AFGHANISTAN

Nutrition, Mortality and IYCF SMART Survey Final Report

Urban Kabul city, Afghanistan

From 15th to 28th January 2019

Lead by: Dr. Baidar Bakht Habib

Authors: Dr. Baidar Bakht HabibDr. Abed Habibi, and Said Rahim RASTKAR

Funded by: EUROPEAN COMMISSION Humanitarian Aid and Civil Protection

Action Against Hunger | Action Contre La Faim

A non-governmental, non-political and non-religious organization

ACKNOWLEDGMENTS

The authors would like to extend their sincere appreciation to the Action Against Hunger (AAH) team in Kabul and in Paris Headquarter.

Special appreciation goes to the MOVE Welfare Organization team in Kabul. Finally, tremendous appreciation goes to the following stakeholders:

- Ministry of Public Health (MoPH), especially the Public Nutrition Department (PND), AIM-Working Group and Nutrition Cluster for their support and validation of survey protocol.
- Kabul Provincial Public Health Directorate (PPHD) and Public Health Officers (PHO) team for their support and authorization.
- European Commission Humanitarian Aid Office (ECHO) for their financial support in the survey.
- All community members for welcoming and supporting the survey teams during the data collection process.
- Special appreciation to the survey teams for making the survey a reality.

Statement on Copyright

© Action Against Hunger

Action Against Hunger is a non-governmental, non-political, and non-religious organization.

Unless otherwise indicated, reproduction is authorized on the condition that the source is credited. If reproduction or use of texts and visual materials (sound, images, software, etc.) is subject to prior authorization, such authorization was render null and void the above-mentioned general authorization and will clearly indicate any restrictions on use.

The content of this document is the responsibility of the authors and does not necessarily reflect the views of Action Against Hunger, MOVE or ECHO.

ABBREVIATIONS

AAH	Action Against Hunger
AfDHS	Afghanistan Demographic and health survey
BPHS	Basic Package of Health Services
BSU	Basic Sampling Unit
CBR	Crude Birth Rate
CDR	Crude Death Rate
CSO	Central Statistics Organization
DoPH	Directorate of Public Health
ENA	Emergency Nutrition Assessment
EPHS	essential Public Health Services
EFSA	Emergency food Security assessment
FCS	Food Consumption Score
GAM	Global Acute Malnutrition
HH	Household
IYCF	Infant and Young Child Feeding
IDPs	Internal Displaces populations
IPC	Integrated Food Security phases classification
KISs	Kabul Informal Settlements
LCS	Living Condition Survey
MUAC	Mid Upper Arm Circumference
MW	Mean Weight
MoPH	Ministry of Public Health
NNS	National Nutrition SurveyPPS
OW	Observed weight
PHO	Public Health officer
PPHD	Public Health Directorate
PND	Public Nutrition Department
PPS	Proportional Population to Size
PSU	Primary Sampling Unit
RC	Reserve Cluster
SAM	Severe Acute Malnutrition
SD	Standard Deviation

SDO	Sanayee Development Organization
SMART	Standardized Monitoring and Assessment of Relief and Transition
TWG	Technical Working Group
U5DR	Under five Death Rate
UNICEF	United Nation Children's Fund
WFP	World Food Program
WHZ	Weight for Height Z score
W/H	Weight for height
WHO	World Health Organization

Table of Contents

Acknowledgments **2**
Abbreviations **3**
1. Executive summary **9**
2. Introduction **12**
3. Survey objectives **15**
3.1 Primary objective 15
3.2. Specific objectives 15
3.3. Survey Justification 15
4. Methodology **16**
4.1. Sample Size 16
4.2. Sampling Methodology 18
5. Indicators: Definition, Calculation, and Interpretation **21**
5.1. Overview of Indicators 21
5.2. Anthropometric, immunization and IYCF Indicators 22
6. Training, team composition, and supervision **27**
7. Data analysis **28**
8. Limitations **28**
9. Survey findings **30**
9.1. Survey Sample 30
9.2. Data Quality 32
9.3. Prevalence of Acute Malnutrition 33
9.4. Prevalence of Chronic Malnutrition 39
9.5. Prevalence of Underweight 41
..... 42
9.6. Malnutrition prevalence among Women 15-49 years old based on MUAC criterion 42
9.7. Retrospective Mortality 43
9.8. Infant and Young Child Feeding 44
9.9. Child Immunization Status 45
10. Discussion **46**
11. Recommendations **49**

12. Annexes **51**
Annex 1: Standard Integrated SMART Survey Questionnaire (English) 51
Annex 2: geographical unit for Kabul urban (city) 54
Annex 3: Plausibility check for: Kabul Urban SMART_ DATA 1512019.as 59
Annex 4: Standardization test rerults for Kabul urban (city) 73
13. References **73**

List of tables

Table 1: Parameters for sample size calculation of anthropometry 16

Table 2: Sample size calculation for mortality surveys 17

Table 3: Household selection per day time table 19

Table 4: Standardized Integrated SMART Indicators 21

Table 5: Definition of Acute Malnutrition, Chronic Malnutrition, and Underweight according to WHO Reference 2006 24

Table 6: Classification for Severity of Malnutrition by Prevalence among Children Under Five.. 25

Table 7: WHO Definition of Acute Malnutrition According to Cut-off Values for MUAC 25

Table 8: Proportion of household and child sample achieved 30

Table 9: Demographic data summary 30

Table 10: Distribution of Age and Sex of among Children 6-59 months 32

Table 11: Mean Z-scores, Design Effects, Missing and Out-of-Range Data of Anthropometric Indicators among Children 6-59 Months 33

Table 12: Prevalence of Acute Malnutrition by WHZ (and/or oedema) by Severity and Sex among Children 6-59 months, WHO 2006 Reference 34

Table 13: Prevalence of Acute Malnutrition by WHZ (and/or oedema) by Severity and Sex among Children 0-59 months, WHO 2006 Reference 34

Table 14: Prevalence of Acute Malnutrition per WHZ and/or Oedema by Severity and Age Group 35

Table 15: Prevalence of Acute Malnutrition by MUAC (and/or oedema) by Severity and Sex among children 6-59 months 37

Table 16: Prevalence of Acute Malnutrition per MUAC and/or Oedema by Severity and Age Group 37

Table 17: Distribution of Severe Acute Malnutrition per Oedema among Children 6-59 Months 38

Table 18: Prevalence of Acute Malnutrition by WHZ and/or MUAC by Severity and Sex among Children 6-59 months 38

Table 19: Proportion of Acutely Malnourished Children 6-59 Months Enrolled in a Treatment Programme..... 39

Table 20: Prevalence of Chronic Malnutrition by HAZ by Severity and Sex among Children 6-59 months, WHO 2006 Reference..... 39

Table 21: Prevalence of Underweight by WAZ by Severity and Sex among Children 6-59 months, WHO 2006 Reference 41

Table 22: Prevalence of Underweight per WAZ by Severity and Age Group..... 41

Table 23: Prevalence of Acute Malnutrition among Women per MUAC 43

Table 24: Death Rate by Age and Sex with Reported Design Effect..... 43

Table 25: Second Dose Measles Immunization Coverages among Children 18-59 Months..... 45

Table 26: Prevalence of GAM by WHZ Comparing the 0-59 Month to the 6-59 Month Sample 47

List of Figures

Figure 1: Kabul city map (Source: Wikipedia)..... 13

Figure 2: Kabul Urban (city) Population Pyramid..... 32

Figure 3: Distribution of WAZ Sample Compared Figure 4: Mean WAZ by Age Group..... 42

Figure 5: Liquids or Food Consumed by Infants 0-5 Months..... 45

Figure 6: Children Captured by GAM by WHZ, MUAC, and Combined..... 46

Figure 7: Among Stunted Children 6-59 Months, those Simultaneous Wasted (WHZ+MUAC)... 48

1. EXECUTIVE SUMMARY

Kabul is the central zone and capital of Afghanistan. Kabul province is one of the thirty four provinces of Afghanistan. The population of Kabul province is nearly 5 million people as of 2018[1], of which almost 85 percent live in the urban areas. Kabul province comprises 14 districts without the capital city of Kabul: Bagrami, Chahar Asyab, Deh Sabz, Farza, Guldara, Istalif, Kalakan, Khaki Jabbar, Sarai Khuaja, Mussahi, Paghman, Qarabagh, Shakadara, and Surobi.

A nutrition and mortality survey was conducted in Kabul Province from the 15th to 28th January2019 during the winter season. It was a cross-sectional population-representative survey following the Standardized Monitoring and Assessment of Relief and Transition (SMART) methodology. The final report presents the analysis and interpretation of the nutritional status of children under five, the nutritional status of women, infant and young child feeding (IYCF) practices, immunization coverage and retrospective mortality rates. The summary of the key findings is presented in tables below.

Summary of Findings

Malnutrition prevalence – Children under five years old	
Indicator	Prevalence
GAM prevalence among children 6-59 months per WHZ <-2SD*	8.9 % (7.1-11.1 95% C.I.)
SAM prevalence among children 6-59 months per WHZ <-3SD	0.9 % (0.5 - 1.6 95% C.I.)
GAM prevalence among children 0-59 months per WHZ <-2SD	9.2% (7.5-11.3 95% CI)
SAM prevalence among children 0-59 months per WHZ <-3SD	0.9% (0.5-1.7 95% CI)
GAM prevalence among children 6-59 months per MUAC <125 mm	3.0 % (2.0-4.4 95% C.I.)
SAM prevalence among children 6-59 months per MUAC <115 mm	0.2 % (0.0-0.7 95% C.I.)

[1] Update Population Afghanistan , CSO 2018/19

Combined GAM prevalence among children 6-59 months per WHZ <-2SD or MUAC <125mm	9.9% (8.0-12.2 95% CI)
Combined SAM prevalence among children 6-59 months per WHZ <-3SD or MUAC <115 mm	1.0% (0.6-1.7 95% CI)
Stunting among children 6-59 months per HAZ <-2SD	29.0 % (25.9-32.2 95% C.I.)
Severe Stunting among children 6-59 months per HAZ <-3SD	7.4 % (5.8-9.4 95% C.I.)
Underweight among children 6-59 months per WAZ <-2SD	19.9 % (16.4-24.1 95% C.I.)
Severe Underweight among children 6-59 months per WAZ <-3SD	4.3 % (2.9-6.4 95% C.I.)

**GAM and SAM prevalence by any indicator include cases of nutritional oedema*

Nutritional Status of Women 15-49 years old	
Indicator	Result
MUAC among all women 15-49 years per MUAC <230mm	7.4%
MUAC among pregnant women per MUAC <230 mm	10.8%
MUAC among lactating women per MUAC <230 mm	8.6%
MUAC among all pregnant and lactating women per MUAC <230mm	9.4%

Crude and Under Five Death Rate (Death/10,000/Day)	
Indicator	Result
Crude Death Rate (CDR)	0.31 (0.20-0.50 95% CI)
Under five Death Rate (U5DR)	0.50 (0.24-1.02 95% CI

Infant and Young Children Feeding Practices	
Indicator	Result
Initiation of breastfeeding within 1 hour of birth among children 0-23 months	63.1%
Exclusive breastfeeding among infants 0-5 months	43.1%
Continued breastfeeding at 1 year among children 12-15 months	76.8%
Continued breastfeeding at 2 year among children 20-23 months	53.9%
Introduction of solid, semi-solid, or soft foods (6-8 months)	66.6%

Child Immunization	
Indicator	Result
Second dose measles vaccination among children 18-59 months confirmed by vaccination card	62.0%
Second dose measles vaccination among children 18-59 months confirmed by caregiver recall	25.2%
Second dose measles vaccination among children 18-59 months confirmed by vaccination card or caregiver recall	87.2%

2. INTRODUCTION

Kabul is the central zone and capital of Afghanistan. Kabul province is one of the thirty-four provinces of Afghanistan. The population of Kabul province is nearly 5 million people as of 2018[2], of which almost 85 percent live in the urban areas. Kabul province comprises 14 districts without the capital city of Kabul: Bagrami, Chahar Asyab, Deh Sabz, Farza, Guldara, Istalif, Kalakan, Khaki Jabbar, Sarai Khuaja, Mussahi, Paghman, Qarabagh, Shakadara, and Surobi.

Kabul city is located between Latitude 34-31' North and Longitude 69-12' East at an altitude of 1800 m (6000 feet) above sea level, which makes it one of the world's highest capital cities. Kabul is strategically situated in a valley surrounded by high mountains at crossroads of North-South and East-West trade routes.

It is surrounded by Koh-e Paghman Mountain from the East, Koh-e Qrough Mountain from the South-West and Koh-e Shirdarwaza Mountain from the North-East. Kabul has only one river, which is called the Kabul River. Kabul River rises at the Paghman Mountain toward South Pass about 70 km (43 mi) West of Kabul. It flows in an easterly direction, past Kabul, and through Jalalabad city, and then on to Dakka where it enters Pakistani territory and finally runs into the Indus at Attack.

The coldest month of the year is January and the hottest month is July. The maximum temperature was recorded at + 42.7 °C in July and the minimum at -26.3 °C in January. Survey data collection was conducted from 16 January to 27 January 2018, therefore during the winter season [The Months of Jadi 1397 in Solar Calendar], when higher morbidity is reported and access to livelihoods is difficult. This is the lean season for Kabul province, with hunger peak.

Description of the survey area

The survey was conducted in the capital city Kabul. Kabul city comprises about 4,141,165[3] population. All part of the city was included in this survey corresponding to 17 divisions as highlighted in figure 1 below. There are many internally displaced persons (IDPs) living in the city, settled in the so-called Kabul Informal Settlements (KIS). The KIS were excluded for this assessment due to various reasons, the main ones being different livelihoods and access to health services for the KIS population compared to the population living in other parts of Kabul. However, the IDPs living among the host community were included in the survey.

[2] Update Population Afghanistan , CSO 2018/19
[3] CSO up dated population 1397 (2018-2019)

To note that a separate SMART survey was conducted in Kabul province rural areas during the same period. 2 SMART surveys were conducted due to disparities, for example, related to food security or access to essential services, between populations living in rural versus urban areas.

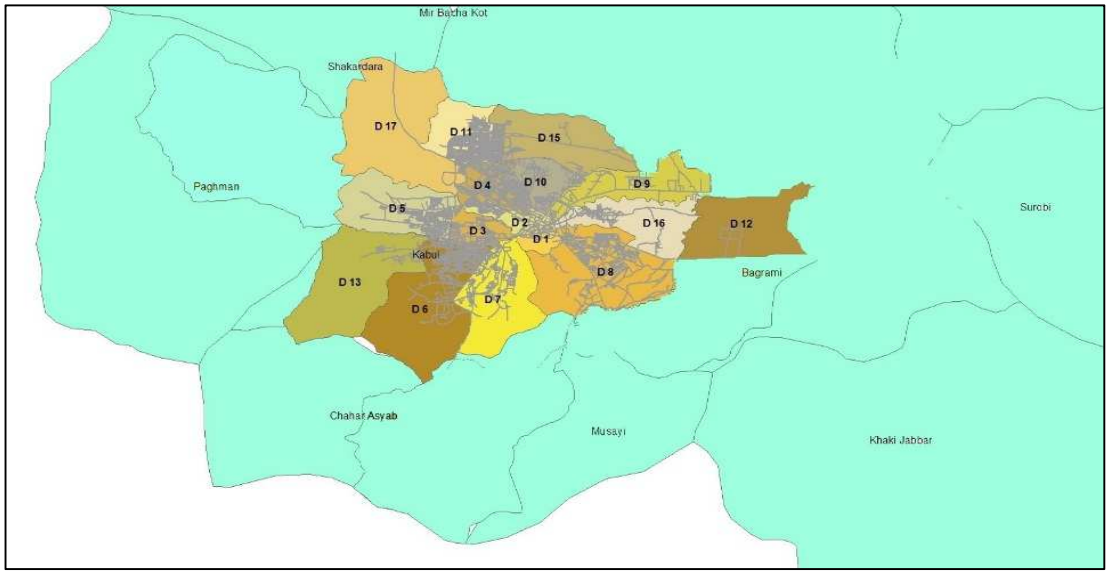


Figure 1: Kabul city map (Source: Wikipedia)

Demography and economy

The city of Kabul is multi-ethnic and composed of Tajik, Hazara, Pashtun, Uzbeks, Baloch, Turkmen, and Hindu. Dari and Pashto languages are widely used in the region. Population from other provinces and mostly from rural areas have moved to Kabul city over the past years due to the tense security situation all over the country. These IDPs are looking for better living conditions and are mostly mixed with the urban population, except the IDPs settled in the KIS.

Few up to date data are available with regards to the population living in Kabul city. Data are mostly available for provincial level, but not reflecting specifically the situation of the urban population. No up to date undernutrition and mortality data are available since 2013, date of the last National nutrition survey (NNS).

Looking at food security situation at Kabul province level and the First Level FS Outcomes[4]: Although the FCS under the crisis and emergency category is very high as per the EFSA data, after the review of other direct indicators and contributing factors, it has been agreed among the IPC TWG members that the FCS range could be 18-20%, giving poor and borderline FCS. 14.1% of the population are using 0-4 food groups which defines crisis and emergency situation in terms of HDDS. 15% of the population either have moderate or severe hunger which corresponds to emergency and crisis situation. LCS prevalence rate as per the EFSA 2018 data is very high. After review and convergence of other direct indicators and contributing factors, it has been agreed that the LCS rate could be in the range of 25-27% applying either crisis and or emergency coping strategies. According to the IPC 2018 report, 68% of the population in Kabul province do not have access to improved sanitation and 38% of the population do not have access to safe drinking water.

