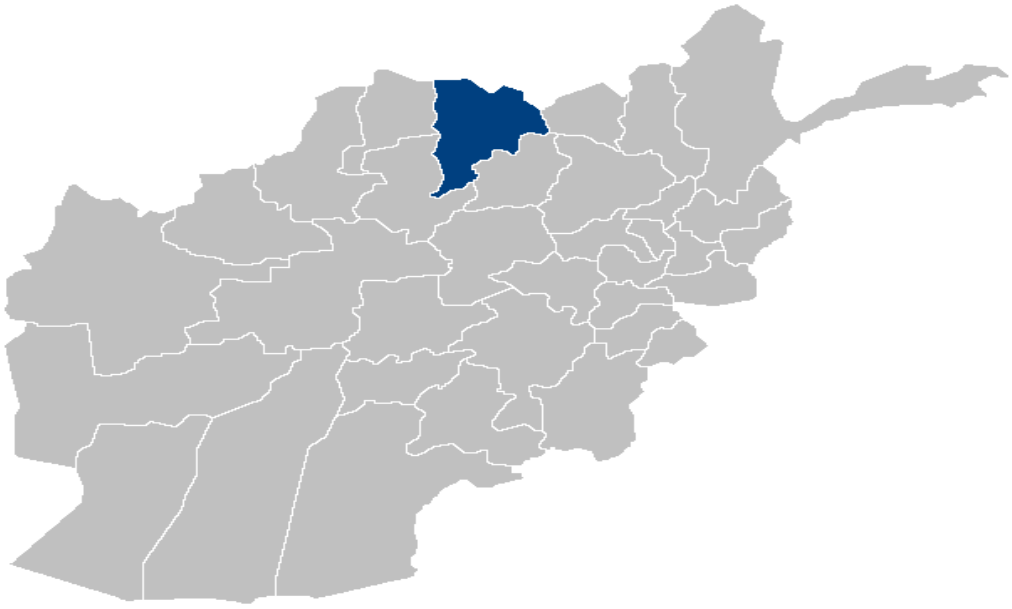
AFGHANISTAN

BDNglobal
BAKHTAR DEVELOPMENT NETWORK GLOBAL
Solutions for a brighter future

ACF INTERNATIONAL
Afghanistan

Nutrition, Mortality, IYCF & Wash SMART Survey Final Report

Balkh Province, Afghanistan
August 2015



Funded by

Foreign Affairs, Trade and Development Canada

Reported By:
Victor MALLELAH and Danka PANTCHOVA

Action Contre la Faim

ACF is a non-governmental, non-political and non-religious organization

TABLE OF CONTENTS

Acknowledgement 3
Executive Summary 4
Introduction 6
Objectives of the Survey 7
Broad objective *7*
Specific objectives *7*
Justification of the Assessment 7
Challenges and Limitations 8
Methodology 9
Survey design, area and population *9*
Sample size *10*
Sampling procedure *11*
Case definitions and inclusion criteria *12*
Anthropometric Indicators *13*
Mortality Indicators calculation *16*
Additional Indicators - Health & WASH *16*
Infant and Young Child Feeding Practices Indicators (IYCF) *17*
Training and supervision *18*
Data Analysis *19*
Timeline *20*
Results 20
Description of the sample *20*
Anthropometric results (children 6-59) *22*
Crude and Under-5 Mortality rates *28*
Additional health information *29*
Maternal health and nutrition *30*
IYCF (children 0-23) *31*
Households *33*
Conclusions 35
Children nutritional status *35*
Mortality *36*
Contributing factors *36*
Recommendations 38
Nutrition status *38*
Morbidity status *38*
Immunization, Deworming and Vitamin A supplementation *38*
Behavior change *39*
Annexes 40

ACKNOWLEDGEMENT

Action Contre la Faim Afghanistan mission would like to thank to the following organizations and individuals for their support in conducting this SMART survey in Balkh Province:

- ✓ The community members of Balkh province for welcoming and supporting the teams during the time of data collections, specifically the household heads, mothers/caregivers and children
- ✓ The multiple National and International Organizations for sharing information on Balkh Province (CSOs and BDN)
- ✓ Balkh province administration such as Ministry of Economy, Ministry of Health Directory, the PNO and MOPH for their support and authorization for conducting the survey
- ✓ Foreign Affairs, Trade and Development (DFATD) for financing this survey
- ✓ ACF teams in Mazar, Kabul and Paris
- ✓ Bakhtar Development Network (BDN) team in Mazar, especially Dr. Sarwalaq and Dr. Sharifa, for the commitment and participation in the survey process.
- ✓ The entire data collection teams for making the whole process successful

EXECUTIVE SUMMARY

Following the NNS 2013, Bakhtar Development Network - Afghanistan (BDN)[1], with technical support from ACF, has reinforced existing SAM Management services in Balkh. Since the NNS in 2013, no other surveys have been conducted to gather necessary information for additional programming or for readjusting existing programs and provincial public health policies related to child and maternal health. Therefore, it was important to get an up to date estimation of prevalence of under nutrition among children as well as to identify the main factors contributing to child undernutrition and maternal nutrition status. Besides, this survey was a great opportunity to build capacity of key BDN staffs on SMART methodology for conducting nutrition surveys.

The main constrain in conducting this assessment was the unpredictable security situation and the rising insecurity incidences in the province leading two districts completely inaccessible for the assessment team. However, this represents 39.2%[2] of the entire population of Balkh province.
The GAM rate reported in this survey using both WHZ-score (6,6 % [4,0 - 10,9 95% C.I.]) and MUAC (5,1 % [2,9 - 8,8 95% C.I.]) can be classified as "poor"[3] according to the WHO 2006 threshold. The statistical tests have shown potential existence of "pockets of wasting").

Chronic Malnutrition levels can be classified borderline as "serious" with 29,4 % (25,3 - 33,8 95% C.I.) of stunting rate. The crude mortality rate (0.12 [0.05-0.29 95% C.I.]) and under-five mortality rate (1.07 [0.43-2.63 95% C.I.]) are both below the emergency and alert levels. Monitoring of the situation is required in order to keep these rates below.

From the contributing factors, under-5 morbidity (mainly fever, and diarrhea) was considered to be above average and ARI slightly below average. The rates of exclusive breastfeeding for example are quite positive. The same can be said for the rest of the core indicators except for "Introduction of solid, semi-solid or soft foods for children from 6-9 months" which is very low and show important shortages with the timely complementary feeding.

[1] BDN is currently BPHS Implementing partner in Balkh Province.
[2] Settled Population of Balkh Province by Civil Division, Urban, Rural and Sex-2012-2013
[3] < 5% Acceptable; 5 – 9 % Poor ; 10 – 14 % Serious; > 15 % Critical

Maternal and child health seeking behavior appears to be relatively good, may be due to the shorter distance to health facilities (76,2% are at 40 min walking distance). However, maternal MUAC <230 mm was of 13,2% (9,3-17,0 95% C.I.) can be classified as high. Caregiver hand washing practices were not appropriate for 67,9% of the interviewed.

Based on the findings, set of recommendations have been done mainly aiming at reinforcing IMAM services coverage, improving maternal and child care, working with innovative ways to approach community health, setting clear BCC strategy for Balkh populations. Additional studies were also recommended to understand barriers to improved practices and behavior change, as well as to study the existence of pockets of acute malnutrition.

INTRODUCTION

Balkh province is located in the northern part of Afghanistan. It borders with Tajikistan in the North-East, Kunduz province in the East, Uzbekistan in the North, Samangan province in the South-East, Sar-e-Pul province in the South-West and Jowzjan Province in the West. Mazar-e-Sharif is the capital city of the province and one of the biggest commercial and financial centers of Afghanistan. The coverage area of the province is about 16,840 km^2.

Nearly half of the province (48.7%) is mountainous or semi mountainous terrains while half of the area (50.2%) is made up of flat land. The province is divided into 15 districts. Physical map of Balkh is available in Annex 1.

About 66% of the population of Balkh lives in rural districts and 34% lives in urban areas. The major ethnic groups living in Balkh province are Tajiks and Pashtuns followed by Uzbek, Hazaras, Turkman, Arab and Baluch. The majority (50%) of the population speaks Dari followed by Pashtu (27%), Turkmani (11.9%) and Uzbeki (10.7%).[4]

The Balkh river basin provides for the cultivated area to be concentrated in the southern and central districts of the. 90% of the cultivated land is spread over 10 of the 16 districts of Balkh province. Farmers raise livestock in all districts because of the proximity to Mazar-e-Sharif and opportunities for trade that this brings. Balkh is famous for producing melons, cashmere, wool, grains and pistachio.

61% of rural households depend on agriculture as their main source of income; 70% of rural households own or manage agricultural land or garden plots in the province. However, more than one-fifth of households (21%) in rural areas derive income from trade and services and at least a quarter (25%) in rural areas earn some income through non-farm related labour. Livestock also accounts for income for 29% of rural households[5].

[4] https://en.wikipedia.org/wiki/Balkh_Province
[5] *(http://afghanag.ucdavis.edu/country-info/Province-agriculture-profiles/balkh/fsnhlpbalkhpdf.pdf)*

OBJECTIVES OF THE SURVEY

Broad objective

To estimate the prevalence of undernutrition of 0-59 months children in Balkh province and analyse possible factors contributing to malnutrition.

Specific objectives

- To determine prevalence of wasting, stunting, underweight and overweight among children 6-59 months old
- To determine core IYCF practices of children 0-23 months
- To determine the MUAC based nutrition status of Pregnant and lactating women
- To estimate Vitamin A supplementation and deworming coverage in the last 6 months among children under 5 and Iron/folate supplementation among pregnant women.
- To estimate coverage of measles
- To assess the 2-weeks recall morbidity among children 0-59 months based
- To study WASH proxy indicators: household water access and storage, water use and mother's hand washing practices.
- To estimate Crude death Rate and under five death rate.
- A detailed analysis of the above objectives and appropriate recommendations will be presented in the final SMART survey report.

JUSTIFICATION OF THE ASSESSMENT

The National Nutrition Survey conducted in 2013 indicated quite worrying levels of Severe Acute Malnutrition[6] in Balkh. Following the NNS 2013, Bakhtar Development Network - Afghanistan (BDN)[7], with technical support from ACF, has reinforced existing SAM Management services by reopening the services in 5 TFUs at district level hospitals and 20 OTPs to provide ambulatory SAM services.

[6] National Nutrition Survey Report, Afghanistan 2013, MoPH/UNICEF
[7] BDN is currently BPHS Implementing partner in Balkh Province.

Since the NNS in 2013, no other surveys have been conducted to gather necessary information for additional programming or for readjusting existing programs and provincial public health policies related to child and maternal health. Therefore, it is important to get an up to date estimation of prevalence of under nutrition among children as well as to identify the main factors contributing to child undernutrition and maternal nutrition status.

Besides, this survey was a great opportunity to build capacity of key BDN staffs on SMART methodology for conducting nutrition surveys. Two BDN staffs were trained on SMART Survey Methodology and one participated in data collection for the entire period.

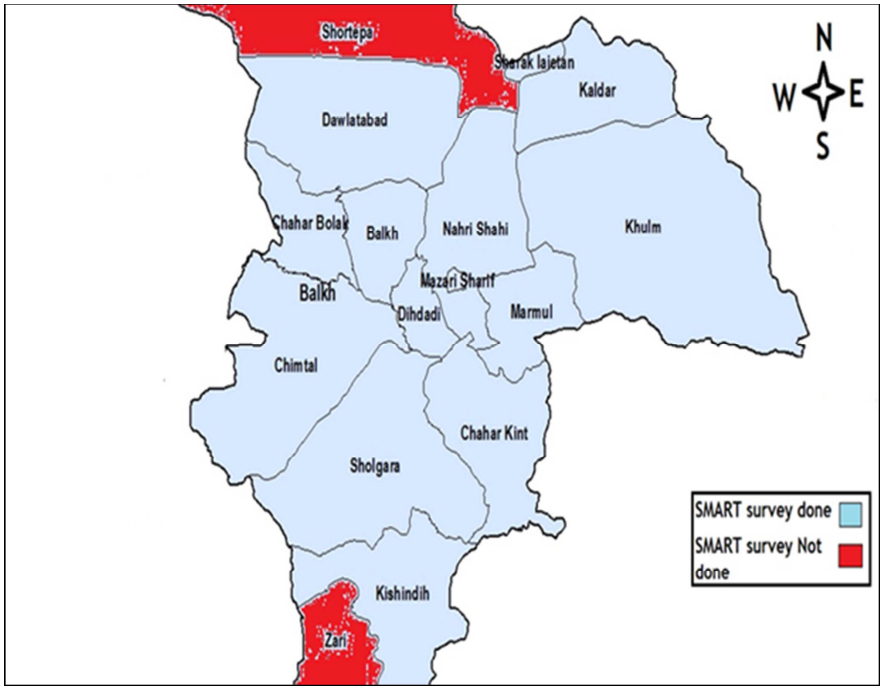
In addition, the results from this survey would allow BDN and other partners to revise their implementing strategy in order to get more positive impact from their interventions.

CHALLENGES AND LIMITATIONS

The main constrain in conducting this assessment was the unpredictable security situation and the rising insecurity incidences in the province leading two districts completely inaccessible for the assessment team. Moreover, a number of villages within the accessible districts were also eliminated because of their security situation and related accessibility. However, this represents 39.2%8 of the entire population of Balkh province. During this survey, 1 out of 36 selected clusters could not be accessed due insecurity and thus was not surveyed. The Figure 1 below displays assessed versus unassessed zones.

[8] Settled Population of Balkh Province by Civil Division, Urban, Rural and Sex-2012-2013

Figure 1: Map of Balkh Province indicating districts surveyed



METHODOLOGY

Survey design, area and population

A cross-sectional two-stage cluster sampling following SMART methodology was adopted. The first stage involved selection of the clusters. The villages were considered as the smallest geographical unit (clusters). Household[9] was considered as the basic sampling unit. The second stage involved selection of households.

