AFGHANISTAN

Nutrition and Mortality SMART Survey
Preliminary Report
Panjshir Province, Afghanistan
3rd to 21st April 2016

Funded by: OCHA

Public Nutrition Department (PND),
With the technical support of Action Contre la Faim (ACF)
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ABBREVIATIONS

ACF	Action Contre la Faim
BCG	Bacillus Chalmette Guerin
CDR	Crude Death Rate
CSO	Central Statistics Organization
ENA	Emergency Nutrition Assessment
GAM	Global Acute Malnutrition
HH	Household
HA	Height for Age
MAM	Moderate Acute Malnutrition
MW	Mean Weight
IYCF	Infant and Young Child Feeding
MOPH	Ministry of Public Health
MUAC	Mid-Upper Arm Circumference
NNS	National Nutrition Survey
OW	Observed Weight
PPS	Probability Proportion to Size
PND	Public Health Nutrition Department
PPHD	Provincial Public Health Department
PNO	Public Nutrition Officer
RC	Reserve Cluster
SAM	Severe Acute Malnutrition
SD	Standard Deviation
SM	Strengthen Mechanism
SMART	Standardized Monitoring and Assessment of Relief and Transition
WFP	World Food Program
WASH	Water Sanitation and Hygiene
W/H	Weight for height
WHO	World Health Organization
WHZ	Weight for Height Z score
U5	Under five
U5DR	Under five Death Rates
UNICEF	United Nation Children's Fund

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EXECUTIVE SUMMARY

The integrated SMART survey was conducted from 3rd to 21th April 2016. A total of 647 households were assessed using a two-stage cluster sampling methodology. The main target group for the assessment was children below five years (0-59 months). The integrated nutrition and mortality SMART survey preliminary report provides a summary on the methodology used, analysis and interpretation of survey findings and recommendations proposed.

The final report will comprehensively provide an analysis and interpretation of nutritional anthropometric findings, child health status, immunization and supplementation, maternal nutrition status, Water, Sanitation and Hygiene (WASH) and livelihood (FSL). The final report will be disseminated to the wider stakeholders after validation process scheduled to complete in the Month of May, 2016.

Summary findings:

- 647 households assessed with 925 children under 5 years and 660 women in child bearing age.
- Global Acute Malnutrition (GAM) Prevalence based on Weight-for-Height/ and or the presence of bilateral oedema was **8.7% (6.8-11.0 95% CI)** and SAM **1.6% (0.8- 3.0 95% CI)**.
- GAM prevalence based on MUAC/ and or the presence of bilateral oedema **10.8% (8.4-13.8 95% CI)** and SAM was **2. 8% (1.9- 4.2 95% CI)**.
- Combined GAM prevalence (Weight-for-Height Z-score <-2 Z score and/ or MUAC <-125 mm and / or the presence of bilateral oedema) was **17.7% (95%CI, 15.2-20.3)** and SAM is **5.5% (4.0-7.0 95% CI)**.
- **No** oedema cases were identified.
- Crude Death Rate (CDR) and Under-five Death Rate (U5DR) was at 0.58 (0.33-1.03 95% CI) and 1.18 (0.59-2.36 95% CI) respectively.
- Prevalence based on stunting was **35.3% (31.5-39.2 95% CI)** while severe stunting was **12.5% (9.6-15.3 95% CI**).
- Prevalence of underweight was **21.1%** (17.8-24.8 95% CI) and severe underweight was **6.4%** (4.8- 8.6 95% CI).
- The nutrition status of women in childbearing age based on MUAC cut of <230 mm was **23.8%.**

INTRODUCTION

Panjshir province is located in the central region of Afghanistan and surrounded by Nuristan, Kapisa, Parwan, Baghlan, Takhar and Badakhshan. The province has eight districts namely Rukha, Darah, Hisa-e-Awal (khing), Unaba, Shuful, Paryan, Ab Shar[1] and Bazarak.

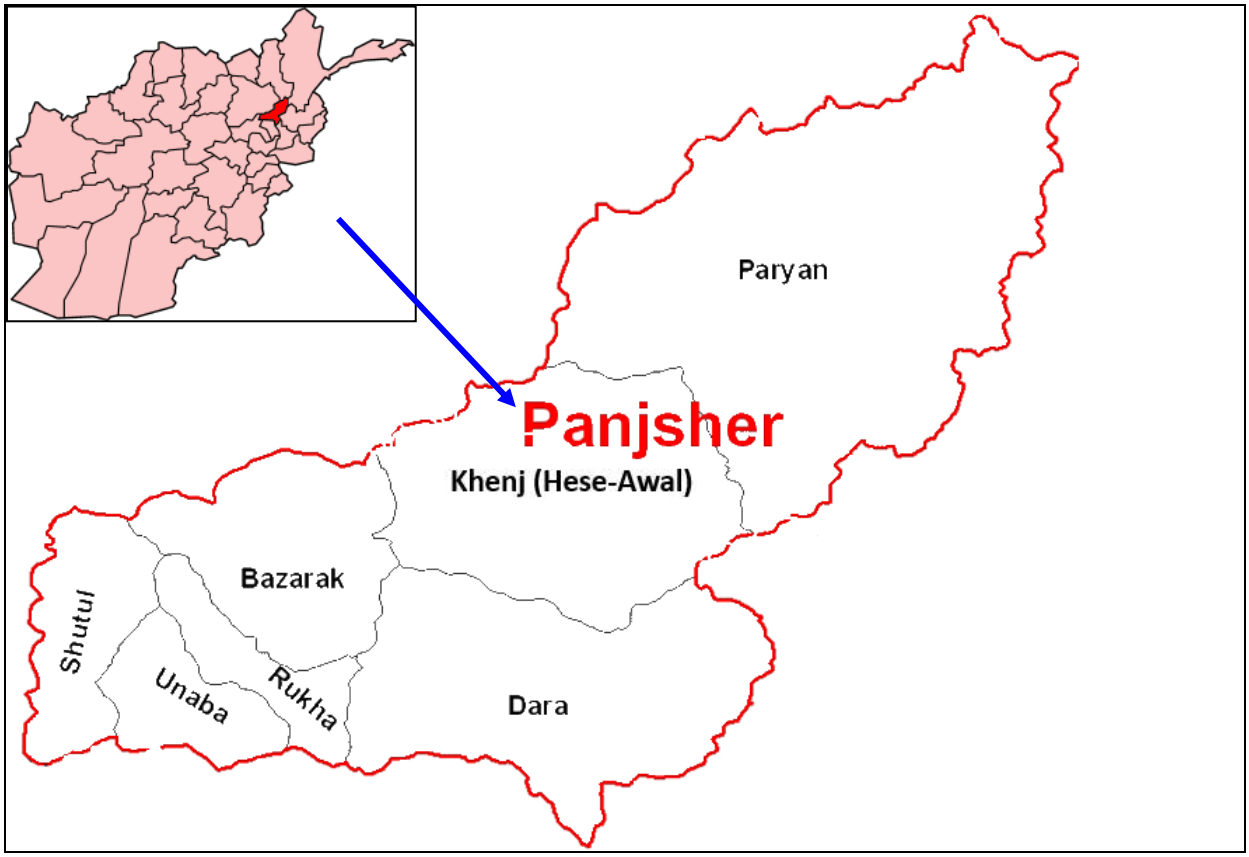

Figure 1. District Map of Panjshir Province, Wikipedia.com

The province covers an area of 3,531 km^2 with a total population of 231,609 persons[2] mostly Tajiks. The entire province (91.2%) has mountainous or semi mountainous terrain while only about 4.4% of the area is made up of flat land. Panjshir is considered to be a rural setting and majority of its inhabitants are farmers and depend on farming and sheep breeding for their livelihood.

