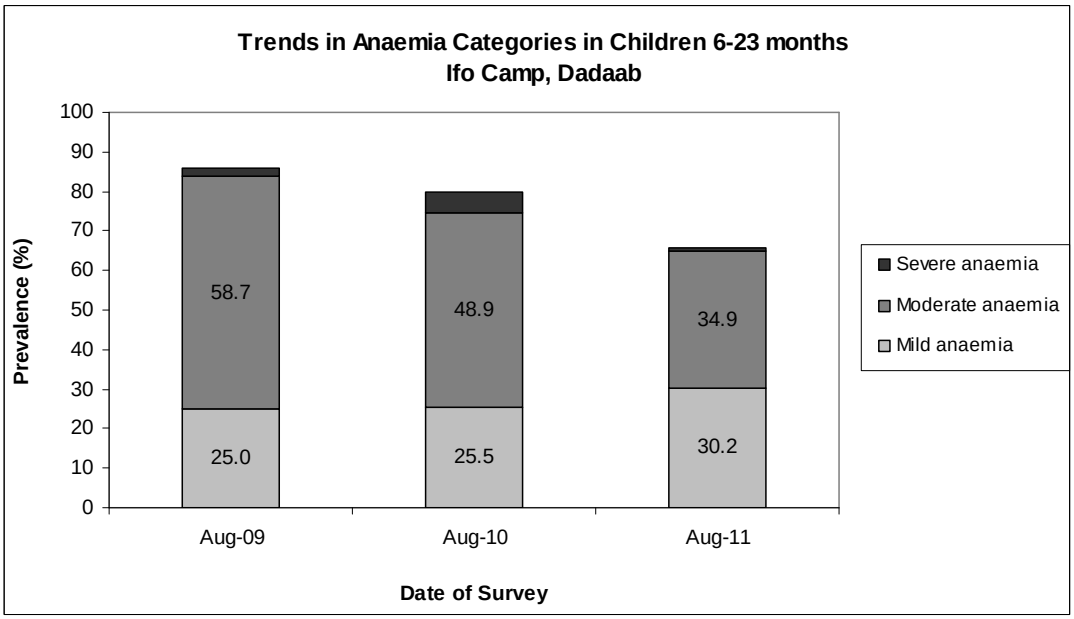
The 6-23 months age group had the highest prevalence of anaemia of 63.4%; prevalence of anaemia declined with increasing age. These age trends are similar to those seen in 2009 and 2010.

Table 83 Prevalence of anaemia by age-Ifo camp, Dadaab (Aug 2011)

		Severe Anaemia (<7.0 g/dL)		Moderate Anaemia (7.0-9.9 g/dL)		Mild Anaemia (Hb 10.0-10.9 g/dL)		Total Anaemia (Hb<11g.0 g/dL)		Normal (Hb≥11.0 g/dL)	
Age (mths)	**Total no.**	**No.**	**%** (95% CI)	**No.**	**%** (95% CI)	**No.**	**%** (95% CI)	**No.**	**%** (95% CI)	**No.**	**%** (95% CI)
6-23	184	1	0.5 (0-1.7)	68	37.0 (28.0-45.9)	54	29.3 (21.2-37.5)	123	66.8 (58.6-75.1)	61	33.2 (24.9-1.4)
24-35	124	2	1.6 (0-3.9)	38	30.6 (21.6-39.7)	30	24.2 (16.6-31.8)	70	56.5 (46.6-66.3)	54	43.5 (33.7-53.4)
36-59	238	2	0.8 (0-2.0)	36	15.1 (9.9-20.4)	66	27.7 (21.6-33.9)	104	43.7 (37.0-50.4)	134	56.3 (49.6-63.0)
Total	**546**	5	0.9 (0.1-1.7)	142	26 (21.5-30.6)	150	27.5 (22.9-32.0)	297	54.4 (49.5-59.3)	249	45.6 (40.7-50.5)

Figure 24 below shows the anaemia prevalence from nutrition surveys in children aged 6-23 months since 2009. This Figure was drawn to aid in the assessment of the impact of Nutributter® to reduce anaemia in children 6-23 months. For comparison purpose, children who joined the camp in 2011 were excluded from analysis because they may not have been exposed to Nutributter® as of 6 months of age or may have been malnourished before joining the camp. Comparison with results from 2010 shows a significant decrease in anaemia among children 6-23 months ($p<0.05$).

Figure 24 Nutrition survey results (anaemia in children 6-23 months) since 2009-Ifo camp, Dadaab (Aug 2011)



Programme coverage

Selective feeding programme

Table 84 Nutrition treatment programme coverage based on all admission criteria (weight-for-height, MUAC and oedema)-Ifo camp, Dadaab (Aug 2011)

	Number/total	% (95% CI)
Proportion of children aged 6-59 months with severe acute malnutrition currently enrolled in therapeutic feeding programme*	10/41	24.4 (8.1-40.6)
Proportion of children aged 6-59 months with moderate acute malnutrition currently enrolled in supplementary feeding programme*	17/98	17.3 (9.7-25.0)

*WHZ flags excluded from analysis

Table 85 Nutrition treatment programme coverage based on MUAC and oedema only -Ifo camp, Dadaab (Aug 2011)

	Number/total	% (95% CI)
Proportion of children aged 6-59 months with severe acute malnutrition currently enrolled in therapeutic feeding programme	5/7	71.4 (26.3-100)
Proportion of children aged 6-59 months with moderate acute malnutrition currently enrolled in supplementary feeding programme	19/42	45.2 (25.7-64.8)

Vaccination and supplementation programmes

The coverage of vaccination card was found to be at 29.6% (20.2-39.195%CI)

Measles vaccination coverage

Table 86 Measles vaccination coverage for children aged 9-59 months (n= 534) -Ifo camp, Dadaab (Aug 2011)

	Measles (with card) n=152	**Measles (with card or confirmation from mother) n=476**
YES	28.5 % (19.1-37.8 95% CI)	89.1 % (84.0-94.3 95% CI)

Due to an outbreak of measles in the camps, a mass measles vaccination campaign was conducted among

children aged 6-59 months prior to the nutrition survey. The coverage results are presented below.

Table 87 Measles vaccination coverage for children aged 6-59 months (n=560) -Ifo camp, Dadaab (Aug 2011)

	Measles (with card) n=153	**Measles (with card or confirmation from mother) n=492**
YES	27.3 (18.2-36.4 95% CI)	87.9 (82.4-93.3 95% CI)

PENTA vaccination coverage

PENTA vaccination coverage was measured in light of a potential outbreak of pertussis (whooping cough). Surveyors had to verify the vaccine by card only. However there were misunderstandings among survey teams and some also verified by recall. Hence, the data needs to be interpreted with caution.

Table 88 PENTA vaccination coverage for children aged 6-59 months (n= 560) -Ifo camp, Dadaab (Aug 2011)

	PENTA 1 n=25	**PENTA 2 n=114**	**PENTA 3 n=158**
YES	4.5% (1.9-7.0 95% CI)	20.4% (7.2-33.5 95% CI)	28.2% (16.7-39.8 95% CI)

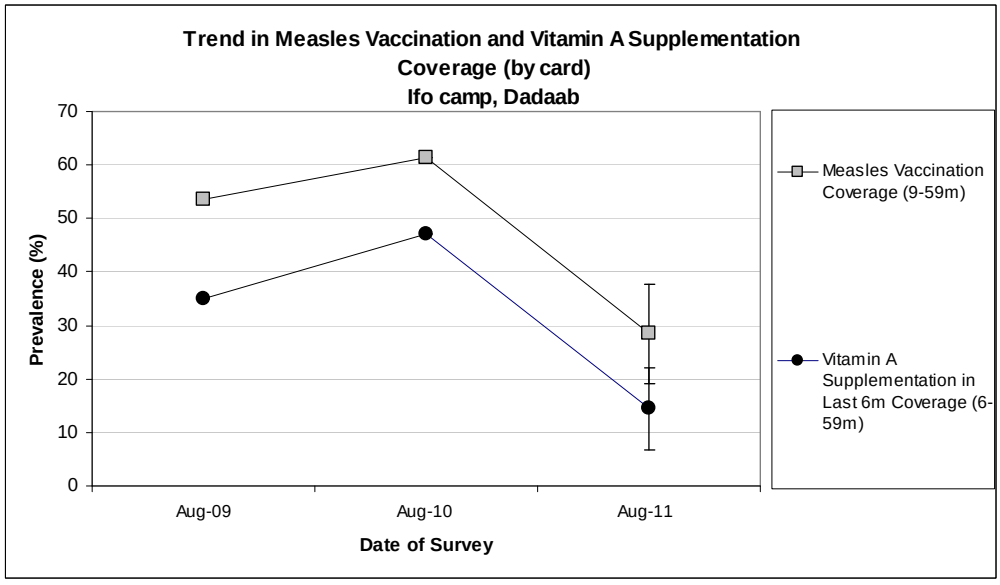
Vitamin A supplementation coverage

Table 89 Vitamin A supplementation for children aged 6-59 months within past 6 months (n=560) -Ifo camp, Dadaab (Aug 2011)

	Vitamin A capsule (with card) n=81	**Vitamin A capsule (with card or confirmation from mother) n=479**
YES	14.5 % (6.8-22.2 95% CI)	85.5 % (79.5-91.6 95% CI)

Comparison with results from 2010 shows a decrease in measles vaccination and vitamin A supplementation (within past six months) coverage *with card* among children 6-59 months.

Figure 25 Nutrition survey results (measles vaccination and vitamin A supplementation within past 6 months with car) since 2009-Ifo camp, Dadaab (Aug 2011)



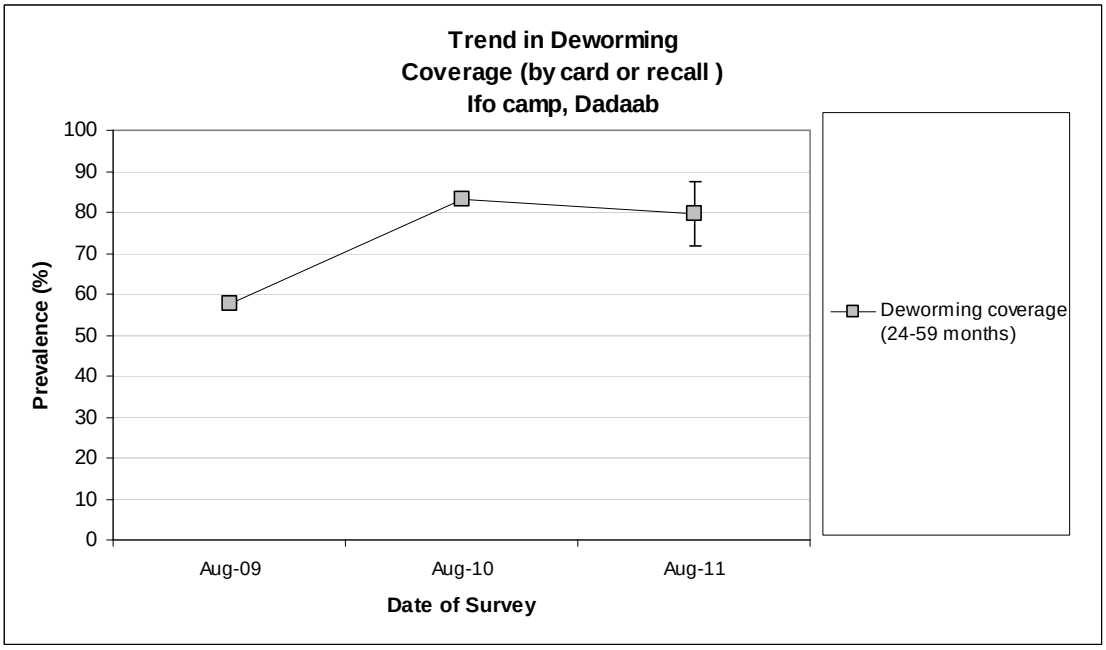
Deworming coverage

Table 90 Deworming for children aged 24-59 months within past 6 months (n=368) -Ifo camp, Dadaab (Aug 2011)

	Deworming (with card) n=17	Deworming (with card or confirmation from mother) n=293
YES	4.6 % (1.4-7.8 95% CI)	79.6 % (71.6-87.6 95% CI)

Comparison with results from 2010 shows no difference in deworming (within past six months) coverage *with card or recall* among children 24-59 months. Note that, in surveys in 2009 and 2010, only coverage by recall was measured.

Figure 26 Nutrition survey results (deworming for children aged 24-59 months within past 6 months) since 2009 - Ifo camp, Dadaab (Aug 2011)



Nutributter® and Food Voucher programmes

Table 91 Nutributter® programme for children aged 6-23 months-Ifo camp, Dadaab (Aug 2011)

	Number/total	% (95% CI)
Currently receiving Nutributter®	50/160	31.3 (22.2-40.3 95% CI)

Of those receiving Nutributter®, the average number of sachets collected the last time they collected Nutributter® was **23.4 sachets** (range: 6-30 sachets). When asked if Nutributter® was shared with others in the family, **31.3%** (18.1-44.4 95% CI) reported that it was shared.

Table 92 Food Voucher programme for children aged 6-12 months-Ifo camp, Dadaab (Aug 2011)

	Number/total	% (95% CI)
Currently have a Food Voucher	39/60	65.0 (52.1-77.9 95% CI)

Morbidity from diarrhoea and feeding during diarrhoea

Table 93 Prevalence of reported diarrhoea in the two weeks prior to the interview -Ifo camp, Dadaab (Aug 2011)

	Number/total	% (95% CI)
Diarrhoea in past 2 weeks	99/561	17.6 (13.1-22.2 95% CI)

Table 94 Feeding during diarrhoea episodes - Ifo camp, Dadaab (Aug 2011)

	n=97
Less than normal	(81) 83.5% (73.9-93.1 95% CI)
Same as normal	(14) 14.4% (5.0-23.8 95% CI)
More than normal	(2) 2.1% (0-5.0 95% CI)
No food	(0) 0 (0-0)

CHILDREN 0-23 MONTHS-IFO CAMP, DADAAB (AUG 2011)

In Ifo, the majority of the surveyed children aged 0-23 months were Somalis, followed by other nationalities (not including the Somali Bantus). New arrivals in the camps for less than three months represented 4.8% of the sample.

Table 95 Demographic information -Ifo camp, Dadaab (Aug 2011)

	Number/total	%
Nationality		
Somali	236/252	93.6
Somali Bantu	6/252	2.4
Others	10/252	4.0
Arrival in camp		
<3 months	27/252	4.8
3-6 months	12/252	10.7
>6 months	213/252	84.5

Table 96 Prevalence of Infant and Young Child Feeding Practices indicators-Ifo camp, Dadaab (Aug 2011)

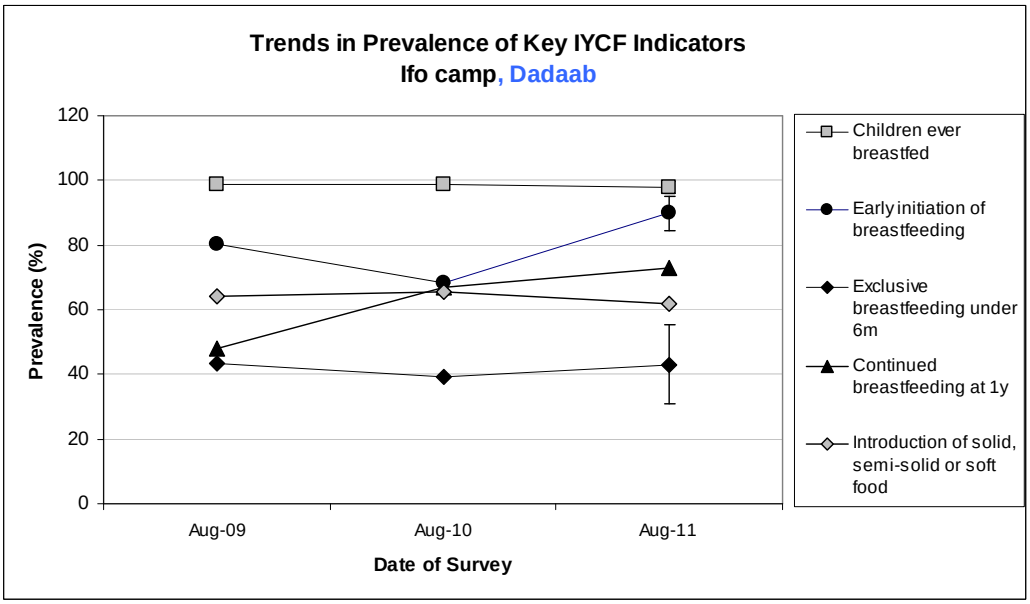
Indicator	Age range	Number/total	Prevalence (%)	95% CI
Children ever breastfed	0-23 months	253/259	97.7	(95.9-99.5)
Early initiation of breastfeeding	0-23 months	228/253	90.1	(85.1-95.2)
Exclusive breastfeeding under 6 months	0-5 months	43/100	43.0	(30.8-55.2)
Continued breastfeeding at 1 year	12-15 months	32/44	72.7	(58.5-87.0)
Continued breastfeeding at 2 years	20-23 months	6/18	33.3	(9.3-57.4)
Introduction of solid, semi-solid or soft foods	6-8 months	13/21	61.9	(38.8-85.1)
Children bottle fed	0-23 months	30/258	11.6	(6.9-16.3)
Children given infant formula	0-23 months	47/258	18.2	(11.5-24.9)
Reported prevalence of diarrhoea	0-23 months	58/259	22.4	(16.0-28.8)
Continued feeding during diarrhoea	0-23 months	13/57	22.8	(10.1-35.5)

The confidence intervals are an integral part of the results when analysing trends over the years[3]. When IYCF indicators are collected in nutritional surveys, it is not feasible to achieve a large enough sample size for some of the indicators to be estimated as precisely as desired, especially for indicators covering a very narrow age range (e.g. 12-15 months, 6-8 months). Hence, trend analyses need to be interpreted with caution. Nevertheless, trend analyses are useful for assessing the situation and major differences seen from year to year should warrant further investigation.

Comparison with results from previous years shows an increasing trend in early initiation of breastfeeding and continued breastfeeding at 1 year. Note that confidence intervals could not be obtained from IYCF indicators collected in previous nutrition surveys.

[3] The 'precision' of the estimate is measured by a statistical term known as the *confidence interval (CI.).* This reflects the error introduced by the sampling method and the sample size. Confidence intervals are usually associated with a probability of 95 per cent, which is equivalent to saying that if the survey is done 100 times the true population value will be within the range of the confidence interval 95 times out of 100.

Figure 27 Nutrition survey results (key IYCF indicators) since 2009-Ifo camp, Dadaab (Aug 2011)



CHILDREN 5-9 YEARS-IFO CAMP, DADAAB (AUG 2011)

In Ifo, the majority of the surveyed children aged 5-9 years were Somalis, followed by other nationalities (not including the Somali Bantus). New arrivals in the camps for less than three months represented 6.4% of the sample.

Table 97 Demographic information-Ifo camp, Dadaab (Aug 2011)

	Number/total	%
Nationality		
Somali	416/448	92.9
Somali Bantu	10/448	2.2
Others	22/448	4.9
Arrival in camp		
<3 months	29/451	6.4
3-6 months	6/451	1.3
>6 months	416/451	92.2

Five children were found to be more than 140 cm in height. Four out of five were reported to be 9 years old while one was reported to be 8 years old. A similar number of boys and girls were surveyed. The children 5 and 9 years of age were slightly under-represented and the children 6 years of age are slightly over-represented as compared to the other ages.

Table 98 Age and sex distribution of the sampled children, 5-9 years-Ifo camp, Dadaab (Aug 2011)

Age (years)	Boys		Girls		Total		Ratio
	no.	%	no.	%	no.	%	Boy:girl
5	38	50.7	37	49.3	75	16.7	1.0
6	67	56.3	52	43.7	119	26.4	1.3
7	46	50.0	46	50.0	92	20.4	1.0
8	49	52.1	45	47.9	94	20.9	1.1
9	30	42.9	40	57.1	70	15.6	0.8
Total	230	51.1	220	48.9	450	100.0	1.0

Table 99 Prevalence of low MUAC or oedema in children 5-9 years and by sex-Ifo camp, Dadaab (Aug 2011)

MUAC (cm)	All n=451	Boys n=230	Girls n=221
<15.0	(181) 40.1% (32.4-47.9 95% CI)	(92) 40.0 % (30.7-49.3 95% CI)	(89) 40.3% (31.9-48.7 95% CI)
14.0-14.9	(126) 27.9 % (21.9-34.0 95% CI)	(69) 30.0 % (22.6-37.4 95% CI)	(57) 25.8% (18.9-32.7 95% CI)
<14.5	(117) 25.9% (20.1-31.8 95% CI)	(61) 26.5% (18.9-34.1 95% CI)	(56) 25.3% (18.8-31.9 95% CI)
<14.0	(55) 12.2% (8.2-16.2 95% CI)	(23) 10.0 % (5.4-14.6 95% CI)	(31) 14.5% (8.7-20.3 95% CI)
<13.5	(27) 6.0 % (3.3-8.7 95% CI)	(13) 5.7% (2.6-8.7 95% CI)	(14) 6.3% (2.4-10.2 95% CI)

The prevalence of oedema is 0%

Since 6.4% of the survey sample were new arrivals (arrived in the camp in the past three months) (Table 97 above) and most likely to be more affected by malnutrition, the prevalence of low MUAC was calculated excluding them from the overall analysis. Results shown below demonstrate no major difference in the prevalence of low MUAC when excluding the new arrivals.

Table 100 Prevalence of low MUAC or oedema in children 5-9 years and by sex excluding new arrivals in camp for less than 3 months-Ifo camp, Dadaab (Aug 2011)

MUAC (cm)	All n=422	Boys n=209	Girls n=213
<15.0	(168) 39.8% (32.4-5-47.2 95% CI)	(83) 39.7% (30.8-48.6 95% CI)	(85) 39.9% (31.7-48.1 95% CI)
14.0-14.9	(118) 28.0% (22.1-33.8 95% CI)	(62) 29.7 % (22.7-36.7 95% CI)	(56) 26.3% (19.4-33.2 95% CI)
<14.5	(106) 25.1% (19.7-30.5 95% CI)	(53) 25.4% (18.4-32.3 95% CI)	(53) 24.9% (18.4-31.4 95% CI)
<14.0	(50) 11.8% (7.9-15.8 95% CI)	(21) 10.0 % (5.4-14.7 95% CI)	(29) 13.6% (7.9-19.3 95% CI)
<13.5	(23) 5.5 % (2.8-8.1 95% CI)	(12) 5.7% (2.4-9.1 95% CI)	(11) 5.2% (1.8-8.6 95% CI)

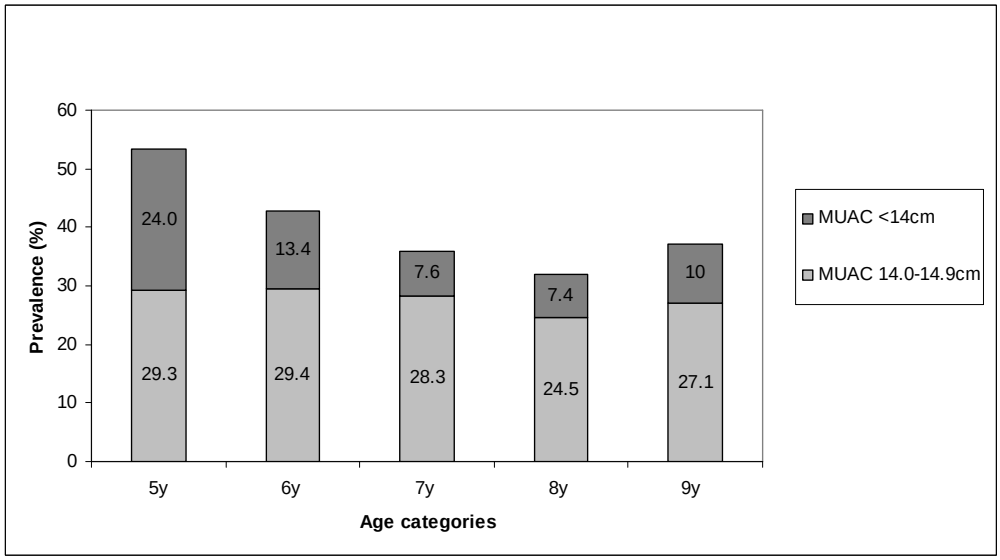
The prevalence of oedema is 0%

The younger ages (5-6 years) tend to have a higher prevalence of low MUAC as compared to the older ages (7-9 years).

Table 101 Prevalence of low MUAC or oedema by age in children 5-9 years-Ifo camp, Dadaab (Aug 2011)

		MUAC < 13.5 cm		MUAC < 14.0 cm		MUAC <14.5 cm		MUAC 14.0 – 14.9 cm		MUAC > 15.0 cm		Oedema	
Age (years)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
5	75	9	12.0	18	24	29	38.7	22	29.3	35	46.7	0	0
6	119	9	7.6	16	13.4	33	27.7	35	29.4	68	57.1	0	0
7	92	4	4.3	7	7.6	17	18.5	26	28.3	59	64.1	0	0
8	94	3	3.2	7	7.4	18	19.1	23	24.5	64	68.1	0	0
9	70	2	2.9	7	10	19	27.1	19	27.1	44	62.9	0	0
Total	450	27	6.0	55	12.2	116	25.8	125	27.8	270	60.0	0	0

Figure 28 Trends in the prevalence of low MUAC by age in children 5-9 years- Ifo camp, Dadaab (Aug 2011)



WOMEN 15-49 YEARS-IFO CAMP, DADAAB (AUG 2011)

In Ifo, the majority of the surveyed women aged 15-49 years were Somalis, followed by other nationalities (not including the Somali Bantus). New arrivals in the camps for less than three months represented 3.5% of the sample.

Table 102 Demographic information-Ifo camp, Dadaab (Aug 2011)

	Number/total	***%***
Nationality		
Somali	228/250	91.2
Somali Bantu	5/250	2.0
Others	17/250	6.8
Arrival in camp		
<3 months	9/258	3.5
3-6 months	3/258	1.2
>6 months	246/258	95.3
Physiological status		
Pregnant	19/258	7.4
Lactating (until 6 months post-natal only)	27/258	10.5
Neither lactating nor pregnant	212/258	82.2

The mean age of the women sampled was 26.8 years (range: 15-48 years).

Table 103 Prevalence of anaemia and haemoglobin concentration in non-pregnant women of reproductive age (15-49 years) -Ifo camp, Dadaab (Aug 2011)

Anaemia – Non-pregnant women of reproductive age 15-49 years	**All** n = 230
Total Anaemia (<12.0 g/dL)	(117) 50.9% (42.8-59.0 95% CI)
Mild Anaemia (11.0-11.9 g/dL)	(42) 18.3% (12.2-24.4 95% CI)
Moderate Anaemia (8.0-10.9 g/dL)	(66) 28.7% (21.6-35.8 95% CI)
Severe Anaemia (<8.0 g/dL)	(9) 3.9% (0.5-7.3 95% CI)
Mean Hb (g/dL)	11.6 g/dL (11.3-12.0 95% CI) [4.3 min,15.5 max]

Comparison with results from 2010 shows a significant decrease in anaemia among non-pregnant women of reproductive age ($p<0.05$). Trends in the decrease of anaemia categories (severe, moderate, mild) could not be assessed with previous years due to differences in the classification of anaemia categories.

Figure 29 Nutrition survey results (anaemia) since 2009-Ifo camp, Dadaab (Aug 2011)

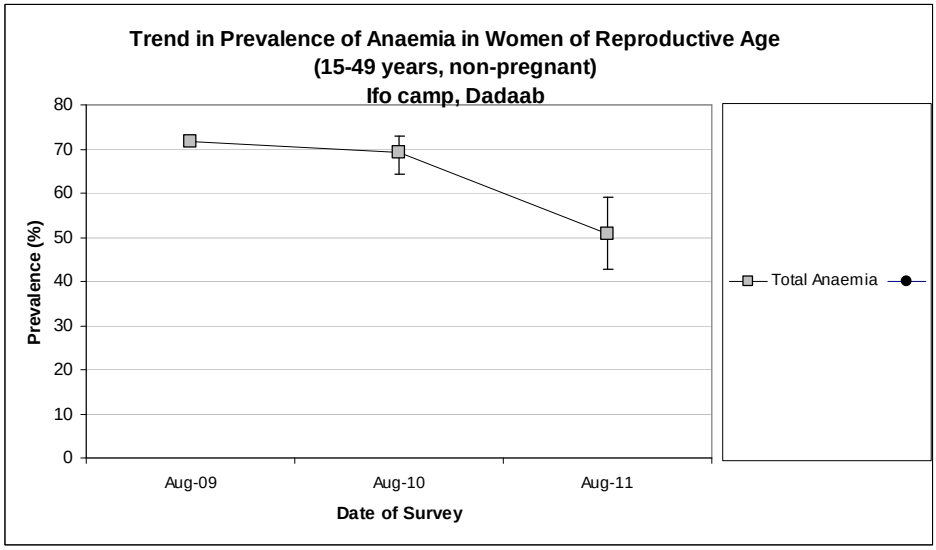


Table 104 Undernutrition based on MUAC-Ifo camp, Dadaab (Aug 2011)

Pregnant and lactating women	**Number/total**	**% (95% CI)**
Moderate undernutrition (18.5-20.9 cm)	2/46	4.3 (0-10.4)
Severe undernutrition (<18.5 cm)	0/46	0
Non-pregnant women and non-lactating		
Moderate undernutrition (16.0-18.4 cm)	0/212	0
Severe undernutrition (<16.0 cm)	0/212	0

ANC enrolment and iron-folic acid supplementation coverage

Table 105 ANC enrolment and iron-folic acid pills coverage among pregnant women (15-49 years)-Ifo camp, Dadaab (Aug 2011)

	Number/total	**% (95% CI)**
Currently enrolled in ANC programme with card	5/16	31.3 (4.5-58.0)
Currently enrolled in ANC programme with card or recall	10/16	62.5 (40.9-84.1)
Currently receiving iron-folic acid pills	5/16	31.3 (2.1-60.4)

Table 106 Post-natal vitamin A supplementation among women (15-49 years)-Ifo camp, Dadaab (Aug 2011)

	Number/total	**% (95% CI)**
Received vitamin A supplementation since delivery with card	4/27	14.8 (0.3-29.3)
Received vitamin A supplementation since delivery with card or recall	14/27	51.9 (29.5-74.2)

HOUSEHOLD INDICATORS-WASH, FOOD SECURITY AND MORTALITY-IFO CAMP, DADAAB (AUG 2011)

Table 107 shows the different indicators and the total number of households who were sampled for each household-level indicator. All households were considered whether tor not hey had eligible individuals for the individual-level measurements.

Table 107 Target sample size and actual number captured during the survey-Ifo camp, Dadaab (Aug 2011)

Indicator	Target sample size	Household interviewed during the study	% of the target
WASH	350	347	99.1
Food security	350	344	98.3
Mortality	525	514	97.9

WATER, SANITATION AND HYGIENE-IFO CAMP, DADAAB (AUG 2011)

In Ifo, new arrival households in the camp for less than three months represented 5.8% of the household sample with WASH data. 13.7% of the surveyed households for WASH indicators had members who joined their household in the last three months.

Table 108 Demographic information-Ifo camp, Dadaab (Aug 2011)

	Number/total	%
Date of arrival of household in camp		
<3 months	20/347	5.8
3-6 months	5/347	1.4
>6 months	322/347	92.8
Proportion of surveyed HH who had one or more members who joined within last 3 months	47/343	13.7

Table 109 Ownership of water containers-Ifo camp, Dadaab (Aug 2011)

	Number/total	% (95% CI)
Proportion of households that say they have water containers to collect water	333/342	97.4 (95.6-99.1)

Among the households reporting not to have water containers, two households reported they did not go to the reception centre or were not registered, two households reported that they did not receive any during reception and two households reported they did not have money to buy containers.

Table 110 Water Quality-Ifo camp, Dadaab (Aug 2011)

	Number/total	% (95% CI)
Proportion of households using an improved drinking water source	345/345	100.0 (100-100)
Proportion of households that use a covered or narrow necked container for storing their drinking water	271/339	79.9 (69.2-90.7)

The mean litres of water per person per day was found to be 20.6 lpppd with a range of 4-120 lpppd.

Table 111 Water Quantity 1: Amount of litres of water used per person per day-Ifo camp, Dadaab (Aug 2011)

Proportion of households that access:	Number/total	% (95% CI)
≥ 20 litres	147/340	43.2 (35.9-50.6)
15 – <20 litres	49/340	14.4 (10.8-18.0)
10-<15 litres	89/340	26.2 (20.3-32.0)
<10 litres	55/340	16.2 (10.7-21.6)

Table 112 Water Quantity 2-Ifo camp, Dadaab (Aug 2011)

	Number/total	% (95% CI)
Proportion of households that take less than 30 minutes to collect their main drinking water source	135/342	39.5 (29.0-49.9)

Table 113 Satisfaction with water supply-Ifo camp, Dadaab (Aug 2011)

	Number/total	% (95% CI)
Proportion of households that say they are satisfied with the drinking water supply	294/345	85.2 (78.0-92.4)

Table 114 Soap distribution-Ifo camp, Dadaab (Aug 2011)

	Number/total	% (95% CI)
Proportion of households that received soap during the last two distribution cycles or at reception	14/346	4.0 (1.2-6.9)

Table 115 Safe Excreta disposal-Ifo camp, Dadaab (Aug 2011)

	Number/total	% (95% CI)
Proportion of households using an improved excreta disposal facility (improved toilet facility, not shared)	175/341	51.3 (41.4-61.2)
Proportion of households using a shared family toilet	89/341	26.1 (19.5-32.7)
Proportion of households using a communal toilet	64/341	18.8 (12.4-25.1)
Proportion of households using an unimproved toilet	13/341	3.8 (0-7.8)
The proportion of households with children under three years old that dispose of faeces safely	237/243	97.5 (94.1-100)
Proportion of households with a household or shared family toilet in use	259/259	100.0 (100-100)

FOOD SECURITY-IFO CAMP, DADAAB (AUG 2011)

In Ifo, new arrival households in the camp for less than three months represented 3.5% of the household sample with food security data. 8.1% of the surveyed households for food security indicators had members who joined their household in the last three months.

