Report of Rapid Nutrition Assessment (RNA)
In
Taloqan District, Takhar province of Afghanistan
(29th Jan to 1st Feb 2020).

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Implementer

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ABBREVIATIONS

ARDHO	Afghanistan Research, Development and Health Organization
AIM-WG	Assessment and Information Management Working Group
ARI	Acute Respiratory Infection
BHC	Basic Health Center
BPHS	Basic Package of Health Services
BSU	Basic Sampling Unit
CDR	Crude Death Rate
CHC/CHC+	Comprehensive Health Center
DH	District Hospital
ECHO	European Commission of Humanitarian Aid
ENA	Emergency Nutrition Assessment
EPHS	Essential Package of Hospital Services
EPI	Expanded Program on Immunization
FCS	Food Consumption Score
GAM	Global Acute Malnutrition
HHs	Household(s)
IDPs	Internally Displaced populations
IPC	Integrated Food Security Phase Classification
IPD-SAM	Inpatient Department for Severe Acute Malnutrition
IYCF	Infant and Young Child Feeding
MoPH	Ministry of Public Health
MUAC	Mid-Upper Arm Circumference
MW	Mean Weight
NSIA	National Statistics and Information Authorities
NSSSSC	Nutrition Small Scale Survey Steering Committee
OPD-MAM	Outpatient Department for Moderate Acute Malnutrition
OPD-SAM	Outpatient Department for Severe Acute Malnutrition
OW	Observed weight
PLW	Pregnant and Lactating Women
PND	Public Nutrition Directorate
PPHD	Provincial Public Health Directorate
PPS	Probability Proportional to Size

PSU	Primary Sampling Unit
RC	Reserve Cluster
SAM	Severe Acute Malnutrition
SD	Standard Deviation
SHC	Sub Health Center
SMART	Standardized Monitoring and Assessment of Relief and Transitions
U5DR	Under-five Death Rate
W/H	Weight for height
WHO	World Health Organization
WHZ	Weight for Height Z score

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Executive summary

Takhar is one of the thirty-four provinces of Afghanistan, located in the northeast of the country next to Tajikistan with a population of 1,073,319[1] and 17 Districts. Badakhshan surrounds it in the east, Panjshir in the south, and Baghlan and Kunduz in the west. The city of Taloqan serves as its capital. Takhar province established in 1964 when Qataghan Province divided into three provinces: Baghlan, Kunduz, and Takhar.

Based on the need to update humanitarian information on IDPs and its host population after last year influx from violence in Kunduz late 2019, Rapid Nutrition Survey (RNA) was conducted from 29th Jan to 2nd Feb 2020; recommended Rapid SMART methodology for RNA of 25 Randomly sampled Cluster, 10 households per cluster, with a total minimum of 200 Children. The main indicators were the prevalence of malnutrition, Measles vaccination, morbidity in Children under five and wasting women of reproductive age.

Table 1: Summary Results Taloqan District, Takhar Province RNA 28th Feb 2020.

Acute Malnutrition Z-score/Oedema	% (95% CI)	Classification of public health significance
Prevalence of global malnutrition (<-2 z-score and/or oedema)	5.3 % (3.3 - 8.4)	Very High ≥ 15%
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	5.0 % (3.0 - 8.3)	
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	0.3 % (0.0 - 2.0)	
Prevalence of Oedema	0.0%	
Acute Malnutrition (MUAC)		
Prevalence of global malnutrition (< 125 mm and/or oedema)	5.6 % (3.9 - 8.0)	
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	4.1 % (2.5 - 6.6)	
Prevalence of severe malnutrition (< 115 mm and/or oedema)	1.5 % (0.8 - 3.0)	
Combined Acute Malnutrition (MUAC & WFH Z-Score		
Prevalence of combined GAM (WHZ <-2 and/or MUAC < 125 mm and/or oedema)	8.7 % (6.1 - 12.3)	

[1] Afghanistan Population Estimations – National Statistics and Information Authorities "NSIA" 1398/2019

Prevalence of combined SAM (WHZ < -3 and/or MUAC < 115 mm and/or oedema	1.8 % (1.0 - 3.3)	
Prevalence of Stunting		
Prevalence of stunting (<-2 z-score)	35.4% (By 1 SD)	Very High ≥ 30%
Underweight		
Prevalence of underweight (<-2 z-score)	18.5 % (13.6 - 24.8)	Very High ≥ 30%
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	13.3 % (9.3 - 18.7	
Prevalence of severe underweight (<-3 z-score)	5.2 % (3.4 - 7.9)	
Measles Vaccinations		
Measles vaccination with card only (9-59 months)	19.9%	
Measles vaccination with card or recall (9-59 months)	86.3%	The target ≥ 90%
2nd Measles vaccination with card only (18-59 months)	12.4%	
2nd Measles vaccination with card or recall (18-59 months)	77.3%	The target ≥ 90%
Morbidity		
Diarrhoea in the last 2 weeks	20.3%	
ARI in the last 2 weeks	51.9%	
Nutrition Status of Women		
All women 15-49 years	14.7%	
Pregnant women	13.3%	
Lactating women	15.4%	
Non PLW	14.4%	
All PLWs	14.9%	

Trends analysis of the last three assessments indicates short-term undernutrition (wasting) in Takhar province within confidence interval intersects WHO acceptable & poor thresholds and falls below the national average of wasting 9.7%. The challenge remains consistently chronic rates of stunting defined by a low height-for-age.

Child stunting can happen in the first 1000 days after conception and related to many factors, including socioeconomic status, dietary intake, infections, maternal nutritional status, infectious diseases, micronutrient deficiencies, and the environment[2]. Infectious diseases

[2] Black RE, Allen LH, Bhutta ZA, Caulfield LE, de Onis M, Ezzati M et al. Maternal and child undernutrition:global and regional exposures and health consequences. Lancet. 2008;371(9608):243–60.doi:10.1016/S0140-

caused by a lack of hygienic conditions and clean water are also important determinants of child stunting. Among these factors that impede child growth, diarrhoea is particularly important, owing to malabsorption of nutrients and lack of appetite; estimated 20.3% of children under five had diarrhoea.

Child stunting affects the function and structure of the brain, impeding mental development and possibly affecting human capital and social progress in the long term[3]. Stunted children usually belong to the most socioeconomically disadvantaged population groups and are likely to do poorly in school, have low incomes in adulthood and contribute to the intergenerational transmission of poverty and income inequality.

Being a complex problem, there is no single nutrition intervention to address stunting in children, but rather multiple, complex and coordinated nutrition-sensitive and nutrition-specific interventions in partnership with other health and non-health actors in development.

Thus, clean and sufficient drinking water, proper sanitation, drains for wastewater and proper management of solid waste are some of the interventions that can be considered. These should be coupled with nutrition-specific interventions for nutrition behaviour change and the distribution of fortified foods and supplements. Conditional cash transfers can also be considered so as to increase the purchasing power and promote access to nutritional foods as well as positively impacting health outcomes. Conditional cash transfers may also improve children's nutritional status and development, as well as increasing access to and coverage of hygiene, clean water, and several other child health interventions. Effective implementation of these interventions requires coherence within sectors and stakeholder institutions, as well as horizontal coherence across sectors and stakeholders, addressing inequity and progressing towards universal coverage so that no one is left behind, especially the poor and most vulnerable in the populations.

6736(07)61690-0.

[3] Ibid

1. Introduction

Takhar is known as the second-grade province of Afghanistan, Takhar province is regarded as the most suitable place for agriculture. The province lies at a distance of 400 KM from the country's capital, Kabul. Takhar is surrounded by Badakhshan to its northeast; Kunduz to the west; Baghlan to the south and to the north it shares an international border with Tajikistan. The central institute of statistics in 2009 put the number of people per kilometre at 71 individuals while the total area of Takhar is estimated at around 124,000 square kilometres. The province is hot in summer where the temperature soars to 35 °C- 40 °C and it is extremely cold in winter with the temperature hitting a low of -21 °C to -29 °C. From October until April, the weather remains cold, rainy amid snowfall while it is hot in the remaining months. The average rainfall in the province is estimated at 2,290 millimeters annually.

Historically, the antiquity of Takhar belongs to the time of Alexander, the great; ancient Greeks wrote the history of Takhar province some, 300 years ago; and Marco Polo in 1275 CE described the old city to the west on the riverside. Takhar also holds notoriety as the location where Afghan mujahideen leader Ahmad Shah Massoud was assassinated on September 9, 2001.

On administrative divisions, Takhar province has 16 districts. Taluqan is the capital city of Takhar province; Warsaj, Farkhar, Khawaja Ghar, Khawajah Bahawodin, Baharak, Hazar Sumuch, Dashti Qala, Yangi Qala, Chahab, Rustaq, Bangi, Ishkamish, Kalafgan, Chal, Namakab and Darqad are its districts. Several ethnicities reside side by side in the province including Uzbek, Tajik, Pashtun and Hazara tribes. The majority of the residents belong to Uzbek while Hazara is the minority tribe in the province. The population of the province is estimated at 1,073,319[4]. In the whole of Afghanistan, it was estimated from 1st January 2019 to 20th December 2019 that, 422,878 individuals fled their homes due to conflict. According to the provincial government, Takhar province had 7,600 displaced people of which 70% of them had been registered[5] a prerequisite to receiving support as well as for planning purposes. Most of the refugee was displaced from Neighboring Kunduz province as a result of recent fighting.[6] Takhar is among the agricultural provinces of the country where the economy of the residents depends on agriculture and livestock farms. The province has 130,000 irrigated and 300,000

[4] Afghanistan Population Estimations – National Statistics and Information Authorities "NSIA" 1398/2019

[5] Ministry of refugees and repatriation https://morr.gov.af/index.php/en/minister-refugees-and-repatriation-visits-governor-takhar-province

[6] Afghanistan Weekly Humanitarian Update | 9 December to 15 December 2019 (OCHA)

rain-fed lands with farmers cultivate crops twice in a year7. Rice, barley, and corn are widely cultivated crops of the province. The fruit orchards in Takhar produce ample apple, plum, cherry, pears, peach, apricot, grapes, melon and watermelon. The fruit crops help the farmer community to export to other parts of the country. Many districts of Takhar are green because of frequent rains. Livestock has achieved great progress in the province. The livestock farms provided the opportunity of export of animals to Tajikistan and Pakistan.

Whoever, the province faces a number of major challenges. The remote geographical location of a number of districts, sluggish economic growth, poverty, a lack of education among the rural population, and a volatile security situation in some areas hinder progress and development. Almost 90% of the population lives in rural areas. The near inaccessibility of several districts means that their residents often have to rely on horses and donkeys for transport. Schools and health centres are difficult to reach. Natural disasters such as avalanches and floods are a frequent occurrence. The provincial economy is largely based on the service and agricultural sectors. Local people generate most of their income through the sale of agricultural products from this relatively fertile and water-rich region and the manufacture of ceramics, jewelry and rugs[8].

Takhar is among 21 provinces classified in IPC Phase 3 in the 2019 IPC analysis; An estimated 40% of the population were estimated to be in Crisis and Emergency (IPC Phase 3 and Phase 4). These include an estimated 53,666 in IPC Phase 4 (Emergency) people who require urgent action to reduce food consumption gaps and to protect/save livelihoods and reduce acute malnutrition. The situation is expected to worsen given the sporadic armed clashes between Afghanistan National Security Forces (ANSF) and Non-State Armed Group (NSAG) in the Khustak area of Jorm district in Badakhshan province, as well as Khowja Ghar, Darqad and Khowja Bahawuddin Districts in Takhar province. Clashes between ANSF and an NSAG resulted in the displacement of around 10,500 people from Yangi Qala and Darqad to Taloqan city. Some displaced families moved to inaccessible remote villages in Darqad and Khowja Bahawuddin district in Takhar province.

Currently, 5 national and international humanitarian organizations are providing health and nutrition services in the province. A local NGO named Assistance for Health, Education and Development "AHEAD" is implementing the BPHS SEHATMANDI project and the EPHS is functioning under DoPH. The BPHS has a total of 86 health facilities providing health services

[7] Pajhwok Afghan News
[8] German Cooperation with Afghanistan Organization

(4 DH, 1 CHC+, 13 CHC, 35 BHC, 32 SHC), from those, 52 of the health facilities do provide OPD SAM, 50 OPD MAM and 5 of them provide IPD SAM services in the province. The health system is in the area is relatively stable, but the IDP families cannot afford to pay for medicine and medical treatment. IDP families' main concerns include inadequate schools for their children; lack of job facilities in the areas of displacement, lack of winterization and lack of Food Items (FIs) and Non Food Items (NFIs). These groups of families are eager to return to their places of origin but due to high-security threats, they cannot return. The inter-agency assessment team highly recommended humanitarian aids for the selected families.