The security situation is still highly tense in the country, with multiple ongoing conflicts involving various parties. The situation is hard to handle with for the general population, living so often in precarious conditions, with limited access to livelihoods and basic commodities and services. The UN agencies support the Afghan population in need by providing various humanitarian assistance. Many international aid organizations are also providing humanitarian aid to the crisis affected population. For instance, national and international humanitarian organizations are providing health and nutrition services in Kabul province, but also in Kabul city under the MoPH governance. AAH is implementing nutrition and health services in two zones (South and west zones) out of four zones in the city. The agency Move was BPHS implementer in the districts of Kabul province, providing health and nutrition services, and the MoPH is in charge to implement the BPHS/EPHS in Kabul city. The agency Sanayee Development Organization (SDO) has been selected as the new Sehatmandi (formerly called BPHS) implementer and will support the BPHS/EPHS programs in the province from the end of January 2019. The proposed survey was conducted by the Sehatmanti implementer MOVE with technical support of AAH and under close coordination with the MoPH (PND) and the local authorities.

[4] IPC report 2018

3. SURVEY OBJECTIVES

3.1 Primary objective

- To investigate the nutritional status of children under five years of age and women 15-49 years old living in Kabul city, Afghanistan.

3.2. Specific objectives

- To estimate prevalence of stunting, wasting and underweight among children 6-59 months.
- To estimate prevalence of wasting, among children aged 0-59 months.
- To determine the nutritional status of women 15-49 years based on MUAC assessment.
- To estimate Crude Death Rate (CDR) and under-five Death Rate (U5DR).
- To determine core Infant and Young Child Feeding (IYCF) practices among children aged <24 months.
- To estimate second dose measles vaccination coverage among children 18-59 months.

3.3. Survey Justification

The target area was selected by the nutrition cluster and the Assessment Information Management Working Group (AIM-WG) to know the nutrition situation in the urban area of Kabul province, for instance, Kabul city, due to various reasons:

- Based on the nutrition survey prioritization matrix, Kabul, Paktia, Khost, Faryab, Sar-e-pol, Nuristan and Wardak are the high priority provinces. The National Nutrition Survey (NNS) done in 2013 included Kabul entire province and has revealed a GAM rate of 6.5% (4.32 - 9.78; 95% CI) and a SAM rate of 2.0% (1.01 - 3.96; 95% CI). Due to lack of recent data, AIM-WG and the Nutrition Cluster have prioritized Kabul province to conduct a SMART survey.
- According to the IPC report, 2018, the loss of employment is closely linked to the security situation. The main livelihoods of the people are informal jobs, off-farm labor and agriculture labor. Recently, the loss of formal jobs, the reduction of development activities and the drought have negatively affected the living conditions and vulnerability of the Afghan population. Due to low precipitation, there is an increase in water-borne diseases[5], limited access to safe drinking water and improved sanitation.

[5] EFSA 2018 report

- Due to the conflict, many people have also lost their properties, family members or breadwinners. The population also suffers from a decrease in the investment sector and availability of basic services.
- The survey was a good opportunity to build the capacity of the local partner.

4. METHODOLOGY

4.1. Sample Size

The household sample size surveyed is determined using ENA for SMART software version 2011 (updated 9th July 2015). A two-stage cluster methodology was applied. Clusters, Guzar (local name for the division, managed by a Wakil Guzar), multi-storeyed buildings and municipalities streets and sub-streets numbers (based on urban health enumeration area Urban EPI micro-plan) was the Primary Sampling Unit (PSU) for the proposed survey. This list was used from Urban EPI updated lists (MoPH).

The first stage involves the selection of clusters from a total list of enumeration areas using the Probability Proportion to Size (PPS) method. This selection was done before starting the data collection.

The second stage of the methodology was based on the systematic random selection of households from a complete and updated list of households. This was conducted at field level. Households were the Basic Sampling Unit (BSU) for the proposed survey. Tables 1 and 2 highlights the parameters used for sample size calculation for anthropometric and mortality surveys.

Table 1: Parameters for sample size calculation of anthropometry

Parameters for Anthropometry	Value	Assumptions Based on Context
Estimated prevalence of GAM (%)	9.8%	According to the MoPH National Nutrition Survey-2013, GAM 6.5 % (4.32-9.78 95% CI)[6]. The upper confidence interval of 9.8% is selected as a more conservative estimate for the planning stage, particularly given the effect of food security and security situation in the province.

[6] National Nutrition Survey-2013

Desired precision	±2.5	Based on SMART recommendation.
Design Effect	2.0	The population living in the survey area is considered to have different living conditions and food security situation. Hence, the design effect was estimated at 2.0.
Children to be included	**1183**	Generated by ENA software.
Average HH Size	8	Based on AFDHS survey 2015[7], the average HH size is estimated at 8.0 members per HH at the national level. There is no available average for provincial level.
% Children under five	17.3%	Based on CSO updated population 1397 (2018)[8]
% Non-response Households	8%	The percentage of non-respondent households was estimated at 8%, due to lack of a male in the households (women may not be allowed to welcome the survey team in the absence of the men). Moreover, many children were expected to be in children-garden.
Households to be included	**1032**	Generated by ENA software.

Table 2: Sample size calculation for mortality surveys

Parameters for Mortality	Value	Assumptions based on context
Estimated Death Rate /10,000/day	0.5	There was no updated mortality data available; therefore, the 0.5 CDR baseline was used as per the SMART methodology.
Desired precision /10,000/day	±0.3	Based on SMART recommendation.
Design Effect	2.0	The standard design effect of 2 was used.

[7] AFDHS survey 2015
[8] Update Population Afghanistan , CSO 2018/19

Recall Period in days	120	The starting point of recall period is 20th Sep 2018 (29th Sunbula 1397) (Ashura) to the mid-point of data collection estimated to be the 19th January 2019 (19th Jadi 1397).
Population to be included	**3872**	Generated by ENA.
Average HH Size	8.0	Based on [9]AFDHS survey 2015, the average HH size is estimated at 8.0 members per HH at the national level. There is no available average for provincial level.
% Non-response Households	8%	The percentage of non-respondent households was estimated at 8%, due to lack of a male in the households (women may not be allowed to welcome the survey team in the absence of the men). Moreover, many children were expected to be in children-garden.
Households to be included	**526**	Generated by ENA software.

Based on the SMART methodology, between the calculated anthropometry and mortality sample sizes, the largest sample size was used for this survey. In this case, the larger sample size was anthropometry sample with 1032 households.

4.2. Sampling Methodology

A two-stage cluster sampling methodology was implemented.

Stage 1:

The clusters were randomly selected by applying probability proportion to size (PPS) method using ENA software (Version 2011, updated 9 July 2015) for SMART. A complete and updated list of all accessible enumeration areas was added into the software.

Following the principles of PPS, the enumeration area lists were gathered from the MoPH (Urban EPI micro plan) in consultation with the DoPH of Kabul, WHO and local government to finalize the

[9] AFDHS survey 2015

sampling frame. The enumeration area with a large population had a greater chance of being selected than the clusters with a small population and vice versa.

It is notable that the KISs were excluded from the survey due to different livelihood, food security and living conditions compared to the general urban population in Kabul city.

Based on the estimated time to travel to the survey area, and to select and survey the households, it was estimated that each team could effectively survey 14 HHs per day (see table below 3 for more details). Based on the selected HH sample size, 74 clusters were required (1032/14=73.7 rounded up to 74 clusters).8 Reserve Clusters (RCs) were also selected by ENA software for SMART during the same step. Reserve clusters were not surveyed as only two clusters were not accessible (no consent received from the Wakil Guzar of the selected areas).

Table 3: Household selection per day time table

Total working time	8:30 AM to 4;00 PM (7 Hours 450 minutes)
Time for transportation (round trip)	1 hour (60 minutes)
Time for break and pray	1 hour (60 minutes)
Time for interview	23 minutes
Distance from one HH to another HH	10 minutes

In each selected cluster, one or more key informants from the community (i.e. Wakil Guzar, elder, mullah,) were asked to provide information about the enumeration area such as geographic layout and the number of households. The cluster was divided into smaller segments if they contain more than 150 households or if households are very geographically dispersed. This division was based on existing administrative units (neighbourhood, zone, Guzar, street) or natural landmarks (municipality street number, road, or public places like a market, school, or mosque,). If the segments had a similar number of households then a segment was selected randomly to represent the cluster. If the segments had very different numbers of households, a segment was selected using the PPS.

Stage 2:

The household is defined as “all people eating from the same pot and living together” (World Food Programme definition). The household was the BSU. In Afghanistan, the term household is often used synonymously with a compound, which potentially represents more than one household. Hence, the household definition was explained to key informants before updating the household list to identify compounds composed of multiple households in advance.

In total, 1036 (74 *14) households were surveyed with each team covering effectively 14 households in a day. The data collection lasted 11 days : the data collection during the two first days was done with 12 teams and for the next 10 days, only 6 urban survey teams have done the data collection (6 teams were involved for the SMART Survey in Kabul rural areas).
Before the data collection, all team members had the clusters list and visited the selected cluster for meeting the local authorities or Wakil Guzar. This meeting was the opportunity to introduce the team, explain the purpose of the survey and gather information about the land mark and HH counting in the area.
In this assessment, households were chosen within each cluster using systematic random sampling. All households were listed and numbered by the survey team. The 14 households were identified from this enumerated household list using systematic random sampling method before the data collection days. At the beginning of the data collection for each enumeration area, the team leader has received the list from leaders of the area and has applied the systematic selection method.
As the list may not be available or accurate in all target locations, the teams were trained on both methods of sampling: simple random sampling and systematic random sampling. This assessment was designed for Kabul city: the teams have taken into account multi-storeyed buildings as multiple HHs based on the HH definition.

- In the case of a multi-storeyed building containing multiple households counted as one HH during the initial listing process, the enumerators conducted another round of randomization to select one HH.
- In the case of polygamous HH, the WFP definition of a HH was used: people eating from the same pot. If the HH used different meal pots then a random selection was done to select one family living in this HH.
- If the selected HH was absent and the key members (for instance the mothers) are out of the home, the team have revisited the HH at a later stage of the day. If this problem was recurrent, then the team has readjusted its work plan and survey schedule accordingly.

Every household was asked to consent before any data is collected. The data was collected anonymously and no compensation was given to participants.

All children 0 to 59 months living in the selected HH were included for anthropometric measurements, including twins, orphans or unrelated children living in the household. Children aged <24 months were included for IYCF assessment. Households without children were still assessed for household level questions.

Any absent households or households with missing or absent women or children were revisited at the end of the day before leaving the cluster. Missing or absent children not found after multiple visits were not included in the survey neither replaced. A cluster control form was used to record all household visits and any missed and absent households. Abandoned HHs were excluded from the total HHs list before the launch of the survey and were replaced.

5. INDICATORS: DEFINITION, CALCULATION, AND INTERPRETATION

5.1. Overview of Indicators

The anthropometric indicators assessed by this survey and the corresponding target population are presented in the Table 4 below.

Table 4: Standardized Integrated SMART Indicators

Indicator	Target Population
Anthropometry	
Acute Malnutrition by WHZ	Children 0-59 and 6-59 months
Acute Malnutrition by MUAC	Children 6-59 months
Acute Malnutrition by Combined (WHZ and/or MUAC)	
Chronic Malnutrition by HAZ	
Underweight by WAZ	
Mortality	
Crude Mortality Rate (CDR)	Entire population
Under Five Mortality Rate (U5MR)	Children under five
IYCF	
Early Initiation of Breastfeeding	Children <24 months
Exclusive Breastfeeding (EBF)	Infants 0-5 months
Continued Breastfeeding at 1 Year	Children 12-15 months
Continued Breastfeeding at 2 Years	Children 20-23 months
Health	
Measles Vaccination (2 doses)	Children 18-59 months
Women of Reproductive Age & PLW	
MUAC	Women 15-49 years and PLW

5.2. Anthropometric, immunization and IYCF Indicators

Age

Age was recorded among children 0-59 months as date of birth (day/month/year) according to the Solar Calendar in the field, and later on, was converted to the Gregorian Calendar for analysis. The exact date of birth was recorded only if the information was confirmed by supportive documents, such as vaccination card or birth certificate. Where the above-mentioned documents were unavailable or questionable, age was estimated using a local calendar of events and recorded in months.

Weight

Weight was recorded among children 0-59 months in Kg to the nearest 0.1kg using an electronic SECA scale with the 2-in-1 (mother/child) weighing function. Children who could easily stand up were weighed on their own. When children could not stand independently, the 2-in-1 weighing method was applied with the help of a caregiver. Two team members worked in unison to take the measurements of each child.

Height

Height was recorded among children 0-59 months in cm to the nearest 0.1cm. A height board was used to measure bareheaded and barefoot children. Children less than two years old were measured lying down and those more than two years old were measured standing up. Two team members worked in unison to take the measurements of each child.

MUAC

MUAC was recorded among children 6-59 months[10] and women 15-49 years to the nearest mm. All subjects were measured on the left arm using standard MUAC tapes.

Oedema

The presence of oedema among children 0-59 months was recorded as “yes” or “no”. All children were checked for the presence of oedema by applying pressure with thumbs for three continuous seconds on the tops of both feet. Any suspected cases required confirmation by multiple team members, a supervisor if present, and photo-documented when possible.

Acute malnutrition

Acute malnutrition in children 6-59 months is expressed by using three indicators.

[10] MUAC is not standardised for infants <6 months

Weight for Height (W/H) and MUAC are described below. Nutritional oedema is the third indicator of severe acute malnutrition. Additionally, the prevalence of GAM amongst 0-59 was reported.

WHZ

A child's nutritional status is estimated by comparing it to the weight-for-height distribution curves of 2006 WHO growth standards reference population. The expression of the weight-for-height index as a Z-score (WHZ) compares the observed weight (OW) of the surveyed child to the mean weight (MW) of the reference population, for a child of the same height. The Z-score represents the number of standard deviations (SD) separating the observed weight from the mean weight of the reference population: WHZ = (OW - MW) / SD.

During data collection, the weight-for-height index in Z-score was calculated in the field for each child in order to refer malnourished cases to the appropriate center if needed. Moreover, the results were presented in Z-score using WHO reference in the final report. The classification of acute malnutrition based on WHZ well-illustrated in Table 5.

MUAC

The mid-upper arm circumference does not need to be related to any other anthropometric measurement. It is a reliable indicator of the muscular status of the child and is mainly used to identify children with a risk of mortality. The MUAC is an indicator of malnutrition only for children greater or equal to 6 months. Table 7 provides the cut-off criteria for categorizing acute malnutrition cases.

Oedema

Nutritional bilateral pitting Oedema is a sign of Kwashiorkor, one of the major clinical forms of severe acute malnutrition. When associated with Marasmus (severe wasting), it is called Marasmic-Kwashiorkor. Children with bilateral Oedema are automatically categorized as being severely malnourished, regardless of their weight-for-height index.

Combined GAM

In Afghanistan, but also at worldwide level, it has been demonstrated that there is a large discrepancy between the prevalence of GAM by WHZ and GAM by MUAC. Therefore, AAH routinely reports the prevalence of GAM by WHZ *or* MUAC as "combined GAM" among children 6-59 months. Combined GAM considers the cut-offs of both WHZ and MUAC.

Chronic malnutrition

Chronic malnutrition is the physical manifestation of longer-term malnutrition which retards growth. Also known as stunting, it reflects the failure to achieve one's optimal height. In children 6-59 months, chronic malnutrition is estimated using Height-for-Age z-score (HAZ).

HAZ is calculated using ENA Software for SMART by comparing the observed height of a selected child to the mean height of children from the reference population for a given age. When using HAZ, the distribution of the sample is compared against the 2006 WHO reference population. Global chronic malnutrition is the sum of moderate and severe chronic malnutrition. HAZ cut-offs are presented in Table 5 below.

Underweight

Underweight is the physical manifestation of both acute malnutrition and chronic malnutrition. In children 6-59 months, underweight is estimated using Weight-for-Age (WAZ) z-score. WAZ is calculated using ENA Software for SMART by comparing the observed weight of a selected child to the mean weight of children from the reference population for a given age. When using WAZ, the distribution of the sample is compared against the 2006 WHO reference population. Global underweight is the sum of moderate and severe underweight. WAZ cut-offs are presented in Table 5 below.

The prevalence of malnutrition as identified by WHZ, HAZ and WAZ have also been classified by the WHO in terms of severity of public health significance. The thresholds are presented in table 6 below.

