

SENS NUTRITION SURVEY REPORT

KAKUMA REFUGEE CAMP

Survey conducted: 15th – 21st November 2012

Report finalised: 13.02.2013



UNHCR / IRC

IN COLLABORATION WITH

UCL



**Note that this report has been modified from its original version to be used as a SENS tool.
SENS Version 1 was used in this survey and hence there are differences
with SENS Version 2.**

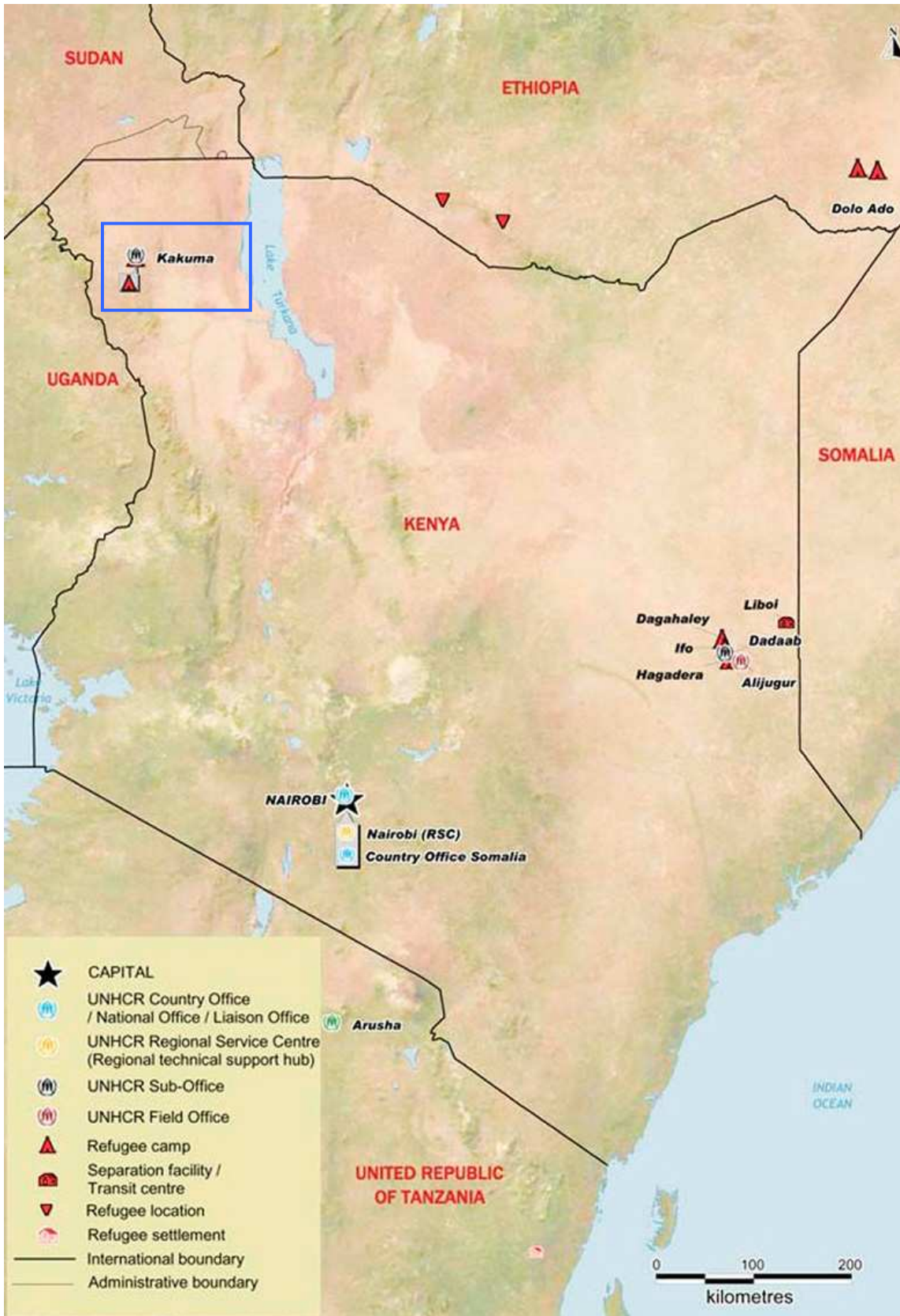


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ACRONYMS AND ABBREVIATIONS

ANC	Ante Natal Clinic
BSFP	Blanket Supplementary Feeding Programme
CDR	Crude Death Rate
CI	Confidence Interval
CHP	Community Health Promoter
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
GAM	Global Acute Malnutrition
GFD	General Food Distribution
GFR	General Food Ration
GIZ	German Development Cooperation
GoK	Government of Kenya
HAZ	Height-for-Age z-score
Hb	Haemoglobin
HH	Household
HIS	Health Information System
IPs	Implementing Partners
IYCF	Infant and Young Child Feeding
IRC	International Rescue Committee
IRS	Indoor Residual Spraying
KAP	Knowledge Attitude and Practice
LLIN	Long-lasting insecticidal net
Lpppd	Litres per Person per Day
MAM	Moderate Acute Malnutrition
MCH	Maternal and Child Health
MOH	Ministry of Health
MUAC	Middle Upper Arm Circumference
NCHS	National Centre for Health Statistics
OTP	Out-patient Therapeutic Programme
PDM	Post Distribution Monitoring
PLWHA	Persons Living with HIV/AIDS
PPS	Probability Proportional to Size
ProGres	Registration database for refugee population data
SAM	Severe Acute Malnutrition
SC	Stabilization Centre
SD	Standard Deviation
SFP	Supplementary Feeding Programme
SMART	Standardised Monitoring and Assessment of Relief and Transitions
TFP	Therapeutic Feeding Programme
U5	Children under 5 years old
U5CDR	Under-5 Crude Death Rate
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
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

EXECUTIVE SUMMARY

INTRODUCTION:

Kakuma refugee camp is located in the Turkana district in the north western region of Kenya. The camp was established in 1992 to cater for the influx of Sudanese refugees fleeing conflict in their country. Kakuma lies in a semi-arid area, and has been identified by the World Food Programme (WFP) / UNICEF/ Government of Kenya (GoK) as adversely affected by protracted drought issues. The camp has grown considerably since 1992, and at the time of the survey, the camp was hosting 104,218 refugees, originating from 13 countries, of which 16% were estimated to be under-5. Where previously the Sudanese made up the majority of the population, the main country of origin is now Somalia, followed by South Sudan, with smaller numbers from Ethiopia, Sudan, Burundi, Uganda, and others. Throughout 2012, Kakuma has experienced a large number of new arrivals, both fleeing conflict from nearby countries and re-located from Dadaab camp, resulting in a 20% population increase.

This report summarises the results of a nutrition survey conducted from 15th – 21st November 2012, coordinated by UNHCR and UCL in collaboration with IRC. The overall aim of this survey was to assess the prevalence of malnutrition and to monitor selected indicators of programme performance. Objectives of the survey were as follows:

Primary Objectives:

1. To determine the prevalence of acute malnutrition amongst children aged 6-59 months;
2. To determine the prevalence of stunting among children aged 6-59 months;
3. To assess the prevalence of anaemia among children aged 6-59 months and non-pregnant women of reproductive age (15-49 years);
4. To assess the two week period prevalence of diarrhoea among children 6-59 months;
5. To estimate the coverage of blanket supplementary feeding programmes (BSFP) for children aged 6-23 months;
6. To assess the coverage of vitamin A supplementation in the last 6 months in children aged 6-59 months;
7. To determine the coverage of measles vaccination in children 9-59 months;
8. To assess the nutritional status of pregnant and lactating women using MUAC;
9. To establish IYCF practices among infants and young children aged 0 to 23 months;
10. To determine the ownership of mosquito nets (all types and Long-lasting insecticidal (LLINs)) in households;
11. To determine the utilization of mosquito nets (all types and LLINs) by the total population, children 0-59 months, and pregnant women;
12. To determine the population's access to, and use of improved water, sanitation and hygiene facilities;
13. To investigate household food security and household dietary diversity;
14. To identify priority areas in programme implementation and propose informed recommendations for future programming.

Secondary Objectives:

1. To assess the coverage of targeted supplementary feeding programmes (TSFP) and therapeutic feeding programmes (TFP) for children aged 6-59 months.
2. To assess the coverage of iron-folic acid supplementation in pregnant women.

METHODOLOGY:

A two-stage cluster survey was conducted using the Standardized Monitoring and Assessment of Relief and Transitions (SMART) methodology to collect and analyse data on child anthropometry. Information on other indicators was collected and analysed using UNHCR's Standardised Expanded Nutrition Survey (SENS) Guidelines for Refugee Populations (Version 1.3, March 2012) (see www.sens.unhcr.org).

The sample size was calculated using an expected prevalence of global acute malnutrition (GAM) of 10% in children 6-59 months of age with a desired precision of +/- 3.5, a design effect (DEFF) of 1.5 (low heterogeneity in acute malnutrition was assumed), and an average household size of 6. Three module specific questionnaires were designed to collect information on the different population target groups, namely children 6-59 months, infants 0-5 months, women of reproductive age 15-49 years; and 3 questionnaires were used to collect household information on food security, WASH, and mosquito net ownership (see **Appendix 5** for all questionnaires). Peripheral blood was obtained in all sampled children, and half of women surveyed, and tested for haemoglobin using a portable HemoCue 301 analyser. The survey used Android mobile phones and Open Data Kit (ODK) software for data collection and entry, replacing paper questionnaires. A total of six teams collected data during the survey, each comprising of 6 members.

SUMMARY OF RESULTS

	Number / total	% (95% CI)	Classification of public health significance or target (where applicable)
CHILDREN 6-59 months			
Acute Malnutrition (WHO 2006 Growth Standards)			
Global Acute Malnutrition (GAM)	27/521	5.2 (3.6-7.4)	Critical if ≥ 15%
Moderate Acute Malnutrition (MAM)	25/521	4.8 (3.2-7.0)	
Severe Acute Malnutrition (SAM)	2/521	0.4 (0.1-1.5)	
Oedema		0	
Mid Upper Arm Circumference (MUAC)			
MUAC <125mm and/or oedema	13/529	2.5 (1.4-4.2)	
MUAC 11.5-12.4 cm	11/529	2.1 (1.1-3.9)	
MUAC <11.5 cm and/or oedema	2/529	0.4 (0.1-1.5)	
Stunting (WHO 2006 Growth Standards)			
Total Stunting	126/501	25.1 (19.9-31.2)	Critical if ≥ 40%
Severe Stunting	37/501	7.4 (5.1-10.6)	
Programme coverage			
Measles vaccination recorded from card or recall (9-59 months)	465/484	96.1 (92.7-99.5)	
Vitamin A supplementation in last 6 months with card or recall	466/518	90.0 (83.0-96.9)	
Diarrhoea			
Diarrhoea in last 2 weeks	28/515	5.4 (3.0-7.8)	
Anaemia			
Total Anaemia (Hb <11 g/dl)	182/529	34.4 (29.0-39.8)	High if ≥ 40%
Mild (Hb 10-10.9)	99/529	18.7 (15.1-22.4)	
Moderate (Hb 7-9.9)	82/529	15.5 (11.7-19.3)	

	Number / total		
Severe (Hb<7)	1/529	0.2 (0-1.5)	
CHILDREN 0-23 months			
IYCF indicators			
Timely initiation of breastfeeding	218/253	86.2 (79.6-92.8)	
Exclusive Breastfeeding under 6 months	42/55	76.4 (68.1-84.6)	
Consumption of iron-rich or iron-fortified foods	18/35	51.5 (34.5-68.3)	
Bottle feeding	16/252	6.3 (2.5-10.1)	
WOMEN (15-49 years)			
Anaemia (non-pregnant)			
Total Anaemia (Hb <12 g/dl)	59/229	25.8 (19.5-32.0)	High if ≥ 40%
Mild (Hb 11-11.9 g/dl)	32/229	14.0 (8.8-19.1)	
Moderate (Hb 8-10.9 g/dl)	24/229	10.5 (6.8-14.1)	
Severe (Hb<8.0 g/dl)	3/229	1.3 (0-2.8)	
FOOD SECURITY			
Food distribution			
Proportion of households with a ration card	254/254	100	
Average number of days general food ration lasts out of 15 days (mean, 95% CI)	10.5 (10.0-10.9)		
Negative household coping strategies			
Proportion of households reporting using none of the coping strategies over the past month	254/254	100	
Household dietary diversity			
Average HDDS (mean, 95% CI)	4.6 (4.1-5.2)		
WASH			
Water Quality			
Proportion of households using improved drinking water source	521/522	99.8 (99.4-100)	
Water quantity			
Proportion of households that use:			Average quantity of water available per person / day ≥ 20 litres
≥ 20 lpppd	251/520	48.5 (41.6-55.3)	
15 - <20 lpppd	72/520	13.8 (10.1-17.5)	
<15 lpppd	197/520	37.7 (31.0-44.4)	
Satisfaction with drinking water supply			
Proportion of households that say they are satisfied with drinking water supply	343/522	65.7 (56.6-74.8)	
Safe excreta disposal			
Proportion of households that use:			
An improved excreta disposal facility (improved toilet facility, not shared)	287/516	55.6 (46.5-64.7)	
A shared family toilet (improved toilet facility, 2 households only)	77/516	14.9 (10.3-19.6)	
A communal toilet (improved toilet facility, 3 households or more)	114/516	22.1 (12.3-31.8)	

	Number / total		
An unimproved toilet (unimproved toilet facility or public toilet)	38/516	7.4 (2.2-12.5)	
MOSQUITO NET COVERAGE			
Mosquito net ownership			
Proportion of households owning at least one LLIN	234/256	91.4 (87.0-95.8)	>80%
Average number of persons per LLIN	2.6 persons/LLIN		2 persons/LLIN
Mosquito net utilisation			
Proportion of total household members (all ages) who slept under an LLIN	1259/1570	80.2	
Proportion of children 0-59 months who slept under an LLIN	255/295	86.4	
Proportion of pregnant women who slept under an LLIN	29/30	96.7	

INTERPRETATION OF RESULTS

Food, Nutrition and Anaemia

- Since April 2010 there has been a reducing trend in the prevalence of GAM in Kakuma, indicating that the current situation is slowly improving. However, the prevalence of GAM is still above 5% (WHO classification indicating GAM of acceptable public health significance).
- There has been good coverage of the BSFP providing CSB++ to children 6-23 months running since October 2011 (Nutributter® was provided between April 2011-September), a fairly high prevalence of exclusive breastfeeding of children <6 months, and few cases of diarrhoea reported in the two weeks prior to the survey. This is encouraging given the rapid expansion of the camp in the last year, due to the influx of around 20,000 new arrivals.
- Since 2008, global stunting has remained between 19-26%, and although the prevalence remains fairly low, it is still currently considered of 'medium' public health significance. Probable reasons for this include low dietary diversity, illness, and infections that limit the children's full growth and development.
- The prevalence of anaemia, in both children 6-59 months and non-pregnant women of reproductive age (15-49 years), has significantly reduced ($p < 0.05$) since 2010 (although for women, no significant difference was seen between 2011 and 2012). In children, there has been >20% reduction in anaemia since the introduction of Nutributter®. Nevertheless, anaemia in both groups is considered of 'medium' public health significance according to WHO classifications.
- Whilst the prevalence of exclusive breastfeeding is relatively high, improvements are still needed in the protection, promotion and support of infant and young children feeding practices, indicated by a low prevalence of continued breastfeeding at 1 and 2 years, and late introduction of solid/semi-solid or soft foods.
- The coverage of both TSFP and OTP were below the target of >90% whether based on all admission criteria or just MUAC and oedema. However the sample sizes were small, limiting clear interpretation of these results.

Food security

- Although 100% of interviewed households had ration cards, for the majority of households, food from the general ration did not last the entire cycle of 15 days.
- Household dietary diversity was low, with households eating 4.6 out of a total of 12 food groups in the 24 hours before the survey, the most common being oils/fats (consumed by nearly all households, followed by cereals and vegetables (~54%) and pulses (~52%).
- The two most common negative coping strategies over the last month before the survey were to reduce the quantity and/or frequency of meals, and borrow cash, food and other items (without interest).

Health related

- HIS indicates that throughout 2012, the crude mortality rate has remained low and below emergency levels.
- As in previous years, the main causes of illness among children 6-59 months were upper and lower respiratory tract infections, followed by malaria, and watery diarrhoea (HIS).
- Despite a measles and Vitamin A campaign immediately before data collection, coverage of Vitamin A supplementation was poor, and was not being consistently recorded on child health cards.
- Household coverage of long-lasting insecticidal net (LLIN) mosquito nets reached UNHCR targets of >80%, however did not reach the targets of <2 persons per LLIN.

WASH

- The majority of households were using an improved source of drinking water and were storing it in a covered or narrow necked container, thus reducing contamination.
- The average water usage in litres per person per day (lpppd) was low, with around half of all households interviewed using less than 20 lpppd. Less than three quarters of households were satisfied with the water supply, with the main reason being that there was not enough, although some reported lack of jerry cans.
- Around half of households were using an improved toilet facility (pit latrine with floor slab, and shared by a maximum of 2 households). This low coverage may be in part due to the influx of new arrivals.

RECOMMENDATIONS:

Immediate term

1. WFP to continue the blanket supplementary feeding programme for children 6-23 months of age to help ensure that improvements in nutrition situation of infants and young children is sustained, and a reduction of anaemia to acceptable levels is achieved. Ensure increased awareness and sensitisation for proper use of the supplementary foods in the target group through household visits, education, and mother-to-mother support groups. .
2. Community Health Workers to improve documentation of Vitamin A supplementation and measles vaccinations in child health books.
3. IRC to continue and strengthen activities for the timely diagnosis and treatment of malaria.
4. IRC to continue malaria prevention activities such as the distribution of bed nets, and Indoor Residual spraying (IRS) to be implemented in the first quarter of 2013 as there was none in 2012.

5. Implement an in-depth assessment looking into the quality and efficacy of chemical repellent used in LLINs available at the household level.
6. Investigate reasons for the potentially low coverage of TFP and put in strategies to increase the coverage to meet sphere standards.

Medium term

7. LWF to increase the number of water storage containers to aid households in collecting / accessing more water.
8. WASH partners to implement Knowledge Attitude and Practice (KAP) survey to explore household water usage, storage container situation, poor hygiene practices related to water storage etc., to aid WASH programme planning.
9. WASH partners to improve water distribution network amongst all blocks to ensure adequate coverage of the water supply.
10. NRC to improve coverage and maintenance of household latrines over the next year (1 latrine for 1 to 2 families), particularly in new arrival areas.
11. IRC to consider implementing a KAP survey of IYCF to explore poor complementary feeding practices of children 6-23 months, including sharing of CSB++ at household level.
12. Partners to reinforce activities to improve dietary diversity at household level, including continued scale up of home gardening projects¹, and investigation in to the provision of appropriate (non-perishable) complementary foods for example, beans and canned tuna, considering the challenges in buying, transporting and distributing perishable foods at a large scale.
13. Continued scale up of home gardening projects, and increased camp coverage, alongside provision of seeds, training, monitoring, and protection of water collection points².
14. WFP to provide milled cereals in the GFD more consistently, to ensure that ration items are not sold to pay for milling.
15. 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 or complement the GFD e.g. food vouchers, cash transfers or vouchers for non-food items.
16. Health agencies to conduct qualitative assessments of the health-seeking behaviour of new arrivals, with the aim of improving uptake of services and preventing a deterioration of their nutritional status.

Long term

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

¹ Note that GIZ, who were previously responsible for all Kitchen Garden projects have now left the refugee operation and it is not know who they will be replaced with.

² Ibid

18. All partners to improve monitoring of programmes to aid with endline impact evaluations, for example, consistent monitoring of the CSB++ BSFP.
19. IRC to maintain integrated approach to programming, and ensure sufficient training for new community health workers, and timely re-fresher training where necessary.

1 Introduction

This report provides information from the annual nutrition survey in Kakuma refugee camp, Kenya, conducted by IRC, UNHCR and ENN from 15th – 21st November 2012. The main aim of this survey was to assess the prevalence of malnutrition and to monitor selected indicators of programme performance.

1.1 Background

Kakuma refugee camp is located in the Turkana district in the north western region of Kenya. The camp was established in 1992 to cater for the influx of Sudanese refugees fleeing conflict in their country, and covers 12km². Kakuma lies in a semi-arid area, and has been identified by the World Food Programme (WFP) / UNICEF/ Government of Kenya (GoK) as adversely affected by the protracted drought issues. Internationally, the camp borders with Ethiopia, and is situated 10km from the Sudanese border at Lokichoggio, and 50km from the Ugandan border. Locally, it borders with West Pokot, Baringo, Samburu and Marsabit regions, all of which are equally vulnerable to the devastating effects of drought.

The camp has grown considerably since 1992, and at the time of the survey, the camp was hosting 104,218 refugees originating from 13 countries. The number of children under 5 years of age is currently estimated at 16,947, or 16.3% of the Kakuma population. According to the United Nations High Commission for Refugees (UNHCR) ProGres database (Nov 2012), the main countries of origin are currently Somalia, 47.6 %, and South Sudan, 31.6 %, with the remaining 20.8 % originating from various countries in the region including Ethiopia (6.0%), Sudan (4.5%), Democratic republic of Congo (5.7%), and Burundi (3.2%). Throughout 2012, Kakuma has experienced a large number of refugees fleeing conflict from nearby countries, and re-located from Dadaab camp, resulting in a 20% population increase.

The United Nations High Commission for Refugees (UNHCR) and WFP are working together with partners, 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 (GFR) and supplementary feeding programmes (SFP) within the camp, while UNHCR is mainly involved in coordinating services offered to the refugees through its implementing partners (IPs). These services include provision of health services, water and sanitation, shelter, and basic non-food items. IPs includes the International Rescue Committee (IRC), Film Aid International, Norwegian Refugee Council (NRC), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), Jesuit Refugee Services (JRS), Lutheran World Federation (LWF), National Council of Churches of Kenya (NCCK), Refugee Consortium of Kenya (RCK) and Windle Trust.

IRC has been running health and nutrition services in the camps since 1992, and from 1997 was charged with the responsibility of provision of comprehensive primary healthcare to the refugees when the environmental health docket was added. This comprehensive healthcare model is provided through five programmes, namely clinical services, nutrition, HIV/AIDS, community health and environmental health, and sanitation (IRC takes the lead in sanitation for Kakuma 1 and 2, and NRC for Kakuma 3). The programmes are staffed by both national and refugee auxiliary staff.

The camp is divided in to 3 main parts; Kakuma 1, Kakuma 2, and Kakuma 3, which are further subdivided in to Zones and Blocks, and borders a seasonal river that cuts off sections of the camp during the rainy season. Due to the aforementioned population increase, the camp has expanded considerably in the past year, and a number of new zones and blocks have been added to Kakuma 3.

1.2 Food Security

Refugees in Kakuma camp have limited access to additional sources of income or employment opportunities, and the majority are largely dependent on the general ration distributed by WFP as their main source of food. 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 (except poultry) or getting involved in large scale agricultural activities. The arid landscape compounded by on-going drought has made it difficult for households to grow their own food.

The ration scale is based on a bi-monthly family distribution system with the same rate for children and adults, and provides approximately 2100 kcal/person/day. The food basket normally consists of cereal flour/rice/bulgur, maize grain or maize meal, pulses, vitamin A fortified vegetable oil, iodized salt, sugar and corn-soy blend (CSB). Since August 2011 WFP changed from providing CSB to CSB+, which is an improved version, and provides a modified content of vitamins and minerals compared to previous formulations. The WFP post distribution monitoring (PDM) reports (2012) shows that between January to December, 95.5% of households consumed 100% of cereals received from food distribution centers, 99.7% consumed 100% of pulses, 99.3% of the households consumed 100% of CSB while 100% of the households consumed 100% of salt. The ration is calculated to last for 15 days, but from the PDMs was reported to last an average of 10 days, compared to 8 days in 2011. The 2010 Joint Assessment Mission (JAM) found that up to 77% of households sell part of their ration to meet other needs, with other coping mechanisms reported as borrowing food from neighbours, reducing food intake, and buying from the market (either by credit or cash).

To work towards improving the nutritional wellbeing of the refugees, in 2000, GIZ initiated a small scale vegetable gardening programme, which has been scaled up since implementation of UNHCR's Anaemia reduction and control strategy in 2008³.

In 2011, 10,001 individuals (9195 refugee and 806 host community) were sensitised/trained and supported with vegetable seeds, farming tools and pesticides and engaged in vegetable production and consumption. By November 2012, 7,483 households had vegetable gardens representing approximately 20-25% of the households in Kakuma, with a future target to reach 50% of all households⁴. The programme targets households with vulnerable groups such as breastfeeding mothers, children under 5, persons with special nutritional needs and the elderly. Nevertheless, there are challenges due to inadequate water supply and land use, due to the increasing camp population.

1.3 Health situation

As in previous years, the main causes of illness among children 6-59 months in 2011 were upper and lower respiratory tract infections (URTI and LRTI). This affected 80.8/1000/month (21.0%) and 96.5/1000/month (32.7%) respectively (**Figure 1**). Throughout 2012 there has been an unusually high incidence of malaria, probably due to the unprecedented rains which commenced earlier than expected. The incidence of confirmed cases of malaria in children under five was 7.8/1000/month, representing 14% of children. Skin diseases affected 24.8/1000/month and eye diseases affected 10.9/1000/month.

³ UNHCR Strategic Plan for Anaemia Prevention, Control and Reduction. Reducing the Global Burden of Anaemia in Refugee Populations. 2008-2010

⁴ GIZ. Report on Kitchen Gardening in Kakuma, 2012

The mortality rates recorded by the Health Information System (HIS) in Kakuma camp have been fairly low and stable for several years. Throughout 2012, crude mortality rate remained as low at approximately 0.2/1000/month, and the under-five mortality rate was 0.6/1000/month (**Figure 2**). The infant mortality rate was relatively high at 26.0/1000 live births/month.