The survey focussed on the 12 districts of Balkh province, two districts (Zari and Shortepa) were eliminated due to insecurity. The sampling frame contained only the list of villages considered secure and accessible. Out of total population **(744, 404[10])** of Balkh Province this survey covered a population of 323,212. This represents 39.2% of the entire population of Balkh province.

The survey was conducted between 5th August and 24th August 2015 (14 days) inclusive of both training and data collection.

[9] All people eating from the same pot and living together (WFP definition).

[10] Settled Population of Balkh Province by Civil Division, Urban, Rural and Sex-2012-2013

Sample size

Emergency Nutrition Assessment (ENA) for SMART software updated version April 2014 will be used for sample size calculation. The purpose of the sample calculation is to get a sample having the optimal units so results are reliable, with reasonable precision. As the survey has many objectives and for the sake of simplification, the sample size calculation takes into consideration the most important indicators: the anthropometry and the mortality. The parameters for the sample size calculation are as outlined in the table 1 and 2 below.

Table 1: Parameters for sample size calculation – anthropometry, SMART – Balkh, August 2015

Parameters	Value	Assumptions based on context
Estimated Prevalence	5%	The National Nutrition Survey (2013) found GAM of 5.7, the recent NCA-SMART conducted in Dar-i-Suf, a neighboring district found GAM of 4.6%. Considering these factors, GAM rate of 5% was considered the most appropriate for planning.
Desired Precision	±2.5	Since the expected GAM prevalence is low, a precision of ± 2.5% was chosen (based on SMART Guidelines).
Design Effect	1.5	The population living in the province is considered as having similar living conditions and the same access to food and social services. Hence the design effect was estimated at 1.5.
Children 6-59 to be included	477	This is the minimum number, however to avoid possible bias of selection all children 0-59 months in the household will be surveyed.
Average HHs size	7.8	The average household size is 7.8, according to the national vulnerability assessment of Afghanistan 2014.
% of children under 5	15,6	The estimated U5 population according to the Afghanistan NNS 2013.
% non-Response rate	6	This is based on experience from previous surveys.
Household to include	463	All the households to be visited

Table 2: Parameters for sample size calculation - mortality, SMART - Balkh, August 2015

Parameters	Value	Assumptions based on context
Estimated dead/10000/day	0.5	No updated death rate at population level; recommended in cases where there is no specific mortality data for the area to be surveyed.
Desired precision	0.3	In order to meet set mortality objectives
Design effect	1.5	This is to cater for heterogeneity in the province population being sampled
Recall period	110	Celebration of Islamic revolution in Afghanistan (28th April 2015) is considered to be the most memorable event/day. (surveys starts on 16th August and end on 23rd August)
Average HH size	7.8	National vulnerability assessment of Afghanistan -2014 and National Nutrition Survey 2013.
% non-Response rate	6	Past experience from assessments in Afghanistan due to cultural challenges. Anticipated community mobilization is expected to create further awareness.
Population to be included	3168	Total population to be included
Households to be Included	432	Total number of households to be surveyed

Based on the parameters above, the anthropometric sample will be used as the overall sample size as it is the highest and therefore qualifies to represent the other indicators. Therefore with the selection of the highest sample size (463 HHs), the other indicators will have representation within the larger sample size selected.

Sampling procedure

This involves two stages: Clusters selection and Household selection.

Selecting clusters

A two stage sampling methodology was employed. In the first stage is the cluster selection. Clusters were sampled using probability proportional to population size (PPS).

It is estimated that one team could cover 13 households per day. By targeting 13 households per cluster per day, a total number of 36 clusters are expected to be reaching over the duration of this survey (463 HHs/13HHs/day=35.6 clusters).This could theoretically allow reaching the minimum sample of 463 of children 6-59 months old required for the anthropometric sample.

Out of 287 villages, 36 villages, corresponding to 36 clusters were included in the survey. Reserve Clusters (RCs) were selected automatically by ENA software. Reserve clusters were supposed to only been used if 10% or more clusters were impossible to reach during the field data collection. Cluster selection might be seen in Annex 7.

Selecting households

Simple random sampling method was used where an up-to-date list of the households in each village was created to select the households at random, with enough information to allow them to be located. All households was enumerated and given numbers by the survey team. The 13 households were chosen randomly from these enumerated households, by randomly drawing from a hat or using a random number table. In each selected village, one or more community member(s) was asked to help the survey teams to conduct their work by providing information about the village with regard to the geographical organization or the number of households.

In cases where it was difficult to obtain an updated list of Households systematic random sampling was used to identify the households to be surveyed. The teams were trained on both methods of sampling (simple and systematic random sampling) and they were also offered with materials to assist in determining the households during the data collection exercise.

In cases where there are large villages in a cluster, the village was divided into smaller segments and a segment was selected randomly to represent the cluster. This division was done based on existing administrative units e.g. neighborhoods, or streets or natural landmarks like river, road, or public places like market, schools, and mosques.

All of the selected HH was included in the mortality survey as well as were responding to questions concerning the HH as a whole (ex. water storage).

Case definitions and inclusion criteria

The household was the basic sampling unit. Here, a household was defined as all people eating from the same pot and living together (WFP definition). In Afghanistan, the term household is often defined and/or used synonymous with a compound – which potentially represents more than one household as defined here. In this case, a two-step process was ensured with the village leaders/community elders supporting in identification of compounds and then identifying compound

together with the use of the list of households within the community, asking if there are multiple cooking areas to determine what members of the household/compound should be included in the study.

Although only children from 6-59 months will be included in the anthropometric analysis, all the children under 5 (0-59 months) living in the selected house will be included for anthropometric measurement. This measure will mitigate the risk of missing borderline children (around the age of 6 months), as the studied population is supposed to be extremely stunted. The 0-23 months for IYCF will be included, without regard to their height. If more than one eligible child are found in a household, both will be included, even if there are twins. Eligible orphans living in the selected Households will also be surveyed.

Any empty households, or households with missing or absent children were revisited at the end of the sampling day in each cluster; any missing or absent children that were not be subsequently found was not included in the survey. A cluster control form was used to record all these missed and absent households.

Anthropometric Indicators

Different parameters are used to assess the nutritional status of an individual. Weight, height, Mid-Upper Arm Circumference and bilateral oedema are the most commonly used. These are often linked to sex and age. For each selected child, the following information was collected through child questionnaire (Annex 4):

Age (in months): Only children between 0 and 59 months old of age were included. Height was not considered as a valid criterion in absence of age due to the high stunting rates in Balkh province. Age was confirmed by showing a vaccination card or a birth certificate, if available. If these documents were not available, the use of a local event calendar built for Balkh province was used to determine the age. The age was recorded into the questionnaire in months.

Sex: Male or female

Weight (in kg): Children were weighed to the nearest 0.1kg by using an Electronic Uni-scale. The children who can easily stand was asked to stand on the weighing scale and their weight recorded. In a situation when the children could not stand up, the double weighing method was applied.

Height (in cm): Measuring board was used to measure bare headed and barefoot children. The precision of the measurement is 1 mm. Children of less than 2 years of age was measured lying down and those equal to or above 2 years of age measured standing up.

Mid-Upper Arm Circumference (in mm): MUAC was used as an indicator of mortality risk for malnutrition and was measured to the nearest 1mm for all children with an indicated age of greater than 6 months, using the UNICEF MUAC strips. An adult MUAC tape was used to measure women of reproductive age (15-49 years)

Oedema: Only children with bilateral pitting nutrition oedema was recorded as having nutritional oedema This was checked by applying normal thumb pressure for at least 3 seconds to both feet.

Acute malnutrition

Acute malnutrition in children 0-59 months could be expressed by using 2 indicators: Weight-for-Height (WHZ) or Mid Upper Arm Circumference (MUAC). The presence of bilateral pitting oedema classifies the clinical form of kwashiorkor as severe acute malnutrition. The acute malnutrition in Afghanistan is defined as described below.

Table 3: Definition of acute malnutrition in Afghanistan (according to WHO standards)

Severe Acute Malnutrition (SAM)
W/H <-3 z-score and /or bilateral oedema and/or MUAC < 115 mm
Moderate Acute Malnutrition (MAM)
W/H <-2 z-score and >= -3 z-score and absence of bilateral oedema and/or MUAC >= 115mm and <125mm
Global Acute Malnutrition (GAM)
W/H <-2 z-score and /or bilateral oedema and MUAC < 125 mm

Weight-for-Height Z-score (WHZ): A child's nutritional status is estimated by comparing it to the weight-for-height curves of a reference population (WHO standards data[11]). These curves have a normal shape and are characterized by the median weight (value separating the population into two groups of the same size) and its standard deviation (SD).

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

[11] WHO: World Health Organization, WHO growth curves for children, 2006

weight from the mean weight of the reference population: WHZ = (OW - MW) / SD.

During the field data collection, the weight-for-height index in Z-score was calculated on the field for each child in order to refer malnourished cases to appropriate centre if needed. Moreover, the results were presented in Z-score using WHO reference in the final report.

Mid Upper Arm Circumference (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 4: Cut offs points of MUAC, children 6-59 months, WHO Recommendations

Target group	MUAC (mm)	Nutritional status
Children 6-59 months	> or = 125 and < 135	No malnutrition
	< 125 and > or = 115	Moderate acute malnutrition
	< 115	Severe acute malnutrition

Nutritional bilateral pitting 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.

Chronic malnutrition

The height-for-age index: The height-for-age measure indicates if a child of a given age is stunted and so if he is considered as chronically malnourished. This index reflects the nutritional history of a child. The same principle is used as for WHZ index except that a child's chronic nutritional status is estimated by comparing its height with WHO standards height-for-age curves, as opposed to weight-for-height curves. The height-for-age index of a child from the studied population is expressed in Z-score (HAZ). The HAZ cut-off points are presented in table 7.

Table 5: Cut-off points of the Height for Age index (HAZ) expressed in Z-score, WHO standards

Not stunted	≥ -2 z-score
Moderate stunting	-3 z-score ≤ H/A < -2 z-score
Severe stunting	< -3 z-score

Underweight

The weight-for-age index: Underweight indicates the weight of the child compared to his age. It is expressed by the Weight-for-Age index and in Z-scores of WHO Standards (2006). The table below show underweight classes with their cut-off points.

Table 6: Cut-off point of the Height for Age index (HAZ) expressed in Z-score, WHO standards

Normal	≥ -2 z-score
Moderate underweight	-3 z-score ≤ W/A < -2 z-score
Severe underweight	< -3 z-score

Mortality Indicators calculation

The mortality indicators included all household members. All members of the household were counted, using the household definition.

Crude death rate (CDR): Number of persons in the total population that dies over a defined period of time.

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

Under-5 death rate (U5DR): The probability for those children aged 0-5 years to die during a specific time interval. Calculated as:

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

Additional Indicators – Health & WASH

Beside anthropometric data, additional information was collected as follows:

Immunization status, deworming and vitamin A supplementation: Mothers/caretakers of all children were asked if children received all measles vaccination, which was subsequently be verified by reviewing the vaccination card, if available. If the vaccination card was not available, then recall of the caregiver option was considered. The deworming and the Vitamin A supplementation of children were also recorded using samples.

Morbidity: Mothers/caretakers of children were asked if children had experienced an illness in the past 2 weeks. Acute respiratory infection, fever and diarrhoea were recorded when symptoms according to the case definition are described by the caretaker.

Mother's nutritional status and Iron/Folate supplementation for pregnant: Women in childbearing age were assessed for their nutritional status based on MUAC using the cut-off of 230 mm (caregivers' questionnaire in Annex 3). All mothers of selected children under 5 were asked whether they had Iron/folate supplementation during their pregnancy using samples.

Mother's health seeking behaviour: Distance to the nearest health facility (in min) and use of antenatal care.

Hand washing practices: The mothers were asked on what occasions they wash their hands and also what they use to wash their hands to determine the hand washing practices in the surveyed area (Annex 5 with methodology employed).

Household data: WASH and main occupation of the household head (Household questionnaire Annex 2).

Infant and Young Child Feeding Practices Indicators (IYCF)

The IYCF indicators used in the measurement of infant and young child feeding practices asked to the mothers/caretakers of children aged 0-23 months are described as follows (Annex 4).

Child ever breastfed: Proportion of children who have ever received breast milk.

Timely initiation of breastfeeding: Proportion of children born in the last 23 months who were put to the breast within one hour of birth.

Provision of colostrum in the first 3 days of life: Proportion of children who received colostrum (yellowish liquid) within the first 3 days after birth.

Exclusive breastfeeding under 6 months: Proportion of infants 0-5 months of age who are fed exclusively with breast milk.

Continued breastfeeding at 1 year: Proportion of children 12 – 15 months of age who are fed with breast milk.

Individual Dietary Diversity Score: Proportion of 6-23 months children consumed minimum 4 food groups the last 24 hours.

Introduction of solid, semi-solid or soft foods: Proportion of infants 6-8 months of age who receive solid, semi-solid or soft foods.

Continued breastfeeding at 2 years: Proportion of children 20–23 months of age who are fed breast milk.

Training and supervision

An intensive 7 days training for the survey team covering all aspects of the survey (Trainings Schedule available in Annex 6). A standardization test was conducted over the course of 1 day, measuring 10 children, in order to evaluate the accuracy and the precision of the team members in taking the anthropometrics measurements. A one-day field test was conducted by the teams in order to evaluate their work in real field conditions. Feedback was provided to the team in regard to the results of the field test; particularly in relation to digit preferences and data collection. A review on the anthropometric measurement and on the filling of the questionnaires and the household's selection was organized on the last day of the training to ensure overall comprehension before going to the field.

