Integrated Nutrition SMART Survey Preliminary Report

Ghazni Province, Afghanistan

18th January to 6th February, 2016

Funded by: OCHA

Medical Management and Research Courses for Afghanistan (MMRC-A), Organization for Research & Community Development (ORCD) with the technical support of Action Contre la Faim (ACF)

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

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ABBREVIATIONS

ACF	Action Contre la Faim/Action Against Hunger
BCG	Bacillus Calmette Guerin
BHC	Basic Health Center
BPHS	Basic Package of Health Services
CDR	Crude Death Rate
CHC	Comprehensive Health Center
CHF	Common Humanitarians Fund
DH	District Hospital
ENA	Emergency Nutrition Assessment
EPHS	Essential Package Health Services
EPI	Expanded Programme for Immunization
GAM	Global Acute Malnutrition
HAZ	Height for Age
HH	Household
MM	Millimeter
MMRCA	Medical Management and Research Courses Afghanistan (MMRC-A)
MOPH	Ministry of Public Health
MUAC	Mid Upper Arm Circumference
ORCD	Organization for Research & Community Development (ORCD)
SAM	Severe Acute Malnutrition
SD	Standard Deviation
SMART	Standardized Monitoring and Assessment of Relief Transition
U5DR	Under five Death Rate
WASH	Water Sanitation and Hygiène
WFP	World Food Programme
WHO	World Health Organisation
WHZ	Weight for Height

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EXECUTIVE SUMMARY

The integrated nutrition SMART[1] survey was conducted on 18th January to 6th February, 2016 in 12 districts of Ghazni Province. A total of 622 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 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), Infant and Young Child Feeding (IYCF) practices, household demographic and Food Security and Livelihood (FSL). The final report will be disseminated to the wider stakeholders after validation process scheduled to complete in month of March, 2016.

Summary findings

- 622 households assessed with 1069 children under-5 and 723 women in childbearing age
- Global Acute Malnutrition (GAM) prevalence based on Weight-for-Height Z-scores (WHZ) was at 10.3 % (8.2 - 12.8 95% C.I.) and Severe Acute Malnutrition (SAM) was at 3.2 % (2.0 - 5.0 95% C.I.) respectively. Prevalence of confirmed one case of oedema was at 0.1%.
- GAM and SAM prevalence based on Mid-Upper Arm Circumference (MUAC) was at 14.3 % (11.2-18.1 95% C.I.) and 3.6% (2.3 - 5.6 95% C.I.) respectively.
- GAM prevalence by WHZ <-2 z-scores and/or MUAC<125 mm and/or the presence of bilateral oedema is 19.6% (17.0-22.1 95% C.I.) and SAM of 7.4% (5.7-9.1 95% C.I.) respectively
- Crude Death Rate (CDR) and Under-five Death Rate (U5DR) was at 0.50 (0.33-0.78 95% CI) and 1.61 (1.06-2.42 95% CI) respectively.
- Prevalence based on stunting was at 39.2 %(34.6 - 44.0 95% C.I.) and severe stunting was 18.4 % (15.5 - 21.7 95%CI) respectively.
- Prevalence of underweight was 24.6% (20.8 - 28.7 95% C.I) and severe underweight was 8.9% (6.8 - 11.7 95% C.I) respectively
- The nutritional status women in childbearing age based on MUAC cut off <230 mm was at 24,4%.

[1] Standardized Monitoring of Assessment for Relief and Transition

INTRODUCTION

Ghazni is one of the 34 Afghanistan. It's located in the eastern part of the country and borders Paktya and Logar in the north-east, Paktika in the south-east, Zabul in the south-west, Daykundi and Bamyan in the northwest, and Wardak in the north. The province covers an area of 23,378 km^2. The terrain of the area is covered by mountainous or semi-mountainous terrain and flat land representing 59.8% and 35.7% respectively.