The present survey was aimed to update nutritional situation in Panjshir province after National Nutrition Survey conducted in 2013 and Rapid nutrition assessment conducted in March 2015 over avalanche affected villages in Paryan district.

The survey findings will be used to inform programming and to better understand the nutritional satiation in the province and provide recommendations for action to the concerned stakeholders.

The survey covered all the 8 districts of Panjshir and therefore it is representative of the entire province of Panjshir. The survey was conducted in spring season (3rd – 21st April 2016).

[1] Newly formed district from Paryan that is not reflected in the map.

[2] Panjshir EPI Micro-Plan, PPHD, 2014-2015

SURVEY OBJECTIVES

The survey aimed to evaluate nutritional status of vulnerable population groups (under-five children and women in childbearing age) of Panjshir province. This opportunity was used to collect also several additional data on risk factors likely to influence nutritional status of different groups such as health (Vitamin A supplementation, deworming in the last 6 months, crude and Under 5 death rates, coverage of measles and BCG vaccination and assess morbidity of children under-5 years), WASH, food security and IYCF.

A detailed analysis and discussion of all the additional data will be presented in the final report.

METHODOLOGY

Survey design

A two-stage cluster survey following SMART methodology is applied. In the first stage random selection of clusters using probability proportion to size (PPS) was applied over a list of villages; villages being the cluster sampling unit. In the second stage, a simple or systematic random sampling of households from updated list of households was applied.

Sample Size

There were two main samples: for anthropometry and for mortality survey. The samples size calculation is based on hypothetical estimation of different statistical parameters assuming possible results at the end of the survey. The assumptions are based on prior knowledge or existing data while studying secondary sources (see table 1 and 2 below). ENA for SMART 2011 (update from 9th July 2015) was used in actual calculation of sample size.

Table 1: Parameters for sample size calculation of anthropometric indicators, Panjshir SMART, April 2016

Parameters for Anthropometry	Value	Assumptions based on context
Estimated prevalence of GAM (%)	7.2	Data from the National nutrition survey (NNS[3]) 2013 indicated a prevalence of 7.2% (95% CI: 5.85 – 8.83) with a standard deviation of 1.4.
± % Desired precision	2.5	Based on the estimated prevalence chosen SMART recommends when estimated prevalence is between 5 and 10% to use desired precision of ±2.5
Design Effect *(if applicable)*	1.5	The population living in the targeted districts is considered as having similar patterns, so the design effect was estimated at 1.5.
Children to be included	**671**	Minimum sample size-children aged 6-59 months.
Average HH Size	7.7	Based on National Nutrition Survey (NNS) 2013, the average household size was **7.7**.
% Children under-5	15.6%	Based on the Afghanistan Mortality survey of 2010 was at 15.6%.
% Non-response Households	6%	Based on past experiences.
Households to be included	**660**	Minimum households to reach the children sample.

[3] MOPH and UNICEF, National Nutrition Survey of Afghanistan (2013)

Table 2: Sample size calculation for mortality surveys, Panjshir SMART, April 2016

Parameters for Mortality	Value	Assumptions based on context
Estimated Death Rate /10,000/day	**0.5**	Recommended in cases where there is no specific mortality data for the area to be surveyed.
± Desired precision /10,000/day	**0.3**	In order to meet set mortality objectives and inline to estimated death rate
Design Effect *(if applicable)*	**1.5**	To caters for heterogeneity in the population being sampled
Recall Period in days	113	Starting point of recall period (during the start of 24th Qowous1394 (this were done from the start of Chela Kalan). 1st Jadi 1394 the date of recall is equivalent to 22nd Dec 2015 as per Gregorian calendar.
Population to be included	**3,084**	Population
Average HH Size	**7.7**	Based on National Nutrition Survey 2013.
% Non-response Households	**6%**	Based on previous experiences
Households to be included	**426**	Minimum households to potentially reach the minimum population number for mortality survey.

Finally based on the above assumptions, the minimum households sample necessary for both anthropometry and mortality samples were of 660 households.

Final sample strategy

Based on previous experiences in implementation of integrated nutrition surveys a single team can cover a maximum of 12 households in a day. The required number of clusters was derived from dividing the minimum sample size of 660 households by 14 to get an approximate 47 clusters. The clusters were automatically selected with ENA for SMART from a total list of villages (472) of the 8 districts (with exception of insecure villages) using Probability Proportionate to Size (PPS). It provided also a list of Reserve Clusters (RC) to be used in case more than 10% from the total clusters are not be accessible.

Finally, the total of the 47 clusters initially planned were successfully covered by the survey. In villages where the clusters had to cover large population, the zone was divided into smaller segments and a segment was selected randomly to represent the overall population. This division was done based on existing administrative units to include neighborhoods, roads, streets and mosques.

The second stage involved random selection of households from a total list of households for each of sampled villages/zone. 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 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. All households in each of sampled villages were enumerated and given numbers by the survey team. A total of 14 households were chosen randomly by survey team drawing the folded papers with numbers of households from a hat. A total of 658 households were selected. Out of them 11 households were not assessed (about 2% of non-response). Finally 647 households were surveyed, representing 98 % of the initially planned households. In the selected households there were 925 children aged (0-59 months) assessed. Out of them 852 were 6-59 months old.

The sample achieved is above the minimum sample size needed (671) to have meaningful and representative results for the child anthropometry.

Table 3 summarizes these results. During data collection, survey team had to revisit households at the end of the day to ensure children missing or households not present at the initial visit were covered. A cluster control form was used to record all the missed and absent households.

Table 3: Details of proposed and actual sample size achieved, Panjshir SMART, April 2016.

Number of HH planned	Number of HH surveyed	% surveyed /planned	Number of children 6-59 months planned	Number of children 6-59 months surveyed	% surveyed /planned
660	647	98,3	671	852	126.9

Survey team composition

The survey data collection team comprised of six teams with each team having four members. The survey data collection team composition includes one supervisor, one team leader and two data collectors. It was important to note that in each of the team at least one female data collector was required. During data collection every female member of the survey team was accompanied with a mahram[4] to facilitate the work of the female data collectors. The teams were supervised by ACF Deputy Program manager and Panjshir Provincial Nutrition officer. It's important to note the survey teams were trained on SMART methodology; they undertook standardization tests and participated in pilot test exercise. The standardization test was also used to group various teams especially the data collectors.

Data entry and analysis

ENA for SMART software was also used to generate anthropometric and mortality results automatically. For the rest of the indicators, they were entered and analysed in Excel.

