STANDARDIZED EXPANDED NUTRITION SURVEY (SENS) FINAL REPORT- REFUGEE CAMPS IN RWANDA

Survey conducted: 6 - 24 May 2019
Report finalized: 5 Aug 2019

UNHCR and WFP

IN COLLABORATION WITH

African Humanitarian Action (AHA), American Refugee Council (ARC), Save the Children International (SCI), and UNICEF

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Acknowledgements

This exercise is the outcome of commitment from the government and partners. UNHCR, WFP, UNICEF, AHA, ARC and SCI jointly executed the survey in the six refugee camps of Gihembe, Kigeme, Kiziba, Mugombwa, Nyabiheke and Mahama with the support of MINEMA. The author would like to acknowledge all agencies, camp management, and health and nutrition personnel, especially community health and nutrition education workers. Particular thanks to the following staff for their commitment to the duration of this activity: Dr. Mulugeta Tenna (AHA), Fidele Ngizwenayo (AHA), Jean Jacques Safari Musira (AHA), Gatoya Christophe (AHA), Chrisostome Ndabagaruye (AHA), Jean Bosco Uwizeyimana (AHA), Anathalie Ingabire (AHA), Alice Murerwa (WFP), Soubious Umutoni (SCI), Samuel Ushizimpumu (SCI), Marguerite Mukajyoni (ARC), Jean Damascene Habimana (ARC), Evode Imanimurinde (ARC), Jeanne Muporeze (UNHCR), Jonathan Calbayan (UNHCR), Kassim Noor (UNHCR), Damien Nsengiyumva (WFP), Jules Rugwiro (WFP). **Section 5 and 6** provide a full list of the names and agencies involved in this exercise**.** Finally, thanks to the refugees for consenting to the interviews and special thanks to mothers who accepted to bring their children to the standardization exercise. Their incredible patience is very much appreciated.

Acronyms and Abbreviations

AHA	Africa Humanitarian Action
ARC	American Refugee Council
ANC	Ante-Natal Care
ARI	Acute respiratory infection
ART	Anti-retroviral Therapy
ASF	Animal Source Foods
CBT	Cash Based Transfer
CHW	Community Health Worker
CI	Confidence Interval
CMR	Crude Mortality Rate
CSB	Corn Soya Blend
ECD	Early Childhood Development
ENA	Emergency Nutrition Assessments
EPI	Expanded Program for Immunization
FBF	Fortified Blended Food
FNG	Fill the Nutrient Gap
GAM	Global Acute Malnutrition
GOR	Government of Rwanda
HAZ	Height for Age Z-Score
Hb	Hemoglobin
HFA	Height for Age
HIS	Health Information System
ICCM	Integrate Community Case Management
IMAM	Integrated Management of Acute Malnutrition
IRS	Indoor Residual Spraying
IYCF	Infant and Young Child Feeding
JAM	Joint Assessment Monitoring
LLIN	Long Lasting Insecticidal Net
LNS	Lipid-Based Nutrient Supplements
MAM	Moderate Acute Malnutrition
M&E	Monitoring and Evaluation
MIDIMAR	Ministry of Disaster Management and Refugee Affairs
MIYCN	Maternal, Infant and Young Child Nutrition
MoH	Ministry of Health
MUAC	Mid Upper Arm Circumference
NEC	Nutrition Education and Counseling
NFIs	Non-Food Item
NGO	Non-Governmental Organization
OTP	Outpatient Therapeutic Program
PDM	Post Distribution Monitoring
PMTCT	Prevention of Mother to Child Transmission
PRRO	Protracted Relief and Recovery Operation
Rwf	Rwandan Franc
SAM	Severe Acute Malnutrition
SBCC	Social and Behavior Change Communication
SCI	Save the Children International
SFP	Supplementary Feeding Program
SMART	Standardized Monitoring and Assessment of Relief and Transitions
SNF	Specialized Nutritious Foods
TB	Tuberculosis
U5MR	Under five mortality rate
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
VAM	Vulnerability and Assessment Mapping
WASH	Water, Sanitation and Hygiene
WFP	World Food Programme
WHO	World Health Organization
WHZ	Weight for Height Z Score

Executive Summary

Background:
Political and ethnic conflicts in the Great Lakes Region[1], coupled with a favorable refugee policy, have given rise to the refugee situation in Rwanda. As of April 2019, Rwanda hosted about 175,000 Congolese and Burundian refugees, 80% that now reside in six camps provided by the government of Rwanda, while the remainder are classified as urban refugees in Kigali. Congolese refugees have been fleeing to Rwanda since 1996 and constitute 45% of the population, residing in five camps in the northern and western areas of the country (Gihembe, Nyabiheke, Kiziba, Kigeme and Mugombwa).[2] The refugee population in Rwanda increased significantly in 2015 following election-related conflicts in Burundi which necessitated the establishment of a sixth camp, Mahama in Kirehe district. Mahama is now Rwanda's largest refugee camp of over 59,000 Burundian refugees. Compared to 2018, camp populations increased by 4% overall with increases in Gihembe (5%), Mahama (7%) and Mugombwa (15%) and 1-3% reductions in the other 3 camps. The demographic structure of the camps is young with half of the population under the age of 18 years and 15% under the age of 5 years. The volatile political and security situations in the DRC and Burundi continue to create unfavorable prospects for refugees and asylum seekers to return home.[3]

Refugees face significant challenges in accessing livelihoods and income-generating opportunities, despite the Rwandan Government's economic inclusion strategy that envisions "by 2020 all refugees and neighbouring communities are able to fulfil their productive potential as self-reliant members of Rwandan society who contribute to economic development of their host districts" and a refugee policy which allows them to work, move freely within the country, establish companies, pay taxes and create jobs. Limited access to livelihood opportunities and suitable land for agricultural production results in an excessive reliance on humanitarian assistance to meet basic needs like water, shelter, fuel, medical care, food and education. The greatest source of income for most refugees remains food or cash assistance provided by WFP and UNHCR. Refugees in the five Congolese camps have now all transitioned to the cash-based transfer assistance modality while refugees in Mahama receive a mix of cash and in-kind food assistance. Until November 2017, Congolese refugees received a cash voucher worth Rwf 7600 (~USD 8.76) per person per month and used over a third of their total expenditure on food (36%). Due to funding constraints the transfer value reduced by 25% since January 2018. Apart from in kind food / cash, the most important refugee income sources are formal employment, borrowing, petty trading, casual labour related to agricultural activities and gifts from families, friends and remittances.

Nutritional outcomes remain a concern in most refugee contexts including Rwanda due to the association with various forms of malnutrition (wasting, stunting, underweight and anemia) in children aged 6-59 months and excess mortality. Children under five years old are growing rapidly and are the most sensitive to nutritional stress, disease and food shortages. Globally, wasting and stunting are implicated in the deaths of over 2 million children annually and account for over 15% of all disability-adjusted life years lost in young children with a multiplicative effect on the risk of mortality for children with concurrent deficits in wasting and stunting. Ensuring adequate nutrition and eliminating malnutrition have long been recognized as integral to fulfilling UNHCR's protection mandate and WFP's strategic objective to save lives in emergencies. Comprehensive nutrition surveys have been conducted in the camps on an annual basis since 2015. Malnutrition is widespread across the camps and improvements in stunting and anemia have been inconsistent.

The 2018 Standardized Expanded Nutrition Survey (SENS) established that acute malnutrition prevalence was within the WHO 'acceptable' range of 5% all six while chronic malnutrition continued to decrease in all camps except Kigeme due to improvement in the delivery of nutrition specific and sensitive interventions by cooperating partners. In two camps stunting prevalence was within the WHO acceptable threshold (less than 20%): 14.3% in Gihembe and 17.4% in Mugombwa. Despite the overall improvements in the prevalence of acute and chronic malnutrition among children under five, anemia prevalence was still high, exceeding the WHO critical threshold of 40% in some camps: 44.6% in Mahama and 41.4% in Nyabiheke. The persistent anemia prevalence in the camps could be multifactorial and extend beyond just food intake to include health-related ailments, malaria, low consumption of heme-iron foods and suboptimal IYCF practices. A follow up SENS was planned for 2019 to asses progress in these critical indicators.

[1] This region comprises the following countries that surround the **African Great Lakes:** Burundi, the Democratic Republic of the Congo, Kenya, Rwanda, Tanzania and Uganda.
[2] Kiziba was the first camp established in 1996, followed by Gihembe in 1997, Nyabiheke in 2005, Kigeme in 2012, and Mugombwa in 2013. Most Congolese refugees arrived in Rwanda in 1995-1996 after fleeing conflict in eastern DRC, while a further 30,000 escaped from increasing insecurity during 2012 and 2013.
[3] UNHCR and WFP. Joint Assessment Mission Report for Refugee Camps in Rwanda, 2017.

Survey Design: A UNHCR SENS was conducted in the six refugee camps from 6 - 24 May 2019 with an overall objective to determine the current nutrition status for children aged 6-59 and key associated indicators. Five out of the six standard modules were assessed: (1) Anthropometry and Health, (2) Anemia, and (3) Infant and Young Child Feeding (IYCF), (4) Water, Sanitation and Hygiene (WASH), and (5) mosquito net coverage. The timing of the survey in May traditionally marks the end of the rainy season in Rwanda and allows comparison with previous SENS conducted periodically since May 2012[4] and annually since May 2015.[5]

Survey Objectives

The aim of SENS was to assess the overall nutrition and health situation and related indicators among the refugee population in the six refugee camps in Rwanda.

Primary Objectives:

- To measure the prevalence of acute malnutrition and 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 in children aged 6-59 months.
- To assess the two-week prevalence of diarrhea in children aged 6-59 months.
- To measure the prevalence of anemia in children aged 6-59 months and in non-pregnant women between 15-49 years.
- To investigate IYCF practices among children aged 0-23 months.

Secondary objectives:

- To determine enrolment in selective feeding programs for children aged 6-59 months.
- To determine enrolment in antenatal care clinics, iron-folic acid supplementation programs and supplementary feeding programs among pregnant women.
- To determine the population's access to, and use of, improved water and sanitation and hygiene facilities.
- To determine the ownership of mosquito nets in households.
- To determine the utilization of mosquito nets by the total population, children 0-59 months and pregnant women.

Methodology

Based on the UNHCR SENS guidelines for refugee populations (v2) and the Standardized Monitoring and Assessment of Relief and Transitions (SMART) methodology (v1), simple random sampling was applied to provide statistically representative and precise information for children aged 6-59 months with a sampling frame of the updated demographic list of all households in the six refugee camps from UNHCR *ProGres* database and the basic sampling unit of a household with a child 6-59 months of age.[6]

Based on the parameters of an estimated prevalence of Global Acute Malnutrition (GAM) ranging from 3.8% to 7.2%[7], a desired precision of $\pm$0.025 to 0.03 and a design effect of 1.0, the required sample size was calculated in ENA software (9 July 2015 version) to be 1300. An estimated non-response rate of 23.0%-57% required a selection of 1749 households containing children 6-59 months across the six camps.[8] The non-response rate was based on the ability to locate households during previous SENS.

[4]UNHCR. A Joint Nutrition Survey Report Conducted in Kiziba, Nyabiheke and Gihembe refugee camps, May 2012.

[5]UNHCR and WFP. Standardized Expanded Nutrition Survey Conducted in Five Congolese Refugee Camps in Rwanda, May 2015. Survey conducted: 8-18 May 2015. Report prepared: 9 Aug 2015.
UNHCR and WFP. Standardized Expanded Nutrition Survey Conducted in Six Refugee Camps in Rwanda, May 2016. Survey conducted: 14 May-1 June 2016. Report prepared: 5 Aug 2016.
UNHCR and WFP. Standardized Expanded Nutrition Survey Conducted in Six Refugee Camps in Rwanda, May 2017. Survey conducted: 9-26 May 2017. Report prepared: 30 Jun 2017.
UNHCR and WFP. Standardized Expanded Nutrition Survey Conducted in Six Refugee Camps in Rwanda, May 2018. Survey conducted: 7-26 May 2018. Report prepared: 23 Sep 2018.

[6] Refer to section 3.6 limitations for more information about statistical representation of the survey.

[7] Uses the upper confidence interval (95% C.I.) of GAM from the May 2018 SENS.

[8] The choice for non-response rate was based on collected information from 2018 SENS of the HOUSEHOLDs containing children 6-59 months for refugee camps in Rwanda due to movements in and out of the camp and inability to locate some households due to inaccuracies in registration / addresses in ProGres database.

The 1749 households containing children 6-59 months were selected using a random number and interval generated within the survey planning interface of ENA software and linked to *ProGres* to obtain the household addresses. Community Health Workers (CHWs) mobilized the eligible women and children from the randomly selected households to come for interviews on designated days within each camp.

Data was collected for the following demographic groups:

- Anthropometric measurements of children aged 6-59 months.
- Anemia testing by for children aged 6-59 months and non-pregnant women aged 15-49 years old.
- Structured questionnaire translated into Kinyarwanda to determine enrolment into antenatal care clinics and coverage of iron-folic acid supplementation in pregnant women.
- Structured questionnaire translated into Kinyarwanda covering IYCF indicators for children 0-23 months of age, WASH and mosquito net use. Respondents for the interviews were mothers or caregivers of the children from the sampled households.

24 personnel, organized into 6 teams of 4 members each, participated in the 2019 survey: 1 team leader, 2 anthropometry measurers, and 1 hemoglobin (Hb) measurer. The team leaders and anthropometry measurers and household enumerators were recruited from a database of experienced survey personnel maintained by WFP VAM unit and technicians from private laboratories in Kigali were hired to serve as Hb measurers.

Survey data was collected using structured questionnaires programmed with ODK (Open Data Kit) application and ONA platform on Samsung Galaxy 3 Pro v8.4 tablets which allowed data to be available on the server immediately after online submission. Extracted and verified data was analyzed using ENA for SMART software (v. 9 July 2015) and SPSS (v21.0) software. **Table 1** summarizes the key findings.

TABLE 1 SUMMARY OF KEY FINDINGS FROM MAY 2019 SENS IN THE REFUGEE CAMPS IN RWANDA

Camp	Gihembe		Kigeme		Kiziba		Mugombwa		Nyabiheke		Mahama	
	Number/ Total	% (95% CI)	Number/ Total	% (95% CI)	Number/ Total	% (95% CI)	Number/ Total	% (95% CI)	Number/ Total	% (95% CI)	Number/ Total	% (95% CI)
Children 6-59 months												
Acute Malnutrition (WHO 2006 Growth Standards)[9] - Critical if ≥ 15%												
Global Acute Malnutrition (GAM)	8/289	2.8 (1.4-5.4)	5/330	1.5 (0.6-3.5)	16/301	5.3 (3.3-8.5)	3/252	1.2 (1.0-1.5)	8/260	3.1 (1.6-6.0)	8/342	2.3 (1.2-4.5)
Moderate Acute Malnutrition (MAM)	7/289	2.4 (1.2-4.9)	5/330	1.5 (0.6-3.5)	13/301	4.3 (2.5-7.2)	3/252	1.2 (1.0-1.5)	8/260	3.1 (1.6-6.0)	8/342	2.3 (1.2-4.5)
Severe Acute Malnutrition (SAM)	1/289	0.3 (0.1-1.9)	0/330	0.0 (0.0-1.2)	3/301	1.0 (0.3-2.9)	0/252	0.0 (0.0-0.0)	0/260	0.0 (0.0-1.5)	0/342	0.0 (0.0-1.1)
Oedema	0/289	0.0 (0.0-0.0)	0/330	0.0 (0.0-1.0)	0/301	0.0 (0.0-0.0)	0/252	0.0 (0.0-0.0)	0/260	0.0 (0.0-0.0)	0/425	0.0 (0.0-0.0)
Mid Upper Arm Circumference (MUAC)												
MUAC <125mm and/or oedema	2/289	0.7 (0.2-2.5)	3/331	0.9 (0.3-2.6)	9/301	3.0 (1.6-5.6)	0/252	0.0 (0.0-0.0)	2/263	0.8 (0.2-2.7)	5/342	1.5 (0.6-3.4)
MUAC 115-124 mm	1/289	0.3 (0.1-1.9)	2/331	0.6 (0.2-2.2)	6/301	2.0 (0.9-4.3)	0/252	0.0 (0.0-0.0)	1/263	0.4 (0.1-2.1)	5/342	1.2 (0.5-3.0)
MUAC <115 mm and/or edema	1/289	0.3 (0.1-1.9)	1/331	0.3 (0.1-1.7)	3/301	1.0 (0.3-2.9)	0/252	0.0 (0.0-0.0)	1/263	0.4 (0.1-2.1)	0/342	0.3 (0.0-1.6)
Stunting (WHO 2006 Growth Standards)[10]- Critical if ≥ 40%												
Total Stunting	49/287	17.1 (13.2-21.9)	92/329	28.0 (23.4-33.0)	67/300	22.3 (18.0-27.4)	47/251	18.7 (13.2-25.9)	60/262	22.9 (18.2-28.4)	87/341	25.5 (21.2-30.4)
Severe Stunting	13/287	4.5 (2.7-7.6)	23/329	7.0 (4.7-10.3)	13/300	4.3 (2.5-7.3)	8/251	3.2 (1.3-7.4)	4/262	1.5 (0.6-3.9)	14/341	4.1 (2.5-6.8)
Program coverage - Target of ≥ 95% for measles and ≥ 90% for vitamin A supplementation												
Measles vaccination with card or recall (9-59 months)	267/268	99.6 (97.2-100.0)	316/321	98.4 (97.1-99.2)	283/286	99.0 (95.8-99.7)	237/240	98.8 (95.2-99.7)	246/249	98.8 (97.2-99.5)	305/309	98.7 (94.8-99.7)
Vitamin A supplementation within past 6 months with card or recall (6-59 months)	290/291	99.7 (97.5-100.0)	316/334	94.6 (87.8-97.7)	280/304	92.1 (80.2-97.1)	247/252	98.0 (95.7-99.1)	261/265	98.5 (97.3-99.1)	331/344	84.9 (40.7-97.9)

[9] *results exclude SMART flags <-3 and ≥+3 WHZ*

[10] *results exclude SMART flags <-3 and ≥+3 HAZ*

Camp	Gihembe		Kigeme		Kiziba		Mugombwa		Nyabiheke		Mahama	
	Number/ Total	% (95% CI)	Number/ Total	% (95% CI)	Number/ Total	% (95% CI)	Number/ Total	% (95% CI)	Number/ Total	% (95% CI)	Number/ Total	% (95% CI)
Deworming in past 6 months (6-59 months)	259/291	89.0 (73.7-95.9)	300/333	90.1 (82.7-94.5)	242/304	79.6 (76.3-82.5)	222/251	88.4 (81.4-93.1)	244/265	88.4 (81.4-93.1)	285/344	82.8 (77.5-87.1)
Acutely malnourished children enrolled in a selective feeding program (combines classification by MUAC and/or WHZ)	5/7	71.4 (38.2-91.0)	2/6	33.3 (5.4-81.3)	4/14	28.6 (8.2-64.2)	2/2	100.0 (100.0-100.0)	2/4	50.0 (16.3-83.7)	3/7	42.9 (12.0-80.4)
Diarrhea												
Diarrhea in last 2 weeks	54/291	18.6 (15.0-22.7)	80/334	24.0 (20.7-27.6)	53/304	17.4 (11.4-25.8)	34/252	13.5 (10.10-17.8)	55/265	20.8 (15.0-28.1)	98/344	28.5 (22.5-35.3)
Anemia - High if ≥ 40%												
Total Anemia (Hb <11 g/dl)	61/291	22.0 (15.8-29.8)	94/333	28.2 (24.6-32.2)	82/304	27.0 (20.4-34.8)	72/252	28.6 (23.2-34.6)	82/265	30.9 (22.9-40.4)	106/344	30.8 (23.5-39.2)
Mild (Hb 10-10.9)	41/291	15.1 (12.4-18.4)	68/333	20.4 (17.1-24.2)	58/304	19.1 (11.8-29.4)	52/252	20.6 (17.6-24.0)	60/265	22.6 (18.9-26.8)	76/344	22.1 (16.6-28.8)
Moderate (Hb 7-9.9)	20/291	6.9 (3.7-12.5)	28/333	7.8 (5.6-10.8)	24/304	7.9 (4.9-12.4)	20/252	7.9 (4.5-13.5)	20/265	7.5 3.1-17.1)	30/344	8.7 (5.2-14.2)
Severe (Hb <7)	0/291	0.0 (0.0-0.0)	0/333	0.0 (0.0-0.0)	0/304	0.0 (0.0-0.0)	0/252	0.0 (0.0-0.0)	2/265	0.8 (0.2-2.6)	0/344	0.0 (0.4-2.3)
Children 0-23 months												
IYCF indicators												
Timely initiation of breastfeeding	101/121	83.5 (65.6-93.0)	114/130	87.7 (77.1-93.8)	107/123	87.0 (80.1-91.8)	85/99	85.9 (63.5-95.5)	88/101	87.1 (67.0-95.8)	123/143	86.0 (75.3-92.5)
Exclusive breastfeeding under 6 months	13/14	92.9 (71.9-98.5)	24/25	96.0 (74.8-99.5)	13/14	92.9 (61.0-99.1)	12/12	100.0 (100.0-100.)	17/20	85.0 (49.3-97.1)	21/22	95.5 (68.6-99.5)
Continued breastfeeding at 1 year	26/32	81.2 (56.3-96.3)	16/17	94.1 (56.3-99.5)	21/23	91.3 (70.6-97.9)	15/16	93.8 (67.2-99.1)	13/16	81.2 (66.7-90.4)	18/19	94.7 (64.8-99.4)
Continued breastfeeding at 2 years	15/22	68.2 (59.9-	14/22	63.6 (38.7-	14/22	63.6 (41.5-	11/18	61.1 (34.7-	11/19	57.9 (30.1-	14/22	58.3 (39.9-74.7)

Camp	Gihembe		Kigeme		Kiziba		Mugombwa		Nyabiheke		Mahama	
	Number/ Total	% (95% CI)	Number/ Total	% (95% CI)	Number/ Total	% (95% CI)	Number/ Total	% (95% CI)	Number/ Total	% (95% CI)	Number/ Total	% (95% CI)
		75.4)		82.9)		81.2)		82.3)		81.4)		
Introduction of solid, semi-solid or soft foods	22/23	95.7 (69.1-99.5)	10/13	76.9 (45.1-93.1)	15/18	83.3 (33.0-98.1)	12/12	100.0 (100.0-100.0)	16/16	100.0 (100.0-100.0)	35/35	100.0 (100.0-100.0)
Consumption of iron-rich or iron-fortified foods	107/107	100.0 (100.0-100.0)	97/105	92.4 (85.2-96.2)	95/109	87.2 (75.3-93.8)	84/86	97.7 (91.6-99.4)	77/81	95.1 (87.1-98.2)	118/121	97.5 (92.0-99.3)
Bottle feeding	6/121	5.0 (2.3-10.4)	4/130	3.1 (0.8-11.7)	9/123	7.3 (4.3-12.3)	7/99	7.1 (2.9-16.2)	13/101	12.9 (6.1-25.0)	7/143	4.9 (2.3-10.1)
Proportion of children who achieved Minimum Acceptable Diet (MAD)	75/107	70.1 (55.7-81.4)	48/105	54.3 (44.5-63.8)	53/110	48.2 (37.4-59.1)	58/86	67.4 (55.1-77.8)	42/81	51.9 (41.5-62.0)	55/121	45.5 (33.9-57.5)
Prevalence of intake												
Proportion of children aged 0-23 months who receive infant formula (fortified or non-fortified)	2/121	1.7 (0.5-5.7)	1/130	0.8 (0.1-5.0)	2/123	1.6 (0.5-5.4)	2/99	2.0 (0.2-15.4)	2/101	2.0 (0.3-13.8)	0/143	0.0 (0.0-0.0)
Proportion of children aged 6-23 months who receive FBF+ (CSB++)	105/107	98.1 (92.9-99.5)	95/105	90.5 (85.1-94.1)	91/109	83.5 (74.7-89.7)	82/86	95.3 (83.7-98.8)	77/81	95.1 (87.1-98.2)	111/121	91.7 (83.0-96.2)
Proportion of children aged 6-23 months who are enrolled in the MNP programme	94/107	87.9 (67.3-96.2)	77/105	73.3 (54.6-86.3)	96/109	88.1 (80.9-92.8)	68/86	79.1 (59.0-90.8)	70/81	86.4 (78.5-91.7)	103/121	85.1 (76.6-90.9)
Women 15-49 years												
Anemia (non-pregnant)- High if ≥ 40%												
Total Anemia (Hb <12 g/dl)	12/270	4.4 (2.7-7.2)	37/295	12.5 (7.5-20.1)	19/265	7.2 (4.5-11.2)	11/225	4.9 (2.0-11.3)	26/240	10.8 (6.9-16.7)	29/309	9.4 (3.6-22.3)
Mild (Hb 11-11.9)	9/270	3.3 (1.6-6.6)	29/295	9.8 (5.4-17.2)	14/265	5.3 (3.6-7.7)	9/225	4.0 (1.4-11.2)	22/240	9.2 (5.0-16.2)	21/309	6.8 (2.5-17.0)
Moderate (Hb 8-10.9)	3/270	1.1 (0.5-2.6)	8/295	2.7 (1.6-4.4)	5/265	1.9 (0.7-5.3)	2/225	0.9 (0.2-3.4)	4/240	1.7 (0.6-4.4)	8/309	2.6 (1.0-6.8)
Severe (Hb <8)	0/270	0.0 (0.0-0.0)	0/295	0.0 (0.0-0.0)	0/265	0.0 (0.0-0.0)	0/225	0.0 (0.0-0.0)	0/240	0.0 (0.1-5.3)	0/309	0.0 (0.0-0.0)
Program coverage (pregnant)												
Currently enrolled in ANC program	20/22	90.9	19/29	65.5	20/29	64.7	19/25	76.0	18/18	100.0	38/41	92.7 (72.8-

Camp	Gihembe		Kigeme		Kiziba		Mugombwa		Nyabiheke		Mahama	
	Number/ Total	% (95% CI)	Number/ Total	% (95% CI)	Number/ Total	% (95% CI)	Number/ Total	% (95% CI)	Number/ Total	% (95% CI)	Number/ Total	% (95% CI)
		(51.4-99.0)		(42.7-82.9)		(32.0-87.7)		(54.2-89.5)		(100.0-100.0)		98.4)
Currently receiving iron-folic acid pills	20/22	90.9 (51.4-99.0)	12/29	41.4 (26.9-57.5)	18/29	62.1 (40.7-79.6)	19/25	76.0 (54.2-89.5)	14/18	77.8 (42.9-94.2)	37/41	90.2 (71.4-97.2)
Currently enrolled in SFP (receiving CSB+, oil and sugar)	5/22	22.7 (6.5-55.3)	10/29	34.5 (16.2-82.9)	19/29	65.5 (49.0-79.0)	17/25	68.0 (46.0-84.1)	18/18	100.0 (100.0-100.0)	33/41	80.5 (62.6-91.1)
Minimum Diet Diversity-Women (MMD-W)												
Proportion achieving MDD-W (consuming ≥5 groups out of 10 in past 24 hours)	119/291	40.9 (31.4-51.1)	78/324	24.1 (14.1-38.0)	80/294	27.2 (15.4-43.4)	81/251	32.3 (25.0-40.5)	60/258	23.3 (14.0-36.0)	88/350	25.1 (15.3-38.4)
Households containing at least one child 6-59 months												
Water, Sanitation and Hygiene												
Household has improved[11] water source access	187/187	100.0 (100.0-100.0)	211/211	100.0 (100.0-100.0)	191/191	100.0 (100.0-100.0)	159/159	100.0 (100.0-100.0)	208/208	100.0 (100.0-100.0)	219/219	100.0 (100.0-100.0)
Amount of liters of water used per person per day – Acceptable if ≥15												
<10	28/184	15.2 (11.1-20.6)	89/211	42.2 (36.3-48.3)	45/183	24.6 (15.3-37.0)	41/159	25.8 (16.6-37.8)	57/165	34.5 (29.9-39.5)	61/218	28.0 (19.9-37.7)
10 to <15	58/184	31.5 (26.6-36.9)	77/211	36.5 (28.3-45.6)	61/183	33.3 (26.8-40.6)	67/159	42.1 (32.2-51.6)	63/165	38.2 (28.9-48.4)	92/218	42.2 (33.1-51.8)
15 to <20	36/184	19.6 (12.4-29.5)	27/211	12.8 (9.7-16.7)	32/183	17.5 (11.3-26.0)	25/159	15.7 (9.6-24.7)	17/165	10.3 (6.2-16.7)	36/218	16.5 (10.8-24.5)
≥20	62/184	33.7 (29.8-37.8)	18/211	8.5 (5.8-12.4)	45/183	24.6 (17.7-33.1)	26/159	16.4 (9.3-27.1)	28/165	17.0 (11.7-23.9)	29/218	13.3 (9.8-17.8)

[11] The following "improved" water sources are assumed to be of a suitable quality: a piped water supply into the home or a yard/plot, a public tap/standpipe, a tube well/borehole (with pump), a protected dug well, a protected spring and rainwater collection, and tanker truck for which the water has been chlorinated. The following "unimproved" water sources are likely to be contaminated: an unprotected spring, an unprotected dug well, a small water vendor (e.g. cart with a small tank / drum), a water tanker-truck and surface water (e.g. river, pond).

Camp	Gihembe		Kigeme		Kiziba		Mugombwa		Nyabiheke		Mahama	
	Number/ Total	% (95% CI)	Number/ Total	% (95% CI)	Number/ Total	% (95% CI)	Number/ Total	% (95% CI)	Number/ Total	% (95% CI)	Number/ Total	% (95% CI)
Household is satisfied with the water supply	184/187	98.4 (96.2-99.3)	189/211	89.6 (80.1-94.8)	154/191	80.6 (67.4-90.4)	155/159	97.5 (95.0-98.7)	112/173	64.7 (48.9-77.9)	160/219	73.1 (42.4-90.9)
All household water containers are covered or narrow necked	121/187	64.7 (52.7-75.1)	132/211	62.6 (55.4-69.2)	132/191	69.1 (60.2-76.8)	108/159	67.9 (55.8-78.0)	81/208	46.8 (33.6-60.5)	70/219	32.0 (25.6-39.1)
Household uses a communal latrine (3 households or more)	151/187	80.7 (72.4-87.0)	201/211	95.3 (75.7-99.2)	188/191	98.4 (96.2-99.4)	155/159	97.5 (83.0-99.7)	168/173	97.1 (89.9-99.2)	178/219	81.3 (65.1-91.0)
Feces of children under 3 disposed of safely	164/167	98.2 (95.3-99.9)	171/175	97.7 (91.7-99.9)	167/168	98.2 (90.9-99.9)	136/137	98.9 (91.5-99.8)	139/141	98.6 (94.8-99.9)	215/215	100.0 (100.0-100.0)
Mosquito Nets												
Household owns at least one mosquito net of any type	170/187	90.9 (85.4-94.5)	116/211	55.0 (49.1-60.7)	163/191	85.3 (81.1-88.8)	126/159	79.2 (66.8-87.8)	141/173	81.5 (67.6-90.3)	81/219	37.0 (28.3-46.6)
Household owns at least one mosquito net for sleeping	169/187	90.4 (81.2-94.4)	116/211	55.0 (49.1-60.7)	160/191	83.7 (74.8-88.4)	126/159	79.2 (66.8-87.8)	141/173	81.5 (67.6-90.3)	79/219	36.1 (25.0-46.4)
Proportion of children under five years (0-59 months) who slept under a net of any type	265/305	86.9 (81.8-90.7)	163/354	46.0 (38.9-53.3)	260/315	82.5 (75.8-87.7)	196/264	74.2 (58.9-85.3)	224/281	79.7 (66.8-88.5)	110/361	30.5 (24.6-37.1)
Proportion of pregnant women who slept under a net of any type	22/22	100.0 (100.0-100.0)	12/28	42.9 (20.3-68.8)	24/29	82.8 (53.3-95.3)	18/25	72.0 (46.4-88.4)	18/18	100.0 (100.0-100.0)	14/41	34.1 (19.1-53.3)
Household covered by indoor residual spray (IRS) in past 6 months	21/187	11.2 (4.7-24.5)	101/211	47.9 (35.0-61.0)	19/191	9.9 (3.6-24.7)	154/159	96.9 (93.9-98.4)	169/173	97.7 (91.4-99.4)	81/219	37.0 (28.3-46.6)

Result Interpretation

The tables below show the public health significance malnutrition classification among children under 5 years old.

TABLE 2A CLASSIFICATION OF PUBLIC HEALTH SIGNIFICANCE FOR CHILDREN UNDER 5 YEARS OF AGE (BASED ON 2000 THRESHOLDS)

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

Source: WHO (1995) Physical Status: The Use and Interpretation of Anthropometry and WHO (2000). The Management of Nutrition in Major Emergencies

TABLE 3B CLASSIFICATION OF PUBLIC HEALTH SIGNIFICANCE FOR CHILDREN UNDER 5 YEARS OF AGE (BASED ON 2018 THRESHOLDS)

Prevalence %	Very High	High	Medium	Low	Very Low
Wasting	≥15	10- <15	5- <10	2.5- <5	<2.5
Stunting	≥30	20- <30	10- <20	2.5- <10	<2.5
Overweight	≥15	10- <15	5- <10	2.5- <5	<2.5

Source: WHO Prevalence Thresholds. de Onis et al, 2018.[12]

TABLE 4 CLASSIFICATION OF PUBLIC HEALTH SIGNIFICANCE FOR ANEMIA

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

Source: WHO (2000) The Management of Nutrition in Major Emergencies

TABLE 5 SIMPLIFIED CLASSIFICATION OF THE SEVERITY OF GAM, ANEMIA, AND STUNTING IN REFUGEE SETTING AMONG CHILDREN AGED 6-59 MONTHS (UNHCR OPERATIONAL GUIDANCE)

Prevalence %	High		Medium	Low
GAM	≥15 Critical	10-14 Serious	5-9	<5
Anemia	≥40		20-39	5-19
Stunting	≥30		20-29	<20

Source: UNHCR operational guidance

Interpretation of Key Findings

The population of children under-5 years of age in the six camps was estimated at 20,000 at the time of the 2019 SENS, of whom approximately 540 children were affected by acute malnutrition, 4480 by chronic malnutrition, 5580 by anemia, and 1400 by the double burden of stunting and anemia. In terms of the overall burden of various forms of child undernutrition in 2019, Kigeme and Mahama fared worst, followed by Nyabiheke and Kiziba. Mugombwa and Gihembe had better nutrition situations than the other four camps. Progress in reducing undernutrition in children under 5 years has been inconsistent since SENS data has been collected since 2012. The average Global Acute Malnutrition (GAM) prevalence consistently reduced from 5% in 2012 to an acceptable level of 2.7% in 2019 although Kiziba exceeded 5%. Stunting and anemia prevalence have fluctuated between 2015 and 2019 and remained within moderate to high public health significance in 2019.

[12] Mercedes de Onis, Elaine Borghi, Mary Arimond, Patrick Webb, Trevor Croft, Kuntal Saha, Luz Maria De-Regil, Faith Thuita, Rebecca Heidkamp, Julia Krasevec, Chika Hayashi and Rafael Flores-Ayala. Prevalence thresholds for wasting, overweight and stunting in children under 5 years. Public Health Nutrition, 2018.
https://www.cambridge.org/core/services/aop-cambridge-core/content/view/52FB155B69DC75990CEFEE0C13A65A65/S1368980018002434a.pdf/prevalence_thresholds_for_wasting_overweight_and_stunting_in_children_under_5_years.pdf

TABLE 5 SUMMARY OF TYPES OF MALNUTRITION PREVALENCE AMONG CHILDREN 6-59 MONTHS IN 2019, BY CAMP

	Stunting (%)	Wasting (%)	Anemia U5 (%)	Sum	Rank (1 best to 6 worst)
Gihembe	17.1	2.8	22.0	41.9	1
Kigeme	28.0	1.5	28.2	57.7	5
Kiziba	22.3	5.3	27.0	54.6	3
Mugombwa	18.7	1.2	28.6	48.5	2
Nyabiheke	22.9	3.1	30.9	56.9	4
Mahama	25.5	2.3	30.8	58.6	6

Key	Low public health Significance	Medium Public Health Significance

Global Acute Malnutrition (GAM):

Overall unweighted GAM prevalence in the six camps was 2.7%, the lowest of any SENS since 2012 and within the WHO acceptable threshold of 5% in five of the six camps and the third consecutive year for those five camps. However, it was the first time that GAM prevalence exceeded 5% in Kiziba since 2012.

Stunting among children aged 6-59 months:

Overall unweighted stunting prevalence in the six camps was 22%, nearly in line with the 2018 figure of 23%. For the second consecutive year, stunting prevalence was within the WHO acceptable level (20%) in two camps (Gihembe and Mugombwa) although there was no improvement in stunting prevalence since 2018 (+2% in Gihembe and +1% in Mugombwa). In the other four camps, stunting prevalence was between 20% and 30% (WHO serious level) and showed improving trends since 2018.

Anemia among children aged 6-59 months and women:

Total anemia prevalence among children aged 6-59 months in the six camps was 28% of medium public health significance (20-39%) in the 6 camps and the first year in which no camp exceeded the critical 40% threshold. Anemia prevalence was 31% in Nyabiheke and Mahama and below 30% in the other 4 camps. Anemia prevalence reduced in all camps on average of 9% except Kigeme, which showed no change. The prevalence of anemia among young children aged 6-23 months in all the camps was 48% on average, above the 40% WHO critical level in five of six camps like in previous years with the exception of Kigeme (37%). Anemia among women was below 15% in all camps, constituting an issue of low/mild public health concern for the second consecutive year. The overall unweighted camp average of 12% total anemia prevalence was about 4% lower than 2018, with improving trends in five of the camps, while Kigeme worsened.

Enrolment in selective feeding program:

Enrolment of SAM and MAM cases among children aged 6-59 months in the selective feeding program was 45% (range 28.6% and 100.0% in the six camps), below the expected >90% SPHERE standards in all the camps and about 10% lower than 2018. Of the 55% of wasted children not enrolled as reported by their caregivers, most were identified by low WHZ, which is not done for community level screening. All non-enrolled acutely malnourished children identified during SENS were immediately enrolled for treatment.

Vitamin A supplementation and measles vaccination:

Measles vaccination with card or confirmation from mother exceeded the 95% SPHERE standard in all camps like in 2018 although confirmation by card in 2019 was lower in all camps compared to the previous year. Vitamin A coverage was above the 90% SPHERE standard in all camps except Mahama, which fell to 85% compared to 99% in 2018. The proportion of confirmation by card was less than 50% in all camps for vitamin A (range 10-42%).

Prioritized Recommendations to Improve the Health and Nutrition Situation in the Refugee Camps in Rwanda

TOPIC	KEY FINDINGS	RECOMMENDATIONS
Acute Malnutrition & Selective Feeding Program Enrolment	• On average across the six camps, Global acute malnutrition (GAM) prevalence of 2.7 was the lowest of any SENS since 2012 and within the WHO acceptable threshold of 5% in five of the six camps. However, it was the first time that GAM prevalence exceeded 5% in Kiziba since 2012. • Severe acute malnutrition (SAM) cases were only found in Kiziba (1%) and Gihembe (0.3%). • GAM by any criteria (low WHZ and/or low MUAC) in all camps was 3.2% (N=59/1778) • Of the 59 cases of GAM by any criteria, 46 (78%) had MUAC < 135mm and 55 (93%) had MUAC<140mm. • Wasting affected more children 6-17 months than any other age group but the prevalence was still less than 5% among all age groups. • Low WHZ index identified more than double the children than MUAC (48 vs. 21). Of 59 acutely malnourished children, 11 (19%) were classified by both criteria. • Selective feeding program enrolment was between 29% and 100% in the six camps and below SPHERE standard of 90% in all camps except Mugombwa. • While the overall prevalence of acute malnutrition in the 6 camps decreased since 2018, the overall enrolment of 45% in selective feeding programmes was about 10% lower than 2018 (56%). • In Kiziba, the camp with the highest number and prevalence of acute malnutrition cases, less than 1/3 (28.6) of acutely malnourished children were enrolled. • Of the 55% of wasted children not enrolled as	• Analyze the cost of treatment per child (i.e. CMAM) vs prevention per child (e.g. NEC project, MNP, BSFP) to optimally allocate funding resources and prioritize nutrition programmes.[13] • Consider piloting a simplified approach for CMAM with for maximum integration treatment with preventive interventions (promote, protect and support IYCF practices, good hygiene and diarrhea treatment).[14] • Review CMAM approach in all camps to ensure SAM cases come once per week for nutrition observation and to receive RUTF. Do take home dry feeding for MAM and BSFP on a once per two weeks basis and reinforce community level follow up and mobilization. • To identify non-enrolled acutely malnourished children, utilize automated growth monitoring tools to immediately interpret weight-for-length Z score during mass measurements at BSFP in combination with periodic mass screening with mid upper arm circumference (MUAC).[15] • Consider mass distribution of MUAC tapes to households for self screening. MUAC of <140mm or <135mm could be used for first level screening for referral to a health center for full anthropometric measurement. The threshold of <140mm would entail regular measurement of ~18% of the camp population of children under-five years of age while <135mm would entail regular measurement of ~10% of the camp under-five population. • Conduct FGD with CHWs in Kiziba and/or

[13] e.g. Based on GAM prevalence of 3.2% by combined WHZ and/or MUAC criteria, the estimated annual caseload for CMAM programmes would be 2178 (3.2% GAM*combined camp population of 133,450*15% proportion of U5*3.4 incidence). Actual admission from HIS stastics were 2010.

[14] Further discussions about the details of a simplified approach need to be discussed at camp level possibly during the next JAM but could include co-location of treatment and prevention—e.g. CMAM could occur on site with BSFP and MNP and using expanded admission criteria based on MUAC self-screening at household level with incentives for mothers who bring children for confirmatory anthropometric measurements who are eventually not admitted to avoid deleterious impacts on programme coverage. Transition to a single RUF product for treatment could be considered.

[15] As part of camp-wide nutrition surveillance, growth monitoring is currently being carried out by partners implementing health and nutrition services in the camps on a limited basis (MUAC and weight for age) using paper registers; however, nutrition programme staff face several challenges including having skills to make accurate and precise anthropometric measurements, systematically record them, and interpret the data to monitor a child over time. WHO field lookup tables are not sufficient to monitor an individual child's rehabilitation once enrolled in a nutrition programme interpret the data about an individual's linear growth over the course of 1000 days. For example, using these tables, there is no difference between a child having weight for height of -2.1 Z score and -2.9 Z score (both fall in the yellow range of moderate acute malnutrition). New tools being piloted in Mahama which have the potential to be rolled out in the Congolese camps can provide precise Z score for weight for height, weight for age and height for age which can be collected on digital health cards to track individuals.

	reported by their caregivers, most were identified by low WHZ, which is not done for community level screening. • All non-enrolled acutely malnourished children identified during SENS were referred to CHWs/camp nutrition staff for immediate enrolment.	consider an IMAM coverage survey in all camps, particularly Kiziba, to understand barriers to treatment and reasons for lower program quality compared to other camps.
Chronic Malnutrition	• Stunting affected 22% of the refugee children 6-59m in Rwanda, nearly in line with the 2018 figure of 23%. • For the second consecutive year, prevalence was within the WHO acceptable level (20%) in two camps (Gihembe and Mugombwa) and between 20% and 30% (WHO serious level) in the other four camps for the second consecutive year. • While there was no significant improvement in stunting prevalence in Gihembe (+2%) and Mugombwa (+1%), the other four camps showed improving trends. • For the first time in 2019, Mahama was no longer the camp with the highest stunting prevalence, falling second to Kigeme. Stunting prevalence in Mahama has decreased by more than 20% since the 47% recorded at the camp's inception in 2015. • In aggregate across the six camps, stunting affected a higher proportion of boys (26%) than girls (20%).	• Integrate more opportunities to promote, protect and support IYCF practices and hygiene and nutrition counselling and support with well attended programmes such as BSFP and MNP, most importantly timely introduction of complementary foods with appropriate MNP use at 6 months and feeding frequency of at least 2-3 times per day plus continued breastfeeding up to 2 years. • Streamline automated growth monitoring (including length-for-age) in BSFP on "digital health cards" to efficiently identify stunted and at-risk children for follow up and link mothers/caretakers of moderate/severely stunted children to income generating activities and behavior change activities related to improved WASH and complementary feeding (e.g. NEC, mother to mother support groups).
Micronutrient Deficiencies / Anemia	• Anemia among women was below 15% in all camps, constituting an issue of low/mild public health concern for the second consecutive year. The overall unweighted camp average of 12% total anemia prevalence was about 4% lower than 2018, with improving trends in five of the camps, while Kigeme worsened. • Total anemia prevalence among children aged 6-59 months was of medium public health significance (20-39%) in the 6 camps and the first year in which no camp exceeded the critical 40% threshold. Anemia was above 30% in Nyabiheke and Mahama. • Prevalence in all camps trended negatively since 2018 except Kigeme which remained stagnant at 28%. The most significant reduction was seen in Gihembe (-15%) and Mahama (-14%) • Like in previous rounds of SENS, anemia disproportionately affected under-two children compared to children 24-59 months. The average prevalence of anemia among children aged 6-23 months in all the camps	• Conduct a study to examine the etiology of anemia in women and children which could assist with development of targeted social and behaviour change communiciation (SBCC) approaches to prevent and control micronutrient deficiencies • Examine barriers to coverage and adherence to maximize MNP programme quality as part of a multi pronged strategy to fight micronutrient deficiencies including routine screening based on clinical signs and treatment for cases of moderate/ severe anemia, iron folate supplementation, malaria treatment and control, de-worming, fresh food vouchers and increased household access to income generation and activities to increase heme-iron intake. • Increase coverage of routine postpartum vitamin A supplementation and sensitize women about taking iron tablets as recommended during pregnancy (=>90 pills). • Track MNP utilization vs anemia prevalence in children and possibly extend coverage to

	was 48%, above the 40% WHO critical level in five of six camps like in previous years with the exception of Kigeme (37%). • Across the six camps, anemia affected a higher proportion of girls (30%) than boys (26%).	adolescent girls in school or provide multiple micronutrient tablets. • Implement recommendations produced by the "Fill the Nutrient Gap" (FNG)[16] exercise to increase access to micronutrient rich foods: -For children aged 6–23 months, both fresh and fortified foods reduced the cost of a nutritious diet. The BSFP programme has the greatest impact in reducing the cost of meeting nutrient needs. -For a school aged child: a school meal with a combination of CSB+, sugar, milk, dried fish, fruits and vegetables was the most effective at reducing the cost of a nutritious diet. -For an adolescent girl: a multiple micronutritent tablet was the most effective at reducing the cost of a nutritious diet. -For a PLW: The BSFP programme and a multiple micronutritent tablet were the most effective at reducing the cost of meeting nutrient needs. -For the household: fortified rice available in the market had the greatest impact at reducing the cost of a nutritious diet in the cash camps. In Mahama camp fresh food vouchers had the greatest impact.
Immunization, Vitamin A Supplementation and Deworming	• Measles vaccination with card or confirmation from mother exceeded the 95% SPHERE standard in all camps like in 2018 although confirmation by card in 2019 was lower in all camps compared to the previous year. • Vitamin A coverage was above the 90% SPHERE standard in all camps except Mahama which fell to 85% compared to 99% in 2018. The proportion of confirmation by card was less than 50% in all camps for vitamin A (range 10-42%). • About 20% of children across all camps experienced diarrhea in the past 2 weeks, ranging from a low of 14% in Mugombwa to a high of 29% in Mahama although this was about a 4% reduction compared to 2018. Kigeme was the only camp in which diarrhea prevalence notably increased compared to 2018 (24% vs. 17%). • About 85% of children in the six camps received a deworming tablet within the past six months.	• Issue digital health cards for all children in the camp for growth monitoring, anemia, de-worming, vitamin A supplementation, vaccinations, IYCF, and other relevant health and nutrition indicators. • Organize "health week" at the camps level as it is organized by Goveremnt at district level or request government to consider refugee camps in the joint preparation of health week. Include growth monitoring in addition to current de-worming, vitamin A supplementation and immunization. • Particularly emphasize vitamin A supplementation in Mahama to reach SPHERE standards through mass media campaigns ahead of the scheduled activities. • Start collecting data during 2020 SENS about critical handwashing behaviors and how mothers/caretakers treat diarrhea to shape an appropriate SBCC campaign about appropriate treatment with ORS and Zinc.
Maternal, Infant and Young Child Nutrition (MIYCN)	• Exclusive breastfeeding remained above 90% in all camps except Nyabiheke (85%). Some MIYCN indicators trended negatively compared to 2018 (lower timely initiation of breastfeeding within 1 hour and increased	• Promote, protect and support IYCF practices through establishment of community based IYCF support group and use of the UNHCR multi-sectoral IYCF friendly framework.

[16] WFP. FNG Refugee Summary, 2018.

	bottle feeding). • Stunting trends by age group suggest inadequate nutrient intake during the complementary feeding period from 6-23 months despite some improvements. Age appropriate introduction of complementary food at 6-8 months was 93% across the six camps-- lowest in Kigeme (77%) and Kiziba (83%) and above 95% in the other camps. 89% of young children continued to breastfeed at one year (-4% vs 2018) but that proportion fell to 62% by 2 years (-4% vs 2018). Continued breastfeeding at 1 year was above 90% in all camps except Gihembe (81%) and Nyabiheke (81%). • While age appropriate introduction to complementary food improved since 2018, only 56% of children 6-23 months consumed a minimum acceptable diet (MAD). This overall average was almost back to the 2017 prevalence of 58% after a dip to 44% in 2018. Improvements were seen in all camps with the biggest in Mahama (+24%). Slightly more girls (56%) than boys (53%) achieved MAD although the difference was not statistically significant. MAD was highest among the youngest children 6-11 months (68%), falling to 47% for children 12-17 months and 37% for children 18-23 months, mostly due low achievement of minimum feeding frequency as children aged. • Almost all children (95%) consumed an iron fortified or iron rich food in the past day due to high enrolment in BSFP (96%) and MNP programmes (83%) but only 14% of children consumed heme iron from animal source foods.	• Sensitize NEC workers and CHWs on delayed initiation of solid foods among young children in Kigeme and Kiziaba. • With more women involved in paid employment, continue to emphasize inclusion of men in IYCF promotion. Find male champions who support their wives in domestic chores and child care duties and who believe in making decisions equally, to act as male change agents in the community. • With demonstrated high prevalence of exclusive breastfeeding under 6 months and continued breastfeeding at 1 year for several consecutive years, focus MIYCN messages and behaviour change on areas of concern: diet diversity for women to include more animal source foods, continued breastfeeding among children 12-23 months, diet diversity among children 6-23 months of at least four groups, including eggs, flesh foods and orange fleshed fruits and vegetables, the importance of achieving minimum meal frequency (2 times for breastfed infants 6–8 months, 3 times for breastfed children 9–23 months and 4 times for non-breastfed). • Periodically measure MAD for children at the BSFP on the child's digital health card to track changes of sub-camp populations, seasonality over time, consumption of particular food groups to better inform MIYCN strategy. • Ensure the NEC/ mother-to-mother support group demonstrations include affordable nutrient dense ingredients in the cooking demonstration recipes (e.g. avocados, pumpkin mash with green leaves, eggs and/or small dried fish) • Set MIYCN targets in conjunction with CHWs and provide performance benchmarks to reach the indicators. • Commission a study for MIYCN practices and how to improve the SFP and BSFP system to encourage optimal intake of the ration and improve attendance. The study should also cover the issue of mothers leaving camp for work, leaving children in the camps.
Women of reproductive age (15-49 years)	• BSFP and iron folate distribution were integrated into the ANC package since 2018. Among pregnant women, 82% were enrolled in ANC, 73% received iron folate and 70% were enrolled in BSFP, which are all about the same proportion from 2018. The camps with lowest enrolment for these services were Kigeme, Kiziba and Mugombwa.	• Incoporate the importance of nutrition and supplementation for pregnant women in camp SBCC activities, especially among opion leaders and that adolescents and PLW have particularly high (i.e. relatively more expensive) nutrient needs during these critical periods of life.

	• 28.6% of women consumed a minimum diet diversity (MDD-W) of foods from at least 5 groups out of 10 in the past 24 hours, ranging from 23.3% in Mugombwa to 40.9% in Gihembe and a nearly 25% improvement since 2018. • On average, women consumed foods from four groups on a daily basis: 1) grains/roots/tubers, 2) pulses, 3) dark green leafy vegetables and 4) nuts and seeds. This represents almost one food group more per day than 2018. When fortified blended food (CSB+) is combined with the flesh food category, the proportion of women who achieved MDD-W reached 40.2%.[17] • Women who achieve MDD-W are more likely to have children / care for children who achieve MAD (60 v 52). • FNG results emphasise the high nutrient needs of adolescent girls and PLW and illustrate that more than half (61%) of the household cost of a nutritious diet should be allocated to meeting their requirements.	• Promote the importance of keeping girls in school as a key way to reduce teenage pregnancies and ensure better child health and nutrition outcomes. Increase opportunities for secondary school enrolment and track net enrolment for girls and boys. • Include educational messages / campaigns for pregnant women about the importance of prenatal care and maternal nutrition and health including dietary diversity for healthy pregnancy outcomes. • Consider a nutrition sensitive social protection scheme such as a conditional cash top up for adequate ANC attendance of at least 4 visits during pregnancy. • Ensure health centres have continuous stock of iron and folic acid tablets. • Provide list of non-enrolled pregnant women to camps for follow up in ANC/ BSFP/ iron folate supplementation and conduct key informant interviews with them to understand reasons for non-enrolment. • Expand mother to mother support group programmes to include groups specifically for adolescent girls. • Use schools as a platform to deliver multiple micronutrient tablets and to collect nutrition and health data on adolescent girls.
WASH	• All households in all camps had access to an improved water source but only a third of the refugee households met the SPHERE adequate clean water standards of 15 liters per person per day and less than 20% met the UNHCR standard of 20 liters per person per day. • With the exception of Gihembe (34%), less than a quarter of households in the other five camps had access to a minimum average water use of 20 liters per person per day for drinking, cooking and personal hygiene, ranging from a low of 9% in Kigeme to 25% in Kiziba. • Insufficient access to treated water in most camps causes refugees to source water from rivers in the nearby valleys where there is a heightened risk of waterborne diseases. Due to insufficient firewood, households cannot always boil their water before consuming it. • Most households containing a child 6-59	• Increase access to basic infrastructure to promote better outcomes in health, agriculture, education, and WASH. • Increase access to water availability to meet the minimum per person per day standard in all camps to at least SPHERE standards. • Ensure CHWs are promoting messages about safe water storage and distribute covered storage containers where availability is low, particularly in Mahama. • Continue advocacy in all camps that safe disposal of human feces including that of young children is to use the latrine and/or dispose the young child's feces into the latrine. Throwing feces in the garbage is not a safe means of disposal. • As the majority of families in all camps use a communal toilet, incorporate messages about ownership and responsibility in camp communication campaigns, incorporate

[17] The Minimum Dietary Diversity for Women (MDD-W) Guidance from WFP recommends *Super-cereal* for women of reproductive age to be coded with flesh food rather than a grain given that the indicator is supposed to measure potential micronutrient adequacy and because its micronutrient profile most closely approximates that of of flesh food.

	months (84%) were satisfied with their water supply, ranging from a high of 98% in Gihembe to a low of 65% in Nyabiheke. Another 11% of households were partially satisfied with the water supply, leaving 4% not satisfied. This is an improvement since 2018 when 10% were not satisfied. The primary cited reasons for dissatisfaction across all camps were irregular supply (42%) and insufficient quantity (35%) although most unsatisfied households in Nyabiheke (53%) mentioned insufficient quantity. The overall proportion of satisfaction with the water supply reduced by about 5% in Kigeme and Kiziba but improved the other camps. • Water containers were covered and/or narrow necked in about 2/3 of households in Gihembe, Kigeme, Kiziba and Mugombwa but the proportion was less than half in Nyabiheke (47%) and Mahama (32%). The overall six camp average of 56% was about a 20% improvement compared to 2018. About 10% of households across all camps had no covered / narrow necked containers, ranging from 4% in Mugombwa to 27% in Mahama. • Households in all camps had access to toilet facilities. Only 2% of households used an unimproved toilet facility. Of those using an improved facility, 91% of households used a communal latrine shared by three or more households, 3% used a shared family toilet with another household, and 3% used their own family toilet. • 2017 JAM noted "With the exception of Gihembe and Mahama, the latrine situation in the camps is inadequate and needs prioritisation. Despite improvements on the ratio of users to latrines since the 2014 JAM, half of the camps have at least 50% too many users per drop hole." • Mothers'/caretakers' safe disposal of under 3 childrens' feces improved in all camps since 2018 (between 2% and 9%) for an overall camp average of 97%. Safe disposal methods include the child using the toilet/latrine, the caretaker disposing it in the latrine, or burial. For the few cases of unsafe disposal in the camps, feces were thrown in the garbage.	cleanliness checks into the CHW duties, and build additional toilets where possible to allow for more two family or individual family toilets. A single household toilet is usually the easiest to keep clean. • Brief camp-based WASH staff in the SENS findings. Each camp has an NGO in charge of WASH and hygiene to supply water, waste management and sensitization around WASH. • Including a strong component of WASH in schools to ensure meals are prepared safely as well as providing hand washing facilities to prevent illness.
Mosquito Nets	• Around half of all households interviewed had their houses sprayed with insecticide in an indoor residual spray (IRS) campaign although there was wide variation by camp. Most households in Mugombwa (88%), Nyabiheke (97%) and Mahama (98%) were sprayed versus only about half in Kigeme (51%) and	• Conduct an IRS campaign in Kigeme, Kiziba and Gihembe. • Distribute LLINs in Kigeme and Mahama to prioritize households with pregnant women and children under five years old. Malaria also constitutes a top cause of morbidity among children under five Nyabiheke and

	about 10% in the other 2 camps. • Most households (70%) owned at least one mosquito net used while sleeping. The proportion exceeded 80% in all camps except Kigeme (55%) and Mahama (37%). Within households that owned nets, most children under 5 years old and pregnant women slept under the net last night.	Mugombwa. Distribution could be done in conjunction with ANC visits.
Cross cutting	• Of 1778 children 6-59 months interviewed, 4% children were acutely malnourished by any criteria while 26% were stunted and 27% were anemic. Two or more forms of malnutrition affected 9%, with the most common double burden being anemia and stunting (7%). This represents a small reduction of the concurrent forms of malnutrition since 2018 (-2%). • Mahama and Kigeme have the worst nutrition situation of the six camps. • Anemia prevalence was higher among stunted children (32%) than non-stunted children (27%). • CHWs perform the majority of community-based health and nutrition programs in the camp supplemented by NEC program staff. The ratio of refugee population to CHWs averages 700:1 across the 5 Congolese camps and 400:1 in Mahama, which is within SPHERE standards. • FNG found that current targeted nutrition programmes, in combination with general food assistance (food or cash), have the potential to reduce the cost of a nutritious diet for refugee households. However, combined programmes are not enough to meet all of the household's nutrient needs, emphasising the need to improve access to skill-building and livelihoods to increase income. • SENS collects valuable quantitative data which could be better contextualized with supplemental qualitative data including focus group discussions and key informant interviews. For example, 2017 JAM found cases in all camps of mothers leaving children unattended while they left the camp to search for work, thus contributing to poor IYCF practices and high default rates among those children enrolled in SFP. Additionally, some households live outside the camp and may not be in a position to come regularly to receive their CSB++ ration. Finally, not everyone has equal access to food. When food is scarce,	• Convene regularly scheduled camp level coordination meetings involving actors in nutrition specific and nutrition sensitive programme delivery, to be attended by Kigali staff where possible. Facilitate opportunities for camp based health and nutrition staff in camps with worse nutritions situations (i.e. Mahama and Kigeme) to learn from camps faring better (Gihembe and Nyabihke) through knowledge sharing, case studies, study tours, etc). • Prioritize stunting and anemia reduction and treatment as the most prevalent forms of malnutrition among children under five years old. Include anemia screening among stunted children[18] and SBCC for the caretakers of the children affected by multiple forms of malnutrition. • Issue digital health cards for all children in the camp for growth monitoring, anemia, de-worming, vitamin A supplementation, vaccinations, IYCF, and other relevant health and nutrition indicators. • Conduct a cost benefit analysis of how CHWs spend their time. Active case finding for GAM cases could possibly more efficiently be done by automated growth monitoring tools, leaving time for their other duties. • Review the CHW training package and job description for standardization across camps to include essential nutrition actions including growth monitoring (taking anthropometric measurement and interpretting anthropometric indices), IYCF, multi sectoral framework for stunting and anemia reduction, interpersonal counseling, SBCC to improve the quality of nutrition education delivered at community, facility and household level interactions. • Currently, nutrition messages are only included in health sector activities. These messages should also be integrated into agriculture, social protection and WASH activities.

[18] Due to operational challenges, this could most easily be piloted among children 6-23 months who participate in regular growth monitoring as part of BSFP.

	parents reported prioritising feeding their children over themselves and in some cases, women will prioritise the men in the house over themselves (this is especially worrying for PLW). The JAM tried to ascertain whether any cultural practices affected the order of eating in the household or portion-size but no clear pattern emerged. What did come out strongly however was that in some households, family members may sell off part of the ration to buy alcohol, thus reducing the amount available at the HH level.	• Prepare camp specific health and nutrition profiles based on key findings and plan a dissemination meeting for nutrition / health program staff and CHWs to draft annual action plans. Plan associated staff capacity to monitor nutrition programs with regular trainings and supportive supervision. • Conduct nutrition education and SBCC around MIYCN and diversified diets from nutrition sensitive kitchen gardens, and optimal CBT allocation for cost effective nutrient dense foods available in the local markets using FNG recommendations. Extend the promotion of kitchen gardens to schools in the camps to teach children from an early age how to grow vegetables and the importance of a balanced diet. • Continually look at ways to improve refugee diets by lowering price of nutritious foods/supplements, increasing availability of nutritious foods and increasing income with continued investment and implementation of UNHCR's Economic Inclusion of Refugees Strategy to develop employable skills and access credit for start-up businesses. It is essential that youth are able to access these services once they finish school to break the cycle of dependence. • Incorporate information / trainings on management of the monthly cash-based transfer to help households emerge from indebtedness and budget resources for even small quantities of nutrient dense animal source foods. • Incorporate additional indicators and/or a qualitative component during the next SENS or in JAM, PDM, IYCF survey or other opportunity on several important topics.[19]

[19] Women of Reproductive Age: women's body mass index by age; prevalence of deworming among pregnant women; age of first birth; reasons for not enrolling at ANC; how the diets of women change when they are pregnant or breastfeeding for a more complete understanding of how to improve nutrition of this vulnerable population group
Households: Who in the family consumes the heme-source iron-given that anemia rates are only measured in young children and adult women who might (or might not) have equal access to the animal source foods. What nutritious, fresh foods are available in the markets that serve the refugees and whether supply could respond to an increase in demand (e.g. through school meals or uptake of behavior change messaging).
MIYCN: Reasons for low attainment of timely introduction of complementary feeding.
-Proportional piling of a woman's time demands: time spent looking for work, collecting water/ firewood, cooking, caring for children, washing clothes, visiting relatives, leisure
-Factor ranking for contribution to malnutrition for community understanding: lack of food, disease, high workload, water shortage, lack of latrines, poor hygiene practices, dirty water, lack of resources, lack of care / knowledge.

1. Introduction

1.1 Description of survey area

Political and ethnic conflicts in the Great Lakes Region[20], coupled with a favorable refugee policy, have given rise to the refugee situation in Rwanda. As of April 2019, Rwanda hosted about 175,000 Congolese and Burundian refugees, 80% that now reside in six camps provided by the government of Rwanda, while the remainder are classified as urban refugees in Kigali. Congolese refugees have been fleeing to Rwanda since 1996 and constitute 45% of the population, residing in five camps in the northern and western areas of the country (Gihembe, Nyabiheke, Kiziba, Kigeme and Mugombwa).[21] The refugee population in Rwanda increased significantly in 2015 following election-related conflicts in Burundi which necessitated the establishment of a sixth camp, Mahama in Kirehe district. Mahama is now Rwanda's largest refugee camp of over 59,000 Burundian refugees. Compared to 2018, camp populations increased by 4% overall with increases in Gihembe (5%), Mahama (7%) and Mugombwa (15%) and 1-3% reductions in the other 3 camps. The demographic structure of the camps is young with half of the population under the age of 18 years and 15% under the age of 5 years. The volatile political and security situations in the DRC and Burundi continue to create unfavorable prospects for refugees and asylum seekers to return home.[22]

Refugees face significant challenges in accessing livelihoods and income-generating opportunities, despite the Rwandan Government's economic inclusion strategy that envisions "by 2020 all refugees and neighbouring communities are able to fulfil their productive potential as self-reliant members of Rwandan society who contribute to economic development of their host districts" and a refugee policy which allows them to work, move freely within the country, establish companies, pay taxes and create jobs. Limited access to livelihood opportunities and suitable land for agricultural production results in an excessive reliance on humanitarian assistance to meet basic needs like water, shelter, fuel, medical care, food and education. The greatest source of income for most refugees remains food or cash assistance provided by WFP and UNHCR. Refugees in the five Congolese camps have now all transitioned to the cash-based transfer assistance modality while refugees in Mahama receive a mix of cash and in-kind food assistance. Until November 2017, Congolese refugees received a cash voucher worth Rwf 7600 (~USD 8.76) per person per month and used over a third of their total expenditure on food (36%). Due to funding constraints the transfer value reduced by 25% since January 2018. Apart from in kind food / cash, the most important refugee income sources are formal employment, borrowing, petty trading, casual labour related to agricultural activities and gifts from families, friends and remittances.

TABLE 6 CHARACTERISTICS OF REFUGEE CAMPS IN RWANDA IN 2019

	GIHEMBE	KIGEME	KIZIBA	MUGOMBWA	NYABIHEKE	MAHAMA
Location (District)	Gicumbi	Nyama-gabe	Karongi	Gisagara	Gatsibo	Kirehe
Total Population (as of 30 April 2019)	12,946	19,845	17,043	10,420	14,421	59,843
Date of Establishment	1997	2012	1996	2014	2005	2015
Number of Years Old	22	7	23	5	14	4
Type of Food Assistance	CBT	CBT	CBT	CBT	CBT	Partially CBT (Beans and CSB+ in kind)[23]
Proportion of Households with High Diet Diversity Score[24]	12%	5%	7%	11%	12%	8%
Proportion of Households with	90%	85%	94%	96%	92%	98%

[20] This region comprises the following countries that surround the **African Great Lakes:** Burundi, the Democratic Republic of the Congo, Kenya, Rwanda, Tanzania and Uganda.

[21] Kiziba was the first camp established in 1996, followed by Gihembe in 1997, Nyabiheke in 2005, Kigeme in 2012, and Mugombwa in 2013. Most Congolese refugees arrived in Rwanda in 1995-1996 after fleeing conflict in eastern DRC, while a further 30,000 escaped from increasing insecurity during 2012 and 2013.

[22] UNHCR and WFP Joint Assessment Mission (JAM) Report, 2017.

[23] Calculated at 1.5kg super cereal and 3.6kg of pulses per person per month

[24] WFP. Post Distribution Monitoring Report Conducted in Six Rwandan Refugee Camps, June 2019

Acceptable Food Consumption Score [25]						
Proportion of Households consuming heme iron daily or sometimes (FCS-N Heme Iron)[26]	15%	9%	21%	9%	18%	35%
Proportion of Households consuming protein daily or sometimes (FCS-N Protein)[27]	99%	99%	100%	100%	99%	100%
Proportion of Households consuming Vitamin A rich foods daily or sometimes (FCS-N Vit. A Rich)[28]	92%	75%	81%	89%	94%	94%
Primary partner(s) for health and nutrition program implementation	ARC	AHA	AHA	AHA	ARC	ARC/ SCI
Number of CHWs (change since 2018)	28 (-2)	22 (0)	22 (0)	15 (+5)	24 (0)	150 (0)
Ratio of Camp Population: 1 CHW	462:1	878:1	773:1	692:1	599:1	395:1
Date of Last Vitamin A Supplementation Campaign	Apr 2019	Apr 2019	Apr 2019	Apr 2019	Apr 2019	Apr 2019
Date of Last Deworming Campaign	Apr 2019	Apr 2019	Apr 2019	Apr 2019	Apr 2019	Apr 2019

1.2 Health situation

American Refugee Council (ARC) implements health care services In Gihembe, Nyabiheke and Mahama camps while African Humanitarian Action (AHA) implements health care services in Kiziba, Kigeme and Mugombwa camps. Save the Children (SCI) also operates in Mahama.

Complete primary health care services are available in Kiziba, Gihembe, Nyabiheke and Mahama camps, including outpatient consultations, an inpatient department, an expanded program for immunization (EPI), ante natal care (ANC), maternity, post-natal care (PNC), FP services, laboratory services, pharmacy, minor surgery, tuberculosis (TB) control program, voluntary counselling and testing (VCT), prevention of mother to child transmission (PMTCT), antiretroviral therapy (ART), a referral system and community health. In Mugombwa, all services except ART and PMTCT are available. In Kigeme, all health services except ART, PMTCT and immunization are available. The missing health services are given at nearby government health centers. Supplemental services include mental health services and dental care. Twice a year, Ministry of Health (MOH) implement the "Week of Mother and Child" where districts organize campaigns to provide deworming for children aged 1 to 15 years and pregnant women, vitamin A for those 6 to 59 months and iron supplementation and deworming for pregnant and lactating women (PLW).

Community Health Workers (CHWs) in the camps mobilize the communities around the following health and nutrition topics, identify cases of disease and malnutrition and refer cases to the health facilities and nutrition centers and participate in different campaigns in the community, house-to-house visits, community sensitization, mass communication and community meetings:

1. **Primary health care:** to give general health messages to the community on disease prevention (hygiene promotion, health education, TB screening, malaria screening and community level treatment for under 5 children), refer sick patients to the health facility. In Nyabiheke, CHWs do Integrated community case management (ICCM).
2. **Maternal and child health:** register pregnant women and refer for ANC services, report births, refer sick newborns and facilitate postnatal consultations with lactating mothers. In Nyabiheke, CHWs implement community-based family planning.

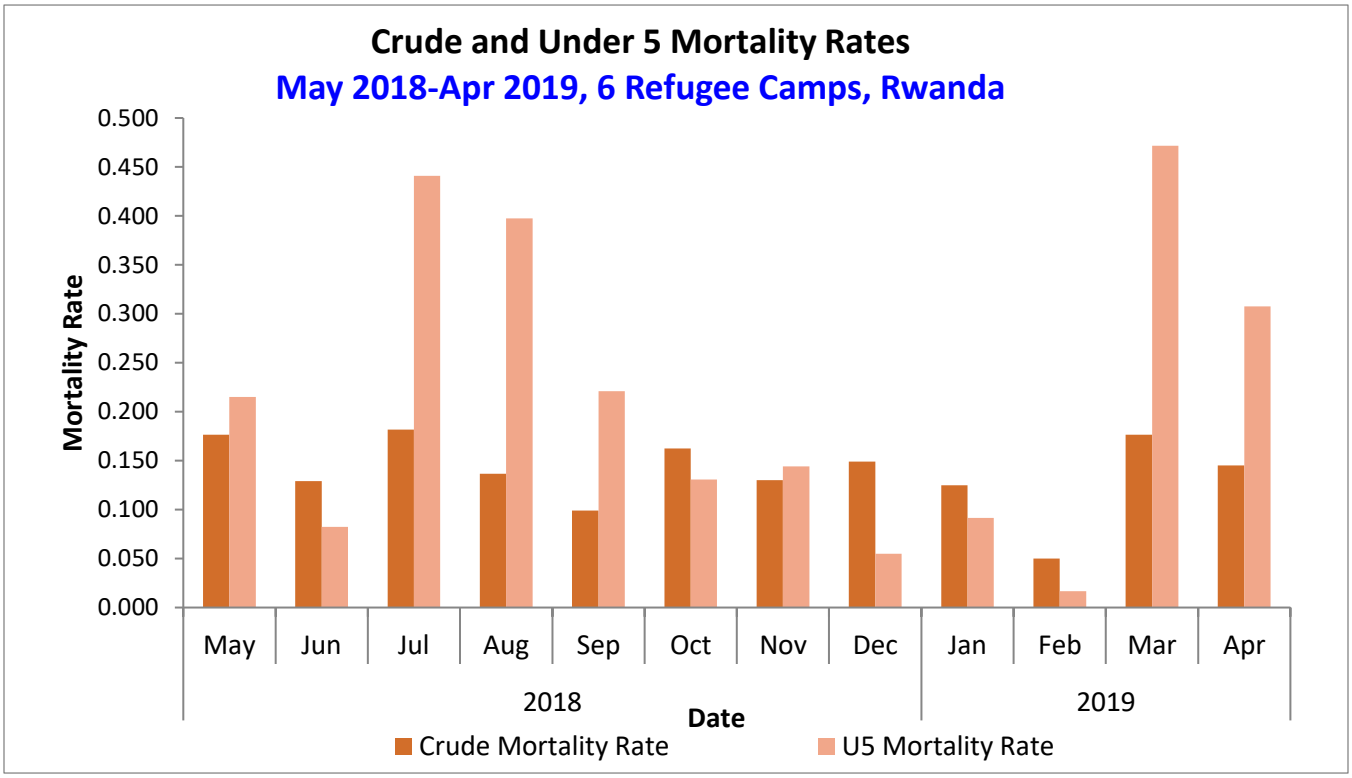
[25] ibid
[26] ibid
[27] ibid
[28] ibid

3. **Nutrition:** conduct home visits of children in MAM and SAM program, malnutrition screening of children aged 6-59 months using MUAC and nutrition counseling and education on Maternal, Infant and Young Child Nutrition (MIYCN) focused on diverse diets.
4. **HIV** - Voluntary counselling and testing, circumcision, PLHIV rendez-vous reminders

The CHW to population ratios widely vary across the camps, ranging from the best in Mahama with a ratio of 1:395 to the worst in Kigeme 1:878. The 2017 JAM cited challenges in the health sector as a result of insufficient CHW numbers, budget, and high staff turn-over. In some camps like Nyabiheke and Gihembe, CHWs are integrated in the national health system and receive trainings and Performance Based Financing through MoH, however, this is not the case in other camps and the JAM noted a lack of harmonization of the CHW activities across all camps. CHWs submit some data to MoH by rapid SMS on growth monitoring for children under-5 (MUAC, weight) and pregnant women (attendance for 4 ANC visits, reported delivery). An example weekly workplan of CHWs includes a coordination meeting every morning, followed by:

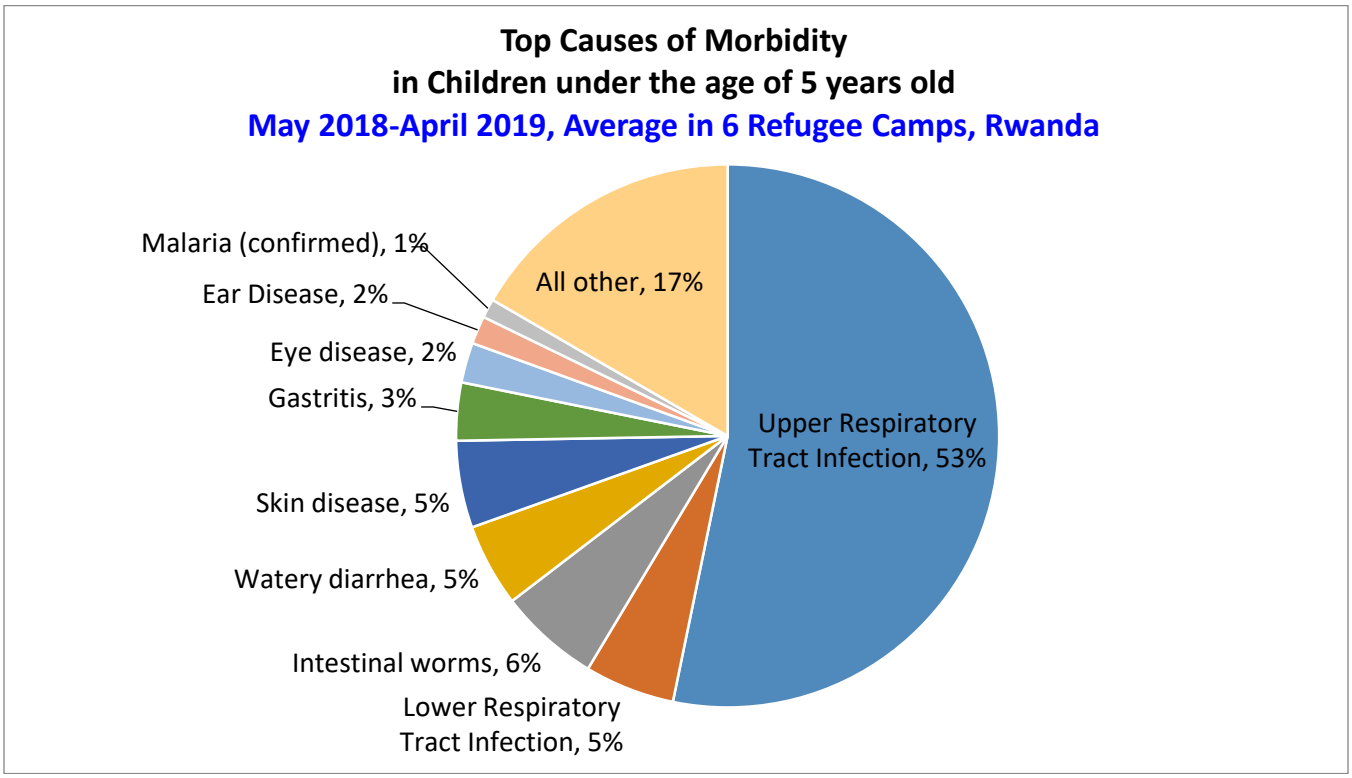
- Monday: special cases
- Tuesday: mass communication rotating topic (hygeine, malaria)-has been proliferation of waterborne illness
- Wednesday: growth monitoring and follow up
- Thursday: mass communication and counseling and weekly report
- Friday: household visit individual / family counseling

FIGURE 2 CRUDE AND UNDER-5 MORTALITY RATES



Source: HIS data, extracted in May 2019

FIGURE 3 TOP FIVE CAUSES OF MORBIDITY IN CHILDREN UNDER-5



Source: HIS data, extracted in May 2019

1.3 Nutrition situation

AHA, ARC and SCI implement the nutrition programs in the camps in addition to the health services. 261 community health workers (CHWs) conduct nutrition education and counseling within the community as well as active case finding for acute malnutrition. This is a decrease of 2 CHW in Gihembe and increase of 5 CHW in Mugombwa compared to 2018. The other 4 camps maintained the number from 2018, resulting in a ratio of approximately 1 CHW for every 700 refugees in the Congolese camps and 1 CHW for every 400 refugees in Mahama. CHWs refer cases of moderate acute malnutrition (MAM) among children aged 6 to 59 months to the supplementary feeding program (SFP) for Plumpy'Sup® every 15 days and refer uncomplicated cases of severe acute malnutrition to the outpatient therapeutic program (OTP) for Plumpy'Nut® on a daily basis in Congolese camps and a weekly basis in Mahama. SAM children with complications are referred to district hospitals.

PLW and malnourished people living with HIV (PLHIV) are eligible for the SFP, where they receive fortified blended food, oil and sugar. If a PLW is also enrolled in ART, she is not additionally enrolled in ANC because the ration is the same. PLHIV on ART, HIV positive pregnant and lactating mothers, and diabetic cases and special medical cases receive fresh food on a monthly basis with the exception of Mahama where nutrition support for vulnerable groups ended unexpectedly due to funding constraints in 2018. Infant formula is provided to children under six months whose mothers passed away and to mothers of twins/triplets who do not produce enough breast milk.

In AHA camps, PLW and sick children 6-59m seeking treatment at health facilities with severe or moderate anemia receive iron supplements and iron rich food (vegetables and rabbits) and education on iron rich foods and anemia prevention is incorporated. Families with anemic and/or acutely malnourished children benefit from vegetables grown in the health center and few are assisted in kitchen garden construction and rabbit rearing project.

In Gihembe and Nyabiheke camps, all eligible beneficiaries with anemia receive iron supplements and those with moderate to severe anemia receive iron-rich food like meat to prepare at home and fruits rich in Vitamin C on a biweekly basis. In

Mahama camp, eligible beneficiaries with severe to moderate anemia receive iron supplements. All camps receive education on iron-rich foods and anemia prevention. MNPs are distributed to children age 6-23 months.