The province has 19 districts with over a thousand villages. It has an estimated number of 1,228,831[2] persons comprising of multi-ethnic and diverse population. The major tribes are Pashtu and Hazara representing more than 90% of the entire population. Tajik, Hindus, and other ethnic minorities comprise the remaining less than 10% of the population. Tajik population is concentrated in the provincial capital of Ghazni City. In Ghazni city 55% of population are Tajik, 20% are Pashtun, 15% are Hazaras while the rest are Hindu. The people of Ghazni are overwhelmingly Sunni Muslim, Shia and a low percentage of Hindu.

Agriculture represents the major source of income for more than half the households in the province, rural development will be a key element of progress in Ghazni. The most important field crops grown in Ghazni Province include wheat (94%), alfalfa/clover/other fodder (58%), barley (35%) and potatoes (14%).

Only 12 districts out of 19 districts in Ghazni province were surveyed, namely Andar, Deh Yek, Gelan, Ghazni, Jaghtu, Jaghori, Khogyni (Wali Muhammadi Shahid), Khwaja Umari, Muqur, Qarabagh, Waghaz and Zana Khan Districts. The population of these 12 districts represent 70.33% of the entire population of Ghazni Province (1,228,831).

Ghazni SMART survey is conducted in winter season (January 26th – February 4th 2016). The survey findings will be used to inform programming and great opportunity to enhance survey capacity of MMRCA and ORCD staff. The information generated from the survey provide an updated nutritional situation while complementing national nutrition survey that was conducted in 2013.

SURVEY OBJECTIVES

The surveys aimed to evaluate nutritional status of vulnerable population groups (under-five, pregnant and lactating women) in 12 districts of Ghazni province. This opportunity was used to collect also several additional data on risk factors likely to influence nutritional status of different groups such as 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 and IYCF.
A detailed analysis and discussion of all the additional data will be presented in the final report.

METHODOLOGY

A two-stage cluster 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.

[2] Afghanistan population estimate CSO update – 2015-16

Sample size calculation

There were two main samples: for anthropometry and for mortality survey. The samples size calculation is based on hypothetical estimation 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: Sample size calculation for anthropometric survey

Parameters for Anthropometry	Value	Assumptions based on context
Estimated Prevalence of GAM (%)	6.1%	Data from Paktika (neighbouring province), 2015 SMART survey indicated a prevalence of 6.1%(95 % CI: 4.5 – 8.1)
± 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	1.5	The population living in all 19 targeted districts is considered as having similar living conditions and the same access to food and social conditions. The design effect was estimated at 1.5.
Children to be included	**575**	Minimum Children 6-59 months old. However all children from 0 to 59 months old found in the selected households will be surveyed.
Average HH Size	7	According to Paktika Nutrition & Mortality SMART assessment – May 2015, the average household size is **7.**
% Children under-5	15.8 %	SMART Paktika province indicated 15.8 %
% Non-response	6%	Based on past experiences
Households	**614**	Minimum households to potentially reach children's sample

Table 2: Sample size calculation for Mortality survey

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	**1.5**	Cater for heterogeneity in the County population being sampled is homogeneous.
Recall Period in days	120	Start point of recall period is 1st of Mezan solar month 1394 (26th January 2016 from the Gregorian calendar).
Population to be included	**2904**	Population
Average HH Size	**7**	Paktika Nutrition & Mortality SMART – May 2015
% Non-response	**6%**	Based on past experiences
Households to be included	**441**	Minimum Households to potentially reach the minimum population number need for mortality survey

Finally, based on those assumptions, the minimum households sample necessary for both anthropometry and mortality samples were of 614 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 614 households by 12 to get an approximate 52 clusters. The clusters were automatically selected with ENA for SMART from a total list of villages (1292) of the 12 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 52 clusters initially planned were successfully covered by the survey. In villages or urban neighborhood 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 12 households were chosen randomly by survey team drawing the folded papers with numbers of households from a hat. A total of 622 households were achieved with 1,069 children aged (0-59 months) assessed.
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 planned and actual size of Households and children samples achieved, SMART Ghazni, February 2016

Number of HH planned	Number of HH surveyed	% surveyed /planned	Number of 6-59 planned	Number of 6-59 surveyed	% surveyed / planned
614	622	99.7%	575	946	164.5%

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[3] to facilitate the work of the female data collectors. The teams were supervised by ACF

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

Deputy Program manager, Ghazni Provincial Nutrition officer and MMRC-A and ORCD nutrition program supervisor. 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.