IRC runs a community health programme which is responsible for disease surveillance within the community, the expanded programme of immunization, screening of new arrivals at the reception centre and health education in the community. The integrated community health promoters (CHP) form the backbone of these programmes. The IRC run environmental health programme provides sanitation facilities through provision of latrines to the refugees, and is responsible for solid and liquid waste management, vector control, and hygiene promotion activities within the camp. NRC is now responsible for sanitation in Kakuma 3.

Figure 1 Under-five proportional top 5 morbidity, Nov 2011 - Nov 2012 (UNHCR Health Information System)

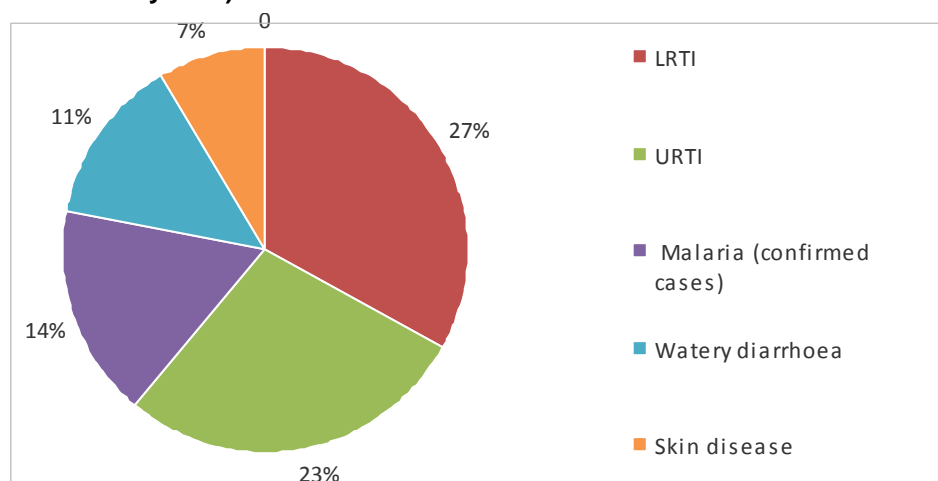


Figure 2 Crude and under-five mortality rates, Nov 2011 - Sep 2012 (UNHCR Health Information System)

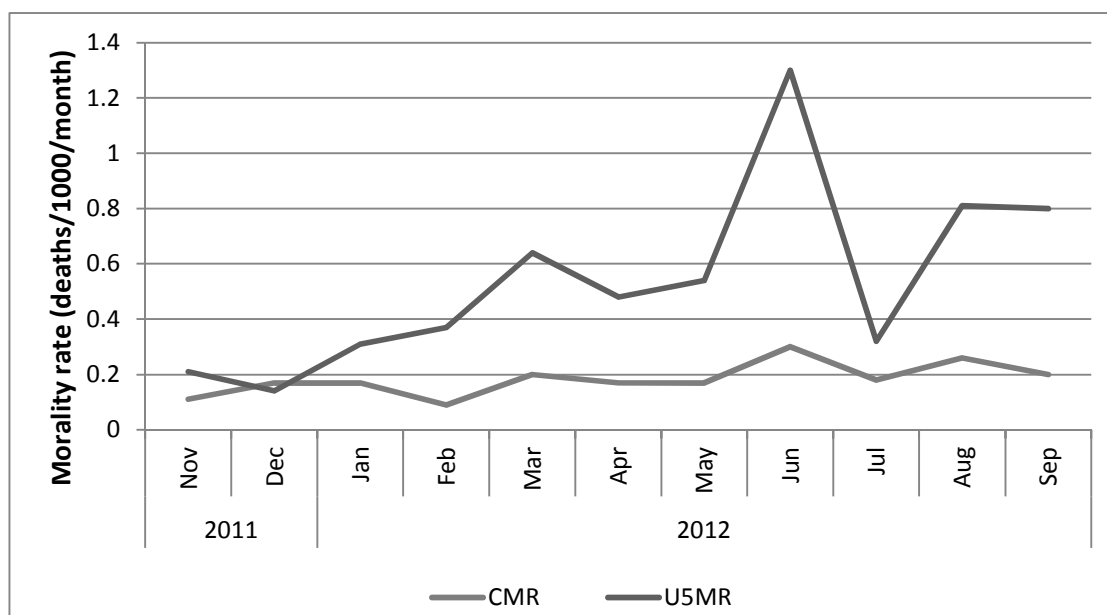
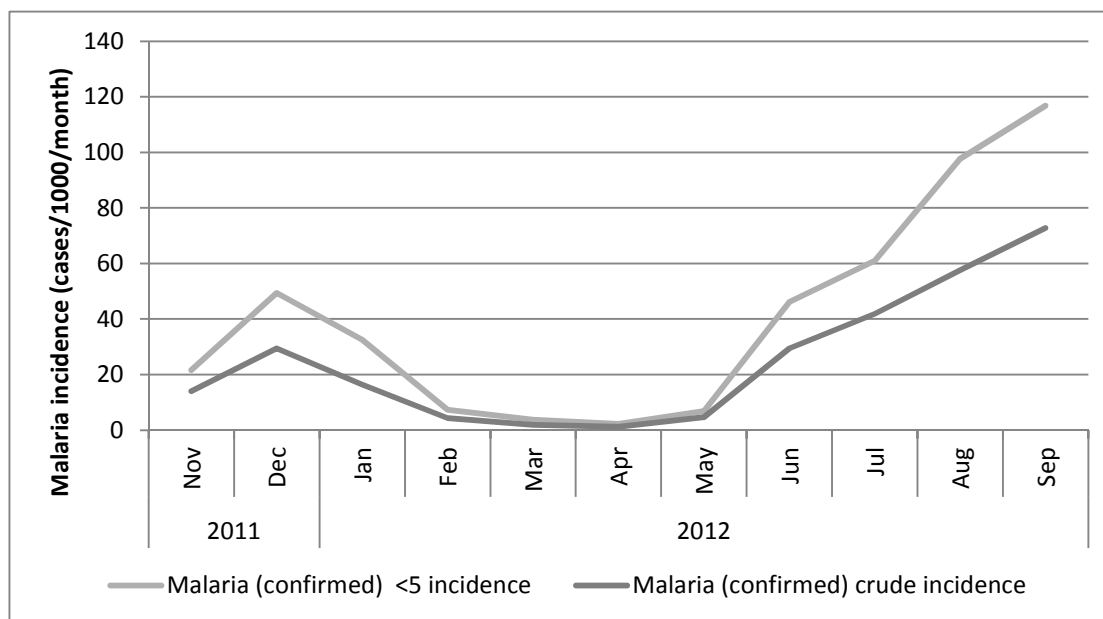


Figure 3 Under-five and crude malaria incidence, Nov 2011 - Sep 2012 (UNHCR Health Information System)



1.4 Nutrition

Trends in prevalence of global acute malnutrition (GAM) have shown a steady decline over the last few years and since 2010 has remained below the 15% emergency threshold. A peak in GAM was seen in 2009 where it rose to 17.0% (95% CI 14.5-19.9) (95% CI: 14.5 - 19.9). Since then GAM, has remained below 10%, reaching 7.5% (95% CI 5.4-10.4) in 2011, which is considered 'poor' according to WHO guidelines.

Prior to 2011, the prevalence of anaemia in children and women has remained well above 40%, the WHO cut off defining anaemia of high public health significance. However, in 2011, anaemia in children 6-59 and women 15-49 reduced significantly compared to 2010, dropping from 73.6% (95% CI 68.1-79.1) in children and 60.5% (95% CI 54.4-66.5) in women, to 44.0% (95% CI 38.5-45.5) and 31.2% (25.6-36.8). For women, according to WHO classification, anaemia therefore dropped to medium public health significance (20-40%).

Current Nutrition Services and Activities

A number of nutrition programmes and activities are implemented by IRC (and supported by WFP and UNHCR) as detailed below:

- **Community-based management of malnutrition (CMAM):** The CMAM programme includes the Supplementary feeding programme (SFP), outpatient therapeutic programme (OTP) and stabilization Centre (SC). The nutrition programme also runs a supplementary feeding programme for specific chronic medical cases such as HIV, and tuberculosis. Community mobilisation and active case finding is conducted in the community by CHPs.
 - SFP: Supports moderately malnourished children without medical complications, pregnant and lactating women (PLW) and medical cases in need of nutritional support. Children enrolled receive 14 sachets of Plumpy'sup® twice monthly and 1 sachet is taken daily. Malnourished PLWs receive 3.85kg per cycle (i.e.14 days).

- OTP: The five outpatient feeding centres cater for severely malnourished children without medical complications. Enrolled children receive a weekly supply of Plumpy'nut®.
 - SC: The camp hosts one SC in the main hospital. IRC provides in-patient feeding for severely malnourished children with medical complications, both from the refugee population and from the host community. Children receive F75, F100 and Plumpy'nut® through UNHCR support.
- **BSFP for children 6-23 months of age and PLWs:** Children 6-23 months are currently receiving 6 kg of CSB++ on a monthly basis from all clinics. PLWs receive 1.61 kgs of CSB+ per cycle (i.e. for 14 days) through the five nutrition sites.
 - **Infant and young child feeding (IYCF):** Improved knowledge and practice is promoted through the CHP led mother-to-mother and father-to-father support groups, and IYCF counselling in antenatal clinics, postnatal clinics, maternity, paediatric and SC wards.
 - **Vitamin A supplementation and deworming:** Mass campaigns are held bi-annually to administer vitamin A and deworming supplementation. In addition, children receive vitamin A supplementation when enrolled in a feeding programme, as do new arrivals to the camp.
 - **Mass MUAC screening of children 6-59 months:** All eligible children in the camp are screened four times per year using MUAC. All malnourished children identified by the screening are referred to the relevant feeding programme.
 - **Vegetable gardening:** Aimed at improving the nutritional status of households with vulnerable groups.
 - **Complementary feeding:** In August and September 2012, green grams were distributed to PLW, persons living with HIV/AIDS (PLWHA), tuberculosis and diabetic patients. Each beneficiary received 2kg.

Figure 4 Admission trends for the SFP, Nov 2011 - Nov 2012 (UNHCR Health Information System)

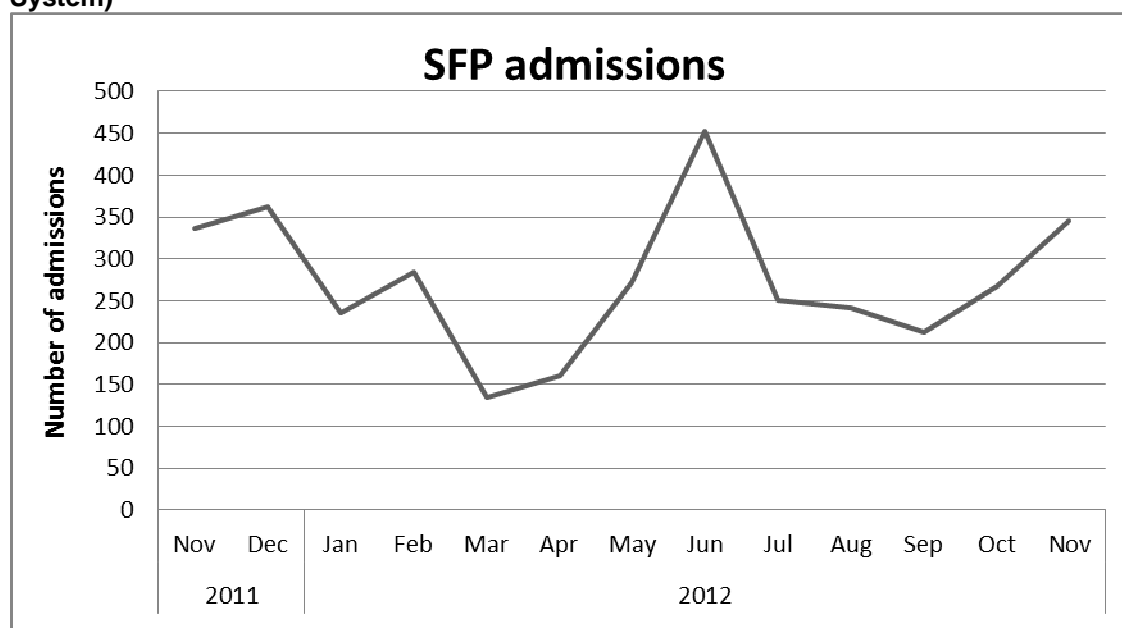
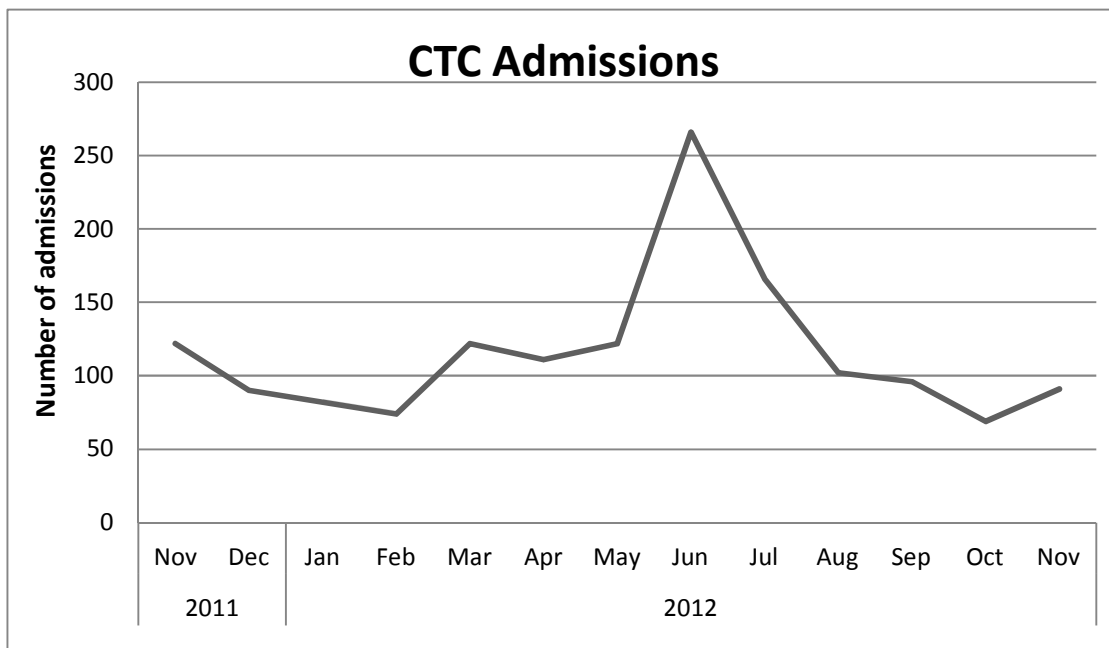


Figure 5 Admission trends in community therapeutic care (CTC), Nov 2011 - Nov 2012 (UNHCR Health Information System)



2 Survey Objectives

The nutrition survey was conducted with the aim of assessing the following objectives:

Primary Objectives

1. To determine the prevalence of acute malnutrition amongst children aged 6-59 months;
2. To determine the prevalence of stunting among children aged 6-59 months;
3. To assess the prevalence of anaemia among children aged 6-59 months and non-pregnant women of reproductive age (15-49 years);
4. To assess the two week period prevalence of diarrhoea among children 6-59 months;
5. To estimate the coverage of blanket supplementary feeding programmes (BSFP) for children aged 6-23 months;
6. To assess the coverage of vitamin A supplementation in the last 6 months in children aged 6-59 months;
7. To determine the coverage of measles vaccination in children 9-59 months;
8. To assess the nutritional status of pregnant women, and lactating women using MUAC;
9. To establish IYCF practices among infants and young children aged 0 to 23 months;
10. To determine the ownership of mosquito nets (all types and Long-lasting insecticidal (LLINs)) in households;
11. To determine the utilization of mosquito nets (all types and LLINs) by the total population, children 0-59 months, and pregnant women;
12. To determine the population's access to, and use of improved water, sanitation and hygiene facilities;
13. To investigate household food security and dietary diversity;
14. To identify priority areas in programme implementation and propose informed recommendations for future programming.

Secondary Objectives:

1. To assess the coverage of targeted supplementary feeding programmes (TSFP) and therapeutic feeding programmes (TFP) for children aged 6-59 months.
2. To assess the coverage of iron-folic acid supplementation in pregnant women.

3 Methodology

A two-stage cluster survey was conducted using the Standardized Monitoring and Assessment of Relief and Transitions (SMART) methodology to collect and analyse data on child anthropometry. Information on other indicators was collected and analysed using UNHCR's Standardised Expanded Nutrition Survey (SENS) Guidelines for Refugee Populations (Version 1.3, March 2012) (see www.sens.unhcr.org).

3.1 Sample size

The sample size for children 6-59 months was calculated using ENA for SMART software (version 31st July 2012) according to UNHCR survey guidelines (see **Table 1**). The calculation was based on the expected prevalence of global acute malnutrition (GAM) in children 6-59 months of age found in previous surveys (e.g. November 2011; GAM 9.2%, 95% CI 6.5-12.9). GAM was not expected to have deteriorated; therefore an estimate of 10% GAM was used in the final calculation with a precision of +/-3.5. A design effect (DEFF) of 1.5 was used to account for cluster selection, assuming that heterogeneity in acute malnutrition within the camp was relatively low. Population data from implementing partners indicated an average household size of 6. Considering both recent UNHCR ProGres data and Community Health Promoter (CHP) population data from 2011, the percentage of children under 5 was estimated at 16.0%.

Table 1 Sample size calculation, Kakuma, Nov 2012

Estimated GAM	DEFF ¹	Precision	Under 5 population	Average household size	NRR ²	Sample size: children	Sample size: households
10.0%	1.5	3.5	16.0%	6	5.0%	461	561 including NRR (rounded up to 570)

¹ Design effect

² Non-response rate

The sample size for anaemia in children aged 6-59 was based on the sample size for GAM as recommended by the UNHCR Standardised Expanded Nutrition Survey (SENS) Guidelines when there is a need to assess the impact of an anaemia reduction intervention.

For each of the indicators used, households and individuals were sampled as follows:

Household-level indicators:

- WASH: *all* households
- Food Security: every other household
- Mosquito net: every other household

Individual-level indicators:

- Children 0-59 months: all eligible children in *all* households were assessed (based on the above calculations)
- Women 15-49: all eligible women in every other households were assessed.

3.2 Sampling procedure: selecting clusters

Population data for cluster selection was largely provided by UNHCR ProGres. NCK were also consulted regarding 'new arrival blocks' which had not yet been updated on ProGres and for which population sizes were subsequently estimated⁵. Lastly, the 2011 CHP census was used to cross check non-existent blocks appearing on the ProGres database, which were then removed from cluster allocations once verified.

New arrivals, at an average rate of 154 per week as per ProGres data were recognised in the sample size calculations. The transition centre temporarily housing refugees from Dadaab, however, was not included in the sample.

A total of 38 clusters (blocks) were selected, using probability proportional to size (PPS) and ENA software (see **Appendix 3** for selected clusters). Given the large number of indicators it was estimated that no more than 15 households could be surveyed each day by one team.

3.3 Sampling procedure: selecting households and individuals

Due to the number of different block/household structures used by the different ethnic groups residing in Kakuma, two methods were used for second stage sampling; the standard EPI (spin the pen) method (ref UNHCR SENS), as well as an adapted version of the EPI method were used to select the households to survey⁶.

The EPI method was used for blocks with no outer fence, and few or no fences surrounding individual compounds, and was carried out as follows:

- 1) The survey team moved to the approximate centre of the block (where possible advised by a CHP who knew the block well).
- 2) A pen was spun to determine a random direction.
- 3) The team walked in this direction, counting all houses along the way until the edge of the block (cluster) was reached.
- 4) The first household to be sampled was selected randomly from the total number of houses counted.
- 5) Subsequent households were selected by proximity to the left.

The adapted Epi method was used for blocks with narrow paths going across them, where households live mainly in large compounds surrounded by fences made of wood and other building material. Household selection was completed as follows:

- 1) To select the first household to survey, the 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.
- 2) 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.
- 3) They then randomly selected the first household to survey using random numbers.
- 4) 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.

All teams followed standardised procedures. If an individual or an entire household was

⁵ A member of the survey team visited new arrival blocks with NCK in order to confirm their boundaries and estimate population size by counting the number of households present.

⁶ Due to the number of different block structures in Kakuma, it is recommended that future nutrition surveys use systematic sampling for second stage sampling, and that clusters be selected early on so that household lists can be made in advance.

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/household was recorded as absent and was not replaced with another household/individual. If an individual/household refused to participate, then it was considered a refusal and the individual or the household was not replaced with another. If a selected household was abandoned, the household was replaced by another. 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.

3.4 Questionnaires and measurement methods

Questionnaires

Six module specific questionnaires were designed to provide information on the relevant indicators for the different target groups, as indicated in the survey objectives and based on the standard SENS questionnaires (see **Appendix 5** for all questionnaires). Questionnaires were prepared in English and administered in the language spoken by the household selected, via translators where necessary. All questionnaires were pre-tested before the survey. Questionnaires covered all SENS modules and included the following areas and measurements:

- 1) **Children 6-59 months (SENS Modules 1-2):** Anthropometric status, oedema, enrolment in selective feeding programmes and blanket feeding programmes (CSB++), immunisation (measles and PENTA), vitamin A supplementation in last six months, morbidity from diarrhoea in past two weeks, haemoglobin assessment.
- 2) **Children 0-23 months (SENS Module 3):** Questions on infant and young children feeding practices..
- 3) **Women 15-49 years (SENS Module 2):** Pregnancy status, coverage of iron-folic acid pills and post-natal vitamin A supplementation, MUAC measurements for pregnant and lactating women (PLW), and haemoglobin assessment for non-pregnant women.
- 4) **Food Security (SENS Module 4):** Access and use of the general food ration (GFR), coping mechanisms when the GFR ran out ahead of time and household food dietary diversity using the food consumption score.
- 5) **Water, sanitation and hygiene (SENS Module 5):** Access to improved drinking water source, storage of water, quantity of water used per household, satisfaction with the water supply, type and quality of excreta disposal facilities in use and safe disposal of young children's stools.
- 6) **Mosquito Net Coverage (SENS Module 6):** Ownership of mosquito nets, utilization of nets of all types and long-lasting insecticidal net (LLIN), and Indoor Residual Spraying (IRS).

Measurement methods

Household level indicators

- **Food security, WASH and Mosquito net:** The questionnaire was based on the standard SENS questionnaires.

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 a 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 measured and a cut off between 65-110 cm was used for inclusion. The UNHCR Manifest was not used for recording age.

- **Age of women 15-49 years:** Reported age was recorded in years.
- **Weight of children 6-59 months:** Measurements were taken to the nearest 100 grams using an electronic scale (SECA scale) with a wooden board to stabilise it on the ground. The double-weighing technique was used to weigh young children unable to stand on their own or unable to understand instructions not to move while on the scale. Clothes were removed during weighing although where necessary, light undergarments were allowed. Due to logistical challenges, only 5 out of 6 teams had electronic scales for the full survey; one team used a hanging spring Salter scale measuring to the nearest 100g, and swapped to an electronic scale at mid-point of the survey.
- **Height/Length of children 6-59 months:** Children's height or length was taken to the closest millimetre using a wooden height board. Height was used to decide on whether a child should be measured lying down (length) or standing up (height). Children less than 87cm were measured lying down, while children ≥ 87 cm were measured standing up.
- **Oedema in children 6-59 months:** The presence of bilateral oedema was determined by applying gentle thumb pressure on to the tops of both feet of the child for three seconds. If a shallow indent remained in both feet, oedema was recorded as present. The survey coordinators verified all oedema cases reported by the survey teams.
- **MUAC of children 6-59 months and women 15-49 years (PLWs only):** 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 standard tapes.
- **Child enrolment in selective feeding programme for children 6-59 months:** This was assessed for the outpatient therapeutic programme and for the supplementary feeding programme using card or recall.
- **Measles vaccination in children 9-59 months:** Measles vaccination was assessed by checking for the measles vaccine on the EPI card or by carers recall if no EPI card was available. For ease of data collection, all children aged 6-59 months were assessed for measles but analysis was only done on children aged 9-59 months.
- **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 an EPI card or health card if available, or by asking the caregiver to recall if no card was available. A vitamin A capsule was shown to the caregiver when asked to recall.
- **Haemoglobin (Hb) concentration in children 6-59 months and women 15-49 years (non-pregnant):** 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.
- **Diarrhoea in last 2 weeks in children 6-59 months:** an episode of diarrhoea was defined as three loose stools or more in 24 hours. Caregivers were asked if their child had suffered episodes of diarrhoea in the past two weeks.
- **ANC enrolment and iron and folic acid pills coverage in pregnant women:** Whether the woman was enrolled in the ANC programme and was receiving iron-folic acid pills was assessed by recall. An iron-folic acid pill was shown to the pregnant woman when asked to recall.
- **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). Infant formula feeding was also assessed.
- **Referrals:** Children aged 6-59 months were referred to the health post for treatment when MUAC was <12.5 cm, when oedema was present or when haemoglobin was <7.0 g/dL. Women of reproductive age were referred to the hospital for treatment if haemoglobin was < 7.0 g/dL. PLW were referred to the health post if MUAC <210 mm.

3.5 Case definitions, inclusion criteria and calculations

Indicators of Nutritional Status and Anaemia

Table 2 shows the definition and classification of the nutritional indicators used. Main results are reported according the WHO Growth Standards 2006. Results using the NCHS Growth Reference 1977 are reported in **Appendix 4**.