One field guidelines document with instructions and household definition and selection document will be provided to each team member. All documents, such as local event calendar, questionnaires, and consent forms were translated in local language, for better understanding. The questionnaires was back translated using a different translators and was pre-tested during the field test. Any adjustments were done as necessary.

Six teams of three members conducted the field data collection. Each team had at least one female data collector to ensure acceptance of the team amongst the surveyed households; particularly for IYCF questionnaires. Each female member of the survey team was accompanied with a mahram[12] to facilitate the work of the female data collectors at the community level. The teams were supervised by ACF and BDN nutrition program manager/nutrition focal points.

Table 7: Team composition and organization, SMART – Balkh, August 2015

Position	Number	Comment
Supervisors	8	2 from regular ACF staff in Mazar,1 from BDN and 4 temporary staff
Team leaders	6	All temporary staff
Enumerators	14	All temporary staff
Data entry	2	All temporary staff
Translator	1	Temporary staff

Throughout the field work, rigorous quality control measures were adopted. Anthropometric equipment (scales, height boards and MUAC tapes) were calibrated and checked before distributing

[12] Women are not allowed to go outside without being accompanied by one male relative called locally a 'mahram'.

them to the different teams and the calibration & accuracy verification was repeated every day before starting the field work.

Every day, filled forms were reviewed on site by team leaders and checked by field supervisors including for data accuracy and completeness. For each case of severe acute malnutrition (SAM) and moderate acute malnutrition (MAM), a referral form was filled with the child's details and the team leader explained and advised the parent/caregiver to take the child to a designated health center for further nutrition support and guidance.

Team leaders were checking the forms before leaving the household; identify errors and making sure data collected is correct before signing off. At the end of each day and/or before leaving the cluster, the teams were checking all the forms for any identifiable errors and made sure data collected is correct. The coordinator (Survey Coordinator) with the support of supervisors' was verifying all the questionnaires filled by the team in each cluster on the same day. The anthropometric data entered in ENA software was organized and checked for any suspect data (outliers) every night through the appropriate sections of the plausibility report[13]. The SMART PM was reviewing the anthropometric data quality report and giving feedback to the supervisors and teams the next day, during the daily early morning meeting (planning of the day).

Plausibility reports and feed-back of the Survey Manager determined whether the team needs to go back to the previous day's cluster to rectify the errors identified, before embarking on another cluster. In case of incorrect anthropometric measurements or "flagged" results which demand the return to the previous day's cluster, the field supervisor accompanied the team back to the cluster to take fresh measurement of the child.

Data Analysis

All data were checked for completeness, consistency and ranged before by the SMART Survey focal person. This check was used to provide feedback to the teams to improve data collection as the assessment progresses. All data files were cleaned before analysis. A data cleaning process was conducted whereby data capture and errors were verified and corrected.

[13] Plausibility check is an important data quality verification property of the ENA software

Anthropometric analysis was performed using ENA for SMART; The SMART Plausibility Report was generated in order to check the quality of the anthropometric data and a summary of the key quality criteria. Other collected data were analysed using Microsoft excel and EPIINFO 7 software's. Cross tabulations were done and the results will be presented in a tabular format in terms of gender and age groups. Correlation analysis and chi-square tests were also performed.

Timeline

Table 8: Proposed timeline; SMART – Balkh, August 2015

Task	Start	Duration	End
Training of Survey team	9-Aug	6	15-Aug
Data collection	16-Aug	8	24-Aug
Preliminary Report	25-Aug	5	29-Aug
Final Report	29-Aug	13	10-Sep

RESULTS

This section summarizes the findings of the survey on nutrition, health, mortality, IYCF and households indicators. One cluster was not surveyed due to security constraints. Despite this, the samples for the anthropometry and the mortality have been sufficient to get reliable and representative results. This was due to the very conservative hypothesis from the planning stage, where the percentage of non-responding household was doubled and the percentage of children under-5 was taken from the lowest existing reference.

Description of the sample

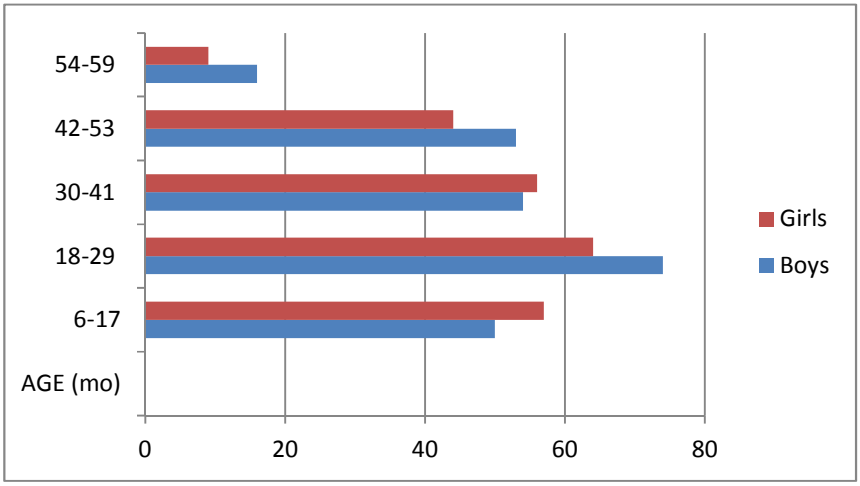
A total of 526 children aged 0-59 months, from 421 sampled households were assessed for their nutritional and health status. Out of them, 477 were from 6-59 mounts and 49 were infants having 0 to 5,99 months of age. The ratio of boys to girls in the survey and age ratio of the sampled children was considered to be excellent (p value = p=0.436) and acceptable (p value = p=0.018) respectively. Therefore the anthropometric sample was representative for the surveyed population.

Table 9: Distribution of age and sex of sample, SMART - Balkh, August 2015

	Boys		Girls		Total		Ratio
AGE (mo)	no.	%	no.	%	no.	%	Boy:girl
6-17	50	46,7	57	53,3	107	22,4	0,9
18-29	74	53,6	64	46,4	138	28,9	1,2
30-41	54	49,1	56	50,9	110	23,1	1,0
42-53	53	54,6	44	45,4	97	20,3	1,2
54-59	16	64,0	9	36,0	25	5,2	1,8
Total	**247**	**51,8**	**230**	**48,2**	**477**	**100,0**	**1,1**

Boys and girls from 6-17 age group were underrepresented (Figure 2 below).

Figure 2: Population age and sex pyramid, SMART - Balkh, August 2015



A total of 3788 individuals and 545 children under-5 from the 421 households were included in the calculation of crude and under-5 mortality rates. A short summary of some useful demographics that were withdrawn from the mortality sample are presented in the table below.

Table 10: Short summary of demographics, SMART - Balkh, August 2015

Indicator	Value
Average HH size	9 members
Children under 5	14,4%
Most frequent HH size	8 members
Minimum HH Size	2 members
Maximum HH Size	35 members

Anthropometric results (children 6-59)

Quality of the data

The anthropometric data were analyzed using ENA for SMART Software (version 2011, 21st April 2015 updated). Exclusion of z-scores is computed from the Observed mean (SMART flags): WHZ -3 to 3; HAZ -3 to 3; WAZ -3 to 3.

Table 11 summarizes overall mean Z-Score and Standard Deviation, Design effect and out of range z-scores per anthropometric index. The overall quality of the survey as evaluated by the ENA software is reported as excellent, with plausibility score of 7% (excellent). A detailed data quality analysis is presented in Annex 8 (automatically generated plausibility check on anthropometric results).

Table 11: Mean z-scores, Design Effects and excluded subjects, SMART - Balkh, August 2015

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	467	-0,50±0,99	2,09	1	9
Weight-for-Age	468	-1,03±1,08	1,21	1	8
Height-for-Age	446	-1,29±1,30	1,00	1	30

* contains for WHZ and WAZ the children with oedema.

Acute Malnutrition defined by Weight-for-Height index (WHO 2006)

The sex and age disaggregated results are presented in Table 11 and 12 respectively. There was slight difference in WHZ point estimates boys and girls, but this difference was not significant (p-value=0,6314). Both genders were equally affected. There were no edematous cases (Table 12).

Table 12: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex SMART - Balkh, August 2015

	All n = 467	Boys n = 242	Girls n = 225
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(31) 6,6 % (4,0 - 10,9 95% C.I.)	(17) 7,0 % (3,8 - 12,5 95% C.I.)	(14) 6,2 % (3,5 - 10,9 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(27) 5,8 % (3,4 - 9,6 95% C.I.)	(15) 6,2 % (3,3 - 11,3 95% C.I.)	(12) 5,3 % (2,8 - 9,9 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(4) 0,9 % (0,3 - 2,2 95% C.I.)	(2) 0,8 % (0,2 - 3,3 95% C.I.)	(2) 0,9 % (0,2 - 3,5 95% C.I.)

[14] Significance level α of 5% was used (p>0,05)

The prevalence of oedema is 0.0 % as seen from automatically generated **Table 13** below.

Table 13: Distribution of acute malnutrition and oedema based on weight-for-height z-scores SMART - Balkh, August 2015

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0,0 %)	Kwashiorkor No. 0 (0,0 %)
Oedema absent	Marasmic No. 7 (1,5 %)	Not severely malnourished No. 468 (98,5 %)

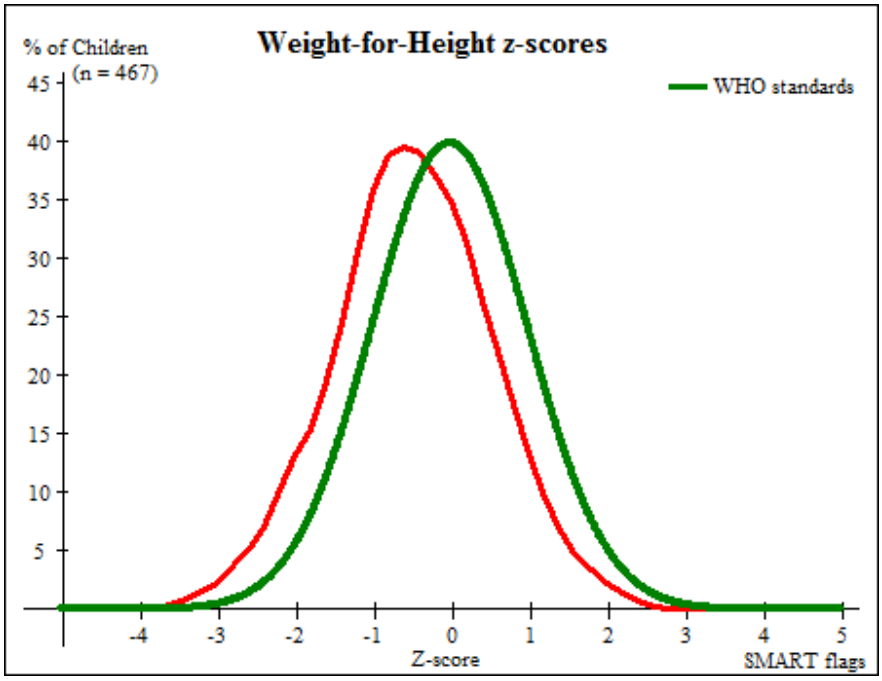
The younger age group (6-29) was more likely to have WHZ<-2 compared to older age group (30-59), p-value = 0.0005 (**Table 14**).

Table 14: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema, SMART - Balkh, August 2015

		Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	105	2	1,9	10	9,5	93	88,6	0	0,0
18-29	134	0	0,0	10	7,5	124	92,5	0	0,0
30-41	107	2	1,9	5	4,7	100	93,5	0	0,0
42-53	96	0	0,0	1	1,0	95	99,0	0	0,0
54-59	25	0	0,0	1	4,0	24	96,0	0	0,0
Total	**467**	**4**	**0,9**	**27**	**5,8**	**436**	**93,4**	**0**	**0,0**

Overall, the normal (Gaussian) distribution curve of the observed population (with SMART flags excluded) was equally distributed and slightly shifted to the left from the reference WHO 2006 WHZ curve (Figure 3 below). The mean ±SD of WHZ (n=467) was negative and the SD was within the accepted limits of 1,2: -0,50±0,99. This confirms that there were more malnourished children in the surveyed districts of Balkh when compared with the reference population.

Figure 3: Distribution curve for WHZ (WHO 2006), SMART - Balkh, August 2015



The Test of comparison with the Poisson distribution curve have shown an index of Dispersion of the sample for WHZ < -2 of 1,98 (p=0,001) which indicate that WHZ case were not distributed evenly and malnourished cases are aggregated in several clusters. Pockets of malnutrition are likely to be the case.

Acute Malnutrition defined by Weight-for-Height index (WHO 2006)

As shown in **Table 15**, the prevalence of global acute malnutrition, based on MUAC (<125mm), and/or oedema was slightly below WHZ based prevalence (presented in the section above).

Table 15: Prevalence of acute malnutrition based on MUAC cut off's (and/or oedema) and by sex, SMART - Balkh, August 2015

	All n = 475	Boys n = 246	Girls n = 229
Prevalence of global malnutrition (< 125 mm and/or oedema)	(24) 5,1 % (2,9 - 8,8 95% C.I.)	(7) 2,8 % (1,1 - 7,5 95% C.I.)	(17) 7,4 % (4,2 - 12,9 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(17) 3,6 % (1,9 - 6,6 95% C.I.)	(4) 1,6 % (0,5 - 5,2 95% C.I.)	(13) 5,7 % (3,0 - 10,4 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(7) 1,5 % (0,7 - 2,9 95% C.I.)	(3) 1,2 % (0,4 - 3,8 95% C.I.)	(4) 1,7 % (0,7 - 4,5 95% C.I.)

There was difference between boys and girls if the point estimate is looked at. Girls have been found to have lower MUAC than boys. However, this correlation was quite weak (p-value=0.022) and might be due to the lower overall occurrence of low MUAC in the sample.