2. Survey Objectives

To quickly assess the health and nutrition situation of children U5 and PLWs in the emergency affected area of Taluqan District, Takhar province.

2.1. Specific Objectives

- To assess the prevalence of undernutrition (Wasting, Underweight, Stunting) and other malnutrition indicators among children from 0-59 months.
- To estimate using two weeks recall period morbidity among children from 0-59 months
- To estimate vaccination coverage among children from 9 -59 months.
- To estimate the prevalence of malnutrition among pregnant and lactating women (PLWs) using MUAC cut-off.
- And Make recommendations for programme interventions.

3. Methodology

3.1. Sample size & Sampling procedure

The target population was people living in Taluqan District both IDP and the host population. The sample is predetermined based on the SMART methodology for RNA; the recommended number clusters is a minimum of 25 with 200 minimum number of children (6-59 months) as illustrated in table 1 below:

Table 2: the sample size calculation and precision.

Expected GAM Prevalence by MUAC	Sample size	Precision
20%	200 children	+/- 7.1%
15%	200 children	+/- 6.3 %
10%	200 children	+/- 5.3 %
5%	200 children	+/- 3.9%

To reach the required number of sample, Rapid SMART for Afghanistan proposes simplified rule to convert children into households:

A. When the percentage of children under the age of 5 is below 15%, 25 clusters of 12 households have to be selected
B. When the percentage of children under the age of 5 is above 15%, 25 clusters of 10 households have to be selected

The reference percentage of the under-5 population for Afghanistan is 17.3% (Afghanistan CSO updated population 2019)[9], so conversion option **B** was applied. Therefore, 25 Clusters of 10 households were selected randomly using PPS by ENA software out of the list. The total number of HH surveyed was 250 HHs.

3.2. Sampling procedure: selecting households and children

Two-stage cluster sampling with Probability proportional to size (PPS) sampling was applied. The sampling frame was 53 villages hosting IDP in Taluqan District, out of which 25 villages were randomly selected using ENA for SMART software. The villages with a large population had a higher chance of selection than villages with a small population and vice versa. Three Reserve Clusters (RCs) were selected by ENA software as a replacement for the selected cluster if 10% of clusters were not to be accessible.

Large zones in a cluster (households above 150), was divided into smaller segments and a segment was selected randomly to be included in the cluster using PPS. This division was based on existing landmarks in the area, such as pathways, water points, mosques, health facilities, schools.

[9] percentage of under-5 population for Afghanistan which is 17.3% (Afghanistan CSO updated population 1397)

The 2nd stage sampling, which involved the random selection of basic sampling units (households) within the selected clusters was done using systematic random sampling; the total number of households in selected zones/villages was obtained from the Chief and other local leaders. Sampling interval was calculated by dividing the total number of households by the required number of households to be sampled. For the sake of simplification and operational expediency, polygamous families were accounted for as ONE household based on the recommended definition of households in RNA/SMART manual. In each selected zone, one or more community member(s) were asked to help the survey teams to conduct their work by providing information about the zone with regard to the geographical organization or the number of households and to ease the introduction process in the households.
All children 0-5 years were assessed in the select households; the respondents were the caretakers in their absence of other adult's family members. Absent households or children were revisited once and were not replace if in the second visit they were not found, similarly, empty households were not replaced.

3.3. Case definitions and inclusion criteria

- **The gender**: was recorded with codes: f= female and m=male.
- **Age:** The age recorded down in months. Event calendar was developed locally and used in lieu of age documentation which is rare in Afghanistan. **It is important to note that the official calendar in Afghanistan is the solar Hijri calendar (Iranian calendar);** The use of the Gregorian calendar can introduce bias and confusion while interviewing caretakers and therefore can cause additional loss of time, so the Solar calendar was used for data collection afterward it was converted back to Gregorian calendar using *Farsi tool* MS-excel Add-on.
- **Weight (in kg):** Children weighted by using an Electronic Unica scale (or SECA) was recorded to the nearest 0.1 kg. The children who were able to stand were asked to stand on the weighing scale; in a situation when the children were not able to stand up, the double weighing method was applied.
- **Height (in cm):** Height/Length Measuring board was used to measure bareheaded and barefoot children. The precision of the measurement was 1.0 mm. Children of less than 87 cm/<2 years were measured lying down and those equal to or above 87 cm/>2 years were measured standing up.
- **Oedema:** All children were checked for bilateral pitting oedema. If a child was suspected to have nutritional oedema, it had to be confirmed by both enumerators.
- **Anthropometric indices** of stunting, wasting, underweight, were calculated to provide

specific information about the growth and body composition for assessing nutritional status.

  - Children are defined as stunted Anthropometric status of children if their height-for-age is more than two standard deviations below (< -2SD) the WHO Child Growth Standards median (WHO, 2009).
  - Children are defined as wasted if their weight-for-height is more than two standard deviations below (< -2SD) the WHO Child Growth Standards median (WHO, 2009).
  - Children are defined as underweight if their weight-for-age is more than two standard deviations below (< -2SD) the WHO Child Growth Standards median (WHO, 2009).

- **MUAC**: taken on the LEFT arm using MUAC tape. The MUAC measurements were also recorded in mm. Once measured, visible small mark on the left upper arm or on the fingernails of the child was made in order to avoid measuring the same child several times. Cut off for cute malnutrition is absolute MUAC<12.5cm.
- All children detected as MAM or SAM whether by the presence of bilateral pitting oedema and/or MUAC < 115 cm, were referred to the nearest health facility or agency responsible for therapeutic care for immediate treatment in this case.
- **Measles immunization status** for all children 9-59 months selected in the sample, the mother/caretaker (CT) was asked if the child has been immunized against measles or not and if there was a vaccination card. The answers were recorded as 'Y' (Yes); yes 'VWC' (Vaccination without Card); 'N' (No); 'DK' (Does not Know), according to the situation.
- **Morbidity data** for all children 0-59 months selected in the sample, the mother/CT was asked: If the child had diarrhoea/ARI within the last 14 days. Diarrhoea was defined as every episode of more than three liquid stools per day. The record was made as follows: 'Y' (Yes); 'N' (No); 'DK' (Do not Know) If the child had Acute Respiratory Infection (ARI) within the last 14 days. Acute Respiratory Infection was any episode with a severe, persistent cough or difficulty breathing. Record is made as follows: 'Y' (Yes); 'N' (No); 'DK' (Does not Know), according to the situation.

3.4. Questionnaire, training and supervision

- The Questionnaire was translated to the second national language Dari and back-translated by a different set of translators to ensure the meaning was preserved; It was also field-tested before being finalized.

- Eight teams of two members in each (one female and one male) conducted the field data collection. Every two teams had one supervisor. The previous experience from Afghanistan has shown that in some cases, households are not always willing to allow surveyors to measure female children; It was, therefore, important to ensure all the teams had female surveyor for better adaptability and cultural sensitivity approach with the community. Action Against Hunger technical staff, provincial MoPH, and the implementing NGO's Nutrition officer supervised the survey teams.
- This survey intended to utilize the same enumerators (as much as possible and available) who participated in the previous SMART surveys and other similar assessments; however, most of the field enumerators hired were their first experience in the survey activity. The enumerators received 4 days of training on data collection for Rapid SMART assessment, which included a one-day standardization test irrespective of new or previous experience. Pilot survey and feedback was also conducted to give the teams' field experience, and supervisors a chance to harmonize and strengthen the teams in key areas.
- One-field guidelines document with instructions and another household with definition and selection document was provided to each team member. All documents, such as local event calendar, questionnaires, and consent forms were translated in Dari local language for better understanding and to avoid direct translation during the field data collection.
- Daily data entry and analysis were done using ENA plausibility checks, and feedbacks were provided to the data collection teams every morning prior to going to the field where possible.

3.5. Data analysis

Data entry was done by data entry clerk with one assistant at the field level on excel template. Anthropometric data quality was analysed using ENA plausibility checks on a daily basis with feedback to the teams prior to next day fieldwork. In addition, to enhance quality control, 10% of questionnaires were picked at random and crosschecked against the entered data. The quality was deemed sufficient not warrant double data entry. During analysis, the quality was further strengthened through the generation of all indicators to identify unexpected out and rectified by double-checking the questionnaires. Outliers in anthropometry data were excluded from the analysis based on SMART flags +/- 3 SD of WHZ from the observed Z-score means, Data analysis was conducted using ENA for SMART 2020 version software and excel 2017 version.

4. Results

4.1. Malnutrition

Table 3: Survey sample and nonresponse

Number of HH planned	Number of HH surveyed	Minimum number of children 6-59 months planned	Number of children 6-59 months surveyed
250	250	200	390
	100%		195%[10]

3.1 Anthropometric results (based on WHO standards 2006):

Definitions: global acute malnutrition is defined as <-2 z scores weight-for-height and/or oedema, severe acute malnutrition is defined as <-3z scores weight-for-height and/or oedema.

Exclusion of z-scores from Observed mean SMART flags: WHZ -3 to 3; HAZ -3 to 3; WAZ -3 to 3

Table 4: Distribution of age and sex of the sample

	Boys		Girls		Total		Ratio
AGE (mo)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy:girl**
6-17	64	64.6	35	35.4	99	25.4	1.8
18-29	50	52.1	46	47.9	96	24.6	1.1
30-41	47	52.2	43	47.8	90	23.1	1.1
42-53	28	39.4	43	60.6	71	18.2	0.7
54-59	19	55.9	15	44.1	34	8.7	1.3
Total	208	53.3	182	46.7	390	100.0	1.1

Table 5: Prevalence of acute malnutrition among children 6-59 months based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 380	**Boys** n = 203	**Girls** n = 177
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(20) 5.3 % (3.3 - 8.4 95% C.I.)	(11) 5.4 % (2.7 - 10.5 95% C.I.)	(9) 5.1 % (2.9 - 8.9 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(19) 5.0 % (3.0 - 8.3 95% C.I.)	(11) 5.4 % (2.7 - 10.5 95% C.I.)	(8) 4.5 % (2.4 - 8.2 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(1) 0.3 % (0.0 - 2.0 95% C.I.)	(0) 0.0 % (0.0 - 0.0 95% C.I.)	(1) 0.6 % (0.1 - 4.5 95% C.I.)

The prevalence of oedema is 0.0 %

Table 6: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or

[10] Includes infants under 6 Months

oedema

		Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	93	1	1.1	11	11.8	81	87.1	0	0.0
18-29	94	0	0.0	3	3.2	91	96.8	0	0.0
30-41	89	0	0.0	2	2.2	87	97.8	0	0.0
42-53	70	0	0.0	2	2.9	68	97.1	0	0.0
54-59	34	0	0.0	1	2.9	33	97.1	0	0.0
Total	380	1	0.3	19	5.0	360	94.7	0	0.0

Table 7: Distribution of acute malnutrition and oedema based on weight-for-height z-scores

	<-3 z-score	**>=-3 z-score**
Oedema present	Marasmic kwashiorkor. 0 (0.0 %)	Kwashiorkor. 0 (0.0 %)
Oedema absent	Marasmic No. 10 (2.6 %)	Not severely malnourished. 380 (97.4 %)

Table 8: Prevalence of acute malnutrition among children 6-59 months based on MUAC cut off's (and/or oedema) and by sex

	All n = 390	**Boys** n = 208	**Girls** n = 182
Prevalence of global malnutrition (< 125 mm and/or oedema)	(22) 5.6 % (3.9 - 8.0 95% C.I.)	(9) 4.3 % (2.3 - 8.1 95% C.I.)	(13) 7.1 % (3.9 - 12.7 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(16) 4.1 % (2.5 - 6.6 95% C.I.)	(6) 2.9 % (1.3 - 6.1 95% C.I.)	(10) 5.5 % (2.7 - 10.9 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(6) 1.5 % (0.8 - 3.0 95% C.I.)	(3) 1.4 % (0.5 - 4.2 95% C.I.)	(3) 1.6 % (0.5 - 5.0 95% C.I.)