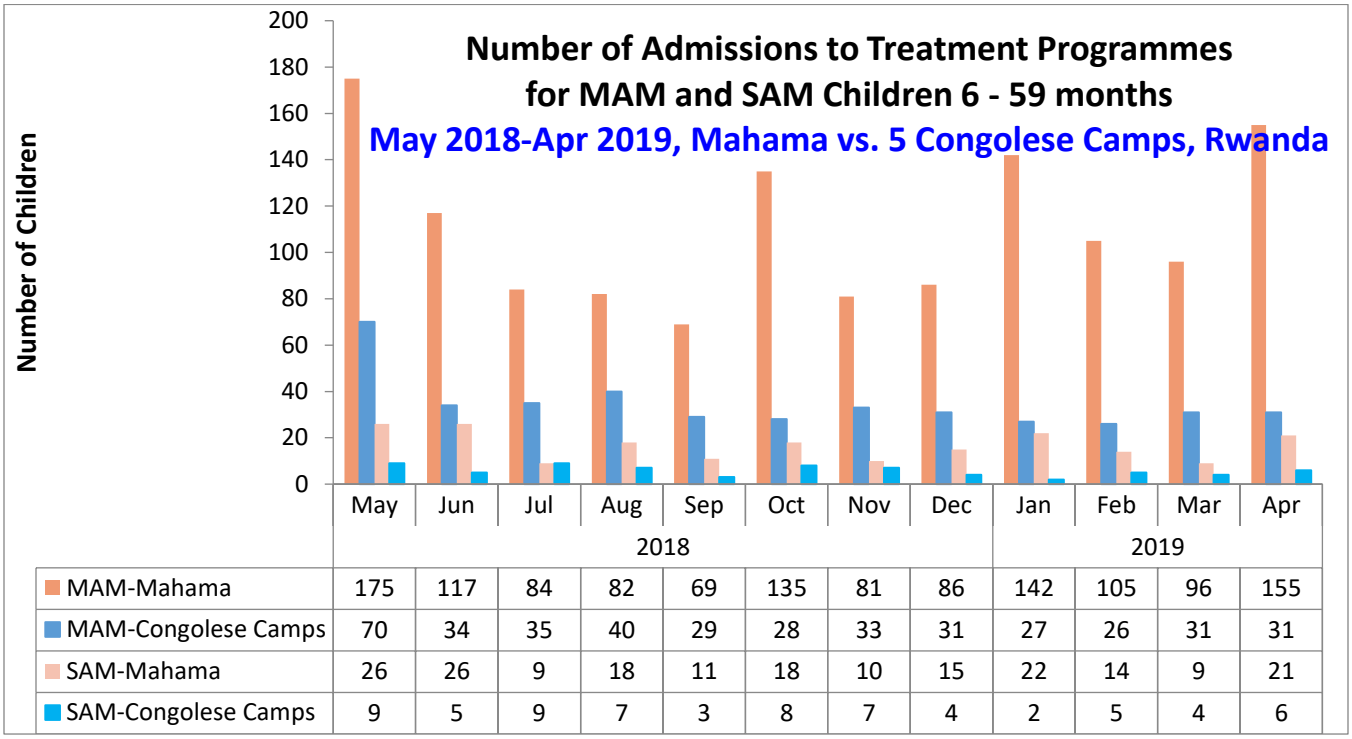
PLAN International implemented the fourth phase of the nutrition education and counseling (NEC) project from July to December 2018 in all six camps which engaged approximately 20 nutrition animators per camp. Negotiations are underway to commence the NEC 2019 phase.

TABLE 7 PREVENTIVE AND CURATIVE NUTRITION PROGRAMS IN REFUGEE CAMPS IN RWANDA

Objective	Program	Eligibility / Age Range	Description
Prevention	Nutrition Education Counseling (NEC)	All	Until December 2018, the NEC program supported mother-to-mother support groups on MIYCN, evening parents, theater, sports events, kitchen garden promotion/demonstration, men engagement/ involvement, training to nutrition staff. As of May 2019, the program has lapsed but may be reinstated through the remainder of 2019. Phase IV had a small livelihood component where lands are rented outside the camp to allow some vulnerable groups to produce food for consumption and sale.
	MNP	6-23 months	Distributed on a monthly basis to children age 6-23 months in Gihembe, Nyabiheke and Mahama since 2018 and in the remaining camps since April 2019.
	BSFP	PLW (verified with ANC card) and PLHIV/ TB	Daily ration of CSB+ 200g / 25g oil/ 15g sugar distributed every 15 days.
		6-23 months (6-72 months in Mahama)	In Congolese camps: daily dry ration of 200g CSB++ distributed every 15 days. In Mahama: children 6-23 months receive 100g CSB++ in morning and 50g CSB++ in afternoon at 11 community kitchens operated by BSFP assistants. Children 36-72m receive 100g SOSOMA, a locally produced FBF, in the morning + 100g SOSOMA in the afternoon from ECDs. Due to firewood ban in Mahama refugee camp and because wet feeding is only recommended for emergency contexts without cooking possibilities, the programme shifted from wet to dry BSFP as of July 2019.
	"Week of mother and child"	Various	Twice a year, the Ministry of Health implements the "week of mother and child" including deworming for children aged 1-15 years and pregnant women. Children aged 6 to 59 months receive Vitamin A and pregnant woman receive supplemental iron.
Treatment	OTP	SAM children 6-59m	SAM children without complications receive Plumpy'Nut® from OTP centers on daily basis in Congolese camps and a weekly basis in Mahama. SAM children with complications are referred to district hospitals.
	TSFP	MAM children 6-59m	MAM children receive Plumpy'Sup® every 15 days (1 sachet of Plumpy'Sup®/day).
	Anemia	PLW and sick children 6-59m seeking treatment at health facilities with severe or moderate anemia	Receive iron supplements, iron rich food (vegetables and rabbits), and education on iron rich foods and anemia prevention.
	Fresh food distribution	PLHIV on ARVs and TB patients, diabetics and	Receive fresh food on a monthly basis including green vegetables, Vitamin C rich fruits, etc. except in Mahama where the program ended in 2018 due to funding constraints.

		special medical cases, hospitalized patients	

FIGURE 4 NUMBER OF ADMISSIONS TO TREATMENT PROGRAMS FOR MAM AND SAM IN CHILDREN 6-59 MONTHS



	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
	2018								2019			
MAM-Mahama	175	117	84	82	69	135	81	86	142	105	96	155
MAM-Congolese Camps	70	34	35	40	29	28	33	31	27	26	31	31
SAM-Mahama	26	26	9	18	11	18	10	15	22	14	9	21
SAM-Congolese Camps	9	5	9	7	3	8	7	4	2	5	4	6

Source: HIS data, extracted in May 2019

1.4 Survey Objectives

To determine the current nutrition status for children aged 6-59 and key associated indicators in the six refugee camps in Rwanda, UNHCR and WFP conducted a follow up SENS in May 2019 with an overall objective to determine the general health and nutrition situation of children aged 6-59 months and anemia prevalence among non-pregnant women of reproductive age (15-49 years) in six refugee camps in Rwanda. Five modules were assessed: (1) anthropometry and health, (2) anemia, (3) infant and young child feeding (IYCF), (4) water, sanitation and hygiene (WASH), and (5) mosquito net coverage.

Primary objectives:

- To measure the prevalence of acute malnutrition (wasting) and chronic malnutrition (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 in children aged 6-59 months.
- To assess the two-week prevalence of diarrhea in children aged 6-59 months.
- To measure the prevalence of anemia in children aged 6-59 months and in non-pregnant women between 15-49 years.
- To investigate IYCF practices among children aged 0-23 months.

Secondary objectives:

- To determine enrollment in selective feeding programs for children aged 6-59 months.
- To determine enrollment in antenatal care clinics, iron-folic acid supplementation programs and supplementary feeding programs among pregnant women.
- To determine the population's access to, and use of, improved water and sanitation and hygiene facilities.

- To determine the ownership of mosquito nets in households.
- To determine the utilisation of mosquito nets by the total population, children 0-59 months and pregnant women.

2 Methodology

Based on the UNHCR SENS guidelines for refugee populations (v2) and the Standardized Monitoring and Assessment of Relief and Transitions (SMART) methodology (v1), simple random sampling was applied to provide statistically representative and precise information for children aged 6-59 months with a sampling frame of the updated list of all households in the six refugee camps from UNHCR *ProGres* database and the basic sampling unit of a household with a 6-59-month-old child.

2.1 Sample size

Based on the parameters of an estimated prevalence of Global Acute Malnutrition (GAM) ranging from 3.8% to 7.2%[29], a desired precision of ±0.025 to 0.03 and a design effect of 1.0, the required sample size was calculated in ENA software (9 July 2015 version) to be 1300. An estimated non-response rate of 23%-57% required a selection of 1749 households containing children 6-59 months across the six camps.[30]

TABLE 8 SAMPLE SIZE CALCULATION FOR NUMBER OF CHILDREN 6-59 MONTHS INCLUDED IN THE SURVEY

	Estimated GAM	Design effect	Precision	Corrected Sample Size	Non response rate	Sample size including reserves
Gihembe	4.2	1	2.5	216	41%	305
Kigeme	7.2	1	3	258	28%	330
Kiziba	5.3	1	3	196	57%	308
Mugombwa	3.8	1	2.5	190	23%	234
Nyabiheke	6.3	1	3	224	37%	307
Mahama	5.5	1	3	216	23%	266
Total				1300		1749

2.2 Sampling procedure: selecting households and individuals

1749 households containing children 6-59 months were selected using a random number and interval generated within the survey planning interface of ENA software and linked to *ProGres* to obtain the household addresses. The list of randomly selected children was provided before the survey to community health workers (CHWs) to visit the household and inform the mother/caregiver to bring children 6-59 months to a designated location on the survey date, where enumerators collected data for the sampled child and any other eligible children 0-59 months and women 15-49 years in the household Information was also obtained for the modules on WASH and mosquito nets at the interview site.

2.3 Measurement methods

Data was collected using the following data collection tools for the following demographic groups:

- Anthropometric measurements of children aged 6-59 months including height, length, weight, MUAC and oedema.
- Anemia testing by HemoCue 301+ for children aged 6-59 months and non-pregnant women aged 15-49 years old.
- Structured questionnaire translated into Kinyarwanda determining enrolment into antenatal care clinics and coverage of iron-folic acid supplementation in pregnant women.
- Structured questionnaire translated into Kinyarwanda exploring IYCF indicators for children 0-23 months of age.
- Survey respondents for the selected children were mothers and/or primary caregivers.

[29] Uses the upper confidence interval (95% C.I.) of GAM from the May 2018 SENS.

[30] Based on collected information from 2017 SENS, of the HOUSEHOLDs containing children 6-59 months in ProGres database for refugee camps in Rwanda, 21% are not available at any given time due to movements in and out of the camp and an additional 11% cannot be located due to inaccuracies in registration / addresses.

TABLE 9 SUMMARY OF SENS DATA TO COLLECT FOR VARIOUS POPULATION GROUPS

Survey Module	Household	0-6m child	6-23m child	24-59m child	15-49y woman (non-pregnant)
1. Anthropometry/health			**X**	**X**	
2. Anemia			**X**	**X**	**X**
3. IYCF		**X**	**X**		
4. Food Security	**Not collected (see note)**				
5. WASH	**X**				
6. Mosquito net coverage	**X**				

**Note: Household food security data collected as part of independent WFP PDM exercise in June 2019 instead of 2019 SENS*

2.4 Questionnaire

The standard SENS questionnaire was translated from English **(Appendix 5)** to Kinyarwanda **(Appendix 6)** and back translated to identify any possible discrepancies and programed into tablets in both languages. The survey team leaders practiced using the programed tablets during training at which time choices and name brand examples for IYCF food groups were verified. The most updated version of the questionnaire was used for data collection. Because the selected team leaders were native Kinyarwanda speakers, a language understood by survey respondents in all six camps, interviews were conducted without translators in the field.

2.5 Case definitions, inclusion criteria and calculations

Household: a household was defined as the group of people living under the same roof, sharing food from the same pot and sharing the same ration card.

Diarrhea in the last 2 weeks in children 6-59 months: was defined as three loose motions stools or more within 24 hours as recalled by the mother or caretaker of the child.

Malnutrition in children 6-59 months: was determined based on standard WHO 2006 growth standard indices. Findings based on NCHS 1977 Growth Reference are reported in **Appendix 4.**

TABLE 10 APPLIED ANTHROPOMETRIC CUT-OFFS FOR CHILDREN 6-59 MONTHS (SOURCE: WHO 2006 GROWTH STANDARDS)

	Normal	Moderate Malnutrition	Severe Malnutrition
Weight-for-Height (Wasting)	$\geq$ - 2 z-scores	< - 2 and $\geq$ - 3 z-scores	< - 3 z-scores and/or bilateral pitting oedema
Weight-for-Age (Underweight)	$\geq$ - 2 z-scores	< - 2 and $\geq$ - 3 z-scores	< - 3 z-scores
Height-for-Age (Stunting)	$\geq$ - 2 z-scores	< - 2 and $\geq$ - 3 z-scores	< - 3 z-scores
MUAC	$\geq$ 125 mm	< 125 and $\geq$ 115 mm	< 115 mm

Children between the length/height of 65.0 and 110.0 cm were included in the survey and children with appropriate age who were either shorter or taller than the range were also included. Where a child's age was unknown, a seasonal and local events calendar was used to determine the age. Children less than 24 months with official birth documentation were measured lying down and children 24 months and older with official birth documentation were measured in a standing position. Among children without official age documentation, those less than 87.0 cm were measured lying down and children with height $\geq$ 87.0 cm were measured in a standing position. Enumerators checked for bilateral oedema by applying moderate thumb pressure on the tops of both feet for 3 seconds and checking for the remainder of a depression. Disabled and ill children remained eligible, unless the anthropometric measurements would be influenced by the condition (for example, accurate weight or height measurements would be influenced by missing limbs), in which case measurements were not taken and data were recorded as missing. MUAC was still recorded where appropriate.

Anemia in children 6-59 months and women of reproductive age (15 to 49 years): was measured for children aged 6-59 months from the sampled households and for non-pregnant women aged 15-49 years old from every other household as per SENS guidelines. The UNHCR guideline on routine anemia assessments excludes pregnant women due to difficulties related to determining the pregnancy gestational age since anemia cutoffs for pregnant women should be adjusted depending on the gestational age. Qualified laboratory technicians measured Hb concentration for eligible women and children from a capillary blood sample taken from the third drop of the fingertip of the third or fourth finger, using disposable sterile lancets for a relatively painless puncture, and recorded to the closest gram per deciliter (g/dl) using a portable HemoCue 301+ Analyzer. To determine the anemia status of children and women, WHO references for cut-off points were used. Any child with Hb <7.0g/dl or woman with Hb <8.0 g/dl not already enrolled in an anemia treatment program was referred to the health center for further assessment and treatment.

Hb Adjustment: Hb was adjusted for altitude according to the following equation[31]:

Hb adjustment = –0.032 x (altitude in meters x 0.0032808) + 0.022 x (altitude in meters x 0.0032808)

TABLE 11 INDIVIDUAL HB ADJUSTMENT FOR SENS NUTRITION SURVEYS

Camp / Situation	Elevation (in meters)	Reduction in individual HB concentration (g/dl)
Gihembe	2275	-1.0
Kigeme	2074	-0.8
Kiziba	1975	-0.7
Mugombwa	1640	-0.5
Nyabiheke	1612	-0.4
Mahama	1650	-0.5

TABLE 12 WHO ANEMIA CLASSIFICATION (SOURCE: WHO 2000)

	Categories of Anemia (Hb g/dL)			
	Total	Mild	Moderate	Severe
Children 6-59 months	<11.0	10.0-10.9	7.0-9.9	<7.0
Non-pregnant women 15-49 years	<12.0	11.0-11.9	8.0-10.9	<8.0

Timely initiation of breastfeeding in children under 24 months

Proportion of children born in the last 23.99 months who were put to the breast within one hour of birth.

Exclusive breastfeeding under 6 months

Proportion of infants 0-5.99 months of age who were fed exclusively with breast milk.

Continued breastfeeding at 1 year

Proportion of infants 12-15.99 months of age who are fed breastmilk.

Introduction of solid, semi solid or soft foods

Proportion of infants 6-8.99 months of age who receive solid, semi-solid or soft foods.

Continued breastfeeding at 2 years

Proportion of children 20-23.99 months of age who are fed breastmilk.

Bottle feeding

Proportion of children 0-23.99 months of age who were fed with a bottle and nipple/teat during the previous 24 hours/ children 0-23.99 months of age.

[31] Penelope N.: Adjusting Hb Values in Program Surveys, by the INACG Steering Committee.http://pdf.usaid.gov/pdf_docs/PNACO927.pdf

Minimum Acceptable Diet (MAD)

Proportion of children 6-23.99 months of age who achieve both minimum feeding frequency and minimum dietary diversity as appropriate for age group and breastfeeding status. MAD is calculated slightly differently based on breastfeeding status: Breastfed Children: Proportion of breastfed children 6-23.99 months who met the requirements of both Minimum Diet Diversity (MDD) and Minimum Meal Frequency (MMF). Non-Breastfed Children: Proportion of non-breastfed children 6-23.99 months who received 2 milk feedings and met the requirements of both MDD, not including the milk feedings, and MMF.

Minimum Diet Diversity (MDD)

Proportion of children 6-23.99 months of age who receive foods from 4 or more out of 7 food groups in the previous day. The seven food groups include (1) grains, roots, and tubers; (2) legumes and nuts; (3) dairy products; (4) flesh foods; (5) eggs; (6) vitamin- A rich fruits and vegetables; (7) other fruits and vegetables. While not a separate food group, specialized nutritious foods (SNF) utilized in nutrition programming such as CSB++ are classified with "Flesh Foods" due to its micronutrient profile.

Minimum Meal Frequency (MMF)

Proportion of children 6-23.99 months of age who receive solid, semi-solid, or soft foods (but also including milk feeds for non-breastfed children) the minimum number of times or more based on the child's age. In the previous day, the child must have the following number of feedings to meet the minimum meal frequency:

- 2 feedings for breastfed children age 6-8.99 months
- 3 feedings for breastfed children age 9 – 23.99 months
- 4 feeding for non-breastfed children age 6 – 23.99 months

Measles Vaccination Coverage

Coverage = Number of surveyed children 9-59 months of age who received measles vaccination / number of surveyed children 9-59 months of age
UNHCR and SPHERE standards recommend coverage of at least 95% of children aged 9-59 months old in refugee camps.

Vitamin A Supplementation Coverage

Coverage = Number of surveyed children 6-59 months of age who received vitamin A supplementation in the past six months / number of surveyed children 6-59 months of age
UNHCR and SPHERE standards recommend coverage of at least 90% of children aged 6-59 months old in refugee camps.

Deworming Coverage

Coverage = Number of surveyed children 6-59 months of age who received deworming tablet in the past six months / number of surveyed children 6-59 months of age.

Supplementary Feeding Program (SFP) Enrolment

Enrolment = Number of surveyed children 6-59 months with moderate acute malnutrition (MAM) as per SFP admission criteria registered in SFP / number of surveyed children with MAM x 100
UNHCR and SPHERE standards recommend coverage of at least 90% of children aged 6-59 months old in refugee camps.

Outpatient Therapeutic Program (OTP) Enrolment

Enrolment = Number of surveyed children 6-59 months with severe acute malnutrition (SAM) as per OTP admission criteria registered in OTP / number of surveyed children with SAM x 100
UNHCR and SPHERE standards recommend coverage of 90% of children aged 6-59 months old in refugee camps.

Minimum Diet Diversity for Women of Reproductive Age

Proportion of women of reproductive age (15-49) who reached minimum diet diversity. Minimum diet diversity is defined as consumption of 5 or more food groups out of 10 in the last 24 hours. While not a separate food group, specialized

nutritious foods (SNF) utilized in nutrition programming such as CSB+ are classified with "Flesh Foods" due to its micronutrient profile.

2.6 Classification of public health problems and targets

Prevalence of malnutrition in children 6-59 months old: Applying the UNHCR Strategic Plan for Nutrition and Food Security, the nutrition target for GAM for children 6-59 months is <10% and for SAM is <2%.

TABLE 13A SEVERITY OF MALNUTRITION FOR CHILDREN UNDER 5 YEARS OF AGE BASED ON PUBLIC HEALTH SIGNIFICANCE (SOURCE: WHO 2000)

Prevalence (%)	Acceptable	Poor	Serious	Critical
Low weight-for-Height (Wasting)	< 5	5-9	10-14	≥15
Weight-for-Age (Underweight)	< 10	10-19	20-29	≥30
Height-for-Age (Stunting)	< 20	20-29	30-39	≥40

TABLE 14B SEVERITY OF MALNUTRITION FOR CHILDREN UNDER 5 YEARS OF AGE BASED ON PUBLIC HEALTH SIGNIFICANCE (SOURCE: WHO 2018)

Prevalence (%)	Very Low	Low	Medium	High	Very High
Low weight-for-Height (Wasting)	<2.5	2.5- <5	5- <10	10- <15	≥15
Height-for-Age (Stunting)	<2.5	2.5- <10	10- <20	20- <30	≥30
Overweight	<2.5	2.5- <5	5- <10	10- <15	≥15

Prevalence of anemia in children 6-59 months and women of reproductive age (15 to 49 years)

TABLE 15 SEVERITY OF ANEMIA BASED ON PUBLIC HEALTH SIGNIFICANCE (SOURCE: WHO 2000)

Prevalence (%)	Acceptable	Low	Medium	High
Anemia	< 5	5-19	20-39	≥40

2.7 Training, coordination and supervision

2.7.1 Survey teams and supervision

A total of six survey teams each with a team leader, two anthropometry measurers, one lab technician, and household level enumerators were trained for five days, which included an anthropometric standardization test and a pilot test. Supervisors from AHA, ARC, SCI, UNHCR and WFP facilitated the training and served as survey supervisors throughout the survey.

2.7.2 Training

Nutrition staff from WFP and UNHCR conducted training for all enumerators for four days on topics including survey objectives, selecting eligible subjects from a household, proper technique for anthropometric measurements and obtaining a finger prick blood sample, referral of malnourished and severely anemic children and women, interview skills, age determination from a local events calendar **(Appendix 6)**. All participants took a pre-test and post-test to ensure mastery of concepts. Standardization tests on anthropometry and Hb and a pilot test for team leaders occurred on the last day of training in Kigeme Camp. The anthropometry standardization tests consisted of all team members responsible for taking anthropometric measurements during the survey to measure children between the ages of 6 and 59 months twice, with a time interval between individual measures. The size of the variation between these repeated measures was calculated to assess how precisely each person measures the children (repeatability of measurements). Each team member earned a competence score performing measurements. The Hb standardization tests consisted of all lab technicians responsible for taking Hb measurements during the survey to measure the Hb of three different fellow trainees twice. The lab technicians calculated the size of the variation between these repeated measures to determine their measurement precision and discuss any possible reason for variation. Team leaders practiced using the questionnaire loaded in the tablet by each interviewing at least three households containing a child between 6-59 months.

2.8 Data collection

Data collection occurred for twenty days under the supervision of staff from AHA, ARC, SCI WFP and UNHCR. Community health workers in each camp mobilized the selected households to come to the survey venue. Team leaders took time before each interview to explain the objects of the survey and obtained consent from each person before proceeding with data collection using structured questionnaires programmed with ODK (Open Data Kit) application and ONA platform on Samsung Galaxy 3 Pro v8.4 tablets which allowed data to be available on the server immediately after submission by team leaders. Data bounds of realistic values for variables were programed in the tablets and anthropometric data was first recorded on paper sheets by anthropometric measurers and then double entered by team leaders in tablets to avoid common transcription errors. The system only accepted matching values.

2.9 Data analysis

Completed questionnaires were uploaded to a password protected server daily. Staff from WFP VAM Unit extracted the anthropometric data for daily checks in .xls format. Extracted and verified anthropometric data was analyzed using ENA for SMART software (v. 9 July 2015) and other variables were analyzed in SPSS (v25.0). Cases with outlying anthropometry data were excluded from the final analysis with exclusion boundaries based on the SMART flags from the observed results and applied means (WHZ -3 to 3; HAZ -3 to 3; WAZ -3 to 3). Data was kept confidential and the cleaned raw data was shared with WFP Rwanda Country Office, UNHCR Rwanda Branch Office and UNHCR HQ.

3 Results

The 2019 SENS was conducted in six refugee camps. Overall 1778 children 6-59 months, 717 children 0-23 months and 1869 women aged 15-49 years from 1140 households were assessed during the survey period of 6-24 May 2019.

TABLE 16 DEMOGRAPHIC CHARACTERISTICS OF THE STUDY POPULATION

	Gihembe	Kigeme	Kiziba	Mugombwa	Nyabiheke	Mahama
Survey dates	15-16 May	6-8 May	12-14 May	9-10 May	19-20 May	22-24 May
No. of households containing children 6-59m sampled (includes 23%-57% NRR)[32]	305	330	308	234	397	266
Actual # household surveyed from sample list	187	211	191	159	173	219
% response rate	61%	64%	62%	68%	44%	82%
Total children 6-59 months old surveyed	289	331	301	252	263	342
Total children 0-23 months old surveyed	121	130	123	99	101	143
% children under-5 years of age without official documentation of birthdate	0.7%	1.4%	0.6%	0.4%	1.1%	0.8%
Total women 15-49 years surveyed	300	348	313	262	284	362

3.1 Children 6-59 months

3.1.1 Demographic characteristics

TABLE 17 TARGET AND ACTUAL NUMBER OF CHILDREN 6-59 MONTHS INTERVIEWED

	Target (No.)	Total surveyed (No.)	% of the Target
Gihembe	216	289	134%
Kigeme	258	331	128%
Kiziba	196	301	154%
Mugombwa	190	252	133%
Nyabiheke	224	263	117%
Mahama	216	342	158%
Total	1300	1778	137%

The surveys equally represented girls and boys as indicated by sex ratios within the range of standard values in all camps with the exception of Kigeme where more girls were measured. Age distribution was normal in all camps except in Mahama where the proportion of children 6-29 months to 30-59 months exceeded the standard value of 0.85. There were no children recruited based on height instead of age in any camp. The proportion of children without exact birth documentation ranged from 0.0% to 4.3% in the camps, an improvement since 2018.

[32] Based on actual NRR from May 2018 SENS

TABLE 18 CHILDREN 6-59 MONTHS - DISTRIBUTION OF AGE AND SEX OF SAMPLE FOR GIHEMBE

	Boys		Girls		Total		Ratio
AGE (mo)	no.	%	no.	%	no.	%	Boy:girl
6-17	30	40.5	44	59.5	74	25.6	0.7
18-29	37	56.9	28	43.1	65	22.5	1.3
30-41	28	48.3	30	51.7	58	20.1	0.9
42-53	35	57.4	26	42.6	61	21.1	1.3
54-59	11	35.5	20	64.5	31	10.7	0.6
Total	141	48.8	148	51.2	289	100.0	1.0

TABLE 19 CHILDREN 6-59 MONTHS - DISTRIBUTION OF AGE AND SEX OF SAMPLE FOR KIGEME

	Boys		Girls		Total		Ratio
AGE (mo)	no.	%	no.	%	no.	%	Boy:girl
6-17	28	42.4	38	57.6	66	19.9	0.7
18-29	21	29.2	51	70.8	72	21.8	0.4
30-41	33	48.5	35	51.5	68	20.5	0.9
42-53	41	50.0	41	50.0	82	24.8	1.0
54-59	22	51.2	21	48.8	43	13.0	1.0
Total	145	43.8	186	56.2	331	100.0	0.8

TABLE 20 CHILDREN 6-59 MONTHS - DISTRIBUTION OF AGE AND SEX OF SAMPLE FOR KIZIBA

	Boys		Girls		Total		Ratio
AGE (mo)	no.	%	no.	%	no.	%	Boy:girl
6-17	36	51.4	34	48.6	70	23.3	1.1
18-29	30	45.5	36	54.5	66	21.9	0.8
30-41	31	50.8	30	49.2	61	20.3	1.0
42-53	26	41.3	37	58.7	63	20.9	0.7
54-59	24	58.5	17	41.5	41	13.6	1.4
Total	147	48.8	154	51.2	301	100.0	1.0

TABLE 21 CHILDREN 6-59 MONTHS - DISTRIBUTION OF AGE AND SEX OF SAMPLE FOR MUGOMBWA

	Boys		Girls		Total		Ratio
AGE (mo)	no.	%	no.	%	no.	%	Boy:girl
6-17	25	43.1	33	56.9	58	23.0	0.8
18-29	30	60.0	20	40.0	50	19.8	1.5
30-41	30	54.5	25	45.5	55	21.8	1.2
42-53	36	53.7	31	46.3	67	26.6	1.2
54-59	13	59.1	9	40.9	22	8.7	1.4
Total	134	53.2	118	46.8	252	100.0	1.1

TABLE 22 CHILDREN 6-59 MONTHS - DISTRIBUTION OF AGE AND SEX OF SAMPLE FOR NYABIHEKE

	Boys		Girls		Total		Ratio
AGE (mo)	no.	%	no.	%	no.	%	Boy:girl
6-17	24	51.1	23	48.9	47	17.9	1.0
18-29	32	52.5	29	47.5	61	23.2	1.1
30-41	30	49.2	31	50.8	61	23.2	1.0
42-53	32	53.3	28	46.7	60	22.8	1.1
54-59	18	52.9	16	47.1	34	12.9	1.1
Total	136	51.7	127	48.3	263	100.0	1.1

TABLE 23 CHILDREN 6-59 MONTHS - DISTRIBUTION OF AGE AND SEX OF SAMPLE FOR MAHAMA

	Boys		Girls		Total		Ratio
AGE (mo)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy:girl**
6-17	45	51.7	42	48.3	87	25.4	1.1
18-29	43	50.0	43	50.0	86	25.1	1.0
30-41	47	62.7	28	37.3	75	21.9	1.7
42-53	28	46.7	32	53.3	60	17.5	0.9
54-59	18	52.9	16	47.1	34	9.9	1.1
Total	181	52.9	161	47.1	342	100.0	1.1

3.1.2 Anthropometric results (based on WHO Growth Standards 2006)[33]

TABLE 24 PREVALENCE OF ACUTE MALNUTRITION BASED ON WEIGHT-FOR-HEIGHT Z-SCORES (AND/OR OEDEMA) AND BY SEX IN GIHEMBE

	All n = 289	**Boys** n = 141	**Girls** n = 148
Prevalence of global malnutrition (<-2 z-score and/or edema)	(8) 2.8 % (1.4 - 5.4 95% C.I.)	(5) 3.5 % (1.5 - 8.0 95% C.I.)	(3) 2.0 % (0.7 - 5.8 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(7) 2.4 % (1.2 - 4.9 95% C.I.)	(4) 2.8 % (1.1 - 7.1 95% C.I.)	(3) 2.0 % (0.7 - 5.8 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(1) 0.3 % (0.1 - 1.9 95% C.I.)	(1) 0.7 % (0.1 - 3.9 95% C.I.)	(0) 0.0 % (0.0 - 2.5 95% C.I.)

The prevalence of oedema is 0.0 %

TABLE 25 PREVALENCE OF ACUTE MALNUTRITION BASED ON WEIGHT-FOR-HEIGHT Z-SCORES (AND/OR OEDEMA) AND BY SEX IN KIGEME

	All n = 330	**Boys** n = 145	**Girls** n = 185
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(5) 1.5 % (0.6 - 3.5 95% C.I.)	(3) 2.1 % (0.7 - 5.9 95% C.I.)	(2) 1.1 % (0.3 - 3.9 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(5) 1.5 % (0.6 - 3.5 95% C.I.)	(3) 2.1 % (0.7 - 5.9 95% C.I.)	(2) 1.1 % (0.3 - 3.9 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(0) 0.0 % (0.0 - 1.2 95% C.I.)	(0) 0.0 % (0.0 - 2.6 95% C.I.)	(0) 0.0 % (0.0 - 2.0 95% C.I.)

The prevalence of oedema is 0.0 %

TABLE 26 PREVALENCE OF ACUTE MALNUTRITION BASED ON WEIGHT-FOR-HEIGHT Z-SCORES (AND/OR OEDEMA) AND BY SEX IN KIZIBA

	All n = 301	**Boys** n = 147	**Girls** n = 154
Prevalence of global malnutrition (<-2 z-score and/or edema)	(16) 5.3 % (3.3 - 8.5 95% C.I.)	(9) 6.1 % (3.3 - 11.2 95% C.I.)	(7) 4.5 % (2.2 - 9.1 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(13) 4.3 % (2.5 - 7.2 95% C.I.)	(8) 5.4 % (2.8 - 10.4 95% C.I.)	(5) 3.2 % (1.4 - 7.4 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(3) 1.0 % (0.3 - 2.9 95% C.I.)	(1) 0.7 % (0.1 - 3.8 95% C.I.)	(2) 1.3 % (0.4 - 4.6 95% C.I.)

The prevalence of oedema is 0.0 %

[33] NCHS Growth Reference 1977 shown in Appendix 4

TABLE 27 PREVALENCE OF ACUTE MALNUTRITION BASED ON WEIGHT-FOR-HEIGHT Z-SCORES (AND/OR OEDEMA) AND BY SEX IN MUGOMBWA

	All n = 252	Boys n = 134	Girls n = 118
Prevalence of global malnutrition (<-2 z-score and/or edema)	(3) 1.2 % (1.0 – 1.5 95% C.I.)	(1) 0.7 % (0.7 – 0.8 95% C.I.)	(2) 1.7 % (1.4 – 2.1 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(3) 1.2 % (1.0 – 1.5 95% C.I.)	(1) 0.7 % (0.7 – 0.8 95% C.I.)	(2) 1.7 % (1.4 – 2.1 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(0) 0.0 % (0.0 – 0.0 95% C.I.)	(0) 0.0 % (0.0 – 0.0 95% C.I.)	(0) 0.0 % (0.0 – 0.0 95% C.I.)

The prevalence of oedema is 0.0 %

TABLE 28 PREVALENCE OF ACUTE MALNUTRITION BASED ON WEIGHT-FOR-HEIGHT Z-SCORES (AND/OR OEDEMA) AND BY SEX IN NYABIHEKE

	All n = 260	Boys n = 133	Girls n = 127
Prevalence of global malnutrition (<-2 z-score and/or edema)	(8) 3.1 % (1.6 - 6.0 95% C.I.)	(2) 1.5 % (0.4 - 5.3 95% C.I.)	(6) 4.7 % (2.2 - 9.9 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(8) 3.1 % (1.6 - 6.0 95% C.I.)	(2) 1.5 % (0.4 - 5.3 95% C.I.)	(6) 4.7 % (2.2 - 9.9 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(0) 0.0 % (0.0 - 1.5 95% C.I.)	(0) 0.0 % (0.0 - 2.8 95% C.I.)	(0) 0.0 % (0.0 - 2.9 95% C.I.)

The prevalence of oedema is 0.0 %

TABLE 29 PREVALENCE OF ACUTE MALNUTRITION BASED ON WEIGHT-FOR-HEIGHT Z-SCORES (AND/OR OEDEMA) AND BY SEX IN MAHAMA

	All n = 342	Boys n = 181	Girls n = 161
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(8) 2.3 % (1.2 - 4.5 95% C.I.)	(5) 2.8 % (1.2 - 6.3 95% C.I.)	(3) 1.9 % (0.6 - 5.3 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(8) 2.3 % (1.2 - 4.5 95% C.I.)	(5) 2.8 % (1.2 - 6.3 95% C.I.)	(3) 1.9 % (0.6 - 5.3 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(0) 0.0 % (0.0 - 1.1 95% C.I.)	(0) 0.0 % (0.0 - 2.1 95% C.I.)	(0) 0.0 % (0.0 - 2.3 95% C.I.)

The prevalence of oedema is 0.0 %

FIGURE 5 TRENDS IN THE PREVALENCE OF GLOBAL AND SEVERE ACUTE MALNUTRITION BASED ON WHO GROWTH STANDARDS IN CHILDREN 6-59 MONTHS FROM 2012-2019 IN GIHEMBE

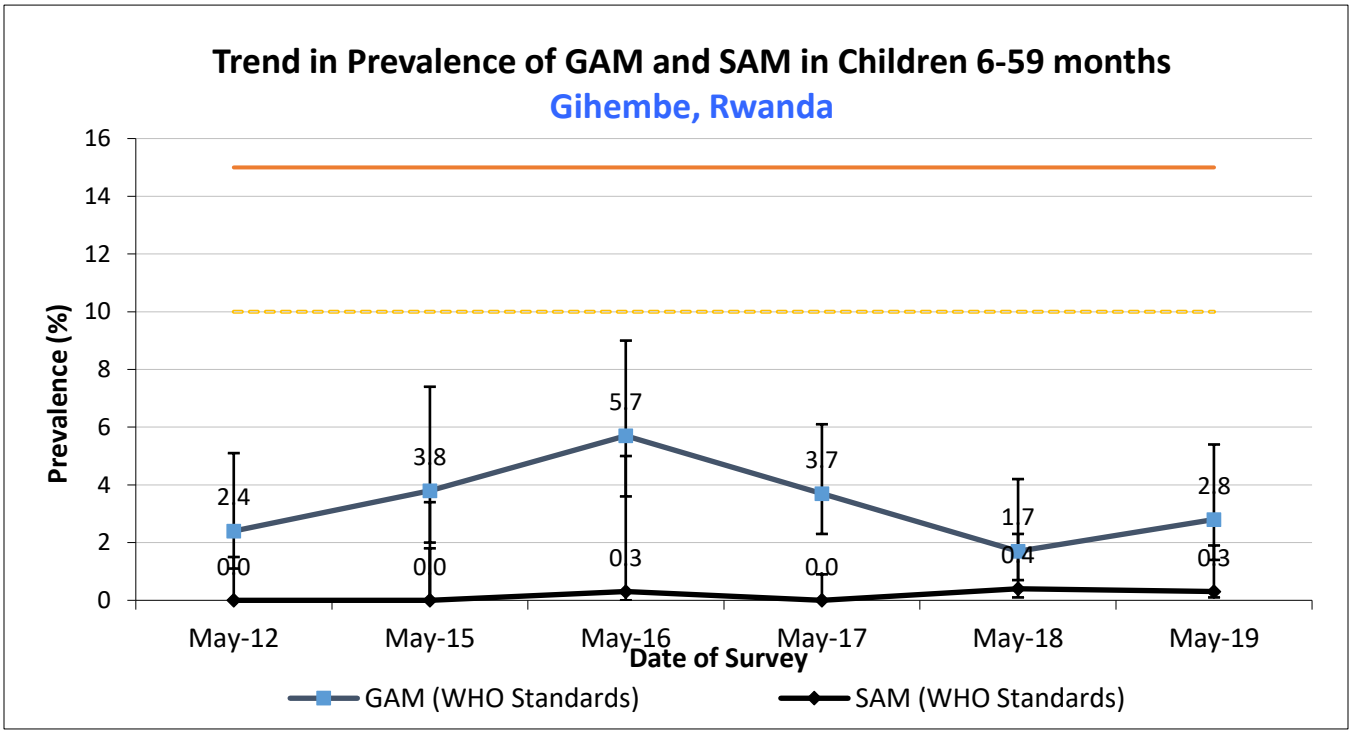


FIGURE 6 TRENDS IN THE PREVALENCE OF GLOBAL AND SEVERE ACUTE MALNUTRITION BASED ON WHO GROWTH STANDARDS IN CHILDREN 6-59 MONTHS FROM 2015-2019 IN KIGEME

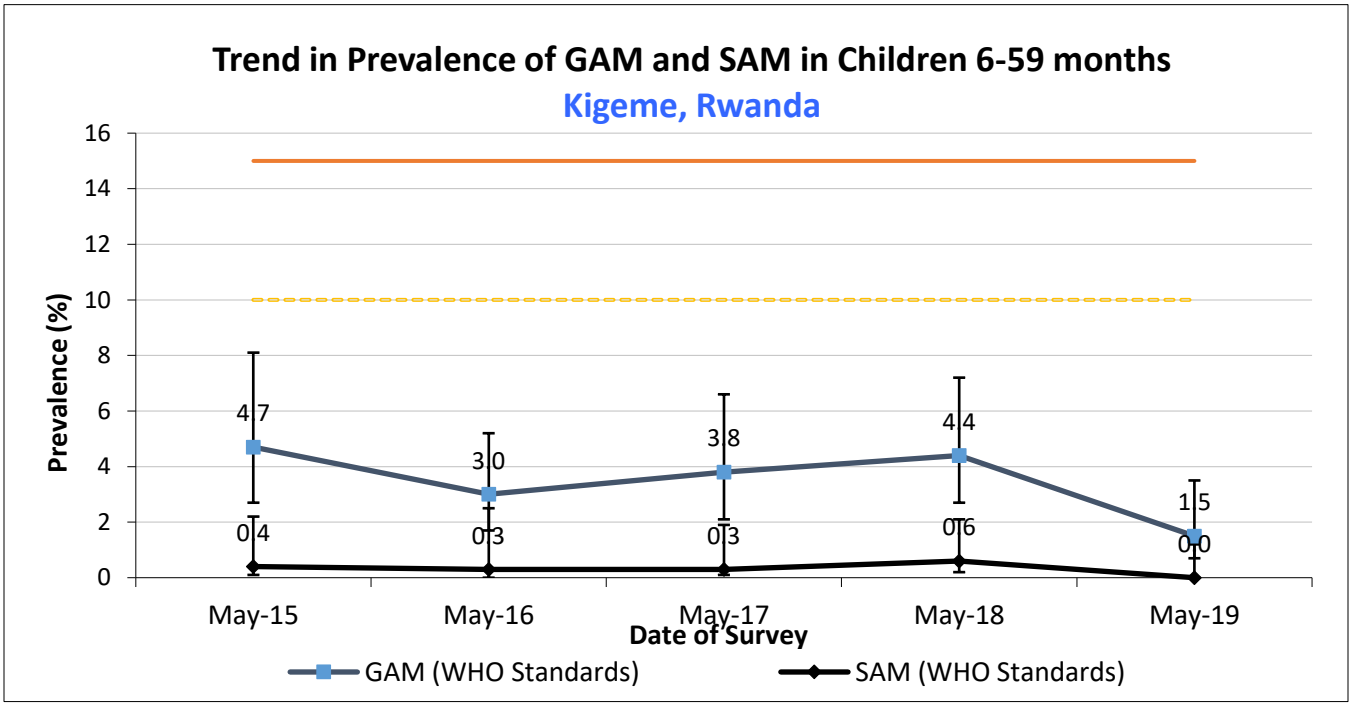


FIGURE 7 TRENDS IN THE PREVALENCE OF GLOBAL AND SEVERE ACUTE MALNUTRITION BASED ON WHO GROWTH STANDARDS IN CHILDREN 6-59 MONTHS FROM 2012-2019 IN KIZIBA

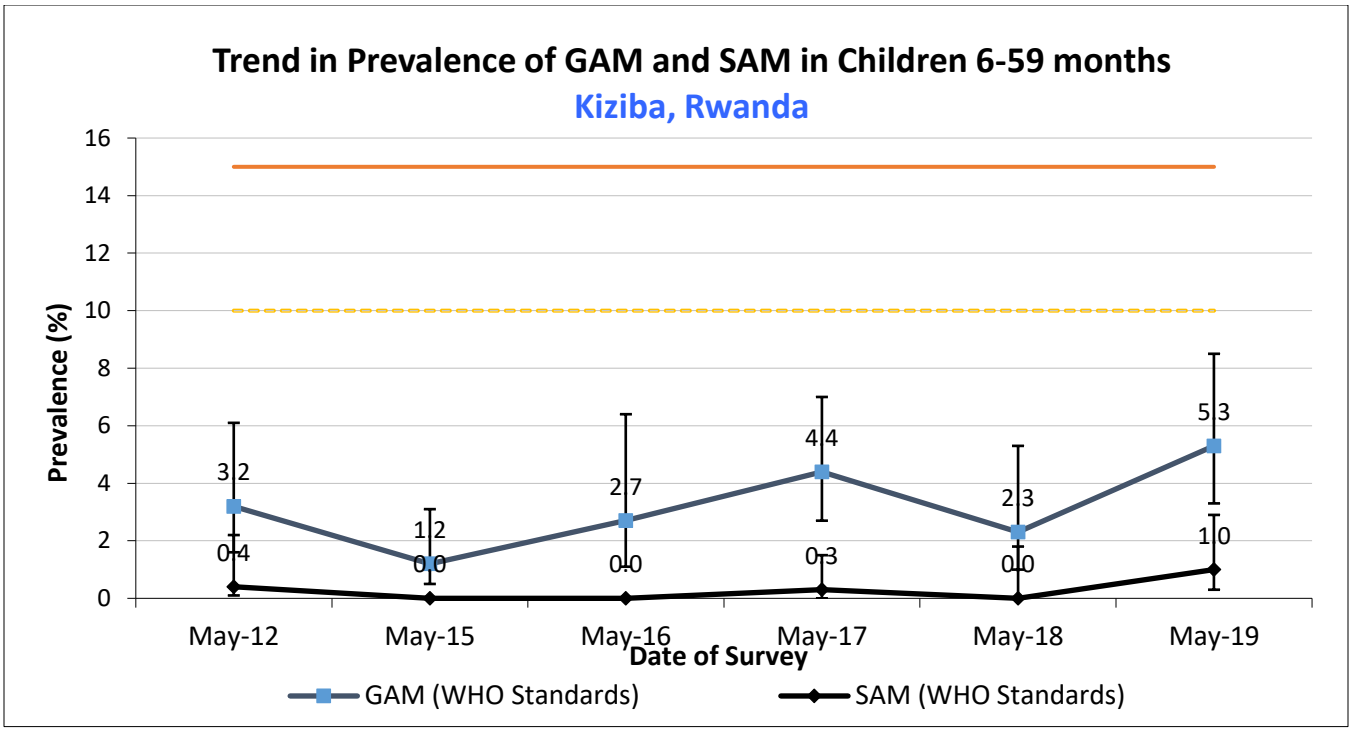


FIGURE 8 TRENDS IN THE PREVALENCE OF GLOBAL AND SEVERE ACUTE MALNUTRITION BASED ON WHO GROWTH STANDARDS IN CHILDREN 6-59 MONTHS FROM 2015-2019 IN MUGOMBWA

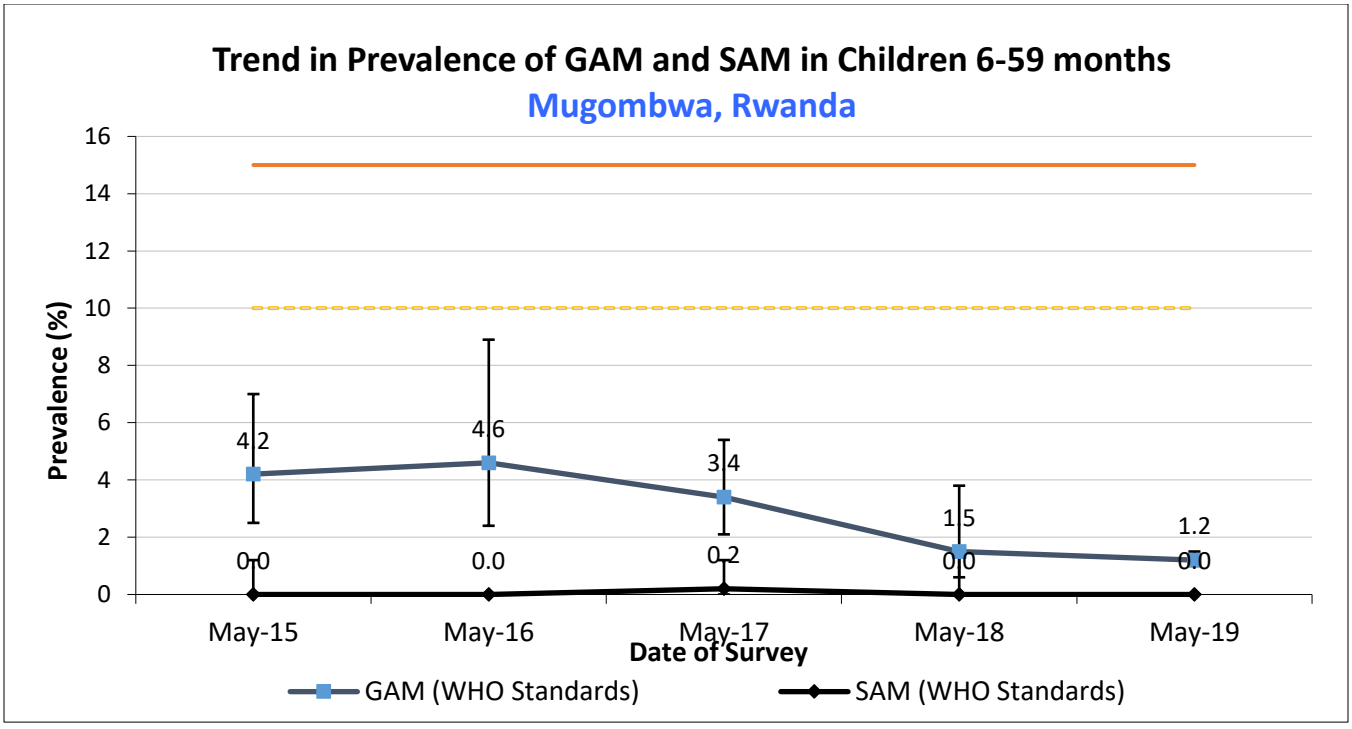


FIGURE 9 TRENDS IN THE PREVALENCE OF GLOBAL AND SEVERE ACUTE MALNUTRITION BASED ON WHO GROWTH STANDARDS IN CHILDREN 6-59 MONTHS FROM 2012-2019 IN NYABIHEKE

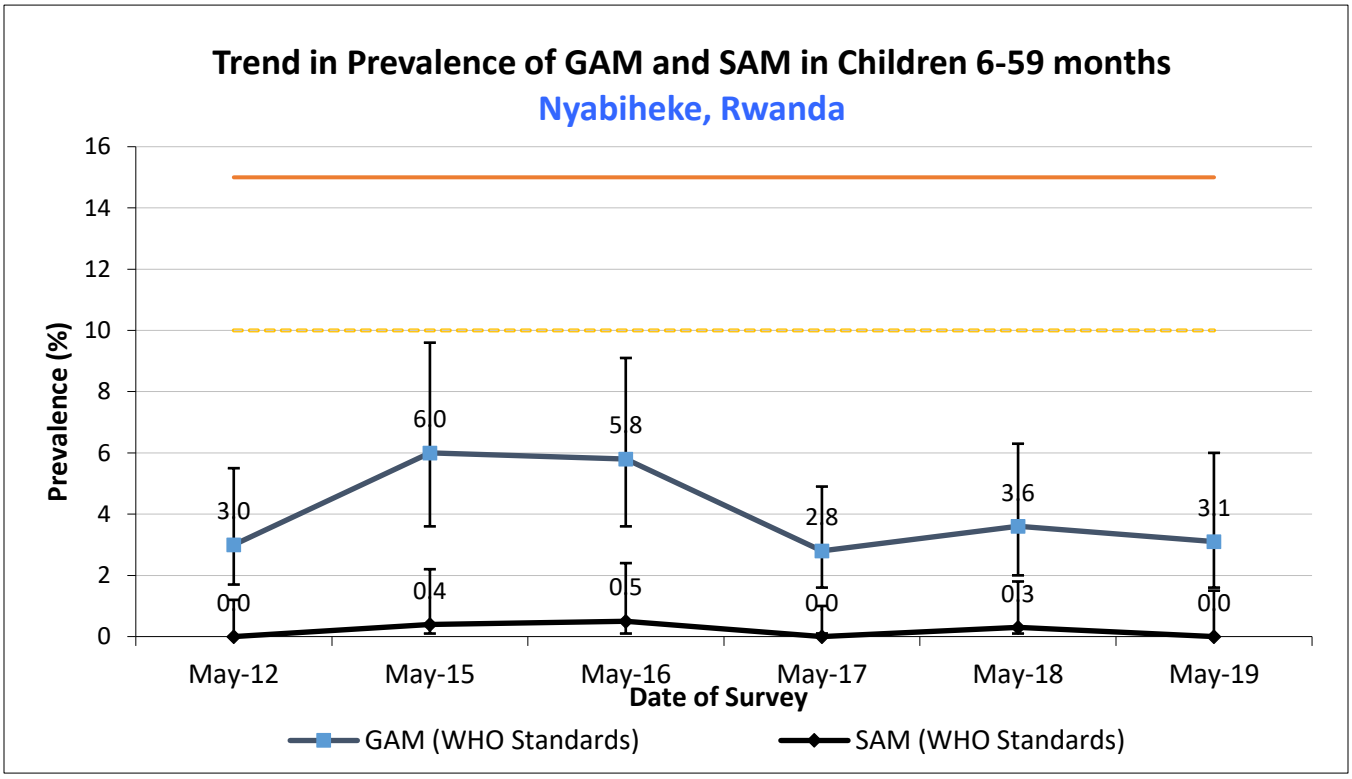


FIGURE 10 TRENDS IN THE PREVALENCE OF GLOBAL AND SEVERE ACUTE MALNUTRITION BASED ON WHO GROWTH STANDARDS IN CHILDREN 6-59 MONTHS FROM 2015-2019 IN MAHAMA

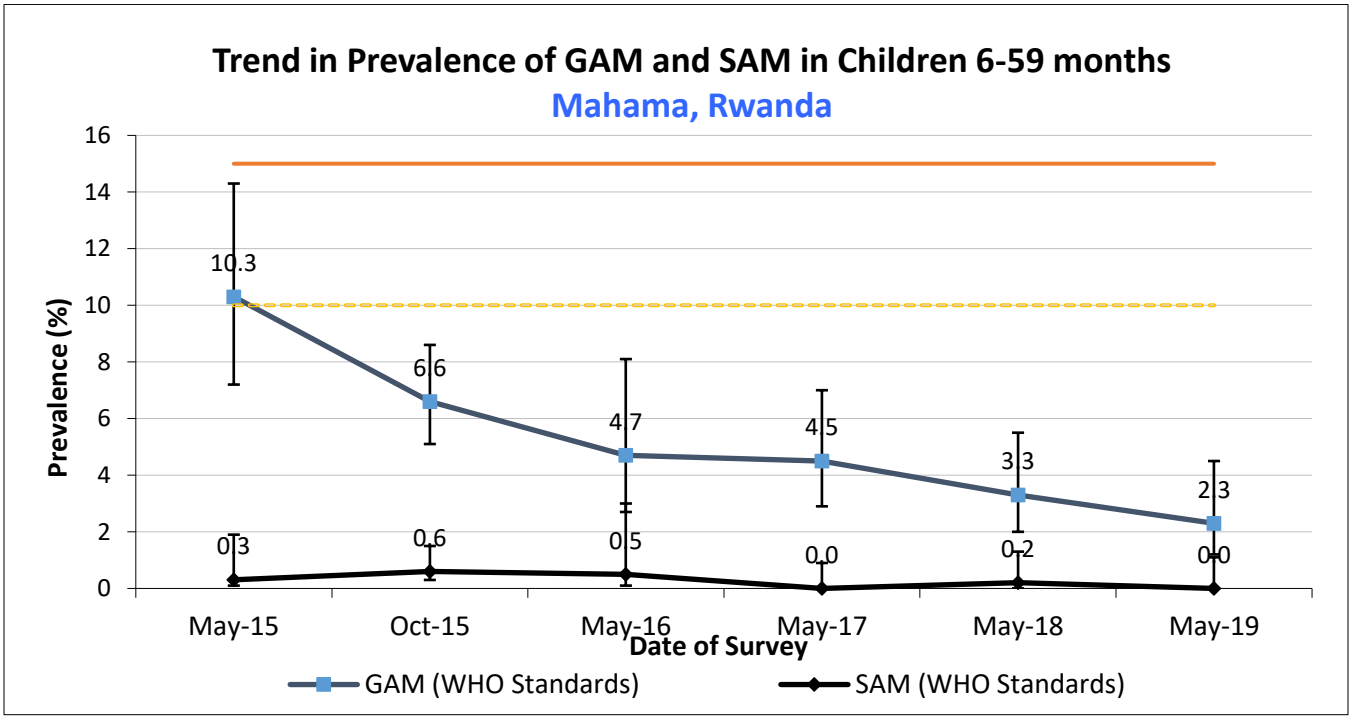


TABLE 30 PREVALENCE OF ACUTE MALNUTRITION BY AGE, BASED ON WEIGHT-FOR-HEIGHT Z-SCORES AND/OR OEDEMA IN GIHEMBE

		SEVERE WASTING (<-3 Z-SCORE)		MODERATE WASTING (>= -3 AND <-2 Z-SCORE)		NORMAL (> = -2 Z SCORE)		OEDEMA	
AGE (mo)	TOTAL	NO.	%	NO.	%	NO.	%	NO.	%
6-17	74	1	1.4	3	4.1	70	94.6	0	0.0
18-29	65	0	0.0	2	3.1	63	96.9	0	0.0
30-41	58	0	0.0	0	0.0	58	100.0	0	0.0
42-53	61	0	0.0	2	3.3	59	96.7	0	0.0
54-59	31	0	0.0	0	0.0	31	100.0	0	0.0
TOTAL	289	1	0.3	7	2.4	281	97.2	0	0.0

TABLE 31 PREVALENCE OF ACUTE MALNUTRITION BY AGE, BASED ON WEIGHT-FOR-HEIGHT Z-SCORES AND/OR OEDEMA IN KIGEME

		SEVERE WASTING (<-3 Z-SCORE)		MODERATE WASTING (>= -3 AND <-2 Z-SCORE)		NORMAL (> = -2 Z SCORE)		OEDEMA	
AGE (mo)	TOTAL	NO.	%	NO.	%	NO.	%	NO.	%
6-17	66	0	0.0	3	4.5	63	95.5	0	0.0
18-29	71	0	0.0	0	0.0	71	100.0	0	0.0
30-41	68	0	0.0	0	0.0	68	100.0	0	0.0
42-53	82	0	0.0	1	1.2	81	98.8	0	0.0
54-59	43	0	0.0	1	2.3	42	97.7	0	0.0
TOTAL	330	0	0.0	5	1.5	325	98.5	0	0.0

TABLE 32 PREVALENCE OF ACUTE MALNUTRITION BY AGE, BASED ON WEIGHT-FOR-HEIGHT Z-SCORES AND/OR OEDEMA IN KIZIBA

		SEVERE WASTING (<-3 Z-SCORE)		MODERATE WASTING (>= -3 AND <-2 Z-SCORE)		NORMAL (> = -2 Z SCORE)		OEDEMA	
Age (mo)	TOTAL	NO.	%	NO.	%	NO.	%	NO.	%
6-17	70	3	4.3	5	7.1	62	88.6	0	0.0
18-29	66	0	0.0	5	7.6	61	92.4	0	0.0
30-41	61	0	0.0	1	1.6	60	98.4	0	0.0
42-53	63	0	0.0	0	0.0	63	100.0	0	0.0
54-59	41	0	0.0	2	4.9	39	95.1	0	0.0
TOTAL	301	3	1.0	13	4.3	285	94.7	0	0.0

TABLE 33 PREVALENCE OF ACUTE MALNUTRITION BY AGE, BASED ON WEIGHT-FOR-HEIGHT Z-SCORES AND/OR OEDEMA IN MUGOMBWA

		SEVERE WASTING (<-3 Z-SCORE)		MODERATE WASTING (>= -3 AND <-2 Z-SCORE)		NORMAL (> = -2 Z SCORE)		OEDEMA	
AGE (mo)	TOTAL	No.	%	No.	%	No.	%	No.	%
6-17	58	0	0.0	2	3.4	56	96.6	0	0.0
18-29	50	0	0.0	0	0.0	50	100.0	0	0.0
30-41	55	0	0.0	1	1.8	54	98.2	0	0.0
42-53	67	0	0.0	0	0.0	67	100.0	0	0.0
54-59	22	0	0.0	0	0.0	22	100.0	0	0.0
Total	252	0	0.0	3	1.2	249	98.8	0	0.0

TABLE 34 PREVALENCE OF ACUTE MALNUTRITION BY AGE, BASED ON WEIGHT-FOR-HEIGHT Z-SCORES AND/OR OEDEMA IN NYABIHEKE

		SEVERE WASTING (<-3 Z-SCORE)		MODERATE WASTING (>= -3 AND <-2 Z-SCORE)		NORMAL (> = -2 Z SCORE)		OEDEMA	
AGE (mo)	TOTAL	No.	%	No.	%	No.	%	No.	%
6-17	45	0	0.0	2	4.4	43	95.6	0	0.0
18-29	61	0	0.0	1	1.6	60	98.4	0	0.0
30-41	61	0	0.0	3	4.9	58	95.1	0	0.0
42-53	59	0	0.0	2	3.4	57	96.6	0	0.0
54-59	34	0	0.0	0	0.0	34	100.0	0	0.0
Total	260	0	0.0	8	3.1	252	96.9	0	0.0

TABLE 35 PREVALENCE OF ACUTE MALNUTRITION BY AGE, BASED ON WEIGHT-FOR-HEIGHT Z-SCORES AND/OR OEDEMA IN MAHAMA

		SEVERE WASTING (<-3 Z-SCORE)		MODERATE WASTING (>= -3 AND <-2 Z-SCORE)		NORMAL (> = -2 Z SCORE)		OEDEMA	
AGE (mo)	TOTAL	No.	%	No.	%	No.	%	No.	%
6-17	87	0	0.0	4	4.6	83	95.4	0	0.0
18-29	86	0	0.0	0	0.0	86	100.0	0	0.0
30-41	75	0	0.0	1	1.3	74	98.7	0	0.0
42-53	60	0	0.0	1	1.7	59	98.3	0	0.0
54-59	34	0	0.0	2	5.9	32	94.1	0	0.0
Total	342	0	0.0	8	2.3	334	97.7	0	0.0

FIGURE 11 PREVALENCE OF WASTING BY AGE IN CHILDREN 6-59 MONTHS IN GIHEMBE

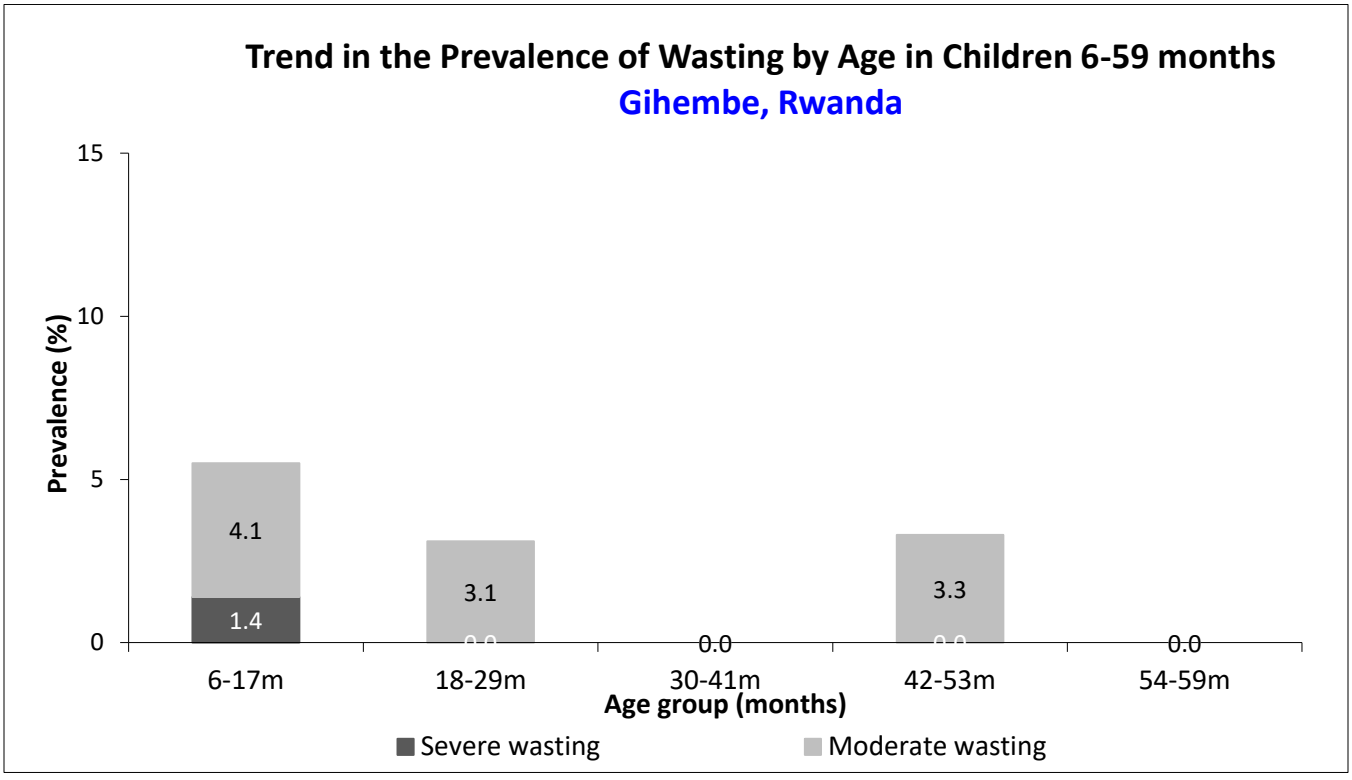


FIGURE 12 PREVALENCE OF WASTING BY AGE IN CHILDREN 6-59 MONTHS IN KIGEME

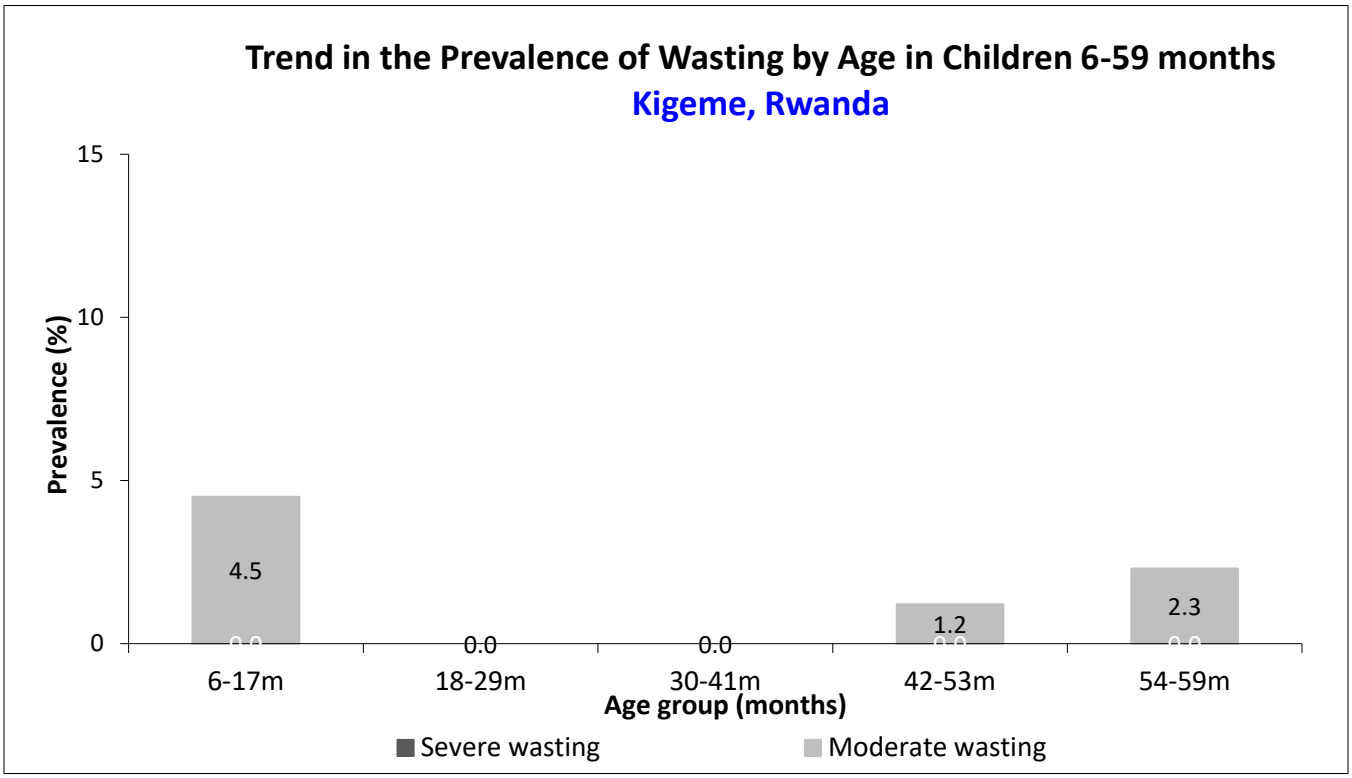


FIGURE 13 PREVALENCE OF WASTING BY AGE IN CHILDREN 6-59 MONTHS IN KIZIBA

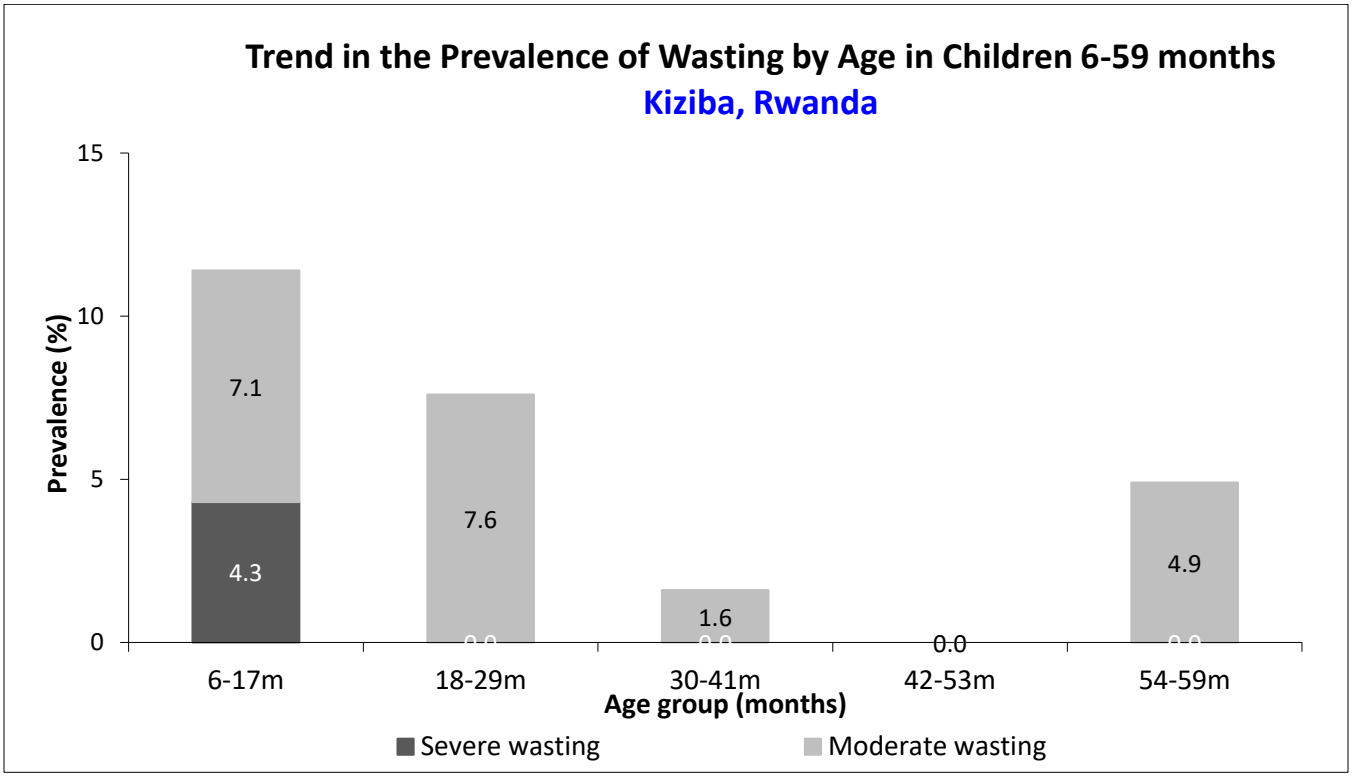


FIGURE 14 PREVALENCE OF WASTING BY AGE IN CHILDREN 6-59 MONTHS IN MUGOMBWA

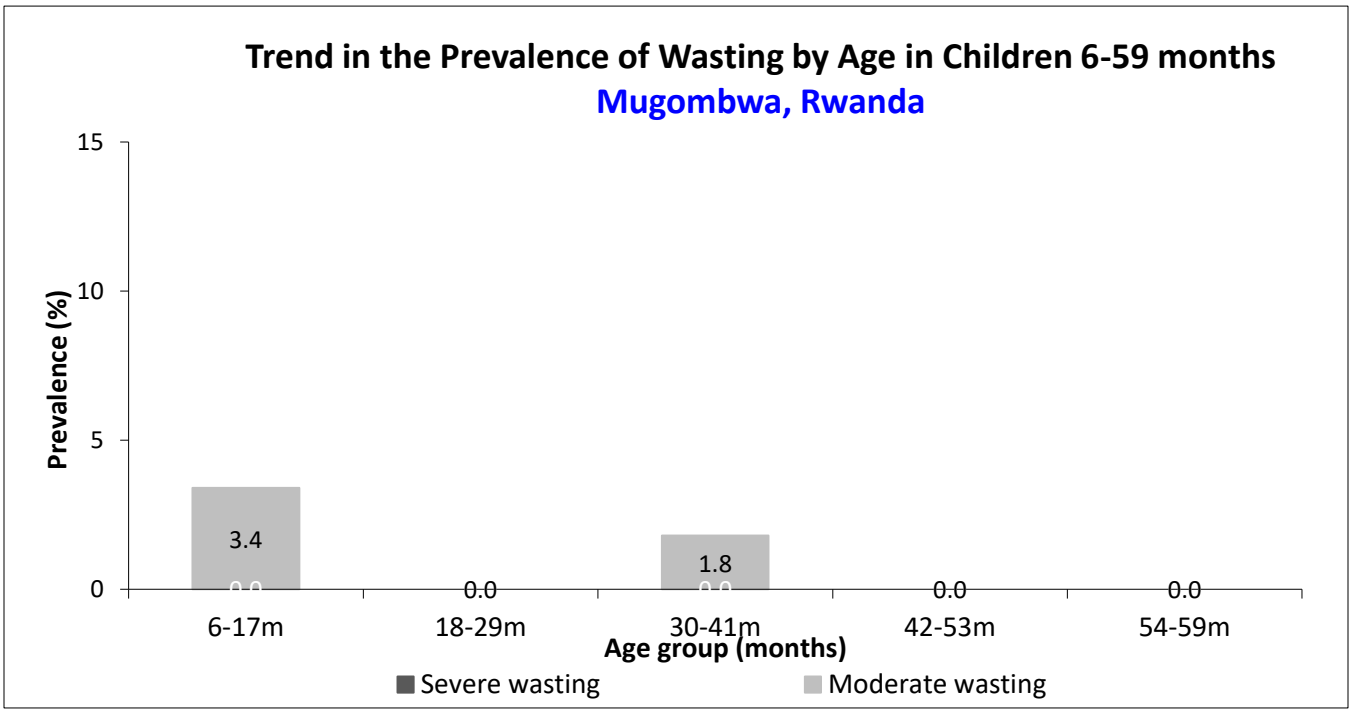


FIGURE 15 OF WASTING BY AGE IN CHILDREN 6-59 MONTHS IN NYABIHEKE

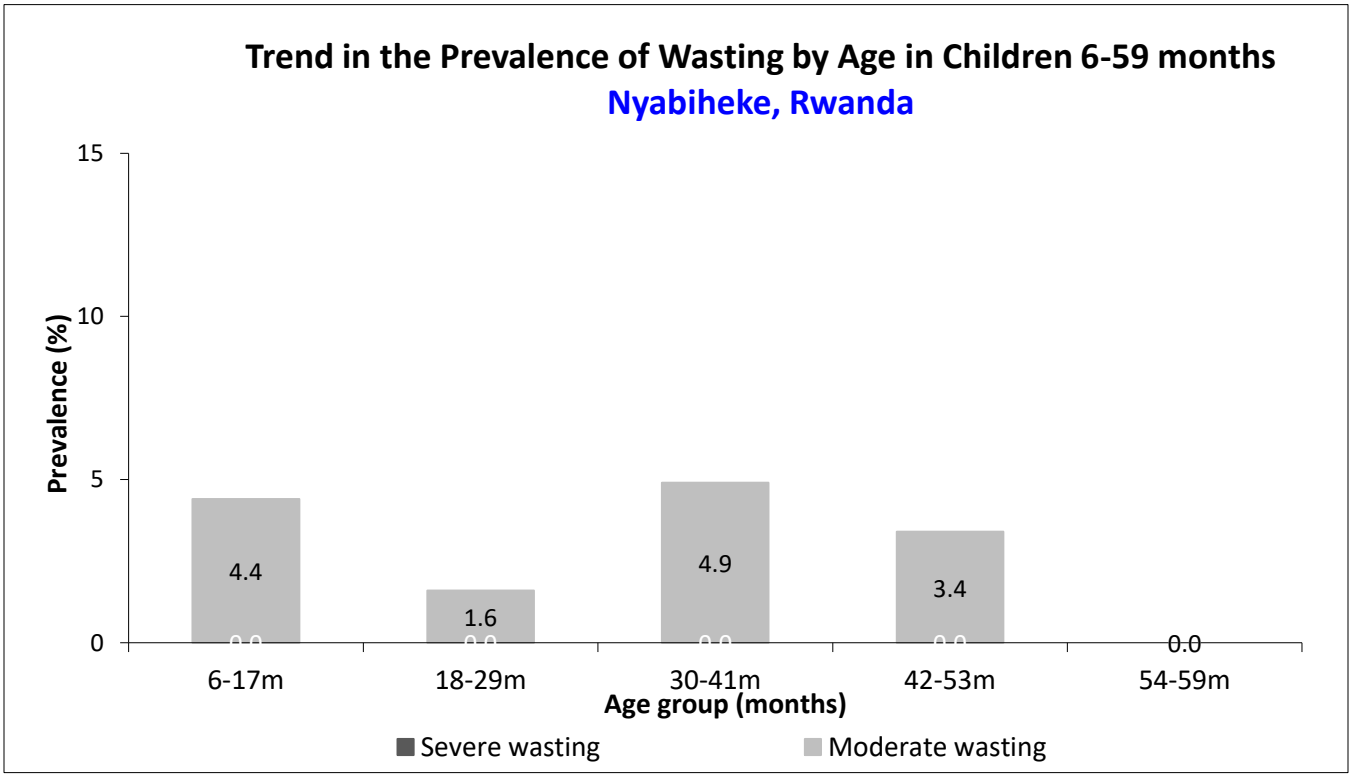


FIGURE 16 PREVALENCE OF WASTING BY AGE IN CHILDREN 6-59 MONTHS IN MAHAMA

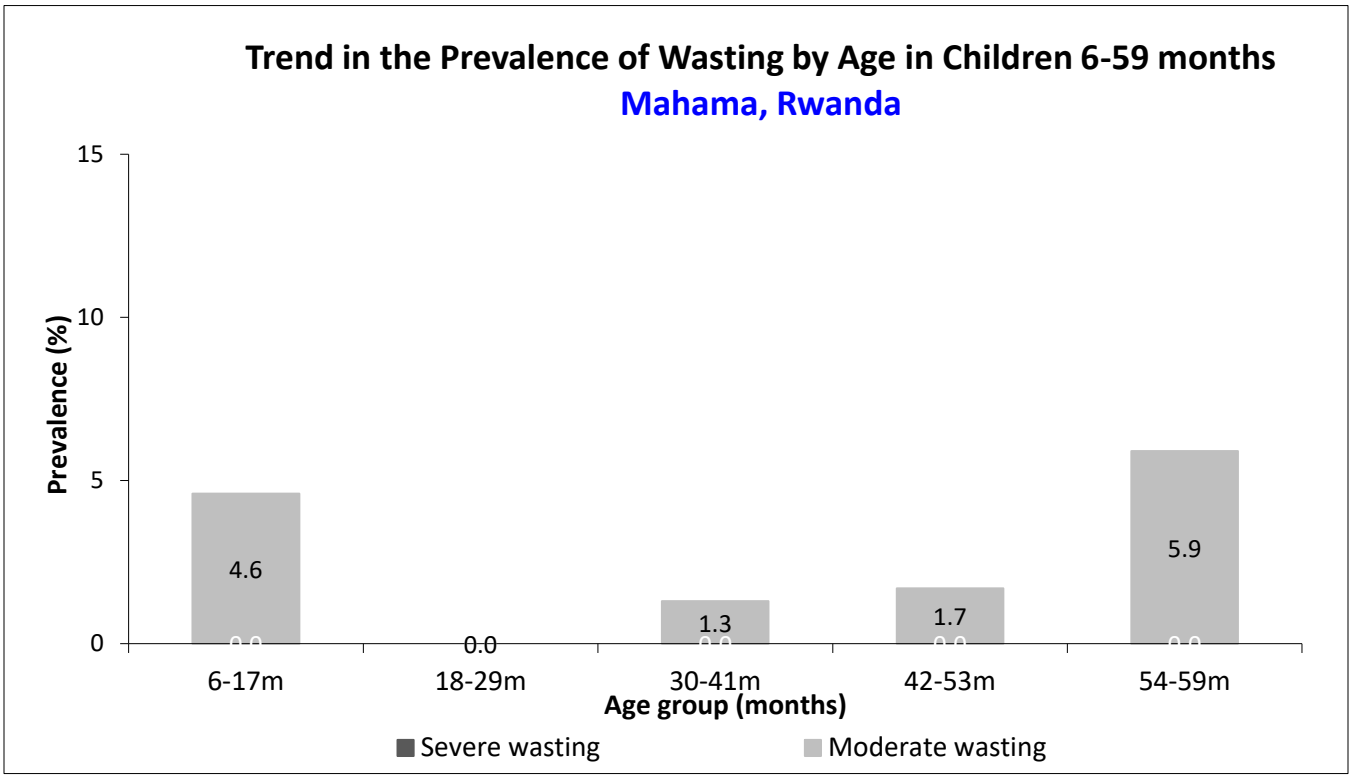


TABLE 36 DISTRIBUTION OF SEVERE ACUTE MALNUTRITION AND OEDEMA BASED ON WEIGHT-FOR-HEIGHT Z-SCORES IN GIHEMBE

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 1 (0.3 %)	Not severely malnourished No. 288 (99.7 %)

TABLE 37 DISTRIBUTION OF SEVERE ACUTE MALNUTRITION AND OEDEMA BASED ON WEIGHT-FOR-HEIGHT Z-SCORES IN KIGEME

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 1 (0.3 %)	Not severely malnourished No. 330 (99.7 %)

TABLE 38 DISTRIBUTION OF SEVERE ACUTE MALNUTRITION AND OEDEMA BASED ON WEIGHT-FOR-HEIGHT Z-SCORES IN KIZIBA

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 3 (1.0 %)	Not severely malnourished No. 298 (99.0 %)

TABLE 39 DISTRIBUTION OF SEVERE ACUTE MALNUTRITION AND OEDEMA BASED ON WEIGHT-FOR-HEIGHT Z-SCORES IN MUGOMBWA

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 0 (0.0 %)	Not severely malnourished No. 252 (100.0 %)

TABLE 40 DISTRIBUTION OF SEVERE ACUTE MALNUTRITION AND OEDEMA BASED ON WEIGHT-FOR-HEIGHT Z-SCORES IN NYABIHEKE

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 1 (0.4 %)	Not severely malnourished No. 261 (99.6 %)

