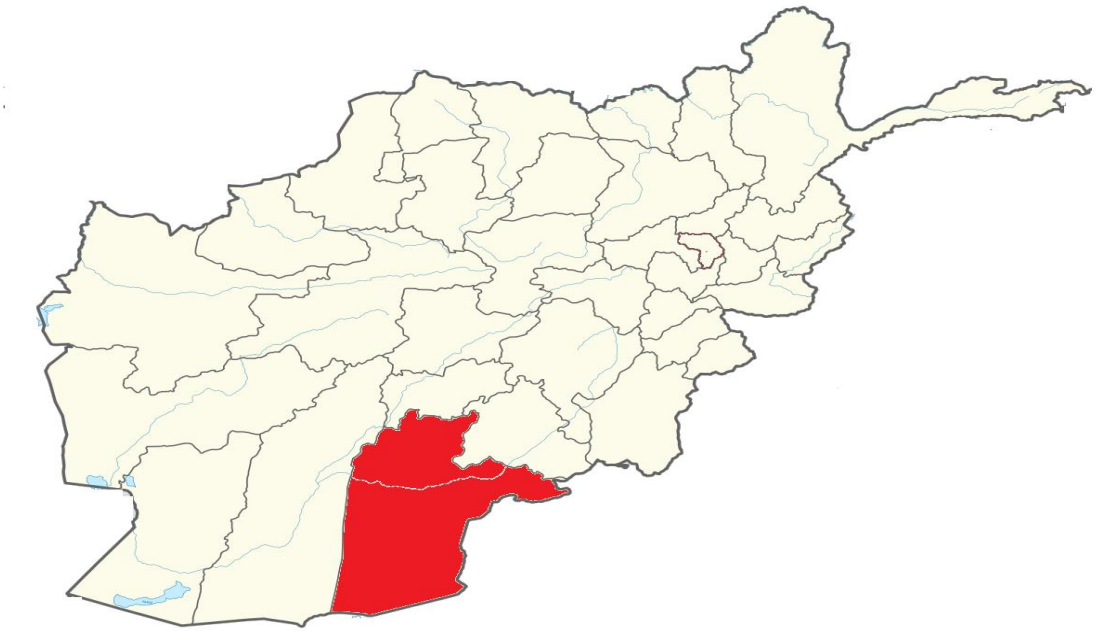
AFGHANISTAN

# Rapid SMART Assessment Final Report

## Panjwayi and Zhari Districts of Kandahar Province

Date: 25th June to 3rd July, 2018

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Humanitarian Aid and Civil Protection


**Action Against Hunger | Action Contre La Faim**

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## ABBREVIATIONS

| | |
|---|---|
| **ACF** | Action Contre La Faim \| Action Against Hunger |
| **AIM** | Assessments & Information Management Working Group |
| ARI | Acute Respiratory Infection |
| **BPHS** | Basic package of health services |
| **BRAC** | Building Resources across Community |
| **CSO** | Central Statistics Organization |
| **CT** | Care Taker |
| **DK** | Do not know |
| **ENA** | Emergency Nutrition Assessment |
| **GAM** | Global Acute Malnutrition |
| **HAZ** | Height for Age Z-Score |
| **HH** | Household |
| **IYCF** | Infant and Young Child Feeding |
| **MoPH** | Ministry of Public Health |
| **MUAC** | Mid-Upper Arm Circumference |
| **OCHA** | Office for the Coordination of Humanitarian Affairs |
| **OW** | Observed Weight |
| **PNO** | Provincial Nutrition Officer |
| **RC** | Reserve Cluster |
| **SAM** | Severe Acute Malnutrition |
| **SD** | Standard Deviation |
| **SMART** | Standardized Monitoring and Assessment of Relief and Transitions |
| SRS | Systematic Random Sampling |
| **U5DR** | Under 5 Death Rate |
| **WASH** | Water, Sanitation and Hygiene |
| **WAZ** | Weight for Age Z-Score |
| **W/H** | Weight for Height |
| **WHZ** | Weight for Height Z-Score |
| **WHO** | World Health Organization |

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## 1. EXECUTIVE SUMMARY

The Rapid Nutrition Assessment was conduct between 25th June to 3rd July 2018 in Panjwayi and Zhari districts of Kandahar province using Rapid SMART method. 551 children aged 0-59 months and 518 children aged 6-59 months were assessed in 235 households out of 250 targeted households. The Rapid SMART assessment report provides an analysis and interpretation of nutrition anthropometric, child morbidity, Immunization coverage (measles), nutritional status of pregnant and lactating women as well as recommendations

### Summary of Key survey findings:

| Child Nutritional Status (N=518; 6-59 months children) | |
|---|---|
| **Indicators** | **Result** |
| GAM rate among children aged 6-59 months based on Weight for Height- Z- Score <-2 SD and/or Oedema | 13.8% (10.2 - 18.5; 95% CI) |
| SAM rate among children aged 6-59 months based on Weight for Height Z-Score <-3 SD and/or Oedema | 2.4% ( 1.2 - 4.6; 95% CI) |
| GAM rate among children aged 6-59 months based on MUAC <125 mm and/or Oedema | 15.6% (11.5 - 21.0; 95% CI) |
| SAM rate among children aged 6-59 months based on MUAC <115 mm and/or Oedema | 5.0% ( 3.0 - 8.2; 95% CI) |
| GAM rate among children aged 6-59 months based on combined criteria (WHZ <-2 SD and/or MUAC <125 mm and/or Oedema)* | 22.3% (17.7 – 27.7; 95% CI) |
| SAM rate among children aged 6-59 months based on combined criteria (WHZ <-3 SD and/or MUAC <115 mm and/or Oedema)* | 6.5% (4.1 – 10.1; 95% CI) |
| Stunting or chronic malnutrition among children aged 6-59 months based on Height for Age Z-Score <-2 SD | 45.1% (40.3 - 50.0; 95% CI) |
| Underweight among children aged 6-59 months based on Weight for Age Z-Score <-2SD | 23.9% (19.8 - 28.5; 95% CI) |

*The combined GAM and SAM estimation was performed manually by changing all the MUAC only GAM/SAM data into Oedema in the ENA software to provide an aggregated prevalence under the result category of WHZ and/or Oedema.

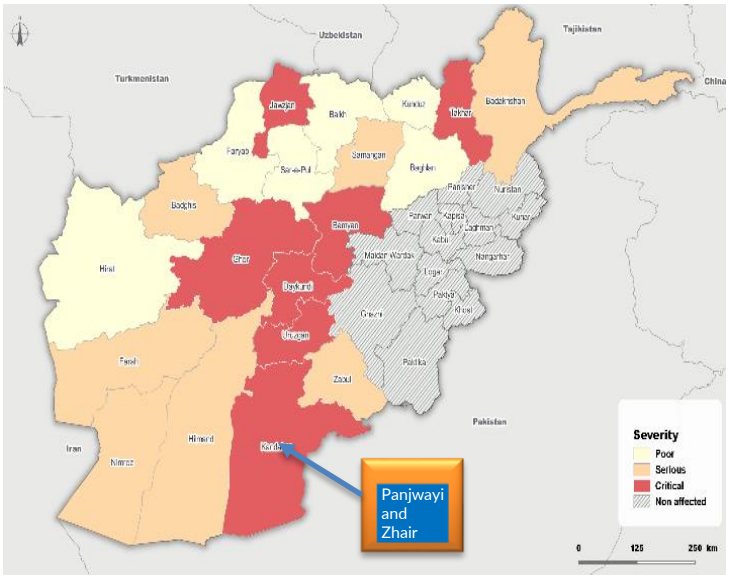
| Child Health and immunization (N=551; 0-59 months children) | |
|---|---|
| **Indicators** | **Result** |
| Children aged 0-59 months that reported of having Diarrhea during the past 14 days of the survey (based on two weeks recall method) | 37.2% |
| Children aged 0-59 months that reported of having ARI during the past 14 days to the survey (based on two weeks recall method) | 20.1% |
| Measles vaccination status for the children aged 9-59 months based on both recall and vaccination card confirmation | 61.8% |

| Nutrition status among Pregnant and Lactating Women (N=313) | |
|---|---|
| **Indicators** | **Result** |
| Undernutrition among Pregnant Women based on MUAC <230 mm | 50.8% |
| Undernutrition among only Lactating Women based on MUAC < 230 mm | 28.0% |
| Undernutrition among Pregnant and Lactating Women (PLWs) based on MUAC <230mm | 37.1% |

## 2. INTRODUCTION

**Kandahar** is one of the thirty-four provinces of Afghanistan, located in the southern part of the country next to Pakistan. It is surrounded by Helmand in the west, Uruzgan in the north and Zabul Province in the east. Its capital is the city of Kandahar, which is located on the Arghandab River.

The province has 16 districts such as Arghand Ab, Arghistan, Daman, Ghorak, Khakriz, Maruf, Maywand, Miyanishin, Nesh, Panjwaye, Reg, Shah wali kot, Shorabak, Spin boldak, Zhari and Kandahar. Kandahar is the capital and main city of this province.




**Map: Drought affected area of Afghanistan and location of survey**

The population of the province is about 1,279,520[1], which is mostly tribal and a rural society. The inhabitants of Kandahar province are ethnic Pashtuns, although smaller communities of Tajiks, Hazaras, Uzbeks and Baloch are also found in parts of the city of Kandahar. The main language spoken in the province is Pashto but in some urban centers, Dari (Afghan Persian) is also in use as a second language.

There are different tribes in the province, but two major tribes are Durani and Galzai. Durani tribes has different ethnics such as Popalza, Alikozai, Barakzai, Achakzai the second major tribe is Ghalzai such as Tokhi, Nurzai, Hotak, Taraki, Loudin.

Kandahar is also one of the provinces that recently seriously affected by drought. OCHA has categorized Kandahar as one of the "Critical" drought affected province. Nutrition Cluster along with Assessment and Information Management Working Group/PND/MoPH through different meetings decided to conduct one Rapid SMART assessment in Panjwayi and Zhrai districts.

