SENS NUTRITION SURVEY REPORT

DUKWI REFUGEE CAMP

BOTSWANA

Survey conducted: (16th to 23rd DECEMBER, 2013)

Report finalised: (FEBRUARY, 2014)

UNHCR

IN COLLABORATION WITH

BOTSWANA RED CROSS SOCIETY, BOTSWANA MINISTRY OF HEALTH & SKILLSHARE INTERNATIONAL

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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
FGD	Focus Group Discussions
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 Heath
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

Geographic area surveyed, population type, population number (total and U5)

Dukwi refugee camp sprawls for 20 sq.km into the Botswana savannah along the road between Francistown, Botswana's second city, and the Zambian border to the north. Opened in 1978, it is situated some 180 km outside Francistown and 559 km (340 Miles) north of the country's capital city, Gaborone. The camp is situated 10 km from the village of Dukwi and not far from Nata in a region that is favorable for cultivation, despite the extreme summer heat, which renders the camp's roads and common areas dusty and arid. From patches of maize to groves of banana and mango trees, fruits and vegetables grow copiously within many family compounds throughout the camp. Nevertheless, during the rainy season, the camp infrastructure is jeopardized by flash flooding, often damaging semi-permanent structures such as mud-brick buildings and United Nations-issued tents.

According to UNHCR, the camp is inhibited by estimated 3,104 individuals from 14 countries, mostly Somalia, and Namibia (Most Angolans were repatriated back in October 2013); there are an assortment of languages and cultures co-existing in the camp. The estimated breakdown of the population in Dukwi Camp is 45 percent female, with 45 percent of the population under the age of 18. The camp may look temporary with its jumble of small brick buildings, shacks and huts but it has been in existence for 30 years. Some of the residents have raised their children and even grandchildren in Dukwi and are sometimes given permission to live and work outside the camp.

Camp structure & organization

Ministry of Defence, Justice and Security is responsible for overall camp management; UNHCR support coordination of the camp activities. Skill share International is responsible for providing vocational skills, development services and training on different types of apprentices and practices such as tailoring and dressmaking, farming and livestock rearing. Red Cross Society, Botswana is responsible for the Community health & counselling, as well as arrangements of burials/funeral services. The government currently provides free access to Anti-Retroviral drugs to the local population while Red Cross Society is responsible in providing the Anti-Retroviral drugs to the refugees; the HIV and AIDS prevalence in the country is reportedly about 17%.

This report summarises the results of a nutrition survey conducted from 17th – 24th December 2013, coordinated by UNHCR. 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:

Objectives

Primary objectives

1. To measure the prevalence of acute malnutrition in children aged 6-59 months.
2. To measure the prevalence of stunting in children aged 6-59 months.
3. To determine the coverage of measles vaccination among children aged 9-59 months.
4. To determine the coverage of vitamin A supplementation received during the last 6 months among children aged 6-59 months.
5. To assess the two-week period prevalence of diarrhoea among children aged 6-59 months.
6. To measure the prevalence of anaemia in children aged 6-59 months and in women of reproductive age between 15-49 years (non-pregnant).
7. To investigate IYCF practices among children aged 0-23 months.

Household-based modules (Food Security, WASH and Mosquito Net Coverage)

1. To determine the coverage of ration cards and the duration the general food ration lasts for recipient households.
2. To determine the extent to which negative coping strategies are used by households.
3. To assess household dietary diversity.
4. To determine the population's access to, and use of, improved water, sanitation and hygiene facilities.
5. To determine the ownership of mosquito nets (all types and LLINs) in households.
6. To determine the utilisation of mosquito nets (all types and LLINs) by the total population, children 0-59 months and pregnant women.
7. To determine the household coverage of indoor residual spraying.

Secondary objectives

1. To determine enrolment into Antenatal Care clinic and coverage of iron-folic acid supplementation in pregnant women.
2. To collate available information on the performance of the food aid system.

Methodology

The survey was based on the UNHCR Standardised Expanded Nutrition Survey (SENS) guidelines for refugee populations (v1.3) (see www.sens.unhcr.org) and the Standardized Monitoring and Assessment of Relief and Transitions (SMART) methodology (v1). Simple random sampling was used to estimate a representative sample of households and children based on the expected prevalence of acute malnutrition (10%), estimated desired precision (3%), proportion of children below 5 years (12.5%), and average household size (5), with a 15% allowance for non-response. Population data was obtained from the ProGres database, which had the addresses of all camp residents. The resultant required sample size was 383 households and 183 children.

Three questionnaires were used to collect information on the different individual 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 6-59 months, and half of women surveyed, and tested for haemoglobin using a portable HemoCue 301 analyser. Paper questionnaires were used for data collection, and data was entered into ENA and Epi Info respective templates concurrently with data collection. Data analysis was done using ENA for SMART software to analyse anthropometric data, and Epi Info 3.5.4 software for the remaining data. A total of 5 teams collected data during the survey, each comprising of 5 members.

Summary Results

Table 1: 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)	6/163	3.7% (1.7-7.8)	Critical if ≥ 15%
Moderate Acute Malnutrition (MAM)	6/163	3.7% (1.7-7.8)	
Severe Acute Malnutrition (SAM)	0/163	0.0% (0.0-2.3)	
Oedema			
Mid Upper Arm Circumference (MUAC)			
MUAC <125mm and/or oedema	1/165	0.6% (0.1-3.4)	
MUAC 115-124 mm	0/165	0.0% (0.0-2.3)	
MUAC <115 mm and/or oedema	1/165	0.6% (0.1-3.4)	
Stunting[1] (WHO 2006 Growth Standards)			
Total Stunting	20/156	12.8% (8.5-19.0)	Critical if ≥ 40%
Severe Stunting	4/156	2.6% (1.0-6.4)	
Programme coverage			
Measles vaccination with card or recall (9-59 months)	155/160	96.9% (92.9-99.0)	Target of ≥ 95%
Vitamin A supplementation within past 6 months with card or recall	155/165	93.9% (89.1-97.1)	Target of ≥ 90%
Diarrhoea			
Diarrhoea in last 2 weeks	22/165	13.3% (8.5-19.5)	
Anaemia			

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[1] Note that z-scores for height-for-age require accurate ages to within two weeks (CDC/WFP: A manual: Measuring and Interpreting Mortality and Malnutrition, 2005).

	Number / total	% (95% CI)	Classification of public health significance or target (where applicable)
Total Anaemia (Hb <11 g/dl)	84/165	50.9% (43.0-58.8)	High if ≥ 40%
Mild (Hb 10-10.9)	57/165	34.5% (27.3-42.3)	
Moderate (Hb 7-9.9)	27/165	16.4% (11.1-22.9)	
Severe (Hb <7)	0/165	-	
CHILDREN 0-23 months			
IYCF indicators			
Timely initiation of breastfeeding	50/73	68.5% (56.6-78.9)	
Exclusive breastfeeding under 6 months	4/22	18.2% (5.2-40.3)	
Consumption of iron-rich or iron-fortified foods	12/14	85.7% (57.2-98.2)	
Bottle feeding	23/73	31.5% (21.1-43.4)	
WOMEN 15-49 years			
Anaemia (non-pregnant)			
Total Anaemia (Hb <12 g/dl)	71/147	48.3% (40.0-56.7%)	High if ≥ 40%
Mild (Hb 11-11.9)	35/147	23.8% (17.2-31.5)	
Moderate (Hb 8-10.9)	33/147	22.4% (16.0-30.1)	
Severe (Hb <8)	3/147	2.0% (0.4-5.8)	
FOOD SECURITY			
Food distribution			
Proportion of households with a ration card	334/335	99.7% (98.1-100)	
Average number of days general food ration lasts out of 30 days	20.9 (19.5-22.3)		
Negative household coping strategies			
Proportion of households reporting using none of the coping strategies over the past month	63/325	19.4% (15.3-24.2)	
Household dietary diversity			
Average HDDS (mean, SD / range)	5.7 (5.5-5.9)		
WASH			
Water quality			
Proportion of households using improved drinking water source	351/365	96.2% (93.5-97.8)	
Water quantity			
Proportion of households that use:			**Average quantity of water available per person / day ≥ 20 litres**
≥ 20 lpppd	173/362	47.8% (42.6-53.1)	
15 - <20 lpppd	33/362	9.1% (6.4-12.7)	
<15 lpppd	156/362	43.1% (38.0-48.4)	
Satisfaction with drinking water supply			

	Number / total	% (95% CI)	Classification of public health significance or target (where applicable)
Proportion of households that say they are satisfied with drinking water supply	63/365	17.3% (13.6-21.6)	
Safe excreta disposal			
Proportion of households that use:			
An improved excreta disposal facility (improved toilet facility, 1 household)	161/344	46.8% (41.5-52.2)	
A shared family toilet (improved toilet facility, 2 households)	89/344	25.9% (21.4-30.9)	
A communal toilet (improved toilet facility, 3 households or more)	18/344	5.2% (3.2-8.3)	
An unimproved toilet (unimproved toilet facility or public toilet)	76/344	22.1% (17.9-26.9)	
MOSQUITO NET COVERAGE			
Mosquito net ownership			
Proportion of households owning at least one LLIN	171/343	49.9% (44.4-55.3)	**Target of >80%**
Average number of persons per LLIN (mean)		1.9	**2 persons per LLIN**
Mosquito net utilisation			
Proportion of household members (all ages) who slept under an LLIN	392/1304	30.1%	
Proportion of children 0-59 months who slept under an LLIN	87/244	35.7%	
Proportion of pregnant women who slept under an LLIN	9/33	27.3%	
Indoor residual spraying			
Proportion of households covered by IRS	103/343	30% (25.3-35.2)	

Interpretation

According to the survey findings, the situation in Dukwi refugee camp was similar to those observed in other refugee camps in the region, with **low acute malnutrition** and **high anaemia** (above the WHO "high" classification of 40%) for both children 6-59 months and women of reproductive age.

Nearly all water sources reported by respondents were "improved". However, more than half **of the households (52.2%) used less than 20 litres** of water per day; the survey was conducted during an acute shortage of water occasioned by disconnection of water to the camp by the water authority. This was due to alleged non-payment of water bill by the ministry of defence and national security who are responsible for the camp water supply and security among other issues. The camp residents were forced to source water from Dukwi Village, 10 km away. Regrettably, it was leading to friction

with the village residents who were beginning to resent the sharing of the scant resources. At the time of survey, 20 Litre jerry can was being sold for 5-15 Pula (0.8-1.7 USD) within the camp, a large amount of money considering that the refugees are not allowed to work.

Slightly less than half of the households (46.8%) were using sanitation facilities which were "improved", about 31.1% of households either using shared family or communal facilities, and the remainder (22.1%) were using "unimproved" facilities.

The Infant and Young Child Feeding practices is grossly suboptimal compared to recommended practices; exclusive breastfeeding is dismal, with only 18.2% of children under age of 6 months being exclusively breastfed.

Residential spaying was conducting in the month of October 2013, although only 30% of the residents had their houses sprayed. Discussions with key informants indicate most resident are apprehensive of the whole exercise; that it might have ulterior motives or unintended health consequences negating the potential benefits. Sensitisation through refugee opinion leaders should be intensified prior to the next spraying activity.

Recommendations

Immediate

1. Partners to reinforce activities to improve dietary diversity at household level, including continued scale up of home gardening projects, and investigation in to the provision of appropriate (non-perishable) complementary foods for example, canned tuna, considering the challenges in buying, transporting and distributing perishable foods at a large scale.

2. UNHCR, and partners to consider blanket provision of micronutrient powder (MNP) to children 6-59/6-23 months and women of reproductive age (depending on resources) to increase micronutrient content of the diet. In the long term, food diversity should be explored in the design of the food aid basket.

3. Introduction of new activities such as use of lipid based nutrient supplements or micronutrient powders or provision of micronutrients through improving the micronutrient content of the general food ration;

4. Increased BCC is necessary for targeted groups who are not sleeping under their LLINs;

5. Redistribution of LLINs is necessary to achieve ownership of sufficient LLINs to reach Universal Coverage; A hang-up campaign is necessary to put unused LLINs over sleeping surfaces so that they are more likely used;

6. There is need to strengthen the awareness, promotion, and protection of IYCF through for example baby tents and initiation of mother to mother support groups (Existing or new groups could be used and other activities incorporated e.g. income generating activities); linked to promotion of Essential Nutrition Actions (ENA) interventions; the results of this survey could be used to inform advocacy efforts to improve funding and / or the deployment of resources especially from partners like UNICEF who are focused on issues affecting infants and mothers.

7. Providing information and education for the refugee community on anaemia and micronutrient deficiencies; in addition, carry out a study to better understand the causes of anaemia in the camp.

8. Rehabilitate the two boreholes in the camp and if possible motorize the system to support the on-going small scale irrigation.

Medium Term

1. Kitchen Garden initiatives already being undertaken by some of the households should be supported and promoted with the focus on growing micronutrient-rich foods, especially rich in iron, and inclusion of a health education component.

2. However, with the water shortage and emerging government policies on the restrictions on the use of water for small scale irrigation, it is paramount to explore water conservation farming like the use of green houses, alongside provision of seeds, training, monitoring.

3. A multi-dimensional approach to food security among refugees including: use of cash, fresh food vouchers, income generating activities, cash and food for work programmes, and augmenting safety net programmes for vulnerable groups should be considered

4. Small animal farming (Chicken & Rabbit) currently being promoted and supported by Skillsshare International should be scaled up to target more households.

5. Implement a KAP survey of IYCF to explore poor complementary feeding practices of children 6-23 months and Exclusive Breastfeeding of children under 6 months. It will explore among other issues: the proportion of non-breastfed infants that will necessitate identification and skilled assessment and support; reasons for the low prevalence figures of exclusive breastfeeding that will require skilled breastfeeding support; identifying inadequate intake of micronutrient rich foods that will necessitate improving the quality of food available for complementary feeding; investigating the factors determining bottle feeding;

6. There is need for community awareness through key opinion leaders before the next IRS campaign. Recent IRS campaign did not succeeded in reaching sufficient coverage rates of households. The residents have inherent fear that the spraying of houses could be a health hazard in the long term.

7. Toilet facilities coverage to be looked into so as to increase coverage of improved sanitation facilities and reduce sharing of toilets.

Long Term

1. It is necessary to carry out another follow up nutrition survey in the camp preferably during the winter period (May-Sept) when most households are within the camp and schools are closed.

2. Toilet facilities coverage to be looked into so as to increase coverage of improved sanitation facilities and reduce sharing of toilets.

3. Improve and scale up the livelihood opportunities for the refugees through developmental-oriented initiatives to improve their economic status. Given the restriction to access to work and other sources of income outside the camp, opportunities should be explored for income generating activities within the camp and support given terms of access to markets. Already some of the refugees are putting into use skills like art work. There is already a market between the camp and outside for farm produce and if intensive water conserving farming like greenhouses was to be promoted, the residents would be gainfully employed and would contribute to the local economy and availability of fresh foods.

4. Long lasting solution for the annual perennial flash floods should be found. Establishing drainage system could go a long way in ameliorating the situation and alleviating constant displacements occasioned by the floods. It has been quite disruptive to the well-being of the refugee. The survey witnessed one such flood incident.

5. UNHCR and its partners should continue to advocate, support and promote establishment of improved dwelling houses for the refugees especially those who have been tent dwellers for decades even as more durable solutions are being sort like resettlement. The camp has been in temporary mode for the last 30 years with the government of Botswana hoping it will eventually close. However, with constant, unending and new political instability and the resulting complex emergencies in great lakes region and the rest of Africa, influx of refugees will continue to pour in to the stable and relatively economically well off southern African countries.

1   Introduction

1.1   Geographic description of survey area

The country's only refugee camp, the Dukwi Refugee Camp was once described as "capturing the history of Southern Africa in a nutshell." Situated in the eastern part of the country, since its establishment in 1978, Dukwi Refugee Camp has provided refuge to refugees from the Southern African region and other parts of the continent. At its peak, the camp hosted more than 45,000 people, mostly fleeing oppression and racism in Zimbabwe (former Rhodesia) and apartheid in South Africa. During this period it also provided refuge to refugees from Angola and Namibia.

The refugee camp sprawls for 20 sq.km into the Botswana savannah along the road between Francistown, Botswana's second city, and the Zambian border to the north. It is situated some 180 km outside Francistown and 559 km (340 Miles) north of the country's capital city, Gaborone and 10 km from the village of Dukwi and not far from Nata; in a region that is favourable for cultivation, despite the extreme summer heat which renders the camp's roads and common areas dusty and arid. From patches of maize to groves of banana and mango trees, fruits and vegetables grow copiously within many family compounds throughout the camp. Nevertheless, during the rainy season, the camp infrastructure is jeopardized by flash flooding, often damaging semi-permanent structures such as mud-brick buildings and tents issued by the United Nations. Currently, the camp is home to over 3,000 refugees from 14 nationalities, including Algeria, Angola, Burundi, DR Congo, Eritrea, Ethiopia, Botswana, Namibia, Rwanda, Somalia, South Sudan, Sudan, Uganda and Zimbabwe. There is an assortment of languages and cultures co-existing in the camp. The estimated breakdown of the population in Dukwi Camp is 45 per cent female, with 45 per cent of the population under the age of 18.

The camp may look temporary with its jumble of small brick buildings, shacks and huts but it has been in existence for 30 years. Some of the residents have raised their children and even grandchildren in Dukwi and are sometimes given permission to live and work outside the camp.

1.2   Description of the population

As of November, the total population was 3104 individuals comprising of 1527 households as per UNHCR ProGress[2] and Botswana fact sheet.

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[2]In ProGress, a household is defined as members sharing a ration card, which does not necessarily reflect the preferred household definition used in nutrition surveys as two or more rations can be combined to form a larger household. In a nutrition survey, a household is usually defined as a group of people who live together and routinely eat out of same pot.