TABLE 41 DISTRIBUTION OF SEVERE ACUTE MALNUTRITION AND OEDEMA BASED ON WEIGHT-FOR-HEIGHT Z-SCORES IN MAHAMA

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 0 (0.0 %)	Not severely malnourished No. 342 (100.0 %)

FIGURE 17 DISTRIBUTION OF WEIGHT-FOR-HEIGHT Z-SCORES IN GIHEMBE (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

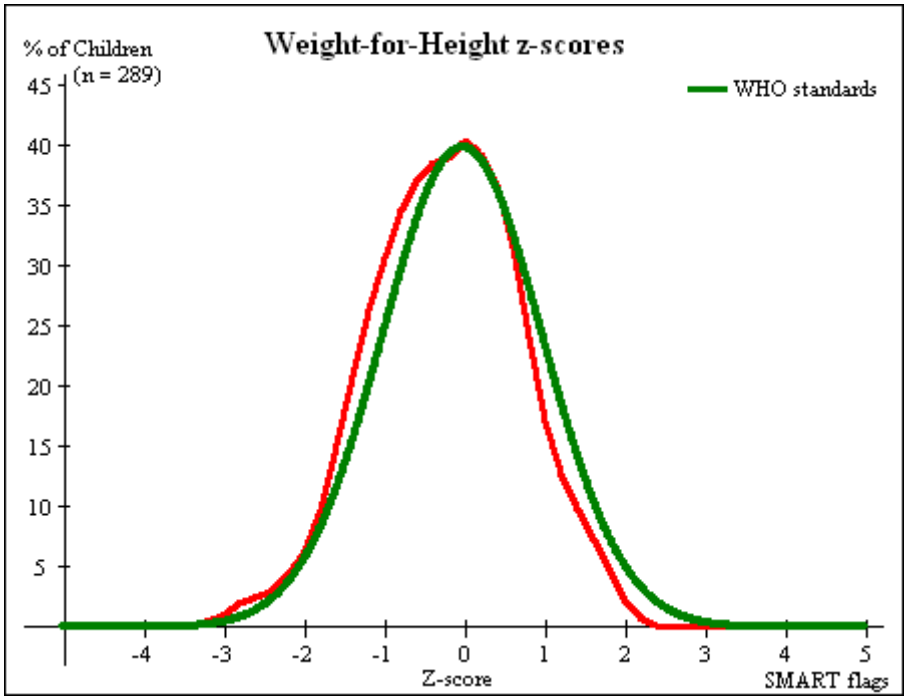


FIGURE 18 DISTRIBUTION OF WEIGHT-FOR-HEIGHT Z-SCORES IN KIGEME (BASED ON WHO GROWTH STANDARDS; THE REFERENCE POPULATION IS SHOWN IN GREEN AND THE SURVEYED POPULATION IS SHOWN IN RED) OF SURVEY POPULATION COMPARED TO REFERENCE POPULATION

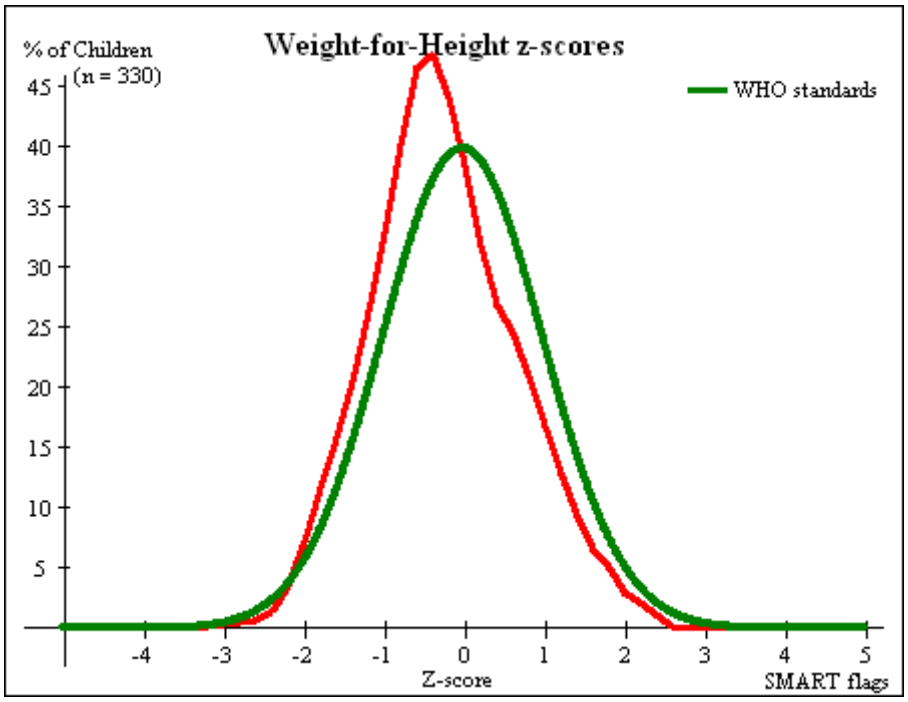


FIGURE 19 DISTRIBUTION OF WEIGHT-FOR-HEIGHT Z-SCORES IN KIZIBA (BASED ON WHO GROWTH STANDARDS; THE REFERENCE POPULATION IS SHOWN IN GREEN AND THE SURVEYED POPULATION IS SHOWN IN RED) OF SURVEY POPULATION COMPARED TO REFERENCE POPULATION

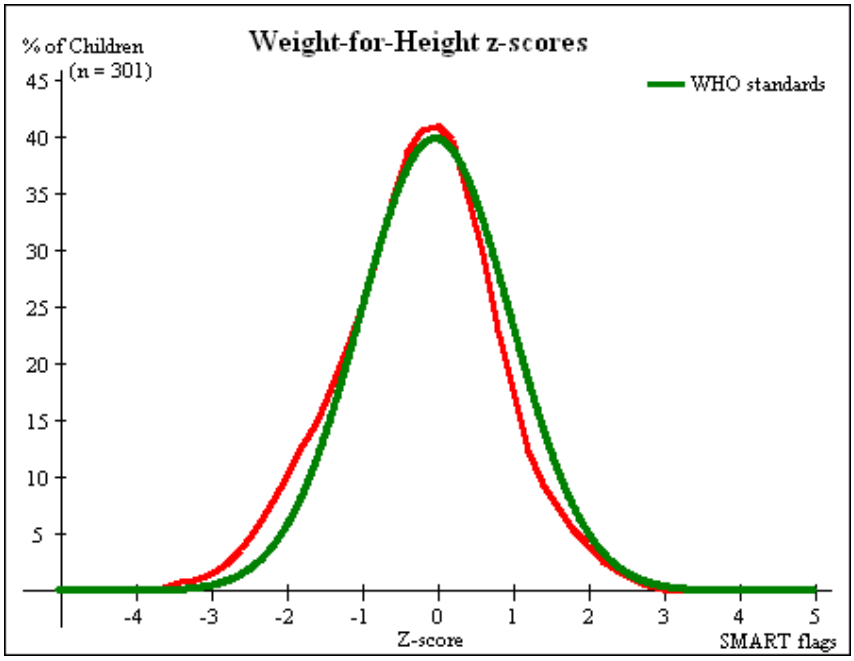


FIGURE 20 DISTRIBUTION OF WEIGHT-FOR-HEIGHT Z-SCORES IN MUGOMBWA (BASED ON WHO GROWTH STANDARDS; THE REFERENCE POPULATION IS SHOWN IN GREEN AND THE SURVEYED POPULATION IS SHOWN IN RED) OF SURVEY POPULATION COMPARED TO REFERENCE POPULATION

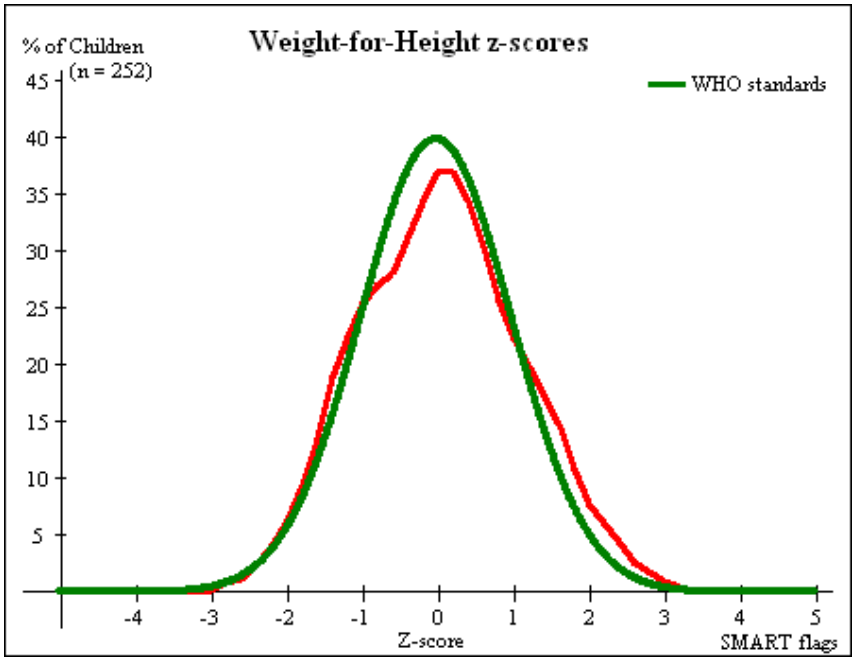


FIGURE 21 DISTRIBUTION OF WEIGHT-FOR-HEIGHT Z-SCORES IN NYABIHEKE (BASED ON WHO GROWTH STANDARDS; THE REFERENCE POPULATION IS SHOWN IN GREEN AND THE SURVEYED POPULATION IS SHOWN IN RED) OF SURVEY POPULATION COMPARED TO REFERENCE POPULATION

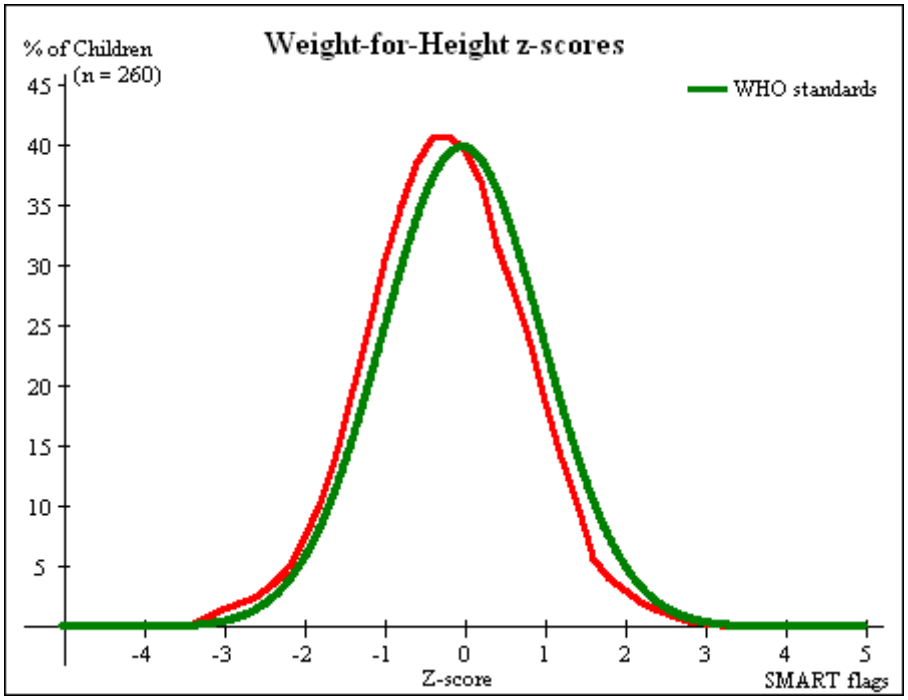


FIGURE 22 DISTRIBUTION OF WEIGHT-FOR-HEIGHT Z-SCORES IN MAHAMA (BASED ON WHO GROWTH STANDARDS; THE REFERENCE POPULATION IS SHOWN IN GREEN AND THE SURVEYED POPULATION IS SHOWN IN RED) OF SURVEY POPULATION COMPARED TO REFERENCE POPULATION

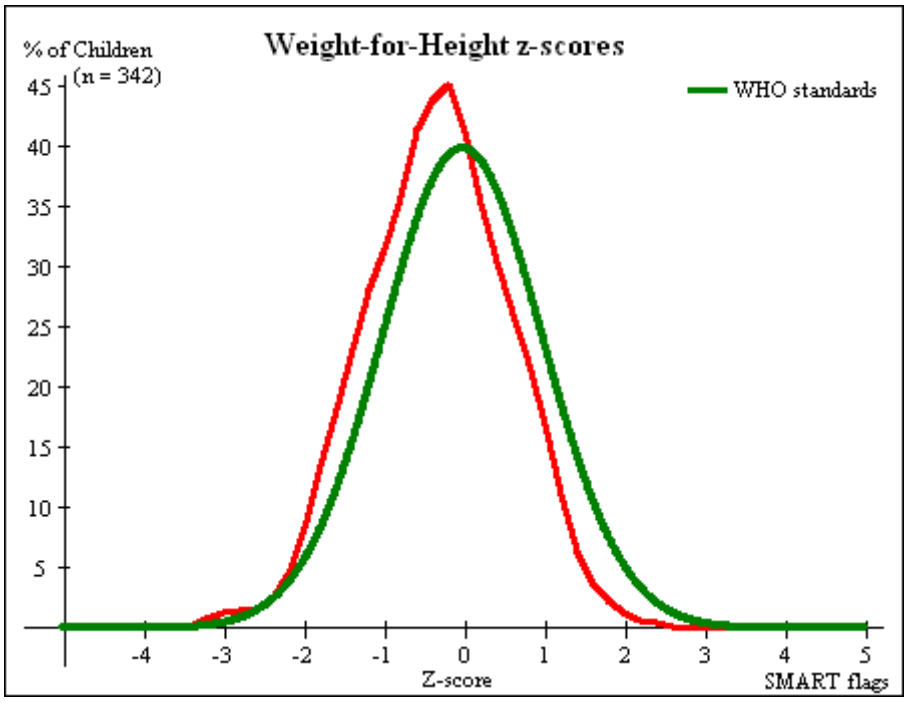


TABLE 42 PREVALENCE OF MUAC MALNUTRITION IN GIHEMBE (AND/OR OEDEMA) AND BY SEX

	All n = 289	Boys n = 141	Girls n = 148
Prevalence of global malnutrition (< 125 mm and/or oedema)	(2) 0.7 % (0.2 - 2.5 95% C.I.)	(1) 0.7 % (0.1 - 3.9 95% C.I.)	(1) 0.7 % (0.1 - 3.7 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(1) 0.3 % (0.1 - 1.9 95% C.I.)	(0) 0.0 % (0.0 - 2.7 95% C.I.)	(1) 0.7 % (0.1 - 3.7 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(1) 0.3 % (0.1 - 1.9 95% C.I.)	(1) 0.7 % (0.1 - 3.9 95% C.I.)	(0) 0.0 % (0.0 - 2.5 95% C.I.)

TABLE 43 PREVALENCE OF MUAC MALNUTRITION IN KIGEME (AND/OR OEDEMA) AND BY SEX

	All n = 331	Boys n = 145	Girls n = 186
Prevalence of global malnutrition (< 125 mm and/or oedema)	(3) 0.9 % (0.3 - 2.6 95% C.I.)	(1) 0.7 % (0.1 - 3.8 95% C.I.)	(2) 1.1 % (0.3 - 3.8 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(2) 0.6 % (0.2 - 2.2 95% C.I.)	(0) 0.0 % (0.0 - 2.6 95% C.I.)	(2) 1.1 % (0.3 - 3.8 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(1) 0.3 % (0.1 - 1.7 95% C.I.)	(1) 0.7 % (0.1 - 3.8 95% C.I.)	(0) 0.0 % (0.0 - 2.0 95% C.I.)

TABLE 44 PREVALENCE OF MUAC MALNUTRITION IN KIZIBA (AND/OR OEDEMA) AND BY SEX

	All n = 301	Boys n = 147	Girls n = 154
Prevalence of global malnutrition (< 125 mm and/or oedema)	(9) 3.0 % (1.6 - 5.6 95% C.I.)	(3) 2.0 % (0.7 - 5.8 95% C.I.)	(6) 3.9 % (1.8 - 8.2 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(6) 2.0 % (0.9 - 4.3 95% C.I.)	(3) 2.0 % (0.7 - 5.8 95% C.I.)	(3) 1.9 % (0.7 - 5.6 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(3) 1.0 % (0.3 - 2.9 95% C.I.)	(0) 0.0 % (0.0 - 2.5 95% C.I.)	(3) 1.9 % (0.7 - 5.6 95% C.I.)

TABLE 45 PREVALENCE OF MUAC MALNUTRITION IN MUGOMBWA (AND/OR OEDEMA) AND BY SEX

	All n = 252	Boys n = 134	Girls n = 118
Prevalence of global malnutrition (< 125 mm and/or oedema)	(0) 0.0 % (0.0 – 0.0 95% C.I.)	(0) 0.0 % (0.0 – 0.0 95% C.I.)	(0) 0.0 % (0.0 – 0.0 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(0) 0.0 % (0.0 – 0.0 95% C.I.)	(0) 0.0 % (0.0 – 0.0 95% C.I.)	(0) 0.0 % (0.0 – 0.0 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(0) 0.0 % (0.0 – 0.0 95% C.I.)	(0) 0.0 % (0.0 – 0.0 95% C.I.)	(0) 0.0 % (0.0 – 0.0 95% C.I.)

TABLE 46 PREVALENCE OF MUAC MALNUTRITION IN NYABIHEKE (AND/OR OEDEMA) AND BY SEX

	All n = 263	Boys n = 136	Girls n = 127
Prevalence of global malnutrition (< 125 mm and/or oedema)	(2) 0.8 % (0.2 - 2.7 95% C.I.)	(1) 0.7 % (0.1 - 4.0 95% C.I.)	(1) 0.8 % (0.1 - 4.3 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(1) 0.4 % (0.1 - 2.1 95% C.I.)	(0) 0.0 % (0.0 - 2.7 95% C.I.)	(1) 0.8 % (0.1 - 4.3 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(1) 0.4 % (0.1 - 2.1 95% C.I.)	(1) 0.7 % (0.1 - 4.0 95% C.I.)	(0) 0.0 % (0.0 - 2.9 95% C.I.)

TABLE 47 PREVALENCE OF MUAC MALNUTRITION IN MAHAMA (AND/OR OEDEMA) AND BY SEX

	All n = 342	Boys n = 181	Girls n = 161
Prevalence of global malnutrition (< 125 mm and/or oedema)	(5) 1.5 % (0.6 - 3.4 95% C.I.)	(2) 1.1 % (0.3 - 3.9 95% C.I.)	(3) 1.9 % (0.6 - 5.3 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(4) 1.2 % (0.5 - 3.0 95% C.I.)	(2) 1.1 % (0.3 - 3.9 95% C.I.)	(2) 1.2 % (0.3 - 4.4 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(1) 0.3 % (0.1 - 1.6 95% C.I.)	(0) 0.0 % (0.0 - 2.1 95% C.I.)	(1) 0.6 % (0.1 - 3.4 95% C.I.)

TABLE 48 PREVALENCE OF MUAC MALNUTRITION BY AGE, BASED ON MUAC CUT OFFS AND/OR OEDEMA IN GIHEMBE

		Severe wasting (< 115 mm)		Moderate wasting (>= 115 mm and < 125 mm)		Normal (> = 125 mm)		Oedema	
Age (mo.)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	74	1	1.4	1	1.4	72	97.3	0	0.0
18-29	65	0	0.0	0	0.0	65	100.0	0	0.0
30-41	58	0	0.0	0	0.0	58	100.0	0	0.0
42-53	61	0	0.0	0	0.0	61	100.0	0	0.0
54-59	31	0	0.0	0	0.0	31	100.0	0	0.0
Total	289	1	0.3	1	0.3	287	99.3	0	0.0

TABLE 49 PREVALENCE OF MUAC MALNUTRITION BY AGE, BASED ON MUAC CUT OFFS AND/OR OEDEMA IN KIGEME

		Severe wasting (< 115 mm)		Moderate wasting (>= 115 mm and < 125 mm)		Normal (> = 125 mm)		Oedema	
Age (mo.)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	66	1	1.5	1	1.5	64	97.0	0	0.0
18-29	72	0	0.0	1	1.4	71	98.6	0	0.0
30-41	68	0	0.0	0	0.0	68	100.0	0	0.0
42-53	82	0	0.0	0	0.0	82	100.0	0	0.0
54-59	43	0	0.0	0	0.0	43	100.0	0	0.0
Total	331	1	0.3	2	0.6	328	99.1	0	0.0

TABLE 50 PREVALENCE OF MUAC MALNUTRITION BY AGE, BASED ON MUAC CUT OFFS AND/OR OEDEMA IN KIZIBA

		Severe wasting (< 115 mm)		Moderate wasting (>= 115 mm and < 125 mm)		Normal (> = 125 mm)		Oedema	
Age (mo.)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	70	3	4.3	5	7.1	62	88.6	0	0.0
18-29	66	0	0.0	1	1.5	65	98.5	0	0.0
30-41	61	0	0.0	0	0.0	61	100.0	0	0.0
42-53	63	0	0.0	0	0.0	63	100.0	0	0.0
54-59	41	0	0.0	0	0.0	41	100.0	0	0.0
Total	301	3	1.0	6	2.0	292	97.0	0	0.0

TABLE 51 PREVALENCE OF MUAC MALNUTRITION BY AGE, BASED ON MUAC CUT OFFS AND/OR OEDEMA IN MUGOMBWA

		Severe wasting (< 115 mm)		Moderate wasting (>= 115 mm and < 125 mm)		Normal (> = 125 mm)		Oedema	
Age (mo.)	Total no.	No.	%	No.	%	No.	%	No.	%
6-17	58	0	0.0	0	0.0	58	100.0	0	0.0
18-29	50	0	0.0	0	0.0	50	100.0	0	0.0
30-41	55	0	0.0	0	0.0	55	100.0	0	0.0
42-53	67	0	0.0	0	0.0	67	100.0	0	0.0
54-59	22	0	0.0	0	0.0	22	100.0	0	0.0
Total	252	0	0.0	0	0.0	252	100.0	0	0.0

TABLE 52 PREVALENCE OF MUAC MALNUTRITION BY AGE, BASED ON MUAC CUT OFFS AND/OR OEDEMA IN NYABIHEKE

		Severe wasting (< 115 mm)		Moderate wasting (>= 115 mm and < 125 mm)		Normal (> = 125 mm)		Oedema	
Age (mo.)	Total no.	No.	%	No.	%	No.	%	No.	%
6-17	47	1	2.1	0	0.0	46	97.9	0	0.0
18-29	61	0	0.0	1	1.6	60	98.4	0	0.0
30-41	61	0	0.0	0	0.0	61	100.0	0	0.0
42-53	60	0	0.0	0	0.0	60	100.0	0	0.0
54-59	34	0	0.0	0	0.0	34	100.0	0	0.0
Total	263	1	0.4	1	0.4	261	99.2	0	0.0

TABLE 53 PREVALENCE OF MUAC MALNUTRITION BY AGE, BASED ON MUAC CUT OFFS AND/OR OEDEMA IN MAHAMA

		Severe wasting (< 115 mm)		Moderate wasting (>= 115 mm and < 125 mm)		Normal (> = 125 mm)		Oedema	
Age (mo.)	Total no.	No.	%	No.	%	No.	%	No.	%
6-17	87	1	1.1	4	4.6	82	94.3	0	0.0
18-29	86	0	0.0	0	0.0	86	100.0	0	0.0
30-41	75	0	0.0	0	0.0	75	100.0	0	0.0
42-53	60	0	0.0	0	0.0	60	100.0	0	0.0
54-59	34	0	0.0	0	0.0	34	100.0	0	0.0
Total	342	1	0.3	4	1.2	337	98.5	0	0.0

TABLE 54 PREVALENCE OF UNDERWEIGHT BASED ON WEIGHT-FOR-AGE Z-SCORES BY SEX IN GIHEMBE

	All n = 287	Boys n = 139	Girls n = 148
Prevalence of underweight (<-2 z-score)	(25) 8.7 % (6.0 - 12.5 95% C.I.)	(16) 11.5 % (7.2 - 17.9 95% C.I.)	(9) 6.1 % (3.2 - 11.2 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(22) 7.7 % (5.1 - 11.3 95% C.I.)	(13) 9.4 % (5.5 - 15.3 95% C.I.)	(9) 6.1 % (3.2 - 11.2 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(3) 1.0 % (0.4 - 3.0 95% C.I.)	(3) 2.2 % (0.7 - 6.2 95% C.I.)	(0) 0.0 % (0.0 - 2.5 95% C.I.)

TABLE 55 PREVALENCE OF UNDERWEIGHT BASED ON WEIGHT-FOR-AGE Z-SCORES BY SEX IN KIGEME

	All n = 329	Boys n = 144	Girls n = 185
Prevalence of underweight (<-2 z-score)	(42) 12.8 % (9.6 - 16.8 95% C.I.)	(12) 8.3 % (4.8 - 14.0 95% C.I.)	(30) 16.2 % (11.6 - 22.2 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(39) 11.9 % (8.8 - 15.8 95% C.I.)	(10) 6.9 % (3.8 - 12.3 95% C.I.)	(29) 15.7 % (11.1 - 21.6 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(3) 0.9 % (0.3 - 2.6 95% C.I.)	(2) 1.4 % (0.4 - 4.9 95% C.I.)	(1) 0.5 % (0.1 - 3.0 95% C.I.)

TABLE 56 PREVALENCE OF UNDERWEIGHT BASED ON WEIGHT-FOR-AGE Z-SCORES BY SEX IN KIZIBA

	All n = 301	Boys n = 147	Girls n = 154
Prevalence of underweight (<-2 z-score)	(41) 13.6 % (10.2 - 18.0 95% C.I.)	(22) 15.0 % (10.1 - 21.6 95% C.I.)	(19) 12.3 % (8.0 - 18.5 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(34) 11.3 % (8.2 - 15.4 95% C.I.)	(20) 13.6 % (9.0 - 20.1 95% C.I.)	(14) 9.1 % (5.5 - 14.7 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(7) 2.3 % (1.1 - 4.7 95% C.I.)	(2) 1.4 % (0.4 - 4.8 95% C.I.)	(5) 3.2 % (1.4 - 7.4 95% C.I.)

TABLE 57 PREVALENCE OF UNDERWEIGHT BASED ON WEIGHT-FOR-AGE Z-SCORES BY SEX IN MUGOMBWA

	All n = 252	Boys n = 134	Girls n = 118
Prevalence of underweight (<-2 z-score)	(18) 7.1 % (6.6 – 7.7 95% C.I.)	(8) 6.0 % (5.4 – 6.6 95% C.I.)	(10) 8.5 % (6.8 – 10.5 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(17) 6.7 % (6.2 – 7.3 95% C.I.)	(8) 6.0 % (5.4 - 6,6 95% C.I.)	(9) 7.6 % (6.1 – 9.4 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(1) 0.4 % (0.4 – 0.4 95% C.I.)	(0) 0.0 % (0.0 – 0.0 95% C.I.)	(1) 0.8 % (0.7 – 1.1 95% C.I.)

TABLE 58 PREVALENCE OF UNDERWEIGHT BASED ON WEIGHT-FOR-AGE Z-SCORES BY SEX IN NYABIHEKE

	All n = 261	Boys n = 134	Girls n = 127
Prevalence of underweight (<-2 z-score)	(24) 9.2 % (6.3 - 13.3 95% C.I.)	(12) 9.0 % (5.2 - 15.0 95% C.I.)	(12) 9.4 % (5.5 - 15.8 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(20) 7.7 % (5.0 - 11.5 95% C.I.)	(10) 7.5 % (4.1 - 13.2 95% C.I.)	(10) 7.9 % (4.3 - 13.9 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(4) 1.5 % (0.6 - 3.9 95% C.I.)	(2) 1.5 % (0.4 - 5.3 95% C.I.)	(2) 1.6 % (0.4 - 5.6 95% C.I.)

TABLE 59 PREVALENCE OF UNDERWEIGHT BASED ON WEIGHT-FOR-AGE Z-SCORES BY SEX IN MAHAMA

	All n = 342	Boys n = 181	Girls n = 161
Prevalence of underweight (<-2 z-score)	(48) 14.0 % (10.8 - 18.1 95% C.I.)	(29) 16.0 % (11.4 - 22.1 95% C.I.)	(19) 11.8 % (7.7 - 17.7 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(45) 13.2 % (10.0 - 17.2 95% C.I.)	(27) 14.9 % (10.5 - 20.8 95% C.I.)	(18) 11.2 % (7.2 - 17.0 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(3) 0.9 % (0.3 - 2.5 95% C.I.)	(2) 1.1 % (0.3 - 3.9 95% C.I.)	(1) 0.6 % (0.1 - 3.4 95% C.I.)

TABLE 60 PREVALENCE OF STUNTING BASED ON HEIGHT-FOR-AGE Z-SCORES AND BY SEX IN GIHEMBE

	All n = 287	**Boys** n = 139	**Girls** n = 148
Prevalence of stunting (<-2 z-score)	(49) 17.1 % (13.2 - 21.9 95% C.I.)	(30) 21.6 % (15.6 - 29.1 95% C.I.)	(19) 12.8 % (8.4 - 19.2 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(36) 12.5 % (9.2 - 16.9 95% C.I.)	(21) 15.1 % (10.1 - 22.0 95% C.I.)	(15) 10.1 % (6.2 - 16.0 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(13) 4.5 % (2.7 - 7.6 95% C.I.)	(9) 6.5 % (3.4 - 11.8 95% C.I.)	(4) 2.7 % (1.1 - 6.7 95% C.I.)

TABLE 61 PREVALENCE OF STUNTING BASED ON HEIGHT-FOR-AGE Z-SCORES AND BY SEX IN KIGEME

	All n = 329	**Boys** n = 143	**Girls** n = 186
Prevalence of stunting (<-2 z-score)	(92) 28.0 % (23.4 - 33.0 95% C.I.)	(39) 27.3 % (20.6 - 35.1 95% C.I.)	(53) 28.5 % (22.5 - 35.4 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(69) 21.0 % (16.9 - 25.7 95% C.I.)	(30) 21.0 % (15.1 - 28.4 95% C.I.)	(39) 21.0 % (15.7 - 27.4 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(23) 7.0 % (4.7 - 10.3 95% C.I.)	(9) 6.3 % (3.3 - 11.5 95% C.I.)	(14) 7.5 % (4.5 - 12.2 95% C.I.)

TABLE 62 PREVALENCE OF STUNTING BASED ON HEIGHT-FOR-AGE Z-SCORES AND BY SEX IN KIZIBA

	All n = 300	**Boys** n = 146	**Girls** n = 154
Prevalence of stunting (<-2 z-score)	(67) 22.3 % (18.0 - 27.4 95% C.I.)	(31) 21.2 % (15.4 - 28.6 95% C.I.)	(36) 23.4 % (17.4 - 30.7 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(54) 18.0 % (14.1 - 22.7 95% C.I.)	(27) 18.5 % (13.0 - 25.6 95% C.I.)	(27) 17.5 % (12.3 - 24.3 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(13) 4.3 % (2.5 - 7.3 95% C.I.)	(4) 2.7 % (1.1 - 6.8 95% C.I.)	(9) 5.8 % (3.1 - 10.7 95% C.I.)

TABLE 63 PREVALENCE OF STUNTING BASED ON HEIGHT-FOR-AGE Z-SCORES AND BY SEX IN MUGOMBWA

	All n = 251	**Boys** n = 134	**Girls** n = 117
Prevalence of stunting (<-2 z-score)	(47) 18.7 % (13.2 - 25.9 95% C.I.)	(32) 23.9 % (19.6 - 28.7 95% C.I.)	(15) 12.8 % (2.6 - 44.5 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(39) 15.5 % (12.6 - 18.9 95% C.I.)	(28) 20.9 % (17.2 - 25.1 95% C.I.)	(11) 9.4 % (7.5 - 11.7 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(8) 3.2 % (1.3 – 7.4 95% C.I.)	(4) 3.0 % (2.5 - 3.6 95% C.I.)	(4) 3.4 % (0.0 - 5.3 95% C.I.)

TABLE 64 PREVALENCE OF STUNTING BASED ON HEIGHT-FOR-AGE Z-SCORES AND BY SEX IN NYABIHEKE

	All n = 262	**Boys** n = 135	**Girls** n = 127
Prevalence of stunting (<-2 z-score)	(60) 22.9 % (18.2 - 28.4 95% C.I.)	(36) 26.7 % (19.9 - 34.7 95% C.I.)	(24) 18.9 % (13.0 - 26.6 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(56) 21.4 % (16.8 - 26.7 95% C.I.)	(34) 25.2 % (18.6 - 33.1 95% C.I.)	(22) 17.3 % (11.7 - 24.8 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(4) 1.5 % (0.6 - 3.9 95% C.I.)	(2) 1.5 % (0.4 - 5.2 95% C.I.)	(2) 1.6 % (0.4 - 5.6 95% C.I.)

TABLE 65 PREVALENCE OF STUNTING BASED ON HEIGHT-FOR-AGE Z-SCORES AND BY SEX IN MAHAMA

	All n = 341	Boys n = 180	Girls n = 161
Prevalence of stunting (<-2 z-score)	(87) 25.5 % (21.2 - 30.4 95% C.I.)	(58) 32.2 % (25.8 - 39.4 95% C.I.)	(29) 18.0 % (12.8 - 24.7 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(73) 21.4 % (17.4 - 26.1 95% C.I.)	(44) 24.4 % (18.7 - 31.2 95% C.I.)	(29) 18.0 % (12.8 - 24.7 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(14) 4.1 % (2.5 - 6.8 95% C.I.)	(14) 7.8 % (4.7 - 12.6 95% C.I.)	(0) 0.0 % (0.0 - 2.3 95% C.I.)

FIGURE 23 TRENDS IN THE PREVALENCE OF GLOBAL AND SEVERE STUNTING BASED ON WHO GROWTH STANDARDS IN CHILDREN 6-59 MONTHS FROM 2012-2019 IN GIHEMBE

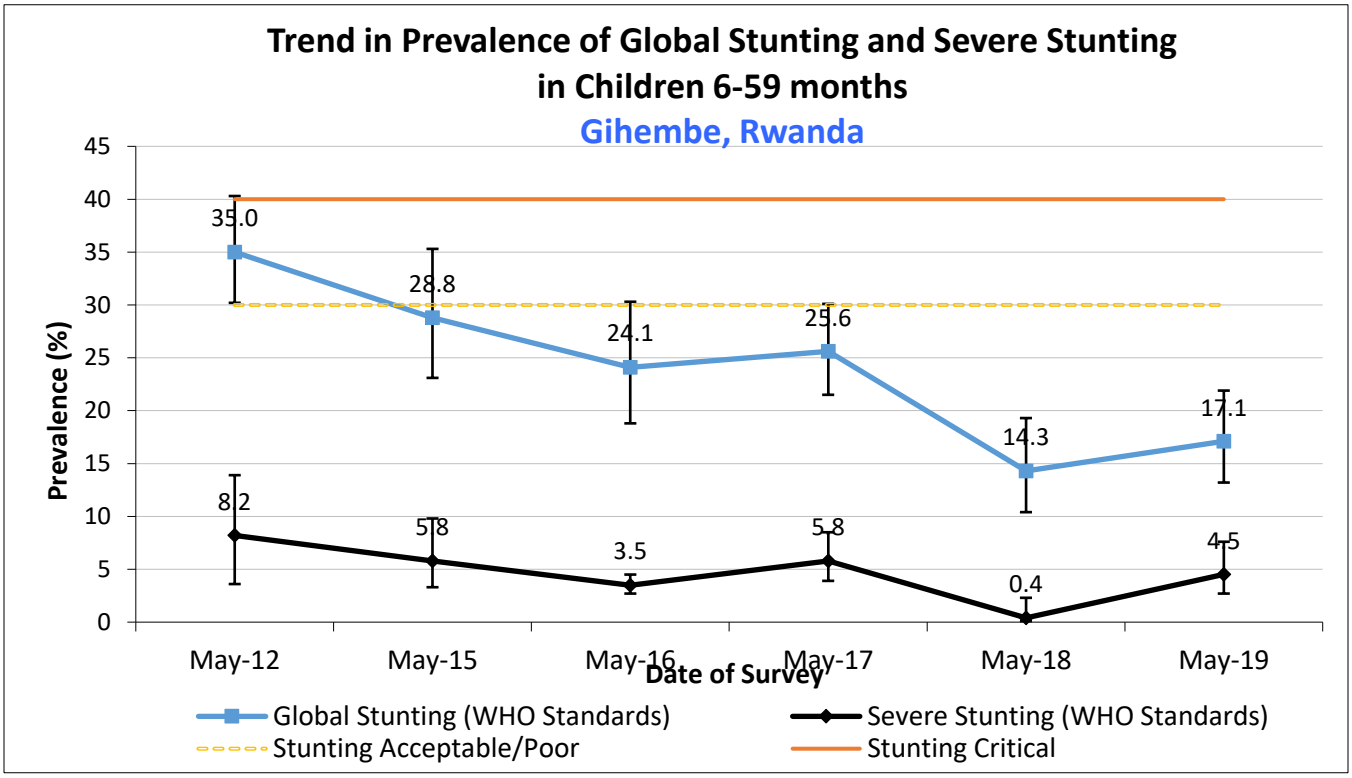


FIGURE 24 TRENDS IN THE PREVALENCE OF GLOBAL AND SEVERE STUNTING BASED ON WHO GROWTH STANDARDS IN CHILDREN 6-59 MONTHS FROM 2015-2019 IN KIGEME

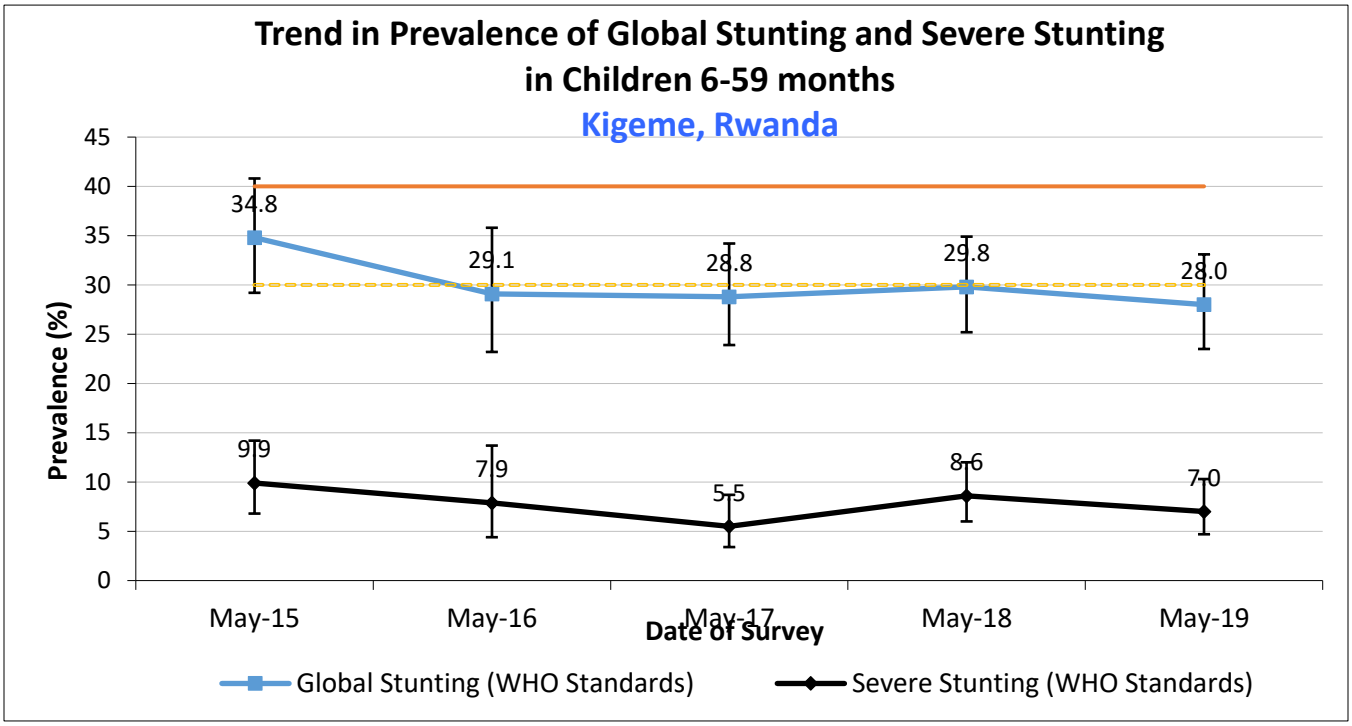


FIGURE 25 TRENDS IN THE PREVALENCE OF GLOBAL AND SEVERE STUNTING BASED ON WHO GROWTH STANDARDS IN CHILDREN 6-59 MONTHS FROM 2012-2019 IN KIZIBA

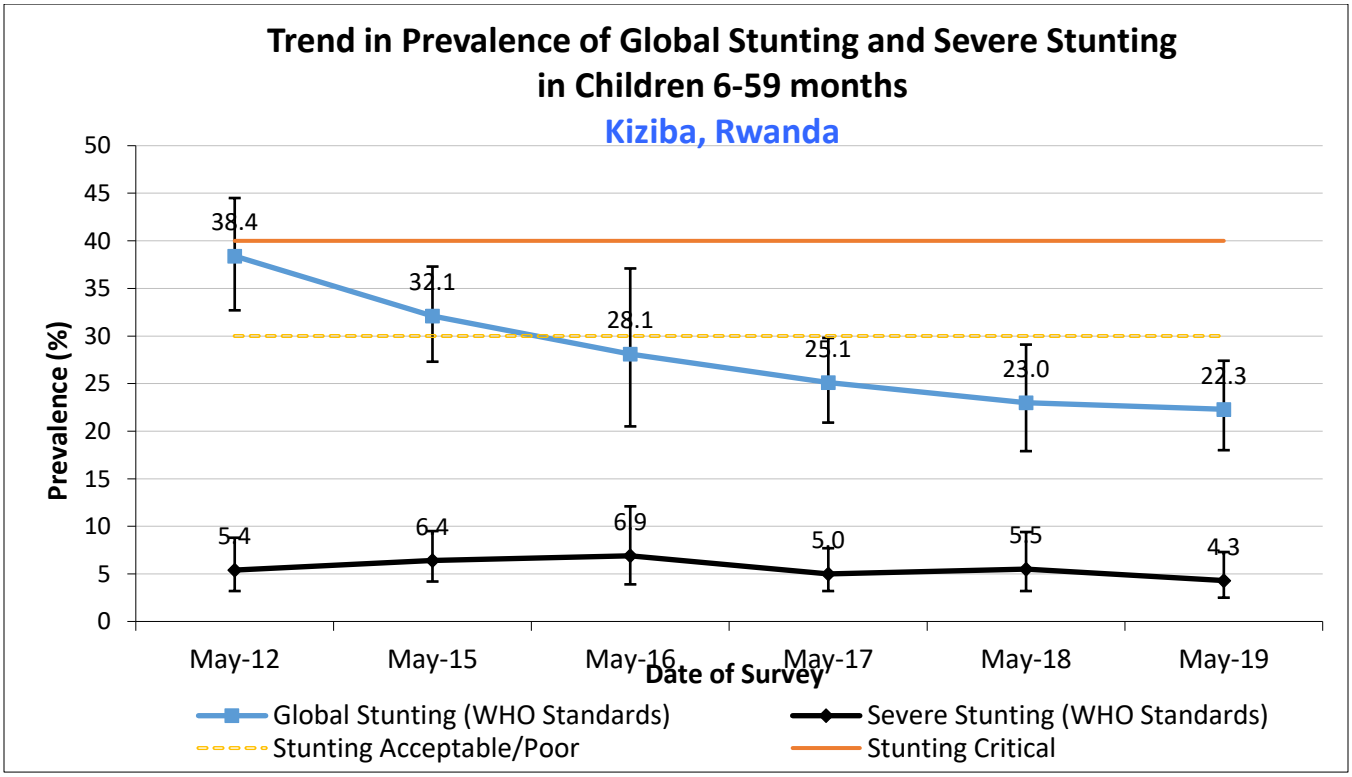


FIGURE 26 TRENDS IN THE PREVALENCE OF GLOBAL AND SEVERE STUNTING BASED ON WHO GROWTH STANDARDS IN CHILDREN 6-59 MONTHS FROM 2015-2019 IN MUGOMBWA

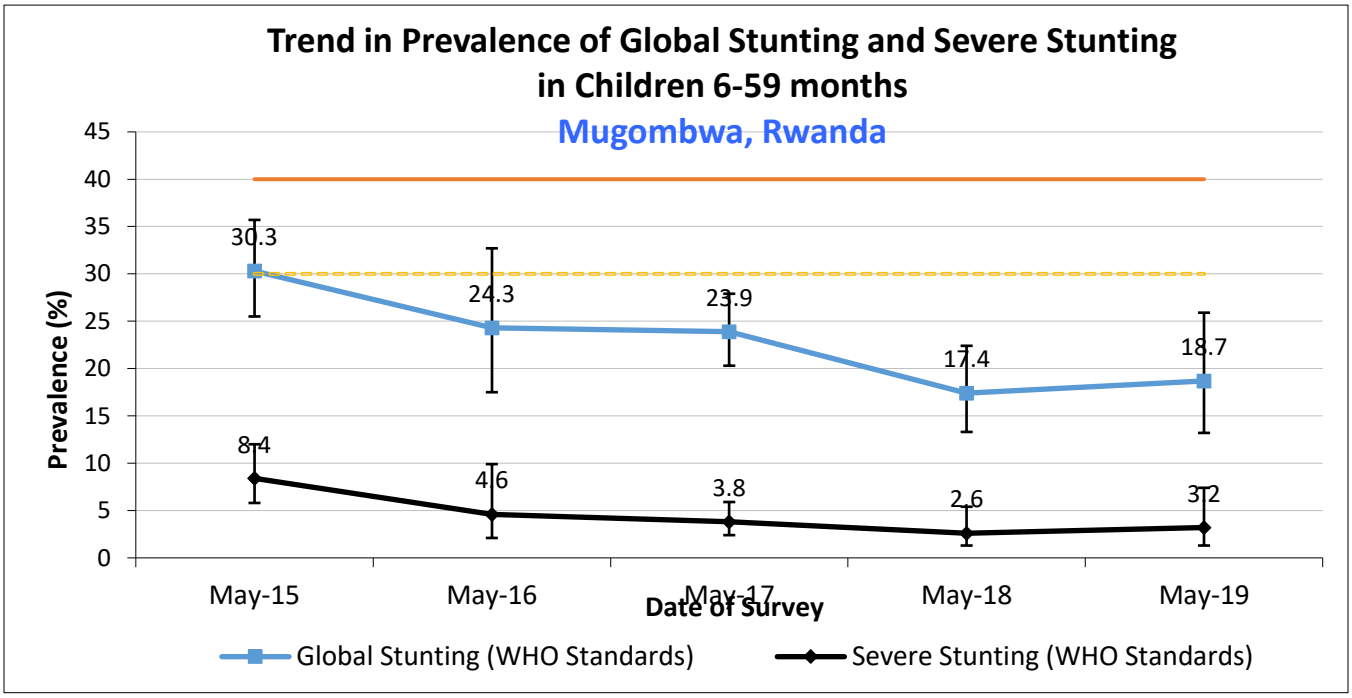


FIGURE 27 TRENDS IN THE PREVALENCE OF GLOBAL AND SEVERE STUNTING BASED ON WHO GROWTH STANDARDS IN CHILDREN 6-59 MONTHS FROM 2012-2019 IN NYABIHEKE

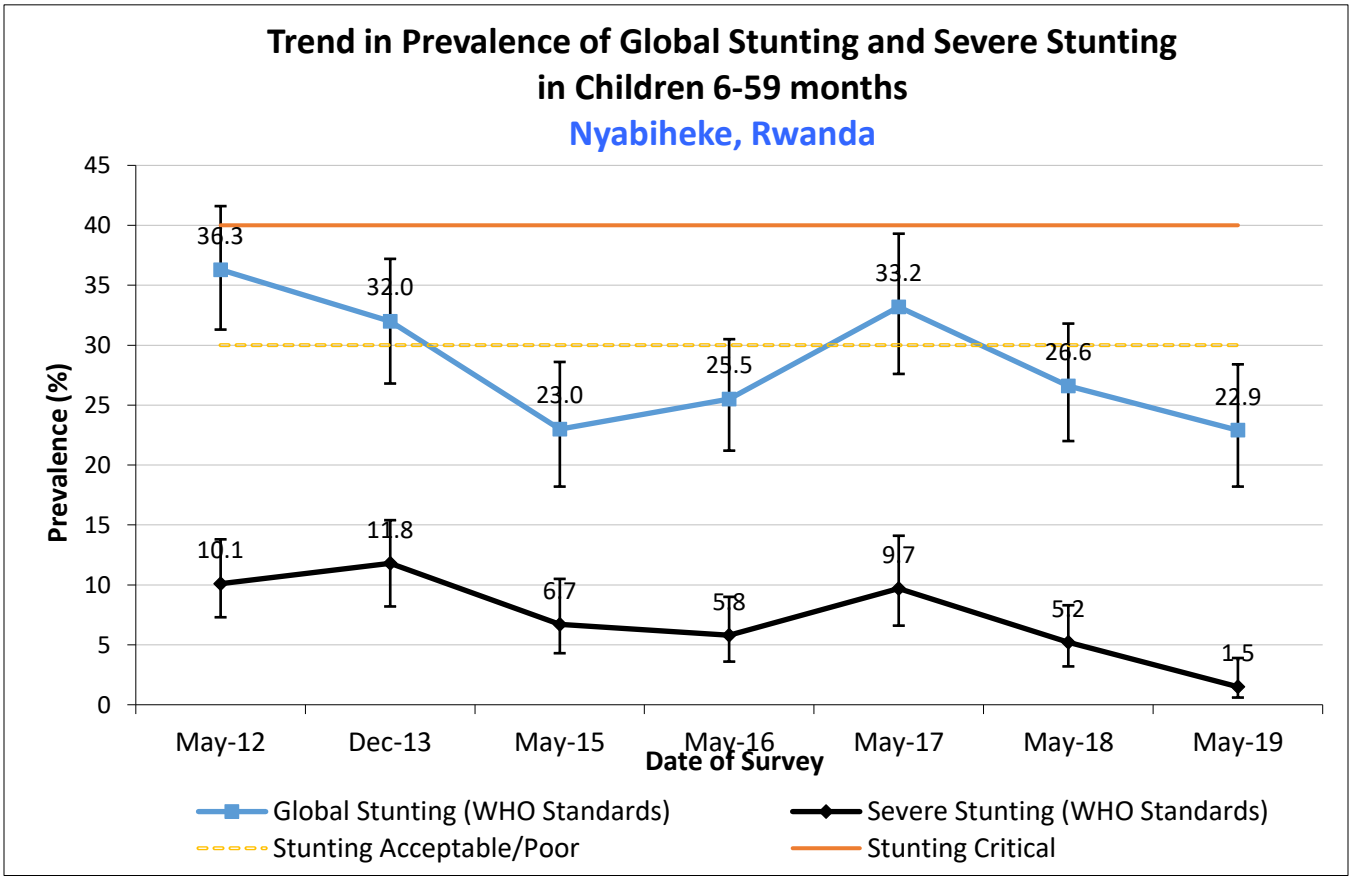


FIGURE 28 TRENDS IN THE PREVALENCE OF GLOBAL AND SEVERE STUNTING BASED ON WHO GROWTH STANDARDS IN CHILDREN 6-59 MONTHS FROM 2015-2019 IN MAHAMA

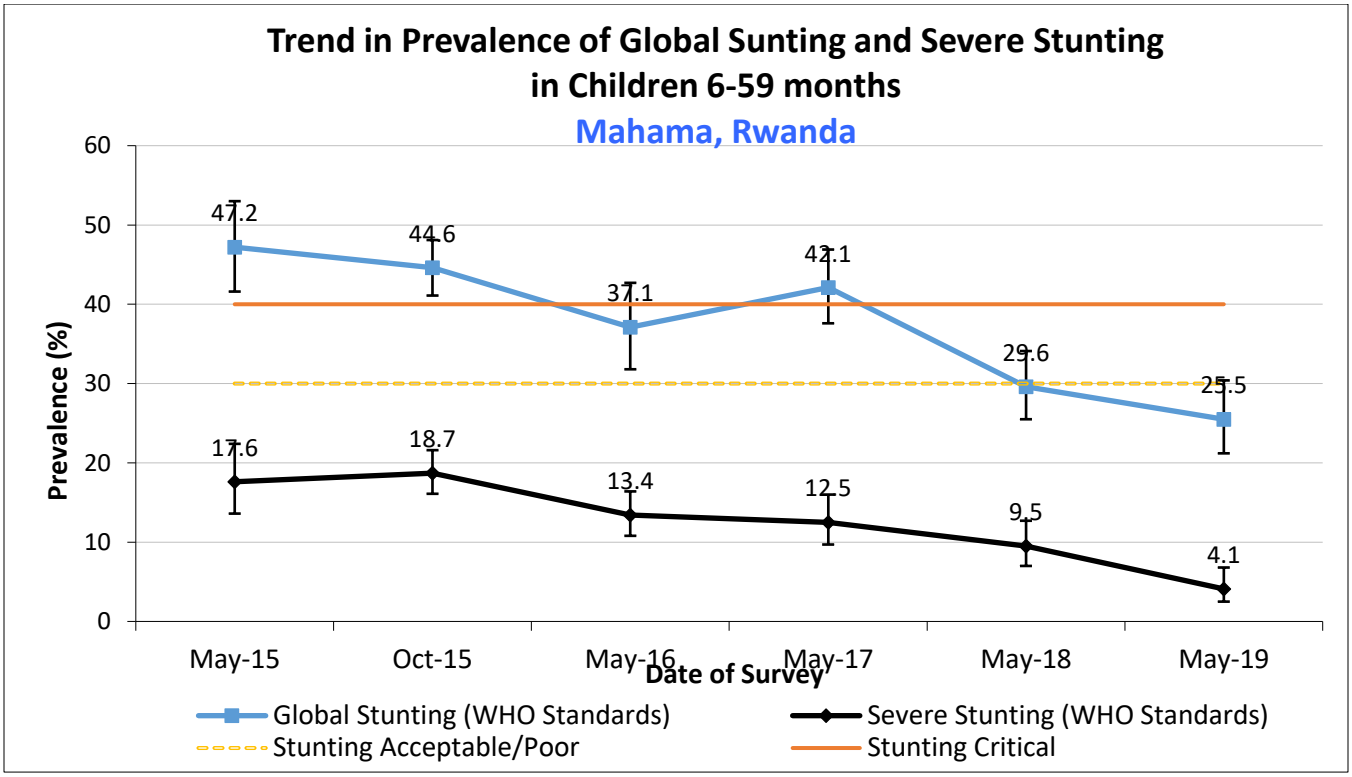


TABLE 66 PREVALENCE OF STUNTING BY AGE BASED ON HEIGHT-FOR-AGE Z-SCORES IN GIHEMBE

		Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
Age (mo.)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	73	3	4.1	8	11.0	62	84.9
18-29	64	2	3.1	6	9.4	56	87.5
30-41	58	7	12.1	10	17.2	41	70.7
42-53	61	1	1.6	11	18.0	49	80.3
54-59	31	0	0.0	1	3.2	30	96.8
Total	287	13	4.5	36	12.5	238	82.9

TABLE 67 PREVALENCE OF STUNTING BY AGE BASED ON HEIGHT-FOR-AGE Z-SCORES IN KIGEME

		Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
Age (mo.)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	64	0	0.0	12	18.8	52	81.3
18-29	72	9	12.5	13	18.1	50	69.4
30-41	68	8	11.8	17	25.0	43	63.2
42-53	82	5	6.1	17	20.7	60	73.2
54-59	43	1	2.3	10	23.3	32	74.4
Total	329	23	7.0	69	21.0	237	72.0

TABLE 68 PREVALENCE OF STUNTING BY AGE BASED ON HEIGHT-FOR-AGE Z-SCORES IN KIZIBA

		Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
Age (mo.)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	70	3	4.3	8	11.4	59	84.3
18-29	65	9	13.8	17	26.2	39	60.0
30-41	61	0	0.0	17	27.9	44	72.1
42-53	63	1	1.6	6	9.5	56	88.9
54-59	41	0	0.0	6	14.6	35	85.4
Total	300	13	4.3	54	18.0	233	77.7

TABLE 69 PREVALENCE OF STUNTING BY AGE BASED ON HEIGHT-FOR-AGE Z-SCORES IN MUGOMBWA

		Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
Age (mo.)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	58	2	3.4	8	13.8	48	82.8
18-29	50	2	4.0	10	20.0	38	76.0
30-41	54	2	3.7	13	24.1	39	72.2
42-53	67	2	3.0	6	9.0	59	88.1
54-59	22	0	0.0	2	9.1	20	90.9
Total	251	8	3.2	39	15.5	204	81.3

TABLE 70 PREVALENCE OF STUNTING BY AGE BASED ON HEIGHT-FOR-AGE Z-SCORES IN NYABIHEKE

		Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
Age (mo.)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	47	0	0.0	8	17.0	39	83.0
18-29	61	3	4.9	13	21.3	45	73.8
30-41	61	1	1.6	17	27.9	43	70.5
42-53	59	0	0.0	12	20.3	47	79.7
54-59	34	0	0.0	6	17.6	28	82.4
Total	262	4	1.5	56	21.4	202	77.1

TABLE 71 PREVALENCE OF STUNTING BY AGE BASED ON HEIGHT-FOR-AGE Z-SCORES IN MAHAMA

		Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
Age (mo.)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	86	3	3.5	25	29.1	58	67.4
18-29	86	6	7.0	14	16.3	66	76.7
30-41	75	3	4.0	16	21.3	56	74.7
42-53	60	1	1.7	14	23.3	45	75.0
54-59	34	1	2.9	4	11.8	29	85.3
Total	341	14	4.1	73	21.4	254	74.5

FIGURE 29 PREVALENCE OF STUNTING BY AGE IN CHILDREN 6-59 MONTHS IN GIHEMBE

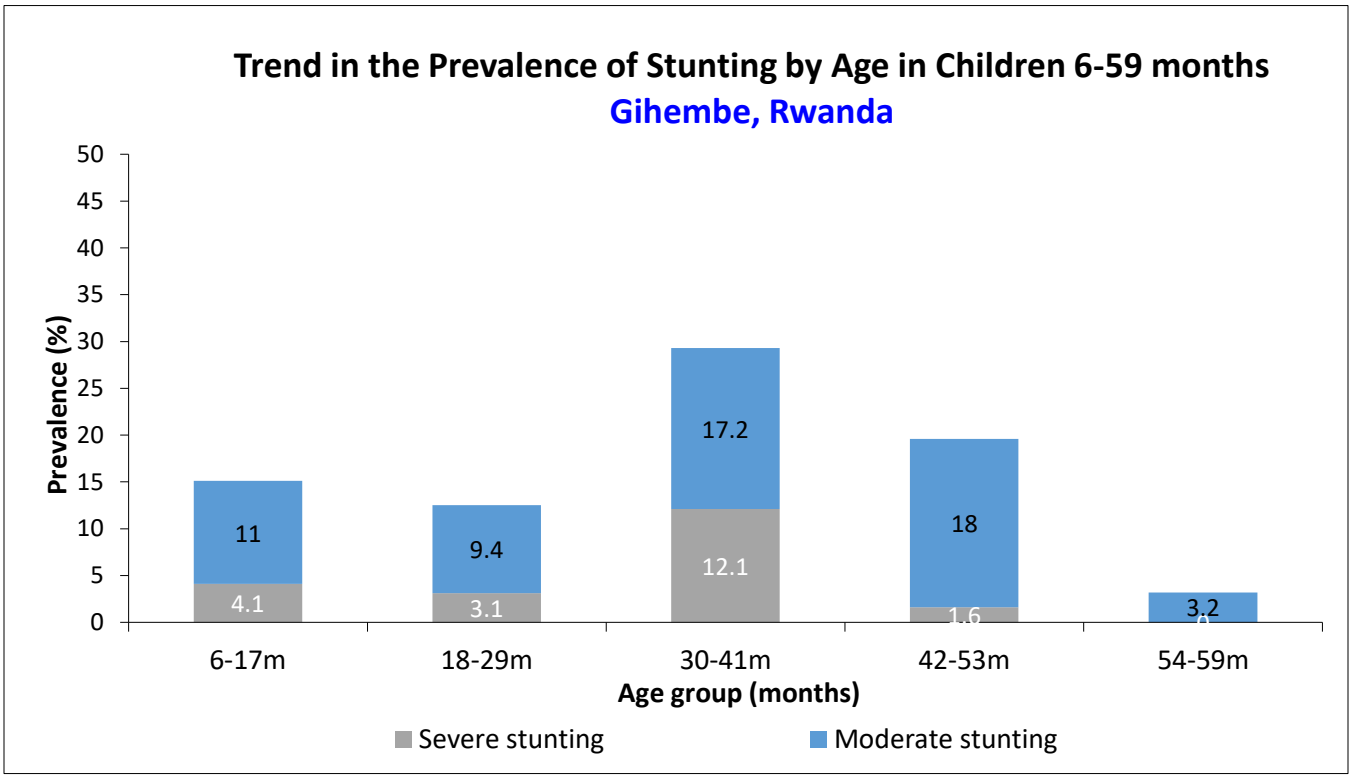


FIGURE 30 PREVALENCE OF STUNTING BY AGE IN CHILDREN 6-59 MONTHS IN KIGEME

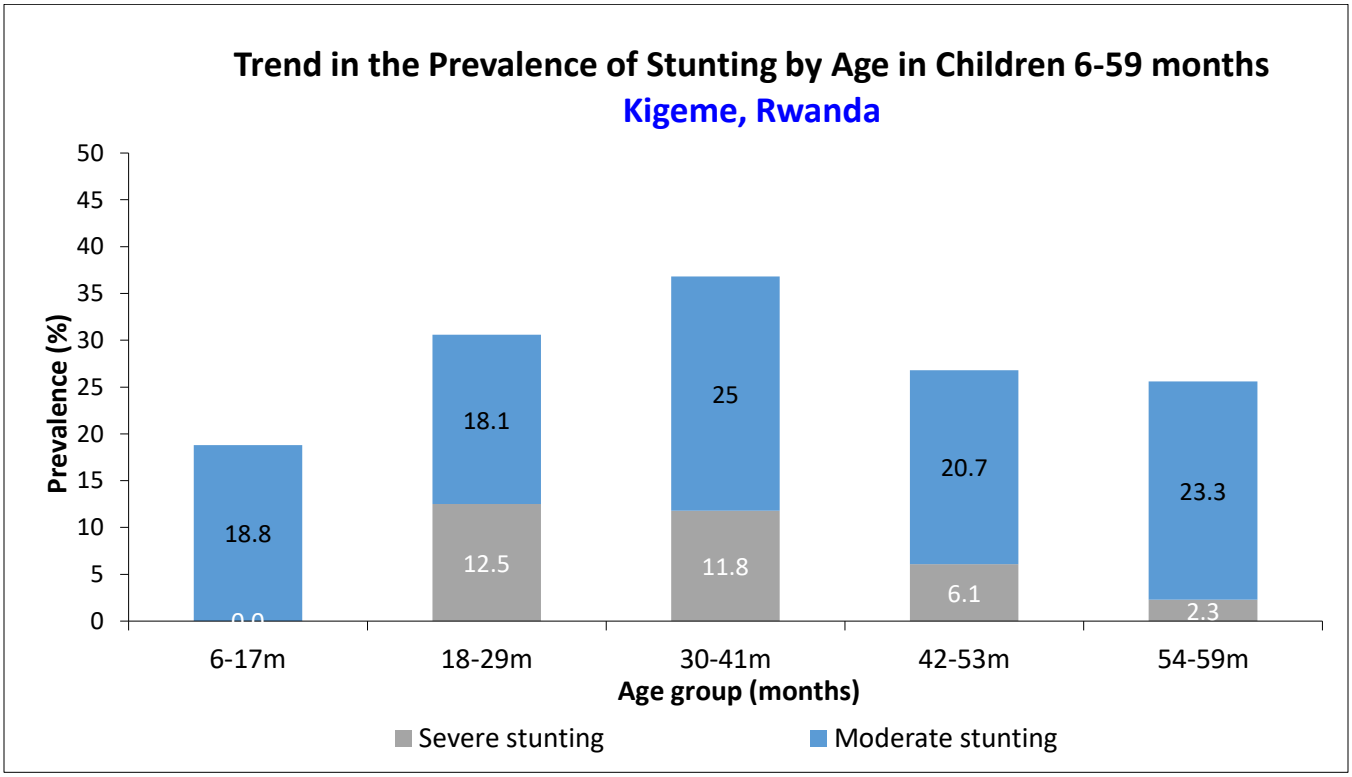


FIGURE 31 PREVALENCE OF STUNTING BY AGE IN CHILDREN 6-59 MONTHS IN KIZIBA

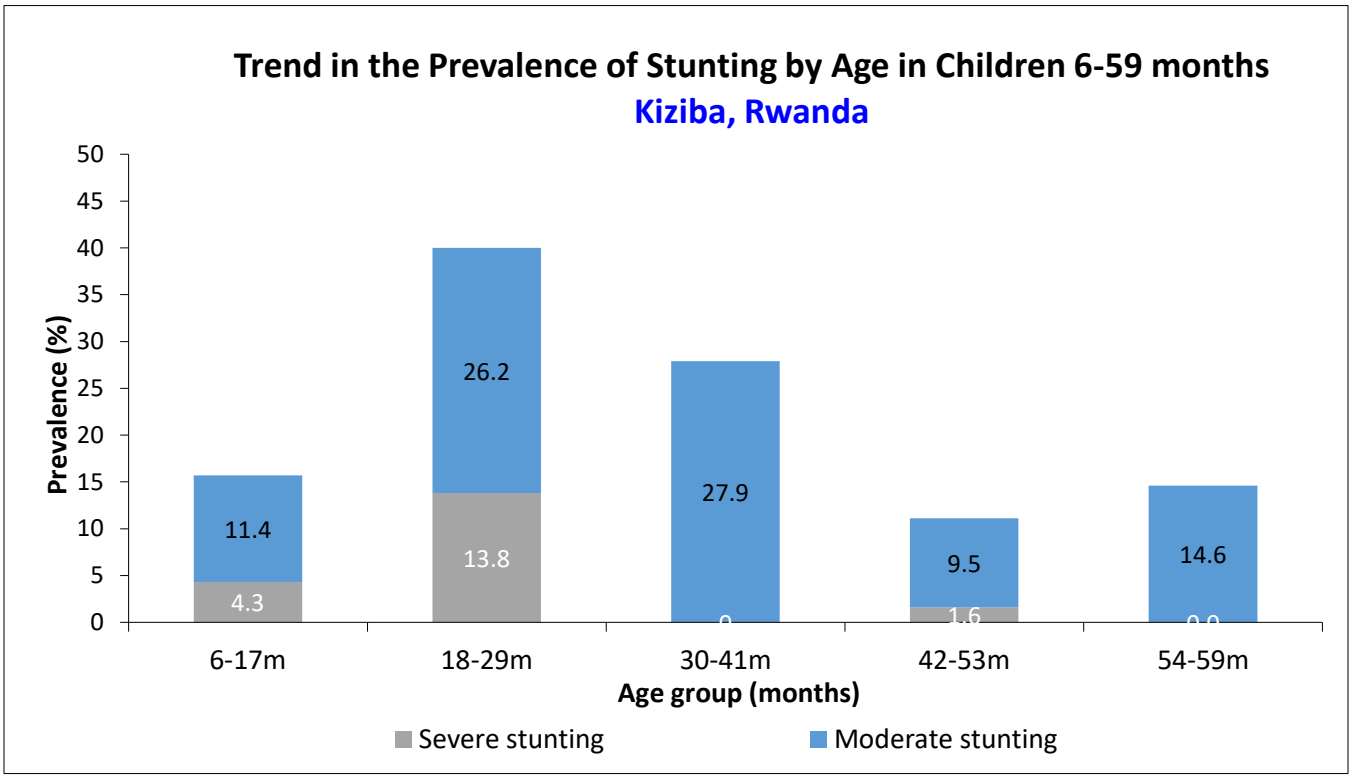


FIGURE 32 PREVALENCE OF STUNTING BY AGE IN CHILDREN 6-59 MONTHS IN MUGOMBWA

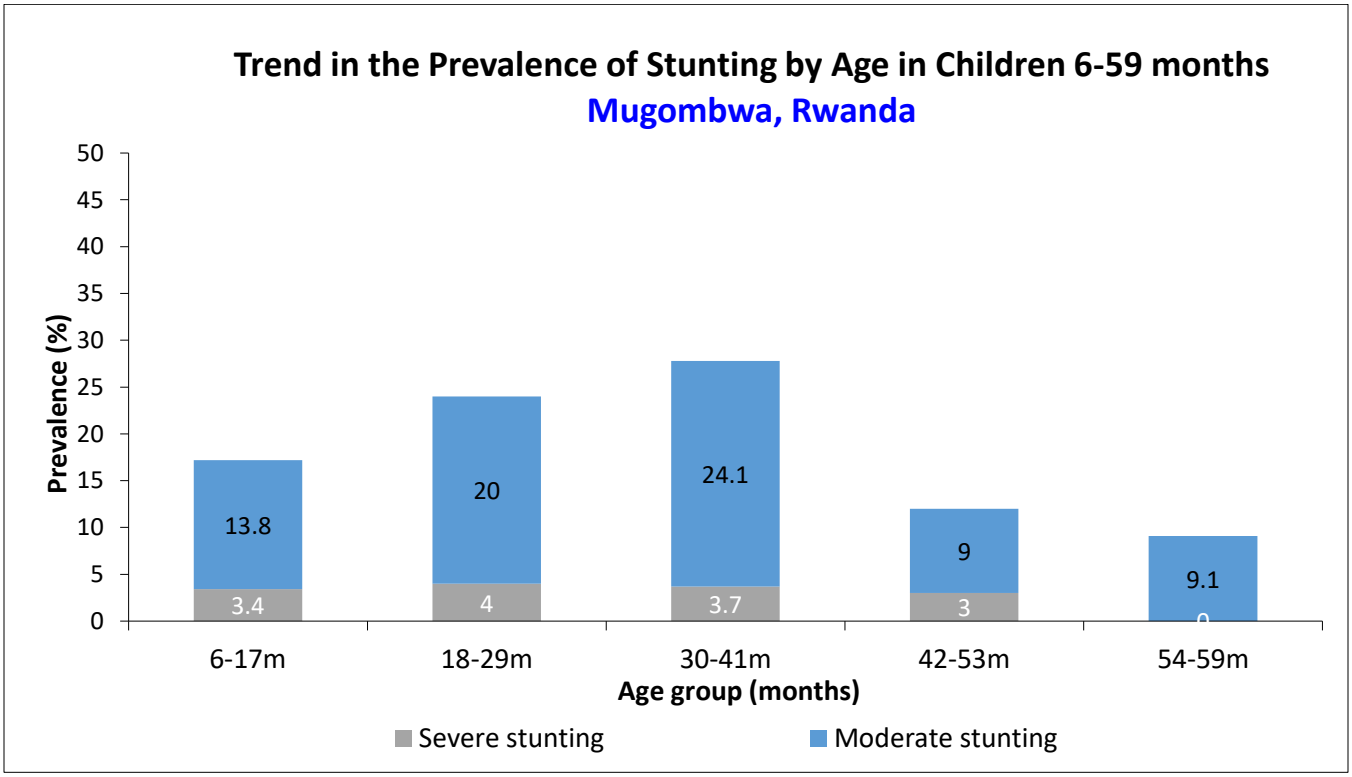


FIGURE 33 PREVALENCE OF STUNTING BY AGE IN CHILDREN 6-59 MONTHS IN NYABIHEKE

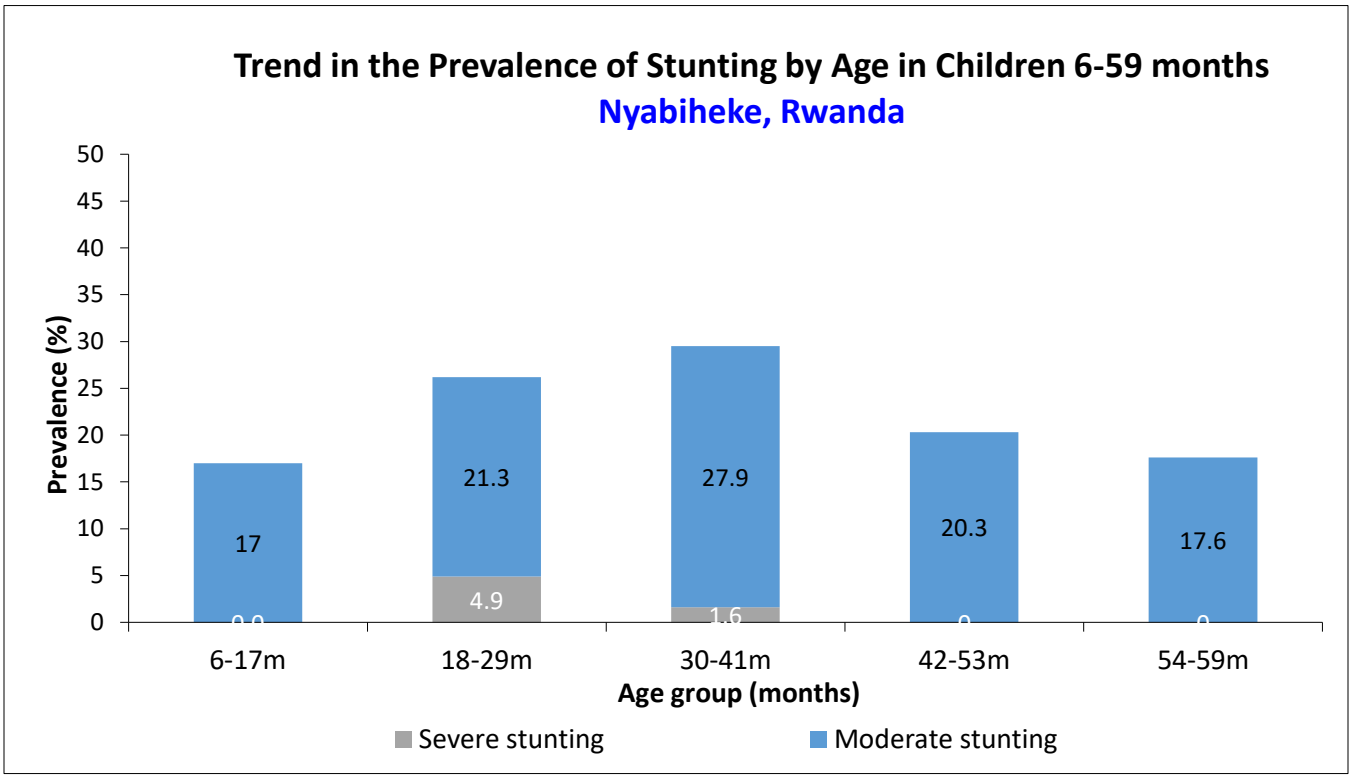


FIGURE 34 PREVALENCE OF STUNTING BY AGE IN CHILDREN 6-59 MONTHS IN MAHAMA

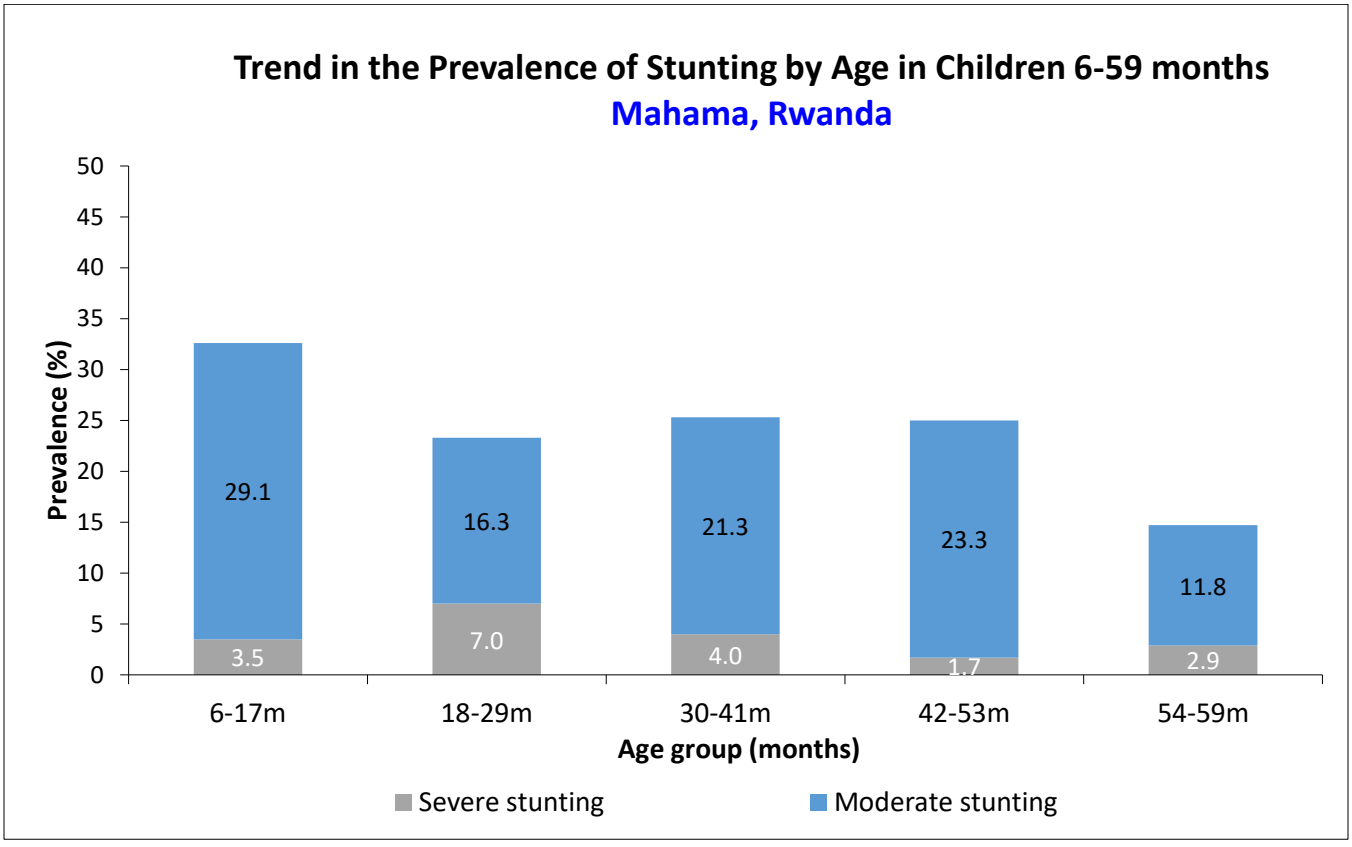


FIGURE 35 DISTRIBUTION OF HEIGHT-FOR-AGE Z-SCORES IN GIHEMBE (BASED ON WHO GROWTH STANDARDS; THE REFERENCE POPULATION IS SHOWN IN GREEN AND THE SURVEYED POPULATION IS SHOWN IN RED) OF SURVEY POPULATION COMPARED TO REFERENCE POPULATION

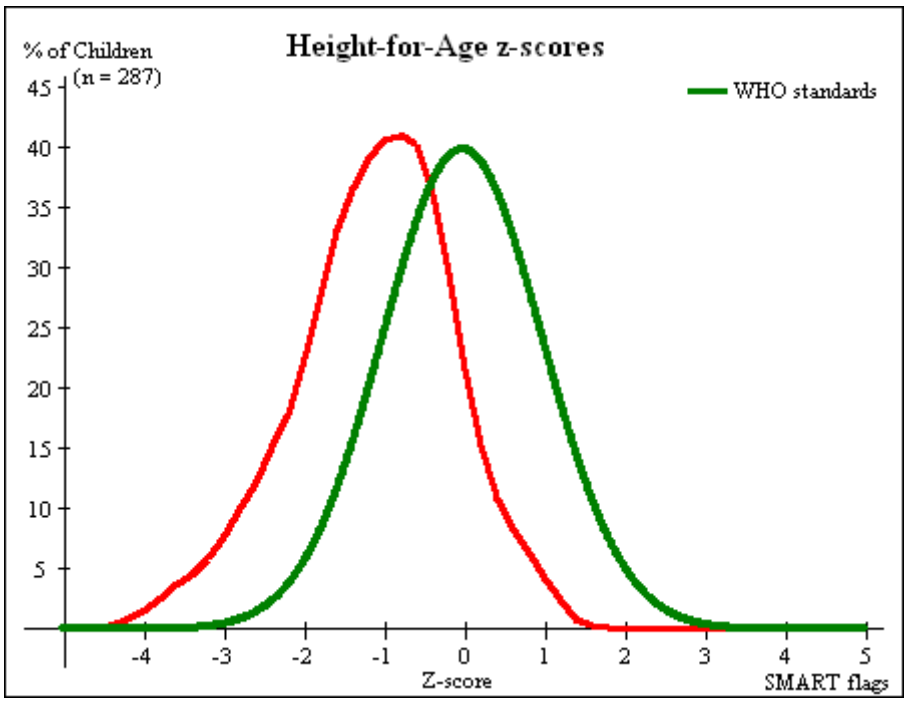


FIGURE 36 DISTRIBUTION OF HEIGHT-FOR-AGE Z-SCORES IN KIGEME (BASED ON WHO GROWTH STANDARDS; THE REFERENCE POPULATION IS SHOWN IN GREEN AND THE SURVEYED POPULATION IS SHOWN IN RED) OF SURVEY POPULATION COMPARED TO REFERENCE POPULATION

FIGURE 37 DISTRIBUTION OF HEIGHT-FOR-AGE Z-SCORES IN KIZIBA (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

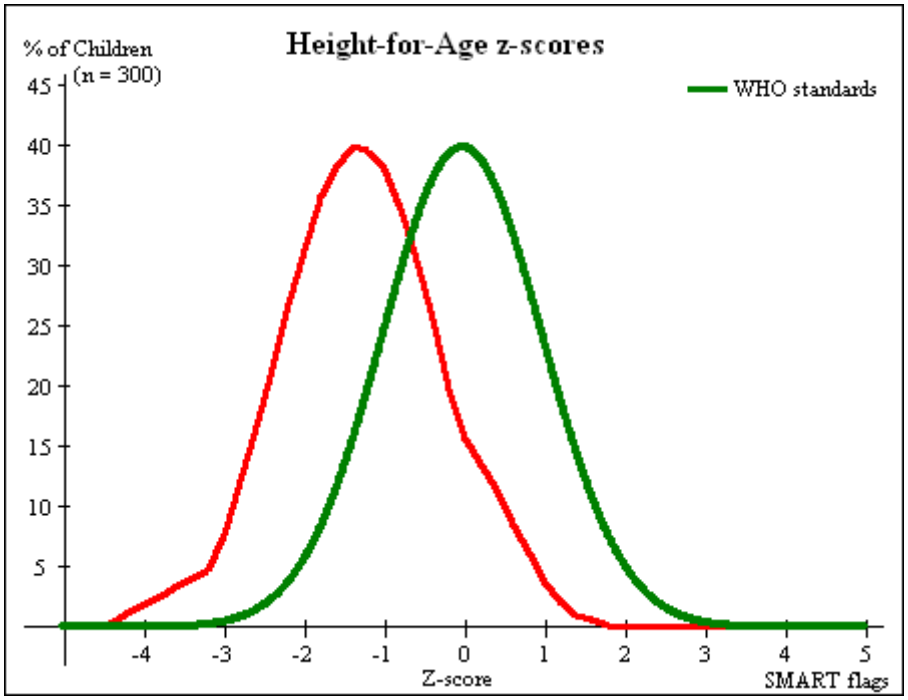


FIGURE 38 DISTRIBUTION OF HEIGHT-FOR-AGE Z-SCORES IN MUGOMBWA (BASED ON WHO GROWTH STANDARDS; THE REFERENCE POPULATION IS SHOWN IN GREEN AND THE SURVEYED POPULATION IS SHOWN IN RED) OF SURVEY POPULATION COMPARED TO REFERENCE POPULATION

FIGURE 39 DISTRIBUTION OF HEIGHT-FOR-AGE Z-SCORES IN NYABIHEKE (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

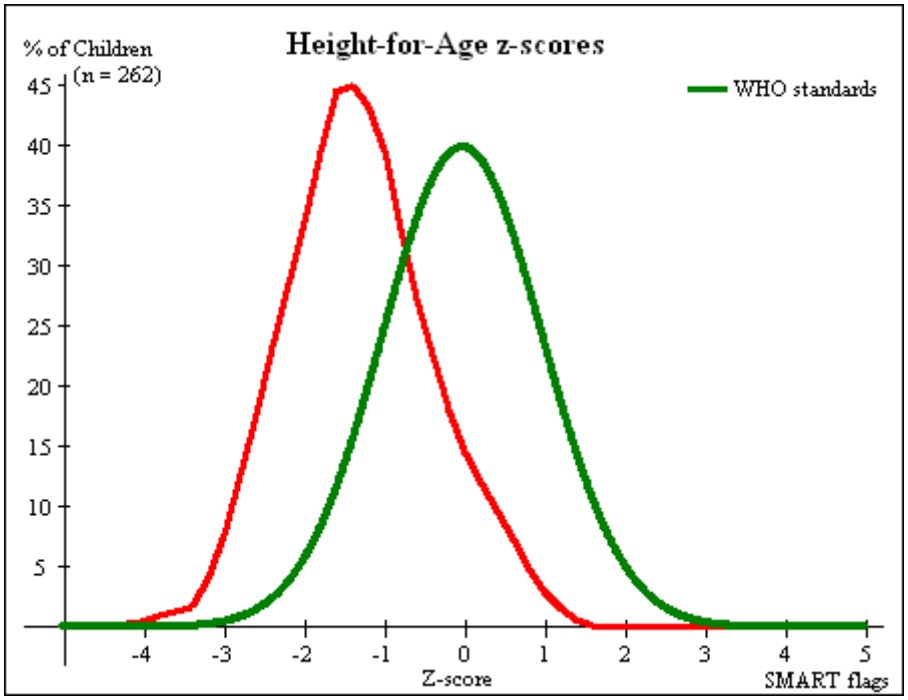


FIGURE 40 DISTRIBUTION OF HEIGHT-FOR-AGE Z-SCORES IN MAHAMA (BASED ON WHO GROWTH STANDARDS; THE REFERENCE POPULATION IS SHOWN IN GREEN AND THE SURVEYED POPULATION IS SHOWN IN RED) OF SURVEY POPULATION COMPARED TO REFERENCE POPULATION

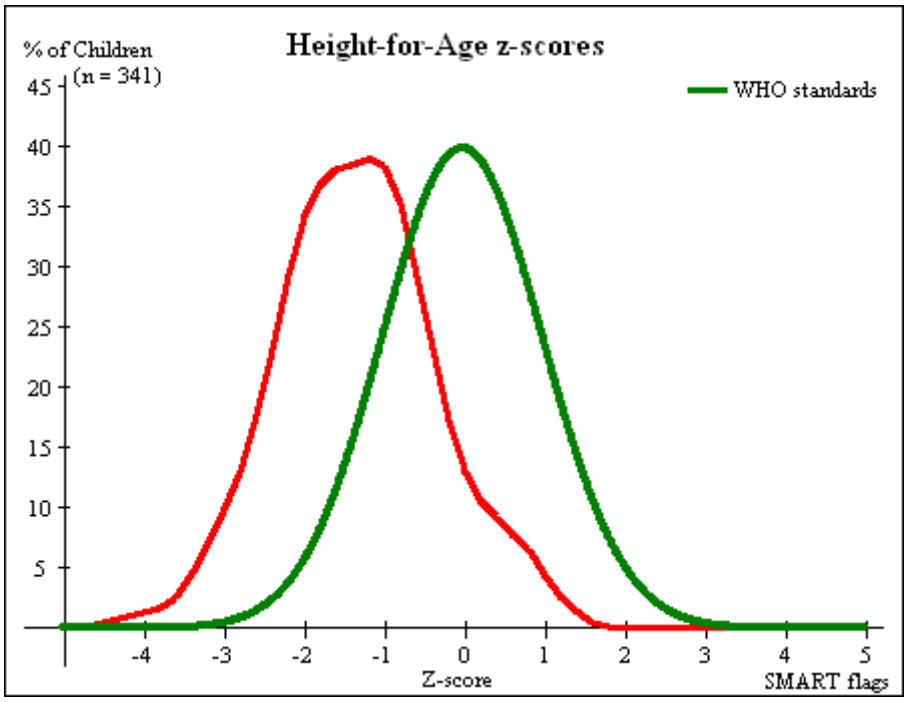


TABLE 72 PREVALENCE OF OVERWEIGHT IN GIHEMBE BASED ON WEIGHT FOR HEIGHT CUT OFFS AND BY SEX (NO ODEMA)

	All n = 289	Boys n = 141	Girls n = 148
Prevalence of overweight (WHZ > 2)	(0) 0.0 % (0.0 - 1.3 95% C.I.)	(0) 0.0 % (0.0 - 2.7 95% C.I.)	(0) 0.0 % (0.0 - 2.5 95% C.I.)
Prevalence of severe overweight (WHZ > 3)	(0) 0.0 % (0.0 - 1.3 95% C.I.)	(0) 0.0 % (0.0 - 2.7 95% C.I.)	(0) 0.0 % (0.0 - 2.5 95% C.I.)