[1] Updated CSO population 1396 ( 2017- 2018 )

Based on the different SMART surveys conducted in recent years as well as latest information available from other sources, Kandahar province have been identified as prioritized location to do nutrition survey. The last SMART survey conducted in Kandahar was during August 2015.

## 2.1. Health and Nutrition programme Background of BPHS in Kandahar province

There are many NGOs working in Kandahar city but only four NGOs are specifically working in nutrition program such as BARAN under the BPHS program offers the BPHS package in all health facilities of Kandahar province. SCI has also been running nutrition program in Bouldak district and in the Capital of Kandahar province; MEDAIR and INTERSOS also offering IMAM services by Mobile team in remote area of Kandahar city.

BARAN is the BPHS implementer in Kandahar province that have 61 Health facilities (HF), 616 Health Posts (HP) and 7 mobile teams in Kandahar province, A total of 2 IPD SAM center, 41 OPD SAM . At the area of assessment (Panjwayi and Zhari districts) total has 8 HF, out of them 8 Hfs have, OPD SAM and no OPD MAM and IPD SAM in the districts.

During the assessment a total of 81 malnourished children were found based on MUAC (55 MAM and 26 SAM and referred to the nearest Health facilities to receive the treatment. Only one of the malnourished children was enrolled in nutrition treatment (while unable to show the documentation).

## 2.2. OBJECTIVE OF THE SURVEY

### *2.2.1. MAIN OBJECTIVE*

- To quickly evaluate the nutrition situation of children U5 and PLWs in the drought affected area of Kandahar province (Panjwayi and Zhari districts).

### *2.2.2. SPECIFIC OBJECTIVES*

- To broadly estimate Global Acute Malnutrition (GAM) rates among children from 6- 59 months living Panjwayi and Zhari districts of Kandahar province.
- To estimate two weeks recall morbidity among children from 0- 59 months living in Panjwayi and Zhari districts of Kandahar province.
- To estimate measles vaccination coverage among children from 9 - 59 months living in Panjwayi and Zhari districts of Kandahar province.

- To estimate prevalence of malnutrition among pregnant and lactating women (PLWs) based on MUAC cut-offs.

## 2.3. JUSTIFICATION OF THE SURVEY

- Kandahar province categorized as “critical” based on OCHA analysis for recent drought in Afghanistan.
- Internal displaced population (IDPs) mainly in Panjwayi and Zhrai districts due to drought.
- Possible deterioration of health and nutrition situation due to drought and conflict related issues causing food insecurity in the area that require updated information.
- The area was selected by nutrition cluster and AIM-Working Group to know the nutrition situation in the districts.

# 3. SAMPLE SIZE, SAMPLING DESIGN AND PROCEDURES

## 3.1. SAMPLE SIZE AND SAMPLING DESIGN

The population assessed are inhabitants living in the group of affected villages, meaning several settlements and households were assumed to be living in the area more than 200. As there is more than ONE settlement and the population is dispersed: two stage cluster sampling has been used. The number of clusters was also fixed to a minimum of 25 with 200 minimum number of children (6-59 months) required. It has been selected using two-stage cluster sampling. The table below presents the precision, which was expected to be reached, according to the GAM result. The table below presents the precision, which was expected to be reached, according to the GAM result.

| Expected GAM Prevalence | 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 assessment for Afghanistan proposed 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 reference percentage of under-5 population for Afghanistan which is 15.6% (Afghanistan Mortality Survey 2010), so conversion option B was applied. So 25 Clusters of 10 households were selected randomly using PPS by ENA software out of the list. The total number of HH to be surveyed was 250, So, 25 clusters of 10 households were selected randomly using ENA for SMART software 2011 latest version (9th July 2015) from the list of villages.

### 3.2. FINAL SAMPLING STRATEGY

In total, 24 clusters were visited. One cluster could not be accessed due to some security problem. 5 HHs refused to take part in the assessment process ; a total HHs of 235 were surveyed. Clusters were mainly based on villages (please see the 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

| Number of cluster planned | Number of cluster surveyed | % of cluster surveyed | Number of HH planned | Number of HH surveyed | % HH surveyed | Number of children 6-59 months planned | Number of children 6-59 months surveyed | % children surveyed |
|---|---|---|---|---|---|---|---|---|
| **25** | 24 | 96% | 250 | 235 | 94.0 % | 200 | 518 | 259.0% |

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

### 3.3. SAMPLING PROCEDURES

Two-stage cluster sampling methodology was employed in this survey.

**Stage 1: Clusters/ Villages Selection**

**Random selection** of clusters/villages was done using probability proportionate to size (PPS) using ENA for SMART software version 2011 of (updated 9th July, 2015). There were 722 cluster/villages in the original sampling frame but 50 clusters were systematically excluded because of insecurity and inaccessibility, meaning 6.9% clusters/villages excluded from the original sampling frame.
In case of large villages in a cluster, the village was divided into smaller segments and one segment was selected randomly to include the cluster. This division was done based on existing landmarks in the area, pathways, water points, mosques, health facilities, schools etc.

**Stage 2: Households:**

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

Again, 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 ask 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 0 to 59 months of age** living in selected households were included in the cluster (6-59 for anthropometry and <6 month for other health part). 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 use of locally developed event calendar, child dental chart, etc. was apply. Local event calendar can be update if there is one from previous studies. If there is none, than a calendar including events of only border months can be rapidly elaborate 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.

### Maternal Health and Nutrition

Women in childbearing age were assessed for their nutritional status based on MUAC measurements. The nutritional status of pregnant and lactating mothers were derived from the MUAC cut-off of 230 mm.

## 3.4. DATA COLLECTION

A simple tally sheets instead of a questionnaire was use (ANNEX 3 and 4) where surveyors would simply write down these data for each child. The number of the child in the household and the number of the household in the cluster is record too.

Anthropometric data

The **sex** has to be record with codes: f = female and m=male.

The **age** was written down in months. The preparation and the use on the field of tools to determine age could time consuming and require previous preparation (e.g. Event calendar). The teams had at maximum sensitized to the importance of the age record.

**Weight (in kg):** Children were weighed to the nearest 0.1 kg by using an Electronic Uniscale (or SECA). The children who could easily stand were ask to stand on the weighing scale and their weight was record. In a situation when the children could not stand up, the double weighing method was applied.

**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).

All children checked for **Bilateral Pitting Oedema**. It was essential that all staff well trained to check for Oedema on both feet.

**MUAC** was token 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 edema and/ or MUAC <115 mm, referred to the nearest facility or agency responsible for therapeutic care for immediate treatment in this case BARAN BPHS implementer organization.

Measles immunization status

For all children selected in the sample, the mother/caretaker (CT) 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 ask :

- 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.

## 3.5. 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. ACF SMART technical team, PPHD PNO Public Nutrition Officer and BPHS M&E officer supervised the teams

Enumerator Training Picture

This survey utilized the eight-community Males enumerators, eight community Females enumerators and 2-cluster supervisor recommended b;y BARAN and 2 more cluster supervisor recommended by PPHD of Kandahar office for this assessment. In this case, the teams received a 4 days training on data collection for Rapid SMART assessment, which includes a 1-day standardization test. It was expected that based on the teams experience with Health and Nutrition services they were more aware and skilled to properly execute the data collection activities for the Rapid SMART assessment.

Survey Supervison picture

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

## 3.6. DATA ANALYSIS

The anthropometric data was analyzed by using ENA for SMART software 2011 version, with July 9th 2015 update. Survey results were presented in reference to WHO growth standards 2006 for overall final analysis.

After data has been entered and quality check performed by ENA, the software generates a gender specific table with MUAC/oedema results (and if this is the case: Wasting and stunting. The software ENA automatically calculates confidence intervals.

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

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

If the weight and the height have been assessed, ENA can generate a survey report automatically. If all anthropometric measurements are collected, than ENA was generating results for Acute Malnutrition (WHZ), Stunting (HAZ), and Underweight (WAZ). Results are presented in **% Z-scores with 95% Confidence Interval**. These are defined as follows:

Table 2: Classification and definition of wasting, underweight and stunting

| | Wasting | Underweight | Stunting |
|---|---|---|---|
| **Global** | WHZ <-2 z scores and/or Oedema | WAZ <-2 z scores | HAZ <-2 z scores |
| **Moderate** | -3 < WHZ < -2 z scores | -3 < WAZ < -2 | -3 < HAZ < -2 z scores |
| **Severe** | WHZ < -3 z scores and/or Oedema | WAZ < -3 z scores | HAZ < -3 z scores |

## 3.7. SURVEY LIMATION

- Security problem
- Lack of updated list of Households in the villages

- 50 villages (6.9%) were excluded from the original sampling frame due to insecurity and lack of access.
- Inaccuracy of some villages level population data; some villages found that was smaller or larger than anticipated on visits time during data collection.
- Most of the children (97%) didn't have vaccination card and those who had card – there were often no mention of exact date of birth or in some cases wrong date of birth.

# 4. RESULTS

## 4.1. DATA QUALITY

The overall data quality for the survey was classified as "Good" with an overall score of 12% based on the ENA plausibility test. The SD was categorized as acceptable 1.15 (the SD should be between 0.8 to 1.2) among the surveyed children, boys and girls were equally represented (boys/girls ratio was 1.11 with p=0.219). The age ratio of 6-29 months to 30-59 months was 0.90, (The value should be around 0.85): p-value = 0.537 (as expected).

## 4.2. Anthropometric Results:

Estimation of GAM prevalence 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 WHZ -3 to +3.the overall data quality check is shown in **Annex 2.** See table below for distribution of age and sex sample.