Table 2 : Demographic Profile of the Refugee Camp Population in Botswana

COUNTRY OF ORIGIN	Refugees	Asylum Seeks	Total
Angola	1	0	1
Burundi	68	13	81
Cameroon	1	0	1
DRC	196	91	287
Ethiopia	12	4	16
Botswana	4	1	5
Namibia	981	6	987
Rwanda	62	3	65
Somalia	461	100	561
South Sudan	1	0	1
Sudan	7	7	14
Uganda	27	4	31
Zimbabwe	989	65	1054
Total	2,810	294	3,104

As the table demonstrate Botswana is host to refugees from different sub-Saharan African countries. Currently the dominant populations are from Zimbabwe, Namibia (Caprivi region) and Somalia. In the face of persecution, these individuals travelled from as far away as Somalia in search of refuge and protection. As illustrated by both tables, the women, men and children in the camp fled persecution varying from internal civil war, political unrest to ethnic violence. The story of the Dukwi community is one of the realities of struggle and survival, and the rebuilding of lives through resiliency and courage[3].

1.3   Food security situation & Major livelihoods in the area

Theoretically, refugees receive food rations equal to approximately 2,200 Kcal per day, and also supplement their monthly food rations by maintaining household gardens.

Table 3: Composition of monthly food ration per person per month

Maize	12.5 kg
Soya mince soup	200 g
Beans	1.5 kg
Corn Soya Blend	2.5 kg/per quarter
Vegetable oil	0.75 litres
Sugar	1 kg
Salt	500 g

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[3] Exploring Ways of Including Human Rights Narratives of Refugees in Transitional Justice and peacebuilding Processes Through Storytelling:Narratives from Dukwi Refugee Campby Mavis N. Matenge, 2013

Food Security & Livelihood practices in the refugee:

Agro-forestry is practised in the refugee camp; fruit trees or shrubs are grown among or around crops as means of preserving or enhancing the productivity of the land including harvesting crops and fruits, and at the same time assuring income and food for the households. The refugees keep small stock like poultry and some rabbits recently introduced by Skillshare International; whereas, several cattle present in the camp belong to the local population. Small vegetable gardens and farms are widespread. It is important however to ensure elaborate fencing system to protect the crops and trees planted in the field against animals and human activities. The destruction of crops by the animals of the host community could be a source of conflict in the future. Also, the camp has fenced about 10 hectares of land to grow different types of orchards/fruits, which will increase production, incomes and nutrition situation.

Picture 1: Fruits and vegetables grow copiously within many family tree compounds throughout the camp

Water & Sanitation

The government provides the refugees' water freely for both domestic and small scale irrigation purposes. Jointly with the government, UNHCR in 2012 developed two additional boreholes, at about 17 million pula, to boost the domestic and irrigation water supply system. However, at the time of survey, the two boreholes were no longer functional. Each family who is interested in farming normally gets about a 40x40 meter size plot area or more land for growing different types of vegetables, fruits and other crops like maize, beans etc. using the sprinkler and/or flood irrigation systems. As a result, there is a significant amount of water wasted in the farms, which community leaders need to address, as it actually denies other sections and some parts in the community access to water. Indeed, the wastage of the water is part of the reason the water authority discontinued water for the camp from 10th December 2013. At the end of the survey towards Christmas, the water had not been resumed causing widespread distress for the camp residents. To avert potential public health disaster after more than two weeks of lack of water, UNHCR initiated small scale water trunking from private providers.

Socio-Economic Classification

A focus group discussion carried out in October 2013 estimated proportion of the camp resident as shown in fig. 4 in terms of resources[4]. The relatively better off group comprised 20% of the total camp population; these are basically those with tangible material resources such as vehicles, vehicle garages, groceries and other forms of trade; this group is providing a number of services like buying and selling farm produce and other types of groceries in the camp. The moderate group, which comprises about 60%, constitutes the majority actively involved in medium/small business, crops, vegetables- and fruits production. Besides this they are very active in camp social organization, leadership and evangelism services.

The relatively poor group of the camp population was estimated at 15%. This group is characterized by high dependency on ration distributions, and provide casual labour to those moderate and relatively better off groups. The provision of casual labour forms a significant source of their livelihood system. The group provides labour in households' chores such as washing dishes, farm work, child care, and so on. They are also involved in rearing and selling chicken; and there are some who are involved in project activities such as rabbit rearing and skills development trainings conducted by Skillshare International.

The very poor category of the refugee population is about 5% comprising mainly the elderly, chronically ill, and those with different forms of disabilities, receiving supplementary food and non-food items supplies as well as home based care support services such as psychosocial support provided through a network of social workers of the Red Cross Society. It is important to continue assessing and evaluating the respective needs of the different groups to identify those most vulnerable and to ensure effective programmatic targeting that might involve subsidy and equity in terms of getting sufficient resources and other needs.

Table 4 : FGD with both women and men 29/10/2012[5]

Variables	Typically Better off	Moderate	Poor	Very Poor
%Pop	20%	60%	15%	5
Pop.	640	1,920	480	160
No. of household based on five/hh size	128	1,152	96	32
Business / trading activities	These are basically traders, at the camp; some also hawk goods in nearby villages and small town travel back to the	Small scale business, gardens, water problem, producing and selling produce to the business	Ration, labour to the moderate and better off groups such as washing dishes, farm	Sick, elderly, disabled, Red Cross special attention, supplements, Psychosocial support in communities,

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[4] Exploring Ways of Including Human Rights Narratives of Refugees in Transitional Justice and peacebuilding Processes Through Storytelling:Narratives from Dukwi Refugee Campby Mavis N. Matenge, 2013

[5] Adapted from, UNHCR Energy And Environment Rapid Assessment, October 2012.

	camp in the evening; those with relatively big shops/ groceries, vehicles, garage,	group and get money to buy fuel	work so that can buy more fuel and food	depending kinship networks
Growing crops and vegetables and fruits	Buy farm households produce from the moderate	These are the main producers of crops, vegetables and fruits sold to the business households	Provide casual labour to the moderate and better off households.	n/a
Livestock: owned by the local population refugees have chicken and rabbits introduced Skills Share International	Buy chicken form the other groups	Some chicken over 5 chicken / rabbits	Few chicken 3 -5 and some few rabbits	2or 3 chicken or none
Source of fuel/energy	Electricity, paraffin, firewood, and LPG; solar for lighting and household electrical appliances	Electricity, paraffin, firewood, and LPGs , solar for lighting and household electrical appliances	Firewood, paraffin and candles for lighting	Firewood and paraffin, candles

1.4 Health situation

Primary Health Care Services in Dukwi refugee camp are provided by the Botswana Ministry of Health supported by Botswana Red Cross. There is a camp-based clinic providing primary health care that includes reproductive health services, services for sexually transmitted infections, antenatal and postnatal care, HIV services including prevention, voluntary counselling and testing (VCT) services, treatment for opportunistic infections, and family planning. All services are provided free of charge to refugees and local communities. When necessary, patients are referred to Tutume district hospital (80 km and approximately one hour drive) for more comprehensive services. The catchment area for Dukwi clinic comprises the camp plus the four surrounding villages (up to 35 km distance) resulting in a total population of approximately 6,000 persons of whom 48% are refugees. However, approximately 90% of consultations at the Dukwi clinic are from the refugee community. Cultural and linguistic barriers are problems for some refugees who attend the health clinic.

1.5 Service providers

The camp is run by the government of Botswana with support from UNHCR and partner organizations. Services provided at Dukwi Camp include: a health clinic, a police station, a pre-school, a primary school, short vocational training and tertiary distance learning. There is no secondary school in the camp. Refugee children attend secondary school outside of the camp either in a local village or in Francistown, or, in a few cases, in other locations in Botswana. Vocational training is provided by Skillshare International, while UNHCR is responsible for overseeing and provision of support to the primary school, secondary and previous years' tertiary level students. The Botswana Red Cross Society (BRCS) is responsible for community services and facilitates refugees' access to health services, and also runs a home-based care programme and other social welfare services, such as psychosocial counselling and support to orphans and unaccompanied and separated children. Medical care and services are provided to refugees in a government-run clinic in the camp. Habitat for Humanity is in charge of shelter operations. Funding from President George Bush's Emergency Plan for AIDS Relief (PEPFAR) has been earmarked for a project to mobilise camp communities to disseminate HIV/AIDS prevention messages targeted at their specific cultures and languages. Skillshare International Botswana also works in partnership with local organisations, community groups and the government to reduce poverty improve living conditions and create long-term sustainable livelihoods. Also working in the camp is FORGE - a United States based non-profit organization that works with displaced communities in Africa.

Figure 1 Crude and Under-5 Mortality Rates
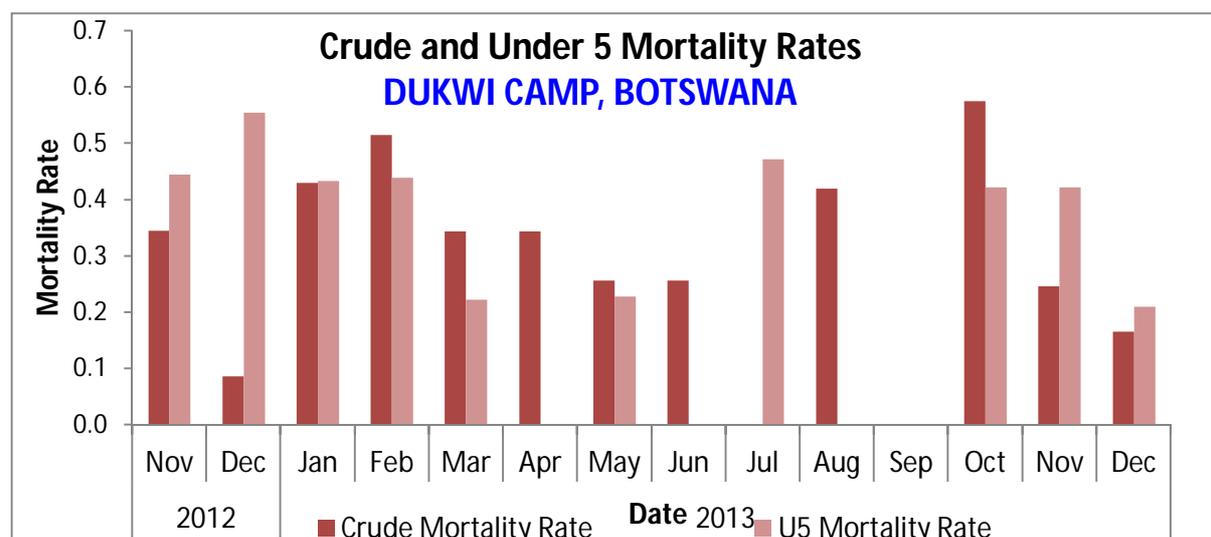
2 Survey Objectives

Primary objectives:
- To measure the prevalence of acute malnutrition in children aged 6-59 months.
- To measure the prevalence of stunting in children aged 6-59 months.

- To determine the coverage of measles vaccination among children aged 9-59 months).
- To determine the coverage of vitamin A supplementation received during the last 6 months among children aged 6-59 months.
- To assess the two-week period prevalence of diarrhoea among children aged 6- 59 months.
- To measure the prevalence of anaemia in children aged 6-59 months and in women of reproductive age between 15-49 years (non-pregnant)
- To investigate IYCF practices among children aged 0-23 months.
- To determine the coverage of ration cards and the duration the general food ration lasts for recipient households.
- To determine the extent to which negative coping strategies are used by households.
- To assess household dietary diversity.
- To determine the population's access to, and use of, improved water, sanitation and hygiene facilities.
- To determine the ownership of mosquito nets (all types and LLINs) in households.
- To determine the utilisation of mosquito nets (all types and LLINs) by the total population, children 0-59 months and pregnant women.
- To determine the household coverage of indoor residual spraying.
- To establish recommendations on actions to be taken to address the situation in *Dukwi Refugee Camp.*

Secondary objective:
- To determine enrolment into Antenatal Care clinic and coverage of iron-folic acid supplementation in pregnant women.

3   Methodology

3.1   Sample size

The survey was based on the UNHCR Standardised Expanded Nutrition Survey (SENS) guidelines for refugee populations (v1.3) and the Standardized Monitoring and Assessment of Relief and Transitions (SMART) methodology (v1). Simple random sampling was used to estimate a representative sample of households and children based on the expected prevalence of acute malnutrition (10%), the estimated desired precision (3%), proportion of children below 5 years (12.5%), and average household size (5), with a 15% allowance for non-response. Population data was obtained from the ProGres database, which had the addresses of all camp residents. The resultant required sample size was 383 households and 183 children.

3.2   Sampling procedure: selecting households and individuals

Systematic random sampling (interval sampling) without a list was used in selecting households after it became apparent during the pilot test that the list of household available from UNHCR ProGres was not updated and was complicated further by frequent change of houses by the camp residents therefore negating the use of simple random sampling. A sampling interval of 3 was used which was determined by dividing the total number of verified houses by the estimated sample (1280/383=3.4). The starting household was selected randomly using SMART software random number generator. The sampled houses were subsequently marked and each morning teams were assigned 15 households. After finishing with interviewing, household were marked with a different colour to guard against duplication.

Empty households were visited three times and in some cases the absent occupants of the households were telephoned to book appointment. The survey teams had to fit in to the schedule of the households most of whom were out as early as 6am in the morning to harvest caterpillars (Mopani worms) which is a delicacy in December in most of the southern African countries. It was good foresight all the survey team were residence of the camp hence were able to visit the absentee households at odd hours. A few households were out of the camp for short term work in town and villages as far as Francistown. Apparently, in December, there are lots of prospects for labour outside the camp during the festive season. Empty household was not replaced; the situation had been anticipated and 15% extra household had been factored in.

3.3   Questionnaire

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. Questionnaires were made to available in three languages Kiswahili, Somali and French. The translated questionnaires were downloaded from SENS UNHCR website. To ensure the translation was correct as per the versions spoken in southern Africa, they were back translated to English by translators hired for that purpose. 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, immunisation (measles), 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, 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).

3.4   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. All the children had child health card/ notification of birth.

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 ≥ 87cm 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.

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 the 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 <12.5cm, when oedema was present or when haemoglobin was <7.0g/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 <210mm.

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 5 : 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	--	<21.0cm	
	--	<11.5cm and/or odema	--	--	--
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

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.

     o <u>Children 0-23 months of age who were put to the breast within one hour of birth</u>
                    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).

     o <u>Infants 0–5 months of age who received only breast milk during the previous day</u>
                    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.

     o <u>Children 12–15 months of age who received breast milk during the previous day</u>
                    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.

<u>Infants 6–8 months of age who received solid, semi-solid or soft foods during the previous day</u>
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.

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
<u>Fortified in the home with a product that included iron during the previous day</u>
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.

  o <u>Children 20–23 months of age who received breast milk during the previous day</u>
  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.

  o <u>Children 0–23 months of age who were fed with a bottle during the previous day</u>
  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 Dukwi refugee camp.

Table 6: Definitions of drinking water and sanitation

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 runs 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 *maximum* of 2 families / households or with no more than *12 individuals*. 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 7 : 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 8 : 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 9 : 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 10 : 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 11 : 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 12 : 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 Dickson Sigei (Consultant, UNHCR) in coordination with Dr. Gilbert-lephodisa Masego (Botswana Red Cross) and Dr. Joseph Nshimyumuk, a Refugee medical specialist from Rwanda.

A total of 5 teams were recruited for data collection during the survey. Each team was comprised of 5 members: one team leader, one medical specialist, two measurers, and one Interviewer[6]. Due to the multiple Nationalities/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 who also acted as translator when the need arises. The team leader was responsible for administering the individual level questionnaires, and the interviewer was responsible for the household level questionnaires. 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 University Graduates or Students (University of Botswana under sponsorship of UNHCR) while the rest of the team members were also ether University graduates/Students or with high school level education (secondary certificates) who were able to read and write in English.

Training

A five-day standardised training was conducted by the coordination team. 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 households not included in the final 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 lasted 7 days from 17th – 23rd 2013. 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 four supervisors (including Doctor from Red Cross and refugee medical specialist) who were present during the entire data collection period and one Survey Coordinator.

3.9 Data analysis

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

During supervision in the field, and at the end of each day, supervisors manually checked all paper 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, data entry was done starting with anthropometry questionnaires. Any questionnaires with discrepancies / mistakes was however were temporarily marked and set aside 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. 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 (Centres for Disease Control, version 3.5.1).

4 Results

The demographic characteristics of the population surveyed are presented in **Table 14**.

Table 13: Demographic Characteristics of the study population

Total households surveyed	*364*
Total population surveyed	*1304*
Total U5 surveyed	*244*
Average household size	*3.6*
% of U5	*18.7%*

*The NRR rate was 10.1%

4.1 Children 6-59 months

4.1.1 Sample size and clusters

The number of children sampled was below the planned sample size of 183 children. The high NRR of 10.1 was due to the Camp residence out of the camp illegally for work opportunities in the towns and villages during the festive season.

Table 14: Target and actual number captured

	Target (No.)	Total surveyed (No.)	% of the target
Children 6-59 months	183	165	90.16
Clusters (where applicable)	N/A	N/A	N/A

Age documentation was available all the sampled children except one child who subsequently left out of the analysis. 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 16**). The age group 54-59 months was under-represented compared to the other age groups. This is often the case in nutrition surveys.

Table 15: Children 6-59 months - Distribution of age and sex of sample

AGE (mo)	Boys no.	%	Girls no.	%	Total no.	%	Ratio Boy:Girl
6-17 months	15	50.0	15	50.0	30	18.2	1.0
18-29 months	16	40.0	24	60.0	40	24.2	0.7
30-41 months	18	41.9	25	58.1	43	26.1	0.7
42-53 months	25	64.1	14	35.9	39	23.6	1.8
54-59 months	10	76.9	3	23.1	13	7.9	3.3
Total	84	50.9	81	49.1	165	100.0	1.0

All the children had child health cards provide in the clinic hence exact birth date was recorded.
**All children were recruited on the basis of age.*

4.1.2 Anthropometric results (based on WHO Growth Standards 2006;NHCS Growth Reference 1977 shown in Appendix 4)

The prevalence of global acute malnutrition (GAM) in children 6-59 months is shown in **Table 17**. The prevalence of GAM was higher in girls compared to boys (test of significance was not done as the sample size is not sufficient as to be appropriate).