Table 9: Prevalence of acute malnutrition by age, based on MUAC cut off's and/or oedema

		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	99	5	5.1	12	12.1	82	82.8	0	0.0
18-29	96	1	1.0	2	2.1	93	96.9	0	0.0
30-41	90	0	0.0	0	0.0	90	100.0	0	0.0
42-53	71	0	0.0	1	1.4	70	98.6	0	0.0
54-59	34	0	0.0	1	2.9	33	97.1	0	0.0
Total	390	6	1.5	16	4.1	368	94.4	0	0.0

Table 10: Prevalence of combined GAM and SAM among children 6-59 months based on WHZ and MUAC cut offs (and/or oedema) and by sex*

	All n = 390	Boys n = 208	Girls n = 182
Prevalence of combined GAM (WHZ <-2 and/or MUAC < 125 mm and/or oedema)	(34) 8.7 % (6.1 - 12.3 95% C.I.)	(16) 7.7 % (4.3 - 13.5 95% C.I.)	(18) 9.9 % (6.3 - 15.1 95% C.I.)
Prevalence of combined SAM (WHZ < -3 and/or MUAC < 115 mm and/or oedema	(7) 1.8 % (1.0 - 3.3 95% C.I.)	(3) 1.4 % (0.5 - 4.2 95% C.I.)	(4) 2.2 % (0.8 - 5.7 95% C.I.)

*With SMART or WHO flags a missing MUAC/WHZ or not plausible WHZ value is considered as normal when the other value is available

Table 11: Detailed numbers for combined GAM and SAM

	GAM		SAM	
	no.	%	no.	%
MUAC	14	3.6	6	1.5
WHZ	12	3.1	1	0.3
Both	8	2.1	0	0.0
Oedema	0	0.0	0	0.0
Total	34	8.7	7	1.8

Total population: 390

Table 12: Prevalence of wasting among **0-59** month's children based on weight-for-age z-scores and by sex.

	All **n = 417**	**Boys** **n = 221**	**Girls** **n = 196**
Prevalence of underweight (<-2 z-score)	(22) 5.3% (3.3- 8.4 95% CI)	(12) 5.4% (2.9- 9.9 95% CI)	(10) 5.1% (2.7- 9.3 95% CI)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(20) 4.8% (3.0- 7.7 95% CI)	(12) 5.4% (2.9- 9.9 95% CI)	(8) 4.1% (2.2- 7.4 95% CI)
Prevalence of severe underweight (<-3 z-score)	(2) 0.5% (0.1- 2.0 95% CI)	(0) 0.0% (0.0- 0.0 95% CI)	(2) 1.0% (0.2- 4.4 95% CI)

Table 13: Prevalence of underweight among children 6-59 months based on weight-for-age z-scores by sex

	All n = 383	**Boys** n = 204	**Girls** n = 179
Prevalence of underweight (<-2 z-score)	(71) 18.5 % (13.6 - 24.8 95% C.I.)	(41) 20.1 % (13.3 - 29.3 95% C.I.)	(30) 16.8 % (12.3 - 22.4 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(51) 13.3 % (9.3 - 18.7 95% C.I.)	(28) 13.7 % (8.2 - 22.1 95% C.I.)	(23) 12.8 % (8.9 - 18.2 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(20) 5.2 % (3.4 - 7.9 95% C.I.)	(13) 6.4 % (3.7 - 10.8 95% C.I.)	(7) 3.9 % (2.0 - 7.6 95% C.I.)

Table 14: Prevalence of underweight among children 0-59 months based on weight-for-age z-scores by sex

	All n = 421	**Boys** n = 223	**Girls** n = 198
Prevalence of underweight (<-2 z-score)	(80) 19.0 % (14.0 - 25.3 95% C.I.)	(46) 20.6 % (14.3 - 28.9 95% C.I.)	(34) 17.2 % (12.2 - 23.6 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(55) 13.1 % (9.2 - 18.3 95% C.I.)	(31) 13.9 % (8.4 - 22.2 95% C.I.)	(24) 12.1 % (8.3 - 17.3 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(25) 5.9 % (3.9 - 9.0 95% C.I.)	(15) 6.7 % (4.2 - 10.6 95% C.I.)	(10) 5.1 % (2.7 - 9.1 95% C.I.)

Table 15: Prevalence of underweight by age, based on weight-for-age z-scores

		Severe underweight (<-3 z-score)		Moderate underweight (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	94	9	9.6	17	18.1	68	72.3	0	0.0
18-29	95	4	4.2	10	10.5	81	85.3	0	0.0
30-41	90	5	5.6	13	14.4	72	80.0	0	0.0
42-53	71	2	2.8	6	8.5	63	88.7	0	0.0
54-59	33	0	0.0	5	15.2	28	84.8	0	0.0
Total	383	20	5.2	51	13.3	312	81.5	0	0.0

The prevalence of stunting we used the SD of 1 because most of the children were with no exact birth date and the survey teams mostly used event calendar, and the result in stunting with using observed SD was rejected, therefore, the point prevalence of stunting to be use is 35.4%.

Table 16: Prevalence of overweight based on weight for height cut off's and by sex (no oedema)

	All n = 380	**Boys** n = 203	**Girls** n = 177
Prevalence of overweight (WHZ > 2)	(4) 1.1 % (0.4 - 2.7 95% C.I.)	(2) 1.0 % (0.2 - 4.2 95% C.I.)	(2) 1.1 % (0.3 - 4.4 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 17: Prevalence of overweight by age, based on weight for height (no oedema)

		Overweight (WHZ > 2)		Severe Overweight (WHZ > 3)	
Age (mo.)	**Total no.**	**No.**	**%**	**No.**	**%**
6-17	93	2	2.2	0	0.0
18-29	94	1	1.1	0	0.0
30-41	89	1	1.1	0	0.0
42-53	70	0	0.0	0	0.0
54-59	34	0	0.0	0	0.0
Total	380	4	1.1	0	0.0

Table 18: 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	380	-0.13±1.04	1.09	0	10
Weight-for-Age	383	-1.01±1.11	1.87	0	7
Height-for-Age	371	-1.63±1.32	1.81	0	19

* contains for WHZ and WAZ the children with oedema.

4.2. Enrolment in nutrition program: OPD/IPD for SAM/MAM cases

The proportion of children identified as acutely malnourished by MUAC only and their corresponding treatment enrolment status are presented in Table 22 below.

Overall, out of 20 children 6-59 months old identified as acutely malnourished by MUAC and WHZ by the teams in the field, 14 were MAM cases and 6 were SAM cases. The proxy program coverage for all malnourished cases was 75.0%. 5 (25.0%) out of 20 children identified as malnourished were not in any program and were referred to as the appropriate program in their neighborhood.

Table 19: Proportion of Acutely Malnourished Children 6-59 Months enrolled in a Treatment Program

Sample	**Enrolled in an OPD SAM**	**Enrolled in an OPD MAM**	**Enrolled in an IPD SAM**	**Not Enrolled/Referred**
Acutely malnourished children 6-59 months by MUAC and WHZ, or oedema (N=20)	3	2	0	5

4.3. Children's morbidity

Table 20: Prevalence of reported illness in children in the two weeks prior to interview (N=428)

	6-59 months
Prevalence of reported illness	(238) 6%

Table 21: Symptom breakdown in the children in the two weeks prior to interview (n=428)

	6-59 months
Diarrhoea	(87) 20.3%
ARI	(222) 51.9%

4.4. Vaccination Results

Table 22: Vaccination coverage: First dose measles for 9-59 months (N=366)

	Measles (with card)	Measles (with card or confirmation from mother)
YES	(73) 19.9 %	(316) 86.3%

Table 23: Vaccination coverage: Second dose measles for 18-59 months (N=291)

	Measles (with card)	Measles (with card or confirmation from mother)
YES	(36) 12.4%	(225) 77.3%

Table 24: Woman Undernutrition

Physiological status	No.	%
All women 15-49 years	47	14.7
Pregnant women	4	13.3
Lactating women	25	15.4
Non-PLW	18	14.4
All PLWs	29	14.9

5. Discussion

5.1. Nutritional status

Estimated 5.3% (3.3- 8.4) of children under five years were wasted, while prevalence of SAM was 0.3% (0.0- 2.0 95% CI). Based on WHO classification, if falls under poor public health classification, the second less severe category indicating a relatively stable situation.

Absolute MUAC (MUAC measured in millimeters) is a globally recognized measure of acute malnutrition (WHO, 2007). Overall, 5.6% (3.9- 8.0 95% CI) of children aged 6 to 59 months were acutely malnourished as measured by absolute MUAC (MUAC <125 mm). The prevalence of severe acute malnutrition (SAM) by absolute MUAC below the global recommended cut-off (MUAC <115 mm) was 1.5% (0.8- 3.0 95% CI). While the GAM rate by Z-Score & MUAC was similar, the prevalence of SAM by MUAC was more five times the rate by Z-score indicating the independence of the two measures identifying wasted children. In line with, combined GAM by SAM and was calculated; the GAM and SAM rate was 8.7 % (6.1 - 12.3) and 1.8 %(1.0 - 3.3) respectively. However, there is not yet an international threshold for the cut off based on this indicator.

Overall, 18.5% of children aged 6 to 59 Months were underweight, with 5.2% severely underweight. The prevalence is of serious public health classification. The prevalence of underweight was 27.7% at age 17 months but reduces and remained stable across the months of the five-year period (Figure 3).

The prevalence of total stunting was 35.4% among children aged 6 to 59 months, 15.4% were severely stunted. This falls within the critical threshold of public health importance WHO classification. The trend in stunting by age is restively low at 23.1 at 17 months of age and rising to above 40% in the older children 18-59 months (Figure 4).

5.2. Morbidity

Prevalence of Morbidity two weeks prior to the survey was quite high with an estimated 60.3% of the caretakers of children under five reporting illnesses during the period under review.

Mothers reported that 20.3% of children under age 5 had diarrhoea in the 2 weeks before the survey. The prevalence of diarrhoea rises gradually after the first 6 months of life, when children are typically introduced to complementary foods, also about the time when children start to walk and are at increased risk of contamination from the environment. The introduction

of other liquids and foods at the time of weaning can also facilitate the spread of disease-causing microbes.

Given that the survey took during the mid-winter period, 51.9% of children were reported with symptoms of ARI with prevalence peaking at early age group 0-6 month infants, though remaining high across the different age groups.

Trend analysis sharp rise in ARI prevalence 8.8% in 2013, 9.9% in 2017 to 51.9% in 2020; this reflects the different seasons the assessment was carried out. However, the opposite occurs in the trend of diarrhoea 23.5% to 44.2% and back to 20.3 respectively (Figure 8).

5.3. Vaccination

In Afghanistan, the target group for routine immunization in children under age of 12 months; however, children up to age 23 months will not be refused vaccinations when brought to a health facility (except for BCG, which is administered only to children less than 12 months of age). The same age groups are targeted during outreach activities.

At age 18 months, the second dose of the measles vaccine is recommended. The current assessment uses the 1st and 2nd measles vaccination at 9 months and 18 months respectively as a proxy measure of coverage; it is projected that a child who has received the measles vaccination in most cases has a contact point to receive the other vaccination too. The contagious nature of the measles disease outbreak makes it a good proxy for assessing immunization levels for all vaccine-preventable diseases.

Overall, 86.3% of children age above 9 months and 77.3% above 18 months had been vaccinated based on confirmation of vaccination card that was seen by the interviewer and recall by the mother. This is far below the 90% herd immunity for measles. For many common infectious diseases, herd immunity kicks in when 80 to 85 percent of the population has been immunized. However, for measles, an outbreak can occur as soon as coverage drops below 90 percent. In both cases, confirmation by card was less than 30% yet accurate records are an important component of monitoring and evaluation of any program.

5.4. Malnutrition in Women

Approximately 14.9% of the Woman was wasted based on MUAC<230. This is a reduction by half compared to findings of SMART survey in 2017 where 25.1% of the woman of reproductive age were wasted.