Table 116 Demographic information - Ifo camp, Dadaab (Aug 2011)

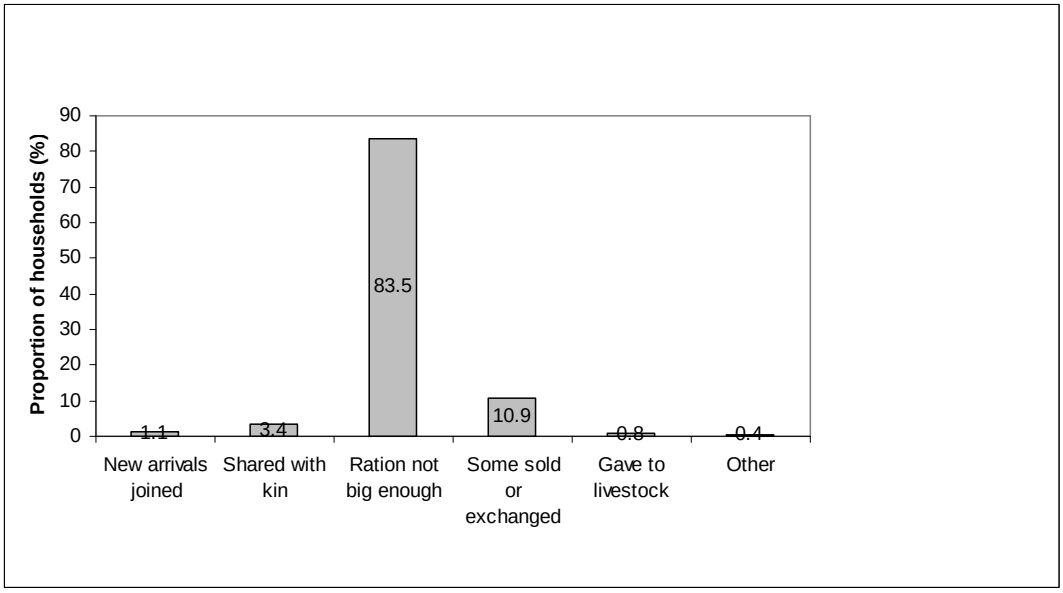
	Number/total	%
Date of arrival of household in camp		
<3 months	12/344	3.5
3-6 months	3/344	0.9
>6 months	329/344	95.6
Proportion of surveyed HH who had one or more members who joined within last 3 months	28/344	8.1

Table 117 Ration card coverage and duration of general food ration - Ifo camp, Dadaab (Aug 2011)

	Number/total	% (95% CI)
Proportion of households with a ration card	335/337	99.4 (98.6-100)
Proportion of households reporting that the GFR lasted <15 days	271/339	79.9 (74.7-85.2)
Average number of days GFR lasts	-	10.6 days (range: min 3- max 16)

When asked why the general good ration did not last the entire cycle, the main reason given by the surveyed households was that the ration was not big enough.

Figure 30 Main reason given by each household for why general good ration did not last 15 days - Ifo camp, Dadaab (Aug 2011)



As shown in Figure 31 below, the most important coping strategy that was reported to be used to fill the food gap was to borrow from neighbours or relatives or get credit, followed by buying of food.

Figure 31 Most important coping strategies used to fill the food gap when general food ration runs out -Ifo camp, Dadaab (Aug 2011)

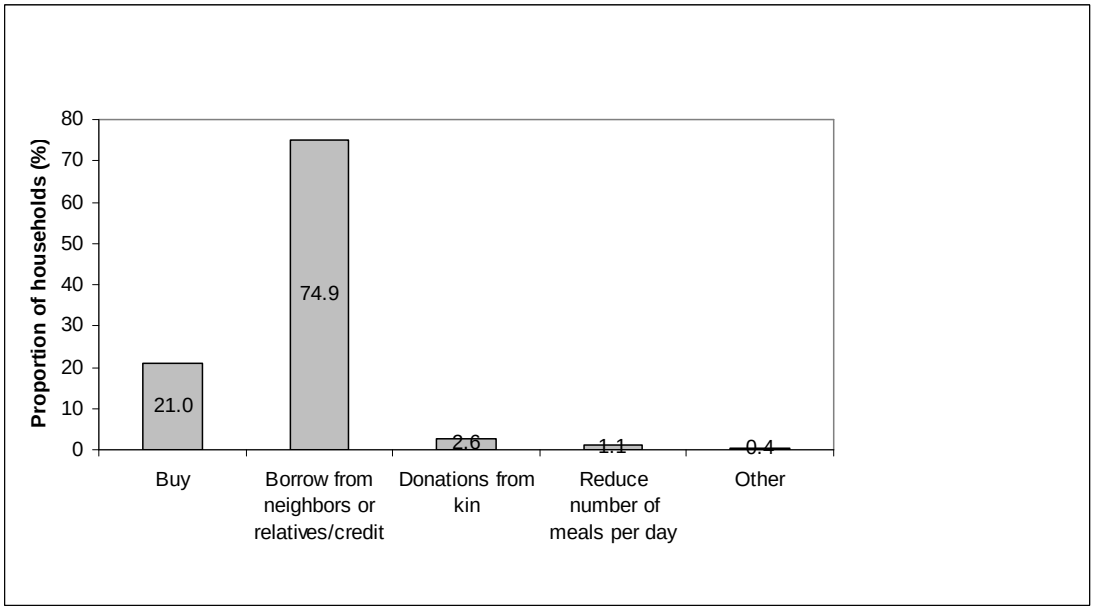
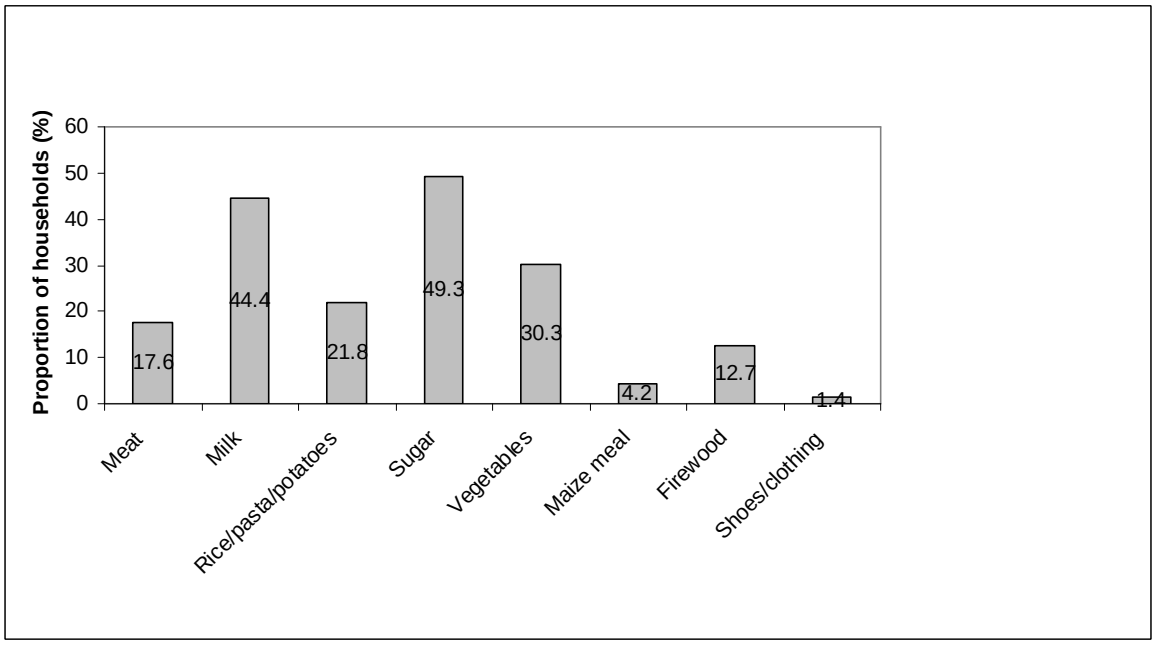


Table 118 Sell or exchange of food from the general ration-Ifo camp, Dadaab (Aug 2011)

	Number/total	% (95% CI)
Proportion of households selling or exchanging food ration items	142/339	41.9 (31.1-52.7)

As shown in Figure 32 below, when food from the general ration was sold or exchanged, the most common items reported to be bought were sugar and milk, followed by vegetables, rice / pasta / potatoes and meat.

Figure 32 Most common items bought when general ration is sold or exchanged-Ifo camp, Dadaab (Aug 2011)



MORTALITY-IFO CAMP, DADAAB (AUG 2011)

Retrospective mortality data was collected over the past three months. More specifically, the recall period was 86 days and started at the end of May also known as Jamadul Akhir in the Somali calendar or Bisha Shanaad in the Arabic calendar. Demographic data was also derived from the mortality data as presented below.

Table 119 Demographic and retrospective mortality within camp--Ifo camp, Dadaab (Aug 2011)

Demographic data	
Number of HH surveyed	514
Average HH size	6.8
% U5	22.7%
Retrospective mortality	
Number of current HH residents	3470
Total number U5	789
Number of people who joined HH / camp	234
Total number U5 who joined HH / camp	63
Number of people who left HH / camp	77
Total number U5 who left HH / camp	10
Number of births during recall	48
Number of deaths during recall	12
Total number U5 deaths during recall	6
Crude Death Rate (total deaths/10,000 people / day)	0.41 (0.21-0.80 95% CI)
U5 Death Rate (deaths in children under five/10,000 children under five / day)	0.94 (0.45-1.98 95% CI)

RESULTS FROM DAGAHALEY

INDIVIDUAL-LEVEL INDICATORS-CHILDREN 6-59 MONTHS, 0-23 MONTHS, AND 5-9 YEARS, AND WOMEN OF REPRODUCTIVE AGE 15-49 YEARS-HAGADERA CAMP, DADAAB (SEP 2011)

Table 120 shows the different population groups and the total number of individuals who were sampled within each group. 35 clusters were sampled for all indicators.

Table 120 Target sample size and actual number captured during the survey-Dagahaley camp, Dadaab (Sep 2011)

Indicator	Target sample size	Subjects measured/interviewed during the survey	% of the target
Children 6-59 months	595	595	100.0
Children 0-5 months	105	101	96.2
Children 5-9 years	455	461	101.3
Women 15-49 years	280	285	101.8

CHILDREN 6-59 MONTHS-DAGAHALEY CAMP, DADAAB (SEP 2011)

In Dagahaley, the majority of the surveyed children aged 6-59 months were Somalis, followed by the Somali Bantus. New arrivals in the camps for less than three months represented 7.5% of the sample. The majority of children 6-59 months joining the camp in the past six months came from Lower Juba, followed by Mogadishu and Gedo.

Table 121 Demographic information-Dagahaley camp, Dadaab (Sep 2011)

	Number/total	%
Nationality		
Somali	531/587	90.5
Somali Bantu	56/587	9.5
Others	0	0
Arrival in camp		
<3 months	44/587	7.5
3-6 months	4/587	0.7
>6 months	539/587	91.8
Region of origin for children in camps <6 months		
Lower Juba	17/48	35.4
Middle Juba	4/48	8.3
Gedo	8/48	16.7
Bay	0	0
Bakool	2/48	4.2
Lower Shabelle	0	0
Middle Shabelle	0	0
Hiraan	1/48	2.1
Mogadishu/Banadir	9/48	18.8
Other	7/48	14.6

Anthropometric results (based on WHO Growth Standards 2006)

Anthropometric results based on NCHS 1977 Growth Reference are shown in **Appendix 2**.

The coverage of age documentation was low with 36% of children having an exact birth date. The age group 18-29 was slightly over-represented while the age group 54-59 months was slightly under-represented as compared to the other age groups. Under-representation of the latter age group often happens in surveys where there are limited proofs of age as caregivers tend to recall

best the birth date of smaller children.

The overall sex ratio was 1.1 (sex ratio should be between 0.8-1.2), which confirms that both sexes were equally distributed.

Table 122 Distribution of age and sex of sample-Dagahaley camp, Dadaab (Sep 2011)

	Boys		Girls		Total		Ratio
AGE (mo)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy:girl**
6-17	68	50.7	66	49.3	134	22.7	1.0
18-29	79	51.6	74	48.4	153	25.9	1.1
30-41	70	51.5	66	48.5	136	23.0	1.1
42-53	80	58.0	58	42.0	138	23.4	1.4
54-59	16	53.3	14	46.7	30	5.1	1.1
Total	313	53.0	278	47.0	591	100.0	1.1

Boys were found to be more affected by acute malnutrition as compared to girls and the difference was statistically significant ($p<0.05$).

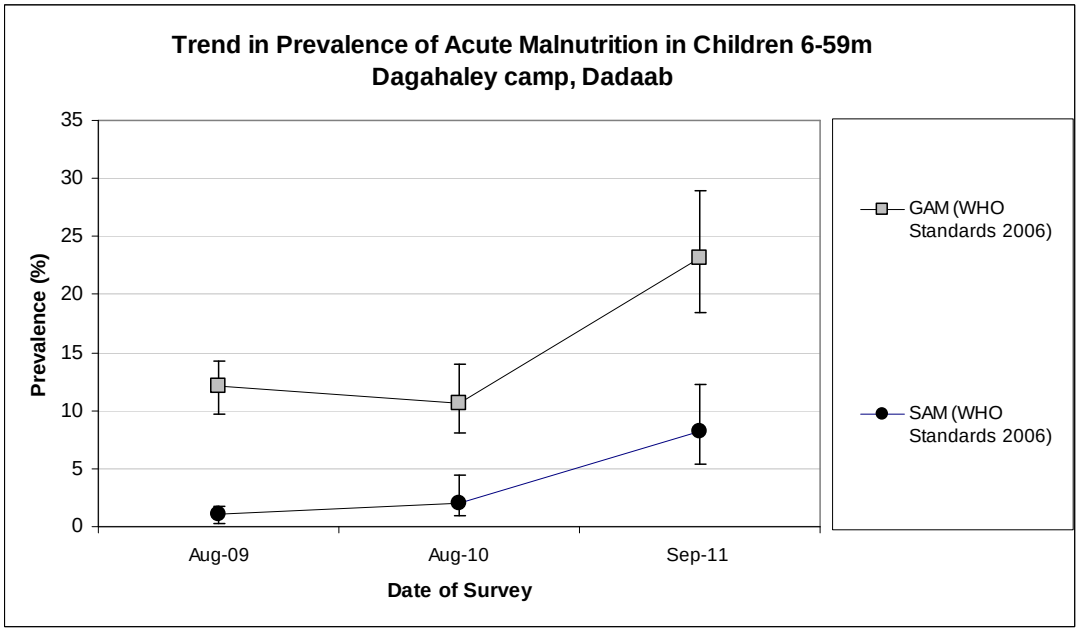
Table 123 Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex-Dagahaley camp, Dadaab (Sep 2011)

	All n = 573	**Boys** n = 302	**Girls** n = 271
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(133) 23.2 % (18.4 - 28.9 95% CI)	(85) 28.1 % (22.6 - 34.4 95% CI)	(48) 17.7 % (12.0 - 25.3 95% CI)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(86) 15.0 % (11.8 - 18.9 95% CI)	(53) 17.5 % (13.9 - 21.9 95% CI)	(33) 12.2 % (8.0 - 18.1 95% CI)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(47) 8.2 % (5.4 - 12.2 95% CI)	(32) 10.6 % (6.3 - 17.3 95% CI)	(15) 5.5 % (3.2 - 9.3 95% CI)

The prevalence of oedema is 0.0 %

Comparison with results from 2010 shows a significant increase in GAM and SAM among children 6-59 months ($p<0.05$).

Figure 33 Nutrition survey (GAM, SAM) results since 2009-Dagahaley camp, Dadaab (Sep 2011)



Since 7.5% of the sample were new arrivals (arrived in the camps in the past three months as per UNHCR definition) (Table 121) and most likely to be more affected by malnutrition, the prevalence of acute malnutrition in the camp was calculated excluding them from the overall analysis. Results shown below demonstrate no major difference in acute malnutrition when excluding the new arrivals.

Table 124 Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex excluding new arrivals in camp for less than 3 months-Dagahaley camp, Dadaab (Sep 2011)

	All n = 524	**Boys** n = 279	**Girls** n = 245
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(119) 22.7 % (17.5 - 28.9 95% CI)	(75) 26.9 % (20.8 - 34.0 95% CI)	(44) 18.0 % (11.9 - 26.2 95% CI)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(76) 14.5 % (11.2 - 18.6 95% CI)	(46) 16.5 % (12.6 - 21.4 95% CI)	(30) 12.2 % (7.9 - 18.5 95% CI)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(43) 8.2 % (5.4 - 12.3 95% CI)	(29) 10.4 % (6.0 - 17.3 95% CI)	(14) 5.7 % (3.3 - 9.6 95% CI)

The prevalence of oedema is 0.0 %

The age groups 6-17 months and 30-41 months tend to be affected the most by wasting.

Table 125 Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema-Dagahaley camp, Dadaab (Sep 2011)

		Severe wasting (<-3 z-score)		**Moderate wasting (>= -3 and <-2 z-score)**		**Normal (> = -2 z score)**		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	131	17	13.0	16	12.2	98	74.8	0	0.0
18-29	149	6	4.0	23	15.4	120	80.5	0	0.0
30-41	132	9	6.8	27	20.5	96	72.7	0	0.0
42-53	132	15	11.4	15	11.4	102	77.3	0	0.0
54-59	29	0	0.0	5	17.2	24	82.8	0	0.0
Total	573	47	8.2	86	15.0	440	76.8	0	0.0

Figure 34 Trends in the prevalence of wasting by age in children 6-59 months- Dagahaley camp, Dadaab (Sep 2011)

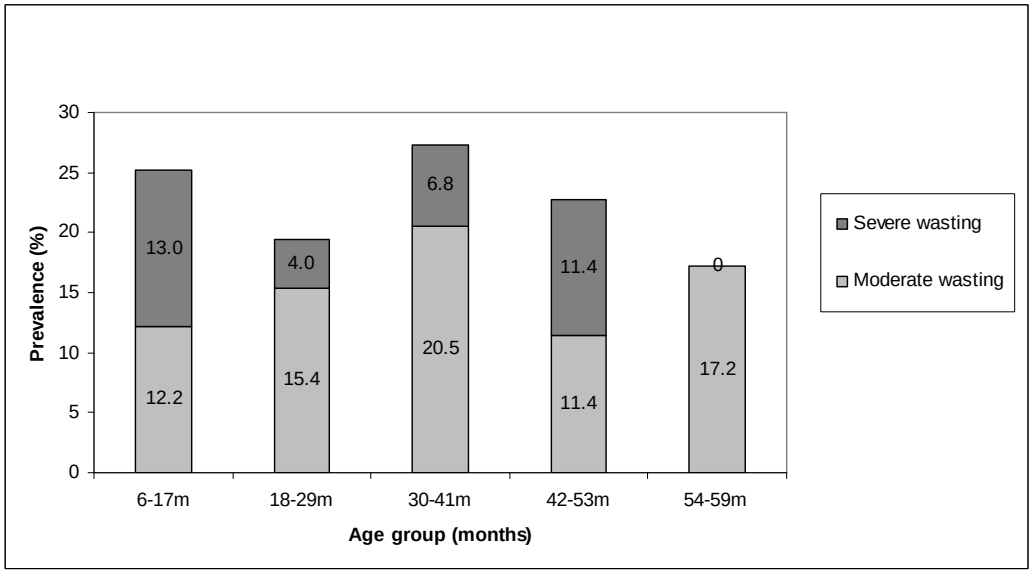


Table 126 Distribution of severe acute malnutrition and oedema based on weight-for-height z-scores-Dagahaley camp, Dadaab (Sep 2011)

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 47 (8.2 %)	Not severely malnourished No. 526 (91.8 %)

Figure 35 shows that the weight-for-height z-score distribution is shifted to the left, illustrating a poorer status than the international WHO Standard population of children aged 6-59 months.

Figure 35 Distribution of weight-for-height z-scores (based on WHO Growth Standards; the reference population is shown in green) of survey population compared to reference population-Dagahaley camp, Dadaab (Sep 2011)

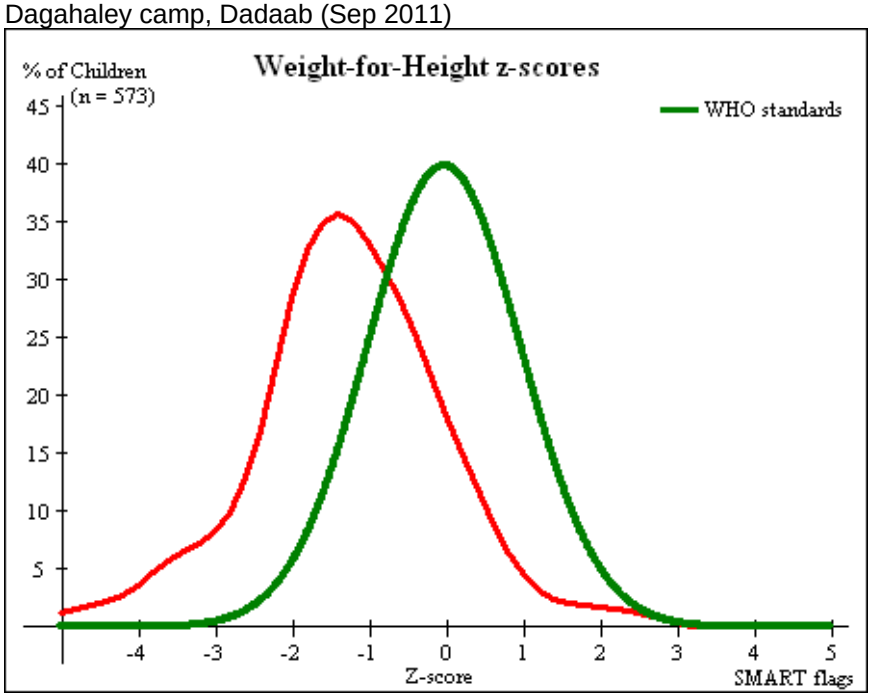


Table 127 Prevalence of stunting based on height-for-age z-scores and by sex-Dagahaley camp, Dadaab (Sep 2011)

	All n = 537	**Boys** n = 280	**Girls** n = 257
Prevalence of stunting (<-2 z-score)	(111) 20.7 % (15.3 - 27.3 95% CI)	(62) 22.1 % (15.8 - 30.1 95% CI)	(49) 19.1 % (13.3 - 26.5 95% CI)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(82) 15.3 % (11.4 - 20.1 95% CI)	(46) 16.4 % (11.6 - 22.7 95% CI)	(36) 14.0 % (9.6 - 20.0 95% CI)
Prevalence of severe stunting (<-3 z-score)	(29) 5.4 % (3.1 - 9.2 95% CI)	(16) 5.7 % (2.6 - 12.2 95% CI)	(13) 5.1 % (2.8 - 9.1 95% CI)

Children in the age groups 18-29 and 30-41 months tend to be the most affected by stunting as compared to the other age groups.

Table 128 Prevalence of stunting by age based on height-for-age z-scores-Dagahaley camp, Dadaab (Sep 2011)

		Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	115	5	4.3	15	13.0	95	82.6
18-29	136	7	5.1	27	19.9	102	75.0
30-41	129	8	6.2	23	17.8	98	76.0
42-53	129	9	7.0	13	10.1	107	82.9
54-59	28	0	0.0	4	14.3	24	85.7
Total	537	29	5.4	82	15.3	426	79.3

Figure 36 Trends in the prevalence of stunting by age in children 6-59 months- Dagahaley camp, Dadaab (Sep 2011)

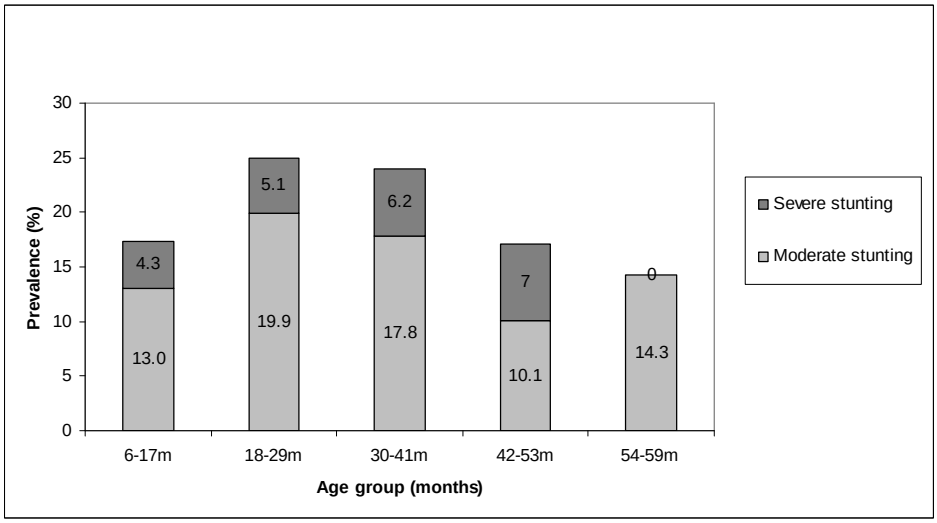


Table 129 Prevalence of underweight based on weight-for-age z-scores by sex-Dagahaley camp, Dadaab (Sep 2011)

	All n = 576	**Boys** n = 304	**Girls** n = 272
Prevalence of underweight (<-2 z-score)	(155) 26.9 % (22.4 - 32.0 95% CI)	(81) 26.6 % (21.4 - 32.6 95% CI)	(74) 27.2 % (21.5 - 33.8 95% CI)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(96) 16.7 % (14.0 - 19.8 95% CI)	(51) 16.8 % (13.8 - 20.3 95% CI)	(45) 16.5 % (12.8 - 21.2 95% CI)
Prevalence of severe underweight (<-3 z-score)	(59) 10.2 % (7.0 - 14.7 95% CI)	(30) 9.9 % (6.4 - 15.0 95% CI)	(29) 10.7 % (6.7 - 16.6 95% CI)

Table 130 Mean z-scores, Design Effects and excluded subjects -Dagahaley camp, Dadaab (Sep 2011)

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	573	-1.25±1.25	2.14	6	12
Weight-for-Age	576	-1.40±1.12	1.66	1	14
Height-for-Age	537	-0.95±1.25	2.82	5	49

* contains for WHZ and WAZ the children with oedema.

MUAC is being used in the community for screening and admission to therapeutic and supplementary feeding programmes.

Table 131 Prevalence of malnutrition based on MUAC-Dagahaley camp, Dadaab (Sep 2011)

	n = 592
At risk of malnutrition (≥ 125mm and <135 mm)	(113) 19.1% (15.0-23.2 95% CI)
Moderate malnutrition (≥ 115mm and <125 mm)	(31) 5.2% (3.0-7.5 95% CI)
Severe malnutrition (< 115mm)	(11) 1.9% (0.7-3.0 95% CI)

Similar to the weight-for-height z-score analysis, the prevalence of malnutrition based on MUAC was calculated excluding the new arrivals (arrived in the camp in the past three months) from the overall analysis. Results shown below demonstrate no major difference in malnutrition when excluding the new arrivals.

Table 132 Prevalence of malnutrition based on MUAC excluding new arrivals in camp for less than 3 months -Dagahaley camp, Dadaab (Sep 2011)

	n = 540
At risk of malnutrition (≥ 125mm and <135 mm)	(103) 19.1% (14.7-23.4 95% CI)
Moderate malnutrition (≥ 115mm and <125 mm)	(27) 5% (2.6-7.4 95% CI)
Severe malnutrition (< 115mm)	(10) 1.9% (0.6-3.1 95% CI)

The case load for the selective feeding programmes was estimated to aid in programme planning. The Dagahaley population used during the survey was 99,921. Based on the survey results, 25.6% children were found to be under 5 years (total of 25580 children) and hence a total of 23022 children were estimated to be between 6-59 months (assuming that 10% of under-5 are 0-5 months).

Table 133 Estimated number of malnourished children eligible to be enrolled in a selective feeding programme at the time of the survey (based on all admission criteria)-Dagahaley camp, Dadaab (Sep 2011)

	Number/total	**% (95% CI)**	**N (LCI-UCI)***
Eligible for therapeutic feeding programme**	50/594	8.4 (5.1-11.8)	1934 (1174-2717)
Eligible for supplementary feeding programme**	102/594	17.2 (13.6-20.7)	3960 (3131-4766)

*LCI=Lower Confidence Interval; UCI: Upper Confidence Interval
**WHZ flags excluded from analysis

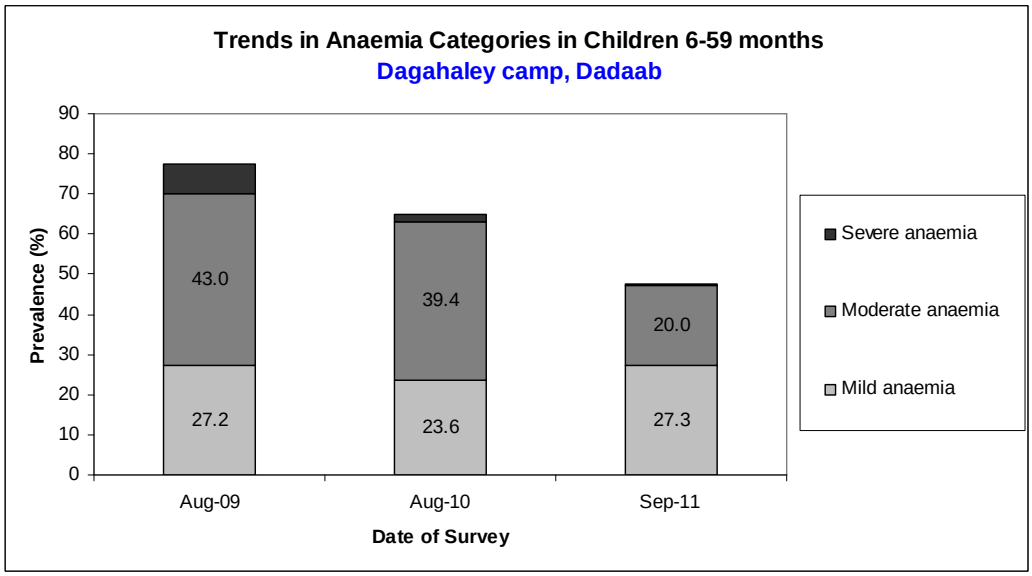
Anaemia results

Table 134 Prevalence of anaemia and haemoglobin concentration in children 6-59 months of age - Dagahaley camp, Dadaab (Sep 2011)

Anaemia – Children 6-59 months	**All** n =576
Total Anaemia (Hb<11.0 g/dL)	(274) 47.6 (42.9-52.2 95% CI)
Mild Anaemia (Hb 10.0-10.9 g/dL)	(157) 27.3 (23.1-31.4 95% CI)
Moderate Anaemia (7.0-9.9 g/dL)	(115) 20.0 (16.3-23.6 95% CI))
Severe Anaemia (<7.0 g/dL)	(2) 0.3 (0-0.8 95% CI)
Mean Hb (g/dL)	10.9g/dL (10.8-11.1 95% CI) [5.8 min,14.6 max]

Comparison with results from 2010 shows a significant decrease in anaemia among children 6-59 months ($p<0.05$).

Figure 37 Nutrition survey results (anaemia in children 6-59 months) since 2009-Dagahaley camp, Dadaab (Sep 2011)



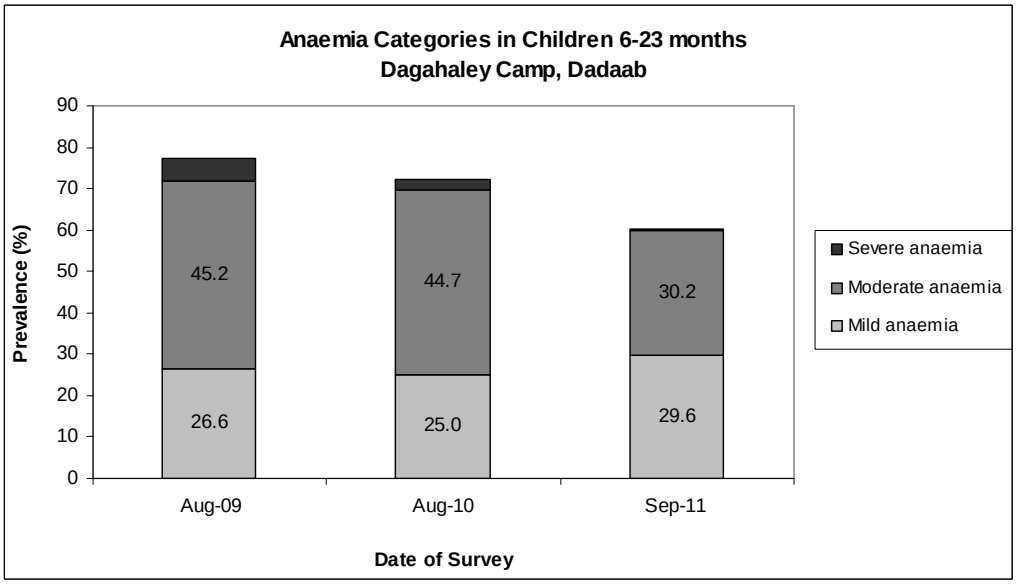
The 6-23 months age group had the highest prevalence of anaemia of 63.4%; prevalence of anaemia declined with increasing age. These age trends are similar to those seen in 2009 and 2010.

Table 135 Prevalence of anaemia by age-Dagahaley camp, Dadaab (Sep 2011)

		Severe Anaemia (<7.0 g/dL)		**Moderate Anaemia (7.0-9.9 g/dL)**		**Mild Anaemia (Hb 10.0-10.9 g/dL)**		**Total Anaemia (Hb<11g.0 g/dL)**		**Normal (Hb≥11.0 g/dL)**	
Age (mths)	**Total no.**	**No.**	**%** (95% CI)	**No.**	**%** (95% CI)	**No.**	**%** (95% CI)	**No.**	**%** (95% CI)	**No.**	**%** (95% CI)
6-23	180	2	1.1 (0-2.7)	58	32.2 (24.0-40.4)	53	29.4 (22.0-36.9)	113	62.8 (55.4-70.1)	67	37.2 (29.9-44.6)
24-35	147	0	0 (0-0)	27	18.4 (11.4-25.3)	45	30.6 (23.2-38.0)	72	49.0 (40.5-57.5)	75	51.0 (42.5-59.5)
36-59	244	0	0 (0-0)	29	11.9 (6.7-17.1)	57	23.4 (17.9-28.8)	86	35.2 (28.7-41.8)	158	64.8 (58.2-71.3)
Total	**571**	2	0.4 (0-0.8)	114	20.0 (16.3-23.6)	155	27.1 (22.9-31.3)	271	47.5 (42.8-52.1)	300	52.5 (47.9-57.2)

Figure 38 below shows the anaemia prevalence from nutrition surveys in children aged 6-23 months since 2009. This Figure was drawn to aid in the assessment of the impact of Nutributter® to reduce anaemia in children 6-23 months. For comparison purpose, children who joined the camp in 2011 were excluded from analysis because they may not have been exposed to Nutributter® as of 6 months of age or may have been malnourished before joining the camp. Comparison with results from 2010 shows a significant decrease in anaemia among children 6-23 months ($p<0.05$).

Figure 38 Nutrition survey results (anaemia in children 6-23 months) since 2009-Dagahaley camp, Dadaab (Sep 2011)



Programme coverage

Selective feeding programme

Table 136 Nutrition treatment programme coverage based on all admission criteria (weight-for-height, MUAC, oedema) -Dagahaley camp, Dadaab (Sep 2011)

	Number/total	% (95% CI)
Proportion of children aged 6-59 months with severe acute malnutrition currently enrolled in therapeutic feeding programme*	5/48	10.4 (1.0-19.9)
Proportion of children aged 6-59 months with moderate acute malnutrition currently enrolled in supplementary feeding programme*	6/97	6.2 (1.3-11.1)

*WHZ flags excluded from analysis

Table 137 Nutrition treatment programme coverage based on MUAC and oedema only-Dagahaley camp, Dadaab (Sep 2011)

	Number/total	% (95% CI)
Proportion of children aged 6-59 months with severe acute malnutrition currently enrolled in therapeutic feeding programme	4/10	40.0 (2.2-77.8)
Proportion of children aged 6-59 months with moderate acute malnutrition currently enrolled in supplementary feeding programme	6/29	20.7 (2.6-38.7)

Vaccination and supplementation programmes

The coverage of vaccination card was found to be low at 31.3% (24.4-38.2 95% CI).