RESULTS

Anthropometric results

Undernutrition 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 of 1. Age ratio was of 0,99 while the value should be around 0.85. This indicates significant excess of younger children (6-29 months) in the sample (p-value=0.02). However, this significance was weak. See details in Plausibility report (Annex 1).

Table 4: Distribution of age and sex of sample, SMART Ghazni, February 2016

	Boys		Girls		Total		Ratio
AGE (mo)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy : girl**
6-17	124	46.1	145	53.9	269	28.4	0.9
18-29	101	50.2	100	49.8	201	21.2	1.0
30-41	107	49.1	111	50.9	218	23.0	1.0
42-53	81	54.0	69	46.0	150	15.9	1.2
54-59	60	55.6	48	44.4	108	11.4	1.3
Total	**473**	**50.0**	**473**	**50.0**	**946**	**100.0**	**1.0**

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) SMART Ghazni, February 2016

	All n = 914	Boys n = 455	Girls n = 459
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(94) 10.3 % (8.2 - 12.8 95% C.I.)	(53) 11.6 % (8.8 - 15.3 95% C.I.)	(41) 8.9 % (6.6 - 12.0 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(65) 7.1 % (5.5 - 9.1 95% C.I.)	(37) 8.1 % (5.8 - 11.2 95% C.I.)	(28) 6.1 % (4.3 - 8.6 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(29) 3.2 % (2.0 - 5.0 95% C.I.)	(16) 3.5 % (1.9 - 6.3 95% C.I.)	(13) 2.8 % (1.7 - 4.8 95% C.I.)

Table 6: Distribution of acute malnutrition and oedema based weight-for-height z-scores, SMART Ghazni, February 2016

	<-3 z-score	>=-3 z-score
Oedema present	Miasmic kwashiorkor No. 1 (0.1 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Miasmic No. 54 (5.7 %)	Not severely malnourished No. 893 (94.2 %)

The prevalence of oedema is 0.1 %

Table 7: Prevalence of acute malnutrition based on MUAC cut offs (and/or oedema) and by sex, SMART Ghazni, February 2016

	All n = 946	Boys n = 473	Girls n = 473
Prevalence of global malnutrition (< 125 mm and/or oedema)	(135) 14.3 % (11.2 - 18.1 95% C.I.)	(48) 10.1 % (7.4 - 13.8 95% C.I.)	(86) 18.4 % (14.3 - 23.3 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(101) 10.7 % (8.5 - 13.4 95% C.I.)	(37) 7.8 % (5.7 - 10.7 95% C.I.)	(64) 13.5 % (10.6 - 17.1 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(34) 3.6 % (2.3 - 5.6 95% C.I.)	(11) 2.3 % (1.3 - 4.1 95% C.I.)	(23) 4.9 % (3.0 - 7.8 95% C.I.)

Table 8: Prevalence of underweight based on weight-for-age z-scores and by sex SMART Ghazni, February 2016

	All n = 920	Boys n = 458	Girls n = 462
Prevalence of underweight (<-2 z-score)	(226) 24.6 % (20.8 - 28.7 95% C.I.)	(110) 24.0 % (19.4 - 29.3 95% C.I.)	(116) 25.1 % (20.2 - 30.7 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(144) 15.7 % (13.0 - 18.7 95% C.I.)	(73) 15.9 % (12.6 - 20.0 95% C.I.)	(71) 15.4 % (11.7 - 19.9 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(82) 8.9 % (6.8 - 11.7 95% C.I.)	(37) 8.1 % (5.8 - 11.2 95% C.I.)	(45) 9.7 % (6.9 - 13.6 95% C.I.)