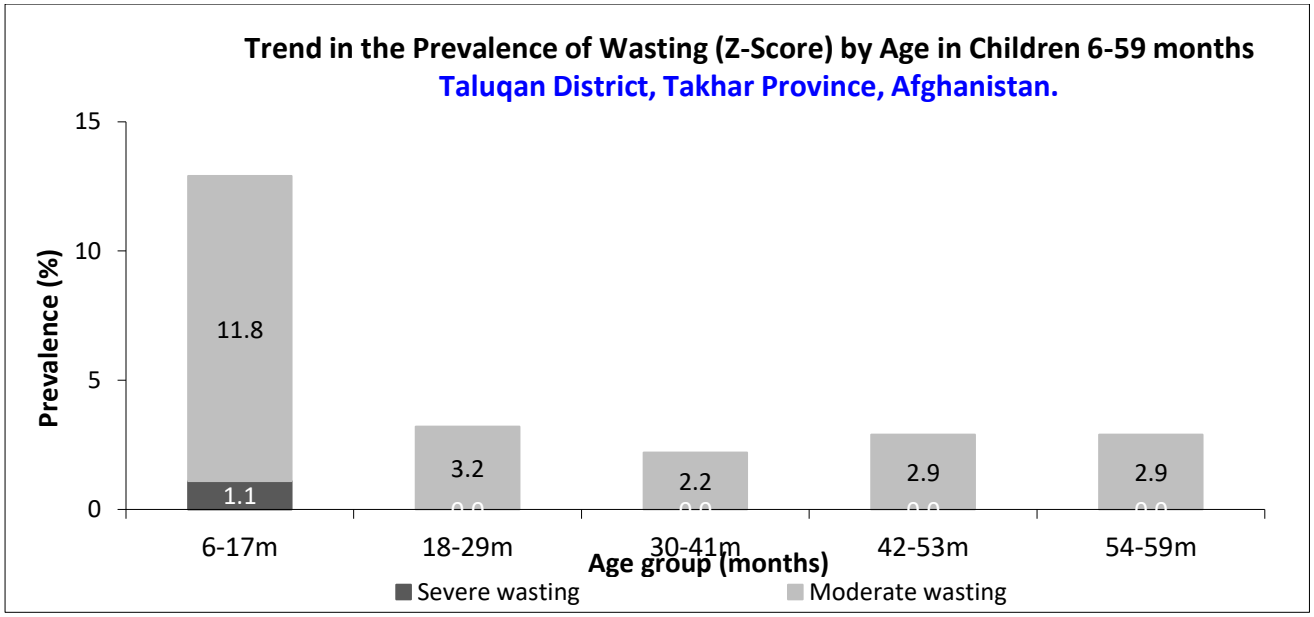

Figure 1: Trend in Prevalence of Wasting by age

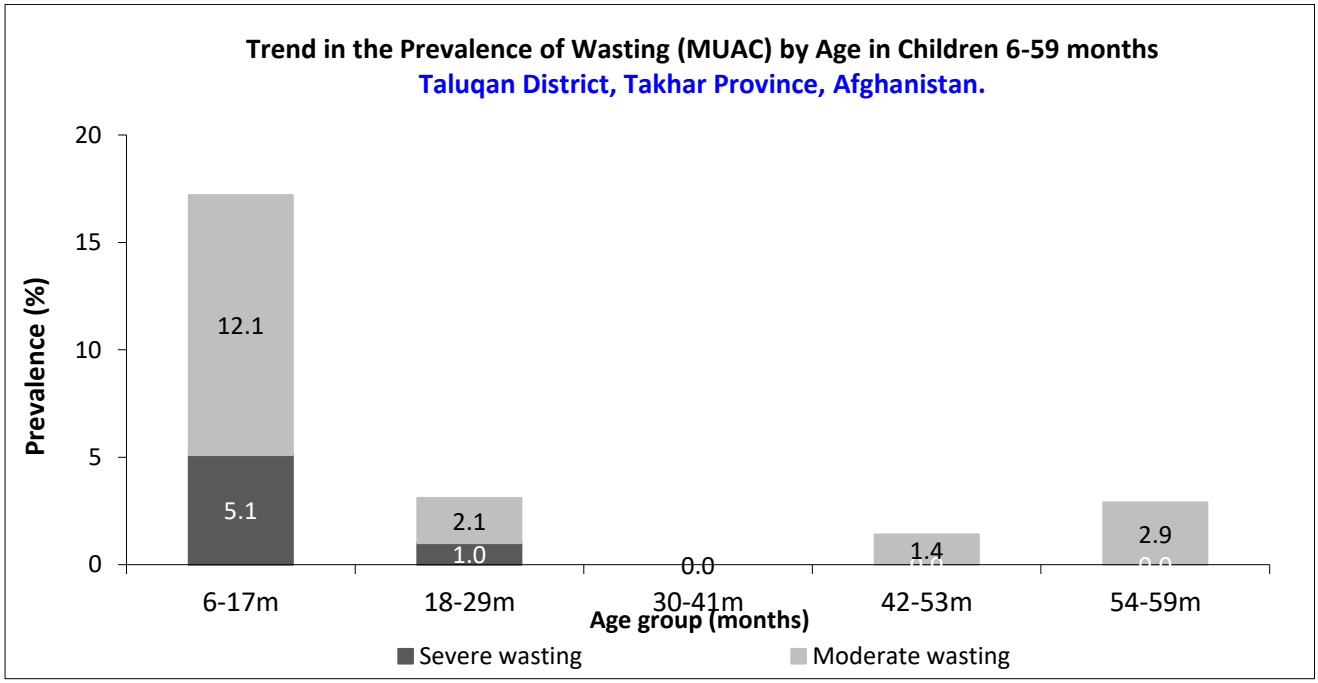

Figure 2: Trend of Prevalence of Wasting based on MUAC by Ag

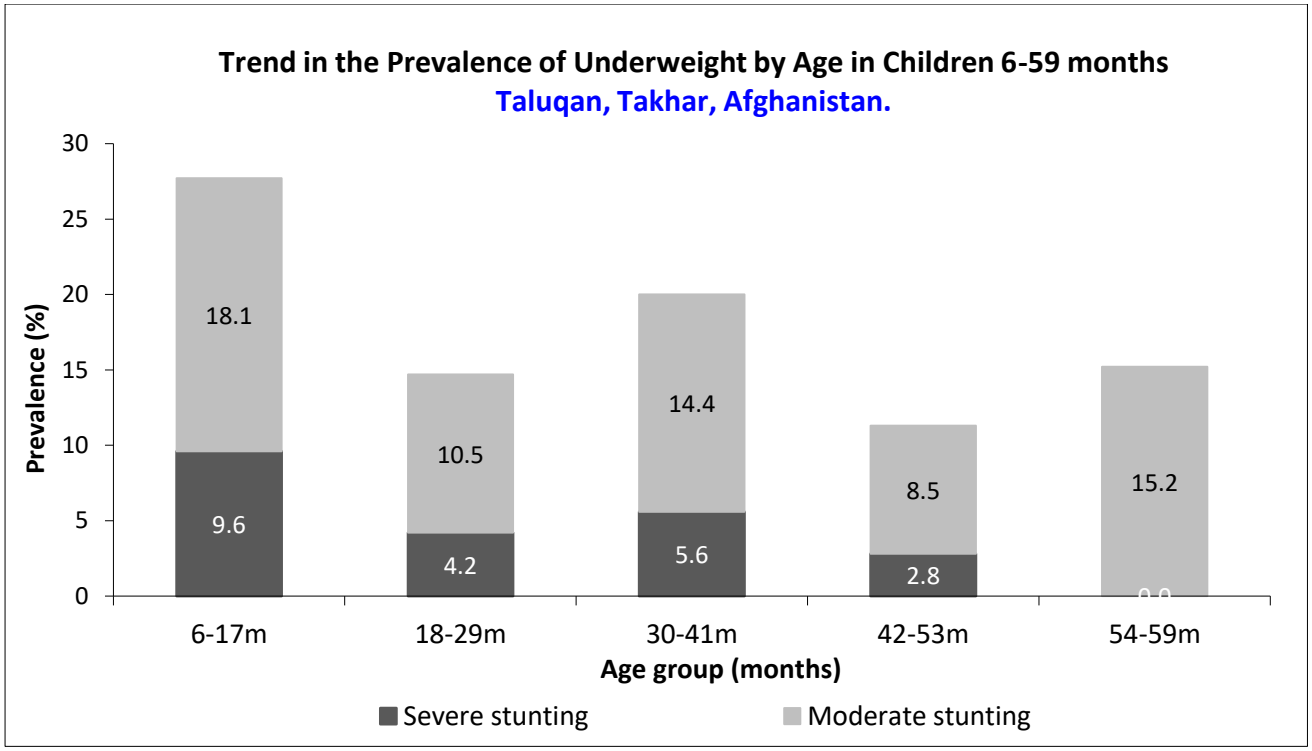

Figure 3: Trends in the Prevalence of Underweight by Age

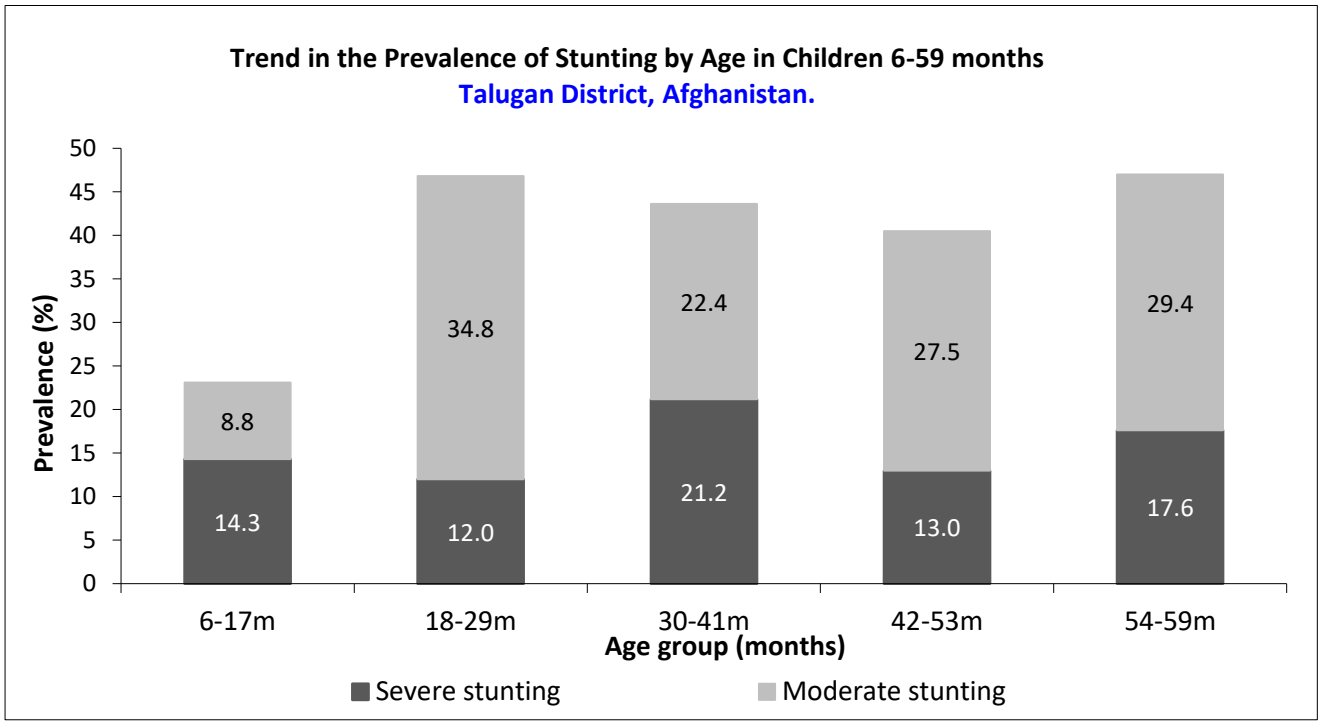

Figure 4: Trend in Prevalence of Stunting by Age

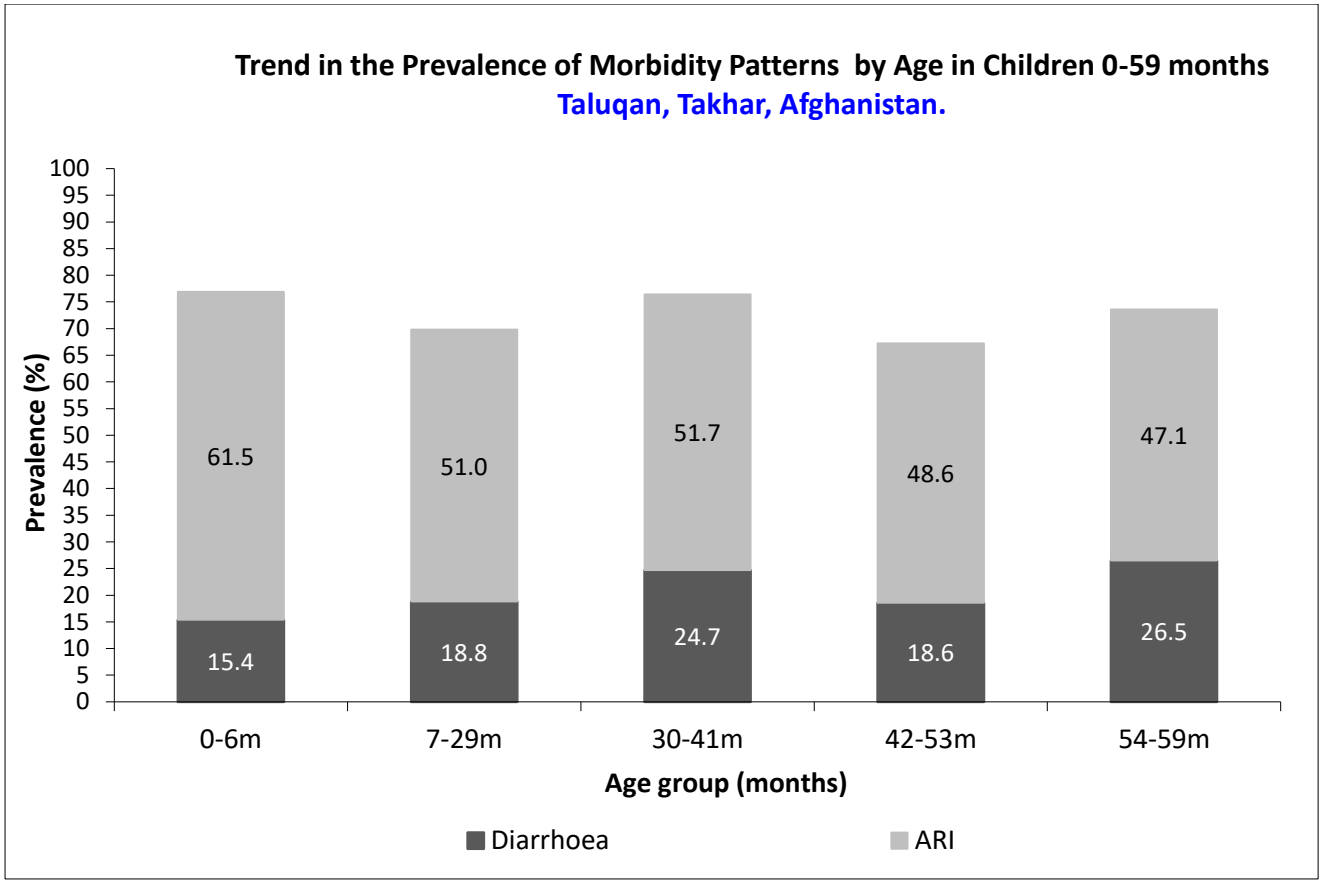

Figure 5: Prevalence of Diarrhoea & ARI 2-weeks recall.

6. Conclusions

Acute undernutrition (wasting) in children under five is lower than would be expected for a protracted humanitarian affected area hosting IDPs, but these wasting levels remain very high in the first few years of life concurrently with a high burden of stunting and underweight. The burden of common morbidities and prevalence of long-term undernutrition (stunting & underweight) among under-five children was very high in Taluqan District; more than 1 in children under five were stunted, while a fifth had diarrhoea and more than half were had acute respiratory infections two weeks prior to the assessment. A very high prevalence of non-exclusive breastfeeding of less than six-month-old infants, a lack of safe water and appropriate sanitation are direct contributors to the high levels of diarrheal disease and respiratory illness, which are the main causes for the high rates of childhood morbidity and mortality.

While acute infections are one of the most correlating factors with acute malnutrition, chronic malnutrition is more influenced by WASH, IYCF practices and limit access to health care services, therefore, one cannot separate infection and its risk factors as determinants of the whole malnutrition burden. A combination of disease and malnutrition weakens metabolism creating a vicious cycle of infection and undernourishment, leading to vulnerability to illness.

In terms of feeding practices, a large proportion of infants in Afghanistan are introduced to complementary foods too early (before six months) or too late (after six months), and the micronutrient content in the typically available foods for most infants and toddlers generally is inadequate. This contributes to vitamin and mineral deficiencies that are evidenced by the high prevalence of chronic malnutrition-or stunted growth-and anemia among young children in the country.

There is a clear need to scale up both nutrition-specific and sensitive programming; the former would include IYCF promotion & support, maternal nutrition interventions including micronutrient supplementation not forgetting to include mothers of the future adolescent girls' nutrition interventions through weekly iron-folic acid supplementation. These should be linked with nutrition-sensitive interventions: - Creating linkages with livelihoods/income generating program to improve asset base of households; improving water, sanitation, and hygiene not forgetting Food and nutrition situational monitoring, assessments and surveillance

Multi-pronged approaches aimed at improving child health care, including nutrition education, growth monitoring, exclusive breastfeeding, complementary feeding, standard case management of diarrhoea and ARI would be beneficial to combat the problem of undernutrition given aforementioned multifaceted causes.

And since chronic vulnerability and undernutrition significantly overlap, emergency needs must be addressed while building resilience and sustaining gains achieved by development

interventions. While humanitarian response primarily focuses on life-saving, services should also contribute towards mitigating the risk of undernutrition.

7. **Recommendations and priorities**

Indicators	Recommendation	Actor	Timeline (Start date)
Health and Nutrition	• Given the very high stunting rate observed in this survey, interventions are needed to focus on the critical 1,000-day window including antenatal care, IYCF, and IMNCI before a child turns two years using community-based service-delivery platforms. Programs for folic acid supplementation, multiple micronutrient supplementation, or making awareness regarding exclusive breastfeeding, and as well as perinatal and postnatal care. • Increase of community awareness regarding nutrition. To ensure nutrition messages are included in health information messages circulating by HFs and health posts. • A very high number of uncovered cases were observed in the community. The community screening and referral pathway should be strengthened, to ensure all the children in need of treatment and eligible for therapeutic programs admitted to the treatment program and are receiving medication.	AHEAD with support from relevant stakeholders (e.g. PPHD/MoPH)	Quarter 1-2, 2020

Immunization & Morbidity	• The retrospective morbidity results showed a very high number of children ill in the last two weeks. Public awareness and sensitization measures should be taken at the community level to take rid of the possible further raise of the cases in the upcoming summer. • Create awareness in the communities particularly targeting mothers about the advantages of vaccination to strengthening EPI outreaching activities and active follow-up of the absent children during the vaccination days.	AHEAD with support from relevant stakeholders (e.g. PPHD/MoPH)	Quarter 1-2, 2020

1. Appendices

Appendix 1: Plausibility Report