Measles vaccination coverage

Table 138 Measles vaccination coverage for children aged 9-59 months (n=553)-Dagahaley camp, Dadaab (Sep 2011)

	Measles (with card) n=157	**Measles (with card or confirmation from mother) n=466**
YES	28.4 % (21.3-35.5 95% CI)	84.3 % (75.9-92.6 95% CI)

Due to an outbreak of measles in the camps, a mass measles vaccination campaign was conducted among children aged 6-59 months prior to the nutrition survey. The coverage results are presented below.

Table 139 Measles vaccination coverage for children aged 6-59 months (n=585)-Dagahaley camp, Dadaab (Sep 2011)

	Measles (with card) n=163	**Measles (with card or confirmation from mother) n=483**
YES	27.9 (20.8-34.9 95% CI)	82.6 (74.6-90.5 95% CI)

PENTA vaccination coverage

PENTA vaccination coverage was measured in light of a potential outbreak of pertussis (whooping cough). Surveyors had to verify the vaccine by card only. However there were misunderstandings among survey teams and some also verified by recall. Hence, the data needs to be interpreted with caution

Table 140 PENTA vaccination coverage for children aged 6-59 months (n= 587)-Dagahaley camp, Dadaab (Sep 2011)

	PENTA 1 n=21	**PENTA 2 n=13**	**PENTA 3 n=265**
YES	3.6% (0.7-6.5 95% CI)	2.2% (0.4-4.0 95% CI)	45.1% (32.7-57.6 95% CI)

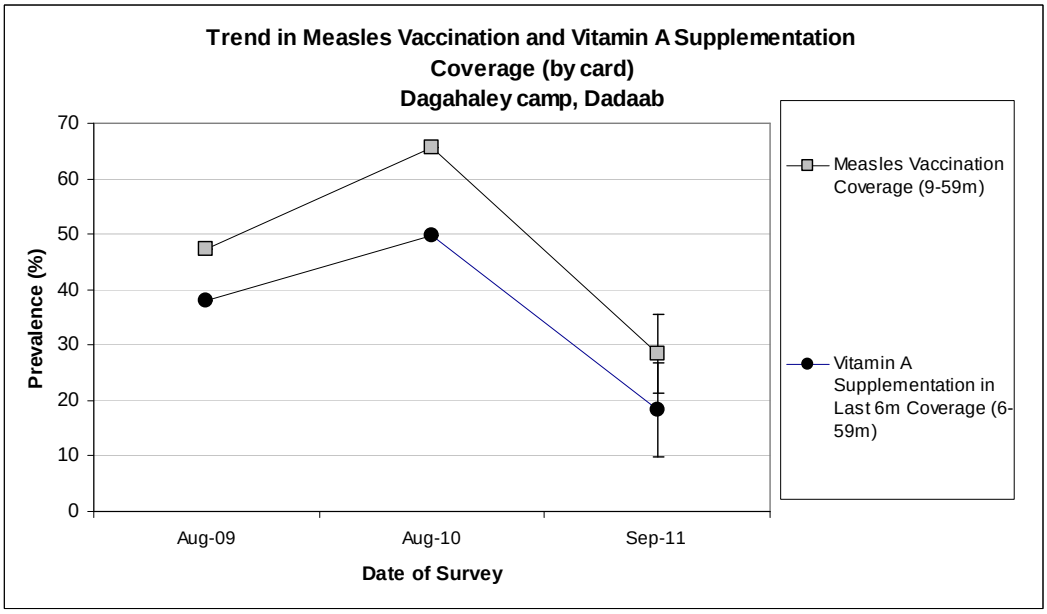
Vitamin A supplementation coverage

Table 141 Vitamin A supplementation for children aged 6-59 months within past 6 months (n=586) -Dagahaley camp, Dadaab (Sep 2011)

	Vitamin A capsule (with card) n=107	**Vitamin A capsule (with card or confirmation from mother) n=462**
YES	18.3 % (9.9-26.7 95% CI)	78.8 % (69.5-88.2 95% CI)

Comparison with results from 2010 shows a decrease in measles vaccination and vitamin A supplementation (within past six months) coverage *with card* among children 6-59 months.

Figure 39 Nutrition survey results (measles vaccination and vitamin A supplementation within past 6 months with car) since 2009-Dagahaley camp, Dadaab (Sep 2011)



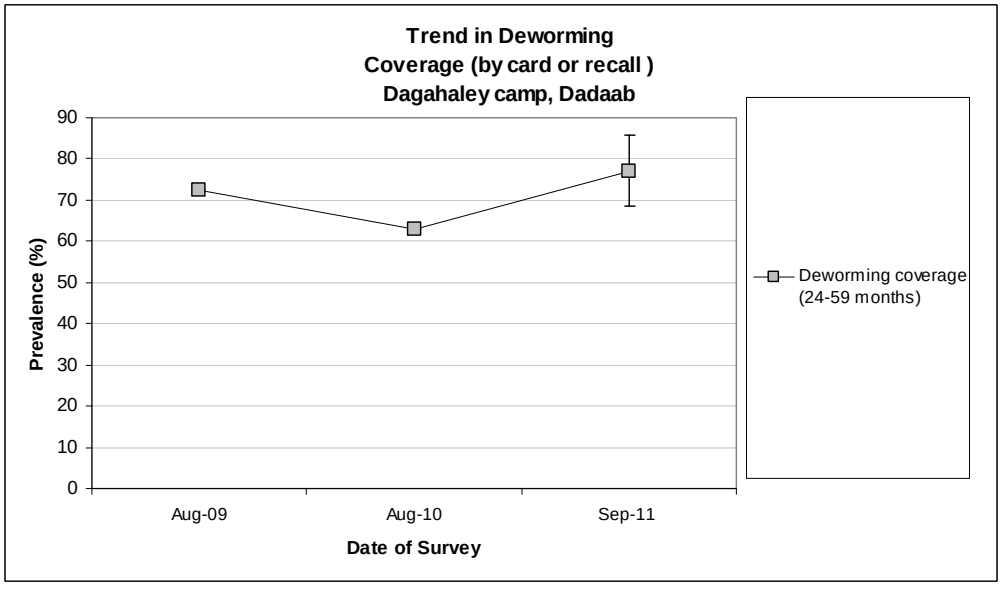
Deworming coverage

Table 142 Deworming for children aged 24-59 months within past 6 months (n=404)-Dagahaley camp, Dadaab (Sep 2011)

	Deworming (with card) n=54	**Deworming (with card or confirmation from mother) n=307**
YES	13.6 % (5.4-21.8 95% CI)	77.1 % (68.6-85.7 95% CI)

Comparison with results from 2010 shows an increase in deworming (within past six months) coverage *with card or recall* among children 24-59 months. Note that, in surveys in 2009 and 2010, only coverage by recall was measured.

Figure 40 Nutrition survey results (deworming for children aged 24-59 months within past 6 months) since 2009 - Dagahaley, Dadaab (Sep 2011)



Nutributter® and Food Voucher programmes

Table 143 Nutributter® programme for children aged 6-23 months-Dagahaley camp, Dadaab (Sep 2011)

	Number/total	% (95% CI)
Currently receiving Nutributter®	84/177	47.5 (35.0-59.9 95% CI)

Of those receiving Nutributter®, the average number of sachets collected the last time they collected Nutributter® was **28.0 sachets** (range: 28-28). When asked if Nutributter® was shared with others in the family, **19.0%** (3.7-34.4 95% CI) reported that it was shared.

Table 144 Food Voucher programme for children aged 6-12 months-Dagahaley camp, Dadaab (Sep 2011)

	Number/total	% (95% CI)
Currently have a Food Voucher	38/77	49.4 (34.0-64.7 95% CI)

Morbidity from diarrhoea and feeding during diarrhoea

Table 145 Prevalence of reported diarrhoea in the two weeks prior to the interview -Dagahaley camp, Dadaab (Sep 2011)

	Number/total	% (95% CI)
Diarrhoea in past 2 weeks	51/582	8.8 (5.1-12.4 95% CI)

Table 146 Feeding during diarrhoea episodes-Dagahaley camp, Dadaab (Sep 2011)

	n=47
Less than normal	(37) 78.7% (65.4-92.0 95% CI)
Same as normal	(8) 17.0% (3.6-30.4 95% CI)
More than normal	(1) 2.1 (0-6.8 95% CI)
No food	(1) 2.1% (0-6.5 95% CI)

CHILDREN 0-23 MONTHS-DAGAHALEY CAMP, DADAAB (SEP 2011)

In Dagahaley, the majority of the surveyed children aged 0-23 months were Somalis, followed by the Somali Bantus. New arrivals in the camps for less than three months represented 6.8% of the sample.

Table 147 Demographic information -Dagahaley camp, Dadaab (Sep 2011)

	Number/total	%
Nationality		
Somali	251/279	90
Somali Bantu	28/279	10
Others	0	0
Arrival in camp		
<3 months	19/279	6.8
3-6 months	2/279	0.7
>6 months	258/279	92.5

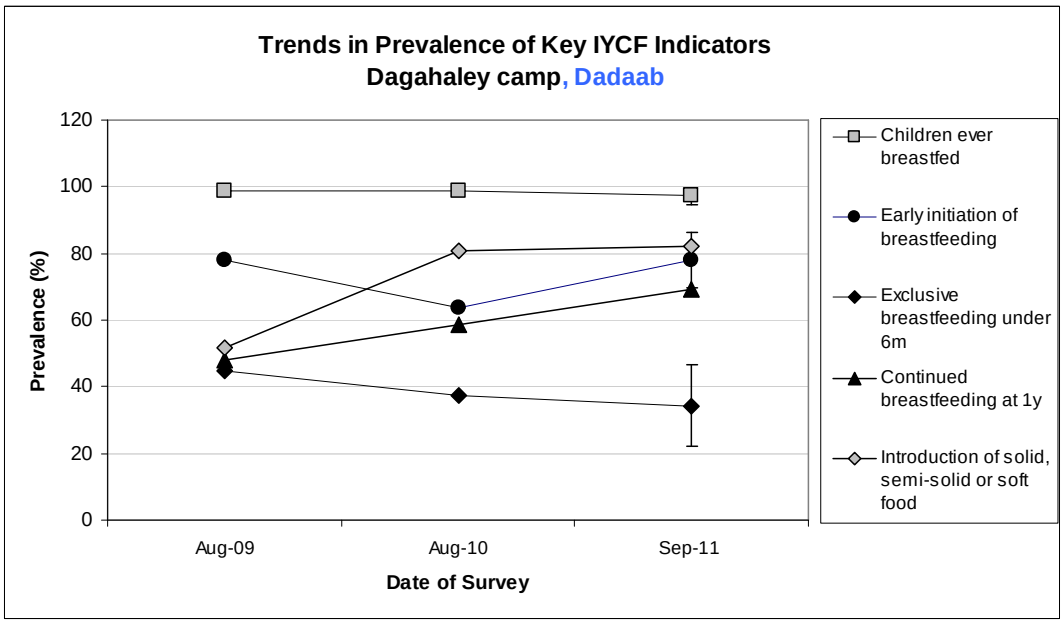
Table 148 Prevalence of Infant and Young Child Feeding Practices indicators-Dagahaley camp, Dadaab (Sep 2011)

Indicator	Age range	Number/total	Prevalence (%)	95% CI
Children ever breastfed	0-23 months	273/280	97.5	(95.0-100)
Early initiation of breastfeeding	0-23 months	215/269	79.9	(71.9-87.9)
Exclusive breastfeeding under 6 months	0-5 months	34/99	34.3	(22.0-46.7)
Continued breastfeeding at 1 year	12-15 months	35/50	70.0	(54.6-85.4)
Continued breastfeeding at 2 years	20-23 months	9/29	31.0	(9.3-52.8)
Introduction of solid, semi-solid or soft foods	6-8 months	23/28	82.1	(66.2-98.1)
Children bottle fed	0-23 months	41/274	15.0	(8.6-21.3)
Children given infant formula	0-23 months	73/281	26.0	(19.6-32.4)
Reported prevalence of diarrhoea	0-23 months	25/277	9.0	(4.7-13.4)
Continued feeding during diarrhoea	0-23 months	4/22	18.2	(1.0-35.4)

The confidence intervals are an integral part of the results when analysing trends over the years[4]. When IYCF indicators are collected in nutritional surveys, it is not feasible to achieve a large enough sample size for some of the indicators to be estimated as precisely as desired, especially for indicators covering a very narrow age range (e.g. 12-15 months, 6-8 months). Hence, trend analyses need to be interpreted with caution. Nevertheless, trend analyses are useful for assessing the situation and major differences seen from year to year should warrant further investigation.

Comparison with results from previous years shows an increasing trend in introduction of solid, semi-solid or soft food and continued breastfeeding at 1 year, while there appears to be a decreasing trend in exclusive breastfeeding under 6 months. Note that confidence intervals could not be obtained from IYCF indicators collected in previous nutrition surveys.

Figure 41 Nutrition survey results (key IYCF indicators) since 2009-Dagahaley camp, Dadaab (Sep 2011)



[4] The 'precision' of the estimate is measured by a statistical term known as the *confidence interval (CI)*. This reflects the error introduced by the sampling method and the sample size. Confidence intervals are usually associated with a probability of 95 per cent, which is equivalent to saying that if the survey is done 100 times the true population value will be within the range of the confidence interval 95 times out of 100.

CHILDREN 5-9 YEARS-DAGAHALEY CAMP, DADAAB (SEP 2011)

In Dagahaley, the majority of the surveyed children aged 5-9 years were Somalis, followed by the Somali Bantus. New arrivals in the camps for less than three months represented 8.2% of the sample.

Table 149 Demographic information-Dagahaley camp, Dadaab (Sep 2011)

	Number/total	%
Nationality		
Somali	414/457	90.6
Somali Bantu	43/457	9.4
Others		
Arrival in camp		
<3 months	38/461	8.2
3-6 months	4/461	0.9
>6 months	419/461	90.9

Four children were found to be more than 140cm in height. Two out of four were reported to be 9 years old while two were reported to be 8 years old. A slightly higher number of boys was surveyed as compared to the girls. The children 5 and 9 years of age were slightly under-represented as compared to the other ages.

Table 150 Age and sex distribution of the sampled children, 5-9 years-Dagahaley camp, Dadaab (Sep 2011)

Age (years)	Boys		Girls		Total		Ratio
	no.	%	no.	%	no.	%	Boy:girl
5	46	59.7	31	40.3	77	16.7	1.5
6	55	52.4	50	47.6	105	22.8	1.1
7	55	55.0	45	45.0	100	21.7	1.2
8	63	56.8	48	43.2	111	24.1	1.3
9	38	55.9	30	44.1	68	14.8	1.3
Total	257	55.7	204	44.3	461	100.0	1.3

Table 151 Prevalence of low MUAC or oedema in children 5-9 years and by sex-Dagahaley camp, Dadaab (Sep 2011)

MUAC (cm)	All n=461	Boys n=257	Girls n=204
<15.0	(130) 28.2% (22.1-34.3 95% CI)	(78) 30.4% (24.0-36.7 95% CI)	(52) 25.5% (17.7-33.2 95% CI)
14.0-14.9	(93) 20.2% (15.6-24.7 95% CI)	(54) 21.0% (16.0-26.1 95% CI)	(39) 19.1% (13.0-25.2 95% CI)
<14.5	(69) 15.0% (9.8-20.1 95% CI)	(43) 16.7% (11.1-22.4 95% CI)	(26) 12.7% (6.0-19.5 95% CI)
<14.0	(37) 8.0% (4.6-11.5 95% CI)	(24) 9.3% (4.7-14.0 95% CI)	(13) 6.4% (2.7-10.1 95% CI)
<13.5	(17) 3.7% (1.5-5.9 95% CI)	(12) 4.7% (1.7-7.6 95% CI)	(5) 2.4% (0.4-4.5 95% CI)

The prevalence of oedema is 0%

Since 8.2% of the survey sample were new arrivals (arrived in the camp in the past three months) (Table 149 above) and most likely to be more affected by malnutrition, the prevalence of low MUAC was calculated excluding them from the overall analysis.

Table 152 Prevalence of low MUAC or oedema in children 5-9 years and by sex excluding new arrivals in camp for less than 3 months-Dagahaley camp, Dadaab (Sep 2011)

MUAC (cm)	All n=423	Boys n=234	Girls n=189
<15.0	(110) 26.0 % (19.7-32.3 95% CI)	(67) 28.6% (21.9-35.4 95% CI)	(43) 22.8% (14.8-30.7 95% CI)
14.0-14.9	(85) 20.1% (15.2-24.9 95% CI)	(49) 20.9% (15.5-26.4 95% CI)	(36) 19.0% (12.7-25.4 95% CI)
<14.5	(52) 12.3% (6.9-17.6 95% CI)	(34) 14.5% (8.5-20.5 95% CI)	(18) 9.5% (2.7-16.3 95% CI)
<14.0	(25) 5.9 % (2.7-9.1 95% CI)	(18) 7.7% (3.1-12.3 95% CI)	(7) 3.7% (0.8-6.6 95% CI)
<13.5	(9) 2.1% (0.5-3.7 95% CI)	(8) 3.4% (0.9-6.0 95% CI)	(1) 0.5% (0-1.6 95% CI)

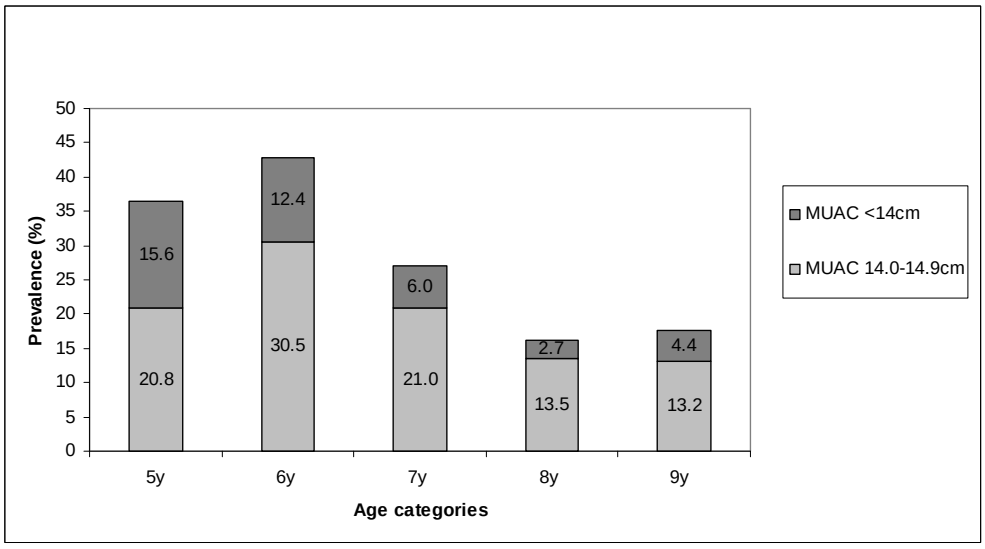
The prevalence of oedema is 0%

The younger ages (5-6 years) tend to have a higher prevalence of low MUAC as compared to the older ages (7-9 years).

Table 153 Prevalence of low MUAC or oedema by age in children 5-9 years-Dagahaley camp, Dadaab (Sep 2011)

		MUAC < 13.5 cm		MUAC < 14.0 cm		MUAC <14.5 cm		MUAC 14.0 – 14.9 cm		MUAC > 15.0 cm		Oedema	
Age (years)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
5	77	4	5.2	12	15.6	16	20.8	16	20.8	49	63.6	0	0
6	105	6	5.7	13	12.4	26	24.8	32	30.5	60	57.1	0	0
7	100	3	3.0	6	6.0	12	12.0	21	21.0	73	73.0	0	0
8	111	1	0.9	3	2.7	11	9.9	15	13.5	93	83.8	0	0
9	68	3	4.4	3	4.4	4	5.9	9	13.2	56	82.4	0	0
Total	461	17	3.7	37	8.0	69	15.0	93	20.2	331	71.8	0	0

Figure 42 Trends in the prevalence of low MUAC by age in children 5-9 years-Dagahaley camp, Dadaab (Sep 2011)



WOMEN 15-49 YEARS-DAGAHALEY CAMP, DADAAB (SEP 2011)

In Dagahaley, the majority of the surveyed women aged 15-49 years were Somalis, followed by the Somali Bantus. New arrivals in the camps for less than three months represented 6.3% of the sample.

Table 154 Demographic information-Dagahaley camp, Dadaab (Sep 2011)

	Number/total	***%***
Nationality		
Somali	256/283	90.5
Somali Bantu	27/283	9.5
Others	0	0
Arrival in camp		
<3 months	18/285	6.3
3-6 months	3/285	1.1
>6 months	264/285	92.6
Physiological status		
Pregnant	28/285	9.8
Lactating (until 6 months post-natal only)	44/285	15.4
Neither lactating nor pregnant	213/285	74.7

The mean age of the women sampled was 26.5 years (range: 15-48 years).

Table 155 Prevalence of anaemia and haemoglobin concentration in non-pregnant women of reproductive age (15-49 years) -Dagahaley camp, Dadaab (Sep 2011)

Anaemia – Non-pregnant women of reproductive age 15-49 years	**All** n = 249
Total Anaemia (<12.0 g/dL)	(124) 49.8% (41.3-58.3 95% CI)
Mild Anaemia (11.0-11.9 g/dL)	(55) 22.1 % (16.5-27.7 95% CI)
Moderate Anaemia (8.0-10.9 g/dL)	(62) 24.9% (17.2-32.7 95% CI)
Severe Anaemia (<8.0 g/dL)	(7) 2.8% (0.8-4.8 95% CI)
Mean Hb (g/dL)	11.8 g/dL (11.5-12.1 95% CI) [5.9 min, 15.3 max]

Comparison with results from 2010 shows a significant decrease in anaemia among non-pregnant women of reproductive age ($p<0.05$). Trends in the decrease of anaemia categories (severe, moderate, mild) could not be assessed with previous years due to differences in the classification of anaemia categories.

Figure 43 Nutrition survey results (anaemia) since 2009-Dagahaley camp, Dadaab (Sep 2011)

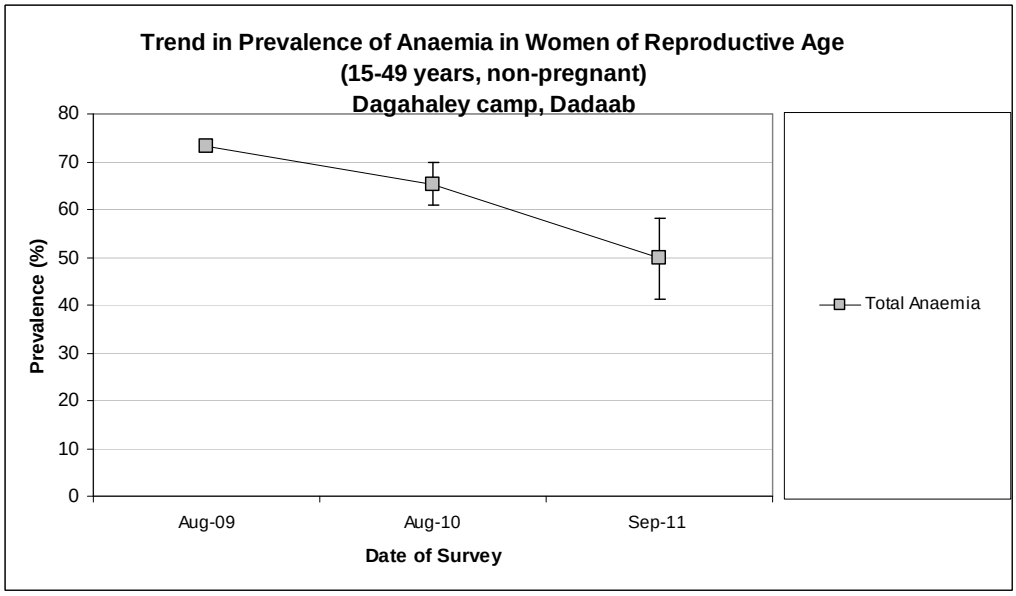


Table 156 Undernutrition based on MUAC-Dagahaley camp, Dadaab (Sep 2011)

Pregnant and lactating women	**Number/total**	**% (95% CI)**
Moderate undernutrition (18.5-20.9 cm)	0/72	0
Severe undernutrition (<18.5 cm)	0/72	0
Non-pregnant women and non-lactating		
Moderate undernutrition (16.0-18.4 cm)	1/213	0.5 (0-1.4)
Severe undernutrition (<16.0 cm)	1/213	0.5 (0-1.4)

ANC enrolment and iron-folic acid supplementation coverage

Table 157 ANC enrolment and iron-folic acid pills coverage among pregnant women (15-49 years) -Dagahaley camp, Dadaab (Sep 2011)

	Number/total	**% (95% CI)**
Currently enrolled in ANC programme with card	16/28	57.1 (36.4-77.9)
Currently enrolled in ANC programme with card or recall	19/28	67.9 (48.4-87.3)
Currently receiving iron-folic acid pills	16/26	61.5 (40.9-82.2)

Table 158 Post-natal vitamin A supplementation among women (15-49 years)-Dagahaley camp, Dadaab (Sep 2011)

	Number/total	**% (95% CI)**
Received vitamin A supplementation since delivery with card	15/48	31.3 (11.4-51.1)
Received vitamin A supplementation since delivery with card or recall	39/48	81.3 (64.0-98.5)

HOUSEHOLD-LEVEL INDICATORS-WASH, FOOD SECURITY AND MORTALITY- DAGAHALEY CAMP, DADAAB (SEP 2011)

Table 159 shows the different indicators and the total number of households who were sampled for each household-level indicator. All households were considered whether tor not hey had eligible individuals for the individual-level measurements.

Table 159 Target sample size and actual number captured during the survey-Dagahaley camp, Dadaab (Sep 2011)

Indicator	Target sample size	Household interviewed during the study	% of the target
WASH	350	343	98.0
Food security	350	343	98.0
Mortality	525	505	96.2

WATER, SANITATION AND HYGIENE-DAGAHALEY CAMP, DADAAB (SEP 2011)

In Dagahaley, new arrival households in the camp for less than three months represented 3.2% of the household sample with WASH data. 13.5% of the surveyed households for WASH indicators had members who joined their household in the last three months.

Table 160 Demographic information-Dagahaley camp, Dadaab (Sep 2011)

	Number/total	%
Date of arrival of household in camp		
<3 months	11/343	3.2
3-6 months	5/343	1.5
>6 months	327/343	95.3
Proportion of surveyed HH who had one or more members who joined within last 3 months	46/340	13.5

Table 161 Ownership of water containers-Dagahaley camp, Dadaab (Sep 2011)

	Number/total	% (95% CI)
Proportion of households that say they have water containers to collect water	324/343	94.5 (90.7-98.2)

Among the households reporting not to have water containers, one household reported they did not go to the reception centre or were not registered, four households reported that they did not receive any during reception, seven reported that they did not receive any after registration and six households reported they did not have money to buy containers.

Table 162 Water Quality-Dagahaley camp, Dadaab (Sep 2011)

	Number/total	% (95% CI)
Proportion of households using an improved drinking water source	330/330	100.0 (100-100)
Proportion of households that use a covered or narrow necked container for storing their drinking water	229/334	68.6 (56.9-80.3)

The mean litres water per person per day was found to be 24.8 lpppd with a range of 4.5-240 lpppd.

Table 163 Water Quantity 1: Amount of litres of water used per person per day-Dagahaley camp, Dadaab (Sep 2011)

Proportion of households that access:	Number/total	% (95% CI)
≥ 20 litres	160/307	52.1 (43.9-60.4)
15 – <20 litres	48/307	15.6 (11.2-20.0)
10-<15 litres	70/307	22.8 (17.7-27.9)
<10 litres	29/307	9.4 (6.0-12.9)

Table 164 Water Quantity 2-Dagahaley camp, Dadaab (Sep 2011)

	Number/total	% (95% CI)
Proportion of households that take less than 30 minutes to collect their main drinking water source	74-331	22.4 (10.2-34.5)

Table 165 Satisfaction with water supply-Dagahaley camp, Dadaab (Sep 2011)

	Number/total	% (95% CI)
Proportion of households that say they are satisfied with the drinking water supply	297/331	89.7 (83.2-96.3)

Table 166 Soap distribution-Dagahaley camp, Dadaab (Sep 2011)

	Number/total	% (95% CI)
Proportion of households that received soap during the last two distribution cycles or at reception	93/315	29.5 (17.2-41.9)

Table 167 Safe Excreta disposal-Dagahaley camp, Dadaab (Sep 2011)

	Number/total	% (95% CI)
Proportion of households using an improved excreta disposal facility (improved toilet facility, not shared)	197/338	58.3 (49.2-67.4)
Proportion of households using a shared family toilet	85/338	25.1 (17.0-33.3)
Proportion of households using a communal toilet	28/338	8.3 (3.3-13.3)
Proportion of households using an unimproved toilet	28/338	8.3 (3.5-13.0)
The proportion of households with children under three years old that dispose of faeces safely	209/220	95.0 (90.8-99.2)
Proportion of households with a household or shared family toilet in use	191/195	97.9 (96.0-99.9)

FOOD SECURITY-DAGAHALEY CAMP, DADAAB (SEP 2011)

In Dagahaley, new arrival households in the camp for less than three months represented 3.5% of the household sample with food security data. 8.1% of the surveyed households for food security indicators had members who joined their household in the last three months.

Table 168 Demographic information - Dagahaley camp, Dadaab (Sep 2011)

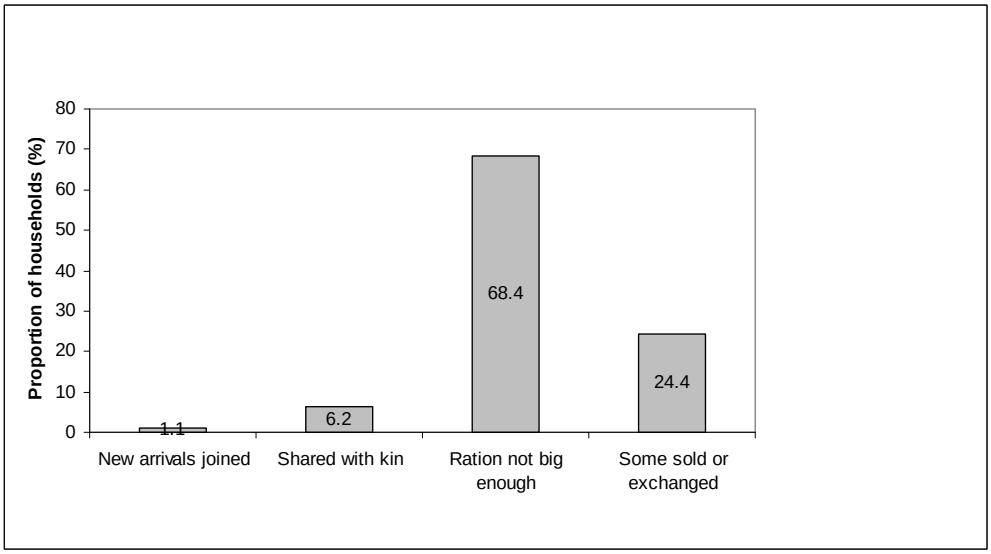
	Number/total	%
Date of arrival of household in camp		
<3 months	9/343	2.6
3-6 months	2/343	0.6
>6 months	332/343	96.8
Proportion of surveyed HH who had one or more members who joined within last 3 months	35/341	10.3

Table 169 Ration card coverage and duration of general food ration - Dagahaley camp, Dadaab (Sep 2011)

	Number/total	% (95% CI)
Proportion of households with a ration card	342/342	100.0
Proportion of households reporting that the GFR lasted <15 days	281/342	82.2 (74.7-89.6)
Average number of days GFR lasts	-	10.2 days (range: min 2-max 16)

When asked why the general good ration did not last the entire cycle, the main reason given by the surveyed households was that the ration was not big enough.

Figure 44 Main reason given by each household for why general good ration did not last 15 days - Dagahaley camp, Dadaab (Sep 2011)



As shown in Figure 45 below, the most important coping strategy that was reported to be used to fill the food gap was to borrow from neighbours or relatives or get credit, followed by buying of food.

Figure 45 Most important coping strategies used to fill the food gap when general food ration runs out -Dagahaley camp, Dadaab (Sep 2011)

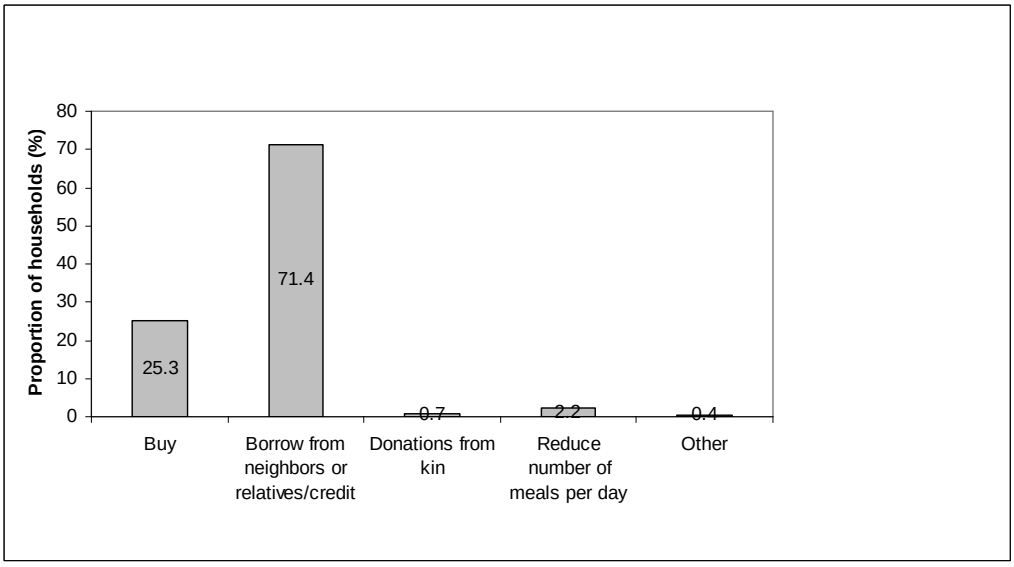
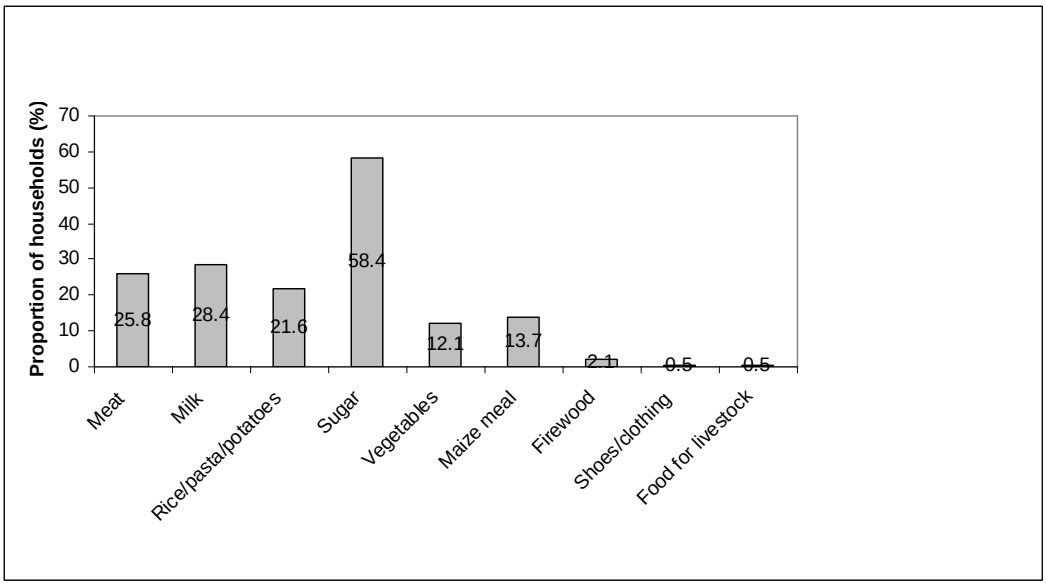


Table 170 Sell or exchange of food from the general ration-Dagahaley camp, Dadaab (Sep 2011)

	Number/total	% (95% CI)
Proportion of households selling or exchanging food ration items	190/343	55.4 (41.3-69.5)

As shown in Figure 46 below, when food from the general ration was sold or exchanged, the most common items reported to be bought was sugar, followed by milk, meat and rice / pasta / potatoes.

