AFGHANISTAN

Rapid SMART Assessment Report

Khugyani District, Nangarhar province

2nd to 9th January 2018

Survey Manager : Dr. Shafiqullah Bashari

Report Compiled by: Dr. Baidar Bakht Habib

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Implemented by AADA with technical suport of Action Against Hunger
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LIST OF ABBREVIATIONS

ACF	Action Contre la Faim| Action Against Hunger
AADA	Agency for Assistance and Development of Afghanistan
AIM	Assessments Information Management Working Group
ARI	Acute Respiratory Infection
BPHS	Basic package of health services
CSO	Central Statistics Organization
CT	Care Taker
DK	Don't not know
ENA	Essential Nutrition Assessment
GAM	Global Acute Malnutrition
OCHA	Office for the Coordination of Humanitarian Affairs
HAZ	Height for Weight Z-score
HH	Household
MoPH	Ministry of Public Health
MUAC	Mid-upper arm circumference
PNO	Provincial Nutrition Officer
RC	Reserve Cluster
SAM	Severe Acute Malnutrition
SD	Standard Deviation
SMART	Standardized Monitoring and Assessment of Relief and Transitions
WASH	Water, Sanitation and Hygiene
WH	Weight for Height
WHO	World Health Organization

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2. EXECUTIVE SUMMARY

The Rapid Nutrition Assessment was conducted between 2nd to 9th January 2018 in Khugyani District, Nangarhar province. A total of 229 households were assessed. The Rapid SMART assessment report provides a description of the methodology used, an analysis and interpretation of the survey findings on anthropometric status, child morbidity, Immunization coverage (measles), nutritional status of pregnant and lactating women and recommendations proposed.

Summary of Key survey findings:

- A total of 359 children aged 0-59 months and 347 children aged 6-59 months were assessed
- Combined GAM and SAM prevalence (based on all criteria: WHZ, MUAC and bilateral edema) was **20.2% (95% CI 15.9-24.4)** and **7.9% (95% CI 5.0 - 10.8)** respectively.
- Prevalence of Global Acute Malnutrition (GAM) based on Weight-for-Height <-2 Z score was at **12.6 %(8.0 - 19.3 95% C.I.)** and SAM was at **3.8 % (2.2 - 6.5 95% C.I.)**.
- Prevalence of GAM based on MUAC was at **10.1 % (6.5 - 15.2 95% C.I.)** and SAM was at **4.3 %(1.9 - 9.3 95% C.I)**.
- No oedema cases were identified.
- Prevalence of stunting based on Height-for-Age Z score was at **33.2 % (27.5 - 39.5 95% C.I.)** while severe stunting was **12.9 %(9.1 - 17.9 95% C.I.)**.
- Prevalence of underweight based on Weight-for-age Z score was **22.2 % (17.5 - 27.6 95% C.I.)** and severe stunting was **4.4 % (2.3 - 8.0 95% C.I.)**
- Maternal nutrition status of pregnant and lactating women with MUAC <230 mm was at **11.2%.**
- ARI and Diarrhea prevalence were at **28.1%** and **6.7%** respectively from the total assessed children under five in the target area with two weeks recall period.
- Measles immunization coverage (confirmed by card and recall) was at **48.3%**.

3. INTRODUCTION

Khugyani is one of the 22 districts of Nangarhar province in the south of Nangarhar province, bordering on Pakistan. Its population is entirely Pashtun, and was estimated at 147,300[1]

The survey was conducted in the winter season (January 2018). It was agreed (based on the security, population movement and accessibility) to select complete secure and partially secure villages in the Khugyani District as the most appropriate areas to conduct Rapid SMART assessment using the Rapid SMART methodology and the result is only representative for the Khugyani district. **See Annex 1** selected Villages list.

4. OBJECTIVES OF THE SURVEY

4.1. BROAD OBJECTIVE

To determine the nutritional status of vulnerable population mainly under five, pregnant and lactating women living in Khugyani district and to evaluate the need of emergency nutrition program.

4.2. SPECIFIC OBJECTIVE

1. To broadly estimate Global Acute Malnutrition (GAM) rates among children from 6 - 59 months living in Khugyani district, Nangarhar Province.
2. To estimate two weeks recall morbidity among children from 0- 59 months living in Khugyani district, Nangarhar Province.
3. To estimate measles vaccination coverage among children from 9 - 59 months living in Khugyani district, Nangarhar Province.
4. To estimate prevalence of malnutrition among pregnant and lactating women (PLWs).

5. JUSTIFICATION

- Due to insecurity and accessibility issues, Khugyani district was selected to carry out a Rapid SMART instead of full SMART, based on Afghanistan Rapid SMART survey methodology.
- There were internally displaced people (IDPs) from Khugyani district insecure villages to some secure villages in the Khugyani district; it was difficult to separate the IDPs in the district from the host population due to ongoing conflict between AOGs and governments.
- The justification of this Rapid SMART Assessment is to investigate rapidly the situation of vulnerable children and women in the Khugyani selected district.
- This assessment will provide some evidence based statistics on the current nutrition situation the selected district.

[1] CSO updated population 2017

6. SAMPLE SIZE, SAMPLING DESIGN AND PROCEDURES

6.1. SAMPLE SIZE AND SAMPLING DESIGN

The population assessed were inhabitants and IDPs living in group in the selected villages, meaning several settlements and the total of the households (host population and IDPs) was above 200. As there was more than ONE settlement and the population was dispersed: **two-stage cluster sampling** was used. For the first stage, clusters/villages were randomly selected from a total list of villages using probability proportion to size (PPS) method.The number of clusters was fixed to a minimum of 25 with a minimum of 200 children (6-59 months) required.

The second stage of methodology involved random selection of households from an updated list of households. The sample size of households to be surveyed was calculated using ENA for SMART software version 2011 (up dated 9th July 2015).The table below presents the precision which was expected to be reached, according to the GAM result:

Expected GAM Prevalence	Minimum 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 sample size, Rapid SMART assessment for Afghanistan proposes simplified rule to convert children into households:

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

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

The number of households per cluster has to be adapted following the reference percentage of under-5 population for Afghanistan, which is 17.2% (CSO updated population for Afghanistan 1396).

So, 25 clusters of 10 households were randomly selected using ENA for SMART software 2011 latest version (9 July 2015) from the list of villages.

6.2. FINAL SAMPLING STRATEGY

In total, 24 clusters were visited and one cluster was not visited due the security issue at the time of the data collection. Clusters were based mainly on villages (cluster selection is in Annex 2). Table 1 makes a summary of the achieved samples (household, children).