Table 3: Distribution of age and sex of sample

| | Boys | | Girls | | Total | | Ratio |
|---|---|---|---|---|---|---|---|
| AGE (mo) | no. | % | no. | % | no. | % | Boy : Girl |
| **6-17** | 65 | 50.4 | 64 | 49.6 | 129 | 24.9 | 1.0 |
| **18-29** | 66 | 56.9 | 50 | 43.1 | 116 | 22.4 | 1.3 |
| **30-41** | 72 | 54.5 | 60 | 45.5 | 132 | 25.5 | 1.2 |
| **42-53** | 46 | 50.0 | 46 | 50.0 | 92 | 17.8 | 1.0 |
| **54-59** | 24 | 49.0 | 25 | 51.0 | 49 | 9.5 | 1.0 |
| **Total** | 273 | 52.7 | 245 | 47.3 | 518 | 100.0 | 1.1 |

Table 4: Prevalence of acute malnutrition based on WHZ (and/or edema) disaggregated by sex

| | All<br>n = 507 | Boys<br>n = 269 | Girls<br>n = 238 |
|---|---|---|---|
| Prevalence of global acute malnutrition (<-2 z-score and/or oedema) | (70) 13.8 %<br>(10.2 - 18.5 95% C.I.) | (32) 11.9 %<br>(7.9 - 17.6 95% C.I.) | (38) 16.0 %<br>(11.1 - 22.4 95% C.I.) |
| Prevalence of moderate acute malnutrition (<-2 z-score and ≥-3 z-score, no oedema) | (58) 11.4 %<br>(8.1 - 16.0 95% C.I.) | (25) 9.3 %<br>(5.7 - 14.8 95% C.I.) | (33) 13.9 %<br>(9.6 - 19.6 95% C.I.) |
| Prevalence of severe acute malnutrition (<-3 z-score and/or oedema) | (12) 2.4 %<br>(1.2 - 4.6 95% C.I.) | (7) **2.6 %**<br>(1.0 - 6.4 95% C.I.) | (5) 2.1 %<br>(0.9 - 4.9 95% C.I.) |

Table 5: Distribution of acute malnutrition and edema based on WHZ

| | <-3 z-score | >=-3 z-score |
|---|---|---|
| Edema present | **Marasmic kwashiorkor No. 0**<br>**(0.0 %)** | **Kwashiorkor No. 0**<br>**(0.0 %)** |
| Edema absent | **Marasmic No. 18**<br>**(3.5 %)** | **Not severely malnourished No. 500**<br>**(96.5 %)** |

There were no cases of Oedema found during the survey (0%).

Table 6: Prevalence of acute malnutrition based on MUAC cut offs (and/or edema) and by sex

| | All<br>n = 518 | Boys<br>n = 273 | Girls<br>n = 245 |
|---|---|---|---|
| Prevalence of global acute malnutrition<br>(<125 mm and/or edema) | **(81) 15.6 %**<br>**(11.5 - 21.0 95% C.I.)** | **(39) 14.3 %**<br>**(9.6 - 20.7 95% C.I.)** | **(42) 17.1 %**<br>**(11.2 - 25.4 95% C.I.)** |

| | | | |
|---|---|---|---|
| Prevalence of moderate acute malnutrition (<125 mm and ≥115 mm, no edema) | **(55) 10.6 % (7.8 - 14.3 95% C.I.)** | **(26) 9.5 % (6.5 - 13.7 95% C.I.)** | **(29) 11.8 % (8.1 - 16.9 95% C.I.)** |
| Prevalence of severe acute malnutrition (<115 mm and/or edema) | **(26) 5.0 % (3.0 - 8.2 95% C.I.)** | **(13) 4.8 % (2.5 - 9.0 95% C.I.)** | **(13) 5.3 % (2.3 - 11.6 95% C.I.)** |

Table 7: Prevalence of Acute Malnutrition based on combine criteria (MUAC+WHZ+Oedema)*

| | Results |
|---|---|
| Prevalence of global acute malnutrition based on both criteria (WHZ <-2SD and/or MUAC <125mm and/or Oedema) | **22.3%** (17.7 – 27.7; 95% CI) |
| Prevalence of severe acute malnutrition based on combined criteria (WHZ <-3SD and/or MUAC <115mm and/or Oedema | **6.5%** (4.1 – 10.1; 95% CI) |

*The combined GAM and SAM estimation was performed manually by changing all the MUAC only GAM/SAM data into Oedema in the ENA software to provide an aggregated prevalence under the result category of WHZ and/or Oedema.

Table 8 Prevalence of underweight based on weight-for-age z-scores and by sex

| | All n = 515 | Boys n = 272 | Girls n = 243 |
|---|---|---|---|
| Prevalence of underweight (<-2 z-score) | (123) 23.9 % (19.8 - 28.5; 95% C.I.) | (69) 25.4 % (19.5 - 32.3; 95% C.I.) | (54) 22.2 % (16.3 - 29.5; 95% C.I.) |
| Prevalence of moderate underweight (<-2 z-score and >=-3 z-score) | (87) 16.9 % (14.2 - 20.0; 95% C.I.) | (47) 17.3 % (12.9 - 22.7; 95% C.I.) | (40) 16.5 % (12.4 - 21.5; 95% C.I.) |
| Prevalence of severe underweight (<-3 z-score) | (36) 7.0 % (4.7 - 10.2; 95% C.I.) | (22) 8.1 % (5.1 - 12.7; 95% C.I.) | (14) 5.8 % (2.9 - 11.1; 95% C.I.) |

Table 9: Prevalence of stunting based on height-for-age z-scores and by sex

| | All<br>n = 515 | Boys<br>n = 272 | Girls<br>n = 243 |
|---|---|---|---|
| Prevalence of stunting (<-2 z-score) | (230) 45.1 %<br>(40.3 - 50.0; 95% C.I.) | (146) 54.5 %<br>(48.1 - 60.7; 95% C.I.) | (84) 34.7 %<br>(29.2 - 40.7; 95% C.I.) |
| Prevalence of moderate stunting (<-2 z-score and ≥-3 z-score) | (147) 28.8 %<br>(24.5 - 33.6; 95% C.I.) | (85) 31.7 %<br>(26.3 - 37.7 95% C.I.) | (62) 25.6 %<br>(21.3 - 30.5 95% C.I.) |
| Prevalence of severe stunting (<-3 z-score) | (83) 16.3 %<br>(13.5 - 19.5; 95% C.I.) | (61) **22.8** %<br>(18.5 - 27.7; 95% C.I.) | (22) 9.1 %<br>(5.8 - 13.9; 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 10 below.

Table 10: Mean z-scores, design effect 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 | **507** | **-0.61±1.15** | **1.68** | **0** | **11** |
| Weight-for-Age | **515** | **-1.47±0.90** | **1.24** | **0** | **3** |
| Height-for-Age | **510** | **-1.89±1.07** | **1.15** | **0** | **8** |

*Contains for WHZ and WAZ the children with edema (if any).

### 4.3. CHILD HEALTH AND IMMUNIZATION

Retrospective morbidity data was collected among all children 0-59 months, with the 2 weeks recall period assessed 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 11 and 12.

Table 11: Under-five morbidity, two week recall (N=551)

| Parameters | Frequency | Results |
|---|---|---|
| Acute Respiratory Infection | **111** | **20.1%** |
| Diarrhea | **205** | **37.2%** |

Table 12: Measles immunization status, children 9-59 mounts (N=490)

| Parameters | Frequency | Results |
|---|---|---|
| Yes, confirmed by card | **10** | **2.0%** |
| Yes, recall | **293** | **59.8%** |
| Yes by both card and recall | **303** | **61.8%** |
| No | **175** | **35.7%** |
| Don't Know | **12** | **2.4%** |

### 4.4. MATERNAL NUTRITION STATUS

The information on maternal nutrition status was collected only for women at childbearing age (CBA), from 15 to 49 years. The results illustrated in the tables 13 and 14 below.

Table 13: Physiological status of women of reproductive age (15-49 years), n=487

| Status | Frequency | Results |
|---|---|---|
| Pregnant Women | **124** | **39.6%** |
| Lactating Women | **189** | **60.4%** |
| Non-pregnant & non-Lactating women | **174** | **55.6%** |

Table 14: Nutrition status of Pregnant and Lactating women based on MUAC cut off

| Parameters (N=313) | Frequency | Results |
|---|---|---|
| Global Acute Malnutrition of PLW based on MUAC <230mm | 116 | **37.1%** (31.7–42.4 95% CI) |
| Sever acute malnutrition of PLW based on MUAC <185 mm | 0 | 0.0% |

*The cut-offs were used according to national IMAM guideline.

# 5. DISCUSSION

## 5.1. UNDER NUTRITION RATES

Results of this survey is not reflecting of the provincial nutrition situation but are representative of only for the Panjwayi and Zhari ditricts. The results of the survey shows a prevalence of Global Acute Malnutrition (GAM) based on weight-for-height Z-score was 13.8% (10.2 – 18.5 95% C.I.) and SAM rate 2.4% (1.2 – 4.6 95% CI). According to WHO threshold[2] GAM is classified serious public health situation in Panjwayi and Zhari districts of Kandahar province and GAM prevalence based on MUAC<125 mm was 15.6% (11.5 -21.0 95% CI) and SAM (MUAC <115mm) was 5.0% (3.0 – 8.2 95% CI) respectively.

The combined MUAC and WHZ prevalence revealed GAM and SAM prevalence of **22.3% (17.7 – 27.7; 95% CI)** and **6.5% (4.1 – 10.1; 95% CI)** respectively. According to this combined GAM and SAM prevalence, the nutritional situation is very critical in the province. The combined rate informs the total estimated SAM and MAM caseload in the assessment area for better programing. All the children in the sample detected as acutely malnourished (either by MUAC or WHZ or Oedema) are brought into the calculation according to combined criteria. To detect all acute malnourished children eligible for treatment, the MUAC only detection is not enough according to Afghanistan IMAM Guidelines.

Further analysis suggests that these rates do not refer to overlapping of same children. Children classified as wasted based on MUAC only is 38.1%, based on WHZ only is 30.1% and the rest

[2] WHO acute malnutrition classification : <5% acceptable, 5-9% poor, 10-14% serious, >15% critical (without aggravating factors)

31.9% children are malnourished based on both WHZ and/or MUAC criteria. If both criteria combined the overall prevalence of children likely to be eligible for SAM and MAM management program in Panjwayi and Zhari districts of Kandahar province was founded 22.3% while the SAM alone is analyzed using combined WHZ and/or MUAC criteria then the SAM prevalence is projected at 6.5%. Combined rates recommended being use for caseload estimation of SAM and MAM management in the assessed health facilities coverage areas.