Figure 46 Most common items bought when general ration is sold or exchanged-Dagahaley camp, Dadaab (Sep 2011)



MORTALITY-DAGAHALEY CAMP, DADAAB (SEP 2011)

Retrospective mortality data was collected over the past three months. More specifically, the recall period was 97 days and started at the end of May also known as Jamadul Akhir in the Somali calendar or Bisha Shanaad in the Arabic calendar. Demographic data was also derived from the mortality data as presented below.

Table 171 Demographic data and retrospective mortality within camp-Dagahaley camp, Dadaab (Sep 2011)

Demographic data	
Number of HH surveyed	505
Average HH size	5.9
% U5	25.6
Retrospective mortality	
Number of current HH residents	2996
Total number U5	766
Number of people who joined HH / camp	155
Total number U5 who joined HH / camp	31
Number of people who left HH / camp	39
Total number U5 who left HH / camp	4
Number of births during recall	59
Number of deaths during recall	4
Total number U5 deaths during recall	2
Crude Death Rate (total deaths/10,000 people / day)	0.14 (0.05-0.36 95% CI)
U5 Death Rate (deaths in children under five/10,000 children under five / day)	0.28 (0.07-1.17 95% CI)

RESULTS FROM DAGAHALEY OUTSKIRTS

INDIVIDUAL-LEVEL INDICATORS-CHILDREN 6-59 MONTHS, 0-23 MONTHS, AND 5-9 YEARS, AND WOMEN OF REPRODUCTIVE AGE 15-49 YEARS-DAGAHALEY OUTSKIRTS, DADAAB (SEP 2011)

Table 172 shows the different population groups and the total number of individuals who were sampled within each group. 30 clusters were sampled for all indicators.

Table 172 Target sample size and actual number captured during the survey-Dagahaley outskirts, Dadaab (Sep 2011)

Indicator	Target sample size	Subjects measured/interviewed during the survey	% of the target
Children 6-59 months	570	568	99.6
Children 0-5 months	90	86	95.6
Children 5-9 years	390	382	97.9
Women 15-49 years	240	231	96.3

CHILDREN 6-59 MONTHS-DAGAHALEY OUTSKIRTS, DADAAB (SEP 2011)

In Dagahaley outskirts, the majority of the surveyed children aged 6-59 months were Somalis, followed by the Somali Bantus. New arrivals in the camps for less than three months represented 44% of the sample. The majority of children 6-59 months joining the camp in the past six months came from Lower Juba, followed by Mille Juba and other regions of Somalia not listed below.

Table 173 Demographic information-Dagahaley outskirts, Dadaab (Sep 2011)

	Number/total	%
Nationality		
Somali	471/545	86.4
Somali Bantu	74/545	13.6
Others	0	0
Arrival in camp		
<3 months	238/541	44.0
3-6 months	164/541	30.3
>6 months	139/541	25.7
Region of origin for children in camps for <6 months		
Lower Juba	111/400	27.8
Middle Juba	105/400	26.3
Gedo	63/400	15.8
Bay	23/400	5.8
Bakool	0	0
Lower Shabelle	9/400	2.3
Middle Shabelle	2/400	0.5
Hiraan	0	0
Mogadishu/Banadir	2/400	0.5
Other	85/400	21.3

Anthropometric results (based on WHO Growth Standards 2006)

Anthropometric results based on NCHS 1977 Growth Reference are shown in **Appendix 2**.

The coverage of age documentation was very low with only 1% of children having an exact birth date. The age group 30-41 months was slightly over-represented as compared to the other age groups.

The overall sex ratio was 0.9 (sex ratio should be between 0.8-1.2), which confirms that both sexes were equally distributed.

Table 174 Distribution of age and sex of sample**-**Dagahaley outskirts, Dadaab (Sep 2011)

	Boys		Girls		Total		Ratio
AGE (mo)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy:girl**
6-17	62	52.1	57	47.9	119	21.0	1.1
18-29	59	48.4	63	51.6	122	21.5	0.9
30-41	68	46.9	77	53.1	145	25.6	0.9
42-53	47	43.5	61	56.5	108	19.0	0.8
54-59	27	37.0	46	63.0	73	12.9	0.6
Total	263	46.4	304	53.6	567	100.0	0.9

There was no difference between boys and girls in the prevalence of acute malnutrition.

Table 175 Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex**-**Dagahaley outskirts, Dadaab (Sep 2011)

	All n = 549	**Boys** n **=** 257	**Girls** n **=** 292
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(210) 38.3 % (32.1 - 44.8 95% CI)	(102) 39.7 % (31.6 - 48.4 95% CI)	(108) 37.0 % (30.3 - 44.2 95% CI)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(107) 19.5 % (16.2 - 23.2 95% CI)	(53) 20.6 % (15.9 - 26.3 95% CI)	(54) 18.5 % (13.9 - 24.1 95% CI)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(103) 18.8 % (14.7 - 23.6 95% CI)	(49) 19.1 % (14.1 - 25.3 95% CI)	(54) 18.5 % (13.1 - 25.5 95% CI)

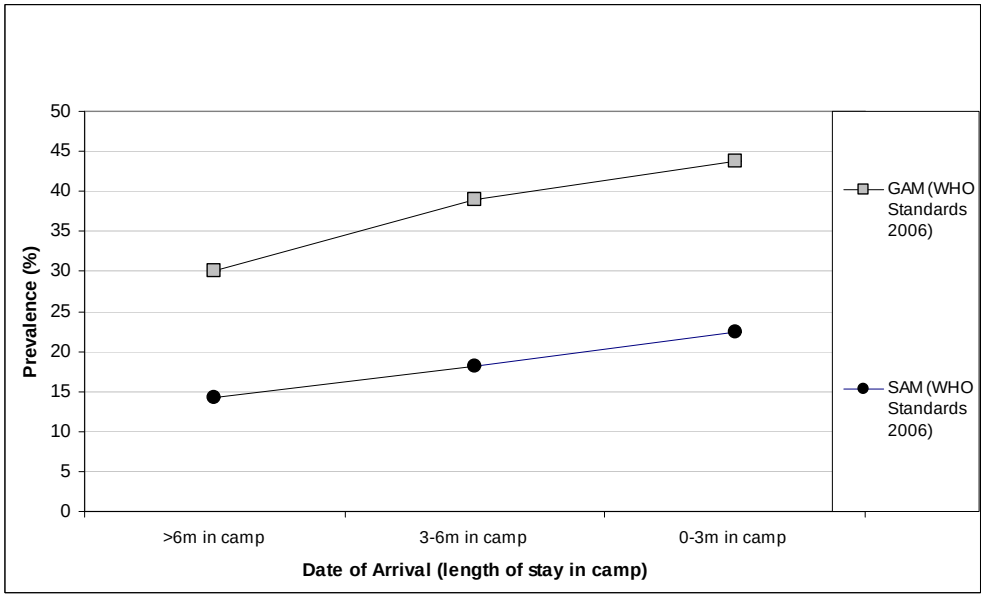
The prevalence of oedema is 0.2 %

The prevalence of acute malnutrition was disaggregated by length of stay in the camp to assess trends. Results shown in Table 176 and Figure 47 below demonstrate that the children aged 6-59 months tend to be much more malnourished in the first few months upon arrival in the camp.

Table 176 Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) by length of stay in camp **-**Dagahaley outskirts, Dadaab (Sep 2011)

	New arrivals (<3 m in camp) n = 231	**New arrivals (3-6 m in camp)** n = 159	**Old arrivals (>6 in camp)** n = 133
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(101) 43.7 % (35.9 - 51.8 95% CI)	(62) 39.0 % (30.9 - 47.8 95% CI)	(40) 30.1 % (19.2 - 43.7 95% CI)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(49) 21.2 % (16.3 - 27.2 95% CI)	(33) 20.8 % (15.0 - 28.0 95% CI)	(21) 15.8 % (9.9 - 24.3 95% CI)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(52) 22.5 % (16.5 - 29.9 95% CI)	(29) 18.2 % (14.1 - 23.3 95% CI)	(19) 14.3 % (7.0 - 26.8 95% CI)

Figure 47 Trend in prevalence of acute malnutrition by length of stay in camp-Dagahaley outskirts, Dadaab (Sep 2011)



The youngest (6-17 months and 18-29 months) and the oldest (54-59 months) age groups tend to be affected the most by wasting.

Table 177 Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema-Dagahaley outskirts, Dadaab (Sep 2011)

		Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	114	33	28.9	21	18.4	59	51.8	1	0.9
18-29	116	23	19.8	25	21.6	68	58.6	0	0.0
30-41	143	20	14.0	23	16.1	100	69.9	0	0.0
42-53	107	12	11.2	24	22.4	71	66.4	0	0.0
54-59	69	14	20.3	14	20.3	41	59.4	0	0.0
Total	549	102	18.6	107	19.5	339	61.7	1	0.2

Figure 48 Trends in the prevalence of wasting by age in children 6-59 months- Dagahaley outskirts, Dadaab (Sep 2011)

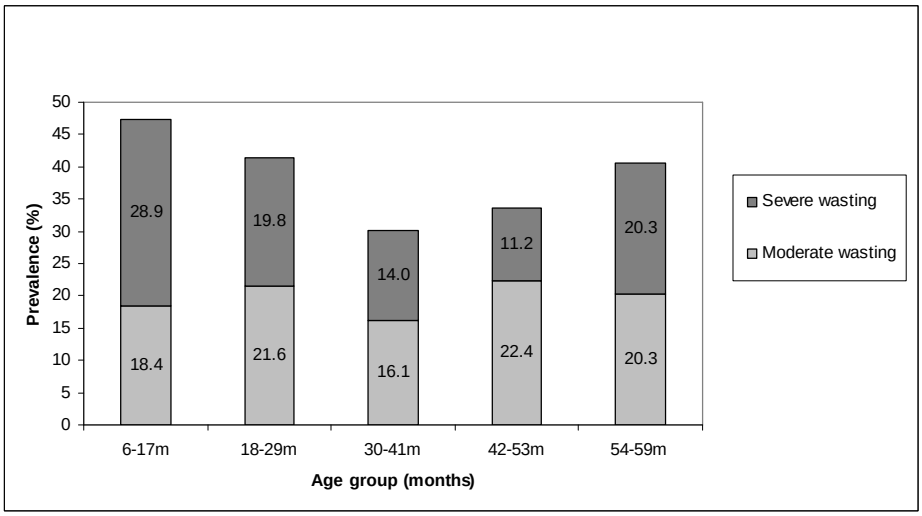


Table 178 Distribution of severe acute malnutrition and oedema based on weight-for-height z-scores-Dagahaley outskirts, Dadaab (Sep 2011)

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 1 (0.2 %)
Oedema absent	Marasmic No. 102 (18.6 %)	Not severely malnourished No. 446 (81.2 %)

Figure 49 shows that the weight-for-height z-score distribution is shifted to the left, illustrating a much poorer status than the international WHO Standard population of children aged 6-59 months.

Figure 49 Distribution of weight-for-height z-scores (based on WHO Growth Standards; the reference population is shown in green) of survey population compared to reference population-Dagahaley outskirts, Dadaab (Sep 2011)

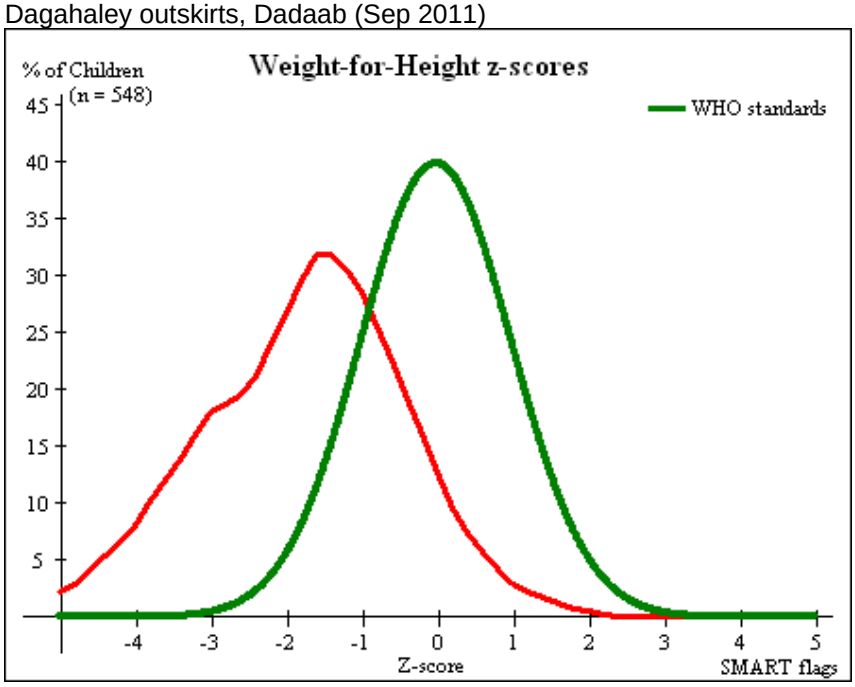


Table 179 Prevalence of stunting based on height-for-age z-scores and by sex-Dagahaley outskirts, Dadaab (Sep 2011)

	All n = 513	**Boys** n = 237	**Girls** n = 276
Prevalence of stunting (<-2 z-score)	(142) 27.7 % (21.9 - 34.3 95% CI)	(73) 30.8 % (23.8 - 38.8 95% CI)	(69) 25.0 % (18.5 - 32.9 95% CI)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(85) 16.6 % (13.1 - 20.8 95% CI)	(43) 18.1 % (13.7 - 23.6 95% CI)	(42) 15.2 % (11.1 - 20.5 95% CI)
Prevalence of severe stunting (<-3 z-score)	(57) 11.1 % (7.7 - 15.8 95% CI)	(30) 12.7 % (8.7 - 18.0 95% CI)	(27) 9.8 % (5.6 - 16.6 95% CI)

Children in the age groups 18-29 and 30-41 months tend to be the most affected by stunting as compared to the other age groups.

Table 180 Prevalence of stunting by age based on height-for-age z-scores**-**Dagahaley outskirts, Dadaab (Sep 2011)

		Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	100	8	8.0	15	15.0	77	77.0
18-29	112	16	14.3	19	17.0	77	68.8
30-41	132	17	12.9	29	22.0	86	65.2
42-53	103	14	13.6	14	13.6	75	72.8
54-59	66	2	3.0	8	12.1	56	84.8
Total	513	57	11.1	85	16.6	371	72.3

Figure 50 Trends in the prevalence of stunting by age in children 6-59 months- Dagahaley outskirts, Dadaab (Sep 2011)

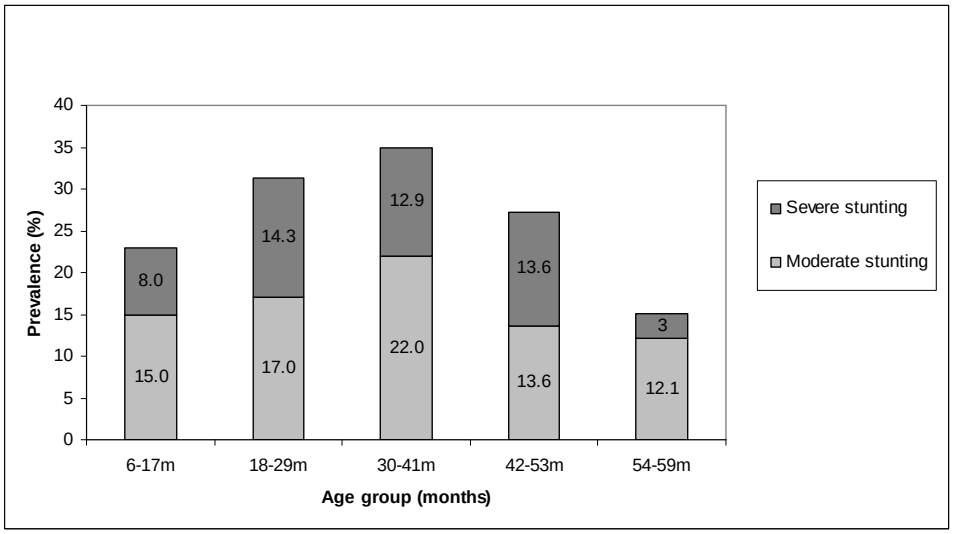


Table 181 Prevalence of underweight based on weight-for-age z-scores by sex**-**Dagahaley outskirts, Dadaab (Sep 2011)

	All n = 545	**Boys** n **=** 258	**Girls** n **=** 287
Prevalence of underweight (<-2 z-score)	(220) 40.4 % (34.1 - 46.9 95% CI)	(106) 41.1 % (33.1 - 49.6 95% CI)	(114) 39.7 % (32.6 - 47.4 95% CI)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(114) 20.9 % (16.9 - 25.7 95% CI)	(53) 20.5 % (15.6 - 26.5 95% CI)	(61) 21.3 % (15.8 - 28.0 95% CI)
Prevalence of severe underweight (<-3 z-score)	(106) 19.4 % (15.3 - 24.3 95% CI)	(53) 20.5 % (14.7 - 28.0 95% CI)	(53) 18.5 % (13.9 - 24.1 95% CI)

Table 182 Mean z-scores, Design Effects and excluded subjects **-**Dagahaley outskirts, Dadaab (Sep 2011)

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	548	-1.76±1.31	2.26	9	10
Weight-for-Age	545	-1.77±1.24	2.25	5	17
Height-for-Age	513	-1.09±1.43	2.33	3	51

* contains for WHZ and WAZ the children with oedema.

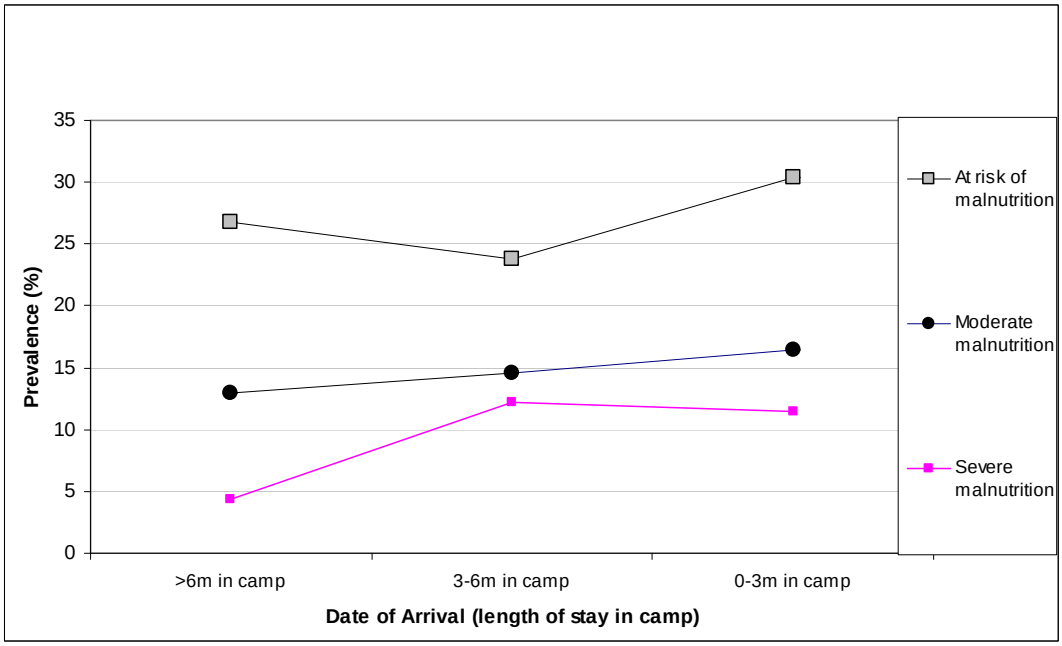
MUAC is being used in the community for screening and admission to therapeutic and supplementary feeding programmes.

Similar to the weight-for-height z-score analysis, the prevalence of malnutrition based on MUAC was disaggregated by length of stay in the camp to assess trends. Results shown in Table 183 and Figure 51 below demonstrate that the children aged 6-59 months tend to be much more *severely* malnourished as defined by low MUAC in the first few months upon arrival in the camp.

Table 183 Prevalence of malnutrition based on MUAC for all children and by length of stay in camp-Dagahaley outskirts, Dadaab (Sep 2011)

	All n=566	**New arrivals (<3 m in camp)** n=237	**New arrivals (3-6m in camp)** n=164	**Old arrivals (>6m in camp)** n =138
At risk of malnutrition (≥ 125mm and <135 mm)	(152) 26.9% (23.2-30.5 95% CI)	(72) 30.4% (23.8-37.0 95% CI)	(39) 23.8% (15.4-32.1 95% CI)	(37) 26.8% (20.0-33.7 95% CI)
Moderate malnutrition (≥ 115mm and <125 mm)	(83) 14.7% (11.5-17.8 95% CI)	(39) 16.5% (12.0-20.9 95% CI)	(24) 14.6% (7.0-22.3 95% CI)	(18) 13.0% (6.0-20.0 95% CI)
Severe malnutrition (< 115mm)	(55) 9.7% (6.3-13.1 95% CI)	(27) 11.4% (5.6-17.1 95% CI)	(20) 12.2% (7.4-17.0 95% CI)	(6) 4.3% (0.1-8.6 95% CI)

Figure 51 Trend in prevalence of malnutrition based on MUAC by length of stay in camp-Dagahaley outskirts, Dadaab (Sep 2011)



The case load for the selective feeding programmes was estimated to aid in programme planning. The Dagahaley outskirts population used during the survey was 22736. Based on the survey results, 31.6% children were found to be under 5 years (total of 7185 children) and hence a total of 6466 children were estimated to be between 6-59 months (assuming that 10% of under-5 are 0-5 months).

Table 184 Estimated number of malnourished children eligible to be enrolled in a selective feeding programme at the time of the survey (based on all admission criteria)**-**Dagahaley outskirts, Dadaab (Sep 2011)

	Number/total	% (95% CI)	N (LCI-UCI)*
Eligible for therapeutic feeding programme**	113/566	20.0 (15.2-24.8)	1293 (983-1604)
Eligible for supplementary feeding programme**	121/566	21.4 (17.7-25.1)	1384 (1145-1623)

*LCI=Lower Confidence Interval; UCI: Upper Confidence Interval
** WHZ flags excluded from analysis

Programme coverage

Selective feeding programme

Table 185 Nutrition treatment programme coverage based on all admission criteria (weight-for-height, MUAC, oedema) -Dagahaley outskirts, Dadaab (Sep 2011)

	Number/total	% (95% CI)
Proportion of children aged 6-59 months with severe acute malnutrition currently enrolled in therapeutic feeding programme	31/113	27.4 (17.9-36.9)
Proportion of children aged 6-59 months with moderate acute malnutrition currently enrolled in supplementary feeding programme	9/120	7.5 (1.7-13.3)

*WHZ flags excluded from analysis

Table 186 Nutrition treatment programme coverage based on MUAC and oedema only-Dagahaley outskirts, Dadaab (Sep 2011)

	Number/total	% (95% CI)
Proportion of children aged 6-59 months with severe acute malnutrition currently enrolled in therapeutic feeding programme	19/55	34.5 (21.0-48.1)
Proportion of children aged 6-59 months with moderate acute malnutrition currently enrolled in supplementary feeding programme	16/82	19.5 (10.1-28.9)

Vaccination and supplementation programmes

The coverage of vaccination card was found to be low at 16.9% (9.2-24.6 95% CI).

Measles vaccination coverage

Table 187 Measles vaccination coverage for children aged 9-59 months (n= 502) **-**Dagahaley outskirts, Dadaab (Sep 2011)

	Measles (with card) n=61	**Measles (with card <u>or</u> confirmation from mother) n=421**
YES	12.1 (5.7-18.6 95% CI)	83.9 (73.7-94.0 95% CI)

Due to an outbreak of measles in the camps, a mass measles vaccination campaign was conducted among children aged 6-59 months prior to the nutrition survey. The coverage results are presented below.

Table 188 Measles vaccination coverage for children aged 6-59 months (n= 544)**-**Dagahaley outskirts, Dadaab (Sep 2011)

	Measles (with card) n=67	**Measles (with card or confirmation from mother) n=443**
YES	12.3 (5.7-18.9 95% CI)	81.4 (70.9-91.9 95% CI)

PENTA vaccination coverage

PENTA vaccination coverage was measured in light of a potential outbreak of pertussis (whooping cough). Surveyors had to verify the vaccine by card only. However there were misunderstandings among survey teams and some also verified by recall. Hence, the data needs to be interpreted with caution.

Table 189 PENTA vaccination coverage for children aged 6-59 months (n= 587)**-**Dagahaley outskirts, Dadaab (Sep 2011) **-**Dagahaley outskirts, Dadaab (Sep 2011)

	PENTA 1 (1 dose) n=132	**PENTA 2 (2 doses) n=89**	**PENTA 3 (3 doses) n=20**
YES	24.1% (12.1-36.2 95% CI)	16.3% (7.9-24.7 95% CI)	3.7% (0.8-6.5 95% CI)

Vitamin A supplementation coverage

Table 190 Vitamin A supplementation for children aged 6-59 months within past 6 months (n=530) **-**Dagahaley outskirts, Dadaab (Sep 2011)

	Vitamin A capsule (with card) n=56	**Vitamin A capsule (with card or confirmation from mother) n=386**
YES	10.6 (4.1-17.0 95% CI)	72.8 (62.6-83.0 95% CI)

Deworming coverage

Table 191 Deworming for children aged 24-59 months within past 6 months (n=396)**-**Dagahaley outskirts, Dadaab (Sep 11)

	Deworming (with card) n=8	**Deworming (with card or confirmation from mother) n=162**
YES	2.1 (0-4.3 95% CI)	42.6 (29.7-55.6 95% CI)

Nutributter® and Food Voucher programmes

Table 192 Nutributter programme for children aged 6-23 months**-**Dagahaley outskirts, Dadaab (Sep 2011)

	Number/total	**% (95% CI)**
Currently receiving Nutributter®	24/145	16.6 (7.9-25.2)

Of those receiving Nutributter®, the average number of sachets collected the last time they collected Nutributter® was **23.5 sachets** (range: 2-28). When asked if Nutributter® was shared with others in the family, **50.0%** (18.4-81.6 95% CI) reported that it was shared.

Table 193 Food Voucher programme for children aged 6-12 months**-**Dagahaley outskirts, Dadaab (Sep 2011)

	Number/total	% (95% CI)
Currently have a Food Voucher	28/70	40.0 (25.4-54.6)

Morbidity from diarrhoea and feeding during diarrhoea

Table 194 Prevalence of reported diarrhoea in the two weeks prior to the interview **-**Dagahaley outskirts, Dadaab (Sep 2011)

	Number/total	% (95% CI)
Diarrhoea in past 2 weeks	83/536	15.5 (9.1-21.9)

Table 195 Feeding during diarrhoea episodes **-**Dagahaley outskirts, Dadaab (Sep 2011)

	n=47
Less than normal	(43) 54.4% (27.1-81.8 95% CI)
Same as normal	(18) 22.8% (5.0-40.6 95% CI)
More than normal	(16) 20.3% (6.4-34.1 95% CI)
No food	(2) 2.5% (0-7.9 95% CI)

CHILDREN 0-23 MONTHS-DAGAHALEY OUTSKIRTS, DADAAB (SEP 2011)

In Dagahaley outskirts, the majority of the surveyed children aged 0-23 months were Somalis, followed by the Somali Bantus. New arrivals in the camps for less than three months represented 47.8% of the sample. The majority of children 0-23 months joining the camp in the past six months came from Lower Juba, followed by Middle Juba and other regions of Somalia not listed below.

Table 196 Demographic information -Dagahaley outskirts, Dadaab (Sep 2011)

	Number/total	%
Nationality		
Somali	268/324	82.7
Somali Bantu	56/324	17.3
Others	0	0
Arrival in camp		
<3 months	154/322	47.8
3-6 months	75/322	23.3
>6 months	93/322	28.9
Region of origin for children in camp for <6 months or born outside the camp	Number/total	%
Lower Juba	81/229	35.4
Middle Juba	55/229	24.0
Gedo	24/229	10.5
Bay	18/229	7.9
Bakool	0	0
Lower Shabelle	4/229	1.7
Middle Shabelle	2/229	0.9
Hiraan	0	0
Mogadishu/Banadir	5/229	2.2
Other	10/229	17.5

Table 197 Prevalence of Infant and Young Child Feeding Practices indicators-Dagahaley outskirts, Dadaab (Sep 2011)

Indicator	Age range	Number/total	Prevalence (%)	95% CI
Children ever breastfed	0-23 months	303/329	92.1	(87.2-97.0)
Early initiation of breastfeeding	0-23 months	96/293	32.8	(20.5-45.0)
Exclusive breastfeeding under 6 months	0-5 months	35/85	41.2	(29.7-52.7)
Continued breastfeeding at 1 year	12-15 months	16/21	76.2	(50.0-100)
Continued breastfeeding at 2 years	20-23 months	6/18	33.3	(6.1-60.6)
Introduction of solid, semi-solid or soft foods	6-8 months	31/44	70.5	(52.0-88.9)
Children bottle fed	0-23 months	58/324	17.9	(8.8-27.0)
Children given infant formula	0-23 months	31/329	9.4	(3.8-15.0)
Reported prevalence of diarrhoea	0-23 months	67/322	20.8	(11.5-30.1)
Continued feeding during diarrhoea	0-23 months	41/66	62.1	(38.2-86.1)

CHILDREN 5-9 YEARS-DAGAHALEY OUTSKIRTS, DADAAB (SEP 2011)

In Dagahaley outskirts, the majority of the surveyed children aged 5-9 years were Somalis, followed by the Somali Bantus. New arrivals in the camps for less than three months represented 47.6% of the sample. The majority of children 5-9 years joining the camp in the past six months came from Lower Juba, followed by other regions of Somalia not listed below and Middle Juba.

Table 198 Demographic information-Dagahaley outskirts, Dadaab (Sep 2011)

	Number/total	%
Nationality		
Somali	324/382	84.8
Somali Bantu	58/382	15.2
Others	0	0
Arrival in camp		
<3 months	182/382	47.6
3-6 months	114/382	29.8
>6 months	86/382	22.5
Region of origin for children in camp for <6 months		
Lower Juba	90/296	30.4
Middle Juba	63/296	21.3
Gedo	49/296	16.6
Bay	15/296	5.1
Bakool	0	0
Lower Shabelle	9/296	3.0
Middle Shabelle	0	0
Hiraan	0	0
Mogadishu/Banadir	2/296	0.7
Other	68/296	23.0

Two children were found to be more than 140cm in height. One was reported to be 8 years old while one was reported to be 6 years old. A similar number of boys and girls were surveyed. The children 5 and 9 years of age were slightly under-represented as compared to the other ages.

Table 199 Age and sex distribution of the sampled children, 5-9 years-Dagahaley outskirts, Dadaab (Sep 2011)

Age (years)	Boys		Girls		Total		Ratio
	no.	%	no.	%	no.	%	Boy:girl
5	28	57.1	21	42.9	49	12.9	1.3
6	55	59.1	38	40.9	93	24.5	1.4
7	33	38.4	53	61.6	86	22.6	0.6
8	51	54.3	43	45.7	94	24.7	1.2
9	28	48.3	30	51.7	58	15.3	0.9
Total	195	51.3	185	48.7	380	100	1.1

Table 200 Prevalence of low MUAC or oedema in children 5-9 years and by sex-Dagahaley outskirts, Dadaab (Sep 2011)

MUAC (cm)	All n= 382	Boys n=197	Girls n=185
<15.0	(163) 42.7% (34.6-50.8 95% CI)	(89) 45.2% (34.8-55.6 95% CI)	(74) 40.0% (31.2-48.8 95% CI)
14.0-14.9	(93) 24.3% (19.6-29.1 95% CI)	(49) 24.9% (19.5-30.2 95% CI)	(44) 23.8 % (16.6-31.0 95% CI)
<14.5	(113) 29.6% (22.0-37.2 95% CI)	(63) 32.0% (22.6-41.4 95% CI)	(50) 27.0% (19.0-35.1 95% CI)
<14.0	(70) 18.3% (12.5-24.2 95% CI)	(40) 20.3% (12.7-27.9 95% CI)	(30) 16.2 % (9.7-22.7 95% CI)
<13.5	(45) 11.8% (7.1-16.5 95% CI)	(27) 13.7% (7.2-20.2 95% CI)	(18) 9.7% (5.1-14.4 95% CI)

The prevalence of oedema is 0%

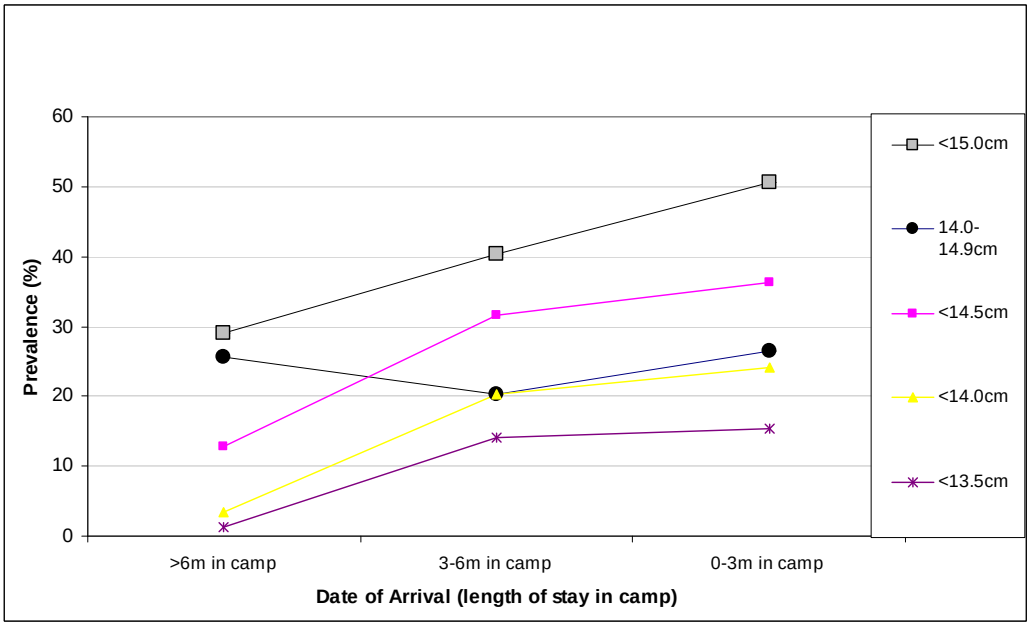
The prevalence of low MUAC was disaggregated by length of stay in the camp to assess trends. Results shown in Table 201 and Figure 52 below demonstrate that the children aged 5-9 years tend to be more malnourished in the first few months upon arrival in the camp.