Table 16: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 163	Boys n = 83	Girls n = 80
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(6) 3.7 % (1.7 - 7.8 95% C.I.)	(1) 1.2 % (0.2 - 6.5 95% C.I.)	(5) 6.3 % (2.7 - 13.8 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and ≥-3 z-score, no oedema)	(6) 3.7 % (1.7 - 7.8 95% C.I.)	(1) 1.2 % (0.2 - 6.5 95% C.I.)	(5) 6.3 % (2.7 - 13.8 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(0) 0.0 % (0.0 - 2.3 95% C.I.)	(0) 0.0 % (0.0 - 4.4 95% C.I.)	(0) 0.0 % (0.0 - 4.6 95% C.I.)

The prevalence of oedema is 0.0%

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Table 17: 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	30	0	0.0	1	3.3	29	96.7	0	0.0
18-29	40	0	0.0	2	5.0	38	95.0	0	0.0
30-41	43	0	0.0	1	2.3	42	97.7	0	0.0
42-53	38	0	0.0	1	2.6	37	97.4	0	0.0
54-59	12	0	0.0	1	8.3	11	91.7	0	0.0
Total	163	0	0.0	6	3.7	157	96.3	0	0.0

Figure 2: Trend in the prevalence of wasting by age in children 6-59 months.
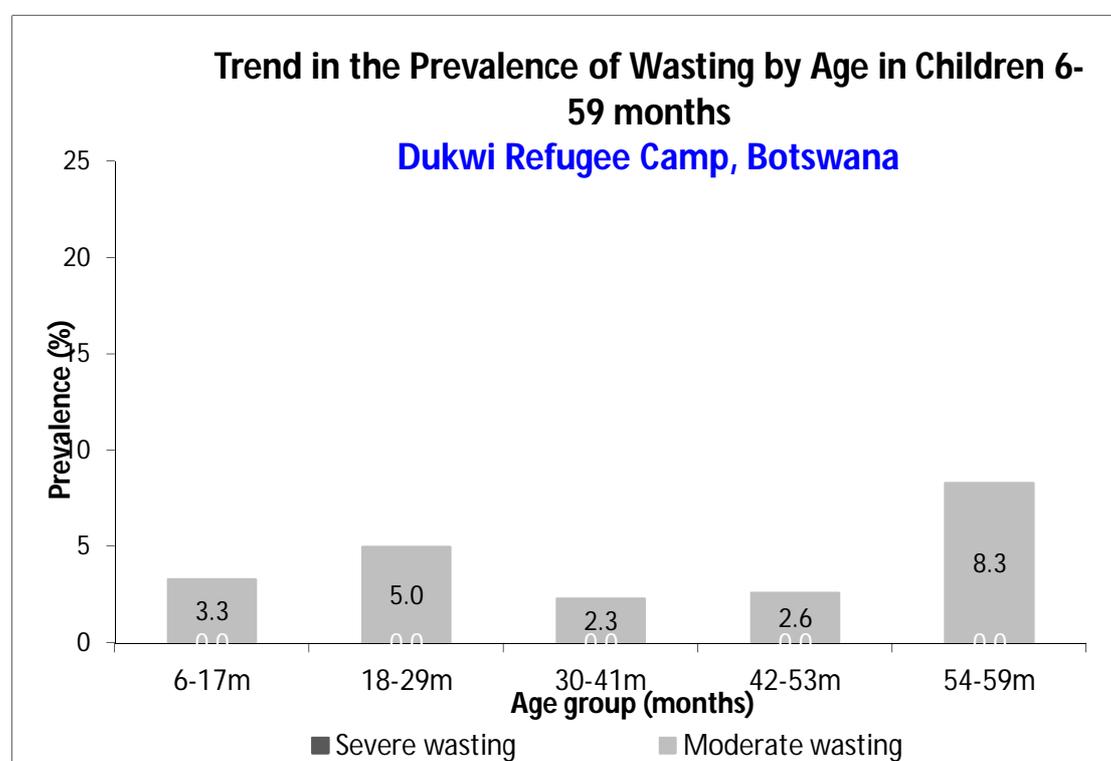
Table 18: Distribution of severe acute malnutrition and oedema based on WEIGHT-FOR-height z-scores

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 1 (0.6 %)	Not severely malnourished No. 164 (99.4 %)

The Figure below shows that the distribution for weight-for-height z-scores for the survey sample is almost similar to the international WHO Standard population of children aged 6-59 months.

Figure 3: Distribution of weight-for-height z-scores

(Based on WHO Growth Standards; the reference population is shown in green and the surveyed population is shown in red) of survey population compared to reference population.
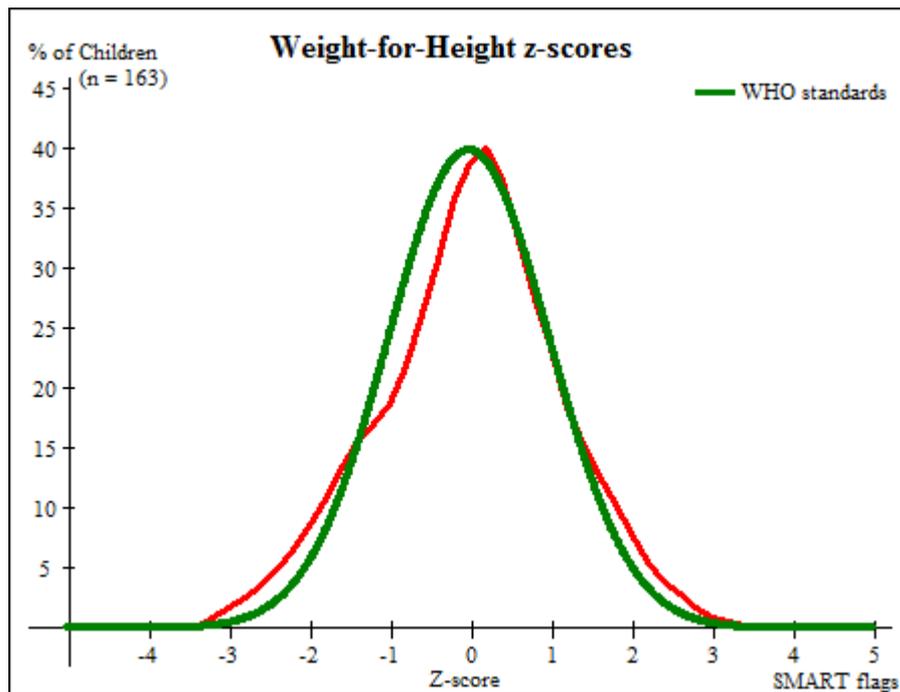
Table 19: Prevalence of MUAC Malnutrition.

	All n = 165	Boys n = 84	Girls n = 81
Prevalence of MUAC < 125 mm and/or oedema	(1) 0.6 % (0.1 - 3.4 95% C.I.)	(0) 0.0 % (0.0 - 4.4 95% C.I.)	(1) 1.2 % (0.2 - 6.7 95% C.I.)
Prevalence of MUAC < 125 mm and ≥ 115 mm, no oedema	(0) 0.0 % (0.0 - 2.3 95% C.I.)	(0) 0.0 % (0.0 - 4.4 95% C.I.)	(0) 0.0 % (0.0 - 4.5 95% C.I.)
Prevalence MUAC < 115 mm and/or oedema	(1) 0.6 % (0.1 - 3.4 95% C.I.)	(0) 0.0 % (0.0 - 4.4 95% C.I.)	(1) 1.2 % (0.2 - 6.7 95% C.I.)

Table 20: PREVALENCE OF MUAC MALNUTRITION by age, based on MUAC cut off's and/or oedema.

Age (mo)	Total no.	MUAC < 115 mm		MUAC ≥ 115 mm and < 125 mm		MUAC ≥ 125 mm		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	30	1	3.3	0	0.0	29	96.7	0	0.0
18-29	40	0	0.0	0	0.0	40	100.0	0	0.0
30-41	43	0	0.0	0	0.0	43	100.0	0	0.0
42-53	39	0	0.0	0	0.0	39	100.0	0	0.0
54-59	13	0	0.0	0	0.0	13	100.0	0	0.0
Total	165	1	0.6	0	0.0	164	99.4	0	0.0

Table 21: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 161	Boys n = 84	Girls n = 77
Prevalence of underweight (<-2 z-score)	(12) 7.5 % (4.3 - 12.6 95% C.I.)	(3) 3.6 % (1.2 - 10.0 95% C.I.)	(9) 11.7 % (6.3 - 20.7 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and ≥-3 z-score)	(8) 5.0 % (2.5 - 9.5 95% C.I.)	(3) 3.6 % (1.2 - 10.0 95% C.I.)	(5) 6.5 % (2.8 - 14.3 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(4) 2.5 % (1.0 - 6.2 95% C.I.)	(0) 0.0 % (0.0 - 4.4 95% C.I.)	(4) 5.2 % (2.0 - 12.6 95% C.I.)

Table 22: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 156	Boys n = 82	Girls n = 74
Prevalence of stunting (<-2 z-score)	(20) 12.8 % (8.5 - 19.0 95% C.I.)	(10) 12.2 % (6.8 - 21.0 95% C.I.)	(10) 13.5 % (7.5 - 23.1 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and ≥-3 z-score)	(16) 10.3 % (6.4 - 16.0 95% C.I.)	(8) 9.8 % (5.0 - 18.1 95% C.I.)	(8) 10.8 % (5.6 - 19.9 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(4) 2.6 % (1.0 - 6.4 95% C.I.)	(2) 2.4 % (0.7 - 8.5 95% C.I.)	(2) 2.7 % (0.7 - 9.3 95% C.I.)

Overall, children 18-29 and 30-41 months old appeared most affected by severe stunting; while the age groups 6-17 and 30-41 month old are more affected by moderate stunting (**Table 24, Figure 6**). 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 7**). The survey population distribution curve is also wider indicating greater variance compared to the reference population.

Table 23: 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	29	0	0.0	4	13.8	25	86.2
18-29	35	2	5.7	3	8.6	30	85.7
30-41	43	2	4.7	6	14.0	35	81.4
42-53	36	0	0.0	3	8.3	33	91.7
54-59	13	0	0.0	0	0.0	13	100.0
Total	156	4	2.6	16	10.3	136	87.2

Figure 4: Trends in the prevalence of stunting by age in children 6-59 months.
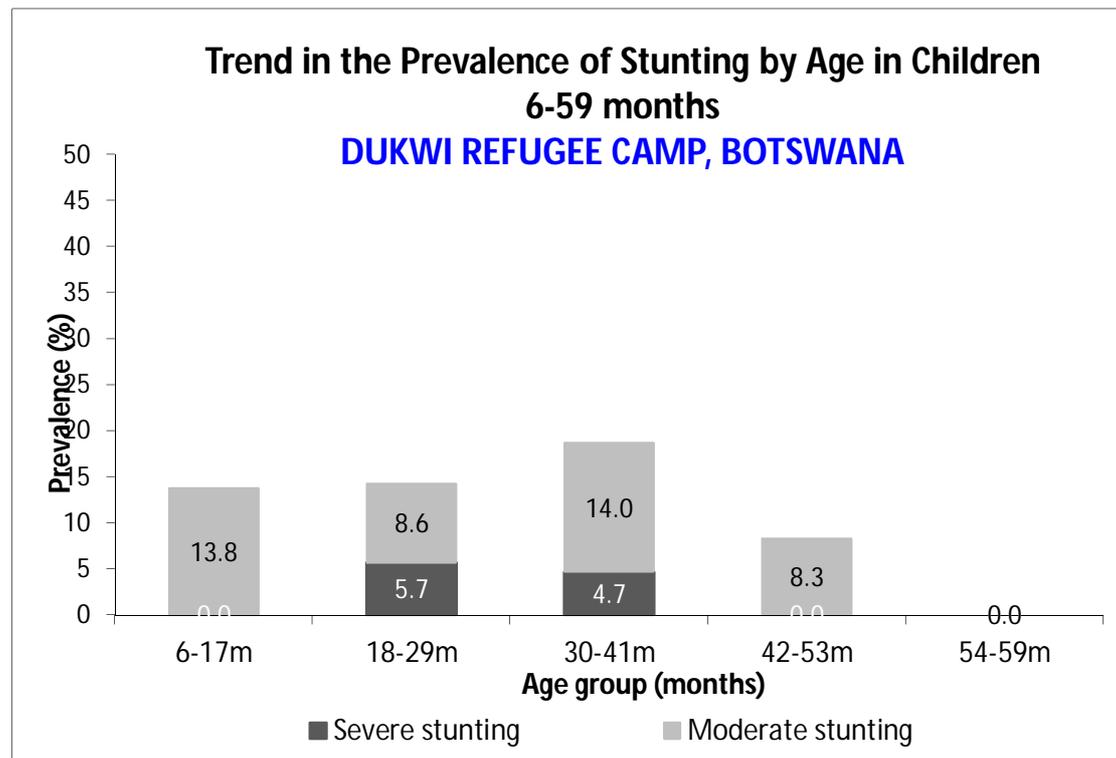
Figure 5: Distribution of height-for-age z-scores
(Based on WHO Growth Standards; the reference population is shown in green and the surveyed population is shown in red) of survey population compared to reference population.
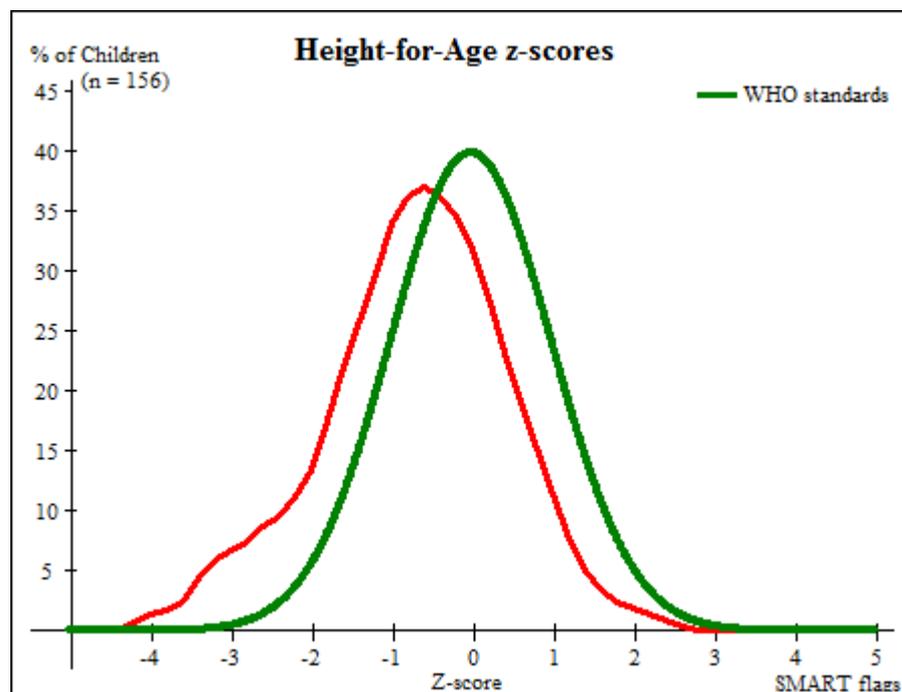
Table 24: Mean z-scores, Design Effects and excluded subjects

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	163	0.00±1.09	1.00	0	2
Weight-for-Age	161	-0.41±1.04	1.00	0	4
Height-for-Age	156	-0.71±1.11	1.00	0	9

* contains for WHZ and WAZ the children with oedema.

**The flagging criteria used for anthropometric indices was SMART flags and ranges used -/+3 from the observed mean.

1.1.1 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 94.5% (89.9 – 97.5 95% CI) (**Table 26**).

Table 25: Measles vaccination coverage for children aged 9-59 months (or other context-specific target group) (n=165).

	Measles (with card) n=151	Measles (with card or confirmation from mother) n=156
YES	93.8% (88.8 – 97.0 95% CI)	96.9% (92.9 – 99.0 95% CI)

Vitamin A supplementation coverage results

Vitamin A supplementation coverage by card or confirmed by mother was also relatively high at 93.9% (89.1-97.1 95% CI) however coverage was higher by card or mother's recall (**Table 27**).

Table 26 Vitamin: A supplementation for children aged 6-59 months within past 6 months (or other context-specific target group) (n=165)

	Vitamin A capsule (with card) n=150	Vitamin A capsule (with card <u>or</u> confirmation from mother) n=155
YES	90.9% (85.4 – 94.8 95% CI)	93.9% (89.1-97.1 95% CI)

4.1.3 Diarrhoea results

The results show that 13.3% (95% CI 8.5-19.5) of children 6-59 months surveyed experienced diarrhoea in the two weeks prior to the survey.

Table 27: Period prevalence of diarrhoea

	Number/total	% (95% CI)
Diarrhoea in the last two weeks	22/163	13.5% (8.7 - 19.7)

4.1.4 Anaemia results

The prevalence of anaemia in children 6-59 months was 50.9% (95 %CI 43.0-58.8). There was only no case of severe anaemia. The breakdown of anaemia by severity is shown in **Table 29** below.

Table 28: Prevalence of TOTAL anaemia, ANAEMIA CATEGORIES, and MEAN haemoglobin concentration in children 6-59 months of age AND BY AGE GROUP

	6-59 months n = 165	6-23 months n=52	24-59 months n=113
Total Anaemia (Hb <11.0 g/dL)	(84) 50.9% (43.0 – 58.8)	(33) 63.5% (49.0-76.4)	(51) 45.1% (35.8 – 54.8)
Mild Anaemia (Hb 10.0-10.9 g/dL)	(57) 34.5% (27.3 – 42.3)	(22) 42.3% (28.7 – 56.8)	(35) 31.0% (22.6 – 40.4)
Moderate Anaemia (Hb 7.0-9.9 g/dL)	(27) 16.4% (11.1 – 22.9)	(11) 21.2% (11.1 – 34.7)	(16) 14.2% (8.3 – 22.0)
Severe Anaemia (Hb <7.0 g/dL)	-	-	-
Mean Hb (g/dL) (SD) [range]	11.0g/dL SD 1.2311 (7.2,13.8) [min, max]	10.7g/dL SD 1.2115 (7.2,13.0) [min, max]	11.2 g/dL SD 1.212 (8.1,13.8) [min, max]

The 6-23 month age group had the highest prevalence of anaemia at 63.5% (95% CI 49.0-76.4).