Table 2 Nutritional Status and Anaemia indicators and cut-offs used

Indicator		Children 6-59 months	Women 15-49 years		
			Non-Pregnant	Lactating	Pregnant
Acute Malnutrition ¹	Global acute malnutrition	WHZ <-2 and/or oedema	--	--	--
	Moderate acute malnutrition	WHZ <-2 and ≥-3	--	--	--
	Severe acute malnutrition	WHZ <-3 and/or oedema	--	--	--
Stunting ¹	Total stunting	HAZ <-2	--	--	--
	Moderate stunting	HAZ <-2 and ≥-3	--	--	--
	Severe stunting	HAZ <-3	--	--	--
Underweight ¹	Total underweight	WAZ <-2	--	--	--
	Moderate underweight	WAZ <-2 and ≥-3	--	--	--
	Severe underweight	WAZ <-3	--	--	--
Malnutrition (MUAC)	--	<12.5cm and/or oedema	--	--	--
	--	≥11.5cm and <12.5cm	--	MUAC <210mm ⁷	
	--	<11.5cm and/or oedema	--	--	--
Anaemia	Total anaemia	Hb <11.0 g/dL	Hb <12.0 g/dL	Hb <12.0 g/dL	--
	Mild anaemia	Hb 10.0 - 10.9 g/dL	Hb 11.0 - 11.9 g/dL	Hb 11.0 - 11.9 g/dL	--
	Moderate anaemia	Hb 7.0 - 9.9 g/dL	Hb 8.0 - 10.9 g/dL	Hb 8.0 - 10.9 g/dL	--
	Severe anaemia	Hb <7.0 g/dL	Hb <8.0 g/dL	Hb <8.0 g/dL	--

¹ Calculated using NCHS Growth Reference 1977 and WHO Growth Standards 2006

WHZ: weight-for-height z-score, **HAZ:** height-for-age z-score, **WAZ:** weight-for-age z-score

Selective Feeding Programme Coverage (children 6-59 months)

Selective feeding programme coverage was assessed using the direct method as follows:

Targeted supplementary feeding programme

Coverage of TSFP programme (%) =

⁷ Ministry of Medical Services & Ministry of Public Health and Sanitation. National Guideline for the Integrated Management of Acute Malnutrition (2009).

$$100 \times \frac{\text{No. of surveyed children with MAM according to SFP admission criteria who reported being registered in SFP}}{\text{No. of surveyed children with MAM according to SFP admission criteria}}$$

Therapeutic feeding programme

Coverage of OTP programme (%) =

$$100 \times \frac{\text{No. of surveyed children with SAM according to OTP admission criteria who reported being registered in OTP}}{\text{No. of surveyed children with SAM according to OTP admission criteria}}$$

Infant and Young Child Feeding (IYCF) Indicators (children 0-23 months)

Infant and young child feeding practices were assessed based on standard WHO recommendations (WHO, 2007) as follows:

- **Timely initiation of breastfeeding: WHO core indicator 1** - Proportion of children 0-23 months of age who were put to the breast within one hour of birth.

$$\frac{\text{Children 0-23 months of age who were put to the breast within one hour of birth}}{\text{Children 0-23 months of age}}$$

- **Exclusive breastfeeding under 6 months: WHO core indicator 2** - 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, minerals, medicines)).

$$\frac{\text{Infants 0–5 months of age who received only breast milk during the previous day}}{\text{Infants 0–5 months of age}}$$

- **Continued breastfeeding at 1 year: WHO core indicator 3** - Proportion of children 12–15 months of age who are fed breast milk.

$$\frac{\text{Children 12–15 months of age who received breast milk during the previous day}}{\text{Children 12–15 months of age}}$$

- **Introduction of solid, semi-solid or soft foods: WHO core indicator 4** - Proportion of infants 6–8 months of age who receive solid, semi-solid or soft foods.

$$\frac{\text{Infants 6–8 months of age who received solid, semi-solid or soft foods during the previous day}}{\text{Infants 6–8 months of age}}$$

- **Consumption of iron-rich or iron-fortified foods: WHO core indicator 8** - Proportion of children 6–23 months of age who receive an iron-rich or iron-fortified food that is specially designed for infants and young children, or that is fortified in the home.

$$\frac{\text{Children 6–23 months of age who received an iron-rich food or a food that was specially designed for infants and young children and was fortified with iron, or a food that was fortified in the home with a product that included iron during the previous day}}{\text{Children 6–23 months of age}}$$

- **Continued breastfeeding at 2 years: WHO optional indicator 10** - Proportion of children 20–23 months of age who are fed breast milk.

$$\frac{\text{Children 20–23 months of age who received breast milk during the previous day}}{\text{Children 20–23 months of age}}$$

- **Bottle feeding: WHO optional indicator 14** - Proportion of children 0-23 months of age who are fed with a bottle.

$$\frac{\text{Children 0–23 months of age who were fed with a bottle during the previous day}}{\text{Children 0–23 months of age}}$$

Household food security

- **Household dietary diversity score**

A household dietary diversity score was calculated according to FANTA 2006 and FAO 2011 guidelines (adapted to refugee settings) by summing the number of food groups consumed by any household member in and outside the house over the last 24 hour period, out of a maximum of 12 food groups (below).

1. Cereals
2. White roots and tubers
3. Vegetables (combination of 3 sub-groups: vitamin A rich vegetables and tubers, dark green leafy vegetables and other vegetables).
4. Fruits (combination of 2 sub-groups: vitamin A rich fruits and other fruits)
5. Meat(combination of 2 sub-groups: organ meat and flesh meat)
6. Eggs
7. Fish and other seafood
8. Legumes, nuts and seeds
9. Milk and milk products
10. Oils and fats
11. Sweets
12. Spices, condiments and beverages

WASH

The table below provides an overview of the definitions of drinking water and sanitation (toilet) facilities used in the survey and available in Kakuma refugee camp.

Drinking Water	Improved source	Unimproved source
	Public tap	Small water vendor (cart with small tank or drum)
Protected dug well with hand pump		Bottled water*
		Surface water (river, dam, lake, pond, stream, canal, irrigation channels). Rainwater collection from surface run off.
*Bottled water is considered improved only when the household uses it by choice rather than because they are obliged to or when it can be guaranteed that this water is not contaminated.		
Sanitation facility definition		
	Improved category	Unimproved category

	Pit latrine with slab	Pit latrine without slab (slab with holes) /open pit
		No facilities or bush or field
Sanitation facility classification based on definition and sharing		
Improved excreta disposal facility	A toilet in the above “improved” category AND one that is not shared with other families***	
Shared family toilet	A toilet in the above “improved” category AND one used by 2 families / households only (for a maximum of 12 people)**	
Communal toilet	A toilet in the above “improved” category AND one used by 3 families / households or more	
Unimproved toilet	A toilet in the above “unimproved” category OR a public toilet which any member of the public can use e.g. in hospitals or markets	
*To maintain consistency with other survey instruments (e.g. the multiple indicator cluster survey), UNHCR SENS WASH module classifies an “ improved excreta disposal facility ” as a toilet in the above “improved” category AND one that is not shared with other families / households.		
**According to UNHCR WASH monitoring system, an “ improved excreta disposal facility ” is defined differently than in other survey instruments and is defined as a toilet in the above “improved” category AND one that is shared by a <i>maximum</i> of 2 families / households or with no more than 12 <i>individuals</i> . Therefore, the following two categories from the above SENS survey definitions are considered “improved excreta disposal facility” for UNHCR WASH monitoring system: “improved excreta disposal facility” and “shared family toilet”.		

Safe excreta disposal for children aged 0-3 years: 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. 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. This is the method that is most likely to prevent contamination from faeces in the household.

3.6 Classification of public health problem and targets

Anthropometric data: UNHCR 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 <10% and the target for the prevalence of severe acute malnutrition (SAM) should be <2%. **Table 3** below shows the classification of public health significance of the anthropometric results for children under-5 years of age.

Table 3 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:

Table 4 Performance indicators for selective feeding programmes (UNHCR Strategic Plan for Nutrition and Food Security 2008-2012)*

	Recovery	Case fatality	Defaulter rate	Coverage		
				Rural areas	Urban areas	Camps
SFP	>75%	<3%	<15%	>50%	>70%	>90%
SC/OTP	>75%	<10%	<15%	>50%	>70%	>90%

* Also meet SPHERE standards for performance

Measles vaccination and vitamin A supplementation in last 6 months coverage:
UNHCR recommends the following target:

Table 5 Recommended targets for measles vaccination and vitamin A supplementation in last 6 months (UNHCR SENS Guidelines)

Indicator	Target Coverage
Measles vaccination coverage (9-59m)	95% (also SPHERE)
Vitamin A supplementation in last 6 months coverage	90%

Anaemia data: The 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 for the prevalence of anaemia should be classified according to WHO criteria as shown in the Table below.

Table 6 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 following standards apply to UNHCR WASH programmes:

Table 7 UNHCR WASH Programme Standard

UNHCR Standard	Indicator
Average quantity of water available per person/day	> or = 20 litres

Mosquito nets: WHO defines a long-lasting insecticidal net as a factory-treated mosquito net made with netting material that has insecticide incorporated within or bound around the fibres. The net must retain its effective biological activity without re-treatment for at least 20 WHO standard washes under laboratory conditions and three years of recommended use.

Table 8 UNHCR Mosquito Net Programme Standards

UNHCR Standard	Indicator
Proportion of households owning at least one Long-Lasting Insecticide treated bed net (LLIN)	>80%
Average number of persons per LLIN	2 persons per LLIN

3.7 Training, coordination and supervision

Survey teams and supervision

The survey was coordinated by IRC (Everlyne Owii, and Michael Ng'ang'a) in coordination with UNHCR (Breege Erukudi) and ENN/UCL (Sarah Style, and Josephine Pringle). A UNHCR nutrition consultant provided additional technical and logistical support during part of the training and on day one of data collection (Mélody Tondeur).

A total of six teams were recruited for data collection during the survey. Each team was comprised of 6 members: one team leader, one assistant team leader, one main translator, two measurers, and one general assistant⁸. Due to the multiple ethnic groups residing in the camp, teams were organised so that all of the main languages spoken in the camp were also spoken by at least one team member. The team leader was responsible for administering the individual level questionnaires, and the assistant team leader responsible for the household level questionnaires. Both worked alongside the translator(s). One team member was responsible for taking all haemoglobin measurements, two members took anthropometric measurements, and the final member assisted with sampling, age determination and reading of health/vaccination cards or birth certificates etc.

Team leaders were all national staff from IRC and LWF, while the rest of the team members were CHPs with basic education (primary or secondary certificates) who were able to read and write in English.

Training

A five-day standardised training was conducted by the coordination team. Four days were allocated for the standardised survey training and one day for training on the android phones used for data collection (see below). Topics covered included anthropometric and haemoglobin measurements (including a practical standardisation test for both), interview techniques, sampling procedures and how to complete the questionnaires. This was followed by a one-day pilot test in which teams visited a minimum of 2-3 households (in blocks not included in the final cluster selection) and administered the questionnaires and performed the measurements. A feedback session was held following the pilot to identify any areas of weakness and the data collection tools were reviewed.

3.8 Data collection

Data Collection

Data collection lasted 7 days from 15th – 21st 2012. Each survey team explained the purpose of the survey, confidentiality of the procedures and obtained verbal consent before continuing with the survey in the selected households (see **Appendix 5** for consent form). All teams were supported by five to six supervisors who were present at different points of data collection: one Survey Manager, three Assistant Managers and two UNHCR staff.

⁸ Training allowed for 6 members per team, to allow for potential drops outs as the minimum requirement was 5 members per team.

Android Phones

The survey incorporated the use of mobile phones using the Android operating system, and Open Data Kit (ODK) software for data collection and entry as with the 2011 survey. The phones replaced paper questionnaires, however, all teams carried hard copies of the questionnaires as back-ups in case the phone failed at any point⁹.

Questionnaires were first developed and adapted on paper and then coded in ODK by an external consultant from CartONG, and then uploaded to the mobile phones. Team leaders were each provided with two phones to maximise battery life and provide back up. Remote support was provided by CartONG throughout all stages of training and data collection.

3.9 Data analysis

During supervision in the field, and at the end of each day, supervisors manually checked the phone questionnaires for completeness, consistency and accuracy. This check was also used to provide feedback to the teams to improve data collection as the survey progressed. At the end of each day, and once supervisors had completed their checks, the phones were each synchronised to the server and the data collected was downloaded; once all data was uploaded, there was no need for any further data entry. Any questionnaires with discrepancies / mistakes however were temporarily left on the phone in order to verify the data with the relevant team. The SMART plausibility report was generated daily in order to identify any problems with anthropometric data collection such as flags and digit preference for age, height and weight, to improve the quality of the anthropometric data collected as the survey was on-going. Teams needing the most support from the supervision and coordination team were identified.

All data files were cleaned before analysis although use of android phones reduced the amount of cleaning needed, as a number of restrictions were programmed in order to reduce data entry errors. Anthropometric data for children 6-59 months was cleaned and analysed using ENA for SMART software (1st November 2011 version) by the coordination team.

The nutritional indices were cleaned using flexible cleaning criterion (+/- 3 SD from the observed mean; also known as SMART flags in the ENA for SMART software). This flexible cleaning approach is one that is recommended in the UNHCR SENS (Version 1.2, June 2011) in accordance with SMART recommendations. A summary of the key quality criteria from the anthropometric data is shown in **Appendix 1**.

Additional data for children aged 6-59 months, data for infants aged 0-5 months, women aged 15-49 years, WASH and food security indicators were cleaned and analysed using Epi Info Software (Centers for Disease Control, version 3.5.1).

⁹ Details of the advantages, challenges and lessons learnt using android technology are provided in a separate report.

4 Results

The demographic characteristics of the population surveyed are presented in **Table 9**.

Table 9 Demographic characteristics of the study population

Total households surveyed	522
Total population surveyed	3285
Total U5 surveyed	585
Average household size	6.3
% of U5	17.8%

*The NRR rate was 8.4%

4.1 Children 6-59 months

4.1.1 Sample size and clusters

The number of children sampled was over the planned sample size of 461 children, despite a NRR of 8.3%. This high NRR is due to the General Food Distribution (GFD) running through the majority of data collection. It was not possible to change the dates of data collection therefore making this overlap un-avoidable.

Table 10 Target and actual number captured

	Target (No.)	Total surveyed (No.)	% of the target
Children 6-59 months	461	529	114.8
Clusters	38	38	100

Table 11 Children 6-59 months - distribution of age and sex of sample

AGE (mo)	Boys		Girls		Total		Ratio Boy:girl
	no.	%	no.	%	no.	%	
6-17	72	50.3	71	49.7	143	27.0	1.0
18-29	56	50.5	55	49.5	111	21.0	1.0
30-41	67	51.1	64	48.9	131	24.8	1.0
42-53	54	51.4	51	48.6	105	19.8	1.1
54-59	20	51.3	19	48.7	39	7.4	1.1
Total	269	50.9	260	49.1	529	100.0	1.0

Age documentation was available for 94% of the sampled children. The overall sex ratio was 1.0 and therefore within the recommended range (0.8-1.2) which confirms that both sexes were equally distributed, and the sample was unbiased (**Table 11**). As in previous Kakuma nutrition surveys, the age group 54-59 months was under-represented compared to the other age groups. This is often the case in nutrition

surveys where there may be less proof of age for older children as caregivers tend to recall best the birth date of smaller children.

4.1.2 Anthropometric results (based on WHO Growth Standards 2006; NCHS Growth Reference 1977 shown in Annex)

The prevalence of global acute malnutrition (GAM) in children 6-59 months is shown in **Table 12**. The prevalence of GAM and SAM was almost identical in boys and girls. Out of a total of 529 children surveyed, 8 were not included analysis of GAM due to aberrant values.

Table 12 Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 521	Boys n = 264	Girls n = 257
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(27) 5.2 % (3.6 - 7.4 95% C.I.)	(14) 5.3 % (3.3 - 8.4 95% C.I.)	(13) 5.1 % (2.9 - 8.6 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(25) 4.8 % (3.2 - 7.0 95% C.I.)	(13) 4.9 % (3.1 - 7.7 95% C.I.)	(12) 4.7 % (2.6 - 8.3 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(2) 0.4 % (0.1 - 1.5 95% C.I.)	(1) 0.4 % (0.1 - 2.8 95% C.I.)	(1) 0.4 % (0.1 - 2.9 95% C.I.)

The prevalence of oedema is 0.0 %

Trend analysis shows no significant difference in the prevalence of GAM ($p>0.05$) between 2010-2011 or 2011-2012, despite a clear decreasing trend.

Figure 6 Trends in the prevalence of global and severe acute malnutrition based on WHO growth standards in children 6-59 months from 2008-2012

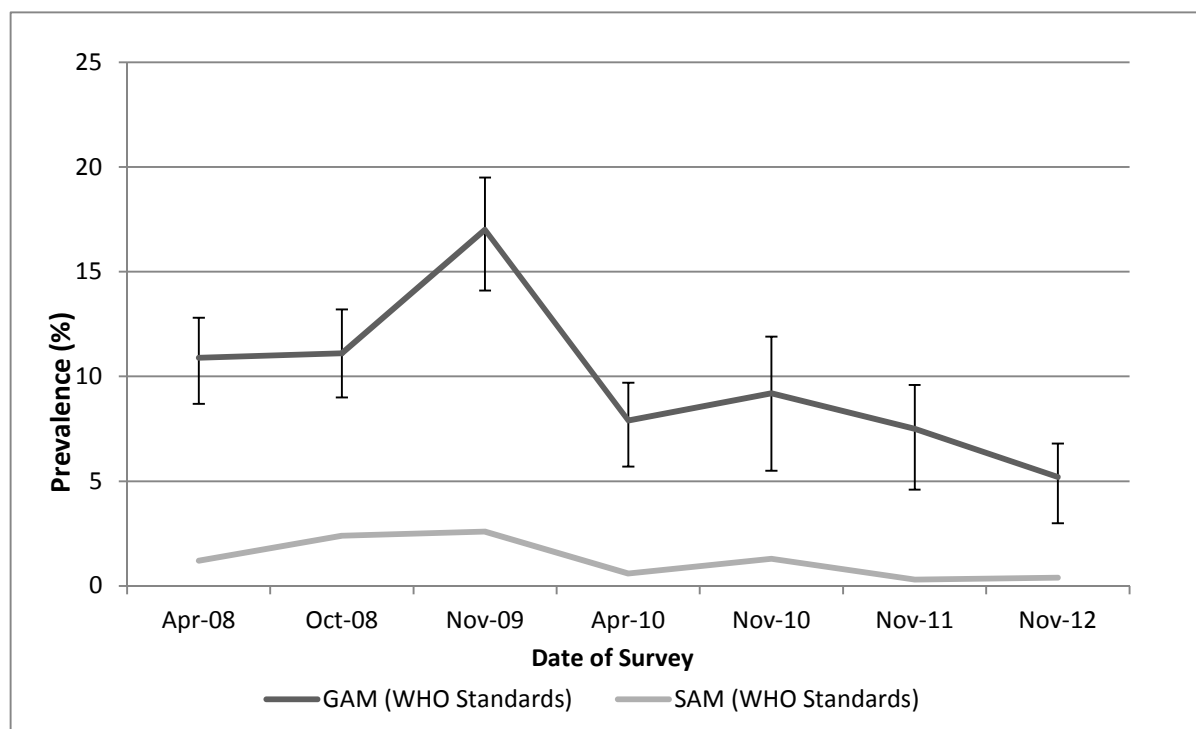


Table 13 presents the prevalence of acute malnutrition by age group. The oldest age group (54-59m) appear to be the most affected by moderate wasting. However, these results should be interpreted with caution due to the small sample size. Trends in moderate and acute wasting by age group are presented in **Figure 7**.

Table 13 Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema

Age (mo)	Total no.	Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	140	1	0.7	7	5.0	132	94.3	0	0.0
18-29	109	0	0.0	3	2.8	106	97.2	0	0.0
30-41	129	1	0.8	6	4.7	122	94.6	0	0.0
42-53	104	0	0.0	3	2.9	101	97.1	0	0.0
54-59	39	0	0.0	6	15.4	33	84.6	0	0.0
Total	521	2	0.4	25	4.8	494	94.8	0	0.0

Figure 7 Trends in prevalence of moderate and severe wasting by age in children 6-59 months

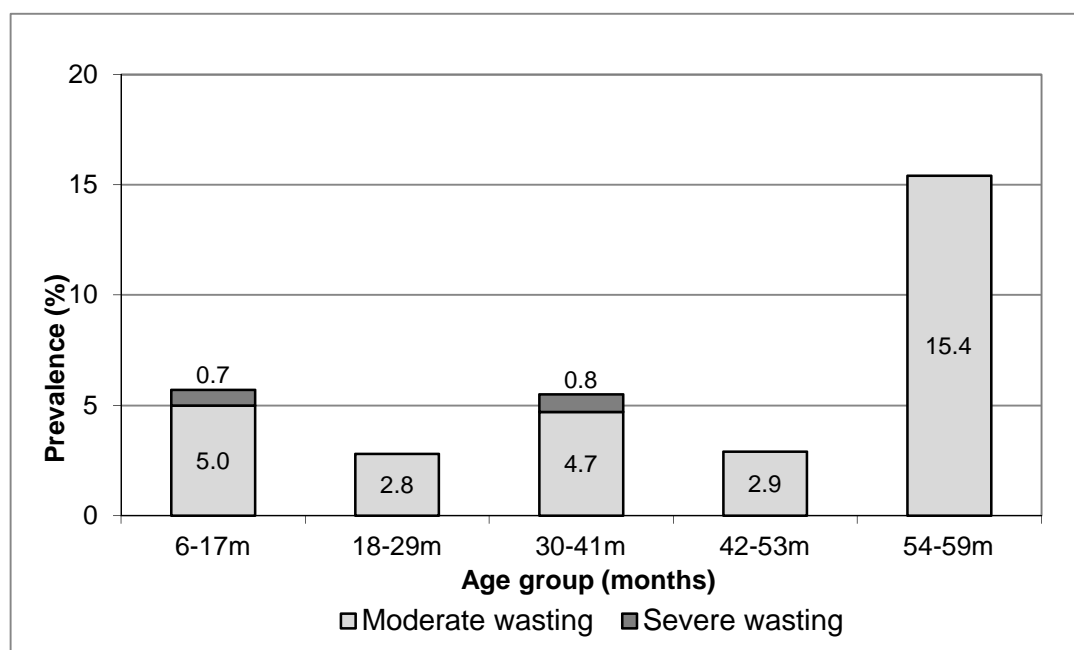
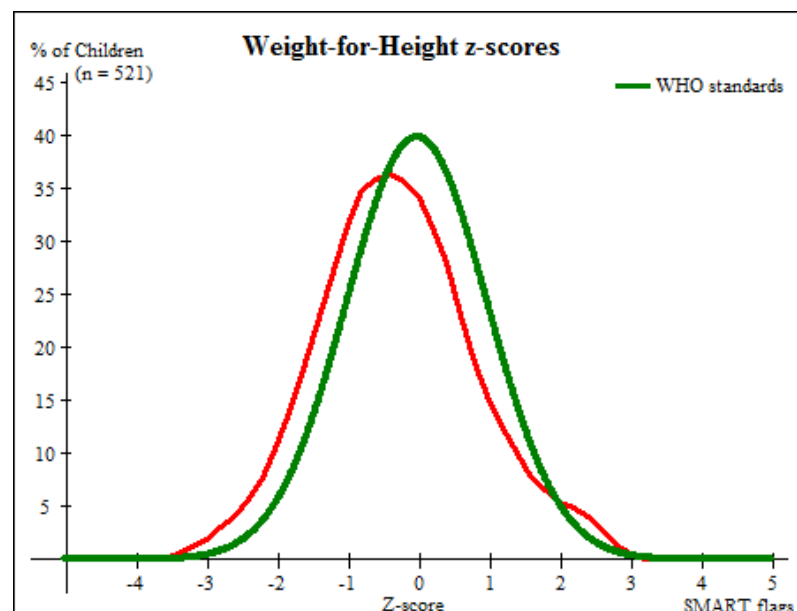


Table 14 Distribution of severe acute malnutrition and oedema based on weight-for-height z-scores

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 2 (0.4 %)	Not severely malnourished No. 519 (99.6 %)

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

Figure 8 Distribution of weight-for-height z-scores of survey population (red) compared to reference population (green) (based on WHO Growth Standards)



MUAC is being used in the community for screening and admission to therapeutic and supplementary feeding programmes¹⁰. As commonly found in certain populations, the prevalence of acute malnutrition when measured by MUAC is less compared WHZ (Table 15). There was no difference in MUAC <12.5cm between boys and girls ($p < 0.05$).

Table 15 Prevalence of MUAC Malnutrition

	All n = 529	Boys n = 269	Girls n = 260
Prevalence of MUAC < 12.5 cm and/or oedema	(13) 2.5 % (1.4 - 4.2 95% C.I.)	(4) 1.5 % (0.6 - 3.8 95% C.I.)	(9) 3.5 % (1.8 - 6.5 95% C.I.)
Prevalence of MUAC < 12.5 cm and >= 11.5 cm, no oedema	(11) 2.1 % (1.1 - 3.9 95% C.I.)	(4) 1.5 % (0.6 - 3.8 95% C.I.)	(7) 2.7 % (1.2 - 5.9 95% C.I.)
Prevalence MUAC < 11.5 cm and/or oedema	(2) 0.4 % (0.1 - 1.5 95% C.I.)	(0) 0.0 % (0.0 - 0.0 95% C.I.)	(2) 0.8 % (0.2 - 3.0 95% C.I.)

According to MUAC, moderate wasting predominately affected children 6-17 months old (Table 16).

Table 16 Prevalence of MUAC malnutrition ranges by age, based on MUAC cut off's and/or oedema

	MUAC < 115 mm	MUAC >= 115 mm and < 125	MUAC >= 125 mm	Oedema
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¹⁰ The cut-off for inclusion into the supplementary feeding programme is MUAC ≥ 11.5 and <12.5 cm, and for therapeutic feeding programme is MUAC <11.5 cm and/or oedema.