Table 201 Prevalence of low MUAC or oedema in children 5-9 years and by sex by length of stay in camp-Dagahaley outskirts, Dadaab (Sep 2011)

MUAC (cm)	New arrivals (<3m in camp) n=182	New arrivals (3-6m in camp) n=114	Old arrivals (>6m in camp) n=86
<15.0	(92) 50.5% (41.8-59.3 95% CI)	(46) 40.4% (26.4-54.3 95% CI)	(25) 29.1% (14.9-43.2 95% CI)
14.0-14.9	(48) 26.4% (21.3-31.5 95% CI)	(23) 20.2% (10.2-30.1 95% CI)	(22) 25.6% (14.1-37.0 95% CI)
<14.5	(66) 36.3% (27.2-45.3 95% CI)	(36) 31.6% (20.3-42.8 95% CI)	(11) 12.8% (2.6-22.9 95% CI)
<14.0	(44) 24.2% (17.0-31.4 95% CI)	(23) 20.2% (10.0-30.3 95% CI)	(3) 3.5% (0-8.7 95% CI)
<13.5	(28) 15.4% (8.4-22.3 95% CI)	(16) 14.0% (6.5-21.5 95% CI)	(1) 1.2% (0-3.6 95% CI)

The prevalence of oedema is 0%

Figure 52 Trend in prevalence of low MUAC in children 5-9 years by length of stay in camp-Dagahaley outskirts, Dadaab (Sep 2011)



The younger ages (5-7 years) tend to have a higher prevalence of low MUAC as compared to the older ages (8-9 years).

Table 202 Prevalence of low MUAC or oedema by age in children 5-9 years-Dagahaley outskirts, Dadaab (Sep 2011)

		MUAC < 13.5 cm		MUAC < 14.0 cm		MUAC <14.5 cm		MUAC 14.0 – 14.9 cm		MUAC > 15.0 cm		Oedema	
Age (years)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
5	49	11	22.4	18	36.7	25	51.0	12	24.5	19	38.8	0	0
6	93	14	15.1	23	24.7	37	39.8	30	32.3	40	43.0	0	0
7	86	13	15.1	15	17.4	24	27.9	22	25.6	49	57.0	0	0
8	94	4	4.3	8	8.5	18	19.1	22	23.4	64	68.1	0	0
9	58	3	5.2	6	10.3	9	15.5	6	10.3	46	79.3	0	0
Total	380	45	11.8	70	18.4	113	29.7	92	24.2	218	57.4	0	0

Figure 53 Trends in the prevalence of low MUAC by age in children 5-9 years- Dagahaley outskirts, Dadaab (Sep 2011)

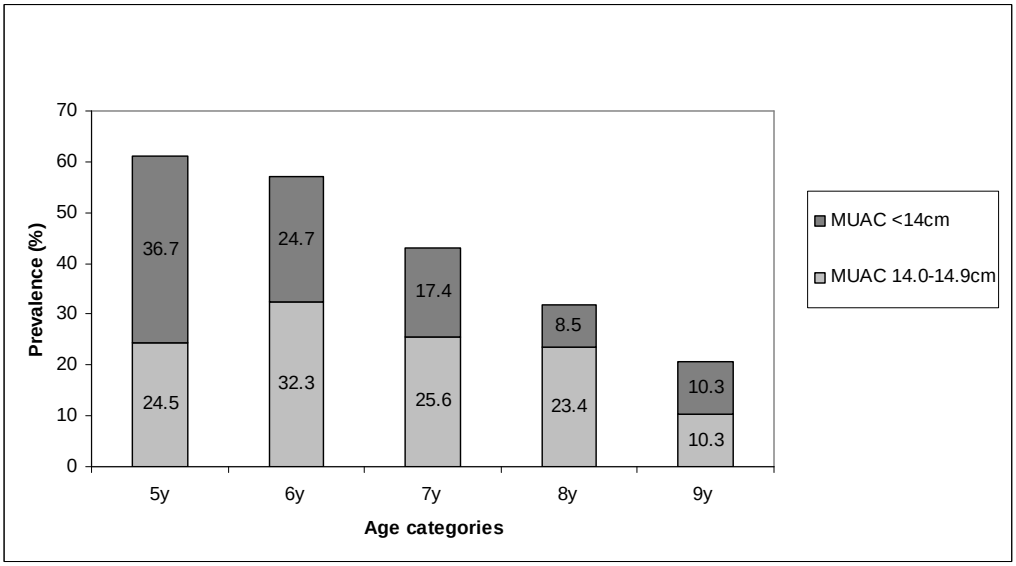


Table 203 Reception centre MUAC screening summary in children 5-9 years-all camps, Dadaab

August - September 2011								
	Oedema	**<14.0cm**		**14.0- 15.0cm**		**>15.0cm**		**No of children Screened**
Dagahaley	0	463	16.4	821	29.0	1546	54.6	2830
Hagadera	0	699	15.4	1267	27.9	2578	56.7	4544
Ifo	0	1245	23.4	1750	32.8	2335	43.8	5330
Dadaab Average	**0**	**2407**	**18.4**	**3838**	**29.9**	**6459**	**51.7**	**12704**

WOMEN 15-49 YEARS-DAGAHALEY OUTSKIRTS, DADAAB (SEP 2011)

In Dagahaley outskirts, the majority of the surveyed women aged 15-49 years were Somalis, followed by the Somali Bantus. New arrivals in the camps for less than three months represented 46% of the sample. The majority of women of reproductive age joining the camp in the past six months came from Lower Juba, followed by Middle Juba and other regions of Somalia not listed below.

Table 204 Demographic information-Dagahaley outskirts, Dadaab (Sep 2011)

	Number/total	**%**
Nationality		
Somali	187/226	82.7
Somali Bantu	39/226	17.3
Others	0	0
Arrival in camp		
<3 months	104/226	46.0
3-6 months	71/226	31.4
>6 months	51/226	22.6
Physiological status		
Pregnant	23/225	10.2
Lactating (until 6 months post-natal only)	27/225	12.0
Neither lactating nor pregnant	175/225	77.8
Region of origin for new arrivals in camp for <6 months		
Lower Juba	48/175	27.4
Middle Juba	43/175	24.6
Gedo	29/175	16.6
Bay	12/175	6.9
Bakool	0	0
Lower Shabelle	5/175	2.9
Middle Shabelle	0	0
Hiraan	0	0
Mogadishu/Banadir	1/175	0.6
Other	37/175	21.1

Table 205 Undernutrition based on MUAC-Dagahaley outskirts, Dadaab (Sep 2011)

Pregnant and lactating women	**Number/total**	**% (95% CI)**
Moderate undernutrition (18.5-20.9 cm)	3/50	6.0 (0-12.9)
Severe undernutrition (<18.5 cm)	0/50	0
Non-pregnant women and non-lactating		
Moderate undernutrition (16.0-18.4 cm)	3/173	1.7 (0-4.3)
Severe undernutrition (<16.0 cm)	0/173	0

ANC enrolment and iron-folic acid supplementation coverage

Table 206 ANC enrolment and iron-folic acid pills coverage among pregnant women (15-49 years)-Dagahaley outskirts, Dadaab (Sep 2011)

	Number/total	% (95% CI)
Currently enrolled in ANC programme with card	12/23	52.2 (28.3-76.0)
Currently enrolled in ANC programme with card or recall	14/23	60.9 (41.0-80.8)
Currently receiving iron-folic acid pills	12/20	34.8 (34.8-85.2)

Table 207 Post-natal vitamin A supplementation among women (15-49 years) - Dagahaley outskirts camp, Dadaab (Sep 2011)

	Number/total	% (95% CI)
Received vitamin A supplementation since delivery with card	9/32	28.1 (8.3-47.9)
Received vitamin A supplementation since delivery with card or recall	15/32	46.9 (25.7-68.1)

HOUSEHOLD-LEVEL INDICATORS-WASH, FOOD SECURITY AND MORTALITY- DAGAHALEY OUTSKIRTS, DADAAB (SEP 2011)

Table 208 shows the different indicators and the total number of households who were sampled for each household-level indicator. All households were considered whether tor not hey had eligible individuals for the individual-level measurements.

Table 208 Target sample size and actual number captured during the survey-Dagahaley outskirts, Dadaab (Sep 2011)

Indicator	Target sample size	Household interviewed during the study	% of the target
WASH	300	299	99.7
Food security	300	299	99.7
Mortality	450	426	94.7

WATER, SANITATION AND HYGIENE-DAGAHALEY OUTSKIRTS, DADAAB (SEP 2011)

In Dagahaley outskirts, new arrival households in the camp for less than three months represented 43.5% of the household sample with WASH data. 7.1% of the surveyed households for WASH indicators had members who joined their household in the last three months

Table 209 Demographic information-Dagahaley outskirts, Dadaab (Sep 2011)

	Number/total	%
Date of arrival of household in camp		
<3 months	128/294	43.5
3-6 months	99/294	33.7
>6 months	67/294	22.8
Proportion of surveyed HH who had one or more members who joined within last 3 months	21/295	7.1

Table 210 Ownership of water containers-Dagahaley outskirts, Dadaab (Sep 2011)

	Number/total	% (95% CI)
Proportion of households that say they have water containers to collect water	290/293	99.0% (97.8-100)

Among the households reporting not to have water containers, one household reported they did not go to the reception centre or were not registered.

Table 211 Water Quality-Dagahaley outskirts, Dadaab (Sep 2011)

	Number/total	% (95% CI)
Proportion of households using an improved drinking water source	294/297	99.0 (96.9-100)
Proportion of households that use a covered or narrow necked container for storing their drinking water	203/284	71.5 (59.7-83.2)

The mean litres water per person per day was found to be 18.8 with a range of 3.3-60 lpppd.

Table 212 Water Quantity 1: Amount of litres of water used per person per day-Dagahaley outskirts, Dadaab (Sep 2011)

Proportion of households that access:	Number/total	% (95% CI)
≥ 20 litres	125/288	43.4 (35.3-51.5)
15 – <20 litres	43/288	14.9 (10.4-19.4)
10-<15 litres	66/288	22.9 (17.2-28.7)
<10 litres	54/288	18.8 (11.9-25.6)

Table 213 Water Quantity 2-Dagahaley outskirts, Dadaab (Sep 2011)

	Number/total	% (95% CI)
Proportion of households that take less than 30 minutes to collect their main drinking water source	29/225	12.9 (4.5-21.2)

Table 214 Satisfaction with water supply-Dagahaley outskirts, Dadaab (Sep 2011)

	Number/total	% (95% CI)
Proportion of households that say they are satisfied with the drinking water supply	173/292	59.2 (44.3-74.2)

Table 215 Soap distribution-Dagahaley outskirts, Dadaab (Sep 2011)

	Number/total	% (95% CI)
Proportion of households that received soap during the last two distribution cycles or at reception	76/292	26.0 (13.7-38.3)

Table 216 Safe Excreta disposal-Dagahaley outskirts, Dadaab (Sep 2011)

	Number/total	% (95% CI)
Proportion of households using an improved excreta disposal facility (improved toilet facility, not shared)	1/278	0.4 (0-1.1)
Proportion of households using a shared family toilet	3/278	1.1 (0-2.3)
Proportion of households using a communal toilet	87/278	31.3 (19.6-43.0)
Proportion of households using an unimproved toilet	187/278	67.3 (55.5-79.0)
The proportion of households with children under three years old that dispose of faeces safely	89/214	41.6 (29.9-53.3)
Proportion of households with a household or shared family toilet in use	3/3	100.0 (100-100)

FOOD SECURITY-DAGAHALEY OUTSKIRTS, DADAAB (SEP 2011)

In Dagahaley outskirts, new arrival households in the camp for less than three months represented 44.5% of the household sample with food security data. 5.1% of the surveyed households for food security indicators had members who joined their household in the last three months.

Table 217 Demographic information-Dagahaley outskirts, Dadaab (Sep 2011)

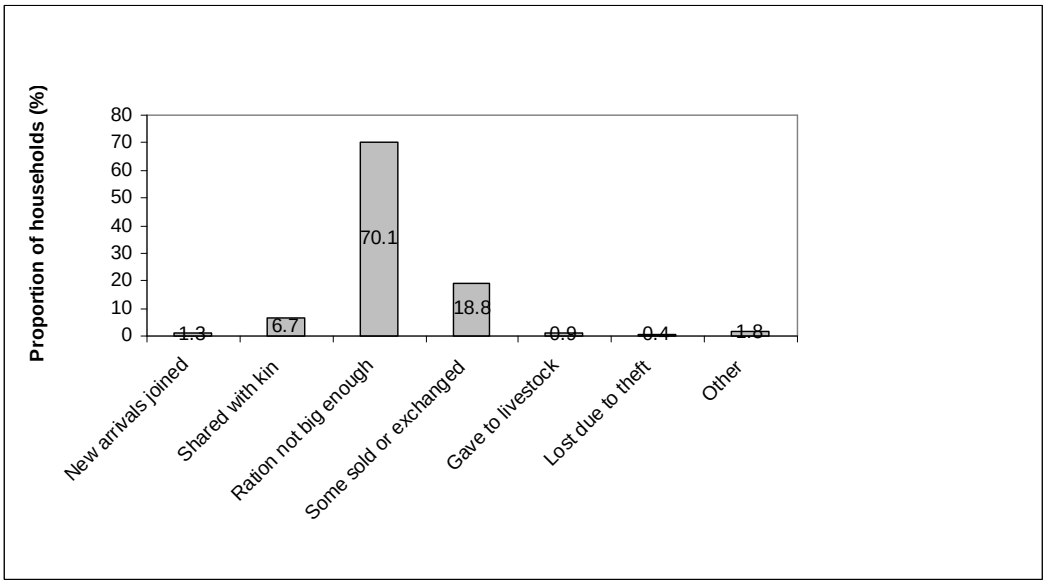
	Number/total	%
Date of arrival of household in camp		
<3 months	133/299	44.5
3-6 months	100/299	33.4
>6 months	66/299	22.1
Proportion of surveyed HH who had one or more members who joined within last 3 months	15/299	5.1

Table 218 Ration card coverage and duration of general food ration – Dagahaley outskirts, Dadaab (Sep 2011)

	Number/total	% (95% CI)
Proportion of households with a ration card	297/297	100.0 (100-100)
Proportion of households reporting that the GFR lasted <15 days	236/287	82.2 (75.3-89.2)
Average number of days GFR lasts	-	10.3 days (range: min 0-max 15)
Average number of days reception centre food ration lasts	-	10.2 days (range: min 3-mix 25)

When asked why the general good ration did not last the entire cycle, the main reason given by the surveyed households was that the ration was not big enough.

Figure 54 Main reason given by each household for why general good ration did not last 15 days – Dagahaley outskirts, Dadaab (Sep 2011)



As shown in Figure 55 below, the most important coping strategy that was reported to be used to fill the food gap was to borrow from neighbours or relatives or get credit, followed by buying of food.

Figure 55 Most important coping strategies used to fill the food gap when general food ration runs out – Dagahaley outskirts, Dadaab (Sep 2011)

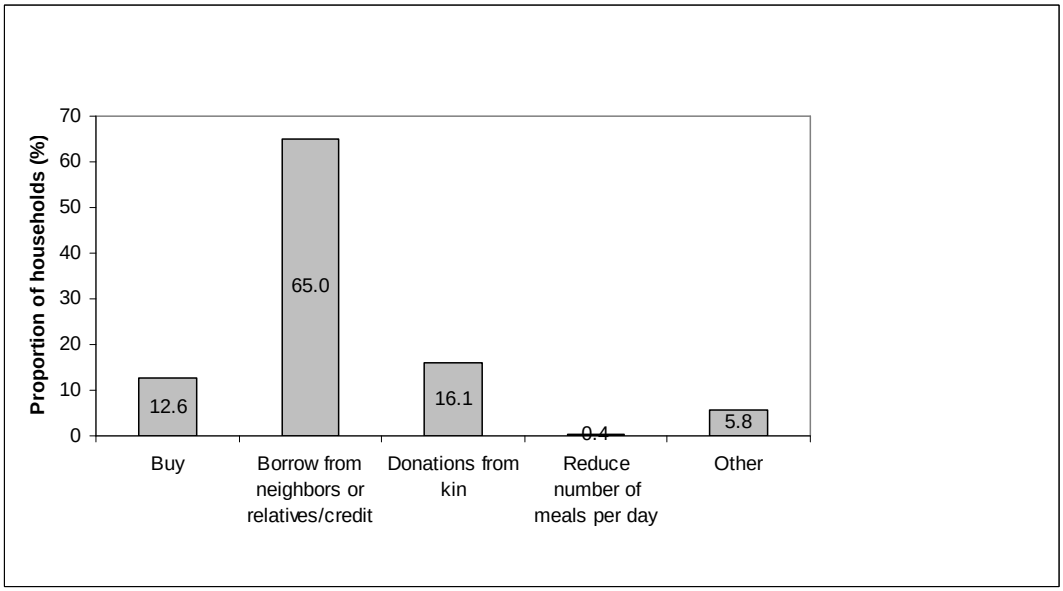
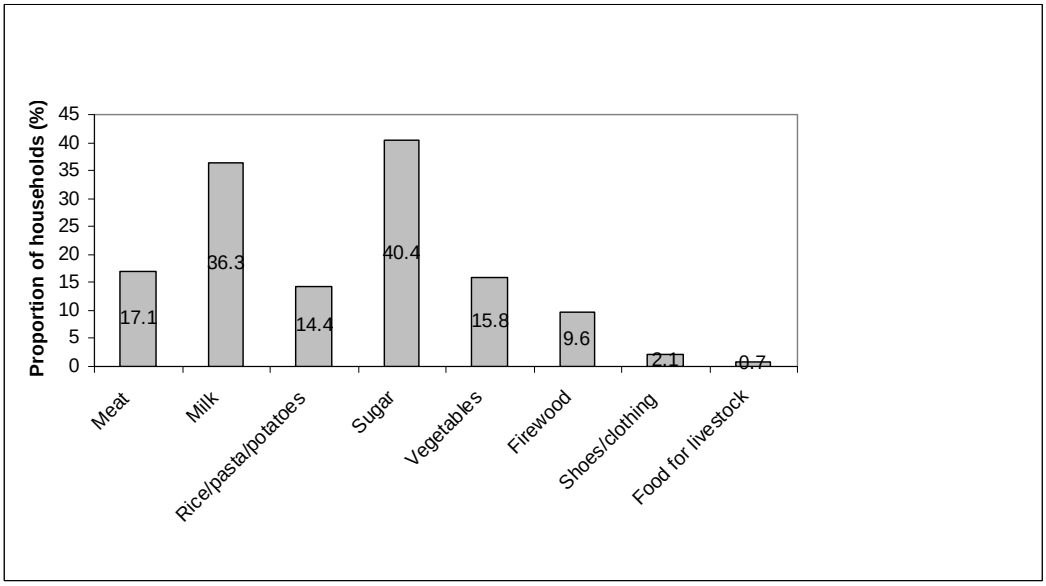


Table 219 Sell or exchange of food from the general ration- Dagahaley outskirts, Dadaab (Sep 2011)

	Number/total	**% (95% CI)**
Proportion of households selling or exchanging food ration items	146/299	48.8 (33.8-63.8)

As shown in Figure 56 below, when food from the general ration was sold or exchanged, the most common items reported to be bought were sugar and milk, followed by vegetables, rice / pasta / potatoes and meat.

Figure 56 Most common items bought when general ration is sold or exchanged - Dagahaley outskirts, Dadaab (Sep 2011)



MORTALITY-DAGAHALEY OUTSKIRTS, DADAAB (SEP 2011)

Retrospective mortality data was collected over the past three months. More specifically, the recall period was 97 days and started at the end of May also known as Jamadul Akhir in the Somali calendar or Bisha Shanaad in the Arabic calendar. Demographic data was also derived from the mortality data as presented below.

Table 220 Demographic data and retrospective mortality within camp-Dagahaley outskirts, Dadaab (Sep 2011)

Demographic data	
Number of HH surveyed	426
Average HH size	5.6
% U5	31.6
Retrospective mortality	
Number of current HH residents	2371
Total number U5	749
Number of people who joined HH / camp	1030
Total number U5 who joined HH / camp	312
Number of people who left HH / camp	9
Total number U5 who left HH / camp	1
Number of births during recall	43
Number of deaths during recall	22
Total number U5 deaths during recall	17
Crude Death Rate (total deaths/10,000 people / day)	1.23 (0.73-2.06 95% CI)
U5 Death Rate (deaths in children under five/10,000 children under five / day)	3.02 (1.72-5.24 95% CI)

LIMITATIONS

- **Accuracy of population data:** Due to the crisis and the high influx of new arrivals, there was a significant backlog of registration in UNHCR ProGres database at the time of the survey planning in early August. Adjusted population data from UNHCR ProGres was used for cluster selection as described in the methodology section.

- **Nutritional products in camps**: At the time of the survey, there were different types of nutritional products available in the camps including Plumpy'Nut®, eeZeePaste™, Plumpy'Sup® (also known as Supplementary'Plumpy®) and Nutributter®. In the assessment of Nutributter® coverage at the time of the survey, even though surveyors had a Nutributter® sachet to show to the respondents, some respondents may have gotten confused with the different nutritional products present in camps.

- **Poor quality of age data for children U5 and 5-9 years**: The coverage of age documentation among children 6-59 months was low in all camps and very low in the outskirts. Due to this limitation and although an event calendar was used by the surveyors to ascertain age, stunting results are to be interpreted with caution because z-scores for height-for-age require accurate ages to within two weeks (CDC/WFP: A manual: Measuring and Interpreting Mortality and Malnutrition, 2005). In addition, age of children U5 was sometimes ascertained using the UNHCR manifest. During the survey, it was noted that UNHCR documentation for family members often reflected the same days and months of birth for all family members. Age of children 5-9 years was ascertained using recall only and hence may be imprecise for some children.

- **Survey conducted during Ramadan**: The surveys in Hagadera and Ifo were conducted towards the end of the Ramadan and hence surveyor and respondent fatigue may have affected some of the results. Surveys in the past two years in all main camps of Dadaab were also conducted during the Ramadan.

- **Mortality**: Due to the extent and scope of the surveys, it was not feasible to achieve a large enough sample size for mortality results to be estimated as precisely as desired. Even though surveyors assured to the respondents that the survey results would stay confidential and would not be linked to the ration card, some respondents may have under-reported mortality of their household members for fear that their ration size would be affected.

- **Selective feeding programme coverage for young children:** Selective feeding programme coverage results should be interpreted with caution due to the small survey sample size. In addition, although surveyors had sachets of Plumpy'Nut® and Plumy'Sup® to show to the respondents, admission to selective feeding programme was assessed by recall and hence it is possible that some children included in a selective programme were not captured because the caregiver misunderstood the question or some children being admitted in the SFP were mixed with children admitted in the OTP and vice versa.

- **Programme coverage for women:** The coverage of ANC enrolment of and iron-folic acid supplementation to pregnant women, and the coverage of vitamin A supplementation to post-natal women should be interpreted with caution due to the small number of beneficiaries that were sampled during the survey.

DISCUSSION

Nutritional status of young children and mortality

The prevalence of global acute malnutrition (GAM) in the three main camps of Dadaab increased significantly in 2011 as compared to last year and is above WHO level for emergency of 15%. In Hagadera, the prevalence of GAM significantly increased from 5.6% (3.6-8.7 95% CI) in 2010 to 17.2% (13.2-22.1) this year ($p<0.05$); in Ifo, GAM increased from 7.6% (5.7 – 10.2) to 22.4% (17.4-28.3) ($p<0.05$); and in Dagahaley, GAM increased from 10.7% (8.1 – 14.0) to 23.2% (18.4-28.9) ($p<0.05$). The new arrival settlements of Dagahaley outskirts were surveyed independently revealing extremely high GAM levels of 38.3% (32.1-44.8) combined with high mortality.

The prevalence of severe acute malnutrition (SAM) was found to be unacceptably high and significantly increased in all three main camps as compared to last year ($p<0.05$). SAM prevalence was found to be 4.6% (2.7-7.6 95% CI) in Hagadera, 6.8% (4.2-11.0) in Ifo and 8.2% (5.4-12.2) in Dagahaley. In the outskirt survey, SAM prevalence was found to be 18.8% (14.1-23.6). Compared to moderate malnutrition, severe malnutrition is associated with high risk of death.

Although no statistically significant differences in the prevalence of acute malnutrition were found between the three main camps ($p>0.05$), Hagadera camp tends to have the lowest prevalence. The prevalence of acute malnutrition was found to be significantly higher in the outskirt survey as compared to the three main camps' surveys, the difference being statistically significant ($P<0.05$).

While the crude mortality and under five mortality rates were at acceptable levels in the three main camps, the outskirts survey revealed rates above the emergency thresholds of CDR >1 death per 10,000 people per day and U5DR > 2 children U5 deaths per 10,000 per day. The CDR was 0.14 deaths per 10,000 per day (0.04-0.46 95% CI) in Hagadera, 0.41 (0.21-0.80) in Ifo, 0.14 (0.05-0.36) in Dagahaley and 1.23 (0.73-2.06) in Dagahaley outskirts. The U5DR was 0.33 children U5 deaths per 10,000 per day (0.08-1.36 95% CI) in Hagadera, 0.94 (0.45-1.98) in Ifo, 0.28 (0.07-1.17) in Dagahaley and 3.02 (1.72-5.24) in Dagahaley outskirts.

Although mortality had not been collected in nutrition surveys in recent years, the rates seen in the main camps were similar to those collected in the health information system. It is to be noted however that the HIS was under-estimating mortality at the time of the survey and that mortality results from the survey need to be interpreted with caution for reasons outlined above regarding the precision of the estimate and the possible under-reporting of deaths (see limitations section). Nevertheless, the rates in the main camps were relatively low, as expected with Ifo appearing to have higher mortality rates (CDR and U5DR) than Hagadera and Dagahaley. The results of an exhaustive nutrition survey conducted by Epi-centre in Dagahaley outskirts in August 2011 found a CDR of 1.2 and a U5DR of 2.4 and are comparable to the outskirts survey reported here.

As demonstrated by the outskirt survey, children aged 6-59 months tend to be much more malnourished in the first three months upon arrival in the camp (a new arrival is defined as being in the camp for <3 months as per UNHCR). However, the GAM prevalence remains at high level in these children even after six months of living in the camp. Based on these results from the outskirt survey, new arrivals representing between 7-11% of the sample of children 6-59 months in the main camps, were excluded from the overall analysis of GAM but results revealed no major differences in overall GAM prevalence. This suggested that the new arrivals did not skew the GAM results in the main camps.

The prevalence of stunting in children 6-59 months in 2011 ranged from 20.7% to 27.7% in the four surveys and is defined as a serious public health problem as per WHO classification. Given that the coverage of age documentation was found to be low (ranging from 36-54%) in the main camps and extremely low (1%) in the outskirts, stunting results need to be interpreted with caution. Stunting prevalence has remained unchanged as compared the past years and the age groups 18-29 months and 30-41 months appear to be the most affected in all three main camps and the outskirts. The chronic causes of malnutrition in this community are known to be poverty (lack of livelihoods), illiteracy (lack of nutrition knowledge) and disease (poor health seeking practices and reliance on traditional medicine).

The surveys collected data on diarrhoea which is closely linked to nutritional status. The period prevalence was calculated based on caregivers' recall. It was found that 13.5%, 17.6%, 8.8% and

15.5% of the surveyed children aged 6-59 months in Hagadera, Ifo, Dagahaley and Dagahaley outskirts respectively, had suffered from diarrhoea in the two weeks prior to the survey. As noted in all four surveys, feeding practices during diarrhoea were found to be sub-standard; the majority of the children (between ~50-80%) were offered less food than usual when they were sick with diarrhoea.

Diarrhoea is associated with insufficient water quality and poor hygiene practices and is a major cause of admission to stabilization centres for children with severe malnutrition. The rates reported here are also similar to those reported in the health information system (July to September 2011). Compared to 2010, according to HIS data there was an increased trend in common childhood diseases (RTIs being the most prevalent) and also an outbreak of measles at the time of the survey (one measles case was found during the survey). Infections compromise the nutritional status of children because of higher nutrient requirements and appetite suppression and malnourished children are prone to infections because of a compromised immune system.

The overall deterioration in nutrition status can be attributed to the following:

1. Possible explanations for the very poor nutritional status and high mortality rates among U5 children who newly arrived include: New arrivals fleeing famine and war in Somalia arrived in Dadaab refugee camps in poor nutritional status and even with access to UNHCR programmes on arrival, are still in a weakened and often life-threatening condition for a few months. Despite the fact that the new arrivals were allowed access to all the services, it was reported that many of them did not know about the services offered in the camps. Even after >6 months in the camps, the households were perhaps not able to fully stabilize and become food secure affecting the nutritional status of young children (see section of discussion on food security indicators).

2. Possible explanations for the deteriorated nutritional status of the established population include: a) the practice of 'hosting' relatives and clan members when they first arrive and before they are registered and receiving their own food ration; b) the overstretched health and nutrition services in the camps when the mass influx began in February / March 2011 and it took some time for agencies to expand services to meet the demands of both new arrivals and the established caseload.

The nutritional situation in the Dadaab camps is comparable to other assessments done in the region at the time of the survey. From rapid assessments conducted in the four Ethiopia refugee camps of Dolo Ado bordering Somalia and Kenya in July-August 2011, GAM levels were found to range from 24-47% and SAM from 7-19% in children 6-59 months. The three major areas of origin for refugees in Dolo Ado are Gedo, Bay and Bakool, all of which are in a state of nutrition and food security crisis. Gedo region had a reported GAM of 32.9% and SAM of 17.7%, Bay a GAM of 58.3% and SAM of 22.1% and Bakool a GAM of 41.1% and SAM of 13.1% based on surveys conducted by FSNAU in August 2011. The most common regions of origin of children 6-59 months surveyed in the present outskirts survey were Lower Juba (27.8%), Middle Juba (26.3%), Gedo (15.8%) and Bay (5.8%). Surveys by FSNAU in Middle and Lower Juba from August 2011 reported GAM levels similar to the ones reported from the outskirts ranging from 31.2-39.2% and SAM levels ranging from 12.9-19%.

Generally, the harsh drought affected the horn of Africa region and nutrition surveys conducted in northern Kenya illustrated similar findings. The host community surrounding Dadaab also exerted pressure on the refugees since they were also affected by the harsh famine and lost their livestock which is their source of livelihood. A survey conducted by Save the children-UK in Wajir district found a GAM of 28.5% (24.4- 33.0 95% CI) and a SAM of 4.5% (2.7 – 7.4) in May 2011. Wajir district is adjacent to Dadaab refugee camps. In Turkana north-east district, the GAM was 37.4% (33.0 -42.0 95% CI) and SAM was 9.40% (7.2- 12.3) in May 2011 in a survey conducted jointly by IRC, MERLIN, OXFAM, World Vision and Kenya Ministry of Health.

Programme coverage in young children

Selective feeding programme

The OTP and SFP coverage results based on all admission criteria were found to be very low in all three main camps and in the outskirts. Coverage ranged from approximately 6% to 34%, well below the 90% target for camp setting. Since MUAC is used as a screening tool, there is a possibility that children with a high MUAC measurement but a low weight-for-height are not detected during population screening. This is suggested by the higher coverage results found by MUAC which ranged from approximately 20% to 83%. It is to be noted that selective feeding programme coverage results should be interpreted with caution for reasons outlined above regarding the small survey sample size and the possibility of missing some children admitted due to confusion with the different nutrition products and supplementary foods available (see limitations section). Nevertheless, there is need to review the screening strategy for the selective feeding programmes in order not to exclude some malnourished children.

Vaccination, vitamin A supplementation and deworming

The coverage for measles vaccination and vitamin A supplementation were found to be relatively high (ranging from ~73-89%) in all three main camps and the outskirts, confirming the implementation of the measles campaign (targeting different age groups 6 months to 29 years) and *malezi bora* prior to the surveys, and the routine immunisation and supplementation of new arrivals at the reception centres opened in June 2011 in all camps. The coverage of deworming was found to be relatively high (ranging from ~77-82%) in the main camps while it was found to be low (42.6%) in the outskirts. However these results were based on both card and recall, and hence need to be interpreted with caution. The measles vaccination and vitamin A supplementation results based on card only were found to be significantly lower in all three main camps as compared to previous years (2009-2010). The coverage of the full PENTA vaccination (assessed by card only) was found to be low in all camps ranging from ~28-45% and very low in the outskirts at 3.7%.There is need to improve the supply and retention of cards for reliability and for monitoring.

Children 5-9 years

For the first time in Dadaab, children aged 5-9 years were surveyed. This was owing to increased number of malnourished older children seen at new arrival reception centers. Although those children were referred and treated, there was a need to determine the prevalence for better planning and resource allocation.

Malnutrition based on MUAC cut-off <14cm was 6.8% (4.6-9.1 95% CI) in Hagadera, 8.0% (4.6-11.5) in Ifo, 12.2% (8.2-16.2) in Dagahaley, and 18.3% (12.5-24.2) in Dagahaley outskirts. These results demonstrate that the new arrivals aged 5-9 years are also much more vulnerable to malnutrition. Similar to the children aged 6-59 months, children aged 5-9 years tend to be much more malnourished in the first three months upon arrival in the camp. In addition, among these new arrival children, the lower age group 5-7 years tend to be more affected as compared to the older age group (8-9 years).

MUAC screening data in children 5-9 years from reception centers was also collected concurrently for a period of four weeks in August and September 2011 and found that malnutrition levels in this age group ranging from 15.4% in Hagadera to 23.4% in Ifo and 16.4% in Dagahaley. These results are similar to those found in Dagahaley outskirt survey, hence confirming that new arrivals are much more affected by malnutrition. It is important to note that there are no known cut-offs for this age-group therefore more research and guidance is required. In Dadaab, based on an inter-agency consensus meeting (Nairobi, October 2011), the MUAC cut-offs currently being used for this age group for direct admission to feeding programmes are the same cut-offs as those used for the younger children (i.e. MUAC<12.5 cm for moderate acute malnutrition and <11.5 cm for severe acute malnutrition). At the community level, a MUAC cut-off of < 14 cm is being used for screening; the subsequent step is to take weight-for-height of these children to determine the z-score and assess whether the child should be admitted to a feeding programme.