TABLE 73 PREVALENCE OF OVERWEIGHT IN KIGEME BASED ON WEIGHT FOR HEIGHT CUT OFFS AND BY SEX (NO ODEMA)

	All n = 330	Boys n = 145	Girls n = 185
Prevalence of overweight (WHZ > 2)	(3) 0.9 % (0.3 - 2.6 95% C.I.)	(1) 0.7 % (0.1 - 3.8 95% C.I.)	(2) 1.1 % (0.3 - 3.9 95% C.I.)
Prevalence of severe overweight (WHZ > 3)	(0) 0.0 % (0.0 - 1.2 95% C.I.)	(0) 0.0 % (0.0 - 2.6 95% C.I.)	(0) 0.0 % (0.0 - 2.0 95% C.I.)

TABLE 74 PREVALENCE OF OVERWEIGHT IN KIZIBA BASED ON WEIGHT FOR HEIGHT CUT OFFS AND BY SEX (NO ODEMA)

	All n = 301	Boys n = 147	Girls n = 154
Prevalence of overweight (WHZ > 2)	(4) 1.3 % (0.5 - 3.4 95% C.I.)	(3) 2.0 % (0.7 - 5.8 95% C.I.)	(1) 0.6 % (0.1 - 3.6 95% C.I.)
Prevalence of severe overweight (WHZ > 3)	(0) 0.0 % (0.0 - 1.3 95% C.I.)	(0) 0.0 % (0.0 - 2.5 95% C.I.)	(0) 0.0 % (0.0 - 2.4 95% C.I.)

TABLE 75 PREVALENCE OF OVERWEIGHT IN MUGOMBWA BASED ON WEIGHT FOR HEIGHT CUT OFFS AND BY SEX (NO ODEMA)

	All n = 252	Boys n = 134	Girls n = 118
Prevalence of overweight (WHZ > 2)	(9) 3.6 % (2.9 - 4.4 95% C.I.)	(7) 5.2 % (4.3 - 6.3 95% C.I.)	(2) 1.7 % (1.4 - 2.1 95% C.I.)
Prevalence of severe overweight (WHZ > 3)	(0) 0.0 % (0.0 - 0.0 95% C.I.)	(0) 0.0 % (0.0 - 0.0 95% C.I.)	(0) 0.0 % (0.0 - 0.0 95% C.I.)

TABLE 76 PREVALENCE OF OVERWEIGHT IN NYABIHEKE BASED ON WEIGHT FOR HEIGHT CUT OFFS AND BY SEX (NO ODEMA)

	All n = 260	Boys n = 133	Girls n = 127
Prevalence of overweight (WHZ > 2)	(3) 1.2 % (0.4 - 3.3 95% C.I.)	(0) 0.0 % (0.0 - 2.8 95% C.I.)	(3) 2.4 % (0.8 - 6.7 95% C.I.)
Prevalence of severe overweight (WHZ > 3)	(0) 0.0 % (0.0 - 1.5 95% C.I.)	(0) 0.0 % (0.0 - 2.8 95% C.I.)	(0) 0.0 % (0.0 - 2.9 95% C.I.)

TABLE 77 PREVALENCE OF OVERWEIGHT IN MAHAMA BASED ON WEIGHT FOR HEIGHT CUT OFFS AND BY SEX (NO ODEMA)

	All n = 342	Boys n = 181	Girls n = 161
Prevalence of overweight (WHZ > 2)	(1) 0.3 % (0.1 - 1.6 95% C.I.)	(0) 0.0 % (0.0 - 2.1 95% C.I.)	(1) 0.6 % (0.1 - 3.4 95% C.I.)
Prevalence of severe overweight (WHZ > 3)	(0) 0.0 % (0.0 - 1.1 95% C.I.)	(0) 0.0 % (0.0 - 2.1 95% C.I.)	(0) 0.0 % (0.0 - 2.3 95% C.I.)

TABLE 78 MEAN Z-SCORES, DESIGN EFFECTS AND EXCLUDED SUBJECTS IN GIHEMBE

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	289	-0.25±0.91	1.00	0	0
Weight-for-Age	287	-0.78±0.88	1.00	0	2
Height-for-Age	287	-1.13±0.97	1.00	0	2

* contains for WHZ and WAZ the children with oedema.

TABLE 79 MEAN Z-SCORES, DESIGN EFFECTS AND EXCLUDED SUBJECTS IN KIGEME

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	330	-0.27±0.89	1.00	0	1
Weight-for-Age	329	-1.01±0.88	1.00	0	2
Height-for-Age	329	-1.48±0.97	1.00	0	2

* contains for WHZ and WAZ the children with oedema.

TABLE 80 MEAN Z-SCORES, DESIGN EFFECTS AND EXCLUDED SUBJECTS IN KIZIBA

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	301	-0.25±1.01	1.00	0	0
Weight-for-Age	301	-0.87±0.97	1.00	0	0
Height-for-Age	300	-1.28±0.98	1.00	0	1

* contains for WHZ and WAZ the children with oedema.

TABLE 81 MEAN Z-SCORES, DESIGN EFFECTS AND EXCLUDED SUBJECTS IN MUGOMBWA

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	252	0.04±1.04	1.00	0	0
Weight-for-Age	252	-0.58±1.01	1.00	0	0
Height-for-Age	251	-1.08±1.02	1.00	0	1

* contains for WHZ and WAZ the children with oedema.

TABLE 82 MEAN Z-SCORES, DESIGN EFFECTS AND EXCLUDED SUBJECTS IN NYABIHEKE

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	260	-0.50±0.87	1.00	1	2
Weight-for-Age	261	-1.10±0.90	1.00	1	1
Height-for-Age	262	-1.14±0.85	1.00	1	0

* contains for WHZ and WAZ the children with oedema.

TABLE 83 MEAN Z-SCORES, DESIGN EFFECTS AND EXCLUDED SUBJECTS IN MAHAMA

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	342	-0.35±0.88	1.00	0	0
Weight-for-Age	342	-0.99±0.85	1.00	0	0
Height-for-Age	341	-1.34±0.99	1.00	0	1

* contains for WHZ and WAZ the children with oedema.

3.1.3 Feeding program enrolment results

TABLE 84 FEEDING PROGRAM (OTP/TSFP) ENROLMENT FOR ACUTELY MALNOURISHED (SAM AND MAM) CHILDREN AGED 6 – 23 MONTHS, BY CAMP

	Acutely malnourished children enrolled in selective feeding program (combines children classified by MUAC and/or WHZ criteria)*	
	Number/total	% (95% CI)
Gihembe	5/7	71.4 (38.2-91.0)
Kigeme	2/6	33.3 (5.4-81.3)
Kiziba	4/14	28.6 (8.2-64.2)
Mugombwa	2/2	100.0 (100.0-100.0)
Nyabiheke	2/4	50.0 (16.3-83.7)
Mahama	3/7	42.9 (12.0-80.4)

**Note: some data was missing for this indicator. The enrolment question was only asked for children 6-23.99 months and should be changed for the 2020 SENS to be asked for all children 6-59 months. The consequence of this possibility would be an over-estimation of enrolment since more cases of acute malnutrition tend to occur among younger children.*

3.1.4 Measles vaccination coverage results

TABLE 85 MEASLES VACCINATION COVERAGE FOR CHILDREN AGED 9-59 MONTHS, BY CAMP

	Measles (with card)		Measles (with card or confirmation from mother)	
	Number/total	% (95% CI)	Number/total	% (95% CI)
Gihembe	156/268	58.2 (28.8-82.8)	267/268	99.6 (97.2-100.0)
Kigeme	80/321	24.9 (11.3-46.3)	316/321	98.4 (97.1-99.2)
Kiziba	126/286	44.1 (22.0-68.8)	283/286	99.0 (95.8-99.7)
Mugombwa	61/240	25.4 (15.7-38.4)	237/240	98.8 (95.2-99.7)
Nyabiheke	25/249	10.0 (2.6-31.5)	246/249	98.8 (97.2-99.5)
Mahama	58/309	18.8 (3.5-59.4)	305/309	98.7 (94.8-99.7)

3.1.5 Vitamin A supplementation coverage results

TABLE 86 VITAMIN A SUPPLEMENTATION FOR CHILDREN AGED 6-59 MONTHS WITHIN PAST 6 MONTHS, BY CAMP

	Vitamin A capsule (with card)		Vitamin A capsule (with card or confirmation from mother)	
	Number/total	% (95% CI)	Number/total	% (95% CI)
Gihembe	124/291	42.6 (21.9-66.2)	290/291	99.7 (97.5-100.0)
Kigeme	72/334	21.6 (6.6-51.6)	316/334	94.6 (87.8-97.7)
Kiziba	103/304	33.9 (12.9-64.0)	280/304	92.1 (80.2-97.1)
Mugombwa	53/252	21.0 (7.0-48.6)	247/252	98.0 (95.7-99.1)
Nyabiheke	27/265	10.2 (2.9-29.9)	261/265	98.5 (97.3-99.1)
Mahama	52/344	15.1 (2.1-59.3)	331/344	84.9 (40.7-97.9)

3.1.6 Deworming coverage results

TABLE 87 DEWORMING FOR CHILDREN AGED 6-59 MONTHS WITHIN PAST 6 MONTHS, BY CAMP

	Deworming (with card and/or confirmation from mother)	
	Number/total	% (95% CI)
Gihembe	259/291	89.0 (73.7-95.9)
Kigeme	300/333	90.1 (82.7-94.5)
Kiziba	242/304	79.6 (76.3-82.5)
Mugombwa	222/251	88.4 (81.4-93.1)
Nyabiheke	244/265	88.4 (81.4-93.1)
Mahama	285/344	82.8 (77.5-87.1)

FIGURE 41 TRENDS IN THE COVERAGE OF MEASLES VACCINATION AND VITAMIN A SUPPLEMENTATION IN LAST 6 MONTHS IN CHILDREN 6-59 MONTHS FROM 2012-2019 IN GIHEMBE

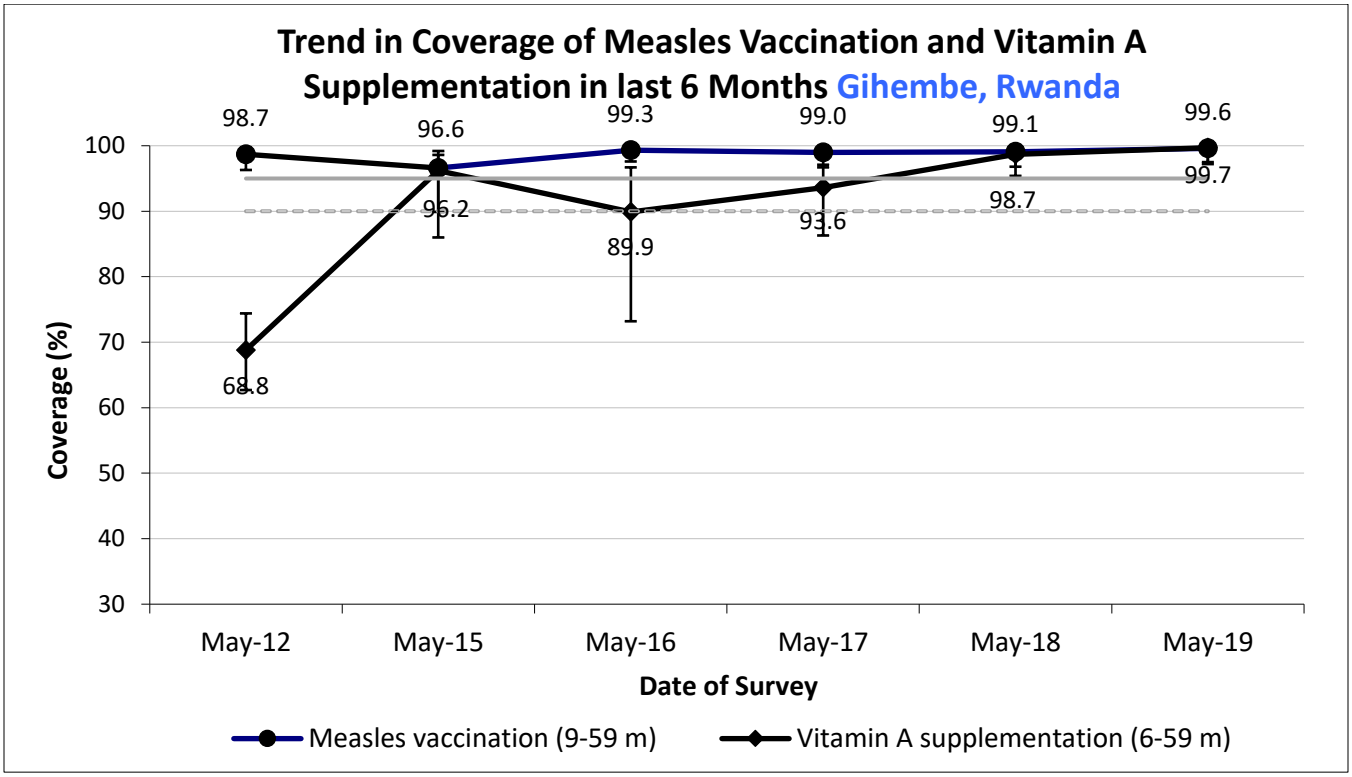


FIGURE 42 TRENDS IN THE COVERAGE OF MEASLES VACCINATION AND VITAMIN A SUPPLEMENTATION IN LAST 6 MONTHS IN CHILDREN 6-59 MONTHS FROM 2015-2019 IN KIGEME

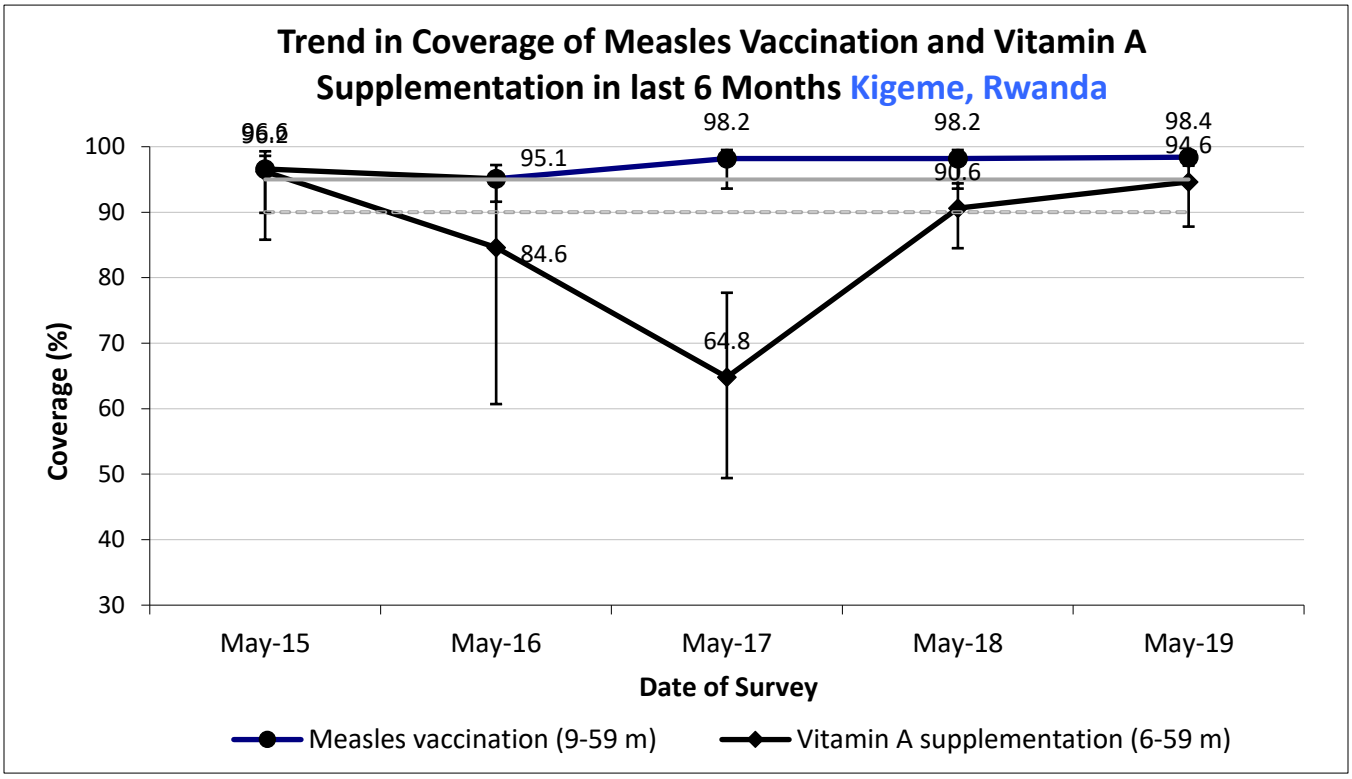


FIGURE 43 TRENDS IN THE COVERAGE OF MEASLES VACCINATION AND VITAMIN A SUPPLEMENTATION IN LAST 6 MONTHS IN CHILDREN 6-59 MONTHS FROM 2012-2019 IN KIZIBA

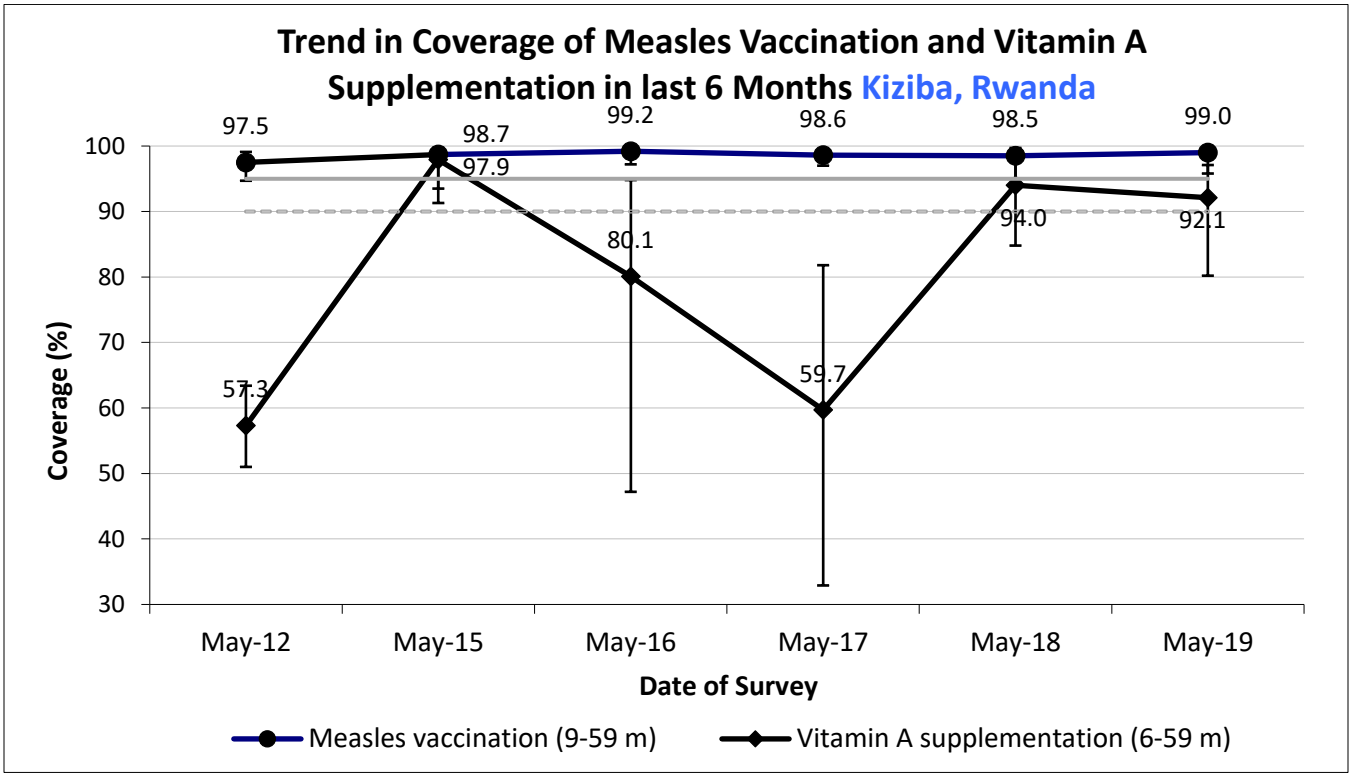


FIGURE 44 TRENDS IN THE COVERAGE OF MEASLES VACCINATION AND VITAMIN A SUPPLEMENTATION IN LAST 6 MONTHS IN CHILDREN 6-59 MONTHS FROM 2015-2019 IN MUGOMBWA

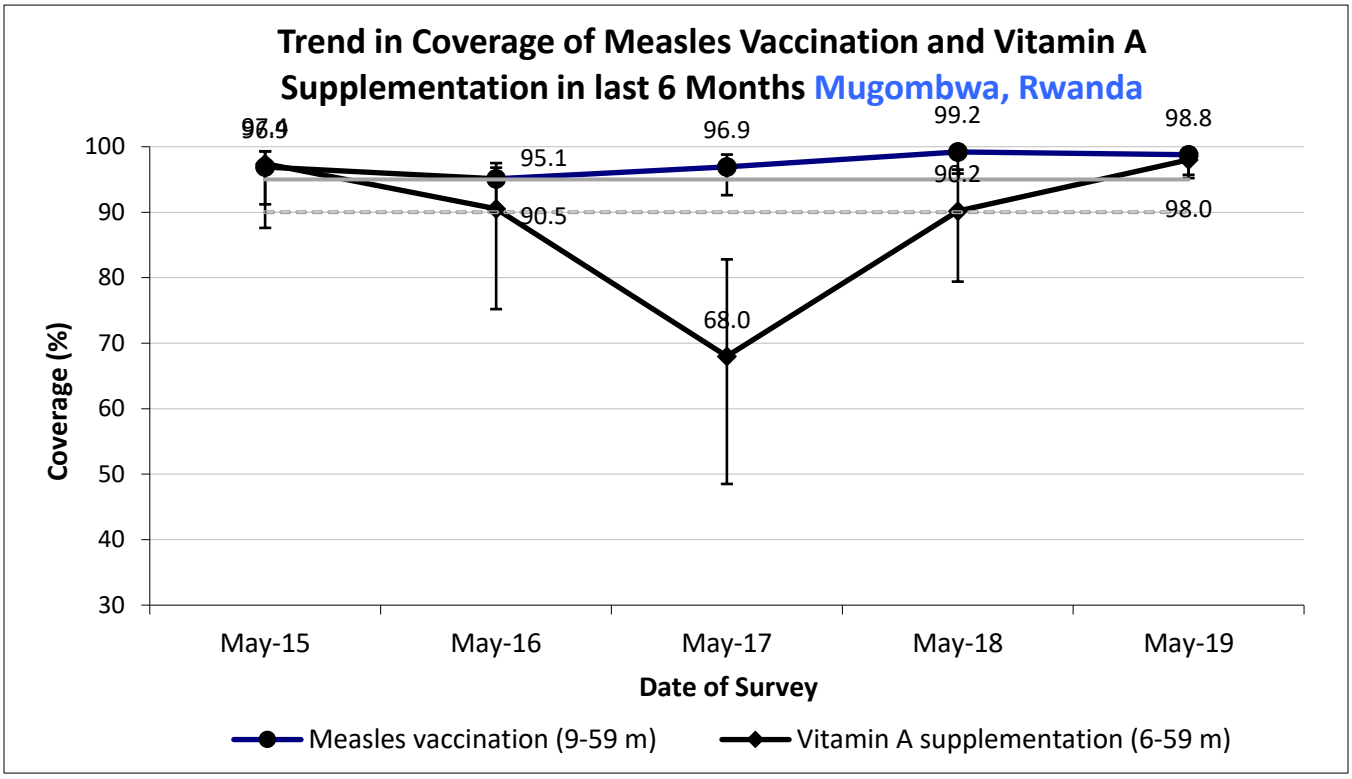


FIGURE 45 TRENDS IN THE COVERAGE OF MEASLES VACCINATION AND VITAMIN A SUPPLEMENTATION IN LAST 6 MONTHS IN CHILDREN 6-59 MONTHS FROM 2012-2019 IN NYABIHEKE

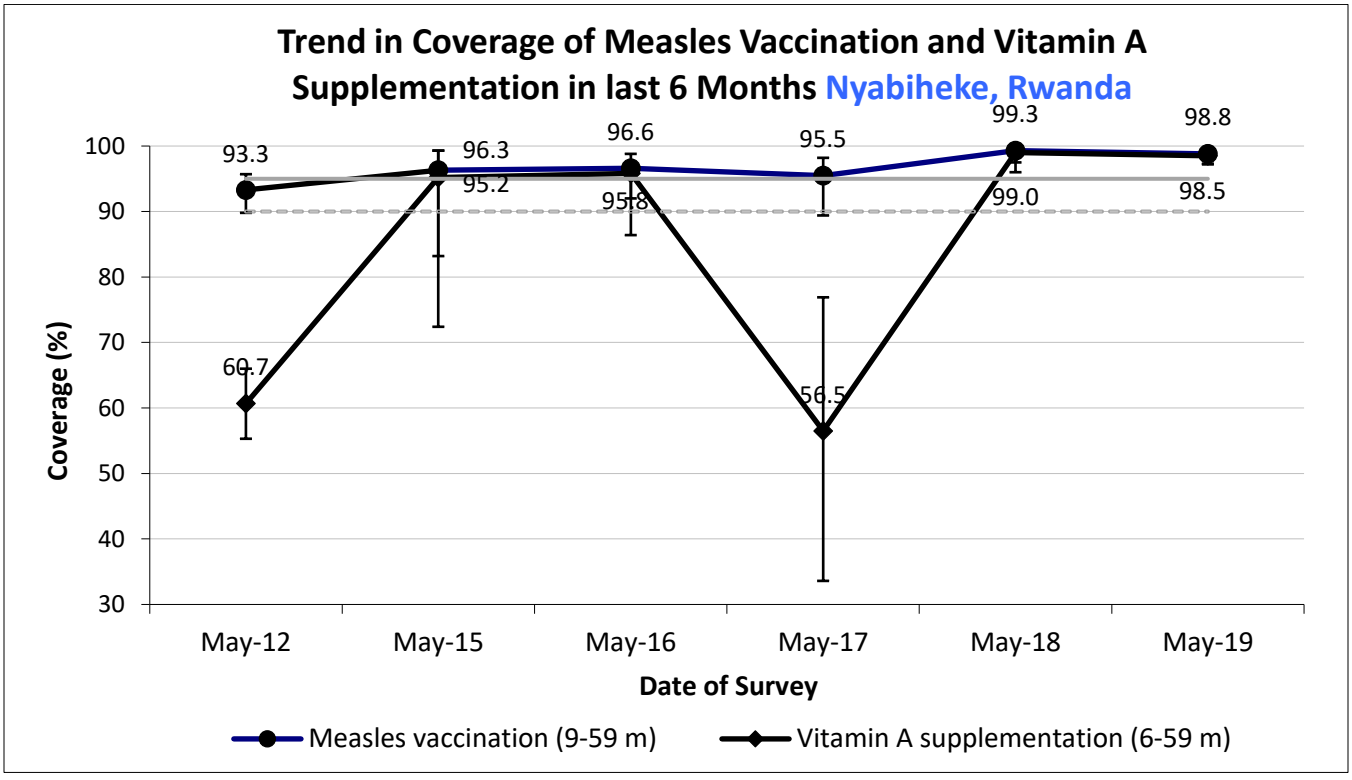
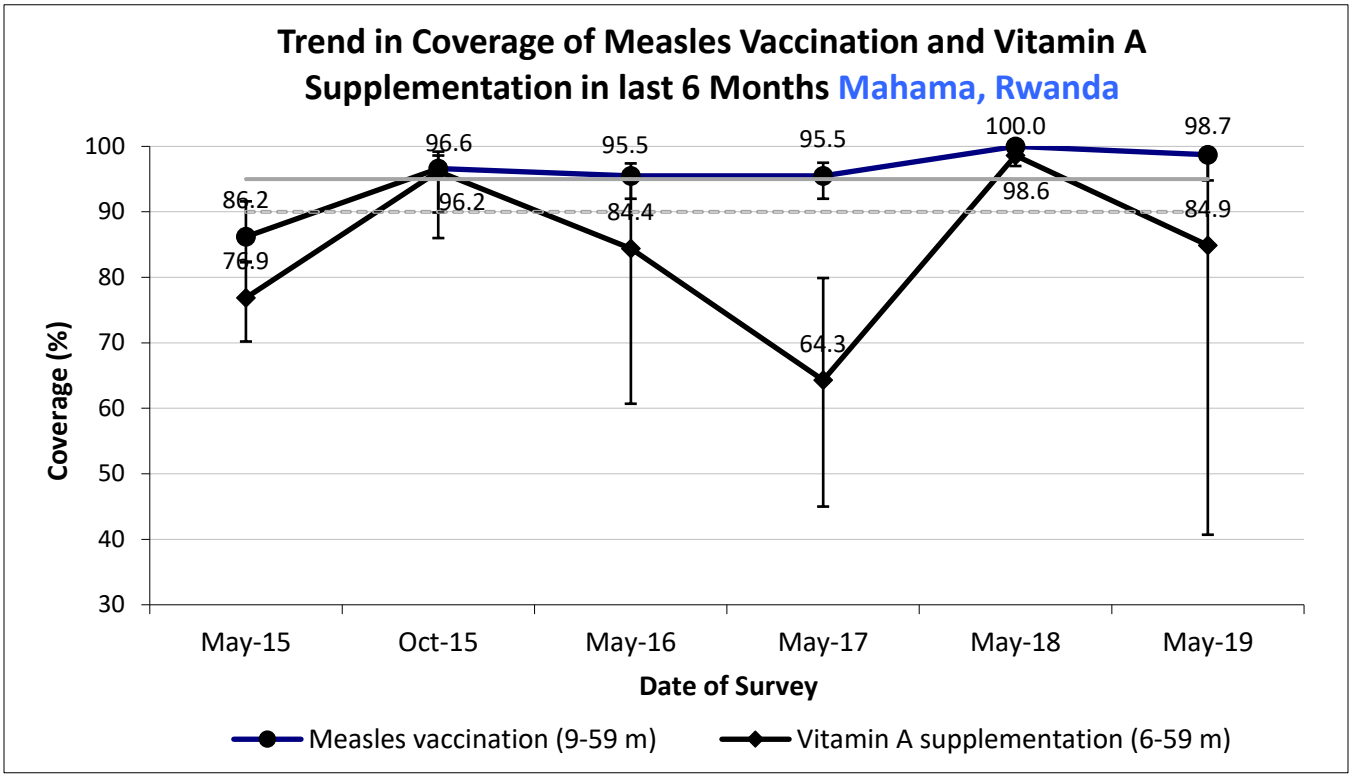


FIGURE 46 TRENDS IN THE COVERAGE OF MEASLES VACCINATION AND VITAMIN A SUPPLEMENTATION IN LAST 6 MONTHS IN CHILDREN 6-59 MONTHS FROM 2015-2019 IN MAHAMA



3.1.7 Diarrhea results

TABLE 88 PERIOD PREVALENCE OF DIARRHEA, IN CHILDREN AGED 6-59 MONTHS, BY CAMP

	Diarrhea in the last two weeks	
	Number/total	% (95% CI)
Gihembe	54/291	18.6 (15.0-22.7)
Kigeme	80/334	24.0 (20.7-27.6)
Kiziba	53/304	17.4 (11.4-25.8)
Mugombwa	34/252	13.5 (10.1-17.8)
Nyabiheke	55/265	20.8 (15.0-28.1)
Mahama	98/344	28.5 (22.5-35.3)

3.1.8 Anemia results

TABLE 89 PREVALENCE OF TOTAL ANEMIA, ANEMIA CATEGORIES, AND MEAN HB CONCENTRATION IN CHILDREN 6-59 MONTHS OF AGE AND 6-23 MONTHS OF AGE IN GIHEMBE

	6-59 months		6-23 months	
	Number/total	% (95% CI)	Number/total	% (95% CI)
Total Anemia (Hb<11.0 g/dL)	61/291	22.0 (15.8-29.8)	40/67	37.4 (25.2-51.4)
Mild Anemia (Hb 10.0-10.9 g/dL)	41/291	15.1 (12.4-18.4)	29/67	27.1 (20.1-35.5)
Moderate Anemia (7.0-9.9 g/dL)	20/291	6.9 (3.7-12.5)	11/67	10.3 (4.9-20.1)
Severe Anemia (<7.0 g/dL)	0/291	0.0 (0.0-0.0)	0/67	0.0 (0.0-0.0)

Mean Hb (g/dL) ± SD [range]	11.7 ± 1.1 [8.8,14.7]	11.2+1.0 [9.0,14.1]

TABLE 90 PREVALENCE OF TOTAL ANEMIA, ANEMIA CATEGORIES, AND MEAN HB CONCENTRATION IN CHILDREN 6-59 MONTHS OF AGE AND 6-23 MONTHS OF AGE IN KIGEME

	6-59 months		6-23 months	
	Number/total	% (95% CI)	Number/total	% (95% CI)
Total Anemia (Hb<11.0 g/dL)	94/333	28.2 (24.6-32.2)	54/105	51.4 (44.7-58.1)
Mild Anemia (Hb 10.0-10.9 g/dL)	68/333	20.4 (17.1-24.2)	38/105	36.2 (28.4-44.8)
Moderate Anemia (7.0-9.9 g/dL)	28/333	7.8 (5.6-10.8)	16/105	15.2 (8.5-25.8)
Severe Anemia (<7.0 g/dL)	0/333	0.0 (0.0-0.0)	0/105	0.0 (0.0-0.0)
Mean Hb (g/dL) ± SD [range]	11.7 ± 1.2 [7.4,14.7]		11.0+1.3 [7.4,13.7]	

TABLE 91 PREVALENCE OF TOTAL ANEMIA, ANEMIA CATEGORIES, AND MEAN HB CONCENTRATION IN CHILDREN 6-59 MONTHS OF AGE AND 6-23 MONTHS OF AGE IN KIZIBA

	6-59 months		6-23 months	
	Number/total	% (95% CI)	Number/total	% (95% CI)
Total Anemia (Hb<11.0 g/dL)	82/304	27.0 (20.4-34.8)	54/110	49.1 (40.5-57.7)
Mild Anemia (Hb 10.0-10.9 g/dL)	58/304	19.1 (11.8-29.4)	39/110	35.5 (24.7-47.9)
Moderate Anemia (7.0-9.9 g/dL)	24/304	7.9 (4.9-12.4)	15/110	13.6 (10.1-18.1)
Severe Anemia (<7.0 g/dL)	0/304	0.0 (0.0-0.0)	0/110	0.0 (0.0-0.0)
Mean Hb (g/dL) ± SD [range]	11.7 ± 1.2 [7.8,15.1]		11.0+1.0 [7.8,13.2]	

TABLE 92 PREVALENCE OF TOTAL ANEMIA, ANEMIA CATEGORIES, AND MEAN HB CONCENTRATION IN CHILDREN 6-59 MONTHS OF AGE AND 6-23 MONTHS OF AGE IN MUGOMBWA

	6-59 months		6-23 months	
	Number/total	% (95% CI)	Number/total	% (95% CI)
Total Anemia (Hb<11.0 g/dL)	72/252	28.6 (23.2-34.6)	47/86	54.7 (48.5-60.7)
Mild Anemia (Hb 10.0-10.9 g/dL)	52/252	20.6 (17.6-24.0)	29/86	33.7 (22.0-47.8)
Moderate Anemia (7.0-9.9 g/dL)	20/252	7.9 (4.5-13.5)	18/86	20.9 (13.8-30.5)
Severe Anemia (<7.0 g/dL)	0/252	0.0 (0.0-0.0)	0/86	0.0 (0.0-0.0)
Mean Hb (g/dL) ± SD [range]	11.6 ± 1.1 [7.4,13.9]		10.8+1.0 [7.4,13.2]	

TABLE 93 PREVALENCE OF TOTAL ANEMIA, ANEMIA CATEGORIES, AND MEAN HB CONCENTRATION IN CHILDREN 6-59 MONTHS OF AGE AND 6-23 MONTHS OF AGE IN NYABIHEKE

	6-59 months		6-23 months	
	Number/total	% (95% CI)	Number/total	% (95% CI)
Total Anemia (Hb<11.0 g/dL)	82/265	30.9 (22.9-40.4)	47/82	57.3 (42.6-70.8)
Mild Anemia (Hb 10.0-10.9 g/dL)	60/265	22.6 (18.9-26.8)	37/82	45.1 (36.1-54.4)
Moderate Anemia (7.0-9.9 g/dL)	20/265	7.5 (3.1-17.1)	10/82	12.2 (3.0-38.5)
Severe Anemia (<7.0 g/dL)	2/265	0.8 (0.2-2.6)	0/82	0.0 (0.0-0.0)
Mean Hb (g/dL) ± SD [range]	11.6±1.3 [6.4,15.0]		11.0+1.1 [7.5,13.9]	

TABLE 94 PREVALENCE OF TOTAL ANEMIA, ANEMIA CATEGORIES, AND MEAN HB CONCENTRATION IN CHILDREN 6-59 MONTHS OF AGE AND 6-23 MONTHS OF AGE IN MAHAMA

	6-59 months		6-23 months	
	Number/total	% (95% CI)	Number/total	% (95% CI)
Total Anemia (Hb<11.0 g/dL)	106/344	30.8 (23.5-39.2)	49/121	40.5 (35.9-45.2)
Mild Anemia (Hb 10.0-10.9 g/dL)	76/344	22.1 (16.6-28.8)	36/121	28.9 (27.6-31.9)
Moderate Anemia (7.0-9.9 g/dL)	30/344	8.7 (5.2-14.2)	13/121	10.7 (6.8-16.5)
Severe Anemia (<7.0 g/dL)	0/344	0.0 (0.4-2.3)	0/121	0.0 (0.0-0.0)
Mean Hb (g/dL) ± SD [range]	11.4 ± 1.1 [7.5,15.0]		11.1+1.0 [7.5,13.5]	

TABLE 95 PREVALENCE OF MODERATE AND SEVERE ANEMIA (HB<10.0 g/dL) IN CHILDREN 6-59 MONTHS OF AGE AND AND 6-23 MONTHS OF AGE BY CAMP

	6-59 months		6-23 months	
	Number/total	% (95% CI)	Number/total	% (95% CI)
Gihembe	20/291	6.9 (3.7-12.5)	11/67	10.3 (4.9-20.1)
Kigeme	28/333	7.8 (5.6-10.8)	16/105	15.2 (8.5-25.8)
Kiziba	24/304	7.9 (4.9-12.4)	15/110	13.6 (10.1-18.1)
Mugombwa	20/252	7.9 (4.5-13.5)	18/86	20.9 (13.8-30.5)
Nyabiheke	22/265	8.3 (3.5-18.6)	10/82	12.2 (3.0-38.5)
Mahama	30/344	8.7 (5.2-14.2)	13/121	10.7 (6.8-16.5)

FIGURE 47. COMPARISON OF ANEMIA CATEGORIES IN CHILDREN 6-59 MONTHS IN GIHEMBE 2012-2019

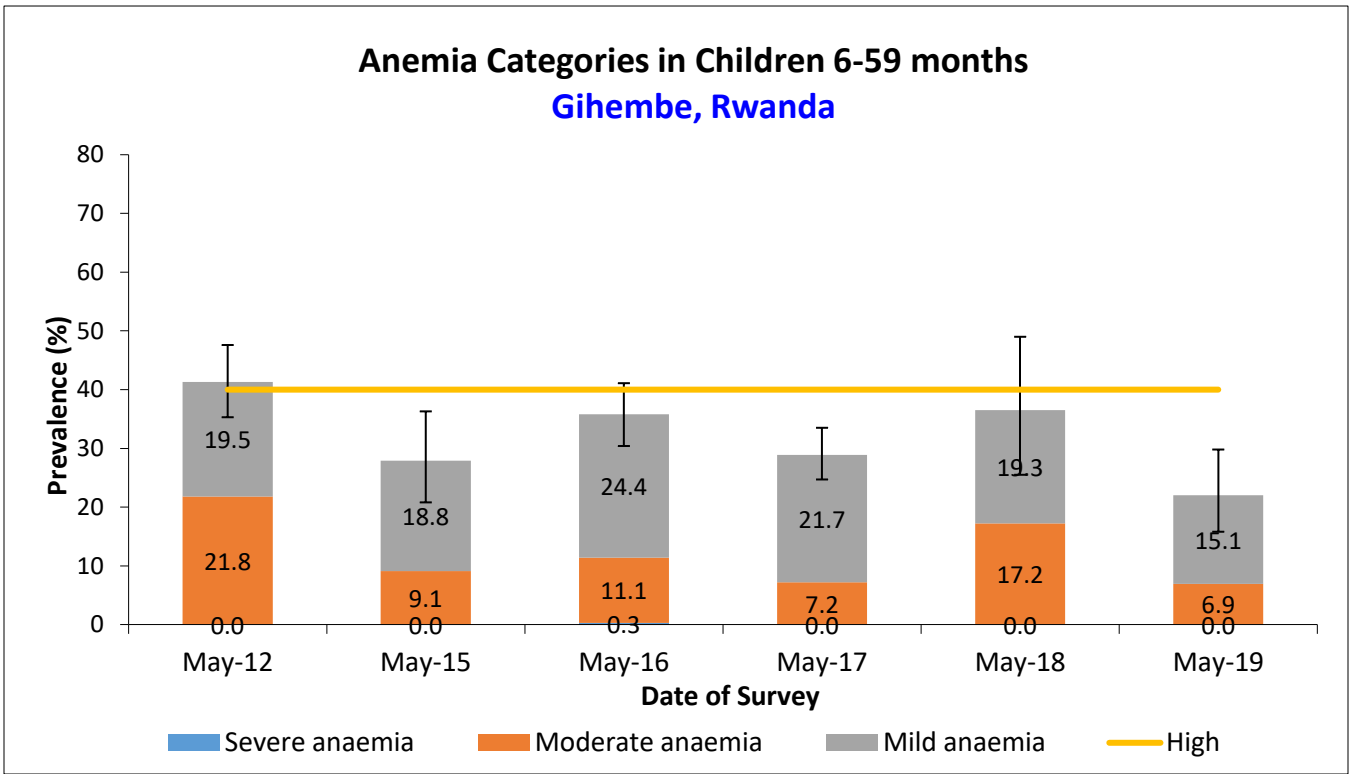


FIGURE 48. COMPARISON OF ANEMIA CATEGORIES IN CHILDREN 6-59 MONTHS IN KIGEME 2015-2019

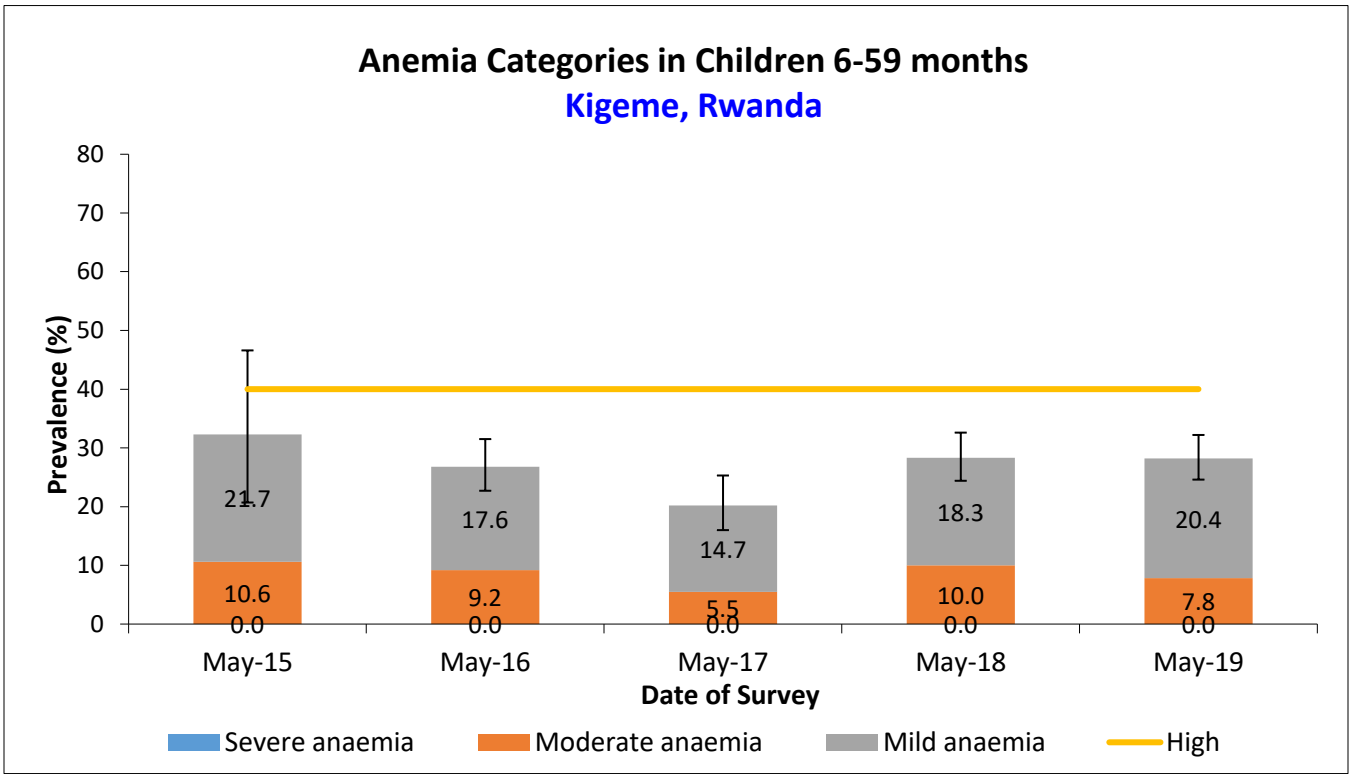


FIGURE 49. COMPARISON OF ANEMIA CATEGORIES IN CHILDREN 6-59 MONTHS IN KIZIBA 2012-2019

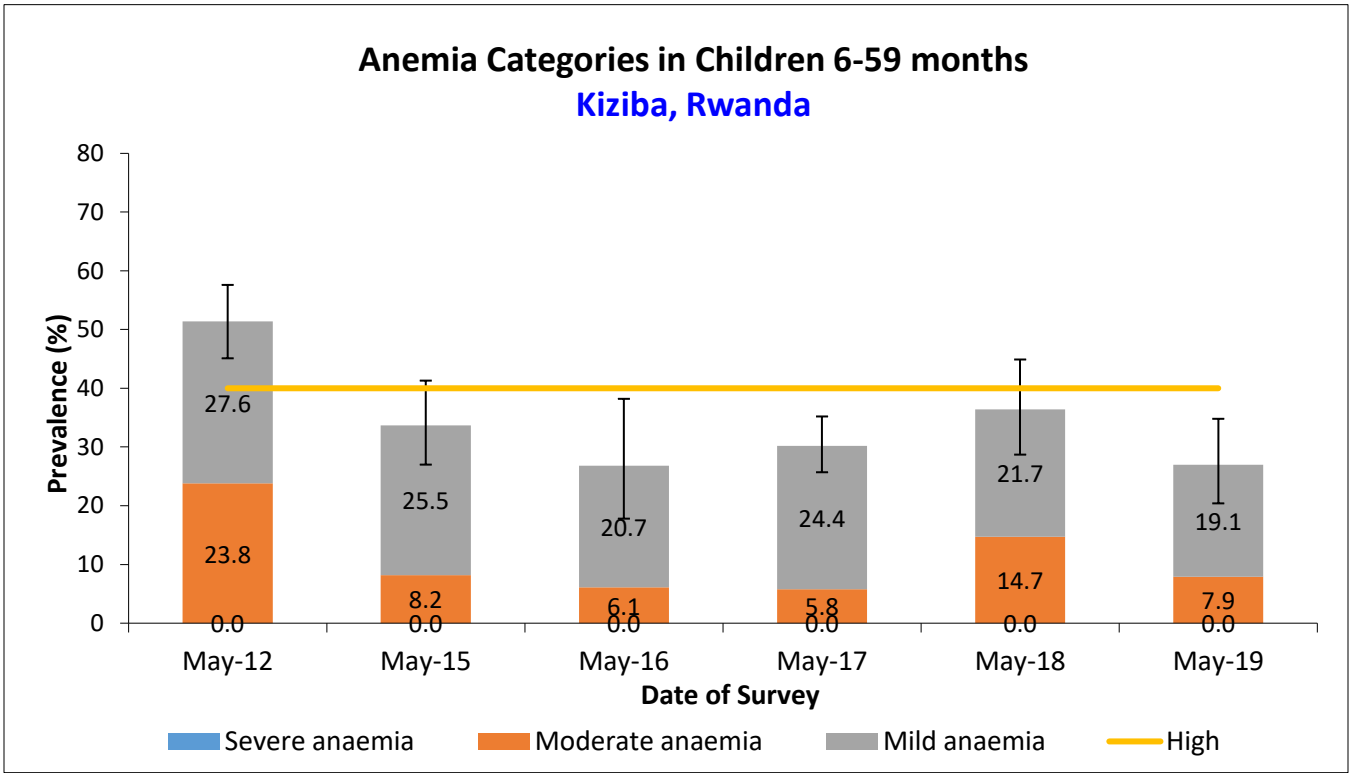


FIGURE 50. COMPARISON OF ANEMIA CATEGORIES IN CHILDREN 6-59 MONTHS IN MUGOMBWA 2015-2019

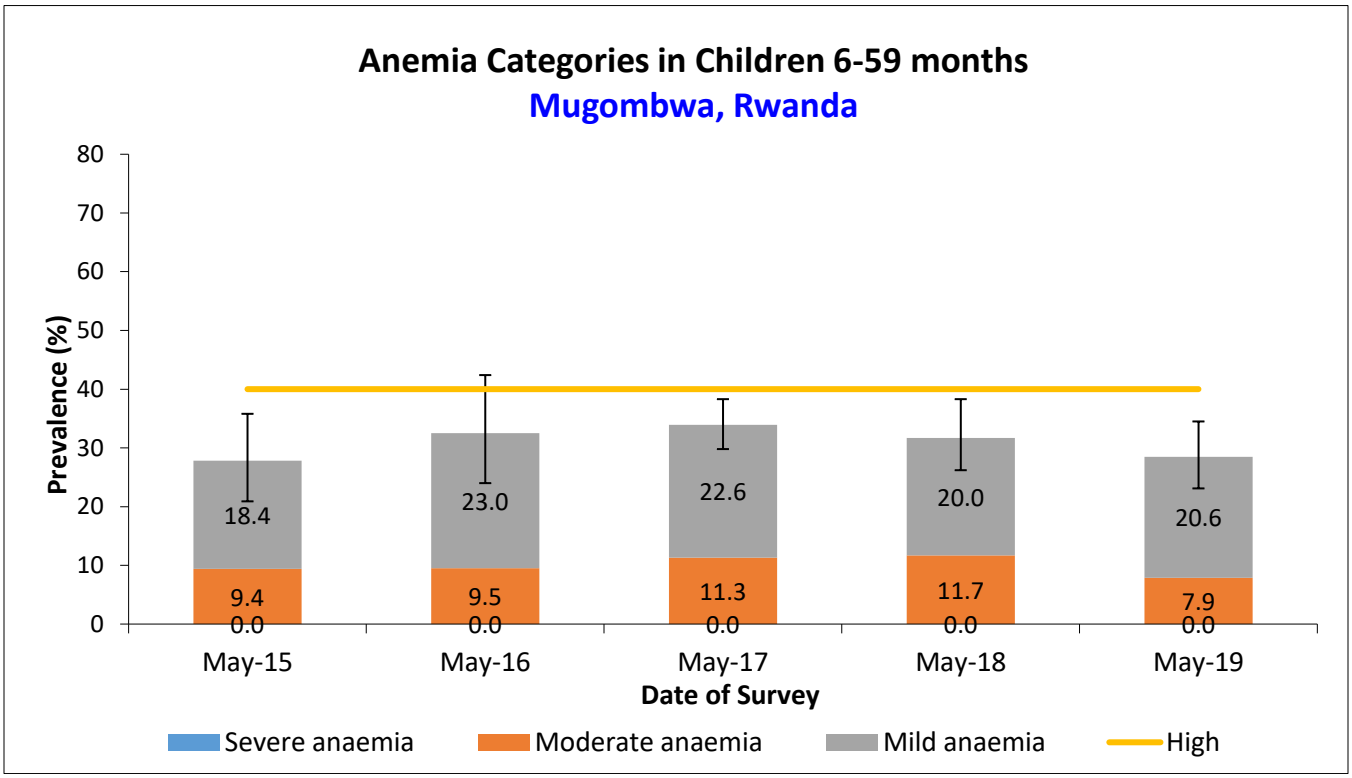


FIGURE 51. COMPARISON OF ANEMIA CATEGORIES IN CHILDREN 6-59 MONTHS IN NYABIHEKE 2012-2019

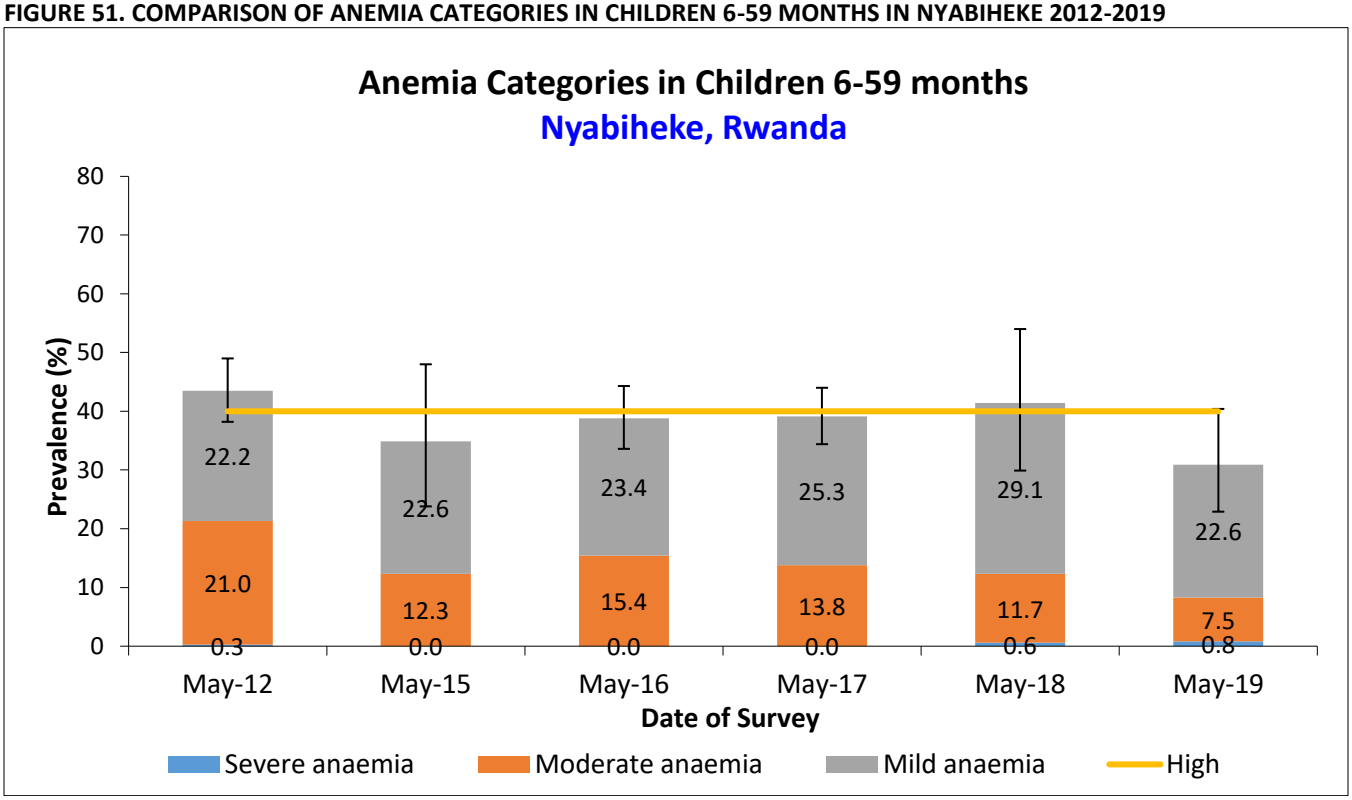


FIGURE 52. COMPARISON OF ANEMIA CATEGORIES IN CHILDREN 6-59 MONTHS IN MAHAMA 2015-2019

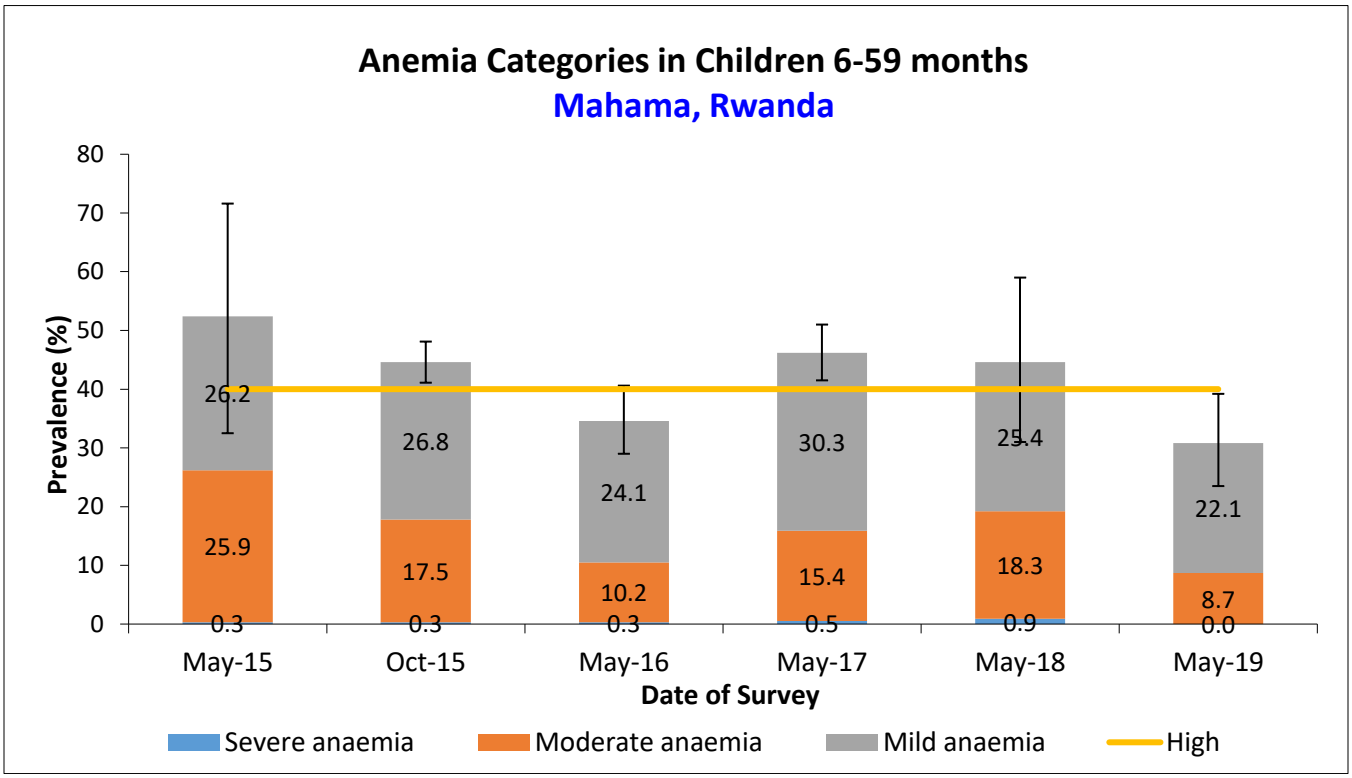


FIGURE 53 TOTAL ANEMIA (<11 G/DL), AND MODERATE AND SEVERE ANEMIA (<10 G/DL) WITH 95% CI IN CHILDREN 6-59 MONTHS IN GIHEMBE, 2012-2019

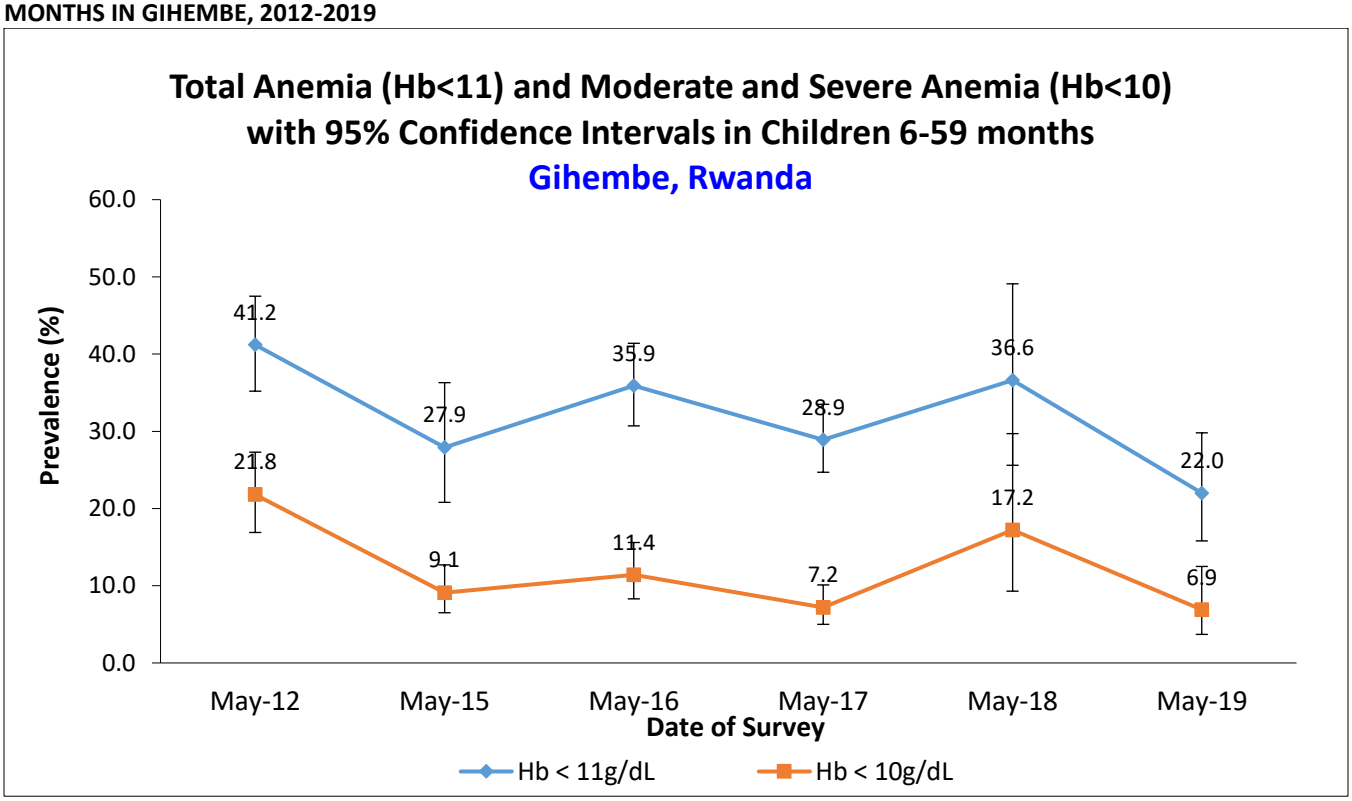


FIGURE 54 TOTAL ANEMIA (<11 G/DL), AND MODERATE AND SEVERE ANEMIA (<10 G/DL) WITH 95% CI IN CHILDREN 6-59 MONTHS IN KIGEME, 2015-2019

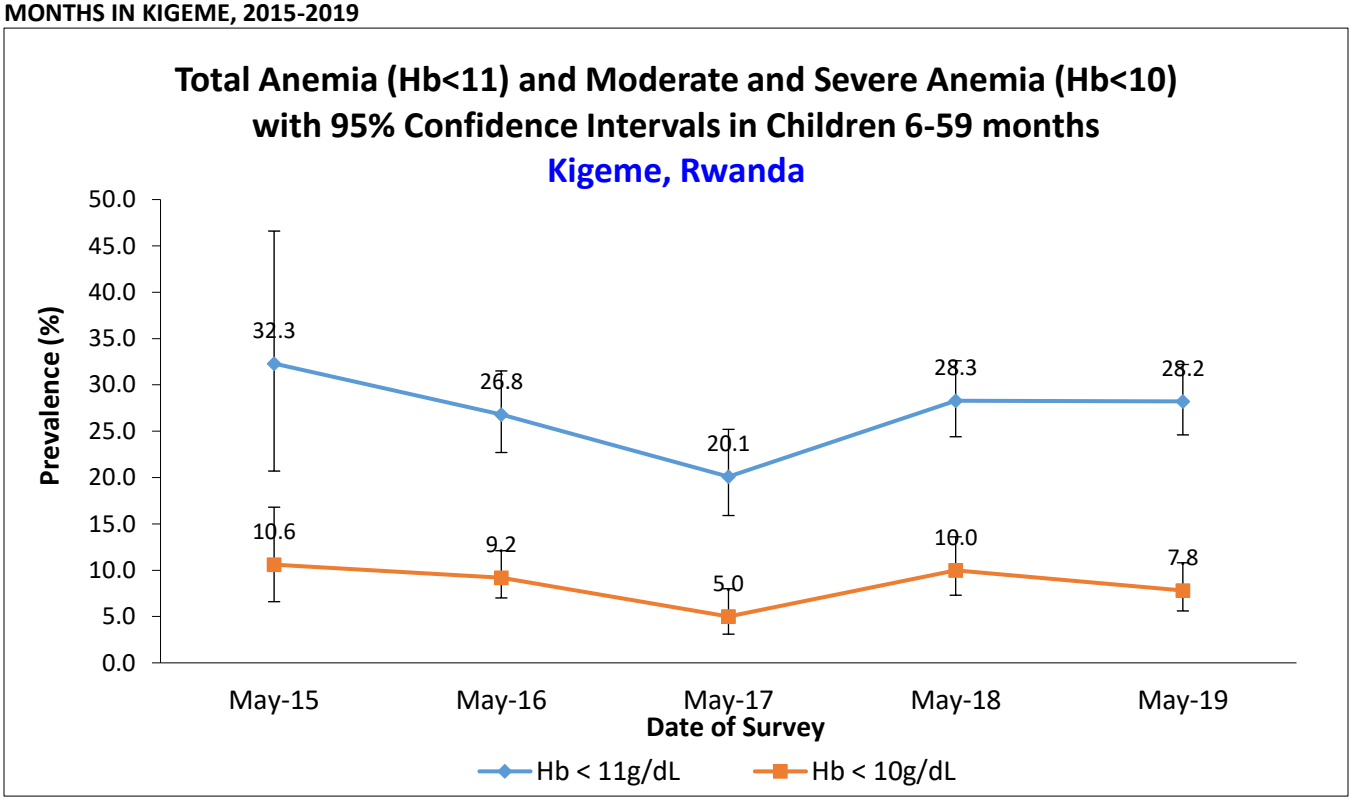


FIGURE 55 TOTAL ANEMIA (<11 G/DL), AND MODERATE AND SEVERE ANEMIA (<10 G/DL) WITH 95% CI IN CHILDREN 6-59 MONTHS IN KIZIBA, 2012-2019

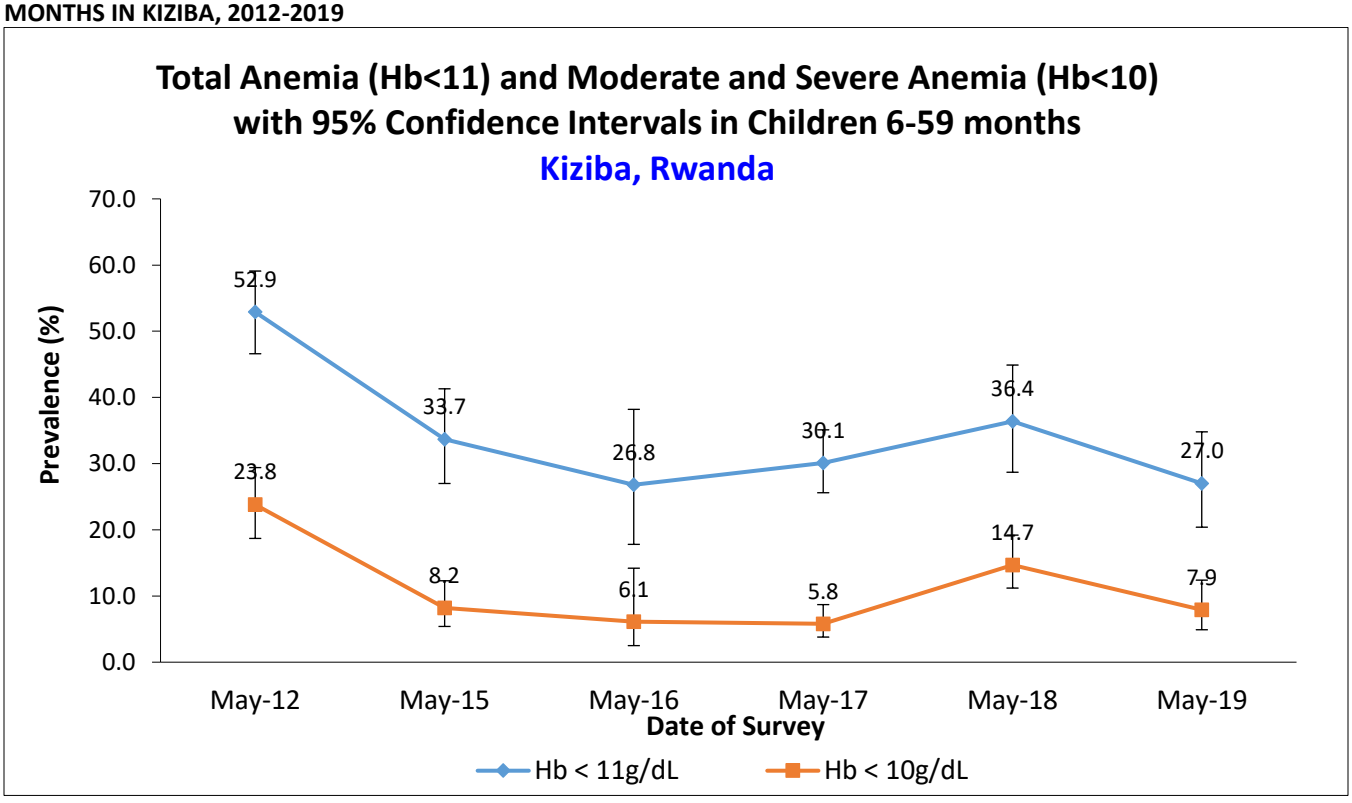


FIGURE 56 TOTAL ANEMIA (<11 G/DL), AND MODERATE AND SEVERE ANEMIA (<10 G/DL) WITH 95% CI IN CHILDREN 6-59 MONTHS IN MUGOMBWA, 2015-2019

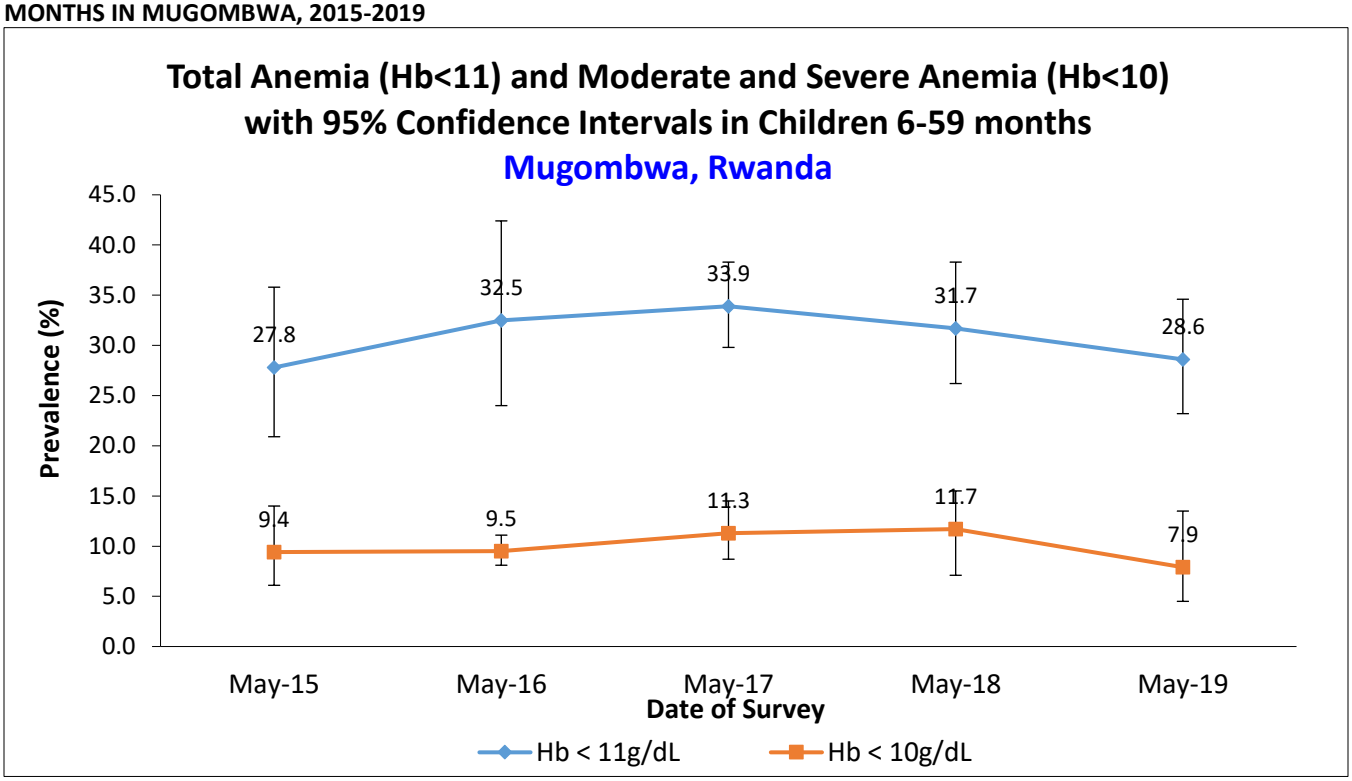


FIGURE 57 TOTAL ANEMIA (<11 G/DL), AND MODERATE AND SEVERE ANEMIA (<10 G/DL) WITH 95% CI IN CHILDREN 6-59 MONTHS IN NYABIHEKE, 2012-2019