Table 1: Details of proposed and actual sample size achieved, Khugyani District, January 2018

Number of HH planned	Number of HH surveyed	% HH surveyed /planned	Number of children 6-59 months planned	Number of children 6-59 months surveyed	% children surveyed /planned
250	229	91.6%	200	347	123.5%

Data was analyzed with ENA for SMART (software 2011 version updated 9 July 2015). Additional data (morbidity, measles vaccination and women nutritional status) was analyzed using Microsoft Excel.

6.3. SAMPLING PROCEDURES

Two-stage cluster sampling methodology was employed.

Stage 1:

Random selection of clusters/villages was done using probability proportionate to size (PPS) using ENA for SMART software version 2011 of (9th July, 2015).

In case of large villages in a cluster, the village was divided into smaller segments and a segment was selected randomly to include the cluster. This division was done based on existing landmarks in the camp e.g. pathways, water points, mosques, health facilities, schools.

Stage 2: Households

It was difficult to obtain an updated and complete list of Households, hence **systematic random sampling** was used to identify the households surveyed. The teams were trained on both methods of sampling (simple and systematic random sampling) and they were offered with materials to assist in determining the households during the data collection exercise

For the sake of simplification and rapidity, polygamous families were accounted as ONE household.

In each selected village, one or more community member(s) was asked to help the survey teams to conduct their work by providing information about the village with regard to the geographical organization or the number of households.

Children

All children from zero to 59 months of age living in the selected household were included in the cluster (6-59 months for anthropometry measurements, 0-59 months for morbidity and from 9-59 months for measles vaccination).

Age being very difficult to investigate and to ascertain, the high prevalence of stunting in Afghanistan impairs the relevance of height benchmarks to identify simply an age category. Careful age identification by the use of locally developed event calendar, child dental chart, etc. was applied. Local event calendar was updated from previous studies. If there was no calendar, then a calendar including events of only close months was rapidly elaborated with the staffs during the training. **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.

6.4. TRAINING AND SUPERVISION

Eight teams of two members in each team (one female and one male) conducted the field data collection. Each two teams had one supervisor. The previous experience from Afghanistan has shown that in some cases people are not eager to allow surveyors to measure female children. It is important to bear that in mind while conducting Rapid SMART assessment and to have as much as possible mixed teams of surveyors that have adapted communication approach. AAH SMART technical team, AAH - Nangarhar Nutrition and Health deputy manager and BPHS M&E officer supervised the teams.

This survey utilized 8 AADA BPHS implementers of the province 4 CHSs, 16 enumerators who had participated in the two previous SMART surveys conducted last years. In this case, the teams received a 4-days training on data collection for Rapid SMART assessment, which included a 1-day standardization test. It was expected that based on the teams' experience with Health and Nutrition services they would be more aware and skilled to properly execute the data collection activities for the Rapid SMART assessment.

One field guideline document with instructions, household definition and selection information was provided to each team member. All documents, such as local event calendar, questionnaires or consent forms were translated form English to Pashto local language for better understanding and to avoid direct translation during the field data collection. The questionnaires were translated back using a different translator. Alterations were made as necessary.

6.5. DATA COLLECTION

A simple tally sheets instead of a questionnaire was used (ANNEX 4) where surveyors would simply write down data for each child. The number of the child in the household and the number of the household in the cluster were recorded too.

Anthropometric data

- All 0-59 months children were included in the surveyed .
- The **sex** has recorded with codes: f = female and m=male.
- The **age** was written in months. The preparation and the use of tools to determine age was time consuming and required previous preparation (e.g. Event calendar). The teams were sensitized to the importance of the age record.
- **Weight (in kg):** Children were weighed to the nearest 0.1 kg by using an Electronic Uni scale (or SECA). The children who could easily stand were asked to stand on the weighing scale and their weight was recorded. In a situation when the children could not stand up, the double weighing method was applied[2].
- **Height/Length (in cm):** Measuring board used to measure bare headed and barefoot children. The precision of the measurement was 1 mm. Children of less than 2 years were measured lying down (length) and those equal to or above 2 years measured standing up (Height).

[2] The first measurement is the weight of the care taker and the second is the weight of the caretaker with the child. The scale can record the first measurement and automatically extract it from the second measurement, showing only the weight of the child on the screen.

- All children were checked for **Bilateral Pitting Oedema**. It was essential that all staff was well trained to check for Oedema on both feet.
- **MUAC** was taken on the **LEFT** arm using flexible MUAC tape. The MUAC measurement had recorded in mm.

All children detected as SAM whether by presence of bilateral pitting oedema WHZ <-3 Zscore and/ or MUAC < 115 cm, were referred to the nearest health facility or agency responsible for therapeutic care for immediate treatment, in this case BRAC BPHS implementer organization.

Measles immunization status

For all children 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 was recorded as 'Y' (Yes); 'VWC' (Vaccination without Card); 'N' (No); 'DK' (Does not Know), according to the situation.

Morbidity data

For all children selected in the sample, the mother/CT was asked:

- If the child had diarrhea within the last 14 days. Diarrhea is defined as every episode of more than 3 liquid stools per day. Record was made as follows: 'Y' (Yes); 'N' (No); 'DK' (Does not Know)
- If the child had Acute Respiratory Infection (ARI) within the last 14 days. Acute Respiratory Infection is any episode with severe, persistent cough or difficulty breathing. Record was made as follows: 'Y' (Yes); 'N' (No); 'DK' (Does not Know), according to the situation.

6.6. DATA ANALYSIS

The anthropometric data was analyzed using ENA for SMART software 2011 version, (July 9 2015) update. After data were entered and the quality checked, ENA software generated results for acute malnutrition (WHZ), stunting (HAZ), and underweight (WAZ). Confidence intervals were automatically calculated by the software ENA. ENA generated a survey report automatically

Survey results are presented in reference to WHO standards for overall final analysis. Results are presented in (**%**) z-scores with 95% Confidence Interval.

ENA generates automatically table for MUAC results using cut-offs presented below:

Classification	Normal	Moderate Acute Malnutrition	Severe acute malnutrition
MUAC	**≥125mm**	**<125mm to ≥115**	**<115mm and/or oedema**

and for weight for Height z-scores as follows:

	Acute Malnutrition	Underweight	Stunting
Global	**WHZ <-2 SD and/or edema**	**WAZ <-2 SD**	**HAZ <-2 SD**
Moderate	**WHZ <-2 SD to ≥-3SD**	**WAZ <-2 SD to ≥-3 SD**	**HAZ <-2 SD to ≥-3SD**
Severe	**WHZ <-3 SD and/or edema**	**WAZ <-3 SD**	**HAZ <-3 SD**

6.7. SURVEY LIMITATION

- Security problems
- Lack of updated list of Households in the villages
- Inaccuracy of some villages level population data; some villages found smaller or larger than anticipated at the time of the visit during data collection.