Anaemia in young children and women

The prevalence of anaemia in children aged 6-59 months and in non-pregnant women of reproductive age (15-49 years) in the three main camps of Dadaab decreased significantly in 2011 as compared to 2010 although the levels are still above WHO threshold of 40% for defining a problem of high public health significance. In Hagadera, the prevalence of anaemia in children aged 6-59 months significantly decreased from 72.4% (68.4-76.5 95% CI) in 2010 to 45.3% (40.4-50.2) this year ($p<0.05$), a 37% relative decrease; in Ifo, anaemia significantly decreased from 73.2% (69.2-77.2) to 54.4% (49.5-59.2) ($p<0.05$), a 26% decrease; and in Dagahaley, anaemia significantly decreased from 65.4% (61.1-69.8) to 47.6% (42.9-52.2) ($p<0.05$), a 27% decrease.
In Hagadera, the prevalence of anaemia in non-pregnant women of reproductive age significantly decreased from 61.2% (56.7-65.8 95% CI) in 2010 to 43.3% (35.6-50.9) this year ($p<0.05$), a 29% relative decrease; in Ifo, anaemia significantly decreased from 69.1% (64.2-72.8) to 50.9% (42.8-59.0) ($p<0.05$), a 26% decrease; and in Dagahaley, anaemia significantly decreased from 65.2% (60.8-69.7) to 49.8% (41.3-58.3) ($p<0.05$), a 24% decrease.

The overall decrease in anaemia prevalence can most likely be attributed to the different interventions in place to mitigate and reduce the burden of anaemia in the camps including anaemia screening, iron/folic acid supplementation of women during pregnancy, blanket feeding of CSB to pregnant women and lactating women, deworming (pregnant women and 24 months-15 years old), the blanket use of a special nutrition product (Nutributter®) in young children 6-23 months and malaria reduction initiatives at the population level.

According to the findings of a collaborative study between Centre for Public Health Research (CPR), Kenya Medical Research Institute (KEMRI) and UNICEF on anaemia in Hagadera camp in 2008, the major cause of anaemia was found to be iron-deficiency and possibly deficiency of other micronutrients most likely due to the long-term reliance on food aid. The mostly-plant based diet distributed to refugees and habitual preference for carbohydrates with limited diversity is a key factor, as well heavy consumption of tea. Closely-spaced deliveries and poor compliance to iron supplements during pregnancy is also an important factor.

In all three main camps, the 6-23 months age group had the highest prevalence of anaemia with the prevalence declining with increasing age, as seen in the surveys in 2009 and 2010. Trend analysis comparing anaemia levels in children 6-23 months from 2009 to 2011 and excluding children who arrived in the camp this year shows a sharp decrease in anaemia in this age group which can most likely be attributed to Nutributter® (a lipid-based nutrient supplement) targeted to children 6-23 months. In Hagadera, the prevalence of anaemia in children aged 6-23 months significantly decreased from 82.2% (77.4-86.9 95% CI) in 2010 to 60.7% (52.0-69.4) this year ($p<0.05$)), a 26% relative decrease; in Ifo, anaemia decreased from 79.8% (74.5-85.0) to 65.7% (56.8-74.6) ($p<0.05$), an 18% decrease; and in Dagahaley, anaemia decreased from 72.1% (65.5-78.8) to 60.5% (53.1-67.9) ($p<0.05$), a 16% decrease.

Nutributter® was being phased out of the camps at the time of the survey report writing after 14 months of programme duration to be replaced, as of September 2011, with CSB++ (or supercereal++) for all children 6-59 months. CSB++ is a newly developed fortified blended food for young children which contains an improved micronutrient formulation; it also contains milk powder and has a higher energy density than other types of fortified blended food. Nutributter® had been distributed on a monthly basis to all eligible children as a blanket programme through growth monitoring. The proportion of surveyed children receiving Nutributter® at the time of the survey was found to be very low in all camps ranging from 31% to 49%; in the outskirts, 16.6% of caregivers reported currently receiving Nutributter®. This low coverage could be attributed to: 1) a disruption in distribution systems owing to on-going influx and relocation of refugees from one camp to another, 2) the surveys happening during and right after the Ramadan, or 3) the caregivers' confusion during the interview regarding the different products available in the camp for young children (see limitations section). A relatively large proportion of caregivers (between 19-54%) reported sharing Nutributter® with other members in the family. Routine data collected since roll-out of the programme indicated high coverage (>90%) owing to high acceptability and high demand for the product.

Nutritional status of and programme coverage in women

The proportion of surveyed pregnant women who were enrolled in the ANC (with card and recall) at the time of the survey ranged from ~42-68% in all four surveys with the lowest proportion being in Hagadera. The coverage of iron/folate supplementation for pregnant women ranged from ~31-62% in all four surveys with the highest coverage being in Dagahaley camp and Dagahaley outskirts, and the lowest in Ifo. The coverage of post-natal vitamin A supplementation based on card and recall ranged from ~33-81% in all four surveys, with the highest coverage being in Dagahaley and the lowest in Hagadera. It is to be noted that these coverage results should be interpreted with caution for reasons outlined above regarding the small numbers (see limitations section). Nevertheless, there is a need to improve coverage of these programmes for pregnant and lactating women.

The prevalence of moderate and severe malnutrition in non-pregnant, non-lactating women based on MUAC was found to be very low in all four surveys with Dagahaley outskirts having the highest prevalence of moderate malnutrition at 1.7% (0-4.3 95% CI). The prevalence of malnutrition in pregnant and lactating women based on MUAC was also found to be relatively low in all four surveys ranging from the lowest prevalence of moderate malnutrition (0%) in Dagahaley to the highest of 6.0% (0-12.9 95% CI) in Dagahaley outskirts. These low prevalence figures can most likely be attributed to the blanket programme providing CSB to pregnant women (from second trimester) and lactating women (up to 6 months post delivery) on a bi-monthly basis.

IYCF indicators

Adequate food alone will not result in improved nutritional status if practices related to child care remain poor. It has been shown that children from food secure and well to do households can still be malnourished if caring practices such as hygiene and child feeding practices are poor.

Trend analysis since 2009 in the three main camps does not show any major change in IYCF indicators.

Early initiation of breastfeeding was highest in the main camps as compared to Dagahaley outskirts which can be attributed to increased hospital delivery. Mothers delivering in hospitals are encouraged and given support to breastfeed their newborns. The prevalence figures were 83.3% (77.3-89.3 95% CI), 90.1% (85.1-95.2), 79.9% (71.9-87.9) and 32.8% (20.5-45.0) in Hagadera, Ifo, Dagahaley and Dagahaley outskirts, respectively. Less than half of babies aged 0-5 months were exclusively breastfed up to six months of age in all three camps and the outskirts; in all four surveys, the prevalence figures ranged from the lowest being 34.3% (22.0-46.7) in Dagahaley to the highest being 47.1% (35.9-58.4) in Hagadera. In all four surveys, more than 50% of the surveyed children were being breastfed up to 1 year however much less than 50% were being breastfed up to two years. Diarrhoea prevalence in the two weeks preceding the survey in children 0-23 months tended to be higher than the levels reported for the 6-59 months age group; it was found that 21.1%, 22.4%, 9.0% and 20.8% of the surveyed children aged 0-23 months in Hagadera, Ifo, Dagahaley and Dagahaley outskirts respectively, had suffered from diarrhoea in the two weeks prior to the survey. Feeding practices during diarrhoea were found to be sub-standard; only a small number of children (between 0-20%) were offered increased feeding during diarrhoea. Reduced feeding, as well as withdrawal of feeding during diarrhoea, can reduce the chances of a full recovery and is an important risk factor for developing severe malnutrition. Breastfeeding reduces infant morbidity and mortality from diarrhoea and respiratory infections. The benefits of breastfeeding increase with exclusiveness of breastfeeding. One of the probable reasons for the short duration of breastfeeding is the short intervals between pregnancies as noted from the programme documents and observed during the survey. Increasing awareness and support to lactating mothers will be provided as part of the IYCF strategy (see recommendations).

Save The Children has been running a fresh food voucher programme for children aged 6-12 months to support complementary feeding since January 2010 and has been distributing food vouchers on a monthly basis. The proportion of surveyed children aged 6-12 months that had a food voucher at the time of the survey was found to be low in all three camps ranging from the lowest of 49.4% in Dagahaley to the highest of 65% in Ifo; in the outskirts, 40% of caregivers reported currently having a fresh food voucher. This low coverage could be attributed to a disruption in distribution systems owing to on-going influx and relocation of refugees from one camp to another. Introduction of solid, semi-solid or soft foods in infants 6-8 months ranged from

61.9% (38.8-85.1) to 83.3% (72.6-94.1) in the four surveys.

The proportion of children aged 0-23 months who were bottle fed was 8.1% in Hagadera, 11.6% in Ifo, 15.0% in Dagahaley and 17.9% in the outskirts. It is concerning that children who are bottle fed are given less breast milk and are prone to increased morbidity and mortality due to the bottles with a nipple being particularly prone to contamination. In addition, the proportion of children aged 0-23 months given infant formula was found to be relatively high ranging from the lowest of 9.4% (3.8-15.0) in the outskirts to the highest of 26.0% (19.6-32.4) in Dagahaley camp.

Results on IYCF indicators from Dadaab are similar to national results from Kenya. In Kenya, exclusive breastfeeding (breast milk only) is not common. According to KDHS 2008/ 2009, 32% of children under six months of age are exclusively breastfed. 36% of babies below six months of age are given complementary food, presumably mushy or semi-solid food. By age 6-9 months, 83% of children are given complementary foods. The situation in the camps is expected to improve in the coming months with UNHCR partnership with an operational partner that will be dedicated to elaborating IYCF strategy in the camps and providing technical and programmatic support to existing health agencies. In future nutrition surveys, it is recommended to measure the WHO indicator on predominant breastfeeding under 6 months since many women lose exclusivity from giving water and other fluids, both for cultural reasons and due to lack of knowledge on composition of breast milk.

Food security indicators

There was no break in the general food pipeline in 2011 and the amount of Kilocalories supplied per person per day met the FAO recommended 2100 Kcal for most of the months of the year 2011. WFP continued to provide milled cereals and culturally preferred wheat flour, although distribution of food to complement the general basket (green grams/groundnuts) by UNHCR was not consistent. Based on the JAM 2010 recommendations, the food basket had been revised thus increasing the vegetable oil from 30 to 35 grams per person per day and reducing CSB plus from 45 to 40 grams per person per day as of October 2011.

Over 99% of households surveyed had a ration card which may not however translate to food reaching the households and being utilized appropriately. This is due to the dynamics which include sale of ration to purchase other preferred items or reduced quantity of food intake owing to sharing. Through the Post Distribution Monitoring reports by WFP for 2009 and 2010, beneficiaries reported that they sell part of their rations for the following three main reasons (from most to least important): to buy other essential items, to pay for transport of their food ration back to their homes (which costs 10-15 ksh per load), to buy other commodities not provided in the GFD food basket. The majority of those who reported to have sold food during the last six months did so to pay for transport (53%) followed by those who needed to buy other items (32%).

Secondary data review (e.g. partners programme reports, JAM) indicates that inadequate firewood distribution to the refugees is an important factor when analyzing reasons for sale of food ration. Borrowing of food form relatives or taking credit creates a continuing cycle of food insecurity which impacts negatively on the nutritional status of the young children especially as they are the most vulnerable group of people. Food may not be accessible to the vulnerable groups at the household level. For instance CSB plus premix, meant for moderately malnourished children under five years, is commonly shared among all other family members. In this case, the child will not gain weight fast enough to exit from the programme as expected.

79.6% of households in Hagadera camp, 79.9% in Ifo, 82.2% in Dagahaley and 82.2% in Dagahaley outskirts reported that food from the general ration lasted less than the expected 15 days. In all four surveys, the average number of days the food from the general ration lasted ranged from 10.2-10.6 days. When asked why the general ration did not last the entire cycle, >68% of households in all four surveys cited that the main reason was that the ration was not enough. The second most cited reason was that the food was sold or exchanged. In all four surveys, the most important coping strategy that was reported to be used to fill the gap when the food from the general ration ran out was to *borrow from neighbors or relatives and get credit*. In the three main camps, the second most important coping strategy that was reported was *buying of food*. However, in the outskirts, the second most important coping strategy that was reported was to receive *donations from kin*.

The proportion of households selling or exchanging food ration items was found to be 38.0% in Hagadera, 41.9% in Ifo, 55.4% in Dagahaley and 48.8% in Dagahaley outskirts. When food from the general ration was sold or exchanged, the most common food item to be bought was sugar in 40%-58% of households in all surveys. Vegetables, milk, rice, pasta, potatoes, and meat were also commonly reported to be bought by many surveyed households.

Food quantity (intake) can be affected by sharing of food at the household level especially so for households hosting new arrivals. In the three main camps, the proportion of surveyed households who had one or more members who joined their household within the last three months ranged from 7%-18%. It can be assumed that new arrivals exerted pressure on these hosting families in terms of food quantity. However, with the opening of reception centres in all three camps in June 2011, new arrivals were able to access food prior to registration and hence this most likely relieved the reliance on hosting families for food. From the outskirt survey, it was found that the food from the reception centres lasted an average of 10.2 days, which was similar to the general food ration.

WASH indicators

Poor water, sanitation and hygiene have serious consequences for health and nutritional status, especially among the most vulnerable population groups. Improvements in hygiene and particularly hand washing with soap can have a significant impact on reducing diarrhoeal rates. At the time of the survey, there had been no general distribution of soap with only 2.0%, 4.0%, 29.5% and 26.0% of households in Hagadera, Ifo, Dagahaley and Dagahaley outskirts reporting to have received soap in the last two distribution cycles or at reception. This does not mean however that households did not have access to soap at all since it is possible that they purchase some. Nevertheless, the lack of soap in the general distribution could be a contributing factor to the high prevalence of diarrhoea reported by caregivers during the two weeks preceding the surveys hence negatively affecting nutritional status of the young children, with Hagadera and Ifo camps having the highest period prevalence of diarrhoea in children under-5 and the lowest soap distribution coverage as compared to Dagahaley camp. This is a programme implementation issue that needs rapid resolution.

In all four surveys, over 95% of households surveyed had water containers to collect water. Reported reasons for not having water containers included that the households did not go to the reception centre or were not registered, that they did not receive any during reception or after registration or that they did not have money to buy containers.

The assumption is made that if households use an improved drinking water source they are more likely to be drinking clean water. Over 99% of the surveyed households reported using an improved drinking water source. Water can be contaminated at the household level however; open containers with no lid are more likely to be contaminated as compared to covered or narrow necked containers. Contamination can still occur for example when removing water from the container with unwashed hands which come into contact with the water. The proportion of households that use a covered or a narrow necked container for storing their drinking water was found to be 97.4% in Hagadera, 79.9% in Ifo, 68.6% in Dagahaley and 71.5% in Dagahaley outskirts.

Hygiene and health are compromised by a lack of water. UNHCR minimum water quantity standard is 20 litres per person per day (lpppd); Sphere is 15 lpppd. 53.9%, 43.2%, 52.1% and 43.4% of households in Hagadera, Ifo, Dagahaley and Dagahaley outskirts respectively were found to have access to 20 lpppd or more. The main water source needs to be sufficiently close or accessible to households to ensure that there is an adequate daily volume of water for basic household purposes. The available research shows that where people take more than 30 minutes to collect water this will impact on the amount of water they use. People may take a lot longer to collect water because of long queues or interruptions to the supply and this will reduce the amount of time available for child-care where women are expected to do both. The proportion of households that take less than 30 minutes to collect their main drinking water source was found to be 9.5%, 39.5%, 22.4% and 12.9% in Hagadera, Ifo, Dagahaley and Dagahaley outskirts, respectively. When asked if they were satisfied with the drinking water supply, in the three main camps, ~85-90% of households responded positively. In the outskirts however, only 59.2% responded that they were satisfied with the drinking water supply. These results show that the water quantity in more than half of the surveyed households was sub-standard. It can be assumed that the sharing of water resources with new arrivals exerted pressure in all camps. In Dagahaley

outskirts, the settling of refugees beyond the camp boundaries constrained extension of the water network. Water tankering to the outskirts was thus used in most cases albeit delays in providing water to the population.

In all three main camps, the proportion of households using an unimproved toilet ranged between 1.7-8.3% whereas in the outskirts it was as high as 67.3% indicating much poorer hygiene practices among the new arrivals. This is attributed to the low latrine coverage in the outskirts. The high rate of the influx as well as settling of new arrivals beyond the camp boundaries constrained the response. The proportion of households using a communal toilet was found to be highest in Hagadera (26.8%) and the outskirts (31.3%) as compared to Ifo (18.8%) and Dagahaley (8.3%). Communal toilets that are shared between a large number of families (two or more households) may be difficult to keep clean. A single household toilet (not shared) and shared family toilets (no more than 2 families or 12 people use the facilities) are the easiest to keep clean and maintain although a cleaning rota may be necessary for shared toilets. The proportion of households using an improved excreta disposal facility (improved toilet facility, not shared) ranged between 47.6-58.3% in all main camps whereas it was <0.5% in the outskirts. Similarly, the proportion of households using shared family toilets ranged between 23.9-26.1% in all main camps whereas it was 1.1% in the outskirts. Observations of these two types of toilet categories by surveyors revealed that >98% of them were in use at the time of the survey.

The safe disposal of children's faeces is of particular importance because children's faeces are the most likely cause of faecal contamination to the immediate household environment as adults will often choose to go elsewhere if there is no facility available. It is also common for people to think that children's faeces are less harmful than adult faeces. "Safe" is understood to mean disposal in a safe sanitation facility or by burying. In all three main camps, 93-97.5% of the households reported disposing of U3 children excreta safely whereas in the outskirts, 41.6% reported disposing of U3 children excreta safely, indicating much poorer hygiene practices among the new arrivals. However, in the main camps, the use of CHWs for data collection may lead to biased findings given that they are the same people who provide services to the community. There is likelihood, therefore, that the findings may be biased to reflect what has been taught by the CHWs rather than what is practiced regarding the safe disposal of U3 children's stools.

CONCLUSION

New arrivals fleeing famine and war in Somalia arrived in Dadaab refugee camps in poor nutritional status are still in a weakened and often life-threatening condition for a prolonged period after arrival in Dadaab. Despite the fact that the new arrivals were allowed access to all the services, it was reported that many of them did not know about the services offered in the camp. While the under five mortality and crude mortality rates were acceptable in the three camps, the outskirts has rates above the emergency threshold. There is no doubt that the Dadaab camps are in nutrition crisis and that immediate steps must be taken to improve access to services and to ensure that fundamental curative services are running to standard and meeting the needs of the population. Both the old and new caseloads are at risk in the context of overstretched services, delayed formal registration and timely identification of those in need of enhanced support. The lack of a transit centre means that refugees spontaneously arrive across a porous border crossing and can be subsumed in the camp before ever being screened regarding food, nutrition and health needs. This means that all agencies need to redouble efforts to ensure that the vulnerable refugees are getting to the services and that these services are able to deliver appropriate care.

Discussions with community leaders and health committee members prior to the surveys revealed that the community recommends increases in food quantity, diet diversification, distribution of non-food items like firewood, soap and clothes; and increasing livelihood initiatives. The community also recommends provision of nutritious food to children and mothers.

Immediate measures must be taken to improve both access to and management of acute malnutrition and illness especially among new arrivals, considering the above emergency levels of malnutrition and mortality. This should include screening and treatment of malnutrition in various age-groups; blanket supplementary feeding for children aged 6-59 months; scaled-up infant and young child feeding programmes; and identification and treatment of communicable diseases including measles and diarrhoea.

Hygiene promotion and sanitation needs to scaled-up urgently to arrest the increasing diarrhoea trends as well as provision of safe and sufficient water. The reasons for low coverage of SFP and OTP need to be investigated and strategies put in place to increase the coverage. A food security assessment needs to be urgently implemented to investigate the reasons for the high malnutrition levels amongst the old-stayers in the main camps.

Concerted integrated efforts will be required to bring the GAM levels to the WHO acceptable level of <5% because of the multifactorial nature of malnutrition.

RECOMMENDATIONS AND PRIORITIES

Immediate term

1. Existing nutrition programmes should be continued and linkages between the programmes should be strengthened; including selective feeding programmes for malnourished children and chronic medical cases as well as blanket feeding for pregnant and lactating mothers.

2. WFP to continue the blanket supplementary feeding programme for children 6-59 months of age until the prevalence of GAM decreases to internationally acceptable levels. Ensure increased awareness and sensitisation for proper use of the supplementary foods in the target group.

3. Enhance the nutrition programme for children aged 5-9 years: Heath and nutrition agencies to scale up case finding and plan accordingly for the increased case- load; WFP to provide supplementary food to moderately malnourished children aged 5-9 years while UNICEF/UNHCR to provide therapeutic food supplies.

4. Strengthen the food distribution monitoring system including the introduction of on-site food basket monitoring to monitor the efficiency and equity of the general ration distribution system, and conduct/analyse regular post-distribution monitoring assessments.

5. Investigate the reasons for low coverage of SFP and OTP, and urgently identify and put in place strategies to increase the coverage to meet Sphere standards.

6. Increase MUAC screening cut-off at community level for children 6-59 months to 13.5 cm in order to refer all children at-risk of malnutrition for further assessment and conduct quarterly mass MUAC screening to improve coverage and monitor the nutritional situation.

7. Increase the ratio of Community Health Workers to 1:500 in the newly established camps (Ifo extension and Kambioss) to enhance active case finding of malnourished children and uptake of nutrition programme services by the refugee community.

8. Reconfigure the current community health worker activities and methods to better respond to the specific needs of the new arrivals who exhibit very poor health seeking behaviours and a limited understanding of health triggers and household management of basic illnesses.

9. Review the community health structure with the aim of strengthening the community health programme, and rationalizing the role of Community Health Workers to focus on Priority interventions. This includes active case finding for sick and malnourished persons, identification of new arrivals to educate on availability of services, identification of pregnant women, disease surveillance and mortality surveillance.

10. Heath agencies to recruit and train specialised Community Nutrition Workers to support strengthening of community nutrition outreach, community management of acute malnutrition and support to infant and young child nutrition.

11. Strengthen the awareness, promotion, and protection of Infant and Young Child Feeding through baby tents, expanded mother to mother support groups, and the hiring of a professional to undertake relactation counselling in the nutrition programmes and by accelerating sensitisation and awareness creation on appropriate breast-feeding and complementary feeding practices. Investigate the factors determining use of breast milk substitutes and bottle feeding and provide appropriate support for safe breast milk substitute utilisation where needed as well as promote breast feeding in the non-breast feeding population.

12. Health agencies to strengthen routine measles vaccination, vitamin A supplementation and de-worming in children 6-59 months through defaulter tracing at block level and house to house checking of immunisation status by Community Health Workers.

Improve the supply and retention of health record cards for children, and enhance the recording of key information.

13. UNHCR to ensure adequate soap distribution on a monthly basis.

14. Scale-up of hygiene promotion activities. This is to include effective messaging and dissemination on latrine usage and maintenance and hand-washing at the community level, at schools and at communal places, and ensuring adequate number of hygiene promoters to meet standards (1 hygiene promoter:500).

15. Review the distribution network of water to ensure equity among all blocks in the camps and to ensure adequate water supply.

16. Ensure water quality through effective chlorination and monitoring.

Medium term

1. UNHCR to conduct nutrition surveys in all camps in six months time (i.e. March 2012).

2. WFP and UNHCR to conduct an expanded food security assessment to understand the causes of food insecurity at the household level and, where appropriate, design food security interventions that can support, complement or alternatives to GFD e.g. food vouchers, cash transfers or vouchers for non-food items.

3. Health agencies to conduct qualitative assessments on health-seeking behavior with the aim of improving uptake of services.

4. UNHCR to finalize the Dadaab anaemia reduction strategy and intervention package targeting children under two years of age and pregnant women. Consideration will be given to including supplementation of all women of child-bearing age with an acceptable micronutrient formulation.

5. Improve coverage and maintenance of household latrines over the next year (1 latrine for 1 to 2 families).

6. Conduct an in-depth assessment of household water containers to examine adequacy of water containers, and water storage practices and knowledge.

Longer term

1. Develop operational research for children 5-9 years in all camps to guide MUAC screening cut-off points for this age group.

2. Improve and scale up the livelihood opportunities for the refugees through developmental-oriented initiatives to improve their economic status.

Future nutrition monitoring

Nutritional surveys should be conducted in the Dadaab refugee camps in six months (March 2012) to monitor the evolving emergency situation. However, the methodology should be simplified to capture only key indicators of anthropometry in children aged 6-59 months and mortality in the whole population as recommended by the SMART methodology. A full expanded nutrition survey (such as the ones reported here) should be repeated in 12 months (August-September 2012) and subsequently annually following UNHCR Standardised Nutritional Survey Guidelines for Refugee Populations. With two additional camps, the size and intensity of the nutritional surveys will be increased, therefore it is recommended that a consultant be recruited to lead the anthropometric and mortality surveys to be conducted in six months time. For the annual routine nutritional surveys, a team consisting of a lead consultant plus four assistant consultants is recommended to be recruited for quality assurance.

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Appendix 1 - Names of contributors

Data collection teams

	Dagahaley Camp		Ifo Camp		Hagadera Camp		Dagahaley outskirts
	Enumerators		**Enumerators**		**Enumerators**		**Enumerators**
1	Abdinasir Hussein Adan	1	Abdi Adow Aden	1	Bashir Halane	1	Hassan Abdi Khadid
2	Abdirashid Ahmed Musa.	2	Khadija Mohamed	2	Abshiro Mohamed Adan	2	Jelle Mohamed Ali
3	Amina Omar Yussuf	3	Ibrahim Rashid	3	Abdirahman Mohamed Ibrahim	3	Hussein Hassan Ibrahim
4	Ali Musa Dagane	4	Safio Omar Ibrahim	4	Shamsa Khalif Hussein	4	Qadar Dekow Muktar
5	Adow Mohamed Isaack	5	Mohamed Ali Noor	5	Ibrahim Madnoor Issack	5	Kheira Dagane
6	Ahmed Adan	6	Abdi Rizak Ahmed	6	Khadija Noor Ubahle	6	Nathifa Noor Ismail
7	Deka Abdullahi Abdulle	7	AbdiRashid Ugas	7	Jammaa Garane Muse	7	Fowsiyo Mohamed Yussuf
8	Farhan Hassan	8	Mohamed Hassan Mohamed	8	Abdullahi Jama Abdi	8	Wanago Mohamed
9	Farhiya Hajji Abdi	9	Musa Yale	9	Saadio Noor Mohamed	9	Abdikani Mohamed Iman
10	Ali Malaq	10	Mohamed Ali	10	Mohamed Issa Hassan	10	Abdiyusuf Haji
11	Habiba Diriye	11	Kamil Hussein Rashid	11	Bashir Abdi Hassan	11	Hawo Abdirizack Abdullahi
12	Hamaro Gedi Khalif	12	Mohamed Salat Abdullahi	12	Katra Mohamed GANOK	12	Abdullahi Khalif
13	Mohamed Salah	13	Ahmed Hassan BARE	13	Rashid Abdi Omar	13	Ali Abdi Dagane
14	Nimco Sheik Musa	14	Abdinoor Mohamed	14	Osman Hassan Farah	14	Mohamed Mowlid Muhumed
15	Yussuf Weyrah Dagane	15	Abdufatah Salah Mahda	15	Adey Ali Mohamed	15	Abdikani Mohamed Iman
	Team Leaders		**Team Leaders**		**Team Leaders**		**Team Leaders**
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2	Hamdi Ahmed	2	Hawa Wario	2	Nuria Muktar	2	John Kinyajui
3	Sofia Hassan Abdi	3	Jeanks Namukula	3	Ahmed Hassan OSMAN	3	Farah Onle
4	Noella Chelimo	4	Daniel Karanja	4	Bishar Maash Saman	4	Hassan Abdikadir Abdulle
5	Hassan Abdi	5	Antony Njeru	5	Kezia Baraza	5	Fatuma Mohamed Omar
	Supervisors		**Supervisors**		**Supervisors**		**Supervisors**
1	Daud Shimbir	1	Abdi Yussuf Bare	1	Sirat Abdullahi Amin	1	Mohamed Dahir
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Appendix 2 - Result Tables for NCHS 1977 Growth Reference

Table 221 Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex – NCHS 1977 Growth Reference

		Hagadera	Ifo	Dagahaley	Dagahaley outskirts
All	n	597	545	581	554
Prevalence of global acute malnutrition	(n) %	(79) 13.2	(96) 17.6	(120) 20.7	(185) 33.4
(<-2 z-scores and/or oedema)	(95% CI)	(10.0 – 17.3)	(13.1 – 23.2)	(15.2 – 27.4)	(27.3 – 40.1)
Prevalence of moderate acute malnutrition	(n) %	(65) 10.9	(75) 13.8	(92) 15.8	(130) 23.5
(<-2 and ≥-3 z-scores, no oedema)	(95% CI)	(8.1 – 14.4)	(10.3 – 18.1)	(11.9 – 20.7)	(18.9 – 28.7)
Prevalence of severe acute malnutrition	(n) %	(14) 2.3	(21) 3.9	(28) 4.8	(55) 9.9
(<-3 z-score and/or oedema	(95% CI)	(1.1 – 4.8)	(2.1 – 7.1)	(2.5- 9.0)	(7.2 – 13.6)
Oedema prevalence	n	(1) 0.2	(0) 0.0	(0) 0.0	(1) 0.2
Boys	n	302	268	307	261
Prevalence of global acute malnutrition	(n) %	(43) 14.2	(47) 17.5	(74) 24.1	(91) 34.9
(<-2 z-scores and/or oedema)	(95% CI)	(10.2 – 19.5)	(12.1 – 24.7)	(18.0 – 31.4)	(27.4 – 43.2)
Prevalence of moderate acute malnutrition	(n) %	(38) 12.6	(36) 13.4	(59) 19.2	(61) 23.4
(<-2 and ≥-3 z-scores, no oedema)	(95% CI)	(8.8 – 17.7)	(8.8 – 20.0)	(14.7 – 24.7)	(17.2 – 30.9)
Prevalence of severe acute malnutrition	(n) %	(5) 1.7	(11) 4.1	(15) 4.9	(30) 11.5
(<-3 z-score and/or oedema	(95% CI)	(0.6 – 4.6)	(2.1 - 7.9)	(2.3 – 10.0)	(7.5 – 17.3)
Girls	n	295	277	274	293
Prevalence of global acute malnutrition	(n) %	(36) 12.2	(49) 17.7	(46) 16.8	(94) 32.1
(<-2 z-scores and/or oedema)	(95% CI)	(8.3 – 17.7)	(12.4 – 24.7)	(10.5 – 25.7)	(25.3 – 39.7)
Prevalence of moderate acute malnutrition	(n) %	(27) 9.2	(39) 14.1	(33) 12.0	(69) 23.5
(<-2 and ≥-3 z-scores, no oedema)	(95% CI)	(6.0 – 13.7)	(10.0 – 19.4	(7.4 – 19.0)	(18.8 – 29.1)
Prevalence of severe acute malnutrition	(n) %	(9) 3.1	(10) 3.6	(13) 4.7	(25) 8.5
(<-3 z-score and/or oedema	(95% CI)	(1.6 – 5.8)	(1.6 – 7.8)	(2.3 – 9.5)	(5.4 – 13.3)

Table 222 Prevalence of acute malnutrition based on the percentage of the median and/or oedema – NCHS 1977 Growth Reference

		Hagadera	Ifo	Dagahaley	Dagahaley outskirts
All	n	597	545	581	554
Prevalence of global acute malnutrition	(n) %	(52) 8.7	(69) 12.7	(78) 13.4	(147) 26.5
(<-2 z-scores and/or oedema)	(95% CI)	(5.9-12.6)	(9.1-17.3)	(9.2-19.2)	(20.8-33.1)
Prevalence of moderate acute malnutrition	(n) %	(44) 7.4	(56) 10.3	(62) 10.7	(119) 21.5
(<-2 and ≥-3 z-scores, no oedema)	(95% CI)	(5.1-10.5)	(7.5-13.9)	(7.7-14.7)	(16.8-27.1)
Prevalence of severe acute malnutrition	(n) %	(8) 1.3	(13) 2.4	(16) 2.8	(28) 5.1
(<-3 z-score and/or oedema)	(95% CI)	(0.6-2.8)	(1.1-5.2)	(1.0-7.7)	(3.3-7.6)

Table 223 Mean z-score values (NCHS 1977 Growth Reference) in children aged 6-59 months, design effects and included and excluded subjects

Indicator	Camp	Total	Mean z-scores ± S.D.	Design Effect (z-score < -2)	z-scores not available	z-scores out of range
Weight-for-Height	**Hagadera**	596	-1.00±1.01	1.71	5	3
	Ifo	545	-1.06±1.15	2.30	4	8
	Dagahaley	581	-1.24±1.11	3.14	5	5
	Dagahaley outskirts	553	-1.60±1.06	2.44	7	7
Height-for-Age	**Hagadera**	576	-0.86±1.18	1.34	4	24
	Ifo	504	-0.95±1.26	1.83	4	49
	Dagahaley	546	-0.74±1.25	2.39	5	40
	Dagahaley outskirts	518	-0.92±1.40	2.57	3	46
Weight-for-Age	**Hagadera**	594	-1.34±1.05	1.50	3	7
	Ifo	542	-1.51±1.05	2.77	1	14
	Dagahaley	578	-1.53±1.06	1.79	1	12
	Dagahaley outskirts	550	-1.83±1.15	2.57	5	12

Table 224 Prevalence of stunting based on height-for-age z-scores and by sex – NCHS 1977 Growth Reference

		Hagadera	Ifo	Dagahaley	Dagahaley outskirts
All		576	504	546	518
Prevalence of stunting	(n) %	(103) 17.9	(104) 20.6	(91) 16.7	(121) 23.4
(<-2 z-scores)	(95% CI)	(14.4 – 22.0)	(16.1- 26.0)	(12.2 – 22.3)	(17.8 – 30.0)
Prevalence of moderate stunting	(n) %	(78) 13.5	(72) 14.3	(70) 12.8	(77) 14.9
(<-2 and ≥-3 z-scores)	(95% CI)	(10.2 – 17.7)	(10.9- 18.6)	(9.4 – 17.2)	(10.9 – 19.9)
Prevalence of severe stunting	(n) %	(25) 4.3	(32) 6.3	(21) 3.8	(44) 8.5
(<-3 z-score)	(95% CI)	(3.0 – 6.2)	(4.5 – 8.9)	(2.3- 6.5)	(5.6 – 12.6)
Boys		292	250	287	244
Prevalence of stunting	(n) %	(55) 18.8	(48) 19.2	(49) 17.1	(62) 25.4
(<-2 z-scores)	(95% CI)	(13.7 – 25.3)	(14.1- 25.6)	(12.0 – 23.7)	(18.4 – 33.9)
Prevalence of moderate stunting	(n) %	(40) 13.7	(33) 13.2	(37) 12.9	(36) 14.8
(<-2 and ≥-3 z-scores)	(95% CI)	(9.4 – 19.5)	(9.1 – 18.7)	(9.3 – 17.6)	(9.9 – 21.4)
Prevalence of severe stunting	(n) %	(15) 5.1	(15) 6.0	(12) 4.2	(26) 10.7
(<-3 z-score)	(95% CI)	(3.4 – 7.8)	(3.6 – 9.7)	(2.0 – 8.4)	(7.1 – 15.8)
Girls		284	254	259	274
Prevalence of stunting	(n) %	(48) 16.9	(56) 22.0	(42) 16.2	(59) 21.5
(<-2 z-scores)	(95% CI)	(12.9 – 21.8)	(15.9 – 29.8)	(11.1 – 23.1)	(15.7 – 28.9)
Prevalence of moderate stunting	(n) %	(38) 13.4	(39) 15.4	(33) 12.7	(41) 15.0
(<-2 and≥[3]-3 z-scores)	(95% CI)	(9.6 – 18.3)	(10.5 – 22.0)	(8.4 – 18.8)	(10.4 – 21.1)
Prevalence of severe stunting	(n) %	(10) 3.5	(17) 6.7	(9) 3.5	(18) 6.6
(<-3 z-score)	(95% CI)	(1.9 – 6.5)	(4.0 - 11.1)	(1.8 – 6.7)	(3.6 – 11.7)