Table 29: Prevalence of MODERATE AND SEVERE anaemia in children 6-59 months of age AND BY AGE GROUP

	6-59 months n = 165	6-23 months n=52	24-59 months n=113
Moderate and Severe Anaemia (Hb<10.0 g/dL)	(27) 16.4% (11.1 – 22.9)	(11) 21.2 % (11.1 – 34.7)	(16) 14.2 % (8.3 – 22.0)

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4.2   Children 0-23 months

Table 31 summarises the results of the IYCF indicators assessed. Information on IYCF indicators were based on previous day recall[7]. The proportion of mothers reporting early initiation of breastfeeding was relatively low at 68.5% (95% CI 56.6-78.9). Less than one quarter of infants 0-5 months were being exclusively breastfed (18.2% 95% CI 5.2-40.3).

Continuation of breastfeeding at 12 and 24 months was grossly low at 28.6% (95% CI 3.7-71.0) and 23.1% (95% CI 5.0-53.8) respectively, indicating that more than a three quarters of women are stopping breastfeeding earlier than the recommended 2 years[8]. However, these could be due to the high prevalence of HIV in Botswana and high awareness, though not necessarily accurate knowledge on breastfeeding in high HIV prevalence situation.

Introduction of solid, semi-solid or soft foods at 6 to 8 months was also low at 20.0% (95% CI 2.5-55.6). This indicator is used to evaluate the introduction of complementary foods suggest that more than three quarters 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 31.5% (95% CI 21.1-43.4) of women were bottle feeding at the time of the survey thus exposing their child to an increased risk of illness and infection.

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[7] Indicators for assessing Infant and Young Child Feeding Practices (WHO, 2007).
[8] Ibid

Table 30: Prevalence of Infant and Young Child Feeding Practices Indicators

Indicator	Age range	Number/ total	Prevalence (%)	95% CI
Timely initiation of breastfeeding	**0-23 months**	50/73	68.5	56.6-78.9
Exclusive breastfeeding under 6 months	**0-5 months**	4/22	18.2	5.2-40.3
Continued breastfeeding at 1 year	**12-15 months**	2/7	28.6	3.7-71.0
Continued breastfeeding at 2 years	**20-23 months**	3/13	23.1	5.0-53.8
Introduction of solid, semi-solid or soft foods	**6-8 months**	2/10	20.0	2.5-55.6
Consumption of iron-rich or iron-fortified foods	**6-23 months**	12/14	85.7%	57.2-98.2
Bottle feeding	**0-23 months**	23/73	31.5	21.1-43.4

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Infant formula

The proportion of children 0-23 months receiving infant formula (fortified or unfortified) was low at 30.6% (95% CI 20.2-42.5).

Table 31: 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)	22/72	30.6 (20.2-42.5)

Fortified blended foods

Table 32: FBF intake in children aged 6-23 months

	Number/total	% (95% CI)
Proportion of children aged 6-23 months who receive FBF	23/47	48.9 (34.1-63.9)

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Table 33 : FBF++ intake in children aged 6-23 months

	Number/total	% (95% CI)
Proportion of children aged 6-23 months who receive FBF	13/45	28.9 (16.4-44.3)

Special nutritional products

Table 34 : LNS products intake in children aged 6-23 months.

	Number/total	% (95% CI)
Proportion of children aged 6-23 months who receive LNS	1/15	6.7 (0.2-31.9)

Table 35: MNP intake in children aged 6-23 months

	Number/total	% (95% CI)
Proportion of children aged 6-23 months who receive MNP	5/45	11.1 (3.7-24.1)

4.3   Women 15-49 years

The physiological status of the women sampled is shown in **Table 37** below.

Table 36: Women physiological status and age

Physiological status	Number/total	% of sample
Pregnant	3/150	2.0
Non-pregnant	147/150	98.0
Mean age (range)	29 (15 - 49)	

The prevalence of anaemia in non-pregnant women 15-49 is currently at high public health significance according to WHO classifications (**Table 38**)[9] [10]. The majority of anaemic women are either mild or moderately anaemic with 3 cases of severe anaemia.

Table 37: 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 = 147
Total Anaemia (<12.0 g/dL)	(71) 48.3% (95% CI 40.0 – 56.7)
Mild Anaemia (11.0-11.9 g/dL)	(35) 23.8% (95% CI 17.2 – 31.5)
Moderate Anaemia (8.0-10.9 g/dL)	(33) 22.4% (95% CI 16.0 – 30.1)
Severe Anaemia (<8.0 g/dL)	(3) 2.0% (95% CI 0.4 – 5.8)
Mean Hb (g/dL) (SD)	11.9g/dL SD 1.7818

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[9] WHO (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)
[10] The Management of Nutrition in Major Emergencies available from
http://www.who.int/topics/nutrition/publications/emergencies/en/

[range]	(5.9,15.8)[min, max]	

Table 38: ANC enrolment and iron-folic acid pills coverage among pregnant women (15-49 years)

	Number /total	% (95% CI)
Currently enrolled in ANC programme	3/3	100% (95% CI 100.0 - 100.0%)
Currently receiving iron-folic acid pills	2/2	100% (95% CI 100.0- 100.0%)

4.4 Food security

Table 39: Food security SAMPLING information

Household data	Planned	Actual	% of target
Total households surveyed for Food Security	383	*335*	*87.5%*

4.4.1 Access to food assistance results

Table 40: Ration card coverage

	Number/total	% (95% CI)
Proportion of households with a ration card	334/335	99.7% (98.1-100)

The single case who did not have a card said it was because their ration card was lost in the month preceding the survey.

Table 41: Reported duration of general food ration 1[11]

Average number of days the food ration lasts (SD)	Average duration (%) in relation to the theoretical duration of the ration*
20.9 ( )	**69.7%**

*Intended duration =30 days

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[11] In contexts where a mix of full rations and half rations are given, only report this value for the households receiving the full ration.

Table 42: Reported duration of general food ration 2

	Number/total	% (95% CI)
Proportion of households reporting that the food ration lasts the entire duration of the cycle	64/271	19.1 (15.1-23.8)
Proportion of households reporting that the food ration lasted:		
≤75% of the cycle [22.5 DAYS]	243/335	72.5 (67.4-77.2)
>75% of the cycle [22.5 DAYS]	92/335	27.5 (22.8-32.6)

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 44**.

Table 43: 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 *with or without interest*	153/325	47.1 (41.5-52.7)
Sold any assets that would not have normally sold (furniture, seed stocks, tools, other NFI, livestock etc.)	86/332	25.9 (21.3-31.0)
Requested increased remittances or gifts as compared to normal	51/329	15.5 (11.9-20.0)
Reduced the quantity and/or frequency of meals	188/331	56.8 (51.3-62.2)
Begged	73/329	22.2 (17.9-27.1)
Engaged in potentially risky or harmful activities	29/330	8.8 (6.1-12.5)
Proportion of households reporting using none of the coping strategies over the past month	63/323	19.4 (15.3-24.2)

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 5.7 out of a total of a total of 12 food groups (**Table 45**), 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 (91.9%); followed by spices/condiments (79.1%), cereals (85.5%); vegetables (67.2%) and Eggs (57.0%). The last general food distribution ended 10 days prior to the start of the survey data collection. The food distribution normally last for a period of 2-3 days/cycle.

The survey was conducted during a period when the small gardens were full of greens and fruits. In addition, it was edible Caterpillars (Mopani worms) harvest season, a delicacy in southern African countries in December. The harvesting and sale of Mopani worm is a multi-million rand industry in Southern Africa. The principle producers are Botswana, Namibia, Southern Africa and Zimbabwe. It is one of the region most economically important insect. Mopani worms represent an important sector in the local rural economy; they attract large number of people who seek to cash in on the profits from the selling of insects as food.
It is quite rich in protein. Otherwise there was no other extraordinary event that may have affected household dietary intake, such as festivity.

Table 44: Average HDDS

	Mean (SD)
Average HDDS	5.7 (SD 2.0885) 0.0, 12.0 (Min, Max)

* Maximum HDDS is 12.

Figure 6: Proportion of households consuming different food groups within last 24 hours.
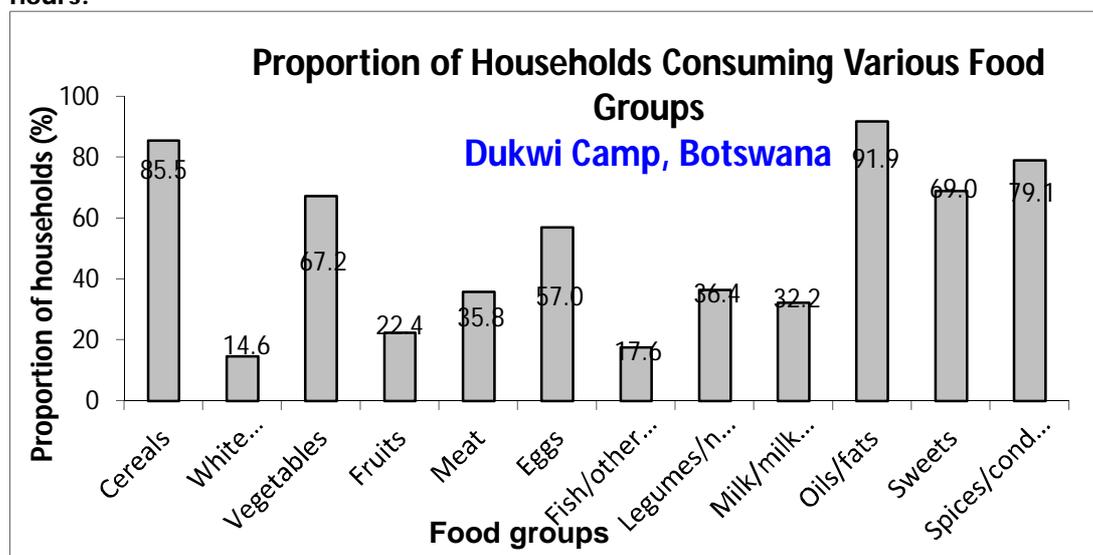
Table 45 Consumption of micronutrient rich foods by households

	Number/total	% (95% CI)
Proportion of households *not consuming any* vegetables, fruits, meat, eggs, fish/seafood, and milk/milk products	59/335	**17.3 (13.5-21.9)**
Proportion of households consuming either a plant or animal source of vitamin A	223/335	**66.6 (61.2-71.6)**
Proportion of households consuming organ meat/flesh meat, or fish/seafood (food sources of haem iron)	154/335	**46.0 (40.6-51.5)**

Consumption of high protein foods was low; slightly more than half of households did not eat any flesh foods in the previous 24 hours, consumption of vitamin A rich foods was relatively high (66.6%). In addition, majority of households did not consume at least one of the following; vegetables, fruit, meat, eggs or milk.

4.4.4 Food aid flow

The content of the food ration distributed from June to Dec 2013 for 2012) shows that it met and exceeded Spheres (Sphere, 2011) for lipids, proteins, iodine, and but not for energy, iron, vitamin A, vitamin C, and 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 48**).

The macronutrient recommendations were met by the food ration actually distributed almost every cycle June to December 2013 except energy **(Figure 9)**. As for micronutrients, the recommendations for iodine were met by the distributed food ration in every cycle whereas they were never met for vitamin A, Vitamin C, calcium and iron. Over the course of the year, the ration provided approximately a quarter of the recommendation for calcium 60% of Vitamin A, 65% of vitamin C and half the recommendation for iron. On the other hand, it provided 4 times more the iodine recommendation (**Figure 10**).

Table 46 : Content of general food ration based on December 2013 (UNHCR distribution report)[1]

Item	Standard recommendation (Sphere 2011)	Provision by ration	Ration Contents						Sugar White
			Maize grain, white	Beans, Dried	Oil, vegetable	CSB+	Salt, iodised	Soya Flour, Full fat, Raw	
Energy (Kcal)	2,100	2,061	1,439	164	195	101	0	31	132
Lipids (g)	40	42.6.*	16.4	0.6	22.0	2.2	0.0	1.4	0
Proteins (g)	53	57.4**	41.1	9.8	0.0	4.1	0.0	2.4	0
Iron (mg)	32	18.1	11.1	4.0	0.0	2.5	0.0	0.4	0
Iodine (mcg)	138	971	0	0	0	11	960	0	0
Calcium (mg)	989	220	29	70	0	107	0	14	0
Vitamin A (mcg RAE)	550	350	0	0	198	150	0	3	0
Vitamin C (mg)	41.6	27	0	0	0	27	0	0	0

[1]Recommended daily minimum kcal is 2,100, *21.1% of total energy, **12.4% if total energy
As shown in the tables above, the theoretical ration provides sufficient quantities of (*lipids and proteins and/or*) but is insufficient in (*energy*). In terms of micronutrients, the provision of (*Iron, Calcium, Vitamin A and Vitamin C*) is below the recommendations."

Figure 7 : Daily kilocalories in general food distribution during 2013 (UNHCR distribution report).
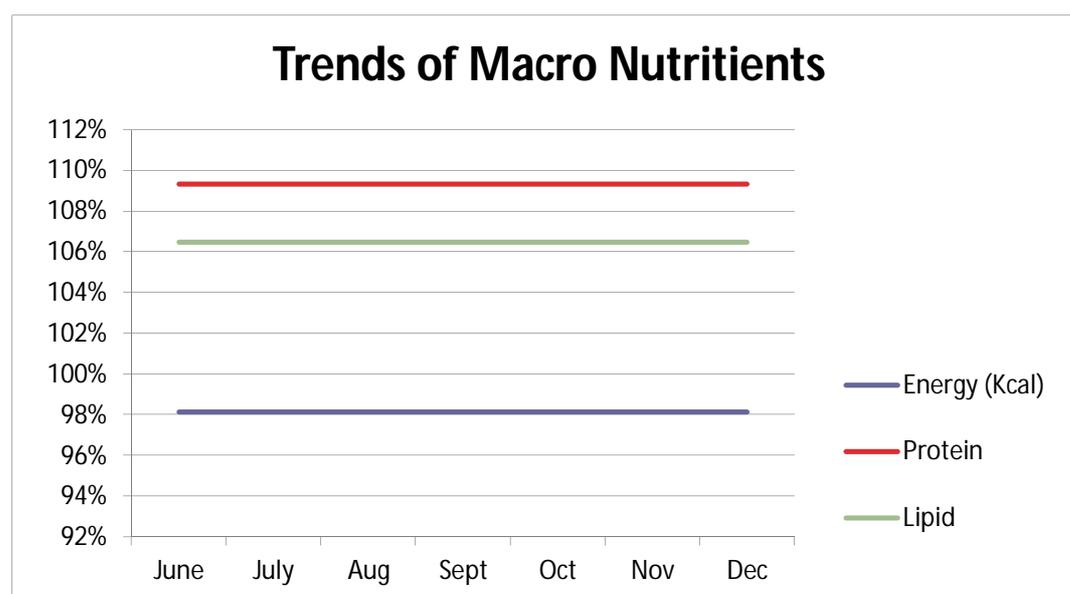
Figure 8 : Trend in actual energy and selected micronutrients provided in general food ration during June- Dec 20131 (UNHCR distribution report)
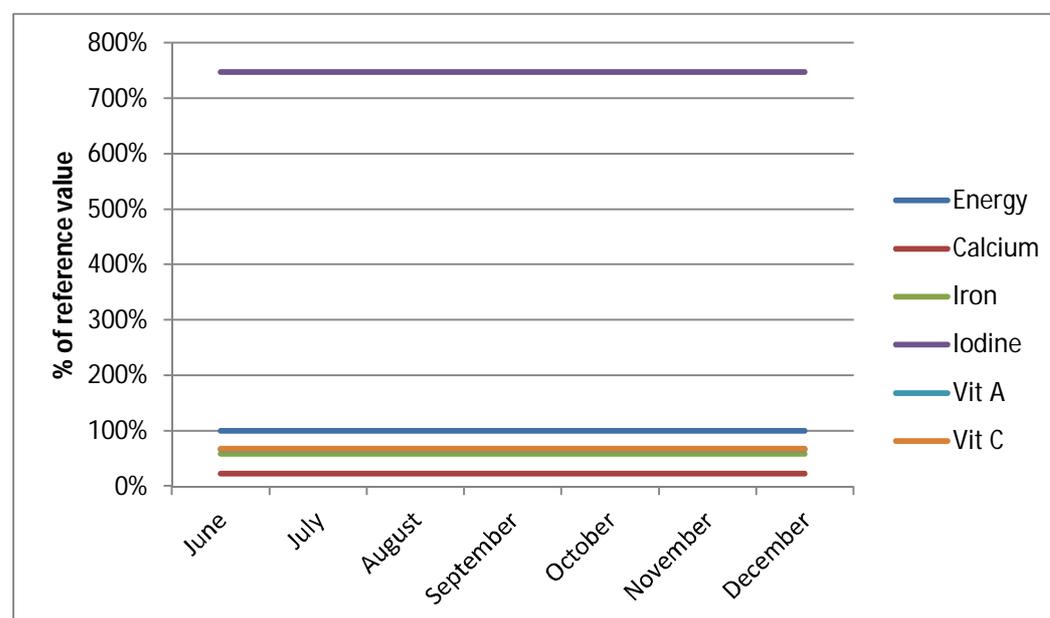
4.5 WATER, SANITATION AND HYGIENE

Table 47: WASH SAMPLING information

Household data	Planned	Actual	% of target
Total households surveyed for WASH	*383*	368	*95.0*

Encouragingly, the majority of households were using an improved source of drinking water although those storing it in a covered or narrow necked container need to be improved (**Table 49**).

Table 48: Water Quality

	Number/total	% (95% CI)
Proportion of households using an improved drinking water source	351/365	96.2 (93.5-97.8)
Proportion of households that use a covered or narrow necked container for storing their drinking water	239/364	65.7 (60.5-70.5)

*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.