The anthropometric results are presented as percentage z-scores from WHO 2006 Growth references for the weight-for-height (wasting), height-for-age (stunting) and weight-for-age (underweight) indexes. Separate analysis of wasting based on MUAC cut-offs is automatically done by ENA for SMART too.

Plausibility check automatically generated is used to evaluate quality and representativeness of the data, and therefore – the reliability of the results.

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

Results

Anthropometric Results

Under nutrition rates

The results are presented with exclusion of SMART flags: Z score values ranging outside -3 to + 3 for all three indexes, WHZ, HAZ and WAZ.

The survey findings revealed that the distribution of boys and girls in the sample were equally represented, sex ratio was of 1.1 (p= 0.451). Age ratio was of 0.93 (close to the reference value of 0.85). This indicates slight excess of younger children (6-29 months) in the sample but this was not significant (p-value=0.202). See details in Plausibility report (Annex 1).

Table 4: Distribution of age and sex of sample, Panjshir SMART, April 2016

	Boys		Girls		Total		Ratio
AGE (mo)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy: girl**
6-17	107	51.9	99	48.1	206	24.2	1.1
18-29	104	51.0	100	49.0	204	23.9	1.0
30-41	98	49.0	102	51.0	200	23.5	1.0
42-53	89	52.7	80	47.3	169	19.8	1.1
54-59	39	53.4	34	46.6	73	8.6	1.1
Total	437	51.3	415	48.7	852	100.0	1.1

The anthropometric results in the following tables give overall and sex disaggregated rates with 95% of Confidence Intervals (CI) as follows:

- Acute malnutrition rates based on weight-for-height z-scores and oedema (WHO 2006) in Table 5
- Oedema distribution in Table 6
- Acute malnutrition rates based on MUAC cut offs in Table 7
- Prevalence of underweight based on weight-for-age z-scores(WHO 2006) in Table 8
- Prevalence of stunting based on height-for-age z-scores(WHO 2006) in Table 9

Table 5: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex, Panjshir SMART, April 2016.

	All n = 820	Boys n = 417	Girls n = 403
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(71) 8.7 % (6.8 - 11.0 95% C.I.)	(32) 7.7 % (5.2 - 11.2 95% C.I.)	(39) 9.7 % (7.2 - 12.9 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(58) 7.1 % (5.5 - 9.1 95% C.I.)	(25) 6.0 % (4.0 - 9.0 95% C.I.)	(33) 8.2 % (5.9 - 11.3 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(13) 1.6 % (0.8 - 3.0 95% C.I.)	(7) 1.7 % (0.8 - 3.7 95% C.I.)	(6) 1.5 % (0.6 - 3.5 95% C.I.)

Table 6: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex, Panjshir SMART, April 2016.

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 29 (3.4 %)	Not severely malnourished No. 820 (96.6 %)

Table 7: Prevalence of acute malnutrition based on MUAC cut off (and/or oedema) and by sex, Panjshir SMART, April 2016.

	All n = 851	Boys n = 437	Girls n = 414
Prevalence of global malnutrition (< 125 mm and/or oedema)	(92) 10.8 % (8.4 - 13.8 95% C.I.)	(44) 10.1 % (7.3 - 13.7 95% C.I.)	(48) 11.6 % (8.8 - 15.2 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(68) 8.0 % (6.0 - 10.6 95% C.I.)	(36) 8.2 % (5.9 - 11.5 95% C.I.)	(32) 7.7 % (5.5 - 10.8 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(24) 2.8 % (1.9 - 4.2 95% C.I.)	(8) 1.8 % (1.0 - 3.5 95% C.I.)	(16) 3.9 % (2.3 - 6.4 95% C.I.)

Table 8: Prevalence of underweight based on weight-for-age z-scores by sex, Panjshir SMART, April 2016.

	All n = 839	Boys n = 428	Girls n = 411
Prevalence of underweight (<-2 z-score)	(177) 21.1 % (17.8 - 24.8 95% C.I.)	(88) 20.6 % (16.4 - 25.5 95% C.I.)	(89) 21.7 % (17.4 - 26.6 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(123) 14.7 % (12.1 - 17.7 95% C.I.)	(61) 14.3 % (11.1 - 18.1 95% C.I.)	(62) 15.1 % (11.4 - 19.6 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(54) 6.4 % (4.8 - 8.6 95% C.I.)	(27) 6.3 % (4.1 - 9.6 95% C.I.)	(27) 6.6 % (4.8 - 9.0 95% C.I.)

Table 9: Prevalence of stunting based on height-for-age z-scores and by sex, Panjshir SMART, April 2016.

	All n = 814	Boys n = 415	Girls n = 399
Prevalence of stunting (<-2 z-score)	(287) 35.3 % (31.5 - 39.2 95% C.I.)	(152) 36.6 % (32.1 - 41.4 95% C.I.)	(135) 33.8 % (28.7 - 39.4 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(188) 23.1 % (20.1 - 26.4 95% C.I.)	(95) 22.9 % (19.1 - 27.1 95% C.I.)	(93) 23.3 % (19.1 - 28.2 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(99) 12.2 % (9.6 - 15.3 95% C.I.)	(57) 13.7 % (10.4 - 17.9 95% C.I.)	(42) 10.5 % (7.7 - 14.2 95% C.I.)

Quality of the anthropometric data

The digit preference score of the survey teams was classified as "excellent" for all anthropometric measurements. The sex ratio was within accepted limits, while the age ratio vas slightly above the limit of 0.85, but not significantly different.. Standards Deviations[5] are within accepted limits.

The summary of the Mean Z-scores with their Standard Deviations, the design effects and number of the out of range data per index is the table 10 below. There were all within accepted limits and values.

Table 10: Mean z-scores, Design Effects and excluded subjects, Panjshir SMART, April 2016.

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	820	-0.49±1.08	1.09	3	29
Weight-for-Age	839	-1.21±1.07	1.52	0	13
Height-for-Age	814	-1.54±1.17	1.33	1	37

Maternal nutritional status

660 women in childbearing age (15-49 years) living in the selected households have been surveyed. The results are presented (see table 11) as a proportion from the total number of measured using MUAC cut-off of 210 mm and 230 mm. While to classify the early referrals and OPD-MAM enrolment criteria the unique cut-off of 230 mm is used, in Afghanistan the cut-offs of 210 mm is mostly used to make distinction of early and late referrals at community level. If many of the PLWs for example are referred to OPD-MAM with MUAC below 210 mm, it is an indication of low performance of the community screenings to early detection of cases and low health seeking behaviour among this category.

Table 11: Nutritional status of women in reproductive age 15-49 years (n=660) based on MUAC measurements, Panjshir SMART, April 2016.

	Frequency	Results (%)
Global acute malnutrition MUAC < 230 mm	157	23.8
Moderate acute malnutrition MUAC >210mm and <230 mm	126	18.9
Severe Acute Malnutrition MUAC < 210mm	31	4.8
Normal MUAC ≥ 230 mm	503	76.2

[5] http://www.who.int/nutgrowthdb/about/introduction/en/index5.html

Crude and under five Mortality Rates

The crude and under five mortality rates were below the emergency threshold.