7. RESULTS

7.1. DATA QUALITY

The overall standard deviation (SD) for acute malnutrition, weight for height z-scores, was calculated at 1.15, with SMART flags, a SD that is within the acceptable range of values for SD, between 0.8 and 1.2.

The plausibility check reported a percentage of values flagged with SMART flags:WHZ: 1.4 %, HAZ: 3.7 %, WAZ: 1.2.

Among the surveyed children, boys and girls were equally represented (boys/girls ratio was 1.10 with p=0.361).

The age ratio of 6-29 months to 30-59 months was 0.97 (the value should be around 0.85: the p-value = 0.039 for age distribution was significant difference), it means, there were younger children than older children in the sample size.

7.2. ANTHROPOMETRIC RESULTS:

347 children aged 6-59 months were surveyed. Estimation of prevalence of GAM was done based on WHO 2006 child growth standards and the results are presented with exclusion of Z- score from observed mean SMART flags: WHZ -3 to + 3, HAZ -3 to +3 and WAZ -3 to +3. The overall data quality check is shown in **Annex 3**.

See table below for distribution of age and sex sample.

Table 2: Distribution of age and sex of sample, Khugyani district, Nangarhar, January 2018

	Boys		Girls		Total		Ratio
AGE (mo)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy:girl**
6-17	42	56.0	33	44.0	75	21.6	1.3
18-29	50	52.1	46	47.9	96	27.7	1.1
30-41	40	49.4	41	50.6	81	23.3	1.0
42-53	25	45.5	30	54.5	55	15.9	0.8
54-59	25	62.5	15	37.5	40	11.5	1.7
Total	182	52.4	165	47.6	347	100.0	1.1

The following tables present the under-nutrition rates as follows:

- Prevalence of acute malnutrition based on WHZ-score and/or oedema and by sex (Table 3)
- Rates of oedema (Table 4)
- Sex disaggregated rates of MUAC cut-offs (Table 5)

- Prevalence of combined acute malnutrition (WHZ+MUAC+Oedema) (table 6)
- Sex disaggregated weight-for-age z-scores (Table 7)
- Sex disaggregated height-for-age z-scores (Table 8)

Table 3: Prevalence of acute malnutrition based on weight-for-height Z-scores (and/or oedema) and by sex, Khugyani district, Nangarhar, January 2018

	All **n = 342**	Boys **n = 179**	Girls **n = 163**
Prevalence of global malnutrition (<-2 Z-score and/or oedema)	(43) 12.6 % (8.0 - 19.3 95% C.I.)	(32) 17.9 % (10.7 - 28.2 95% C.I.)	(11) 6.7 % (3.6 - 12.2 95% C.I.)
Prevalence of moderate malnutrition (<-2 Z-score and >=-3 Z-score, no edema)	(30) 8.8 % (5.1 - 14.6 95% C.I.)	(24) 13.4 % (7.9 - 21.9 95% C.I.)	(6) 3.7 % (1.5 - 8.7 95% C.I.)
Prevalence of severe malnutrition (<-3 Z-score and/or oedema)	(13) 3.8 % (2.2 - 6.5 95% C.I.)	(8) 4.5 % (2.2 - 8.9 95% C.I.)	(5) 3.1 % (1.4 - 6.5 95% C.I.)

Table 4: Distribution of acute malnutrition and oedema based on weight-for-height Z-scores, Khugyani district, Nangarhar, January 2018

	<-3 z-score	>=-3 z-score
OEdema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
OEdema absent	Marasmic No. 17 (4.9 %)	Not severely malnourished No. 330 (95.1 %)

Table 5: Prevalence of acute malnutrition based on MUAC cut offs (and/or oedema) and by sex, Khugyani district, Nangarhar, January 2018

	All **n = 347**	Boys **n = 182**	Girls **n = 165**
Prevalence of global malnutrition (< 125 mm and/or oedema)	(35) 10.1 % (6.5 - 15.2 95% C.I.)	(13) 7.1 % (4.0 - 12.3 95% C.I.)	(22) 13.3 % (8.0 - 21.4 95% C.I.)

Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(20) 5.8 % (3.6 - 9.1 95% C.I.)	(7) 3.8 % (1.7 - 8.5 95% C.I.)	(13) 7.9 % (4.4 - 13.6 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(15) 4.3 % (1.9 - 9.3 95% C.I.)	(6) 3.3 % (1.6 - 6.8 95% C.I.)	(9) 5.5 % (2.0 - 14.2 95% C.I.)

Table 6: Prevalence of Global Acute Malnutrition based on both criteria (MUAC+WHZ), Khugyani district, Nangarhar, January 2018

Status	All (boys and girls) N=342
Prevalence of global acute malnutrition	(69) 20.2% 15.9-24.4 ,95 % CI
Prevalence of severe acute malnutrition	(27) 7.9% 5.0-10.8, 95% CI)

Table 7: Prevalence of underweight based on weight-for-age Z-scores and by sex, Khugyani district, Nangarhar, January 2018

	All **n = 343**	Boys **n = 179**	Girls **n = 164**
Prevalence of underweight (<-2 Z-score)	(76) 22.2 % (17.5 - 27.6 95% C.I.)	(45) 25.1 % (18.0 - 34.0 95% C.I.)	(31) 18.9 % (14.0 - 25.0 95% C.I.)
Prevalence of moderate underweight (<-2 Z-score and >=-3 Z-score)	(61) 17.8 % (14.5 - 21.6 95% C.I.)	(36) 20.1 % (14.5 - 27.2 95% C.I.)	(25) 15.2 % (10.6 - 21.4 95% C.I.)
Prevalence of severe underweight (<-3 Z-score)	(15) 4.4 % (2.3 - 8.0 95% C.I.)	(9) 5.0 % (2.3 - 10.8 95% C.I.)	(6) 3.7 % (1.6 - 8.3 95% C.I.)

Table 8: Prevalence of stunting based on height-for-age Z-scores and by sex, Khugyani district, Nangarhar, January 2018

	All n = 334	Boys n = 175	Girls n = 159
Prevalence of stunting (<-2 z-score)	(111) 33.2 % (27.5 - 39.5 95% C.I.)	(61) 34.9 % (27.9 - 42.5 95% C.I.)	(50) 31.4 % (23.4 - 40.8 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(68) 20.4 % (16.8 - 24.5 95% C.I.)	(38) 21.7 % (17.4 - 26.7 95% C.I.)	(30) 18.9 % (13.0 - 26.6 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(43) 12.9 % (9.1 - 17.9 95% C.I.)	(23) 13.1 % (8.4 - 20.0 95% C.I.)	(20) 12.6 % (8.6 - 18.0 95% C.I.)

The summary of the Mean Z-scores with their Standard Deviations, the design effects and number of the out of range data per index is the table 9 below.