Table 16 shows the distribution of acute malnutrition based on MUAC by age group. The younger children (6-29 months) were more affected than older children (30-59 months). The difference was highly significant (p-value=0.0002).

Table 16: Prevalence of acute malnutrition by age, based on MUAC cut off's and/or oedema, SMART - Balkh, August 2015

		Severe wasting (< 115 mm)		Moderate wasting (>= 115 mm and < 125 mm)		Normal (> = 125 mm)		Oedema	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	105	3	2,9	12	11,4	90	85,7	0	0,0
18-29	138	3	2,2	3	2,2	132	95,7	0	0,0
30-41	110	1	0,9	2	1,8	107	97,3	0	0,0
42-53	97	0	0,0	0	0,0	97	100,0	0	0,0
54-59	25	0	0,0	0	0,0	25	100,0	0	0,0
Total	**475**	**7**	**1,5**	**17**	**3,6**	**451**	**94,9**	**0**	**0,0**

Stunting (WHO 2006)

The chronic malnutrition or stunting is defined by Height-for-age Z-scores (HAZ) <-2. The sex and age disaggregated results are represented in **Table 17 and 18**. Both genders were equally affected.

Table 17: Prevalence of stunting based on height-for-age z-scores and by sex, SMART - Balkh, August 2015

	All n = 446	Boys n = 231	Girls n = 215
Prevalence of stunting (<-2 z-score)	(131) 29,4 % (25,3 - 33,8 95% C.I.)	(68) 29,4 % (23,7 - 35,9 95% C.I.)	(63) 29,3 % (24,5 - 34,6 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(86) 19,3 % (15,8 - 23,3 95% C.I.)	(47) 20,3 % (15,8 - 25,8 95% C.I.)	(39) 18,1 % (13,5 - 23,9 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(45) 10,1 % (7,4 - 13,6 95% C.I.)	(21) 9,1 % (6,0 - 13,6 95% C.I.)	(24) 11,2 % (7,5 - 16,4 95% C.I.)

Figure 4 shows the distribution of HAZ of the observed population (SMART flags excluded) compared to WHO Reference curve. In Balkh, it was strongly shifted to the left, suggesting restricted linear growth of the observed population.

Figure 4: Distribution curve for HAZ (WHO 2006), SMART - Balkh, August 2015

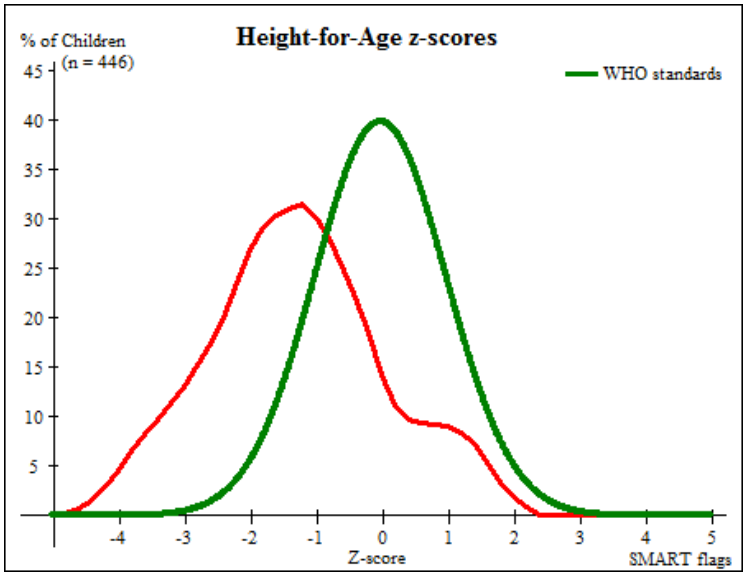


Table 18: Prevalence of stunting by age based on height-for-age z-scores, SMART - Balkh, August 2015

		Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	100	10	10,0	13	13,0	77	77,0
18-29	127	18	14,2	32	25,2	77	60,6
30-41	101	11	10,9	21	20,8	69	68,3
42-53	94	6	6,4	18	19,1	70	74,5
54-59	24	0	0,0	2	8,3	22	91,7
Total	**446**	**45**	**10,1**	**86**	**19,3**	**315**	**70,6**

The 18-29 age group appears of being the most affected by stunting (**Table 18** and **Figure 5**). The overall trend observed was HAZ decreasing with the age (Figure 6).

Figure 5: Height-for-age <-2 Z-scores by age group, SMART - Balkh, August 2015

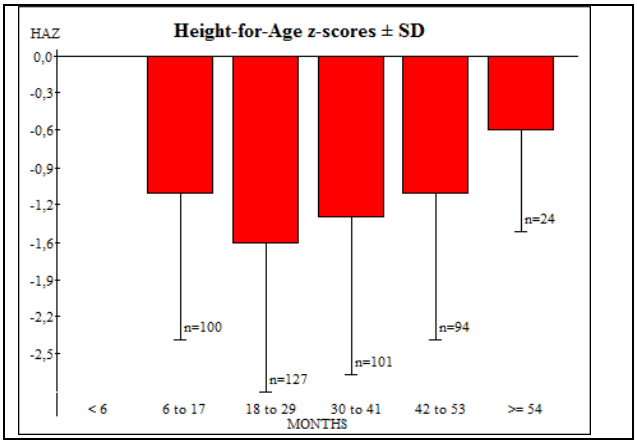
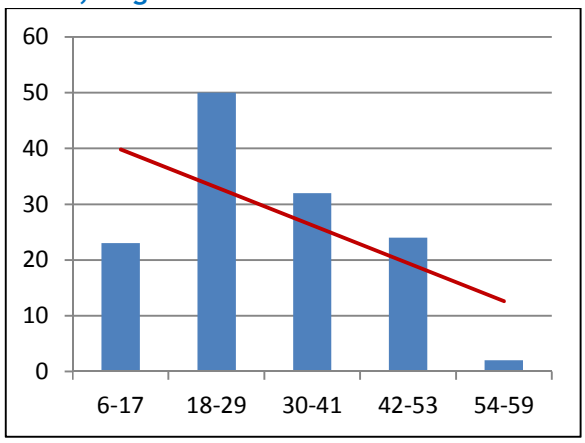


Figure 6: Linear trend of Height-for-age <-2 Z-scores by age group (n=131), SMART - Balkh, August 2015



Underweight (WHO 2006)

The underweight is defined by weight-for-age z-scores (WAZ). The sex and age disaggregated results are represented in **Table 19 and 20**. The usual accumulation of underweight cases in younger age group was observed.

Table 19: Prevalence of underweight based on weight-for-age z-scores by sex, SMART - Balkh, August 2015

	All n = 468	Boys n = 242	Girls n = 226
Prevalence of underweight (<-2 z-score)	(89) 19,0 % (15,3 - 23,4 95% C.I.)	(43) 17,8 % (13,7 - 22,8 95% C.I.)	(46) 20,4 % (14,7 - 27,4 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(74) 15,8 % (12,7 - 19,6 95% C.I.)	(36) 14,9 % (11,0 - 19,8 95% C.I.)	(38) 16,8 % (12,1 - 23,0 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(15) 3,2 % (1,8 - 5,7 95% C.I.)	(7) 2,9 % (1,3 - 6,2 95% C.I.)	(8) 3,5 % (1,7 - 7,2 95% C.I.)

Table 20: Prevalence of underweight based on weight-for-age z-scores by age, SMART - Balkh, August 2015

		Severe underweight (<-3 z-score)		Moderate underweight (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (mo)	Total no.	No.	%	No.	%	No.	%	No.	%
6-17	104	4	3,8	21	20,2	79	76,0	0	0,0
18-29	134	6	4,5	25	18,7	103	76,9	0	0,0
30-41	108	4	3,7	19	17,6	85	78,7	0	0,0
42-53	97	1	1,0	7	7,2	89	91,8	0	0,0
54-59	25	0	0,0	2	8,0	23	92,0	0	0,0
Total	**468**	**15**	**3,2**	**74**	**15,8**	**379**	**81,0**	**0**	**0,0**

Overweight (WHO 2006)

The prevalence of overweight is based on weight-for-height in z-score >2 (no oedema) and found to remain low.

Table 21: Prevalence of overweight based on weight-for-age z-scores by sex, SMART - Balkh, August 2015

	All n = 467	Boys n = 242	Girls n = 225
Prevalence of overweight (WHZ > 2)	(3) 0,6 % (0,2 - 2,0 95% C.I.)	(1) 0,4 % (0,1 - 3,1 95% C.I.)	(2) 0,9 % (0,2 - 3,7 95% C.I.)
Prevalence of severe overweight (WHZ > 3)	(0) 0,0 % (0,0 - 0,0 95% C.I.)	(0) 0,0 % (0,0 - 0,0 95% C.I.)	(0) 0,0 % (0,0 - 0,0 95% C.I.)

Crude and Under-5 Mortality rates

The Crude and Under-5 mortality rates were below the emergency thresholds for the region[15] (**Table 22**).

Table 22: Mortality rates, SMART - Balkh, August 2015

	Definition	Rate (CI 95%)
CMR	total deaths/10,000 people / day	0.12 (0.05-0.29)
U5MR	deaths in children under five/10,000 children under five/day	1.07 (0.43-2.63)

[15] WHO's emergency thresholds of CMR 2/10,000/day and U5MR 4/10,000/day respectively.

Additional health information

Several key health indicators have been collected: 2-week recall morbidity, immunization, vitamin A supplementation and deworming.

Retrospective morbidity data was collected among 526 children 0-59 months (two-week recall) to assess the occurrence of main diseases. Based on the data, overall **54.2% (49.8-58.5%)** of the children had episodes of illness in the past 2 weeks prior to the survey. Among them, 62.1% had Fever, 56.5% had diarrhea (watery & bloody), 40.0% had ARI and 10.2% had other diseases such as skin rushes, vomiting (**Table 23**).

Table 23: Under 5 Morbidity (2 weeks Caregivers' Recall period), SMART - Balkh, August 2015

Parameters (n*=285)	N*	% (95% CI)
Fever	177	62.1% (56.2-67.8)
Diarrhea	161	56.5% (50.5-62.3)
ARI	114	40.0% (34.3-45.9)
Others	29	10.2% (6.9-14.3)

*Note: n = number of positive answers overall, N=proportion of positive answers by illness.

Based on the results, around 83.5% (433) of the children reported to have received vitamin A supplementation in the past 6 months.

Table 24: Vitamin A Supplementation, children 0-59 months (n=477), SMART - Balkh, August 2015

Vitamin A	Frequency	Percentage	[95% CI]	
Yes	401	84,1%	80,8%	87,4%
No	69	14,5%	11,3%	17,6%
Do not know	7	1,5%	0,4%	2,6%

The coverage for deworming was analyzed among children aged 12-59 months. About 30.5% (126) of the children reported to have received deworming tablets in the last 6 months prior to the survey.

Table 25: Deworming, children 12-59 months (n=413), SMART - Balkh, August 2015

Deworming	Frequency	Percentage	[95% CI]	
Yes	126	30,5%	26,0%	35,0%
No	274	66,3%	61,8%	70,9%
Do not Know	13	3,1%	1,5%	4,8%

Furthermore, 91.1% of children aged 9-59 months, were vaccinated against measles. Among them, about a third of the cases were verified by their immunization cards while the remaining cases were through recalls (see Table 26 below).

Table 26: Measles Vaccination, children 9-59 months (n=414), SMART - Balkh, August 2015

Measles Vaccination	Frequency	Percentages
Yes, card	148	35,7%
Yes, recall	229	55,3%
No	31	7,5%
Do not know	6	1,4%
Yes, Card and recall	377	91,1%

Maternal health and nutrition

All mothers of selected children were invited to respond to a caregiver questionnaire (Annex 3) containing following indicators:

- Maternal physiological status
- Time taken to reach nearest health facility (minutes)
- Attendance to ANC
- Iron folate supplementation during pregnancy
- Mid-Upper Arm Circumference
- Handwashing practices/behaviors

Results are presented in the tables below.

73,9% of the mothers declaredd to be either pregnant, either lactating or both (Table 27 below). This might be due to the practice of continuous breasfeeding: 96,6% of the mothers declared to breastfeed upto the first year of the child and 43,8% upto the second year (See IYCF results in Table 33).

Table 27: Mother's physiological status (n=330), SMART - Balkh, August 2015

	Frequency	Percent	Cum. Percent
Pregnant	50	15,15%	15,15%
Lactating	184	55,76%	70,91%
Pregnant and lactating	10	3,03%	73,94%
None of the above	86	26,06%	100,00%

Table 28: Time nearest health facility, (n=303), SMART - Balkh, August 2015

Time (minutes)	Frequency	Percent	Cum. Percent
0-9	8	2,6%	2,6%
10-19	56	18,5%	21,1%
20-29	87	28,7%	49,8%
30-39	80	26,4%	76,2%
40-49	20	6,6%	82,8%
50-59	21	6,9%	89,8%
60 and Above	31	10,2%	100,0%

Table 29: Antenatal care during last pregnancy (n=330), SMART - Balkh, August 2015

Did you see anyone for antenatal care during last pregnancy	Frequency	Percent
Yes	310	93,9%
No	20	6,1%

Table 30: Iron/Folate supplementation during last pregnancy, (n=320), SMART - Balkh, August 2015

Iron/folate	Frequency	%
Yes	162	50,6%
No	157	49,1%
Do not know	1	0,3%

Maternal nutritional status was assessed only based on MUAC cut-off point of 230 mm. Here below the results with 95%CI.