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

	All n = 903	Boys n = 450	Girls n = 453
Prevalence of stunting (<-2 z-score)	(354) 39.2 % (34.6 - 44.0 95% C.I.)	(179) 39.8 % (33.8 - 46.1 95% C.I.)	(175) 38.6 % (33.5 - 44.1 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(188) 20.8 % (17.8 - 24.2 95% C.I.)	(92) 20.4 % (16.3 - 25.4 95% C.I.)	(96) 21.2 % (17.5 - 25.4 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(166) 18.4 % (15.5 - 21.7 95% C.I.)	(87) 19.3 % (15.7 - 23.6 95% C.I.)	(79) 17.4 % (13.8 - 21.9 95% C.I.)

Quality of the anthropometric data

The digit preference score of the survey teams was classified as "excellent" for all. The sex ratio was within accepted limits, while the age ration vas above the limit of 0,85. This suggest slightly biased sample, though classified as "acceptable", including more children from the younger age groups.

The table 10 below make a sum up of rest of quality parameters by index. Standards Deviations[4] are within accepted limits as well as the number of WHZ flags is below the limit of 3,4%.

Table 10: Mean z-scores, design effect and excluded subjects SMART Ghazni, February 2016

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	913	-0.57±1.11	1.33	1	32
Weight-for-Age	920	-1.41±1.07	1.92	2	24
Height-for-Age	903	-1.78±1.23	2.12	1	42

Maternal nutritional status

723 women in childbearing age (15-49 years) living in the selected households have been surveyed. Out of them, 700 accepted to have their mid-upper arm circumference measured. The results in proportion from the total number of measured using MUAC cut-off of 230 mm, as per Afghani protocol, are presented in the table 11 below.

Table 11: Maternal nutritional status based on MUAC cut-off, n=700, SMART Ghazni, February 2016

MUAC cut off	Frequency(n)	Proportion (%
<230 mm	171	24,4
≥230 mm	529	75,6

Crude and Under 5 Mortality Rates

The crude and under five mortality rates were below the WHO emergency levels[5].

Table 12: Mortality rates survey findings SMART Ghazni, February 2016

Definition	Results % (95 % CI)
CMR (total deaths/10,000/day)	0.50 (0.33-0.78)
U5MR (deaths in children-5/10,000/day)	1.61 (1.06-2.42)

Health and immunization

Retrospective morbidity data was collected among 1069 children 0-59 months to assess the occurrence of main diseases in the last 2 weeks. The survey findings revealed that 52,2% of the children had episode of illness in the 2 weeks prior to the survey. The major illnesses reported include fever, diarrhoea and ARI as highlighted in table 13.

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

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

Table 13: Morbidity status among under-fives, 2 weeks recall (n=1069), SMART Ghazni, February 2016

Parameter	Frequency(n)	Results (%)
Acute respiratory Infection (ARI)	443	41,4
Fever	439	41,1
Diarrhoea	113	10,6
Others (skin infection, jaundice)	10	0,9

Immunization coverage for BCG and measles vaccination was below the 80% target as highlighted in table 14 below.

Table 14: Immunization coverage, SMART Ghazni, February 2016

Indicators	Criteria	Frequency	Results (%)
Measles among children from 9-59 months (n=864)	Confirmed by card	210	24.3
	Both by recall and by card	655	75.8
BCG among children 0-59 months (N=1069)	Scar observed	830	77.6
Polio among children 0-59 months (N=1069)	Confirmed by card	350	32.7
	Both by recall and by card	890	83.3

While the deworming rate was quite satisfactory, vitamin A supplementation was compromised (table 15 below).

Table 15: Vitamin A supplementation and deworming, SMART Ghazni, February 2015

Indicators	Frequency(n)	Results (%)
Vitamin A supplementation among children 6-59 months (N=941)	646	68,6
Deworming among children 12-59 months (N=795)	709	89,1

CONCLUSION

The survey findings revealed that the prevalence of Global Acute Malnutrition (GAM) based on weight for height z-score was at 10,3% (8,2 – 12,8 95% C.I.) and GAM based on MUAC was at 14,3% (11,2 – 18,1 95% C.I.). Both results can be classified as "serious levels" of acute malnutrition in Ghazni province according to WHO classification of acute malnutrition[6].