Prevalence of Stunting rate was **45.1% (40.3 – 50.0 95% C.I.)** Based on the survey finding in every 3 people more than one person has chronic malnutrition or stunting.

The prevalence of underweight was at **23.9% (19.8 – 28.5 95% CI);** this from of under-nutrition depicts the burden of acute and chronic under-nutrition among under-fives.

### 5.2. Child health and immunization

Prevalence of diarrhea **37.2%** and ARI 20.1**%** reported in Panjwaye and Zhari districts of Kandahar province, illness is one of contributing factors of under nutrition.

The low coverage **(61.8 %)** of measles vaccination illustrates the hindrance in accessing the basic health services in the area, with coverage below the WHO thresholds of >80%

### 5.3. Nutritional status of pregnant and lactating women

The nutritional situation of PLW is very much worrying in the survey location. 37.1% PLWs are malnourished while a staggering 50.8% pregnant women are malnourished based on MUAC <230mm. So one in every two pregnant women is malnourished in Panjwayi and Zhari districts of Kandhar province.

### 5.3. RECOMMENDATIONS AND JOINT ACTION PLAN

| Key findings | Explanation | Actions to be taken | By who? | Resources required | Timeline of implementation |
|---|---|---|---|---|---|
| High GAM Prevalence based on WHZ | GAM prevalence based on WHZ is 13.8% (10.2%-10.8% 95% C.I) which is serious situation according to the WHO threshold | BARAN has 8 OPD-SAM sites in all 8 BPHS HFs of Zhari and Panjwayi districts and provides nutrition services include Screening, IYCF counseling, RUTF supply, etc. There is gap of OPD-MAM program since end of 2017 and starting TSFP program is one of the top priorities. | WFP re-allocate MAM supplies through TSFP project | MAM commodities include super cereal, RUSF and budget for operation. | From August 2018 |
| High Combined GAM prevalence | Based on both criteria (MUAC and WHZ) GAM prevalence is 22.3% and SAM 6.5% which is critical situation according to the WHO threshold. | BARAN will focus on quality of SAM program and will ask WFP to start OPD-MAM program through its TSFP project. | BARAN & WFP | SAM and MAM supplies | Regular |
| High Chronic Malnutrition | Stunting in the area covered by the Rapid SMART survey was 45.1%, Which very high | BARAN through its BPHS HFs will re-assessed the underlying causes of the malnutrition and will work with communities for behavior change, food | BARAN | Financial support for food demonstration events | Regular |

| | | | | | |
|---|---|---|---|---|---|
| | according to the WHO threshold. | diversification and conduction of food demonstration events. | | | |
| Low coverage of Immunization (Measles) | According to the WHO SPHER standard for the National target measles >80%.<br>However, according to the Rapid SMART survey finding the measles coverage was 61.5% which is low than WHO threshold. | the issue Maybe because of not being able to show vaccination cards by mothers/caregivers or some other reasons. BARAN has had good progress since taken over the BPHS project in July 2015. They increased number of EPI team members at provincial level from 1 to 4.<br>Trained (51) midwives on EPI and they can implement vaccines as back up vaccinators, BARAN has full membership of regional EOC and actively participate in micro planning. Implementation of measles and polio campaigns, in last year BARAN responded to outbreaks of Measles in Kandahar, BRAN Community Health Supervisors participated to 885 EPI outreach sessions with vaccinators and CHWs to 2146 sessions as well. BARAN mobilized communities especially those refused vaccinations through establishing 14 refusal committees at 8 districts of | BARAN in close coordination with PPHD/REMT, WHO, UNICEF and other related stakeholders | Review of EPI micro-plan and increase the number and quality of outreach and campaign activities include health education at HFs level | Regular |

| | | | | | |
|---|---|---|---|---|---|
| | | Kandahar include Zharai and Panjwayi. EPI is first priority for us and is main topic of health education sessions at HFs and community level sessions. 8584 education session on EPI conducted at HFs level and 5508 at community level during last year. We are optimistic to achieve targets by using mentioned and other strategies. | | | |
| Maternal Nutrition status | GAM prevalence of PLWs based on MUAC was 37.1%. Which is very high. | There is gap of OPD-MAM program since end of 2017 and starting TSFP program is one of the top priorities. BARAN also will focus on community awareness and food diversity education. | WFP and BARAN | MAM supplies and Nutrition education sessions | Regular |
| General observation (Poor Hygiene practice, Poor access to safe drinking water, High disease rate at the time and poor food security status of the community) | These are multi-sectorial tasks | BARAN through its HFs and community programs will increase community awareness regarding mentioned topics and the issues will be raised in Kandahar PHCC and PDC meetings for involvement of related stakeholders. | BARAN provincial management and stakeholders | TBD | Regular |

## 6. ANNEXES

### *Annex 1: Cluster selection*

| Province.name | Distract Name | Geographical unit | Population size | Cluster |
|---|---|---|---|---|
| Kandahar | Panjwaye | شین غزی مسجد | 685 | 1 |
| Kandahar | Panjwaye | گورگان حاجی قاسم مسجد | 682 | 2 |
| Kandahar | Panjwaye | محاجرین او اختر محمد اکا | 945 | 3 |
| Kandahar | Panjwaye | حاجی خان ممحمد | 450 | 4 |
| Kandahar | Panjwaye | سیدانو کلاچه او هلمندیان او کلاجه | 1407 | 5 |
| Kandahar | Panjwaye | پهلوان مسجد | 1260 | 6 |
| Kandahar | Panjwaye | حاجی سید محمد او یخ څاه مسجد | 1050 | 7 |
| Kandahar | Panjwaye | حاجی حیات ماما مسجد | 119 | 8 |
| Kandahar | Panjwaye | رحیم خان مسجد | 140 | RC |
| Kandahar | Panjwaye | حاجی کریم داد مسجد او حاجی علی محمد مسحجد | 924 | 9 |
| Kandahar | Panjwaye | ملا اغا مسچد | 189 | 10 |
| Kandahar | Panjwaye | ابراهیم زی عبدالله او محمد شفیع مسجد | 738 | 11 |
| Kandahar | Panjwaye | حاجی باغوان مسجد | 490 | 12 |
| Kandahar | Zeari | برانو احمد خان مسجد | 110 | RC |
| Kandahar | Zeari | ډاکتر یونس مسجد | 230 | 13 |
| Kandahar | Zeari | سرتخت حاجی بابا مینه | 200 | 14 |
| Kandahar | Zeari | حاجی سید محمد مسجد | 147 | 15 |
| Kandahar | Zeari | اول کیمپ حاجی عبدالرشید مسجد | 1421 | 16 |
| Kandahar | Zeari | عبدالححکیم مسجد باوری | 600 | 17 |
| Kandahar | Zeari | حوض مدد مربت کوچیان | 1449 | 18 |
| Kandahar | Zeari | کلاچه | 1044 | 19 |
| Kandahar | Zeari | بلوڅانو دښت | 1302 | 20 |
| Kandahar | Zeari | لوړ سنځری کلی ډاکتر نور احمد مسحد | 525 | 21 |
| Kandahar | Zeari | حاجی جلال مسجد | 210 | 22 |
| Kandahar | Zeari | لالا جان مسجد | 420 | RC |
| Kandahar | Zeari | غلام محمد مسجد | 273 | 23 |
| Kandahar | Zeari | اسلم پمپ لوړ دښت | 1370 | 24 |

| | | | | |
|---|---|---|---|---|
| Kandahar | Zeari | حاجی یار محمد خان کلی | 735 | 25 |

## *Annex 2: Plausibility Check 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 **0** (2.1 %)

Overall Sex ratio Incl p >0.1 >0.05 >0.001 <=0.001

(Significant chi square) 0 2 4 10 **0** (p=0.219)

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=0.537)

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 **2** (8)

Dig pref score - MUAC Incl # 0-7 8-12 13-20 > 20

0 2 4 10 **0** (5)

Standard Dev WHZ Excl SD <1.1 <1.15 <1.20 >=1.20

. and and and or

. Excl SD >0.9 >0.85 >0.80 <=0.80

0 5 10 20 **5** (1.15)

Skewness WHZ Excl # <±0.2 <±0.4 <±0.6 >=±0.6

0 1 3 5 **1** (-0.28)

Kurtosis WHZ Excl # <±0.2 <±0.4 <±0.6 >=±0.6

0 1 3 5 **3** (-0.49)

Poisson dist WHZ-2 Excl p >0.05 >0.01 >0.001 <=0.001

0 1 3 5 **1** (p=0.045)

OVERALL SCORE WHZ = 0-9 10-14 15-24 >25 **12** %

The overall score of this survey is 12 %, this is good.