Table 31: Maternal nutritional status based on MUAC (n=296), SMART - Balkh, August 2015

MUAC cut offs	Frequency	%	95% CI	
MUAC <230 mm	39,00	13,2%	9,3%	17,0%
MUAC >229 mm	257,00	86,8%	86,8%	86,8%

Table 32: Care takers hand washing (n=330), SMART - Balkh, August 2015

Hand washing	Definition	Frequency	%
Insufficient	Below 8 positive answers	224	67,9%
Appropriate	8 and above positive answers	106	32,1%

IYCF (children 0-23)

The sample for Infant and Young Child Feeding (IYCF) practices included all children 0 – 23 months, representing a total of 223 children. The results are presented as percentage of the total answers

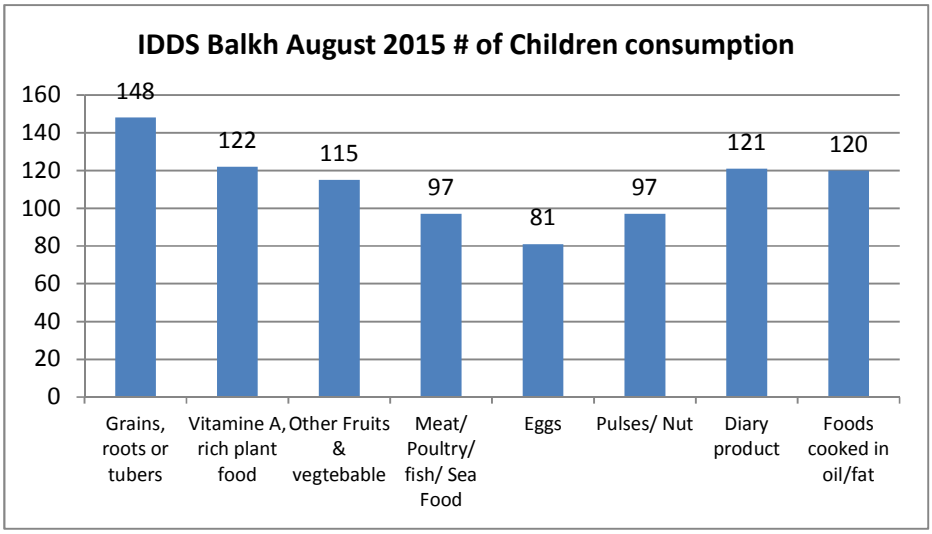
available, and as such will not be presented with confidence interval (**See Table 33**). The indicators have been calculated following WHO/UNICEF "Indicators for assessing infant and young child feeding practices", Part 2.

Table 33: Summary for Infant and Young Child Feeding (IYCF) Practices Core Indicators, SMART - Balkh, August 2015

Core Indicators	Definition	N	%
Child ever breastfed (n=223)	Proportion of children who have ever received breast milk.	223	100,0%
Early initiation of breastfeeding (n=223)	Proportion of children born in the last 23 months who were put to the breast within one hour of birth	190	85,2%
	Proportion of children born in the last 23 months who were put to the breast 1ST day within 24 hours of birth	201	90,1%
Exclusive breastfeeding under 6 months (n=49)	Proportion of infants 0-5.9 months of age who are fed exclusively with breast milk	46	93,9%
Continued breastfeeding at 1 year (n = 29)	Proportion of children 12 – 15.9 months of age who are fed with breast milk	28	96,6%
Introduction of solid, semi-solid or soft foods (n =33)	Proportion of infants 6-8 .9 months of age who receive solid, semi-solid or soft foods	17	45,5
IDDS (223)	Proportion of 6-23 months children who consumed minimum 4 food groups in the last 24 hours.	119	53,4%
Continued breastfeeding at 2 years (n =48)	Proportion of children 20-23 months of age who are fed with breast milk	21	43,8%
Colostrum (223)	Child fed on colostrum 3 days after birth	218	97,8%

The satisfactory IDDS cut-off was more than 4 food groups consumed within the last 24 hours. While 53,4% had more than 4 food groups in their diet, the protein rich foods were less consumed (Figure 7).

Figure 7: Frequency of consumed food groups (24 hours of recall), SMART - Balkh, August 2015



Households

WASH and livelihood information have been collected from selected households:

- Main occupation of Household head
- Use of improved source of drinking water
- Treatment of drinking water at household level
- Access to water per person per day using Sphere cut-off of 15 litters per person per day

The results are displayed in the figures and the tables below.

Figure 8: Occupation of Head of households, (n=421), SMART - Balkh, August 2015

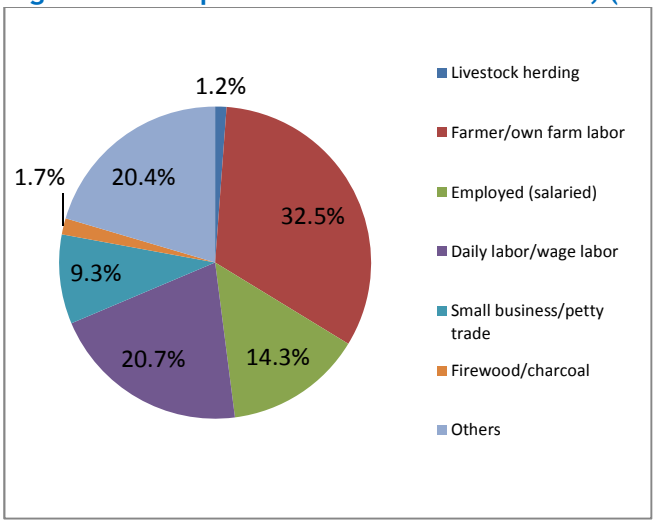


Figure 9: Use of improved source of drinking water (n=321), SMART - Balkh, August 2015

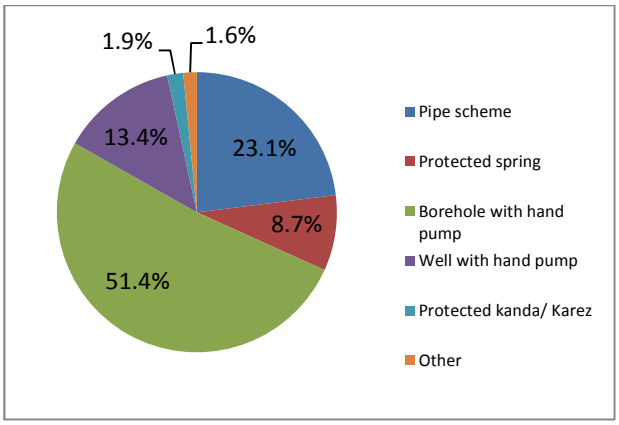
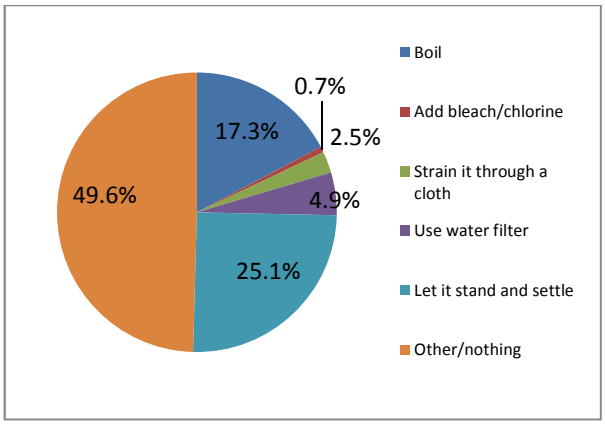


Figure 10: Treatment of drinking water at HH level, (n=421), SMART - Balkh, August 2015



96,9% of the household had latrines. The access to drinking water per person per day was calculated using the water consumption of the household for the last 24 hours divided by the number of household members. 48,3% of the households declared to have consumed less than 15 litters/person/day (Table 34).

Table 34: Access to water, 24 hours recall, (n=420), SMART - Balkh, August 2015

Standard	Frequency	Percentage
< 15 litters/person/day	203	48,3%
>15 litters/person/day	217	51,7%

CONCLUSIONS

Children nutritional status

The GAM rate reported in this survey using both WHZ-score (6,6 % [4,0 - 10,9 95% C.I.]) and MUAC (5,1 % [2,9 - 8,8 95% C.I.]) can be classified as "poor"[16] according to the WHO 2006 threshold. Therefore, it is important to monitor the GAM rates more closely to avoid any risk of further deterioration.

Younger children (6-29 months) were significantly more wasted then older children following both WHZ and MUAC criteria. Low MUAC was significantly more prevalent in girls than in boys. However, this have to be interpreted with caution as it might be due to the lower occurrence of MUAC<125mm in general in the sample. There is very high probability of pocket of malnutrition in the surveyed zones as cases of GAM based on WHZ were not evenly distributed between clusters. It would be good to follow the data collected through other sources such as SAM admission data, sentinel sites, screenings data in the zones so this assumption is confirmed.

Chronic Malnutrition levels can be classified borderline as "serious" with 29,4 % (25,3 - 33,8 95% C.I.) of stunting rate. Despite lower as compared to other zones of Afghanistan, these rates remain worryingly high and contribute to the general low nutritional status and resilience capacity of the studied population.

Boys and girls were equally affected by stunting. The stunting rates were decreasing with the age, which might be due to some selection bias: children from 30-59 were slightly underrepresented. Another version might be catchup growth before age of 2. The quite good IYCF levels found in Balkh (as opposite to what can been seen in other zone of Afghanistan) might contribute for better growth before the age of 2. The lethal exodus might be also an option explain this decreasing stunting but very unlikely (see the mortality rates below).

[16] < 5% Acceptable; 5 – 9 % Poor ; 10 – 14 % Serious; > 15 % Critical

Mortality

The crude mortality rate (0.12 [0.05-0.29]) and under-five mortality rate (1.07 [0.43-2.63]) are both below the emergency and alert levels. Monitoring of the situation is required in order to keep these rates below.

Contributing factors

Health access and child morbidity

Under-5 morbidity (mainly fever, and diarrhea) was considered to be above average and ARI slightly below average, yet, diseases such as diarrhea, ARI are some of the potential triggers for malnutrition, and could increase the rate of malnutrition if not appropriately addressed.

The lower levels of deworming suggest still weaknesses linked with community outreach activities of BPHS. Additional reinforcement of Community based health services, such as Health Posts (CHW) and engagement and working together with Community health supervisors, and health shuras should be envisaged.

The recommended SPHERE standard (2011) for measles vaccination is 95%. About 91.1% of children 9 months and older in Balkh were immunized against measles according to this survey. Although this shows a very good progress against measles outbreaks, it is still slightly below the recommended standard and efforts need to be made to reach far areas of the province to be able to increase the coverage of measles vaccination.

Infant and Young Child Feeding

The IYCF indicators studied using SMART surveys sampling frame and sizes might potentially limit the representativeness of the results. So, they have to be considered for information purposes only. However, compared to other provinces where IYCF study was coupled with SMART, the rates of exclusive breastfeeding for example are quite positive. The same can said for the rest of the core indicators except for “Introduction of solid, semi-solid or soft foods for children from 6-9 months”

which is regularly very low in Afghanistan and show important shortages with the timely complementary feeding. The IDDS score is also quite low and is an indication of low quality of the complementary (and not only) diet given to young children. Worrying is the very low use of protein rich foods, knowing that proteins are the building material for children's growth. Complementary feeding has to be specifically studied and reinforced in Balkh.

Maternal health and nutrition

Many women declared to be pregnant or lactating who might overestimate; the expectancy for some assistance for these women might influence the results. As the proportion of under-5 children in Balkh remain low (14,4%), to have more than 15 of pregnant women is very unlikely.

It appears that health seeking behavior is relatively good, 93,9% of the women declared to have received antenatal care. This might be due to the average good proximity of the health services: 76,2% declared to walk below 40 min to reach the health facility. However, slightly above 50% declared to have received Iron/folate supplementation during their last pregnancy, which might be indication of lower quality of the ANC delivery.

The nutritional status of the mothers was worrying. 13,2% (95%CI 9,3-17,0) had MUAC below 230 mm cut off. Although MUAC is not the best predictor of low maternal nutritional status as the Body Mass Index, it can be in still a good proxy indicator for nutritional status for older women, and a good proxy indicator for early pregnancies and young mothers, as it remain low with well-nourished adolescent mothers. Low MUAC within pregnant is mentioned as a predictor of Low-Birth-Weight babies17.

Caregivers hand washing practices were measured using "Access and Behavioural Outcome Indicators for WASH" (USAID Hygiene Improvement Project). It has shown that 67,9 % of the caregivers do not have appropriate hand washing practices. The barriers for better hygiene practices need to be further studied in order to propose adapted strategy for improving appropriate behaviours. In the meantime, WASH activities have to be reinforced.

---

[17] Use of Cutoffs for Mid-Upper Arm Circumference (MUAC) as an Indicator or Predictor of Nutritional and Health Related Outcomes in Adolescents and Adults: A Systematic Review, FANTA III Project (http://www.fantaproject.org/sites/default/files/resources/MUAC%20Systematic%20Review%20_Nov%2019.pdf).

WASH at household level

The almost majority of the households were disposing with a latrine. 321 out of 421 households declared to use improved sources of water. However, almost 49,6% of the households declared to do nothing to treat the water and 48,3% of the household were consuming below the Sphere standards of 15 litters per person per day. This last data might be interpreted more as indicator of water use than access, as majority of the households were having boreholes with hand pumps at HH level (51,4% of the HH with improved water source).

RECOMMENDATIONS

Some recommendations have been drawn after the context analysis and the results from the survey.

Nutrition status

- Continue strengthening of IMAM services and scaling up the services where possible, in order to have better access to the treatment.
- Strengthening the community screening activities for early detection of active cases.
- A coverage assessment may be needed to find out the possible reasons for the pockets of malnutrition.
- Reinforcing and re-establishing mobile teams at the HF levels to support hard to reach areas with treatment support and also to increase coverage of IMAM services.

Morbidity status

- Strengthen health education by reinforcing health seeking behavior for management of common infections such diarrhea, ARI and fever among children for both at facilities and communities.
- Upscaling hygiene and sanitation education and awareness in in entire Balkh province in order to sensitize the community to link hygiene and sanitation to some common morbidities such as diarrhea and ARI.