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

(If it is not mentioned, flagged data is included in the evaluation. Some parts of this plausibility report are more for advanced users and can be skipped for a standard evaluation)

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	**Score**
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	**5** (2.6 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**0** (p=0.188)
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=0.108)
Dig pref score - weight	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (4)
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	**2** (10)
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** (1.04)
Skewness WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**1** (-0.36)
Kurtosis WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (-0.08)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<=0.001	
			0	1	3	5	**0** (p=0.282)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	**8** %

The overall score of this survey is 8 %, this is excellent.

There were no duplicate entries detected.

Percentage of children with no exact birthday: 77 %

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 - chosen in Options panel - these values will be flagged and should be excluded from analysis for a nutrition survey in emergencies. For other surveys this might not be the best procedure e.g. when the percentage of overweight children has to be calculated):

Line=6/ID=1: HAZ (-4.638), Age may be incorrect

Line=11/ID=1: **WHZ (-5.316)**, Weight may be incorrect
Line=49/ID=2: **WHZ (-4.703)**, HAZ (-4.698), WAZ (-5.809)
Line=81/ID=2: HAZ (-4.617), Age may be incorrect
Line=91/ID=2: **WHZ (-3.286)**, Weight may be incorrect
Line=102/ID=2: HAZ (3.730), Age may be incorrect
Line=103/ID=3: HAZ (4.742), WAZ (2.558), Age may be incorrect
Line=105/ID=2: HAZ (2.371), Height may be incorrect
Line=120/ID=1: HAZ (5.841), WAZ (3.271), Age may be incorrect
Line=122/ID=2: HAZ (-5.026), Age may be incorrect
Line=130/ID=5: HAZ (-4.818), Age may be incorrect
Line=146/ID=2: **WHZ (4.204)**, Weight may be incorrect
Line=172/ID=3: **WHZ (-4.760)**, HAZ (1.625), Height may be incorrect
Line=192/ID=1: HAZ (-5.828), Age may be incorrect
Line=198/ID=2: **WHZ (-3.675)**, WAZ (-4.835), Weight may be incorrect
Line=234/ID=1: **WHZ (-3.288)**, HAZ (-5.441), WAZ (-4.858)
Line=243/ID=1: HAZ (2.041), Age may be incorrect
Line=244/ID=1: **WHZ (-3.292)**, Weight may be incorrect
Line=246/ID=1: WAZ (-4.184), Age may be incorrect
Line=249/ID=1: HAZ (1.718), Age may be incorrect
Line=250/ID=1: HAZ (2.169), Age may be incorrect
Line=282/ID=1: **WHZ (-3.318)**, Weight may be incorrect
Line=343/ID=1: **WHZ (-4.516)**, Weight may be incorrect
Line=354/ID=1: HAZ (-4.608), Height may be incorrect
Line=356/ID=1: HAZ (2.876), Age may be incorrect
Line=366/ID=2: HAZ (2.588), WAZ (2.130), Age may be incorrect
Line=379/ID=2: HAZ (3.002), Age may be incorrect

Percentage of values flagged with SMART flags:WHZ: 2.6 %, HAZ: 4.9 %, WAZ: 1.8 %

Age distribution:

Month 6 : #
Month 7 : ##########
Month 8 : ##############
Month 9 : ######
Month 10 : #######
Month 11 : ##############
Month 12 : ########
Month 13 : ############
Month 14 : #########
Month 15 : #####
Month 16 : #######
Month 17 : ######
Month 18 : ##########
Month 19 : #########
Month 20 : ###########
Month 21 : #######
Month 22 : #######
Month 23 : ##########

Month 24 : #########
Month 25 : #########
Month 26 : #####
Month 27 : #######
Month 28 : ####
Month 29 : ########
Month 30 : #####
Month 31 : ######
Month 32 : ####
Month 33 : #########
Month 34 : ##########
Month 35 : ###########
Month 36 : ###########
Month 37 : #######
Month 38 : ########
Month 39 : #######
Month 40 : ####
Month 41 : #######
Month 42 : #######
Month 43 : ##
Month 44 : ########
Month 45 : #####
Month 46 : #########
Month 47 : #####
Month 48 : ############
Month 49 : ######
Month 50 : #####
Month 51 : #####
Month 52 : ###
Month 53 : ###
Month 54 : ##
Month 55 : ##
Month 56 : ####
Month 57 : ########
Month 58 : #########
Month 59 : #########

Age ratio of 6-29 months to 30-59 months: 1.00 (The value should be around 0.85).: p-value = 0.108 (as expected)

Statistical evaluation of sex and age ratios (using Chi squared statistic):

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	64/48.4 (1.3)	35/42.3 (0.8)	99/90.7 (1.1)	1.83
18 to 29	12	50/46.7 (1.1)	46/40.8 (1.1)	96/87.5 (1.1)	1.09
30 to 41	12	47/45.7 (1.0)	43/40.0 (1.1)	90/85.7 (1.1)	1.09
42 to 53	12	28/45.0 (0.6)	43/39.4 (1.1)	71/84.3 (0.8)	0.65
54 to 59	6	19/22.3 (0.9)	15/19.5 (0.8)	34/41.7 (0.8)	1.27
6 to 59	54	208/195.0 (1.1)	182/195.0 (0.9)		1.14

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 0.188 (boys and girls equally represented)
Overall age distribution: p-value = 0.254 (as expected)
Overall age distribution for boys: p-value = 0.016 (significant difference)
Overall age distribution for girls: p-value = 0.477 (as expected)
Overall sex/age distribution: p-value = 0.001 (significant difference)

Distribution of month of birth

Jan: ##
Feb: ######################
Mar: ##
Apr: ####################################
May: ###
Jun: ############################
Jul: ####################
Aug: ################################
Sep: ################
Oct: ####################
Nov: ######################
Dec: ############################