Table 225 Prevalence of underweight based on weight-for-age z-scores by sex –NCHS 1977 Growth Reference

		Hagadera	Ifo	Dagahaley	Dagahaley outskirts
All	n	594	542	578	550
Prevalence of underweight	(n) %	(164) 27.6	(180) 33.2	(183) 31.7	(238) 43.3
(<-2 z-scores)	(95% CI)	(23.3 – 32.4)	(26.7 – 40.4)	(26.6-37.1)	(36.5 – 50.3)
Prevalence of moderate underweight	(n) %	(130) 21.9	(139) 25.6	(130) 22.5	(139) 25.3
(<-2 and ≥-3 z-scores)	(95% CI)	(17.8 – 26.6)	(20.9 – 31.1)	(19.6-25.7)	(21.0 – 30.0)
Prevalence of severe underweight	(n) %	(34) 5.7	(41) 7.6	(53) 9.2	(99) 18.0
(<-3 z-score)	(95% CI)	(4.0 – 8.1)	(5.1 – 11.0)	(6.1-13.5)	(13.9 – 23.0)
Boys	n	301	268	305	259
Prevalence of underweight	(n) %	(83) 27.6	(85) 31.7	(95) 31.1	(111) 42.9
(<-2 z-scores)	(95% CI)	(21.7 – 34.3)	(23.8 – 40.9)	(25.4 – 37.6)	(34.6 – 51.6)
Prevalence of moderate underweight	(n) %	(61) 20.3	(66) 24.6	(70) 23.0	(67) 25.9
(<-2 and ≥-3 z-scores)	(95% CI)	(15.2 – 26.4)	(18.9 – 31.5)	(19.3 – 27.1)	(19.7 – 33.2)
Prevalence of severe underweight	(n) %	(22) 7.3	(19) 7.1	(25) 8.2	(44) 17.0
(<-3 z-score)	(95% CI)	(4.7 – 11.3)	(4.2 – 11.7)	(4.8 – 13.6)	(12.2- 23.2)
Girls	n	293	274	273	291
Prevalence of underweight	(n) %	(81) 27.6	(95) 34.7	(88) 32.2	(127) 43.6
(<-2 z-scores)	(95% CI)	(21.7- 34.5)	(26.8- 43.5)	(26.2 – 39.0)	(35.9 – 51.7)
Prevalence of moderate underweight	(n) %	(69) 23.5	(73) 26.6	(60) 22.0	(72) 24.7
(<-2 and ≥-3 z-scores)	(95% CI)	(18.0 – 30.2)	(20.6- 33.8)	(17.9- 26.7)	(19.2 – 31.2)
Prevalence of severe underweight	(n) %	(12) 4.1	(22) 8.0	(28) 10.3	(55) 18.9
(<-3 z-score)	(95% CI)	(2.4 – 6.9)	(5.0 – 12.7)	(6.7 – 15.4)	(13.8 – 25.3)

Appendix 3 - Combined camp results

Table 226 Combined prevalence results for children 6-59 months of age-all camps, Dadaab Aug-Sep 2011

		Hagadera	Ifo	Dagahaley	Combined (weighted results)
Global acute malnutrition (<-2 z-scores and/or oedema)	%	17.2	22.4	23.2	20.8
Severe acute malnutrition (<-3 z-score and/or oedema)	%	4.6	6.8	8.2	6.4
At risk of malnutrition MUAC 12.5-13.4 cm	%	14.3	22.9	19.1	18.7
Moderate malnutrition MUAC 11.5-12.4 cm	%	5.0	7.5	5.2	5.9
Severe malnutrition MUAC <11.5cm	%	1.8	1.3	1.9	1.7
Prevalence of stunting (<-2 z-scores)	%	21.8	23.2	20.7	22.0
Total anaemia (6-59 months) Hb<11 g/dl	%	45.3	54.4	47.6	49.1
Moderate anaemia (6-59 months) Hb 7-9.9 g/dl	**%**	20.6	26.0	20.0	22.3
Severe anaemia (6-59 months) Hb<7 g/dl	**%**	0.5	0.9	0.3	0.6
Total anaemia (6-24 months) Hb<11 g/dl	%	63.4	66.8	62.8	64.4
Moderate anaemia (6-24 months) Hb 7-9.9 g/dl	**%**	31.2	37.0	32.2	30.4
Severe anaemia (6-24 months) Hb<7 g/dl	%	0	0.5	1.1	0.5

		Hagadera	Ifo	Dagahaley	Combined (weighted results)
Measles vaccination with card (9-59 months)	%	42.7	28.5	28.4	33.6
Measles vaccination with card or recall (9-59 months)	%	89.2	89.1	84.3	87.7
Vitamin A supplementation in past 6 m with card (6-59 months)	%	20.9	14.5	18.3	17.9
Vitamin A supplementation in past 6 m with card or recall (6-59 months)	%	86.8	85.5	78.8	84.0
Deworming in past 6 m with card (24-59 months)	%	5.8	4.6	13.6	7.7
Deworming in past 6 m with card or recall (24-59 months)	%	81.7	79.6	77.1	79.6

Table 227 Combined IYCF results for children 0-23 months of age-all camps, Dadaab Aug-Sep 2011

		Hagadera	Ifo	Dagahaley	Combined (weighted results)
Children ever breastfed	%	99.3	97.7	97.5	98.2
Early initiation of breastfeeding	%	83.3	90.1	79.9	84.6
Exclusive breastfeeding under 6 months	%	47.1	43.0	34.3	41.9
Continued breastfeeding at 1 year	%	62.5	72.7	70.0	68.2
Continued breastfeeding at 2 years	%	13.3	33.3	31.0	25.4
Introduction of solid, semi-solid or soft foods	%	83.3	61.9	82.1	75.6

Table 228 Combined anaemia results for non-pregnant women 15-49 years of age-all camps, Dadaab Aug-Sep 2011

		Hagadera	Ifo	Dagahaley	Combined (weighted results)
Total anaemia (6-59 months) Hb<12 g/dl	%	43.3	49.8	50.9	47.8
Moderate anaemia (6-59 months) Hb 8-10.9 g/dl	**%**	17.6	24.9	28.7	23.4
Severe anaemia (6-59 months) Hb<8 g/dl	**%**	0.8	2.8	3.9	2.4

Table 229 Combined WASH results -all camps, Dadaab Aug-Sep 2011

		Hagadera	Ifo	Dagahaley	Combined (weighted results)
Proportion of households that access:					
≥20 lpppd	**%**	53.9	43.2	52.1	49.7
15-<20 lpppd	**%**	14.8	14.4	15.6	14.9
10-<15 lpppd	**%**	20.8	26.2	22.8	23.2
<10 lpppd	**%**	10.4	16.2	9.4	12.1
Proportion of households using an unimproved toilet	**%**	1.7	3.8	8.3	4.4

Note: The combined, weighted results were calculated using the tool provided in UNHCR Standardised Nutrition Survey Guidelines Version 1.2 June 2011 (Tool 15-Calculation of weighted prevalence from combined camps)**.**

Appendix 4 - Summary of overall quality of anthropometric data (weight-for-height data) and interpretation

SMART Plausibility Report uses WHO Growth Standards 2006 for z-score calculations.

HAGADERA

Overall data quality (SMART Plausibility Report)

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	**Score**
Missing/Flagged data	Incl	%	0-2.5	>2.5-5.0	>5.0-10	>10	
(% of in-range subjects)			0	5	10	20	**0** (1.2 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<0.000	
(Significant chi square)			0	2	4	10	**0** (p=0.684)
Overall Age distrib	Incl	p	>0.1	>0.05	>0.001	<0.000	
(Significant chi square)			0	2	4	10	**4** (p=0.049)
Dig pref score - weight	Incl	#	0-5	5-10	10-20	> 20	
			0	2	4	10	**0** (5)
Dig pref score - height	Incl	#	0-5	5-10	10-20	> 20	
			0	2	4	10	**2** (9)
Standard Dev WHZ	Excl	SD	<1.1	<1.15	<1.20	>1.20	
			0	2	6	20	**20** (1.20)
Skewness WHZ	Excl	#	<±1.0	<±2.0	<±3.0	>±3.0	
			0	1	3	5	**0** (-0.01)
Kurtosis WHZ	Excl	#	<±1.0	<±2.0	<±3.0	>±3.0	
			0	1	3	5	**0** (0.27)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<0.000	
			0	1	3	5	**3** (p=0.004)
OVERALL SCORE WHZ =			0-5	5-10	10-15	>15	**29** %

At the moment the overall score of this survey is 29 %, this is problematic.

Evaluation of standard deviation using the 3 exclusion (Flag) procedures (SMART Plausibility Report)

.	**no exclusion**	**exclusion from reference mean (WHO flags)**	**exclusion from observed mean (SMART flags)**
WHZ			
Standard Deviation SD:	1.30	1.24	1.20
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	17.5%	17.0%	17.1%
calculated with current SD:	21.3%	19.5%	19.2%
calculated with a SD of 1:	15.1%	14.4%	14.9%

Statistical evaluation of sex and age ratios (using Chi squared statistic) (SMART Plausibility Report):

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	73/71.2 (1.0)	72/68.9 (1.0)	145/140.1 (1.0)	1.01
18 to 29	12	65/69.4 (0.9)	71/67.2 (1.1)	136/136.6 (1.0)	0.92
30 to 41	12	73/67.3 (1.1)	73/65.1 (1.1)	146/132.4 (1.1)	1.00
42 to 53	12	75/66.2 (1.1)	60/64.1 (0.9)	135/130.3 (1.0)	1.25
54 to 59	6	21/32.8 (0.6)	21/31.7 (0.7)	42/64.5 (0.7)	1.00
6 to 59	54	307/302.0 (1.0)	297/302.0 (1.0)		1.03

Overall sex ratio: p-value = 0.684 (boys and girls equally represented)
Overall age distribution: p-value = 0.049 (significant difference)

Test if cases are randomly distributed or aggregated over the clusters by calculation of the Index of Dispersion (ID) and comparison with the Poisson distribution for (SMART Plausibility Report):

WHZ < -2: ID=1.77 (p=0.004)
WHZ < -3: ID=1.93 (p=0.001)
Oedema: ID=1.00 (p=0.468)
GAM: ID=1.74 (p=0.005)
SAM: ID=1.84 (p=0.002)

IFO

Overall data quality (SMART Plausibility Report)

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	**Score**
Missing/Flagged data	Incl	%	0-2.5	>2.5-5.0	>5.0-10	>10	
(% of in-range subjects)			0	5	10	20	**0** (2.0 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<0.000	
(Significant chi square)			0	2	4	10	**0** (p=0.672)
Overall Age distrib	Incl	p	>0.1	>0.05	>0.001	<0.000	
(Significant chi square)			0	2	4	10	**4** (p=0.002)
Dig pref score - weight	Incl	#	0-5	5-10	10-20	> 20	
			0	2	4	10	**2** (6)
Dig pref score - height	Incl	#	0-5	5-10	10-20	> 20	
			0	2	4	10	**4** (14)
Standard Dev WHZ	Excl	SD	<1.1	<1.15	<1.20	>1.20	
			0	2	6	20	**20** (1.34)
Skewness WHZ	Excl	#	<±1.0	<±2.0	<±3.0	>±3.0	
			0	1	3	5	**0** (0.06)
Kurtosis WHZ	Excl	#	<±1.0	<±2.0	<±3.0	>±3.0	
			0	1	3	5	**0** (0.31)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<0.000	
			0	1	3	5	**3** (p=0.003)
Timing	Excl	Not determined yet					
			0	1	3	5	
OVERALL SCORE WHZ =			0-5	5-10	10-15	>15	**33** %

At the moment the overall score of this survey is 33 %, this is problematic.

Evaluation of standard deviation using the 3 exclusion (flag) procedures (SMART Plausibility Report)

.	**no exclusion**	**exclusion from reference mean (WHO flags)**	**exclusion from observed mean (SMART flags)**
WHZ			
Standard Deviation SD:	1.52	1.45	1.34
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	22.3%	22.1%	22.4%
calculated with current SD:	25.1%	24.2%	23.9%
calculated with a SD of 1:	15.4%	15.6%	17.2%

Statistical evaluation of sex and age ratios (using Chi squared statistic) (SMART Plausibility Report):

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	65/63.3 (1.0)	74/65.7 (1.1)	139/129.0 (1.1)	0.88
18 to 29	12	65/61.8 (1.1)	54/64.0 (0.8)	119/125.8 (0.9)	1.20
30 to 41	12	71/59.9 (1.2)	79/62.0 (1.3)	150/121.9 (1.2)	0.90
42 to 53	12	60/58.9 (1.0)	52/61.1 (0.9)	112/120.0 (0.9)	1.15
54 to 59	6	12/29.1 (0.4)	24/30.2 (0.8)	36/59.3 (0.6)	0.50
6 to 59	54	273/278.0 (1.0)	283/278.0 (1.0)		0.96

Overall sex ratio: p-value = 0.672 (boys and girls equally represented)
Overall age distribution: p-value = 0.002 (significant difference)

Test if cases are randomly distributed or aggregated over the clusters by calculation of the Index of Dispersion (ID) and comparison with the Poisson distribution for (SMART Plausibility Report):

WHZ < -2: ID=1.79 (p=0.003)
WHZ < -3: ID=2.08 (p=0.000)
GAM: ID=1.79 (p=0.003)
SAM: ID=2.08 (p=0.000)

DAGAHALEY

Overall data quality (SMART Plausibility Report)

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	**Score**
Missing/Flagged data	Incl	%	0-2.5	>2.5-5.0	>5.0-10	>10	
(% of in-range subjects)			0	5	10	20	**0** (2.1 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<0.000	
(Significant chi square)			0	2	4	10	**0** (p=0.150)
Overall Age distrib	Incl	p	>0.1	>0.05	>0.001	<0.000	
(Significant chi square)			0	2	4	10	**10** (p=0.000)
Dig pref score - weight	Incl	#	0-5	5-10	10-20	> 20	
			0	2	4	10	**0** (5)
Dig pref score - height	Incl	#	0-5	5-10	10-20	> 20	
			0	2	4	10	**4** (11)
Standard Dev WHZ	Excl	SD	<1.1	<1.15	<1.20	>1.20	
			0	2	6	20	**20** (1.25)
Skewness WHZ	Excl	#	<±1.0	<±2.0	<±3.0	>±3.0	
			0	1	3	5	**0** (-0.08)
Kurtosis WHZ	Excl	#	<±1.0	<±2.0	<±3.0	>±3.0	
			0	1	3	5	**0** (0.81)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<0.000	
			0	1	3	5	**1** (p=0.016)
Timing	Excl	Not determined yet					
			0	1	3	5	
OVERALL SCORE WHZ =			0-5	5-10	10-15	>15	**35** %

At the moment the overall score of this survey is 35 %, this is problematic.

Evaluation of standard deviation using the 3 exclusion (flag) procedures (SMART Plausibility Report)

.	**no exclusion**	**exclusion from reference mean (WHO flags)**	**exclusion from observed mean (SMART flags)**
WHZ			
Standard Deviation SD:	1.46	1.29	1.25
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	23.6%	22.6%	23.2%
calculated with current SD:	29.8%	26.7%	27.6%
calculated with a SD of 1:	22.0%	21.0%	22.8%

Statistical evaluation of sex and age ratios (using Chi squared statistic) (SMART Plausibility Report):

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	68/72.6 (0.9)	66/64.5 (1.0)	134/137.1 (1.0)	1.03
18 to 29	12	79/70.8 (1.1)	74/62.9 (1.2)	153/133.7 (1.1)	1.07
30 to 41	12	70/68.6 (1.0)	66/61.0 (1.1)	136/129.6 (1.0)	1.06
42 to 53	12	80/67.5 (1.2)	58/60.0 (1.0)	138/127.5 (1.1)	1.38
54 to 59	6	16/33.4 (0.5)	14/29.7 (0.5)	30/63.1 (0.5)	1.14
6 to 59	54	313/295.5 (1.1)	278/295.5 (0.9)		1.13

Overall sex ratio: p-value = 0.150 (boys and girls equally represented)
Overall age distribution: p-value = 0.000 (significant difference)

Test if cases are randomly distributed or aggregated over the clusters by calculation of the Index of Dispersion (ID) and comparison with the Poisson distribution for (SMART Plausibility Report):

WHZ < -2: ID=1.59 (p=0.016)
WHZ < -3: ID=1.88 (p=0.001)
GAM: ID=1.59 (p=0.016)
SAM: ID=1.88 (p=0.001)

DAGAHALEY OUTSKIRTS

Overall data quality (SMART Plausibility Report)

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	Score
Missing/Flagged data	Incl	%	0-2.5	>2.5-5.0	>5.0-10	>10	
(% of in-range subjects)			0	5	10	20	**0** (1.8 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<0.000	
(Significant chi square)			0	2	4	10	**2** (p=0.085)
Overall Age distrib	Incl	p	>0.1	>0.05	>0.001	<0.000	
(Significant chi square)			0	2	4	10	**2** (p=0.056)
Dig pref score - weight	Incl	#	0-5	5-10	10-20	> 20	
			0	2	4	10	**0** (3)
Dig pref score - height	Incl	#	0-5	5-10	10-20	> 20	
			0	2	4	10	**4** (18)
Standard Dev WHZ	Excl	SD	<1.1	<1.15	<1.20	>1.20	
			0	2	6	20	**20** (1.31)
Skewness WHZ	Excl	#	<±1.0	<±2.0	<±3.0	>±3.0	
			0	1	3	5	**0** (-0.19)
Kurtosis WHZ	Excl	#	<±1.0	<±2.0	<±3.0	>±3.0	
			0	1	3	5	**0** (-0.16)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<0.000	
			0	1	3	5	**0** (p=0.098)
Timing	Excl	Not determined yet					
			0	1	3	5	
OVERALL SCORE WHZ =			0-5	5-10	10-15	>15	**28** %

At the moment the overall score of this survey is 28 %, this is problematic.

Evaluation of standard deviation using the 3 exclusion (flag) procedures (SMART Plausibility Report)

.	**no exclusion**	**exclusion from reference mean (WHO flags)**	**exclusion from observed mean (SMART flags)**
WHZ			
Standard Deviation SD:	1.53	1.36	1.31
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	38.2%	37.3%	38.1%
calculated with current SD:	43.1%	41.0%	42.7%
calculated with a SD of 1:	39.5%	37.8%	40.5%

Statistical evaluation of sex and age ratios (using Chi squared statistic):

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	62/61.0 (1.0)	57/70.5 (0.8)	119/131.6 (0.9)	1.09
18 to 29	12	59/59.5 (1.0)	63/68.8 (0.9)	122/128.3 (1.0)	0.94
30 to 41	12	68/57.7 (1.2)	77/66.7 (1.2)	145/124.3 (1.2)	0.88
42 to 53	12	47/56.7 (0.8)	61/65.6 (0.9)	108/122.3 (0.9)	0.77
54 to 59	6	27/28.1 (1.0)	46/32.4 (1.4)	73/60.5 (1.2)	0.59
6 to 59	54	263/283.5 (0.9)	304/283.5 (1.1)		0.87

Overall sex ratio: p-value = 0.085 (boys and girls equally represented)
Overall age distribution: p-value = 0.056 (as expected)

Test if cases are randomly distributed or aggregated over the clusters by calculation of the Index of Dispersion (ID) and comparison with the Poisson distribution for (SMART Plausibility Report):

WHZ < -2: ID=1.35 (p=0.098)
WHZ < -3: ID=1.35 (p=0.098)
Oedema: ID=1.00 (p=0.465)
GAM: ID=1.35 (p=0.099)
SAM: ID=1.36 (p=0.094)

Interpretation of the key quality criteria from the SMART plausibility reports on anthropometric data from Hagadera, Ifo, Dagahaley, and Dagahaley outskirts

ENA for SMART software can analyse the anthropometric data from nutrition surveys and generate a 'Plausibility Report' on indicators of data quality. A 'problematic' score should lead to a careful examination of the anthropometric data but, by itself, does not necessarily mean that the data is of poor quality. A summary of the results from the Plausibility Reports is given below with recommendations for future surveys where appropriate.

- SMART specifies that missing or flagged values should not exceed 5-10%. Missing values and flagged weight-for-height data from all camps and Dagahaley outskirts were minimal, ranging from 1.2-2.1%.
- The sex ratio in all four surveys was in the acceptable range of 0.8-1.2 which suggests that both sexes were equally represented.
- Different age groups should usually be equally represented. The overall age distribution was unbalanced in the three main camps with the older children aged 54-59 months being under-represented. This is most likely due to the imprecision in age estimation because there were limited proofs of age, and caregivers tend to recall best the birth date of smaller children and assume their older children are above five years of age. In the absence of age documentation, additional efforts should be made in future surveys to better estimate the age of the older children using the local event calendar.
- In all surveys, there was less digit preference for weight measurements as compared to height measurements due to the use of the electronic scales. Electronic scales should be used in all future nutrition surveys. Additional efforts should be made in future surveys to limit digit preference for the height measurements.
- The standard deviation (SD) of weight-for-height z-scores should be less than 1.2 according to SMART recommendations. As shown in Tables 230-233 below, in all four surveys, the SD ranged from the lowest of 1.2 in Hagadera to the highest of 1.34 in Ifo when using the WHO Standards 2006 and hence a 'problematic score' was assigned to all four surveys for this quality criteria in the Plausibility Report. The SD ranged from the lowest of 1.01 in Hagadera to the highest of 1.15 in Ifo when using the NCHS 1977 Reference (not analysed in the Plausibility report; shown below). The 'problematic scores' reported here for the SDs can most likely be attributed to the following: 1) the SD tends to be wider when using WHO Standards 2006 as compared to NCHS 1977 Reference; 2) some imprecision in height measurements; 3) the significant heterogeneity within the population surveyed as demonstrated by the high observed design effects (>2).

Table 230 Summary table of mean z-score, design effect, and excluded subjects for the *weight-for-height* index using both reference populations - Hagadera camp (Aug 2011)

Reference population	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
WHO Standards 2006	592	-0.96±1.20	2.03	5	7
NCHS Reference 1977	596	-1.00±1.01	1.71	5	3

*contains for WHZ and WAZ the children with oedema.

Table 231 Summary table of mean z-score, design effect and excluded subjects for the *weight-for-height* index using both reference populations - Ifo camp (Aug 2011)

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
WHO Standards 2006	541	-1.05±1.34	2.25	5	11
NCHS Reference 1977	545	-1.06±1.15	2.30	4	8

* contains for WHZ and WAZ the children with oedema.

Table 232 Summary table of mean z-score, design effect and excluded subjects for the *weight-for-height* index using both reference populations - Dagahaley camp (Sep 2011)

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
WHO Standards 2006	573	-1.25±1.25	2.14	6	12
NCHS Reference 1977	581	-1.24±1.11	3.14	5	5

* contains for WHZ and WAZ the children with oedema.

Table 233 Summary table of mean z-score, design effect and excluded subjects for the *weight-for-height* index using both reference populations - Dagahaley outskirts (Sep 2011)

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
WHO Standards 2006	548	-1.76±1.31	2.26	9	10
NCHS Reference 1977	553	-1.60±1.06	2.44	7	7

* contains for WHZ and WAZ the children with oedema.

Appendix 5 - Assignment of clusters

HAGADERA

Geographical unit	Population size	Cluster
HAG A-3	1176	1
HAG A-7	1065	2
HAG B-1	2096	3
HAG B-4	1067	4
HAG B-8	870	5
HAG C-3	1638	6
HAG C-5	1306	7
HAG D-1	2631	8
HAG D-10	939	9
HAG D-3	1348	10
HAG D-7	1180	11
HAG E-1	2452	12
HAG E-2	1386	13
HAG E-4	1152	14
HAG E-8	774	15
HAG F-1	2061	16
HAG F-3	1626	17
HAG F-5	985	18
HAG F-9	800	19
HAG G-2	1171	20
HAG G-5	838	21
HAG H-1	1313	22
HAG H-4	826	23
HAG I-1	980	24
HAG I-3	795	25
HAG J-1	2736	26
HAG J-10	1446	27
HAG J-4	1168	28
HAG K-10	880	29
HAG K-4	1271	30
HAG K-8	762	31
HAG L-4	905	32
HAG M-2	1242	33
HAG M-5	1060	34
HAG N-6	140	35

Total population used: 122,741

IFO

Geographical unit	Population size	Cluster
IFO A-1	2705	1
IFO A-2	2704	2
IFO A-3	3672	3
IFO A-4	4700	4
IFO A-5	2748	5
IFO A-6	2615	6
IFO B-1	2047	7
IFO B-3	929	8
IFO B-10	321	9
IFO B-15	1093	10
IFO B-18	949	11
IFO B-21	512	12
IFO C-1	2075	13
IFO C-3	1352	14
IFO C-6	696	15
IFO C-9	683	16
IFO C-12	1335	17
IFO C-15	1482	18
IFO C-17	1199	19
IFO C-19	1379	20
IFO C-22	984	21
IFO C-27	746	22
IFO D-2	2233	23
IFO D-3	3506	24
IFO D-4	4464	25,26
IFO D-5	4254	27
IFO D-7	1632	28
IFO F-1	115	29
IFO F-3	2911	30
IFO G-3	491	31
IFO N-3	682	32
IFO N-8	682	33
IFO N-17	569	34
IFO N-27	389	35

Total population used: 115,864

DAGAHALEY

Geographical unit	Population size	Cluster
DAG A-0	1740	1
DAG A-10	1209	2
DAG A-2	1834	3
DAG A-3	3236	4
DAG A-4	1322	5
DAG A-6	2853	6
DAG A-7	1141	7
DAG A-9	1167	8
DAG Ac	882	9
DAG B-1	1758	10
DAG B-2	1583	11
DAG B-4	1342	12
DAG B-6	1201	13
DAG Ba	832	14
DAG Bc	720	15
DAG C-2	1296	16
DAG C-4	1641	17
DAG C-6	1604	18
DAG C-8	999	19
DAG D-10	806	20
DAG D-4	1039	21
DAG D-7	1101	22
DAG Db	1189	23
DAG E-0	1455	24
DAG E-3	1133	25
DAG E-7	1064	26
DAG E-A	1050	27
DAG F-10	906	28
DAG F-4	799	29
DAG F-8	906	30
DAG G-1	748	31
DAG G-4	823	32
DAG G-9	791	33
DAG H-4	510	34
DAG H-8	777	35

Total population used: 99,921

DAGAHALEY OUTSKIRTS

Table: Cluster allocation by PPS

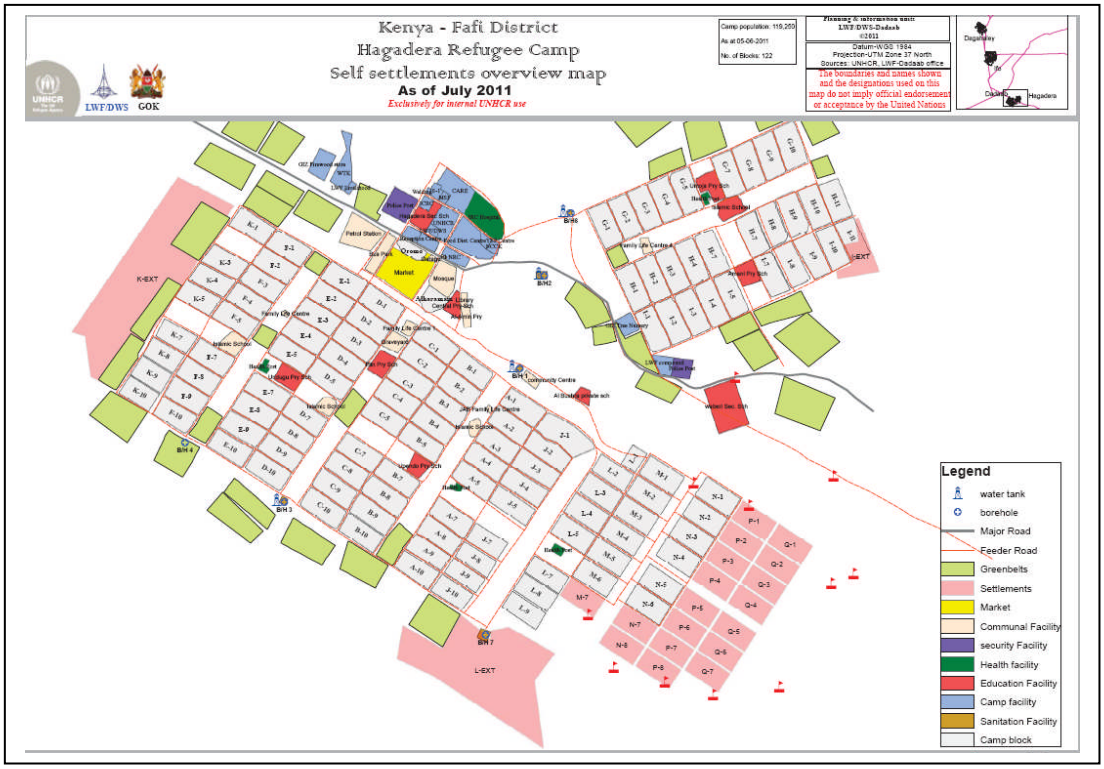
Geographical area	Population Size	Cluster Allocation
Main Outskirts	21,568	1-29
Southern Outskirts (G1-G2 extension)	1,168	30
Total population	**22,736**	

Table: Random Spatial Cluster Start Points

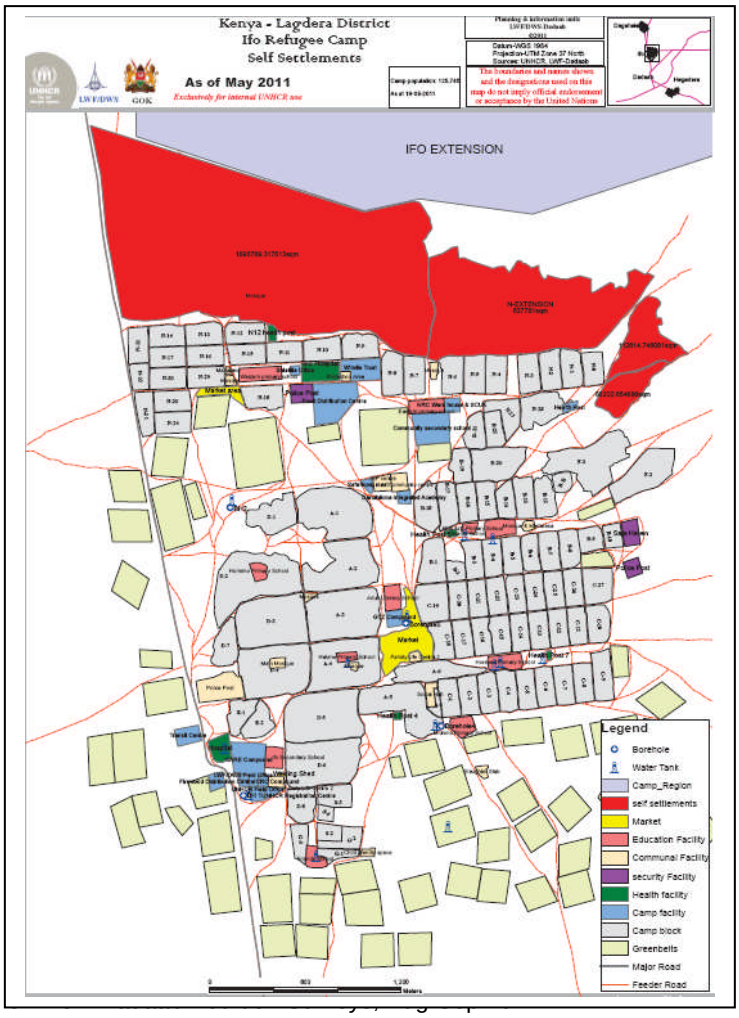
Cluster Number	Latitude	Longitude
001	0.19923	40.26723
002	0.19923	40.26534
003	0.18412	40.27281
004	0.20387	40.27749
005	0.19338	40.27005
006	0.20475	40.27559
007	0.20007	40.27371
008	0.20103	40.28212
009	0.19153	40.27370
010	0.20011	40.27656
011	0.19727	40.27376
012	0.20295	40.27932
013	0.18885	40.27563
014	0.18971	40.27188
015	0.19162	40.27740
016	0.19343	40.27557
017	0.18506	40.27653
018	0.19913	40.27097
019	0.19730	40.27277
020	0.19446	40.26910
021	0.19763	40.26989
022	0.18883	40.27468
023	0.19727	40.27656
024	0.19540	40.27842
025	0.19071	40.27562
026	0.19544	40.27563
027	0.19270	40.29369
028	0.19562	40.29672
029	0.19317	40.29649
030	0.19319	40.29977

Appendix 6 - Maps of Dadaab camps

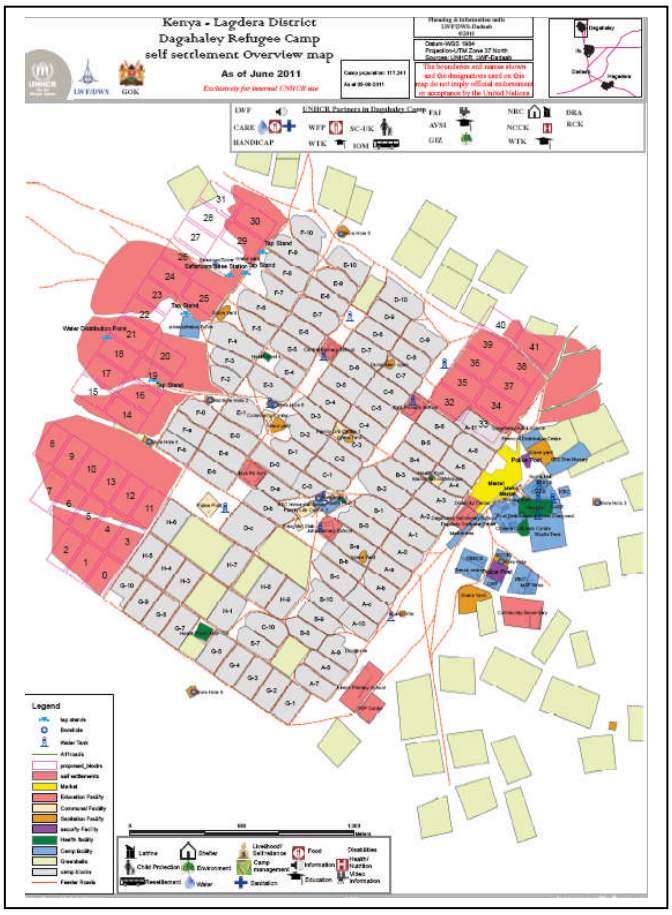
HAGADERA



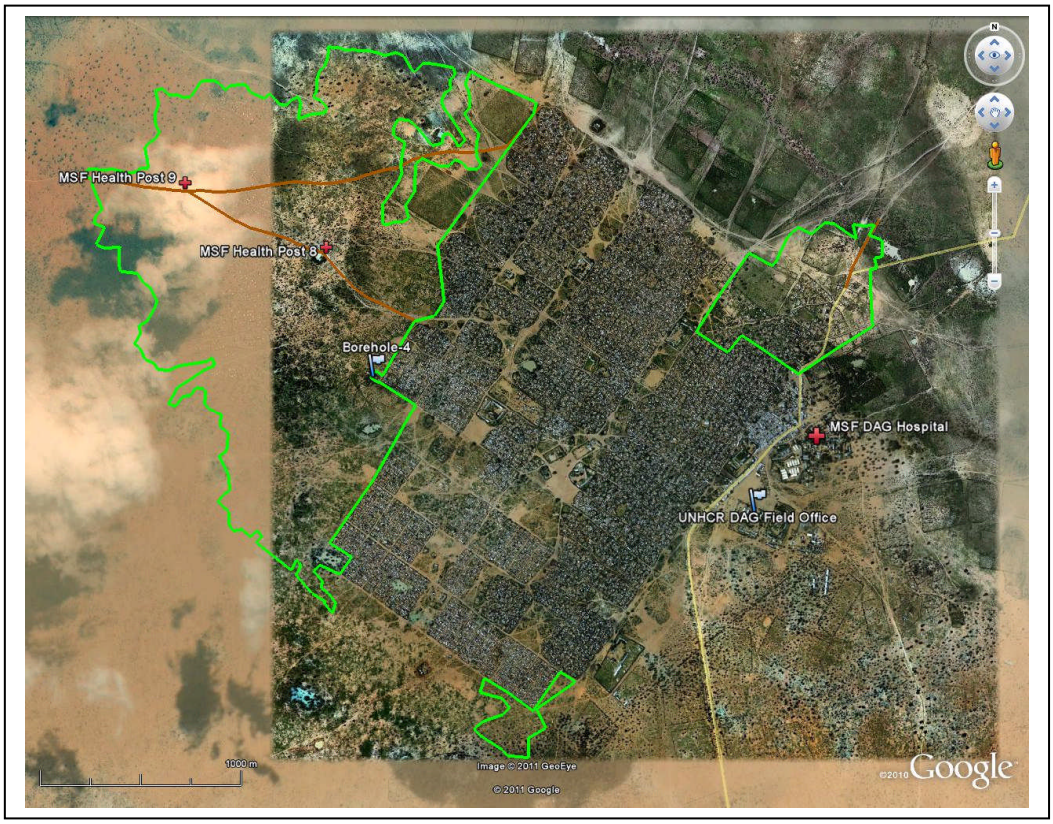
IFO



DAGAHALEY



DAGAHALEY OUTSKIRTS (perimeter of the three outskirt areas shown in green; the areas surveyed were the main outskirt area in the North West and the South Eastern area of G1-G2 extension)



Appendix 7 - Survey questionnaires

Dadaab Nutrition Surveys Questionnaires August/September 2011

Greeting and Reading of Rights

THIS STATEMENT IS TO BE READ TO THE HEAD OF THE HOUSEHOLD OR, IF THEY ARE ABSENT, ANOTHER ADULT MEMBER OF THE HOUSE BEFORE THE INTERVIEW. DEFINE A HOUSEHOLD AS A GROUP OF PEOPLE WHO LIVE TOGETHER AND ROUTINELY EAT OUT OF SAME POT. DEFINE HEAD OF HOUSEHOLD AS MEMBER OF THE FAMILY WHO MANAGES THE FAMILY RESOURCES AND IS THE FINAL DECISION MAKER IN THE HOUSE.