Table 12: Mortality rates, Panjshir SMART April 2016

Definition	Results (95 % CI
CMR (total deaths/10,000 people / day)	0.58 (0.33-1.03)
U5MR (deaths in children under-5/10,000 children under-5/day)	1.18 (0.59-2.36)

Child Health and immunization

Retrospective morbidity data was collected among 925 children 0 -59 months (two weeks recall) to assess the prevalence of main diseases. The survey findings revealed that 70.7% of the children had at least one episode of illness in the 2 weeks prior to the survey. The major illnesses reported include fever, diarrhea and ARI as highlighted in table 14. The caregivers of 145 children (15,7%) declared they all of those three symptoms at once.

Table 13: Major illness reported among under-fives, n=925, Panjshir SMART, April 2016.

Parameter	Frequency	Results (%)
Acute respiratory Infection (ARI)	449	48.5
Fever	510	55.1
Diarrhoea	270	29.1

Immunization coverage for BCG and measles vaccination was above the 80% target as highlighted in table 15 below.

Table 14: Immunization coverage, Panjshir SMART, April 2016

Indicators	Class	Frequency	Results %
Measles (children from 9-59 months) (n=800)	Yes by cards	333	41.6
	Yes by recall	400	50
	No	65	8.1
	Don't Know	2	0.3
	Yes Card and Recall	**733**	**91.6**
Polio (children 0-59 months)(n=925)	Yes by cards	435	47.0
	Yes by recall	443	47.9
	No	44	4.8
	Don't Know	3	0.3
	Yes Card and Recall	**878**	**94.9**
BCG scare (children 0-59 months) (n=925)	**By scar**	**880**	**95.1**

While the vitamin A supplementation was quite satisfactory, deworming found to be significantly low (table 16 below).

Table 15: vitamin A supplementation and Deworming coverage, Panjshir SMART, April 2016

Indicators	Class	Frequency	Results %
Vitamin A supplementation among children 6-59 months (n=852)	**Yes**	**761**	**89.3**
	No	90	10.6
	Don't Know	1	0.1
Deworming among children 12-59 months (n=749)	**Yes**	**432**	**57.7**
	No	308	41.1
	Don't Know	9	1.2

CONCLUSION

The survey findings revealed that the prevalence of Global Acute Malnutrition (GAM) based on weight-for-height z-scores (WHZ) was at 8.7 % (95 % CI 6.8-11.0) indicating a "poor" nutrition situation, and the prevalence of GAM based on MUAC cut-offs was 10.8 % (8.4-13.8 95% CI) can be classified as "serious" according to WHO classification of acute malnutrition[6]. SAM prevalence by WHZ and MUAC was at 1.6% and 2.8% respectively.

Further analysis of the data suggests that these rates do not refer to the same children. Children classified as wasted based WHZ are not fully overlapping with those classified wasted based on MUAC. If both criteria are combined, overall rate of children likely to be eligible for SAM and MAM management rises to 17.7% (95% CI 15.2-20.3). SAM combined rates is estimated to be 5.5% (4.0-7.0 95% CI). It's recommended to use the combined rates for estimation of GAM and SAM in the province for program design and caseload calculation.

Crude Death Rate and Under-five Death rate was at 0.58/10,000/day and 1.18/10,000/per day. The rates are both below SPHERE emergency thresholds.

In conclusion the survey has indicated that there is a problem of malnutrition in Panjshir province. From the results presented above it is notable that although the different measures of malnutrition (WHZ and MUAC) are indicating a poor and serious nutrition situation respectively, a combination of these results/measures indicate that the number of cases found malnourished is high in the province. It is also noted that cases of child morbidity are high in the province; more than 1 in 2 children was reported ill.

Stunting and underweight prevalence in Panjshir can be considered to be high. Although they are much lower than the national rates as reported by NNS 2013 and lower than most of the other provinces assessed. It is important however to enhance efforts to ensure that they do not increase. Poor micronutrient supplementation and deworming, low maternal nutritional status as witnessed in Panjshir if not addressed can contribute to increasing the levels of chronic malnutrition. The fact that chronic malnutrition is not given the attention in the health facilities could be a factor exacerbating the situation. Currently there is no clear guidance in Afghanistan on how to address chronic malnutrition.

[6] WHO acute malnutrition classification : <5% acceptable, 5-9 % poor, 10-14 % serious, >15 % critical

RECOMMENDATION

The summary of recommendations is as below:

Under Nutrition

- Support women and their families to practice optimal breastfeeding and ensure timely and adequate complementary feeding through provision of IYCF programs at facility and community levels.
- Support nutrition relevant aspects of availability, access, as well as the utilization of nutritious and diverse foods through integrated programming
- Prioritize activities addressing chronic malnutrition, high stunting rates, at the community level, through food security/agricultural, nutrition cooking demonstrations, IYCF, appropriate supplementation, growth monitoring, and improving maternal health and nutrition.
- Advocate for an integrated approach within the health system to ensure monitoring of chronic malnutrition, growth monitoring and promotion, at the health facility and primarily community level.
- To scale up IPD-SAM and implement OPD-SAM and OPD-MAM management at CHCs and BHCs level to treat and prevent acute malnutrition cases as this is currently not available in the province.
-

Maternal nutrition status

- To increase awareness program on nutrition and antenatal care (ANC)
- To provide health education and focus on environmental hygiene and nutrition.

Health and Immunization

- Promote proper hygiene and care seeking practices at facility and community levels to reduce child morbidity.
- Advocate for increased the number of Health Facilities, outreach activities for enhanced coverage.

ANNEXES

Annex 1: Plausibility Data check report.

Plausibility check for: AFG_PANJSHIR_SMART_04_2016.as

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

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

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	Score
Flagged data	Incl	%	0-2.5	>2.5-5.0	>5.0-7.5	>7.5	
(% of out of range subjects)			0	5	10	20	**5** (3.4 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**0** (p=0.451)
Age ratio(6-29 vs 30-59)	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**0** (p=0.202)
Dig pref score - weight	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (4)
Dig pref score - height	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (5)
Dig pref score - MUAC	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (5)
Standard Dev WHZ	Excl	SD	<1.1	<1.15	<1.20	>=1.20	
.				And	or		
.	Excl	SD	>0.9	>0.85	>0.80	<=0.80	
			0	5	10	20	**0** (1.08)
Skewness WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (-0.16)
Kurtosis WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (-0.06)
Poisson dist. WHZ-2	Excl	p	>0.05	>0.01	>0.001	<=0.001	
			0	1	3	5	**0** (p=0.192)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	**5** %

The overall score of this survey is 5 %, this is excellent.

There were no duplicate entries detected.