Digit preference Weight:

Digit .0 : ###################################
Digit .1 : ##
Digit .2 : ##
Digit .3 : ####################################
Digit .4 : ##
Digit .5 : ##
Digit .6 : ################################
Digit .7 : ################################
Digit .8 : ##
Digit .9 : ################################

Digit preference score: **4** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)
p-value for chi2: 0.693

Digit preference Height:

Digit .0 : ################################
Digit .1 : ###################################
Digit .2 : ##
Digit .3 : ##
Digit .4 : ##
Digit .5 : ######################################
Digit .6 : ###################################

Digit .7 : ##
Digit .8 : ################################
Digit .9 : ############################

Digit preference score: **6** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)
p-value for chi2: 0.150

Digit preference MUAC:

Digit .0 : ##########
Digit .1 : ##############################
Digit .2 : ##
Digit .3 : ##
Digit .4 : ##
Digit .5 : ################################
Digit .6 : ##
Digit .7 : ##
Digit .8 : ######################################
Digit .9 : ##

Digit preference score: **10** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)
p-value for chi2: 0.000 (significant difference)

Evaluation of Standard deviation, Normal distribution, Skewness and Kurtosis using the 3 exclusion (Flag) procedures

.	no exclusion	exclusion from reference mean (WHO flags)	exclusion from observed mean (SMART flags)
WHZ			
Standard Deviation SD:	1.21	1.18	1.04
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	7.4%	7.2%	5.3%
calculated with current SD:	6.9%	6.3%	3.6%
calculated with a SD of 1:	3.7%	3.5%	3.1%
HAZ			
Standard Deviation SD:	1.59	1.59	1.32
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	39.2%	39.2%	39.1%
calculated with current SD:	39.2%	39.2%	38.8%
calculated with a SD of 1:	33.2%	33.2%	35.4%
WAZ			
Standard Deviation SD:	1.21	1.21	1.11
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	19.2%	19.2%	18.5%
calculated with current SD:	21.1%	21.1%	18.7%
calculated with a SD of 1:	16.5%	16.5%	16.2%

Results for Shapiro-Wilk test for normally (Gaussian) distributed data:

WHZ	p= 0.000	p= 0.000	p= 0.004
HAZ	p= 0.000	p= 0.000	p= 0.006
WAZ	p= 0.005	p= 0.005	p= 0.154

(If p < 0.05 then the data are not normally distributed. If p > 0.05 you can consider the data normally distributed)

Skewness

WHZ	-0.77	-0.65	-0.36
HAZ	0.65	0.65	0.19
WAZ	-0.23	-0.23	-0.15

If the value is:
-below minus 0.4 there is a relative excess of wasted/stunted/underweight subjects in the sample
-between minus 0.4 and minus 0.2, there may be a relative excess of wasted/stunted/underweight subjects in the sample.
-between minus 0.2 and plus 0.2, the distribution can be considered as symmetrical.
-between 0.2 and 0.4, there may be an excess of obese/tall/overweight subjects in the sample.
-above 0.4, there is an excess of obese/tall/overweight subjects in the sample

Kurtosis

WHZ	1.90	1.48	-0.08
HAZ	1.64	1.64	-0.39
WAZ	1.05	1.05	0.01

Kurtosis characterizes the relative size of the body versus the tails of the distribution. Positive kurtosis indicates relatively large tails and small body. Negative kurtosis indicates relatively large body and small tails.
If the absolute value is:
-above 0.4 it indicates a problem. There might have been a problem with data collection or sampling.
-between 0.2 and 0.4, the data may be affected with a problem.
-less than an absolute value of 0.2 the distribution can be considered as normal.

Test if cases are randomly distributed or aggregated over the clusters by calculation of the Index of Dispersion (ID) and comparison with the Poisson distribution for:

WHZ < -2: ID=1.15 (p=0.282)
WHZ < -3: ID=1.00 (p=0.462)
GAM: ID=1.15 (p=0.282)
SAM: ID=1.00 (p=0.462)
HAZ < -2: ID=1.67 (p=0.021)
HAZ < -3: ID=2.43 (p=0.000)
WAZ < -2: ID=1.55 (p=0.043)
WAZ < -3: ID=0.83 (p=0.697)

Subjects with SMART flags are excluded from this analysis.

The Index of Dispersion (ID) indicates the degree to which the cases are aggregated into certain clusters (the degree to which there are "pockets"). If the ID is less than 1 and p > 0.95 it indicates that the cases are UNIFORMLY distributed among the clusters. If the p value is between 0.05 and 0.95 the cases appear to be randomly distributed among the clusters, if ID is higher than 1 and p is less than 0.05 the cases are aggregated into certain cluster (there appear to be pockets of cases). If this is the case for Oedema but not for WHZ then aggregation of GAM and SAM cases is likely due to inclusion of oedematous cases in GAM and SAM estimates.

Are the data of the same quality at the beginning and the end of the clusters?

Evaluation of the SD for WHZ depending upon the order the cases are measured within each cluster (if one cluster per day is measured then this will be related to the time of the day the measurement is made).

```
Time                                        SD for WHZ
point               0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
01: 1.41 (n=25, f=1)  ########################
02: 1.26 (n=24, f=0)  ###################
03: 1.02 (n=21, f=1)  #########
```

```
04: 1.52 (n=24, f=2)  ############################
05: 1.28 (n=24, f=0)  ####################
06: 1.09 (n=24, f=1)  ############
07: 1.05 (n=22, f=0)  ###########
08: 1.14 (n=24, f=0)  ##############
09: 1.14 (n=24, f=0)  ##############
10: 1.26 (n=24, f=1)  ##################
11: 0.89 (n=23, f=0)  ####
12: 1.29 (n=20, f=1)  ####################
13: 1.01 (n=21, f=0)  #########
14: 1.52 (n=19, f=2)  ############################
15: 1.68 (n=16, f=1)  ####################################
16: 1.11 (n=12, f=0)  #############
17: 0.68 (n=11, f=0)
18: 1.22 (n=09, f=0)  OOOOOOOOOOOOOOOOO
19: 0.76 (n=05, f=0)
20: 0.89 (n=06, f=0)  OOOO
21: 0.13 (n=02, f=0)
22: 0.76 (n=03, f=0)
23: 0.29 (n=02, f=0)
24: 0.57 (n=02, f=0)

(when n is much less than the average number of subjects per cluster different symbols are
used: 0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags
found in the different time points)
```

Analysis by Team

Team	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
n =	47	44	54	46	44	58	55	42
Percentage of values flagged with SMART flags:								
WHZ:	4.3	2.3	1.9	2.2	2.3	3.4	1.8	2.4
HAZ:	2.1	6.8	9.3	4.3	6.8	3.4	1.8	4.8
WAZ:	0.0	2.3	3.7	2.2	2.3	1.7	1.8	0.0
Age ratio of 6-29 months to 30-59 months:								
	0.68	1.20	1.35	0.84	1.20	0.81	0.90	1.33
Sex ratio (male/female):								
	1.47	1.20	1.70	1.09	0.76	0.81	1.29	1.10
Digit preference Weight (%):								
.0 :	13	9	13	20	2	7	4	7
.1 :	9	23	17	7	14	9	5	5
.2 :	13	7	6	11	7	14	13	19
.3 :	17	11	4	4	7	10	11	14
.4 :	13	14	11	13	9	12	13	5
.5 :	13	7	2	17	16	16	15	14
.6 :	0	2	7	7	16	10	16	7
.7 :	9	9	17	2	2	10	7	7
.8 :	6	9	11	13	11	7	11	14
.9 :	9	9	13	7	16	5	5	7
DPS:	15	17	16	18	17	10	14	16

Digit preference score (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

Digit preference Height (%):								
.0 :	17	9	15	0	9	5	2	10
.1 :	13	14	9	2	11	12	9	5
.2 :	11	7	17	4	11	16	11	12
.3 :	9	11	15	22	11	10	7	2
.4 :	13	16	15	15	18	14	11	14

.5 :	11	11	4	17	14	7	7	12
.6 :	11	11	7	15	2	10	9	7
.7 :	6	11	7	9	9	5	15	21
.8 :	11	5	4	13	9	10	11	7
.9 :	0	5	7	2	5	10	18	10
DPS:	14	12	15	24	14	11	14	17

Digit preference score (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

Digit preference MUAC (%):

.0 :	0	5	0	2	7	2	5	0
.1 :	11	9	4	9	11	10	4	10
.2 :	4	11	17	17	14	9	5	5
.3 :	19	16	4	4	20	21	4	5
.4 :	15	14	20	13	7	12	18	14
.5 :	9	5	13	13	7	3	11	5
.6 :	9	9	11	13	5	21	11	17
.7 :	2	14	15	9	9	9	20	14
.8 :	13	5	4	17	11	3	15	14
.9 :	19	14	13	2	9	10	7	17
DPS:	21	14	21	18	14	21	19	19

Digit preference score (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

Standard deviation of WHZ:

SD	1.24	0.95	1.19	0.98	1.33	1.24	1.38	1.23

Prevalence (< -2) observed:

%	6.4	7.4	6.8	8.6	12.7	7.1

Prevalence (< -2) calculated with current SD:

%	7.2	7.1	7.5	6.8	9.7	4.4

Prevalence (< -2) calculated with a SD of 1:

%	3.5	4.0	2.7	3.2	3.6	1.8

Standard deviation of HAZ:

SD	1.49	1.49	2.12	1.43	1.72	1.33	1.28	1.43

observed:

%	34.0	36.4	38.9	41.3	25.0	55.2	40.0	38.1

calculated with current SD:

%	37.6	32.0	36.3	49.8	26.3	50.2	43.5	38.5

calculated with a SD of 1:

%	31.9	24.3	22.9	49.8	13.8	50.3	41.7	33.8

Statistical evaluation of sex and age ratios (using Chi squared statistic) for:

Team 1:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	4/6.5 (0.6)	3/4.4 (0.7)	7/10.9 (0.6)	1.33
18 to 29	12	7/6.3 (1.1)	5/4.3 (1.2)	12/10.5 (1.1)	1.40
30 to 41	12	3/6.2 (0.5)	7/4.2 (1.7)	10/10.3 (1.0)	0.43
42 to 53	12	10/6.1 (1.7)	3/4.1 (0.7)	13/10.2 (1.3)	3.33
54 to 59	6	4/3.0 (1.3)	1/2.0 (0.5)	5/5.0 (1.0)	4.00
6 to 59	54	28/23.5 (1.2)	19/23.5 (0.8)		1.47

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 0.189 (boys and girls equally represented)
Overall age distribution: p-value = 0.660 (as expected)
Overall age distribution for boys: p-value = 0.233 (as expected)
Overall age distribution for girls: p-value = 0.506 (as expected)
Overall sex/age distribution: p-value = 0.026 (significant difference)

Team 2:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	6/5.6 (1.1)	6/4.7 (1.3)	12/10.2 (1.2)	1.00
18 to 29	12	6/5.4 (1.1)	6/4.5 (1.3)	12/9.9 (1.2)	1.00
30 to 41	12	6/5.3 (1.1)	3/4.4 (0.7)	9/9.7 (0.9)	2.00
42 to 53	12	4/5.2 (0.8)	2/4.3 (0.5)	6/9.5 (0.6)	2.00
54 to 59	6	2/2.6 (0.8)	3/2.1 (1.4)	5/4.7 (1.1)	0.67
6 to 59	54	24/22.0 (1.1)	20/22.0 (0.9)		1.20

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 0.547 (boys and girls equally represented)
Overall age distribution: p-value = 0.712 (as expected)
Overall age distribution for boys: p-value = 0.963 (as expected)
Overall age distribution for girls: p-value = 0.568 (as expected)
Overall sex/age distribution: p-value = 0.450 (as expected)

Team 3:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	13/7.9 (1.6)	6/4.7 (1.3)	19/12.6 (1.5)	2.17
18 to 29	12	7/7.6 (0.9)	5/4.5 (1.1)	12/12.1 (1.0)	1.40
30 to 41	12	9/7.5 (1.2)	4/4.4 (0.9)	13/11.9 (1.1)	2.25
42 to 53	12	3/7.4 (0.4)	4/4.3 (0.9)	7/11.7 (0.6)	0.75
54 to 59	6	2/3.6 (0.5)	1/2.1 (0.5)	3/5.8 (0.5)	2.00
6 to 59	54	34/27.0 (1.3)	20/27.0 (0.7)		1.70