The mean water usage was 22.3lires and around half of the households surveyed reported using over 20 litres per person per day (lpppd); about 10% used between 15-20 litres of water per person per day. However, nearly half of the households used less than 15lpppd mainly as a result of the acute water shortage due to disconnection of water to the camp by the water authority (**Table 50**). 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 49: Water Quantity: Amount of litres of water used per person per day

Proportion of households that use:	Number/total	% (95% CI)
≥ 20 lpppd	173/362	47.8 (42.6-53.1)
15 – <20 lpppd	33/362	9.1 (6.4-12.7)
<15 lpppd	156/362	43.1 (38.0-48.4)

Note: The average water usage in lpppd was 22.3.

Details of water satisfaction are provided in **Table 51** and **Figure 11**. The main reasons for dissatisfaction with the water supply are shown in **Figure 12** below. Over three quarters of respondents felt there was irregular supply or not enough water available.

Table 50: Satisfaction with water supply

	Number/total	% (95% CI)
Proportion of households that say they are satisfied with the drinking water supply	63/365	17.3 (13.6-21.6)

Figure 9: Proportion of households that say they are satisfied with the water supply
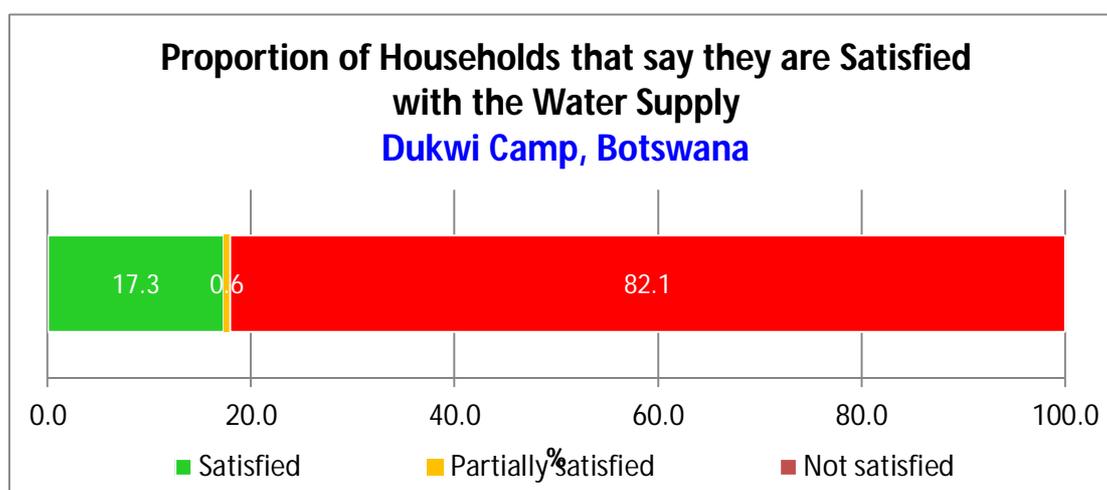
Figure 10: Main reason for dissatisfaction among households not satisfied with water SUPPLY.
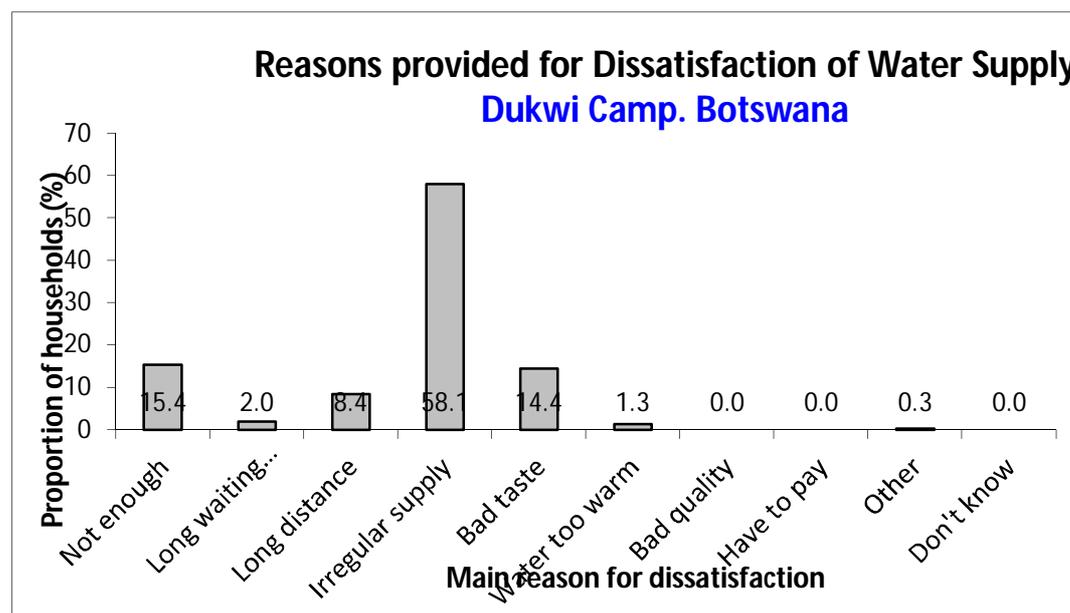
The proportion of households using improved toilet facilities (i.e. pit latrine with floor slab shared by 2 households or less) was low at below 50% (see **Table 52** for full details).

The three quarters of the households with children under three years old dispose of faeces safely (76.9%).

Table 51: Safe Excreta disposal

	Number/total	% (95% CI)
Proportion of households that use:		
An improved excreta disposal facility (improved toilet facility, 1 household)*,**	161/344	46.8 (41.5-52.2)
A shared family toilet (improved toilet facility, 2 households)**	89/344	25.9 (21.4-30.9)
A communal toilet (improved toilet facility, 3 households or more)	18/344	5.2 (3.2-8.3)
An unimproved toilet (unimproved toilet facility or public toilet)	76/344	22.1 (17.9-26.9)
Proportion of households with children under three years old that dispose of faeces safely	100/130	76.9 (68.7-83.9)

Figure 11: Proportion of households with children under the age of 3 years whose (last) stools were disposed of safely.

Proportion of Households with Children under the age of 3 years old whose (last) Stools were Disposed of Safely
Dukwi Refugee Camp, Botswana

- Other 6.2%
- Don't know 0.8%
- Left in the open 2.3%
- Put into drain 5.4%
- Thrown into garbage 9.2%
- Buried 9.2%
- Used toilet 13.8%
- Put into toilet 53.8%
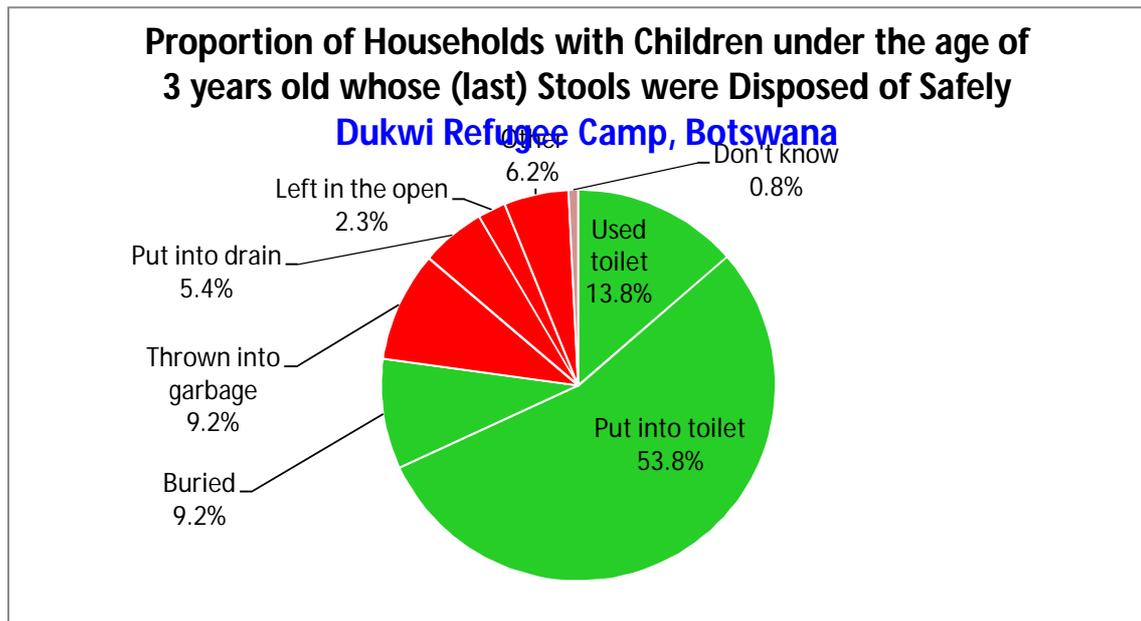
4.6   Mosquito Net Coverage

Table 52: Mosquito net coverage SAMPLING information

Household data	Planned	Actual	% of target
Total households surveyed for mosquito net coverage	383	*343*	*89.6%*

Table 53: Household Mosquito net ownership

	Number/total	% (95% CI)
Proportion of total households owning at least one mosquito net of any type	178/343	51.9 (46.5-57.3)
Proportion of total households owning at least one LLIN	171/343	49.9 (44.4-55.3)

Figure 12: Household ownership of at least one mosquito net (any type)

Proportion of Households with at least one Mosquito Net
(any type)
Dukwi Refugee Camp, Botswana

Households with at least one mosquito net
51.9%

Households with no mosquito net
48.1%
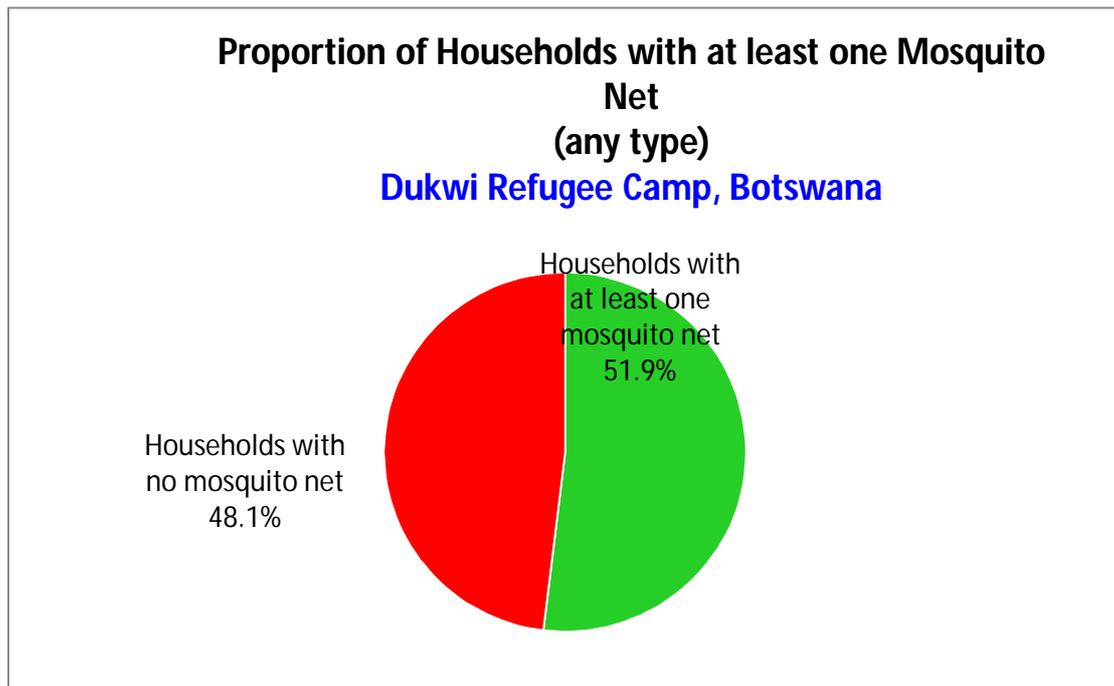
Figure 13: Household ownership of at least one LLIN

Proportion of Households with at least one LLIN
Dukwi Refugee Camp, Botswana

Households with at least one LLIN
49.6%

Households with no LLIN
50.4%
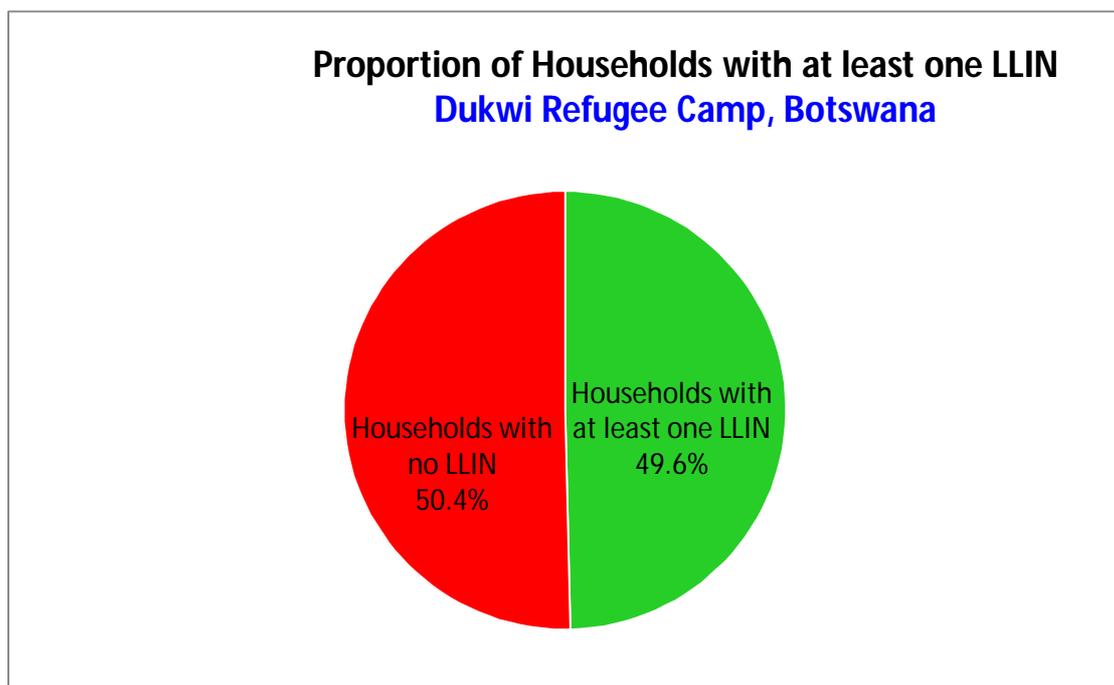
Table 54: Number of nets

Average number of LLINs per household	Average number of persons per LLIN
1.9	3.8

Mosquito net ownership for the 343 households surveyed is shown in **Table 52**. Results indicate that the UNHCR target coverage of 80% coverage of LLINs is far from being reached; only 49.9% of households owned at least one LLIN.

The proportion of household members (total, under five and pregnant women) who slept under either a net of any type or an LLIN was quite low (**Table 54**). Only 41.8% of household members slept under a net of any type, and continuing the poor trend only a third all the pregnant women slept under an LLIN, while only 35.7% children under 5 slept under an LLIN.

Table 55: Mosquito net Utilisation.

	Proportion of total population (all ages)		Proportion of 0-59 months		Proportion of pregnant women	
	Total No=1304	%	Total No=244	%	Total No=33	%
Slept under net of any type	545	**41.8%**	113	**46.3%**	12	**36.4%**
Slept under LLIN	392	**30.1%**	87	**35.7%**	9	**27.3%**

Figure 14: Mosquito Net Utilisation by sub-group
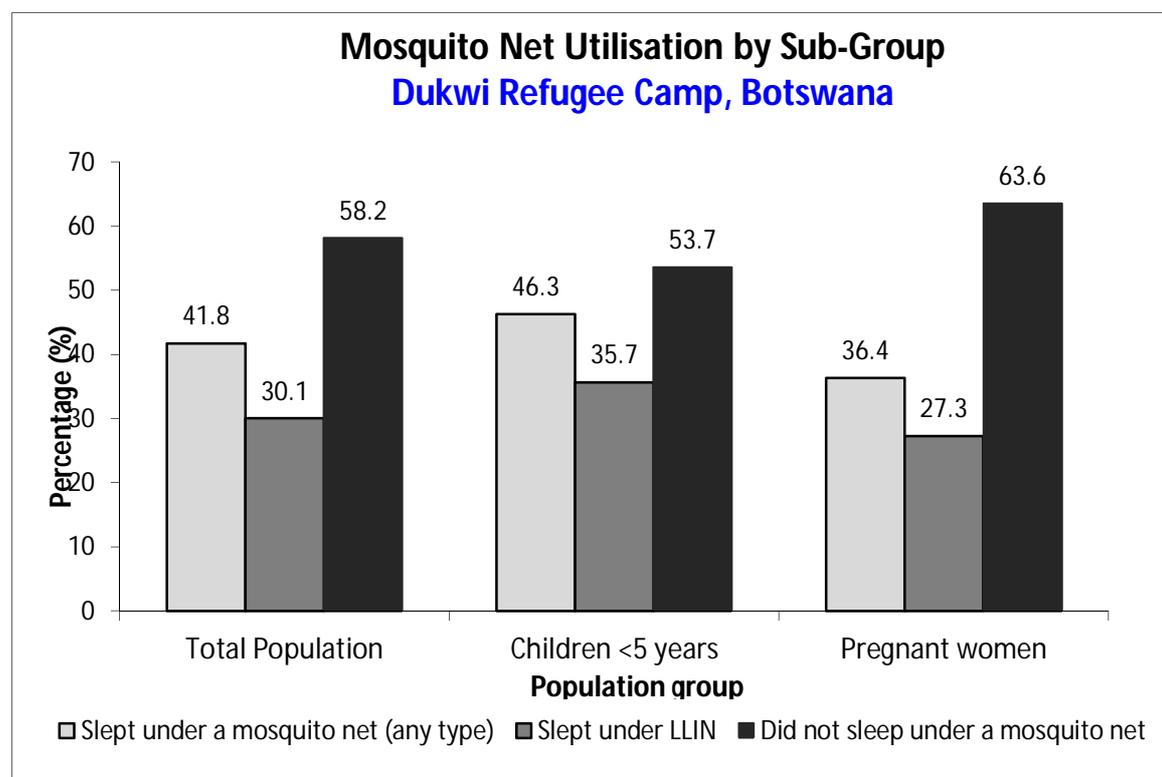
Table 56: Indoor Residual Spraying Household Coverage

Indoor Residential Spraying (IRS) was done 2 months preceding the survey. However, only 30% of the household were sprayed with majority of the household suspicious of potential health hazard resulting from having their houses sprayed.