Age (mo)	Total no.			mm					
		No.	%	No.	%	No.	%	No.	%
6-17	143	0	0.0	9	6.3	134	93.7	0	0.0
18-29	111	1	0.9	1	0.9	109	98.2	0	0.0
30-41	131	1	0.8	0	0.0	130	99.2	0	0.0
42-53	105	0	0.0	1	1.0	104	99.0	0	0.0
54-59	39	0	0.0	0	0.0	39	100.0	0	0.0
Total	529	2	0.4	11	2.1	516	97.5	0	0.0

The prevalence of underweight (WAZ <-2) is presented in **Table 17**, and stunting in **Table 18**. There was no difference in the prevalence of stunting between boys and girls ($p < 0.05$)

Table 17 Prevalence of underweight based on weight-for-age z-scores by sex

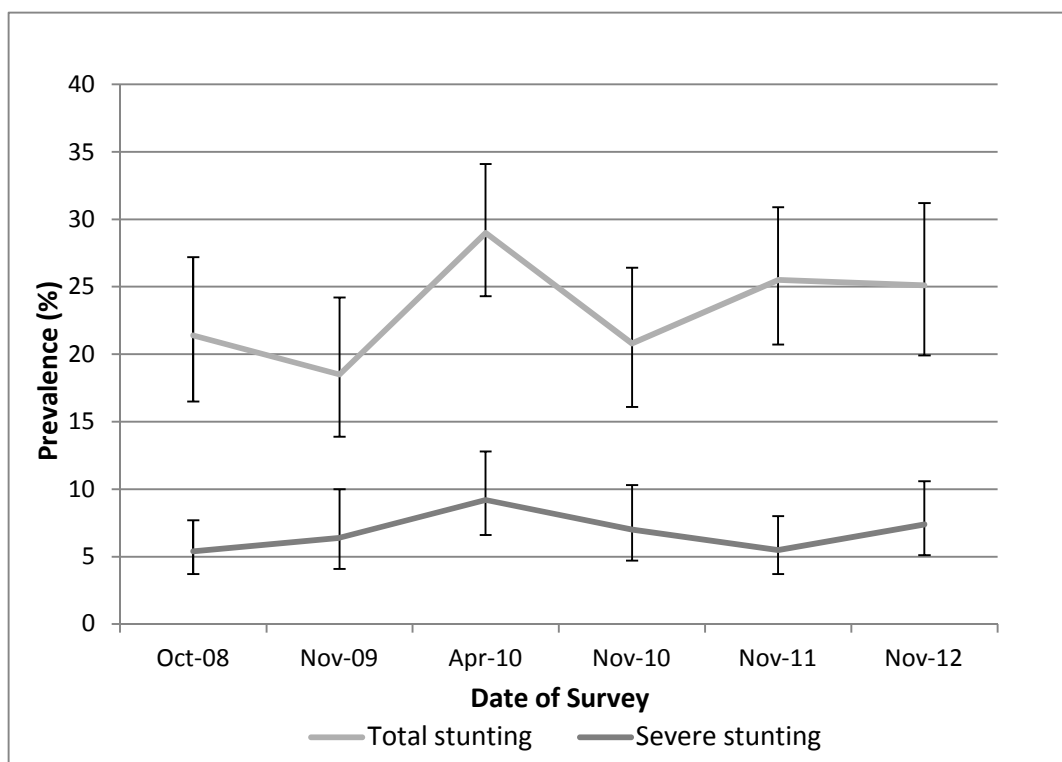
	All n = 523	Boys n = 267	Girls n = 256
Prevalence of underweight (<-2 z-score)	(63) 12.0 % (9.2 - 15.6 95% C.I.)	(33) 12.4 % (8.5 - 17.7 95% C.I.)	(30) 11.7 % (7.9 - 17.1 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(54) 10.3 % (7.6 - 13.9 95% C.I.)	(29) 10.9 % (7.0 - 16.4 95% C.I.)	(25) 9.8 % (6.1 - 15.3 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(9) 1.7 % (1.0 - 3.0 95% C.I.)	(4) 1.5 % (0.6 - 3.8 95% C.I.)	(5) 2.0 % (0.8 - 4.6 95% C.I.)

Table 18 Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 501	Boys n = 254	Girls n = 247
Prevalence of stunting (<-2 z-score)	(126) 25.1 % (19.9 - 31.2 95% C.I.)	(68) 26.8 % (20.1 - 34.7 95% C.I.)	(58) 23.5 % (18.0 - 30.1 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(89) 17.8 % (13.8 - 22.6 95% C.I.)	(48) 18.9 % (13.7 - 25.5 95% C.I.)	(41) 16.6 % (11.5 - 23.3 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(37) 7.4 % (5.1 - 10.6 95% C.I.)	(20) 7.9 % (4.5 - 13.5 95% C.I.)	(17) 6.9 % (4.2 - 11.2 95% C.I.)

Trends in the prevalence of global and severe stunting have remained fairly stable (between ~18-25% for global stunting and ~5-10% for severe), aside from a marked peak in April 2010 (**Figure 9**). Note that the April 2010 survey occurred at a different time of year from all other surveys presented.

Figure 9 Trends in the prevalence of global and severe stunting based on WHO growth standards in children 6-59 months from 2007-2011.



Overall, children 30-41 months old appeared most affected by stunting; both severe and moderate (Table 19, Figure 10). The height for age distribution of children surveyed is shifted to the left, demonstrating a lower height-for-age compared to the WHO reference for children 6-59 months (Figure 11). The survey population distribution curve is also wider indicating greater variance compared to the reference population.

Table 19 Prevalence of stunting by age based on height-for-age z-scores

		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	137	5	3.6	23	16.8	109	79.6
18-29	105	9	8.6	14	13.3	82	78.1
30-41	127	14	11.0	32	25.2	81	63.8
42-53	94	6	6.4	14	14.9	74	78.7
54-59	38	3	7.9	6	15.8	29	76.3
Total	501	37	7.4	89	17.8	375	74.9

Figure 10 Trends in the prevalence of stunting by age in children 6-59 months

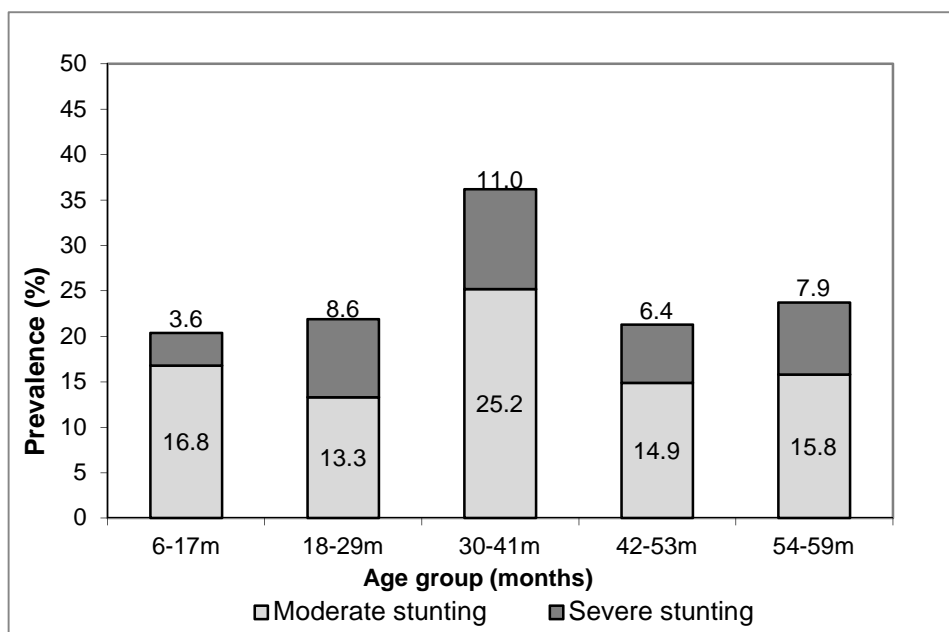
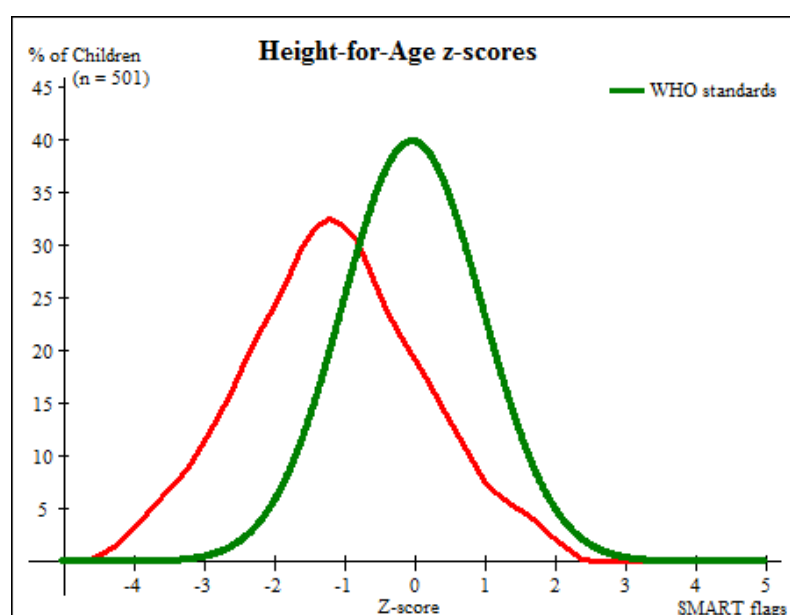


Figure 11 Distribution of height-for-age z-scores of survey population (red) compared to reference population (green)



The mean z-scores for acute malnutrition, stunting and underweight are presented in **Table 20** below.

Table 20 Mean z-scores, design effects and excluded subjects

Indicator	n	Mean z-scores \pm SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	521	-0.29 \pm 1.10	1.00	0	8
Weight-for-Age	523	-0.79 \pm 1.05	1.20	0	6
Height-for-Age	501	-1.14 \pm 1.24	2.06	0	28

* contains for WHZ and WAZ the children with oedema.

4.1.3 Feeding programme coverage results

Feeding programme coverage results are provided in **Table 21** and **Table 22**. These results must be interpreted with caution due to the small number of cases that were sampled during the survey.

Table 21 Programme coverage for acutely malnourished children based on all admission criteria (weight-for-height, MUAC, oedema)

	Number/total	% (95% CI)
Supplementary feeding programme coverage	4/32	12.5 (0-25.9)
Therapeutic feeding programme coverage	2/4	50.0 (0)

*WHZ flags excluded from analysis

Table 22 Targeted selective feeding programme coverage for acutely malnourished children 6-59m based on MUAC and oedema only

	Number/total	% (95% CI)
Supplementary feeding programme coverage	3/11	27.3 (0-62.3)
Therapeutic feeding programme coverage	1/2	50.0 (0)

4.1.4 Vaccination and supplementation programmes

Measles vaccination coverage results

Measles vaccination coverage for children 9-59 months was fairly high when confirmed by card or mother's recall at 96.1% (95% CI 92.7-99.5) (**Table 23**).

Table 23 Measles vaccination coverage for children aged 9-59 months (n=484)

	Measles (with card) n=398	Measles (with card <u>or</u> confirmation from caregiver) n=465
YES	82.2% (95% CI 77.6-86.9)	96.1% (95% CI 92.7-99.5)

Vitamin A supplementation coverage results

Vitamin A supplementation coverage by card was poor at only 67.2% (95% CI 58.6-75.8), however coverage was higher by card or mother's recall (**Table 24**).

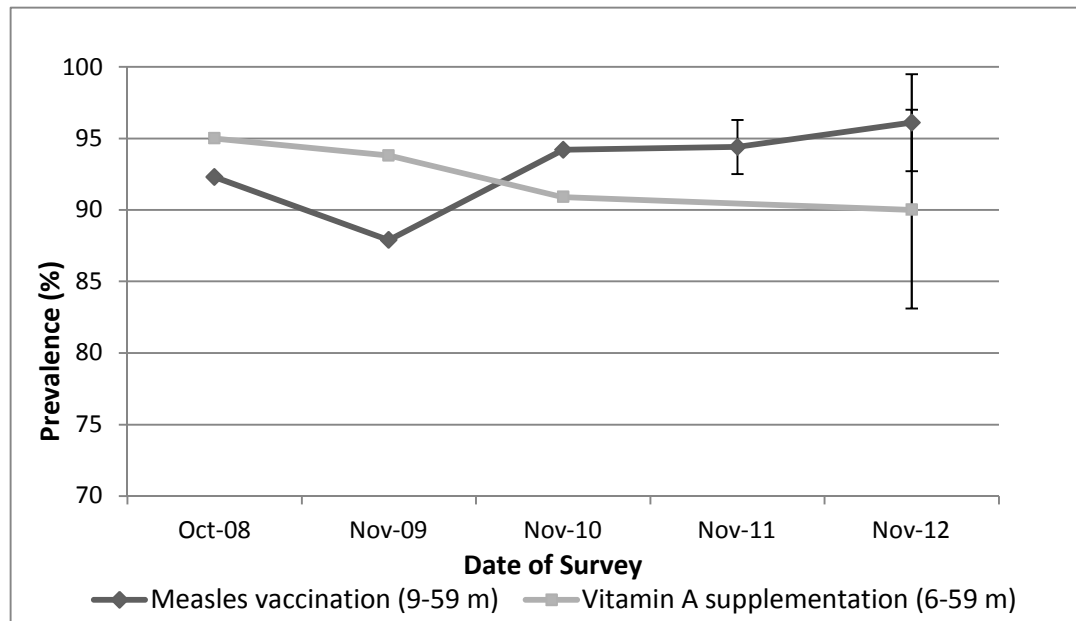
Table 24 Vitamin A supplementation for children aged 6-59 months within past 6 months (n=518)

	Vitamin A capsule (with card) n=348	Vitamin A capsule (with card <u>or</u> confirmation from caregiver) n=466
YES	67.2%	90.0 %

	(95% CI 58.6-75.8)	(95% CI 83.0-96.9)
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Figure 12 illustrates a slightly declining trend in the coverage of vitamin A supplementation by card and recall, and the reverse for measles vaccination coverage, except for 2009.

Figure 12 Trends in the coverage of measles vaccination and vitamin a supplementation in children 6-59 months from 2008-2012



4.1.5 Diarrhoea results

The results show that 5.4% (95% CI 3.0-7.8) of children 6-59 months surveyed experienced diarrhoea in the two weeks prior to the survey. In November 2011 this was as high as 22.8% (95% CI 18.2 – 27.5), which itself is double the level found in November 2010.

Table 25 Period prevalence of diarrhoea

	Number/total	% (95% CI)
Diarrhoea in the last two weeks	28/515	5.4 (3.0-7.8)

4.1.6 Anaemia in children 6-59 months

The prevalence of anaemia in children 6-59 months was 34.4% (95 %CI 29-39.8). There was only one case of severe anaemia (0.2%, 95% CI 0 - 0.6) (Hb<7.0g/dl). The breakdown of anaemia by severity is shown in **Table 26** below.

Table 26 Prevalence of anaemia and haemoglobin concentration in children 6-59 months of age

	6-59 n = 529	6-23 n=199	24-59 n=330

Total Anaemia (Hb<11.0 g/dL)	(182) 34.4 (95% CI 29.0-39.8)	(98) 49.2 (95% CI 41.1-57.4)	(84) 25.5 (95% CI 19.1-31.8)
Mild Anaemia (Hb 10.0-10.9 g/dL)	(99) 18.7 (95% CI 15.1-22.4)	(48) 24.1 (95% CI 18.5-29.8)	(51) 15.5 (95% CI 11.4-19.5)
Moderate Anaemia (7.0-9.9 g/dL)	(82) 15.5 (95% CI 11.7-19.3)	(49) 24.6 (95% CI 18.7-30.6)	(33) 10.0 (95% CI 5.7-14.3)
Severe Anaemia (<7.0 g/dL)	(1) 0.2 (95% CI 0-0.6)	(1) 0.5 (95% CI 0-1.5)	0
Mean Hb (g/dL) (95% CI) [range]	11.3 (95% CI 11.1-11.5) [6.4-15.5]	10.8 (95% CI 10.5-11.0) [6.4-14.3]	11.6 (95% CI 11.4-11.8) [7.0-15.5]

Comparison with results from November 2011 shows a significant decrease in anaemia in children 6-59 months ($p<0.05$) from 44.0% (95% CI 38.5-49.5) in 2011, to 34.4 (95% CI 29.0-39.8) accounting for a 21.8% reduction. This compares to a 40.2% reduction in the prevalence of anaemia between November 2010 and 2011.

Trend analysis shows that between 2008-2010 anaemia persistently remained above 70%, until 2011 where a significant reduction ($p<0.05$) was seen (**Figure 13**). Trends in haemoglobin concentration between 2008-2012 also show an improvement (**Figure 14**).

Figure 13 Trends in anaemia categories in children 6-59 months from 2008-2011.

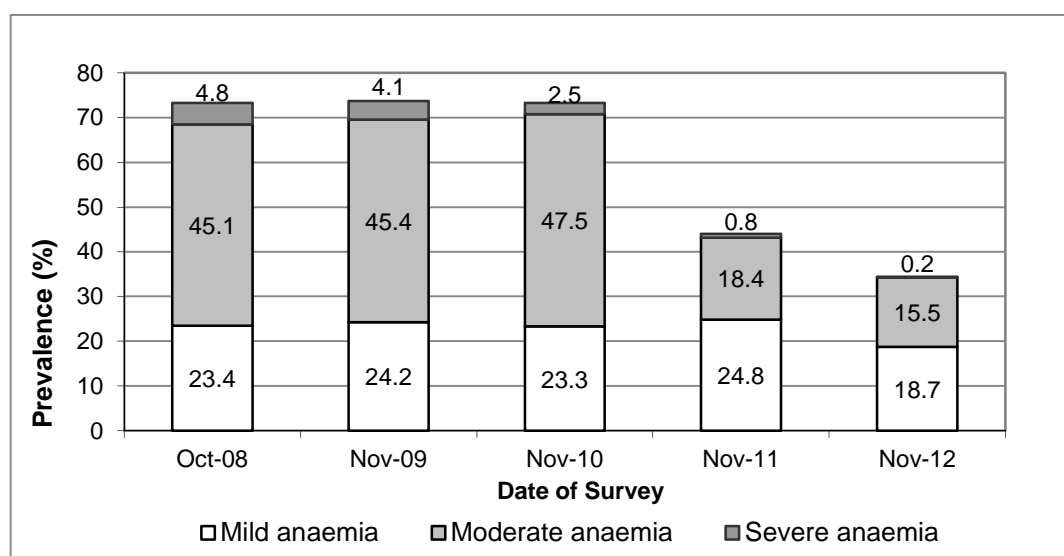
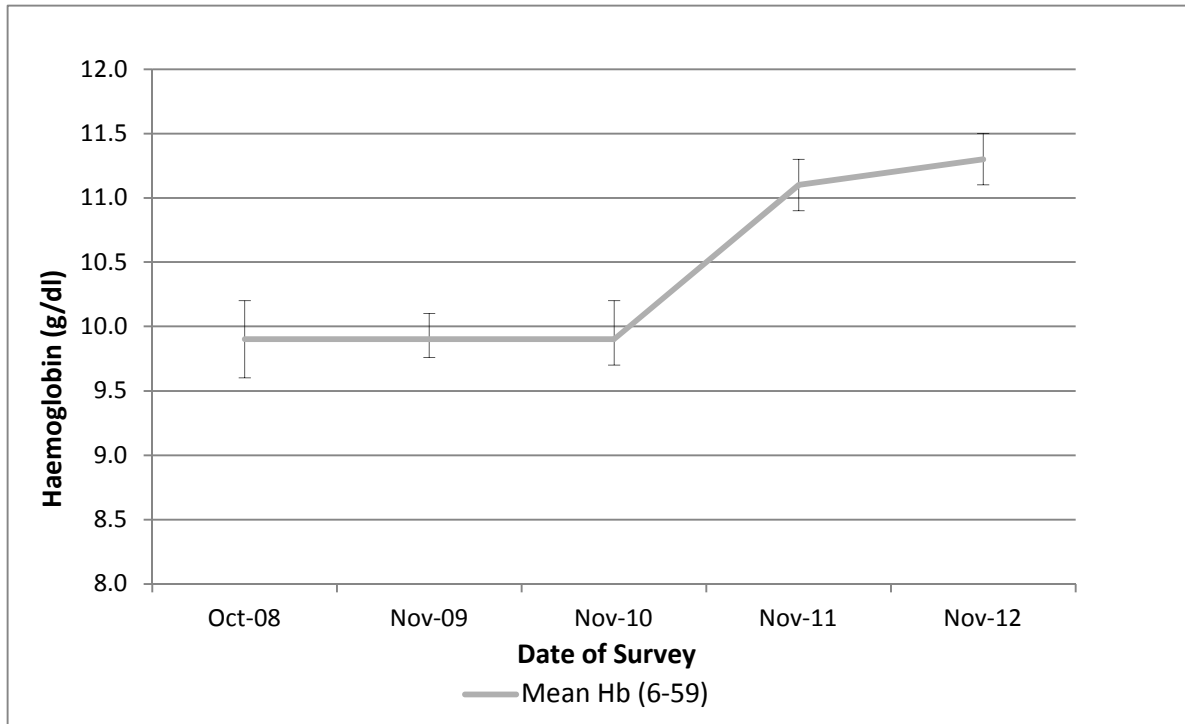


Figure 14 Trend in mean haemoglobin concentration in children 6-59 months from 2008-2012.



The 6-23 month age group had the highest prevalence of anaemia at 49.2 (95% CI 41.1-57.4), however this is an improvement compared to the 2010 levels of 80.3% (95% CI 71.0-90.0), which reduced to 57.3% (95% CI 49.3-65.4) in 2011 (note that between 2010-2011 the confidence intervals do not overlap indicating a significant difference, however due to the small sample sizes in this age group, this needs to be interpreted with caution). There were no cases of severe anaemia in the older age group.

4.2 CHILDREN 0-23 MONTHS

Table 28 summarises the results of the IYCF indicators assessed. Information on IYCF indicators were based on previous day recall¹¹.

The proportion of mothers reporting early initiation of breastfeeding was fairly high at 86.2% (95% CI 79.6-92.8), and similar to 2011 findings of 85.9%. Around three quarters of infants 0-5 months were being exclusive breastfed (76.4% 95% CI 68.1-84.6) compared to 85.9% (95% CI 77.9-93.8) in 2011.

Continuation of breastfeeding at 12 and 24 months was low at 61.7% (95% CI 44.8-78.6) and 54.3% (95% CI 37.3-71.3) respectively, indicating that nearly half of women are stopping breastfeeding earlier than the recommended 2 years¹².

Introduction of solid, semi-solid or soft foods at 6 to 8 months was also low at 63.3% (95% CI 47.2-79.5). This indicator is used to evaluate the introduction of complementary foods suggest that nearly one third of children 6-8 months do not receive complementary foods as per WHO recommendations. The majority of children received some sort of iron-rich or iron-fortified food. Around 6.3% (95% CI 2.5-10.1) of women were bottle feeding at the time of the survey thus exposing their child to an increased risk of illness and infection.

Table 28 Prevalence of infant and young child feeding practices indicators

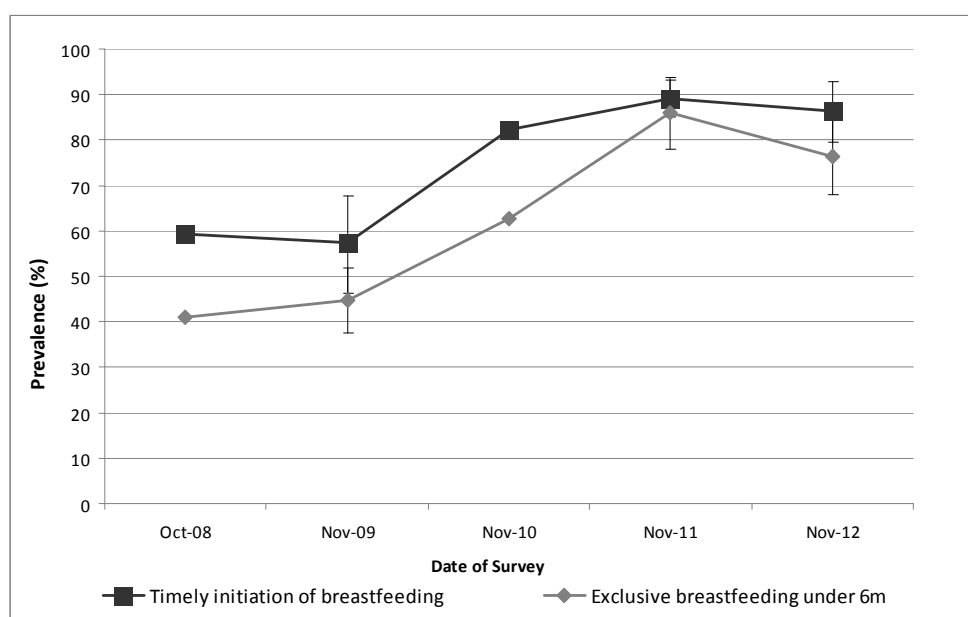
Indicator	Age range	Number/ total	Prevalence (%)	95% CI
Timely initiation of breastfeeding	0-23 months	218/253	86.2	79.6-92.8
Exclusive breastfeeding under 6 months	0-5 months	42/55	76.4	68.1-84.6
Continued breastfeeding at 1 year	12-15 months	29/47	61.7	44.8-78.6
Continued breastfeeding at 2 years	20-23 months	19/35	54.3	37.3-71.3
Introduction of solid, semi-solid or soft foods	6-8 months	18/35	51.5	34.5-68.3
Consumption of iron-rich or iron-fortified foods	6-23 months	173/193	89.6	83.7-95.6
Bottle feeding	0-23 months	16/252	6.3	2.5-10.1

Trend analysis indicates that an overall increasing trend in both timely initiation of breastfeeding and exclusive breastfeeding, with a slight drop in 2012 (**Figure 15**).