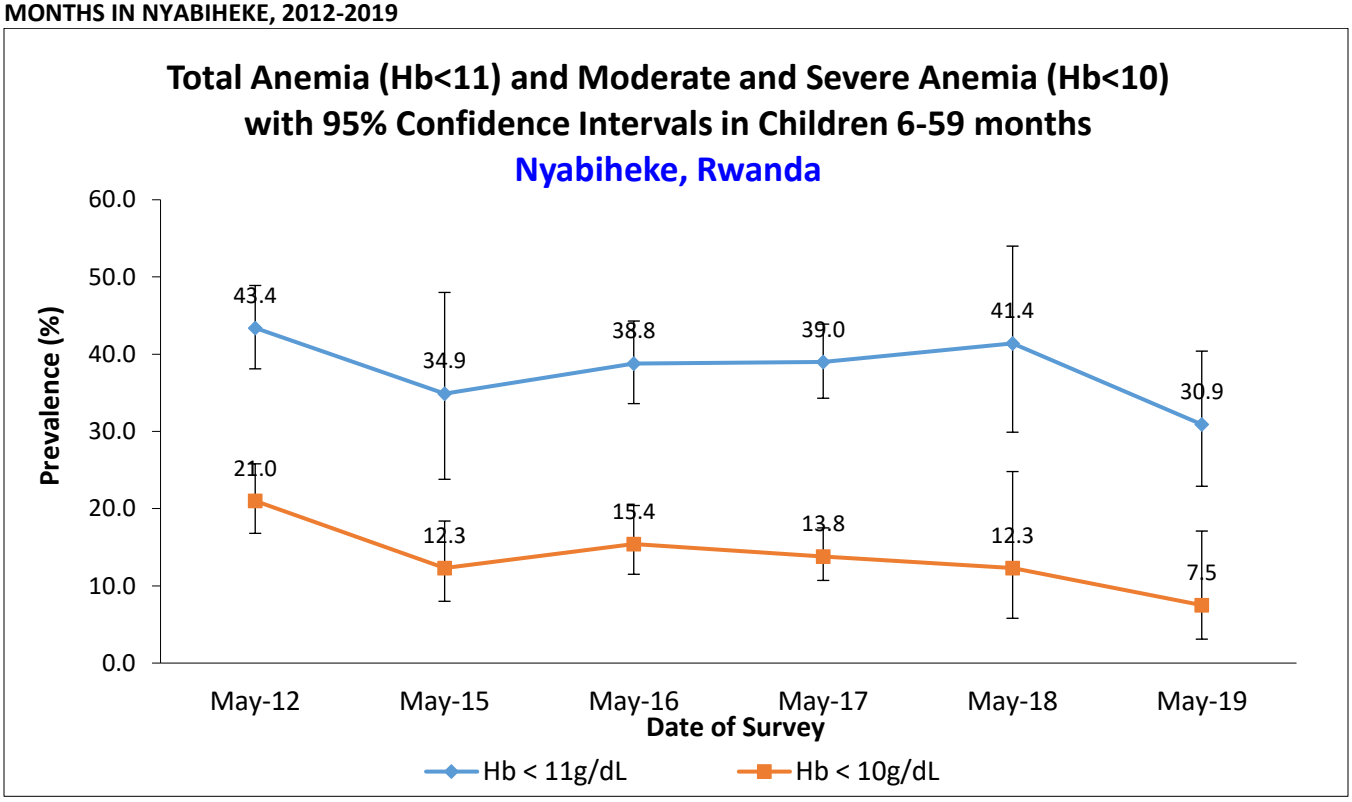


FIGURE 58 TOTAL ANEMIA (<11 G/DL), AND MODERATE AND SEVERE ANEMIA (<10 G/DL) WITH 95% CI IN CHILDREN 6-59 MONTHS IN MAHAMA, 2015-2019

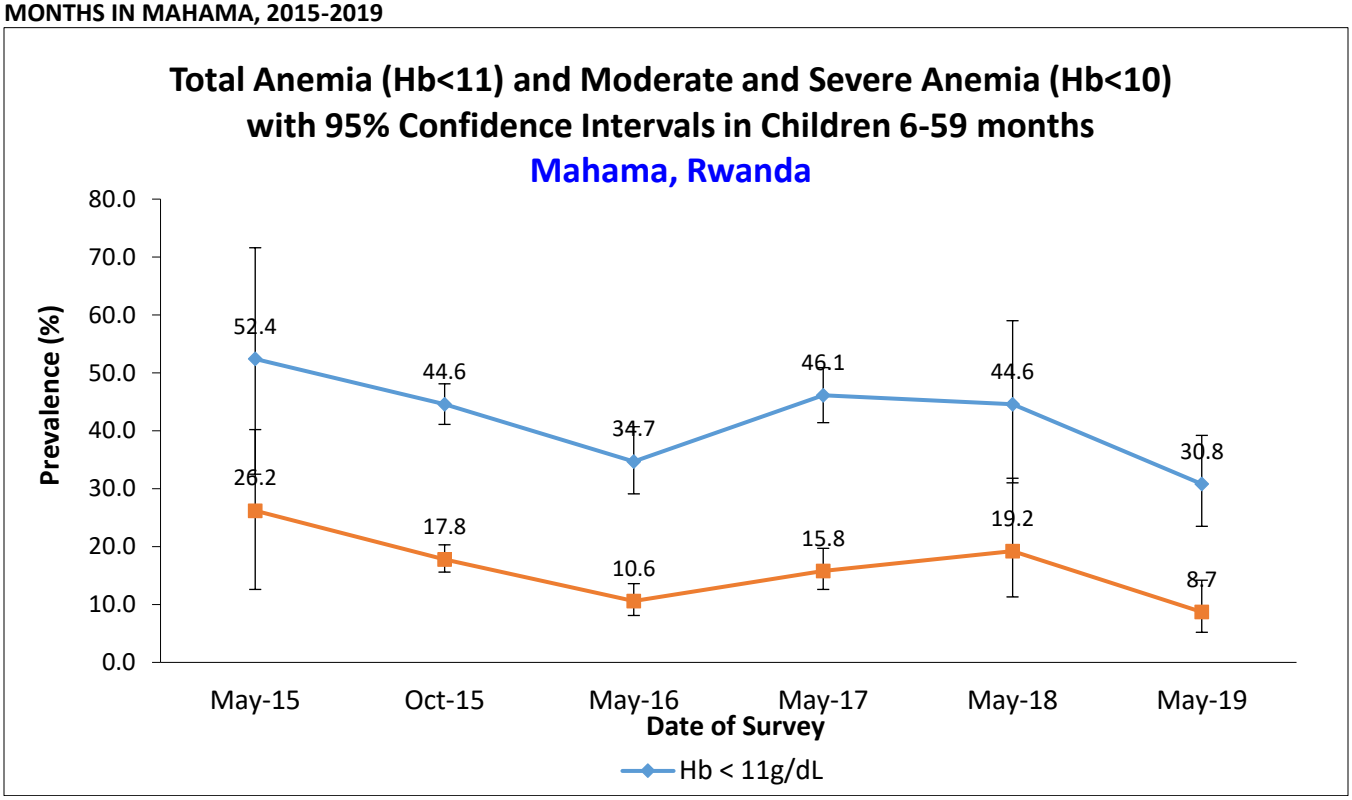


FIGURE 59 TREND IN MEAN HB CONCENTRATION WITH 95% CI IN CHILDREN 6-59 MONTHS IN GIHEMBE, 2012-2019

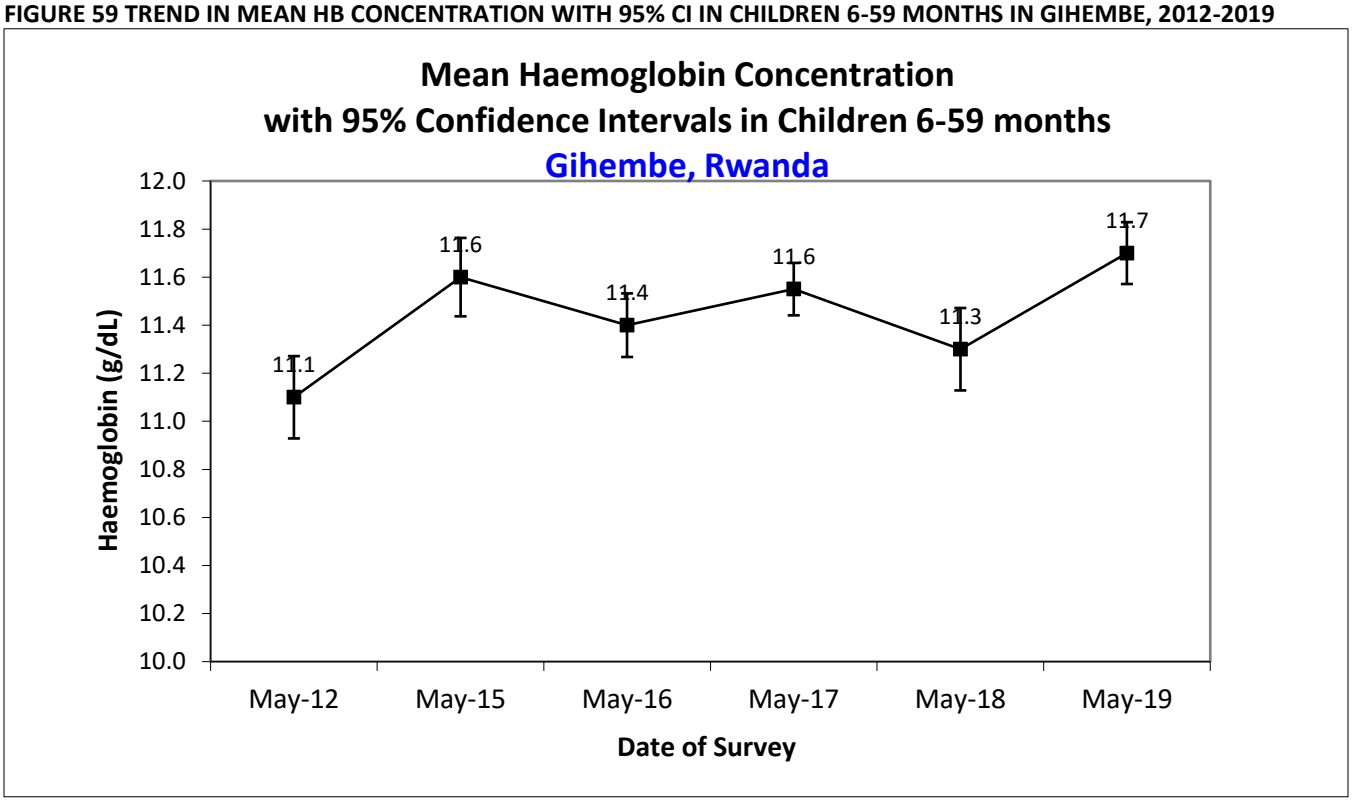


FIGURE 60 TREND IN MEAN HB CONCENTRATION WITH 95% CI IN CHILDREN 6-59 MONTHS IN KIGEME, 2015-2019

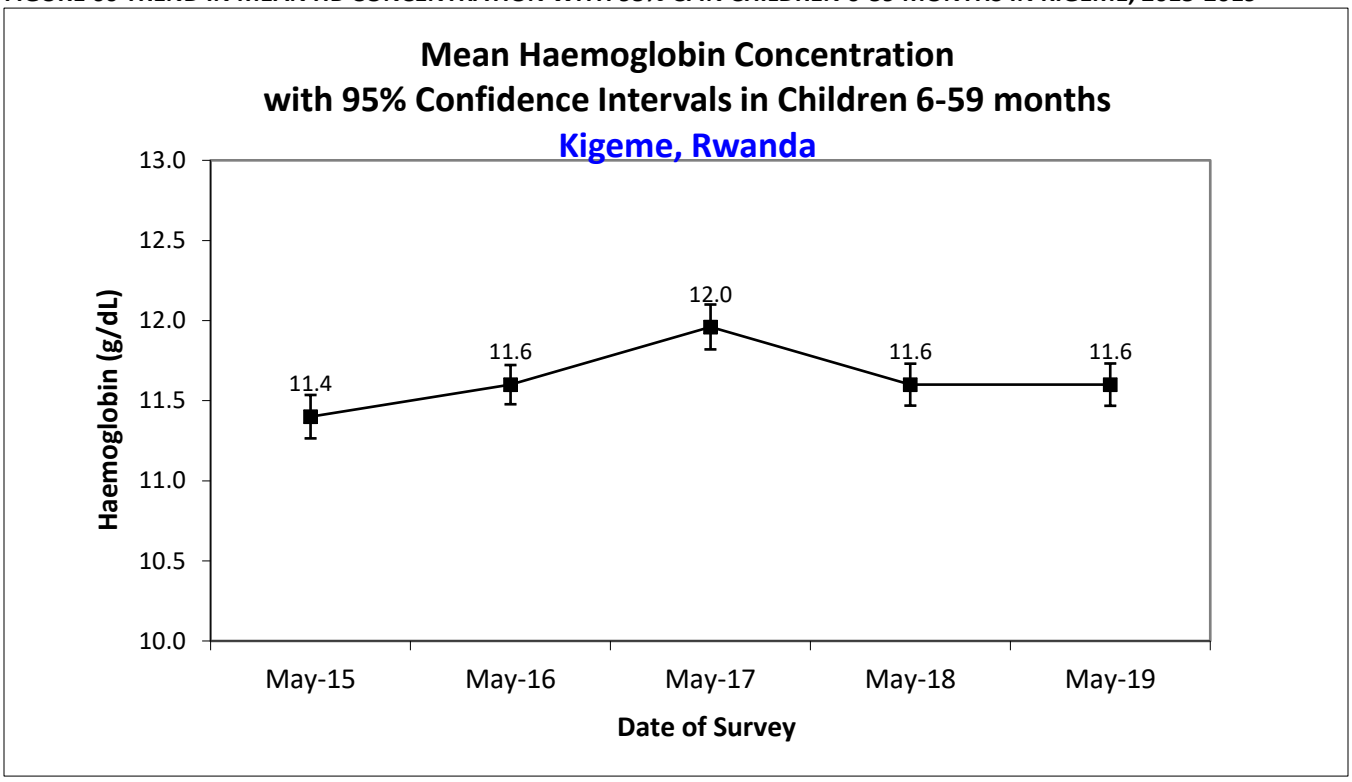


FIGURE 61 TREND IN MEAN HB CONCENTRATION WITH 95% CI IN CHILDREN 6-59 MONTHS IN KIZIBA, 2012-2019

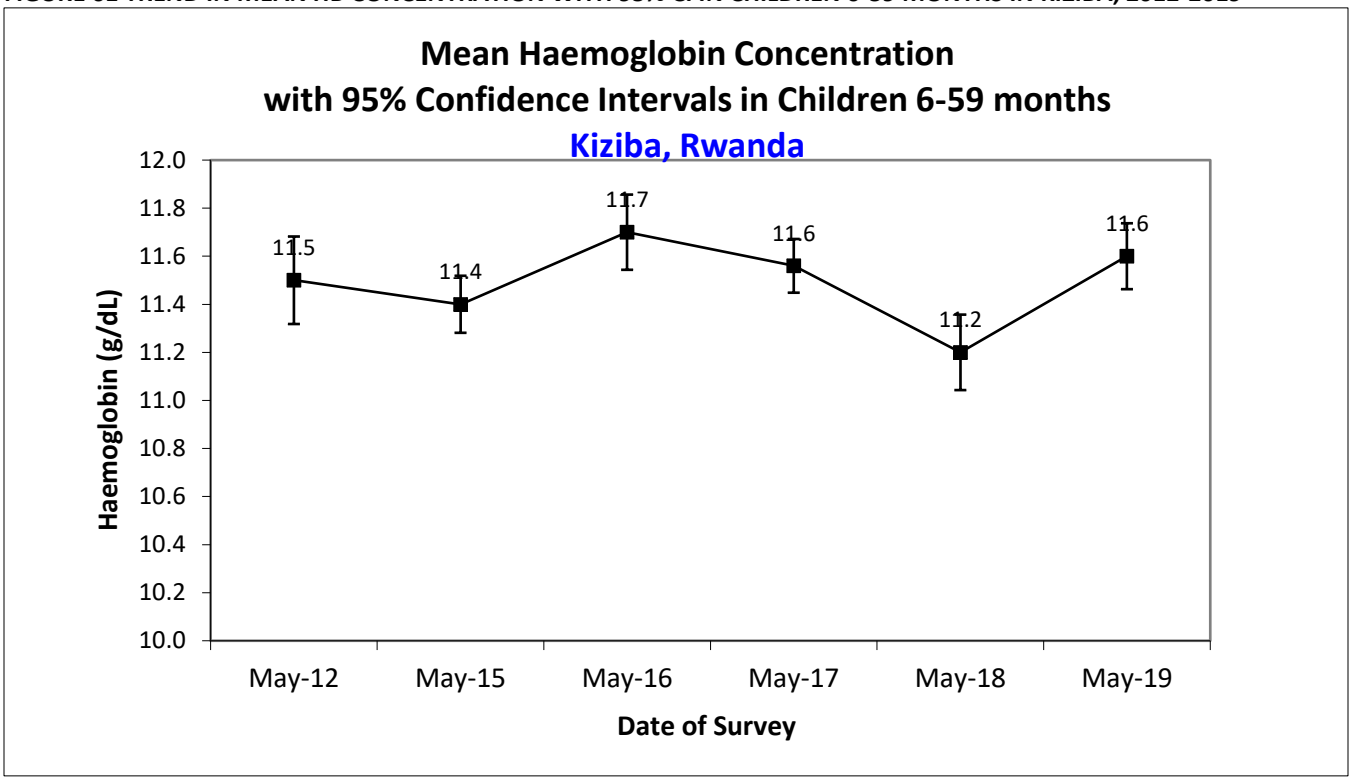


FIGURE 62 TREND IN MEAN HB CONCENTRATION WITH 95% CI IN CHILDREN 6-59 MONTHS IN MUGOMBWA, 2015-2019

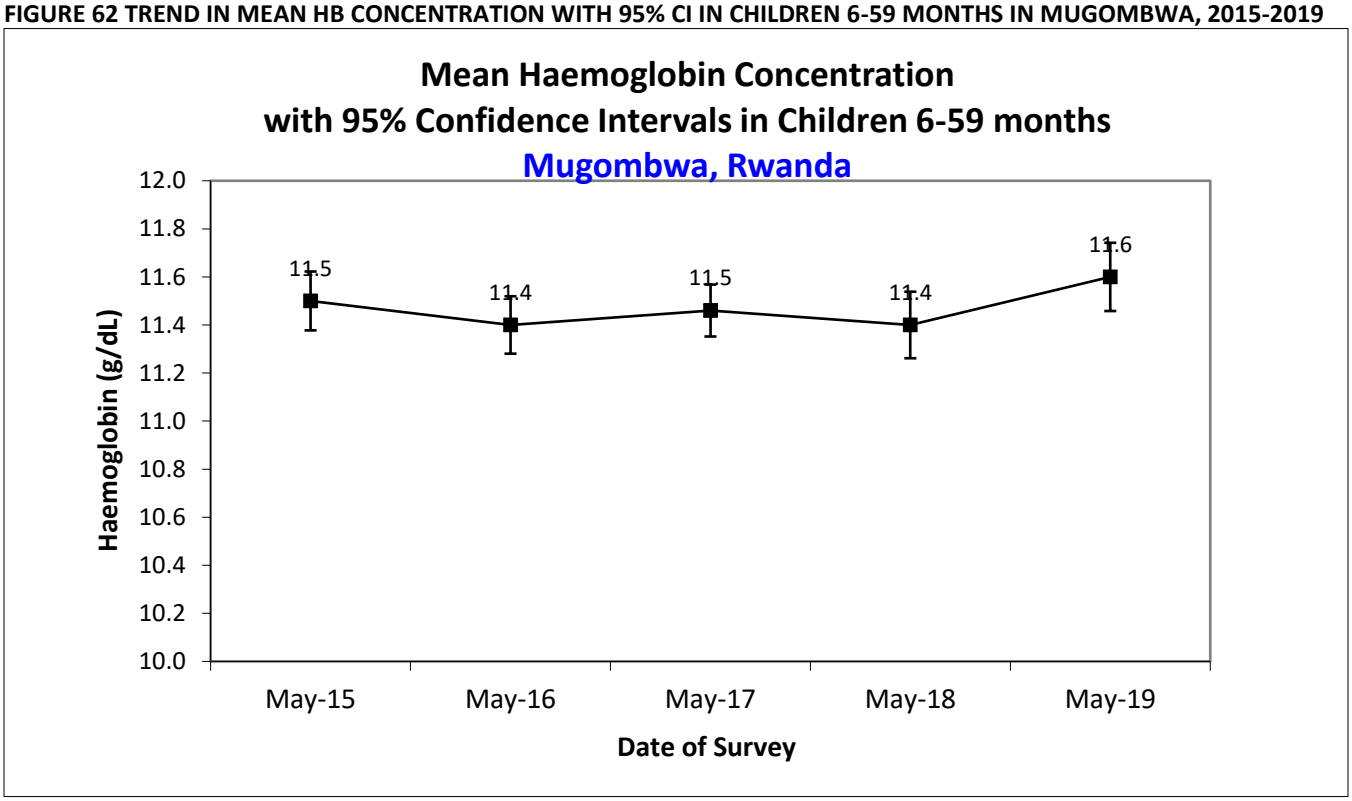


FIGURE 63 TREND IN MEAN HB CONCENTRATION WITH 95% CI IN CHILDREN 6-59 MONTHS IN NYABIHEKE, 2012-2019

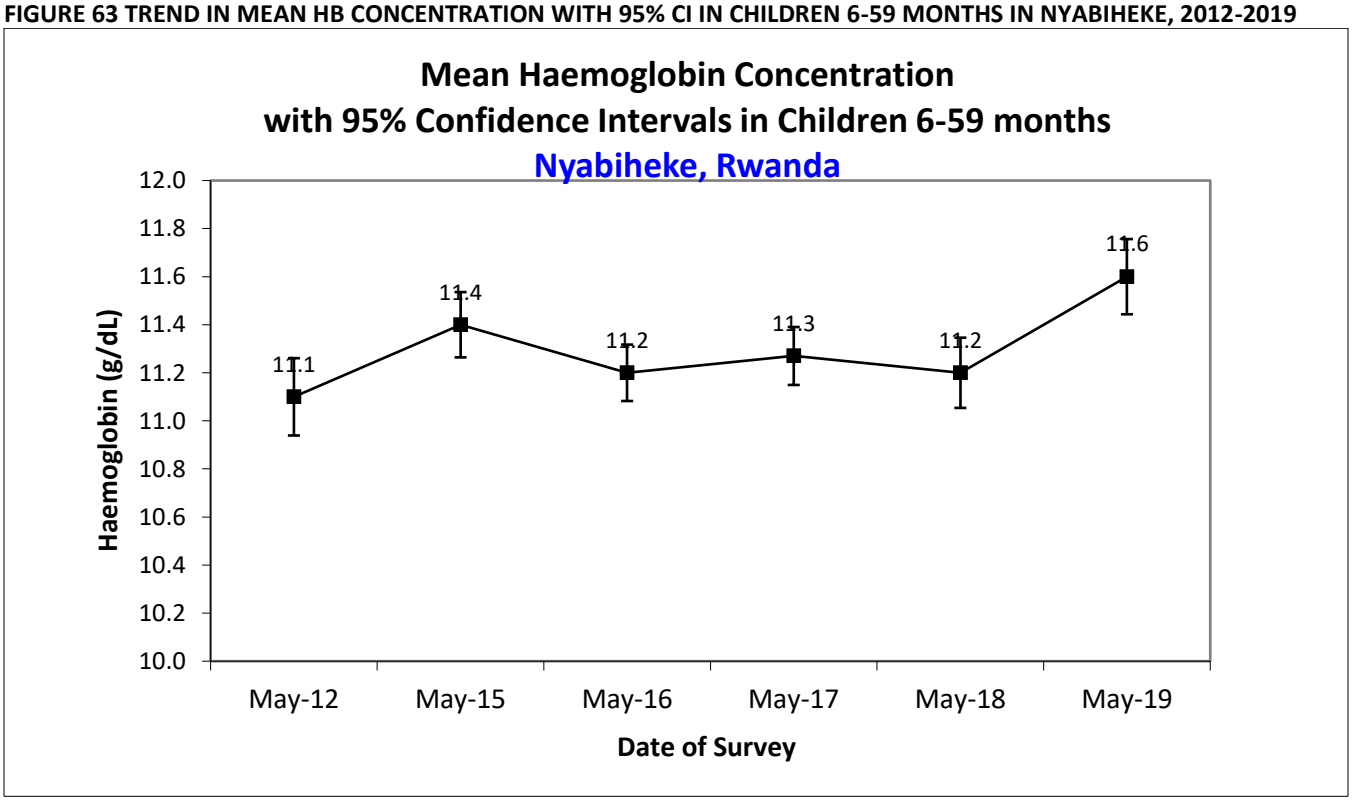
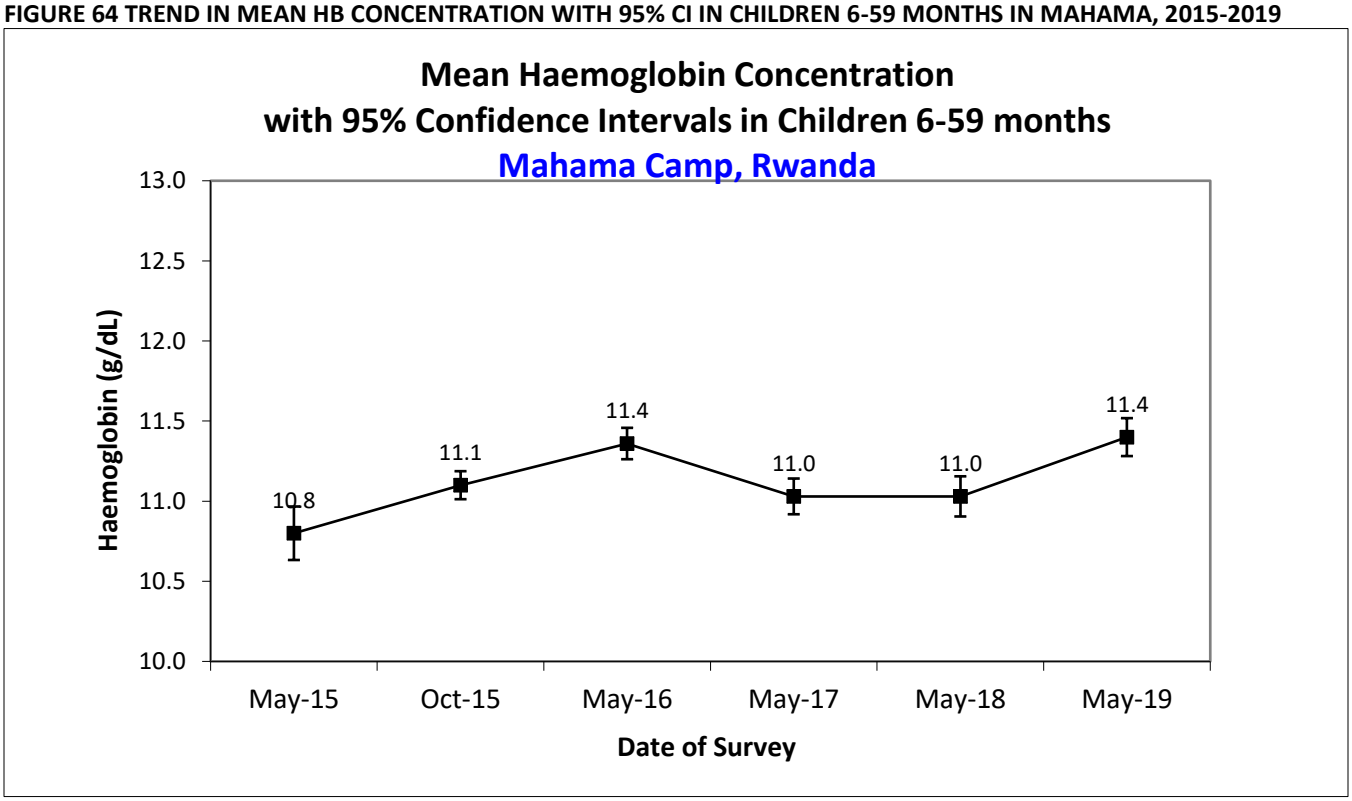


FIGURE 64 TREND IN MEAN HB CONCENTRATION WITH 95% CI IN CHILDREN 6-59 MONTHS IN MAHAMA, 2015-2019



3.2 Children 0-23 months

3.2.1 Prevalence of IYCF

TABLE 96 PREVALENCE OF IYCF INDICATORS IN GIHEMBE

Indicator	Age range	Number/ total	Prevalence % (95% CI)
Timely initiation of breastfeeding	**0-23 months**	101/121	83.5 (65.6-93.0)
Exclusive breastfeeding under 6 months	**0-5 months**	13/14	92.9 (71.9-98.5)
Continued breastfeeding at 1 year	**12-15 months**	26/32	81.2 (56.3-96.3)
Continued breastfeeding at 2 years	**20-23 months**	15/22	68.2 (59.9-75.4)
Introduction of solid, semi-solid or soft foods	**6-8 months**	22/23	95.7 (69.1-99.5)
Consumption of iron-rich or iron-fortified foods	**6-23 months**	107/107	100.0 (100.0-100.0)
Bottle feeding	**0-23 months**	6/121	5.0 (2.3-10.4)
Proportion of children who achieved Minimum Acceptable Diet (MAD)	**6-23 months**	75/107	70.1 (55.7-81.4)

TABLE 97 PREVALENCE OF IYCF INDICATORS IN KIGEME

Indicator	Age range	Number/ total	Prevalence % (95% CI)
Timely initiation of breastfeeding	**0-23 months**	114/130	87.7 (77.1-93.8)
Exclusive breastfeeding under 6 months	**0-5 months**	24/25	96.0 (74.8-99.5)
Continued breastfeeding at 1 year	**12-15 months**	16/17	94.1 (56.3-99.5)
Continued breastfeeding at 2 years	**20-23 months**	14/22	63.6 (38.7-82.9)
Introduction of solid, semi-solid or soft foods	**6-8 months**	10/13	76.9 (45.1-93.1)
Consumption of iron-rich or iron-fortified foods	**6-23 months**	97/105	92.4 (85.2-96.2)
Bottle feeding	**0-23 months**	4/130	3.1 (0.8-11.7)
Proportion of children who achieved Minimum Acceptable Diet (MAD)	**6-23 months**	48/105	54.3 (44.5-63.8)

TABLE 98 PREVALENCE OF IYCF INDICATORS IN KIZIBA

Indicator	Age range	Number/ total	Prevalence % (95% CI)
Timely initiation of breastfeeding	**0-23 months**	107/123	87.0 (80.1-91.8)
Exclusive breastfeeding under 6 months	**0-5 months**	13/14	92.9 (61.0-99.1)
Continued breastfeeding at 1 year	**12-15 months**	21/23	91.3 (70.6-97.9)
Continued breastfeeding at 2 years	**20-23 months**	14/22	63.6 (41.5-81.2)
Introduction of solid, semi-solid or soft foods	**6-8 months**	15/18	83.3 (33.0-98.1)
Consumption of iron-rich or iron-fortified foods	**6-23 months**	95/109	87.2 (75.3-93.8)
Bottle feeding	**0-23 months**	9/123	7.3 (4.3-12.3)
Proportion of children who achieved Minimum Acceptable Diet (MAD)	**6-23 months**	53/110	48.2 (37.4-59.1)

TABLE 99 PREVALENCE OF IYCF INDICATORS IN MUGOMBWA

Indicator	Age range	Number/ total	Prevalence % (95% CI)
Timely initiation of breastfeeding	**0-23 months**	85/99	85.9 (63.5-95.5)
Exclusive breastfeeding under 6 months	**0-5 months**	12/12	100.0 (100.0-100.)
Continued breastfeeding at 1 year	**12-15 months**	15/16	93.8 (67.2-99.1)
Continued breastfeeding at 2 years	**20-23 months**	11/18	61.1 (34.7-82.3)
Introduction of solid, semi-solid or soft foods	**6-8 months**	12/12	100.0 (100.0-100.0)
Consumption of iron-rich or iron-fortified foods	**6-23 months**	84/86	97.7 (91.6-99.4)
Bottle feeding	**0-23 months**	7/99	7.1 (2.9-16.2)
Proportion of children who achieved Minimum Acceptable Diet (MAD)	**6-23 months**	58/86	67.4 (55.1-77.8)

TABLE 100 PREVALENCE OF IYCF INDICATORS IN NYABIHEKE

Indicator	Age range	Number/ total	Prevalence % (95% CI)
Timely initiation of breastfeeding	**0-23 months**	88/101	87.1 (67.0-95.8)
Exclusive breastfeeding under 6 months	**0-5 months**	17/20	85.0 (49.3-97.1)
Continued breastfeeding at 1 year	**12-15 months**	13/16	81.2 (66.7-90.4)
Continued breastfeeding at 2 years	**20-23 months**	11/19	57.9 (30.1-81.4)
Introduction of solid, semi-solid or soft foods	**6-8 months**	16/16	100.0 (100.0-100.0)
Consumption of iron-rich or iron-fortified foods	**6-23 months**	77/81	95.1 (87.1-98.2)
Bottle feeding	**0-23 months**	13/101	12.9 (6.1-25.0)
Proportion of children who achieved Minimum Acceptable Diet (MAD)	**6-23 months**	42/81	51.9 (41.5-62.0)

TABLE 101 PREVALENCE OF IYCF INDICATORS IN MAHAMA

Indicator	Age range	Number/ total	Prevalence % (95% CI)
Timely initiation of breastfeeding	**0-23 months**	123/143	86.0 (75.3-92.5)
Exclusive breastfeeding under 6 months	**0-5 months**	21/22	95.5 (68.6-99.5)
Continued breastfeeding at 1 year	**12-15 months**	18/19	94.7 (64.8-99.4)
Continued breastfeeding at 2 years	**20-23 months**	14/22	58.3 (39.9-74.7)
Introduction of solid, semi-solid or soft foods	**6-8 months**	35/35	100.0 (100.0-100.0)
Consumption of iron-rich or iron-fortified foods	**6-23 months**	118/121	97.5 (92.0-99.3)
Bottle feeding	**0-23 months**	7/143	4.9 (2.3-10.1)
Proportion of children who achieved Minimum Acceptable Diet (MAD)	**6-23 months**	55/121	45.5 (33.9-57.5)

FIGURE 65 KEY IYCF INDICATORS 2012-2019 IN GIHEMBE

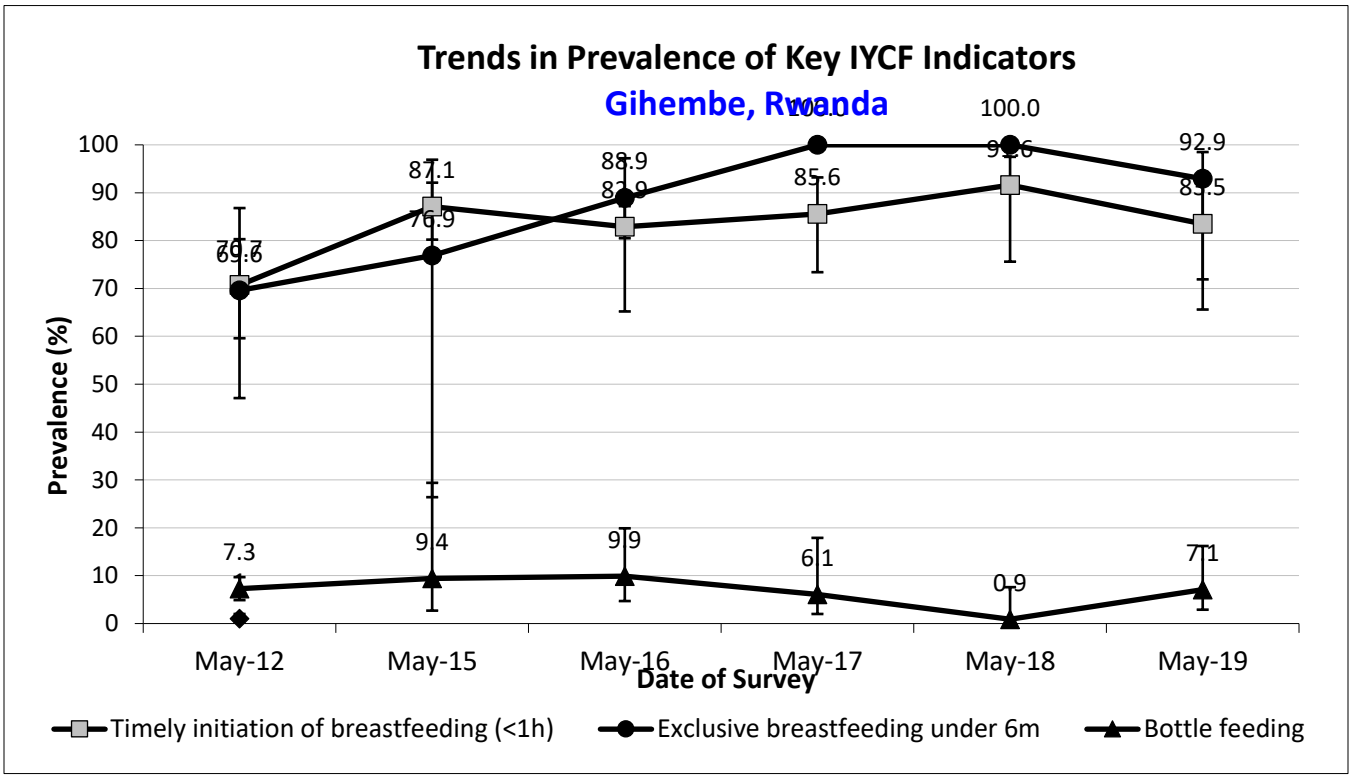


FIGURE 66 KEY IYCF INDICATORS 2015-2019 IN KIGEME

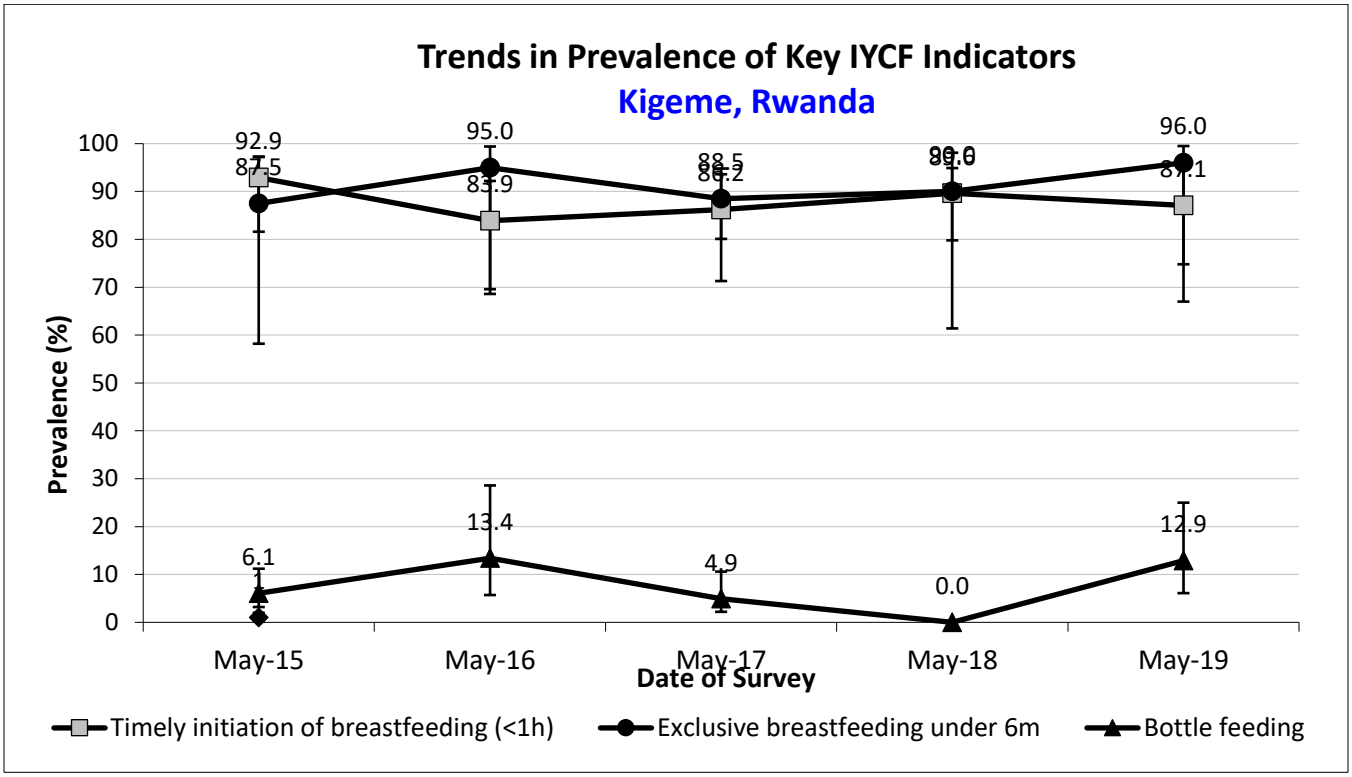


FIGURE 67 KEY IYCF INDICATORS 2012-2019 IN KIZIBA

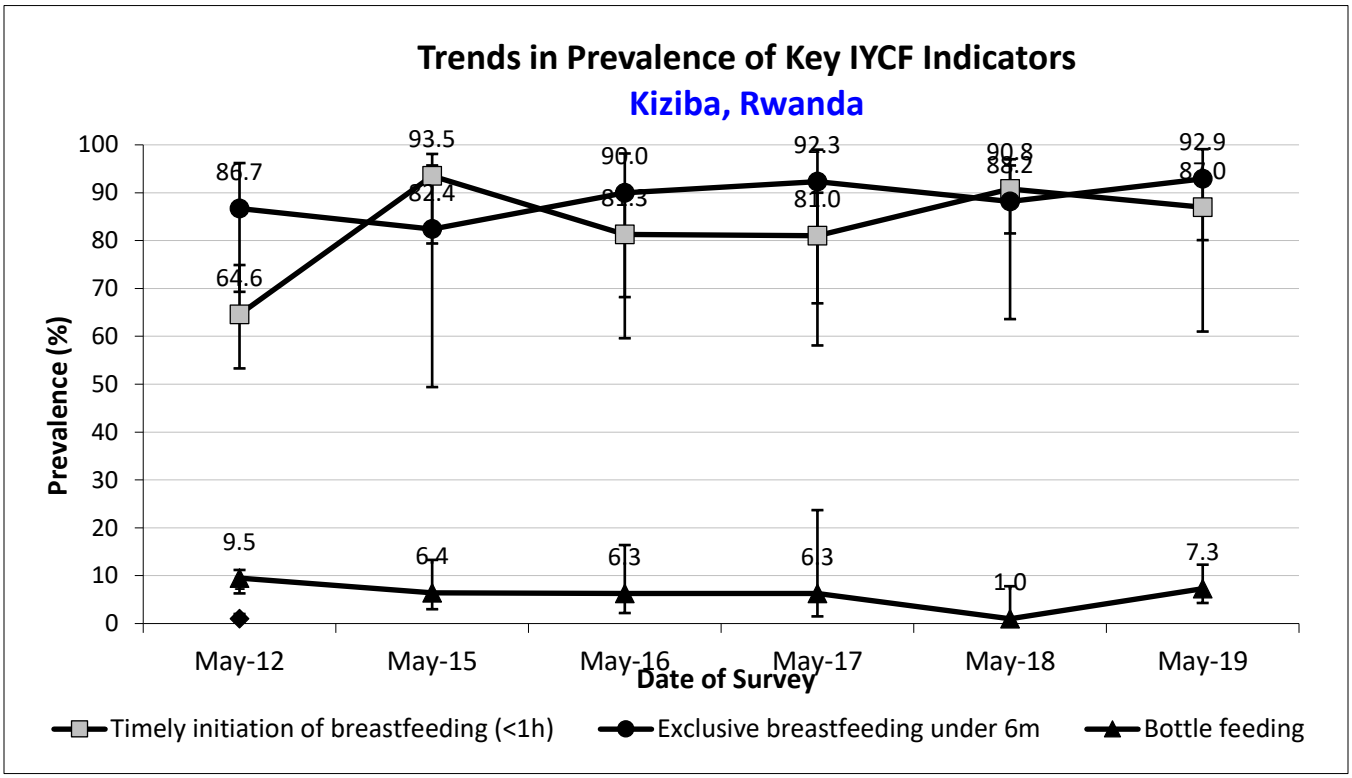


FIGURE 68 KEY IYCF INDICATORS 2015-2019 IN MUGOMBWA

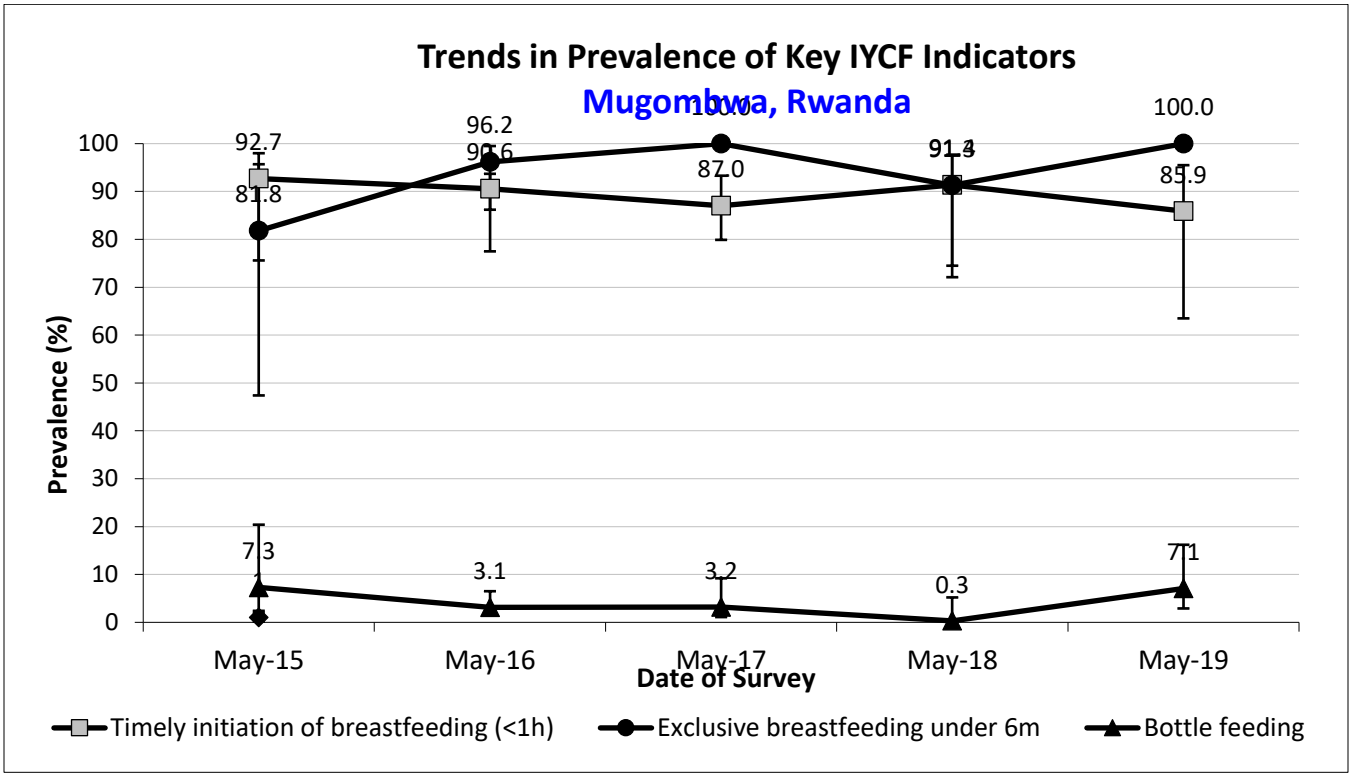


FIGURE 69 KEY IYCF INDICATORS 2012-2019 IN NYABIHEKE

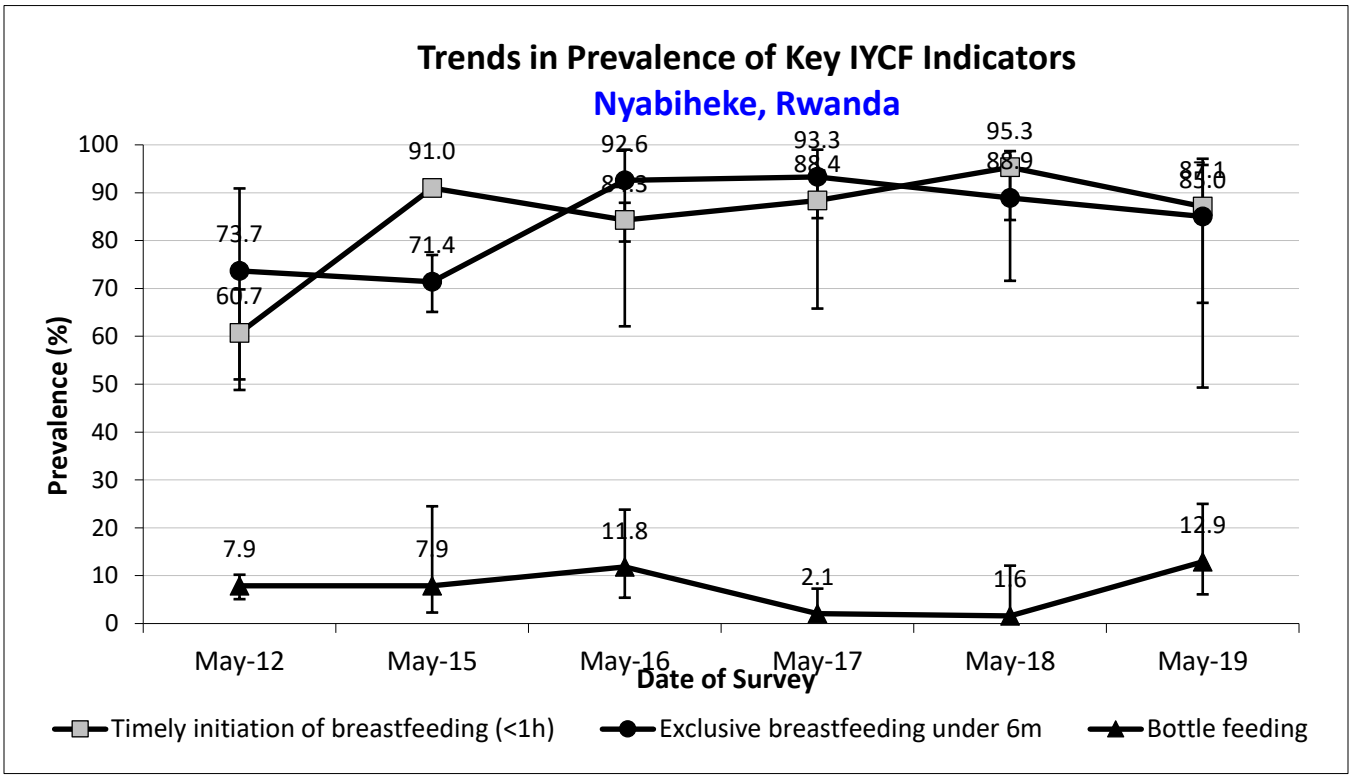
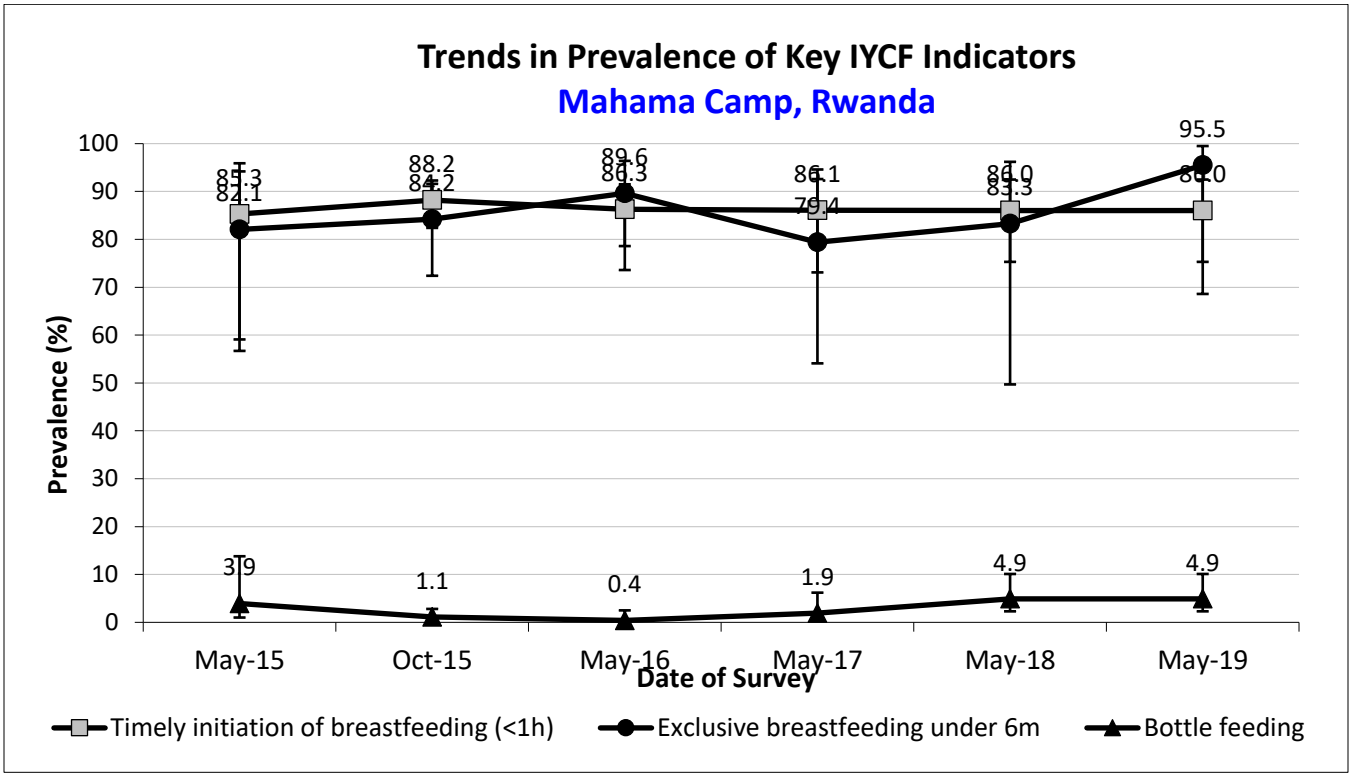


FIGURE 70 KEY IYCF INDICATORS 2015-2019 IN MAHAMA



3.2.2 Prevalence of intake of infant formula

TABLE 102 INFANT FORMULA INTAKE (FORTIFIED OR NON-FORTIFIED) IN CHILDREN AGED 0-23 MONTHS

	Number/total	% (95% CI)
Gihembe	2/121	1.7 (0.5-5.7)
Kigeme	1/130	0.8 (0.1-5.0)
Kiziba	2/123	1.6 (0.5-5.4)
Mugombwa	2/99	2.0 (0.2-15.4)
Nyabiheke	2/101	2.0 (0.3-13.8)
Mahama	0/143	0.0 (0.0-0.0)

3.2.3 Prevalence of intake of specialized nutritious foods

TABLE 103 CSB+ INTAKE IN CHILDREN AGED 6-23 MONTHS BY CAMP

	Number/total	% (95% CI)
Gihembe	3/107	2.8 (1.1-6.8)
Kigeme	11/105	10.5 (2.8-32.3)
Kiziba	1/109	0.9 (0.1-7.1)
Mugombwa	3/86	3.5 (1.5-8.1)
Nyabiheke	3/81	3.7 (0.7-16.4)
Mahama	9/121	7.4 (1.4-31.9)

TABLE 104 CSB++ INTAKE IN CHILDREN AGED 6-23 MONTHS BY CAMP

	Number/total	% (95% CI)
Gihembe	105/107	98.1 (92.9-99.5)
Kigeme	95/105	90.5 (85.1-94.1)
Kiziba	91/109	83.5 (74.7-89.7)
Mugombwa	82/86	95.3 (83.7-98.8)
Nyabiheke	77/81	95.1 (87.1-98.2)
Mahama	111/121	91.7 (83.0-96.2)

TABLE 105 MNP ENROLMENT AMONG CHILDREN AGED 6-23 MONTHS BY CAMP

	Number/total	% (95% CI)
Gihembe	94/107	87.9 (67.3-96.2)
Kigeme	77/105	73.3 (54.6-86.3)
Kiziba	96/109	88.1 (80.9-92.8)
Mugombwa	68/86	79.1 (59.0-90.8)
Nyabiheke	70/81	86.4 (78.5-91.7)
Mahama	103/121	85.1 (76.6-90.9)

3.3 Women 15-49 years

3.3.1 Demographic characteristics

TABLE 106 WOMEN PHYSIOLOGICAL STATUS AND AGE

	Pregnant		Non-pregnant		Mean age ± SD
Physiological status	**Number/total**	**% (95% CI)**	**Number/total**	**% of sample**	
Gihembe	22/293	7.5 (4.8-11.6)	271/293	92.5 (88.4-95.2)	31.1±5.4
Kigeme	29/324	9.0 (4.8-16.0)	295/324	91.0 (84.0-95.2)	31.6±6.5
Kiziba	29/294	9.9 (7.3-13.2)	265/294	90.1 (86.8-92.7)	32.5±6.1
Mugombwa	25/251	10.0 (6.3-15.3)	25/251	90.0 (84.7-93.7)	32.1±6.1
Nyabiheke	18/258	7.0 (3.3-14.0)	18/258	93.0 (86.0-96.7)	31.7±6.6
Mahama	41/350	11.7 (8.0-16.9)	41/350	88.3 (83.1-92.0)	30.3±5.8

3.3.2 Anemia results

TABLE 107 PREVALENCE OF ANEMIA AND HB CONCENTRATION IN NON-PREGNANT WOMEN OF REPRODUCTIVE AGE (15-49 YEARS) IN GIHEMBE

	Number/total	% (95% CI)
Total Anemia (<12.0 g/dL)	12/270	4.4 (2.7-7.2)
Mild Anemia (11.0-11.9 g/dL)	9/270	3.3 (1.6-6.6)
Moderate Anemia (8.0-10.9 g/dL)	3/270	1.1 (0.5-2.6)
Severe Anemia (<8.0 g/dL)	0/270	0.0 (0.0-0.0)
Mean Hb (g/dL) ± SD [range]	13.9±1.0 [10.5,16.7]	

TABLE 108 PREVALENCE OF ANEMIA AND HB CONCENTRATION IN NON-PREGNANT WOMEN OF REPRODUCTIVE AGE (15-49 YEARS) IN KIGEME

	Number/total	% (95% CI)
Total Anemia (<12.0 g/dL)	37/295	12.5 (7.5-20.1)
Mild Anemia (11.0-11.9 g/dL)	29/295	9.8 (5.4-17.2)
Moderate Anemia (8.0-10.9 g/dL)	8/295	2.7 (1.6-4.4)
Severe Anemia (<8.0 g/dL)	0/295	0.0 (0.0-0.0)
Mean Hb (g/dL) ± SD [range]	13.6±1.3 [9.6,16.5]	

TABLE 109 PREVALENCE OF ANEMIA AND HB CONCENTRATION IN NON-PREGNANT WOMEN OF REPRODUCTIVE AGE (15-49 YEARS) IN KIZIBA

	Number/total	% (95% CI)
Total Anemia (<12.0 g/dL)	19/265	7.2 (4.5-11.2)
Mild Anemia (11.0-11.9 g/dL)	14/265	5.3 (3.6-7.7)
Moderate Anemia (8.0-10.9 g/dL)	5/265	1.9 (0.7-5.3)
Severe Anemia (<8.0 g/dL)	0/265	0.0 (0.0-0.0)
Mean Hb (g/dL) ± SD [range]	13.6±1.2 [10.5,16.1]	

TABLE 110 PREVALENCE OF ANEMIA AND HB CONCENTRATION IN NON-PREGNANT WOMEN OF REPRODUCTIVE AGE (15-49 YEARS) IN MUGOMBWA

	Number/total	% (95% CI)
Total Anemia (<12.0 g/dL)	11/225	4.9 (2.0-11.3)
Mild Anemia (11.0-11.9 g/dL)	9/225	4.0 (1.4-11.2)
Moderate Anemia (8.0-10.9 g/dL)	2/225	0.9 (0.2-3.4)
Severe Anemia (<8.0 g/dL)	0/225	0.0 (0.0-0.0)
Mean Hb (g/dL) ± SD [range]	13.4±1.0 [9.1,15.7]	

TABLE 111 PREVALENCE OF ANEMIA AND HB CONCENTRATION IN NON-PREGNANT WOMEN OF REPRODUCTIVE AGE (15-49 YEARS) IN NYABIHEKE

	Number/total	% (95% CI)
Total Anemia (<12.0 g/dL)	26/240	10.8 (6.9-16.7)
Mild Anemia (11.0-11.9 g/dL)	22/240	9.2 (5.0-16.2)
Moderate Anemia (8.0-10.9 g/dL)	4/240	1.7 (0.6-4.4)
Severe Anemia (<8.0 g/dL)	0/240	0.0 (0.1-5.3)
Mean Hb (g/dL) ± SD [range]	13.6±1.2 [10.3,17.1]	

TABLE 112 PREVALENCE OF ANEMIA AND HB CONCENTRATION IN NON-PREGNANT WOMEN OF REPRODUCTIVE AGE (15-49 YEARS) IN MAHAMA

	Number/total	% (95% CI)
Total Anemia (<12.0 g/dL)	29/309	9.4 (3.6-22.3)
Mild Anemia (11.0-11.9 g/dL)	21/309	6.8 (2.5-17.0)
Moderate Anemia (8.0-10.9 g/dL)	8/309	2.6 (1.0-6.8)
Severe Anemia (<8.0 g/dL)	0/309	0.0 (0.0-0.0)
Mean Hb (g/dL) ± SD [range]	13.4±1.2 [10.1,17.6]	