**There were no duplicate entries detected.**

**Percentage of children with no exact birthday: 97 %**

**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=27/ID=1: **WHZ (2.725)**, HAZ (-5.252), Height may be incorrect

Line=44/ID=2: HAZ (7.652), WAZ (3.630), Age may be incorrect

Line=52/ID=1: **WHZ (-4.097)**, Weight may be incorrect

Line=73/ID=2: **WHZ (-3.903)**, Height may be incorrect

Line=76/ID=1: **WHZ (-3.888)**, Weight may be incorrect

Line=77/ID=1: HAZ (6.297), WAZ (2.807), Age may be incorrect

Line=78/ID=2: **WHZ (2.648)**, Weight may be incorrect

Line=103/ID=2: **WHZ (-3.826)**, Weight may be incorrect

Line=107/ID=1: HAZ (1.495), Age may be incorrect

Line=135/ID=4: **WHZ (2.396)**, Weight may be incorrect

Line=155/ID=2: HAZ (1.525), Age may be incorrect

Line=276/ID=2: HAZ (1.162), Age may be incorrect

Line=394/ID=2: **WHZ (-3.780)**, Height may be incorrect

Line=493/ID=3: **WHZ (-6.238)**, Weight may be incorrect

Line=497/ID=1: HAZ (1.838), Age may be incorrect

Line=526/ID=1: **WHZ (4.873)**, WAZ (1.878), Weight may be incorrect

Line=531/ID=2: **WHZ (4.120)**, HAZ (-5.740), Height may be incorrect

Percentage of values flagged with SMART flags:WHZ: 2.1 %, HAZ: 1.5 %, WAZ: 0.6 %

**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: 0.90 (The value should be around 0.85).:

p-value = 0.537 (as expected)

**Statistical evaluation ofsex and age ratios (using Chi squared statistic):**

| Age cat. | mo. | boys | girls | total | ratio boys/girls |
|---|---|---|---|---|---|
| 6 to 17 | 12 | 65/63.3 (1.0) | 64/56.8 (1.1) | 129/120.2 (1.1) | 1.02 |
| 18 to 29 | 12 | 66/61.8 (1.1) | 50/55.4 (0.9) | 116/117.2 (1.0) | 1.32 |
| 30 to 41 | 12 | 72/59.9 (1.2) | 60/53.7 (1.1) | 132/113.6 (1.2) | 1.20 |
| 42 to 53 | 12 | 46/58.9 (0.8) | 46/52.9 (0.9) | 92/111.8 (0.8) | 1.00 |
| 54 to 59 | 6 | 24/29.1 (0.8) | 25/26.1 (1.0) | 49/55.3 (0.9) | 0.96 |
| 6 to 59 | 54 | 273/259.0 (1.1) | 245/259.0 (0.9) | | 1.11 |

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

Overall sex ratio: p-value = 0.219 (boys and girls equally represented)

Overall age distribution: p-value = 0.097 (as expected)

Overall age distribution for boys: p-value = 0.163 (as expected)

Overall age distribution for girls: p-value = 0.540 (as expected)

Overall sex/age distribution: p-value = 0.023 (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: **4** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

p-value for chi2: 0.746

**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: **8** (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: **5** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

p-value for chi2: 0.215

**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: | 1.28 | 1.25 | 1.15 |
| (The SD should be between 0.8 and 1.2) | | | |
| Prevalence (< -2) | | | |
| observed: | 14.7% | 14.5% | 13.8% |
| calculated with current SD: | 13.8% | 13.2% | 11.4% |
| calculated with a SD of 1: | 8.3% | 8.1% | 8.2% |

**HAZ**

| | | | |
|---|---|---|---|
| Standard Deviation SD: | 1.25 | 1.13 | 1.07 |
| (The SD should be between 0.8 and 1.2) | | | |
| Prevalence (< -2) | | | |
| observed: | 44.8% | 45.0% | 45.1% |
| calculated with current SD: | 45.1% | 45.8% | 46.0% |
| calculated with a SD of 1: | 43.9% | 45.2% | 45.7% |

**WAZ**

| | | | |
|---|---|---|---|
| Standard Deviation SD: | 0.95 | 0.95 | 0.90 |
| (The SD should be between 0.8 and 1.2) | | | |
| Prevalence (< -2) | | | |
| observed: | | | |
| calculated with current SD: | | | |
| calculated with a SD of 1: | | | |

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

| | | | |
|---|---|---|---|
| WHZ | p= 0.000 | p= 0.000 | p= 0.000 |
| HAZ | p= 0.000 | p= 0.636 | p= 0.198 |
| WAZ | p= 0.000 | p= 0.000 | p= 0.000 |

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

**Skewness**

| | | | |
|---|---|---|---|
| WHZ | -0.18 | -0.04 | -0.28 |
| HAZ | 1.38 | 0.09 | 0.05 |
| WAZ | 0.01 | 0.01 | -0.57 |

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 | 1.08 | 0.60 | -0.49 |
| HAZ | 9.05 | 0.17 | -0.39 |
| WAZ | 2.53 | 2.53 | 0.61 |

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=1.55 (p=0.045)

WHZ < -3: ID=1.22 (p=0.216)

GAM: ID=1.55 (p=0.045)

SAM: ID=1.22 (p=0.216)

HAZ < -2: ID=0.59 (p=0.939)

HAZ < -3: ID=0.70 (p=0.847)

WAZ < -2: ID=1.07 (p=0.366)

WAZ < -3: ID=1.33 (p=0.131)

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: 1.25 (n=24, f=0) ##################

02: 1.20 (n=24, f=0) #################

03: 1.22 (n=22, f=0) ##################

04: 1.03 (n=22, f=0) ##########

05: 1.34 (n=22, f=1) ######################

06: 1.19 (n=24, f=0) ################

07: 1.33 (n=23, f=0) ####################

08: 1.41 (n=22, f=1) ########################

09: 1.74 (n=24, f=1) ########################################

10: 1.43 (n=23, f=2) ############################

11: 1.27 (n=23, f=1) ####################

12: 1.53 (n=20, f=2) ##############################

13: 0.91 (n=24, f=0) #####

14: 0.97 (n=22, f=0) #######

15: 1.14 (n=22, f=0) ##############

16: 1.30 (n=24, f=0) ####################

17: 1.50 (n=22, f=1) ############################

18: 1.17 (n=20, f=0) ###############

19: 1.14 (n=19, f=0) ##############

20: 1.36 (n=19, f=1) ########################

21: 1.85 (n=17, f=1) ##########################################

22: 1.21 (n=15, f=0) ################

23: 1.18 (n=12, f=0) OOOOOOOOOOOOOOO

24: 0.86 (n=08, f=0) OOO

25: 1.15 (n=05, f=0) ~~~~~~~~~~~~~~

26: 0.27 (n=04, f=0)

27: 1.24 (n=04, f=0) ~~~~~~~~~~~~~~~~~~

28: 0.07 (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 = | 74 | 54 | 62 | 64 | 62 | 66 | 65 | 71 |
| **Percentage of values flagged with SMART flags:** | | | | | | | | |
| WHZ: | 2.7 | 1.9 | 0.0 | 3.1 | 6.5 | 1.5 | 0.0 | 1.4 |
| HAZ: | 2.7 | 0.0 | 0.0 | 0.0 | 3.2 | 3.0 | 1.5 | 1.4 |
| WAZ: | 1.4 | 0.0 | 0.0 | 0.0 | 1.6 | 0.0 | 0.0 | 1.4 |
| **Age ratio of 6-29 months to 30-59 months:** | | | | | | | | |
| | 1.24 | 0.93 | 1.58 | 1.29 | 0.55 | 0.53 | 0.76 | 0.77 |
| **Sex ratio (male/female):** | | | | | | | | |
| | 1.06 | 1.25 | 1.07 | 1.00 | 1.38 | 1.06 | 1.32 | 0.92 |
| **Digit preference Weight (%):** | | | | | | | | |
| .0 : | 4 | 9 | 11 | 17 | 27 | 3 | 6 | 4 |
| .1 : | 14 | 13 | 13 | 9 | 6 | 15 | 11 | 11 |
| .2 : | 15 | 7 | 13 | 8 | 10 | 9 | 15 | 13 |
| .3 : | 7 | 11 | 6 | 14 | 10 | 11 | 9 | 15 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| .4 : | 4 | 17 | 5 | 8 | 10 | 8 | 12 | 8 |
| .5 : | 15 | 22 | 3 | 8 | 3 | 12 | 6 | 13 |
| .6 : | 3 | 9 | 13 | 5 | 5 | 15 | 18 | 7 |
| .7 : | 16 | 6 | 11 | 8 | 13 | 3 | 9 | 13 |
| .8 : | 12 | 4 | 3 | 13 | 5 | 12 | 5 | 8 |
| .9 : | 11 | 2 | 21 | 11 | 11 | 12 | 8 | 7 |
| DPS: | 16 | 19 | 18 | 12 | 22 | 14 | 14 | 11 |

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

**Digit preference Height (%):**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| .0 : | 50 | 2 | 8 | 36 | 5 | 2 | 3 | 6 |
| .1 : | 7 | 11 | 11 | 11 | 13 | 8 | 9 | 20 |
| .2 : | 3 | 17 | 16 | 8 | 11 | 12 | 17 | 11 |
| .3 : | 5 | 7 | 13 | 13 | 15 | 14 | 14 | 13 |
| .4 : | 0 | 9 | 11 | 2 | 6 | 12 | 14 | 10 |
| .5 : | 19 | 9 | 6 | 19 | 10 | 12 | 8 | 11 |
| .6 : | 4 | 13 | 13 | 5 | 11 | 14 | 9 | 8 |
| .7 : | 5 | 11 | 11 | 3 | 13 | 6 | 12 | 7 |
| .8 : | 1 | 11 | 5 | 2 | 2 | 8 | 9 | 11 |
| .9 : | 5 | 9 | 5 | 3 | 15 | 14 | 5 | 3 |
| DPS: | 47 | 12 | 12 | 34 | 14 | 13 | 14 | 14 |

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

**Digit preference MUAC (%):**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| .0 : | 27 | 2 | 10 | 25 | 16 | 6 | 5 | 3 |
| .1 : | 1 | 13 | 3 | 8 | 11 | 14 | 11 | 14 |
| .2 : | 9 | 11 | 6 | 14 | 19 | 8 | 11 | 17 |
| .3 : | 9 | 6 | 21 | 13 | 6 | 18 | 9 | 11 |
| .4 : | 7 | 11 | 11 | 9 | 6 | 6 | 15 | 14 |
| .5 : | 16 | 6 | 13 | 16 | 6 | 9 | 5 | 8 |
| .6 : | 4 | 19 | 5 | 8 | 3 | 14 | 6 | 6 |
| .7 : | 9 | 15 | 23 | 3 | 11 | 9 | 6 | 7 |
| .8 : | 8 | 9 | 3 | 2 | 8 | 8 | 17 | 6 |
| .9 : | 8 | 9 | 5 | 3 | 11 | 9 | 15 | 14 |
| DPS: | 23 | 15 | 22 | 22 | 16 | 12 | 15 | 15 |