¹¹ Indicators for Assessing Infant and Young Child Feeding Practices (WHO, 2007).

¹² Ibid

Figure 15 Nutrition survey results (IYCF indicators) since 2008



*Note that in 2009, the exclusive breastfeeding indicator was calculated as the proportion of children 6-23 months that were exclusively breastfed during the first 6 months of their life.

The confidence intervals are an integral part of the results when analysing trends over the years¹³. 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.

Prevalence of intake

The proportion of children 0-23 months receiving infant formula (fortified or unfortified) was low at 16.7% (95% CI 9.3-24.2), although higher than 2011 figures of 1.9% (95% CI 0.4-3.4) (**Table 29**).

Table 29 Infant formula intake in children aged 0-23 months

	Number/total	% (95% CI)
Proportion of children aged 0-23 months who receive infant formula (fortified or non-fortified)	42/251	16.7 (9.3-24.2)

The proportion of children receiving CSB+ was low (**Table 30**). Only a fifth of children 6-23months were receiving CSB+ (from the general ration), however the proportion of children receiving CSB++ was 74.9% (95% CI 67.3-82.4) meaning that one quarter of children 6-23 months did not receive this product, intended for all children 6-23 months.

¹³ 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.

Table 30 CSB+ (supercereal) intake in children aged 6-23 months

	Number/total	% (95% CI)
Proportion of children aged 6-23 months who receive CSB+	39/194	20.1 (10.3-29.9)

Table 31 CSB++ (supercereal plus) intake in children aged 6-23 months

	Number/total	% (95% CI)
Proportion of children aged 6-23 months who receive CSB++	146/195	74.9 (67.3-82.4)

4.3 WOMEN 15-49 YEARS

The physiological status of the women sampled is shown in **Table 32** below.

Table 32 Women physiological status and age

Physiological status	Number/total	% of sample
Non-pregnant	232/260	89.2
Pregnant	27/260	10.4
Mean age (range)	27.1 (15-49)	

*Note that one woman did not know her pregnancy status.

4.3.1 Anaemia in non-pregnant women (15-49 years)

The prevalence of anaemia in non-pregnant women 15-49 is currently at medium public health significance according to WHO classifications (**Table 33**)^{14 15}. The majority of anaemic women are either mild or moderately anaemic.

Table 33 Prevalence of anaemia and haemoglobin concentration in non-pregnant women of reproductive age (15-49 years)

Anaemia in non-pregnant women of reproductive age (15-49 years)	All n = 229
Total Anaemia (<12.0 g/dL)	(59) 25.8% (95% CI 19.5-32.0)
Mild Anaemia (11.0-11.9 g/dL)	(32) 14.0% (95% CI 8.8-19.1)
Moderate Anaemia (8.0-10.9 g/dL)	(24) 10.5 % (95% CI 6.8-14.1)
Severe Anaemia (<8.0 g/dL)	(3) 1.3% (95% CI 0-2.8)
Mean Hb (g/dL) (95% CI) [range]	12.8g/dL (95% CI 12.6-13.0) [7.0, 16.1]

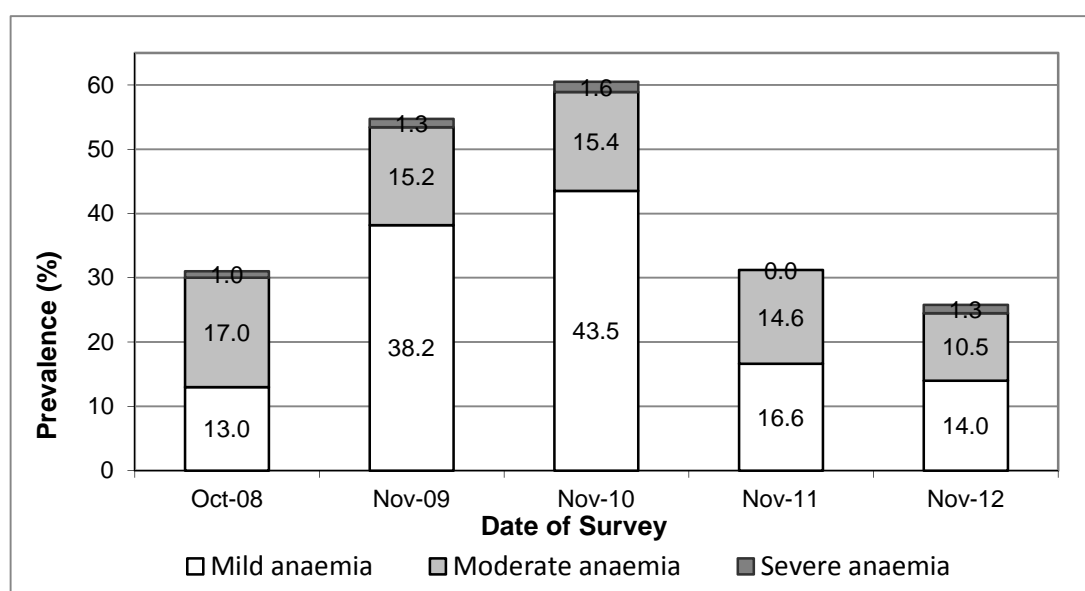
¹⁴WHO (1995) Physical Status: The Use and Interpretation of Anthropometry available from: http://www.who.int/childgrowth/publications/physical_status/en/index.html; and WHO (2000)

¹⁵ The Management of Nutrition in Major Emergencies available from <http://www.who.int/topics/nutrition/publications/emergencies/en/>

Trends in anaemia categories were assessed from 2008-2012 (see **Figure 16**). Anaemia peaked considerably in November 2009 and 2010, compared to previous years (which coincided with a peak in GAM in 2009). Anaemia decreased significantly ($p<0.05$) between 2010 and 2011 ($p<0.05$), however there was no significant difference between 2011 and 2012 ($p>0.05$).

Interestingly, unlike trends in anaemia categories in children 6-59 months where mild anaemia remained relatively stable, in women 15-49, between 2008-2012 the majority of the reduction in total anaemia is accounted for by a reduction in mild anaemia. Note that the anaemia categories (mild, moderate and severe) from 2008-2010 need to be interpreted with caution as WHO cut offs were not used. Nevertheless, there appears to have been a considerable decline, particularly in the prevalence of mild anaemia.

Figure 16 Trends in anaemia categories in women of reproductive age (non-pregnant) from 2008-2012.



**Note that from 2008-2010, the WHO cut offs for anaemia categories in non-pregnant women were not used; instead the following haemoglobin cut offs were used; severe <7g/dl, moderate 7-9.9g/dl, mild 10-11.9gdl. These results therefore need to be interpreted with caution.

In order to assess trends, a minimum of three time points area required; as results from mean haemoglobin concentration were only available for 2011 and 2012 it was not possible to assess trends in this indicator.

Table 34 ANC enrolment and iron-folic acid pills coverage among pregnant women (15-49 years)

	Number /total	% (95% CI)
Currently enrolled in ANC programme	24/27	88.9 (76.8-100)
Currently receiving iron-folic acid pills	21/27	77.8 (59.9-95.6)

4.3.2 MUAC of pregnant and lactating women (15-49 years)

Among the 59 women who were pregnant or had a child <6months (i.e. eligible for Kakuma Nutrition Survey November 2012

the blanket supplementary feeding programme), there were none who were malnourished according to the cut offs used in Kakuma of MUAC <21.0cm (**Table 35**). Note that MUAC data was missing for 1 woman.

Table 35 Undernutrition based on MUAC (PLWs)

Pregnant and lactating women	Number/total	% (95% CI)
Total malnourished (MUAC <21.0cm)	0/58	0

4.4 FOOD SECURITY

Table 36 Food security information

Household data	Planned	Actual	% of target
Total households surveyed for Food Security	289	254	87.9

4.4.1 Food distribution results

Data was collected on the last completed General Food Distribution (GFD) prior to data collection, i.e. the GFD in the last two weeks of October. Coverage of ration cards for all households interviewed was excellent at 100% (**Table 37**), however the ration only lasted 70% of the intended 15 day duration (**Table 38**). The ration lasted less than the expected 15 days for the majority of households.

Table 37 Ration card coverage

	Number/total	% (95% CI)
Proportion of households with a ration card	254/254	100

Table 38 Reported duration of general food ration 1

Average number of days the food ration lasts (95% CI)	Average duration (%) in relation to the theoretical duration of the ration*
10.5 (10.0-10.9)	70%

*Intended duration =15 days

Table 39 Reported duration of general food ration 2

Reporting on duration of food ration	Number/total	% (95% CI)
Proportion of households reporting that the food ration lasts the entire duration of the cycle	9/254	3.5 (0.5-6.6)
Proportion of households reporting that the food ration lasts <15 days	245/254	96.5% (93.4-99.5)
Proportion of households reporting that the food ration lasted:		
≤75% of the cycle [11 days or less]	147/254	57.9 (50.2-65.4)

>75% of the cycle [12 days or more]	107/254	42.1 (34.5-49.8)
-------------------------------------	---------	------------------

4.4.2 Negative coping strategies results

The two most common negative coping strategies over the month prior to the survey were to reduce the quantity and/or frequency of meals, and borrow cash, food, and other items (without interest). Other common coping strategies used by households are provided in **Table 40**.

Table 40 Coping strategies used by the surveyed population over the past month

	Number/total	% (95% CI)
Proportion of households reporting using the following coping strategies over the past month*:		
Borrowed cash, food or other items <i>without interest</i>	112/254	44.1 (33.0-55.1)
Borrowed cash, food or other items <i>with interest</i>	36/254	14.2 (7.9-20.4)
Sold any assets (furniture, seed stocks, tools, other NFI, livestock etc.)	32/254	12.6 (6.8-18.4)
Requested increase remittances or gifts as compared to normal	22/254	8.7 (4.4-13.0)
Reduced the quantity and/or frequency of meals	131/254	51.6 (39.4-63.8)
Begged	49/254	19.3 (10.7-27.9)
Engaged in potentially risky or harmful activities (list activities)	1/254	0.4 (0-1.2)
Sent at least one child to work outside the household in order get cash or in-kind goods or services	14/170	8.2 (3.6-12.8)
Proportion of households reporting using none of the coping strategies over the past month	65/254	25.6 (16.9-34.3)

* The total will be over 100% as households may use several negative coping strategies.

4.4.3 Household dietary diversity results

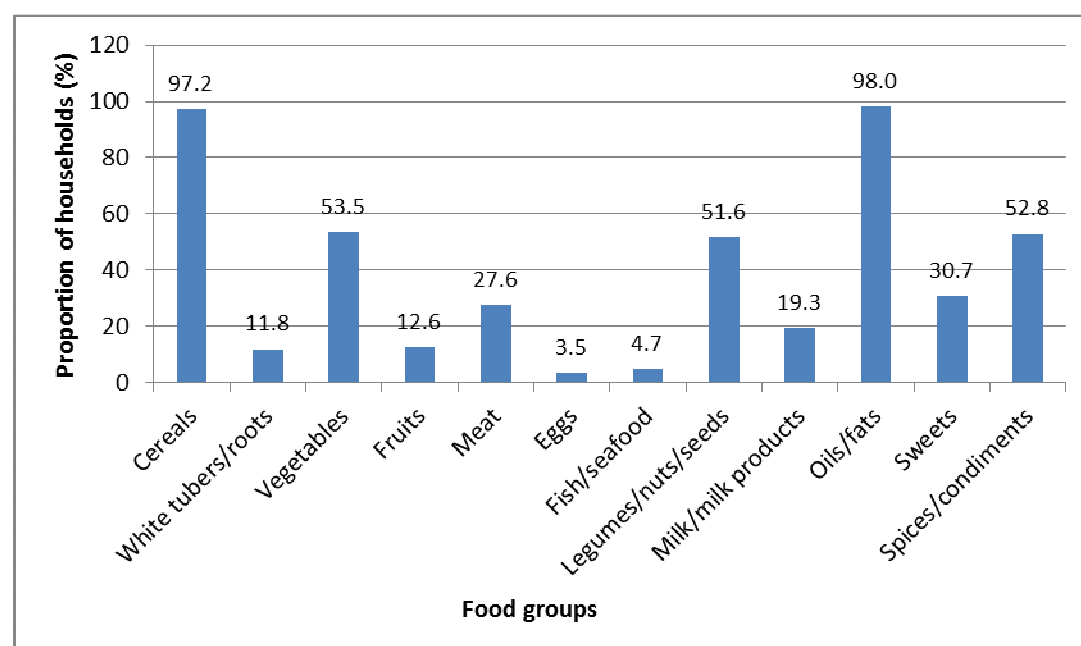
Household dietary diversity is a useful proxy for dietary intake and household food access. The mean household dietary diversity score (HDDS) was low at 4.6 out of a total of a total of 12 food groups (**Table 41**), indicating that the majority of the households surveyed had poor dietary diversity.

The most common food groups consumed in the 24 hours before the survey were oils/fats (98.0%); followed by cereals (97.2%); vegetables (53.5%) and pulses (51.6%). Note that the last full GFD started 12 days, and ended 6 days prior to data collection. The 2nd monthly GFD started on day 3 of the survey.

Table 41 Average HDDS

	Mean (95% CI)
Average HDDS	4.6 (4.1-5.2)

Figure 17 Proportion of households consuming different food groups within last 24 hours



Analysis was conducted on consumption of micronutrient rich foods (**Table 42**).

Consumption of high protein foods was low; >70% of households did not eat any flesh foods in the previous 24 hours, as was consumption of vitamin A rich foods. Nevertheless, the majority of households did consume at least one of the following; vegetables, fruit, meat, eggs or milk.

Table 42 Consumption of micronutrient rich foods by households

	Number/total	% (95% CI)
Proportion of households <i>not consuming any</i> vegetables, fruits, meat, eggs, fish/seafood, and milk/milk products	93/253	36.8 (27.1-46.4)
Proportion of households consuming either a plant or animal source of vitamin A	116/252	46.0 (36.3-55.8)
Proportion of households consuming organ meat/flesh meat, or fish/seafood (food sources of haem iron)	77/253	30.4 (20.8-40.0)

4.4.4 Food Distribution Analysis

The content of the food ration distributed in the 2nd cycle of October 2012 (used as a proxy for 2012) shows that it met and exceeded Spheres (Sphere, 2011) for energy, lipids, proteins, iodine, vitamin A and vitamin C, but not for iron or calcium. The planned food ration contents was projected to meet the standard recommendations mainly through CSB+ for calcium, vitamin A and C, maize grain for iron and iodized salt for the provision of iodine (**Table 43**).

The macronutrient recommendations were met by the food ration actually distributed almost every cycle. As demonstrated in **Figure 18**, the ration provided a higher

amount than the standard recommendation of 2,100 kcal (the lower limit for an adequate diet) almost every cycle. Only 3 cycles had below standard kilocalorie content.

During the second cycle of September, maize was not provided as part of the food ration, leaving only fortified wheat flour, peas, CSB+, oil and salt, which explains the decrease in macronutrient content of the food ration in this cycle (**Figure 19**). It is also worth noting that maize meal was replaced with rice in the second cycle of March and maize meal replaced wheat flour in the first cycle of May, leading to some variation in macronutrient content compared to the planned ration.

The recommendations for iodine and vitamin A were met by the distributed food ration in every cycle whereas they were never met for calcium and iron. Over the course of the year, the ration provided approximately a quarter of the recommendation for calcium and half the recommendation for iron. On the other hand, double the iodine recommendation, well over the full vitamin A recommendation and approximately 100% of the vitamin C recommendation were met almost every cycle of 2012 (**Figure 20**).

Table 43 Content of general food ration based on 2nd cycle of October 2012 (WFP distribution report)¹

Item	Standard recommendation (Sphere 2011)	Provision by ration	Ration Contents					
			Maize grain, white	Wheat flour, white	Peas, dried, split	CSB+	Salt, iodised	Oil, vegetable
Energy (Kcal)	2,100	2,252	776	785	214	156	0	322
Lipids (g)	40	52.7*	8.9	3.4	0.8	3.3	0.0	36.4
Proteins (g)	53	69.7**	22.2	25.8	15.4	6.3	0.0	0.0
Iron (mg)	32	15.3	6.0	2.6	2.8	3.9	0.0	0.0
Iodine (mcg)	138	330	0	0	1	17	312	0
Calcium (mg)	989	248	16	34	35	164	0	0
Vitamin A (mcg RAE)	550	586	0	0	28	230	0	328
Vitamin C (mg)	41.6	43	0	0	1	42	0	0

¹Recommended daily minimum kcal is 2,100

*21.1% of total energy

**12.4% if total energy

Figure 18 Daily kilocalories in general food distribution during 2012 (WFP distribution report)

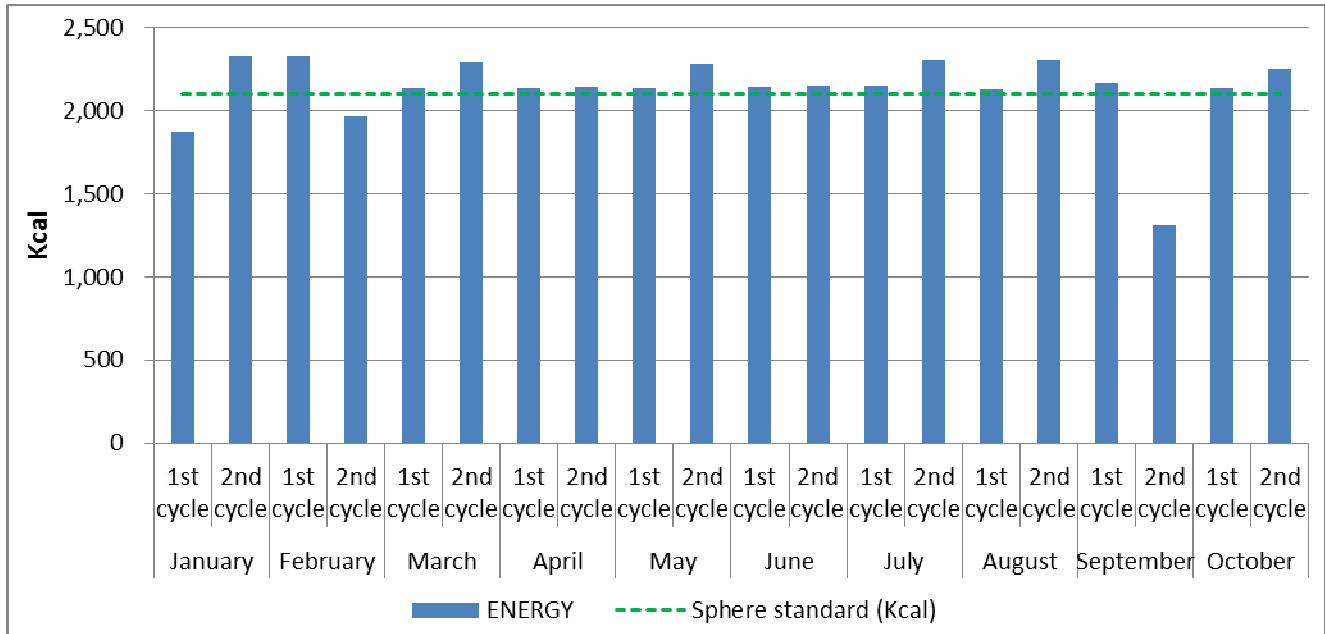


Figure 19 Trend in actual energy and selected macronutrients provided in general food ration during 2012¹ (WFP distribution report)

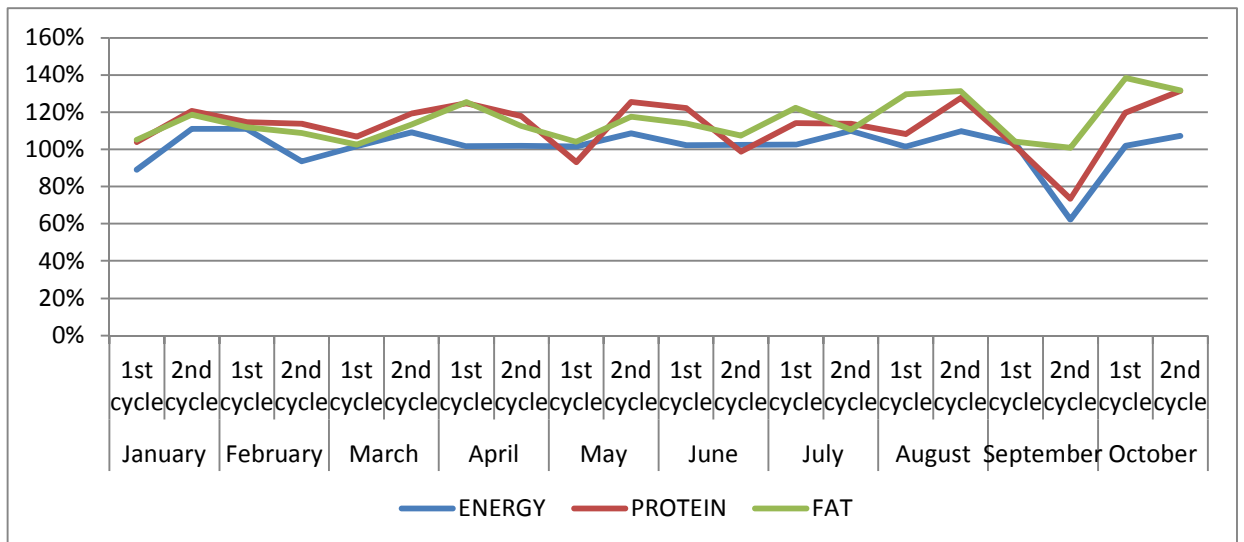
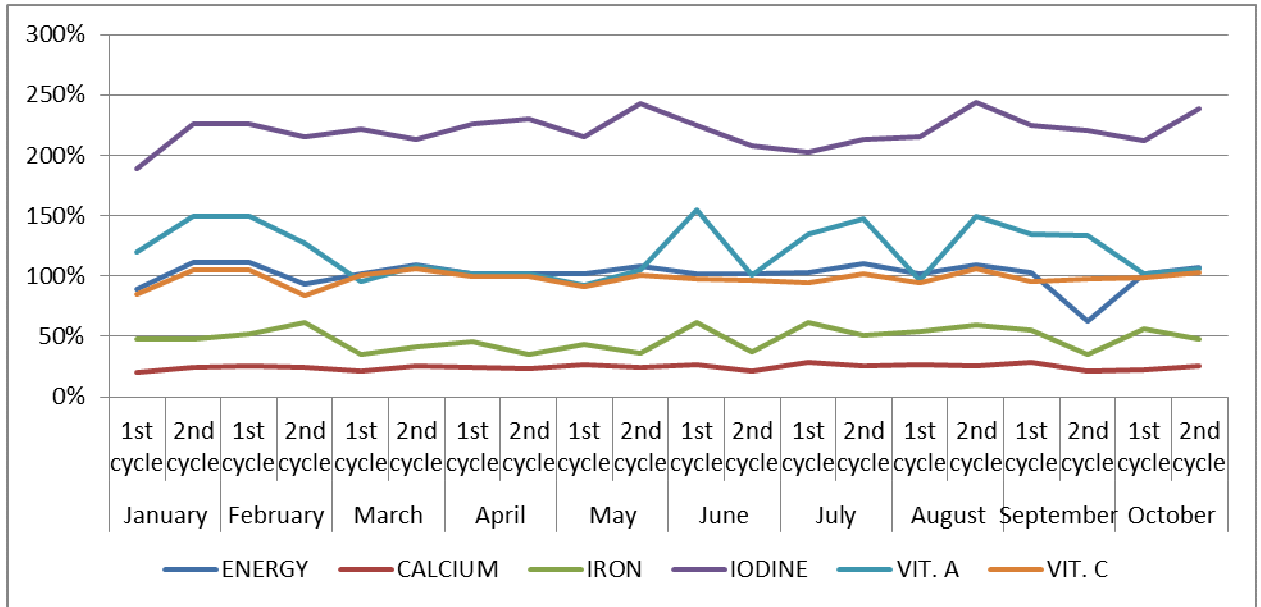


Figure 20 Trend in actual energy and selected micronutrients provided in general food ration during 2012¹ (WFP distribution report)



4.5 WATER, SANITATION AND HYGIENE

Table 44 WASH information

Household data	Planned	Actual	% of target
Total households surveyed for WASH	570	522	91.6

Encouragingly, the majority of households were using an improved source of drinking water and were storing it in a covered or narrow necked container (**Table 45**).

Table 45 Water Quality

	Number/total	% (95% CI)
Proportion of households using an improved* drinking water source	521/522	99.8 (99.4-100)
Proportion of households that use a covered or narrow necked container for storing their drinking water	507/520	97.5 (95.3-99.7)

*According to UNHCR's SENS Improved drinking water sources are; public tap/standpipe, protected dug well or rain-water collection. All other sources were considered un-improved.

However, although mean water usage was 20.1, around half of the households surveyed had < 20 litres per person per day (lpppd) available, and just over one third of third had <15 lpppd available (**Table 46**). Note that the data collected here relates to water usage at the individual level (no information on what the water is used for is collected), whereas UNHCR's target of ≥20 litres per person per day relates to water availability.

Table 46 Water Quantity: Amount of litres of water used per person per day

Proportion of households that use:	Number/total	% (95% CI)
≥ 20 lpppd	251/520	48.3 (41.5-55.0)
15 – <20 lpppd	72/520	13.8 (10.1-17.6)
<15 lpppd	197/520	37.9 (31.2-44.6)

Note: The average water usage in lpppd was 20.1 (18.2-22.0).