Immunization, Deworming and Vitamin A supplementation

- Increase awareness through community mobilization on immunization, specially deworming and Vitamin A supplementation

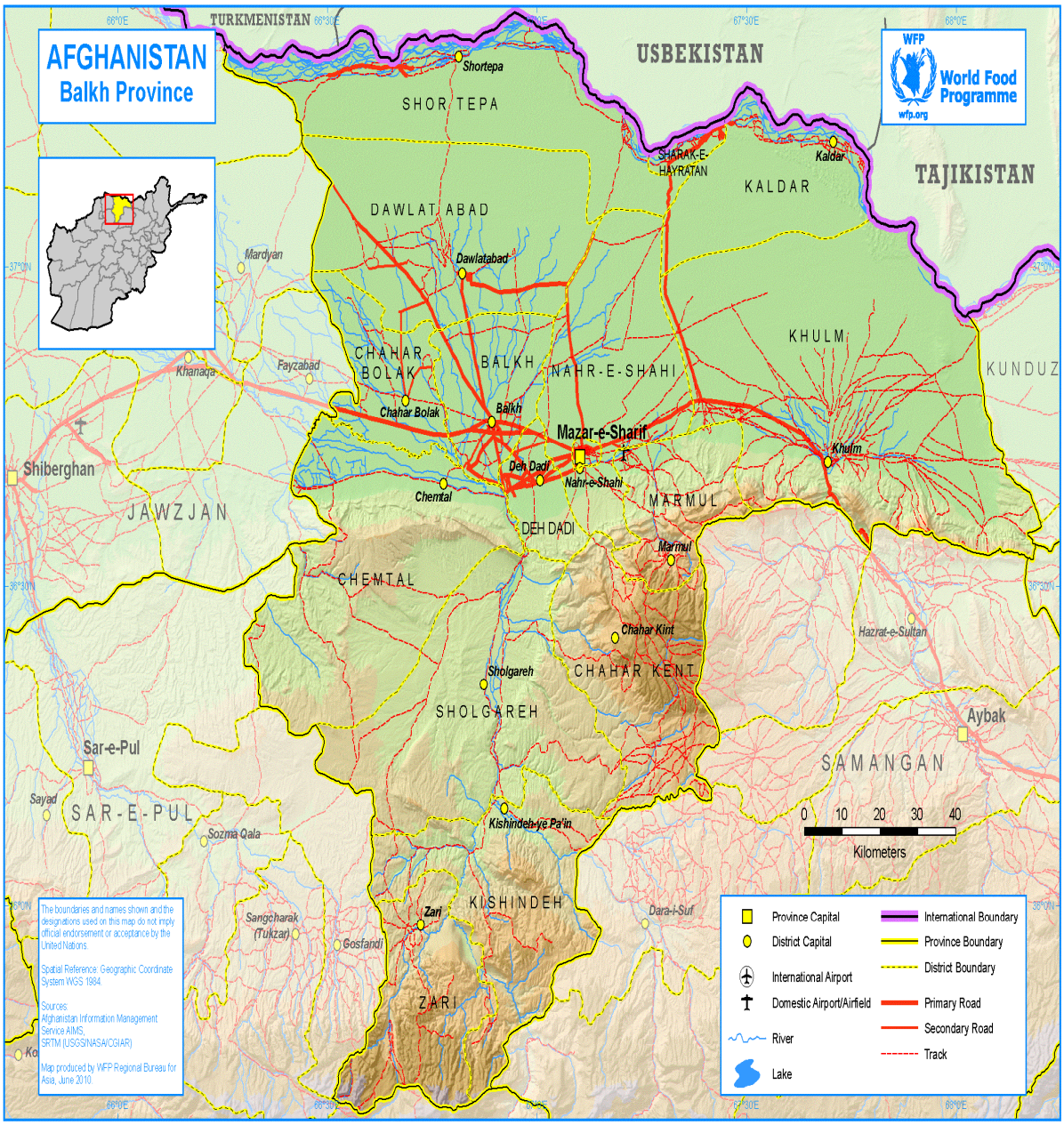
- Strengthening distribution points of vitamin A and deworming supplies together with improved monitoring and evaluation system of immunization activities.

Behavior change

- To make deeper analysis of hampering child and maternal health and nutrition practices (in addition to hand washing, complementary feeding etc.)
- To set proper behavior change strategy involving larger scale of actors from community based health care to facility based care.
- To set protibial multi-sectorial coordination

ANNEXES

Annex 1: Physical map of Balkh Province



Annex 2: Household questionnaire

HOUSE HOLD QUESTIONNAIRE-SMART

SECTION A: IDENTIFICATION
To be filled before the interview, before entering in the household **ID.10** - Date of the survey (day/month/year) …… **ID.20** Name of the village: …… **ID.30** – Cluster number (1 to 36): …… **ID.40** - Team ID number (N° 1 to 6): …… **ID.50** - Household number: (1 to 13)…… **ID.60** - Starting time of the interview: ……

Read the consent form

ID70 -Does the household accept the interview?

1=Yes

2=No

ID.80 – If no, what is the reason? ……

Now, I would like to ask you some questions regarding the household head		
HoH.10	What is the occupation of the household head	1. Livestock herding 2. Farmer /own farm labour 3. Employed (salaried) 4. Daily labour/wage labour 5. Small business/petty trade 6. Firewood/charcoal 96 .Other (specify)……

SECTION B: WATER SANITATION AND HYGIENE (WASH)

All these questions are for domestic use of water and do not include water for animals

UE.10	What is the main source of drinking water for members of your household?	**Improved sources** 1. Pipe scheme 2. Protected spring 3. Borehole with hand pump 4. Well with hand pump 5. Protected kanda/ Karez 96. Other: _____ **Unimproved sources** 1. River/stream/canal

		2. Pond/ Reservoir 3. Well with bucket 4. Unprotected Kanda/ Karez 5. Unprotected spring 97. Other: (please specify) _____
UE.20	What do you usually do to make the water safer to drink? Probe: Anything else? (record all items mentioned)	1. Boil 2. Add bleach/chlorine 3. Strain it through a cloth 4. Use water filter (Ceramic, sand, composite, etc.) 5. Let it stand and settle 96. Other (Please specify)----------
UE.30	How much water did your household use YESTERDAY (excluding for animals)? ASK THE QUESTION IN THE NUMBER OF 20 LITER JERRICAN AND CONVERT TO LITERS	A. Volume of container [____] B. Number of containers used [____] Total water used = A*B = [____]

Now I would like to ask some questions about sanitation.		
UE.40	Where do members of this Household usually relieve themselves?	1. Latrine in the household 2. Public latrine 3. Open defecation 96 Other: _____

SECTION C: MORTALITY RATE

Please fill the table below as accurately as possible
Make sure to clarify the recall period to the respondent
Note: The recall period include all days from 28th April 2015 to the date of the survey.

CODE	Question	Totals (whole numbers only)
MR1	Total household members that are currently living in this household.	
MR2	Total household members under 5 years currently living in the household	

MR3	Total household members who joined during the recall period	
MR4	Total under 5 years who joined during the recall period	
MR5	Total household members who left during the recall period	
MR6	Total under 5 years who left during the recall period	
MR7	Number of births in recall period	
MR8	Total deaths in recall period	
MR9	Total number of under 5 deaths in recall period	

Annex 3: Caregivers questionnaire

MAIN CAREGIVER QUESTIONNAIRE-SMART

Code	Question	Answer
ID 100	Date of the interview (day/month/year)	
ID.210	Name of the Village	
ID.220	Number of the cluster (1 to 36)	
ID.230	Team ID number (N° 1 to 6)	
ID.240	Household number(1 to 13)	
1D .250	Caregiver ID	

H.50	During your last pregnancy, did you see anyone for antenatal care?	1. Yes 2. No (go to H.80)
H.60	If yes, "Whom did you see?" Probe "Anyone else?" till the respondent answer "no one else" Probe for the type of person seen and tick all answers given.	1. Health professional (Doctor, nurse/midwife, auxiliary midwife) 2. Traditional birth attendant 3. community health worker 4. Relative/Friends 96. Others (specify)……

H.80	What are your main barriers from going to the health centre when someone is sick?	1. Money/cost 2. Time 3. Transportation means 4. Geographical distance 5. Decision power 6. The service is not good enough 7. Culture (specify) 8. No man to a accompany the woman 9. None 96. Other (specify)……..
H.90	How long does it take you to go to the nearest health centre?	_ _ (write in minutes)

Now I would like to know when and how you usually wash your hands. When do you wash your hands? (DO NOT PROBE)		**Quoted**	**Not quoted**
UE.100	After defecation	1	0
UE.110	After cleaning babies' bottom	1	0

UE.120	Before food preparation	1	0
UE.130	Before eating	1	0
UE.140	Before feeding children (including breastfeeding)	1	0

Would you explain and show me what you do when you wash your hands? **Ask the participant to show how he/she wash his/her hands.**		**Do**	**Do not**
UE.200	Uses water	1	0
UE.210	Uses soap or ashes	1	0
UE.220	Washes both hands	1	0
UE.230	Rubs hands together at least three times	1	0
UE.240	Dries hands hygienically by air-drying or using a clean cloth	1	0

Now I would like to measure your MUAC (Mid-Upper Arm Circumference) using this tape. It is safe, non-harmful and will take only few minutes.		
ANT.10	MUAC in millimetre	……mm
ANT.20	What is the caretaker's physiological status?	1. Pregnant 2. Lactating 3. Pregnant and lactating 4. None of the above
ANT.30	Have you been taking iron-folate tablets? (Only for pregnant women)	1. Yes 2. No 98.Do not know

…….END

Check if all the questions are correctly filled and thank the caregiver before leaving.

Annex 4: Child questionnaire

CHILD QUESTIONNAIRE-SMART

Code	Questions	Answers
ID. 10	Date of the survey (day/month/year)	
ID.100	Name of selected child	
ID.110	Name of the Village	
ID.120	Number of the cluster (1 to 36)	
ID.130	Team ID number (N° 1 to 6)	
ID.140	Household number (1 to 13)	
ID.150	Child ID	
ID.200	Birth date If the birth date is not known, ask question ID.210	(day/month/year) Birth date __ /__ /____ Don't know 98
ID.210	Calculate immediately in months, if the birth date is known Otherwise use the event calendar to define the age	_____ Months
ID.220	Sex of selected child	1. Male (m) 2. Female (f)

SECTION A. Child 0-23 months

Note: This section only applies to children 0-23 months

Now I would like to ask some question about your child.				
CP.10	Has (**name**) ever been breastfed? If don't know, ask question CP.20	1. Yes	2.No	98.Don't know
CP.20	How long after birth did you first put (**name**) to the breast? **(Probe)**	1. Within one hour 2. In the first day within 24 hours 3. After first day > 24 hours		
CP.30	Did you feed your child with fluid or liquid that came from breasts in the first 3 days after birth (COLUSTRUM)?	1.Yes	2.No	98.Don't know
CP.40	Was (name) breastfed yesterday during the day or at night?	1.Yes	2.No	98.Don't know

Please describe everything that (name) ate yesterday during the day or at night, whether at home or outside the home.				
		Yes 1	NO 2	Don't know 98
IDDS.210	**Grains, roots or tubers** (wheat, wheat flour, rice, maize, noodles, biscuits, or any other food made from wheat or maize, potatoes and food made of potatoes, carrots, radishes, onions, garlic, or any other foods made from roots or tuber etc)	1	2	98
IDDS.220	**Vitamine A, rich plant food** (spinach, carrot, Pumpkin, Mango, Sweet potatoes, Apricot)	1	2	98
IDDS.230	**Other Fruits & vegtebable** (Apple, banana, pomegrante, cherry, grape, tomatoes, eggplants, corriander,cabbages, squash, etc)	1	2	98
IDDS.240	**Meat/ Poultry/ fish** (Beef, goat, lamb, mutton, chicken, duck, other animals, other birds, liver, kidney, heart, or any other organ meat)	1	2	98
IDDS.250	**Eggs**	1	2	98
IDDS.260	**Pulses/ Nut** (beans, peas, lentils, wallnuts, etc)	1	2	98
IDDS.270	**Diary product (yogurts, cheese, butter, Qorut)**	1	2	98
IDDS.280	**Foods cooked in oil/fat**	1	2	98

CP.50	Did (name) eat any solid, semi-solid, or soft foods yesterday during the day or at night?	1.Yes	0.No	Don't know 98
CP.60	How many times did (**name**) eat solid, semi-solid, or soft foods other than liquids yesterday during the day or at night?	Number of times: |_||_| Don't know = 98		

SECTION B. Child 0-59 months

H.30	Has (*name*) ever been ill in the past 14 days?	1.Yes	2.No	98.Don't know
If YES, what type of illness (please circle appropriately)				
H.40.1	Fever	1.Yes	2.No	98.Don't know
H40.2	Acute Respiratory Infection(ARI)/Cough	1. Yes	2. No	98. Don't know
H40.3	Diarrhoea	1. Yes	2 .No	98. Don't know
H.40.5	Other (specify)	1. Yes	2. No	98. Don't know

KEY

Fever High temperature	**Cough/AR** Any episode with severe, persistent cough or difficulty breathing	**Watery diarrhoea :** Any episode of three or more watery stools per day	**Bloody diarrhoea** Any episode of three or more stools with blood per day

Immunization status, deworming and vitamin A supplementation		**Response**
H50	Has the child received Vitamin A in the past 6 months? (Show sample)	1. Yes 2. No 98. Do not know
H60	Has the child received drugs for worms in the past 6 months (**12-59 months**)? Show sample	1. Yes 2. No 98. Do not know
H80	Has the child received measles vaccination (on the upper right shoulder)? (**9-59 months**)	1. Yes, card 2. Yes ,Recall 3. No 4. Do not know

<u>Child 0-59 months</u>
<u>(Anthropometric measurements) all children 0-59 months in the household MUST be measured.</u>
(Do not measure MUAC for children 5 months and below)

Anthropometric measurements:		**Measurement**
ANT.10	Weight in kilogram, record to the nearest 0.1 kilograms (100 grams)	_ _ _ _
ANT.20	Height/Length in centimeters, record to the nearest 0,1cm	_ _ _
ANT.30	Edema If yes, contact your team supervisor to refer the children	1 = Yes 2 = No
ANT.40	MUAC (mm)	_ _ _

Annex 5: Method for data collection, analysis and interpretation of caretakers' handwashing.