Table 5: Definition of Acute Malnutrition, Chronic Malnutrition, and Underweight according to WHO Reference 2006

Severity	ACUTE MALNUTRITION (WHZ)	CHRONIC MALNUTRITION (HAZ)	UNDERWEIGHT (WAZ)
GLOBAL	<-2 z-score and/or oedema	<-2 z-score	<-2 z-score
MODERATE	<-2 z-score and ≥ -3 z-score	<-2 z-score and ≥ -3 z-score	<-2 z-score and ≥ -3 z-score
SEVERE	<-3 z-score and/or oedema	<-3 z-score	<-3 z-score

Table 6: Classification for Severity of Malnutrition by Prevalence among Children Under Five[11]

LABELS	PREVALENCE THRESHOLDS (%)			
	WASTING	OVERWEIGHT	STUNTING	UNDERWEIGHT[12]
Very low	<2.5	<2.5	<2.5	
Low	2.5-<5	2.5-<5	2.5-<10	<10
Medium	5-<10	5-<10	10-<20	10-19.9
High	10-<15	10-<15	20-<30	20-29.9
Very high	≥15	≥15	≥30	≥30

Table 7: WHO Definition of Acute Malnutrition According to Cut-off Values for MUAC

Severity	MUAC (mm)
GLOBAL	<125 (and/or oedema)
MODERATE	≥ 115 and < 125
SEVERE	<115 (and/or oedema)

Proportion of acutely malnourished children enrolled in or referred to a Program

All children 6-59months identified as severely acutely malnourished by MUAC during the data collection were assessed for current enrolment status. All malnourished children not enrolled in a treatment program were referred to the nearest nutrition program if possible.

Malnutrition prevalence among women 15-49 years based on MUAC criterion

All women 15-49 years, including PLW, were assessed for nutritional status based on MUAC measurement. Low MUAC was defined as MUAC <230mm.

Retrospective mortality

Demography and mortality were assessed for all households, regardless of the presence of children. All members of the household were counted according to the household definition.

CDR refers to the number of persons in the total population that died over the mortality recall period (120 days). It is calculated by ENA Software for SMART using the following formula:

[11] UNICEF WINS | Issue 24 | 13 December 2018 | Moving to Updated Prevalence Thresholds
[12] WHO threshold

$$CDR = \frac{Nb\ of\ deaths * 10000\ persons}{population\ at\ mid - interval * time\ interval\ in\ days}$$

U5DR refers to the number of children under five years that die over the same mortality recall period.

$$U5DR = \frac{Nb\ of\ deaths\ of\ U5s * 10000\ U5s}{population\ of\ U5s\ at\ mid - interval * time\ interval\ in\ days}$$

Timely initiation of breastfeeding

Calculated as the proportion of children born in the last 24 months who were put to the breast within one hour of birth. Based on caregiver recall.

Exclusive Breastfeeding

Calculated as the proportion of infants 0-5 months who were fed exclusively with breast milk in the past day or night. This indicator aims to identify if breastmilk is being displaced by other liquids or foods before the infant reaches six months of age. Based on caregiver recall.

Continued Breastfeeding at 1 Year

Calculated as the proportion of children 12–15 months who were fed with breast milk in the past day or night. Based on caregiver recall.

Continued Breastfeeding at 2 Years

Calculated as the proportion of children 20–23 months who were fed with breast milk in the past day or night. Based on caregiver recall.

Second Dose Measles Coverage

Calculated as the proportion of children 18-59 months who received two doses of the measles vaccine. Assessed based on vaccination card or caregiver recall. As part of the Expanded Program on Immunization (EPI), the first dose of measles immunization is given to infants aged between 9 to 18 months, with the second given at 18 months. As this is the last vaccination dose given to a child under five as per the recommended immunization schedule, the second dose measles coverage indicator can also be used as a proxy for overall immunization status and access to healthcare.

6. TRAINING, TEAM COMPOSITION, AND SUPERVISION

AAH conducted two parallel SMART surveys in urban and rural areas of the Kabul province in January 2019.

For the first two days, both urban and rural surveyors (12 teams of four members) collected data for the urban SMART and then six teams of four members have collected the data in the remaining days. Each team was composed of one team leader, two measurers and one interviewer.

Dr. Abdul Wakil Ahmadi
Kabul PPHD speeches in Opening Ceremony

Each team had two female surveyors to ensure acceptance of the team amongst the surveyed households, particularly for IYCF questionnaires. Each female member of the survey team was accompanied by a mahram[1] to facilitate the work at community level. The majority of the population speaks and understands Pashto and Dari languages; therefore, the survey manager used Pashto and Dari languages for training and monitoring purposes. Both Pashto and Dari versions of the questionnaire were used. The questionnaires were back translated using a different translator and were pre-tested during the field test. The teams were supervised by AAH, MOVE and PPHD staff. All surveyors had received a 7-day training on the survey methodology and all its practical aspects; one AAH technical staff and one MOVE Nutrition program coordinator facilitated the training.

A standardization test was conducted over the course of 1 day, measuring 10 children during the day. The measurers have done two rounds of children measurement and after lunch, the assistant have done again the measurements in order to evaluate the accuracy and the precision of the team members in taking the anthropometric measurements.
The teams had conducted a one-day field test in order to evaluate their work in real field conditions. Feedback was provided to the team in regards to the results of the field test; particularly in relation to digit preferences and data collection procedures. Refresh training on anthropometric measurements and on the filling of the questionnaires and the household's selection was organized on the last day of the training by AAH to ensure overall understanding before going to the field.

A field guidelines document with instructions including household definition and selection was provided to each team member. All documents, such as local event calendar, questionnaires or consent forms were translated into Pashto and Dari languages, for better understanding and to avoid direct translation during the data field collection.

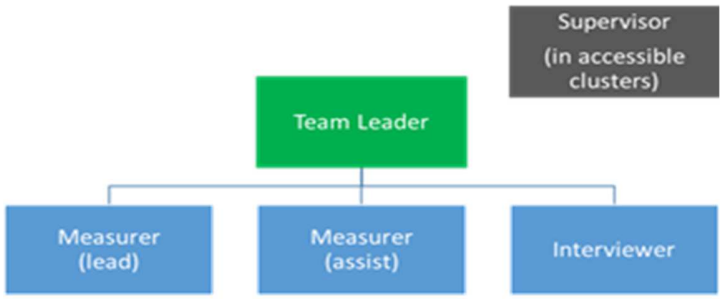


Figure 1: Survey team composition

7. DATA ANALYSIS

The anthropometric and mortality data were analyzed using ENA for SMART software 2011 version (9th July 2015). Survey results were interpreted in reference to WHO standards 2006; Analysis of other indicators to include IYCF and demographics was done using Microsoft Excel version 2010. Contextual information in the field and from routine monitoring was used in complementing survey findings and strengthening analysis. Interpretation of each result was done based on the existing thresholds for different indicators as well as comparing with other available data sources at the national and provincial level.

8. LIMITATIONS

- Only 67% of the surveyed children had documentation to evidence their exact date of birth. Due to the lack of reliable and available documentation of birth, the teams relied on a local events calendar to estimate age. This may have reduced the quality of the age determination and may have biased the estimation of the stunting and underweight prevalence.
- Cultural practices were another limitating factor. For instance, many heads of HH refused to take part in the survey. Two teams going to clusters were rejected by the Wakil Guzar/elders and were not able to survey those clusters.

- Enumeration areas were not fully specified and for some clusters, borders were not specified in available cluster maps. Despite it was in urban area, there is a lot of not well-organized residential areas near the downtown, numbers were not assigned for houses making very hard to differentiate houses of one cluster to a neighboring one in immensely populated areas. The teams faced problems in finding and selecting the HH per the selected clusters.
- As the Kabul urban area survey was launched in the middle of a harsh and snowy winter, with persistent heavy snow falling, the weather conditions have hampered the work and performance of our teams. In some areas caregivers, were not willing to remove extra cloths of their children, most of them were convinced after a long negotiation, and rolling-up the children sleeves during the MUAC measurement was also a challenge. This may have hampered the proper MUAC measurement. For children weighted with clothes, a standard weight of 380 grams was removed for the analysis.

9. SURVEY FINDINGS

9.1. Survey Sample

Overall, the survey assessed 72 clusters out of 74 planned, 964 households, 7,283 individuals, 1,040 women 15-49 years, 1,202 children under five, and 1,096 children 6-59 months. Among the 964 households, the teams attempted to survey, 44 were absent or refused to participate to the survey, resulting in a non-response rate of 4.4%. This rate is lower than the estimate done at the planning stage (8%) as less households have refused to participate to the survey in comparison to the expectations. Overall, 95.6% of the planned households were assessed and 92.6% of the anticipated sample size for children 6-59 months was achieved.

Table 8: Proportion of household and child sample achieved

Number of households planned	Number of households surveyed	Achieved %	Number of children 6-59 months planned	Number of children 6-59 months surveyed	Achieved %
1008	964	95.6%	1183	1096	92.6%

The mortality questionnaire was designed to gather demographic data and capture in- and out-migration. Household demographics and movement are presented in Table 9 below. The survey findings indicate that the average household size was 7.5 (average lower than the one used at planning stage with 8 members per household), 48.9% of the population was female, 51.1% of the population was male, and 17.0% was under five. The observed rate of in-migration (0.34) and the out-migration (0.53) during the recall period may have been influenced by the 120 recall period days.

Table 9: Demographic data summary

Indicator	Values
Total number of clusters	72
Total number of HHs	964
Total number of HHs with children under five	741
Average household size	7.5

Female % of the population	48.9%
Male % of the population	51.1%
Children under five % of the population	17.0%
Birth Rate	0.87
In-migration Rate (Joined)	0.34
Out-migration Rate (Left)	0.54

Households were also assessed for residential status. Among the 967 surveyed households, 76.8% were residents of the area, and 23.2% were internally displaced. No refugee or nomad was found.

Table 10: Household residential status by proportion

Residential Status of Households N= 967	Resident	743	76.8%
	IDP	224	23.2%
	Refugee	0	0.0%
	Nomad	0	0.0%

As the age and sex of all household members were assessed, it was possible to disaggregate the-population by sex and five year age interval, as presented in Figure 2 below. The pyramid is wide at the base and narrows towards the apex, indicating a generally youthful population characterized by a high birth rate and a high mortality rate. Afghanistan's national level Crude Birth Rate "CBR" was 37,9 per 1000 population in 2017 and in accordance with the latest UNICEF[13] report, U5MR is 67.9 per 1000 live births in Afghanistan.

The surveyed sample of children 6-59 months was 1096. The distribution as disaggregated by age and sex are presented in Table 11 below. The overall sex ratio was 1.0, indicating a sample with equal representation of boys and girls. The exact birth date was not determined for 33% of the children as only 67% of the surveyed children had documentation to evidence their exact date of birth. This may have reduced the quality of the age determination, and therefore may have im-pacted the estimation of the stunting and underweight prevalence.

[13] https://data.unicef.org/country/afg/

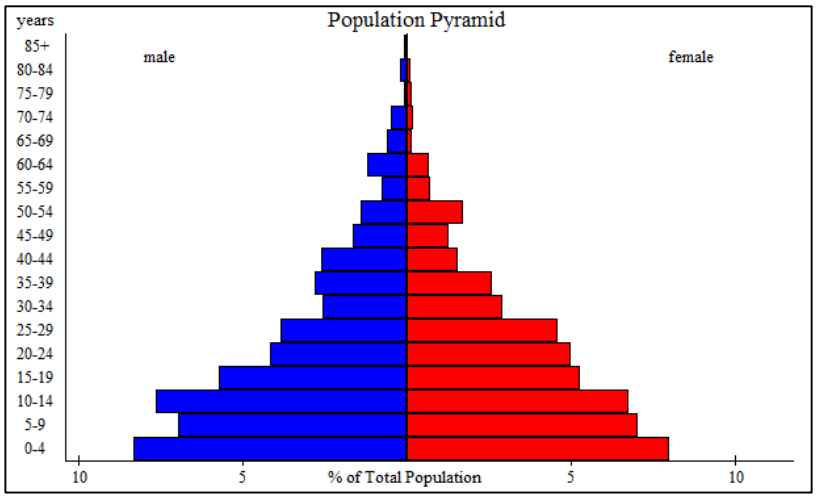


Figure 2: Kabul Urban (city) Population Pyramid

Table 10: Distribution of Age and Sex of among Children 6-59 months

	Boys		Girls		Total		Ratio
AGE (months)	no.	%	no.	%	no.	%	Boy:Girl
6-17	132	52.8	118	47.2	250	22.7	1.1
18-29	136	54.2	115	45.8	251	22.8	1.2
30-41	116	45.0	142	55.0	258	23.4	0.8
42-53	110	46.8	125	53.2	235	21.3	0.9
54-59	62	57.4	46	42.6	108	9.8	1.3
Total	556	50.5	546	49.5	1102	100.0	1.0

9.2. Data Quality

Six children were excluded from WHZ analysis per SMART flags[14], resulting in an overall percentage of flagged data of 0.5% and judged as excellent by the ENA Plausibility Check.

The standard deviation, design effect, missing values, and flagged values are listed for WHZ, HAZ, and WAZ in Table 12 below. The SD of WHZ was 1.06, the SD of HAZ was 1.19, and the SD of WAZ was 1.02. All WHZ, HAZ and WAZ met the normal range (0.8 and 1.2) indicating an adequate distribution of data around the mean and data of excellent quality.

The overall ENA Plausibility Check score was 4%, which is considered a survey of excellent quality. The complete Kabul ENA Plausibility Check report is presented in Annex 3.

[14] SMART flags as observation +/- 3 SD from the observed mean

Table 11: Mean Z-scores, Design Effects, Missing and Out-of-Range Data of Anthropometric Indicators among Children 6-59 Months

Indicator	N	Mean z-scores ± SD	Design effect (z-score < -2)	Z-scores not available*	Z-scores out of range
Weight-for-Height*	1096	-0.44±1.06	1.23	0	6
Weight-for-Age*	1093	-1.05±1.02	1.36	0	9
Height-for-Age	1081	-1.32±1.19	1.31	0	21

*Z-scores unavailable for children presenting with oedema

Additional statistical tests to study the distribution of the sample included:

- The Skewness coefficient for WHZ was considered of good quality by the ENA Plausibility Check, suggesting the distribution curve was symmetrical.
- The Kurtosis coefficient for WHZ was considered of excellent quality by the ENA Plausibility Check, suggesting there was no kurtosis.
- The Poisson distribution for WHZ was not statistically significant (p=0.033) and considered of good quality by the ENA Plausibility Check, suggesting there was observed aggregation of acute malnutrition cases (appears to be pocket of cases) in the clusters.

The sex ratio between boys and girls 6-59 months was satisfactory at 1.0 boys/girls (expected value between 0.8 and 1.2) (p=0.763) suggesting that boys and girls were equally represented. The overall sex ratio was considered of excellent quality by the ENA Plausibility Check.
Among children 6-59 months. The age ratio between children 6-29 months and 30-59 months was 0.748 (expected value near 0.85) and the difference was not statistically significant (p=0.723). The overall age ratio was considered of excellent quality by the ENA Plausibility Check.
All digit preference score were considered of excellent by the ENA Plausibility Check.

9.3. Prevalence of Acute Malnutrition

Acute Malnutrition by WHZ

The prevalence of GAM per WHZ among children 6-59 months in Kabul was 8.9% (7.2-11.0 95% CI), as presented in Table 13 below and was categorized as medium level of public health severity.

This prevalence seems slightly higher in boys than girls but this difference is not statistically valid (p-value = 0.105).

The prevalence of SAM per WHZ among children 6-59 months was 0.9% (0.5-1.6 95% CI). According to national thresholds, this SAM prevalence was categorized as acceptable.

Table 12: Prevalence of Acute Malnutrition by WHZ (and/or oedema) by Severity and Sex among Children 6-59 months, WHO 2006 Reference

Indicators	All n = 1096	Boys n = 552	Girls n = 544
Prevalence of global acute malnutrition (<-2 z-score and/or oedema)	(98) 8.9 % (7.2 - 11.0 95% C.I.)	(57) 10.3 % (7.9 - 13.4 95% C.I.)	(41) 7.5 % (5.4 - 10.4 95% C.I.)
Prevalence of moderate acute malnutrition (<-2 to ≥-3 z-score)	(88) 8.0 % (6.4 - 10.1 95% C.I.)	(51) 9.2 % (6.8 - 12.4 95% C.I.)	(37) 6.8 % (4.8 - 9.6 95% C.I.)
Prevalence of severe acute malnutrition (<-3 z-score and/or oedema)	(10) 0.9 % (0.5 - 1.6 95% C.I.)	(6) 1.1 % (0.5 - 2.3 95% C.I.)	(4) 0.7 % (0.3 - 1.9 95% C.I.)

*There were 0.0% oedema cases in the sample

The prevalence of acute malnutrition by WHZ was also assessed among children 0-59 months. The GAM per WHZ was 9.2% (7.5-11.3 95% CI), as presented in Table 14 below. The prevalence of SAM per WHZ among children 0-59 months was 1.2% (0.5- 2.6 95% CI). There is no statistically valid difference between boys and girls from 0 to 59 months old (p-value = 0.08)

Table 13: Prevalence of Acute Malnutrition by WHZ (and/or oedema) by Severity and Sex among Children 0-59 months, WHO 2006 Reference

Indicators	All N = 1182	Boys n = 601	Girls n = 581
Prevalence of global acute malnutrition (<-2 z-score and/or oedema)	(109) 9.2% (7.5-11.3 95% CI)	(64) 10.6% (8.2-13.8 95% CI)	(45) 7.7% (5.6-10.6 95% CI)

Prevalence of moderate acute malnutrition (<-2 to ≥-3 z-score)	(98) 8.3% (6.6-10.4 95% CI)	(57) 9.5% (7.1-12.5 95% CI)	(41) 7.1% (5.0- 9.8 95% CI)
Prevalence of severe acute malnutrition (<-3 z-score and/or oedema)	(11) 0.9% (0.5- 1.7 95% CI)	(7) 1.2% (0.5- 2.6 95% CI)	(4) 0.7% (0.3- 1.8 95% CI)

*There were 0.0% oedema cases in the sample

When disaggregated by age group, the group with the highest MAM and SAM was 6-17 months, as presented in Table 15 above. The age group with the lowest MAM was 30-41 months and there was no SAM case in the age group of 42-59 months. Results of this disaggregation suggest that the younger age groups (6-29) were more vulnerable to acute malnutrition than older groups (30-59) according to WHZ criterion (p-value <0.05).