FIGURE 71 TRENDS IN ANEMIA CATEGORIES IN WOMEN OF REPRODUCTIVE AGE (NON-PREGNANT) IN GIHEMBE, 2012-2019

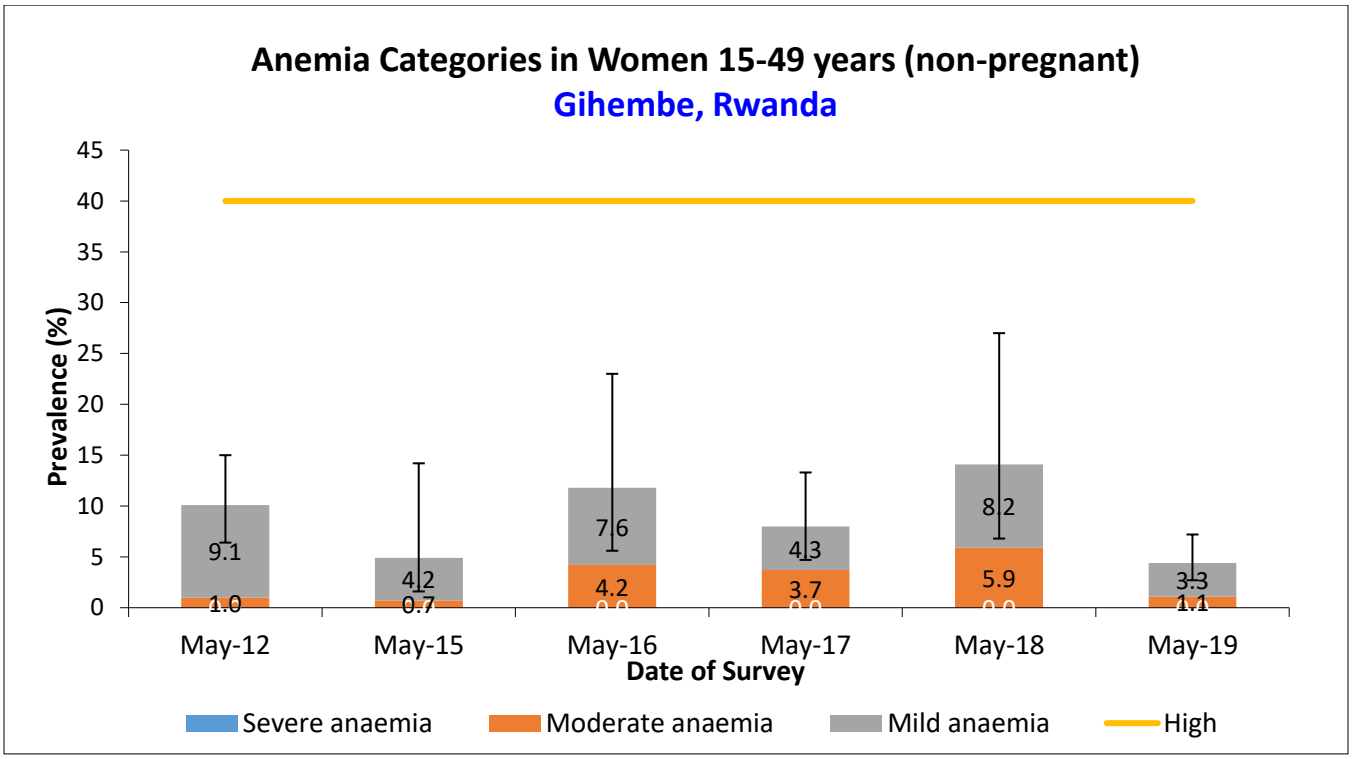


FIGURE 72 TRENDS IN ANEMIA CATEGORIES IN WOMEN OF REPRODUCTIVE AGE (NON-PREGNANT) IN KIGEME, 2015-2019

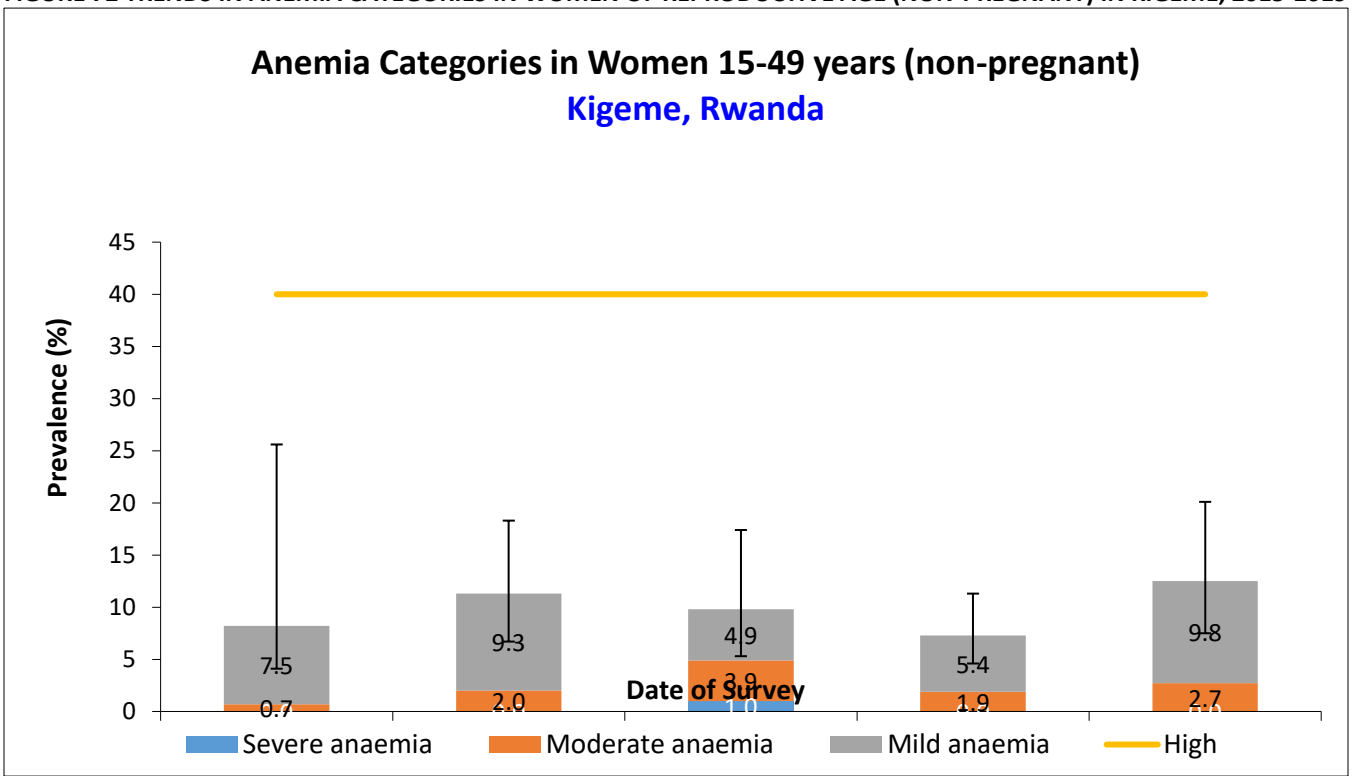


FIGURE 73 TRENDS IN ANEMIA CATEGORIES IN WOMEN OF REPRODUCTIVE AGE (NON-PREGNANT) IN KIZIBA, 2012-2019

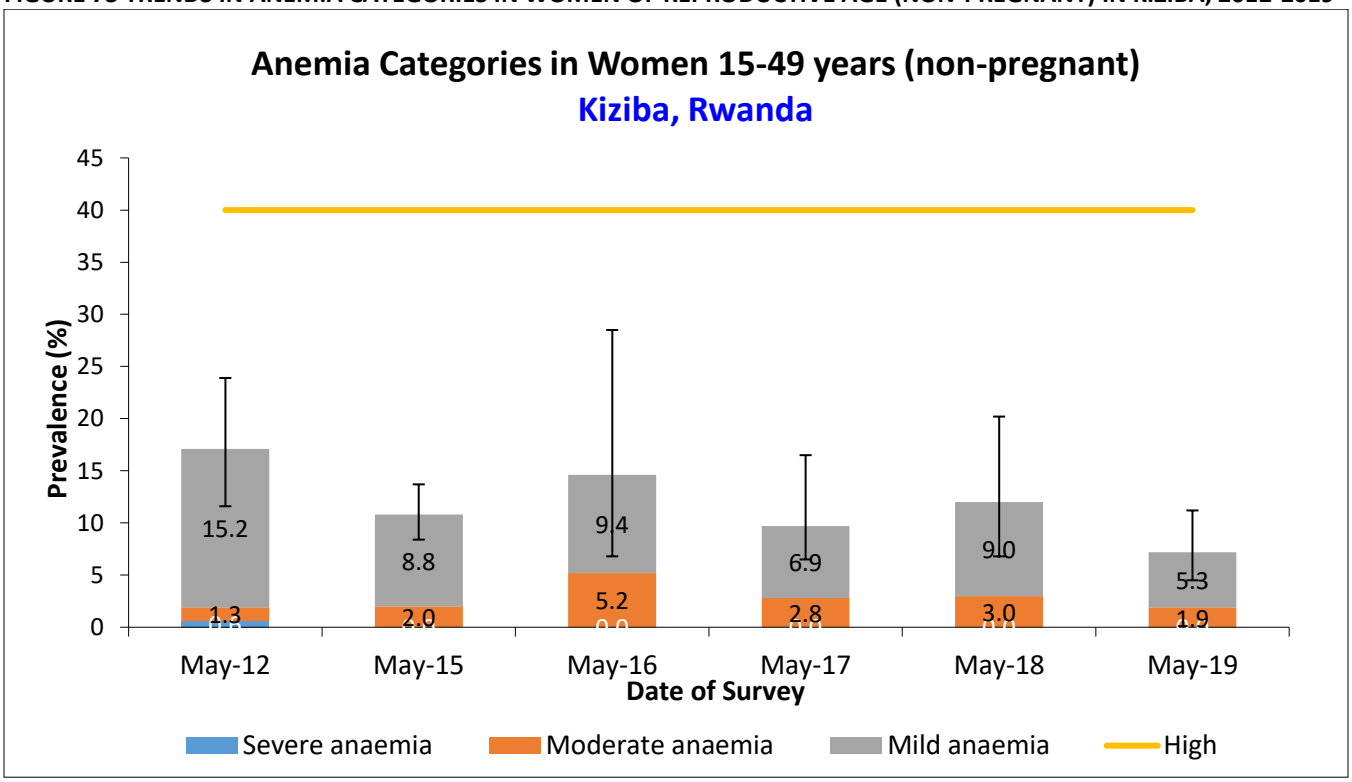


FIGURE 74 TRENDS IN ANEMIA CATEGORIES IN WOMEN OF REPRODUCTIVE AGE (NON-PREGNANT) IN MUGOMBWA, 2015-2019

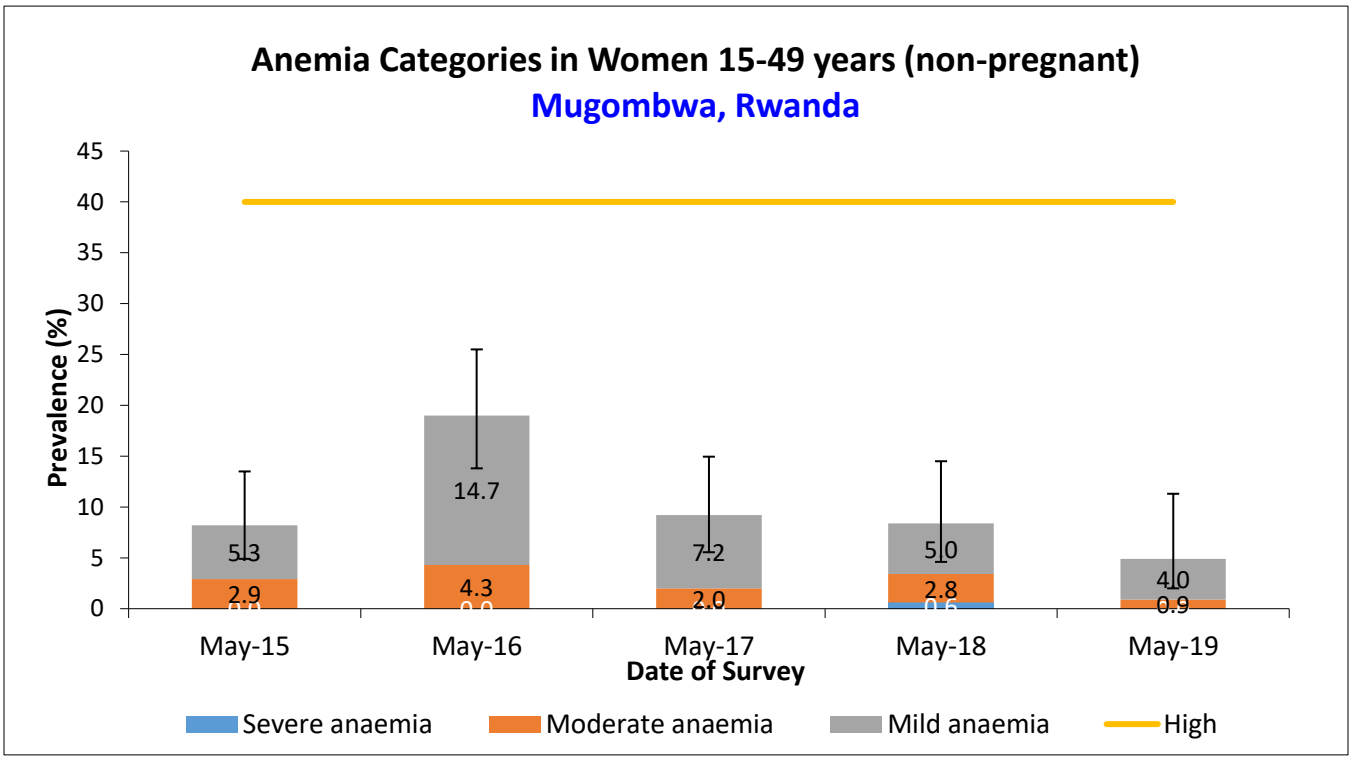


FIGURE 75 TRENDS IN ANEMIA CATEGORIES IN WOMEN OF REPRODUCTIVE AGE (NON-PREGNANT) IN NYABIHEKE, 2012-2019

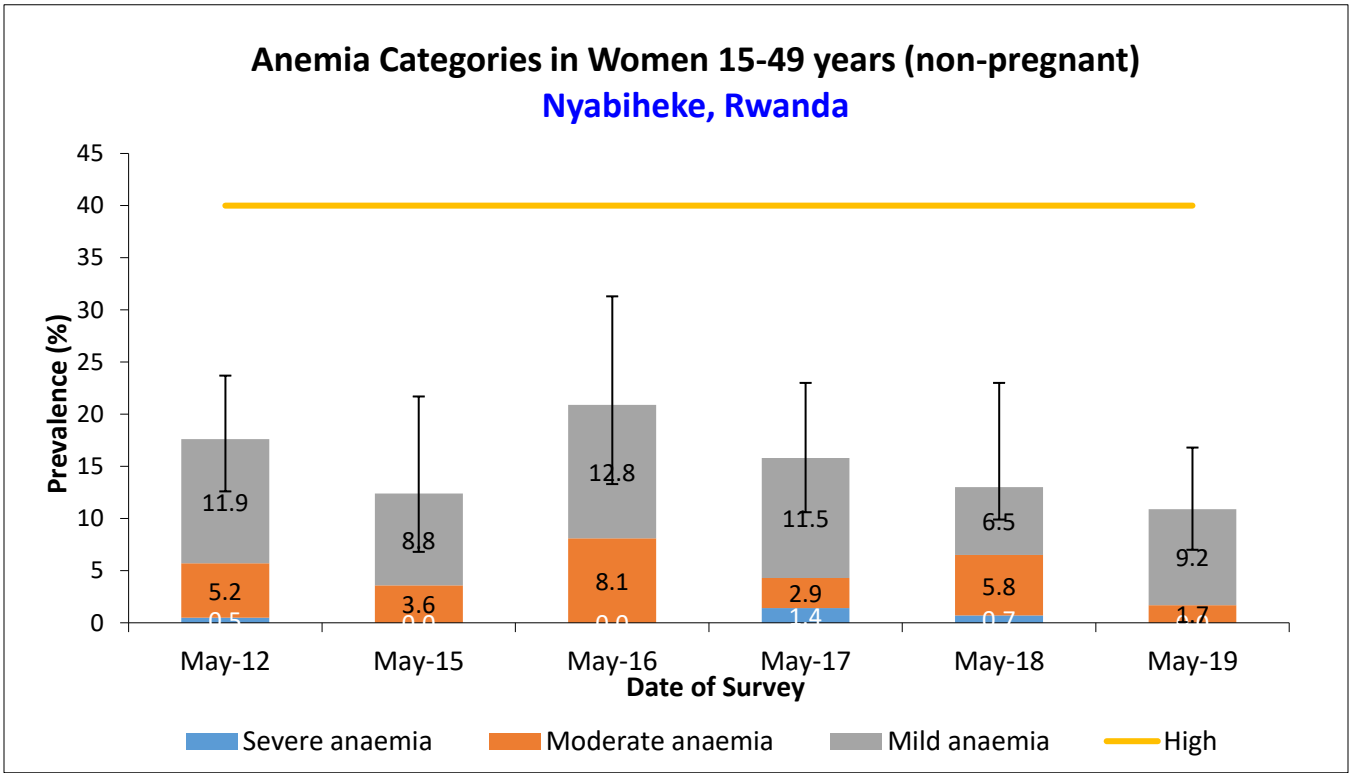


FIGURE 76 TRENDS IN ANEMIA CATEGORIES IN WOMEN OF REPRODUCTIVE AGE (NON-PREGNANT) IN MAHAMA, 2015-2019

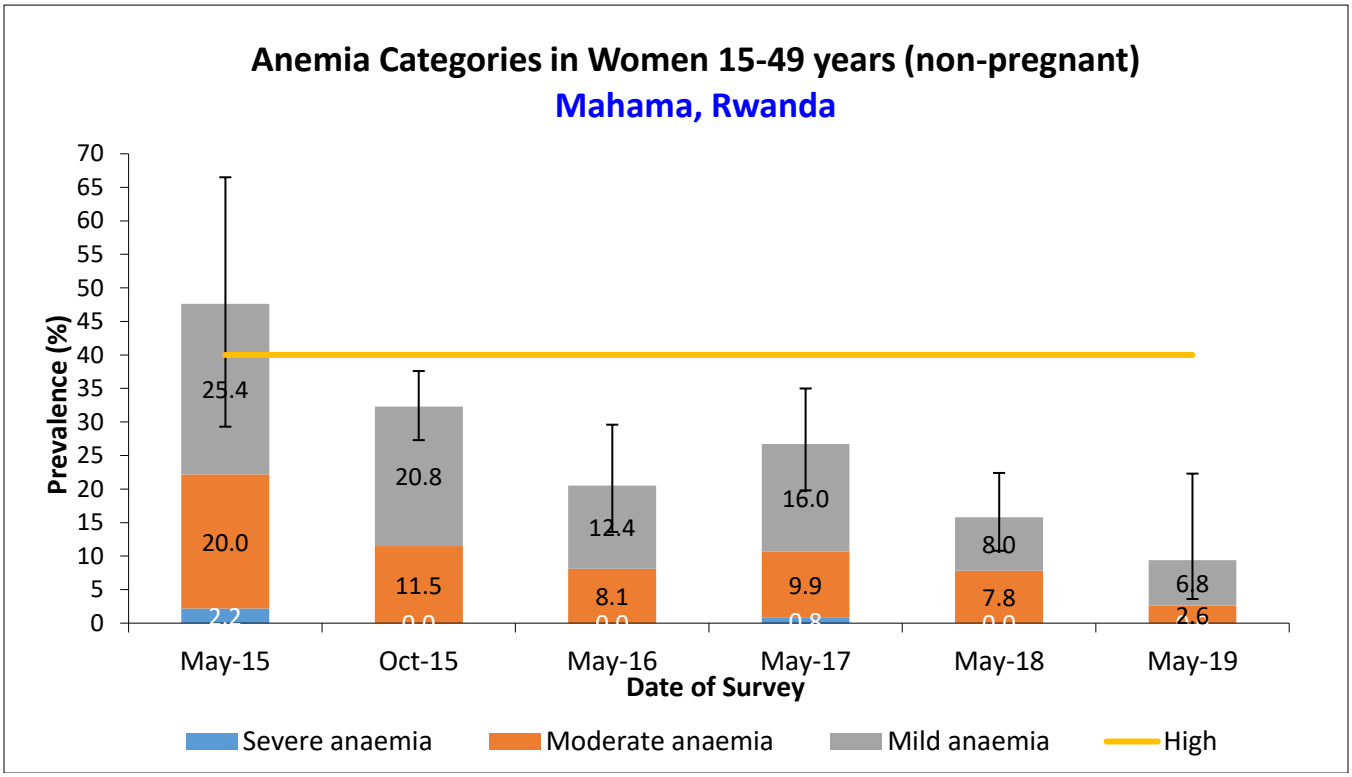


FIGURE 77 MEAN HB CONCENTRATION WITH 95% CI IN WOMEN OF REPRODUCTIVE AGE (NON-PREGNANT) IN GIHEMBE, 2012-2019

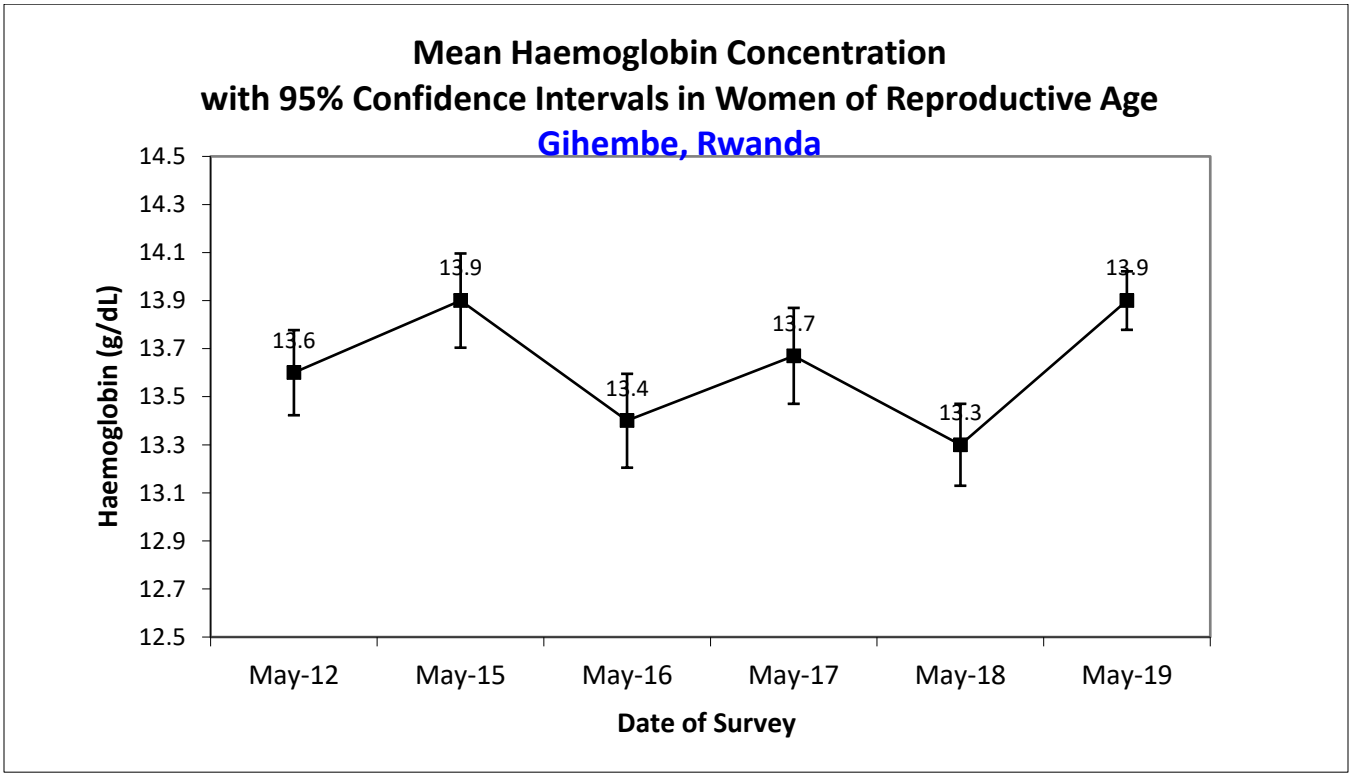


FIGURE 78 MEAN HB CONCENTRATION WITH 95% CI IN WOMEN OF REPRODUCTIVE AGE (NON-PREGNANT) IN KIGEME, 2015-2019

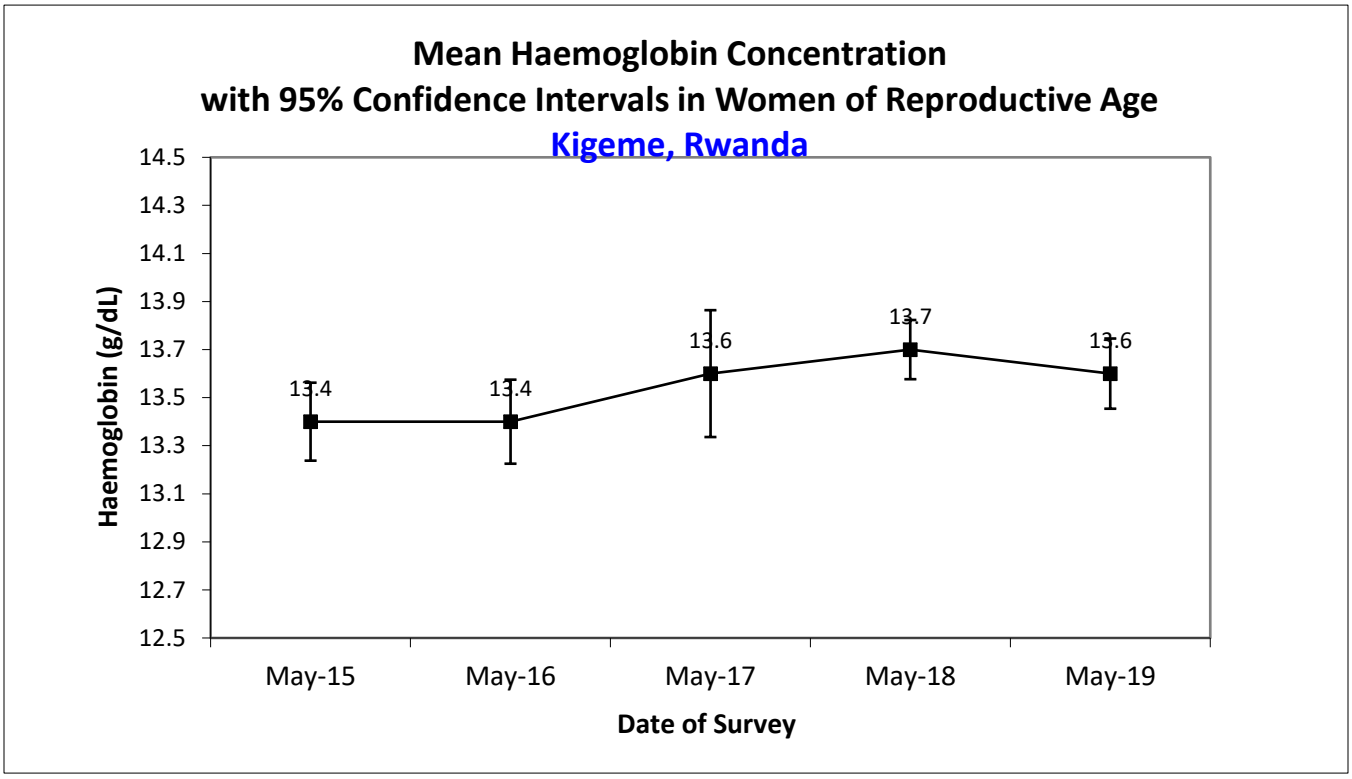


FIGURE 79 MEAN HB CONCENTRATION WITH 95% CI IN WOMEN OF REPRODUCTIVE AGE (NON-PREGNANT) IN KIZIBA, 2012-2019

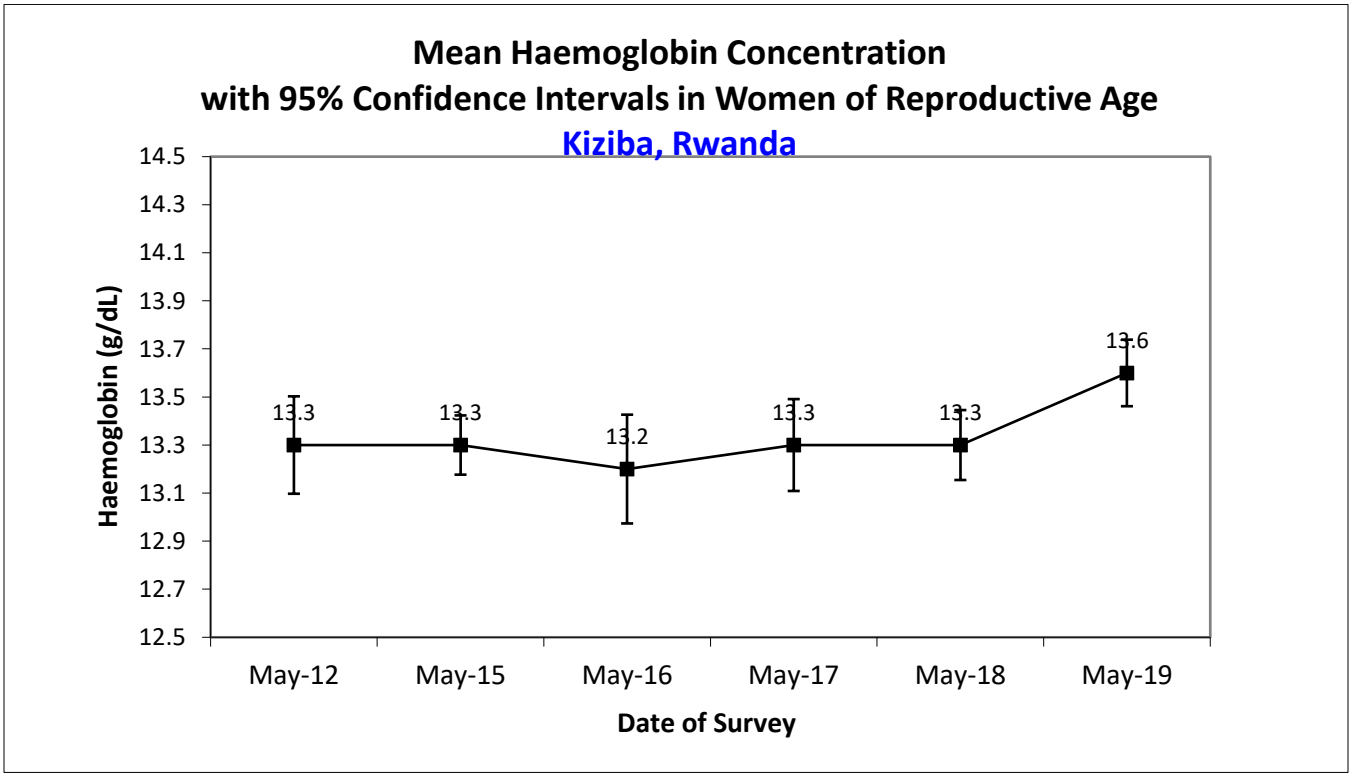


FIGURE 80 MEAN HB CONCENTRATION WITH 95% CI IN WOMEN OF REPRODUCTIVE AGE (NON-PREGNANT) IN MUGOMBWA, 2015-2019

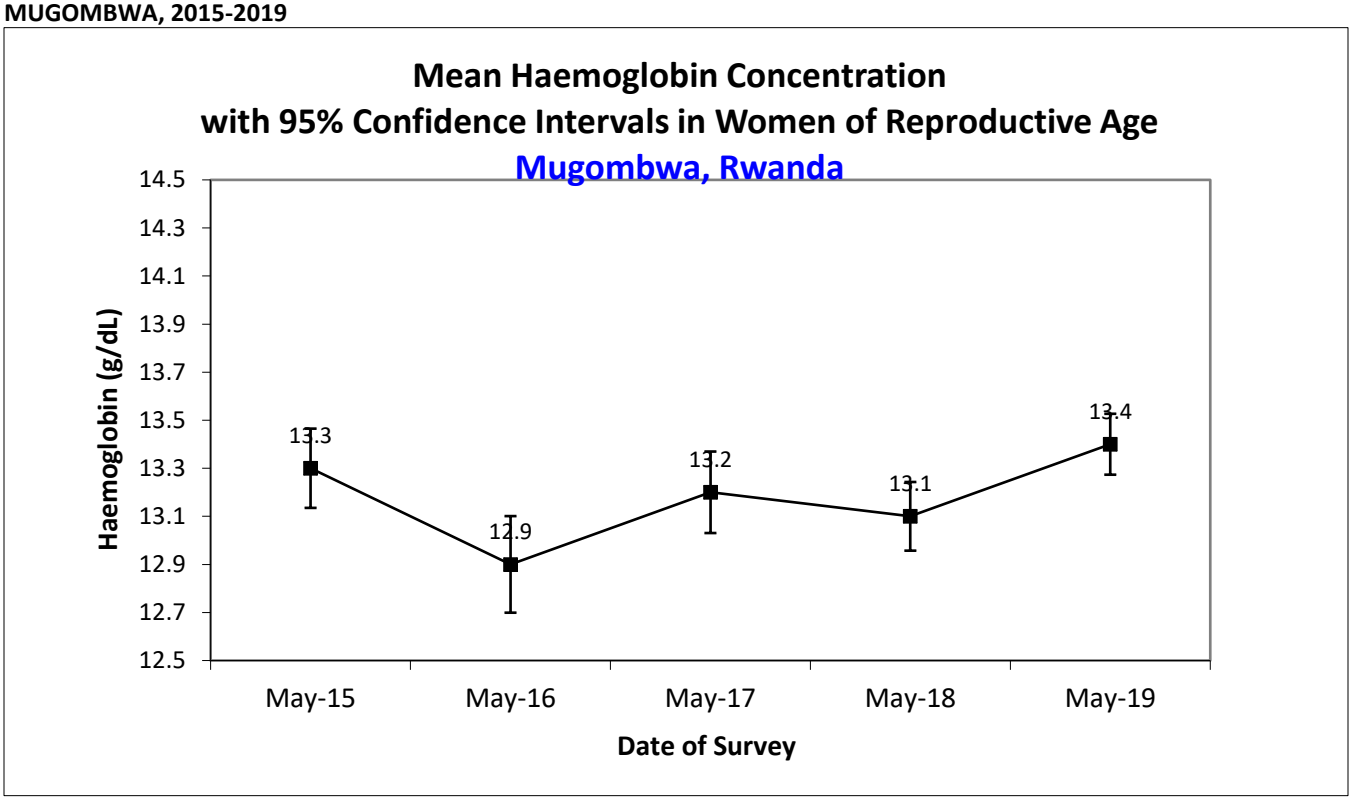


FIGURE 81 MEAN HB CONCENTRATION WITH 95% CI IN WOMEN OF REPRODUCTIVE AGE (NON-PREGNANT) IN NYABIHEKE, 2012-2019

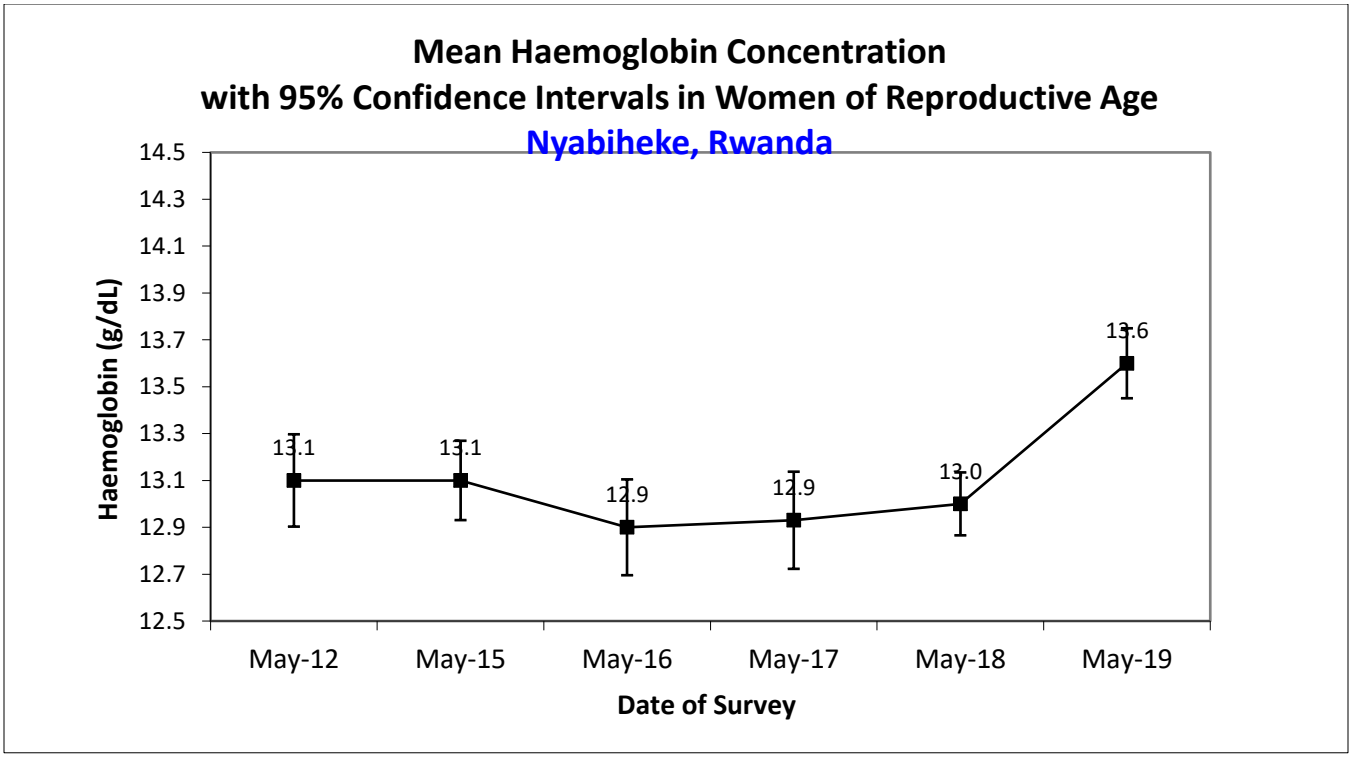
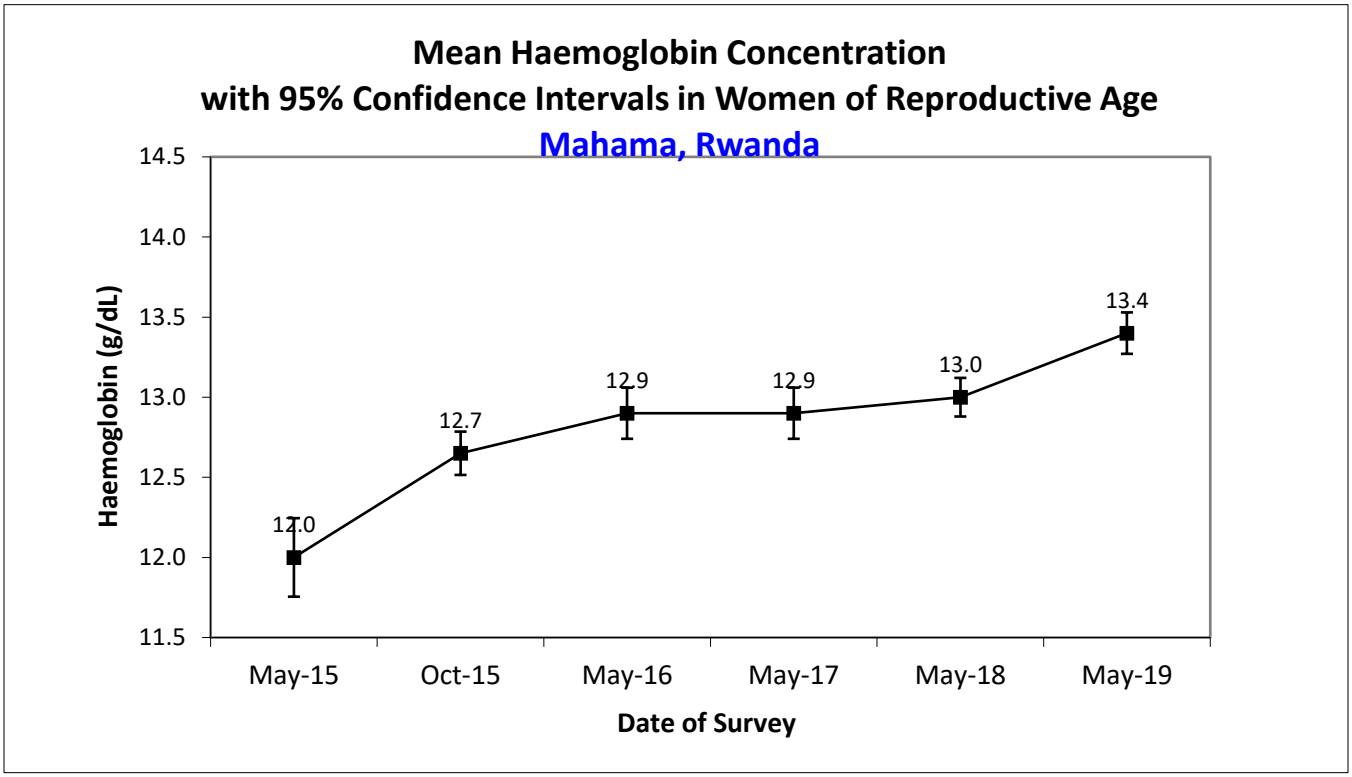


FIGURE 82 MEAN HB CONCENTRATION WITH 95% CI IN WOMEN OF REPRODUCTIVE AGE (NON-PREGNANT) IN MAHAMA, 2015-2019



3.3.3 ANC program enrolment results and minimum dietary diversity for women

TABLE 113 ANC ENROLMENT AMONG PREGNANT WOMEN (15-49 YEARS), BY CAMP

	Number/total	% (95% CI)
Gihembe	20/22	90.9% (51.4-99.0)
Kigeme	19/29	65.5% (42.7-82.9)
Kiziba	20/29	64.7% (32.0-87.7)
Mugombwa	19/25	76.0% (54.2-89.5)
Nyabiheke	18/18	100.0% (100.0-100.0)
Mahama	38/41	92.7% (72.8-98.4)

TABLE 114 NUMBER OF MONTHS PREGNANCY AT TIME OF ENROLMENT IN ANC FOR THE RECENT PREGNANCY (ALL CAMPS)

Month of Pregnancy	Number/total	% (95% CI)
1st Month	18/131	13.7% (8.2%-22.2%)
2nd Month	37/131	28.2% (18.5%-40.5%)
3rd Month	53/131	40.5% (30.5%-51.3%)
4th Month	15/131	11.5% (6.2%-20.2%)
5th Month	8/131	5.3% (2.1%-13.1%)

TABLE 115 PROPORTION OF PREGNANT WOMEN (15-49 YEARS) CURRENTLY RECEIVING IRON-FOLIC ACID PILLS, BY CAMP

	Number/total	% (95% CI)
Gihembe	20/22	90.9% (51.4-99.0)
Kigeme	12/29	41.4% (26.9-57.5)
Kiziba	18/29	62.1% (40.7-79.6)
Mugombwa	19/25	76.0% (54.2-89.5)
Nyabiheke	14/18	77.8% (42.9-94.2)
Mahama	37/41	90.2% (71.4-97.2)

TABLE 116 PROPORTION OF IRON-FOLIC ACID PILLS CONSUMED BY PREGNANT WOMEN ENROLLED IN ANC (CUMULATIVE FOR ALL CAMPS)

	Number/total	% (95% CI)
Most or all of them (80 - 90 pills)	14/120	11.7% (5.6-22.6)
More than a half (50 - 75 pills)	33/120	27.5% (18.1-39.4)
About a half (35 - 45 pills)	45/120	37.5% (25.6-51.1)
Less than a half (<35 pills)	28/120	23.3% (15.3-33.9)

TABLE 117 PROPORTION OF PREGNANT WOMEN (15-49 YEARS) CURRENTLY RECEIVING CSB+, OIL, AND SUGAR IN THE SUPPLEMENTARY FEEDING PROGRAM, BY CAMP

	Number/total	% (95% CI)
Gihembe	5/22	22.7% (6.5-55.3)
Kigeme	10/29	34.5% (16.2-82.9)
Kiziba	19/29	65.5% (49.0-79.0)
Mugombwa	17/25	68.0% (46.0-84.1)
Nyabiheke	18/18	100.0% (100.0-100.0)
Mahama	33/41	80.5% (62.6-91.1)

TABLE 118 PROPORTION OF WOMEN OF REPRODUCTIVE AGE (15-49 YEARS) ACHIEVING MINIMUM DIETARY DIVERSITY (MDD-W), BY CAMP

	Number/total	% (95% CI)
Gihembe	119/291	40.9% (31.4-51.1)
Kigeme	78/324	24.1% (14.1-38.0)
Kiziba	80/294	27.2% (15.4-43.4)
Mugombwa	81/251	32.3% (25.0-40.5)
Nyabiheke	60/258	23.3% (14.0-36.0)
Mahama	88/350	25.1% (15.3-38.4)

3.4 WASH

3.4.1 Water

TABLE 119 MAIN SOURCE OF HOUSEHOLD DRINKING WATER, BY CAMP

	IMPROVED		UNIMPROVED	
	Number/total	% (95% CI)	Number/total	% (95% CI)
Gihembe	187/187	100.0 (100.0-100.0)	0/187	0.0 (0.0-0.0)
Kigeme	211/211	100.0 (100.0-100.0)	0/211	0.0 (0.0-0.0)
Kiziba	191/191	100.0 (100.0-100.0)	0/191	0.0 (0.0-0.0)
Mugombwa	159/159	100.0 (100.0-100.0)	0/159	0.0 (0.0-0.0)
Nyabiheke	208/208	100.0 (100.0-100.0)	0/208	0.0 (0.0-0.0)
Mahama	219/219	100.0 (100.0-100.0)	0/219	0.0 (0.0-0.0)

TABLE 120 NUMBER OF LITRES OF WATER USED PER PERSON PER DAY IN GIHEMBE

	Number/total	% (95% CI)
<10	28/184	15.2 (11.1-20.6)
10 to <15	58/184	31.5 (26.6-36.9)
15 to <20	36/184	19.6 (12.4-29.5)
≥20	62/184	33.7 (29.8-37.8)

TABLE 121 NUMBER OF LITRES OF WATER USED PER PERSON PER DAY IN KIGEME

	Number/total	% (95% CI)
<10	89/211	42.2 (36.3-48.3)
10 to <15	77/211	36.5 (28.3-45.6)
15 to <20	27/211	12.8 (9.7-16.7)
≥20	18/211	8.5 (5.8-12.4)

TABLE 122 NUMBER OF LITRES OF WATER USED PER PERSON PER DAY IN KIZIBA

	Number/total	% (95% CI)
<10	45/183	24.6 (15.3-37.0)
10 to <15	61/183	33.3 (26.8-40.6)
15 to <20	32/183	17.5 (11.3-26.0)
≥20	45/183	24.6 (17.7-33.1)

TABLE 123 NUMBER OF LITRES OF WATER USED PER PERSON PER DAY IN MUGOMBWA

	Number/total	% (95% CI)
<10	41/159	25.8 (16.6-37.8)
10 to <15	67/159	42.1 (32.2-51.6)
15 to <20	25/159	15.7 (9.6-24.7)
≥20	26/159	16.4 (9.3-27.1)

TABLE 124 NUMBER OF LITRES OF WATER USED PER PERSON PER DAY IN NYABIHEKE

	Number/total	% (95% CI)
<10	57/165	34.5 (29.9-39.5)
10 to <15	63/165	38.2 (28.9-48.4)
15 to <20	17/165	10.3 (6.2-16.7)
≥20	28/165	17.0 (11.7-23.9)

TABLE 125 NUMBER OF LITRES OF WATER USED PER PERSON PER DAY IN MAHAMA

	Number/total	% (95% CI)
<10	61/218	28.0 (19.9-37.7)
10 to <15	92/218	42.2 (33.1-51.8)
15 to <20	36/218	16.5 (10.8- 24.5)
≥20	29/218	13.3 (9.8- 17.8)

TABLE 126 HOUSEHOLDS IN WHICH ALL WATER CONTAINERS ARE COVERED OR NARROW NECKED, BY CAMP

	Number/total	% (95% CI)
Gihembe	121/187	64.7 (52.7-75.1)
Kigeme	132/211	62.6 (55.4-69.2)
Kiziba	132/191	69.1 (60.2-76.8)
Mugombwa	108/159	67.9 (55.8-78.0)
Nyabiheke	81/208	46.8 (33.6-60.5)
Mahama	70/219	32.0 (25.6-39.1)

3.4.2 Sanitation and Hygiene

TABLE 127 PROPORTION OF HOUSEHOLDS WITH CHILDREN UNDER 3 YEARS OLD THAT DISPOSE OF FECES SAFELY, BY CAMP

	PROPORTION OF HOUSEHOLDS WITH CHILDREN UNDER 3 YEARS OLD THAT DISPOSE OF FECES SAFELY	
	Number/total	% (95% CI)
Gihembe	164/167	98.2 (95.3-99.9)
Kigeme	171/175	97.7 (91.7-99.9)
Kiziba	167/168	98.2 (90.9-99.9)
Mugombwa	136/137	98.9 (91.5-99.8)
Nyabiheke	139/141	98.6 (94.8-99.9)
Mahama	215/215	100.0 (100.0-100.0)

TABLE 128 TYPE OF TOILET USED BY HOUSEHOLDS IN GIHEMBE

	Number/total	% (95% CI)
An improved excreta disposal facility (improved toilet facility, 1 household)	31/187	16.6 (11.3-23.6)
A shared family toilet (improved toilet facility, 2 households)	3/187	1.6 (0.4-5.9)
A communal toilet (improved toilet facility, 3 households or more)	151/187	80.7 (72.4-87.0)
An unimproved toilet (unimproved toilet facility or public toilet)	2/187	1.1 (0.1-7.9)

TABLE 129 TYPE OF TOILET USED BY HOUSEHOLDS IN KIGEME

	Number/total	% (95% CI)
An improved excreta disposal facility (improved toilet facility, 1 household)	0/211	0.0 (0.0-0.0)
A shared family toilet (improved toilet facility, 2 households)	0/211	0.0 (0.0-0.0)
A communal toilet (improved toilet facility, 3 households or more)	201/211	95.3 (75.7-99.2)
An unimproved toilet (unimproved toilet facility or public toilet)	10/211	4.7 (0.8-24.3)

TABLE 130 TYPE OF TOILET USED BY HOUSEHOLDS IN KIZIBA

	Number/total	% (95% CI)
An improved excreta disposal facility (improved toilet facility, 1 household)	2/191	1.0 (0.3-3.7)
A shared family toilet (improved toilet facility, 2 households)	1/191	0.5 (0.1-3.9)
A communal toilet (improved toilet facility, 3 households or more)	188/191	98.4 (96.2-99.4)
An unimproved toilet (unimproved toilet facility or public toilet)	0/191	0.0 (0.0-0.0)

TABLE 131 TYPE OF TOILET USED BY HOUSEHOLDS IN MUGOMBWA

	Number/total	% (95% CI)
An improved excreta disposal facility (improved toilet facility, 1 household)	0/159	0.0 (0.0-0.0)
A shared family toilet (improved toilet facility, 2 households)	0/159	0.0 (0.0-0.0)
A communal toilet (improved toilet facility, 3 households or more)	155/159	97.5 (83.0-99.7)
An unimproved toilet (unimproved toilet facility or public toilet)	4/159	2.5 (0.3-17.0)

TABLE 132 TYPE OF TOILET USED BY HOUSEHOLDS IN NYABIHEKE

	Number/total	% (95% CI)
An improved excreta disposal facility (improved toilet facility, 1 household)	1/173	0.6 (0.1-4.3)
A shared family toilet (improved toilet facility, 2 households)	1/173	0.6 (0.1-4.3)
A communal toilet (improved toilet facility, 3 households or more)	168/173	97.1 (89.9-99.2)
An unimproved toilet (unimproved toilet facility or public toilet)	3/173	1.7 (0.2-12.0)

TABLE 133 TYPE OF TOILET USED BY HOUSEHOLDS IN MAHAMA

	Number/total	% (95% CI)
An improved excreta disposal facility (improved toilet facility, 1 household)	3/219	1.4 (0.3-5.3)
A shared family toilet (improved toilet facility, 2 households)	34/219	15.5 (6.8-31.5)
A communal toilet (improved toilet facility, 3 households or more)	178/219	81.3 (65.1-91.0)
An unimproved toilet (unimproved toilet facility or public toilet)	4/219	1.8 (0.3-11.6)

FIGURE 83 PROPORTION OF CHILDREN UNDER THE AGE OF 3 YEARS OLD WHOSE (LAST) STOOLS WERE DISPOSED OF SAFELY IN GIHEMBE

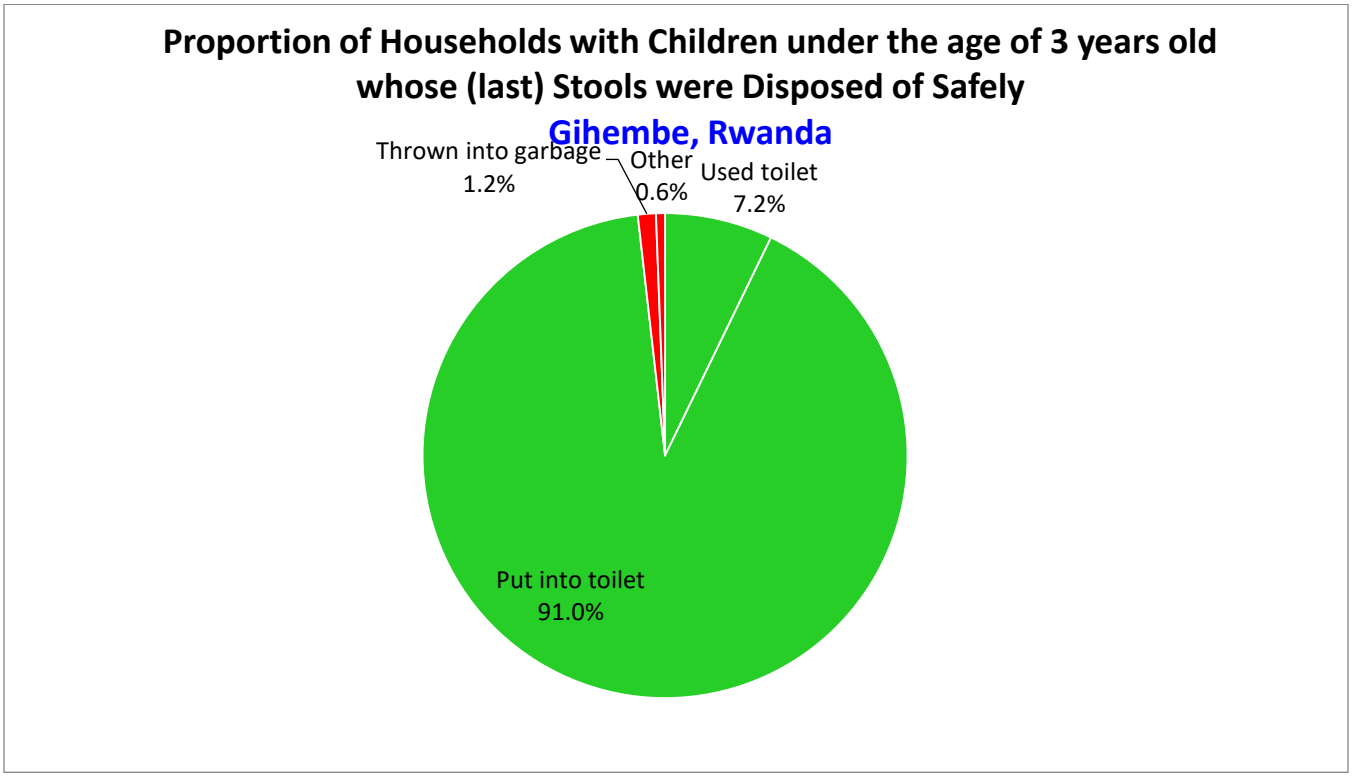


FIGURE 84 PROPORTION OF CHILDREN UNDER THE AGE OF 3 YEARS OLD WHOSE (LAST) STOOLS WERE DISPOSED OF SAFELY IN KIGEME

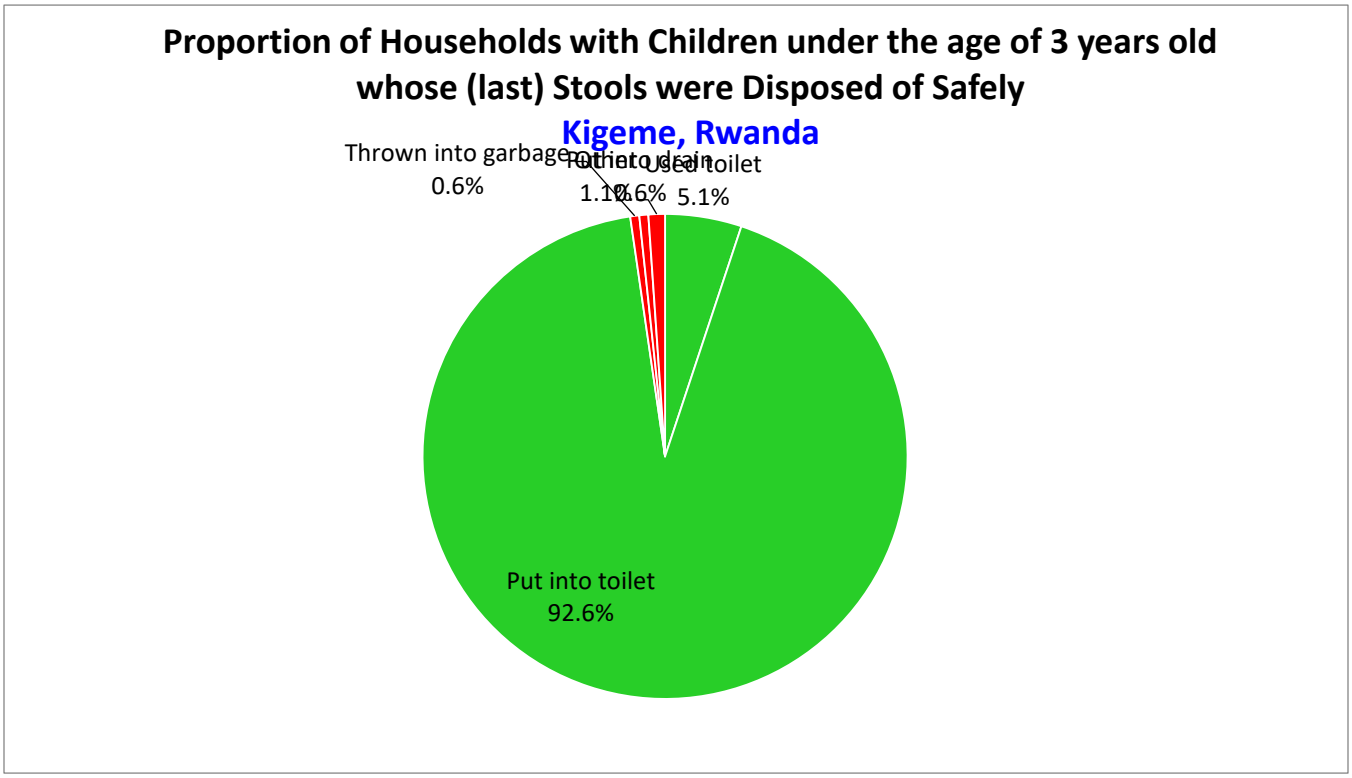


FIGURE 85 PROPORTION OF CHILDREN UNDER THE AGE OF 3 YEARS OLD WHOSE (LAST) STOOLS WERE DISPOSED OF SAFELY IN KIZIBA

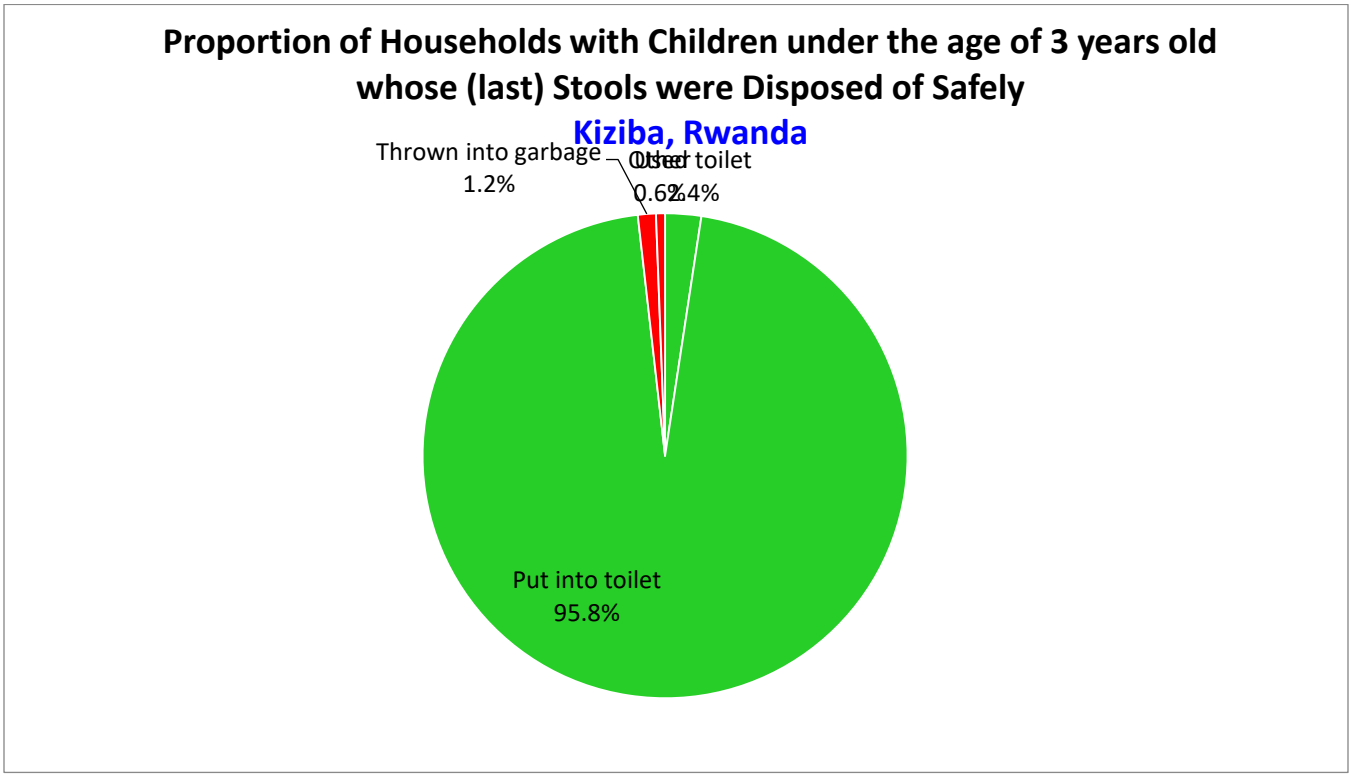


FIGURE 86 PROPORTION OF CHILDREN UNDER THE AGE OF 3 YEARS OLD WHOSE (LAST) STOOLS WERE DISPOSED OF SAFELY IN MUGOMBWA

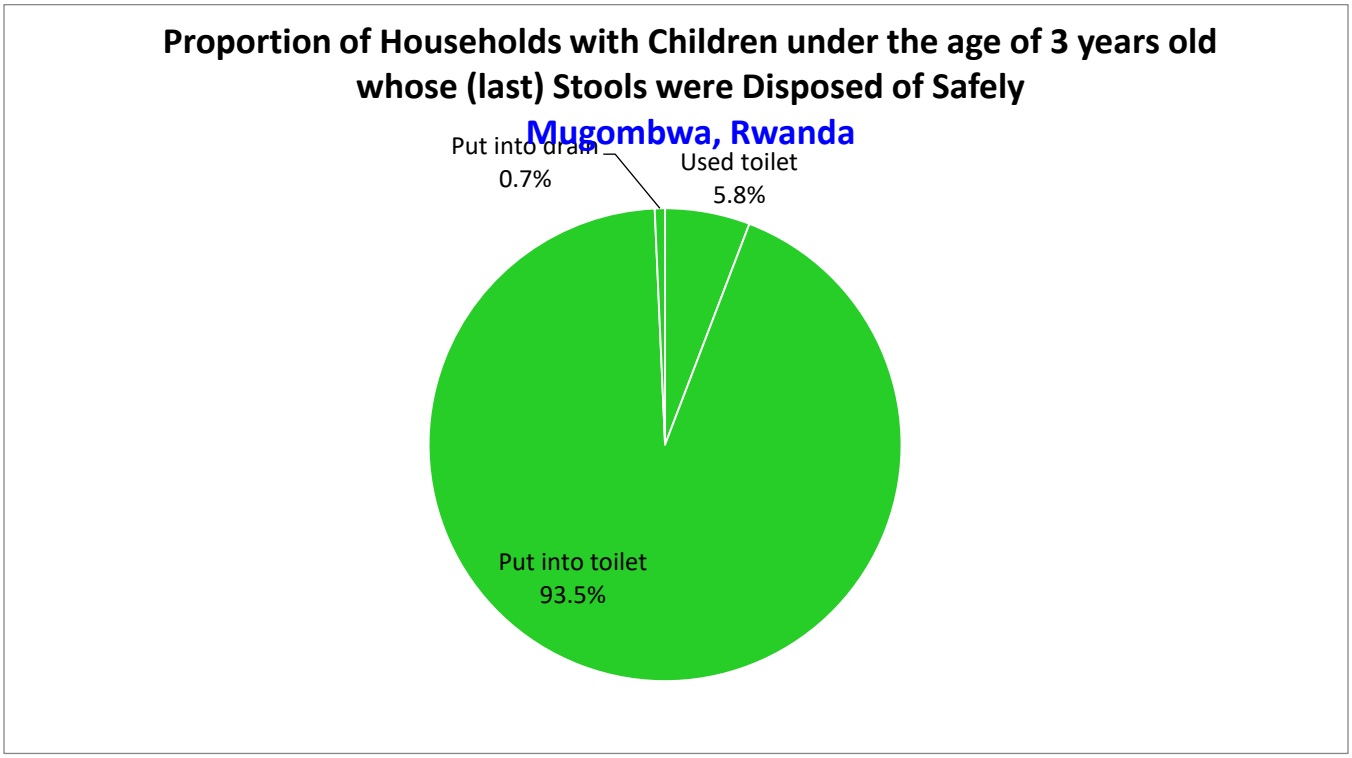


FIGURE 87 PROPORTION OF CHILDREN UNDER THE AGE OF 3 YEARS OLD WHOSE (LAST) STOOLS WERE DISPOSED OF SAFELY IN NYABIHEKE

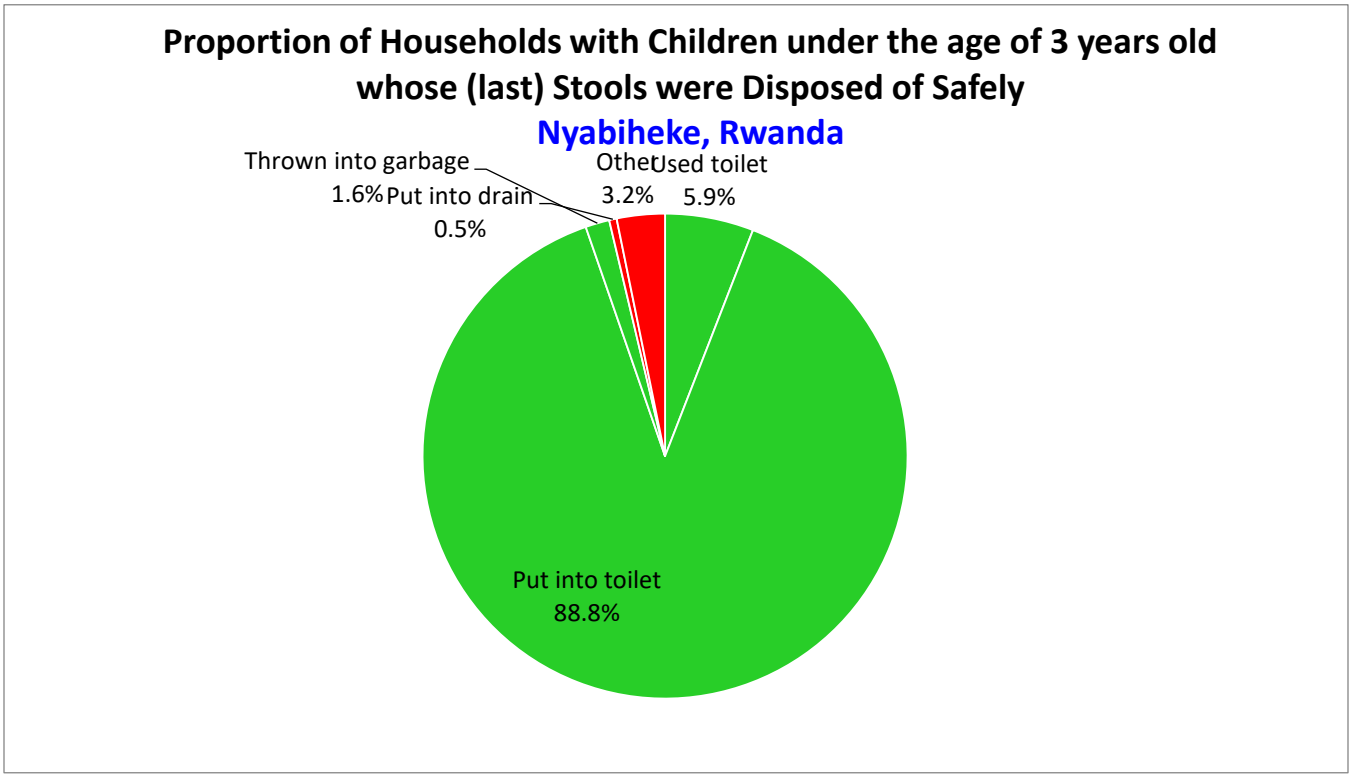


FIGURE 88 PROPORTION OF CHILDREN UNDER THE AGE OF 3 YEARS OLD WHOSE (LAST) STOOLS WERE DISPOSED OF SAFELY IN MAHAMA

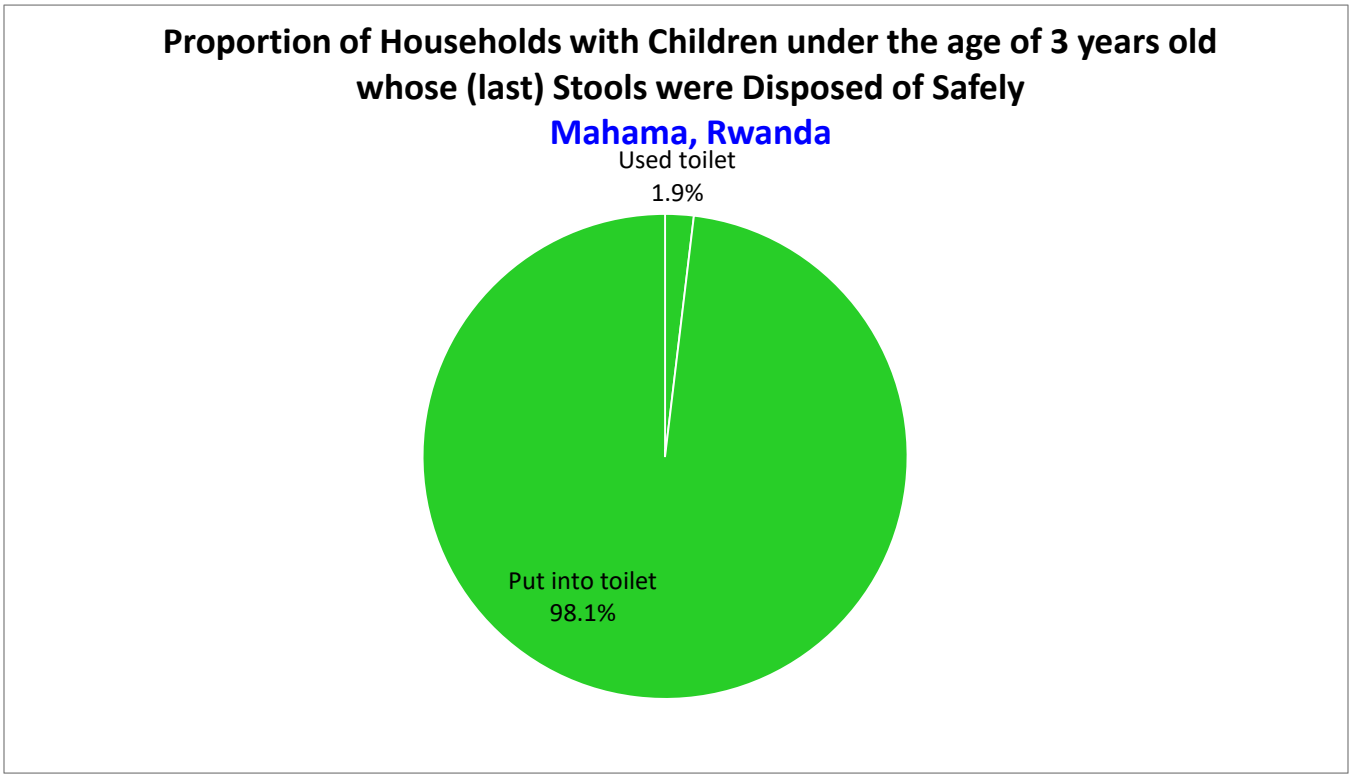


FIGURE 89 PROPORTION OF HOUSEHOLDS THAT EXPRESS SATISFACTION WITH THE WATER SUPPLY IN GIHEMBE

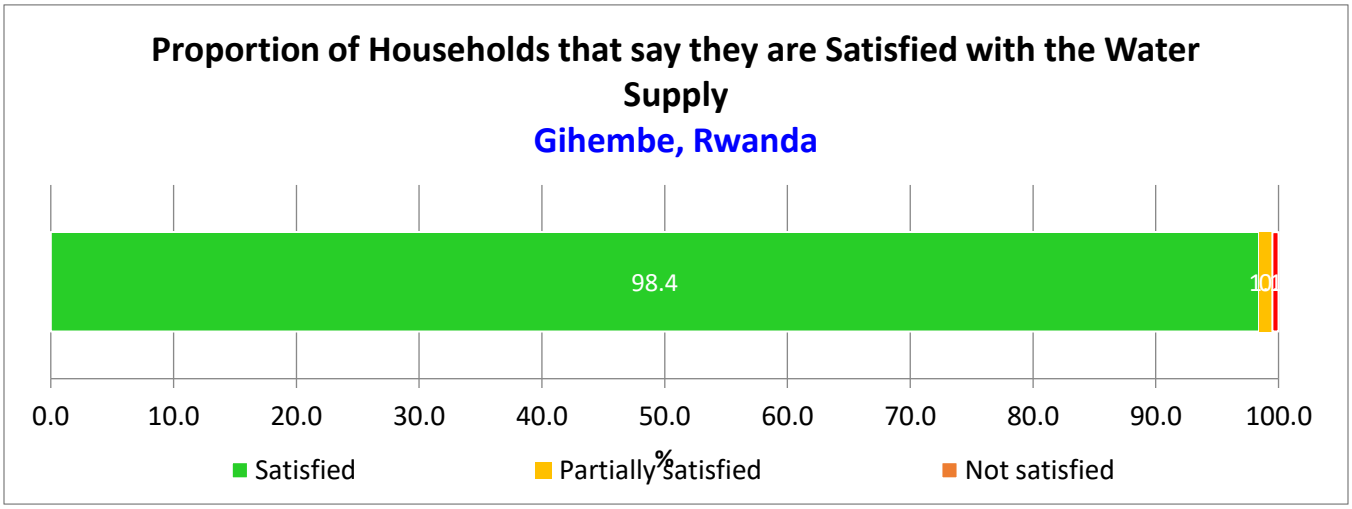


FIGURE 90 PROPORTION OF HOUSEHOLDS THAT EXPRESS SATISFACTION WITH THE WATER SUPPLY IN KIGEME

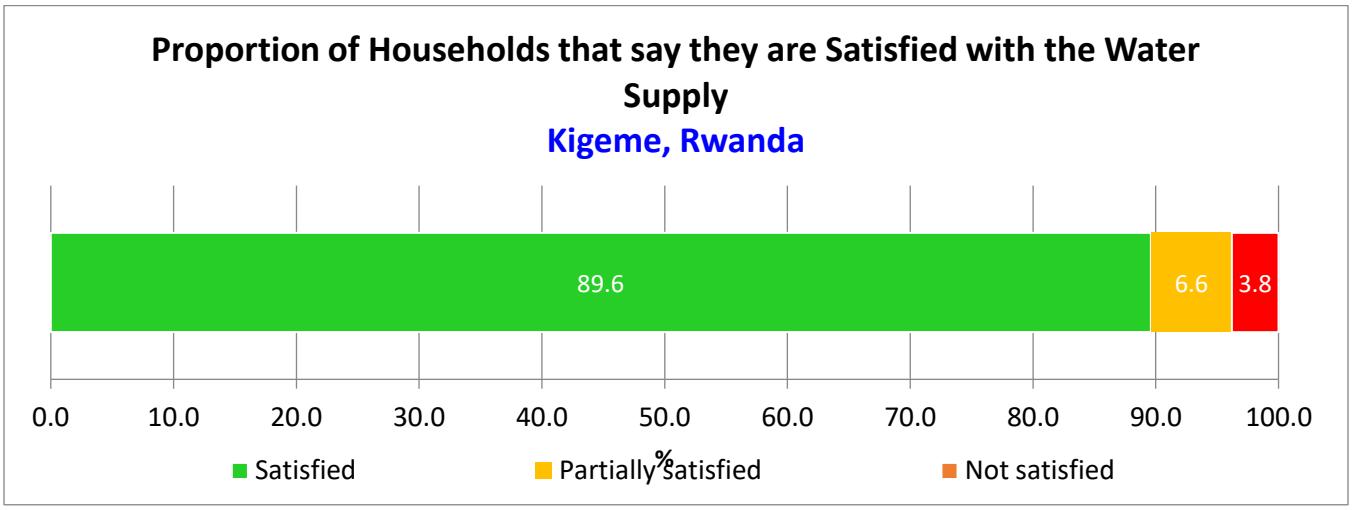


FIGURE 91 PROPORTION OF HOUSEHOLDS THAT EXPRESS SATISFACTION WITH THE WATER SUPPLY IN KIZIBA

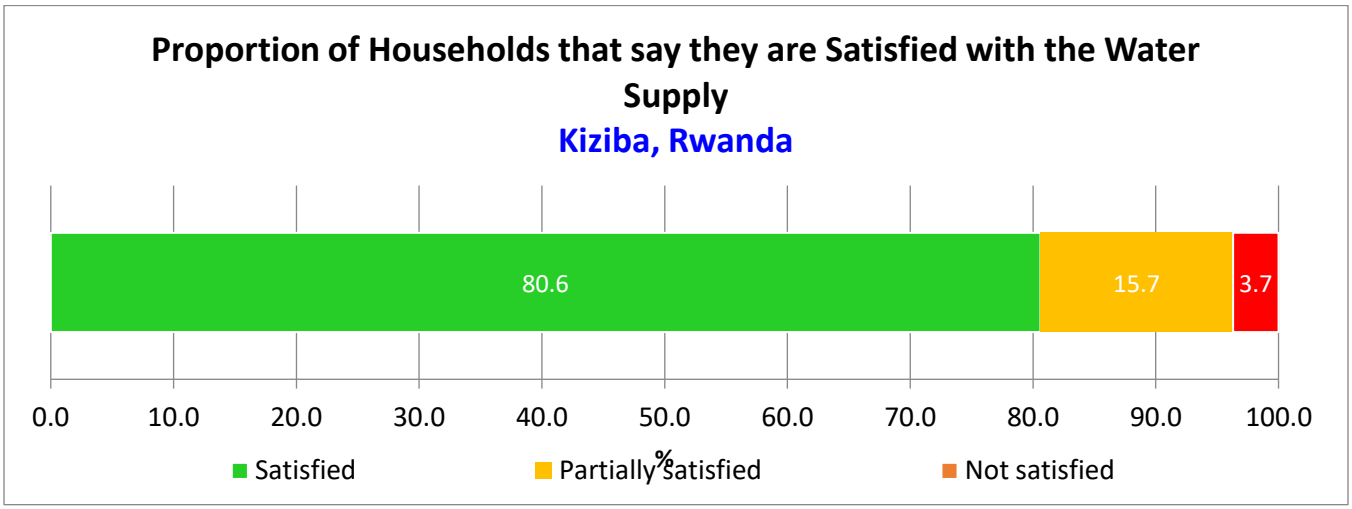


FIGURE 92 PROPORTION OF HOUSEHOLDS THAT EXPRESS SATISFACTION WITH THE WATER SUPPLY IN MUGOMBWA

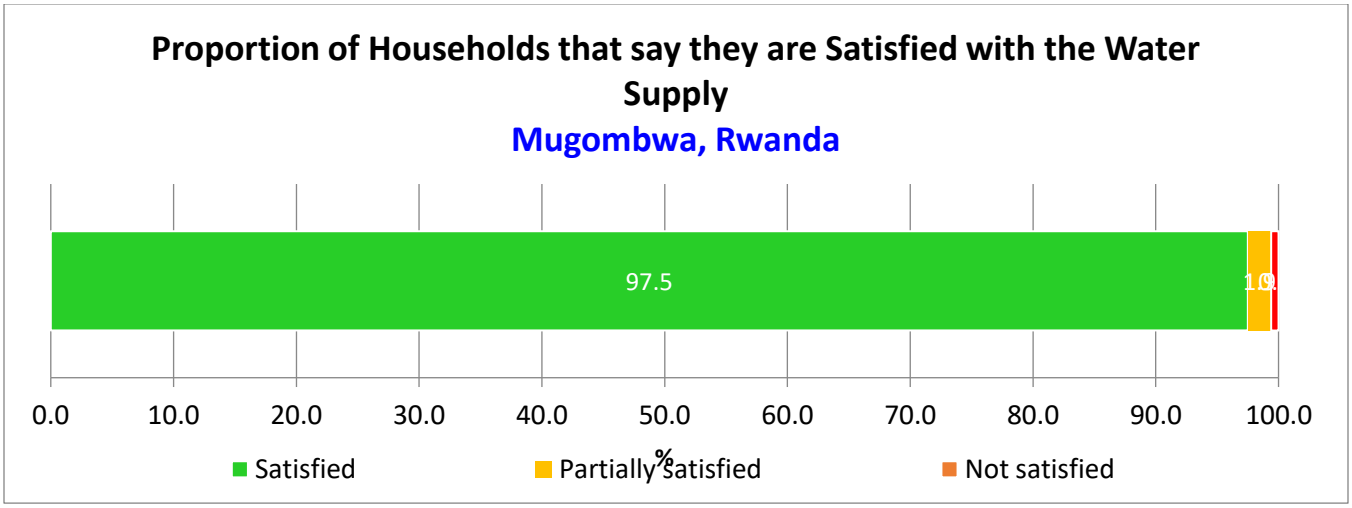


FIGURE 93 PROPORTION OF HOUSEHOLDS THAT EXPRESS SATISFACTION WITH THE WATER SUPPLY IN NYABIHEKE

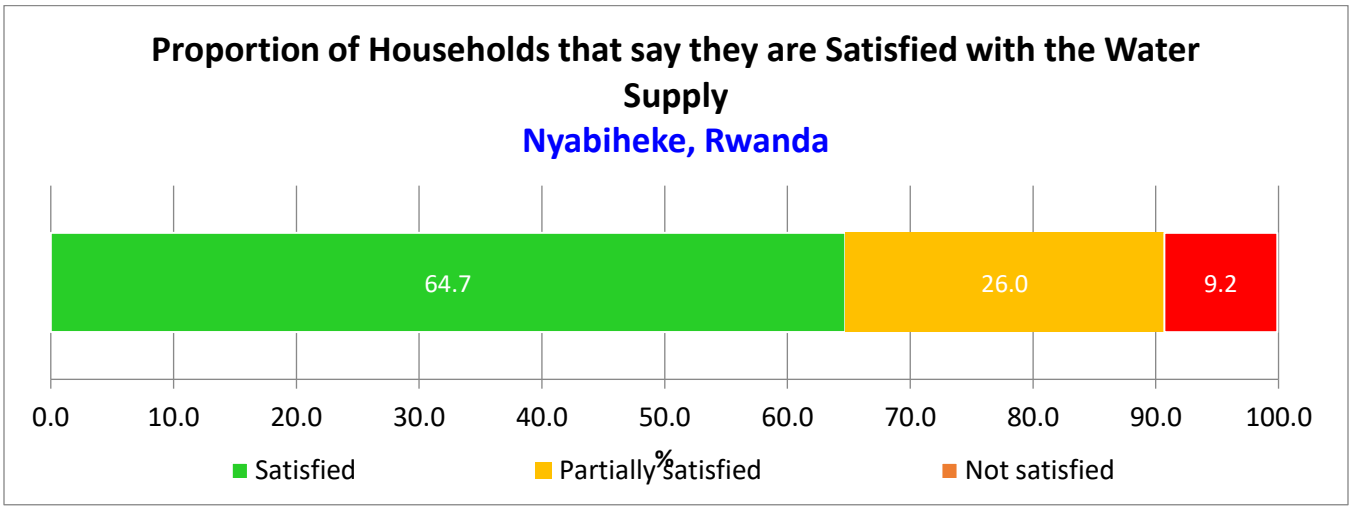


FIGURE 94 PROPORTION OF HOUSEHOLDS THAT EXPRESS SATISFACTION WITH THE WATER SUPPLY IN MAHAMA

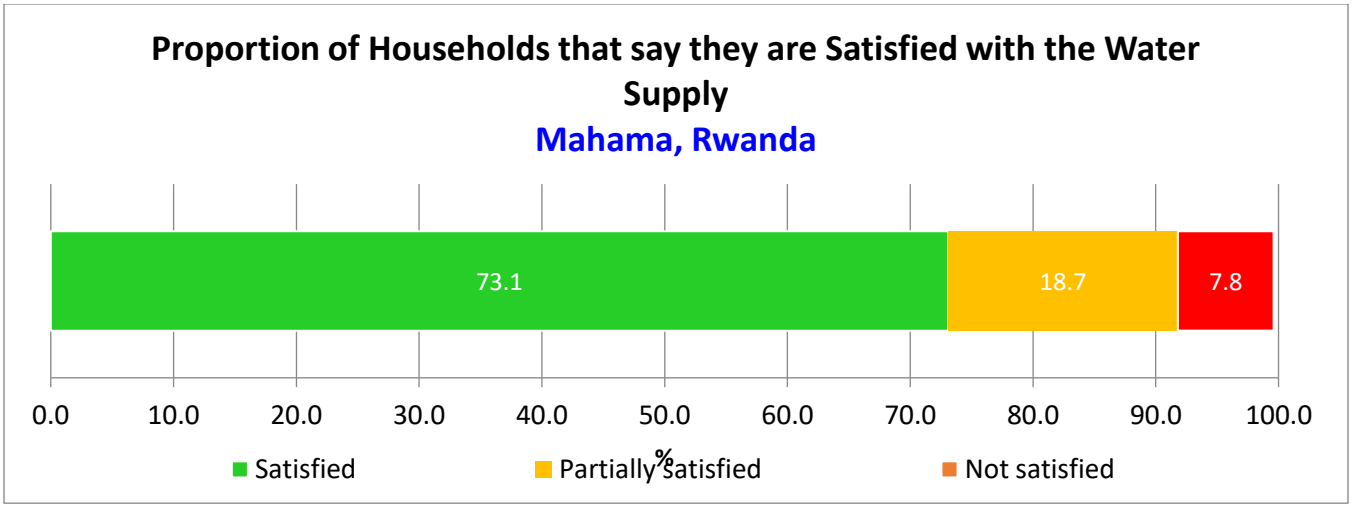
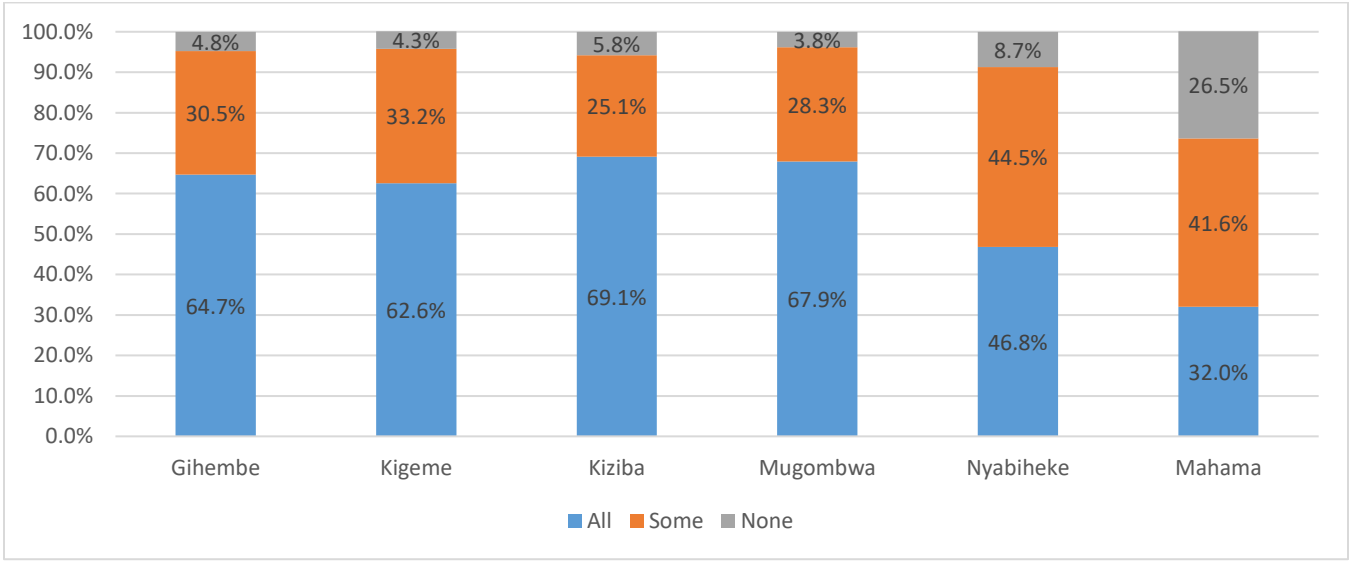


FIGURE 95 PROPORTION OF WATER CONTAINERS THAT ARE COVERED OR NARROW NECKED, BY CAMP



3.5 Mosquito Nets

TABLE 134 HOUSEHOLD MOSQUITO NET OWNERSHIP AND UTILIZATION IN GIHEMBE

	Number/total	% (95% CI)
Household owning at least one mosquito net of any type	170/187	90.9 (85.4-94.5)
Household owning at least one mosquito net for sleeping	169/187	90.4 (81.2-94.4)
Children under 5 years (0-59m) who slept under a mosquito net of any type	265/305	86.9 (81.8-90.7)
Pregnant women who slept under a mosquito net of any type	22/22	100.0 (100.0-100.0)
Households covered by IRS	21/187	11.2 (4.7-24.5)

TABLE 135 HOUSEHOLD MOSQUITO NET OWNERSHIP AND UTILIZATION IN KIGEME

	Number/total	% (95% CI)
Household owning at least one mosquito net of any type	116/211	55.0 (49.1-60.7)
Household owning at least one mosquito net for sleeping	116/211	55.0 (49.1-60.7)
Children under 5 years who slept under a mosquito net of any type	163/354	46.0 (38.9-53.3)
Pregnant women who slept under a mosquito net of any type	12/28	42.9 (20.3-68.8)
Households covered by IRS	101/211	47.9 (35.0-61.0)

TABLE 136 HOUSEHOLD MOSQUITO NET OWNERSHIP AND UTILIZATION IN KIZIBA

	Number/total	% (95% CI)
Household owning at least one mosquito net of any type	163/191	85.3 (81.1-88.8)
Household owning at least one mosquito net for sleeping	160/191	83.7 (74.8-88.4)
Children under 5 years who slept under a mosquito net of any type	260/315	82.5 (75.8-87.7)
Pregnant women who slept under a mosquito net of any type	24/29	82.8 (53.3-95.3)
Households covered by IRS	19/191	9.9 (3.6-24.7)

TABLE 137 HOUSEHOLD MOSQUITO NET OWNERSHIP AND UTILIZATION IN MUGOMBWA

	Number/total	% (95% CI)
Household owning at least one mosquito net of any type	126/159	79.2 (66.8-87.8)
Household owning at least one mosquito net for sleeping	126/159	79.2 (66.8-87.8)
Children under 5 years who slept under a mosquito net of any type	196/264	74.2 (58.9-85.3)
Pregnant women who slept under a mosquito net of any type	18/25	72.0 (46.4-88.4)
Household s covered by IRS	154/159	96.9 (93.9-98.4)

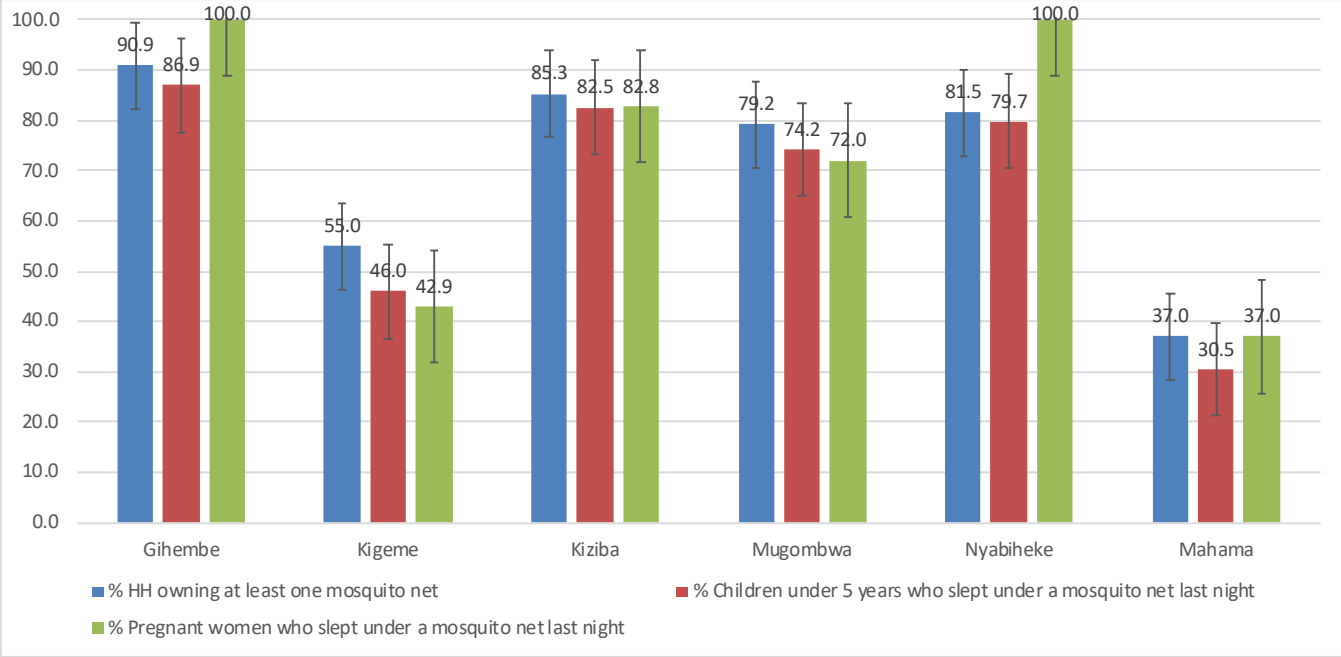
TABLE 138 HOUSEHOLD MOSQUITO NET OWNERSHIP AND UTILIZATION IN NYABIHEKE

	Number/total	% (95% CI)
Household owning at least one mosquito net of any type	141/173	81.5 (67.6-90.3)
Household owning at least one mosquito net for sleeping	141/173	81.5 (67.6-90.3)
Children under 5 years who slept under a mosquito net of any type	224/281	79.7 (66.8-88.5)
Pregnant women who slept under a mosquito net of any type	18/18	100.0 (100.0-100.0)
Households covered by IRS	169/173	97.7 (91.4-99.4)

TABLE 139 HOUSEHOLD MOSQUITO NET OWNERSHIP AND UTILIZATION IN MAHAMA

	Number/total	% (95% CI)
Household owning at least one mosquito net of any type	81/219	37.0 (28.3-46.6)
Household owning at least one mosquito net for sleeping	79/219	36.1 (25.0-46.4)
Children under 5 years who slept under a mosquito net of any type	110/361	30.5 (24.6-37.1)
Pregnant women who slept under a mosquito net of any type	14/41	34.1 (19.1-53.3)
Households covered by IRS	81/219	37.0 (28.3-46.6)

FIGURE 96 MOSQUITO NET OWNERSHIP AND UTILIZATION, BY CAMP



3.6 *Limitations*

- The sample is representative for households containing children 6-59 months of age that were physically present in the camp during the dates of data collection. Results for women of reproductive age and IYCF should be interpreted with caution due to a smaller sub group in the survey. It is not feasible to achieve a large enough sample size for some of the IYCF indicators to be estimated as precisely as desired, especially for indicators covering a very narrow age range (e.g. children aged 6-8 months, 12-15 months, 20-23 months).
- The sample is representative of households containing children 6-59m in the camp at the time of the survey but not necessarily all households in ProGres list. Results do not account for non-registered people in the camp nor inaccuracies of ProGres (e.g. households with wrong / missing addresses). The survey may have missed registered households living or traveling outside of the camp for business, cultivation, or to see relatives.
- Respondents could have failed to inform the enumerator about another eligible child and/or woman in the household that did not attend the interview. Some teenage girls that were eligible for the survey were attending day or boarding school outside of the camp and were not interviewed.
- Lack of a survey coordinator for the 2019 SENS led to some survey design challenges such as data gaps (e.g. missing variables in the questionnaire and difficulty/delay in obtaining the data inputs for the protocol and background section of the report). For example, no data was collected for selective feeding programme enrolment on children 24-59 months.[34] Information about WASH and mosquito nets was based on responses received at the interview site versus household observations as outlined in the standardized modules so differentiation between LLIN vs. conventional insecticide treated net ownership and utilization could not be made.
- The food security module was not collected as part of 2019 SENS. While food security data was collected during PDM in the same period as SENS (June 2019 PDM), the general population was sampled and hence data cannot be correlated with child nutrition outcomes.
- Althought initial drafts of the SENS 2019 report were shared withimplementing partners in the camp, no comments or feedback was received so continued efforts should be made to ensure partners are sensitized on the findings.
- The questionnaire design collected data about how many many ANC visits pregnant women had attended without ascertaining the number of months of pregnancy, making it difficult to determine if they were attending the recommended number of visits. It would be better to determine the duration of pregnancy to make this calculation.

[34] Attributable to an issue of ODK coding

4 Discussion

4.1 *Nutritional Status of Young Children and Women of Reproductive Age*

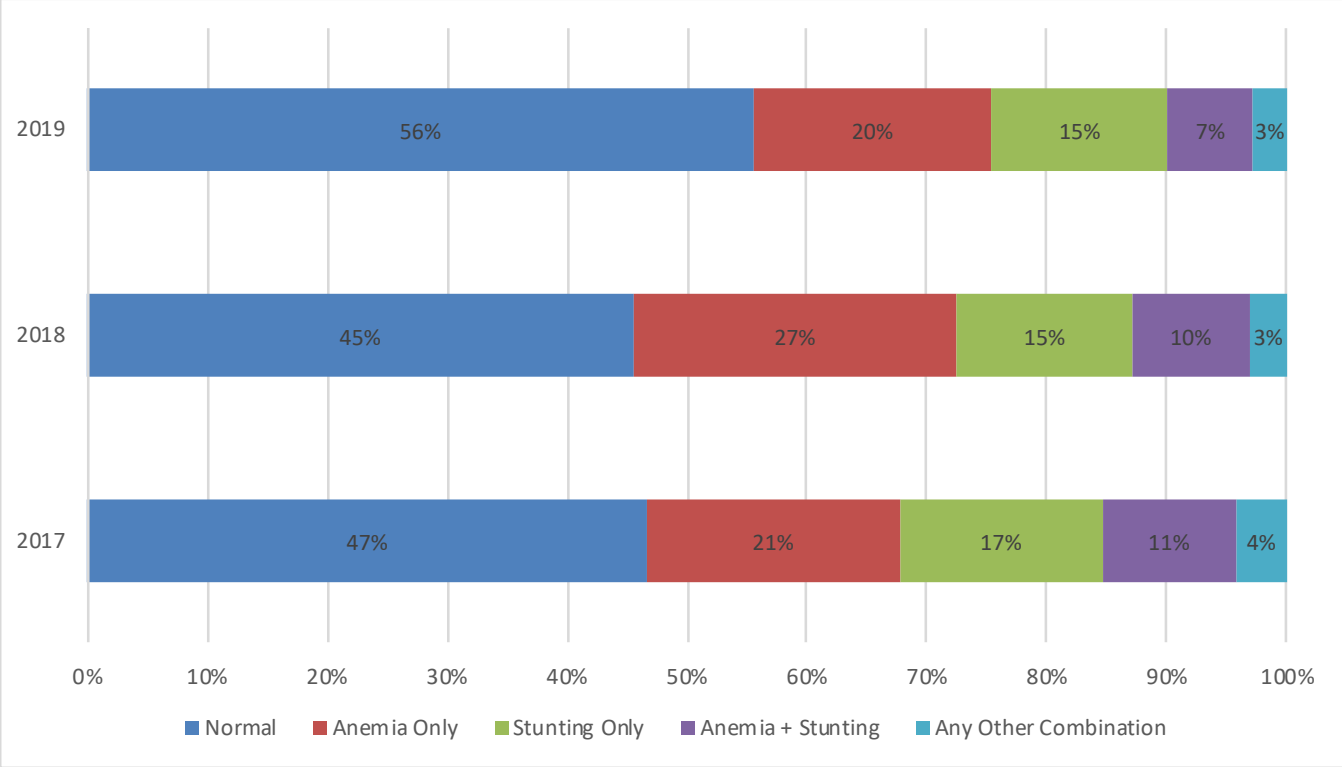
Concurrent Forms of Malnutrition Among Under Five Children

In 2019, more children aged 6–59 months in Rwandan refugee camps were of normal nutrition status than in previous years. For the first time, more than half (56%) were not affected by at least one form of malnutrition, a 10% improvement of since 2018, primarily attributable to lower prevalence of anemia even though stunting and wasting prevalence remained about the same. Two or more forms of malnutrition affected about 10% of children under-5 years of age, with the most common double burden being anemia and stunting which affected 7%. Less than 1% of the under-five population was concurrently affected by anemia, stunting and wasting.