Hello, my name is _____ and I work with *[organisation/institution*]. We would like to invite your household to participate in a survey.

- UNHCR is sponsoring this nutrition survey to find out about the nutrition and health of people in the camp and plan what services are needed.
- Taking part in this survey is totally your choice. You can decide to not participate or stop taking part at any time and for any reason. If you stop being in this survey it will not have any negative effects on how you or your household is treated or what aid you receive.
- If you agree to participate, I will ask you some questions about your family. We will then measure the arm circumference of children who are older than 6 months up to 10 years and the weight and height of children younger than 5 years.
- We will also test a small amount of blood from the finger of the children and women to see if they have anaemia.
- Before we start to ask you any questions or take any measurements, we will ask you to give your consent. Any information that you will provide will be kept strictly confidential.
- You can ask me any questions that you have about this survey before you decide whether to participate. Thank you.

1. Dadaab Nutrition Surveys 2011, <u>Mortality Questionnaire for three main camps and Dagahaley outskirts</u> (One questionnaire / HH)

#	COL1	COL2	COL3	COL4	COL5	COL6
	NAME	SEX M/F	AGE IF **≥5 YRS** **UNIT: YRS**	AGE IF **< 5 YRS** **SPECIFY UNIT: DAYS / MONTHS / YRS**	BORN BETWEEN **END** OF JAMADUL AKHIR (BISHA SHANAAD) AND TODAY **(Y/N)**	JOINED HOUSEHOLD BETWEEN **END** OF JAMADUL AKHIR (BISHA SHANAAD) AND TODAY **(Y/N)**
A.	**LIST ALL MEMBERS WHO ARE CURRENTLY LIVING IN THIS HOUSEHOLD AND EATING FROM THE SAME POT**					
01						
02						
03						
04						
05						
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
B.	**DID ANY MEMBERS OF THE HOUSEHOLD LEAVE BETWEEN END OF JAMADUL AKHIR (BISHA SHANAAD) AND TODAY? IF SO LIST THEM**					
01						
02						
03						
04						
05						
C.	**DID ANY MEMBERS OF THE HOUSEHOLD DIE BETWEEN END OF JAMADUL AKHIR (BISHA SHANAAD) AND TODAY? IF SO LIST THEM**					
01						
02						

MORTALITY SUMMARY (for supervisor only)

		TOTAL	Under 5
1. Members present now	**A.** COL **1**		
2. Joined household between end of Jamadul Akhir (Bisha Shanaad) and today	**A**. COL **6**		
3. Members that left the household between end of Jamadul Akhir (Bisha Shanaad) and today	**B**. COL **1**		
4. Births between end of Jamadul Akhir (Bisha Shanaad) and today	**A, B**. COL **5**		
5. Deaths between end of Jamadul Akhir (Bisha Shanaad) and today	**C**. COL **1**		

NB: Household members are defined as members who are living together *in the camp or the outskirts* and who are eating from the same cooking

2. Dadaab Nutrition Surveys 2011, Food Security Questionnaire for three main camps (One questionnaire / cluster)

	FS1	FS2	FS3	FS4	FS5	FS6	FS7	FS8	FS9	FS10	FS11
HH Number	**Consent** 1=yes 2=no 3= absent	**When did your household arrive in the camps?** IF ANSWER IS 10 GO TO FS5 USE CODES BELOW	**Has your household been processed at a reception centre?** 1 = yes 2 = no 99 = don't know	**Has your household been registered?** 1 = yes 2 = no STOP NOW	**Have any members joined your household between end of Jamadul Akhir (Bisha Shanaad) and today?** 1 = yes 2 = no	**Does your household have a ration card?** 1= yes GO TO FS8 2 = no GO TO FS7	**Why do you not have a ration card?** USE CODES BELOW STOP NOW	**IF FS6 IS YES: How many days did the food from the general ration from the 2nd cycle of August last?** (number of days) IF ANSWER IS > 14 DAYS GO TO FS11	**IF FS7 IS <15 DAYS: What is the *main* reason the general ration did not last until the next distribution?** SELECT *ONE* USE CODES BELOW	**IF FS7 IS <15 DAYS: What was the *most* important thing you did to fill the gap?** SELECT *ONE* USE CODES BELOW	**If food is sold or exchanged, what do you exchange it for?** RECORD *ALL* RESPONSES USE CODES BELOW
01											
02											
03											
04											
05											
06											
07											
08											
09											
10											

CODES:
FS2: 1 = September, 2 = August, 3 = July, 4 = June, 5 = May, 6 = April, 7 = March, 8 = February, 9 = January, 10 = Before January.
FS7: 1=Not given one at registration, 2 = Lost card, 3=traded, 98=Other.
FS9: 1=New arrivals joined, 2=Shared with kin, 3=Ration not big enough, 4=Some sold or exchanged, 5=Gave to livestock, 6=Lost due to theft, 7=Lost due to poor storage, 98=Other.
FS10: 1=Buy, 2=Borrow from neighbours or relatives / credit, 3=Donations from kin, 4=reduce portion size, 5=reduce number of meals per day, 98=Other.
FS11: 1=Food not sold/exchanged, 2=Meat, 3=Sugar, 4=Milk, 5=Rice/pasta/potatoes, 6=Vegetables, 7=Maize meal, 8=Firewood, 9=Shoes /clothing, 10=Scratch cards, 11=School fees, 12=Food for livestock, 13=Bus fare / transport, 98=Other.

2. Dadaab Nutrition Surveys 2011, Food Security Questionnaire for Dagahaley outskirts (One questionnaire/cluster)

	FS1	FS2	FS3	FS4	FS5	FS6	FS7	FS8	FS9
HH No.	**Consent** 1=yes 2=no 3= absent	**When did your household arrive in the camps?** IF ANSWER IS 10 GO TO FS7 USE CODES BELOW	**Has your household been processed at a reception centre?** 1 = yes 2 = no GO TO FS6 99 = don't know GO TO FS6	**Did you receive food for the household from the reception centre on arrival?** 1=yes 2=no GO TO FS6	**How many days did the food from the reception centre last?** (number of days)	**Has your household been registered?** 1 = yes 2 = no **STOP NOW**	**Have any members joined your household between end of Jamadul Akhir (Bisha Shanaad) and today?** 1 = yes 2 = no	**Does your household have a ration card?** 1= yes GO TO FS10 2 = no	**Why do you not have a ration card?** USE CODES BELOW **STOP NOW**
01									
02									
03									
04									
05									
06									
07									
08									
09									
10									

CODES:
FS2: 1=September, 2=August, 3=July, 4=June, 5=May, 6=April, 7=March, 8=February, 9=January, 10=Before January.
FS9: 1=Not given one at registration, 2 = Lost card, 3=traded, 98=Other.

	FS10	FS11	FS12	FS13	
HH No.	**How many days did the food from the general ration from the 2nd cycle of August last?** (number of days) IF ANSWER IS > 14 DAYS GO TO FS13 IF NOT IN MANIFEST OR ARRIVED MID CYCLE, STOP NOW	**IF FS10 IS <15 DAYS: What is the *main* reason the general ration did not last until the next distribution?** SELECT *ONE* USE CODES BELOW	**IF FS10 IS <15 DAYS: What was the *most* important thing you did to fill the gap?** SELECT *ONE* USE CODES BELOW	**If food is sold or exchanged, what do you exchange it for?** RECORD *ALL* RESPONSES USE CODES BELOW	
01					
02					
03					
04					
05					
06					
07					
08					
09					
10					

CODES:
FS11: 1=New arrivals joined, 2=Shared with kin, 3=Ration not big enough, 4=Some sold or exchanged, 5=Gave to livestock, 6=Lost due to theft, 7=Lost due to poor storage, 98=Other.
FS12: 1=Buy, 2=Borrowed from neighbours or relatives / credit, 3=Donations received from kin, 4=Reduced portion size, 5=Reduced number of meals per day, 98=Other.
FS13: 1=Food not sold/exchanged, 2=Meat, 3=Sugar, 4=Milk, 5=Rice/pasta/potatoes, 6=Vegetables, 7=Maize meal, 8=Firewood, 9=Shoes /clothing, 10=Scratch cards, 11=School fees, 12=Food for livestock, 13=Bus fare / transport, 98=Other.

3. Dadaab Nutrition Surveys 2011, <u>WASH Questionnaire for three main camps and Dagahaley outskirts</u> (One questionnaire / HH)

N°	QUESTION	ANSWER	
1.	Consent	Yes……..1 No……..2 Absent……...3	|_____|
2.	How many people live in this household?		|___|___|
3.	When did your household arrive in the camps?	September……..1 August……2 July……..……..…3 June……..……4 May……5 April……..6 March……..…7 February……..8 January ……..9 Before January……..……10	|___| **<u>IF ANSWER IS 10 GO TO Q. 6</u>**
4.	Has your household been processed at a reception centre?	Yes .....1 No .....2 Don't know……99	|___||___|
5.	Has your household been registered?	Yes .....1 No 2	|___|
6.	Have any members joined your household between end of Jamadul Akhir (Bisha Shanaad) and today?	Yes .....1 No 2	|___|
7.	Does your household have water containers to collect water?	Yes .....1 No 2	|___| **<u>IF ANSWER IS 1 GO TO Q. 9</u>**
8.	Why do you not have water containers to collect water? DO NOT READ THE ANSWERS TO THE PARTICIPANT. SELECT ONE ONLY.	Did not go to reception / registration yet……1 Did not receive during reception……..2 Did not receive after registration..……3 Sold/exchange containers……..4 No money to buy containers……..…5 Other……..98	|___||___| **<u>GO TO Q. 13</u>**
9.	What is the main source of drinking water for members of your household? DO NOT READ THE ANSWERS TO THE PARTICIPANT. SELECT ONE ONLY.	Public tap/standpipe .....1 UNHCR Tanker .....2 Small water vendor.....3 Surface water (e.g. river, pond) .....4 Other.....98 Don't know.....99	|___|___|
10.	When was the last time you collected water for the household (excluding today)? DO NOT READ THE ANSWERS TO THE PARTICIPANTS. SELECT ONE ONLY.	Yesterday……1 2 days ago……..2 3 days ago……..3 4 days ago……4 More than 4 days ago……..5	|___|
11.	The last time you collected water (excluding today), how long did it take you to go to your main water source, get water, and come back? THIS RELATES TO DRINKING WATER AND ONE TRIP ONLY. SELECT ONE ONLY.	RECORD THE NUMBER OF MINUTES IF KNOWN (RECORD 99 I F UNKNOWN)	|___|___|___| Minutes
		On premises .....1 Less than 30 minutes .....2 More than 30 minutes.....3 Don't know.....99	|___|___|
12.	Are you satisfied with the drinking water supply? THIS RELATES ONLY TO THE DRINKING WATER SUPPLY.	Yes ..... ….1 No ..... ….2 Other……..98	|___||___|
	What kind of toilet facility does this household use? DO NOT READ THE ANSWERS TO THE PARTICIPANT. SELECT ONE ONLY.	Pour-flush to pit .....1 Simple pit latrine with floor/slab .....2 Pit latrine without floor/slab.....3 No facility, field, bush, plastic bag 4	|___|___| **<u>IF ANSWER IS 4 GO TO Q. 15</u>**

13.	How many ***households*** share this toilet? SELECT ONE ONLY.	RECORD NUMBER OF HOUSEHOLDS IF KNOWN (RECORD 99 IF UNKNOWN) Not shared (**1 HH**) .....1 Shared family (**2 HH**) .....2 Communal toilet (**3 HH or more**).....3 Public toilet (**in market or clinic etc**.) .....4 Don't know.....99	|____|____| Households |____|____|
14.	Do you have children under three years old?	Yes .....1 No 2	|____| **IF ANSWER IS 2 GO TO Q. 17**
15.	The last time [NAME OF YOUNGEST CHILD] passed stools, what was done to dispose of the stools? DO NOT READ THE ANSWERS TO THE PARTICIPANTS. SELECT ONE ONLY.	Child used toilet/latrine .....1 Put/rinsed into toilet or latrine .....2 Buried .....3 Thrown into garbage.....4 Put/rinsed into drain or ditch.....5 Left in the open or thrown into bush .....6 Other.....98 Don't know 99	|____|____|
16.	FOR REGISTERED HH's ONLY (REFER TO Q.5): Did you receive soap within the last two distribution cycles? FOR NON-REGISTERED HH ONLY (REFER TO Q.5): Did you receive soap during reception?	Yes .....1 No 2	|____|

Observation Based Questions

N°	**OBSERVATION / QUESTION**				
17.	CALCULATE THE TOTAL AMOUNT OF WATER COLLECTED BY THE HOUSEHOLD PER DAY. THIS RELATES TO ALL SOURCES OF WATER (DRINKING WATER AND NON-DRINKING WATER) DO NOT COLLECT THIS FOR HH WITH NO WATER CONTAINERS (REFER TO Q. 7)	Please show me the containers you used the last time you collected water for the household? GIVE EACH CONTAINER A NUMBER BELOW	CAPACITY (IN LITRES)	Number of journeys made with each container during the day you last collected water?	**Total litres (supervisor only)**
	Totals (supervisor only)				
18.	Please show me where you store your drinking water. ARE THE DRINKING WATER CONTAINERS COVERED OR NARROW NECKED? DO NOT COLLECT THIS FOR HH WITH NO WATER CONTAINERS (REFER TO Q. 7)	All are……1 Some are……..2 None are……..3		|____|	
19.	Please show me the toilet facility that is usually used by family members. (CONFIRM ANSWER TO Q. 13 ABOVE) **ONLY ANSWER THIS FOR TOILETS USED BY 1 OR 2 HH (Q. 14). IF TOILETS USED BY 3 OR MORE HH LEAVE BLANK.**	Toilet in use……..1 Toilet not in use……..2 Not observed…… 3		|____|	

4. Dadaab Nutrition Surveys 2011, Questionnaire for Women Aged 15-49 years for three main camps (Dagahaley outskirts questionnaire did not include Hb measurements)

		W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11
Woman No.	**HH No.**	**Consent** 1=yes 2=no 3=absent	**Age** (years)	**When did you arrive in the camps?** IF ANSWER IS 10 GO TO W5 USE CODES BELOW	**Region of origin** USE CODES BELOW	**Ethnic group** 1=Somali 2=Somali Bantu 98=Other	**Did you deliver a baby in the last 6 months?** 1=yes alive 2=yes dead GO TO W9 3=no GO TO W9	**Did you receive vitamin A supplementation since delivery? (SHOW CAPSULE)** 1=yes card 2=yes recall 3=no or don't know	**Are you breast-feeding?** 1 = yes 2 = no	**Are you pregnant?** 1 = yes 2 = no GO TO W12 99=don't know GO TO W12	**Are you currently enrolled in the ANC programme?** 1=yes card 2=yes recall 3=no or don't know (ADVISE)	**Are you currently receiving iron-folate pills? (SHOW PILL)** 1=yes 2=no (ADVISE) 99=don't know (ADVISE)
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												

CODES: W3: 1 = September, 2 = August, 3 = July, 4 = June, 5 = May, 6 = April, 7 = March, 8 = February, 9 = January, 10 = Before January or born in camp.
W4: 1 = Lower Juba, 2 = Middle Juba, 3 = Gedo, 4 = Bay, 5 = Bakool, 6 = Lower Shabelle, 7 = Middle Shabelle, 8 = Hiraan, 9 = Mogadishu / Banadir, 98= Other.

		W12	W13	W14	W15
Woman No.	**HH No.**	**MUAC** (mm)	**Woman referred for malnutrition** 1=yes 2=no **IF PREGNANT STOP NOW (SEE W9)**	**Hb** (g/dL)	**Woman referred for severe anaemia** 1=yes 2=no
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

W13: REFER TO HOSPITAL IF MUAC < 160 mm.
W15: REFER TO HOSPITAL IF Hb < 6.0 g/dL.

5. Dadaab Nutrition Surveys 2011, Questionnaire for <u>Children Aged 6-59 months for three main camps (Dagahaley outskirts questionnaire did not include Hb measurements)</u>

		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
Child No.	**HH No.**	**Consent** 1=yes 2=no 3=absent	**Sex** (m/f)	**Birthdate** (dd/mm/yyyy)	**Age** (months)	**Weight** (kg) ±100g	**Height** (cm) ±0.1cm	**Oedema** (y/n)	**MUAC** (cm)	**Weight taken with clothes** (y/n)	**IS CHILD ENROLED IN NUTRITION PROGRAMME?** 1 = OTP 2 = SFP 3 = Referred 4 = Not needed
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											

IF NO VALID AGE DOCUMENTATION IS AVAILABLE: DO NOT FILL IN C3 AND ESTIMATE AGE USING LOVAL EVENTS CALENDAR.
C7 and C8: REFER TO HEALTH POST FOR MALNUTRITION IF NOT ALREADY ENROLED IN SFP /OTP: REFER IF OEDEMA OR IF MUAC<12.5 cm

		C11	C12	C13	C14	C15	C16	C17	C18	C19	C20	C21	C22
Child No.	**HH No.**	**When did [name] arrive in the camps?** IF ANSWER IS 10 GO TO C13 USE CODES BELOW	**Region of origin** USE CODES BELOW	**Ethnic group** 1=Somali 2=Somali Bantu 98=Other	**Measles Vaccination** 1=yes with card 2=yes recall 3=No with card 4=No recall or don't know	**PENTA1 or PENTA2 or PENTA3 with card only** 1=1 dose 2=2 doses 3=3 doses 4=No PENTA or no card	**Vit. A in past 6 months** (SHOW CAPSULE) 1=Yes card 2=Yes recall 3=No or don't know	**Dewormed in past 6 months** (SHOW PILL) 1=Yes card 2=Yes recall 3=No or don't know	**Diarrhoea in last 2 weeks** 1 = yes 2 = no GO TO C20 99 = don't know GO TO C20	**When [name] had diarrhoea did you feed [name]:** 1=less 2=the same 3=more 4=no food	**Hb** (g/dL)	**Child referred for severe anaemia** 1=yes 2=no	**IS THIS CHILD AGED 6-23 MONTHS?** 1=yes 2=no STOP NOW
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													

CODES: C11: 1 = September, 2 = August, 3 = July, 4 = June, 5 = May, 6 = April, 7 = March, 8 = February, 9 = January, 10 = Before January or born in camp.
C12: 1 = Lower Juba, 2 = Middle Juba, 3 = Gedo, 4 = Bay, 5 = Bakool, 6 = Lower Shabelle, 7 = Middle Shabelle, 8 = Hiraan, 9 = Mogadishu / Banadir, 98= Other
REFERAL TO HEALTH POST FOR SEVERE ANAEMIA - C20: REFER IF Hb < 7.0 g/dL

		C23	C24	C25	C26	C27	C28	C29	C30	C31	C32	C33	C34	C35	C36	C37	C38
Child No.	**HH No.**	**Did you ever breastfeed [name]?** 1 = yes 2 = no GO TO C26 99 = don't know GO TO C26	**How long after birth did you first put (name) to the breast?** 1= less than 1 hr 2 = >1hr - <24 hrs 3 = ≥24 hrs 99 = don't know	**Was [name] breastfed yesterday during the day or at night?** 1 = yes 2 = no 99 = don't know	Now I will ask you about what [name] drank or ate during the day or at night. Yesterday during the day or at night, did [name] receive (INSERT ITEM HERE)? 1= yes, 2 = no, 99 = don't know												**Did [name] drink anything from a bottle with a nipple yesterday during the day or night?** 1 = yes 2 = no 99 = don't know
					Plain water	Sugar water	Fresh fruit juice	Sweetened flavoured juices (Zeitun, Altuza, Mushakil, vimto, soda, afya)	Tea or coffee white or black	Infant formula: for example Mamex, Sahar, Nan, S26	Fresh animal milk or any tinned or powdered milk.	Porridge made from CSB	Porridge not made from CSB	Medicines: for example ORS, gripe water	Nutributter (SHOW SACHET)	Foods other than liquids (semi-solid and solid foods,)	
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	

C37: For example: pasta, rice, anjera, ugali, potatoes, maize, beans, mango, banana, other fruits and vegetables, meat.

		C39	C40	C41	C42	C43	
Child No.	**HH No.**	**Is [name] currently <u>receiving</u> Nutributter (*SHOW SACHET*)?** 1=yes 2=no <u>GO TO C42</u> 99=don't know <u>GO TO C42</u>	**How many sachets did you collect the last time you went to collect Nutributter?** (number of sachets)	**Is Nutributter eaten by others in the family?** 1=yes 2=no	**IS THIS CHILD AGED 6-12 MONTHS?** 1=yes 2=no STOP NOW	**Do you currently have a fresh food voucher?** 1=yes 2=no 99=don't know (ADVISE)	
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							

6. Dadaab Nutrition Surveys 2011, Questionnaire for Children Aged 5-9 years for three main camps and Dagahaley outskirts

		OC1	OC2	OC3	OC4	OC5	OC6	OC7	OC8	OC9	OC10	
Child No.	**HH No.**	**Consent** 1=yes 2=no 3=absent	**Age** (years)	**Is the child less than 140 cm?** 1=yes 2=no	**Sex** 1=male 2=female	**When did [name] arrive in the camps?** IF ANSWER IS 10 GO TO OC7 USE CODES BELOW	**Region of origin** USE CODES BELOW	**Ethnic group** 1=Somali 2=Somali Bantu 98=Other	**MUAC** (cm)	**Oedema** 1=yes 2=no	**Referred for screening at health post** 1=yes 2=no	
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												

CODES:
OC5: 1 = September, 2 = August, 3 = July, 4 = June, 5 = May, 6 = April, 7 = March, 8 = February, 9 = January, 10 = Before January or born in camp.
OC6: 1 = Lower Juba, 2 = Middle Juba, 3 = Gedo, 4 = Bay, 5 = Bakool, 6 = Lower Shabelle, 7 = Middle Shabelle, 8 = Hiraan, 9 = Mogadishu / Banadir, 98= Other
OC8 and OC9: REFER FOR SCREENING AT HEALTH POST IF MUAC < 14.0 cm OR OEDEMA

7. Dadaab Nutrition Surveys 2011, Questionnaire for Infants Aged 0-5 months for three main camps and Dagahaley outskirts

		IN1	IN2	IN3	IN4	IN5	IN6	IN7	IN8	IN9	IN10
Child No.	**HH No.**	**Consent** 1=yes 2=no 3=absent	**Birthdate** (dd/mm/yyyy)	**Age** (months)	**Sex** 1=male 2=female	**When did [name] arrive in the camps?** IF ANSWER IS 8 GO TO IN7 USE CODES BELOW	**Region of origin** USE CODES BELOW	**Ethnic group** 1=Somali 2=Somali Bantu 98=Other	**Did you ever breastfeed [name]?** 1=yes 2=no GO TO IN11 99= don't know GO TO IN11	**How long after birth did you first put [name] to the breast?** 1 = within 1 hr 2 = >1hr-<24 hrs 3 = ≥24 hrs 99 = don't know	**Was [name] breastfed yesterday during the day or at night?** 1 = yes 2 = no 99 = don't know
1											
2											
3											

		IN11	IN12	IN13	IN14	IN15	IN16	IN17	IN18	IN19	IN20	IN21	IN22	IN23	IN24	IN25
Child No.	**HH No.**	Now I will ask you about what [name] drank or eat during the day and the night. Yesterday, during the day and night, has [name] received (INSERT ITEM HERE)? 1= yes, 2 = no, 99 = don't know												**Did [name] drink anything from a bottle with a nipple yesterday during the day or night?** 1 = yes 2 = no 99 = don't know	**Diarrhoea in last 2 weeks** 1 = yes 2 = no STOP NOW 99 = don't know STOP NOW	**When [name] had diarrhoea did you feed [name]:** 1=less 2= the same 3=more 4=no food
		Plain water	Sugar water	Fresh fruit juice	Sweetened flavoured juices (Zeitun, Altuza, Mushakil, vimto, soda, afya)	Tea or coffee white or black	Infant formula: for example Mamex, Sahar, Nan, S26	Fresh animal milk or any tinned or powdered milk.	Porridge made from CSB	Porridge not made from CSB	Medicines: for example ORS, gripe water	Nutributter (SHOW SACHET)	Foods other than liquids (semi-solid and solid foods,)			
1																
2																
3																

CODES:
IN5: 1 = September, 2 = August, 3 = July, 4 = June, 5 = May, 6 = April, 7 = March, 8=Born in the camp **IN6**: 1 = Lower Juba, 2 = Middle Juba, 3 = Gedo, 4 = Bay, 5 = Bakool, 6 = Lower Shabelle, 7 = Middle Shabelle, 8 = Hiraan, 9 = Mogadishu / Banadir, 98= Other; **IN22**: For example: pasta, rice, anjera, ugali, potatoes, maize, beans, mango, banana, other fruits and vegetables, meat.

Appendix 8 - Event calendar for Dadaab nutrition surveys 2011

CALENDAR FOR CHILDREN 0-59 MONTHS OF AGE

Seasons	Religious Holidays	Local Event (in camp of surrounding villages)	Arabic Calendar	Somali Calendar	Month / year	Age (m)	Height Range
Mid of Xagaa	Ramadan	Strike (MSF staff)	Bisha Sideedaad	Soon / Ramadhan	August 2011	0	
Beginning of Xagaa		Fight between police and Dagahaley camp	Bisha Todobaad	Shaba'an	July 2011	1	
End of Gu'		Refugee Day / Reception centre opened / Moon eclipse	Bisha Luuly	Rajab	June 2011	2	-
Mid of Gu'			Bisha Shanaad	Jamadul akhir	May 2011	3	
Beginning of Gu'			Abriil	Jamadul awal	April 2011	4	
End of Jiilal		Health post 8 opened in outskirts (cluster 2)	Maarso	Malmadone	March 2011	5	
Mid of Jiilal			Febrayo	Mowlid	February 2011	6	65-70 cm
Beginning of Jililal			Janaayo	Safar	January 2011	7	
End of Deyr			Bisha diseenbar	Zako	December 2010	8	
Mid of Deyr			Bisha kow iyo Tobnad	Arafa	November 2010	9	71-76 cm
Beginning of Deyr			Bisha Tob	Sigalal	October 2010	10	
End of Xagaa	End amadan (09/09/2010)		Bisha Sagaalad	Soon fur	September 2010	11	
Mid of Xagaa	Beginning Ramadan		Bisha Sideedaad	Soon /Ramadhan	August 2010	12	
Beginning of Xagaa		Sudan Somali flight	Bisha Todobaad	Shaba'an	July 2010	13	
End of Gu'		Refugee Day	Bisha Luuly	Rajab	June 2010	14	
Mid of Gu'			Bisha Shanaad	Jamadul akhir	May 2010	15	
Beginning ogf Gu'		Conflict between polic and Dagahaley	Abriil	Jamadul awal	April 2010	16	77-80 cm
End of Jiilal			Maarso	Malmadone	March 2010	17	
Mid of Jiilal		IRC strike. Qarax Madoio	Febrayo	Mowlid	February 2010	18	
Beginning of Jililal		Banamnar Shakhoolo IRC/GTZ	Janaayo	Safar	January 2010	19	
End of Deyr			Bisha diseenbar	Zako	December 2009	20	
Mid of Deyr			Bisha kow iyo Tobnad	Arafa	November 2009	21	
Beginning of Deyr		Mental health day	Bisha Tob	Sigalal	October 2009	22	
End of Xagaa	End Ramadan	Ciidul fidri. Ciid alfidri Dagahaley health post 6 burnt down	Bisha Sagaalad	Soon fur	September 2009	23	81-86 cm
Mid of Xagaa	Beginning Ramadan	MSF begin operations in Dagahaley	Bisha Sideedaad	Soon /Ramadhan	August 2009	24	
Beginning of Xagaa			Bisha Todobaad	Shaba'an	July 2009	25	
End of Gu'		Refugee day	Bisha Luuly	Rajab	June 2009	26	
Mid of Gu'		Tirakobka Hagadera	Bisha Shanaad	Jamadul akhir	May 2009	27	
Beginning ogf Gu'		Madobadki Bisha moon eclipse	Abriil	Jamadul awal	April 2009	28	
End of Jiilal			Maarso	Malmadone	March 2009	29	
Mid of Jiilal			Febrayo	Mowlid	February 2009	30	
Beginning of Jililal		IRC arrival	Janaayo	Safar	January 2009	31	
End of Deyr		MSF arrival	Bisha diseenbar	Zako	December 2008	32	87-90 cm
Mid of Deyr		Dorasho Election gudamiyal	Bisha kow iyo Tobnad	Arafa	November 2008	33	
Beginning of Deyr			Bisha Tob	Sigalal	October 2008	34	
End of Xagaa	End Ramadan (30/09/08)	Daadki Biyana Floods	Bisha Sagaalad	Soon fur	September 2008	35	
Mid of Xagaa	Beginning Ramadan		Bisha Sideedaad	Soon /Ramadhan	August 2008	36	
Beginning of Xagaa			Bisha Todobaad	Shaba'an	July 2008	37	
End of Gu'		Refugee day	Bisha Luuly	Rajab	June 2008	38	
Mid of Gu'			Bisha Shanaad	Jamadul akhir	May 2008	39	
Beginning ogf Gu'			Abriil	Jamadul awal	April 2008	40	
End of Jiilal		Dabki Firebann block 131	Maarso	Malmadone	March 2008	41	
Mid of Jiilal			Febrayo	Mowlid	February 2008	42	
Beginning of Jililal			Janaayo	Safar	January 2008	43	
End of Deyr		Kenya Dorasho	Bisha diseenbar	Zako	December 2007	44	91-99 cm
Mid of Deyr			Bisha kow iyo Tobnad	Arafa	November 2007	45	
Beginning of Deyr	End Ramadan		Bisha Tob	Sigalal	October 2007	46	
End of Xagaa	Beginning Ramadan (12/09/07)		Bisha Sagaalad	Soon fur	September 2007	47	
Mid of Xagaa			Bisha Sideedaad	Soon /Ramadhan	August 2007	48	
Beginning of Xagaa			Bisha Todobaad	Shaba'an	July 2007	49	
End of Gu'		Refugee day. IFO market burnt	Bisha Luuly	Rajab	June 2007	50	
Mid of Gu'			Bisha Shanaad	Jamadul akhir	May 2007	51	
Beginning ogf Gu'			Abriil	Jamadul awal	April 2007	52	
End of Jiilal			Maarso	Malmadone	March 2007	53	
Mid of Jiilal			Febrayo	Mowlid	February 2007	54	
Beginning of Jililal		Elnino – IFO II relocation	Janaayo	Safar	January 2007	55	
End of Deyr		Lid w eeyne	Bisha diseenbar	Zako	December 2006	56	100-110 cm
Mid of Deyr			Bisha kow iyo Tobnad	Arafa	November 2006	57	
Beginning of Deyr	End Ramadan (23/10/06)		Bisha Tob	Sigalal	October 2006	58	
End of Xagaa	Beginning Ramadan (24/09/06)	Ramadhan soon	Bisha Sagaalad	Soon fur	September 2006	59	
Mid of Xagaa		Guild Alfidir	Bisha Sideedaad	Soon /Ramadhan	August 2006	60	

CALENDAR FOR CHILDREN 5-9 YEARS

This calendar is used to help determine the child's age when looking at the birth date from an official record to assess whether the child is eligible for the survey.

			Years					
Years	**Somali Calendar**	**Arabic calendar**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
January	Safar	Janaayo		9	8	7	6	5
February	Mowlid	Febrayo		9	8	7	6	5
March	Malmadone	Maarso		9	8	7	6	5
April	Jamadul awal	Abriil		9	8	7	6	5
May	Jamadul akhir	Bisha Shanaad		9	8	7	6	5
June	Rajab	Bisha Luuly		9	8	7	6	5
July	Shaba'an	Bisha Todobaad		9	8	7	6	5
August	Soon / Ramadan	Bisha Sideedaad		9	8	7	6	5
September	Soon fur	Bisha Sagaalad	9	8	7	6	5	
October	Sigalal	Bisha Tob	9	8	7	6	5	
November	Arafa	Bisha kow iyo Tobnad	9	8	7	6	5	
December	Zako	Bisha diseenbar	9	8	7	6	5	