Percentage of children with no exact birthday: 55 %

Age/Height out of range for WHZ:

HEIGHT:

Line=583/ID=2: 26.70 cm

Line=584/ID=3: 26.10 cm

Line=677/ID=2: 169.20 cm

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=45/ID=2: **WHZ (-3.621)**, Weight may be incorrect

Line=58/ID=1: **WHZ (-4.422)**, Weight may be incorrect

Line=77/ID=2: HAZ (-4.799), Age may be incorrect

Line=184/ID=1: HAZ (1.452), Height may be incorrect

Line=218/ID=1: **WHZ (-3.496)**, Weight may be incorrect

Line=250/ID=3: **WHZ (-3.853)**, Weight may be incorrect

Line=264/ID=3: **WHZ (5.941)**, HAZ (-6.742), Height may be incorrect

Line=269/ID=2: HAZ (-4.714), Age may be incorrect

Line=270/ID=1: **WHZ (-5.644)**, HAZ (5.881), Height may be incorrect

Line=273/ID=1: **WHZ (-3.600)**, Weight may be incorrect

Line=316/ID=1: **WHZ (-6.642)**, HAZ (-7.511), WAZ (-7.216)

Line=319/ID=1: HAZ (-6.284), Age may be incorrect

Line=324/ID=1: **WHZ (3.174)**, Weight may be incorrect

Line=335/ID=2: HAZ (-4.787), Age may be incorrect

Line=348/ID=1: HAZ (2.092), Height may be incorrect

Line=350/ID=2: **WHZ (2.669)**, Weight may be incorrect

Line=356/ID=1: **WHZ (3.845)**, WAZ (1.839), Weight may be incorrect

Line=360/ID=1: **WHZ (3.179)**, WAZ (2.226), Weight may be incorrect

Line=419/ID=1: HAZ (3.100), Age may be incorrect

Line=441/ID=2: HAZ (-4.729), Age may be incorrect

Line=447/ID=1: **WHZ (-6.243)**, WAZ (-4.320), Weight may be incorrect

Line=457/ID=1: HAZ (-4.907), Age may be incorrect

Line=464/ID=2: **WHZ (-5.149)**, HAZ (-4.747), WAZ (-5.586)

Line=480/ID=3: **WHZ (-3.578)**, Weight may be incorrect

Line=518/ID=2: HAZ (1.385), Age may be incorrect

Line=521/ID=1: HAZ (-4.677), Age may be incorrect

Line=532/ID=1: HAZ (-4.641), Age may be incorrect

Line=583/ID=2: HAZ (-17.890), Height may be incorrect

Line=584/ID=3: HAZ (-18.220), Height may be incorrect

Line=598/ID=2: HAZ (-5.061), Age may be incorrect

Line=603/ID=1: HAZ (-4.910), Height may be incorrect

Line=612/ID=2: HAZ (2.287), Age may be incorrect

Line=629/ID=1: **WHZ (2.614)**, HAZ (-6.700), Height may be incorrect
Line=648/ID=2: HAZ (2.072), Age may be incorrect
Line=651/ID=1: HAZ (-4.686), Age may be incorrect
Line=657/ID=1: HAZ (-4.785), Age may be incorrect
Line=660/ID=1: **WHZ (3.397)**, HAZ (-7.690), Height may be incorrect
Line=662/ID=1: HAZ (2.041), Age may be incorrect
Line=708/ID=2: HAZ (-6.471), Age may be incorrect
Line=767/ID=1: **WHZ (-6.192)**, WAZ (-4.611), Weight may be incorrect
Line=780/ID=2: **WHZ (-4.030)**, Weight may be incorrect
Line=782/ID=1: **WHZ (-3.500)**, HAZ (-5.310), WAZ (-4.906)
Line=786/ID=2: HAZ (3.145), WAZ (1.831), Age may be incorrect
Line=787/ID=1: **WHZ (5.005)**, Weight may be incorrect
Line=794/ID=2: HAZ (-5.059), Age may be incorrect
Line=807/ID=2: HAZ (-7.002), Height may be incorrect
Line=809/ID=1: HAZ (1.753), Age may be incorrect
Line=820/ID=1: HAZ (-7.134), WAZ (-4.524), Age may be incorrect
Line=823/ID=2: **WHZ (-4.248)**, WAZ (-5.006), Weight may be incorrect
Line=830/ID=1: HAZ (1.553), Age may be incorrect
Line=832/ID=1: **WHZ (3.529)**, Weight may be incorrect
Line=857/ID=3: **WHZ (-3.867)**, WAZ (-4.714), Weight may be incorrect
Line=871/ID=1: **WHZ (2.826)**, Height may be incorrect
Line=885/ID=1: **WHZ (5.798)**, WAZ (2.564), Weight may be incorrect
Line=888/ID=1: **WHZ (-3.680)**, HAZ (-7.091), WAZ (-5.891)
Line=909/ID=1: **WHZ (4.063)**, HAZ (-5.502), Height may be incorrect
Line=919/ID=1: **WHZ (2.720)**, Weight may be incorrect
Percentage of values flagged with SMART flags:WHZ: 3.4 %, HAZ: 4.3 %, WAZ: 1.5 %
Age distribution:
Month 6 : ##########
Month 7 : ##################
Month 8 : ##################
Month 9 : ###########
Month 10 : ###########
Month 11 : ####################
Month 12 : ################
Month 13 : ########################
Month 14 : ################
Month 15 : ##############
Month 16 : ################
Month 17 : ###########
Month 18 : ##############################
Month 19 : ##########
Month 20 : ########
Month 21 : ##########
Month 22 : ###########
Month 23 : ########################
Month 24 : ##
Month 25 : ####################
Month 26 : ################
Month 27 : #########
Month 28 : ###########
Month 29 : ###########
Month 30 : ########################
Month 31 : ###########
Month 32 : ###############
Month 33 : ##############
Month 34 : ##############
Month 35 : ####################
Month 36 : ##################################
Month 37 : ##############
Month 38 : ################
Month 39 : ########
Month 40 : ############
Month 41 : #######
Month 42 : ####################
Month 43 : #########
Month 44 : ######
Month 45 : #######
Month 46 : ###########
Month 47 : ########################
Month 48 : ##
Month 49 : ################
Month 50 : ##########
Month 51 : ###
Month 52 : ###########
Month 53 : ##########
Month 54 : ##########
Month 55 : ###########
Month 56 : #########

Month 57 : ########
Month 58 : ##########
Month 59 : ##################
Age ratio of 6-29 months to 30-59 months: 0.93 (The value should be around 0.85).:
p-value = 0.202 (as expected)

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

Age cat.	mo.	Boys	girls	total	ratio boys/girls
6 to 17	12	107/101.4 (1.1)	99/96.3 (1.0)	206/197.7 (1.0)	1.08
18 to 29	12	104/98.9 (1.1)	100/93.9 (1.1)	204/192.7 (1.1)	1.04
30 to 41	12	98/95.8 (1.0)	102/91.0 (1.1)	200/186.8 (1.1)	0.96
42 to 53	12	89/94.3 (0.9)	80/89.5 (0.9)	169/183.8 (0.9)	1.11
54 to 59	6	39/46.6 (0.8)	34/44.3 (0.8)	73/90.9 (0.8)	1.15
6 to 59	54	437/426.0 (1.0)	415/426.0 (1.0)		1.05

The data are expressed as observed number/expected number (ratio of obs/expect)
Overall sex ratio: p-value = 0.451 (boys and girls equally represented)
Overall age distribution: p-value = 0.154 (as expected)
Overall age distribution for boys: p-value = 0.703 (as expected)
Overall age distribution for girls: p-value = 0.266 (as expected)
Overall sex/age distribution: p-value = 0.096 (as expected)