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

**Standard deviation of WHZ:**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SD | 1.46 | 1.18 | 1.14 | 1.30 | 1.34 | 1.12 | 1.09 | 1.30 |

Prevalence (< -2) observed:

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| % | 23.0 | 13.0 | 14.5 | 20.3 | 8.1 | 9.1 | 9.2 | 18.3 |

Prevalence (< -2) calculated with current SD:

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| % | 21.4 | 10.3 | 16.5 | 18.7 | 7.6 | 6.6 | 8.2 | 19.0 |

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

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| % | 12.3 | 6.8 | 13.3 | 12.4 | 2.8 | 4.6 | 6.5 | 12.8 |

**Standard deviation of HAZ:**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SD | 1.58 | 1.02 | 1.23 | 1.11 | 1.52 | 1.12 | 1.01 | 1.20 |
| observed: | | | | | | | | |
| % | 40.5 | 51.9 | 38.7 | 42.2 | 58.1 | 37.9 | 55.4 | 36.6 |
| calculated with current SD: | | | | | | | | |
| % | 37.0 | 52.1 | 43.0 | 45.4 | 49.7 | 45.9 | 51.1 | 42.7 |
| calculated with a SD of 1: | | | | | | | | |
| % | 30.0 | 52.1 | 41.5 | 44.9 | 49.6 | 45.4 | 51.1 | 41.2 |

**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 | 12/8.8 (1.4) | 14/8.4 (1.7) | 26/17.2 (1.5) | 0.86 |
| 18 to 29 | 12 | 11/8.6 (1.3) | 4/8.1 (0.5) | 15/16.7 (0.9) | 2.75 |
| 30 to 41 | 12 | 5/8.3 (0.6) | 7/7.9 (0.9) | 12/16.2 (0.7) | 0.71 |
| 42 to 53 | 12 | 5/8.2 (0.6) | 10/7.8 (1.3) | 15/16.0 (0.9) | 0.50 |
| 54 to 59 | 6 | 5/4.1 (1.2) | 1/3.8 (0.3) | 6/7.9 (0.8) | 5.00 |
| 6 to 59 | 54 | 38/37.0 (1.0) | 36/37.0 (1.0) | | 1.06 |

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

Overall sex ratio: p-value = 0.816 (boys and girls equally represented)

Overall age distribution: p-value = 0.175 (as expected)

Overall age distribution for boys: p-value = 0.328 (as expected)

Overall age distribution for girls: p-value = 0.067 (as expected)

Overall sex/age distribution: p-value = 0.010 (significant difference)

**Team 2:**

| Age cat. | mo. | boys | girls | total | ratio boys/girls |
|---|---|---|---|---|---|
| 6 to 17 | 12 | 6/7.0 (0.9) | 8/5.6 (1.4) | 14/12.5 (1.1) | 0.75 |
| 18 to 29 | 12 | 6/6.8 (0.9) | 6/5.4 (1.1) | 12/12.2 (1.0) | 1.00 |

| | | | | | |
|---|---|---|---|---|---|
| 30 to 41 | 12 | 14/6.6 (2.1) | 4/5.3 (0.8) | 18/11.8 (1.5) | 3.50 |
| 42 to 53 | 12 | 3/6.5 (0.5) | 5/5.2 (1.0) | 8/11.7 (0.7) | 0.60 |
| 54 to 59 | 6 | 1/3.2 (0.3) | 1/2.6 (0.4) | 2/5.8 (0.3) | 1.00 |
| 6 to 59 | 54 | 30/27.0 (1.1) | 24/27.0 (0.9) | | 1.25 |

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

Overall sex ratio: p-value = 0.414 (boys and girls equally represented)

Overall age distribution: p-value = 0.137 (as expected)

Overall age distribution for boys: p-value = 0.018 (significant difference)

Overall age distribution for girls: p-value = 0.666 (as expected)

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

**Team 3:**

| Age cat. | mo. | boys | girls | total | ratio boys/girls |
|---|---|---|---|---|---|
| 6 to 17 | 12 | 7/7.4 (0.9) | 12/7.0 (1.7) | 19/14.4 (1.3) | 0.58 |
| 18 to 29 | 12 | 13/7.2 (1.8) | 6/6.8 (0.9) | 19/14.0 (1.4) | 2.17 |
| 30 to 41 | 12 | 8/7.0 (1.1) | 7/6.6 (1.1) | 15/13.6 (1.1) | 1.14 |
| 42 to 53 | 12 | 3/6.9 (0.4) | 4/6.5 (0.6) | 7/13.4 (0.5) | 0.75 |
| 54 to 59 | 6 | 1/3.4 (0.3) | 1/3.2 (0.3) | 2/6.6 (0.3) | 1.00 |
| 6 to 59 | 54 | 32/31.0 (1.0) | 30/31.0 (1.0) | | 1.07 |

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

Overall sex ratio: p-value = 0.799 (boys and girls equally represented)

Overall age distribution: p-value = 0.047 (significant difference)

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

Overall age distribution for girls: p-value = 0.183 (as expected)

Overall sex/age distribution: p-value = 0.005 (significant difference)

**Team 4:**

| Age cat. | mo. | boys | girls | total | ratio boys/girls |
|---|---|---|---|---|---|
| 6 to 17 | 12 | 13/7.4 (1.8) | 7/7.4 (0.9) | 20/14.8 (1.3) | 1.86 |
| 18 to 29 | 12 | 7/7.2 (1.0) | 9/7.2 (1.2) | 16/14.5 (1.1) | 0.78 |
| 30 to 41 | 12 | 3/7.0 (0.4) | 7/7.0 (1.0) | 10/14.0 (0.7) | 0.43 |
| 42 to 53 | 12 | 5/6.9 (0.7) | 7/6.9 (1.0) | 12/13.8 (0.9) | 0.71 |
| 54 to 59 | 6 | 4/3.4 (1.2) | 2/3.4 (0.6) | 6/6.8 (0.9) | 2.00 |

6 to 59 54 32/32.0 (1.0) 32/32.0 (1.0) 1.00

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

Overall sex ratio: p-value = 1.000 (boys and girls equally represented)

Overall age distribution: p-value = 0.486 (as expected)

Overall age distribution for boys: p-value = 0.130 (as expected)

Overall age distribution for girls: p-value = 0.904 (as expected)

Overall sex/age distribution: p-value = 0.086 (as expected

**Team 5:**

| Age cat. | mo. | boys | girls | total | ratio boys/girls |
|---|---|---|---|---|---|
| 6 to 17 | 12 | 2/8.4 (0.2) | 10/6.0 (1.7) | 12/14.4 (0.8) | 0.20 |
| 18 to 29 | 12 | 8/8.1 (1.0) | 2/5.9 (0.3) | 10/14.0 (0.7) | 4.00 |
| 30 to 41 | 12 | 14/7.9 (1.8) | 6/5.7 (1.1) | 20/13.6 (1.5) | 2.33 |
| 42 to 53 | 12 | 11/7.8 (1.4) | 4/5.6 (0.7) | 15/13.4 (1.1) | 2.75 |
| 54 to 59 | 6 | 1/3.8 (0.3) | 4/2.8 (1.4) | 5/6.6 (0.8) | 0.25 |
| 6 to 59 | 54 | 36/31.0 (1.2) | 26/31.0 (0.8) | | 1.38 |

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

Overall sex ratio: p-value = 0.204 (boys and girls equally represented)

Overall age distribution: p-value = 0.271 (as expected)

Overall age distribution for boys: p-value = 0.011 (significant difference)

Overall age distribution for girls: p-value = 0.185 (as expected)

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

**Team 6:**

| Age cat. | mo. | boys | girls | total | ratio boys/girls |
|---|---|---|---|---|---|
| 6 to 17 | 12 | 6/7.9 (0.8) | 2/7.4 (0.3) | 8/15.3 (0.5) | 3.00 |
| 18 to 29 | 12 | 5/7.7 (0.7) | 10/7.2 (1.4) | 15/14.9 (1.0) | 0.50 |
| 30 to 41 | 12 | 14/7.5 (1.9) | 11/7.0 (1.6) | 25/14.5 (1.7) | 1.27 |
| 42 to 53 | 12 | 5/7.3 (0.7) | 4/6.9 (0.6) | 9/14.2 (0.6) | 1.25 |
| 54 to 59 | 6 | 4/3.6 (1.1) | 5/3.4 (1.5) | 9/7.0 (1.3) | 0.80 |
| 6 to 59 | 54 | 34/33.0 (1.0) | 32/33.0 (1.0) | | 1.06 |

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

Overall sex ratio: p-value = 0.806 (boys and girls equally represented)

Overall age distribution: p-value = 0.009 (significant difference)

Overall age distribution for boys: p-value = 0.094 (as expected)

Overall age distribution for girls: p-value = 0.055 (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 | 9/8.6 (1.0) | 4/6.5 (0.6) | 13/15.1 (0.9) | 2.25 |
| 18 to 29 | 12 | 9/8.4 (1.1) | 6/6.3 (0.9) | 15/14.7 (1.0) | 1.50 |
| 30 to 41 | 12 | 4/8.1 (0.5) | 8/6.1 (1.3) | 12/14.3 (0.8) | 0.50 |
| 42 to 53 | 12 | 9/8.0 (1.1) | 5/6.0 (0.8) | 14/14.0 (1.0) | 1.80 |
| 54 to 59 | 6 | 6/3.9 (1.5) | 5/3.0 (1.7) | 11/6.9 (1.6) | 1.20 |
| 6 to 59 | 54 | 37/32.5 (1.1) | 28/32.5 (0.9) | | 1.32 |

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

Overall sex ratio: p-value = 0.264 (boys and girls equally represented)

Overall age distribution: p-value = 0.553 (as expected)

Overall age distribution for boys: p-value = 0.502 (as expected)