	Number/total	% (95% CI)
Proportion of households covered by IRS	103/343	30.0 (25.3-35.2)

5 Limitations

The survey timing coincided with edible caterpillar (Mopani worm[12]) season when most of the households go out in the morning to collect the annual delicacy common in Southern African Countries. In addition, the festive season provides the camp residents with lots of casual labour and other job opportunities in the surrounding villages and in far off towns like Francistown. Conversation with key informants suggest the best timing for the survey could be during the winter (around May-Sept) when the school are closed and most residents are indoor due to the cold season.

The overall score of the plausibility check for anthropometry data as estimated by ENA SMART software[13] is 6 %, which is considered good. The overall sex ratio was 1.0, indicating there were no significant sex differences in the sampled population hence the survey was un-biased regarding sex.

While it was initially assumed it would be easy to get anthropometry equipment, it later proved a struggle as the MOH was initially unwilling to assist. It took several weeks of building relationships before finally succeeding getting the equipment. It would be prudent if UNHCR could preposition the anthropometry equipment just the way it's done with anaemia measuring equipment.

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[12] *Gonimbrasia Belina* is a species of month found in much of Southern Africa, whose large edible caterpillar, the Mopani worm, is an important source of protein for millions of indigenous Southern Africans.

[13] The SMART plausibility check score classifications are: Excellent (0-5), Good (5-10), Acceptable (10-15), Problematic (>15)

6 Discussion

6.1 Nutritional status of young children

The results of the 2013 Dukwi Refugee Camp nutrition survey showed a GAM of 3.7% (1.7 - 7.8 95% C.I.) and no cases of SAM nor oedema among children 6-59 months, which is acceptable level according to WHO classification and in line with most Southern African refugee camps. According to the results girls were five times more malnourished compared to boys (boys 1.2%, girls 6.3%) though no significance test was done the number of malnourished children was very low (1 boy, 5 girls).

The prevalence of stunting was fairly low at 12.8% (8.5 - 19.0 95% C.I.), with 2.6 % (1.0 - 6.4 95% C.I.) of children suffering from severe stunting; this is considered 'low/acceptable' according to WHO classification. This compares favourably to national levels in Botswana of 31.4%[14] stunting. 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. By WHO standards, a country is designated as having a public health concern related to stunting if at least 20% of its children are stunted.

The proportion of children 6-59 months experiencing diarrhoea in the two weeks prior to the survey was low at 13.3% (95%CI 8.5 - 19.5). Considering the survey took place during the rainy season with some level of flooding and at the time of acute water shortage in the camp due to water disconnection by water authority for a period of two weeks; this low level is commendable 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 one cause of acute malnutrition.

The prevalence of malnutrition was lower when measured by MUAC compared to weight-for-height; only one child had MUAC <12.5 cm. This one case was attributable to severe malnutrition whereas SAM was absent as measured by W/H z-score. A 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 groups[15].

The low prevalence of 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, in addition to the benefits of growth monitoring being implemented at the health child clinic days. The multi-faceted causes of malnutrition in this context are known to be poverty and disease (compounded by high prevalence of HIV/AIDS) and sub optimal feeding practices.

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[14] The state of Food and Agriculture, Food and Agriculture Organization (FAO), 2003 edition.
[15] 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.

6.2 Programme coverage

Child vaccination against measles 96.9 % (95% CI 92.9 – 99.0) was above the recommended WHO and UNHCR threshold of 95%; Vitamin A supplementation at 93.9% (89.1-97.1 95% CI) coverage (by card or recall) was also above the UNHCR threshold of 90%. This is a pointer of the fact that the latest vitamin A and measles campaign which occurred one month prior to the survey was effective. Countries face micronutrient deficiency related public health concern if 10% or more of their children are deficient in vitamin A or if at least 20% of children suffer from anaemia[16].

6.3 Anaemia in young children and women

The prevalence of anaemia in children 6-59 months and women 15-49 years is of high public health significance according to WHO classifications. In children, anaemia levels was 50.9% (95% CI 43.0 – 58.8); while the prevalence of total anaemia in women was 48.3% (95% CI 40.0 – 56.7)[17]. This compares with the Botswana prevalence of anaemia among children of 38%.

As expected, the prevalence of anaemia was higher in children 6-23 months at 63.5% (95% CI 49.3-65.4), which is high above the public health significance threshold (>40%). This could be due to suboptimal IYCF practices. If infants are not exclusively breastfed or not fed sufficient breast milk after six months, it may put partially breastfed infants at risk of anaemia. Although the iron content of breast milk is not very high, it is highly bio-available and absorbable. Despite widespread kitchen gardens and reported relatively high prevalence of consumption of iron-rich or iron fortified foods, these might not contribute directly to anaemia reduction due to the relatively small amount of food items produced and households frequently selling their produce in order to further diversify their diets or buy non-food items; indeed greens from Dukwi Camp forms part of supply of greens in the salt and soda ash mining town of Sua, 30 km from the camp. In spite of the aforementioned, the diet could be a contributing factor since the food ration is deficient in animal sources (and the residents lack purchasing power of the same). Given the likely interrelationships and complexity of the potential causes of high rates of anemia among children and women, it is recommended with further investigation of the causes of anaemia in Dukwi camp to effectively and efficiently guide future interventions.

6.4 IYCF indicators

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[16] The state of Food and Agriculture, Food and Agriculture Organization (FAO), 2003 edition.

[17] 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.

IYCF practices directly affect the nutritional status of children under two years of age, and can impact upon child survival. The 2008 Lancet Nutrition Series highlighted the fact that a non-breastfeed child is 14 times more likely to die in the first six months than an exclusively breastfeed child. It is therefore essential to protect, promote and support adequate IYCF practices in order to improve nutrition, health and development of young children (WHO 2007). The IYCF practices in Dukwi Camp are sub optimal. Nevertheless, as mentioned, due to the small sample sizes used, interpretation of the results must be made with caution.

The proportion of women initiating breastfeeding within an hour after birth are 68.5%; and a paltry 18.2% (95% CI 5.2-40.3) of the mothers are exclusively breastfeeding their children up to 6 months of age. 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 micronutrients especially vitamin A and crucial immunoglobulins. Continued breastfeeding at 1 and 2 years was quite low at 28.6% (3.7-71.0) and 23.1% (95% CI 5.0-53.8), respectively. Breastfeeding beyond 6 months of age continues to provide health and nutrition benefits to a child, particularly in the context where the diversity of complementary foods is limited. Reasons for this low prevalence may be due to limited knowledge and skills regarding IYCF practices and cultural beliefs although this would need confirmation. Only 20% the of children were 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 66.7% (95% CI 41.0-86.7), which is mostly likely due to the consumption of green leafy vegetables and mangos which is grown in the camp and was in season during the survey. Around 31.5% (95% CI 21.1-43.4) of caregivers reported to bottle feeding their child <24 months. 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 30.6% (95% CI 20.2-42.5) of the infants. 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 are an indicator of lack of knowledge on recommended IYCF practices.

6.5   Food security

The general ration did not last the full cycle, instead households reported that the ration lasted an average of 20.9 days, with over 72.5% of households saying that it lasts <22.5 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. Additionally, as the rations are calculated to provide an average of 2100 kcl, male dominated households are likely to run out more quickly as their average daily energy requirement is greater than this. Moreover, beneficiaries may consume more than the intended 2100 kcl in the first few days, meaning that it runs out sooner than intended. As expected, nearly all (99.7% of households) had ration cards, indicating that new arrival registration is functioning well and being kept up to date.

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 fairly low with households eating an average of 5.7 out of a total of 12 food groups, and the most common foods consumed being oils/fats (91.9%), cereals (85.5%), vegetables (67.2%) and eggs (57.0%). However, when interpreting the HDDS it must be considered that the last general food distribution ended 10 days prior to data collection and since average duration of food aid ration is 20.9 days food consumption pattern is likely to be different in the last ten days of the 30 days cycle. Nevertheless, the score reflects limited dietary diversity in the sampled households which should be addressed. This may be related to households limited economic power to purchase items (officially refugees are not allowed into the local labour market as a government policy), 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.

The most common negative coping strategies were to reduce the number of meals per day and/or reduce meal size with 56.8% (95% CI 51.3-62.2) of households reporting using either one of these strategies. The next most common strategy was to borrow cash, food or other items without interest (47.1%; 95%CI 41.5-52.7). Slightly more than one fifth of households reported to have begged indicating a severe form of coping and often pointer of destitution. However, questioning on coping strategies is a sensitive topic, and some households may have been hesitant to open up freely, which needs to be considered during interpretation. Discussion with key informants and opinion leaders indicates engaging in potentially harmful activities especially prostitution is on the rise especially since trucks are parked overnight at the nearest shopping centre of New-stead; 5 km from the camp since trucks travelling at night is banned in Botswana. Thus, results indicate that better options for non-risky coping strategies need to be investigated further.

Food aid analysis indicated that the provision of macronutrients met Sphere standards for lipid and protein but not for energy in every cycle. Micronutrient needs was not met for all cycles except for iodine which was far surpassed.

6.6 WASH

The quality of water, sanitation and overall hygiene condition has significant influences on the health and wellbeing of communities including on their nutrition and food security outcomes. In Dukwi Camp, nearly the whole population 96.2% (95% CI 93.5-97.8) used an improved drinking water source, mainly public piped water. Additionally, 65.7% (95% CI 60.5-70.5) were using covered or narrow necked containers to store their drinking water, making it less likely to be contaminated as opposed to having open containers without a lid.

Hygiene and health are compromised by a lack of water, and UNHCR minimum water quantity standard is 20 lpppd. The average water usage in Dukwi was 20.1 lpppd (95% CI 18.2-22.0). However less than half of all households interviewed collected ≥20 lpppd in the previous day, and 43.1% collected <15 lpppd. Responses on water satisfaction suggest reasons for these low levels: overall, only 17.3% of households were satisfied with their source of drinking water, the main reason for the dissatisfaction reported being irregular supply of water (58.1% of cases), which therefore needs further attention; 15.4% households said that the water was not enough; while 14.4% reported bad taste since the water available in the camp is salty. It should be noted that during the time of the survey, there was acute shortage of water as the water services authority had disconnected water from the camp for a period of 10 days preceding the survey due to mounting cost of water that the government was unwilling to pay as it accused the camp resident of misusing water irrigating their gardens. However, discussion with key informants indicated that the water pipes are old and leaky and in fact the water authority has had an intention of overhauling the whole plumbing system as most water is lost prior to distribution.

Safe disposal of excreta is an important preventive 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 less than half of households were using improved excreta disposal facilities and 5.2% (95% CI 3.2-8.3) were using communal toilets. Communal toilets are more difficult to keep clean due to little accountability of the users, thus increasing risk of contamination. Safe disposal of child faeces was carried out in 76.9% of the households with children under three years old.

6.7   Mosquito net coverage

Results of mosquito net ownership and utilisation were sub-optimal. Only half of the households either owned at least one net of any type, or an LLIN, which is below 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). The survey showed an average of 3.8 persons per LLIN which therefore did not meet UNHCR's target of 2 persons or less 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 of the general population. Only about a third (30.1%) of the total population interviewed slept under an LLIN; 35.7% of children <5, and 27.3% of pregnant women. This is quite low and calls for concerted effort including increased awareness and education on the importance of LLIN utilisation.

7   Conclusions

The survey results indicate that the public health and nutrition situation in Dukwi refugee camp is within acceptable public health standards especially malnutrition levels, suggesting that most of the services are functioning and having a positive impact on the overall health and wellbeing of camp inhabitants. However, high rates of anaemia both in children less than five years and women of reproductive age; sub optimal IYCF practices and low utilization and coverage of LLINS are of high public health concerns that require urgent interventions. Sustained efforts will be required to maintain and strengthen existing programmes and activities whilst continuing to protect the health of the general population.

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, the blanket distribution of CSB+ for the vulnerable 6-23 month age group should be continued. It is recommended to carry out investigations into the delayed initiation of complementary feeding and whether this is down to the availability of complementary foods in the camps, or a lack of awareness and skills.

The water supply in the camp is likely to continue to be a cause of conflict with the government. There is urgent need to repair the boreholes in the camp so that this source of water is used for the small irrigation in the kitchen gardens which is the only source of greens in the camp and an important source of income for some households. Measures should also be taken to expand availability of improved latrines. Promotion, health education, awareness building and distribution of LLINS should also be prioritized especially during the on-going rainy season.

In summary, the implementation of multi-faceted interventions by all sectors and partners in Dukwi camp has contributed significantly to the positive impact on the wellbeing and public health situation among the residents in the camp. Nevertheless, there is need to assess present IYCF interventions with a view of strengthening/introducing new strategies to address the suboptimal IYCF practices. Of more urgency, the high prevalence of anaemia; investigating the likely causes of this high rate of anaemia will ensure targeting of intervention to address this situation of high public health importance. 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

8.1   Immediate

9. Partners to reinforce activities to improve dietary diversity at household level, including continued scale up of home gardening projects, and investigation in to the provision of appropriate (non-perishable) complementary foods for example, canned tuna, considering the challenges in buying, transporting and distributing perishable foods at a large scale.

10. UNHCR, and partners to consider blanket provision of micronutrient powder (MNP) to children 6-59/6-23 months and women of reproductive age (depending on resources) to increase micronutrient content of the diet. In the long term, food diversity should be explored in the design of the food aid basket.

11. Introduction of new activities such as use of lipid based nutrient supplements or micronutrient powders or provision of micronutrients through improving the micronutrient content of the general food ration;

12. Increased BCC is necessary for targeted groups who are not sleeping under their LLINs;

13. Redistribution of LLINs is necessary to achieve ownership of sufficient LLINs to reach Universal Coverage; A hang-up campaign is necessary to put unused LLINs over sleeping surfaces so that they are more likely used;

14. There is need to strengthen the awareness, promotion, and protection of IYCF through for example baby tents and initiation of mother to mother support groups (Existing or new groups could be used and other activities incorporated e.g. income generating activities); linked to promotion of Essential Nutrition Actions (ENA) interventions; the results of this survey could be used to inform advocacy efforts to improve funding and / or the deployment of resources especially from partners like UNICEF who are focused on issues affecting infants and mothers.

15. Providing information and education for the refugee community on anaemia and micronutrient deficiencies; in addition, carry out a study to better understand the causes of anaemia in the camp.

16. Rehabilitate the two boreholes in the camp and if possible motorize the system to support the on-going small scale irrigation.

8.2   Medium Term

8. Kitchen Garden initiatives already being undertaken by some of the households should be supported and promoted with the focus on growing micronutrient-rich foods, especially rich in iron, and inclusion of a health education component.

9. However, with the water shortage and emerging government policies on the restrictions on the use of water for small scale irrigation, it is paramount to explore water conservation farming like the use of green houses, alongside provision of seeds, training, monitoring.

10. A multi-dimensional approach to food security among refugees including: use of cash, fresh food vouchers, income generating activities, cash and food for work programmes, and augmenting safety net programmes for vulnerable groups should be considered

11. Small animal farming (Chicken & Rabbit) currently being promoted and supported by Skillsshare International should be scaled up to target more households.

12. Implement a KAP survey of IYCF to explore poor complementary feeding practices of children 6-23 months and Exclusive Breastfeeding of children under 6 months. It will explore among other issues: the proportion of non-breastfed infants that will necessitate identification and skilled assessment and support; reasons for the low prevalence figures of exclusive breastfeeding that will require skilled breastfeeding support; identifying inadequate intake of micronutrient rich foods that will necessitate improving the quality of food available for complementary feeding; investigating the factors determining bottle feeding;

13. There is need for community awareness through key opinion leaders before the next IRS campaign. Recent IRS campaign did not succeeded in reaching sufficient coverage rates of households. The residents have inherent fear that the spraying of houses could be a health hazard in the long term.

14. Toilet facilities coverage to be looked into so as to increase coverage of improved sanitation facilities and reduce sharing of toilets.

8.3   Long Term

6. It is necessary to carry out another follow up nutrition survey in the camp preferably during the winter period (May-Sept) when most households are within the camp and schools are closed.

7. Toilet facilities coverage to be looked into so as to increase coverage of improved sanitation facilities and reduce sharing of toilets.

8. Improve and scale up the livelihood opportunities for the refugees through developmental-oriented initiatives to improve their economic status. Given the restriction to access to work and other sources of income outside the camp, opportunities should be explored for income generating activities within the camp and support given terms of access to markets. Already some of the refugees are putting into use skills like art work. There is already a market between the camp and outside for farm produce and if intensive water conserving farming like greenhouses was to be promoted, the residents would be gainfully employed and would contribute to the local economy and availability of fresh foods.

9. Long lasting solution for the annual perennial flash floods should be found. Establishing drainage system could go a long way in ameliorating the situation and alleviating constant displacements occasioned by the floods. It has been quite disruptive to the well-being of the refugee. The survey witnessed one such flood incident.

10. UNHCR and its partners should continue to advocate, support and promote establishment of improved dwelling houses for the refugees especially those who have been tent dwellers for decades even as more durable solutions are being sort like resettlement. The camp has been in temporary mode for the last 30 years with the government of Botswana hoping it will eventually close. However, with constant, unending and new political instability and the resulting complex emergencies in great lakes region and the rest of Africa, influx of refugees will continue to pour in to the stable and relatively economically well off southern African countries.

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A full list of team members is provided **Appendix 2.**

Finally we thank the community for consenting to participate.