Digit preference Weight:

Digit .0 : ##################################
Digit .1 : ##################################
Digit .2 : ##
Digit .3 : ##
Digit .4 : ##
Digit .5 : ##
Digit .6 : ##
Digit .7 : ##################################
Digit .8 : ##
Digit .9 : ##
Digit preference score: **4** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)
p-value for chi2: 0.098

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: **5** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)
p-value for chi2: 0.010 (significant difference)

Digit preference MUAC:

Digit .0 : ##
Digit .1 : ##
Digit .2 : ##
Digit .3 : ##
Digit .4 : ##
Digit .5 : ##
Digit .6 : ####################################
Digit .7 : ####################################
Digit .8 : ##################################
Digit .9 : ##
Digit preference score: **5** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)
p-value for chi2: 0.028 (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:	1.32	1.20	1.08
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	10.2%	9.8%	8.7%
calculated with current SD:	12.7%	10.3%	8.0%
calculated with a SD of 1:	6.6%	6.5%	6.5%
HAZ			
Standard Deviation SD:	1.64	1.32	1.17
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	36.8%	36.0%	35.3%
calculated with current SD:	41.3%	36.6%	34.6%
calculated with a SD of 1:	36.0%	32.4%	32.2%
WAZ			

Standard Deviation SD:	1.16	1.15	1.07
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	21.8%	21.7%	21.1%
calculated with current SD:	25.5%	25.0%	23.0%
calculated with a SD of 1:	22.2%	22.0%	21.4%

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

WHZ	p= 0.000	p= 0.000	p= 0.019
HAZ	p= 0.000	p= 0.000	p= 0.010
WAZ	p= 0.000	p= 0.000	p= 0.000

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

Skewness

WHZ	-0.09	-0.03	-0.16
HAZ	-2.56	0.15	-0.06
WAZ	-0.55	-0.42	-0.31

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	3.15	0.85	-0.06
HAZ	24.09	1.25	-0.42
WAZ	1.34	0.75	-0.02

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=1.18 (p=0.192)
WHZ < -3: ID=1.53 (p=0.012)
GAM: ID=1.18 (p=0.192)
SAM: ID=1.53 (p=0.012)
HAZ < -2: ID=1.16 (p=0.218)
HAZ < -3: ID=1.43 (p=0.030)
WAZ < -2: ID=1.36 (p=0.050)
WAZ < -3: ID=1.29 (p=0.092)