TABLE 140 MALNUTRITION PREVALENCE AMONG CHILDREN 6-59 MONTHS, BY TYPE AND YEAR

	2019		2018		2017	
	N	%	N	%	N	%
"Normal" (No anemia, stunting or wasting)	987	55.5%	817	45.5%	1093	46.7%
Anemia Only	352	19.8%	485	27.0%	492	21.0%
Stunting Only	262	14.7%	262	14.6%	397	17.0%
Wasting Only	17	1.0%	20	1.1%	34	1.5%
Anemia + Stunting	125	7.0%	176	9.8%	259	11.1%
Anemia + Wasting	14	0.8%	12	0.7%	28	1.2%
Stunting + Wasting	15	0.8%	19	1.1%	23	1.0%
Anemia + Stunting + Wasting	5	0.3%	5	0.3%	16	0.7%
Total	1777		1796		2342	

FIGURE 97 DISTRIBUTION OF CONCURRENT FORMS OF MALNUTRITION AMONG CHILDREN AGED 6-59 MONTHS (CUMULATIVE FOR ALL CAMPS), BY YEAR



In terms of the overall burden of child various forms of undernutrition in 2019, Kigeme and Mahama were the worst off, followed by Nyabiheke and Kiziba. Mugombwa and Gihembe have better nutrition situations than the other four camps.

TABLE 141 SUMMARY OF TYPES OF MALNUTRITION PREVALENCE AMONG CHILDREN 6-59 MONTHS IN 2019, BY CAMP

	Stunting (%)	Wasting (%)	Anemia U5 (%)	Sum	Rank (1 best to 6 worst)
Gihembe	17.1	2.8	22.0	41.9	1
Kigeme	28.0	1.5	28.2	57.7	5
Kiziba	22.3	5.3	27.0	54.6	3
Mugombwa	18.7	1.2	28.6	48.5	2
Nyabiheke	22.9	3.1	30.9	56.9	4
Mahama	25.5	2.3	30.8	58.6	6

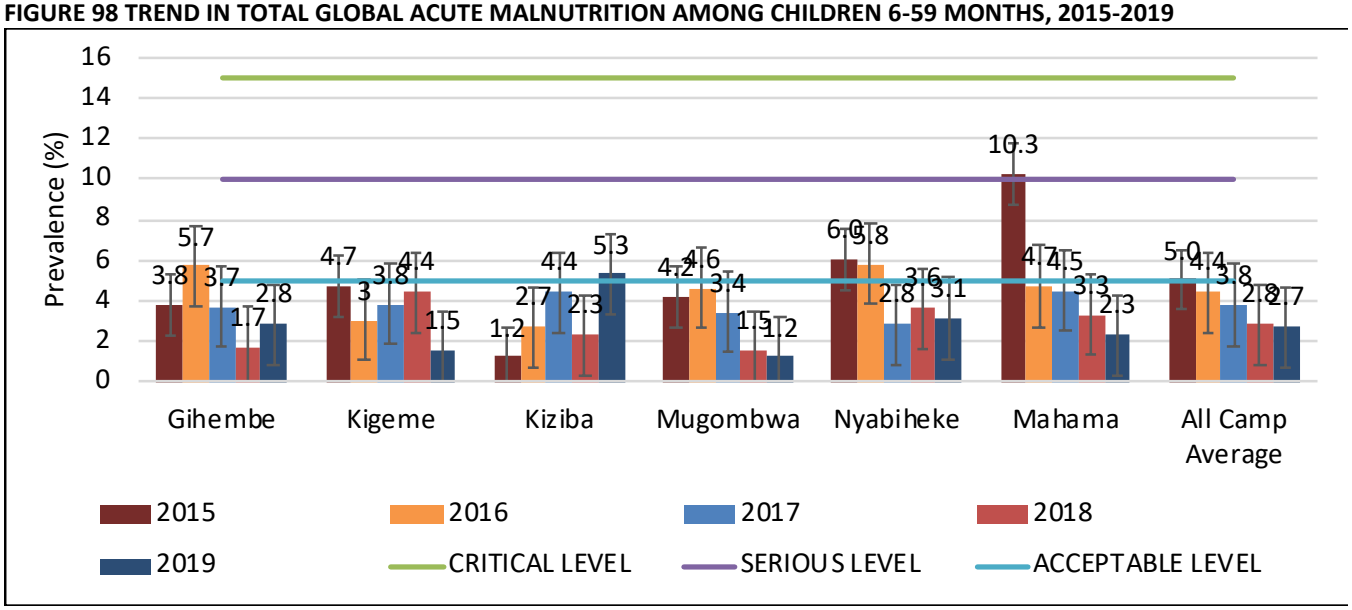
Key	Low public health Significance	Medium Public Health Significance

Progress in reducing undernutrition in refugee children under 5 years has been inconsistent. GAM prevalence is generally acceptable but stunting and anemia are the main burden. Mahama and Kigeme have the worst nutrition situation. Since 2015 the GAM prevalence in refugee camps have reduced to an acceptable level of 3% although Kiziba was the exception in 2019 at 5.3%. Stunting and anemia are of moderate to high public health significance and their rates have fluctuated between 2015 and 2019. For example: anemia prevalence decreased from 34% to 28% between 2015 and 2019 but spiked to 36% in 2018. Overall stunting has fallen 11% from 33% in 2015 to 22% in 2019. However, during 2016 and 2017 stunting increased to 30%.

Acute Malnutrition: Wasting

The unweighted overall GAM prevalence of 2.8% across the six camps was the lowest of any SENS since 2012 and within the WHO acceptable threshold of 5% in five of the six camps; however, it was the first time that GAM prevalence exceeded 5% in Kiziba since 2012. Only 4 SAM cases were detected in 2019 SENS: 3 in Kiziba (1% SAM) and 1 in Gihembe (0.3% SAM).

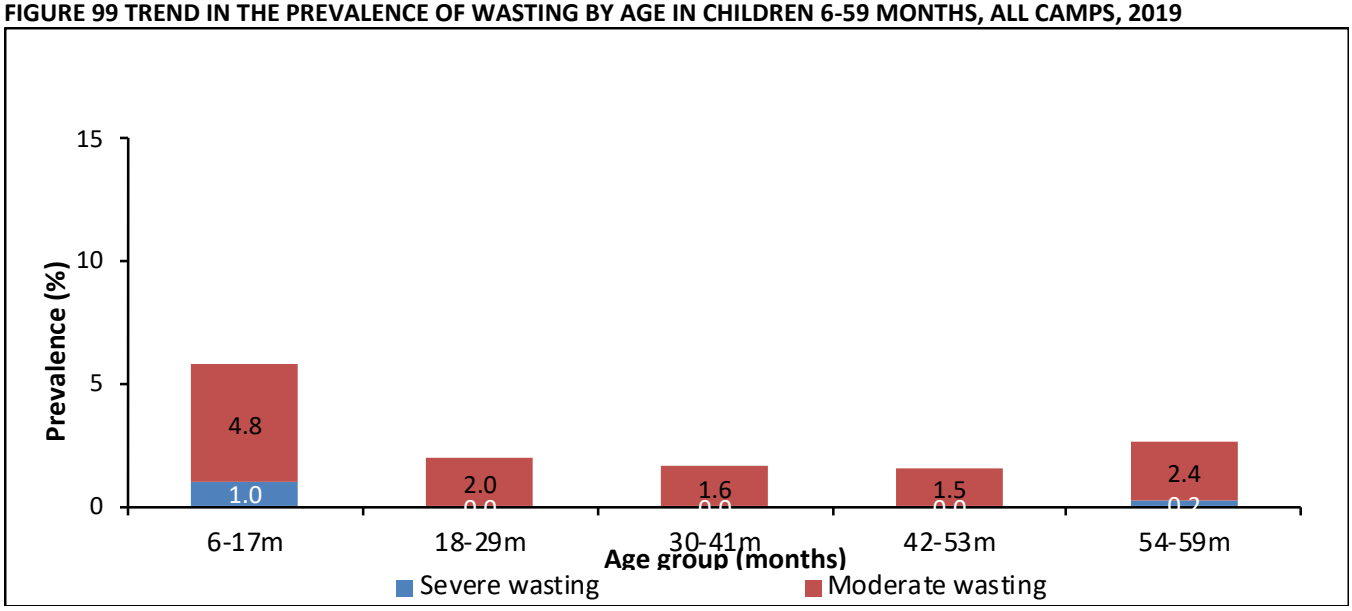
FIGURE 98 TREND IN TOTAL GLOBAL ACUTE MALNUTRITION AMONG CHILDREN 6-59 MONTHS, 2015-2019



The unweighted average of acute malnutrition by any criteria (low weight-for-height Z-score and/or low MUAC) in six refugee camps in Rwanda in 2019 was 3.2% (N=59/1778). Low WHZ index identified more than double the number of children than MUAC (48 vs. 21). Of 59 acutely malnourished children, 11 (19%) were classified by both criteria. Low WHZ identified approximately the same number of males and females (26 vs. 24), while low MUAC identified younger and female children

with the majority of cases between the ages of 6-23 months. Wasting proportionally affected more children 6-17 months than any other age group within under five children although the 24% of wasting cases within the 6 to 17-month age group was a continued annual decrease from 2016 when more than 50% of cases fell in this age group.

FIGURE 99 TREND IN THE PREVALENCE OF WASTING BY AGE IN CHILDREN 6-59 MONTHS, ALL CAMPS, 2019



The UNICEF conceptual framework outlines the contribution of disease to acute malnutrition. Hygienic conditions and adequate access to safe water and sanitation services is a matter of ensuring human dignity and is recognized as a fundamental human right. 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. Further investigation should be recommended even if only a small proportion of households are not disposing of children's faeces safely.

Diarrhea affected about 20% of children across all camps in the two weeks prior to SENS ranging from a low of 14% in Mugombwa to a high of 29% in Mahama which represents a 4% improvement since 2018, likely due to improving WASH practices in the camps. Kigeme was the only camp in which prevalence notably increased compared to 2018 (24% vs. 17%). Diarrhea continued to affect more acutely malnourished than non-acutely malnourished children (31% vs. 21%). Like wasting, diarrhea was more common among younger children 6-23months (33%) and the prevalence gradually reduced with age, affecting less than 15% of children age 24-59 months. Diarrhea prevalence was also higher (24%) among young children from households with less daily water availability (<10 liters per person) compared to children from households with water availability meeting SPHERE standards of at least 15 liters per person per day (18%). CHWs and nutrition programme staff should continue to emphasize health and hygiene promoting activities in households with malnourished children to mitigate the vicious interaction between malnutrition, poor hygiene related to complementary feeding practices, diarrhea and malnutrition.

FIGURE 100 DIARRHEA PREVALENCE IN PAST 2 WEEKS AMONG CHILDREN 6-59M, BY ACUTE MALNUTRITION STATUS (ALL CAMPS), 2016-2019

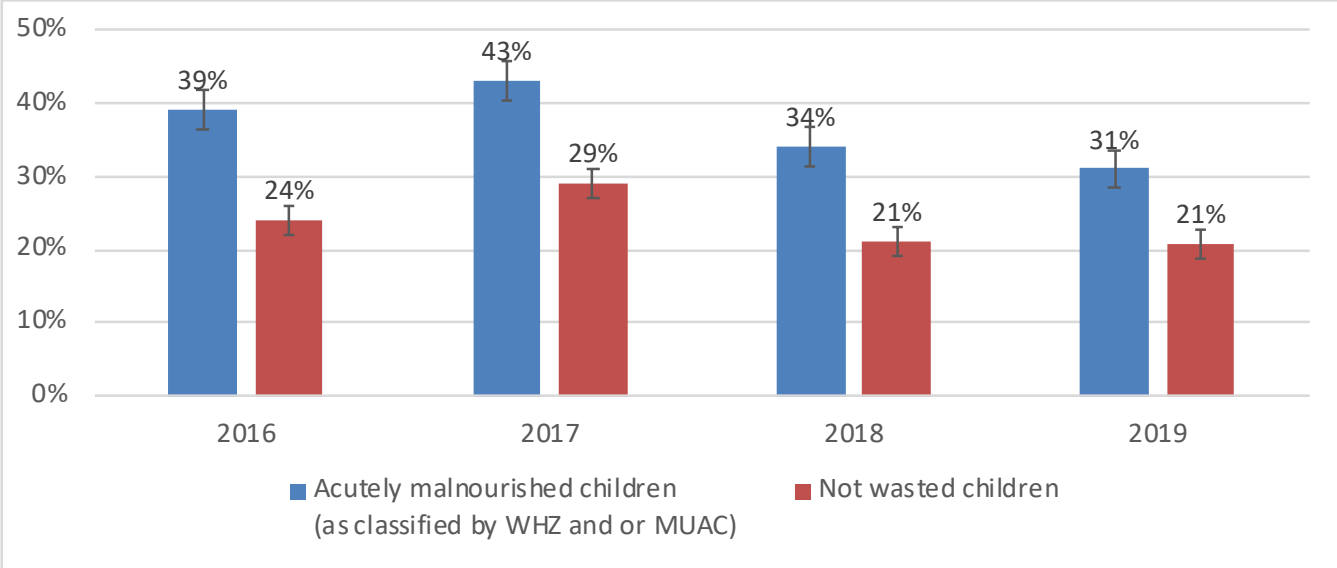
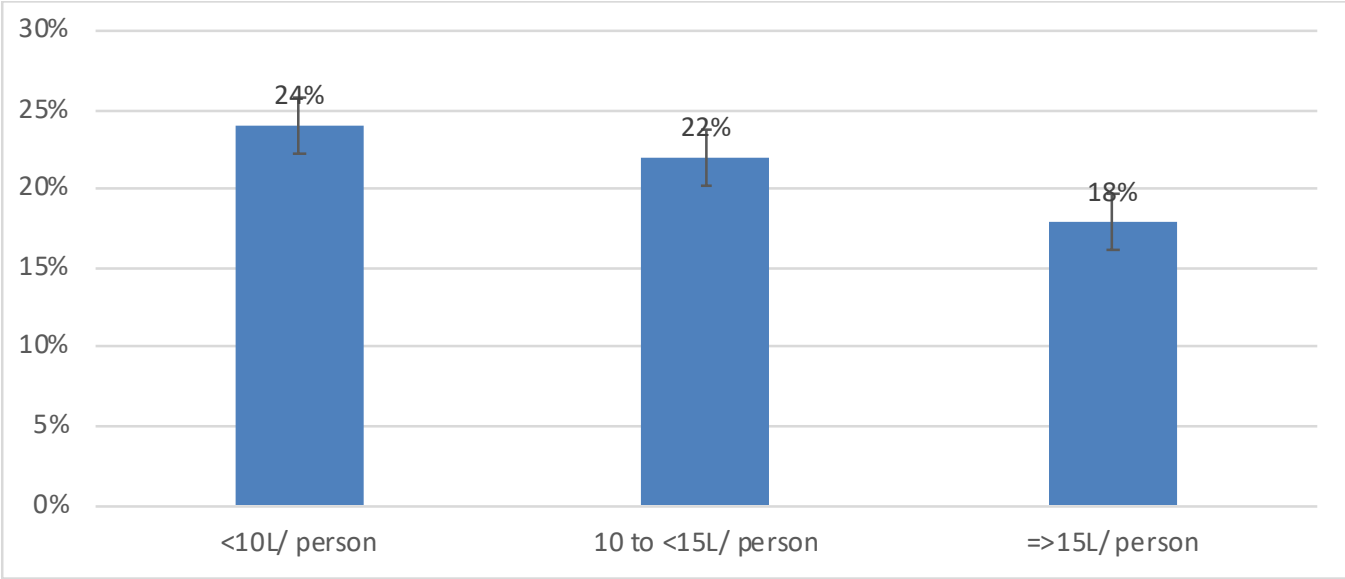


FIGURE 101 DIARRHEA PREVALENCE IN PAST 2 WEEKS AMONG CHILDREN 6-59M, BY HOUSEHOLD WATER AVAILABILITY PER PERSON (LITERS), 2019



While the overall prevalence of acute malnutrition in the 6 camps decreased since 2018, the average enrolment in selective feeding programs for acutely malnourished children was 45%, about 10% lower than 2018 (56%). Enrolment fell below the 90% SPHERE standard in five camps, ranging from a low of 29% in Kiziba to a high of 100% in Mugombwa. Of the 55% of wasted children not enrolled as reported by their caregivers, most were identified by low WHZ, which is not done for community level screening except on a pilot basis in Mahama at BSFP kitchens for children 6-23 months. All non-enrolled acutely malnourished children identified during SENS were immediately enrolled for treatment, although the low enrolment prevalence suggests that the majority of the cases of acute malnutrition remain unidentified and hence untreated in the community.

As a high-impact intervention on child survival, it is imperative to timely identify, enrol and treat acutely malnourished

children. An estimated 45% of deaths in children under five are linked to malnutrition.[35] Studies have shown that the risk of death is three times higher in children with moderate acute malnutrition (MAM) and nine times higher in children with severe acute malnutrition (SAM) compared to healthy children.[36] In addition, late identification and treatment of acute malnutrition contributes to chronic malnutrition.[37]

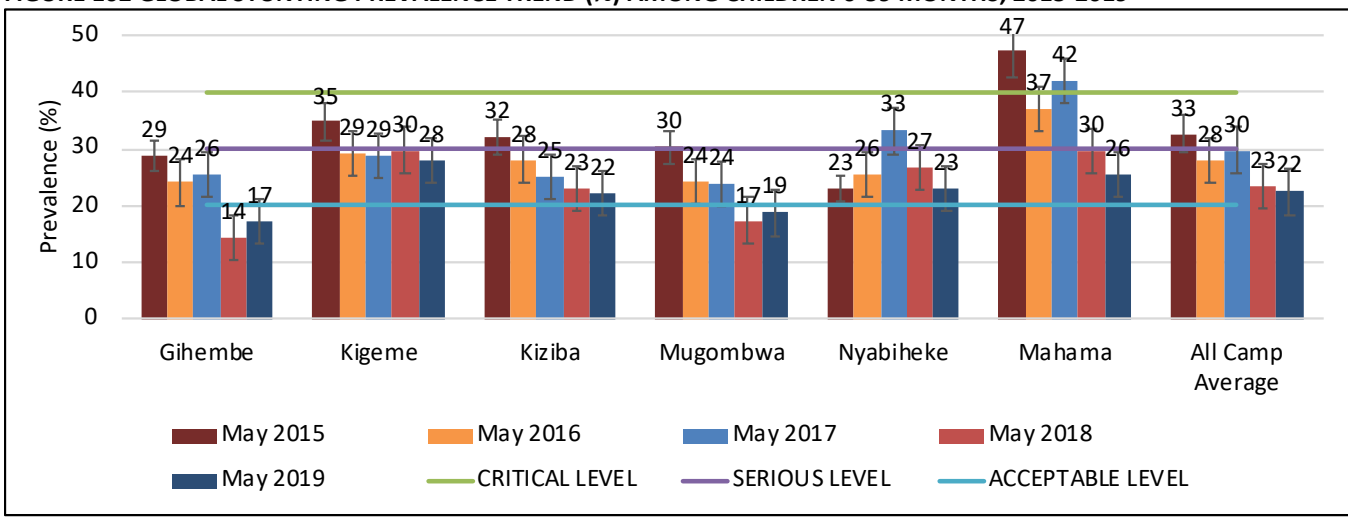
Because an estimated 62% of acute malnutrition was uniquely identified by low WHZ in the refugee population in Rwanda and because community screening and case finding is only done by MUAC, it is prudent to consider a programme redesign. Of the 59 cases of GAM identified by either criterion in 2019 SENS, 46 (78%) had MUAC<135mm and 55 (93%) had MUAC<140mm. For more cost-effective case identification of acute malnutrition cases versus mass screenings by CHWs in the camps it may be worth piloting the utility of MUAC self-screening by mothers/ caretakers at the household level. Choosing a criterion such as MUAC <140mm and raising awareness among caretakers about the meaning of their child's 'at risk' MUAC status and the possibility to seek a confirmatory anthropometric assessment which includes weight and height from a health center may lead to better IMAM programme performance and cost efficiency by reducing the untreated wasting cases that currently exist in the refugee camps without placing additional time demands on CHWs. A mass screening threshold of <140mm would entail confirmatory measurement of ~18% of the camp population of children under-five years of age (about 3600 children) while <135mm would entail confirmatory measurement of ~10% of the camp under-five population (about 2000 children). Besides merely identifying wasted children, a threshold of MUAC<140mm would also potentially identify many of the underweight and stunted children in the community. Within the 2019 SENS data, 63% of the underweight and 31% of the stunted children would be identified by MUAC <140mm and among those, 88% of the severe underweight and 45% of the severely stunted children would be identified which could address multiple forms of malnutrition with a singular screening criterion. While policy, research and clinical management of stunting and wasting are often dealt with separately, the evidence suggests that a more holistic view is needed since untreated wasting can contribute to stunting. Joint identification of all forms of malnutrition with appropriate growth monitoring can improve enrolment in selective feeding programmes to prevent and treat these conditions and potentially link households to behaviour change and social protection initatives to prevent relapse.

Chronic Malnutrition: Stunting

Chronic malnutrition is a cumulative, eventually irreversible process that occurs during approximately the first 1000 days of a child's life. In the short term, children who are stunted are more vulnerable to morbidity and mortality and, in the longer-term, retards learning, employability and economic growth. Stunting affected 22% of the refugee children 6-59m in Rwanda, nearly in line with the 2018 figure of 23%. For the second consecutive year, prevalence was within the WHO acceptable level (20%) in two camps (Gihembe and Mugombwa) and between 20% and 30% (WHO serious level) in the other four camps. Four camps trended positively since 2018 while prevalence in Gihembe (+2%) and Mugombwa (+1%) stagnated. For the first time in 2019, Mahama was no longer the camp with the highest stunting prevalence, falling second to Kigeme. Stunting prevalence in Mahama has decreased by more than 20% since the 47% recorded at the camp's inception in 2015. In aggregate across the six camps, stunting affected a higher proportion of boys (26%) than girls (20%), a trend also observed in previous SENS rounds as well as the host population in the latest nationally representative assessment (CFSVA 2018).[38]

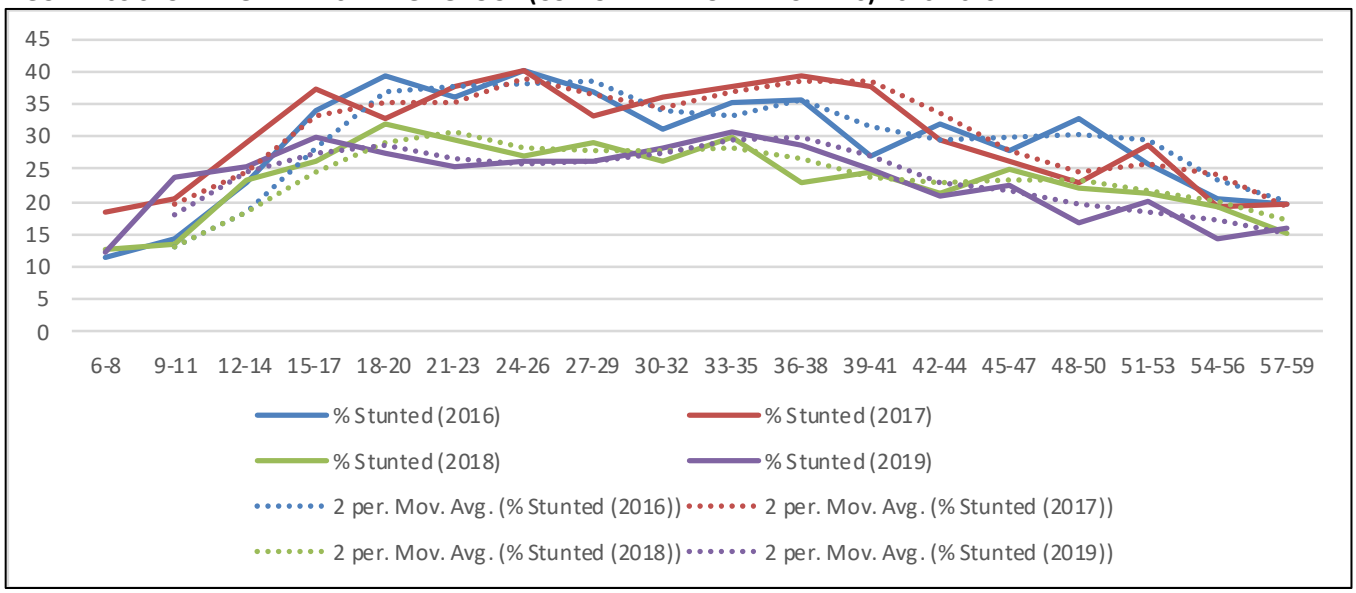
[35] Black et al 2013, Lancet. Maternal and child undernutrition and overweight in low-income and middle-income countries. Lancet, 2013;381:427-51.
[36] Black RE, Allen LH, Bhutta ZA, et al for the Maternal and Child Undernutrition Group. Maternal and child undernutrition: global and regional exposures and health consequences. Lancet, 2008;371:243-60.
[37] Schoenbuchner et al, Am J Clin Nutr, 2019.
[38] WFP, Comprehensive Food Security and Vulnerability Analysis 2018.

FIGURE 102 GLOBAL STUNTING PREVALENCE TREND (%) AMONG CHILDREN 6-59 MONTHS, 2015-2019



Stunting among the youngest children (6-17 months) was higher in 2019 than 2018. Stunting trends by age group indicate that a relatively lower proportion of refugee children are born stunted compared to prevalence that develops during the weaning period. In 2019, 12.1% of children aged 6-8 months were stunted but the prevalence had nearly doubled to 23.5% among the 9-11 month age group, peaked to 29.7% among the 5-17 month age group and remained above 25% until about the 36-month mark. Compared to the previous 3 rounds of SENS, this was the highest stunting prevalence among the 9-11 month aged children and shows the criticality of timely introduction of food, especially in terms of quality and quantity. Preventing and treating this rapid rise in stunting during the concentrated window provides camp stakeholders with biggest opportunity to continue to improve overall stunting prevalence among children 6-59 month by focusing key interventions like optimal child feeding, care and hygiene practices and environmental conditions (i.e. timely introduction of nutrient dense semisolid food and the importance of continued breastfeeding during the complementary feeding period) as further detailed in section 4.3.

FIGURE 103 STUNTING TRENDS BY AGE GROUP (CUMULATIVE FOR ALL CAMPS) 2016-2019

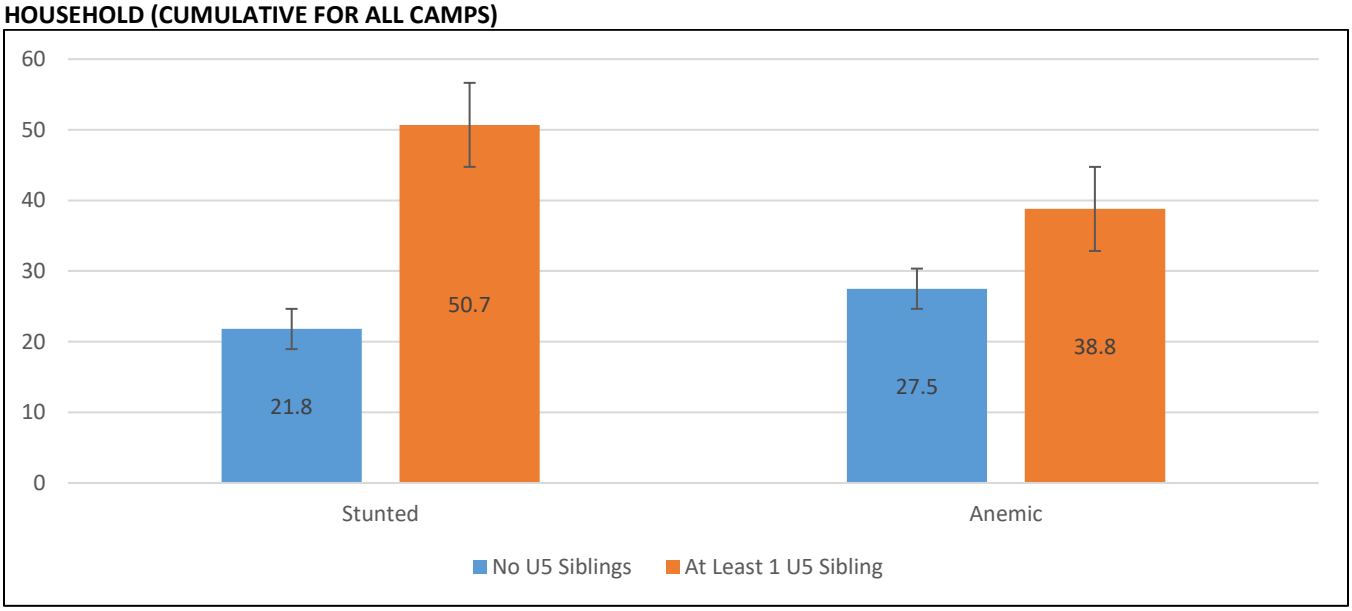


The 2017 JAM linked poor family planning and poor spacing, leading to early cessation of breastfeeding and underweight births to persistent stunting rates in the camps. In 2019 SENS, refugee children from households with siblings under five were more than twice as likely to be stunted (50.7%) compared to children without any under five sibling (21.8%). Anemia was also

higher among children with siblings (38.8% vs. 27.5%). This may indicate that household resources including nutritious foods and caregiver attention are more available for young children without young siblings. It would be useful to explore the theme of household resource allocation and birth spacing during the next JAM or other focus group discussion opportunity to gather additional information to craft appropriate behavior change strategies for increased sensitization on family planning and the link between better child spacing and child nutrition.

BSFP is available in camps for mothers and children throughout the duration of the 1000 days 'window of opportunity' to improve birth outcomes and prevent stunting. BSFP quality remains an area of potential improvement. While BSFP can improve access to sufficient nutrients through the provision of a fortified blended food, it also provides a platform for continuous improvement and discussion around appropriate complementary feeding practices and hygiene in the household, mother-to-mother support groups and nutrition counselling and support. Imporant topics to focus on include consistency of program attendance and appropriate utilization of the commodity at the home (e.g. minimizing sharing of the commodity and dilution with non fortified flour, preparing appropriately dense complementary food, etc.).

FIGURE 104 CHILD STUNTING AND ANEMIA PREVALENCE BY PRESENCE OF SIBLINGS UNDER-5 YEARS OF AGE IN THE HOUSEHOLD (CUMULATIVE FOR ALL CAMPS)



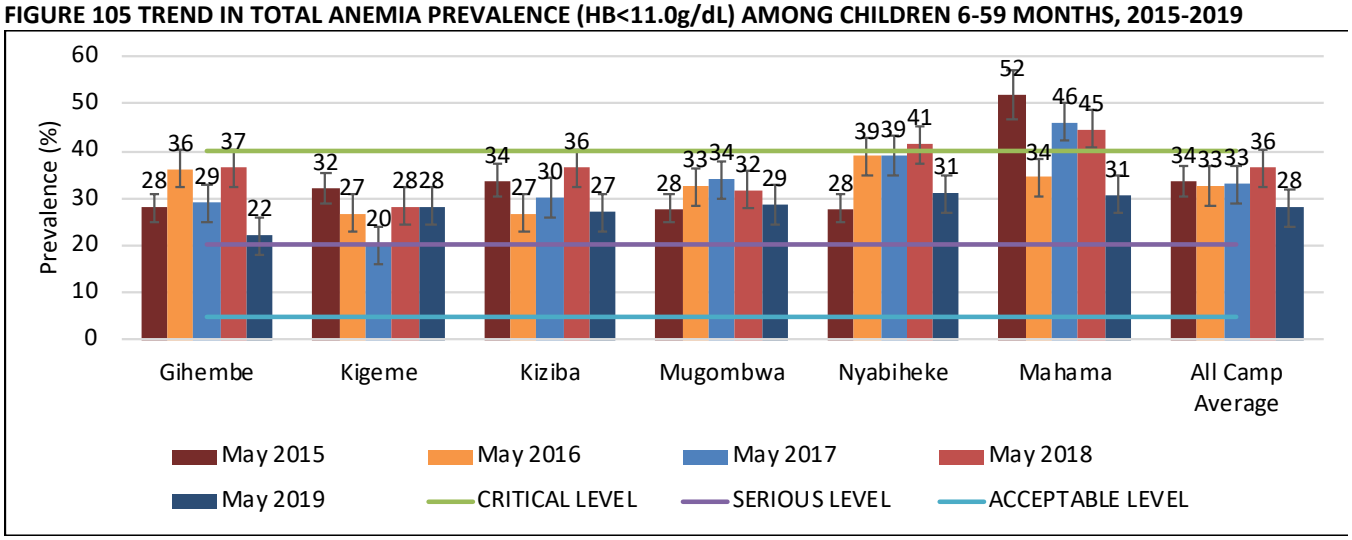
Micronutrient Malnutrition: Anemia

Anemia is a proxy indicator for underlying micronutrient deficiencies, increases the risk of adverse maternal and neonatal outcomes and impairs the health and life quality for affected women and children including reduced physical capacity and mental development. It is linked, among other things, to poor diet diversification. Anemia remains the most prevalent form of malnutrition among the under five population in Rwandan refugee camp. In 2019, 28% of children aged 6-59 months in Rwandan refugee camps were affected by anemia, an average 9% average decrease across the six camps since 2018. Anemia prevalence among children under-5 years of age fell within the range of medium/serious public health significance (20-39%) in the 6 camps and was the first SENS in which no camp exceeded the critical 40% threshold. Like in 2018, prevalence remained highest in Mahama and Nyabiheke camps (>30%). The prevalence was higher among younger children, affecting almost half (48%) of children 6-23 months and exceeding the 40% critical threshold in all camps except Kigeme.

The persistently anemia rates in the camps are likely multifactorial and include food intake, health-related ailments, malaria and lack of routine screening for referral and treatment. As demonstrated by post distribution monitoring, dietary diversity is consistenly poor among refugees at household level and among nutritionally vulnerable groups like children under-5 years of age and women of reproductive age which contributes to inadequate micronutrient intake. Even after the modality of food assistance for refugees transitioned from in-kind to cash (intended to offer refugees more choice in the food they consume), households almost entirely use their cash transfers to purchase staple foods such as grains, tubers, pulses and oil with very little consumption of fresh, micronutrient rich food. Although more than 80% of households consumed vitamin A rich foods

daily or sometimes in the June 2019 PDM, less than 2% of households consumed heme iron daily and another fifth ocassionally (at least once weekly). Of the heme iron consumed, it was obtained almost exclusively from fish compared to meat or organ meat. Around 30% of households in Mahama and 20% of households in Nyabiheke consumed fish at least once per week likely due to geographic proximity to rivers but the proportion of even occasional heme iron consumption in the other 4 camps was less than 2%. The FNG exercise in 2018 found that it cost almost twice as much for a household of five to purchase a nutritious diet from markets inside the camps than a diet that only met their energy needs (608 – 1043 Rwandan Francs (RWF) per day vs. 1408 – 1713 RWF a day). The CotD market survey found that meat was only available in the markets in Kiziba and Mahama.[39] General food assistance (cash and food) should therefore be complimented with other livelihood and income earning opportunities to enable dietary diversification and to cover essential non-food needs.

FIGURE 105 TREND IN TOTAL ANEMIA PREVALENCE (HB<11.0g/dL) AMONG CHILDREN 6-59 MONTHS, 2015-2019

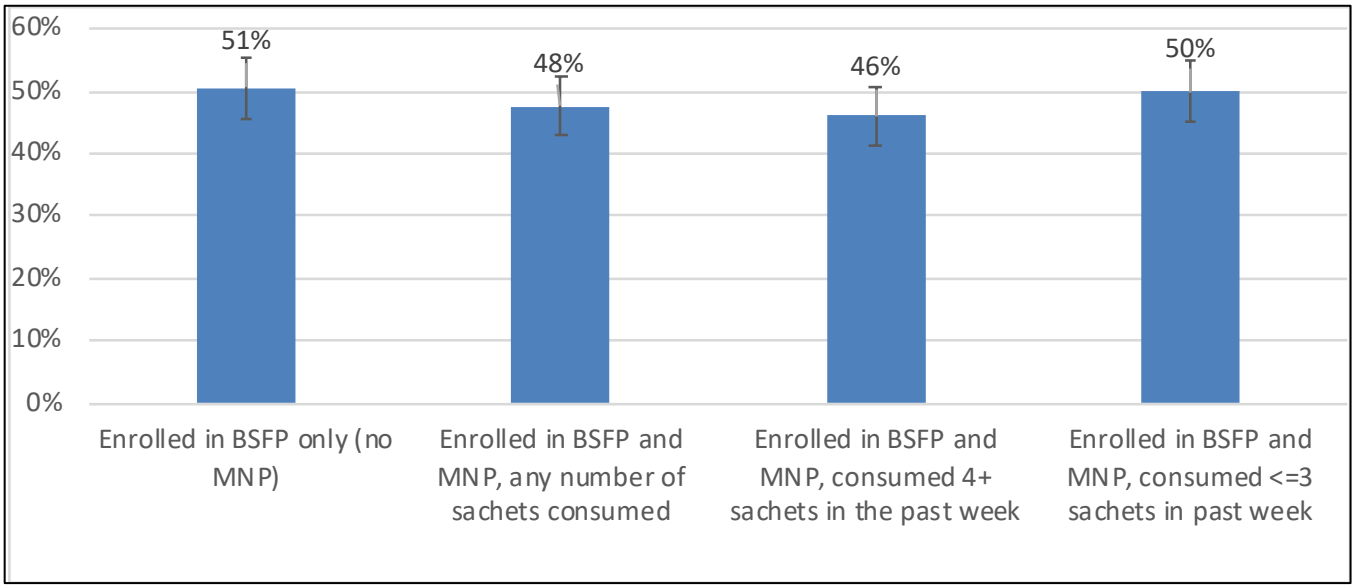


While there has been no consistent trend in anemia prevalence among children under-5 years of age in any camp since the 2015 SENS, anemia prevalence fell in most camps between 2018 and 2019 with the exception of Kigeme. A high proportion of children 6-23 months old were enrolled in preventive nutrition programmes: 96% in the BSFP and 83% in the MNP programme. While the objectives of the respective programmes are different,[40] both offer young children access to iron fortified food. Due to high enrolment in these programmes, more than 90% of children 6-59 months consumed an iron fortified food in the previous 24 hours in all camps except Kiziba (87%). Based on mother's recall, CSB++ consumption in the previous 24 hours was much higher in 2019 (above 90%) in all camps except Kiziba (85%) compared to 2018 in which only 45%-80% of children consumed it. MNP programme enrolment and MNP use was not significantly associated with anemia status as an independent variable. Anemia levels among children 6-23 months were not significantly different depending on enrolment status in BSFP nor MNP irrespective of number of sachets consumed in the previous week.

[39]WFP. FNG Refugee Summary, 2018.

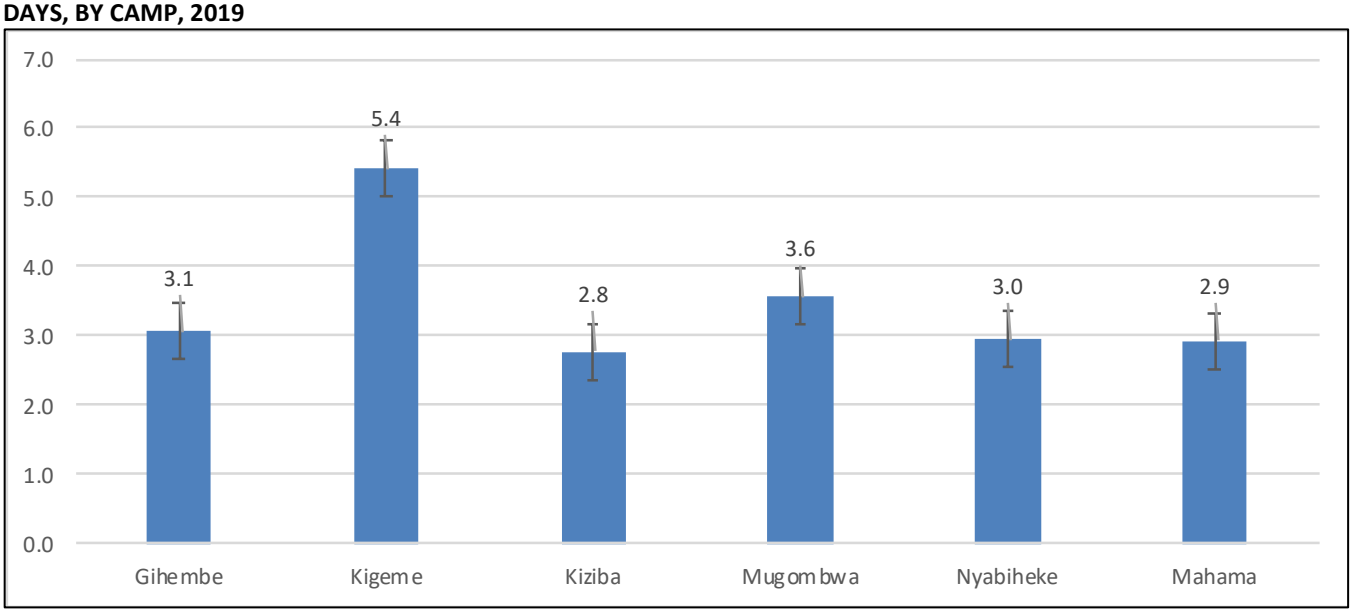
[40] The object of BSFP is to reduce the high stunting levels among refugees in Rwanda through the provision of a fortified blended food to to pregnant and lactating women and refugee children aged 6-23 months in all camps and in Mahama children aged 24-59 months through the ECD programme.

FIGURE 106 ANEMIA PREVALENCE AMONG CHILDREN 6-23 MONTHS ENROLLED IN BSFP AND MNP, BY DIFFERENT CATEGORIES OF SACHET CONSUMPTION IN PREVIOUS WEEK



Children aged 6-23 months enrolled in the MNP programme consumed approximately 3.4 sachets per week or a sachet every other day. The average number of sachets consumed in Kigeme was higher than any other camp at 5.4 per week.

FIGURE 107 AVERAGE NUMBER OF SACHETS CONSUMED BY CHILDREN ENROLLED IN THE MNP PROGRAMME IN PAST 7 DAYS, BY CAMP, 2019



Because 96% of children 6-23 months old were enrolled in BSFP, there was an insufficient number of children to compare anemia status by BSFP enrolment status but as fewer children were enrolled in MNP, comparison of anemia could be done among children enrolled in both programmes MNP and BSFP vs. only MNP. Anemia prevalence was 46% among children 6-23 months old enrolled in BSFP and MNP who consumed 4 or more sachets in the past week, 48% among those enrolled in BSFP and MNP who consumed 3 or fewer sachets in the past week and 51% among those enrolled only in BSFP without receiving MNP but the differences were not significant. A child 6-23 months old consuming 200g CSB++ and 1g MNP would theoretically be getting 200% of his/her recommended nutrient intake, but due to to issues of bioavailability, these may not

be sufficient to prevent iron-deficiency anemia in the Rwandan refugee context. Furthermore, the extent of consumption of CSB++ and MNP by intentended recipients vs. intrahousehold sharing is unknown as described in the 2017 JAM.

Animal source foods (eggs, milk and other dairy, flesh foods) are critical sources of essential fats, protein, vitamins, and minerals. Low consumption of meat, fish, and/or poultry is the main cause of iron-deficiency anemia, especially in poor people.[41,42] While most children 6-23 months consumed an iron rich food in the previous day in the form of an iron fortified food (e.g. CSB++ and/or MNP), few children consumed meat, fish, and/or poultry which provide bio-available heme-iron. Fewer than 2% of young children consumed flesh meat and less than 1% consumed organ meat. The most commonly consumed form of heme-iron was fish, by 13% of children overall, ranging from a low of 4% in Kigeme to 22% in Mahama.

TABLE 142 PREVALENCE OF HEME-IRON CONSUMPTION AMONG CHILDREN 6-23 MONTHS IN PAST 24 HOURS, BY CAMP, 2019

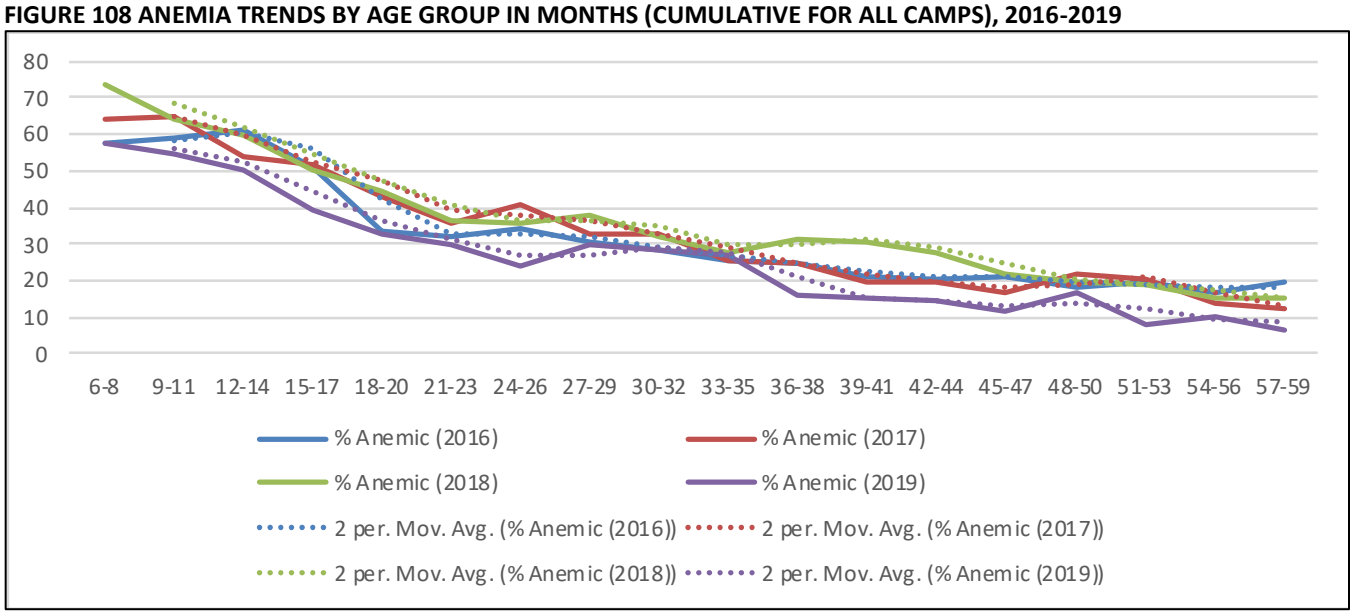
	Heme-iron (Any Form)	Organ Meat	Flesh Meat (e.g. Goat, Beef, Rabbit, Chicken)	Fish
Gihembe	12.1%	0.0%	3.7%	11.2%
Kigeme	3.8%	1.9%	1.0%	3.8%
Kiziba	16.5%	0.9%	0.9%	15.6%
Mugombwa	18.4%	0.0%	1.1%	18.4%
Nyabiheke	11.1%	1.2%	2.5%	7.4%
Mahama	22.3%	0.0%	0.0%	22.3%
Average	14.0%	0.7%	1.5%	13.1%

TABLE 143 IRON CONTENT OF FOODS AVAILABLE IN REFUGEE CAMPS IN RWANDA

	Quantity	Iron (mg)	% Child 6-23m Recommended Nutrient Intake (RNI)
MNP	1g	10	72%
CSB++	200g	17.8	128%
Small fish like sardines	100g	2.9	21%
Fresh fish like tilapia	100g	0.4	3%
Beef Liver	100g	4.9	31%
Beef	100g	1.9	14%
Goat	100g	2.8	20%
Beans, dried	100g	6.2	44%
Dark green leaves e.g. spinach	100g	2.7	19%
Medium green leaves e.g. pumpkin	100g	2.2	16%

[41] Bhargava A, Bouis H, Scrimsaw N. 2001. Dietary intakes and socioeconomic factors are associated with the hemoglobin concentration of Bangladeshi women. *Journal of Nutrition*;131:758-64.

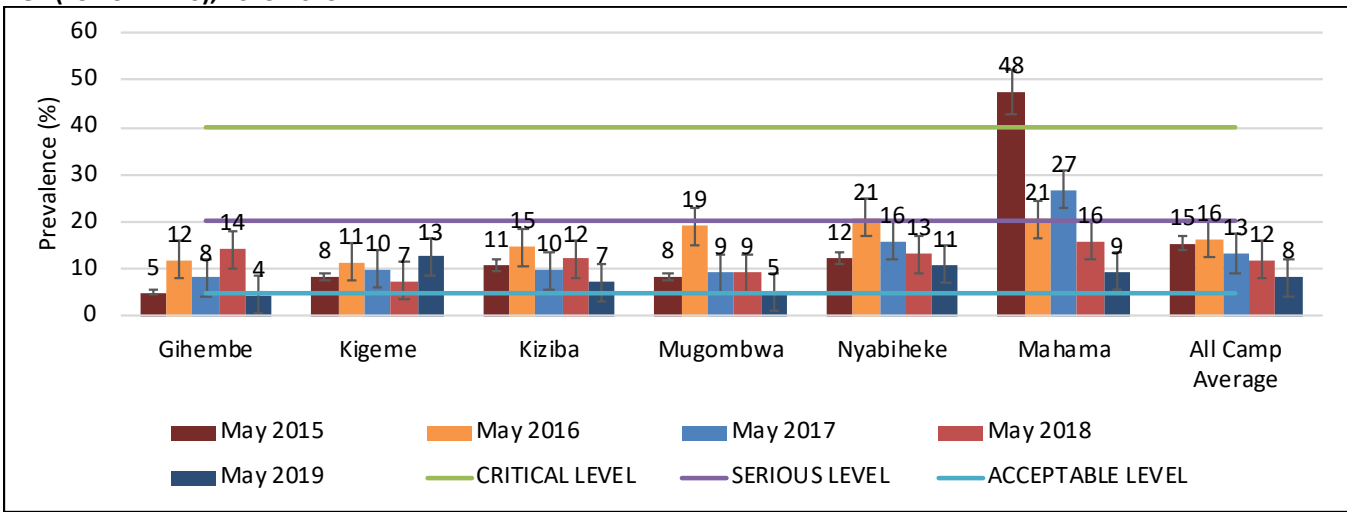
FIGURE 108 ANEMIA TRENDS BY AGE GROUP IN MONTHS (CUMULATIVE FOR ALL CAMPS), 2016-2019



Anemia Among Women of Reproductive Age

Anemia prevalence among women was below 15% in all camps, constituting an issue of low/mild public health concern for the second consecutive year. The overall unweighted camp average of 12% total anemia prevalence was about 4% lower than 2018, with improving trends in five of the camps, while Kigeme worsened. A comprehensive anemia prevention and treatment strategy in the Rwandan refugee camps should also encompass women of reproductive age. Good nourishment and supplementation during the reproductive years can lay down iron stores needed during pregnancy and lactation.

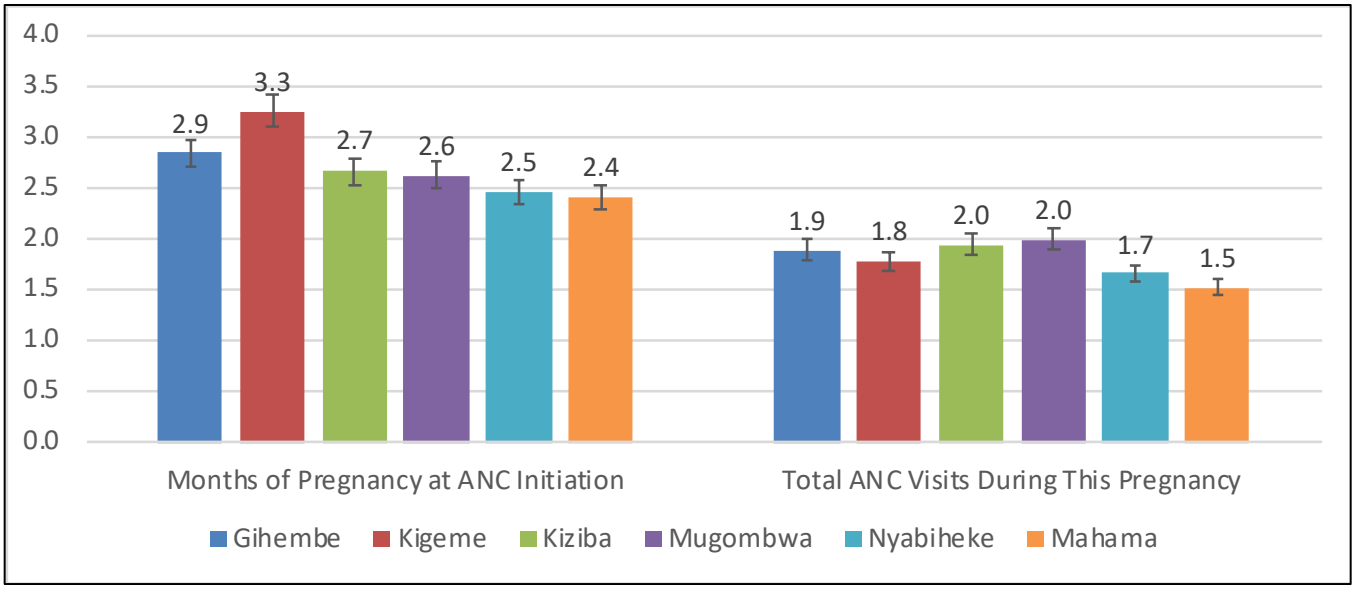
FIGURE 109 TREND IN TOTAL ANEMIA PREVALENCE (HB<11.0g/dL) AMONG NON-PREGNANT WOMEN OF REPRODUCTIVE AGE (15-49 YEARS), 2015-2019



Indicators about the quality of women's diets and health seeking behaviors show room for improvement. ANC visits offer opportunities for providing nutrition interventions including micro-nutrient supplementation, detection and treatment of maternal conditions, counseling for maternal nutrition and preparation for breast-feeding. Approximately 82% of pregnant women were enrolled in ANC which is a slight reduction since 2018 (84%). The average time of enrolment in ANC was between the second and third month of pregnancy in all camps with the exception of Kigeme where women enrolled at the beginning of the second trimester, between the third and fourth month of pregnancy. The questionnaire design collected data about how many many ANC visits pregnant women had attended without ascertaining the number of months of

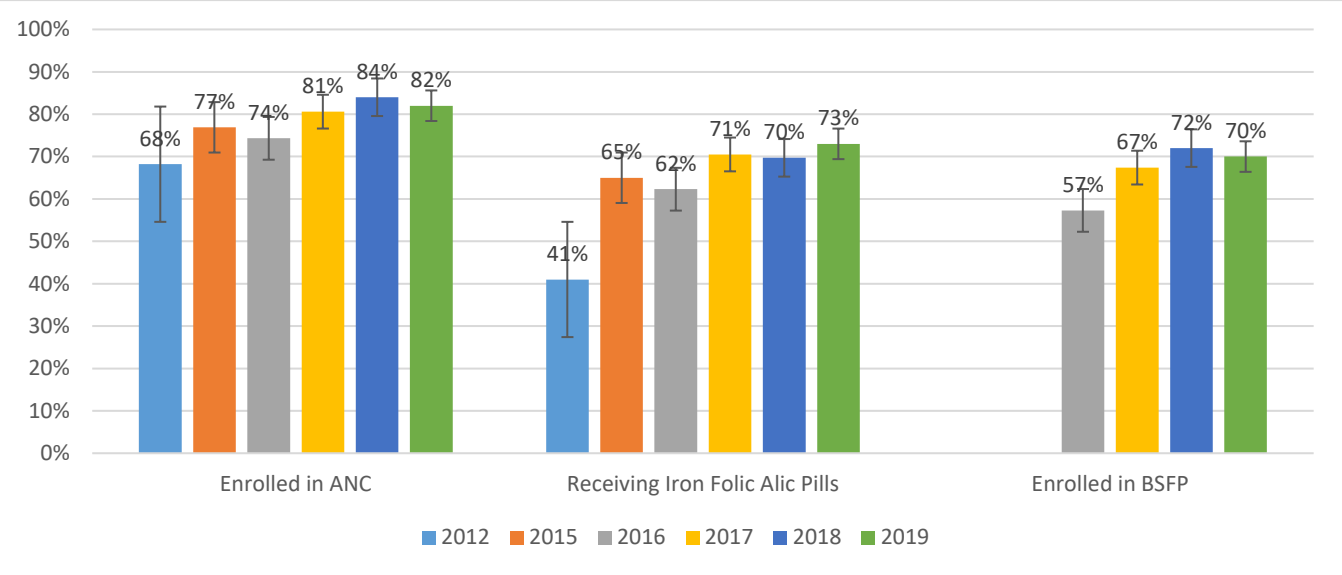
pregnancy, making it difficult to determine if they were attending the recommended number of visits. It would be better to determine the duration of pregnancy to make this calculation in the next round of SENS to interpret whether the women are on track to attend a least 4 ANC sessions.

FIGURE 110 AVERAGE MONTH OF PREGNANCY OF WOMAN'S FIRST ENROLMENT IN ANC AND TOTAL NUMBER OF VISITS, BY CAMP, 2019



Upon identification of pregnancy, a CHW refers the woman for enrolment in ANC where she receives iron and folate tablets from the health facility and BSFP ration from the nutrition center. There was a 9% discrepancy between the number of women enrolled in ANC and those reporting receipt of iron folate tablets (73%) and enrolment in the supplementary feeding program to receive CSB+, oil and sugar (70%). The camps with lowest enrolment for these services are Kigeme and Kiziba. Furthermore, enrolment in ANC did not guarantee recommended behaviors and quality service delivery. Most enrolled pregnant women (60%) consumed half or fewer of the recommended 90 iron folic acid tablets. Early enrolment in ANC during the first trimester and adherence to recommended iron folic acid tablet intake and promotion of fortified food consumption should be a priority in all camps to support optimal preganancy outcomes.

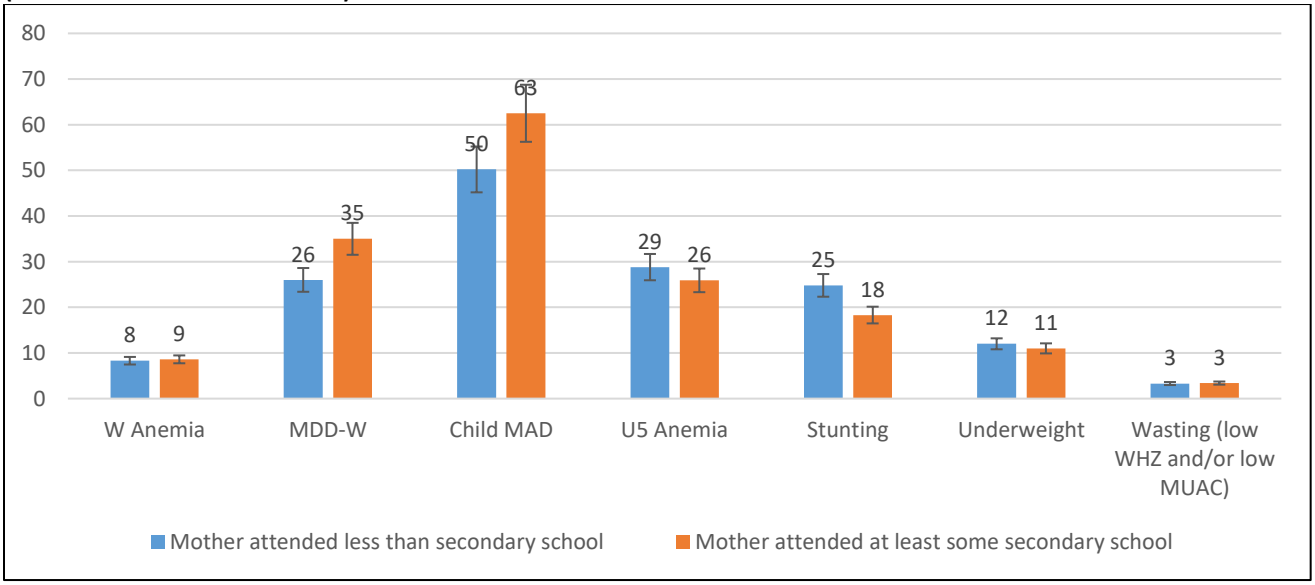
FIGURE 111 TREND IN UTILIZATION OF AVAILABLE HEALTH AND NUTRITION SERVICES AMONG PREGNANT WOMEN, (CUMULATIVE FOR ALL CAMPS), 2015-2019



Women's Education vs. Nutrition and Dietary Indicators

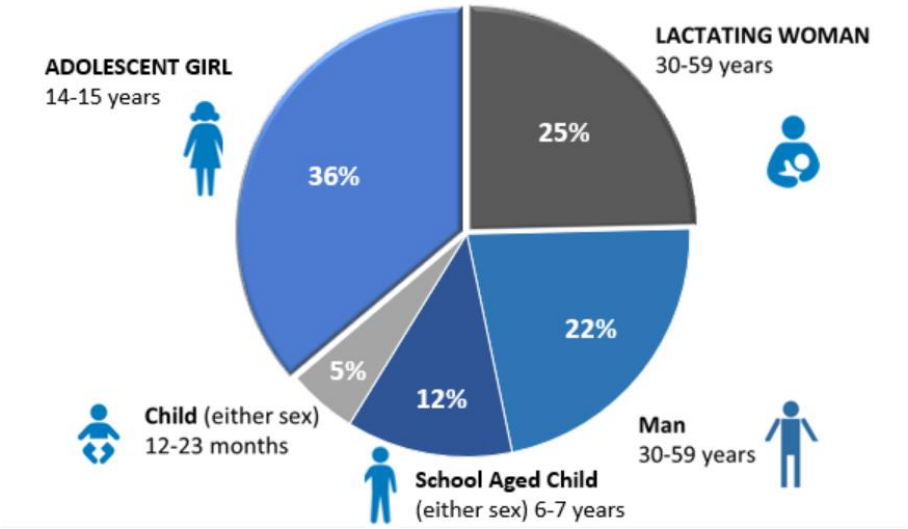
Child stunting was lower (18%) among those whose mothers were more educated (attended at least some secondary school) as compared to those whose mothers never attended school or attended primary school only (25%). Among educated mothers, the prevalence of child anemia was also lower while child MAD and MDD-W were higher. This underscores the need to continue promoting women and children's health, nutrition, and empowerment through access to formal education for girls (e.g. by providing social protection programs that involve a food safety net for families that also encourage girls to stay in school). Furthermore, women are the primary decision makers over the use of food and cash in the majority of households in all refugee camps so equipping them with numeracy skills to manage the utilization monthly cash-based transfer is essential for improved nutrition for all members of the household. Mother's education level was not associated with ANC enrolment, consumption of iron folate tablets, nor women's anemia.

FIGURE 112 NUTRITION AND DIETARY INTAKE INDICATORS BY MOTHER'S/ CARETAKER'S EDUCATION STATUS (CUMULATIVE FOR ALL CAMPS)



The little data that does exist on the diets of women and adolescent girls in refugee camps suggests that their diets are poor and that this is contributing to malnutrition in their children. The Cost of the Diet results from the FNG exercise illustrate the high nutrient needs of adolescent girls and PLW: 61% of the household cost of a nutritious diet should be allocated to meeting their requirements. The high prevalence of anemia in children at the age of 6 months (70%) implies that mothers are not laying down adequate iron stores for their children during the first six months of life. The data gaps identified for these nutritionally vulnerable groups include: women's body mass index by age; consumption of vitamin A and iron rich-food in women; prevalence of deworming; age of first birth; what foods adolescent girls are eating, and; how the diets of women change when they are pregnant or breastfeeding.[43] Increased focus should be placed on SBCC campaigns targeted towards decision makers of household resources to allocate appropriate resources for adolescent girls' nutrient requirements as a time of life that may allow for catch up and as future mothers.

FIGURE 113 THE PERCENTAGE COST OF A NUTRITIOUS DIET ATTRIBUTED TO DIFFERENT HOUSEHOLD MEMBERS IN RWANDA (FROM FNG RESULTS)



4.2 Morbidity and Mortality

Child immunization is the most widely accepted preventive health intervention. "Child Health Days" (e.g. Tanzania, Zambia, Madagascar and Zimbabwe) have successfully integrated growth monitoring, supplementary feeding, health education, vitamin supplementation and immunizations in several African countries as part of the national strategy to combat child mortality. These campaigns improved child nutritional status, contributed to general gains were made for all child health interventions, without any detrimental effects on vaccination coverage.[44]

In all refugee camps in Rwanda, immunization and vitamin A supplementation campaigns had occurred in the month before SENS during MoH's "Week of the Mother and Child." which supports the high prevalence of measles vaccination among children 9-59 around 99% in all camps and above the 95% UNHCR target for camp settings; however, it was based on a combination of card-based confirmation and recall by the mother. Card based confirmation coverage was much lower than that based on the caretakers recall and was also lower than in previous years, which may indicate a general lack of availability of health cards and/or health worker time and skills to complete them. Issuing digital health cards may be a more feasible

[43]WFP. FNG Refugee Summary, 2018.

[44] Doherty T, Chopra M, Tomlinson M, Oliphant N, Nsibande D, Mason J. Moving from vertical to integrated child health programmes: experiences from a multi-country assessment of the Child Health Days approach in Africa. Tropical medicine & international health : TM & IH 2010; 15: 296-305

solution than paper based for efficient tracking of immunization combined with other key health and nutrition indicators like growth monitoring. Vitamin A deficiency is associated with diarrhea mortality and measles mortality, highlighting the importance of high-dose vitamin A supplementation. Coverage was above the 90% SPHERE standard in all camps except Mahama, which fell to 85% compared to 99% in 2018. The proportion of confirmation by card was less than 50% in all camps for vitamin A (range 10-42%). About 85% of children in the six camps received a deworming tablet within the past six months.

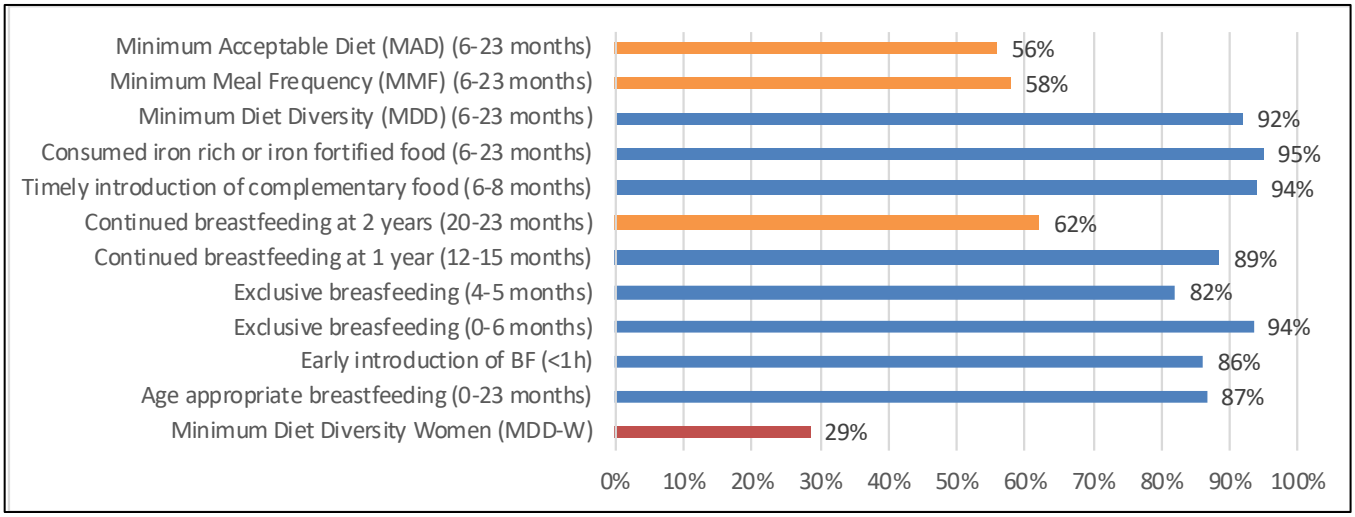
Morbidity and mortality rates in the camps improved compared to the 2018 SENS. The crude mortality rate (CMR) and U5 mortality rate (U5MR) fell in the year preceding the 2019 SENS compared to same period for 2018 SENS (CMR 0.138 vs 0.209 and U5MR 0.215 vs. 0.316). There were notably fewer cases of malaria in 2019 after outbreaks in Mahama in Nyabhiheke in 2018. Diarrhea prevalence also reduced in all camps except Kigeme.

4.3 Maternal, Infant and Young Child Nutrition

The first 1,000 days (from conception to a child's second birthday) are a critical window of opportunity during which poor nutrition causes serious, potentially irreversible problems. Optimum nutrition provides the biggest opportunity for impact including exclusive breastfeeding for an infant's first six months of life followed by continued breastfeeding for two years or beyond combined with timely and appropriate complementary feeding.

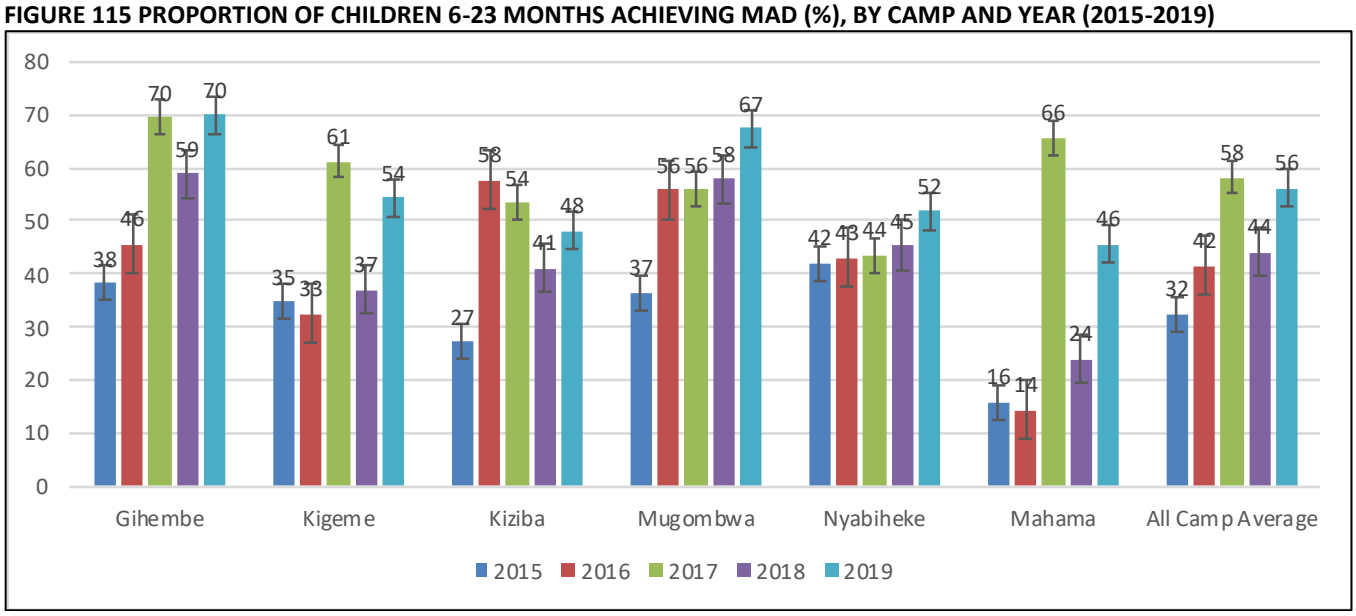
There were mixed trends in MIYCN indicators in 2019 compared to 2018. Improvements were seen in minimum dietary diversity for women (+23%), minimum acceptable diet for children 6-23 months (+12%), exclusive breastfeeding (+3%) amd timely introduction of complementary food (+5%). Other indicators trended negatively including early intiation of breastfeeding within the first hour of birth, exclusive breastfeeding at age 4-5 months, continued breastfeeding at 1 and 2 years. The prevalence of bottle-feeding increased from 2% in 2018 to 6% in 2019. 95% of children consumed iron rich or iron fortified food, a 7% increase since 2018, due to the high enrolment in BSFP and MNP programmes and utilization of the CSB++ and MNP distributed in the programmes. Among the 95% of children that consumed iron rich food in the past 24 hours, 59% had CSB++ as their only iron rich food while 38% consumed both CSB++ and MNP and 3% consumed only MNP.

FIGURE 114 MIYCN AND NUTRIENT ADEQUACY DURING '1000 DAYS' WINDOW OF OPPORTUNITY



The proportion of children 6 to 23 months that consumed a minimum acceptable diet (MAD) was 56% (ranging from 46% in Mahama to 70% in Gihembe) and represents a significant improvement since 2018 (44%) and almost back to the highest level seen in 2017 (58%). More children achieved minimum diet diversity (MDD) than minimum meal frequency (MMF). MDD has improved year on year in almost every camp since 2015, to exceed an average of at least 4 food groups in almost every camp.

FIGURE 115 PROPORTION OF CHILDREN 6-23 MONTHS ACHIEVING MAD (%), BY CAMP AND YEAR (2015-2019)



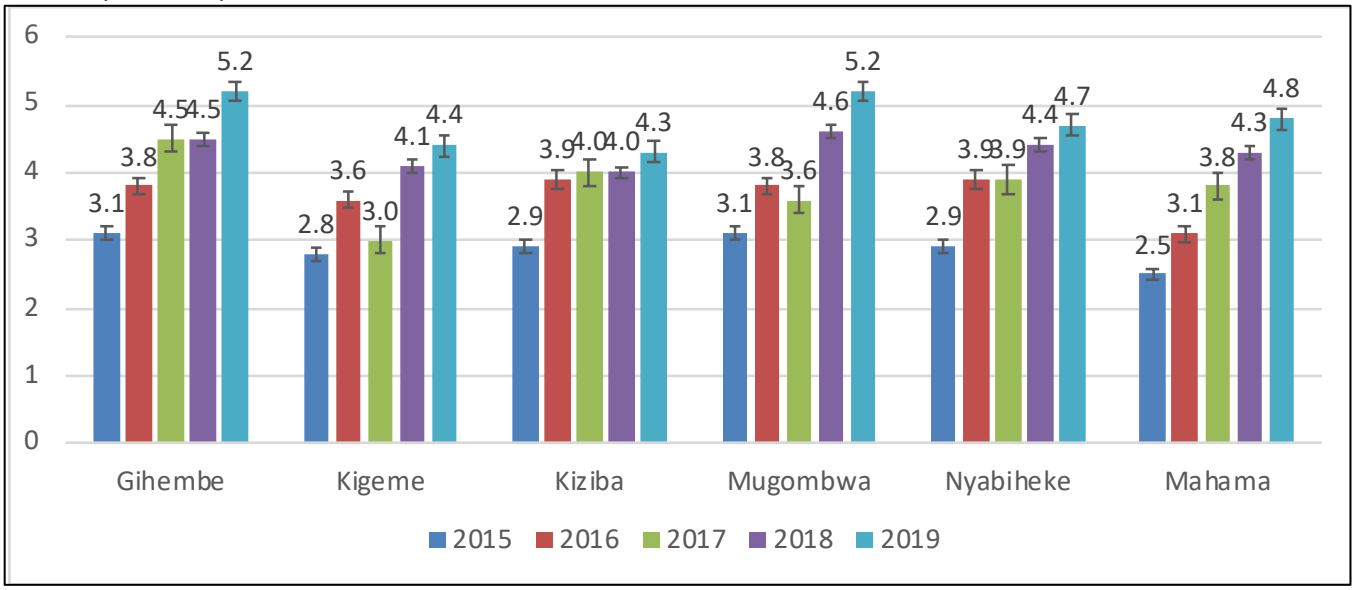
Most children in all camps consumed 4 food groups: 1) grains, roots and tubers, 2) legumes and nuts, 3) dairy products and 4) flesh/fortified foods. The widespread consumption of CSB++ among children 6-23 months is a major contributing factor to high levels of minimum dietary diversity. Fewer children consumed foods from the other 3 food groups. Dark green leaves (i.e. dodo leaves) were the main contributing vitamin A rich group (60-70% by camp). About 10% of children consumed orange-fleshed, vitamin A rich fruit. Eggs were the least commonly consumed group across all camps (4%). The low consumption of animal source foods among children 6-23 months of age may be attributable to insufficient availability and affordability of these foods and low demand driven by poor knowledge of appropriate feeding for infants and young children.

TABLE 144 DIETARY DIVERSITY AND CONSUMPTION OF VARIOUS FOOD GROUPS AMONG CHILDREN 6-23 MONTHS OLD IN REFUGEE CAMPS IN RWANDA

	Minimum Dietary Diversity	Grains, Root, and Tubers	Legumes and Nuts	Dairy Products	Flesh and Fortified Foods	Eggs	Vit-A Rich Fruits and Vegetables	Other Fruits and Vegetables	MAD
Gihembe	96%	98%	98%	99%	100%	7%	79%	58%	70%
Kigeme	89%	94%	94%	92%	92%	3%	55%	30%	46%
Kiziba	84%	95%	90%	88%	86%	2%	58%	24%	48%
Mugombwa	98%	99%	98%	98%	98%	5%	80%	51%	67%
Nyabiheke	93%	98%	95%	99%	95%	4%	62%	37%	52%
Mahama	95%	99%	96%	92%	97%	6%	77%	21%	45%
Average	92%	97%	95%	95%	95%	4%	68%	37%	55%

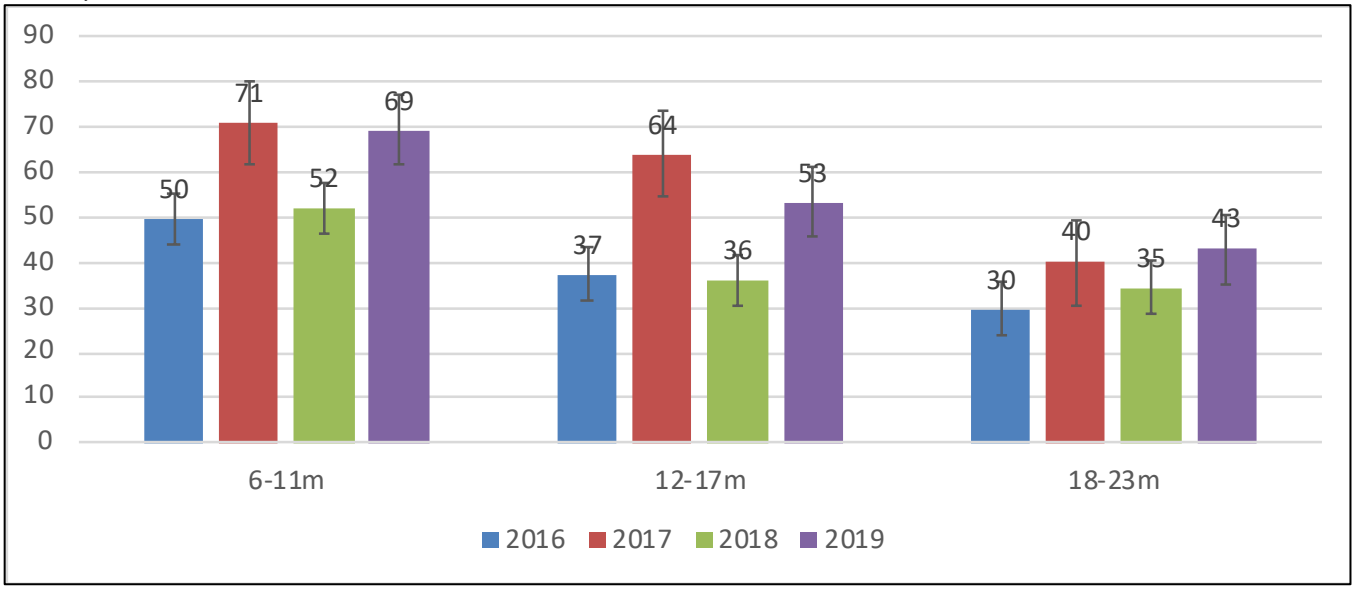
Key: 0-24% | 25-49% | 50-74% | =>75%

FIGURE 116 MEAN NUMBER OF FOOD GROUPS (OUT OF 7) CONSUMED IN THE PREVIOUS 24 HOURS BY CHILDREN 6-23 MONTHS, BY CAMP, 2015-2019



Despite improvement in minimum meal frequency since 2018 in every age group among children 6-23 months, it remains an area of concern and the reason more children are unable to achieve MAD. The proportion of children achieving MMF decreased with age, which indicates that older children aren't getting the important contribution of breastmilk due to early cessation of breastfeeding before 2 years and/or aren't eating enough times to supplement continued breastfeeding for optimal growth. This may be linked to constraints in mothers' knowledge, time, and or inputs like firewood and water. It would be worth conducting a full MIYCN survey in the camps and include some FGD in the next JAM to understand the barriers to achieving optimal feeding practices.