11 Appendices

Appendix 1 SMART Plausibility Check (PC) Report

Plausibility check for: BOT_20131216_UNHCR_DUKWI.as

Standard/Reference used for z-score calculation: WHO standards 2006
(If it is not mentioned, flagged data is included in the evaluation. Some parts of this plausibility report are more for advanced users and can be skipped for a standard evaluation)

Overall data quality

```
Criteria                  Flags* Unit  Excel. Good    Accept  Problematic  Score

Missing/Flagged data      Incl    %    0-2.5 >2.5-5.0 >5.0-10   >10
(% of in-range subjects)                 0      5        10       20        0 (1.2 %)
Overall Sex ratio         Incl    p    >0.1  >0.05    >0.001   <0.000
(Significant chi square)                 0      2         4       10        0 (p=0.815)
Overall Age distrib       Incl    p    >0.1  >0.05    >0.001   <0.000
(Significant chi square)                 0      2         4       10        0 (p=0.308)
Dig pref score - weight   Incl    #    0-5   5-10     10-20    > 20
                                         0      2         4       10        2 (8)
Dig pref score - height   Incl    #    0-5   5-10     10-20    > 20
                                         0      2         4       10        4 (20)
Standard Dev WHZ          Excl    SD   <1.1  <1.15    <1.20    >1.20
                                         0      2         6       20        0 (1.09)
Skewness  WHZ             Excl    #    <±1.0 <±2.0    <±3.0    >±3.0
                                         0      1         3        5        0 (-0.15)
Kurtosis  WHZ             Excl    #    <±1.0 <±2.0    <±3.0    >±3.0
                                         0      1         3        5        0 (-0.06)
Poisson dist WHZ-2        Excl    p    >0.05 >0.01    >0.001   <0.000
                                         0      1         3        5        0 (p=)
Timing                    Excl   Not determined yet
                                         0      1         3        5
OVERALL SCORE WHZ =                    0-5   5-10     10-15     >15        6 %
```

At the moment the overall score of this survey is 6 %, this is good.

There were no duplicate entries detected.

Percentage of children with no exact birthday: 0 %

Appendix 2 Name of Contributors

Supervisor/Manager:
1. Never Jero
2. Felix Kakula
3. Gibert-Lephodisa Masego
4. Dr. Joseph Nshimyumuk

Consultants/ Trainers/ Advisors/ analysts:
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Team members:
1. Fiacre Nkururunziza
2. Sandara Simasiku
3. Claudia Manuel
4. Nasra Abdulahi
5. Marie France
6. Libah Hussein
7. Gift Nyoni
8. James Duburu
9. Mubita Makai
10. Wilondja Enenie
11. Edward Grey
12. Annety Toyano
13. Lelani Mpofu
14. Roselyn Gumiro
15. Dennis Munetsi
16. Karen Musukuvili
17. Mguni Themba
18. Brona Kutazo
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20. Petronella Ndlovu
21. Joyce Iganjo

Team Leaders

1. Dube Pride
2. John Shumbu
3. Benedict Chibozu
4. Baltezar Nyadduye
5. Lina Kaping

Data Entry

1. Phil Francis
2. Dennis Munetsi
3. Leonard Mhlanga
4. Salehe Nsigaye

Drivers: BASUPI, Matiki

Appendix 3 Report for Evaluation of Enumerators

Weight:

	Precision: Sum of Square [W2-W1]	Accuracy: Sum of Square [Superv.(W1+W2)-Enum.(W1+W2]	No. +/- Precision	No. +/- Accuracy
Supervisor	0.03		0/3	
Enumerator 1	0.01 OK	0.04 OK	0/1	1/3
Enumerator 2	0.02 OK	0.05 OK	0/2	2/3
Enumerator 3	0.01 OK	0.20 POOR	0/1	2/4
Enumerator 4	0.04 OK	0.07 OK	0/4	2/2
Enumerator 5	0.05 OK	0.12 POOR	2/0	0/4

Height:

	Precision: Sum of Square [H2-H1]	Accuracy: Sum of Square [Superv.(H1+H2)-Enum.(H1+H2]	No. +/- Precision	No. +/- Accuracy
Supervisor	0.15		2/4	
Enumerator 1	0.90 POOR	1.17 POOR	2/8	6/4
Enumerator 2	0.74 POOR	1.09 POOR	0/9	6/4
Enumerator 3	0.15 OK	0.40 OK	1/3	3/4
Enumerator 4	0.04 OK	0.19 OK	2/2	3/5
Enumerator 5	0.03 OK	0.24 OK	1/2	1/6

MUAC:

	Precision: Sum of Square [MUAC2-MUAC1]	Accuracy: Sum of Square [Superv.(MUAC1+MUAC2)-Enum.(MUAC1+MUAC2]	No. +/- Precision	No. +/- Accuracy
Supervisor	5.00		1/4	
Enumerator 1	21.00 POOR	38.00 POOR	7/3	10/0
Enumerator 2	8.00 OK	99.00 POOR	4/4	7/2
Enumerator 3	3.00 OK	6.00 OK	1/2	2/4
Enumerator 4	1.00 OK	10.00 OK	0/1	3/4

For evaluating the enumerators the precision and the accuracy of their measurements is calculated.

For precision the sum of the square of the differences for the double measurements is calculated. This value should be less than two times the precision value of the supervisor.

For the accuracy the sum of the square of the differences between the enumerator values (weight1+weight2) and the supervisor values (weight1+weight2) is calculated. This value should be less than three times the precision value of the supervisor.

To check for systematic errors of the enumerators the number of positive and negative deviations can be used.

Appendix 4 Result Tables for NCHS growth reference 1977

Table 57 Prevalence of acute malnutrition based on weight-for-height z-scores.

	All n = 162	Boys n = 83	Girls n = 79
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(5) 3.1 % (1.3 - 7.0 95% C.I.)	(1) 1.2 % (0.2 - 6.5 95% C.I.)	(4) 5.1 % (2.0 - 12.3 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(5) 3.1 % (1.3 - 7.0 95% C.I.)	(1) 1.2 % (0.2 - 6.5 95% C.I.)	(4) 5.1 % (2.0 - 12.3 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(0) 0.0 % (0.0 - 2.3 95% C.I.)	(0) 0.0 % (0.0 - 4.4 95% C.I.)	(0) 0.0 % (0.0 - 4.6 95% C.I.)

The prevalence of oedema is 0.0 %

Table 58 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	29	0	0.0	1	3.4	28	96.6	0	0.0
18-29	40	0	0.0	2	5.0	38	95.0	0	0.0
30-41	43	0	0.0	1	2.3	42	97.7	0	0.0
42-53	38	0	0.0	0	0.0	38	100.0	0	0.0
54-59	12	0	0.0	1	8.3	11	91.7	0	0.0
Total	162	0	0.0	5	3.1	157	96.9	0	0.0

TABLE 59 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. 1 (0.6 %)	Not severely malnourished No. 164 (99.4 %)

TABLE 60 Prevalence of acute malnutrition based on the percentage of the median and/or oedema.

	n = 162
Prevalence of global acute malnutrition **(<80% and/or oedema)**	(4) 2.5 % (1.0 - 6.2 95% C.I.)
Prevalence of moderate acute malnutrition **(<80% and >= 70%, no oedema)**	(4) 2.5 % (1.0 - 6.2 95% C.I.)
Prevalence of severe acute malnutrition **(<70% and/or oedema)**	(0) 0.0 % (0.0 - 2.3 95% C.I.)

TABLE 61 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	29	0	0.0	1	3.4	28	96.6	0	0.0
18-29	40	0	0.0	2	5.0	38	95.0	0	0.0
30-41	43	0	0.0	0	0.0	43	100.0	0	0.0
42-53	38	0	0.0	0	0.0	38	100.0	0	0.0
54-59	12	0	0.0	1	8.3	11	91.7	0	0.0
Total	162	0	0.0	4	2.5	158	97.5	0	0.0

TABLE 62 Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 161	**Boys** n = 84	**Girls** n = 77
Prevalence of underweight **(<-2 z-score)**	(16) 9.9 % (6.2 - 15.5 95% C.I.)	(5) 6.0 % (2.6 - 13.2 95% C.I.)	(11) 14.3 % (8.2 - 23.8 95% C.I.)
Prevalence of moderate underweight **(<-2 z-score and >=-3 z-score)**	(12) 7.5 % (4.3 - 12.6 95% C.I.)	(5) 6.0 % (2.6 - 13.2 95% C.I.)	(7) 9.1 % (4.5 - 17.6 95% C.I.)
Prevalence of severe underweight **(<-3 z-score)**	(4) 2.5 % (1.0 - 6.2 95% C.I.)	(0) 0.0 % (0.0 - 4.4 95% C.I.)	(4) 5.2 % (2.0 - 12.6 95% C.I.)

TABLE 63 Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 156	Boys n = 82	Girls n = 74
Prevalence of stunting (<-2 z-score)	(14) 9.0 % (5.4 - 14.5 95% C.I.)	(6) 7.3 % (3.4 - 15.1 95% C.I.)	(8) 10.8 % (5.6 - 19.9 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(11) 7.1 % (4.0 - 12.2 95% C.I.)	(4) 4.9 % (1.9 - 11.9 95% C.I.)	(7) 9.5 % (4.7 - 18.3 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(3) 1.9 % (0.7 - 5.5 95% C.I.)	(2) 2.4 % (0.7 - 8.5 95% C.I.)	(1) 1.4 % (0.2 - 7.3 95% C.I.)

TABLE 64 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	29	0	0.0	3	10.3	26	89.7
18-29	35	1	2.9	3	8.6	31	88.6
30-41	43	2	4.7	3	7.0	38	88.4
42-53	36	0	0.0	2	5.6	34	94.4
54-59	13	0	0.0	0	0.0	13	100.0
Total	156	3	1.9	11	7.1	142	91.0

TABLE 65 Mean z-scores, Design Effects and excluded subjects

Indicator	n	Mean z- scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range	Scores out of
Weight-for-Height	mean±SD of WHZ	162	-0.27±0.98	1.00	0	3
Weight-for-Age	mean±SD of WAZ	161	-0.63±1.05	1.00	0	4
Height-for-Age	mean±SD of HAZ	156	-0.54±1.07	1.00	0	9

Appendix 5 MAP 1 BOTSWANA AND NEIGHBOURING COUNTRIES
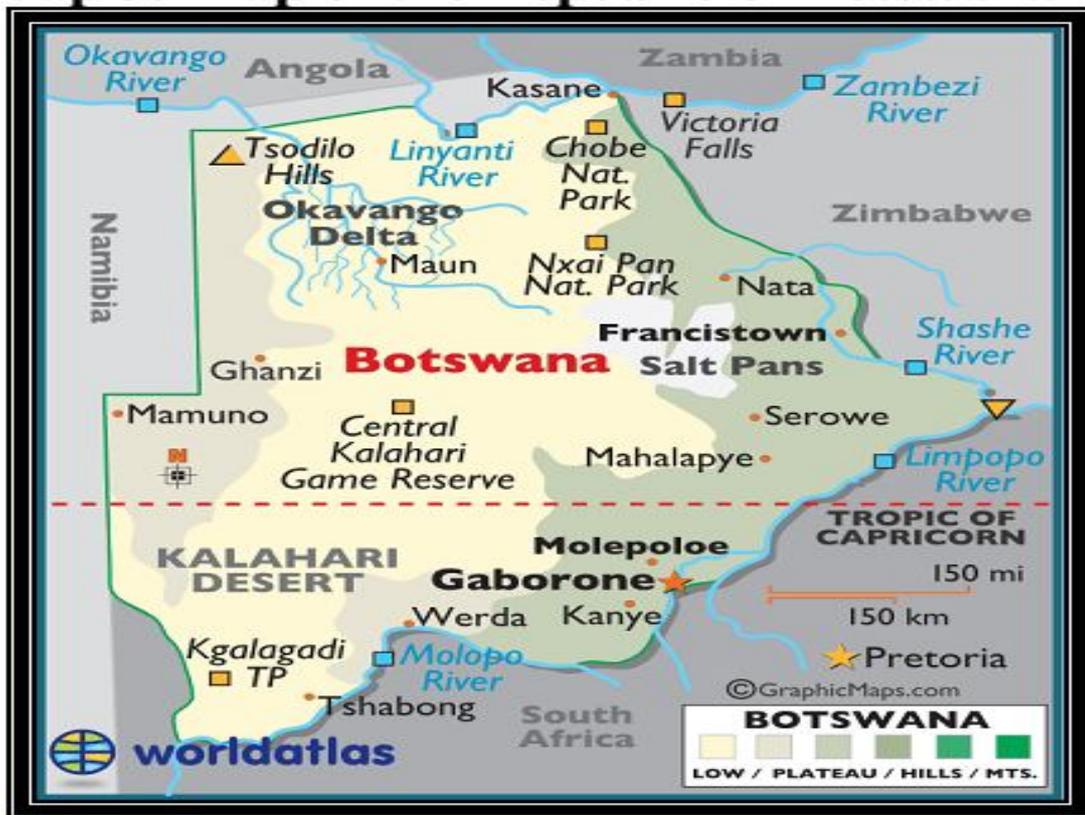
ANNEX 6 LOCATION OF DUKWI CAMP IN BOSWANA.

Appendix 5 Survey Questionnaires

UNHCR Standardised Expanded Nutrition Survey (SENS) Questionnaire

DUKWI REFUGEE CAMP, BOTSWABA Nutrition Survey,December 2013

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 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 assistance 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 women to see if they have anaemia.
- Before we start to ask you any questions or take any measurements, we will ask you to give us your verbal consent. Be assured that any information that you will provide will be kept strictly confidential.
- You can ask me any question 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.

Note that in some camps, the words 'block' and 'section' may not be used and other words may be used for these. Adapt the wording accordingly.

CAPITAL LETTERS refer to instructions for the surveyors and should not be read to the respondent.

CHILDREN 6-59 MONTHS ANTHROPOMETRY, HEALTH AND ANAEMIA: 1 questionnaire per cluster / zones / sections *(THIS QUESTIONNAIRE IS TO BE ADMINISTERED TO ALL CHILDREN BETWEEN 6 AND 59 MONTHS OF AGE)*

Section code / number:_____**Block code / number**: _____

Date of interview (dd/mm/yyyy):														Team number
|___|___|/|___|___|/|___|___||___|___|						|___|___|								|___|
CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8	CH9	CH10	CH11	CH12	CH13	CH14	CH15
ID	HH	Consent given 1=Yes 2=No 3=Absent	Sex (m/f)	Birthdate* dd/mm/yyyy	Age** (months)	Weight (kg) ±100g	Height (cm) ±0.1cm	Oedema (y/n)	MUAC (mm)	Child enrolled 1=tsabana 2=tsabotlhe 3=None	Measles 1=Yes card 2=Yes recall 3=No or don't know	Vit. A in past 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=Don't know	Hb *(g/L or g/dL)*
				/ /										
				/ /										
				/ /										
				/ /										
				/ /										
				/ /										
				/ /										
				/ /										
				/ /										
...				/ /										

*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.

WOMEN ANAEMIA: 1 questionnaire per cluster / zones / sections(THIS QUESTIONNAIRE IS TO BE ADMINISTERED TO ALL WOMEN AGED BETWEEN 15 AND 49 YEARS IN THE SELECTED HOUSEHOLD)

Section code / number:_____**Block code / number**: _____

Date of interview (dd/mm/yyyy):					|___|___|		Team number
|___|___|/|___|___|/|___|___||___|___|							|___|
WM1	**WM2**	**WM3**	**WM4**	**WM5**	**WM6**	**WM7**	**WM8**
ID	HH	Consent given 1=Yes 2=No 3=Absent	Age (years)	Are you pregnant? 1=Yes 2=No (GO TO HB) 8=Don't know (GO TO HB)	Are you currently <u>enrolled</u> in the ANC programme? 1=Yes 2=No 8=Don't know	Are you currently <u>receiving</u> iron-folate pills (*SHOW PILL*)? 1=Yes (STOP NOW) 2=No (STOP NOW) 8=Don't know (STOP NOW)	Hb (g/L or g/dL)

IYCF: 1 questionnaire per child 0-23 months *(*THIS QUESTIONNAIRE IS TO BE ADMINISTERED TO THE MOTHER OR THE MAIN CAREGIVER WHO IS RESPONSIBLE FOR FEEDING THE CHILD AND THE CHILD SHOULD BE BETWEEN 0 AND 23 MONTHS OF AGE)

Section code / number:_____**Block code / number**: _____**Consent** : yes / no / absent

Date of interview (dd/mm/yyyy)	Name of the chilld		
|___|___|/|___|___|/|___|___||___|___|			
Team Number	**ID Number**		**HH Number**
|___|	|___|___|___|		|___|___|___|

No	QUESTION	ANSWER CODES	
SECTION IF1			
IF1	Sex	Male... 1 Female 2	|___|
IF2	Birthdate RECORD FROM AGE DOCUMENTATION. LEAVE BLANK IF NO VALID AGE DOCUMENTATION.	Day/Month/Year.....|___|___| /|___|___| / |___|___||___|___|	
IF3	Child's age in 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?	Yes .... 1 No ....2 Don't know...............................8	|___| **IF ANSWER IS 2 or 8 GO TO IF7**
IF5	How long after birth did you first put [NAME] to the breast?	Less than one hour .... 1 Between 1 and 23 hours ....2 More than 24 hours................................3 Don't know...8	|___|
IF6	Was [NAME] breastfed yesterday during the day or at night?	Yes .... 1 No ....2 Don't know...............................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 DOES NOT KNOW, CIRCLE '8'. EVERY LINE MUST HAVE A CODE.