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

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

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

```
Time                                        SD for WHZ
point                0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
01: 1.25 (n=47, f=1) ###################
02: 1.39 (n=42, f=4) ########################
03: 1.76 (n=44, f=3) ########################################
04: 1.38 (n=41, f=1) ########################
05: 1.14 (n=43, f=0) ##############
06: 1.28 (n=44, f=2) ####################
07: 1.36 (n=46, f=1) ########################
08: 1.30 (n=44, f=3) ####################
09: 1.23 (n=44, f=0) ##################
10: 1.41 (n=40, f=2) ############################
11: 1.24 (n=45, f=2) ##################
12: 1.42 (n=40, f=1) ############################
13: 1.43 (n=39, f=1) ############################
14: 0.95 (n=40, f=0) ######
15: 0.98 (n=37, f=0) ########
16: 1.40 (n=34, f=2) ########################
17: 1.71 (n=36, f=3) ######################################
18: 0.84 (n=35, f=0) #
19: 1.34 (n=30, f=1) ######################
20: 1.19 (n=21, f=0) OOOOOOOOOOOOOOO
21: 1.40 (n=17, f=1) OOOOOOOOOOOOOOOOOOOOOOOO
22: 0.95 (n=14, f=0) OOOOOO
```

```
23: 1.07 (n=10, f=0)  ~~~~~~~~~~~
24: 1.70 (n=05, f=0)  ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
25: 0.65 (n=05, f=0)
26: 3.43 (n=02, f=1)  ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
27: 1.28 (n=02, f=0)  ~~~~~~~~~~~~~~~~~~~~
28: 0.88 (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 =	125	137	167	155	151	117
Percentage of values flagged with SMART flags:						
WHZ:	3.2	1.5	3.7	6.5	4.0	3.4
HAZ:	4.8	2.2	3.6	8.4	4.0	3.4
WAZ:	0.0	0.0	1.2	3.9	2.0	1.7
Age ratio of 6-29 months to 30-59 months:						
	0.89	0.90	0.92	0.87	1.10	0.89
Sex ratio (male/female):						
	1.02	0.96	1.01	0.91	1.29	1.21
Digit preference Weight (%):						
.0 :	6	8	6	10	11	14
.1 :	7	6	10	6	11	12
.2 :	13	4	10	14	9	9
.3 :	6	9	13	8	18	15
.4 :	16	17	11	10	11	12
.5 :	18	4	10	10	7	11
.6 :	7	16	8	9	11	9
.7 :	6	8	11	10	6	7
.8 :	10	16	11	13	9	8
.9 :	10	11	11	10	9	4
DPS:	14	15	6	6	11	11

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

Digit preference Height (%):						
.0 :	6	26	5	8	10	18
.1 :	15	9	10	10	19	12
.2 :	10	12	16	6	6	8
.3 :	12	10	7	15	9	10
.4 :	7	7	10	9	16	7
.5 :	11	20	16	7	8	11
.6 :	7	5	10	10	13	3
.7 :	11	4	9	8	2	16
.8 :	13	4	5	14	8	3
.9 :	8	2	12	12	9	11
DPS:	9	24	12	10	15	15

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

Digit preference MUAC (%):						
.0 :	10	24	9	6	6	12
.1 :	10	6	11	15	8	9
.2 :	7	13	9	6	17	11
.3 :	8	8	12	15	14	11
.4 :	15	7	16	6	8	6
.5 :	15	20	8	7	11	18
.6 :	10	7	9	10	13	4
.7 :	10	7	10	8	5	11
.8 :	10	3	7	10	11	3
.9 :	6	4	10	16	8	15
DPS:	9	22	8	13	12	14

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

Standard deviation of WHZ:						
SD	1.32	1.00	1.28	1.55	1.40	1.21
Prevalence (< -2) observed:						
%	10.4		11.0	13.5	9.3	7.7
Prevalence (< -2) calculated with current SD:						
%	13.8		12.0	18.4	10.2	11.1
Prevalence (< -2) calculated with a SD of 1:						
%	7.5		6.6	8.2	3.7	6.9

Standard deviation of HAZ:						
SD	1.53	1.32	2.23	1.57	1.33	1.42
observed:						
%	34.4	34.3	40.4	47.1	27.8	35.0
calculated with current SD:						
%	37.9	35.2	46.1	51.6	31.3	37.3
calculated with a SD of 1:						
%	31.8	30.9	41.3	52.6	25.8	32.3

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	15/14.6 (1.0)	12/14.4 (0.8)	27/29.0 (0.9)		1.25
18 to 29	12	14/14.3 (1.0)	18/14.0 (1.3)	32/28.3 (1.1)		0.78
30 to 41	12	21/13.8 (1.5)	16/13.6 (1.2)	37/27.4 (1.4)		1.31
42 to 53	12	10/13.6 (0.7)	12/13.4 (0.9)	22/27.0 (0.8)		0.83
54 to 59	6	3/6.7 (0.4)	4/6.6 (0.6)	7/13.3 (0.5)		0.75
6 to 59	54	63/62.5 (1.0)	62/62.5 (1.0)			1.02

The data are expressed as observed number/expected number (ratio of obs/expect)
Overall sex ratio: p-value = 0.929 (boys and girls equally represented)
Overall age distribution: p-value = 0.095 (as expected)
Overall age distribution for boys: p-value = 0.149 (as expected)
Overall age distribution for girls: p-value = 0.537 (as expected)
Overall sex/age distribution: p-value = 0.042 (significant difference)

Team 2:

Age cat.	mo.	boys	girls	total		ratio boys/girls
6 to 17	12	18/15.5 (1.2)	17/16.2 (1.0)	35/31.8 (1.1)		1.06
18 to 29	12	14/15.2 (0.9)	16/15.8 (1.0)	30/31.0 (1.0)		0.88
30 to 41	12	14/14.7 (1.0)	16/15.3 (1.0)	30/30.0 (1.0)		0.88
42 to 53	12	19/14.5 (1.3)	14/15.1 (0.9)	33/29.6 (1.1)		1.36
54 to 59	6	2/7.2 (0.3)	7/7.5 (0.9)	9/14.6 (0.6)		0.29
6 to 59	54	67/68.5 (1.0)	70/68.5 (1.0)			0.96

The data are expressed as observed number/expected number (ratio of obs/expect)
Overall sex ratio: p-value = 0.798 (boys and girls equally represented)
Overall age distribution: p-value = 0.572 (as expected)
Overall age distribution for boys: p-value = 0.227 (as expected)
Overall age distribution for girls: p-value = 0.996 (as expected)
Overall sex/age distribution: p-value = 0.217 (as expected)

Team 3:

Age cat.	mo.	boys	girls	total		ratio boys/girls
6 to 17	12	21/19.5 (1.1)	18/19.3 (0.9)	39/38.7 (1.0)		1.17
18 to 29	12	20/19.0 (1.1)	21/18.8 (1.1)	41/37.8 (1.1)		0.95
30 to 41	12	18/18.4 (1.0)	26/18.2 (1.4)	44/36.6 (1.2)		0.69
42 to 53	12	15/18.1 (0.8)	13/17.9 (0.7)	28/36.0 (0.8)		1.15
54 to 59	6	10/9.0 (1.1)	5/8.9 (0.6)	15/17.8 (0.8)		2.00
6 to 59	54	84/83.5 (1.0)	83/83.5 (1.0)			1.01

The data are expressed as observed number/expected number (ratio of obs/expect)
Overall sex ratio: p-value = 0.938 (boys and girls equally represented)
Overall age distribution: p-value = 0.405 (as expected)
Overall age distribution for boys: p-value = 0.933 (as expected)
Overall age distribution for girls: p-value = 0.152 (as expected)
Overall sex/age distribution: p-value = 0.111 (as expected)

Team 4:

Age cat.	mo.	boys	girls	total		ratio boys/girls
6 to 17	12	17/17.2 (1.0)	19/18.8 (1.0)	36/36.0 (1.0)		0.89
18 to 29	12	19/16.7 (1.1)	17/18.3 (0.9)	36/35.1 (1.0)		1.12
30 to 41	12	16/16.2 (1.0)	17/17.8 (1.0)	33/34.0 (1.0)		0.94
42 to 53	12	14/16.0 (0.9)	19/17.5 (1.1)	33/33.4 (1.0)		0.74
54 to 59	6	8/7.9 (1.0)	9/8.6 (1.0)	17/16.5 (1.0)		0.89
6 to 59	54	74/77.5 (1.0)	81/77.5 (1.0)			0.91

The data are expressed as observed number/expected number (ratio of obs/expect)
Overall sex ratio: p-value = 0.574 (boys and girls equally represented)
Overall age distribution: p-value = 0.999 (as expected)
Overall age distribution for boys: p-value = 0.968 (as expected)
Overall age distribution for girls: p-value = 0.991 (as expected)
Overall sex/age distribution: p-value = 0.889 (as expected)

Team 5:

Age cat.	mo.	boys	girls	total		ratio boys/girls
6 to 17	12	25/19.7 (1.3)	18/15.3 (1.2)	43/35.0 (1.2)		1.39
18 to 29	12	21/19.2 (1.1)	15/14.9 (1.0)	36/34.2 (1.1)		1.40
30 to 41	12	18/18.6 (1.0)	16/14.5 (1.1)	34/33.1 (1.0)		1.13
42 to 53	12	16/18.3 (0.9)	12/14.2 (0.8)	28/32.6 (0.9)		1.33
54 to 59	6	5/9.1 (0.6)	5/7.0 (0.7)	10/16.1 (0.6)		1.00
6 to 59	54	85/75.5 (1.1)	66/75.5 (0.9)			1.29

The data are expressed as observed number/expected number (ratio of obs/expect)
Overall sex ratio: p-value = 0.122 (boys and girls equally represented)
Overall age distribution: p-value = 0.298 (as expected)
Overall age distribution for boys: p-value = 0.445 (as expected)
Overall age distribution for girls: p-value = 0.813 (as expected)
Overall sex/age distribution: p-value = 0.093 (as expected)

Team 6:

Age cat.	mo.	boys	girls	total		ratio boys/girls

6 to 17	12	11/14.8 (0.7)	15/12.3 (1.2)	26/27.1 (1.0)	0.73
18 to 29	12	16/14.5 (1.1)	13/12.0 (1.1)	29/26.5 (1.1)	1.23
30 to 41	12	11/14.0 (0.8)	11/11.6 (0.9)	22/25.7 (0.9)	1.00
42 to 53	12	15/13.8 (1.1)	10/11.4 (0.9)	25/25.2 (1.0)	1.50
54 to 59	6	11/6.8 (1.6)	4/5.7 (0.7)	15/12.5 (1.2)	2.75
6 to 59	54	64/58.5 (1.1)	53/58.5 (0.9)		1.21

The data are expressed as observed number/expected number (ratio of obs/expect)
Overall sex ratio: p-value = 0.309 (boys and girls equally represented)
Overall age distribution: p-value = 0.858 (as expected)
Overall age distribution for boys: p-value = 0.347 (as expected)
Overall age distribution for girls: p-value = 0.848 (as expected)
Overall sex/age distribution: p-value = 0.128 (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: 1.20 (n=08, f=0)  ################
02: 1.77 (n=08, f=1)  ########################################
03: 1.15 (n=08, f=0)  ###############
04: 1.16 (n=06, f=0)  ###############
05: 0.72 (n=07, f=0)
06: 1.47 (n=08, f=1)  ############################
07: 1.88 (n=08, f=1)  ############################################
08: 0.72 (n=07, f=0)
09: 1.28 (n=08, f=0)  ####################
10: 0.95 (n=07, f=0)  ######
11: 1.19 (n=08, f=0)  ##################
12: 0.63 (n=07, f=0)
13: 1.22 (n=07, f=0)  ##################
14: 1.10 (n=05, f=0)  OOOOOOOOOOOO
15: 0.66 (n=05, f=0)
16: 1.37 (n=05, f=0)  OOOOOOOOOOOOOOOOOOOOOOO
17: 3.42 (n=04, f=1)  OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
18: 1.00 (n=05, f=0)  OOOOOOOO
19: 0.42 (n=03, f=0)
(when n is much less than the average number of subjects per cluster different symbols are
used: 0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags
found in the different time points)
```