Table 9: Mean Z-scores, design effect and excluded subjects, Khugyani district, Nangarhar, January 2018

Indicator	N	Mean z-scores ± SD	Design Effect (z-score < -2)	Z-scores not available*	Z-scores out of range
Weight-for-Height	342	-0.59±1.15	2.28	0	5
Weight-for-Age	343	-1.18±1.03	1.19	0	4
Height-for-Age	334	-1.44±1.28	1.26	0	13

* contains for WHZ and WAZ the children with oedema.

The observed mean of the z-score was -0.59 (±1.15) The design effect of 2.28 is reflecting heterogeneity of the surveyed population. The index of dispersion does suggest that there are pockets of under nutrition within the sample areas as WHZ < -2: ID=2.18 (p=0.001)

7.3. CHILD HEALTH AND IMMUNIZATION

Retrospective morbidity data was collected among all children aged 0-59 months, with the 2 weeks recall period to assess the occurrence of main diseases. All children aged from 9 to 59 months were assessed whether they ever received measles vaccine or not. Analysis of data and findings illustrated in table 10 and 11.

Table 10: Under-five morbidity, two weeks recall, (N=359), Khugyani district, Nangarhar, January 2018

Parameters	Frequency	Results
Acute Respiratory Infection (ARI)	101	28.1%

Diarrhea	24	6.7%

Table 11: Measles immunization status, children 9-59 mounts, (N=329), Khugyani district, Nangarhar, January 2018

Parameters	Frequency	Results
Yes, confirmed by card	33	10.0%
Yes, recall	126	38.3%
No	104	31.6%
Don't Know	66	20.1%

Only 48.3% of children 9-59 months are vaccinated which is far below the expected coverage, meaning the population immunity against measles is low.

7.4. Maternal Nutritional Status

The information on maternal nutrition status was collected for women at childbearing age (CBA), from 15 to 49 years with focus on pregnant and lactating women. The results illustrated in the tables 12 and 13 below.

Table 12: Physiological status of women of reproductive age (15-49 years), (N=260), Khugyani district, Nangarhar, January 2018

Status	Frequency	%
Pregnant	70	26.9%
Lactating	117	45.0%
Non-pregnant & non-lactating	73	28.1%

Table 13: Nutrition status of pregnant and lactating women based on MUAC cut off, Khugyani disctirct, Nangarhar, January 2018,

PLWs MUAC cut off (N=280)	Frequency	Results
Global Acute Malnutrition MUAC <230 mm	21	11.2% (6.7-15.8, 95% CI)
Severe acute malnutrition MUAC <210 mm	3	1.6% (5.0-10.8,95% CI)

8. DISCUSSION

8.1 UNDERNUTRITION

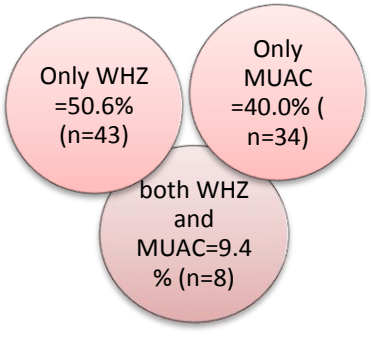
- The nutrition Rapid SMART Survey was done in the Khugyani district in Nangarhar province in January 2018. The GAM prevalence based on WHZ unveiled by the survey **was 12.6 %(8.0 - 19.3 95% C.I.)** which based on the WHO emergency threshold might be classified as critical situation in the district. SAM rate based on WHZ was **3.8 % (2.2 - 6.5 95% C.I.)** which Is higher than the 2% WHO threshold and higher than the 3% level trigger emergency for priority used in the context of Afghanistan to. This situation is critical.

The poison test indicated that some WHZ cases of acute malnutrition were concentrated in some cluster, suggesting existence of pockets of wasting in different areas of the district. In addition, the direct observation show unappropriated personal Hygiene for internally displaced people due to ongoing conflict between AOGs and government in the Khugyani district, which contributes to increase the number of malnourished cases.

The GAM prevalence based on MUAC was **10.1 %(6.5 - 15.2 95% C.I.)** and SAM based on MUAC was **4.3 % (1.9 - 9.3 95% C.I.)** ,slightly higher than the GAM based on WHZ .

When both criteria are combined, the GAM prevalence was **20.2% 15.9-24.4,95 % CI) while SAM rate,** combining WHZ (<-3 Z-score) and MUAC (<115mm) was **7.9% (5.0-10.8, 95% CI), those rates are above the WHO threshold.** Combined rates are recommended to be used for caseloads estimation for SAM and MAM management in the district.

The prevalence of acute malnourished children based on WHZ criteria, or only on MUAC, detected through community screenings, is not enough to detect all acute malnourished children eligible for treatment, according to the Afghanistan IMAM Guidelines criteria. This has to be however further investigated: the figure below shows the actual acute malnutrition prevalence comparing WHZ <-2 Z-score with MUAC <125 mm. There is an important difference.



Overlapping WH <-2 Z Score and MUAC < 125mm , Khugyani District, Nangarhar province, January 2018

- Prevalence of Stunting rate was **33.2 %(27.5 - 39.5 95% C.I.**), meaning that in every three people one person has chronic malnutrition or stunting.
- The prevalence of underweight was at **22.2 % (17.5 - 27.6 95% C.I.)** This form of under-nutrition represents the burden of acute and chronic under-nutrition among under-five.

8.2 IMMUNIZATION STATUS

The low coverage **(48.3%)** of measles vaccination illustrates the hindrance in accessing the basic health services in the area, with coverage below the WHO thresholds of >80%[3].

9 RECOMMENDATIONS

- Considering the high burden of acute malnutrition and the IDPs influx, nutrition services should be expanded and integrated to the IMCI program using mobile nutrition teams approach for both SAM and MAM children as well as for the acute malnourished women.
- Improve access to health care to the population but also to the IDPs and strength child health prevention through vaccination with a specific focus on Measles vaccination.
- Conduct a SMART survey in the entire province to know the real situation given the significant increment in the combined GAM prevalence in Khugyani district and because the province experienced an influx IDPs in 2017.
- Furthermore, more than 80% of returnees have been crossed Torkham border and are currently in Nangarhar. An assessment is of interest in this context as these returnees are an extra burden on the livelihood of the community and the health system.
- During the harvest time, most of the people were displaced from their area. Therefore, there is high chance that people will be food insecure and lost their livelihood, which is also one of the major contributing factor to malnutrition. FSL activities should be implemented for the host population, IDPs and returnees.
- Direct observation showed that unappropriated personal and environmental Hygiene and no safe drinking water were some of the contributing factors that increased the number of malnourished cases. In addition, the number of internal displaced people was tremendous. There is a need to focus on health education and to provide WASH activities.
- Improve access to maternal care services to improve good quality of counseling during antenatal and postnatal care consultations related to anemia prevention, minimum maternal diet, and weight gain during pregnancy.