Details of water satisfaction are provided in **Table 47** and **Figure 21**. The main reasons for dissatisfaction with the water supply are shown in **Figure 22** below. Over three quarters of respondents felt there was not enough water available. Out of the 6 households who stated 'other' as a reason for dissatisfaction, five said it was due to lack of jerry cans.

Table 47 Satisfaction with water supply

	Number/total	% (95% CI)
Proportion of households that say they are satisfied with the drinking water supply	343/522	65.7 (56.6-74.8)

Figure 21 Proportion of households that say they are satisfied with the water supply

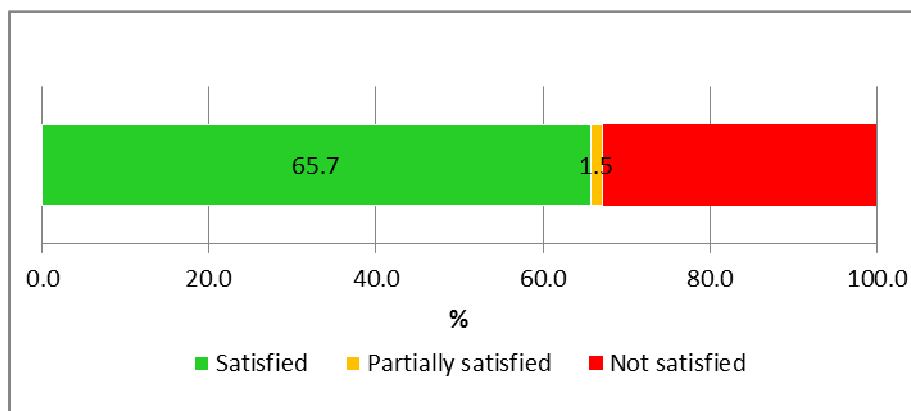
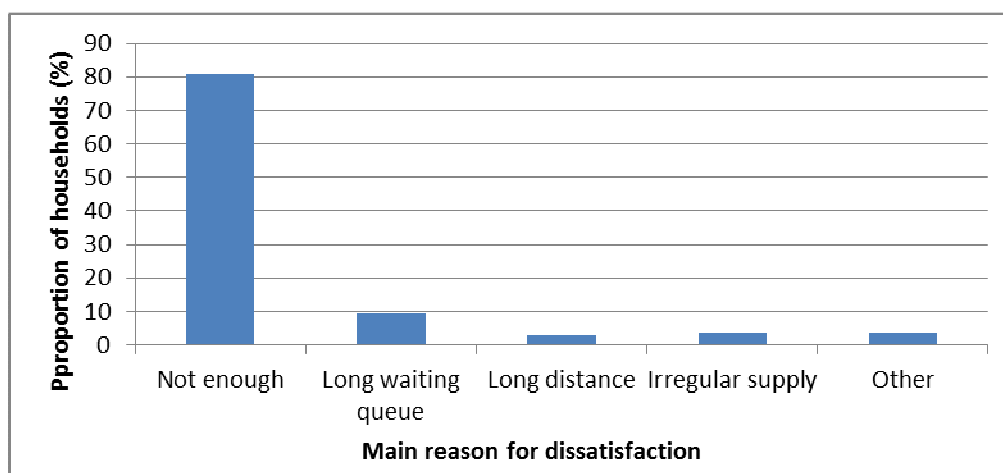


Figure 22 Main reason for dissatisfaction among households not satisfied with water supply



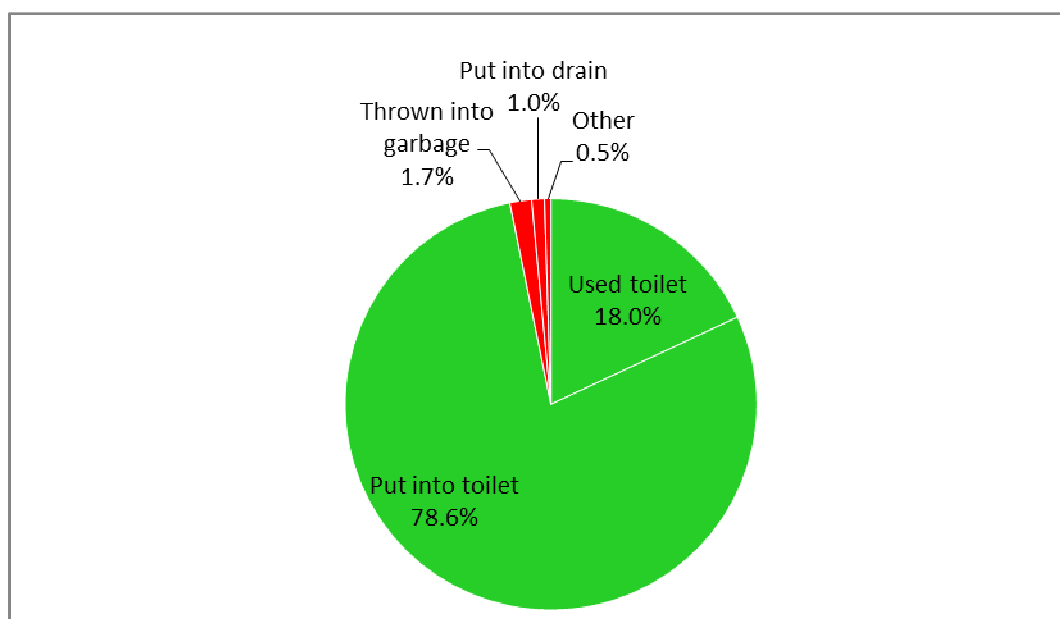
The proportion of households using improved toilet facilities (i.e. pit latrine with floor slab shared by 2 households or less) was low at just over 50% (see **Table 48** for full details).

The vast majority of households with children under three years old dispose of faeces safely (97%).

Table 48 Safe excreta disposal

	Number/total	% (95% CI)
Proportion of households that use:		
An improved excreta disposal facility (improved toilet facility, not shared)	287/516	55.6 (46.5-64.7)
A shared family toilet (improved toilet facility, 2 HH only)	77/516	14.9 (10.3-19.6)
A communal toilet (improved toilet facility, 3 HH or more)	114/516	22.1 (12.3-31.8)
An unimproved toilet (unimproved toilet facility or public toilet)	38/516	7.4 (2.2-12.5)
Proportion of households with children under three years old that dispose of faeces safely.	284/294	96.6 (93.8-99.4)

Figure 23 Proportion of households with children under the age of 3 years whose (last) stools were disposed of safely.



4.6 Mosquito net ownership and utilisation

Table 49 Mosquito net coverage information

Household data	Planned	Actual	% of target
Total households surveyed for mosquito net coverage	289	256	88.6%

Mosquito net ownership for the 256 households surveyed is shown in **Table 50** below. Results indicate that the UNHCR target coverage of 80% coverage of LLINs has been reached; 91.4% of households owned a at least one LLIN, compared to 62.2% (95% CI 54.6-69.8) in 2011.

The proportion of household members (total, under five and pregnant women) who slept under either a net of any type or an LLIN was encouraging (**Table 52**). 80.2% of household members slept under a net of any type, all but one of the pregnant women slept under an LLIN, and 86.4% children under 5 slept under an LLIN. Nevertheless, 20% of the population are still not sleeping under nets.

Table 50 Household mosquito net ownership

	Number/total	% (95% CI)
Proportion of total households owning at least one mosquito net of any type	244/256	95.3 (91.7-98.9)
Proportion of total households owning at least one LLIN	234/256	91.4 (87.0-95.8)

Figure 24 Household ownership of at least one mosquito net (any type)

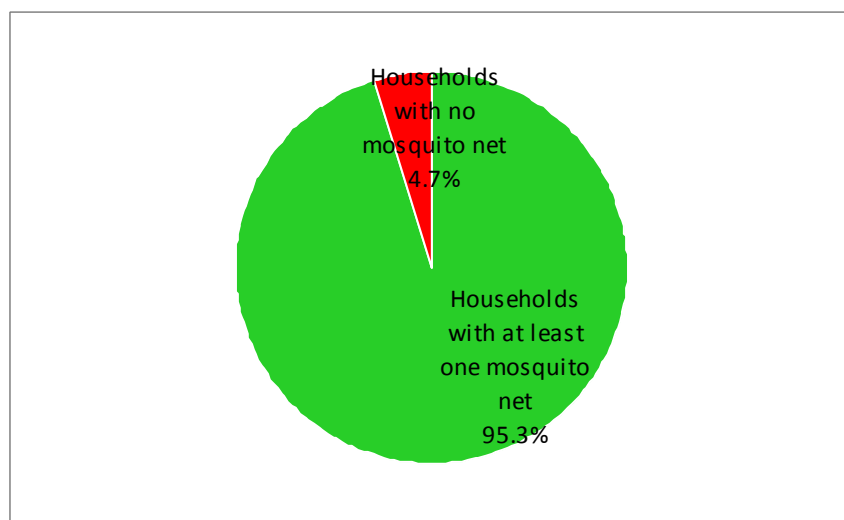


Figure 25 Household ownership of at least one Long-Lasting Insecticide Net (LLIN)

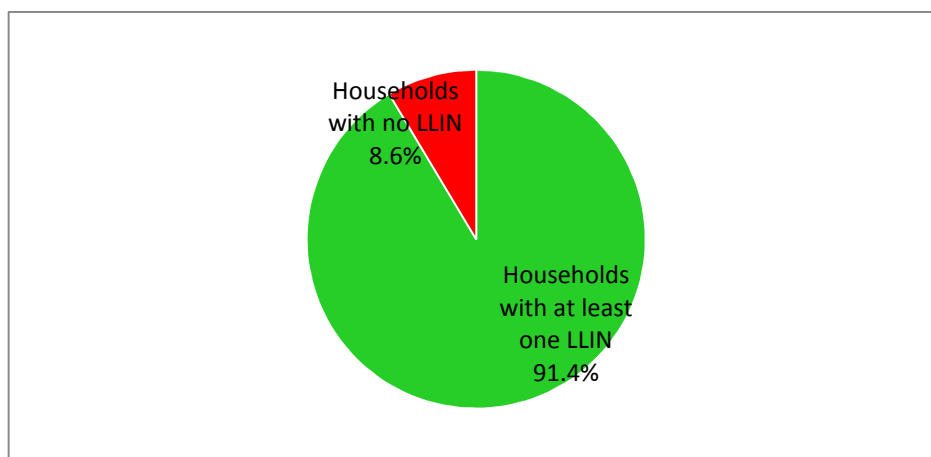


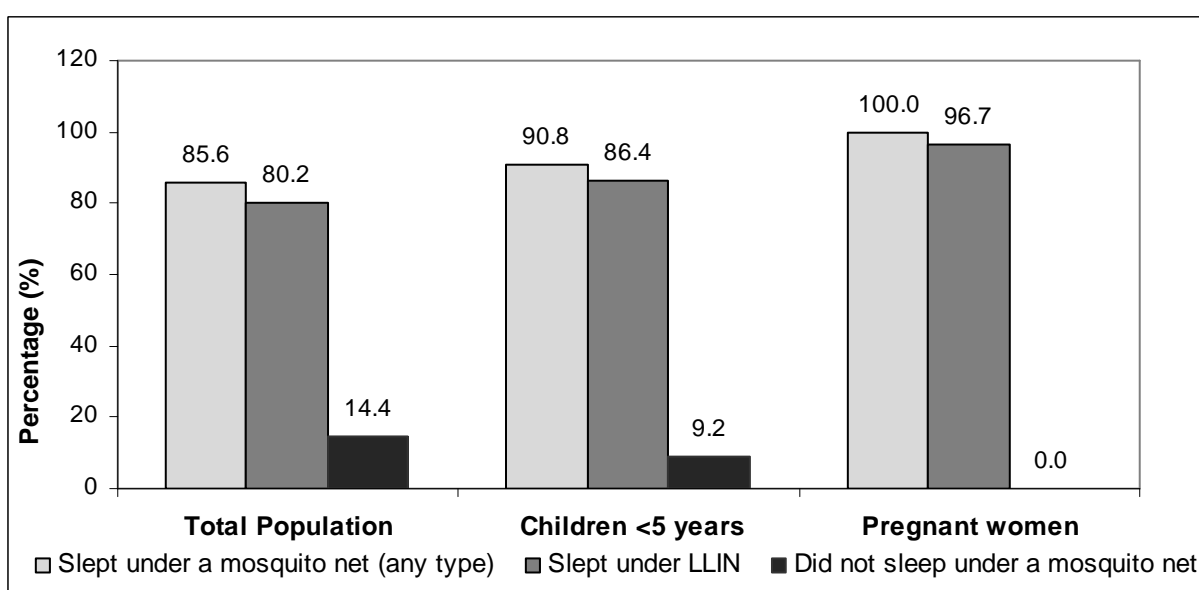
Table 51 Number of nets

Average number of LLINs per household	Average number of persons per LLIN
2.4	2.6

Table 52 Mosquito net utilisation.

	Proportion of total population (all ages)		Proportion of 0-59 months		Proportion of pregnant women	
	1558/1570	%	295	%	30	%
Slept under net of any type	1336	85.6	268	90.8	30	100
Slept under LLIN	1259	80.2	255	86.4	29	96.7

Figure 26 Mosquito net utilisation by sub-groups



There has been no Indoor Residual Spraying (IRS) of any households within the past year, therefore IRS coverage has not been included (the last spraying was May 2011).

5 Limitations

- **Data quality:** The overall quality of the data collected was good as indicated by the ENA plausibility score of 8% (see **Annex 1**). The majority of negative points were due to the overall age distribution; as mentioned there were considerably less children in the 54-59 month age group as frequently seen in Kakuma nutrition surveys. This is perhaps due to mothers more accurately recalling the date of birth of younger children.
- **Accuracy of population data:** UNHCR's ProGres data was used for planning and cluster selection as no CHP census data was available for 2012. The database had not yet been fully updated to the new camp address system (implemented in December – January 2010/11), and a number of blocks were listed that no longer exist. Additionally, the influx of new arrivals throughout 2012 may have affected the accuracy of the population per block due to movement within in the camp. Lastly, no data was available in ProGres for the newest blocks, and therefore were estimated based on the number of households present, and average household size.
- **The use of CHPs for data collection:** This 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 CHPs rather than what is practiced, for example regarding exclusive breastfeeding to children < 6 months.
- **Selective feeding programme coverage for young children:** Selective feeding programme coverage results should be interpreted with caution due to the small survey sample size.
- **Programme coverage for women:** The coverage of ANC enrolment of and iron-folic acid supplementation to pregnant women, and MUAC in PLW should be interpreted with caution due to the small number of beneficiaries that were sampled during the survey.
- **Number of indicators used:** 6 different modules / questionnaires were used in the survey as is becoming increasingly common in UNHCR surveys. As this is quite time consuming it can lead to interviewer fatigue, which may affect the quality of the results. Teams were strictly supervised however throughout data collection.
- **Languages:** A number of different languages are spoken by the various ethnic groups residing in Kakuma. Efforts were made to ensure that each team was made up of individuals who could speak each of the languages. However there were rare occasions where none of the team spoke the household language, and were instead reliant on untrained CHP members joining the team for the day for translation which may have introduced inaccuracies in interpretation¹⁶.

¹⁶ To help with this, future nutrition surveys should aim to translate questionnaires in to all languages spoken in the camp.

6 Discussion

6.1 Nutritional status of young children

The results of the 2012 Kakuma nutrition survey showed a GAM of 5.2% (95% CI 3.6-7.4), and 2 cases of SAM (0.4%, 5% CI 0.1-1.5) among children 6-59 months, continuing the decreasing trend seen since 2010, and indicating that the current situation is slowly improving. Nevertheless, the prevalence of GAM is still above 5% (WHO classification indicating GAM of acceptable public health significance). For three years, the prevalence of GAM has remained below the 10% threshold, and considered 'poor' in terms of public health significance. The prevalence of GAM is comparable to Kenyan national levels of 5.8%¹⁷.

Continued efforts are needed to ensure this improvement is maintained. It must be noted that the influx of new arrivals (approximately 20% of the current population) may have diluted the GAM results, as anecdotally, new arrivals frequently arrive in a better state than the general population, and deteriorate in terms of nutritional status after arrival.

The oldest age group (54-59 months) appeared have the highest prevalence of malnutrition (MAM only), however the sample size in this age group was very small compared to the other age groups, therefore these results need to be interpreted with caution. Nevertheless, this may warrant attention. Aside from this age group, the youngest age group were most vulnerable to malnutrition (as with previous years), followed by children 30-41 months. The higher number of younger children with acute malnutrition is likely due to the weaning process whereby breastfeeding is stopped or reduced and hence the child is more vulnerable to environmental factors influencing their nutritional status. This may also be due to the limited quantity and quality of complementary foods, particularly essential at this age for growth and development. This is compounded by the fact that only half of children 6-8 months were receiving complementary foods by the age of 6-8 months as is recommended by WHO.

The prevalence of stunting was fairly low at 25.1% (95% CI 19.9-31.2), with 7.4% (95% CI 5.1-10.6) of children suffering from severe stunting; this is considered 'poor' according to WHO classification. This is comparable to national levels in Kenya of 29.6%¹⁸. The 30-41 month age group appeared to be most vulnerable to stunting, which may be due to the slightly higher prevalence of GAM in the younger age groups, and the fact that catch up growth may not be apparent yet.

The proportion of children 6-59 months experiencing diarrhoea in the two weeks prior to the survey was low at 5.4% (95%CI 3.0-7.8). This is considerably lower than in November 2011 where the prevalence was 22.8% (95% CI 18.2 – 27.5), which itself is double the level found in November 2010. Considering the unprecedented rains experienced in 2012, this low level is surprising and perhaps indicates good hygiene and care practices, in the context of an average but improving WASH situation. Diarrhoea is closely linked to nutritional status and with insufficient water quality and poor hygiene practices and is a major cause of admission to stabilisation centres for children with severe malnutrition. Note that although surveyors were all aware of the definition of diarrhoea, as information was collected based on mother's recall, there may have been mistakes in mother's interpretation of diarrhoea.

¹⁷ Kenyan Demographic and Health Survey (2008-2009)

¹⁸ Ibid

Similarly to 2011, upper and lower respiratory tract infections were the most common cause of morbidity in 2012. Following this were malaria and diarrhoea. Probably due to the increased rains, 2012 has seen a considerable peak in malaria infections; however it is believed that malaria diagnostic and treatment is very well managed in Kakuma. Nevertheless, infections such as these compromise the nutritional status of children because of higher nutrient requirements and appetite suppression as a result of illness. Malnourished children are prone to infections because of a compromised immune system. With this in mind the decrease in malnutrition prevalence is even more encouraging.

The prevalence of malnutrition was lower when measured by MUAC compared to weight-for-height; MUAC <12.5mm was 2.5% (95% CI 1.4-4.2). However, severe acute malnutrition was the same for both MUAC and weight-for-height at 0.4%. Furthermore, the prevalence of GAM, MAM and SAM may have been lower in boys than girls according to MUAC (although the confidence intervals overlap indicating no true difference). This difference between acute malnutrition as measured by MUAC and weight-for-height z scores has been frequently noted in certain ethnic groups, and has been a significant point of discussion amongst international nutrition groups¹⁹.

The decreasing trend in GAM indicates that programmes are functioning well and are protecting the nutritional status of children 6-59 months and other vulnerable groups such as pregnant women. The quarterly MUAC screenings aid with active case finding and immunisation. Additionally, the BSFP programme which provides CSB++ (see below) (containing a full set of micronutrients and milk powder) to children 6-23 months is likely to have contributed, in addition to the benefits of growth monitoring being implemented at the BSFP distribution points. Nevertheless, the influx of new arrivals is likely to have put a strain on resources, and more new arrivals are expected (such as further relocations from Dadaab), as well as the fact that the nutritional status of new arrivals may decrease as time goes on. The multi-faceted causes of malnutrition in this context are known to be poverty, illiteracy and disease.

There were no significant sex differences in the sampled population indicating that the survey was un-biased

6.2 Programme coverage

The improving nutritional status of children 6-59 months appears to indicate that programme coverage is good. However, coverage of the TSFP and TFP appear to be low and do not meet the 90% WHO target, although as mentioned, these results must be interpreted with caution as nutrition surveys are not the best method for estimating feeding programme coverage, due to small sample sizes, resulting in low precision and wide confidence intervals.

Coverage of the BSFP providing CSB++ to children 6-23 months was fairly high at 74.9% (95% CI 67.3-82.4) which is likely to contribute to the positive nutritional status observed. However, anecdotal evidence indicates that the product is frequently shared, therefore it is not known how much reaches the target children.

The UNHCR target of >95% of children being vaccinated against measles was exceeded at 96.1% (95% CI 92.7-99.5), as was Vitamin A supplementation coverage (by card or recall). However coverage by card was low, despite the fact that the

¹⁹ In December 2012 a technical advisory group met to discuss the use of MUAC in emergency contexts, the results of which may be shared in 2013.

latest vitamin A and measles campaign occurred directly before the survey. Field observations were made where measles vaccination had been marked on child health cards, but not vitamin A supplementation. Therefore although card coverage may be high, CHPs need to take more care in using them consistently.

6.3 Anaemia in young children and women

The prevalence of anaemia in children 6-59 months and women 15-49 years has seen considerable and sustained improvement since 2010 (from levels >60-70% in 2008-2009), reaching its lowest in 2012.

In children, anaemia levels have reduced significantly from 73.6% (95% CI 68.1 – 79.1) in November 2010, to 44.4% (95% CI 38.5 – 49.5) in 2011, and 34.4% (95% CI 29.0-39.8) in 2012 ($p<0.05$). Since 2010, the prevalence of anaemia in women has shown an absolute reduction of 50%, from 50.5% (95% CI 54.4-66.5) in 2010, 31.2% (95% CI 24.5-36.6) in 2011 ($p<0.05$), to 25.5% (95% CI 19.5-32.0) in 2012. The prevalence of anaemia in both groups has therefore reduced from high to medium public health significance according to WHO classifications.

However as expected, the prevalence of anaemia was higher in children 6-23 months at 57.3% (95% CI 49.3-65.4) in 2010, and 49.2% (95% CI 41.1-57.4) in 2012, i.e. of high public health significance (>40%). This is believed to be due to either increased vulnerability of younger children or natural physiological differences, however indicates that younger children would benefit from continued CSB++ distributions.

The majority of the anaemia reduction in children was due to a decrease in moderate and severe (Hb <10g/dl) levels of anaemia whereas for women, the biggest reductions were seen in the mild (10-10.9g/dl) category. These results are believed to be reliable as haemoglobin was measured using new Hemocue 301 analysers which were calibrated at baseline and mid-point of the survey. Measurers were also well trained and supervised in taking measurements.

A number of anaemia reduction activities have been introduced, strengthened and scaled up in Kakuma as a result of UNHCR's anaemia reduction strategy implemented in 2008, which are likely to have contributed to these positive gains. For example, since April 2011, children 6-23 months have benefited from the BSFP. For the first seven months, Nutributter[®] was distributed on a monthly basis to all eligible children. From November 2011, this was replaced by CSB++, a higher energy density fortified blended food containing an improved micronutrient formulation as well as milk powder. As mentioned, coverage of the BSFP have been encouraging and programme monitoring data for CSB++ show coverage >90% throughout implementation (no monitoring data was available for Nutributter[®]). It is important to note that both products are likely to be shared among the family (one third of caregivers reported sharing in 2011), and CSB++ may be more likely to be shared than Nutributter[®], due to its similarities with foods regularly consumed within the household, however this has not been confirmed. It is important therefore that community awareness on the purpose and target group of the product be strengthened and maintained.

Other interventions likely to have contributed to reductions in anaemia include the BSFP for PLW, small-scale kitchen gardens (main vegetable crops include spinach, kale, cowpea, okra, tomatoes etc.), complementary feeding to children and PLW (in previous years), improved malaria management (active case-finding, indoor mass

spraying campaign, distribution of mosquito nets), successful IYCF programming, iron-folic acid supplementation for pregnant women, regular mass deworming campaigns, and malaria reduction initiatives at the population level. Additionally, the proportion of children consuming iron-rich foods was high (see below).

Regarding the kitchen gardens, whilst they may not contribute directly to anaemia reduction due to the relatively small amount of food items produced (despite 20% camp coverage), households frequently sell their produce in order to further diversify their diets or buy non-food items. This helps to protect the GFR from re-sale. However, GIZ, the organisation previously responsible for kitchen garden projects in Kakuma has now left, therefore, it remains to be seen who will assume this responsibility.

The sustained decrease in anaemia suggests that introducing CSB++, as well as carrying out the many other interventions outlined above, is contributing to improved micronutrient status in children.

6.4 IYCF indicators

IYCF practices directly affect the nutritional status of children under two years of age, and can impact upon child survival. It is therefore essential to protect, promote and support IYCF in order to improve nutrition, health and development of young children (WHO 2007).

IYCF practices appear to have improved considerably since 2008 indicated by an increasing trend in some of the key indicators such as timely initiation of breastfeeding, and exclusive breastfeeding under 6 months, suggesting population level progress towards optimal feeding practices. Nevertheless, as mentioned, due to the small sample sizes used, interpretation of the results must be made with caution.

In 2008, the proportion of women initiating breastfeeding within an hour after birth was 59.3% compared to 86.2% (95% CI 79.6-92.8) in 2012 (similar to 2011). This is encouraging given the beneficial immune properties of colostrum to a new born child, in addition to general health and hygiene benefits.

Around three quarters of women were exclusively breastfeeding their child up to 6 months of age; 76.4% (95% CI 68.1-84.6), compared to 85.9% (95% CI 77.9-93.8) in 2011 (the overlapping confidence intervals suggest that there may not be any 'true' difference between 2011 and 2012). These results are encouraging given the high proportion of new arrivals to Kakuma (20% of the current population) who have not been exposed to Kakuma's IYCF educational campaigns. However it is important that IYCF education and awareness in Kakuma continue to be strengthened, protected and promoted to avoid reductions in breastfeeding rates/practices. Note that as previous day recall was used, the prevalence of exclusive breastfeeding may be over-estimated as children receiving liquids etc. irregularly may not have received them the day before the survey. Additionally, it can be difficult to capture the difference between knowledge and practice of a caregiver.