		Yes	No	DK
7A. Yesterday during the day and at night was the child (NAME) givenPlain water	7A..........................1		2	8
7B. Yesterday during the day and at night was the child (NAME) given Infant formula, for exampleNan, Lactogen, S26, Infasoy, Mmelegi	7B..........................1		2	8
7C. Yesterday during the day and at night was the child (NAME) Milk such as tinned, powdered, or fresh animal milk, for exampleCondensed milk, Nespray, Cremora, Klim, Fresh milk like Delta Fresh, LonglifeBonnita, Ultramel, Clover Milk, Parmalatfirstgrowth	7C..........................1		2	8
7D. Yesterday during the day and at night was the child (NAME) Juice or juice drinks,for example100% apple Juice, Dairy Mix, Tropica, Minute Maid, Ceres, Liqufruit,	7D..........................1		2	8
7E. Clear broth (Sopo,)	7E..........................1		2	8
7F. Sour milk or yogurt, for exampleInkomanzi, Yogisip, Nutriday, Parmalat,	7F..........................1		2	8
7G. Thin porridge, for example Soft Porridge (made from Mealie Meal or Sorghum Meal, or Tsabana)	7G..........................1		2	8
7H. Tea or coffee with milk	7H..........................1		2	8
7I. Any other water-based liquids, for example (e.g. *sodas- Fanta, Coke, Iron Brew, Cream Soda ,Pinenut, , other sweet drink (Sweeto,Mazoe, Oros, Wild Island) herbal infusion(Traditional Medicine), gripe water, clear tea with no milk, black coffee, ritual fluids)*	7I.............................1		2	8

IF8	Yesterday, during the day or at night, did [NAME] eat solid or semi-solid (soft, mushy) food?E.g Mashed potatoes, Pap, Rice, Fruits, meat,	Yes.....................1 No......................2 Don't know........8	|___|

SECTION IF3

IF9	Did [NAME] drink anything from a bottle with a nipple yesterday during the day or at night?	Yes.....................1 No......................2 Don't know........8	|___|

SECTION IF4

IF10	IS CHILD AGED 6-23 MONTHS?	Yes....................1	

	REFER TO IF2 / IF3	No....................2	|___| 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 DOES NOT KNOW, CIRCLE '8'. EVERY LINE MUST HAVE A CODE.		
			Yes No DK
	11A. Yesterday, during the day or at night was (NAME) givenLIVER/ORGAN FLESH FOODS USED THE LOCAL SETTING]*(e.g. beef, goat, lamb, mutton, pork, rabbit, chicken, duck, liver, kidney, heart)*	11A..1	2 8
	11B. Yesterday, during the day or at night was (NAME) given Tsabana(or ration from the clinic)	11B..1	2 8
	11C. Tsabotlhe, (ration from the clinic)	11C..1	2 8
	11D.Therapeutic Food *(e.g. Plumpy'Nut®,or Red cross Food Basket)* (SHOW SACHET)	11D..1	2 8
	11E.*(e.g. Plumpy'Sup®)* (SHOW SACHET)- Not applicable Fill 8	11E..1	2 8
	11F. *(e.g.Nutributter®,Plumpy'doz®)* (SHOW SACHET / POT) Not applicable Fill 8	11F..1	2 8
	11G**.** INFANT FORMULA*ONLY(*Nan, Lactogen, S26, Infasoy, Mmelegi*)*	11G..1	2 8
	11H.*Cerelac, Weetabix, Cornflakes,Purity, Morvite, Instant Porridge, Nestam* ANY *IRON FORTIFIED* SOLID, SEMI-SOLID OR SOFT FOODS DESIGNED SPECIFICALLY FOR INFANTS AND YOUNG CHILDREN AVAILABLE IN THE LOCAL SETTING THAT ARE DIFFERENT THAN DISTRIBUTED COMMODITIES AND USE LOCALLY AVAILABLEBRAND NAMES	11H..1	2 8
IF12	Yesterday, during the day or at night, did [NAME] consume any food to which you added a Multivitamin Syrup (mainly given from hospital)? (SHOW MICRONUTRIENT POWDER SACHET)	Yes................................1 No.................................2 Don't know....................8	|___|

WASH: 1 questionnaire per household *(THIS QUESTIONNAIRE IS TO BE ADMINISTERED TO THE MAIN CARETAKER OR, IF THEY ARE ABSENT, ANOTHER ADULT MEMBER OF THE HOUSEHOLD)*

Section code / number:_____**Block code / number**: _____**Consent** : yes / no / absent

Date of interview (dd/mm/yyyy)	
|___|___|/|___|___|/|___|___||___|___|	|___|___|
Team Number	**HH Number**
|___|	|___|___|___|

No	QUESTION	ANSWER CODES	
SECTION WS1			
WS1	How many people live in this household and slept here last night?		|___|___|
WS2	What is the *main* source of drinking water for members of your household? DO NOT READ THE ANSWERS SELECT ONE ONLY	Piped water..01 Public tap/standpipe ....02 Tubewell/borehole (& pump)................03 Protected dug well ....04 Protected spring...................................05 Rain water collection............................06 UNHCR Tanker ....07 Unprotected spring ....08 Unprotected dug well............................09 Small water vendor ....10 Tanker truck ....11 Bottled water ....12 Surface water (e.g. river, pond) ....13 Other ....96 Don't know 98	|___|___|
WS3	Are you satisfied with the water supply? THIS RELATES TO THE DRINKING WATER SUPPLY	Yes ....1 No...2 Partially..3	|___| **IF ANSWER IS 1, 3 OR 8 GO TO**

		Don't know 8	**WS5**
WS4	What is the *main* reason you are not satisfied with the water supply? DO NOT READ THE ANSWERS SELECT ONE ONLY	Not enough ....01 Long waiting queue ....02 Long distance ....03 Irregular supply ....04 Bad taste...05 Water too warm.....................................06 Bad quality ....07 Have to pay ....08 Other ....96 Don't know 98	|___|___|
WS5	What kind of toilet facility does this household use? DO NOT READ THE ANSWERS SELECT ONE ONLY	Flush to piped sewer system .... 01 Flush to septic system .... 02 Pour-flush to pit .... 03 VIP/simple pit latrine with floor/slab..... 04 Composting/dry latrine .... 05 Flush or pour-flush elsewhere .... 06 Pit latrine without floor/slab .... 07 Service or bucket latrine .... 08 Hanging toilet/latrine............................ 09 No facility, field, bush, plastic bag.......... 10	|___|___| **IF ANSWER IS 10 GO TO WS7**
WS6	How many *households* share this toilet? THIS INCLUDES THE SURVEYED HOUSEHOLD	RECORD NUMBER OF HOUSEHOLDS IF KNOWN (RECORD 96 IF PUBLIC TOILET OR 98 IF UNKNOWN)	|___|___| Households
		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 know 8	|___|
WS7	Do you have children under three years old?	Yes ....1 No...2	|___| **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?	Child used toilet/latrine......................... 01 Put/rinsed into toilet or latrine.............. 02 Buried 03	

DO NOT READ THE ANSWERS SELECT ONE ONLY	Thrown into garbage .... 04 Put/rinsed into drain or ditch .... 05 Left in the open .... 06 Other .... 96 Don't know 98	|__|__|

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)	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**
		1	L	x	
		2	L	x	
		3	L	x	
		4	L	x	
		5	L	x	
		6	L	x	
		7	L	x	
		8	L	x	
		9	L	x	
		10	L	x	
		Total liters used by household			
WS10	Please show me where you store your drinking water. ARE THE DRINKING WATER CONTAINERS COVERED OR NARROW NECKED?	All are .... 1 Some are .... 2 None are 3			|__|

FOOD SECURITY: 1 questionnaire per household *(THIS QUESTIONNAIRE IS TO BE ADMINISTERED TO THE MAIN CARETAKER WHO IS RESPONSIBLE FOR COOKING THE MEALS)*

Section code / number:_____**Block code / number**: _____**Consent** : yes / no / absent

Date of interview (dd/mm/yyyy)	
|___|___|/|___|___|/|___|___||___|___|	|___|___|
Team Number	**HH Number**
|___|	|___|___|___|

No	QUESTION	ANSWER CODES	
SECTION FS1			
FS1	Does your household receive ration food?	Yes.. 1 No... 2	|___| **IF ANSWER IS 1 GO TO FS3**
FS2	Why do you notreceive ration food?	Not given one at registration................... 1 Lost card .... 2 Traded/sold card.................................... 3 Not registered but eligible...................... 4 Not eligible (not in targeting criteria) ...... 5 Other 6	|___| **GO TO FS5**
FS3	Does your household receive full or reducedration? (OPTIONAL)	Full...1 Half...2 Other...6	|___| **IF ANSWER IS 2 OR 6 GO TO FS5**
FS4	How many days did the food from the general food aid ration from the last month cycle of (November) last?	RECORD THE NUMBER OF DAYS IF KNOWN (RECORD 98 IF UNKNOWN)	|___|___|
FS5	In the last month, have you or anyone in your household borrowed cash, food or other items with or without interest?	Yes.. 1 No... 2 Don't know 8	|___|
FS6	In the last month, have you or anyone in your household sold any assets that you would not have normally sold (furniture, seed stocks, tools, other NFI, livestock etc.)?	Yes.. 1 No... 2 Don't know 8	|___|

FS7	In the last month, have you or anyone in your household requested increased remittances or gifts as compared to normal?	Yes... 1 No... 2 Don't know 8	|___|
FS8	In the last month, have you or anyone in your household reduced the quantity and/or frequency of meals and snacks?	Yes... 1 No... 2 Don't know 8	|___|
FS9	In the last month, have you or anyone in your household begged?	Yes... 1 No... 2 Don't know 8	|___|
FS10	In the last month, have you or anyone in your household engaged in:or any other risky or harmful activities? Stealing food, hunting, working outside the camp, Commercial Sex, Sale of food?	Yes... 1 No... 2 Don't know 8	|___|

SECTION FS2

FS11	Now I would like to ask you about the types of foods that you or anyone else in your household ate yesterday during the day and at night. I am interested in whether you or anyone else in your household had the item even if it was combined with other foods. I am interested in knowing about meals, beverages and snacks eaten or drank inside or outside the home. READ THE LIST OF FOODS AND DO NOT PROBE. PLACE A *ONE* IN THE BOX IF ANYONE IN THE HOUSEHOLD ATE THE FOOD IN QUESTION, PLACE A *ZERO* IN THE BOX IF NO ONE IN THE HOUSEHOLD ATE THE FOOD.	
	1. Have you eaten any of these food yesterday during the day and at night-*corn/maize,, millet, oats, rice, sorghum,*) or any foods made from these such as *e.g. bread, porridge, noodles, PAP, Macaroni, Spaggheti, Dumpling, Canjero, Chapati, Samp,Madombi, Magwinya*	1................................|___|
	2. Have you eaten any of these food yesterday during the day and at nightAny WHITE ROOTS AND TUBE (*e.g. green bananas, white potatoes, white sweet potatoes, white cassava or any food made from roots such as*	2................................|___|
	3A. AnyVITAMIN A RICH VEGETABLES AND TUBERS(*e.g. carrot, pumpkin, squash, or sweet potato that are orange inside, red sweet pepper, butternuts, watermelon*)	3A...............................|___|
	3B. Any DARK GREEN LEAFY VEGETABLES LOCALLY AVAILABLE INLCUDING WILD FORMS AND VITAMIN A RICH LEAVES(*e.g. amaranth (Imbuya), cassava leaves, imbuya,delele, okra,morugoyadinawa, rape, pumpkin leaves,beetroot leaves, spinach, Pumpkin Leaves, Kales (Sukuma Wiki)*)	3B...............................|___|
	3C. Any OTHER VEGETABLES (*e.g. cabbage, green pepper, tomato, onion, eggplant*)	3C...............................|___|

	4A. Any VITAMIN A RICH FRUITSand 100% fruit juice made from these *(e.g. mango (ripe, fresh and dried), cantaloupe melon (ripe), apricot (fresh or dried), ripe papaya, passion fruit (ripe), dried peach, guava,granadilla,pears, plums,)*	4A…………………… |___|
	4B. AnyOTHER FRUIT INCLUDING WILD FRUITS, and 100% fruit juice made from these*(e.g. apple, avocados, banana, coconut flesh, lemon, orange, pineapple, moroja, morula, baobab fruit)*	4B…………………… |___|
	5A. Any ORGAN MEAT OR BLOOD-BASED FOODS*(e.g. liver, kidney, heart,tongue, chicken feet, chicken skins, chicken heads, intestines)*	5A…………………… |___|
	5B. AnyFLESH MEAT*(e.g. beef, goat, lamb, mutton, pork, rabbit, chicken, duck, cane rat, guinea pig, rat, frogs, phane/caterpillar worms, donkey, Mouse)*	5B…………………… |___|
	6. Any eggs from [INSERT EGGS LOCALLY AVAILABLE]*(e.g. eggs from chicken, duck, guinea fowl)*	6…………………… |___|
	7. AnyFRESH, DRIED OR CANNED FISH *(e.g. tuna, sardines,tinned fish, bream, bubble fish,kapenta*	7…………………… |___|
	8. AnyLEGUMES, NUTS AND SEEDS*(e.g. dried peas, dried beans, lentils, nuts, seeds)* or any foods made from these such as *(peanut butter, morula nuts, ground nuts, coconuts)*	8…………………… |___|
	9. Any MILK AND MILK PRODUCTS*(e.g. milk, infant formula, cheese, yogurt,madila)*	9…………………… |___|
	10.Any OILS AND FATS added to food or used for cooking *(e.g. vegetable oil, plum oil, olive oil, lad, coco oil, sunflower or butter)*	10…………………… |___|
	11. AnySWEETS, SWEETENED SODA OR JUICE DRINKS AND SUGARY FOODS*(e.g. sugar, honey, soda drinks, chocolates, candies, cookies, sweet biscuits and cakes, ginger drink, haluwa, sweetaid)*	11…………………… |___|
	12. Any spices, condiments and beverages *(e.g. black pepper, salt, chillies, soy sauce, hot sauce, fish powder, fish sauce, custard, ginger, herbs, magi cubes, tomato sauce, mustard, coffee, tea, beer, alcoholic beverages like hansa pilsner, black label, hunter gold, ohlssons, st Louis, Windhoek, castle ,Amstel and chibuku)wine (tassenberg, four cousins, jc le roux, hard spirits (whisky, brandy, cognacs,)traditional (kachipempe, kgadi, bojalwajwa Setswana)*	12…………………… |___|

MOSQUITO NET COVERAGE: 1 questionnaire per household (THIS QUESTIONNAIRE IS TO BE ADMINISTERED TO THE HEAD OF THE HOUSEHOLD OR, IF THEY ARE ABSENT, ANOTHER ADULT MEMBER OF THE HOUSEHOLD).

Section code / number:_____**Block code / number**: _____**Consent** : yes / no / absent

Date of interview (dd/mm/yyyy)		
|___|___|/|___|___|/|___|___||___|___|		|___|___|
Team Number		**HH Number**
|___|		|___|___|___|

No	QUESTION		ANSWER CODES		
SECTION TN1					
TN1	How many people live in this household and slept here last night? INSERT NUMBER				|___|___|
TN2	How many children 0-59 months live in this household and slept here last night? INSERT NUMBER				|___|___|
TN3	How many pregnant women live in this household and slept here last night? INSERT NUMBER				|___|___|
TN4	Did you have your house sprayed with insecticide in an indoor residual spray campaign in the past 3 Months (October)?		Yes ....1 No... 2		|___|
TN5	Do you have mosquito nets in this household that can be used while sleeping?		Yes ....1 No... 2		|___| **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		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 HOUSEHOLD. 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 DK.	1=LLIN 2=Other/DK |___|	1=LLIN 2=Other/DK |___|	1=LLIN 2=Other/DK |___|	1=LLIN 2=Other/DK |___|
TN10	**For surveyor/supervisor only (not to be done during interview)**: RECORD THE TOTAL NUMBER OF LLINs IN HOUSEHOLD BYCOUNTING THE NUMBER OF '1' IN TN9.				|___| 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 household members who live here and who slept here last night	Sex m/f	Age years	FOR WOMEN 15-49 YEARS, ASK: Is (NAME) currently pregnant? (CIRCLE NOT APPLICABLEOR N/A'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. WRITE THE NUMBER CORRESPONDING TO THE NET THEY USED.	**For surveyor/ supervisor only:** BASED ON THE OBSERVED NET BRANDNAME RECORDED (TN8), INDICATE IF IT IS AN LLIN OR OTHER / DON'T KNOW (DK). LLIN OTHER/DK
01		m f	<5 ≥5	1 0 99	1 0	|___|	1 2
02		m f	<5 ≥5	1 0 99	1 0	|___|	1 2
03		m f	<5 ≥5	1 0 99	1 0	|___|	1 2
04		m f	<5 ≥5	1 0 99	1 0	|___|	1 2
05		m f	<5 ≥5	1 0 99	1 0	|___|	1 2

06		m f	<5 ≥5	1	0	99	1	0	|___|	1	2
07		m f	<5 ≥5	1	0	99	1	0	|___|	1	2
08		m f	<5 ≥5	1	0	99	1	0	|___|	1	2
09		m f	<5 ≥5	1	0	99	1	0	|___|	1	2
10		m f	<5 ≥5	1	0	99	1	0	|___|	1	2
11		m f	<5 ≥5	1	0	99	1	0	|___|	1	2
12		m f	<5 ≥5	1	0	99	1	0	|___|	1	2
13		m f	<5 ≥5	1	0	99	1	0	|___|	1	2
14		m f	<5 ≥5	1	0	99	1	0	|___|	1	2
15		m f	<5 ≥5	1	0	99	1	0	|___|	1	2

Mosquito net summary (for surveyor/supervisor only, not to be done during interview)

	Total household members		Total <5		Total Pregnant	
Slept under a net of any type	Count the number of '1' in COL5	**TN11** |___|___|	For children < 5 (COL3 is '<5'), count the number of '1' in COL5	**TN13** |___|___|	For pregnant women (COL4 is '1'), count the number of '1' in COL5	**TN15** |___|___|
Slept under an LLIN	Count the number of '1' in COL7	**TN12** |___|___|	For children <5 (COL3 is '<5'), count the number of '1' in COL7	**TN14** |___|___|	For pregnant women (COL4 is '1'), count the number of '1' in COL7	**TN16** |___|___|

Appendix 6 Calendar of Events

All children under five have at least clinic card. Therefore, the supervisors and facilitators deemed it fit not to use calendar of events. It is commendable that Botswana, unlike other sub Saharan African Countries, have near universal registration of births through near ubiquitous free primary health care systems (mobile system) that easily rival developed countries.