[3] WHO from 2010 recommends increase routine coverage with the first dose of measles-containing vaccine (MCV1) by ≥90% nationally and ≥80% in every district or equivalent administrative unit for children aged 1 year (http://www.who.int/mediacentre/factsheets/fs286/en/).

10 ANNEXES

Annex 1: List of selected clusters/ villages

District Name	Population	Villages Name	S/N	Cluster
Khugyani	37000	شهرنو	**1**	1,2,3,4,5,6
Khugyani	9400	حاتم خیل	**2**	RC,7
Khugyani	10000	حکیم اباد	**3**	8,9
Khugyani	5400	زوړبازار	**4**	10
Khugyani	5000	بر او کوز شاکړخیل	**5**	11
Khugyani	2200	برارغچ سوړه	**11**	12
Khugyani	1300	منډه چنار،لنډی، بت خاکی	**15**	RC
Khugyani	1450	اړه ولی،دامان غاړه، محمدعالم کلی	**19**	13
Khugyani	1200	سورداک	**24**	14
Khugyani	2000	خروتی + سرک شرق کیپ	**27**	15
Khugyani	200	زیارت اباد	**38**	16
Khugyani	2500	معلم اول گل بلاکونه	**41**	17
Khugyani	2200	حاجی نیک محمد بلاکونه	**44**	18
Khugyani	2200	ملک نصراله بلاکونه	**46**	19
Khugyani	1600	ملک شیرزمان بلاکونه	**49**	20
Khugyani	3200	حاجی معین شاه بلاک	**51**	RC
Khugyani	2600	سبحان الله بلاک	**53**	21
Khugyani	3000	ملک سیف الله کورونه	**55**	22
Khugyani	2000	ملک عطا الله پنځم بلاک	**57**	23
Khugyani	1800	ملک عطا الله اول بلاک	**61**	24
Khugyani	1800	پراو ، گداخیل	**80**	25

Annex 2: Plausibility Check Report

Plausibility check for: Khugayni Rapid SMART 2018.as

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

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

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	**Score**
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** (1.4 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**0** (p=0.361)
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=0.213)
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	**2** (11)
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	**5** (1.15)
Skewness WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**1** (-0.30)
Kurtosis WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (-0.16)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<=0.001	
			0	1	3	5	**3** (p=0.001)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	**11** %

The overall score of this survey is 11 %, this is good.

There were no duplicate entries detected.

Percentage of children with no exact birthday: 92 %

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=198/ID=1: HAZ (2.801), Height may be incorrect

Line=205/ID=2: HAZ (1.966), Age may be incorrect

Line=218/ID=1: HAZ (2.167), Height may be incorrect

Line=220/ID=1: **WHZ (-3.751)**, Weight may be incorrect

Line=230/ID=1: **WHZ (-3.627)**, HAZ (2.543), Height may be incorrect

Line=232/ID=1: **WHZ (-5.589)**, HAZ (1.891), Height may be incorrect

Line=239/ID=1: HAZ (-5.891), WAZ (-4.225), Age may be incorrect

Line=240/ID=1: HAZ (-4.806), Height may be incorrect

Line=265/ID=1: HAZ (-5.066), Age may be incorrect

Line=288/ID=1: HAZ (1.902), Age may be incorrect

Line=298/ID=1: HAZ (1.704), Age may be incorrect

Line=314/ID=1: **WHZ (3.427)**, WAZ (2.218), Weight may be incorrect

Line=320/ID=1: **WHZ (-4.329)**, WAZ (-4.935), Weight may be incorrect

Line=327/ID=2: HAZ (2.298), Age may be incorrect

Line=347/ID=1: HAZ (-6.095), WAZ (-4.964), Age may be incorrect

Line=350/ID=1: HAZ (-4.451), Height may be incorrect

Percentage of values flagged with SMART flags:WHZ: 1.4 %, HAZ: 3.7 %, WAZ: 1.2 %

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 : ##########

Month 60 : ##

Age ratio of 6-29 months to 30-59 months: 0.97 (The value should be around 0.85).:

p-value = 0.213 (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	42/42.2 (1.0)	33/38.3 (0.9)	75/80.5 (0.9)	1.27
18 to 29	12	50/41.2 (1.2)	46/37.3 (1.2)	96/78.5 (1.2)	1.09
30 to 41	12	40/39.9 (1.0)	41/36.2 (1.1)	81/76.1 (1.1)	0.98
42 to 53	12	25/39.3 (0.6)	30/35.6 (0.8)	55/74.9 (0.7)	0.83
54 to 59	6	25/19.4 (1.3)	15/17.6 (0.9)	40/37.0 (1.1)	1.67
6 to 59	54	182/173.5 (1.0)	165/173.5 (1.0)		1.10

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

Overall sex ratio: p-value = 0.361 (boys and girls equally represented)

Overall age distribution: p-value = 0.039 (significant difference)

Overall age distribution for boys: p-value = 0.070 (as expected)

Overall age distribution for girls: p-value = 0.324 (as expected)

Overall sex/age distribution: p-value = 0.006 (significant difference)

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: **3** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

p-value for chi2: 0.981

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: **11** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

p-value for chi2: 0.000 (significant difference)

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: **6** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

p-value for chi2: 0.267

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:	1.24	1.21	1.15
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	13.5%	13.3%	12.6%
calculated with current SD:	13.2%	12.4%	11.1%
calculated with a SD of 1:	8.4%	8.2%	7.9%
HAZ			
Standard Deviation SD:	1.44	1.42	1.28
(The SD should be between 0.8 and 1.2)			

Prevalence (< -2)			
observed:	33.4%	33.2%	33.2%
calculated with current SD:	34.1%	33.5%	32.9%
calculated with a SD of 1:	27.7%	27.3%	28.6%
WAZ			
Standard Deviation SD:	1.09	1.09	1.03
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	22.8%	22.8%	22.2%
calculated with current SD:	23.2%	23.2%	21.3%
calculated with a SD of 1:	21.2%	21.2%	20.6%
Results for Shapiro-Wilk test for normally (Gaussian) distributed data:			
WHZ	p= 0.001	p= 0.006	p= 0.003
HAZ	p= 0.756	p= 0.854	p= 0.014
WAZ	p= 0.068	p= 0.068	p= 0.120

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

Skewness			
WHZ	-0.43	-0.30	-0.30
HAZ	-0.01	0.06	-0.04
WAZ	-0.32	-0.32	-0.19

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	0.67	0.20	-0.16
HAZ	0.16	0.00	-0.66
WAZ	0.30	0.30	-0.39