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 0.057 (boys and girls equally represented)
Overall age distribution: p-value = 0.157 (as expected)
Overall age distribution for boys: p-value = 0.138 (as expected)
Overall age distribution for girls: p-value = 0.892 (as expected)
Overall sex/age distribution: p-value = 0.010 (significant difference)

Team 4:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	7/5.6 (1.3)	2/5.1 (0.4)	9/10.7 (0.8)	3.50
18 to 29	12	7/5.4 (1.3)	5/4.9 (1.0)	12/10.3 (1.2)	1.40
30 to 41	12	7/5.3 (1.3)	8/4.8 (1.7)	15/10.1 (1.5)	0.88
42 to 53	12	0/5.2 (0.0)	7/4.8 (1.5)	7/9.9 (0.7)	0.00
54 to 59	6	3/2.6 (1.2)	0/2.4 (0.0)	3/4.9 (0.6)	
6 to 59	54	24/23.0 (1.0)	22/23.0 (1.0)		1.09

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 0.768 (boys and girls equally represented)
Overall age distribution: p-value = 0.339 (as expected)
Overall age distribution for boys: p-value = 0.154 (as expected)
Overall age distribution for girls: p-value = 0.117 (as expected)
Overall sex/age distribution: p-value = 0.007 (significant difference)

Team 5:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	5/4.4 (1.1)	3/5.8 (0.5)	8/10.2 (0.8)	1.67
18 to 29	12	9/4.3 (2.1)	7/5.6 (1.2)	16/9.9 (1.6)	1.29
30 to 41	12	2/4.2 (0.5)	7/5.5 (1.3)	9/9.7 (0.9)	0.29
42 to 53	12	3/4.1 (0.7)	7/5.4 (1.3)	10/9.5 (1.1)	0.43
54 to 59	6	0/2.0 (0.0)	1/2.7 (0.4)	1/4.7 (0.2)	0.00
6 to 59	54	19/22.0 (0.9)	25/22.0 (1.1)		0.76

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 0.366 (boys and girls equally represented)
Overall age distribution: p-value = 0.122 (as expected)
Overall age distribution for boys: p-value = 0.066 (as expected)
Overall age distribution for girls: p-value = 0.457 (as expected)
Overall sex/age distribution: p-value = 0.014 (significant difference)

Team 6:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	11/6.0 (1.8)	5/7.4 (0.7)	16/13.5 (1.2)	2.20
18 to 29	12	1/5.8 (0.2)	9/7.2 (1.3)	10/13.0 (0.8)	0.11
30 to 41	12	6/5.7 (1.1)	3/7.0 (0.4)	9/12.7 (0.7)	2.00
42 to 53	12	3/5.6 (0.5)	10/6.9 (1.4)	13/12.5 (1.0)	0.30
54 to 59	6	5/2.8 (1.8)	5/3.4 (1.5)	10/6.2 (1.6)	1.00
6 to 59	54	26/29.0 (0.9)	32/29.0 (1.1)		0.81

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 0.431 (boys and girls equally represented)
Overall age distribution: p-value = 0.330 (as expected)
Overall age distribution for boys: p-value = 0.026 (significant difference)
Overall age distribution for girls: p-value = 0.225 (as expected)
Overall sex/age distribution: p-value = 0.002 (significant difference)

Team 7:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	12/7.2 (1.7)	6/5.6 (1.1)	18/12.8 (1.4)	2.00
18 to 29	12	5/7.0 (0.7)	3/5.4 (0.6)	8/12.3 (0.6)	1.67
30 to 41	12	9/6.8 (1.3)	6/5.3 (1.1)	15/12.1 (1.2)	1.50
42 to 53	12	3/6.7 (0.4)	7/5.2 (1.3)	10/11.9 (0.8)	0.43
54 to 59	6	2/3.3 (0.6)	2/2.6 (0.8)	4/5.9 (0.7)	1.00
6 to 59	54	31/27.5 (1.1)	24/27.5 (0.9)		1.29

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 0.345 (boys and girls equally represented)
Overall age distribution: p-value = 0.262 (as expected)
Overall age distribution for boys: p-value = 0.136 (as expected)
Overall age distribution for girls: p-value = 0.746 (as expected)
Overall sex/age distribution: p-value = 0.033 (significant difference)

Team 8:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	6/5.1 (1.2)	4/4.7 (0.9)	10/9.8 (1.0)	1.50
18 to 29	12	8/4.9 (1.6)	6/4.5 (1.3)	14/9.4 (1.5)	1.33
30 to 41	12	5/4.8 (1.0)	5/4.4 (1.1)	10/9.2 (1.1)	1.00
42 to 53	12	2/4.8 (0.4)	3/4.3 (0.7)	5/9.1 (0.6)	0.67
54 to 59	6	1/2.4 (0.4)	2/2.1 (0.9)	3/4.5 (0.7)	0.50
6 to 59	54	22/21.0 (1.0)	20/21.0 (1.0)		1.10

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 0.758 (boys and girls equally represented)
Overall age distribution: p-value = 0.328 (as expected)
Overall age distribution for boys: p-value = 0.350 (as expected)
Overall age distribution for girls: p-value = 0.894 (as expected)
Overall sex/age distribution: p-value = 0.216 (as expected)

Evaluation of the SD for WHZ depending upon the order the cases are measured within each cluster (if one cluster per day is measured then this will be related to the time of the day the measurement is made).

Team: 1

```
Time                                          SD for WHZ
point                 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
01: 1.19 (n=03, f=0)  ################
02: 0.05 (n=03, f=0)
03: 0.60 (n=03, f=0)
04: 1.34 (n=03, f=0)  ######################
05: 0.91 (n=03, f=0)  #####
06: 1.13 (n=03, f=0)  #############
07: 2.19 (n=03, f=0)  ##########################################################
08: 0.45 (n=03, f=0)
09: 0.48 (n=03, f=0)
10: 2.00 (n=03, f=1)  ################################################
11: 0.87 (n=03, f=0)  ###
12: 0.57 (n=02, f=0)
13: 0.78 (n=03, f=0)
14: 3.12 (n=02, f=1)  ###################################################################
15: 0.77 (n=02, f=0)

(when n is much less than the average number of subjects per cluster different symbols are
used: 0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags
found in the different time points)
```

Team: 2

```
Time                                          SD for WHZ
```

```
point                  0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
01: 0.37 (n=03, f=0)
02: 1.96 (n=02, f=0)   OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
03: 0.57 (n=03, f=0)
04: 0.93 (n=03, f=0)   ######
05: 1.71 (n=03, f=0)   ####################################
06: 1.54 (n=03, f=0)   ################################
07: 1.14 (n=03, f=0)   ##############
08: 0.62 (n=03, f=0)
09: 0.57 (n=02, f=0)
10: 0.58 (n=03, f=0)
11: 0.79 (n=03, f=0)
12: 0.65 (n=03, f=0)
13: 1.42 (n=03, f=0)   ##########################
14: 0.25 (n=02, f=0)
16: 0.12 (n=02, f=0)
17: 0.24 (n=02, f=0)
```

(when n is much less than the average number of subjects per cluster different symbols are used: 0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags found in the different time points)

Team: 3

```
Time                                          SD for WHZ
point                  0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
01: 0.27 (n=03, f=0)
02: 0.43 (n=03, f=0)
03: 0.03 (n=02, f=0)
04: 1.39 (n=03, f=1)   ########################
05: 1.19 (n=03, f=0)   ################
06: 0.46 (n=03, f=0)
07: 0.89 (n=03, f=0)   ####
08: 0.28 (n=03, f=0)
09: 0.73 (n=03, f=0)
10: 0.88 (n=02, f=0)   ###
11: 1.10 (n=03, f=0)   #############
12: 0.57 (n=02, f=0)
13: 1.47 (n=02, f=0)   ############################
14: 0.96 (n=02, f=0)   #######
15: 2.47 (n=02, f=0)   ##################################################################
16: 0.18 (n=02, f=0)
17: 0.36 (n=02, f=0)
18: 0.89 (n=02, f=0)   ####
19: 0.08 (n=02, f=0)
20: 1.22 (n=02, f=0)   ##################
22: 0.96 (n=02, f=0)   #######
```

(when n is much less than the average number of subjects per cluster different symbols are used: 0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags found in the different time points)

Team: 4

```
Time                                          SD for WHZ
point                  0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
01: 0.59 (n=03, f=0)
02: 0.40 (n=03, f=0)
03: 1.57 (n=03, f=0)   ################################
04: 0.54 (n=03, f=0)
05: 1.18 (n=03, f=0)   ################
06: 0.84 (n=03, f=0)   ##
07: 0.31 (n=02, f=0)
08: 0.89 (n=02, f=0)   ####
09: 1.15 (n=03, f=0)   ###############
10: 0.96 (n=03, f=0)   #######
11: 0.73 (n=03, f=0)
12: 0.61 (n=02, f=0)
13: 1.49 (n=02, f=0)   ############################
15: 0.33 (n=02, f=0)
16: 1.32 (n=02, f=0)   ######################
17: 0.80 (n=02, f=0)
18: 0.33 (n=02, f=0)
20: 0.25 (n=02, f=0)
```

(when n is much less than the average number of subjects per cluster different symbols are used: 0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags found in the different time points)

Team: 5

```
Time                                                SD for WHZ
point                 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
01: 1.74 (n=03, f=0)  ######################################
02: 0.23 (n=03, f=0)
03: 1.60 (n=02, f=0)  ################################
04: 2.99 (n=02, f=1)  ##################################################################
05: 1.11 (n=03, f=0)  #############
06: 1.04 (n=03, f=0)  ##########
07: 0.10 (n=03, f=0)
08: 1.50 (n=03, f=0)  ##############################
09: 0.78 (n=03, f=0)
10: 1.48 (n=03, f=0)  ############################
11: 0.11 (n=02, f=0)
12: 0.68 (n=03, f=0)
13: 0.37 (n=03, f=0)
14: 0.50 (n=03, f=0)
15: 1.72 (n=02, f=0)  ######################################
```

(when n is much less than the average number of subjects per cluster different symbols are used: 0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags found in the different time points)

Team: 6

```
Time                                                SD for WHZ
point                 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
01: 2.77 (n=03, f=1)  ##################################################################
02: 2.34 (n=03, f=0)  ##################################################################
03: 0.57 (n=03, f=0)
04: 0.33 (n=03, f=0)
05: 1.24 (n=03, f=0)  ##################
06: 0.85 (n=03, f=0)  ##
07: 0.08 (n=03, f=0)
08: 1.27 (n=03, f=0)  ####################
09: 0.49 (n=03, f=0)
10: 1.45 (n=03, f=0)  ############################
11: 0.93 (n=03, f=0)  #####
12: 2.15 (n=02, f=0)  ############################################################
13: 0.88 (n=03, f=0)  ###
14: 1.88 (n=03, f=1)  ###############################################
15: 1.01 (n=03, f=0)  #########
16: 1.64 (n=03, f=0)  ###################################
```

(when n is much less than the average number of subjects per cluster different symbols are used: 0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags found in the different time points)

Team: 7

```
Time                                                SD for WHZ
point                 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
01: 2.14 (n=04, f=0)  ##########################################################
02: 1.36 (n=04, f=0)  ########################
03: 0.55 (n=03, f=0)
04: 0.78 (n=04, f=0)
05: 0.26 (n=03, f=0)
06: 1.64 (n=04, f=0)  ###################################
07: 1.12 (n=04, f=0)  #############
08: 1.78 (n=04, f=0)  ########################################
09: 2.17 (n=04, f=0)  ############################################################
10: 1.46 (n=04, f=0)  ############################
11: 0.86 (n=03, f=0)  ##
12: 2.47 (n=04, f=1)  ##################################################################
13: 0.21 (n=02, f=0)
14: 0.97 (n=03, f=0)  #######
15: 0.20 (n=02, f=0)
```

```
(when n is much less than the average number of subjects per cluster different symbols are
used: 0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags
found in the different time points)
```

Team: 8

```
Time                                                SD for WHZ
point                 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
01: 0.27 (n=03, f=0)
02: 1.25 (n=03, f=0)  ###################
03: 1.07 (n=02, f=0)  ###########
04: 0.56 (n=03, f=0)
05: 1.97 (n=03, f=0)  ################################################
06: 0.54 (n=02, f=0)
08: 1.35 (n=03, f=0)  ######################
09: 1.58 (n=03, f=0)  ################################
10: 0.86 (n=03, f=0)  ##
11: 0.80 (n=03, f=0)
12: 0.29 (n=02, f=0)
13: 0.36 (n=03, f=0)
14: 1.01 (n=03, f=0)  #########
15: 4.54 (n=02, f=1)  ###################################################################

(when n is much less than the average number of subjects per cluster different symbols are
used: 0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags
found in the different time points)
```