Table 14: Prevalence of Acute Malnutrition per WHZ and/or Oedema by Severity and Age Group

Age (months)	N	Severe wasting* (WHZ <-3)		Moderate wasting (WHZ ≥-3 to <-2)		Normal (WHZ ≥-2)		Oedema	
		n	%	N	%	N	%	n	%
6-17	249	7	2.8	27	10.8	215	86.3	0	0.0
18-29	250	3	1.2	21	8.4	226	90.4	0	0.0
30-41	257	0	0.0	23	8.9	234	91.1	0	0.0
42-53	234	0	0.0	10	4.3	224	95.7	0	0.0
54-59	106	0	0.0	7	6.6	99	93.4	0	0.0
Total	1096	10	0.9	88	8.0	998	91.1	0	0.0

*There were 0 oedema cases in the sample

The WHZ distribution curve (in red) as compared to the WHO 2006 reference WHZ distribution curve (in green) and as presented in Figure 3 below demonstrates a shift to the left, suggesting an undernourished population. Figure 4 illustrates the mean WHZ for age categories.

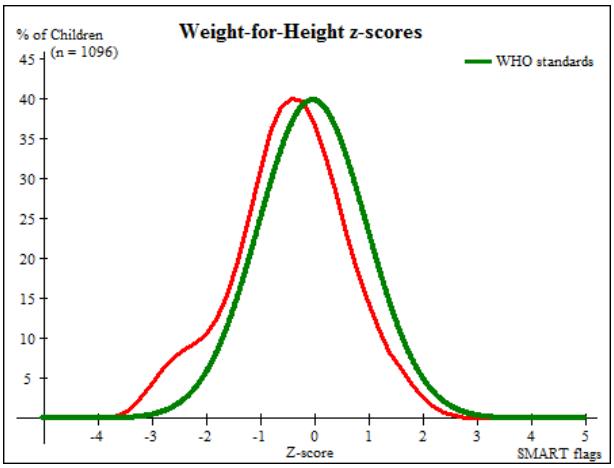


Figure 3: Distribution of WHZ Sample Compared to the WHO 2006 WHZ Reference Curve

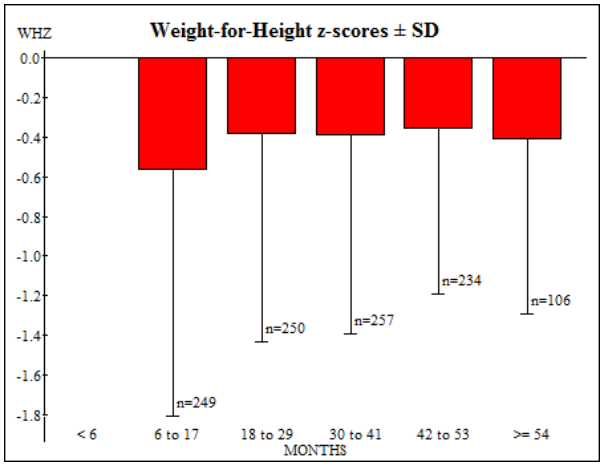


Figure 4: Means WHZ by age groups

Acute malnutrition by MUAC

The prevalence of GAM per MUAC among children 6-59 months in Kabul Urban (city) was 3.0% (1.2-4.0 95% CI), as presented in Table 16 below. This prevalence seems higher in girls than in boys but this difference is not statistically valid (p-value = 0.101). The prevalence of SAM per MUAC among children 6-59 months was 0.2% (0.0-0.7 95% CI).

When disaggregated by age group, the group with the highest MAM and SAM was 6-17 months, as presented in Table 17 below. The age group with no MAM was 42-59 months. Results of this disaggregation suggest that the younger age groups (6-29) were more vulnerable to acute malnutrition compared to older groups (30-59) according to MUAC criterion (p-value < 0.05).

Table 15: Prevalence of Acute Malnutrition by MUAC (and/or oedema) by Severity and Sex among children 6-59 months

Indicators	All n = 1099	Boys n = 554	Girls n = 545
Prevalence of global malnutrition (<125 mm and/or Oedema)	(33) 3.0 % (2.0-4.5 95% C.I.)	(12) 2.2 % (1.2-4.0 95% C.I.)	(21) 3.9 % (2.5-6.0 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm to ≥115 mm, no Oedema)	(31) 2.8 % (1.9-4.2 95% C.I.)	(12) 2.2 % (1.2-4.0 95% C.I.)	(19) 3.5 % (2.2-5.4 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or Oedema)	(2) 0.2 % (0.0-0.7 95% C.I.)	(0) 0.0 % (0.0-0.0 95% C.I.)	(2) 0.4 % (0.1-1.5 95% C.I.)

*There were not oedema cases in the sample

Table 16: Prevalence of Acute Malnutrition per MUAC and/or Oedema by Severity and Age Group

Age (months)	N	Severe wasting* (MUAC<115 mm)		Moderate wasting (MUAC ≥115 mm and <125 mm)		Normal (MUAC ≥125 mm)		Oedema	
		N	%	N	%	N	%	n	%
6-17	248	1	0.4	20	8.1	227	91.5	0	0.0
18-29	251	1	0.4	9	3.6	241	96.0	0	0.0
30-41	257	0	0.0	2	0.8	255	99.2	0	0.0
42-53	235	0	0.0	0	0.0	235	100.0	0	0.0
54-59	108	0	0.0	0	0.0	108	100.0	0	0.0
Total	1099	2	0.2	31	2.8	1066	97.0	0	0.0

*There were not oedema cases in the sample

Acute Malnutrition by Oedema

No Oedema case was observed in the sample. Table 18 below illustrates data for the presence and absence of oedema cases.

Table 17: Distribution of Severe Acute Malnutrition per Oedema among Children 6-59 Months

	WHZ <-3	WHZ>=-3
Presence of Oedema*	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Absence of Oedema	Marasmic No. 12 (1.1 %)	Not severely malnourished No. 1090 (98.9 %)

*There was no oedema case in the sample

Combined Acute Malnutrition by WHZ and MUAC

The prevalence of Combined GAM among children 6-59 months in Kabul Urban (city) was 9.9%, as presented in Table 19 below. The prevalence of Combined SAM among children 6-59 months was 1.0%. Although there is not globally established threshold for Combined GAM, the GAM and SAM prevalence were slightly higher than for WHZ or MUAC, suggesting that Combined GAM indicator captured more acutely malnourished children.

Table 18: Prevalence of Acute Malnutrition by WHZ and/or MUAC by Severity and Sex among Children 6-59 months

Indicators	All n = 1096	Boys n = 552	Girls n = 554
Prevalence of Global Acute Malnutrition (MUAC<125 mm+ WHZ<-2SD)	(109) 9.9% (8.0-12.2 95% CI)	(60) 10.9% (8.1-14.4 95% CI)	(49) 9.0% (6.6-12.2 95% CI)
Prevalence of Sever Acute Malnutrition (MUAC<115 mm+ WHZ<-3SD)	(11) 1.0% (0.6- 1.7 95% CI)	(6) 1.1% (0.5- 2.3 95% CI)	(5) 0.9% (0.4- 2.1 95% CI)

*There were not oedema cases in the sample

Enrollment in nutrition program _ OPD/IPD for SAM/MAM cases

The proportion of children identified as acutely malnourished by MUAC only and their corresponding treatment enrolment status are presented in Table 20 below.

Overall, out of 33 children 6-59 months old identified as acutely malnourished by MUAC by the teams in the field, 32 were MAM cases and 1 was a SAM case.

Out of them, 15.1% (5) were enrolled in a program at the time of the survey. The 28 children identified as malnourished but not enrolled in a treatment program were referred for treatment. The enrolment and referral are described in the below Table 20.

Table 19: Proportion of Acutely Malnourished Children 6-59 Months Enrolled in a Treatment Programme

Sample	Enrolled in an OPD SAM	Enrolled in an OPD MAM	Enrolled in an IPD SAM	Not Enrolled and referred
Acutely malnourished children 6-59 months by MUAC, or oedema (N=33)	1	4	0	28

9.4. Prevalence of Chronic Malnutrition

The prevalence of stunting per HAZ among children 6-59 months in Kabul Urban (city) was 29.0%, as presented in Table 21 below. The prevalence of severe stunting per HAZ among children 6-59 months was 7.4%. According to WHO thresholds 2018, this prevalence was categorized as high. This prevalence seems slightly lower in girls than boys but this difference is not statistically valid (p-value = 0.193).

Table 20: Prevalence of Chronic Malnutrition by HAZ by Severity and Sex among Children 6-59 months, WHO 2006 Reference

Indicators	All n = 1081	Boys n = 546	Girls n = 535
Prevalence of chronic malnutrition (HAZ <-2 SD)	(313) 29.0 % (25.9-32.2 95% C.I.)	(158) 28.9 % (25.1-33.1 95% C.I.)	(155) 29.0 % (24.6-33.7 95% C.I.)
Prevalence of moderate chronic malnutrition (HAZ <-2 to ≥-3 SD)	(233) 21.6 % (18.9-24.5 95% C.I.)	(112) 20.5 % (17.0-24.5 95% C.I.)	(121) 22.6 % (18.8-26.9 95% C.I.)
Prevalence of severe chronic malnutrition (HAZ <-3 SD)	(80) 7.4 % (5.8-9.4 95% C.I.)	(46) 8.4 % (6.2-11.4 95% C.I.)	(34) 6.4 % (4.5-9.0 95% C.I.)

When disaggregated by age group, the age group with the highest severe and moderate chronic malnutrition was 30-41 months, as presented in Table 22 below. The age group with the lowest chronic malnutrition was 6-17. Results of this disaggregation suggest that the older age groups (30-59) were more vulnerable to chronic malnutrition compared to younger groups (6-29) (p-value < 0.05).

Table 22: Prevalence of Chronic Malnutrition per HAZ by Severity and Age Group

Age (months)	N	Severe stunting (HAZ <-3)		Moderate stunting (HAZ >= -3 to <-2)		Normal (HAZ>= -2)	
		n	%	N	%	n	%
6-17	240	11	4.6	29	12.1	200	83.3
18-29	244	18	7.4	65	26.6	161	66.0
30-41	255	29	11.4	70	27.5	156	61.2
42-53	234	19	8.1	47	20.1	168	71.8
54-59	108	3	2.8	22	20.4	83	76.9
Total	1081	80	7.4	233	21.6	768	71.0

The HAZ distribution curve (in red) as compared to the WHO 2006 reference HAZ distribution curve (in green) as presented in Figure 5 below demonstrates a large shift to the left, suggesting a very stunted population in comparison to normal population. Further analysis suggests that linear severe growth retardation is at its highest in the group of children aged 30-41 months (n=255) as shown in figure 6.

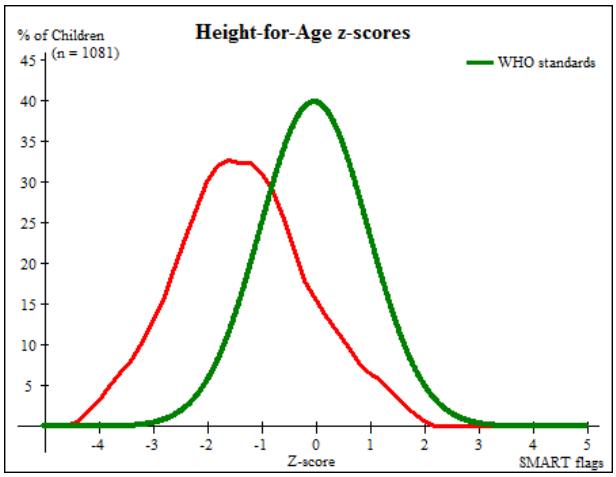


Figure 5: Distribution of HAZ Sample Compared to the WHO 2006 HAZ Reference Curve

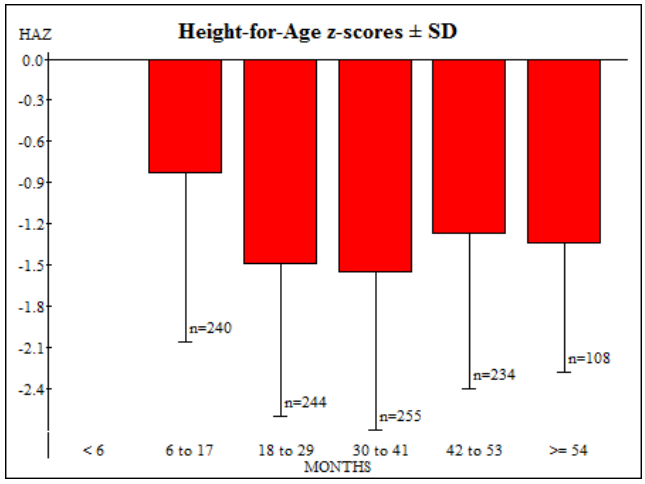


Figure 6: Mean HAZ by Age Group

9.5. Prevalence of Underweight

The prevalence of underweight per WAZ among children 6-59 months in Kabul Urban (city) was 16.3%, as presented in Table 28 below. This prevalence seems slightly higher in boys than in girls, but this difference is not statistically valid (p-value = 0.359). The prevalence of severe underweight per WAZ among children 6-59 months was 3.6%. According to WHO 2018 thresholds, this under-weight prevalence was categorized at Medium level of severity.

Table 21: Prevalence of Underweight by WAZ by Severity and Sex among Children 6-59 months, WHO 2006 Reference

Indicators	All n = 1093	Boys n = 549	Girls n = 544
Prevalence of underweight (WAZ <-2 SD)	(178) 16.3 % (13.9 - 19.1 95% C.I.)	(95) 17.3 % (14.3 - 20.8 95% C.I.)	(83) 15.3 % (11.8 - 19.5 95% C.I.)
Prevalence of moderate under-weight (WAZ <-2 and >=-3 SD)	(139) 12.7 % (10.7- 15.0 95% C.I.)	(71) 12.9 % (10.6 - 15.7 95% C.I.)	(68) 12.5 % (9.5 - 16.3 95% C.I.)
Prevalence of severe under-weight (WAZ <-3SD)	(39) 3.6 % (2.5 - 5.1 95% C.I.)	(24) 4.4 % (2.8 - 6.8 95% C.I.)	(15) 2.8 % (1.6 - 4.8 95% C.I.)

Table 22: Prevalence of Underweight per WAZ by Severity and Age Group

Age (months)	N	Severe underweight (WAZ <-3)		Moderate under-weight (WAZ ≥-3 to <-2)		Normal (WHZ ≥-2)	
		n	%	n	%	N	%
6-17	245	7	2.9	31	12.7	207	84.5
18-29	249	13	5.2	26	10.4	210	84.3
30-41	257	15	5.8	38	14.8	204	79.4
42-53	235	4	1.7	29	12.3	202	86.0
54-59	107	0	0.0	15	14.0	92	86.0
Total	1093	39	3.6	139	12.7	915	83.7

When disaggregated by age group, the age group with the highest severe and moderate underweight was 30-41 months, as presented in Table 24 above. The age group with the lowest moderate underweight was 18-29 months. No severe underweight case was observed in the children 54-59 months.

The WAZ distribution curve (in red) as compared to the WHO 2006 reference WAZ distribution curve (in green) as presented in Figure 7 below demonstrates a large shift to the left, suggesting a very underweighted population in comparison to normal population. Further analysis suggests that linear underweight is at its highest in the group of children aged 30-41 months (n=257) as shown in figure 8.