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=2.18 (p=0.001)

WHZ < -3: ID=0.96 (p=0.516)

GAM: ID=2.18 (p=0.001)

SAM: ID=0.96 (p=0.516)

HAZ < -2: ID=0.75 (p=0.799)

HAZ < -3: ID=1.02 (p=0.437)

WAZ < -2: ID=1.09 (p=0.348)

WAZ < -3: ID=1.37 (p=0.113)

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: 1.47 (n=24, f=1)  ############################
02: 1.32 (n=23, f=1)  ######################
03: 1.28 (n=24, f=1)  ####################
04: 1.28 (n=23, f=0)  ####################
05: 1.54 (n=23, f=1)  ##############################
06: 1.02 (n=22, f=0)  #########
07: 1.11 (n=24, f=0)  #############
08: 0.79 (n=24, f=0)
09: 1.30 (n=22, f=0)  ######################
10: 1.59 (n=23, f=1)  ##################################
11: 1.19 (n=21, f=0)  ################
12: 0.75 (n=19, f=0)
13: 1.23 (n=17, f=0)  ##################
14: 1.10 (n=14, f=0)  ############
15: 1.06 (n=12, f=0)  OOOOOOOOOOO
16: 1.61 (n=10, f=0)  OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
17: 1.25 (n=08, f=0)  OOOOOOOOOOOOOOOOOO
18: 1.00 (n=05, f=0)  ~~~~~~~~~
19: 0.56 (n=04, f=0)
20: 1.13 (n=03, f=0)  ~~~~~~~~~~~~~~~
21: 0.46 (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 =	46	34	37	34	53	50	40	53

Percentage of values flagged with SMART flags:

WHZ:	0.0	0.0	0.0	0.0	0.0	4.0	0.0	5.7
HAZ:	4.3	2.9	0.0	0.0	7.5	0.0	2.5	9.4
WAZ:	2.2	0.0	0.0	0.0	0.0	4.0	0.0	1.9

Age ratio of 6-29 months to 30-59 months:

	1.19	0.89	0.48	0.62	0.77	0.67	1.86	2.12

Sex ratio (male/female):

	0.77	1.43	1.06	1.27	0.83	1.17	2.33	0.89

Digit preference Weight (%):

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

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

Digit preference Height (%):

.0 :	28	44	3	3	17	8	10	11
.1 :	22	3	19	0	9	2	15	26
.2 :	17	12	16	24	8	8	10	11
.3 :	9	15	5	9	13	8	23	15
.4 :	11	6	5	6	11	10	13	2
.5 :	9	12	8	21	15	14	8	15
.6 :	0	3	14	0	4	10	5	4
.7 :	2	3	3	9	9	24	8	8
.8 :	2	0	11	12	8	12	5	0
.9 :	0	3	16	18	6	4	5	8
DPS:	31	41	19	26	13	19	17	25

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

Digit preference MUAC (%):

.0 :	9	9	11	0	8	10	5	8
.1 :	11	15	8	3	6	6	20	8
.2 :	13	12	16	3	8	10	15	13
.3 :	2	9	3	12	9	4	8	19
.4 :	11	15	14	24	9	6	10	8
.5 :	11	12	5	15	23	14	15	11
.6 :	13	15	11	12	4	10	3	8
.7 :	13	9	14	9	9	12	10	9
.8 :	9	6	8	15	17	12	13	9
.9 :	9	0	11	9	8	16	3	8
DPS:	10	15	13	22	18	12	18	12

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

Standard deviation of WHZ:

SD	0.87	1.08	1.05	1.21	1.11	1.27	1.45	1.30

Prevalence (< -2) observed:

%	11.8	2.7	8.8	9.4	6.0	35.0	30.2

Prevalence (< -2) calculated with current SD:

%	8.8	6.1	6.9	9.1	9.1	26.6	31.2

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

%	7.2	5.1	3.6	6.9	4.5	18.3	26.3

Standard deviation of HAZ:

SD	1.32	1.54	1.29	1.05	1.61	1.19	1.48	1.64

observed:

%	43.5	50.0	29.7	38.2	24.5	30.0	32.5	26.4

calculated with current SD:

%	47.4	47.6	27.3	40.0	26.5	29.0	32.5	29.5

calculated with a SD of 1:

%	46.6	46.3	21.7	39.6	15.6	25.4	25.2	18.9

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	6/4.6 (1.3)	4/6.0 (0.7)	10/10.7 (0.9)	1.50
18 to 29	12	5/4.5 (1.1)	10/5.9 (1.7)	15/10.4 (1.4)	0.50
30 to 41	12	5/4.4 (1.1)	8/5.7 (1.4)	13/10.1 (1.3)	0.63
42 to 53	12	2/4.3 (0.5)	2/5.6 (0.4)	4/9.9 (0.4)	1.00
54 to 59	6	2/2.1 (0.9)	2/2.8 (0.7)	4/4.9 (0.8)	1.00

6 to 59	54	20/23.0 (0.9)	26/23.0 (1.1)	0.77

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

Overall sex ratio: p-value = 0.376 (boys and girls equally represented)

Overall age distribution: p-value = 0.157 (as expected)

Overall age distribution for boys: p-value = 0.775 (as expected)

Overall age distribution for girls: p-value = 0.134 (as expected)

Overall sex/age distribution: p-value = 0.036 (significant difference)

Team 2:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	3/4.6 (0.6)	4/3.2 (1.2)	7/7.9 (0.9)	0.75
18 to 29	12	5/4.5 (1.1)	4/3.2 (1.3)	9/7.7 (1.2)	1.25
30 to 41	12	6/4.4 (1.4)	1/3.1 (0.3)	7/7.5 (0.9)	6.00
42 to 53	12	4/4.3 (0.9)	4/3.0 (1.3)	8/7.3 (1.1)	1.00
54 to 59	6	2/2.1 (0.9)	1/1.5 (0.7)	3/3.6 (0.8)	2.00
6 to 59	54	20/17.0 (1.2)	14/17.0 (0.8)		1.43

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

Overall sex ratio: p-value = 0.303 (boys and girls equally represented)

Overall age distribution: p-value = 0.972 (as expected)

Overall age distribution for boys: p-value = 0.869 (as expected)

Overall age distribution for girls: p-value = 0.686 (as expected)

Overall sex/age distribution: p-value = 0.354 (as expected)

Team 3:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	2/4.4 (0.5)	4/4.2 (1.0)	6/8.6 (0.7)	0.50
18 to 29	12	3/4.3 (0.7)	3/4.1 (0.7)	6/8.4 (0.7)	1.00
30 to 41	12	3/4.2 (0.7)	6/3.9 (1.5)	9/8.1 (1.1)	0.50
42 to 53	12	4/4.1 (1.0)	4/3.9 (1.0)	8/8.0 (1.0)	1.00
54 to 59	6	7/2.0 (3.5)	1/1.9 (0.5)	8/3.9 (2.0)	7.00
6 to 59	54	19/18.5 (1.0)	18/18.5 (1.0)		1.06