Overall age distribution for girls: p-value = 0.545 (as expected)

Overall sex/age distribution: p-value = 0.103 (as expected)

**Team 8:**

| Age cat. | mo. | boys | girls | total | ratio boys/girls |
|---|---|---|---|---|---|
| 6 to 17 | 12 | 10/7.9 (1.3) | 7/8.6 (0.8) | 17/16.5 (1.0) | 1.43 |
| 18 to 29 | 12 | 7/7.7 (0.9) | 7/8.4 (0.8) | 14/16.1 (0.9) | 1.00 |
| 30 to 41 | 12 | 10/7.5 (1.3) | 10/8.1 (1.2) | 20/15.6 (1.3) | 1.00 |
| 42 to 53 | 12 | 5/7.3 (0.7) | 7/8.0 (0.9) | 12/15.3 (0.8) | 0.71 |
| 54 to 59 | 6 | 2/3.6 (0.6) | 6/3.9 (1.5) | 8/7.6 (1.1) | 0.33 |
| 6 to 59 | 54 | 34/35.5 (1.0) | 37/35.5 (1.0) | | 0.92 |

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

Overall sex ratio: p-value = 0.722 (boys and girls equally represented)

Overall age distribution: p-value = 0.683 (as expected)

Overall age distribution for boys: p-value = 0.563 (as expected)

Overall age distribution for girls: p-value = 0.710 (as expected)

Overall sex/age distribution: p-value = 0.267 (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: 1.89 (n=03, f=0) ##############################################

02: 1.41 (n=03, f=0) ##########################

03: 1.77 (n=03, f=0) ########################################

04: 1.50 (n=03, f=0) ##############################

05: 1.35 (n=03, f=0) ######################

06: 1.82 (n=03, f=0) ##########################################

07: 2.39 (n=03, f=0) ####################################################################

08: 1.05 (n=02, f=0) ##########

09: 1.26 (n=03, f=0) ##################

10: 2.17 (n=03, f=1) ############################################################

11: 1.48 (n=03, f=0) ##############################

12: 0.81 (n=02, f=0)

13: 0.40 (n=03, f=0)

14: 0.42 (n=03, f=0)

15: 1.08 (n=03, f=0) ############

16: 0.36 (n=03, f=0)

17: 1.31 (n=03, f=0) ####################

18: 1.10 (n=02, f=0) ############

19: 1.50 (n=03, f=0) ##############################

20: 1.96 (n=03, f=0) ################################################

21: 2.74 (n=03, f=1) ############################################################

22: 0.42 (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: 0.82 (n=03, f=0) #

02: 1.54 (n=03, f=0) ################################

03: 0.43 (n=02, f=0)

04: 1.16 (n=03, f=0) ###############

05: 0.78 (n=03, f=0)

06: 1.71 (n=03, f=0) ####################################

07: 0.85 (n=03, f=0) ##

08: 0.83 (n=03, f=0) #

09: 0.36 (n=03, f=0)

10: 1.20 (n=03, f=0) #################

11: 0.64 (n=03, f=0)

12: 0.56 (n=02, f=0)

13: 0.24 (n=03, f=0)

14: 1.41 (n=03, f=0) ##########################

15: 0.98 (n=03, f=0) ########

16: 2.05 (n=03, f=0) ##################################################

17: 1.69 (n=03, f=0) ####################################

18: 0.29 (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: 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: 1.44 (n=03, f=0) ############################

02: 0.76 (n=03, f=0)

03: 1.43 (n=03, f=0) ##########################

04: 0.44 (n=03, f=0)

05: 0.14 (n=02, f=0)

06: 0.80 (n=03, f=0)

07: 0.59 (n=03, f=0)

08: 1.63 (n=03, f=0) ####################################

09: 1.05 (n=03, f=0) ##########

10: 0.92 (n=03, f=0) #####

11: 1.12 (n=03, f=0) #############

12: 0.83 (n=02, f=0) #

13: 0.60 (n=03, f=0)

14: 0.97 (n=03, f=0) #######

15: 1.07 (n=03, f=0) ###########

16: 2.25 (n=03, f=0) ##########################################################

17: 1.82 (n=02, f=0) ##########################################

18: 2.16 (n=03, f=0) ##########################################################

19: 0.99 (n=03, f=0) ########

20: 1.98 (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: 1.60 (n=03, f=0) ##################################

02: 1.09 (n=03, f=0) ############

03: 0.93 (n=03, f=0) #####

05: 0.54 (n=03, f=0)

06: 1.51 (n=03, f=0) ##############################

07: 1.70 (n=03, f=0) ######################################

08: 0.35 (n=02, f=0)

09: 1.77 (n=03, f=0) ##########################################

10: 1.70 (n=02, f=0) OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO

11: 1.19 (n=03, f=0) ################

12: 3.27 (n=03, f=0) ##################################################################

13: 0.11 (n=03, f=0)

14: 0.90 (n=03, f=0) ####

15: 1.16 (n=02, f=0) OOOOOOOOOOOOOO

16: 0.87 (n=03, f=0) ###

17: 0.53 (n=03, f=0)

18: 0.03 (n=02, f=0)

19: 1.32 (n=03, f=0) ######################

20: 1.34 (n=03, f=0) ######################

21: 1.98 (n=03, f=0) ##################################################

22: 1.36 (n=03, f=0) ########################

23: 0.97 (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: 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: 0.45 (n=03, f=0)

02: 0.60 (n=03, f=0)

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

04: 1.32 (n=03, f=0) ######################

05: 1.22 (n=03, f=0) ##################

06: 0.24 (n=03, f=0)

07: 1.70 (n=03, f=0) ######################################

08: 2.93 (n=03, f=1) ################################################################

09: 1.13 (n=03, f=0) ##############

10: 2.35 (n=03, f=1) ################################################################

11: 2.18 (n=03, f=0) ##########################################################

12: 0.84 (n=03, f=0) ##

13: 1.74 (n=03, f=0) ########################################

14: 0.78 (n=02, f=0)

15: 1.27 (n=03, f=0) ####################

16: 0.96 (n=03, f=0) #######

17: 2.26 (n=02, f=1) OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO

18: 0.17 (n=02, f=0)

19: 1.62 (n=02, f=0) OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO

20: 1.30 (n=02, f=0) OOOOOOOOOOOOOOOOOOOOO

21: 0.11 (n=02, f=0)

22: 0.65 (n=02, f=0)

23: 2.41 (n=02, f=0) OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO

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

02: 0.48 (n=03, f=0)

03: 0.25 (n=02, f=0)

04: 1.19 (n=03, f=0) ################

05: 2.13 (n=03, f=1) ##########################################################

06: 1.30 (n=03, f=0) ####################

07: 1.41 (n=03, f=0) ########################

08: 1.76 (n=03, f=0) ######################################

09: 1.90 (n=03, f=0) ##############################################

10: 0.36 (n=03, f=0)

11: 0.54 (n=03, f=0)

12: 1.78 (n=03, f=0) ######################################

13: 1.29 (n=03, f=0) ####################

14: 0.87 (n=02, f=0) OOO

15: 0.17 (n=02, f=0)

16: 0.37 (n=03, f=0)

17: 0.32 (n=03, f=0)

18: 0.55 (n=02, f=0)

19: 0.13 (n=03, f=0)

20: 0.76 (n=03, f=0)

21: 1.25 (n=03, f=0) ###################

22: 1.49 (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: 1.23 (n=03, f=0) ##################

02: 0.62 (n=03, f=0)

03: 0.85 (n=03, f=0) ##

04: 1.03 (n=03, f=0) #########

05: 0.56 (n=02, f=0)

06: 1.32 (n=03, f=0) ######################

07: 0.54 (n=02, f=0)

08: 1.63 (n=03, f=0) ###################################

09: 1.05 (n=03, f=0) ###########

10: 0.70 (n=03, f=0)

11: 2.14 (n=02, f=0) ##########################################################

12: 0.45 (n=03, f=0)

13: 1.48 (n=03, f=0) ##############################

14: 0.59 (n=03, f=0)

15: 1.55 (n=03, f=0) ################################

16: 0.76 (n=03, f=0)

17: 0.96 (n=03, f=0) #######

18: 1.42 (n=03, f=0) ########################

20: 1.23 (n=02, f=0) ##################

21: 0.71 (n=02, f=0)

22: 1.12 (n=02, f=0) ##############

23: 0.56 (n=02, f=0)

24: 1.01 (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: 1.54 (n=03, f=0) ################################

02: 1.16 (n=03, f=0) ###############

03: 1.71 (n=03, f=0) ######################################

04: 0.97 (n=03, f=0) #######

05: 2.02 (n=03, f=0) ##################################################

06: 0.73 (n=03, f=0)

07: 1.09 (n=03, f=0) ############

08: 0.85 (n=03, f=0) ##

09: 3.55 (n=03, f=1) ###################################################################

10: 1.94 (n=03, f=0) ################################################

11: 1.01 (n=03, f=0) #########

12: 1.77 (n=02, f=0) OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO

13: 0.37 (n=03, f=0)

14: 0.92 (n=03, f=0) #####

15: 0.93 (n=03, f=0) #####

16: 0.28 (n=03, f=0)

17: 1.00 (n=03, f=0) ########

18: 1.74 (n=03, f=0) ########################################

19: 0.95 (n=03, f=0) ######

20: 0.13 (n=03, f=0)

21: 0.11 (n=03, f=0)

22: 0.16 (n=02, f=0)

23: 0.32 (n=02, f=0)

24: 0.06 (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)