(for better comparison it can be helpful to copy/paste part of this report into Excel)

Appendix 2: Assignment of Clusters

No	Province	District	Geographical Unit	Population	Cluster No
1	Takhar	Taloqan	شهرکهنه تالقان	3617	1,2
2	Takhar	Taloqan	صوفی جلات	393	3
3	Takhar	Taloqan	بادام دره	1198	4
4	Takhar	Taloqan	حاجی محمداکبر	1286	5
5	Takhar	Taloqan	باغ ذخیره	1093	6
6	Takhar	Taloqan	قشلاق پایین	1371	7
7	Takhar	Taloqan	شهرکهنه قسمت ۲	1403	8
8	Takhar	Taloqan	صوفی کریم	413	9
9	Takhar	Taloqan	شاه بای گیلدی	567	10
10	Takhar	Taloqan	قوماندان نیاز محمد (نجیب آباد)	602	11
11	Takhar	Taloqan	اسماعیل سنگلاخ (پایه اریبا)	882	12
12	Takhar	Taloqan	شاه قیمت	511	13
13	Takhar	Taloqan	قزاق نوآباد	301	14
14	Takhar	Taloqan	قزاق جامع (کته بیک)	1470	15

15	Takhar	Taloqan	نوآباد خطایان 1 و خطایان 2	1785	16
16	Takhar	Taloqan	چقل ملک ها	805	17
17	Takhar	Taloqan	تکه توی مست	1610	18
18	Takhar	Taloqan	خواجه پلان خواه	538	19
19	Takhar	Taloqan	روستاق آبادسراسنگ	455	20
20	Takhar	Taloqan	عزیزآباد	280	21
21	Takhar	Taloqan	داکترقادر	630	22
22	Takhar	Taloqan	حاجی نورمحمد	455	23
23	Takhar	Taloqan	گلانترعبدالوهاب	427	24
24	Takhar	Taloqan	گولای باغ	1050	25

Appendix 3: Takhar Province Districts Map

Appendix 4: Questionnaire

Part one: Child Questionnaire 0-59 months, Anthropometry section

Survey Date (DD/MM/YYYY)		Household Number	
Cluster/Village Name		Province Name	
Cluster/ Village Number		Start of Interview Time (HH:MM)	
Team Number		End of Interview Time (HH:MM)	

1	2	3	4	5	6	7	8	9	10
Child ID	**Sex** (f/m)	**Birthday** (dd/mm/yyyy)	**Age** (months)	**Weight** (00.0 kg)	**Height or length** (00.0 cm)	**Measure** (l/h)*	**Bilateral edema Y/N**	**MUAC** (000 cm) *Left arm*	**With clothes** (y/n)
1									
2									
3									
4									
5									
6									
7									
8									

Child (6-59 months) ID Number					
For any child that is identified as acutely malnourished (WHZ, MUAC, or edema) **Q1. Is the child currently receiving any malnutrition treatment services?** *Probe, ask for enrollment card, and observe the treatment food (RUTF / RUSF) to identify the type of treatment service* 1=OPD SAM 2=OPD MAM 3=No treatment 98=Don't know					

If the child is <u>not</u> enrolled in a treatment program, refer to nearest appropriate treatment center **Q2. Did you refer the child?** 1=yes 0=no					

Note <u>only</u> if length is measured for a child who is older than 2 years or height is measured for a child who is younger than 2 years, due to unavoidable circumstances in the field

Part one: Child Questionnaire Health and Immunization Section

Child (0-59 months) ID Number					
Q3. In the past two weeks, has the child had ARI*? *perceptions of a child who has a cough, is breathing faster than usual with short, quick breaths or is having difficulty breathing, excluding children that had only a blocked nose. 1=yes 0=no 98=don't know					
Q3. In the past two weeks, has the child had diarrhea? *Diarrhea defined as the passage of three or more loose or liquid stools in 24 hrs* 1=yes 0=no 98=don't know					

Child (12-23 months) ID Number					
Q4. Has the child received <u>first and second doses</u> of measles vaccination? (on the upper right arm) *Ask for vaccination card to verify if available* 0=Has not received first doses 1=Received first doses as confirmed by vaccination card 2=Received first doses as confirmed by caregiver recall 98=Don't know					
Ask for vaccination card to verify if available 0=Has not received two doses 1=Received second doses as confirmed by vaccination card 2=Received second doses as confirmed by caregiver recall 98=Don't know					

Part Two: Caregiver questionnaires, Nutrition Section

Woman (15-49 years) age in years					
Q5: Physiologic Status of woman					

1=Pregnant 2=Lactating 3=Pregnant and lactating 4=None					
Age of caregiver by year					
MUAC measurement (cm)					

General comments (optional)

Appendix 5: Seasonal and Event Calendar

نام ماه	ماه	1394	ماه	1395	ماه	1396	ماه	1397	ماه	1398
حمل	59	نورزوی بردن، آغازمکاتب وگل کردن وشگفتن، روزدهقان، خانه تکانی ، آماده کردن سمنک وآب میوه، میله رفتن، بزکشی، میله گل رغوان	47	نورزوی بردن، آغازمکاتب وگل کردن وشگفتن، روزدهقان، خانه تکانی ، آماده کردن سمنک وآب میوه، میله رفتن، بزکشی، میله گل رغوان	35	نورزوی بردن، آغازمکاتب وگل کردن وشگفتن، روزدهقان، خانه تکانی ، آماده کردن سمنک وآب میوه، میله رفتن، بزکشی، میله گل رغوان	23	نورزوی بردن، آغازمکاتب وگل کردن وشگفتن، روزدهقان، خانه تکانی ، آماده کردن سمنک وآب میوه، میله رفتن، بزکشی، میله گل رغوان	11	نورزوی بردن، آغازمکاتب وگل کردن وشگفتن، روزدهقان، خانه تکانی ، آماده کردن سمنک وآب میوه، میله رفتن، بزکشی، میله گل رغوان
ثور	58	سرکشیدن گندم، باریدن باران غوره گرن کمان روستم روزه	46	سرکشیدن گندم، باریدن باران غوره گرن کمان روستم روزه	34	سرکشیدن گندم، باریدن باران غوره گرن کمان روستم روزه	22	سرکشیدن گندم، باریدن باران غوره گرن کمان روستم روزه	10	سرکشیدن گندم، باریدن باران غوره گرن کمان روستم روزه
جوزا	57	یختن میوه جات، آلوبالو وزردالو، شفتالویی جوزایی دروگندم، گرم شدن هوا	45	یختن میوه جات، آلوبالو وزردالو، شفتالویی جوزایی دروگندم، گرم شدن هوا	33	یختن میوه جات، آلوبالو وزردالو، شفتالویی جوزایی دروگندم، گرم شدن هوا	21	یختن میوه جات، آلوبالو وزردالو، شفتالویی جوزایی دروگندم، گرم شدن هوا	9	یختن میوه جات، آلوبالو وزردالو، شفتالویی جوزایی دروگندم، گرم شدن هوا
سرطان	56	خربوزه، رسیدن تربوز،شفتالو،رسیدن گرم دروجو، باب، ترکاری هوا نسبی بودن	44	خربوزه، رسیدن ترکاری تربوز،شفتالو،رسیدن نسبی بودن گرم دروجو، باب، هوا	32	خربوزه، رسیدن ترکاری تربوز،شفتالو،رسیدن بودن گرم دروجو، باب، هوا نسبی	20	خربوزه، رسیدن ترکاری تربوز،شفتالو،رسیدن بودن گرم دروجو، باب، هوا نسبی	8	خربوزه، رسیدن تربوز،شفتالو،رسیدن گرم دروجو، باب، ترکاری هوا نسبی بودن
اسد	55	رسیدن سیب، انگور، خربوزه ارکانی، شدت گرمی، رفتن به پالیزها، کشت شالی، عیدقربان	43	رسیدن سیب، انگور، خربوزه ارکانی، شدت گرمی، رفتن به پالیزها، کشت شالی، عیدقربان	31	رسیدن سیب، انگور، خربوزه ارکانی، شدت گرمی، رفتن به پالیزها، کشت شالی، عیدقربان	19	رسیدن سیب، انگور، خربوزه ارکانی، شدت گرمی، رفتن به پالیزها، کشت شالی، عیدقربان	7	رسیدن سیب، انگور، خربوزه ارکانی، شدت گرمی، رفتن به پالیزها، کشت شالی، عیدقربان
سنبله	54	سردشدن هوا، آمدن ازپالیزها، رسیدن سنجت وچواری	42	سردشدن هوا، آمدن ازپالیزها، رسیدن سنجت وچواری	30	سردشدن هوا، آمدن ازپالیزها، رسیدن سنجت وچواری	18	سردشدن هوا، آمدن ازپالیزها، رسیدن سنجت وچواری	6	سردشدن هوا، آمدن ازپالیزها، رسیدن سنجت وچواری
میزان	53	ماه صفر، دروشالی، رسیدن سیب وبویه	41	ماه صفر، دروشالی، رسیدن سیب وبویه	29	ماه صفر، دروشالی، رسیدن سیب وبویه	17	ماه صفر، دروشالی، رسیدن سیب وبویه	5	ماه صفر، دروشالی، رسیدن سیب وبویه
عقرب	52	مولودشریف، آمدن ازباغ وایلاق، کاکل بام ها، کشت گندم	40	مولودشریف، آمدن ازباغ وایلاق، کاکل بام ها، کشت گندم	28	مولودشریف، آمدن ازباغ وایلاق، کاکل بام ها، کشت گندم	16	مولودشریف، آمدن ازباغ وایلاق، کاکل بام ها، کشت گندم	4	مولودشریف، آمدن ازباغ وایلاق، کاکل بام ها، کشت گندم
قوس	51	شروع امتحانات مکاتب، شروع برف باری، شاندن بخاری، شب یلدا	39	شروع امتحانات مکاتب، شروع برف باری، شاندن بخاری، شب یلدا	27	شروع امتحانات مکاتب، شروع برف باری، شاندن بخاری، شب یلدا	15	شروع امتحانات مکاتب، شروع برف باری، شاندن بخاری، شب یلدا	3	شروع امتحانات مکاتب، شروع برف باری، شاندن بخاری، شب یلدا
جدی	50	ها گل زدن کلان،قلمچه چله مواشی آوردن عیدفطر ها، گوچی آمدن	38	ها گل زدن کلان،قلمچه چله مواشی آوردن عیدفطر ها، گوچی آمدن	26	ها گل زدن کلان،قلمچه چله مواشی آوردن عیدفطر ها، گوچی آمدن	14	ها گل زدن کلان،قلمچه چله مواشی آوردن عیدفطر ها، گوچی آمدن	2	ها گل زدن کلان،قلمچه چله مواشی آوردن عیدفطر ها، گوچی آمدن
دلوه	49	چله خورد، استفاده زیادازمحصولاجیوانی مانند شیربرینج، کتخی، شاندن سندلی	37	چله خورد، استفاده زیادازمحصولاجیوانی مانند شیربرینج، کتخی، شاندن سندلی	25	چله خورد، استفاده زیادازمحصولاجیوانی مانند شیربرینج، کتخی، شاندن سندلی	13	چله خورد، استفاده زیادازمحصولاجیوانی مانند شیربرینج، کتخی، شاندن سندلی	1	چله خورد، استفاده زیادازمحصولاجیوانی مانند شیربرینج، کتخی، شاندن سندلی
حوت	48	ختم چله خورد، نهال شانی بادهای زیاد، جشن های بزکشی، بازشدن غنجه های گل، تاق بری	36	ختم چله خورد، نهال شانی بادهای زیاد، جشن های بزکشی، بازشدن غنجه های گل، تاق بری	24	ختم چله خورد، نهال شانی بادهای زیاد، جشن های بزکشی، بازشدن غنجه های گل، تاق بری	12	ختم چله خورد، نهال شانی بادهای زیاد، جشن های بزکشی، بازشدن غنجه های گل، تاق بری		ختم چله خورد، نهال شانی بادهای زیاد، جشن های بزکشی، بازشدن غنجه های گل، تاق بری