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

Overall sex ratio: p-value = 0.869 (boys and girls equally represented)

Overall age distribution: p-value = 0.223 (as expected)

Overall age distribution for boys: p-value = 0.007 (significant difference)

Overall age distribution for girls: p-value = 0.772 (as expected)

Overall sex/age distribution: p-value = 0.003 (significant difference)

Team 4:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	7/4.4 (1.6)	1/3.5 (0.3)	8/7.9 (1.0)	7.00
18 to 29	12	2/4.3 (0.5)	3/3.4 (0.9)	5/7.7 (0.7)	0.67
30 to 41	12	6/4.2 (1.4)	7/3.3 (2.1)	13/7.5 (1.7)	0.86
42 to 53	12	3/4.1 (0.7)	3/3.2 (0.9)	6/7.3 (0.8)	1.00
54 to 59	6	1/2.0 (0.5)	1/1.6 (0.6)	2/3.6 (0.6)	1.00
6 to 59	54	19/17.0 (1.1)	15/17.0 (0.9)		1.27

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

Overall sex ratio: p-value = 0.493 (boys and girls equally represented)

Overall age distribution: p-value = 0.196 (as expected)

Overall age distribution for boys: p-value = 0.358 (as expected)

Overall age distribution for girls: p-value = 0.182 (as expected)

Overall sex/age distribution: p-value = 0.028 (significant difference)

Team 5:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	5/5.6 (0.9)	4/6.7 (0.6)	9/12.3 (0.7)	1.25
18 to 29	12	8/5.4 (1.5)	6/6.6 (0.9)	14/12.0 (1.2)	1.33
30 to 41	12	4/5.3 (0.8)	10/6.4 (1.6)	14/11.6 (1.2)	0.40
42 to 53	12	4/5.2 (0.8)	5/6.3 (0.8)	9/11.4 (0.8)	0.80
54 to 59	6	3/2.6 (1.2)	4/3.1 (1.3)	7/5.7 (1.2)	0.75
6 to 59	54	24/26.5 (0.9)	29/26.5 (1.1)		0.83

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

Overall sex ratio: p-value = 0.492 (boys and girls equally represented)

Overall age distribution: p-value = 0.636 (as expected)

Overall age distribution for boys: p-value = 0.750 (as expected)

Overall age distribution for girls: p-value = 0.440 (as expected)

Overall sex/age distribution: p-value = 0.176 (as expected)

Team 6:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	3/6.3 (0.5)	4/5.3 (0.7)	7/11.6 (0.6)	0.75
18 to 29	12	7/6.1 (1.1)	6/5.2 (1.2)	13/11.3 (1.1)	1.17
30 to 41	12	7/5.9 (1.2)	5/5.0 (1.0)	12/11.0 (1.1)	1.40
42 to 53	12	6/5.8 (1.0)	5/5.0 (1.0)	11/10.8 (1.0)	1.20
54 to 59	6	4/2.9 (1.4)	3/2.5 (1.2)	7/5.3 (1.3)	1.33

6 to 59	54	27/25.0 (1.1)	23/25.0 (0.9)	1.17

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

Overall sex ratio: p-value = 0.572 (boys and girls equally represented)

Overall age distribution: p-value = 0.610 (as expected)

Overall age distribution for boys: p-value = 0.650 (as expected)

Overall age distribution for girls: p-value = 0.965 (as expected)

Overall sex/age distribution: p-value = 0.475 (as expected)

Team 7:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	7/6.5 (1.1)	1/2.8 (0.4)	8/9.3 (0.9)	7.00
18 to 29	12	12/6.3 (1.9)	6/2.7 (2.2)	18/9.0 (2.0)	2.00
30 to 41	12	5/6.1 (0.8)	2/2.6 (0.8)	7/8.8 (0.8)	2.50
42 to 53	12	1/6.0 (0.2)	3/2.6 (1.2)	4/8.6 (0.5)	0.33
54 to 59	6	3/3.0 (1.0)	0/1.3 (0.0)	3/4.3 (0.7)	
6 to 59	54	28/20.0 (1.4)	12/20.0 (0.6)		2.33

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

Overall sex ratio: p-value = 0.011 (significant excess of boys)

Overall age distribution: p-value = 0.016 (significant difference)

Overall age distribution for boys: p-value = 0.049 (significant difference)

Overall age distribution for girls: p-value = 0.158 (as expected)

Overall sex/age distribution: p-value = 0.000 (significant difference)

Team 8:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	9/5.8 (1.6)	11/6.5 (1.7)	20/12.3 (1.6)	0.82
18 to 29	12	8/5.7 (1.4)	8/6.3 (1.3)	16/12.0 (1.3)	1.00
30 to 41	12	4/5.5 (0.7)	2/6.1 (0.3)	6/11.6 (0.5)	2.00
42 to 53	12	1/5.4 (0.2)	4/6.0 (0.7)	5/11.4 (0.4)	0.25
54 to 59	6	3/2.7 (1.1)	3/3.0 (1.0)	6/5.7 (1.1)	1.00
6 to 59	54	25/26.5 (0.9)	28/26.5 (1.1)		0.89

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

Overall sex ratio: p-value = 0.680 (boys and girls equally represented)

Overall age distribution: p-value = 0.014 (significant difference)

Overall age distribution for boys: p-value = 0.149 (as expected)

Overall age distribution for girls: p-value = 0.134 (as expected)

Overall sex/age distribution: p-value = 0.007 (significant difference)

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: 1.61 (n=03, f=0)  ##################################
02: 0.98 (n=03, f=0)  #######
03: 0.45 (n=03, f=0)
04: 0.30 (n=03, f=0)
05: 1.04 (n=03, f=0)  ##########
06: 0.51 (n=03, f=0)
07: 0.17 (n=03, f=0)
08: 0.36 (n=03, f=0)
09: 1.12 (n=03, f=0)  ###############
10: 0.43 (n=03, f=0)
11: 1.13 (n=03, f=0)  ###############
12: 0.96 (n=03, f=0)  #######
13: 1.06 (n=03, f=0)  ############
14: 0.83 (n=03, f=0)  #
15: 0.08 (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: 1.84 (n=03, f=0)  ##########################################
02: 1.00 (n=03, f=0)  ########
03: 0.35 (n=03, f=0)
04: 1.25 (n=03, f=0)  ###################
05: 0.50 (n=03, f=0)
06: 1.50 (n=03, f=0)  ##############################
07: 0.94 (n=03, f=0)  ######
08: 0.44 (n=03, f=0)
09: 1.35 (n=03, f=0)  ########################
10: 2.12 (n=02, f=0)  OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
11: 0.41 (n=02, f=0)
12: 0.32 (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: 0.46 (n=03, f=0)
```