Appropriate hand washing behavior is defined through 2 questions:

Question 1: When do you wash your hands? (DO NOT PROBE)

One point is given for each of the following:

❒ After defecation
❒ After cleaning babies' bottom
❒ Before food preparation
❒ Before eating
❒ Before feeding children (including breastfeeding)

Note :

Sometimes people will answer that they "sometimes" do it at certain critical times but not always. In this case, probe "Would you say that you do it usually?" because we are looking for the determination of a practice, a daily behavior.

Question 2: Would you explain and show me what you do when you wash your hands?

One point is given for each of the following:

❒ Uses water
❒ Uses soap or ashes
❒ Washes both hands
❒ Rubs hands together at least three times
❒ Dries hands hygienically by air-drying or using a clean cloth

To answer this question, please make sure the respondent actually shows what they do by washing their hands, not just mimicking the action of washing hands. In this case the observer can make sure of the use of soap and water, as well as drying practice.

Note:

Persons conducting the survey should be as neutral as possible when posing the questions and not prompt or suggest answers. This is very important in order to limit biases, and should be obvious in the questionnaire, using bold, underlined and capital letters "DO NOT PROBE".

a) Interpretation

A score of 8 points or more (out of a possible 10) qualifies a hand washing behavior as appropriate. The indicator at the population level can then be calculated as:

$$\frac{Number\ of\ food\ preparers\ and\ child\ caretakers\ in\ the\ sample\ who\ report\ and\ demonstrate\ appropriate\ handwashing\ behavior}{Total\ number\ of\ food\ preparers\ and\ child\ caretakers\ interviewed\ in\ the\ sample}$$

Annex 6: Balkh SMART training schedule à Mazar

Section Code	Section Title	Time
	Day 5TH AUGUST 2015	
	Introductions-expectations, norms	
1A	Enumerator Training Overview	65 min
1B	Survey Teams	45 min
3A	Malnutrition	45 min
3B	Weight	105 min
3C	Height/ Length	45 min
3D	MUAC-Child and PLW	25 min
	Practical Sessions on Anthropometric measurements	180 min
	6TH AUGUST 2015	
	Recap previous day	
2A	Questionnaire Design	60 min
2B	Event Calendar	45 min
5A	Arrival at village	35 min
4	Quality Checks (including Standardisation Test organisation)	60 min
	Mock Standardisation Test	30 min
5B	Segmentation and Random Number Table	
	8TH AUGUST 2015	
	Standardisation Test (morning)	180 min
5c	Simple Random sampling	60 min
	Standardisation Test (afternoon)	180 min
5D	Systematic random Sampling	120 min
5E	Special cases	30 min
	9TH AUGUST 2015	
6	Simple Random sampling	60 min
	Special Cases Mortality and Demography	120 min
	Overview of all the data collection tools 1. Household Questionnaire 2. Caregiver Questionnaire 3. Child questionnaire	30 min
	Practical sessions on conducting interviews,HHs selection	
	10TH AUGUST 2015	
7	Field test	Full Day
	11TH and 12TH AUGUST 2015	
8	Field test Feedback: entire team and individual teams Practice identified areas of improvement:	
9	Final Teams preparation for survey mapping and movement planning Final Logistical Arrangements Finalization of Admin issues Security Briefing-Shawkatullah	

Annex 7: Cluster selection

CLUSTER NR	DISTRICT NAME IN ENGLISH	AREA NAME IN ENGLISH	POPULATION
1	Balkh	Bahuddin	1240
2	Balkh	Zargaran	182
3	Balkh	Balkh	12700
4	Balkh	Mohmandan	2939
RC	Balkh	Samar Qandeyan	5319
5	Balkh	Hesarak	2622
6	Charbulak	Markaz Wolluswali	424
7	Chemtal	Sar Asiyab	4312
8	Chemtal	Chemtal 1	8973
9	Chemtal	Chamtal 2	3049
10,11	Dawlatabad	Dawlat Abad	13600
12	Dehdadi	Baba Qashqar	619
13	Dehdadi	Family Haiye Rahayeshi Kod Bar	7505
14	Dehdadi	Gozar Arab Ha Shair Abad Hulya	1850
15	Dehdadi	Kar Malik	1461
16	Dehdadi	Now Abad	3209
17	Dehdadi	Pusht Bagh	1216
18,19,20	Dehdadi	Deh Dadi	25061
21	Dehdadi	Paghmani Ha	1285
22	Keshendeh	Arab Ga	360
23	Khulm	Wal Jato	929
RC	Khulm	Logari Ha	372
RC,24,25,RC,26	Khulm	Khulm	40800
27	Marmul	Markaz Wolluswaly Marmal	6820
28	Marmul	Marmol	2938
29	Nahr-e- Shahi	Baba Yadgar	7579
30	Nahr-e- Shahi	Langar Khana Payen Khord	5746
31	Nahr-e- Shahi	Takht Pul	1281
32	Nahr-e- Shahi	Gori Mar	1967
33	Sholgareh	Boragi	952
34	Sholgareh	Sar Asiyab	3215
35,36	Sholgareh	Sholgareh	13300

Annex 8: Plausibility check (automatically generated by ENA)

Plausibility check for: AFG_BALKH_0815_ACF_DAT.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 (% of out of range subjects)	Incl	%	0-2.5 0	>2.5-5.0 5	>5.0-7.5 10	>7.5 20	**0** (1,9 %)
Overall Sex ratio (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<=0.001 10	**0** (p=0,436)
Age ratio(6-29 vs 30-59) (Significant chi square)	Incl	p	>0.1 0	>0.05 2	>0.001 4	<=0.001 10	**4** (p=0,018)
Dig pref score - weight	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	**0** (5)
Dig pref score - height	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	**0** (7)
Dig pref score - MUAC	Incl	#	0-7 0	8-12 2	13-20 4	> 20 10	**0** (7)
Standard Dev WHZ .	Excl	SD	<1.1 and	<1.15 and	<1.20 and	>=1.20 or	
.	Excl	SD	>0.9 0	>0.85 5	>0.80 10	<=0.80 20	**0** (0,99)
Skewness WHZ	Excl	#	<±0.2 0	<±0.4 1	<±0.6 3	>=±0.6 5	**0** (-0,05)
Kurtosis WHZ	Excl	#	<±0.2 0	<±0.4 1	<±0.6 3	>=±0.6 5	**0** (-0,04)
Poisson dist WHZ-2	Excl	p	>0.05 0	>0.01 1	>0.001 3	<=0.001 5	**3** (p=0,001)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	**7** %

The overall score of this survey is 7 %, this is excellent.

There were no duplicate entries detected.

Percentage of children with no exact birthday: 56 %

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=13/ID=13: HAZ (2,771), Age may be incorrect
Line=16/ID=16: HAZ (-4,880), Age may be incorrect
Line=20/ID=20: HAZ (5,746), WAZ (3,058), Age may be incorrect
Line=57/ID=57: HAZ (2,370), Age may be incorrect
Line=58/ID=58: **WHZ (-4,045)**, Height may be incorrect
Line=64/ID=64: HAZ (1,877), Age may be incorrect
Line=71/ID=71: HAZ (1,831), Height may be incorrect
Line=84/ID=84: HAZ (2,008), Age may be incorrect
Line=86/ID=86: HAZ (2,543), Age may be incorrect
Line=133/ID=133: **WHZ (4,819)**, HAZ (-7,890), Height may be incorrect
Line=141/ID=141: **WHZ (7,643)**, Weight may be incorrect
Line=142/ID=142: HAZ (3,738), Age may be incorrect
Line=178/ID=178: HAZ (2,376), Age may be incorrect
Line=179/ID=179: **WHZ (2,724)**, Weight may be incorrect
Line=181/ID=181: **WHZ (3,742)**, Weight may be incorrect
Line=209/ID=209: HAZ (-5,738), WAZ (-4,099), Age may be incorrect
Line=210/ID=210: HAZ (-4,255), Age may be incorrect
Line=223/ID=223: HAZ (-7,637), WAZ (-4,199), Age may be incorrect
Line=241/ID=241: HAZ (2,058), Height may be incorrect
Line=243/ID=243: HAZ (4,225), WAZ (2,857), Age may be incorrect
Line=247/ID=247: **WHZ (3,168)**, Height may be incorrect
Line=317/ID=317: **WHZ (-4,855)**, WAZ (-4,223), Weight may be incorrect
Line=321/ID=321: **WHZ (-5,300)**, WAZ (-4,259), Weight may be incorrect
Line=326/ID=326: HAZ (-5,375), Height may be incorrect
Line=340/ID=340: HAZ (-5,001), Height may be incorrect
Line=341/ID=341: WAZ (1,985), Age may be incorrect
Line=356/ID=356: HAZ (2,644), Age may be incorrect
Line=357/ID=357: HAZ (3,051), Age may be incorrect
Line=367/ID=367: HAZ (1,892), Age may be incorrect
Line=403/ID=403: **WHZ (2,575)**, Height may be incorrect
Line=412/ID=412: HAZ (2,137), Height may be incorrect
Line=427/ID=427: HAZ (-5,847), WAZ (-4,628), Age may be incorrect
Line=432/ID=432: HAZ (-4,345), Height may be incorrect
Line=435/ID=435: HAZ (-5,059), Height may be incorrect
Line=448/ID=448: HAZ (-4,481), Age may be incorrect
Line=449/ID=449: HAZ (-5,168), Age may be incorrect
Line=450/ID=450: HAZ (2,346), Age may be incorrect
Line=472/ID=472: HAZ (3,350), Age may be incorrect
Line=477/ID=477: HAZ (-4,543), Age may be incorrect

Percentage of values flagged with SMART flags:WHZ: 1,9 %, HAZ: 6,3 %, WAZ: 1,7 %

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: 1,06 (The value should be around 0.85).:
p-value = 0,018 (significant difference)

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

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	50/57,3 (0,9)	57/53,4 (1,1)	107/110,7 (1,0)	0,88
18 to 29	12	74/55,9 (1,3)	64/52,0 (1,2)	138/107,9 (1,3)	1,16
30 to 41	12	54/54,2 (1,0)	56/50,4 (1,1)	110/104,6 (1,1)	0,96
42 to 53	12	53/53,3 (1,0)	44/49,6 (0,9)	97/102,9 (0,9)	1,20
54 to 59	6	16/26,4 (0,6)	9/24,5 (0,4)	25/50,9 (0,5)	1,78
6 to 59	54	247/238,5 (1,0)	230/238,5 (1,0)		1,07

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

Overall sex ratio: p-value = 0,436 (boys and girls equally represented)
Overall age distribution: p-value = 0,000 (significant difference)
Overall age distribution for boys: p-value = 0,028 (significant difference)
Overall age distribution for girls: p-value = 0,007 (significant difference)
Overall sex/age distribution: p-value = 0,000 (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: **5** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

p-value for chi2: 0,394

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: **7** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)
p-value for chi2: 0,025 (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: **7** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)
p-value for chi2: 0,029 (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:	1,18	1,10	0,99
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	7,1%	7,0%	
calculated with current SD:	9,6%	8,2%	
calculated with a SD of 1:	6,3%	6,3%	

HAZ

Standard Deviation SD:	1,65	1,59	1,30
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	30,3%	30,0%	29,4%
calculated with current SD:	32,5%	31,4%	29,2%
calculated with a SD of 1:	22,8%	22,0%	23,8%

WAZ

Standard Deviation SD:	1,16	1,16	1,08
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	19,7%	19,7%	19,0%
calculated with current SD:	20,4%	20,4%	18,5%
calculated with a SD of 1:	16,9%	16,9%	16,7%

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

WHZ	p= 0,000	p= 0,000	p= 0,879
HAZ	p= 0,000	p= 0,000	p= 0,001
WAZ	p= 0,517	p= 0,517	p= 0,300

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

Skewness

WHZ	0,72	0,23	-0,05
HAZ	0,13	0,38	0,16
WAZ	0,05	0,05	0,06

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	6,12	1,92	-0,04
HAZ	1,61	1,05	-0,32
WAZ	0,34	0,34	-0,34

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=1,98 (p=0,001)
WHZ < -3: ID=0,91 (p=0,615)
GAM: ID=1,98 (p=0,001)
SAM: ID=0,91 (p=0,615)
HAZ < -2: ID=0,78 (p=0,822)
HAZ < -3: ID=1,12 (p=0,284)
WAZ < -2: ID=1,16 (p=0,234)
WAZ < -3: ID=1,27 (p=0,131)

Subjects with SMART flags are excluded from this analysis.