WHO recommends that children are breastfed for up to at least 2 years of age as breast milk continues to provide key nutrients beyond the first year of life including protein, fat and a number of nutrients. Continued breastfeeding at 1 and 2 years was low with 61.7% (95% CI 44.8-78.6) and 54.3% (95% CI 37.3-71.3) being breastfed at 1 and 2 years respectively. This is compared to 76.5% (95% CI 63.4-89.6) and

42.9% (95% CI 26.4-59.3) in 2011. Breastfeeding beyond 6 months of age continues to provide health and nutrition benefits to a child, particularly in the context with the diversity of complementary foods is limited. Reasons for this may be due to large family sizes, and workload resulting in lack of time for child care, although this would need confirmation. Almost half of children were not receiving complimentary foods at the appropriate time, and are reliant only on breast milk or other liquids, which when consumed alone do not meet the energy and nutrient requirements of a growing child over six months old.

The proportion of children consuming iron-rich foods was 89.6% (95% CI 83.7-95.6), which is mostly likely due to the consumption of CSB++, but a small proportion due to consumption of iron fortified infant formula which is less encouraging. This is the first year that this has been calculated; therefore no comparative data is available. Around 6.3% (95% CI 2.5-10.1) of caregivers reported to bottle feed their child <24 months, compared to one in 10 (9.1%) in 2011. Bottle feeding carries with it the risk of contamination and children who are bottle fed are more vulnerable to disease as a result. Infant formula was given to 16.7% (95% CI 9.3-24.2), compared to 1.9% (95% CI 0.4-3.4) in 2011 which warrants further investigation. Information was not collected on whether a cup is being used for feeding which is recommended in circumstances where bottles are likely to carry a greater risk of infection. The findings here may be due to new arrivals who have not received extensive education or appropriate IYCF practices.

Note that contract to recommendations provided in the 2011 survey report, complementary feeding has not been continued in 2012 (except for 2 distributions to PLWs), which may encourage delayed breastfeeding.

Diarrhoeal disease is the second leading cause of death in children under five years old²⁰. Episodes of diarrhoea deprive children of the nutrition necessary for growth and are therefore an important risk factor for the development of malnutrition. According to HIS data, watery diarrhoea throughout 2012 was higher than found in the current survey, affecting 38.6% of children in 2012. The incidence of watery diarrhoea rose sharply from 30.3 to 60.0% between January and February 2012, with similar levels until June 2012. Diarrhoea incidence decreased sharply in July and in August. Indeed, reduced appetite and food intake, reduced feeding or withdrawal of feeding (which was not assessed) during diarrhoea can reduce the chances of full recovery.

6.5 Food security

Similarly to previous years, and other settings, the general ration did not last the full cycle, but instead households reported that the ration lasted an average of 10.5 (95% CI 10.0-10.9) days, with over 50% of households saying that it last <11 days (i.e. ≤75% of the cycle). This could be due to a number of reasons including, sharing and selling of rations for non-food items or other food items not provided, or additionally, as the ration is calculated to provide an average of 2100kcl, male dominated households are likely to run out more quickly as their average daily energy requirement is greater than this. Additionally, beneficiaries may consume more than the intended 2100kcl in the first few days, meaning that it runs out sooner than intended. Encouragingly, 100% of households had ration cards, indicating that new arrival registration is functioning well and being kept up to date.

²⁰ WHO (2009). Diarrhoeal disease factsheet; accessed 18.01.12 from <http://www.who.int/mediacentre/factsheets/fs330/en/>
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The household dietary diversity score (HDDS) is defined as the number of food groups consumed by any member of the household over a reference time period of 24 hours, and therefore does not capture individual dietary intake. It reflects the adequate intake of essential nutrients at the household level and is used as a proxy for dietary intake and household food access.

The mean HDDS was low with households eating an average of 4.6 out of a total of 12 food groups, and the most common foods being consumed being oils/fats (98.0%), cereals (97.2%), vegetables (53.5%) and pulses (51.6%). This means that households are consuming around one third of the total number of food groups. However, when interpreting this, it must be considered that the GFD lasts 6 days, and the last complete cycle ended 6 days prior to data collection. As distribution is organised by family size, some households may have received their ration up to 12 days before the survey and are running out of food, whereas larger families who received their ration later may have received their ration just 6 days prior to the survey. Additionally, the second cycle distribution started on 17th November (i.e. day 3 of the survey), therefore other families may have only just received their food ration. Nevertheless, this low score reflects limited dietary diversity in the sampled households which needs to be addressed²¹. This may be related to households limited economic power to purchase items, as markets appeared to be well functioning with a variety of items available, however an official market assessment was not done, therefore this needs to be investigated further. It may also be due to the lack of complementary foods in 2012. A rise in the prevalence of obesity has been noticed in other refugee populations²², which may be a future cause for concern in Kakuma, noted by the fact that the most commonly consumed food group were oils/fats.

The most common negative coping strategies were to reduce the number of meals per day and/or reduce meal size with 51.6% (95% CI 39.4-63.8) of households reporting using either one of these strategies. The next most common strategy was to borrow cash, food or other items without interest (44.1%; 95%CI 33.0-55.1). Nearly one fifth of households were reported to have begged indicated which is a severe form of coping and often indicates destitution. However, questioning on coping strategies is a sensitive topic, and some households may have been hesitant to share, which needs to be considered during interpretation. Nevertheless, results indicate that greater options for non-risky coping strategies need to be investigated.

Food aid analysis indicated that the provision of macronutrients met sphere standards (2100kcal) in nearly every cycle. However, whole grain was provided in 9 of the 18 cycles between January to October which when milled can lead to up to 20% loss in weight and energy. Micronutrient needs were met for nearly all cycles except for iron and calcium.

6.6 WASH

Poor water, sanitation and hygiene have serious consequences for health and nutritional status, especially among the most vulnerable population groups. Contamination of water sources is a major cause of diarrhoea, but also other major diseases such as cholera, schistosomiasis, and trachoma.

²¹ Where possible, surveys should be implemented at similar points in relation to the general ration cycle in order to improve comparability between years.

²² Western Sahara Refugee Camps, Tindouf, Algeria Nutrition Survey, Oct - Nov 2010

An improved drinking water source was used by 99.8% (95% CI 99.4-100) of households. It is assumed that if a household uses an improved drinking water source they are more likely to be drinking clean water. Additionally, 97.5% (95% CI 95.3-99.7) were using a covered or narrow necked container to store their drinking water, making it far less likely to be contaminated as opposed to having open containers without a lid. Although contamination can still occur, for example when removing water from the container with unwashed hands or not regularly cleaning the container, these aspects of water and sanitation were not investigated as part of this survey. Additionally, the majority of households wrap a wet (dirty) cloth around drinking water containers; anecdotal reports indicated that these cloths are often dipped in larger water containers to wet them, thus exposing these sources to contamination, which may warrant further attention.

Hygiene and health are compromised by a lack of water and UNHCR minimum water quantity standard is 20 lpppd (or 15 lpppd according to Sphere standards). The average water usage in lpppd was 20.1 (18.2-22.0) (note that some households were collected considerably greater than 20 lpppd), which is similar to 2011. However only half of all households interviewed collected ≥ 20 lpppd in the previous day, and 51.7% collected < 20 lpppd. Responses on water satisfaction suggest reasons for these low levels; overall, 32.8% of households were not satisfied with their source of drinking water, the main reason report being that there was not enough water available (80.7% of cases), which therefore needs further attention (5 households said that they were not satisfied due to lack of jerry cans). However, it was sometimes difficult for interviewees to select the most applicable response from the options given (for example, a long queue at the water tap may be due to their not being enough water, or an irregular supply, in which case it is difficult to select the best option). Note that whilst the UNHCR standards related to water availability, the information provided in UNHCR nutrition surveys provide an indication of household water usage/access.

Safe disposal of excreta is an important preventative measure against the contamination of water supplies or the food chain. It is particularly important to prevent defecation near water banks and agricultural land (WHO, 2011). Assessment of the use of improved vs non-improved latrines (whereby improved means simple pit latrine with floor slab, shared by a maximum of two households), indicated that only around half of households were using improved excreta disposal facilities, and 22.1% (95% CI 12.3-31.8) using communal toilets. Communal toilets are more difficult to keep clean due to little accountability of the users, thus increasing risk of contamination. The influx of new arrivals is likely to have put pressure on such facilities in the camp, and it may take new arrivals time to become accustomed to using pit latrines, if they are more acquainted with using the bush, which needs to be taken in the consideration. Nevertheless, investigation is needed in to these low levels.

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. "Safe" is understood to mean disposal in a safe sanitation facility or by burying. Safe disposal of child faeces was carried out in the vast majority of households with children under three years old.

6.7 Mosquito net coverage

Results of mosquito net ownership and utilisation were generally encouraging. The

majority of households either owned at least one net of any type, or an LLIN, and reached UNHCR's target coverage for LLINS of 80%. Long-lasting insecticidal nets

are preferable as they are designed to maintain their biological efficacy against

vector mosquitoes for at least 3 years (WHO, 2007). However the survey showed an average of 2.6 persons per LLIN which therefore did not meet UNHCR's target of 2 persons per LLIN.

In recent years, focus has shifted to universal coverage of mosquito net utilisation rather than just on under-fives, due to the need for protection for the general population. 80.2% of the total population interviewed slept under an LLIN, 86.4% of children <5, and 96.7% of pregnant women. Whilst this is encouraging, it must be noted that their efficacy in the Kakuma context is being questioned, and currently explored by CDC.

Despite these high coverage rates, the incidence of malaria in 2012 has been very high, suggesting that the quality of nets is poor (the survey did not look at the quality of the nets observed, which is an important factor in how effective the nets are at preventing malaria), or that the chemical protection is not effective. It is hoped that the CDC study will shed light on this, however a survey on the quality of nets may also be warranted (and was recommended in 2011). Almost one in 10 children did not sleep under any kind of mosquito net suggesting that increased awareness and education on the importance of this is needed. Additionally, the last IRS spraying took place in May 2011, partly due to the high rains throughout 2012, and should therefore be addressed in 2013.

6.8 Other information collected - nutritional status of pregnant women

Only three quarters of pregnant women reported to be receiving iron-folic acid pills (77.8%, 95% CI 59.9-95.6 in 2012, compared to 89.7%, 95% CI 79.6-99.9 in 2011). This could be due to the fact that around 12% of women reported that they were not enrolled in the ANC programme, however it is also known that there is a general dislike for taking iron pills due to the taste and after effects experienced. Anaemia status of pregnant women was not taken due to the small sample sizes, however clinic data on anaemia of pregnant women may be available for analysis, and should be explored.

7 Conclusion

The survey results indicate that the public health and nutrition situation in Kakuma refugee camp is slowly improving, suggesting that services are functioning well to protect the overall health and wellbeing of camp inhabitants. However, sustained efforts will be required to maintain and strengthen existing programmes and activities, and to reduce undernutrition to acceptable levels (according to WHO classifications this is <5% for wasting, <20% for stunting and 5-20% for anaemia), whilst continuing to protect the health of the general population. This is particularly in light of the 20% increase in camp population seen over 2012, which is likely to have put a strain on existing resources. Additionally, new arrivals may not have previously been exposed to appropriate health and nutrition education.

Food distribution analysis indicated that continued efforts are required to improve dietary diversity and livelihoods opportunities for camp inhabitants, in order to reduce negative coping strategies which can introduce vicious cycles of debt and relief. In the absence of a more diversified diet, continuation of the blanket distribution of CSB++ for the vulnerable 6-23 month age group is likely to be important, as is investigations in to delayed complementary feeding and whether this is down to the availability of complementary foods in the camps, or an education issue.

Increased population numbers appear to have put pressure on the camps water system, with over half of households using/collecting <20 litres per person per day, although there may be some heterogeneity between zones/blocks in this finding. Measures must be taken to improve equality in access to water throughout the camp, as well as the availability of improved latrines. Additionally, malaria diagnostics and treatment must be maintained in order to avoid further increased levels of malaria, in light of the increased rains seen in 2012, which may persist in to 2013. In line with this, the efficacy of LLINs in Kakuma warrants further investigation.

In summary, the implementation of multi-faceted interventions by all sectors in Kakuma camp are likely to have contributed greatly to this improving situation, however must be maintained to ensure that this improvement continues. These programmes should consider the heterogeneity and multi-cultural nature of the camp residents in order to ensure that the services are well received and utilised.

8 Recommendations and priorities

Immediate term

1. WFP to continue the blanket supplementary feeding programme for children 6-23 months of age to help ensure that improvements in nutrition situation of infants and young children is sustained, and a reduction of anaemia to acceptable levels is achieved. Ensure increased awareness and sensitisation for proper use of the supplementary foods in the target group through household visits, education, and mother-to-mother support groups. .
2. Community Health Workers to improve documentation of Vitamin A supplementation and measles vaccinations in child health books.
3. IRC to continue and strengthen activities for the timely diagnosis and treatment of malaria.
4. IRC to continue malaria prevention activities such as the distribution of bed nets, and Indoor Residual spraying (IRS) to be implemented in the first quarter of 2013 as there was none in 2012.
5. Implement an in-depth assessment looking into the quality and efficacy of chemical repellent used in LLINs available at the household level.
6. Investigate reasons for the potentially low coverage of TFP and put in strategies to increase the coverage to meet sphere standards.

Medium term

7. LWF to increase the number of water storage containers to aid households in collecting / accessing more water.
8. WASH partners to implement Knowledge Attitude and Practice (KAP) survey to explore household water usage, storage container situation, poor hygiene practices related to water storage etc., to aid WASH programme planning.
9. WASH partners to improve water distribution network amongst all blocks to ensure adequate coverage of the water supply.
10. NRC to improve coverage and maintenance of household latrines over the next year (1 latrine for 1 to 2 families), particularly in new arrival areas.
11. IRC to consider implementing a KAP survey of IYCF to explore poor complementary feeding practices of children 6-23 months, including sharing of CSB++ at household level.
12. Partners to reinforce activities to improve dietary diversity at household level, including continued scale up of home gardening projects²³, and investigation in to the provision of appropriate (non-perishable) complementary foods for example, beans and canned tuna, considering the challenges in buying, transporting and distributing perishable foods at a large scale.
13. Continued scale up of home gardening projects, and increased camp coverage, alongside provision of seeds, training, monitoring, and protection of water collection points²⁴.
14. WFP to provide milled cereals in the GFD more consistently, to ensure that ration items are not sold to pay for milling.
15. 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 or complement the GFD e.g. food vouchers, cash transfers or vouchers for non-food items.
16. Health agencies to conduct qualitative assessments of the health-seeking behaviour of new arrivals, with the aim of improving uptake of services and preventing a deterioration of their nutritional status.

Long term

17. Improve and scale up the livelihood opportunities for the refugees through developmental-oriented initiatives to improve their economic status.
18. All partners to improve monitoring of programmes to aid with endline impact evaluations, for example, consistent monitoring of the CSB++ BSFP.
19. IRC to maintain integrated approach to programming, and ensure sufficient training for new community health workers, and timely re-fresher training where necessary.

²³ Note that GIZ, who were previously responsible for all Kitchen Garden projects have now left the refugee operation and it is not known who they will be replaced with.

²⁴ Ibid

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10 Acknowledgements

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Finally we thank the community for consenting to participate.

11 Appendices

Appendix 1 - SMART Plausibility Check Report.

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	Score	
Missing/Flagged data (% of in-range subjects)	Incl	%	0-2.5 0	>2.5-5.0 5	>5.0-10 10	>10 20	0 (1.5 %)	
Overall Sex ratio (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<0.000 10	0 (p=0.696)	
Overall Age distrib (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<0.000 10	4 (p=0.017)	
Dig pref score - weight	Incl	#	0-5 0	5-10 2	10-20 4	> 20 10	0 (5)	
Dig pref score - height	Incl	#	0-5 0	5-10 2	10-20 4	> 20 10	2 (7)	
Standard Dev WHZ	Excl	SD	<1.1 0	<1.15 2	<1.20 6	>1.20 20	2 (1.10)	
Skewness WHZ	Excl	#	<±1.0 0	<±2.0 1	<±3.0 3	>±3.0 5	0 (0.22)	
Kurtosis WHZ	Excl	#	<±1.0 0	<±2.0 1	<±3.0 3	>±3.0 5	0 (-0.01)	
Poisson dist WHZ-2	Excl	p	>0.05 0	>0.01 1	>0.001 3	<0.000 5	0 (p=0.633)	
Timing	Excl	Not determined yet						
OVERALL SCORE WHZ =			0-5 0	5-10 1	10-15 3	>15 5	8 %	

At the moment the overall score of this survey is 8 %, this is good.

There were no duplicate entries detected.

Percentage of children with no exact birthday: 6 %

Appendix 2 – Name of Contributors

Survey coordination / team supervision / technical team

1. Breege Erukudi
2. Michael Ng'ang'a
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4. Josephine Pringle
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21. Osman Mohamed
22. Abdifatah Bishar
23. Fatuma Abshir
24. Eddison Bizimana
25. Abdikadir Muhumed Gure
26. Abdi Wahab Ali
27. Muoch Chuol Yiech
28. Benson Ouma Amara
29. Faraja Dunia

Appendix 3– Assignment of Clusters

	Geographical unit	Population size	Cluster
Kakuma 1	Zone 1, Block 1	2016	1
	Zone 1, Block 3	1256	2
	Zone 1, Block 4	1901	3
	Zone 1, Block 6	2329	4
	Zone 1, Block 7	1506	5
	Zone 1, Block 8	1762	6
	Zone 1, Block 10	1075	7
	Zone 1, Block 11	1476	8
	Zone 2, Block 1	705	9
	Zone 2, Block 3	1126	10
	Zone 2, Block 5	1541	11
	Zone 2, Block 7	1469	RC
	Zone 2, Block 9	989	12
	Zone 2, Block 11	1046	13
	Zone 2, Block 14	1441	14
	Zone 3, Block 1	848	15
	Zone 3, Block 3	2137	16
	Zone 3, Block 5	1540	17
	Zone 3, Block 7	1262	18
	Zone 4, Block 2	902	19
Zone 4, Block 4	1576	20	
Kakuma 2	Zone 1, Block 1	811	21
	Zone 1, Block 4	463	22
	Zone 1, Block 6	1430	23
	Zone 1, Block 10	1094	24
	Zone 1, Block 12	869	25
	Zone 2, Block 3	766	26
	Zone 2, Block 5	1229	27
Kakuma 3	Zone 1, Block 3	670	28
	Zone 1, Block 6	3403	29
	Zone 1, Block 10	594	RC, 30
	Zone 1, Block 13	628	31
	Zone 2, Block 1	793	32
	Zone 2, Block 4	636	33
	Zone 2, Block 6	2047	RC
	Zone 2, Block 7	2602	34
	Zone 2, Block 9	659	RC
	Zone 2, Block 12	891	35
	Zone 3, Block 1	2419	36
Zone 3, Block 3	3600	37	
Zone 3, Block 4&5	1818	38	

Appendix 4 – Result Tables for NCHS 1977 growth reference

Result Tables for NCHS growth reference 1977

Table 3.2: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 521	Boys n = 266	Girls n = 255
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(23) 4.4 % (2.9 - 6.6 95% C.I.)	(12) 4.5 % (2.6 - 7.6 95% C.I.)	(11) 4.3 % (2.2 - 8.1 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(22) 4.2 % (2.7 - 6.4 95% C.I.)	(11) 4.1 % (2.3 - 7.3 95% C.I.)	(11) 4.3 % (2.2 - 8.1 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(1) 0.2 % (0.0 - 1.4 95% C.I.)	(1) 0.4 % (0.1 - 2.7 95% C.I.)	(0) 0.0 % (0.0 - 0.0 95% C.I.)

The prevalence of oedema is 0.0 %

Table 3.3: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema

Age (mo)	Total no.	Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> -2 z score)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	140	0	0.0	5	3.6	135	96.4	0	0.0
18-29	108	0	0.0	5	4.6	103	95.4	0	0.0
30-41	130	1	0.8	6	4.6	123	94.6	0	0.0
42-53	104	0	0.0	3	2.9	101	97.1	0	0.0
54-59	39	0	0.0	3	7.7	36	92.3	0	0.0
Total	521	1	0.2	22	4.2	498	95.6	0	0.0

Table 3.4: Distribution of acute malnutrition and oedema based on weight-for-height z-scores

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 1 (0.2 %)	Not severely malnourished No. 520 (99.8 %)

Table 3.5: Prevalence of acute malnutrition based on MUAC cut off's (and/or oedema) and by sex

	All n = 529	Boys n = 269	Girls n = 260
Prevalence of global malnutrition (< 125 mm and/or oedema)	(13) 2.5 % (1.4 - 4.2 95% C.I.)	(4) 1.5 % (0.6 - 3.8 95% C.I.)	(9) 3.5 % (1.8 - 6.5 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(11) 2.1 % (1.1 - 3.9 95% C.I.)	(4) 1.5 % (0.6 - 3.8 95% C.I.)	(7) 2.7 % (1.2 - 5.9 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(2) 0.4 % (0.1 - 1.5 95% C.I.)	(0) 0.0 % (0.0 - 0.0 95% C.I.)	(2) 0.8 % (0.2 - 3.0 95% C.I.)

Table 3.6: Prevalence of acute malnutrition by age, based on MUAC cut off's and/or oedema

Age (mo)	Total no.	Severe wasting (< 115 mm)		Moderate wasting (>= 115 mm and < 125 mm)		Normal (> = 125 mm)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	143	0	0.0	9	6.3	134	93.7	0	0.0
18-29	111	1	0.9	1	0.9	109	98.2	0	0.0
30-41	131	1	0.8	0	0.0	130	99.2	0	0.0
42-53	105	0	0.0	1	1.0	104	99.0	0	0.0
54-59	39	0	0.0	0	0.0	39	100.0	0	0.0
Total	529	2	0.4	11	2.1	516	97.5	0	0.0

Table 3.5: Prevalence of acute malnutrition based on the percentage of the median and/or oedema

	n = 521
Prevalence of global acute malnutrition (<80% and/or oedema)	(12) 2.3 % (1.3 - 4.1 95% C.I.)
Prevalence of moderate acute malnutrition (<80% and >= 70%, no oedema)	(12) 2.3 % (1.3 - 4.1 95% C.I.)
Prevalence of severe acute malnutrition (<70% and/or oedema)	(0) 0.0 % (0.0 - 0.0 95% C.I.)

Table 3.6: Prevalence of malnutrition by age, based on weight-for-height percentage of the median and oedema

Age (mo)	Total no.	Severe wasting (<70% median)		Moderate wasting (>=70% and <80% median)		Normal (> =80% median)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	140	0	0.0	1	0.7	139	99.3	0	0.0
18-29	108	0	0.0	3	2.8	105	97.2	0	0.0
30-41	130	0	0.0	5	3.8	125	96.2	0	0.0
42-53	104	0	0.0	1	1.0	103	99.0	0	0.0
54-59	39	0	0.0	2	5.1	37	94.9	0	0.0
Total	521	0	0.0	12	2.3	509	97.7	0	0.0

Table 3.7: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 525	Boys n = 269	Girls n = 256
Prevalence of underweight (<-2 z-score)	(95) 18.1 % (14.0 - 23.1 95% C.I.)	(49) 18.2 % (13.4 - 24.2 95% C.I.)	(46) 18.0 % (12.9 - 24.4 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(84) 16.0 % (12.2 - 20.7 95% C.I.)	(43) 16.0 % (11.6 - 21.6 95% C.I.)	(41) 16.0 % (11.1 - 22.5 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(11) 2.1 % (1.2 - 3.7 95% C.I.)	(6) 2.2 % (1.0 - 4.7 95% C.I.)	(5) 2.0 % (0.8 - 4.6 95% C.I.)

Table 3.8: Prevalence of underweight by age, based on weight-for-age z-scores

Age (mo)	Total no.	Severe underweight (<-3 z-score)		Moderate underweight (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	139	5	3.6	21	15.1	113	81.3	0	0.0
18-29	111	3	2.7	16	14.4	92	82.9	0	0.0
30-41	131	2	1.5	22	16.8	107	81.7	0	0.0
42-53	105	1	1.0	13	12.4	91	86.7	0	0.0
54-59	39	0	0.0	12	30.8	27	69.2	0	0.0
Total	525	11	2.1	84	16.0	430	81.9	0	0.0

Table 3.9: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 501	Boys n = 255	Girls n = 246
Prevalence of stunting	(100) 20.0 %	(51) 20.0 %	(49) 19.9 %

(<-2 z-score)	(15.7 - 25.0 95% C.I.)	(14.7 - 26.6 95% C.I.)	(15.1 - 25.7 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(73) 14.6 % (11.1 - 18.9 95% C.I.)	(39) 15.3 % (11.0 - 20.9 95% C.I.)	(34) 13.8 % (9.4 - 19.9 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(27) 5.4 % (3.6 - 8.0 95% C.I.)	(12) 4.7 % (2.4 - 9.0 95% C.I.)	(15) 6.1 % (3.5 - 10.4 95% C.I.)

Table 3.10: Prevalence of stunting by age based on height-for-age z-scores

Age (mo)	Total no.	Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
		No.	%	No.	%	No.	%
6-17	137	2	1.5	19	13.9	116	84.7
18-29	107	7	6.5	13	12.1	87	81.3
30-41	128	10	7.8	26	20.3	92	71.9
42-53	92	6	6.5	10	10.9	76	82.6
54-59	37	2	5.4	5	13.5	30	81.1
Total	501	27	5.4	73	14.6	401	80.0

Table 3.11: Mean z-scores, Design Effects and excluded subjects

Indicator	n	Mean z-scores \pm SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	521	-0.55 \pm 0.95	1.00	1	7
Weight-for-Age	525	-1.04 \pm 1.05	1.76	0	4
Height-for-Age	501	-0.98 \pm 1.20	1.62	0	28

* contains for WHZ and WAZ the children with edema.