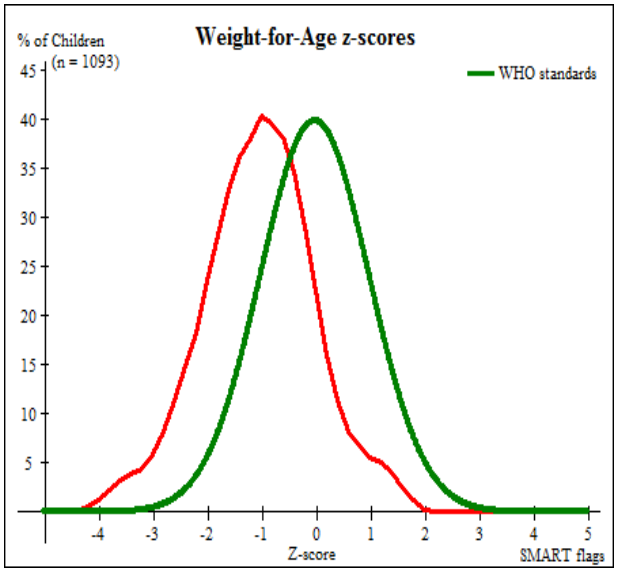


Figure 3: Distribution of WAZ Sample Compared to the WHO 2006 WAZ Reference Curve

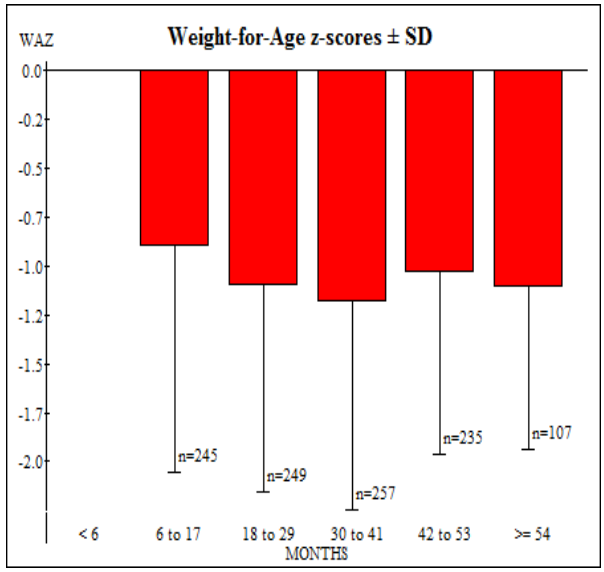


Figure 4: Mean WAZ by Age Group

9.6. Malnutrition prevalence among Women 15-49 years old based on MUAC criterion

All women of child-bearing age (15-49 years) were included in the survey. A total of 1040 women were assessed for nutrition status by MUAC. The analysis looked at all women 15-49 years, further disaggregating the sample by physiological status (pregnant, lactating, both). 14,3% of the women pregnant and lacatating were malnourished. This group of women seems more vulnerable compared to non-pregnant and non-lactating women, with difference statistically significant (p-value <0.05); for more details see table 25 below.

Table 23: Prevalence of Acute Malnutrition among Women per MUAC

Sample	N	MUAC <230 mm	
		N	%
All women 15-49 years	1040	77	7.4%
Pregnant women	130	14	10.8%
Lactating women	373	32	8.6%
Pregnant and lactating women*	21	3	14.3%
Non-pregnant and non-lactating women	515	28	5.4%
All PLWs	524	49	9.4%

**Women that were simultaneously pregnant and lactating*

9.7. Retrospective Mortality

The overall death rate for the surveyed population was 0.33 (0.20-0.52) below the WHO emergency thresholds of 1.0/10,000/day. The death rate was slightly higher for males compared to females in the population. The age group with the highest death rate was 65-120 years. In total, 27 deaths were observed in Kabul urban area.

Population	Death Rate (/10,000/Day)	Design Effect
Overall	0.31 (0.20-0.49)	1.44
By Sex		
Male	0.32 (0.18-0.55)	1.14
Female	0.31 (0.17-0.55)	1.15
By Age Group (in years)		
0-4	0.50 (0.24-1.01)	1.00
5-11	0.00 (0.00-0.00)	1.00
12-17	0.07 (0.01-0.55)	1.01
18-49	0.38 (0.19-0.75)	1.65
50-64	0.18 (0.02-1.28)	1.00
65-120	2.71 (1.13-6.30)	1.00

9.8. Infant and Young Child Feeding

Indicators for IYCF practices were asked from all caregivers with children less than 24 months. A total of 482 children under two years were included in the sample, with the core IYCF indicators assessed presented in Table 27 below.

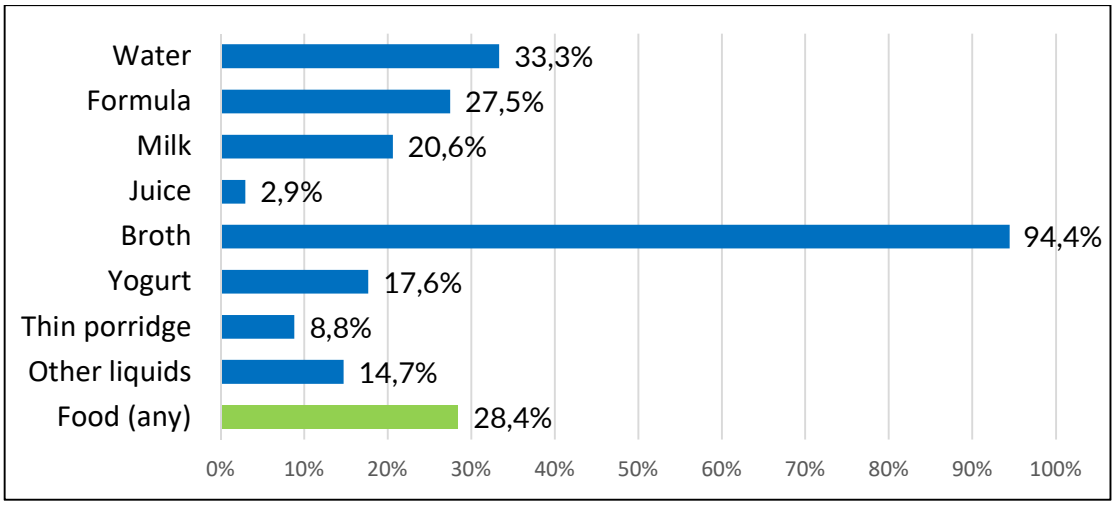
The proportion of infants breastfed within one hour of birth was 63.1% suggesting that they were breastfed within an appropriate amount of time after birth, likely receiving colostrum. However, this highlights that 1 child out of 3 does not get colostrum. The proportion of infants 0-5 months exclusively breastfed was low suggesting frequent replacement of breastmilk by other liquids or foods at a stage when an infant should be receiving the protective benefits of exclusive breast-feeding. The proportion of children with continued breastfeeding at one year was 76.8% and at two years was 53.9%, indicating that many children are receiving breastmilk until their first year but fewer are receiving breastmilk until their second year.

Table 27: Infant and Young Child Feeding Practices

IYCF Indicator	Sample	N	n	Results
Timely initiation of breastfeeding	Children 0-23 months	482	304	63.1%
Exclusive breastfeeding	Infants 0-5 months	102	44	43.1%
Continued breastfeeding at one year	Children 12–15 months	82	63	76.8%
Continued breastfeeding at two years	Children 20-23 months	89	48	53.9%

While asking questions about breastfeeding practices, caregivers of infants 0-5 months were also asked if the infant had consumed liquids or soft, semi-soft, or solid foods in the past day. Figure 9 below presents the liquids most frequently displacing breastmilk. Highly consumed food among the families was for 94.4 % broth, followed by 33.3% water and 27.5% infant formula milk.

Figure 5: Liquids or Food Consumed by Infants 0-5 Months



9.9. Child Immunization Status

In Kabul Urban (city) the survey results indicated that 87.2% of children 18-59 months had received the second dose measles immunization, as confirmed either by vaccination card or caregiver recall.

Table 25: Second Dose Measles Immunization Coverages among Children 18-59 Months

Indicator		Frequency	%
Second Dose Measles Immunization (N=803)	Yes by card	510	62.0%
	Yes by recall	207	25.2%
	Yes by card *or* recall	717	87.2%
	No	73	8.9%
	Don't know	32	3.9%

10. DISCUSSION

Results of this survey are not a reflection of national nutrition situation but are representative for the population living in Kabul Urban city.

The results of this survey showed a GAM prevalence of 8.9% (7.1-11.1 95% C.I.) and a SAM prevalence of 0.9% (0.5 - 1.6 95% C.I). This situation is classified at medium level of severity in Kabul city according to WHO 2018 threshold. The SAM rate by WHZ is below the 3.0% threshold established by the MoPH, the Nutrition Cluster and the AIM-WG as the cut-off after which a response should be prioritized in the Afghanistan context. Looking at the last national nutrition survey conducted in the summer season in 2013, the prevalence of GAM was 6.5% (4.32-9.78 95% CI) and the prevalence of SAM was 2.0% (1.01-3.96 95% CI). The situation seems to have deteriorated as acute malnutrition rates highlighted by the 2018 survey are higher.
The GAM prevalence per MUAC is at 3.0% (2.0 - 4.4 95% CI) and the SAM prevalence is at 0.2% (0.0 – 0.7 95% CI). These prevalences are lower than the ones expressed by WHZ.
Considering both indicators, the Combined GAM prevalence is at 9.9% (8.0-12.2 95% CI) and the the Combined SAM prevalence is at 1.0 %(0.6-1.7 95% CI) 95% CI). This suggests a higher proportion of children under five affected by acute malnutrition in Kabul city when considering both WHZ and MUAC criteria instead of considering separately those 2 indicators. Combined GAM prevalence captures a greater proportion of acutely malnourished children 6-59 months, and may inform better the estimations of SAM and MAM caseloads in Kabul city, ultimately strengthening planning and programming. All children in the sample detected as acutely malnourished by either by WHZ, MUAC, or oedema are reflected in this prevalence according to combined criteria.

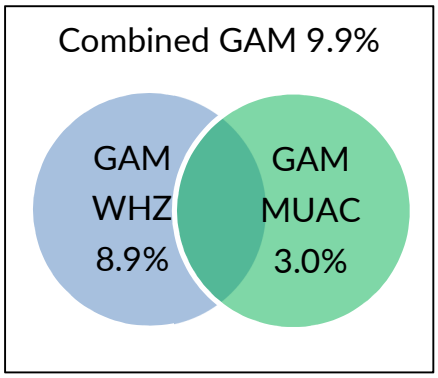


Figure 6: Children Captured by GAM by WHZ, MUAC, and Combined

Across indicators with age disaggregation, a higher vulnerability toward wasting among younger children was highllighted. When the sample of children 0-59 months was compared to the sample of children 6-59 months, as presented in Table 29 below, the prevalence of acute malnutrition was not statitiscally different between children 0-59 month and children 6-59 months old.

Table 26: Prevalence of GAM by WHZ Comparing the 0-59 Month to the 6-59 Month Sample

Sample	GAM by WHZ		SAM by WHZ	
	%	95% CI	%	95% CI
Children 0-59 Months	9.2%	(7.5-11.3 95% CI)	0.9%	(0.5- 1.7 95% CI)
Children 6-59 Months	8.9%	(7.2-11.0 95% CI)	0.9%	(0.5- 1.6 95% CI)

By considering the Combined GAM rate, it is estimated that 103,618 children are acutely malnourished in Kabul city as today (out of 6,049,941 population, with 17.3% of children under five and a Combined GAM rate at 9.9%). Among them, 10,362 are severely acutely malnourished (with a Combined SAM rate at 1%).

Chronic malnutrition in Kabul city is also of concern. The prevalence of chronic malnutrition among children 6-59 months was 29.0% (25.9-32.2 95% CI), which was classified as high according to the WHO 2018 thresholds. In other words, about 1 in 3 children in Kabul city is not reaching his optimal growth and development. This prevalence is of further concern when the simultaneous presence of acute malnutrition is demonstrated. Recent research has concluded that children both stunted and wasted are at a heightened risk of mortality[15], further suggesting that this should be a priority group for treatment interventions. In Kabul city, it was found that among the 311 stunted children, 44 of them (13.8%) were also wasted by both criteria (WHZ<-2SD + MUAC<125 mm) and 6 of them (1.9%) were severely wasted.

[15] Myatt, M. et al (2018) Children who are both wasted and stunted are also underweight and have a high risk of death: a descriptive epidemiology of multiple anthropometric deficits using data from 51 countries

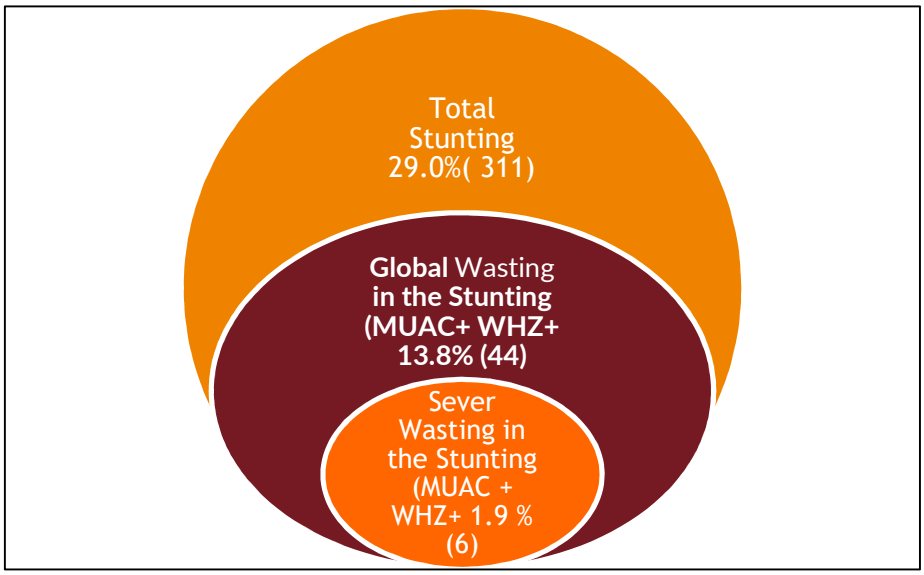


Figure 7: Among Stunted Children 6-59 Months, those Simultaneous Wasted (WHZ+MUAC)

Acute malnutrition among women in Kabul city is also of concern, although there is no globally defined cut-off for acute malnutrition among women. The results demonstrated that a higher proportion of women simultaneously pregnant and lactating had a low MUAC compared to women no pregnant and no lactating. This may be linked to the high energy requirements for breastfeeding and fetal development, further suggesting that this group may be at a heightened risk of acute malnutrition.

Concerns for the IYCF practices in Kabul city were raised, particularly when the prevalence of exclusive breastfeeding was found to be only at 43.1%. The proportion of children breastfed within 1 hour after birth is also low. These rates are unsatisfactory, highliting the needs to reinforced IYCF intervention.

Immunization is an important public health intervention that protects children from illness and disability. Based on this survey, 87.2% of the surveyed children between 9 to 18 months were immunized against measles. This shows a relatively satisfactory coverage, thanks to a well functioning Expanded Program on Immunization at national level.

The CDR and U5DR were below the WHO emergency threshold, with low CDR (0.31 death/10,000/Day) and U5DR (0.50 death/10,000/Day).

11. RECOMMENDATIONS

The below recommendations have been formulated in concertation between the MoPH, the Nutrition Cluster and the AIM-WG.

Key findings	Action to be taken	By who?	Resource required	Time line
• GAM = 8.9% (7.1 - 11.1 95% C.I.) Based on WHZ. • Combined GAM = 9.9% (8.0-12.2 95% CI)	• To increase the frequency of supportive supervision and strengthen it by service provider. • To strengthen GM/Screen and IYCF services in all HFs. • To strengthen coordination between health partners. • To strengthen nutrition education. • To launch food demonstration program in all HFs • To establish OPD-SAM and MAM in the HFs based on criteria. • To start implementation CBNP	Kabul PPHD/PND and other stakeholders	IEC materials, food commodities and nutrition registers	1/6/2019
• Stunting = 29.0 % (25.9 - 32.2 95% C.I.) • Underweight= 19.9 % (16.4-24.1 95% C.I.)	• To strengthen Growth Monitoring and IYCF counseling for all U2 children to improve nutrition and prevent stunting. • To improve health education in HFs & community level. • To strictly follow up of Growth Monitoring &IYCF counseling. • To implement CBNP program and proper follow up • To strengthen food demonstration program in health facilities	Kabul PPHD/PND and other stakeholders	IEC materials and nutrition registers	1/1/2022
• Pregnant and lactating women (PLWs) nutrition status based on MUAC <230 mm = 9.4%	• To conduct food demonstration for PLWs • To strengthen the health education session in maternal nutrition during pregnancy and lactation and usage of local food recipe initiation in TSFP program to treat malnourished cases	Kabul PPHD/PND and other stakeholders	IEC materials and planning tools	1/1/2020

• 2nd dose Measles immunization coverage=87.2% (Coverage lower than national standard of 90%)	• To strengthen health education in HFs level and increase communication toward benefits of the vaccination in the community. • To strengthen on the job training about EPI Micro planning. • To strengthen supportive supervision outreach planning in the health facilities.	Kabul PPHD/PND and other stakeholders	EPI micro-plan and IEC materials	1/6/2019
Early initiation breastfeeding<24 months = **63.1%** Exclusive breastfeeding<6 months = **43.1%**	• To encourage IYCF practices that fail to be achieved: exclusive breastfeeding and timely introduction of breastfeeding.	Kabul PPHD/PND and other stakeholders	IEC materials	1/6/2019

12. ANNEXES

Annex 1: Standard Integrated SMART Survey Questionnaire (English)

Date (dd/mm/year)			**Cluster Name**		
Cluster Number		**Team Number**		**HH Number**	

Household Questionnaire

Start date/event of recall period: 120 days [from last Ashora 1397 (2018)]							
1	2	3	4	5	6	7	8
No.	Name	Sex (m/f)	Age (years)	Joined on or after	Left on or after	Born on or after	Died on or after
List all current household members*							
1	Head of house-hold						
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
List all household members which left since the start of the recall period							
1					Y		
2					Y		
3					Y		
4					Y		
5					Y		
List all household members which died since the start of the recall period							
1							Y
2							Y
3							Y

*Household defined as all people eating from the same pot and living together (WFP definition)

Date (dd/mm/year)			**Cluster Name**		
Cluster Number		**Team Number**		**HH Number**	

Household Questionnaire

Q1. What is the household resident status? 1=Resident of this area 2=Internally displaced 3=Refugee 4=Nomadic	