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

Are the data of the same quality at the beginning and the end of the clusters?
Evaluation of the SD for WHZ depending upon the order the cases are measured within each cluster (if one cluster per day is measured then this will be related to the time of the day the measurement is made).

```
Time                                          SD for WHZ
point                0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
01: 0,96 (n=35, f=0)  #######
02: 1,81 (n=35, f=1)  ##########################################
03: 0,86 (n=34, f=0)  ###
04: 0,77 (n=28, f=0)
05: 1,02 (n=31, f=1)  #########
06: 1,74 (n=29, f=2)  ########################################
07: 0,95 (n=33, f=0)  ######
08: 0,95 (n=31, f=0)  ######
09: 1,02 (n=33, f=1)  #########
10: 1,16 (n=28, f=1)  ###############
11: 1,05 (n=30, f=0)  ###########
12: 1,37 (n=24, f=1)  ########################
13: 1,16 (n=23, f=1)  ###############
14: 1,13 (n=23, f=0)  ##############
15: 1,38 (n=19, f=1)  ########################
16: 1,27 (n=13, f=0)  0000000000000000000
17: 1,09 (n=10, f=0)  0000000000000
18: 1,27 (n=08, f=0)  ~~~~~~~~~~~~~~~~~~~
19: 0,95 (n=03, f=0)  ~~~~~~
20: 0,53 (n=04, f=0)
21: 0,59 (n=02, f=0)

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

Analysis by Team

Team	**1**	**2**	**3**	**4**	**5**	**6**
n =	67	97	85	78	60	90
Percentage of values flagged with SMART flags:						
WHZ:	0,0	1,0	4,7	3,8	0,0	2,2
HAZ:	0,0	7,2	2,4	11,7	5,0	11,1
WAZ:	0,0	3,1	2,4	3,9	1,7	0,0
Age ratio of 6-29 months to 30-59 months:						
	1,09	0,98	1,24	1,29	1,61	0,61
Sex ratio (male/female):						
	1,58	0,90	1,02	1,36	0,58	1,25
Digit preference Weight (%):						

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

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

Digit preference Height (%):

.0 :	6	18	2	13	35	3
.1 :	21	4	11	14	10	8
.2 :	21	13	9	19	7	8
.3 :	10	4	5	9	3	7
.4 :	4	12	19	6	2	13
.5 :	9	11	13	10	13	14
.6 :	6	8	13	6	13	19
.7 :	6	5	15	3	12	9
.8 :	4	18	7	3	3	9
.9 :	12	6	6	17	2	10
DPS:	20	16	16	18	31	14

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

Digit preference MUAC (%):

.0 :	3	3	11	5	13	3
.1 :	21	5	12	9	10	13
.2 :	12	20	8	17	12	6
.3 :	8	5	2	14	13	11
.4 :	11	15	11	12	3	10
.5 :	8	14	14	9	23	9
.6 :	8	9	11	8	3	14
.7 :	6	5	11	8	12	7
.8 :	14	18	8	12	8	7
.9 :	11	5	12	8	2	20
DPS:	16	19	10	11	20	16

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

Standard deviation of WHZ:

SD	0,94	0,93	1,36	1,54	1,01	1,12

Prevalence (< -2) observed:

%		8,2	11,5	6,7	7,8

Prevalence (< -2) calculated with current SD:

%		12,7	17,4	4,7	10,1

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

%		6,0	7,4	4,5	7,7

Standard deviation of HAZ:

SD	1,06	1,85	1,51	1,80	1,50	1,83
observed:						
%	22,4	34,0	32,9	24,7	38,3	28,9
calculated with current SD:						
%	25,5	35,7	34,1	29,0	36,2	31,1
calculated with a SD of 1:						
%	24,3	24,9	26,8	15,8	29,9	18,4

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	9/9,5 (0,9)	9/6,0 (1,5)	18/15,5 (1,2)	1,00
18 to 29	12	10/9,3 (1,1)	7/5,9 (1,2)	17/15,2 (1,1)	1,43
30 to 41	12	9/9,0 (1,0)	2/5,7 (0,4)	11/14,7 (0,7)	4,50
42 to 53	12	9/8,8 (1,0)	5/5,6 (0,9)	14/14,5 (1,0)	1,80
54 to 59	6	4/4,4 (0,9)	3/2,8 (1,1)	7/7,2 (1,0)	1,33
6 to 59	54	41/33,5 (1,2)	26/33,5 (0,8)		1,58

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

Overall sex ratio: p-value = 0,067 (boys and girls equally represented)
Overall age distribution: p-value = 0,817 (as expected)
Overall age distribution for boys: p-value = 0,998 (as expected)
Overall age distribution for girls: p-value = 0,385 (as expected)
Overall sex/age distribution: p-value = 0,151 (as expected)

Team 2:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	10/10,7 (0,9)	11/11,8 (0,9)	21/22,5 (0,9)	0,91
18 to 29	12	13/10,4 (1,2)	14/11,5 (1,2)	27/21,9 (1,2)	0,93
30 to 41	12	5/10,1 (0,5)	13/11,2 (1,2)	18/21,3 (0,8)	0,38
42 to 53	12	12/9,9 (1,2)	10/11,0 (0,9)	22/20,9 (1,1)	1,20
54 to 59	6	6/4,9 (1,2)	3/5,4 (0,6)	9/10,4 (0,9)	2,00
6 to 59	54	46/48,5 (0,9)	51/48,5 (1,1)		0,90

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

Overall sex ratio: p-value = 0,612 (boys and girls equally represented)
Overall age distribution: p-value = 0,736 (as expected)
Overall age distribution for boys: p-value = 0,416 (as expected)
Overall age distribution for girls: p-value = 0,723 (as expected)
Overall sex/age distribution: p-value = 0,188 (as expected)

Team 3:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	11/10,0 (1,1)	9/9,7 (0,9)	20/19,7 (1,0)	1,22
18 to 29	12	14/9,7 (1,4)	13/9,5 (1,4)	27/19,2 (1,4)	1,08
30 to 41	12	11/9,4 (1,2)	13/9,2 (1,4)	24/18,6 (1,3)	0,85
42 to 53	12	6/9,3 (0,6)	7/9,1 (0,8)	13/18,3 (0,7)	0,86
54 to 59	6	1/4,6 (0,2)	0/4,5 (0,0)	1/9,1 (0,1)	
6 to 59	54	43/42,5 (1,0)	42/42,5 (1,0)		1,02

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

Overall sex ratio: p-value = 0,914 (boys and girls equally represented)
Overall age distribution: p-value = 0,009 (significant difference)
Overall age distribution for boys: p-value = 0,184 (as expected)
Overall age distribution for girls: p-value = 0,097 (as expected)
Overall sex/age distribution: p-value = 0,007 (significant difference)

Team 4:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	6/10,4 (0,6)	10/7,7 (1,3)	16/18,1 (0,9)	0,60
18 to 29	12	19/10,2 (1,9)	9/7,5 (1,2)	28/17,6 (1,6)	2,11
30 to 41	12	12/9,9 (1,2)	8/7,2 (1,1)	20/17,1 (1,2)	1,50
42 to 53	12	8/9,7 (0,8)	6/7,1 (0,8)	14/16,8 (0,8)	1,33
54 to 59	6	0/4,8 (0,0)	0/3,5 (0,0)	0/8,3 (0,0)	
6 to 59	54	45/39,0 (1,2)	33/39,0 (0,8)		1,36

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

Overall sex ratio: p-value = 0,174 (boys and girls equally represented)
Overall age distribution: p-value = 0,004 (significant difference)
Overall age distribution for boys: p-value = 0,005 (significant difference)
Overall age distribution for girls: p-value = 0,307 (as expected)
Overall sex/age distribution: p-value = 0,000 (significant difference)

Team 5:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	6/5,1 (1,2)	11/8,8 (1,2)	17/13,9 (1,2)	0,55
18 to 29	12	7/5,0 (1,4)	13/8,6 (1,5)	20/13,6 (1,5)	0,54
30 to 41	12	5/4,8 (1,0)	8/8,3 (1,0)	13/13,2 (1,0)	0,63
42 to 53	12	4/4,7 (0,8)	5/8,2 (0,6)	9/12,9 (0,7)	0,80
54 to 59	6	0/2,3 (0,0)	1/4,1 (0,2)	1/6,4 (0,2)	0,00
6 to 59	54	22/30,0 (0,7)	38/30,0 (1,3)		0,58

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

Overall sex ratio: p-value = 0,039 (significant excess of girls)

Overall age distribution: p-value = 0,050 (significant difference)
Overall age distribution for boys: p-value = 0,485 (as expected)
Overall age distribution for girls: p-value = 0,174 (as expected)
Overall sex/age distribution: p-value = 0,005 (significant difference)

Team 6:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	8/11,6 (0,7)	7/9,3 (0,8)	15/20,9 (0,7)	1,14
18 to 29	12	11/11,3 (1,0)	8/9,0 (0,9)	19/20,4 (0,9)	1,38
30 to 41	12	12/11,0 (1,1)	12/8,8 (1,4)	24/19,7 (1,2)	1,00
42 to 53	12	14/10,8 (1,3)	11/8,6 (1,3)	25/19,4 (1,3)	1,27
54 to 59	6	5/5,3 (0,9)	2/4,3 (0,5)	7/9,6 (0,7)	2,50
6 to 59	54	50/45,0 (1,1)	40/45,0 (0,9)		1,25

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

Overall sex ratio: p-value = 0,292 (boys and girls equally represented)
Overall age distribution: p-value = 0,289 (as expected)
Overall age distribution for boys: p-value = 0,699 (as expected)
Overall age distribution for girls: p-value = 0,444 (as expected)
Overall sex/age distribution: p-value = 0,143 (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: 1,15 (n=05, f=0)  ###############
02: 1,25 (n=05, f=0)  ###################
03: 1,22 (n=04, f=0)  ##################
04: 0,61 (n=05, f=0)
05: 0,42 (n=05, f=0)
06: 1,13 (n=05, f=0)  ##############
07: 0,91 (n=05, f=0)  #####
08: 0,80 (n=04, f=0)
09: 0,41 (n=05, f=0)
10: 0,68 (n=05, f=0)
11: 0,47 (n=05, f=0)
12: 1,78 (n=03, f=0)  OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
13: 0,69 (n=02, f=0)
14: 0,56 (n=03, f=0)
15: 0,77 (n=03, f=0)
17: 0,59 (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: 0,89 (n=06, f=0)  ####
02: 0,95 (n=06, f=0)  ######
03: 1,00 (n=06, f=0)  ########
04: 0,48 (n=04, f=0)
05: 0,70 (n=05, f=0)
06: 1,35 (n=05, f=0)  ######################
07: 0,66 (n=06, f=0)
08: 0,64 (n=06, f=0)
09: 1,23 (n=06, f=0)  ##################
10: 0,87 (n=05, f=0)  ###
11: 0,78 (n=06, f=0)
12: 0,76 (n=04, f=0)
13: 0,62 (n=05, f=0)
14: 1,04 (n=06, f=0)  ##########
15: 1,07 (n=04, f=0)  ###########
16: 1,00 (n=04, f=0)  ########
17: 0,45 (n=03, f=0)
18: 1,39 (n=04, f=0)  ########################
19: 0,16 (n=02, f=0)
20: 0,85 (n=02, f=0)  OO

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

Team: 3

```
Time                                          SD for WHZ
point                 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
01: 0,52 (n=06, f=0)
02: 0,89 (n=06, f=0)  ####
03: 0,62 (n=06, f=0)
04: 0,81 (n=06, f=0)
05: 1,62 (n=05, f=1)  ##################################
06: 3,17 (n=06, f=2)  ########################################################################
07: 1,38 (n=06, f=0)  ########################
08: 0,79 (n=06, f=0)
09: 0,48 (n=06, f=0)
10: 2,06 (n=06, f=1)  ##########################################################
11: 1,33 (n=05, f=0)  ######################
12: 0,90 (n=05, f=0)  ####
13: 1,01 (n=05, f=0)  #########
14: 1,90 (n=04, f=0)  OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
15: 0,50 (n=04, f=0)
16: 0,71 (n=02, f=0)

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

Team: 4

```
Time                                          SD for WHZ
point                 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
01: 0,77 (n=06, f=0)
02: 3,66 (n=06, f=1)  ########################################################################
03: 1,03 (n=06, f=0)  ##########
04: 0,72 (n=05, f=0)
05: 0,88 (n=06, f=0)  ###
06: 1,56 (n=03, f=0)  OOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
07: 1,27 (n=06, f=0)  ####################
08: 0,96 (n=05, f=0)  #######
09: 1,77 (n=05, f=1)  ########################################
10: 0,62 (n=06, f=0)
11: 1,80 (n=06, f=0)  ############################################
12: 1,29 (n=06, f=1)  ####################
```

```
13: 0,28 (n=04, f=0)
14: 1,08 (n=04, f=0)  ############
15: 0,98 (n=02, f=0)  OOOOOOOO
16: 3,26 (n=02, f=0)  OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
```

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

Team: 5

```
Time                                          SD for WHZ
point                 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
01: 0,85 (n=06, f=0)  ##
02: 0,97 (n=06, f=0)  #######
03: 0,55 (n=06, f=0)
04: 0,56 (n=02, f=0)
05: 1,12 (n=05, f=0)  #############
06: 1,05 (n=04, f=0)  ###########
07: 0,97 (n=05, f=0)  #######
08: 1,38 (n=05, f=0)  ##########################
09: 0,72 (n=05, f=0)
10: 0,91 (n=03, f=0)  OOOOO
11: 0,73 (n=05, f=0)
12: 1,26 (n=03, f=0)  OOOOOOOOOOOOOOOOOO
13: 0,97 (n=02, f=0)  OOOOOOO
```

(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: 0,89 (n=06, f=0)  ####
02: 1,58 (n=06, f=0)  ################################
03: 0,81 (n=06, f=0)
04: 0,72 (n=06, f=0)
05: 0,93 (n=05, f=0)  ######
06: 0,77 (n=06, f=0)
07: 0,62 (n=05, f=0)
08: 1,02 (n=05, f=0)  #########
09: 0,94 (n=06, f=0)  ######
10: 0,84 (n=03, f=0)  OO
11: 0,36 (n=03, f=0)
12: 1,02 (n=03, f=0)  OOOOOOOOO
13: 2,13 (n=05, f=1)  ############################################################
14: 0,88 (n=05, f=0)  ###
15: 1,95 (n=05, f=1)  ##################################################
16: 0,68 (n=03, f=0)
17: 1,21 (n=04, f=0)  ##################
18: 1,12 (n=04, f=0)  ##############
20: 0,35 (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)