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

### *Annex 3: RNA tally sheet for women*

هغه ښځی چې عمر یې د ۱۵ نه تر ۴۹ کالو وی 15 – 49 years women

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

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

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

## *Annex 5: Event Calendar*

| د میاشتو نومونه | میاشتنی | 1392 | میاشتنی | 1393 | میاشتنی | 1394 | میاشتنی | 1395 | میاشتنی | 1396 | میاشتنی | 1397 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| حمل | | د نوروز ورځ دبزګر ورځ<br>د ګلانو غوریدل<br>د کار کښت وخت وی<br>سمنک ،نظر، | 52 | د نوروز ورځ دبزګر ورځ<br>د ګلانو غوریدل<br>د کار کښت وخت وی<br>سمنک ،نظر، | 40 | د نوروز ورځ دبزګر ورځ<br>د ګلانو غوریدل<br>د کار کښت وخت وی<br>سمنک ،نظر | 28 | د نوروز ورځ دبزګر ورځ<br>د ګلانو غوریدل<br>د کار کښت وخت وی<br>سمنک ،نظر | 16 | د نوروز ورځ دبزګر ورځ<br>د ګلانو غوریدل<br>د کار کښت وخت وی<br>سمنک ،نظر | 4 | د نوروز ورځ دبزګر ورځ<br>د ګلانو غوریدل<br>د کار کښت وخت وی<br>سمنک ،نظر |
| ثور | | توت پخیږیو، باران<br>۸ ثور نمانخی،<br>کار او کښت کیڑی ، غنم او<br>جوار پخیدل | 51 | توت پخیږیو، باران<br>۸ ثور نمانخی،<br>کار او کښت کیڑی ، غنم او<br>جوار پخیدل | 39 | توت پخیږیو، باران<br>۸ ثور نمانخی،<br>کار او کښت کیڑی ، غنم<br>و جوار پخیدل | 27 | توت پخیږیو، باران<br>۸ ثور نمانخی،<br>کار او کښت کیڑی ، غنم او<br>جوار پخیدل | 15 | توت پخیږیو، باران<br>۸ ثور نمانخی،<br>کار او کښت کیڑی ، غنم او<br>جوار پخیدل | 3 | توت پخیږیو، باران<br>۸ ثور نمانخی،<br>کار او کښت کیڑی ، غنم او<br>جوار پخیدل |
| جوزا | | د غنمو لو،د مکاتیبو رخصتی<br>د غنمو دلو او تریشل وخت<br>د تریاکو را ټلول | 50 | د غنمو لو،د مکاتیبو رخصتی<br>د غنمو دلو او تریشل وخت<br>د تریاکو را ټلول | 38 | د غنمو لو،د مکاتیبو رخصتی<br>د غنمو دلو او تریشل وخت<br>د تریاکو را ټلول | 26 | د غنمو لو،د مکاتیبو رخصتی<br>د غنمو دلو او تریشل وخت<br>د تریاکو را ټلول | 14 | د غنمو لو،د مکاتیبو رخصتی<br>د غنمو دلو او تریشل وخت<br>د تریاکو را ټلول | 2 | د غنمو لو،د مکاتیبو رخصتی<br>د غنمو دلو او تریشل وخت<br>د تریاکو را ټلول |
| سرطان | | دری میاشتنی روخصتی ، د<br>غنمو لو ،کوچنی اختر<br>هندوانی ،خټکی پخیږی | 49 | دری میاشتنی روخصتی ، د<br>غنمو لو ،کوچنی اختر<br>هندوانی ،خټکی پخیږی | 37 | دری میاشتنی روخصتی ،<br>د غنمو لو ،کوچنی اختر<br>هندوانی ،خټکی پخیږی | 25 | دری میاشتنی روخصتی ، د<br>غنمو لو ،کوچنی اختر<br>هندوانی ،خټکی پخیږی | 13 | دری میاشتنی روخصتی ، د<br>غنمو لو ،کوچنی اختر<br>هندوانی ،خټکی پخیږی | 1 | دری میاشتنی روخصتی ، د غنمو<br>لو ،کوچنی اختر<br>هندوانی ،خټکی پخیږی |
| اسد | | دګرمی میاشت ، انګور<br>پخیږی، د ناتار موسم<br>د غرمی خوب زیات کوی | 48 | دګرمی میاشت ، انګور<br>پخیږی، د ناتار موسم<br>د غرمی خوب زیات کوی | 36 | دګرمی میاشت ، انګور<br>پخیږی، د ناتار موسم<br>د غرمی خوب زیات کوی | 24 | دګرمی میاشت ، انګور<br>پخیږی، د ناتار موسم<br>د غرمی خوب زیات کوی | 12 | دګرمی میاشت ، انګور پخیږی، د<br>ناتار موسم<br>د غرمی خوب زیات کوی | | دګرمی میاشت ، انګور پخیږی، د<br>ناتار موسم<br>غرمی خوب زیات کوی |
| سنبله | 59 | روخصتی ختمیږی ، د انار ګل<br>ختمیږی<br>د هوا بدلون،د سبزی پخیدل | 47 | روخصتی ختمیږی ، د انار ګل<br>ختمیږی<br>د هوا بدلون،د سبزی پخیدل | 35 | روخصتی ختمیږی ، د انار<br>ګل ختمیږی<br>د هوا بدلون،د سبزی پخیدل | 23 | روخصتی ختمیږی ، د انار<br>ګل ختمیږی<br>د هوا بدلون،د سبزی پخیدل | 11 | روخصتی ختمیږی ، د انار ګل<br>ختمیږی<br>د هوا بدلون،د سبزی پخیدل | | روخصتی ختمیږی ، د انار ګل<br>ختمیږی<br>هوا بدلون،د سبزی پخیدل |
| میزان | 58 | مکتبونه شروع کیڑی، د<br>حصولاتو را ټلول<br>انار پخیږی ، لوی اختر وی | 46 | مکتبونه شروع کیڑی، د<br>حصولاتو را ټلول<br>انار پخیږی ، لوی اختر وی | 34 | مکتبونه شروع کیڑی، د<br>حصولاتو را ټلول<br>انار پخیږی ، لوی اختر<br>وی | 22 | مکتبونه شروع کیڑی، د<br>حصولاتو را ټلول<br>انار پخیږی ، لوی اختر وی | 10 | مکتبونه شروع کیڑی، د<br>حصولاتو را ټلول<br>انار پخیږی ، لوی اختر وی | | مکتبونه شروع کیڑی، د<br>حصولاتو را ټلول<br>نار پخیږی ، لوی اختر وی |
| عقرب | 57 | هوا سړیږی، بارانی موسم وی<br>دیخی هوا میوجات ،زردګی او<br>مولی پخیږی | 45 | هوا سړیږی، بارانی موسم وی<br>دیخی هوا میوجات ،زردګی او<br>مولی پخیږی | 33 | هوا سړیږی، بارانی موسم<br>وی<br>دیخی هوا میوجات<br>زردګی او مولی پخیږی | 21 | هوا سړیږی، بارانی موسم<br>وی<br>دیخی هوا میوجات ،زردګی<br>او مولی پخیږی | 9 | هوا سړیږی، بارانی موسم وی<br>دیخی هوا میوجات ،زردګی او<br>مولی پخیږی | | هوا سړیږی، بارانی موسم وی<br>دیخی هوا میوجات ،زردګی او<br>مولی پخیږی |
| قوس | 56 | کوچیان ګرمو منطقو ته کډه<br>کیڑی<br>بامونه ګلوی | 44 | کوچیان ګرمو منطقو ته کډه<br>کیڑی<br>بامونه ګلوی | 32 | کوچیان ګرمو منطقو ته<br>کډه کیڑی<br>بامونه ګلوی | 20 | کوچیان ګرمو منطقو ته کډه<br>کیڑی<br>بامونه ګلوی | 8 | کوچیان ګرمو منطقو ته کډه<br>کیڑی<br>بامونه ګلوی | | وچیان ګرمو منطقو ته کډه کیڑی<br>بامونه ګلوی |
| جدی | 55 | د موسم تغیر، چهار نیما<br>متحانونه شروع کیدل<br>میوی بخیڑی، انار، مالټی او<br>نارنج | 43 | د موسم تغیر، چهار نیما<br>متحانونه شروع کیدل<br>میوی بخیڑی، انار، مالټی او<br>نارنج | 31 | د موسم تغیر، چهار نیما<br>متحانونه شروع کیدل<br>میوی بخیڑی، انار، مالټی<br>او نارنج | 19 | د موسم تغیر، چهار نیما<br>متحانونه شروع کیدل<br>میوی بخیڑی، انار، مالټی او<br>نارنج | 7 | د موسم تغیر، چهار نیما<br>متحانونه شروع کیدل<br>میوی بخیڑی، انار، مالټی او<br>نارنج | | د موسم تغیر، چهار نیما<br>متحانونه شروع کیدل<br>میوی بخیڑی، انار، مالټی او<br>نارنج |
| دلو | 54 | مکتبونه شروع کیڑی،<br>مرضونه پکی وی،<br>وچ یخ وی | 42 | مکتبونه شروع کیڑی،<br>مرضونه پکی وی،<br>وچ یخ وی | 30 | مکتبونه شروع کیڑی،<br>مرضونه پکی وی،<br>وچ یخ وی | 18 | مکتبونه شروع کیڑی،<br>مرضونه پکی وی،<br>وچ یخ وی | 6 | مکتبونه شروع کیڑی،<br>مرضونه پکی وی،<br>وچ یخ وی | | مکتبونه شروع کیڑی، مرضونه<br>پکی وی،<br>وچ یخ وی |
| حوت | 53 | مرغان پیداکیڑی،کښتونه<br>کیڑی<br>میلی زیاتیڑی<br>خلک خوشحاله وی | 41 | مرغان پیداکیڑی،کښتونه کیڑی<br>میلی زیاتیڑی<br>خلک خوشحاله وی | 29 | مرغان پیداکیڑی،کښتونه<br>کیڑی<br>میلی زیاتیڑی<br>خلک خوشحاله وی | 17 | مرغان پیداکیڑی،کښتونه<br>کیڑی<br>میلی زیاتیڑی<br>خلک خوشحاله وی | 5 | مرغان پیداکیڑی،کښتونه کیڑی<br>میلی زیاتیڑی<br>خلک خوشحاله وی | | مرغان پیداکیڑی،کښتونه کیڑی<br>میلی زیاتیڑی<br>خلک خوشحاله وی |

## 10. REFERENCES

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