Date (dd/mm/year)			**Cluster Name**		
Cluster Number		**Team Number**		**HH Number**	

Child Questionnaire 0-59 months

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

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

Child (6-59 months) ID Number					
For any child that is identified as acutely malnourished (WHZ, MUAC, or edema) **Q5. Is the child currently receiving any malnutrition treatment services?** *Probe, ask for enrollment card, and observe the treatment food (RUTF / RUSF) to identify the type of treatment service* 1=OPD SAM 2=OPD MAM					

3=IPD SAM 4=No treatment 98=Don't know					
If the child is <u>not</u> enrolled in a treatment program, refer to nearest appropriate treatment center **Q6. Did you refer the child?** 1=yes 0=no					

Date (dd/mm/year)			**Cluster Name**		
Cluster Number		**Team Number**		**HH Number**	

Child Questionnaire

Child (18-59 months) ID Number					
Q7. Has the child received <u>two doses</u> of measles vaccination? (on the upper right arm) *Ask for vaccination card to verify if available* 1=Received two doses as confirmed by vaccination card 2=Received two doses as confirmed by caregiver recall 3=Has not received two doses 98=Don't know					

Child (<24 months) ID Number					
Q8. How long after birth was the child first put to breast? 1=Within one hour 2=In the first day within 24 hours 3=After the first day (>24 hours) 98=Don't know					
Q9. Was the child breastfed yesterday during the day or night? *This includes if the child was fed expressed breastmilk by cup, bottle, or by another woman (these are also considered "yes")* 1=Yes 0=No 98=Don't know					
Q10. Did the child have any liquid drink other than breastmilk yesterday during the day or night? *Do not read options, probe by asking open questions and record all that apply. Vitamin drops, ORS, or medicine as drops are not counted* 1=Yes 0=No					
A. Plain water					
B. Infant formula					

C. Powdered or fresh animal milk					
D. Juice or soft drinks					
E. Clear broth					
F. Yogurt					
G. Thin porridge					
H. Any other liquids (tea, coffee, etc.)					
Q11. Did the child have any solid, semi-solid, or soft foods yesterday during the day or night? 1=Yes 0=No 98=Don't know					

Date (dd/mm/year)			**Cluster Name**		
Cluster Number		**Team Number**		**HH Number**	

Woman (15-49 years) HH Member ID Number					
Q14. Status of woman 1=Pregnant 2=Lactating 3=Pregnant and lactating 4=None					
MUAC measurement (mm)					

Annex 2: geographical unit for Kabul urban (city)

Province	District	Name of villages/sub cluster	0-59 months population	Total population	Cluster
Kabul	P-1-A	از سنگ سفید خانه خالد الی درخت شنگ	194	970	1
Kabul	P-2-A	مغزن ده افغانان شروع خانه گل مردان ختم خانه محمدخان	120	600	2
Kabul	P-2-C	شروع سرک هفتم بهارستان خانه گلستان ختم سرکوه مسجداعبدالرحمن بن عوف	120	600	3
Kabul	P-3-A	عقب شفاخانه اتاترک شروع خانه بلال ختم خانه شفیق	160	800	4
Kabul	P-3-B	نوآباد ده مزنگ شروع کوچه نل وسط کوه خانه امیرمحمد ختم سرکوه	170	850	5
Kabul	P-4-A	کلوله پشته شروع خانه قومندان رشید ختم ریاست ناحیه 4 شاروالی	220	1100	6
Kabul	P-4-B	تایمنی شروع مقابل پایه برق خانه دگروال شفیع ختم رستورانت کابل کروکی	170	850	RC
Kabul	P-4-C	تهیه مسکن شروع بلاک 10 امنیت ختم بلاک 1 امنیت	160	800	7
Kabul	P-4-D	زور اباد های عقب شام پاریس شروع ازخانه زرد لب جوی ختم مقابل پل برج برق زورآباد	160	800	8
Kabul	P-5-A	Afshar silo Kohi Sra Myasht Az Khanai Farooq- Khanai Nasrullah	159	795	9
Kabul	P-5-B	az sari koh khwja jam kochi 28 ela mktb etemad kamil	135	675	10
Kabul	P-5-B	khnai Haje zarif khan ela aqabi godami Alaf	119	595	11
Kabul	P-5-C	Kochai Hamam Kotai Sangi Ala Gadi Raw	158	790	12
Kabul	P-6-A	ناحیه شش سرک عمومی قلعه چهاردهی قلعه بابو کوچه های فرعی آن شروع از خانه سید اسدالله الی خانه حفیظ الله:0772033063/0777415626	310	1550	RC
Kabul	P-6-B	ناحیه شش سرک چهار قلعه قلعه وزیر شروع از خانه احمدجان مقابل مسجد حسین ختم خانه حکمت الله	310	1550	13
Kabul	P-6-C	ناحیه شش سرک عمومی سر کاریز ازخانه غلام نبی الی خانه فواد کوچه حسینیه نور وحدت :۰۷۸۷۱۸۵۶۰۹/۰۷۷۳۳۴۱۶۲	300	1500	14
Kabul	P-6-C	ناحیه شش پل سوخته دشت برچی دست راست مهتاب قلعه رهنمای وکیل راسخ شروع از خانه عبدالغفور راسخ الی خانه حیات الله	120	600	15
Kabul	P-6-D	چهاراهی قلعه پخچک مسجد بی بی عایشه	315	1575	16
Kabul	P-6-E	سرک چهارقلعه کوچه قلعه حاجی روبروی نانوائی ازخانه سیدضیاء شروع الی ختم کار کوچه پنحم نواباد قلعه آخند خانه سید میرزا :۰۷۸۰۹۹۱۰۱	310	1550	17
Kabul	P-6-E	ناحیه شش قلعه بهادر خان ازخانه جان محمد الی خانه محمد همایون قلعه بهادرخان	260	1300	18
Kabul	P-7-A	شروع سرک پاین واصل آباد منزل حمید الله الی سرک پاین واصل اباد عقب کلینک میرستوپ خانه امان الله	300	1500	19

Kabul	P-7-B	ناحیه هفت سرک گلباغ دیو دیوک قلعه لوگری ازخانه عبدالوکیل الی خانه عیسی محمد : ۰۷۷۵۰۱۸۵۰۱	285	1425	20
Kabul	P-7-B	ناحیه هفت سرک دوغ آباد خانه جعفر علی الی خانه محمد رامین شماره تماس : 0785322776/0778456336	318	1590	21
Kabul	P-7-C	مقابل شورای ملی ایوب خان مینه از خانه روحید الله الی خانه امان الله : 079983618	315	1575	22
Kabul	P-7-C	ناحیه هفت دهدانا از کوچه لغمانی ها الی سمت شمال مقبره آغاصاحب ازخانه ویس الدین الی ختم شماره تماس: 0772040500	318	1590	23
Kabul	P-7-D	بالاده چهلستون طرف شرق کانتینرسوخته خانه محمدرحیم الی خانه سیدکمال	300	1500	24
Kabul	P-7-E	جهلستون ناحیه هفتم بازار تنی کوت بالای مسجد امام ابوحنیفه ازخانه پرویز الی خانه ذبیع الله	300	1500	RC
Kabul	P-7-E	شروع واصل آباد کوچه مکتب عمراخان از خانه عبدالسلیم الی خانه حکمت الله واصل اباد سرک بالا	300	1500	25
Kabul	P-7-F	ناحیه هفت ده مراد خان کوچه مسجد عمرفاروق روبروی میدانی الی داخل کوچه فرعی سرک ده مراد خان کوچه مسجد پیش میدانی ازخانه عطا محمد الی خانه ذکی : 0772194770=0711741507	300	1500	26
Kabul	P-7-F	عقب تانک تیل چهلستون خانه محمدامین الی ریگ ریشن خانه محمدبشیر	124	620	27
Kabul	P-8-A	کارته نو استگاه نانوایی کوچه 15 شروع ازخانه حاجی غمی الی خانه محمدنادر کوچه کلینیک درمان	165	825	28
Kabul	P-8-C	شاه شهید کوچه ترافیک از خانه قیوم خان الی خانه غلام گل	172	860	RC
Kabul	P-8-D	کارته نوسرتپه سرک خامه قلعه زمان خان شروع ازخانه حیات الی خانه محمد علی خان نزدمسجد غوث العظم دستگیر(100)خانه	234	1170	29
Kabul	P-8-D	کارته نوسرک سوم پهلوی پارت هشت سی و ناحیه ۱۶ شروع ازخانه عبدالله الی خانه حبیب الله پهلوی کلستر سی پارت هشت دی..59 خانه	180	900	30
Kabul	P-8-F	قلعه حشمت خان کوچه مکتب متوسطه از خانه حاجی مدو خان 0777121280 الی قبرستان تپه تره خیل تا خانه حاجی نازک 0787389432	126	630	31
Kabul	P-9-A	مکرویان 3 بلاک 36	303	1515	32
Kabul	P-9-B	قابلبای شروع خانه نور گل ختم خانه طاووس	240	1200	33
Kabul	P-9-B	پکتیا کوت پورتنی هودخیل خانه جنرال محمد الدین- الی خانه حاجی جبار	150	750	34
Kabul	P-9-C	قلعه حبیب خانه های اطراف جوی اجمل مقابل مسجد قلعه حبیب خانه محمد نصیر ال خانه باشی محمد قلعه هندو	160	800	35
Kabul	P-9-C	نو آباد خواجه رواش کوچه جال خانه خواجه امیر الی خانه محمد عمر	264	1320	36
Kabul	P-10-A	شروع کار از بنیاد اجتماعی وزیر آباد الی آغار کوچه سلیم شاهین وزیر اباد	260	1300	37
Kabul	P-10-B	4 قعله وزیر آباد شروع از کوچه وکیل گل اغا خانه سید ذبیع الله الی کوچه فرعی وکیل گل اعا خانه شیرین آغا	300	1500	38
Kabul	P-10-B	قلعه چمن شروع از مسجد دارالاسلام خانه اغاجان الی کوچه فرعی ریاست امنیت خانه ویس الدین	300	1500	39

Kabul	P-10-C	از کوچه فرعی مکتب نور افشان الی ختم کوچه کابل پاریس خانه سید آغا	378	1890	40
Kabul	P-10-D	از کوجه نانوایی محرم الی کوچه جکشن برق	200	1000	41
Kabul	P-11-A	کوچه 8 سرک قانونی ا ز خانه ویس الدین الی خانه کمال	230	1150	RC
Kabul	P-11-A	خیرخانه سرک خامه حصه اول کوچه ۳مسجد حضرت محمد(ص)ازخانه احمد الی خانه خلیل	250	1250	42
Kabul	P-11-B	کوچه 11 و لب سرک عمومی بازار لیسه مریم شروع عبدالرقیب – ختم وحید الله	240	1200	43
Kabul	P-11-C	خیرخانه 500 فامیلی شروع بلاک اول بلاک های هوای 500 فامیلی الی بلاک هشتم بلاک های هوای 500 فامیلی	210	1050	44
Kabul	P-11-D	پروژه جدید خیرخانه(ش خالق)کوچه۷ پروژه جدید الی اخیر کوچه(خ رقیب)	190	948	45
Kabul	P-11-E	کوچه 12و13 سادات دست چپ از خانه عبد الروف الی منگل	180	900	46
		خیر خانه 315 ساحات کوهی اتفاق کوچه فرعی ان	150	750	47
Kabul	P-12-A	ارزان قیمت-بلاک 2- از کوچه 6 الی 7 شرقی	270	1350	RC
Kabul	P-12-A	ارزان قیمت- بلاک15 – از کوچه 4 الی 6	240	1200	48
Kabul	P-12-B	ارزان قیمت- شهرک سلیم کاروان-از کوچه دوم مکتب خصوصی الی غرب مسجد جامع حاجی عبدالرحمن	216	1080	49
Kabul	P-12-C	پلچرخی- قریه صافی کوت- مقابل حُدران مارکیت (مسجد جباریان(	177	885	50
Kabul	P-12-D	پلچرخی-توحیدآباد- از شمال مسجد جامع قبا توحید آباد الی کوچه مدرسه روضه القرآن	126	630	51
Kabul	P-12-D	پلچرخی- عالم گل کلی- از شمال مسجد حاجی عالم گل الی جنوب مسجد عالم گل	220	1100	RC
Kabul	P-13-A	دشت برچی،شهرک ثارالله، شروع از بغل تپه ثارالله خانه محمد سالم ۰۷۷۴۸۷۰۲۶ الی ختم بالای تپه پیش مسجد امام مسلم خانه سید محمد علی ۰۷۶۵۵۹۴۲۲۷	136	680	52
Kabul	P-13-B	دشت برچی، ایستگاه پل خشک کوچه های مسجد امام رضا الی لب جرشروع از خانه سید مومن 0799398121ختم به خانه قمبر علی0786685672	120	600	53
Kabul	P-13-C	دشت برچی، چهل دختران ، رسالت ۱۷ ، سر کوه شروع خانه رمضان الی رسالت فرعی ۱۸ ختم خانه ایوب	112	560	54
Kabul	P-13-D	دشت برچی، چهار راهی حاجی نوروز، دوراهی گذر بهارستان ، شروع لب جر از خانه عباس علی ۰۷۶۶۳۳۱۴۴۲ الی لب جر چهلوی دوکان سرک معرفت خانه نادر ۰۷۶۵۰۲۳۳۲۵	154	770	55
Kabul	P-13-E	دشت برچی، 20 هزاری ، کوچه گلها از خانه حاجی بسم الله الی خانه شاه محمود.	130	650	56
Kabul	P-13-F	برچی ، تانک تیل کوچه باب الحوایج شروع از سر کوچه غربی مسجد باب الحوایج از خاه دگروال عبدالعلی الی اخر کوچه مسجد امام جعفر صادق سرکوچه خانه دوکاندار ظروف کرایی	124	620	57
Kabul	P-15-A	بالای قبرستان پنجصد فامیلی از کوچه اول مسجد خالد بن ولید خانه گلاب شاه الی خانه عین الدین	210	1050	58
Kabul	P-15-B	از کوچه های سر تبه پوسته کچالو الی چهار کوچه بالا	250	1250	59

Kabul	P-15-C	کوچی های قصبه از 72خانه شیرگل الی 143 خانه حاجی خوانی	190	950	60
Kabul	P-15-D	از هوتل پروان کوچه 7 نوری پلازا الی کوچه 9 ان خانه محمد حسین و اطراف آن	240	1200	61
Kabul	P-15-E	سرک عمومی قصبه کوچه شانزدهم زیر گارد خانه محمد یاسین	200	1000	62
Kabul	P-15-E	برج دوم الی کوچه هزاره ها	220	1100	63
Kabul	P-16-A	بلاک های 15 - 23 ازخانه فرهاد الی خانه مسیح الله	120	600	64
Kabul	P-16-A	پل محمود خان سرای بی بی حاجی شهرک گلبهار	95	475	65
Kabul	P-16-B	شهرک خراسان مسجد حضرت بلال الی خانه غلام عیسی الی خانه محمد عیوض شرق مسجد	181	905	66
Kabul	P-16-B	ده خدای داد سرک پاهین اطراف خانه حاجی تاچ از خانه تاچ الی کریم	360	1800	67
Kabul	P-17-A	سر کوتل شهرک کامیاب خانه های لب سرک از خانه فواد الی خانه بر یالی	300	1500	68
Kabul	P-17-A	سرکوتل کوچه 4 وحدت خانه نمبر 64 شروع واحد و ختم مسجد محمد	201	1005	69
Kabul	P-17-B	سرکوتل چاراهی ذبیح شروع از کوچه دوم مسجد الله تعالی خانه شریف ختم خانه متین	300	1500	RC
Kabul	P-17-C	سرکوتل کوچه ۴ پامیر از خانه فتح محمد الی خانه جاوید	300	1500	70
Kabul	P-17-C	سر کوتل کوچه 43....44مارشال شروع مالک ختم سید محمد	330	1650	71
Kabul	P-17-D	سرک مارشال کوچه50 الی_43 ش خانه سیف خ خانه ستار	300	1500	72
Kabul	P-17-D	سرکوتل جنوب سرک کاریز قلعه دشت الی مدرسه ملاتاج محمد و کوچه های جر اب	240	1200	73
Kabul	P-17-E	تهیه مسکن/ زورآباد/ سرک عمومی سرک سه ش خانه حاجی عبدالمحمد ختم خواجه امیر	270	1350	74

Annex 3: Plausibility check for: Kabul Urban SMART_ DATA 1512019.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** (0.5 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**0** (p=0.763)
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=0.748)
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** (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	**0** (1.06)
Skewness WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**1** (-0.23)
Kurtosis WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (-0.03)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<=0.001	
			0	1	3	5	**1** (p=0.033)