Team: 2

```
Time                                          SD for WHZ
point                0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
01: 1.62 (n=08, f=1)  ##################################
02: 1.09 (n=07, f=0)  ############
03: 1.31 (n=08, f=0)  ######################
04: 0.66 (n=07, f=0)
05: 0.92 (n=07, f=0)  #####
06: 0.68 (n=08, f=0)
07: 1.01 (n=08, f=0)  #########
08: 1.21 (n=08, f=0)  ##################
09: 1.07 (n=07, f=0)  ############
10: 0.74 (n=07, f=0)
11: 0.93 (n=06, f=0)  #####
12: 0.50 (n=07, f=0)
13: 0.39 (n=06, f=0)
14: 1.19 (n=07, f=0)  #################
15: 0.46 (n=05, f=0)
16: 0.98 (n=05, f=0)  ########
17: 1.16 (n=05, f=0)  ################
18: 0.25 (n=04, f=0)
19: 0.71 (n=05, f=0)
20: 1.88 (n=03, f=0)  OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
21: 0.94 (n=04, f=0)  OOOOOO
22: 0.23 (n=02, f=0)
23: 0.99 (n=03, f=0)  OOOOOOOO

(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: 0.76 (n=08, f=0)
02: 0.72 (n=08, f=0)
03: 1.04 (n=08, f=0)  ##########
04: 1.37 (n=07, f=0)  ########################
05: 1.15 (n=06, f=0)  ################
```

```
06: 1.36 (n=07, f=0)  ######################
07: 0.96 (n=08, f=0)  #######
08: 1.49 (n=08, f=0)  ############################
09: 1.27 (n=08, f=0)  ####################
10: 1.00 (n=07, f=0)  ########
11: 1.06 (n=08, f=1)  ###########
12: 0.72 (n=07, f=0)
13: 2.67 (n=06, f=1)  ##################################################################
14: 0.71 (n=08, f=0)
15: 1.26 (n=08, f=0)  ###################
16: 1.54 (n=07, f=0)  ##############################
17: 1.16 (n=08, f=0)  ###############
18: 0.92 (n=08, f=0)  #####
19: 1.33 (n=06, f=0)  ######################
20: 1.41 (n=05, f=0)  ########################
21: 2.28 (n=05, f=1)  ##################################################################
22: 0.72 (n=04, f=0)
23: 0.80 (n=03, f=0)
25: 0.12 (n=02, f=0)
(when n is much less than the average number of subjects per cluster different symbols are
used: 0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags
found in the different time points)
```

Team: 4

```
Time                                          SD for WHZ
point               0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
01: 1.01 (n=08, f=0)  #########
02: 1.96 (n=08, f=2)  ##################################################
03: 2.23 (n=08, f=1)  ############################################################
04: 0.98 (n=08, f=0)  ########
05: 1.45 (n=08, f=0)  ############################
06: 1.92 (n=08, f=1)  ################################################
07: 0.80 (n=08, f=0)
08: 0.89 (n=08, f=0)  ####
09: 1.41 (n=07, f=0)  ############################
10: 2.40 (n=08, f=1)  ##################################################################
11: 0.86 (n=08, f=0)  ###
12: 2.60 (n=08, f=1)  ##################################################################
13: 1.06 (n=07, f=0)  ###########
14: 0.98 (n=07, f=0)  ########
15: 1.26 (n=06, f=0)  ###################
16: 1.87 (n=06, f=1)  ################################################
17: 2.11 (n=06, f=1)  ##########################################################
18: 0.91 (n=06, f=0)  #####
19: 2.01 (n=06, f=1)  ##################################################
20: 1.02 (n=05, f=0)  OOOOOOOOO
21: 0.63 (n=04, f=0)
22: 1.25 (n=04, f=0)  OOOOOOOOOOOOOOOOOO
24: 1.00 (n=02, f=0)  ~~~~~~~~
(when n is much less than the average number of subjects per cluster different symbols are
used: 0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags
found in the different time points)
```

Team: 5

```
Time                                          SD for WHZ
point               0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
01: 1.14 (n=08, f=0)  ##############
02: 1.64 (n=05, f=1)  ###################################
03: 3.47 (n=06, f=2)  ##################################################################
04: 1.71 (n=07, f=0)  ########################################
05: 1.37 (n=08, f=0)  ########################
06: 0.90 (n=07, f=0)  ####
07: 1.32 (n=07, f=0)  ######################
08: 1.57 (n=07, f=0)  ################################
09: 1.11 (n=07, f=0)  ############
10: 1.46 (n=05, f=0)  ############################
11: 0.75 (n=08, f=0)
12: 1.94 (n=06, f=0)  ##################################################
13: 1.20 (n=07, f=0)  ################
14: 0.65 (n=07, f=0)
15: 0.75 (n=07, f=0)
16: 1.31 (n=06, f=0)  ####################
17: 0.86 (n=07, f=0)  ###
18: 1.05 (n=07, f=0)  ###########
19: 1.72 (n=07, f=0)  ########################################
20: 1.13 (n=07, f=0)  ##############
21: 1.23 (n=03, f=0)  OOOOOOOOOOOOOOOOO
22: 0.98 (n=03, f=0)  OOOOOOOO
23: 2.14 (n=02, f=0)  ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
24: 1.45 (n=02, f=0)  ~~~~~~~~~~~~~~~~~~~~~~~~~~
25: 0.87 (n=02, f=0)  ~~~
(when n is much less than the average number of subjects per cluster different symbols are
```

used: 0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags found in the different time points)

Team: 6

```
Time                                                SD for WHZ
point                 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
01: 0.86 (n=07, f=0)  ##
02: 1.08 (n=06, f=0)  ############
03: 1.17 (n=06, f=0)  ################
04: 1.95 (n=06, f=1)  ##################################################
05: 1.19 (n=07, f=0)  ################
06: 1.12 (n=06, f=0)  ##############
07: 1.69 (n=07, f=0)  ####################################
08: 1.44 (n=06, f=1)  ##########################
09: 1.25 (n=07, f=0)  ###################
10: 0.86 (n=06, f=0)  ###
11: 1.62 (n=07, f=1)  ###################################
12: 0.79 (n=05, f=0)
13: 0.84 (n=06, f=0)  #
14: 1.00 (n=06, f=0)  ########
15: 0.63 (n=06, f=0)
16: 1.37 (n=05, f=0)  ########################
17: 1.37 (n=06, f=1)  ########################
18: 0.30 (n=05, f=0)
19: 0.53 (n=03, f=0)
```

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

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