FIGURE 117 PROPORTION OF CHILDREN 6-23 MONTHS ACHIEVING MINIUMUM MEAL FREQUENCY (MMF), BY AGE GROUP, 2015-2019



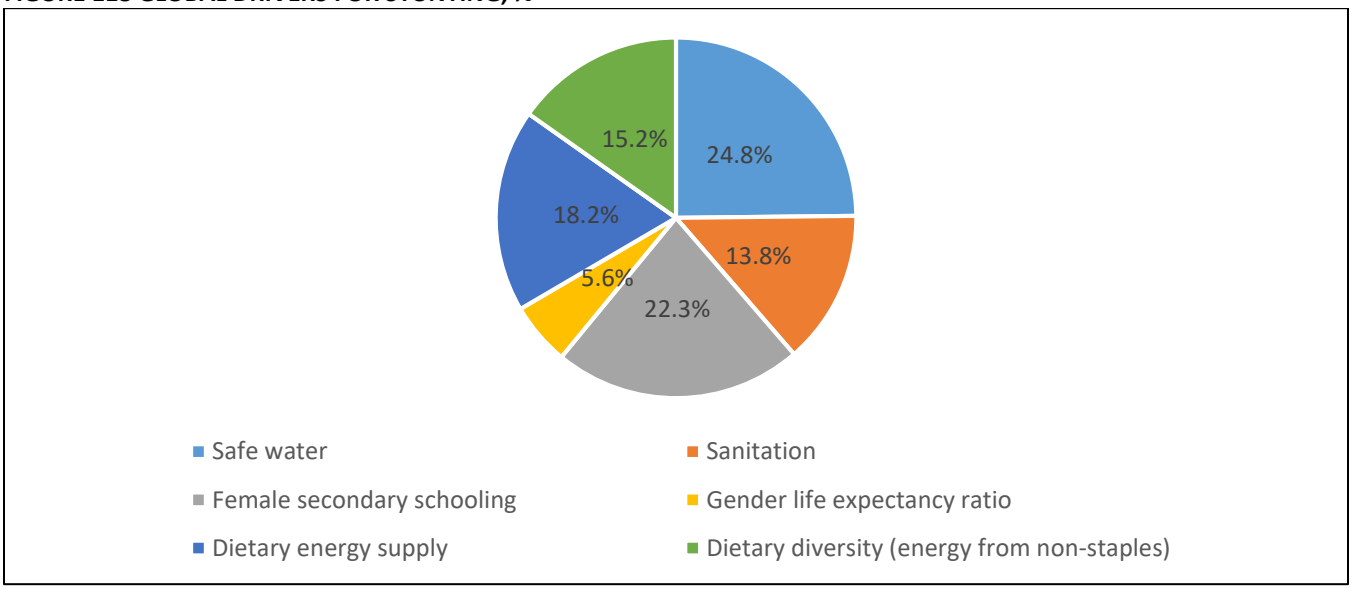
4.4 Multisectoral Considerations

Refugees in Rwanda have experienced significant improvements in nutrition outcomes since SENS started being regularly conducted in 2015, as evidenced by reduction in stunting prevalence among children under 5 years from 33% in 2015 to 22% in 2019. Progress has also been made in caring practices that improve nutrition outcomes. For example, rates of exclusive breastfeeding have increased from 77% in 2012 to 94% in 2019. In 2019, 86% of infants were breastfed within the first hour of life. Despite this progress, some forms of malnutrition like anemia among children 6-59 months remain widespread across all camps.

The underlying drivers of malnutrition are inherently complex and multifacted. In line with the UNICEF conceptual framework, maternal and child undernutrition in refugee children arises from a variety of factors. Multivariate associations between stunting and its determinants have demonstrated that there is no single factor which alone can remedy the problem of stunting. Even after controlling for a variety of factors, nearly all variables remain significantly associated with chronic undernutrition such as child's age and sex, maternal nutritional status, the child's dietary intake and disease status, maternal education, agricultural livelihoods, and household wealth. The causal framework defined by Smith and Haddad which analyzed data from 1970 to 2012 across 116 countries identified that independent of access to health care, globally, safe water access, sanitation, women's education, gender equality and the quantity and quality of food available have been the key underlying drivers of past reductions in stunting and ranked dietary energy from non staples, access to improved sanitation and women's education as factors having the strongest impact for stunting reductions in the future.[45]

Consequently, intervening to improve any single underlying factor will be insufficient to have a significant impact on stunting. Efforts to tackle malnutrition cannot be managed by nutrition and health actors alone and require multisectoral collaboration, coordination and accountability. The creation of an enabling environment that promotes policy coherence and convergence of activities is critical.

FIGURE 118 GLOBAL DRIVERS FOR STUNTING, %



Using this framework, the underlying drivers of stunting were mapped by camp with red representing the worst and green representing the best. Data included in the heat map acknowledges the underlying causes of malnutrition identified in the UNICEF framework and in order to explore the immediate causes, the analysis also mapped dietary diversity as an indicator of dietary intake and a composite of morbidity and access to water, sanitation and hygiene as proxy indicators of disease and infection. Noting that the Smith and Haddad study omitted access to health services as an indicator due to the lack of data, the analysis included 'immunization coverage' as a proxy indicator to measure access to healthcare.

[45] Smith L, Haddad L. 2015. Reducing child undernutrition: past drivers and priorities for the post-MDG era. *World Development;180-204.*

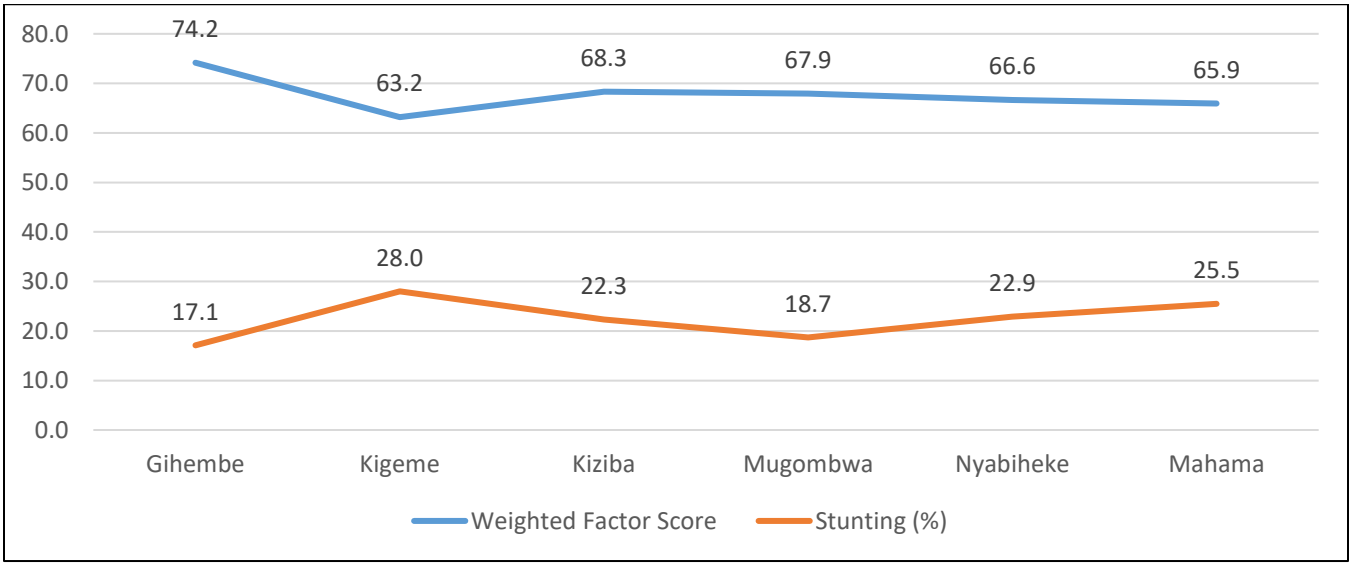
TABLE 119 HEAT MAP FOR DRIVERS FOR STUNTING IN REFUGEE CAMPS IN RWANDA

Factor	1) Safe Water		2) Santiation	3) Female education		4) Gender Equity	5) Dietary Energy Supply		6) Dietary Diversity		7) Healthcare Access	Total
Factor Weight	24.8%		13.8%	22.3%		5.6%	18.2%		15.2%		N/A	
Indicator (%)	HH access to improved drinking water	HH with at least 15L water/ person/ day	HH access to improved sanitation	Female attending at least some secondary school	Female literacy	Women participating in HH decisions around food/ cash	HH with acceptable FCS	% HH expenditure on food (past 30 days)	Children consuming MAD	HH consuming Heme Iron at least once per week	Fully immunized children (age 12-23m)	Overall Weighted Factor Score
Gihembe	100	53	99	45	85	95	90	75	70	18	100	74
Kigeme	100	21	95	29	71	97	85	69	46	12	98	63
Kiziba	100	42	100	35	75	95	94	71	48	9	99	68
Mugombwa	100	32	98	27	74	100	96	73	67	8	99	68
Nyabiheke	100	27	98	31	74	96	92	68	52	23	99	67
Mahama	100	30	98	22	66	95	98	73	46	29	99	66
Average	100	34	98	32	74	96	93	71	55	17	99	68

Key: 0-24% | 25-49% | 50-74% | =>75%

Stunting prevalence by camp showed inverse concordence with a weighted sum of these factors—that is a worse achievement of the underlying drivers of malnutrition was associated with a higher stunting prevalence per camp.

FIGURE 120 WEIGHTED FACTOR SCORE VS. STUNTING PREVALENCE IN RWANDAN REFUGEE CAMPS



While all the underlying drivers of malnutrition require attention, the three main underlying drivers of malnutrition across all refugee camps were:

- inadequate dietary diversity
- insufficient amount of clean water per person per day
- low rates of female secondary school attendance

A fourth consideration from the review of available qualitative literature is the need to promote behavior change at the household level across a range of nutrition promoting behaviors within the domains of household food security, health environments and the quality of caring practices.

Kigeme, the camp with the highest stunting prevalence (28%), also had the worst clean water availability per person and the second lowest female education outcomes after Mahama. Conversely, Gihembe, the camp with the lowest stunting prevalence, fared the best in these underlying factors. The findings of this analysis could ideally bring together camp stakeholders from food security/livelihoods, agriculture, health, education, and nutrition to discuss key findings, identify gaps and opportunities and define recommendations to guide future action to make gains in nutrition and food security more acheiveable.

Finally, public health nutrition workforce capacity and decent staff ratio are critical components of impactful delivery of nutrition specific and sensitive programs through health services. Nutrition training for health workers can improve feeding frequency, energy intake and dietary diversity of children aged six months to two years. Distribution of vegetable seeds and tools alongside MIYCN training to incorporate those homestead crops in the preparation of nutrient dense complementary food has been an effective strategy in other contexts.[46] Delivery of SBCC using multiple platforms was feasible and effective, resulting in improvements in CF practices and child stunting within a 2 year period especially when high coverage can be ensured.[47]

In a context of limited possibilities for income generation and strained household budgets, scaling up of nutrition training for health workers presents a potential entry point to improve nutrition status among children. CHWs and NEC extension workers have a key role to play in promoting the importance of multisectoral nutrition actions in the camp communitites and a consistent training package should be developed across all camps to strengthen their understanding of the underlying factors of malnutrition and associated strategy through food-based approaches, primary healthcare, WASH, education, women's empowerment, and behavior change.

[46] Sunguya et al. 2013. Effectiveness of nutrition training of health workers toward improving caregivers' feeding practices for children aged six months to two years: a systematic review. Nutr J;20:12-66.

[47] Kim S et al. Behavior Change Interventions Delivered through Interpersonal Communication, Agricultural Activities, Community Mobilization, and Mass Media Increase Complementary Feeding Practices and Reduce Child Stunting in Ethiopia. J of Nutr: nxz087, https://doi.org/10.1093/jn/nxz087

5 Survey supervision, technical, administrative and material support

Agency	Name
MINEMA	Germaine Kamayirese Kayumba Olivier Vuganeza André Uwambayikirezi Rosette, Kamanzi Straton Mutabazi Eric Karagire Gonzague Murebwayire Goreth
UNHCR	Camara Dadie Kaberuka Martin Kibui Philip Mumporeze Jeanne Noor Kassim Hussein Jonathan Calbayan
WFP	Batesi Rosemary Candali Joselyne Gatera Marie Claire Habarurema Christophe Habimana Schadrack Kayisire Jeanne Saleh Mohamed Gasasira Salim Patrick Rutiyomba Munyaburanga Christian Murerwa Alice Muyinda Bosco Ngiruwonsanga Viateur Nsengiyumva Damien Nyabyenda Jean Marie Rugwegwe Olivier Jean Claude Bakurikiza Elie Antoine Bigirimana Rugwiro Jules Svanlund Daniel
UNICEF	Kristine Dandanell Garn
AHA	Kalisa Jean de Dieu Ngizwenayo Fidele Nkurunziza Appolinaire Safali Jean Jacques Tenna Mulugeta Gatoya Christophe Chrisostome Ndabagaruye Jean Bosco Uwizeyimana Anathalie Ingabire
ARC	Birasa Liliane Habimana Ladislas Habimana Jean Damascene Mukajyoni Marguerite Imanimurinde Evode
SCI	Umutoni Soubirous Samuel Ushizimpumu Ngarukiye Stanis Nkuru Pascal
Data Analysis and Reporting	Christine Klotz

6 List of Data Collection Teams

Team #	Name	Survey Role
1	Shyaka Alex	Team leader
	Muakafaranga Marie Josee	Hb measurer
	Mugabekazi Revocate	Anthropometry measurer
	Uwamuhoza Shemsa	Anthropometry measurer
2	Uwanyirigira Joselyne	Team leader
	Umumararungu Ritha	Hb measurer
	Mukantabana Marcelline	Anthropometry measurer
	Mukabuhanuzi Jeanne	Anthropometry measurer
3	Uwineza Adeline	Team leader
	Murereyimana Francoise	Hb measurer
	Byaho Dizoni Gratien	Anthropometry measurer
	Nyiraneza Betty	Anthropometry measurer
4	Munyampirwa Esperence	Team leader
	Tuyizere Ezechiel	Hb measurer
	Dusenge Jean Claude	Anthropometry measurer
	Mugisha Sandrine	Anthropometry measurer
5	Dukuzemariya Oliva	Team leader
	Munezero Marthe	Hb measurer
	KAbihogo Emelyne	Anthropometry measurer
	Turatsinze Eugene	Anthropometry measurer
6	Rwamukwaya Elie	Team leader
	Muhirwa Maurice	Hb measurer
	Mukarutamu Patricie	Anthropometry measurer
	Mukamusoni Louise	Anthropometry measurer

7 Appendixes

Appendix 1. Plausibility Checks

Plausibility check for: RWA_Gihembe_SENS_May2019.as

Standard/Reference used for z-score calculation: WHO standards 2006

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	**Score**
Flagged data	Incl	%	0-2.5	>2.5-5.0	>5.0-7.5	>7.5	
(% of out of range subjects)			0	5	10	20	**0** (0.0 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**0** (p=0.681)
Age ratio(6-29 vs 30-59)	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**0** (p=0.463)
Dig pref score - weight	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (3)
Dig pref score - height	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (5)
Dig pref score - MUAC	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (6)
Standard Dev WHZ	Excl	SD	<1.1	<1.15	<1.20	>=1.20	
.			and	and	and	or	
.	Excl	SD	>0.9	>0.85	>0.80	<=0.80	
			0	5	10	20	**0** (0.91)
Skewness WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (-0.18)
Kurtosis WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (-0.10)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<=0.001	
			0	1	3	5	**0** (p=)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	**0** %

The overall score of this survey is 0 %, this is excellent.
There were no duplicate entries detected.
Percentage of children with no exact birthday: 0 %
Anthropometric Indices likely to be in error (-3 to 3 for WHZ, -3 to 3 for HAZ, -3 to 3 for WAZ, from observed mean):
Line=22/ID=uuid:887a86e5-9e7e-4196-8364-440303a5f21d/CDR1[6]: HAZ (-5.374), WAZ (-4.474), Age may be incorrect
Line=287/ID=uuid:6d7bff21-1f9e-4626-a3f3-75533f7197bd/CDR1[8]: HAZ (-4.190), WAZ (-3.993), Age may be incorrect
Percentage of values flagged with SMART flags:WHZ: 0.0 %, HAZ: 0.7 %, WAZ: 0.7 %

Plausibility check for: RWA_Kigeme_SENS_May2019.as

Standard/Reference used for z-score calculation: WHO standards 2006

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	**Score**
Flagged data (% of out of range subjects)	Incl	%	0-2.5 0	>2.5-5.0 5	>5.0-7.5 10	>7.5 20	**0** (0.3 %)
Overall Sex ratio (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<=0.001 10	**4** (p=0.034)
Age ratio(6-29 vs 30-59) (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<=0.001 10	**0** (p=0.177)
Dig pref score - weight	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	**0** (6)
Dig pref score - height	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	**0** (4)
Dig pref score - MUAC	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	**0** (6)
Standard Dev WHZ . .	Excl Excl	SD SD	<1.1 and >0.9 0	<1.15 and >0.85 5	<1.20 and >0.80 10	>=1.20 or <=0.80 20	**5** (0.89)
Skewness WHZ	Excl	#	<±0.2 0	<±0.4 1	<±0.6 3	>=±0.6 5	**1** (0.24)
Kurtosis WHZ	Excl	#	<±0.2 0	<±0.4 1	<±0.6 3	>=±0.6 5	**0** (-0.04)
Poisson dist WHZ-2	Excl	p	>0.05 0	>0.01 1	>0.001 3	<=0.001 5	**0** (p=)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	**10** %

The overall score of this survey is 10 %, this is good.
There were no duplicate entries detected.
Percentage of children with no exact birthday: 0 %
Anthropometric Indices likely to be in error (-3 to 3 for WHZ, -3 to 3 for HAZ, -3 to 3 for WAZ, from observed mean):
Line=177/ID=uuid:706a2d50-3e02-4803-b943-4b1ad5f1efe1/CDR1[11]: **WHZ (-4.202)**, WAZ (-4.301), Weight may be incorrect
Line=230/ID=uuid:b9dfc055-e7f4-4509-9a45-74c2a723bcba/CDR1[3]: HAZ (-4.730), Age may be incorrect
Line=287/ID=uuid:5394164d-acee-4398-92ff-912ac3d59d88/CDR1[6]: HAZ (-4.799), WAZ (-4.394), Age may be incorrect
Percentage of values flagged with SMART flags: WHZ: 0.3 %, HAZ: 0.6 %, WAZ: 0.6 %

Plausibility check for: RWA_Kiziba_SENS_May2019.as

Standard/Reference used for z-score calculation: WHO standards 2006

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	**Score**
Flagged data	Incl	%	0-2.5	>2.5-5.0	>5.0-7.5	>7.5	
(% of out of range subjects)			0	5	10	20	**0** (0.0 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**0** (p=0.687)
Age ratio(6-29 vs 30-59)	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**0** (p=0.790)
Dig pref score - weight	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (6)
Dig pref score - height	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (6)
Dig pref score - MUAC	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (5)
Standard Dev WHZ	Excl	SD	<1.1	<1.15	<1.20	>=1.20	
.			and	and	and	or	
.	Excl	SD	>0.9	>0.85	>0.80	<=0.80	
			0	5	10	20	**0** (1.01)
Skewness WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (-0.19)
Kurtosis WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (0.12)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<=0.001	
			0	1	3	5	**0** (p=)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	**0** %

The overall score of this survey is 0 %, this is excellent.
There were no duplicate entries detected.
Percentage of children with no exact birthday: 0 %
Anthropometric Indices likely to be in error (-3 to 3 for WHZ, -3 to 3 for HAZ, -3 to 3 for WAZ, from observed mean):
Line=171/ID=uuid:22ff06e5-a050-4dc7-93fd-85c7927afd24/CDR1[8]: HAZ (2.791), Age may be incorrect
Percentage of values flagged with SMART flags:WHZ: 0.0 %, HAZ: 0.3 %, WAZ: 0.0 %

Plausibility check for: RWA_Mugombwa_SENS_May2019.as

Standard/Reference used for z-score calculation: WHO standards 2006

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	**Score**
Flagged data (% of out of range subjects)	Incl	%	0-2.5 0	>2.5-5.0 5	>5.0-7.5 10	>7.5 20	**0** (0,0 %)
Overall Sex ratio (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<=0.001 10	**0** (p=0,313)
Age ratio(6-29 vs 30-59) (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<=0.001 10	**0** (p=0,325)
Dig pref score - weight	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	**0** (4)
Dig pref score - height	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	**0** (5)
Dig pref score - MUAC	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	**0** (7)
Standard Dev WHZ .	Excl	SD	<1.1 and	<1.15 and	<1.20 and	>=1.20 or	
.	Excl	SD	>0.9 0	>0.85 5	>0.80 10	<=0.80 20	**0** (1,04)
Skewness WHZ	Excl	#	<±0.2 0	<±0.4 1	<±0.6 3	>=±0.6 5	**0** (0,12)
Kurtosis WHZ	Excl	#	<±0.2 0	<±0.4 1	<±0.6 3	>=±0.6 5	**1** (-0,39)
Poisson dist WHZ-2	Excl	p	>0.05 0	>0.01 1	>0.001 3	<=0.001 5	**0** (p=0,050)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	**1** %

The overall score of this survey is 1 %, this is excellent.
There were no duplicate entries detected.
Percentage of children with no exact birthday: 0 %
Anthropometric Indices likely to be in error (-3 to 3 for WHZ, -3 to 3 for HAZ, -3 to 3 for WAZ, from observed mean):
Line=97/ID=uuid:19cf8769-7c9d-4382-b951-2b3c4101962e/CDR1[5]: HAZ (-4,117), Age may be incorrect
Percentage of values flagged with SMART flags: WHZ: 0,0 %, HAZ: 0,4 %, WAZ: 0,0 %

Plausibility check for: RWA_Nyabiheke_SENS_May2019.as

Standard/Reference used for z-score calculation: WHO standards 2006

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	**Score**
Flagged data	Incl	%	0-2.5	>2.5-5.0	>5.0-7.5	>7.5	
(% of out of range subjects)			0	5	10	20	**0** (0.8 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**0** (p=0.579)
Age ratio(6-29 vs 30-59)	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**0** (p=0.112)
Dig pref score - weight	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (6)
Dig pref score - height	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (6)
Dig pref score - MUAC	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (3)
Standard Dev WHZ	Excl	SD	<1.1	<1.15	<1.20	>=1.20	
.			and	and	and	or	
.	Excl	SD	>0.9	>0.85	>0.80	<=0.80	
			0	5	10	20	**0** (0.95)
Skewness WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (-0.05)
Kurtosis WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (0.13)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<=0.001	
			0	1	3	5	**0** (p=)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	**0** %

The overall score of this survey is 0 %, this is excellent.
There were no duplicate entries detected.
Percentage of children with no exact birthday: 0 %
Anthropometric Indices likely to be in error (-3 to 3 for WHZ, -3 to 3 for HAZ, -3 to 3 for WAZ, from observed mean):
Line=59/ID=uuid:02fdfaf2-4638-4624-b6b0-3daf73d5adad/CDR1[8]: **WHZ (-4.965)**, WAZ (-4.809), Weight may be incorrect
Line=73/ID=uuid:ef9a1f52-1690-4c61-8f17-df7da74f6620/CDR1[11]: **WHZ (2.753)**, Weight may be incorrect
Percentage of values flagged with SMART flags:WHZ: 0.8 %, HAZ: 0.0 %, WAZ: 0.4 %

Plausibility check for: RWA_Mahama_SENS_May2019.as

Standard/Reference used for z-score calculation: WHO standards 2006

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	**Score**
Flagged data	Incl	%	0-2.5	>2.5-5.0	>5.0-7.5	>7.5	
(% of out of range subjects)			0	5	10	20	**0** (0.0 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**0** (p=0.279)
Age ratio(6-29 vs 30-59)	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**2** (p=0.085)
Dig pref score - weight	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (5)
Dig pref score - height	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (4)
Dig pref score - MUAC	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (5)
Standard Dev WHZ	Excl	SD	<1.1	<1.15	<1.20	>=1.20	
.			and	and	and	or	
.	Excl	SD	>0.9	>0.85	>0.80	<=0.80	
			0	5	10	20	**5** (0.88)
Skewness WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (-0.11)
Kurtosis WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (-0.04)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<=0.001	
			0	1	3	5	**0** (p=)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	**7** %

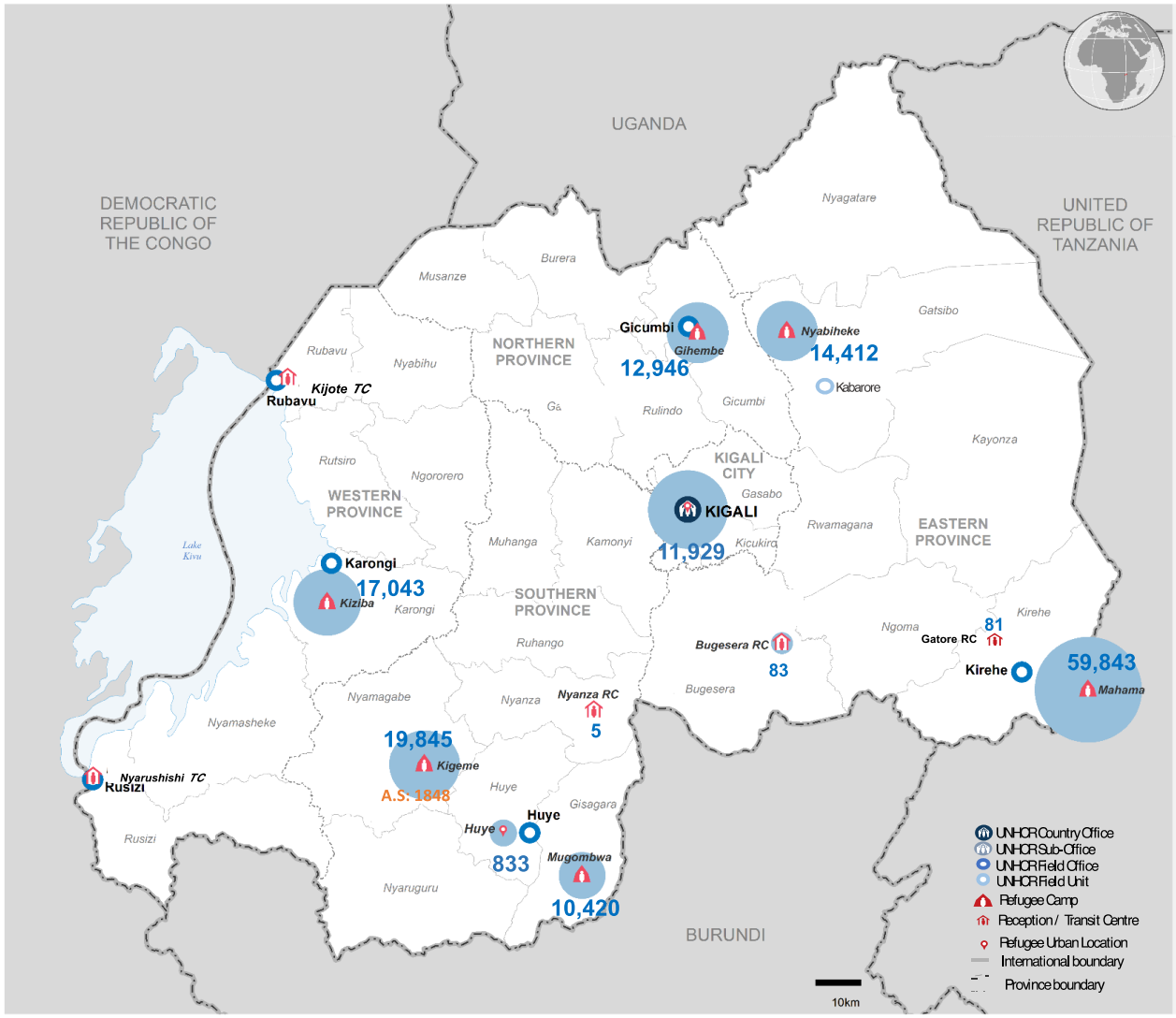
The overall score of this survey is 7 %, this is excellent.
There were no duplicate entries detected.
Percentage of children with no exact birthday: 0 %
Anthropometric Indices likely to be in error (-3 to 3 for WHZ, -3 to 3 for HAZ, -3 to 3 for WAZ, from observed mean):
Line=46/ID=uuid:232f9d08-892e-41b1-845d-c493e9a403e9/CDR1[6]: HAZ (-5.426), Age may be incorrect
Percentage of values flagged with SMART flags: WHZ: 0.0 %, HAZ: 0.3 %, WAZ: 0.0 %

Appendix 2. Rwanda Population of Concern to UNHCR

Rwanda

Population of Concern to UNHCR

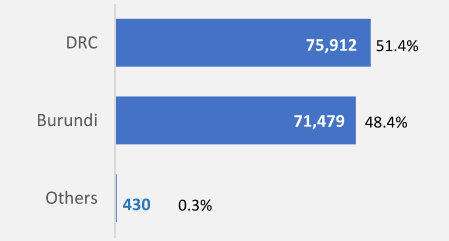
as of 30th April 2019



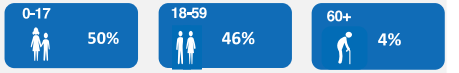
Population Figures

Active Total	**149,289**
Refugees	**147,441**
Asylum Seekers (Pending)	**1,848**

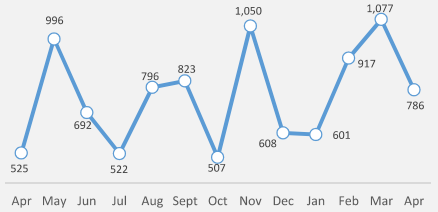
CoO Breakdown (Ref)



Age Breakdown



Monthly Registration Trends



Appendix 3. Results of the Standardization Test

Standardisation test results					Precision				Accuracy	OUTCOME		
Weight	subjects	mean	SD	max	Technical error		TEM/mean		Coef of reliability	Bias from superv	Bias from median	result
	#	kg	kg	kg	TEM (kg)	TEM (%)	R (%)	Bias (kg)	Bias (kg)			
Supervisor	7	12.6	2.6	0.3	0.1	0.8	99.8	-	-1.12	TEM poor R value good	Bias good	
Enumerator 1	7	12.6	2.6	0.1	0.05	0.4	100	-0.01	-1.14	TEM acceptable	R value good	Bias good
Enumerator 2	7	12.6	2.6	0.4	0.12	0.9	99.8	0.02	-1.1	TEM poor R value good	Bias good	
Enumerator 3	7	12.6	2.6	0.1	0.05	0.4	100	0.02	-1.1	TEM acceptable	R value good	Bias good
Enumerator 4	7	12.5	2.7	1.6	0.44	3.5	97.4	-0.06	-1.18	TEM reject R value acceptable	Bias good	
Enumerator 5	7	12.6	2.6	0.1	0.04	0.3	100	-0.01	-1.13	TEM good R value good	Bias good	
Enumerator 6	7	12.6	2.6	0.4	0.17	1.3	99.6	0.06	-1.06	TEM poor R value good	Bias good	
Enumerator 7	7	12.6	2.7	0.3	0.1	0.8	99.9	0.04	-1.08	TEM acceptable	R value good	Bias good
enum inter 1st	7x7	12.6	2.6	-	0.25	2	99.1	-	-	TEM reject R value good		
enum inter 2nd	7x7	12.6	2.5	-	0.08	0.6	99.9	-	-	TEM good R value good		
inter enum + sup	8x7	12.6	2.6	-	0.15	1.2	99.6	-	-	TEM acceptable	R value good	
TOTAL intra+inter	7x7	-	-	-	0.26	2.1	98.9	0.01	-1.11	TEM reject R value acceptable	Bias good	
TOTAL+ sup	8x7	-	-	-	0.25	2	99	-	-	TEM reject R value good		

Height	subjects	mean	SD	max	Technical error		TEM/mean		Coef of reliability	Bias from superv	Bias from median	result
	#	cm	cm	cm	TEM (cm)	TEM (%)	R (%)	Bias (cm)	Bias (cm)			
Supervisor	7	88	10.2	0.7	0.24	0.3	99.9	-	-2.35	TEM good R value good		
Enumerator 1	7	88.3	10.4	0.2	0.09	0.1	100	0.21	-2.14	TEM good R value good	Bias good	
Enumerator 2	7	87.9	10.1	1.2	0.43	0.5	99.8	-0.15	-2.5	TEM acceptable	R value good	Bias good
Enumerator 3	7	88	10.4	0.5	0.19	0.2	100	-0.05	-2.4	TEM good R value good	Bias good	
Enumerator 4	7	88	10.2	1.7	0.51	0.6	99.7	-0.02	-2.37	TEM acceptable	R value good	Bias good

Enumerator 5	7	87.8	10.3	2.2	0.77	0.9	99.4	-0.26	-2.61	TEM poor	R value good	Bias good
Enumerator 6	7	88.2	10	1.1	0.42	0.5	99.8	0.16	-2.19	TEM acceptable	R value good	Bias good
Enumerator 7	7	88.1	10.3	0.2	0.08	0.1	100	0.04	-2.31	TEM good	R value good	Bias good
enum inter 1st	7x7	88	10.1	-	0.55	0.6	99.7	-	-	TEM acceptable	R value good	
enum inter 2nd	7x7	88.1	9.9	-	0.4	0.5	99.8	-	-	TEM good	R value good	
inter enum + sup	8x7	88	9.9	-	0.44	0.5	99.8	-	-	TEM good	R value good	
TOTAL intra+inter	7x7	-	-	-	0.64	0.7	99.6	-0.01	-2.36	TEM acceptable	R value good	Bias good
TOTAL+ sup	8x7	-	-	-	0.6	0.7	99.6	-	-	TEM acceptable	R value good	

MUAC	subjects	mean	SD	max	Technical error		TEM/mean		Coef of reliability		Bias from superv	Bias from median	result
	#	mm	mm	mm	TEM (mm)	TEM (%)	R (%)	Bias (mm)	Bias (mm)				
	Supervisor 7	154	6.1	1.6	0.68	0.4	98.8	-	1.04	TEM good	R value acceptable	Bias acceptable	
	Enumerator 1	7	151.4	6	2	0.65	0.4	98.8	-2.61	-1.57	TEM good	R value acceptable	Bias good
	Enumerator 2	7	156.4	6.7	3	1.13	0.7	97.2	2.39	3.43	TEM good	R value acceptable	Bias reject
	Enumerator 3	7	155.7	6.1	3	1.07	0.7	96.9	1.68	2.71	TEM good	R value acceptable	Bias poor
	Enumerator 4	7	154.5	5.4	3	1.22	0.8	94.8	0.46	1.5	TEM good	R value poor	Bias acceptable
	Enumerator 5	7	153.6	6.2	5	1.58	1	93.5	-0.39	0.64	TEM good	R value poor	Bias good
	Enumerator 6	7	154.4	6.9	5	2.45	1.6	87.6	0.39	1.43	TEM acceptable	R value reject	Bias acceptable
	Enumerator 7	7	152.1	7.2	1	0.38	0.2	99.7	-1.89	-0.86	TEM good	R value good	Bias good
	enum inter 1st	7x7	154.3	6.3	-	2.78	1.8	80.2	-	-	TEM poor	R value reject	
	enum inter 2nd	7x7	153.8	6.6	-	2.39	1.6	87	-	-	TEM acceptable	R value reject	
	inter enum + sup	8x7	154	6.4	-	2.4	1.6	85.9	-	-	TEM acceptable	R value reject	
	TOTAL intra+inter	7x7	-	-	-	2.93	1.9	79.1	0.01	1.04	TEM poor	R value reject	Bias acceptable
	TOTAL+ sup	8x7	-	-	-	2.73	1.8	81.6	-	-	TEM poor	R value reject	

Appendix 4: Result Tables for NCHS growth reference 1977

TABLE 145 PREVALENCE OF ACUTE MALNUTRITION BASED ON WEIGHT-FOR-HEIGHT Z-SCORES (AND/OR OEDEMA)

	GIHEMBE n = 289	KIGEME n = 330	KIZIBA n = 301	MUGOMBWA n = 252	NYABIHEKE N = 260	MAHAMA N=342
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(7) 2.4 % (1.2 - 4.9 95% C.I.)	(9) 2.7 % (1.4 - 5.1 95% C.I.)	(17) 5.6 % (3.6 - 8.9 95% C.I.)	(6) 2.4 % (2.2 - 2.6 95% C.I.)	(9) 3.5 % (1.8 - 6.4 95% C.I.)	(8) 2.3 % (1.2 - 4.5 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(7) 2.4 % (1.2 - 4.9 95% C.I.)	(9) 2.7 % (1.4 - 5.1 95% C.I.)	(17) 5.6 % (3.6 - 8.9 95% C.I.)	(6) 2.4 % (2.2 - 2.6 95% C.I.)	(8) 3.1 % (1.6 - 6.0 95% C.I.)	(8) 2.3 % (1.2 - 4.5 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or edema)	(0) 0.0 % (0.0 - 1.3 95% C.I.)	(0) 0.0 % (0.0 - 1.2 95% C.I.)	(0) 0.0 % (0.0 - 1.3 95% C.I.)	(0) 0.0 % (0.0 - 0.0 95% C.I.)	(1) 0.4 % (0.1 - 2.1 95% C.I.)	(0) 0.0 % (0.0 - 1.1 95% C.I.)
Prevalence of Oedema	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

TABLE 146 PREVALENCE OF ACUTE MALNUTRITION BASED ON MUAC CUT OFFS (AND/OR OEDEMA)

	GIHEMBE N = 289	KIGEME N = 331	KIZIBA n = 301	MUGOMBWA n = 252	NYABIHEKE N = 263	MAHAMA N=342
Prevalence of global malnutrition (< 125 mm and/or oedema)	(2) 0.7 % (0.2 - 2.5 95% C.I.)	(3) 0.9 % (0.3 - 2.6 95% C.I.)	(9) 3.0 % (1.6 - 5.6 95% C.I.)	(0) 0.0 % (0.0 - 0.0 95% C.I.)	(2) 0.8 % (0.2 - 2.7 95% C.I.)	(5) 1.5 % (0.6 - 3.4 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(1) 0.3 % (0.1 - 1.9 95% C.I.)	(2) 0.6 % (0.2 - 2.2 95% C.I.)	(6) 2.0 % (0.9 - 4.3 95% C.I.)	(0) 0.0 % (0.0 - 0.0 95% C.I.)	(1) 0.4 % (0.1 - 2.1 95% C.I.)	(4) 1.2 % (0.5 - 3.0 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(1) 0.3 % (0.1 - 1.9 95% C.I.)	(1) 0.3 % (0.1 - 1.7 95% C.I.)	(3) 1.0 % (0.3 - 2.9 95% C.I.)	(0) 0.0 % (0.0 - 0.0 95% C.I.)	(1) 0.4 % (0.1 - 2.1 95% C.I.)	(1) 0.3 % (0.1 - 1.6 95% C.I.)

TABLE 147 PREVALENCE OF UNDERWEIGHT BASED ON WEIGHT-FOR-AGE Z-SCORES BY SEX

	GIHEMBE N = 288	KIGEME n = 331	KIZIBA n = 301	MUGOMBWA n = 252	NYABIHEKE N = 261	MAHAMA N=342
Prevalence of underweight (<-2 z-score)	(41) 14.2 % (10.7 - 18.7 95% C.I.)	(67) 20.2 % (16.3 - 24.9 95% C.I.)	(57) 18.9 % (14.9 - 23.7 95% C.I.)	(30) 11.9 % (11.0 - 12.9 95% C.I.)	(37) 14.2 % (10.5 - 18.9 95% C.I.)	(59) 17.3 % (13.6 - 21.6 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(39) 13.5 % (10.1 - 18.0 95% C.I.)	(59) 17.8 % (14.1 - 22.3 95% C.I.)	(49) 16.3 % (12.5 - 20.9 95% C.I.)	(29) 11.5 % (10.6 - 12.4 95% C.I.)	(33) 12.6 % (9.1 - 17.2 95% C.I.)	(56) 16.4 % (12.8 - 20.7 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(2) 0.7 % (0.2 - 2.5 95% C.I.)	(8) 2.4 % (1.2 - 4.7 95% C.I.)	(8) 2.7 % (1.4 - 5.2 95% C.I.)	(1) 0.4 % (0.4 - 0.4 95% C.I.)	(4) 1.5 % (0.6 - 3.9 95% C.I.)	(3) 0.9 % (0.3 - 2.5 95% C.I.)

TABLE 148 PREVALENCE OF STUNTING BASED ON HEIGHT-FOR-AGE Z-SCORES

	GIHEMBE N = 288	KIGEME N = 331	KIZIBA n = 300	MUGOMBWA n = 252	NYABIHEKE N = 262	MAHAMA N=341
Prevalence of stunting (<-2 z-score)	(40) 13.9 % (10.4 - 18.4 95% C.I.)	(76) 23.0 % (18.8 - 27.8 95% C.I.)	(54) 18.0 % (14.1 - 22.7 95% C.I.)	(32) 12.7 % (10.8 - 14.9 95% C.I.)	(43) 16.4 % (12.4 - 21.4 95% C.I.)	(65) 19.1 % (15.2 - 23.6 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(29) 10.1 % (7.1 - 14.1 95% C.I.)	(64) 19.3 % (15.4 - 23.9 95% C.I.)	(46) 15.3 % (11.7 - 19.8 95% C.I.)	(25) 9.9 % (9.2 - 10.7 95% C.I.)	(39) 14.9 % (11.1 - 19.7 95% C.I.)	(57) 16.7 % (13.1 - 21.0 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(11) 3.8 % (2.1 - 6.7 95% C.I.)	(12) 3.6 % (2.1 - 6.2 95% C.I.)	(8) 2.7 % (1.4 - 5.2 95% C.I.)	(7) 2.8 % (1.0 - 7.3 95% C.I.)	(4) 1.5 % (0.6 - 3.9 95% C.I.)	(8) 2.3 % (1.2 - 4.6 95% C.I.)

TABLE 149 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	**GIHEMBE**	289	-0.48±0.80	1.00	0	0
	KIGEME	330	-0.53±0.80	1.00	0	1
	KIZIBA	301	-0.50±0.88	1.00	0	0
	MUGOMBWA	252	-0.23±0.97	1.00	0	0
	NYABIHEKE	260	-0.50±0.87	1.00	1	2
	MAHAMA	342	-0.57±0.77	1.00	0	0
WEIGHT-FOR-AGE	**GIHEMBE**	288	-1.02±0.89	1.00	0	1
	KIGEME	331	-1.25±0.90	1.00	0	0
	KIZIBA	301	-1.09±0.96	1.00	0	0
	MUGOMBWA	252	-0.23±0.97	1.00	0	0
	NYABIHEKE	261	-1.10±0.90	1.00	1	1
	MAHAMA	342	-1.20±0.83	1.00	0	0
HEIGHT-FOR-AGE	**GIHEMBE**	288	-0.97±0.96	1.00	0	1
	KIGEME	331	-1.33±0.97	1.00	0	0
	KIZIBA	300	-1.12±0.96	1.00	0	1
	MUGOMBWA	252	-0.93±1.00	1.00	0	0
	NYABIHEKE	262	-1.14±0.85	1.00	1	0
	MAHAMA	341	-1.14±0.95	1.00	0	1

* contains for WHZ and WAZ the children with oedema.

Appendix 5. SENS Questionnaire in English

Standardized Expanded Nutrition Survey (SENS) Questionnaire

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 *[organization/institution*]. We would like to invite you/your child to participate in a survey that is looking at the nutrition and health status of people living in this camp.

- UNHCR and WFP are 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 you and/or your child 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 you and/or the children to see if they have anemia.
- 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 ANEMIA: THIS QUESTIONNAIRE IS TO BE ADMINISTERED TO ALL CHILDREN BETWEEN 6 AND 59 MONTHS OF AGE OF RANDOMLY SELECTED HOUSEHOLDS

Date of interview (dd/mm/yyyy): |___|___|/|___|___|/|___|___||___|___|				**Camp: _____** **Quartier:** |___| **Block:** |___|						**Team number:** |___|			
CH1	**CH2**	**CH3**	**CH4**	**CH5**	**CH6**	**CH7**	**CH8**	**CH9**	**CH10**	**CH11**	**CH12**	**CH13**	**CH14**	**CH15**
ID	**HOUSEHOLD**	**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=SFP 2=TFP 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	**Diarrhea in past 2 weeks** 1=Yes 2=No 3=Don't know	**Hb measured by Hemocue 301+** *(g /dL)*
01				/ /										
02				/ /										
03				/ /										
04				/ /										
05				/ /										
06				/ /										
07				/ /										
08				/ /										
09				/ /										
…				/ /										
	*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 ANEMIA: THIS QUESTIONNAIRE IS TO BE ADMINISTERED TO ALL WOMEN AGED BETWEEN 15 AND 49 YEARS IN THE RANDOMLY SELECTED HOUSEHOLDS
*HB TO BE ASSESSED FOR ELIGIBLE WOMAN FROM EVERY OTHER HOUSEHOLD

WM1	WM2	WM3	WM4	WM5	WM6	WM6a	WM7	WM8
ID	**HOUSE HOLD**	**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 program?** 1=Yes 2=No 8=Don't know	**Are you currently receiving CSB+, oil and sugar?** 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 measured by Hemocue 301+*** *(g /dL)*
01								
02								
03								
04								
05								
06								
07								
08								
09								
10								
11								
12								
…								

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

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.		
	7A. Plain water	7A.....1 2 8	
	7B. Infant formula	7B.....1 2 8	
	7B1. How many times did the child consume infant formula?	|___|	
	7C. Milk such as tinned, powdered, or fresh animal milk	7C.....1 2 8	
	7C1. How many times did the child consume milk?	|___|	
	7D. Juice or juice drinks	7D.....1 2 8	
	7E. Clear broth	7E.....1 2 8	
	7F. Sour milk or yogurt	7F.....1 2 8	
	7F1. How many times did the child consume yogurt?	|___|	
	7G. Thin porridge	7G.....1 2 8	
	7H. Tea or coffee with milk	7H.....1 2 8	
	7I. Any other water-based liquids (e.g. *sodas, other sweet drinks, herbal infusion, 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?	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? REFER TO IF2 / IF3	Yes.....1 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?		
	AIF11 Porridge, bread, rice, noodles, or other foods made from grains (maize, millet, oats, rice, sorghum, teff, wheat)	11A……1 2 8	
	BIF11 White potatoes, white yams, manioc, cassava, plantains, green banana, yam, or any other foods made from roots	11B……1 2 8	
	CIF11 Legumes and nuts (Any foods made from beans, peas, lentils, nuts or seeds (kidney beans, white beans, common beans, lentils, peas, peanuts, soya bean, cashew, macadamia)	11C……1 2 8	
	DIF11 Milk, Cheese, yogurt, or other milk products	11D……1 2 8	
	EIF11 Liver, kidney, heart, or other organ meats	11E……1 2 8	
	FIF11 Any meat, such as beef, pork, lamb, goat, chicken, or duck, rabbit	11F……1 2 8	
	GIF11 Fresh or dried fish, shellfish, or seafood	11G……1 2 8	
	HIF11 Eggs	11H……1 2 8	
	IIF11 Vit A rich vegetable (Pumpkin, carrots, squash, or sweet potatoes that are yellow or orange inside)	11I……1 2 8	
	JIF11 Any dark green leafy vegetables (broccoli, cassava greens, lettuce dark green, pumpkin greens, spinach, sweet potato leaves)	11J……1 2 8	
	KIF11 Ripe mangoes, ripe papayas, or passion fruit, tree tomato, apricot	11K……1 2 8	
	LIF11 Any other fruits or vegetables (apple, avocado, sweet banana, guava, lemon, orange, pineapple, watermelon, beet, cabbage, cauliflower, celery, cucumber, eggplant, green pepper, light green lettuce, mushroom, okra, onion, light colored squash, tomato)	11L……1 2 8	
	MIF11 Foods made with red palm oil, red palm nut, or red palm nut pulp sauce	11M……1 2 8	
	NIF11 Eat FBF (e.g. CSB+)	11N……1 2 8	
	OIF11 Eat FBF+ (e.g. CSB++)	11O……1 2 8	
	PIF11 Yesterday or this night did [CHILD'S NAME]eat RUTF (e.g. Plumpy'Nut®)	11P……1 2 8	
	QIF11 Yesterday or this night did[CHILD'S NAME] eat RUSF (e.g. Plumpy'Sup®)	11Q……1 2 8	
	RIF11 Iron fortified infant formula ONLY] (e.g. Nan)?	11R……1 2 8	
	SIF11 Iron fortified solid, semi-solid or soft foods designed specifically for infants and young children	11S……1 2 8	
	TIF11 Any food to which you added a"Ongera"Micronutrient powder or sprinkles?	11T……1 2 8	
IF12	Yesterday, during day or night how many times did [CHILD'S NAME] eat solid, semisolid, or soft foods other than liquids?	|___|	

MODULE 5. WASH (1 PER HOUHSEOLD)

No	QUESTION	ANSWER CODES	
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	Public tap/standpipe ..... 02 Rain water collection..... 06 UNHCR Tanker ..... 07 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 Don't know..... 8	|___| **IF ANSWER IS 1, 3 OR 8 GO TO 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 septic system ..... 02 VIP/simple pit latrine with floor/slab..... 04 Pit latrine without floor/slab..... 07 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 HOUSEHOLD**)..... 1 Shared family (**2 HOUSEHOLD**) ..... 2 Communal toilet (**3 HOUSEHOLD or more**) ..... 3 Public toilet (**in market or clinic etc**.)..... 4 Don't know..... 8	|___|
WS8	The last time [NAME OF YOUNGEST CHILD] passed stools, what was done to dispose of the stools? DO NOT READ THE ANSWERS SELECT ONE ONLY	Child used toilet/latrine ..... 01 Put/rinsed into toilet or latrine ..... 02 Buried..... 03 Thrown into garbage..... 04 Put/rinsed into drain or ditch..... 05 Left in the open ..... 06 Other ..... 96 Don't know 98	|___|___|

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 E.g. jerry can	25 L	1 x	25
		2 E.g. jerry can	10 L	2 x	20
		3 E.g. jerry can	5 L	2 x	10
		4 E.g. jerry can	5 L	1 x	5
		5 E.g. bucket	50 L	1 x	50
		6			
		7			
		8			
		9			
		10			
		Total litres used by household			110
WS10	Please show me where you store your drinking water. ARE THE DRINKING WATER CONTAINERS COVERED OR NARROW NECKED?	All are.....1 Some are..... 2 None are 3			|___|

MODULE 6. MOSQUITO NET COVERAGE (1 PER HOUHSEOLD)

No	QUESTION		ANSWER CODES		
SECTION TN1					
TN4	Did you have your house sprayed with insecticide in an indoor residual spray campaign in the past |___| months? (OPTIONAL)		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 BY COUNTING THE NUMBER OF '1' IN TN9.				|___| LLINs

Appendix 6. SENS Questionnaire in Kinyarwanda

Indamukanyo no kumenyesha ubazwa uburenganzira bwe

IBI BIRASOMERWA UMUKURU W'UMURYANGO, UMUHAGARARIYE IGIHE ADAHARI CYANGWA UNDI MUNTU MUKURU UGIZE UMURYANGO MBERE YO GUTANGIRA IKIGANIRO/IBIBAZO. UMUKURU W'UMURYANGO ASOBANURWA NK'UMUNTU UGIZE UWO MURYANGO UGENA IBIREBANA N'UMUTUNGO WAWO NDETSE AKANAFATA ICYEMEZO CYA NYUMA MURI UWO MURYANGO.

Muraho, nitwa……kandi nkorana (ikigo cyangwa urwego). Nifuzaga kugusaba /n'abana bawe ko mwagira uruhare mu bushakashatsi bugamije kumenya uko imirire n'ubuzima byifashe ku bantu baba muri iyi nkambi.

- Umuryango mpuzamahanga ushinzwe impunzi (UNHCR) n'Umuryango mpuzamahanga ushinzwe ibiribwa ku isi (WFP) niyo itera inkunga ubu bushakashatsi ku mirirre.
- Gufatanya natwe muri ubu bushakashatsi ni ubushake bwawe. Ushobora guhitamo kudakorana natwe cyangwa ku mpamvu iyo ariyo yose ukaba wabihagarika igihe wari wemeye kugira uruhare muri bwo. Nufata icyemezo cyo guhagarika, nta nkurikizi iyo ariyo yose ishobora kuba ku buryo umuryango wawe witabwagaho cyangwa wahabwaga inkunga.
- Nuba wemeye, ndakubaza ibibazo bikureba cyangwa bireba abana bawe kandi ndanapima ibiro n'uburebure abana bari mu uru rugo bari hagati y'amezi 6 n'imyaka 5. Hanyuma kandi ndabafata uturaso duke mu rutoki kugirango ndebe niba yaba wowe cyangwa abana mudafite ikibazo cy'amaraso make mu mubiri.
- Mbere rero yo kugira icyo dutangira kubaza cyangwa gupima, urabanza utubwire ko utwemereye. Amakuru azava mubyo turi buganire nkwijeje ko azagirwa ibanga
- Ufite uburenganzira bwo kumbaza icyo wifuza mbere y'uko wafata icyemezo cyo kwemera cyangwa kwanga ko tuganira.
- Niba udasobanukiwe cyangwa se ibyo ku byo wambaza ntubone igisubizo kikunyuze urambwira niba ufashe umwanzuro wo kutemera ko kudafatanya natwe muri ubu bushakashatsi.

Murakoze

Menya ko mu nkambi, "igikande" cyangwa"agapande" bishobora gufata indi nyito. Koresha amagambo ajyanye n'aho uri.

Inyuguti nkru zirerekana amabwiriza ahabwa ugiye gukora ubushakashatsi mu rugo. Ntagomba gusomerwa usubiza ibibazo

IBIPIMO, UBUZIMA NO KUBURA KW'AMARASO MU MUBIRI KU BANA BARI HAGATI Y'AMEZI 6-59: Urupapuro rw'ibibazo rumwe kuri buri tsinda/zone/agapande (URU RUPAPURO RW'IBIBAZO RUGENEWE ABANA BARI HAGATI Y'AMEZI 6-59).

Nomero y'agace/umubare **Nomero y'igihande/umubare: _____**

Itariki(itariki/ukwezi/umwaka): |___|___|/|___|___|/|___|___||___|___|							**Umubare ugaragaza itsinda(igihe ubushakashatsi bwakorewe ku itsinda)** |___|___|				**Umubare ugaragaza ikipe** |___|		
CH1	**CH2**	**CH3**	**CH4**	**CH5**	**CH6**	**CH7**	**CH8**	**CH9**	**CH10**	**CH11**	**CH12**	**CH13**	**CH14**	**CH15**
ID Nomeero	**HOUSEHOLD Urugo**	**Consent given Yemeye** 1=Yes/Yego 2=No/Oya 3=Absent/Ntawe uhari	**Sex** (m/f) Igitsina(Gabo/Gore)	**Birthdate*** **Itariki y'amavuko*** **Itariki/ukwezi/umwaka** dd/mm/yyyy	**Age**** (months) Imyaka**(mu mezi)	**Weight** (kg) Ibiro(Kg) ±100g	**Height** (cm) Uburebure (Cm) ±0.1cm	**Oedema** (y/n) Abyimbye ibirenge(Yego/Oya)	**MUAC** (mm) Uburebure bw'ikizigira (mm)	**Child enrolled** Yigeze yinjizwa mu kigo mbonezamirire 1= Ahabwa ibiribwa by'inyongera agataha mu rugo (SFP) 2= Kuvurwa indwara y'imirire mibi aba kwa muganga (TFP) 3= Ntabwo yigeze yinjizwamo	**Measles Urukingo rw'iseru** 1=Yararukingiwe ikarita irabyerekana (yes, card) 2=yararukingiwe ndabyibuka (yes, recall) 3=Nyiyarukingiwe cyangwa simbyibuka (No or don't know)	**Vit. A in past 6 months** (SHOW CAPSULE) **Vitamini A mu mezi 6ashize(EREKANA IKININI)** 1=Yarayihawe ikarita irabyerekana (yes, card) 2=yarayihawe ndabyibuka (yes, recall) 3=Nyiyayihawe cyangwa simbyibuka (No or don't know)	**Diarrhea in past 2 weeks** 1=Yes 2=No 3=Don't know **Impiswi mu byumweru 2 bishize.** 1=Yego 2=Oya 3=Ntabwo mbizi	**Hb (Hemocue 301+)** *(g/dL)* Igipimo cy'amaraso (g/L cyangwag/dL)
01				/ /										
02				/ /										
03				/ /										
04				/ /										
05				/ /										
06				/ /										
07				/ /										
08				/ /										
09				/ /										
…				/ /										

***Itariki nyayo y'amavuko yerekana umunsi, ukwezi,umwaka by'amavuko ishobora gusangwa ku nyanddiko runaka. Igihe iyo nyandiko yemewe ihari nibwo bizandikwa; naho niba nyina w'umwana yibuka gusa itariki, bifatwa nk'ibitakwizerwa cyane.**
**Nib anta nyandiko igaragaza imyaka ihari, gereranya imyaka ukurikije ikintu cyabaye mu gihe runaka. Niba hari inyandiko yemewe ihari, andika imyaka mu mezi uhereye igihe cy'ivuka

AMARASO MAKE KU BAGORE: Urupapuro rw'ibibazo rumwe kuri buri tsinda/zone/agapande(URU RUPAPURO RW'IBIBAZO RUGENEWE ABAGORE BOSE BARI HAGATI Y'IMYAKA 15 NA 49 BABA MU RUGO RWATORANYIJWE).

WM1	WM2	WM3	WM4	WM5	WM6	WM6a	WM7	WM8
ID Nomero	**HOUSEHOLD Urugo**	**Consent given Yemeye** 1= /Yego 2=Oya 3=/Ntawe uhari	**Age** (years) Imyaka (Mu myaka)	**Are you pregnant?** **Waba utwite?** 1=Yego 2=Oya(niba ari Oya jya kuri Hb) 8=ntabwo mbizi (Jya kuri Hb)	**Are you currently <u>enrolled</u> in the ANC program?** **Kuri iyi nda utwite watangiye kujya kwisuzumisha kwa muganga?** 1=Yego 2=Oya 8=Ntabwo mbizi	**Are you currently receiving CSB+, oil and sugar?** **Ufata CSB+/Isukali n'amavuta?** 1=Yego 2=Oya 8=Ntabwo mbizi	**Are you currently <u>receiving</u> iron-folate pills (*SHOW PILL*)?** **Kuri iyi nda utwite wahawe ibinini byongera amaraso(mwereke ikinini)** 1=Yego (HAGARARIRA AHO) 2=Oya (HAGARARIRA AHO) 3=Ntabwo mbizi(HAGARARIRA AHO)	**Hb** (g/L or g/dL) **Igipimo cy'amaraso** (g/L cyangwa g/dL)
01								
02								
03								
04								
05								
06								
07								
08								
09								
10								
11								
12								
…								

IMIRIRE KU MPINJA NO KU BANA: URUPAPURO RW'IBIBAZO 1 KURI BURI MWANA URI HAGATI Y'AMEZI 0-23(IBI BIBAZO BIRABAZWA NYINA W'UMWANA CYANGWA UMUREZI WE W'INGENZI USHINZWE KUMUGABURIRA.UMWANA AGOMBA KUBA ARI HAGATI Y'AMEZI 0 NA 23)

Nomero	Ikibazo	kode z'igisubizo	
Igice cya IF 1			
IF1	Igitsina	Gabo……1 Gore……2	|___|
IF2	Itariki y'amavuko Andika imyaka ukuye ku nyandiko yemewe. Niba udafite imyaka wakuye ku nyandiko yemewe hasige utahanditse)	Umunsi/Ukwezi/Umwaka|__|__| /|___|___| / |___|___||___|___|	
IF3	Imyaka y'umwana mu mezi	Nib anta nyandiko igaragaza imyaka ihari, gereranya imyaka ukurikije ikintu cyabaye mu gihe runaka. Niba hari inyandiko yemewe ihari, andika imyaka mu mezi uhereye igihe cy'ivuka	|___|___|
IF4	**[izina ry'umwana] yigeze yonka?**	Yego……1 Oya……2 Ntabwo mbizi……8	|___| **Niba igisuzo ari 2 cyangwa 8 jya kuri IF7**
IF5	[Izina ry'umwana] wamushyize ku ibere nyuma y'igihe kingana iki kuva avutse?	Mbere y'isaha kuva avutse……1 Hagati y'isaha n'amasaha 23……2 Hejuru y'amasaha 24……3 Ntabwo mbizi……8	|___|
IF6	[Izina ry'umwana] yigeze yonka ku munsi w'ejo hashize yaba ku manywa cyangwa nijoro?	Yaronse……1 Oya……2 Ntabwo mbizi……3	|___|
SECTION IF2			
IF7	Noneho ndashaka kukubaza icyo [izina ry'umwana] yanyoye ku munsi w'ejo haba ku manywa cyangwa se iri joro ryakeye. Nshishikajwe no kumenya niba nta cyo kunywa wahaye umwana kabone n'iyo cyaba kivanze n'ibindi biryo. Muri ibi bikurikira haba ku manywa cyangwa mu ijoro ryakeye ni iki wahaye [izina ry'umwana]? BAZA KURI BURI KINYOBWA. NIBA IKINYOBWA RUNAKA YARAGIHAWE, SHYIRA"1" MU KAZIGA, NIBA ATARAGIHAWE SHYIRA"2" MU KAZIGA. NIBA URERA UMWANA ATABYIBUKA SHYIRA 8 MU KAZINA. BURI MU RONGO UGOMBA KUBA UFITE KODE IGARAGAZA IGISUBIZO		
	IF7A Amazi y'umugezi	7A……1 2 8	
	IF7B Amata yagenewe abana, urugerokigozi cg Nan	7B……1 2 8	
	IF7B_1 Ayo mata nsimburabere, [CHILD'S NAME] yayanyoye kangahe?	|___|	
	IF7C Amata akozwe uhereye ku amata aba mu bikombe bifunze, amata y'ifu, amata y'inka(inshyushyu), urugero inyange, kelemu, nido, linda]	7C……1 2 8	
	IF7C_1 Ayo mata [CHILD'S NAME] yayanyoye kangahe?	|___|	
	IF7D Imitobe cyangwa ibisa nayo, urugero: umutobe w' imbutozitandukanye: ibinyomoro, amatunda inanasi, umutobe w'ibitoki benze, imitobe itandukanye ikorwa n'inyange, imitobe ya nyirangarama	7D……1 2 8	
	IF7E Isupu idafashe	7E……1 2 8	
	IF7F Umubanji, ikivuguto, amacunda, yawurute	7F……1 2 8	
	IF7F_1 ${CH4a} yanyoye yawurute kangahe?	|___|	
	IF7G Igikoma kiyunguruye gikozwe mu ifu y'ibigori, gikozwe mu ifu y'ingano, giikozwe mu ifu y'amasaka, gikozwe mu ruvange rw'ifu z'ibinyampeke	7G……1 2 8	
	IF7H Icyayi cyangwa ikawa birimo amata?	7H……1 2 8	
	IF7I Ikindi kinyobwa kirimo amazi, urugero: soda (cyangwa fanta), ibindi binyobwa biryohera,amazi yavuye mu byatsi babijije, imiti y'amazi, icyayi kitarimo amata, ikawa, ibinyobwa by'imihango)	7I……..1 2 8	
IF8	IF8 Ibiryo bikomeye, cyangwa byoroshye (birimo amazi cyangwa binombye)?	Yego……1 Oya…… 2 Ntabwo mbizi...8	|___|
SECTION IF3			

IF9	Ku munsi w'ejo hashize ku manywa cyangwa mu ijoro ryakeye, [izina ry'umwana] yigeze anywesha inkongoro ifite agapira umwana yonka/anyunyuza?	Yego.....1 Oya.....2 Ntabwo mbizi...8	|___|
SECTION IF4			
IF10	Uyu mwana afite hagati y'amezi 6-23? Rebera kuri IF2/IF3	Yego.....1 Oya.....2	|___| **Niba igisubizo ari 2 hagararira aho**
IF11	Noneho ndashaka kukubaza icyo [NAME] yanyoye ku munsi w'ejo haba ku manywa cyangwa se iri joro ryakeye. nshishikajwe no kumenya niba nta cyo kunywa wahaye umwana kabone n'iyo cyaba kivanze n'ibindi biryo. muri ibi bikurikira haba ku manywa cyangwa mu ijoro ryakeye ni iki wahaye [CHILD'S NAME]?		
	AIF11 Umugati, Umuceri, cyangwa ibiribwa bikomoka ku ibinyampeke?	11A.....1	2 8
	BIF11 Ibikoro, Imyumbati, cyangwa ibindi biribwa bikomoka ku binyabijumba?	11B.....1	2 8
	CIF11 Ibinyamisogwe byose nk'ibishyimbo, soya, amashaza cyangwa ubunyobwa	11C.....1	2 8
	DIF11 Amata, Foromaje, ibirunge, cyangwa ibindi bikomoka ku mata	11D.....1	2 8
	EIF11 Umwijima, Impyiko, Umutima cyangwa izindi nyama zo munda	11E.....1	2 8
	FIF11 Inyama z'umubiri z'Inka, Ingurube, Intama, Ihene imbata, inkoko cyangwa urukwavu	11F.....1	2 8
	GIF11 Amafi (yaba akirobwa cyagwa yumukije) cyangwa ibindi bikomoka mu mazi	11G.....1	2 8
	HIF11 Amagi	11H.....1	2 8
	IIF11 Imboga n'imbuto bikungahaye kuri vitamini A (Imyungu, Karoti n'ibindi binyabijumba by'umutima utukura (Bikungahaye muri VitaminA)?	11I.....1	2 8
	JIF11 Imboga rwatsi izarizo zose?(Dodo, Isombe,	11J.....1	2 8
	KIF11 Imyembe, ipapayi cyangwa izindi mbuto z'umutima utukura (zikungahaye kuri vitamin A)	11K.....1	2 8
	LIF11 Izindi mbuto cyangwa imboga (Pome, avoka, imineke, amatende, amapera, indium)	11L.....1	2 8
	MIF11 Ibiryo bitekeshejwe amamesa	11M.....1	2 8
	NIF11 Ibiryo cyangwa igikoma bikozwe uhereye kuri CSB+, sosoma nomero ya 1, SOSOMA nomerao ya 2 bya DUHAMIC ADRI)	11N.....1	2 8
	OIF11 Ibiryo cyangwa igikoma byakozwe hifashishijwe CSB++ (erekana ishashi irimo) / Super Cereal Plus / (imvange y'amafu akungahaye mu ntungamubiri)	11O.....1	2 8
	PIF11 Inombe iri mu ishashi (urugero: plumy'nut®) Ihari izwi ku izina rya RUTF cyangwa Plumpynut (erekana ishashi ibamo)	11P.....1	2 8
	QIF11 Inombe iri mu ishashi (urugero: plumy'sup®) Ihari izwi ku izina rya RUSF cyangwa Plumpysup (erekana ishashi ibamo)	11Q.....1	2 8
	RIF11 Ibiryo by'abana byongerewe intungamubiri] (urugero: nan) erekana amashashi biba birimo	11R.....1	2 8
	SIF11 Ibiryo bikomeye byongere umunyu ngugu w'ubutare cyangwa ibiryo byoroshye byagenewe abana bato (urugero: cerelac, weetabix)	11S.....1	2 8
	TIF11 Ibiryo byongewemo intungamubiri "Ongera"nk'ibi?	11T.....1	2 8
IF12	IF12 Ejo hashize, ni inshuro zingahe [CHILD'S NAME] yariye ibiryo bikomeye cga bijya gukomera cga ibyoroshye ariko bitari ibyo kunywa? (ndabaza inshuro mwamugaburiye agahaga).	|___|	

MODULE 5. IMIKORESHEREZE Y'AMAZI

No	QUESTION	ANSWER CODES	
SECTION WS1			
WS1	Urebeye ku ikarita ya HCR , muri uru rugo habaruwe abantu bangahe? (saba uwo muganira kukwereka iyo karita)		|___|___|
WS2	Muri rusange, amazi urugo rwanyu rukoresha muyavoma he?	Robine rusange ..... 02 Umureko w'imvura wo mu rugo ..... 06 Aya HCR ..... 07 Ibindi ..... 96 Simbizi 98	|___|___|
WS3	Munyuzwe n'amazi yo kunywa urugo rwanyu rukoresha?	Yego ..... 1 Oya ..... 2 Ntibihagije ..... 3 Simbizi 8	|___| **IF ANSWER IS 1, 3 OR 8 GO TO WS5**
WS4	Niba mutanyuzwe n'izihe mpamvu z'ibanze?	Ntabwo ahagije ..... 01 Ku ivomero haba hari umurongo munini ..... 02 Aho tuvoma ni kure ..... 03 Amazi ajya abura ..... 04 Amazi ntabwo aryoshye ..... 05 Amazi aba ashyushye cyane ..... 06 Amazi ntabwo atunganije neza ..... 07 Ngomba kwishyura ..... 08 Izindi mpamvu ..... 96 Ntabwo mbizi 98	|___|___|
WS5	Urugo rwanyu rukoresha umusarani bwoko ki?	Utinze, wubakiye, usakaye ..... 02 Umusarani rusange ..... 04 Udatinze (umwobo gusa) ..... 07 Ntwao, igihuru, uwabaturanyi 10	|___|___| **IF ANSWER IS 10 GO TO WS7**
WS6	Niba mukoresha umusarani rusange, ni ingo zingahe muwufatanya?		|___|___| Households
WS8	Ubuzima bw'abana bo munsi y'myaka itanu baba muri uru rugo ibibazo bibazawa ku bana bitairiye ubushakashasti	Ntacyo, Umwana yakoresheje umusarani ..... 01 Twawutaye mu musarani ..... 02 Twawutabye ..... 03 Twawutaye mu kimoteri ..... 04 Twawutaye mu cyobo ..... 05 Twawutaye aho yawutaye ..... 06 ibindi ..... 96 Simbizi 98	|___|___|

WS9	Niba ari ikindi ugereranyije gifite amalitiro angahe	Urugo rwanyu rukoresha ibihe bivomesho	Ni litiro zingahe	Mukoresha buri gikoresho inshuro zingahe	Total litres **SUPERVISOR TO COMPLETE HAND CALCULATION**
		1 Icyo kivomesho cy'ilitiro wakivomesheje kangahe ejo hashize?			
		2 Icyo kivomesho cya litiro 3 wakivomesheje kangahe ejo hashize?			
		3 Icyo kivomesho cya litiro 5 wakivomesheje kangahe ejo hashize?			
		4 Icyo kivomesho cya litiro 7 wakivomesheje kangahe ejo hashize?			
		5 Icyo kivomesho cya litiro 10 wakivomesheje kangahe ejo hashize?			
		6			
		7			
		8			
		9			
		10			
		Urugo rwanyu rukoresha ibihe bivomesho?			
WS10	Ibikoresho bibika amazi yo kunywa biba bifunze?	Byose.....1 Bimwe ..... 2 Ntanakimwe… 3			|___|

MODULE 6. Ibijyanye n'inzitiramibu

No	QUESTION		ANSWER CODES		
TN4	Urugo rwanyu rwaba rwarateresewe umuti wica imibu n'utundi dukoko Mumezi atandatu ashize? (November 2017)		Yego ..... 1 Oya..... 2		|___|
TN5	Urugo rwanyu rufite inzitiramibu zirarwamo ?		Yego ..... 1 Oya..... 2		|___| **IF ANSWER IS 2 STOP NOW**
TN6	Hitamo ubwoko bw'inzitiramibu bafite				|___| Nets
TN7	Hitamo ubwoko bw'inzitiramibu bafite	Inzitiramibu #|___|	NET #|___|	NET #|___|	NET #|___|
TN8	Muri izo, ni zingahe bafite				
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 BY COUNTING THE NUMBER OF '1' IN TN9.				|___| LLINs

Appendix 7. Local Event Calendar

Seasons	Religious Holidays	Other Events	Local Events	Months/ Years	Age (M)
Cold, heavy rain		Labour day	Commemoration of Gatumba events	May 2019	0
Cold, Heavy rain		Holidays for the secondary and primary school's students first term	Genocide commemoration	April 2019	1
Rain	Easter	Mayor election	Umunsi w'abagore 08/03/15	March 2019	2
Dry season	Umunsi w'ivu/Gutangira igisibo	Period of crops harvest for the season A(continue) 14/02/2015 saint Valentin	Heroes Day on 1st Feb Rentree scolaire	February 2019	3
Dry season	New Year	Period of crops harvest for the season A		January 2019	4
Rain	Christmas		Umunsi wo kurwanya SIDA Umunsi w'abamugaye, Iminsi 16 yo kurwanya ihohoterwa	December 2018	5
Rain	Umunsi w'abatagatifu bose (Tout saints)			November 2018	6
Rain		Planting crops for Season A (continue) Holidays for primary and secondary school student and national examination		October 2018	7
Rain (beginning)		Planting crops for season A		September 2018	8
Dry season	Assumption(Catholic commemoration of Mary's going to the heaven)	Umuganura		August 2018	9
Dry season		Refugee day celebration	Commemoration of Rwandan independence and Liberation day	July 2018	10
Dry season		Holidays for primary and secondary school student and national examination		June 2018	11
Cold, heavy rain		Labour day 02/05/ kwibuka amabonekerwa y'I Kibeho	Commemoration of Gatumba events	May 2018	12
Cold, Heavy rain		Holidays for the secondary and primary school's students first term	Genocide commemoration	April 2018	13
Rain	Easter	Mayor election	Umunsi w'abagore 08/03	March 2018	14
Dry season	Umunsi w'ivu/Gutangira igisibo	Period of crops harvest for the season A(continue) 14/02/2015 saint Valentin	Heroes Day on 1st Feb Rentree scolaire	February 2018	15
Dry season	New Year	Period of crops harvest for the season A		January 2018	16
Rain	Christmas		Umunsi wo kurwanya SIDA 01/12 Umunsi w'abamugaye, Iminsi 16 yo kurwanya ihohoterwa Referendum on Fundamental law	December 2017	17
Rain	Umunsi w'abatagatifu bose (Tout saints)			November 2017	18

Rain		Planting crops for Season A (continue) Holidays for primary and secondary school student and national examination		October 2017	19
Rain (beginning)		Planting crops for season A		September 2017	20
Dry season	Assumption(Catholic commemoration of Mary's going to the heaven) 15/08/15	Umuganura		August 2017	21
Dry season		Refugee day celebration	Commemoration of Rwandan independence and Liberation day	July 2017	22
Dry season		Holidays for primary and secondary school student and national examination		June 2017	23
Cold, heavy rain		Labour day 02/05/ kwibuka amabonekerwa y'I Kibeho	Commemoration of Gatumba events	May 2017	24
Cold, Heavy rain	Easter	Starting of Burundian refugee flow in Bugesera and Nyanza At the end of April the Burundian refugee transferred to Mahama-Kirehe refugee camp Umunsi wo kubeshya	Genocide commemoration	April 2017	25
Rain	Umunsi w'ivu/Gutangira igisibo	Holidays for the secondary and primary school's students first term	Umunsi w'abagore 08/03	March 2017	26
Dry season		Period of crops harvest for the season A(continue) 14/02/2015 saint Valentin	Heroes Day on 1st Feb	February 2017	27
Dry season	New Year	Period of crops harvest for the season A	Rentree scolaire	January 2017	28
Rain	Christmas		Umunsi wo kurwanya SIDA 01/12 Umunsi w'abamugaye, Iminsi 16 yo kurwanya ihohoterwa	December 2016	29
Rain	Umunsi w'abatagatifu bose(Tout saints)			November 2016	30
Rain		Planting crops for Season A (continue) Holidays for primary and secondary school student and national examination		October 2016	31
Rain (beginning)		Planting crops for season A		September 2016	32
Dry season	Assumption(Catholic commemoration of Mary's going to the heaven) 15/08/15	Umuganura		August 2016	33
Dry season			Commemoration of Rwandan independence and Liberation day	July 2016	34
Dry season		Refugee day celebration		June 2016	35
Cold, heavy rain		Labour day		May 2016	36
Cold, Heavy rain	Easter		Genocide commemoration Refugees started arriving to Mahama	April 2016	37

Rain		Holidays for the secondary and primary school's students first term	Umunsi w'abagore 08/03	March 2016	38
Dry season		Period of crops harvest for the season A(continue)	Heroes Day on 1st Feb	February 2016	39
Dry season	New Year	Period of crops harvest for the season A		January 2016	40
Rain	Christmas		Umunsi wo kurwanya SIDA 01/12 Umunsi w'abamugaye, Iminsi 16 yo kurwanya ihohoterwa	December 2015	41
Rain				November 2015	42
Rain		Planting crops for Season A (continue) Holidays for primary and secondary school student and national examination		October 2015	43
Rain (beginning)		Planting crops for season A		September 2015	44
Dry season	Assumption(Catholic commemoration of Mary's going to the heaven)	Umuganura		August 2015	45
Dry season			Commemoration of Rwandan independence and Liberation day	July 2015	46
Dry season		Refugee day celebration		June 2015	47
Cold, heavy rain		Labour day		May 2015	48
Cold, Heavy rain	Easter		Genocide commemoration	April 2015	49
Rain		Holidays for the secondary and primary school's students first term	Umunsi w'abagore 08/03	March 2025	50
Dry season		Period of crops harvest for the season A(continue)	Heroes Day on 1st Feb	February 2015	51
Dry season	New Year	Period of crops harvest for the season A		January 2015	52
Rain	Christmas		Umunsi wo kurwanya SIDA 01/12 Umunsi w'abamugaye, Iminsi 16 yo kurwanya ihohoterwa	December 2014	53
Rain				November 2014	54
Rain		Planting crops for Season A (continue) Holidays for primary and secondary school student and national examination		October 2014	55
Rain (beginning)		Planting crops for season A		September 2014	56
Dry season	Assumption(Catholic commemoration of Mary's going to the heaven)	Umuganura		August 2014	57
Dry season			Commemoration of Rwandan independence and Liberation day	July 2014	58
Dry season		Refugee day celebration		June 2014	59
Cold, heavy rain		Labour day		May 2014	60

Appendix 8. Training Agenda

Day 1: April 30th 2019				
Time	Topic	Facilitator	Comments	Materials
8 :30-9 :00	Arrival	Alice	Lists of enumerators and other non – WFP participants to the gate	Registration list, schedule, training slides Handouts/slides: 1. Survey questionnaires 2. Anthropometry exercise 3. Case studies 4. Referral slip 5. Event calendar MUAC tapes, weighing scales, height boards
9:00-9:30	Registration and logistics	Alice	Attendance lists	
9:30-9:45	Introduction of coordinators, supervisors and participants	All	Names, positions and organizations	
9:45-10:00	Survey objectives Roles and responsibilities	Damien		
10:00-10:45	Pre-test	Damien and Alice	Enumerators and Lab techn will do the test. All supervisors will supervise the Pre-test	
Tea break				
11:00-11:30	Obtaining consent Interviewing skills Sampling and selection of subjects	Damien	Different techniques of obtaining consent, accurate information,	
11:30-13:00	Introduction to anthropometric equipment, malnutrition, anthropometry for children 6-59 months	Damien		
Lunch				
14:00-15:30	Anthropometry for children 6-59 months: referrals common errors	Damien		
15:30-17:00	Introduction of local events calendar and age determination	Alice/Jeanne(UNHCR)	Go through other ways to determine age when health card is missing	
Day 2: May 1st 2019				
8:30-9:00	Review of Day 1	One of the supervisor from partners	He/she will be designed on the day 1	Training slides Tablets
9:00-10:30	Questionnaire for child 6-59 months	Damien	Review different types of nutrition programs and eligibility criteria	
Tea Break				
10:45-12:30 and 13:30-15:00	IYCF Questionnaire-understanding food groups, how to probe / capture small quantities, and role play	Damien	Practice probing for determining ingredients in mixed dish, examples of condiments that are too small to count as food groups, role play	
15:00-17:00	Woman 15-49 years Questionnaire	Damien		
Day 3: May 2nd 2019				
8:30-9:00	Review of Day 2	One of the supervisor from partners	He/she will be designed on the day 2	Materials

9:00-10:30	Introduction to WASH questionnaire	Kassim/Jeanne		Training slides Hemocues, lancets, cuvettes, laboratory materials, etc Tablets with questionnaire
Tea Break				
10:45-1:00	Introduction to mosquito net questionnaire	Kassim/Jeanne		
Lunch				
2:00-3:00	Introduction to Hemocue machine (with video), Anemia, hemocue machine, referrals	Kalisa Jean de Dieu/Jeanne (UNHCR)		
3:00-5:30	Food security questionnaire	Damien and Alice		
Day 4: May 3rd 2019				
8:30-9:00	Review of Day 3	One of the supervisor from partners	He/she will be designed on day 3	Materials: Tablets with questionnaire
9:00-10:30	Food security questionnaire (Continued)	Damien and Alice		
Tea Break				
10:45-12:30	Field readiness including team dynamics	Damien and Jonathan(UNHCR)	Combining site based and household questionnaire	
	Instructions for standardization test	Damien		
Lunch				
14:00-16:00	Anthropometry and Questionnaires practice	All supervisors		
16:00-17:00	Post-test	Damien		
Day 5: May 5th 2018 - Standardization (in Kigeme camp)				
9:00-13:00	- Standardization of anthropometric measurements for anthropometric measurers -Standardization of hemocue measurements for laboratory technicians - Pilot test of questionnaire for team leaders and household enumerators	All supervisors	Cross check mosquito net types and water containers during pre-test	Standardization forms MUAC tapes, weighing scales, height boards Hemocues, lancets, cuvettes, laboratory material, etc.
13:00-14:00	Feedback session on standardization test	Damien	Revise quesitonnaires / answer codes as necessary	