OVERALL SCORE WHZ =	0-9	10-14	15-24	>25	**4** %

The overall score of this survey is 4 %, this is excellent.
There were no duplicate entries detected.
Percentage of children with no exact birthday: 33 %
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=29/ID=2: HAZ (2.505), Age may be incorrect
Line=39/ID=1: **WHZ (3.994)**, WAZ (2.061), Weight may be incorrect
Line=60/ID=1: HAZ (2.148), Age may be incorrect
Line=112/ID=1: **WHZ (2.705)**, HAZ (-4.933), Height may be incorrect
Line=136/ID=3: HAZ (-5.335), WAZ (-4.135), Age may be incorrect
Line=141/ID=1: HAZ (-4.619), Age may be incorrect
Line=161/ID=2: WAZ (2.035), Age may be incorrect
Line=168/ID=2: HAZ (2.540), Age may be incorrect
Line=181/ID=1: HAZ (1.816), Age may be incorrect
Line=234/ID=2: HAZ (-4.512), Height may be incorrect
Line=290/ID=1: HAZ (2.437), Height may be incorrect
Line=334/ID=1: HAZ (-5.137), Age may be incorrect
Line=347/ID=1: **WHZ (3.022)**, HAZ (2.568), WAZ (3.759)
Line=377/ID=1: HAZ (10.050), WAZ (4.409), Age may be incorrect
Line=390/ID=2: HAZ (10.230), WAZ (4.686), Age may be incorrect
Line=408/ID=1: **WHZ (2.727)**, Weight may be incorrect
Line=459/ID=3: HAZ (3.846), WAZ (2.083), Age may be incorrect
Line=570/ID=3: **WHZ (-3.514)**, HAZ (1.874), Height may be incorrect
Line=582/ID=2: HAZ (-5.374), Age may be incorrect
Line=583/ID=1: HAZ (4.549), Age may be incorrect
Line=600/ID=1: HAZ (-4.692), Age may be incorrect
Line=606/ID=1: HAZ (1.786), WAZ (2.435), Age may be incorrect
Line=614/ID=2: HAZ (2.443), Age may be incorrect
Line=617/ID=1: WAZ (2.447), Weight may be incorrect
Line=680/ID=2: HAZ (-4.846), Height may be incorrect
Line=1155/ID=3: **WHZ (-3.486)**, Weight may be incorrect
Percentage of values flagged with SMART flags:WHZ: 0.5 %, HAZ: 1.9 %, WAZ: 0.8 %

Age distribution:
Month 6 : #######
Month 7 : ####################
Month 8 : ###################
Month 9 : ######################
Month 10 : ##############################
Month 11 : ##################
Month 12 : ######################
Month 13 : ##################
Month 14 : ######################
Month 15 : ######################
Month 16 : #############
Month 17 : ########################
Month 18 : ###################
Month 19 : ########################
Month 20 : ##############################
Month 21 : ##################
Month 22 : ##################
Month 23 : ######################
Month 24 : ##############################
Month 25 : ####################
Month 26 : ###################
Month 27 : ################
Month 28 : ###################
Month 29 : ###################
Month 30 : ##############
Month 31 : ####################
Month 32 : ##############################
Month 33 : ###################
Month 34 : ###################
Month 35 : ###################
Month 36 : ####################################

Month 37 : ##################################
Month 38 : ########################
Month 39 : ############
Month 40 : ################
Month 41 : ##################
Month 42 : ########################
Month 43 : ##############
Month 44 : ################
Month 45 : ##############
Month 46 : ##########################
Month 47 : ############
Month 48 : ##
Month 49 : ####################
Month 50 : ################
Month 51 : ######################
Month 52 : ##########
Month 53 : ###############
Month 54 : ################
Month 55 : ##############
Month 56 : ################
Month 57 : ##################
Month 58 : ############################
Month 59 : ##################
Month 60 : ###
Age ratio of 6-29 months to 30-59 months: 0.83 (The value should be around 0.85).:
p-value = 0.748 (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	132/129.0 (1.0)	118/126.7 (0.9)	250/255.7 (1.0)	1.12
18 to 29	12	136/125.8 (1.1)	115/123.5 (0.9)	251/249.3 (1.0)	1.18
30 to 41	12	116/121.9 (1.0)	142/119.7 (1.2)	258/241.6 (1.1)	0.82
42 to 53	12	110/120.0 (0.9)	125/117.8 (1.1)	235/237.8 (1.0)	0.88
54 to 59	6	62/59.3 (1.0)	46/58.3 (0.8)	108/117.6 (0.9)	1.35
6 to 59	54	556/551.0 (1.0)	546/551.0 (1.0)		1.02

The data are expressed as observed number/expected number (ratio of obs/expect)
Overall sex ratio: p-value = 0.763 (boys and girls equally represented)
Overall age distribution: p-value = 0.723 (as expected)
Overall age distribution for boys: p-value = 0.711 (as expected)
Overall age distribution for girls: p-value = 0.079 (as expected)
Overall sex/age distribution: p-value = 0.032 (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: 0.622

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: 0.001 (significant difference)

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

.	**no exclusion**	**exclusion from reference mean (WHO flags)**	**exclusion from observed mean (SMART flags)**
WHZ			
Standard Deviation SD:	1.08	1.08	1.06
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	9.1%	9.1%	8.9%
calculated with current SD:	7.4%	7.4%	7.0%
calculated with a SD of 1:	5.9%	5.9%	5.9%
HAZ			
Standard Deviation SD:	1.37	1.28	1.19
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	29.1%	29.2%	29.0%
calculated with current SD:	30.1%	29.4%	28.3%
calculated with a SD of 1:	23.8%	24.4%	24.8%
WAZ			
Standard Deviation SD:	1.08	1.08	1.02
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	16.2%	16.2%	16.3%
calculated with current SD:	18.3%	18.3%	17.5%
calculated with a SD of 1:	16.4%	16.4%	17.0%
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= 0.000	p= 0.000
WAZ	p= 0.000	p= 0.000	p= 0.003

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

Skewness			
WHZ	-0.14	-0.14	-0.23
HAZ	1.23	0.26	0.17
WAZ	0.29	0.29	-0.08

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	0.27	0.27	-0.03
HAZ	8.59	0.59	-0.29
WAZ	1.57	1.57	0.15