Appendix 5 – Survey Questionnaires

Kakuma Nutrition Survey, November-December 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 that is looking at the nutrition and health status of people living in this camp.

- UNHCR is sponsoring this nutrition survey.
- Taking part in this survey is totally your choice. You can decide to not participate, or if you do participate you can stop taking part in this survey at any time 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 and I will also measure the weight and height of all the children in the household who are older than 6 months and younger than 5 years. In addition to these assessments, I will test a small amount of blood from the finger of the children and non-pregnant women to see if they have anaemia.
- Before we start to ask you any questions or take any measurements, we will ask you to state your consent on this form. Be assured that 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 to participate or not.
- If you do not understand the information or if your questions were not answered to your satisfaction, do not declare your consent on this form. Thank you.

WASH: 1 questionnaire per household

Kakuma 1/2/3: _____ **Zone:** _____ **Block number:** _____ **Consent :** yes / no / absent

Date of interview (dd/mm/yyyy) SURVDATE	Cluster Number (in cluster survey only) CLUSTER
_ _ _ / _ _ _ / _ _ _ _ _ _ _	_ _ _
Team Number TEAM	HH Number HH
_ _	_ _ _ _

No	QUESTION	ANSWER CODES	
SECTION WS1			
WS1	How many people live in this household and slept here last night? HHSIZE		_ _ _
WS2	What is the <i>main</i> source of drinking water for members of your household? Adapt list to local setting before survey. When adapting the list, keep the original answer codes and do not change. DO NOT READ THE ANSWERS SELECT ONE ONLY SOURCE	Public tap01 Protected dug well(hand pump)02 Small water vendor05 Bottled water (sealed)06 Surface water (e.g. river, pond)07 Other96 Don't know98	_ _ _
WS3	Are you satisfied with the water supply? THIS RELATES TO THE DRINKING WATER SUPPLY SATISFY	Yes1 No.....2 Partially3 Don't know8	_ _ IF ANSWER IS 1, 3 OR 8 GO TO WS5
WS4	What is the <i>main</i> reason you are not satisfied with the water supply? Adapt list to local setting before survey. DO NOT READ THE ANSWERS SELECT ON ONLY REASON	Not enough01 Long waiting queue.....02 Long distance.....03 Irregular supply04 Bad taste05 Water too warm.....06 Bad quality07 Have to pay08 Other (specify)96 Don't know98	
WS5	What kind of toilet facility does this household use?	Simple pit latrine with floor/slab01 Pit latrine without floor/slab02	

	DO NOT READ THE ANSWERS SELECT ONE ONLY TOILET	No facility, field, bush, plastic bag..... 10	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> IF ANSWER IS 10 GO TO WS7
WS6	How many <i>households</i> share this toilet? THIS INCLUDES THE SURVEYED HOUSEHOLD	RECORD NUMBER OF HOUSEHOLDS IF KNOWN (RECORD 96 IF PUBLIC TOILET OR 98 IF UNKNOWN) TOILSHR SUPERVISOR SELECT ONE ONLY 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 know8 TOILSHR_c	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> Households <input type="checkbox"/>
WS7	Do you have children under three years old? CHILD	Yes1 No.....2	<input type="checkbox"/> IF ANSWER IS 2 GO TO WS9
WS8	The last time [NAME OF YOUNGEST CHILD] passed stools, what was done to dispose of the stools? DO NOT READ THE ANSWERS SELECT ONE ONLY STOOL	Child used toilet/latrine.....01 Put/rinsed into toilet or latrine02 Buried.....03 Thrown into garbage04 Put/rinsed into drain or ditch05 Left in the open06 Other96 Don't know98	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

SECTION WS2

Observation Based Questions (done after the initial questions to ensure the flow of the interview is not broken)

No	OBSERVATION / QUESTION	ANSWER			
WS9	CALCULATE THE TOTAL AMOUNT OF WATER USED BY THE HOUSEHOLD PER DAY THIS RELATES TO ALL SOURCES OF WATER (DRINKING WATER AND NON-DRINKING WATER SOURCES) LITRE	Please show me the containers you used yesterday for collecting water ASSIGN A NUMBER TO EACH CONTAINER	Capacity in litres	Number of journeys made with each container	Total litres SUPERVISOR TO COMPLETE HAND CALCULATION
		6			
		7			
		8			

		9			
		10			
		Total litres used by household			110
WS10	Please show me where you store your drinking water. ARE THE DRINKING WATER CONTAINERS COVERED OR NARROW NECKED? STORE	All are..... 1 Some are 2 None are 3			____

WOMEN 15-49: 1 questionnaire per cluster / zones / sections

Kakuma 1/2/3: _____ Zone: _____ Block number: _____

Date of interview (dd/mm/yyyy): _ _ / _ _ / _ _ _ _ SURVDATE					Cluster Number (<i>in cluster survey only</i>) _ _ CLUSTER			Team number _ _ TEAM	
WM1	WM2	WM3	WM4	WM5	WM6	WM7	WM7A	WM7B	WM8
ID	HH	Consent given 1=yes 2=no 3=absent	Age (years)	Are you pregnant? 1=yes 2=no (GO TO WM7A) 8=DK (GO TO WM7A)	Are you currently enrolled in the ANC programme? 1=yes 2=no 8=DK	Are you currently receiving iron-folate pills (<i>SHOW PILL</i>)? 1=yes (GO TO WM7B) 2=no (GO TO WM7B) 8=DK (GO TO WM7B)	Do you have a child < 6months old? 1=yes 2=no (GO TO WM8) 8=DK (GO TO WM8)	MUAC (PLW only) * <u>PREGNANT STOP HERE</u> <u>LACTATING CONTINUE</u>	Hb Non-Pregnant (including lactating Women) ** (g/L or g/dL)
WMID	HH	WMCONS T	WMAGE	PREGNANT	ANC	FEREC	WMBIR	WMMUAC	WMHB
01									
02									
03									
04									
05									
....									
* For MUAC <21 refer to clinic ** For Hb <6 refer to clinic									

CHILDREN 6-59 MONTHS ANTHROPOMETRY, HEALTH AND ANAEMIA: 1 questionnaire per cluster / zones / sections

Kakuma 1/2/3: _____ **Zone:** _____ **Block number:** _____

Date of interview (dd/mm/yyyy):					Cluster Number (in cluster survey only)				Team number						
_ _ / _ _ / _ _ _ _					_ _				_ _						
SURVDATE					CLUSTER				TEAM						
CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8	CH9	CH10	CH11	CH12	CH13	CH14	CH15	CH16
ID	HH	Consent given 1=yes 2=no 3=absent	Sex (m/f)	Birthdate* dd/mm/yy yy	Age** (months)	Weight (kg) ±100g	Height (cm) ±0.1cm	Oedema (y/n)	MUAC *** (mm)	Child enrolled 1=SFP 2=TFP 3=None	Measles 1=yes card 2=yes recall 3=no or don't know	Vit. A in last 6 months (SHOW CAPSULE) 1=yes card 2=yes recall 3=no or don't know	Diarrhoea in past 2 weeks 1=yes 2=no 3=DK	Hb **** (g/L or g/dL)	Arrival When did you arrive in the camp? 1=<6months 2=>6months
ID	HH	CHCONS T	SEX	BIRTHDA T	MONTH S	WEIGHT	HEIGHT	EDEMA	CHMUAC	ENROL	MEASLES	VITA	DIAR	CHHB	
01															
02															
03															
04															
05															
06															

*The exact birth date should only be taken from an age documentation showing day, month and year of birth. It is only recorded if an official age documentation is available; if the mother recalls the exact date, this is not considered to be reliable enough. **Leave blank if no official age documentation is available.**

**If no age documentation is available, estimate age using local event calendar. If an official age documentation is available, record the age in months from the date of birth.

*** For MUAC <11.5 refer to clinic / main hospital; for 11.5<= MUAC <12.5 refer to clinics 1,2,4,5,6

**** For Hb <7 refer to clinic 1,2,4,5,6

IYCF: 1 questionnaire per child 0-23 months

Kakuma 1/2/3: _____ **Zone:** _____ **Block number:** _____ **Consent :** yes / no / absent

Date of interview (dd/mm/yyyy)		Cluster Number (in cluster survey only)	
_ _ / _ _ / _ _ _ _		_ _	
SURVDATE		CLUSTER	
Team Number	ID Number	HH Number	
_ _	_ _ _	_ _ _	
TEAM	ID	HH	

No	QUESTION	ANSWER CODES	
SECTION IF1			
IF1	Sex SEX	Male..... 1 Female 2	_ _
IF2	Birthdate RECORD FROM AGE DOCUMENTATION. LEAVE BLANK IF NO VALID AGE DOCUMENTATION BIRTHDAT	Day/Month/Year..... _ _ / _ _ / _ _ _ _	
IF3	Child's age in months MONTHS	IF AGE DOCUMENTATION NOT AVAILABLE, ESTIMATE USING EVENT CALENDAR. IF AGE DOCUMENTATION AVAILABLE, RECORD THE AGE IN MONTHS FROM THE DATE OF BIRTH	_ _
IF4	Has [NAME] ever been breastfed? EVERBF	Yes 1 No..... 2 DK 8	_ _ IF ANSWE R IS 2 or 8 GO TO IF7
IF5	How long after birth did you first put [NAME] to the breast? INITBF	Less than one hour..... 1 Between 1 and 23 hours..... 2 More than 24 hours 3 DK 8	_ _
IF6	Was [NAME] breastfed yesterday during the day or at night? YESTBF	Yes 1 No..... 2 DK 8	_ _
SECTION IF2			
IF7	Now I would like to ask you about liquids that [NAME] may have had yesterday during the day and at night. I am interested in whether your child had the item even if it was combined with other foods. Yesterday, during the day or at night, did [NAME] receive any of the following? ASK ABOUT EVERY LIQUID. IF ITEM WAS GIVEN, CIRCLE '1'. IF ITEM WAS NOT GIVEN, CIRCLE '2'. IF CAREGIVER DOESN'T KNOW, CIRCLE '8'. EVERY LINE MUST HAVE A CODE.		
			Yes No DK
	7A. Plain water WATER	7A.....1	2 8
	7B. Infant formula: for example Nan, S26, Lactogen, Anchor, Infacare INFORM	7B.....1	2 8
	7C. Milk such as fresh animal milk, tinned or powdered, full cream MILK	7C.....1	2 8

	7D. Juice, juice drinks, sweetened flavoured juices or powdered juice, for example Zeitun, Altuza JUICE	7D.....1 2 8	
	7F. Sour milk or yogurt YOGURT	7F.....1 2 8	
	7G. Thin porridge THINPOR	7G.....1 2 8	
	7H. Tea or coffee with milk, cocoa or kerkede WHTEACOF	7H.....1 2 8	
	7I. Any other water-based liquids for example sodas (Fanta, coke, sprite), other sweet drinks, herbal infusion, gripe water, clear tea with no milk, black coffee, ritual fluids WATLQD	7I.....1 2 8	
IF8	Yesterday, during the day or at night, did [NAME] eat solid or semi-solid (soft, mushy) food? FOOD	Yes.....1 No.....2 DK.....8	<input type="checkbox"/>
SECTION IF3			
IF9	Did [NAME] drink anything from a bottle with a nipple yesterday during the day or at night? BOTTLE	Yes.....1 No.....2 DK.....8	<input type="checkbox"/>
SECTION IF4			
IF10	IS CHILD AGED 6-23 MONTHS? REFER TO IF2 CHELIG2	Yes.....1 No.....2	<input type="checkbox"/> IF ANSWER IS 2 STOP NOW
IF11	Now I would like to ask you about some particular foods [NAME] may eat. I am interested in whether your child had the item even if it was combined with other foods. Yesterday, during the day or at night, did [NAME] consume any of the following? ASK ABOUT EVERY ITEM. IF ITEM WAS GIVEN,CIRCLE '1'. IF ITEM WAS NOT GIVEN, CIRCLE '2'. IF CAREGIVER DOESN'T KNOW, CIRCLE '8'. EVERY LINE MUST HAVE A CODE.		Yes No DK
	11A. Meat for example beef, chicken, camel, goat, offal, liver, intestine, duck, kidney and fish FLESHFD	11A.....1 2 8	
	11B. CSB+ (CSB IS FROM GFD) FBF	11B.....1 2 8	
	11C. CSB++ (Supercereal) FBFSUPER	11C.....1 2 8	
	11D. Plumpy'Nut® (SHOW SACHET) RUTF	11D.....1 2 8	
	11E. Plumpy'Sup® (SHOW SACHET) RUSF	11E.....1 2 8	
	11G. Nan, S26, Lactogen infant formula INFORMFE	11G.....1 2 8	
	11H.Cerelac or Weetabix FOODFE	11H.....1 2 8	

MOSQUITO NET COVERAGE: 1 questionnaire per household

Kakuma 1/2/3: _____ **Zone:** _____ **Block number:** _____ **Consent :** yes / no / absent

Date of interview (dd/mm/yyyy) SURVDATE	Cluster Number (in cluster survey only) CLUSTER
_ _ _ / _ _ _ / _ _ _ _ _ _ _	_ _ _
Team Number TEAM	HH Number HH
_ _	_ _ _ _

No	QUESTION	ANSWER CODES			
SECTION TN1					
TN1	How many people live in this household and slept here last night? INSERT NUMBER TOTHH				_ _ _
TN2	How many children 0-59 months live in this household and slept here last night? INSERT NUMBER TOTCH				_ _ _
TN3	How many pregnant women live in this household and slept here last night? INSERT NUMBER TOTPW				_ _ _
TN4	Did you have your house sprayed with insecticide in an indoor residual spray campaign in the past year (since November 2011)? HHIRS	Yes.....1 No2			_
TN5	Do you have mosquito nets in this household that can be used while sleeping? MOSNETS	Yes.....1 No2			_ IF ANSWER IS 2 STOP NOW
TN6	How many of these mosquito nets that can be used while sleeping does your household have? INSERT NUMBER NUMNETS	IF MORE THAN 4 NETS, ENTER THE NUMBER AND USE ADDITIONAL NET QUESTIONNAIRE SHEETS ENTERING THE NUMBER OF THE NETS SEQUENTIALLY AT THE TOP			_ Nets
TN7	ASK RESPONDENT TO SHOW YOU THE NET(S) IN THE HH. IF NETS ARE NOT OBSERVED → CORRECT TN6 ANSWER	NET # _ _	NET # _ _	NET # _ _	NET # _ _
TN8	OBSERVE NET AND RECORD THE BRANDNAME OF NET ON THE TAG. IF NO TAG EXISTS OR IS UNREADABLE RECORD 'DK' FOR DON'T KNOW.				
TN9	For surveyor/supervisor only (not to be done during interview): WHAT TYPE OF NET IS THIS? BASED ON THE TAG INDICATE IF THIS IS A LLIN OR OTHER TYPE OF NET OR DON'T KNOW.	1=LLIN 2=Other/DK LNTYPE1	1=LLIN 2=Other/DK LNTYPE2	1=LLIN 2=Other/DK LNTYPE3	1=LLIN 2=Other/DK LNTYPE4

TN10	For surveyor/supervisor only (not to be done during interview): RECORD THE TOTAL NUMBER OF LLINs IN HH BY COUNTING THE NUMBER OF '1' IN TN9. TOTLN	<input type="text"/> LLINs
-------------	--	-------------------------------

SECTION TN2														
Line no	Household members	Sex	Age	Pregnancy status			Slept under net		Which net				Type of net	
#	COL1	COL2	COL3	COL4			COL5		COL6				COL7	
	Please give me the names of the HH members who live here and who slept here last night	Sex m/f	Age years	FOR WOMEN 15-49 YEARS, ASK: (NAME) Is (NAME) currently pregnant? (CIRCLE not applicable '99' if female <15->49 years or male) Yes No/DK N/A			Did (NAME) sleep under a net last night? Yes No/DK		ASK THE RESPONDENT TO PHYSICALLY IDENTIFY WHICH OF THE OBSERVED NETS THEY SLEPT UNDER. CIRCLE THE NUMBER CORRESPONDING TO THE NET THEY USED. net#1 net#2 net# 3 net#4				For surveyor/supervisor only: BASED ON THE OBSERVED NET BRANDNAME RECORDED (TN8) INDICATE IF IT IS AN LLIN OR OTHER OR UNKNOWN (DK) LLIN OTHER/DK	
01		m f	<5 ≥5	1 0 99	1 0	1 2 3 4	1 2							
02		m f	<5 ≥5	1 0 99	1 0	1 2 3 4	1 2							
03		m f	<5 ≥5	1 0 99	1 0	1 2 3 4	1 2							
04		m f	<5 ≥5	1 0 99	1 0	1 2 3 4	1 2							
05		m f	<5 ≥5	1 0 99	1 0	1 2 3 4	1 2							
06		m f	<5 ≥5	1 0 99	1 0	1 2 3 4	1 2							
07		m f	<5 ≥5	1 0 99	1 0	1 2 3 4	1 2							
08		m f	<5 ≥5	1 0 99	1 0	1 2 3 4	1 2							
09		m f	<5 ≥5	1 0 99	1 0	1 2 3 4	1 2							
10		m f	<5 ≥5	1 0 99	1 0	1 2 3 4	1 2							
11		m f	<5 ≥5	1 0 99	1 0	1 2 3 4	1 2							
12		m f	<5 ≥5	1 0 99	1 0	1 2 3 4	1 2							
13		m f	<5 ≥5	1 0 99	1 0	1 2 3 4	1 2							
14		m f	<5 ≥5	1 0 99	1 0	1 2 3 4	1 2							
15		m f	<5 ≥5	1 0 99	1 0	1 2 3 4	1 2							

Mosquito net summary (for surveyor/supervisor only, not to be done during interview)						
Total HH members		Total <5			Total Pregnant	
Slept under	TN11	For children < 5	TN13	For pregnant women	TN15	

a net of any type	Count the number of '1' in COL5	_ _ _ TOTSLPNT	(COL3 is '<5'), count the number of '1' in COL5	_ _ _ TOTCHNT	(COL4 is '1'), count the number of '1' in COL5	_ _ _ TOTPWNT
Slept under an LLIN	Count the number of '1' in COL7	TN12 _ _ _ TOTSLPLN	For children <5 (COL3 is '<5'), count the number of '1' in COL7	TN14 _ _ _ TOTCHLN	For pregnant women (COL4 is '1'), count the number of '1' in COL7	TN16 _ _ _ TOTPWLN

Appendix 4 - KAKUMA EVENTS CALENDAR 2012

Religious holiday	Local event	Other event	Somali Calendar	Seasons	Month/ year	Age
			Zako	Mid of Deyr	November 2012	0
Id al Adha	Queen of Qatar visit, plumpy'sup start, opening of clinic 2	World mental health day, Somalia election	Arafa	Beginning of Deyr	October 2012	1
	Mutumbo Dikembe arrival		Sigalal	End of Xagaa	September 2012	2
Eid Fitri		Saitoti plane crash, World breastfeeding week	Soon fur	Mid of Xagaa	August 2012	3
Ramadan		Sudan independence day	Soon	Beginning of Xagaa	July 2012	4
	Mother to mother support group graduation, world refugee day	Congolese election, Somali independence day	Shaba'an	End of Gu'	June 2012	5
	Opening of centre 2 in Kakuma	Labour day	Rajab	Mid of Gu'	May 2012	6
			Jamadol akhir	Beginning of Gu'	April 2012	7
			Jamadol awal	End of Jiilal	March 2012	8
	Valentines day		Malmadone	Mid of Jiilal	February 2012	9
New year			Mowlid	Beginning of Jiilal	January 2012	10
Christmas			Safar	End of Deyr	December 2011	11
	Polio campaign, Mass MUAC screening, Opening of Clinic 6, maternity ward, New arrivals settling next to Clinic 6, Start of csb++ distribution	KCPE – national exams for primary school	Zako	Mid of Deyr	November 2011	12
Id al Adha	End of distribution of NutriButter, Jerry can clean up campaign	Kenyan troops entered Somalia, Kidnapping from Dadaab camp, Mashujua day (20/10), Fightings in Blue Nile, Gadaffi was killed	Arafa	Beginning of Deyr	October 2011	13
	Malaria outbreak, Road accident between Kakuma and Lodwar with Eldoret express	Ethiopian new year (11/09)	Sigalal	End of Xagaa	September 2011	14
End ramadan	Heavy rains, flooding, Population census	World breastfeeding week	Soon fur	Mid of Xagaa	August 2011	15
Start ramadan	Lunar eclipse, End of mosquito spraying	Republic of South Sudan independent	Soon /Ramadhan	Beginning of Xagaa	July 2011	16
	Churchill visiting Kakuma, Mosquito spraying	World refugee day	Shaba'an	End of Gu'	June 2011	17
	Mass muac screening, Measles, vitamin a, deworming, Population census in Kakuma, End of unhcr head count	Osama bin laden was killed	Rajab	Mid of Gu'	May 2011	18
Easter	Introduction of NutriButter		Jamadol akhir	Beginning of Gu'	April 2011	19
	Demarcation of camp, Kakuma 4		Jamadol awal	End of Jiilal	March 2011	20
		Announcement of results Sudanese referendum	Malmadone	Mid of Jiilal	February 2011	21
		New Year, Sudanese referendum	Mowlid	Beginning of Jiilal	January 2011	22
Christmas	Start of UNHCR head count, Mother-child booklet changed, Accident where doctor died	World aids day	Safar	End of Deyr	December 2010	23
		Registration for Sudanese referendum	Zako	Mid of Deyr	November 2010	24
			Arafa	Beginning of Deyr	October 2010	25
End ramadan (09/09/10)	High Commissioner visited, Kakuma, Solar lightning in the camp	Ethiopian new year	Sigalal	End of Xagaa	September 2010	26
Beginning ramadan	Street light in zone 03		Soon fur	Mid of Xagaa	August 2010	27
	Luol Deng visited Kakuma	World peace day, Burundi independence day	Soon	Beginning of Xagaa	July 2010	28
		World refugee celebration, Congo independence day, World cup football	Shaba'an	End of Gu'	June 2010	29
		SPLA/M-day(16/05), EPDR Revolution day (20/05),	Rajab	Mid of Gu'	May 2010	30
Easter			Jamadol akhir	Beginning of Gu'	April 2010	31
	MixMe endline survey		Jamadol awal	End of Jiilal	March 2010	32

	Registration of sudanese new arrival, Vit A, De-worming		Malmdone	Mid of Jiilal	February 2010	33
		New Year, Celebration of CPA (09/01), Baptist day (11/01)	Mowlid	Beginning of Jiilal	January 2010	34
Christmas Ethiopian Christmas (29/12)	cholera outbreak		Safar	End of Deyr	December 2009	35
			Zako	Mid of Deyr	November 2009	36
	Polio and Deworming campaign, Short rains (mid October)	Kenyatta Day (20/10), Moi Day (10/10)	Arafa	Beginning of Deyr	October 2009	37
End ramadan	Measles and Vitamin A campaign		Sigalal	End of Xagaa	September 2009	38
Beginning ramadan	New arrivals from Daadab, MixMe midline survey		Soon fur	Mid of Xagaa	August 2009	39
	4th Polio campaign, Closing of Kenya and South Sudan border	Burundi independence day, Death of Michael Jackson, SPLM&SPLA (30/07/09)	Soon	Beginning of Xagaa	July 2009	40
	3rd Polio campaign	Congo independence day, African Children Day (13/06), World Refugee Day, Environmental Day (05/06)	Shaba'an	End of Gu'	June 2009	41
	2nd Polio campaign, Tension between the host community and UN, Long rains		Rajab	Mid of Gu'	May 2009	42
Easter	Long rains		Jamadul akhir	Beginning ogf Gu'	April 2009	43
	1st polio campaign, Visit of IRC President to Kakuma, Women's Day (08/03),		Jamadul awal	End of Jiilal	March 2009	44
	Mix me baseline survey, Headcount within the camp (early February)		Malmdone	Mid of Jiilal	February 2009	45
		New Year, President Obama came to power (20/01), President Sherrif came to power	Mowlid	Beginning of Jiilal	January 2009	46
Christmas	Closure of Clinic 2	World Aids Day (01/12)	Safar	End of Deyr	December 2008	47
	Short rains		Zako	Mid of Deyr	November 2008	48
	Floods in Kakuma, Short rains	Kenyatta Day (20/10), Moi Day (10/10)	Arafa	Beginning of Deyr	October 2008	49
End ramadan (30/09/08)		Ethiopian new year (01/09), Resignation of Somali president Yusuf (28/09)	Sigalal	End of Xagaa	September 2008	50
Beginning ramadan	G.S.U came to Kakuma		Soon fur	Mid of Xagaa	August 2008	51
		Burundi independence day	Soon	Beginning of Xagaa	July 2008	52
	New arrivals from Daadab	Congo independence day, African Children Day (13/06), World Refugee Day, Environmental Day (05/06)	Shaba'an	End of Gu'	June 2008	53
	Clash between Somalis and Kenyan police, Long rains		Rajab	Mid of Gu'	May 2008	54
	Long rain		Jamadul akhir	Beginning ogf Gu'	April 2008	55
Easter (23/03)	New arrivals from Darfur		Jamadul awal	End of Jiilal	March 2008	56
	IDPS		Malmdone	Mid of Jiilal	February 2008	57
	Post election violence	New Year	Mowlid	Beginning of Jiilal	January 2008	58
Christmas	Closure of clinic 1	General election, Gold discovered, World Aids Day (01/12), General Elections Kenya	Safar	End of Deyr	December 2007	59