```
02: 2.40 (n=03, f=1)  ##################################################################
03: 0.95 (n=03, f=0)  ######
04: 0.77 (n=03, f=0)
05: 0.13 (n=02, f=0)
06: 0.23 (n=03, f=0)
07: 0.44 (n=03, f=0)
08: 0.77 (n=03, f=0)
09: 1.36 (n=03, f=0)  ########################
10: 1.01 (n=03, f=0)  #########
11: 0.27 (n=02, f=0)
12: 0.75 (n=02, f=0)
13: 0.49 (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: 1.32 (n=03, f=0)  #######################
02: 0.36 (n=03, f=0)
03: 1.28 (n=03, f=0)  ####################
04: 0.35 (n=03, f=0)
05: 2.38 (n=03, f=0)  ##################################################################
06: 0.31 (n=02, f=0)
07: 0.74 (n=03, f=0)
08: 1.21 (n=03, f=0)  #################
09: 0.42 (n=03, f=0)
10: 1.08 (n=03, f=0)  ############
11: 0.01 (n=02, f=0)
12: 0.19 (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: 1.93 (n=03, f=0)  ##############################################
02: 0.48 (n=02, f=0)
03: 0.58 (n=03, f=0)
04: 1.23 (n=03, f=0)  ##################
05: 1.80 (n=03, f=0)  ########################################
06: 0.40 (n=02, f=0)
07: 0.54 (n=03, f=0)
08: 0.56 (n=03, f=0)
09: 0.27 (n=02, f=0)
10: 0.30 (n=03, f=0)
11: 0.15 (n=03, f=0)
```

12: 0.26 (n=03, f=0)

13: 0.94 (n=03, f=0) ######

14: 2.26 (n=03, f=0) ##

15: 0.29 (n=03, f=0)

16: 1.78 (n=03, f=0) ##

17: 1.03 (n=02, f=0) OOOOOOOOOO

18: 1.73 (n=02, f=0) OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO

19: 0.60 (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: 0.94 (n=03, f=0) ######

02: 0.59 (n=03, f=0)

03: 2.33 (n=03, f=1) ##

04: 2.38 (n=02, f=0) OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO

05: 2.91 (n=03, f=1) ##

06: 0.53 (n=03, f=0)

07: 1.29 (n=03, f=0) ######################

08: 0.62 (n=03, f=0)

09: 0.58 (n=02, f=0)

10: 1.29 (n=03, f=0) ######################

11: 1.57 (n=03, f=0) ################################

12: 0.42 (n=03, f=0)

13: 0.16 (n=03, f=0)

14: 0.51 (n=03, f=0)

15: 0.37 (n=03, f=0)

16: 1.16 (n=03, f=0) ################

17: 1.71 (n=02, f=0) OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO

18: 0.12 (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: 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: 1.17 (n=03, f=0) #################

02: 1.07 (n=03, f=0) #############

03: 0.66 (n=03, f=0)

04: 0.11 (n=03, f=0)

05: 1.88 (n=03, f=0) ##

06: 0.77 (n=03, f=0)

07: 1.62 (n=03, f=0) ###################################

08: 1.24 (n=03, f=0) ###################

```
09: 2.06 (n=03, f=0)  ######################################################
10: 1.67 (n=03, f=0)  ###################################
11: 1.81 (n=03, f=0)  ##########################################
12: 0.49 (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: 1.76 (n=03, f=0)  ########################################
02: 2.24 (n=03, f=0)  ############################################################
03: 1.36 (n=03, f=0)  ########################
04: 0.16 (n=03, f=0)
05: 0.60 (n=03, f=0)
06: 1.18 (n=03, f=0)  ################
07: 1.03 (n=03, f=0)  #########
08: 1.16 (n=03, f=0)  ################
09: 2.13 (n=03, f=0)  ##########################################################
10: 3.05 (n=03, f=1)  ####################################################################
11: 0.81 (n=03, f=0)
12: 1.01 (n=02, f=0)  OOOOOOOOO
13: 1.85 (n=03, f=0)  ############################################
14: 0.84 (n=03, f=0)  ##
15: 1.35 (n=02, f=0)  OOOOOOOOOOOOOOOOOOOOOO
16: 0.68 (n=02, f=0)
17: 0.56 (n=02, f=0)
19: 0.52 (n=02, f=0)
20: 1.32 (n=02, f=0)  OOOOOOOOOOOOOOOOOOOOO
```

(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)

Annex 3: RNA tally sheet for women

Locationموقعت: _____ Date: تاریخ _____(Cluster No کلسترنمبر :) _____Team No: ټیم نمبر _____

S/ No مسلسل نمیر	HH No د کورنی نمبر	Physiological status: فزیولوژیک حالت 1 = Pregnant/حامله 2 = Lactating شیدی ورکونکی / 3 =None of both / یو هم نه	Age /years) عمر په کال	MUAC (mm) ### د بازو اندازه	Oedema پرسوب 1=Y هو 2=N نه

Annex 4: RNA Tally sheet for children

تاریخ سروی Date of interview (dd/mm/yyyy)	د کلستر نمبر Cluster Number	تیم نمبر Team Number	کلی : Village Name	دکورنی نمبر Households No

د ماشوم نمبر Child No	جنس F/M Sex	د پیدایښت تاریخ Exact Date of Birth	عمر به میاشت Age month	وزن به کیلوګرام Weight (kg)	قد به سانتی متر Height (cm)	پرسوب Oedema 1=Y هو 2=N نه	موک په سانتی متر MUAC (cm)	ایا ستاسی ماشوم په تیرو دوه هفتو کی اسهال شوی ؟ Has your child had diarrhea in the past two weeks? 1=Y هو 2=N نه	ایا ستاسی ماشوم په تیرو دوه هفتو کی په حاده تنفسی ناروغی اخته شوی توخی با سبنه بغل) ؟ Has your child had ARI in the past two weeks? 1=Y هو 2=N نه	ایا ستاسی ماشوم د شری واکسین اخیستی دی (9 میاشتنی) ؟ Have your child been vaccinated against measles? 1=Yes Card: هو کارت لری 2=Yes No card هو کارت نه لری 3=No : نه 4=DK: نه بوهیژم
1										
2										
3										
4										
5										

10 REFERENCES

WHO 2010 recommended measles vaccine coverages

WHO emergency threshold

CSO updated population 2017

CAAC survey 2017

ENA software 2011 Updated 9 July 2015