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=1.33 (p=0.033)
WHZ < -3: ID=0.87 (p=0.768)
GAM: ID=1.33 (p=0.033)
SAM: ID=0.87 (p=0.768)
HAZ < -2: ID=1.65 (p=0.000)
HAZ < -3: ID=1.41 (p=0.013)
WAZ < -2: ID=1.63 (p=0.001)
WAZ < -3: ID=1.40 (p=0.015)
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: 1.16 (n=72, f=1)  ###############
02: 1.23 (n=67, f=2)  ##################
03: 1.15 (n=69, f=0)  ###############
04: 0.98 (n=69, f=0)  ########
05: 1.07 (n=69, f=0)  ############
06: 0.91 (n=68, f=0)  ####
07: 0.95 (n=67, f=0)  ######
08: 1.12 (n=65, f=0)  ##############
09: 1.07 (n=67, f=0)  ###########
10: 0.98 (n=60, f=1)  #######
11: 0.96 (n=57, f=0)  #######
12: 0.90 (n=54, f=0)  ####
13: 1.01 (n=52, f=0)  #########
14: 0.99 (n=48, f=0)  ########
15: 1.12 (n=43, f=0)  #############
16: 0.98 (n=39, f=0)  #######
17: 1.43 (n=30, f=1)  ##########################
18: 1.07 (n=26, f=0)  ###########
19: 1.02 (n=21, f=0)  OOOOOOOOO
20: 0.94 (n=14, f=0)  OOOOOO
21: 1.75 (n=09, f=1)  ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
22: 0.68 (n=06, f=0)
23: 1.80 (n=04, f=0)  ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
24: 0.90 (n=03, f=0)  ~~~~
```

25: 1.57 (n=03, f=0) ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
26: 1.77 (n=04, f=0) ~~~~~~
27: 1.26 (n=02, f=0) ~~~~~~~~~~~~~~~~~~~
28: 1.23 (n=03, f=0) ~~~~~~~~~~~~~~~~~~
29: 2.06 (n=03, f=0) ~~~~~~
30: 0.24 (n=02, f=0)
(when n is much less than the average number of subjects per cluster different symbols are used: 0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags found in the different time points)

Analysis by Team

Team	**1**	**10**	**11**	**12**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
n =	186	23	26	17	161	98	123	179	184	29	37	39
Percentage of values flagged with SMART flags:												
WHZ:	0.5	0.0	0.0	0.0	0.6	1.0	0.0	1.7	0.0	0.0	0.0	0.0
HAZ:	2.7	4.3	0.0	0.0	1.2	1.0	0.0	3.4	2.2	3.4	0.0	2.6
WAZ:	1.6	0.0	0.0	0.0	0.6	2.0	0.0	0.6	0.5	0.0	0.0	2.6
Age ratio of 6-29 months to 30-59 months:												
	0.84	1.30	1.60	1.13	0.89	0.78	0.73	0.74	0.86	0.53	1.06	0.77
Sex ratio (male/female):												
	1.14	1.56	0.86	0.55	1.01	0.69	1.05	0.99	1.00	1.23	1.47	1.29
Digit preference Weight (%):												
.0 :	11	9	0	18	10	8	10	7	9	17	11	8
.1 :	12	17	0	6	11	6	7	15	11	10	16	13
.2 :	15	4	15	18	5	11	11	11	12	21	11	13
.3 :	8	9	15	6	11	13	10	15	14	7	14	8
.4 :	12	13	12	12	8	15	7	10	6	7	8	15
.5 :	12	9	8	6	10	12	13	4	9	3	5	10
.6 :	8	4	15	18	10	7	15	12	9	3	11	3
.7 :	8	17	8	12	11	11	11	9	10	10	8	5
.8 :	8	4	19	6	10	7	7	8	13	10	11	13
.9 :	8	13	8	0	14	8	11	9	8	10	5	13
DPS:	8	16	21	20	7	10	9	11	7	17	11	13
Digit preference score (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)												
Digit preference Height (%):												
.0 :	7	17	23	0	12	20	11	6	16	14	24	10
.1 :	12	9	8	18	9	7	15	13	16	21	11	13
.2 :	11	17	4	6	14	15	15	13	17	3	14	18
.3 :	12	13	12	0	8	9	7	17	10	7	14	23
.4 :	13	0	8	35	9	11	12	6	6	3	3	5
.5 :	14	22	15	18	14	15	9	7	8	10	14	13
.6 :	13	17	8	6	7	6	11	9	8	10	11	5
.7 :	9	0	12	12	13	7	7	11	7	7	5	5
.8 :	3	4	12	0	9	2	6	9	6	17	5	3
.9 :	6	0	0	6	5	6	7	10	6	7	0	5
DPS:	12	27	20	35	10	18	11	11	15	18	22	21
Digit preference score (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)												
Digit preference MUAC (%):												
.0 :	6	9	23	0	18	6	12	6	8	7	14	8
.1 :	10	22	8	12	5	16	8	13	17	3	5	15
.2 :	10	0	12	12	8	11	11	8	11	14	3	15
.3 :	12	4	23	12	14	9	7	15	11	17	11	3
.4 :	13	9	0	6	4	8	11	10	13	7	8	8
.5 :	16	22	0	24	16	11	7	8	9	14	35	13
.6 :	14	17	12	12	9	14	11	8	9	10	8	13
.7 :	6	9	4	12	12	4	14	22	8	3	5	18
.8 :	5	4	12	12	11	9	9	4	9	10	5	3
.9 :	9	4	8	0	4	10	11	5	7	14	5	5
DPS:	11	24	26	22	15	11	7	17	10	15	30	18
Digit preference score (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)												
Standard deviation of WHZ:												
SD	1.03	1.04	1.07	1.18	1.04	1.22	0.99	1.08	1.12	1.03	1.32	0.93

Prevalence (< -2) observed:

%	7.5	4.3	11.5	11.8	9.9	14.3	7.8	12.0	3.4	16.2	

Prevalence (< -2) calculated with current SD:

%	6.2	3.0	6.3	12.5	7.7	10.1	9.4	8.9	4.9	10.4	

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

%	5.6	2.5	5.1	8.7	7.0	6.0	7.7	6.6	4.3	4.8	

Standard deviation of HAZ:

SD	1.67	1.26	1.25	1.04	1.31	1.15	1.16	1.49	1.22	1.33	1.26	1.48

observed:

%	26.3	17.4	19.2	5.9	33.5	27.6	29.3	30.7	31.0	37.9	37.8	20.5

calculated with current SD:

%	31.1	21.3	22.0	8.0	33.3	23.8	28.6	32.1	30.5	39.6	33.0	25.0

calculated with a SD of 1:

%	20.6	15.7	16.7	7.1	28.6	20.6	25.5	24.5	26.6	36.3	28.9	15.9

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	27/23.0 (1.2)	17/20.2 (0.8)	44/43.2 (1.0)	1.59
18 to 29	12	19/22.4 (0.8)	22/19.7 (1.1)	41/42.1 (1.0)	0.86
30 to 41	12	27/21.7 (1.2)	23/19.1 (1.2)	50/40.8 (1.2)	1.17
42 to 53	12	17/21.4 (0.8)	19/18.8 (1.0)	36/40.1 (0.9)	0.89
54 to 59	6	9/10.6 (0.9)	6/9.3 (0.6)	15/19.9 (0.8)	1.50
6 to 59	54	99/93.0 (1.1)	87/93.0 (0.9)		1.14

The data are expressed as observed number/expected number (ratio of obs/expect)
Overall sex ratio: p-value = 0.379 (boys and girls equally represented)
Overall age distribution: p-value = 0.442 (as expected)
Overall age distribution for boys: p-value = 0.458 (as expected)
Overall age distribution for girls: p-value = 0.601 (as expected)
Overall sex/age distribution: p-value = 0.125 (as expected)

Team 2:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	5/3.2 (1.5)	3/2.1 (1.4)	8/5.3 (1.5)	1.67
18 to 29	12	3/3.2 (0.9)	2/2.0 (1.0)	5/5.2 (1.0)	1.50
30 to 41	12	1/3.1 (0.3)	2/2.0 (1.0)	3/5.0 (0.6)	0.50
42 to 53	12	4/3.0 (1.3)	2/1.9 (1.0)	6/5.0 (1.2)	2.00
54 to 59	6	1/1.5 (0.7)	0/1.0 (0.0)	1/2.5 (0.4)	
6 to 59	54	14/11.5 (1.2)	9/11.5 (0.8)		1.56

The data are expressed as observed number/expected number (ratio of obs/expect)
Overall sex ratio: p-value = 0.297 (boys and girls equally represented)
Overall age distribution: p-value = 0.518 (as expected)
Overall age distribution for boys: p-value = 0.587 (as expected)
Overall age distribution for girls: p-value = 0.851 (as expected)
Overall sex/age distribution: p-value = 0.231 (as expected)

Team 3:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	3/2.8 (1.1)	5/3.2 (1.5)	8/6.0 (1.3)	0.60
18 to 29	12	3/2.7 (1.1)	5/3.2 (1.6)	8/5.9 (1.4)	0.60
30 to 41	12	1/2.6 (0.4)	0/3.1 (0.0)	1/5.7 (0.2)	
42 to 53	12	3/2.6 (1.2)	2/3.0 (0.7)	5/5.6 (0.9)	1.50
54 to 59	6	2/1.3 (1.6)	2/1.5 (1.3)	4/2.8 (1.4)	1.00
6 to 59	54	12/13.0 (0.9)	14/13.0 (1.1)		0.86

The data are expressed as observed number/expected number (ratio of obs/expect)
Overall sex ratio: p-value = 0.695 (boys and girls equally represented)
Overall age distribution: p-value = 0.208 (as expected)
Overall age distribution for boys: p-value = 0.822 (as expected)
Overall age distribution for girls: p-value = 0.232 (as expected)
Overall sex/age distribution: p-value = 0.108 (as expected)

Team 4:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	1/1.4 (0.7)	2/2.6 (0.8)	3/3.9 (0.8)	0.50
18 to 29	12	1/1.4 (0.7)	5/2.5 (2.0)	6/3.8 (1.6)	0.20
30 to 41	12	2/1.3 (1.5)	1/2.4 (0.4)	3/3.7 (0.8)	2.00
42 to 53	12	2/1.3 (1.5)	0/2.4 (0.0)	2/3.7 (0.5)	
54 to 59	6	0/0.6 (0.0)	3/1.2 (2.6)	3/1.8 (1.7)	0.00
6 to 59	54	6/8.5 (0.7)	11/8.5 (1.3)		0.55

The data are expressed as observed number/expected number (ratio of obs/expect)
Overall sex ratio: p-value = 0.225 (boys and girls equally represented)
Overall age distribution: p-value = 0.540 (as expected)
Overall age distribution for boys: p-value = 0.811 (as expected)
Overall age distribution for girls: p-value = 0.069 (as expected)
Overall sex/age distribution: p-value = 0.008 (significant difference)

Team 5:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	20/18.8 (1.1)	21/18.6 (1.1)	41/37.4 (1.1)	0.95
18 to 29	12	25/18.3 (1.4)	10/18.1 (0.6)	35/36.4 (1.0)	2.50
30 to 41	12	16/17.8 (0.9)	25/17.5 (1.4)	41/35.3 (1.2)	0.64
42 to 53	12	16/17.5 (0.9)	23/17.3 (1.3)	39/34.7 (1.1)	0.70
54 to 59	6	4/8.6 (0.5)	1/8.5 (0.1)	5/17.2 (0.3)	4.00
6 to 59	54	81/80.5 (1.0)	80/80.5 (1.0)		1.01

The data are expressed as observed number/expected number (ratio of obs/expect)
Overall sex ratio: p-value = 0.937 (boys and girls equally represented)
Overall age distribution: p-value = 0.033 (significant difference)
Overall age distribution for boys: p-value = 0.257 (as expected)
Overall age distribution for girls: p-value = 0.003 (significant difference)
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	8/9.3 (0.9)	9/13.5 (0.7)	17/22.7 (0.7)	0.89
18 to 29	12	14/9.0 (1.5)	12/13.1 (0.9)	26/22.2 (1.2)	1.17
30 to 41	12	5/8.8 (0.6)	13/12.7 (1.0)	18/21.5 (0.8)	0.38
42 to 53	12	8/8.6 (0.9)	18/12.5 (1.4)	26/21.1 (1.2)	0.44
54 to 59	6	5/4.3 (1.2)	6/6.2 (1.0)	11/10.5 (1.1)	0.83
6 to 59	54	40/49.0 (0.8)	58/49.0 (1.2)		0.69

The data are expressed as observed number/expected number (ratio of obs/expect)
Overall sex ratio: p-value = 0.069 (boys and girls equally represented)
Overall age distribution: p-value = 0.431 (as expected)
Overall age distribution for boys: p-value = 0.322 (as expected)
Overall age distribution for girls: p-value = 0.408 (as expected)
Overall sex/age distribution: p-value = 0.019 (significant difference)

Team 7:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	15/14.6 (1.0)	11/13.9 (0.8)	26/28.5 (0.9)	1.36
18 to 29	12	15/14.3 (1.1)	11/13.6 (0.8)	26/27.8 (0.9)	1.36
30 to 41	12	11/13.8 (0.8)	11/13.2 (0.8)	22/27.0 (0.8)	1.00
42 to 53	12	10/13.6 (0.7)	19/12.9 (1.5)	29/26.5 (1.1)	0.53

54 to 59 6 12/6.7 (1.8) 8/6.4 (1.2) 20/13.1 (1.5) 1.50
---
6 to 59 54 63/61.5 (1.0) 60/61.5 (1.0) 1.05
The data are expressed as observed number/expected number (ratio of obs/expect)
Overall sex ratio: p-value = 0.787 (boys and girls equally represented)
Overall age distribution: p-value = 0.279 (as expected)
Overall age distribution for boys: p-value = 0.222 (as expected)
Overall age distribution for girls: p-value = 0.321 (as expected)
Overall sex/age distribution: p-value = 0.033 (significant difference)

Team 8:

Age cat. mo. boys girls total ratio boys/girls
---
6 to 17 12 13/20.6 (0.6) 20/20.9 (1.0) 33/41.5 (0.8) 0.65
18 to 29 12 25/20.1 (1.2) 18/20.4 (0.9) 43/40.5 (1.1) 1.39
30 to 41 12 22/19.5 (1.1) 32/19.7 (1.6) 54/39.2 (1.4) 0.69
42 to 53 12 18/19.2 (0.9) 15/19.4 (0.8) 33/38.6 (0.9) 1.20
54 to 59 6 11/9.5 (1.2) 5/9.6 (0.5) 16/19.1 (0.8) 2.20
---
6 to 59 54 89/89.5 (1.0) 90/89.5 (1.0) 0.99
The data are expressed as observed number/expected number (ratio of obs/expect)
Overall sex ratio: p-value = 0.940 (boys and girls equally represented)
Overall age distribution: p-value = 0.067 (as expected)
Overall age distribution for boys: p-value = 0.326 (as expected)
Overall age distribution for girls: p-value = 0.025 (significant difference)
Overall sex/age distribution: p-value = 0.003 (significant difference)

Team 9:

Age cat. mo. boys girls total ratio boys/girls
---
6 to 17 12 26/21.3 (1.2) 19/21.3 (0.9) 45/42.7 (1.1) 1.37
18 to 29 12 19/20.8 (0.9) 21/20.8 (1.0) 40/41.6 (1.0) 0.90
30 to 41 12 18/20.2 (0.9) 23/20.2 (1.1) 41/40.3 (1.0) 0.78
42 to 53 12 18/19.9 (0.9) 16/19.9 (0.8) 34/39.7 (0.9) 1.13
54 to 59 6 11/9.8 (1.1) 13/9.8 (1.3) 24/19.6 (1.2) 0.85
---
6 to 59 54 92/92.0 (1.0) 92/92.0 (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 = 0.738 (as expected)
Overall age distribution for boys: p-value = 0.787 (as expected)
Overall age distribution for girls: p-value = 0.657 (as expected)
Overall sex/age distribution: p-value = 0.385 (as expected)

Team 10:

Age cat. mo. boys girls total ratio boys/girls
---
6 to 17 12 3/3.7 (0.8) 3/3.0 (1.0) 6/6.7 (0.9) 1.00
18 to 29 12 1/3.6 (0.3) 3/2.9 (1.0) 4/6.6 (0.6) 0.33
30 to 41 12 5/3.5 (1.4) 5/2.9 (1.8) 10/6.4 (1.6) 1.00
42 to 53 12 5/3.5 (1.4) 2/2.8 (0.7) 7/6.3 (1.1) 2.50
54 to 59 6 2/1.7 (1.2) 0/1.4 (0.0) 2/3.1 (0.6)
---
6 to 59 54 16/14.5 (1.1) 13/14.5 (0.9) 1.23
The data are expressed as observed number/expected number (ratio of obs/expect)
Overall sex ratio: p-value = 0.577 (boys and girls equally represented)
Overall age distribution: p-value = 0.457 (as expected)
Overall age distribution for boys: p-value = 0.492 (as expected)
Overall age distribution for girls: p-value = 0.518 (as expected)
Overall sex/age distribution: p-value = 0.137 (as expected)

Team 11:

Age cat. mo. boys girls total ratio boys/girls
---
6 to 17 12 7/5.1 (1.4) 4/3.5 (1.1) 11/8.6 (1.3) 1.75

18 to 29 12 6/5.0 (1.2) 2/3.4 (0.6) 8/8.4 (1.0) 3.00
30 to 41 12 3/4.8 (0.6) 4/3.3 (1.2) 7/8.1 (0.9) 0.75
42 to 53 12 4/4.7 (0.8) 5/3.2 (1.5) 9/8.0 (1.1) 0.80
54 to 59 6 2/2.3 (0.9) 0/1.6 (0.0) 2/3.9 (0.5)
---
6 to 59 54 22/18.5 (1.2) 15/18.5 (0.8) 1.47
The data are expressed as observed number/expected number (ratio of obs/expect)
Overall sex ratio: p-value = 0.250 (boys and girls equally represented)
Overall age distribution: p-value = 0.747 (as expected)
Overall age distribution for boys: p-value = 0.777 (as expected)
Overall age distribution for girls: p-value = 0.499 (as expected)
Overall sex/age distribution: p-value = 0.187 (as expected)

Team 12:

Age cat. mo. boys girls total ratio boys/girls
---
6 to 17 12 4/5.1 (0.8) 4/3.9 (1.0) 8/9.0 (0.9) 1.00
18 to 29 12 5/5.0 (1.0) 4/3.8 (1.0) 9/8.8 (1.0) 1.25
30 to 41 12 5/4.8 (1.0) 3/3.7 (0.8) 8/8.6 (0.9) 1.67
42 to 53 12 5/4.7 (1.1) 4/3.7 (1.1) 9/8.4 (1.1) 1.25
54 to 59 6 3/2.3 (1.3) 2/1.8 (1.1) 5/4.2 (1.2) 1.50
---
6 to 59 54 22/19.5 (1.1) 17/19.5 (0.9) 1.29
The data are expressed as observed number/expected number (ratio of obs/expect)
Overall sex ratio: p-value = 0.423 (boys and girls equally represented)
Overall age distribution: p-value = 0.985 (as expected)
Overall age distribution for boys: p-value = 0.979 (as expected)
Overall age distribution for girls: p-value = 0.995 (as expected)
Overall sex/age distribution: p-value = 0.860 (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: 1.04 (n=11, f=0) ##########
02: 0.99 (n=11, f=0) ########
03: 0.82 (n=09, f=0) #
04: 0.76 (n=10, f=0)
05: 1.06 (n=10, f=0) ###########
06: 0.97 (n=10, f=0) #######
07: 0.98 (n=11, f=0) ########
08: 0.81 (n=10, f=0) #
09: 0.76 (n=09, f=0)
10: 1.17 (n=11, f=1) ################
11: 0.79 (n=08, f=0)
12: 0.80 (n=10, f=0)
13: 1.05 (n=11, f=0) ##########
14: 1.07 (n=10, f=0) ###########
15: 1.07 (n=11, f=0) ###########
16: 0.89 (n=10, f=0) ####
17: 1.45 (n=06, f=0) ##########################
18: 1.06 (n=04, f=0) OOOOOOOOOOO
19: 1.46 (n=04, f=0) OOOOOOOOOOOOOOOOOOOOOOOOOOO
20: 0.82 (n=03, f=0) O
21: 0.03 (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: 0.84 (n=02, f=0) ##
02: 0.70 (n=02, f=0)
03: 0.89 (n=02, f=0) ####
04: 1.06 (n=02, f=0) ##########
05: 1.67 (n=02, f=0) ####################################
06: 0.38 (n=02, f=0)
07: 0.29 (n=02, f=0)
08: 2.80 (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: 1.48 (n=02, f=0) ##############################
02: 0.45 (n=02, f=0)
03: 0.70 (n=02, f=0)
04: 1.12 (n=02, f=0) #############
06: 0.41 (n=02, f=0)
07: 0.57 (n=02, f=0)
08: 0.04 (n=02, f=0)
09: 1.46 (n=02, f=0) ############################
10: 0.78 (n=02, f=0)
11: 0.24 (n=02, f=0)
12: 2.01 (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: 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
(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: 1.42 (n=10, f=0) ##########################
02: 0.94 (n=09, f=0) ######
03: 0.99 (n=10, f=0) ########
04: 0.40 (n=09, f=0)
05: 0.99 (n=10, f=0) ########
06: 0.39 (n=09, f=0)
07: 1.18 (n=10, f=0) ################
08: 0.90 (n=08, f=0) ####
09: 1.07 (n=10, f=0) ##########
10: 0.91 (n=10, f=0) #####
11: 1.16 (n=09, f=0) ###############
12: 1.31 (n=06, f=0) ####################
13: 1.11 (n=09, f=0) #############
14: 1.12 (n=09, f=0) #############
15: 0.76 (n=07, f=0)
16: 0.87 (n=06, f=0) ###
17: 1.22 (n=06, f=0) ##################
18: 1.06 (n=06, f=0) ##########
19: 0.94 (n=04, f=0) OOOOOO
20: 0.17 (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: 0.35 (n=10, f=0)
02: 1.74 (n=09, f=1)  ########################################
03: 1.55 (n=10, f=0)  ##############################
04: 1.51 (n=10, f=0)  ##############################
05: 1.35 (n=09, f=0)  ######################
06: 1.27 (n=09, f=0)  ####################
07: 1.15 (n=07, f=0)  ###############
08: 1.12 (n=08, f=0)  #############
09: 1.16 (n=08, f=0)  ###############
10: 1.23 (n=04, f=0)  OOOOOOOOOOOOOOOOO
11: 0.83 (n=05, f=0)  #
12: 0.61 (n=03, f=0)
13: 0.55 (n=02, f=0)
14: 0.65 (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: 0.72 (n=10, f=0)
02: 0.77 (n=08, f=0)
03: 1.06 (n=10, f=0)  ###########
04: 0.49 (n=09, f=0)
05: 1.17 (n=10, f=0)  ###############
06: 0.98 (n=09, f=0)  ########
07: 0.77 (n=09, f=0)
08: 1.44 (n=10, f=0)  ############################
09: 1.01 (n=10, f=0)  #########
10: 0.52 (n=07, f=0)
11: 0.80 (n=09, f=0)
12: 0.41 (n=06, f=0)
13: 1.59 (n=04, f=0)  OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
14: 2.34 (n=02, f=0)  ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
15: 0.96 (n=03, f=0)  OOOOOOO
16: 0.24 (n=02, f=0)
17: 2.31 (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: 1.64 (n=10, f=1)  ###################################
02: 1.39 (n=10, f=1)  ########################
03: 1.08 (n=10, f=0)  ############
04: 1.00 (n=10, f=0)  ########
05: 0.49 (n=10, f=0)
06: 0.94 (n=10, f=0)  ######
07: 0.49 (n=10, f=0)
08: 0.86 (n=10, f=0)  ###
09: 0.56 (n=10, f=0)
10: 1.05 (n=08, f=0)  ##########
11: 0.81 (n=09, f=0)
12: 1.03 (n=10, f=0)  ##########
13: 1.05 (n=09, f=0)  ###########
14: 0.78 (n=09, f=0)
15: 1.22 (n=07, f=0)  ##################
```

16: 1.18 (n=08, f=0) ################
17: 1.68 (n=05, f=0) #####################################
18: 0.92 (n=06, f=0) #####
19: 0.75 (n=04, f=0)
20: 0.47 (n=03, f=0)
21: 0.62 (n=02, f=0)
22: 0.13 (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: 9

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: 1.34 (n=10, f=0) #######################
02: 0.98 (n=09, f=0) ########
03: 1.11 (n=10, f=0) #############
04: 0.92 (n=10, f=0) #####
05: 1.26 (n=10, f=0) ###################
06: 0.84 (n=10, f=0) ##
07: 0.88 (n=09, f=0) ###
08: 1.40 (n=08, f=0) #########################
09: 1.01 (n=10, f=0) #########
10: 0.73 (n=10, f=0)
11: 0.87 (n=09, f=0) ###
12: 0.84 (n=10, f=0) ##
13: 0.73 (n=09, f=0)
14: 0.80 (n=08, f=0)
15: 1.25 (n=07, f=0) ###################
16: 1.31 (n=08, f=0) #####################
17: 0.90 (n=07, f=0) ####
18: 1.19 (n=06, f=0) ################
19: 0.63 (n=05, f=0)
20: 0.67 (n=03, f=0)
21: 2.75 (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: 10

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=02, f=0) ##################################
02: 0.13 (n=02, f=0)
03: 0.99 (n=02, f=0) ########
04: 0.43 (n=02, f=0)
05: 1.26 (n=02, f=0) ###################
06: 1.49 (n=02, f=0) #############################
07: 1.01 (n=02, f=0) #########
08: 2.61 (n=02, f=1) ##
09: 0.48 (n=02, f=0)
10: 0.05 (n=02, f=0)
12: 0.71 (n=02, f=0)
13: 0.14 (n=02, f=0)
14: 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: 11
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: 0.08 (n=02, f=0)
02: 1.60 (n=02, f=1) ##################################
04: 0.83 (n=02, f=0) #
05: 1.03 (n=02, f=0) ##########
06: 0.96 (n=02, f=0) #######
07: 0.44 (n=02, f=0)
08: 0.84 (n=02, f=0) ##
09: 1.55 (n=02, f=0) ################################
10: 2.19 (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: 12
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: 1.69 (n=02, f=0) ####################################
02: 0.92 (n=02, f=0) #####
03: 0.48 (n=02, f=0)
04: 0.17 (n=02, f=0)
05: 0.13 (n=02, f=0)
06: 0.98 (n=02, f=0) #######
07: 0.17 (n=02, f=0)
08: 0.87 (n=02, f=0) ###
09: 1.81 (n=02, f=0) ##
10: 0.13 (n=02, f=0)
11: 1.38 (n=02, f=0) ########################
12: 0.25 (n=02, f=0)
13: 1.03 (n=02, f=0) ##########
14: 0.64 (n=02, f=0)
15: 1.14 (n=02, f=0) ##############
17: 1.17 (n=02, f=0) ################
18: 0.93 (n=02, f=0) ######
19: 1.72 (n=02, f=0) ##
(when n is much less than the average number of subjects per cluster different symbols are used: 0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags found in the different time points)
(for better comparison it can be helpful to copy/paste part of this report into Excel)

Annex 4: Standardization test rerults for Kabul urban (city)

Enumerator	Weight	Height	MUAC
Enumerator 1	TEM poor	TEM acceptable	TEM good
Enumerator 2	TEM poor	TEM reject	TEM good
Enumerator 3	TEM poor	TEM poor	TEM good
Enumerator 4	TEM poor	TEM good	TEM good
Enumerator 5	TEM poor	TEM good	TEM reject
Enumerator 6	TEM acceptable	TEM good	TEM acceptable
Enumerator 7	TEM acceptable	TEM good	TEM good
Enumerator 8	TEM poor	TEM good	TEM poor
Enumerator 9	TEM acceptable	TEM good	TEM reject
Enumerator 10	TEM poor	TEM good	TEM good
Enumerator 11	TEM acceptable	TEM good	TEM acceptable
Enumerator 12	TEM poor	TEM acceptable	TEM good
Enumerator 13	TEM acceptable	TEM good	TEM reject
Enumerator 14	TEM poor	TEM good	TEM good
Enumerator 15	TEM poor	TEM good	TEM acceptable

13. REFERENCES

- ENA software 2011 updated 9th July 2015
- National nutrition Survey 2013
- WHO Child Growth Standard 2006
- Myatt, M. et al (2018) Children who are both wasted and stunted are also underweight and have a high risk of death: a descriptive epidemiology of multiple anthropometric deficits using data from 51 countries.
- Afghanistan Demographic and Health Survey (AfDHs) 2015
- WHO mortality emergency threshold
- WHO Emergency Severity classification for underweight
- CSO updated population 1397 (2018)
- The SPHERE Handbooks 2018