Further analysis combining both MUAC and WHZ based GAM reveals that both criteria identify different children, meaning that the scale of the problem might be worst. When both criteria are combined, the GAM and SAM rise up to 19,6% (17,0-22,1 95% C.I.) and 7,4 % (5,7-9,1 95% C.I.) respectively. To avoid any risk of underestimation of potential beneficiaries when IMAM is planned, it's recommended to use these combined rates to estimate caseload and supplies during programming.

The prevalence of stunting and underweight were at 39,2% (34,6-44,0 95% C.I) and 24,6% (20,8-28,7 95% C.I) respectively. Both indicators are worryingly "high" [7], indicating the magnitude of the problem.

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

[7] WHO classification of severity of malnutrition

The Crude Death Rate and Under-five Death rate was at 0,50/10,000/day and 1,61/10.000/day below the SPHERE alert thresholds of 1/10,000/day and 2/10.000/day respectively.

24,4 % of the women in childbearing age surveyed in Ghazni were with MUAC<230 mm. This trend is also worrying suggesting that mother's nutritional status is compromised. This suggests also possible existence of intergenerational vicious circle of undernutrition[8].

Continuous monitoring of nutritional situation among under-fives accompanied by immediate response is required to minimize further deterioration in the nutritional situation of under-fives.

RECOMMENDATIONS

Following recommendation can be drown based on the preliminary findings, per category of action:

High undernutrition rates

- Improve exclusive breastfeeding and ensure timely and adequate complementary feeding through provision of IYCF programs at facility and community levels
- Expansion of Targeted Supplementary Feeding Project to all CHCs and BHCs available in the project
- Scale up of OTP services to first Cluster 1 covered by ORCD and continue with eventual improvement of IMAM coverage by opening at all levels: CHC, BHS, DH

Low preventive nutrition and health care coverage (immunization, deworming and supplementation)

- Ensure that there are effective micronutrient strategies for pregnant women to promote Iron-folate supplementation at community and facility levels
- Strengthening the current EPI (fix and outreach) services
- In scope of available SEHAT/WB budget to expand the EPI services to some of the remaining HSCs.
- For increasing awareness of the community regular broadcasting of EPI related messages through local media.

High morbidity

- Advocate for increased number of health facilities, outreach clinics for enhanced coverage and access to basic health
- Distribution and setting of IEC materials at health facility and health post levels to increase health education in community level and promote appropriate health seeking behavior
- Promote hygiene and sanitation practices at health facility and at community level in order to sensitize the community on the linkages between hygiene & sanitation with child morbidity

More recommendations will be integrated in the final report.

[8] Ending Malnutrition by 2020: an Agenda for Change in the Millennium, Final Report to the ACC/SCN by the Commission on the Nutrition, February 2020

ANNEXES

Annex 1: Plausibility Check

Plausibility check for: GHA_SMART_02_2016_MMRC-A_ORCD_ACF

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=1.000)
Age ratio(6-29 vs 30-59)	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**4** (p=0.021)
Dig pref score - weight	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (3)
Dig pref score - height	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (3)
Dig pref score - MUAC	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (3)
Standard Dev WHZ	Excl	SD	<1.1	<1.15	<1.20	>=1.20	
.			and	and	and	or	
.	Excl	SD	>0.9	>0.85	>0.80	<=0.80	
			0	5	10	20	**5** (1.11)
Skewness WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**1** (-0.26)
Kurtosis WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**0** (-0.03)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<=0.001	
	7		0	1	3	5	**0** (p=0.051)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	**15** %

The overall score of this survey is 15 %, this is acceptable.

There were no duplicate entries detected.

Percentage of children with no exact birthday: 64 %

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=6/ID=81: HAZ (1.787), Height may be incorrect
Line=22/ID=93: HAZ (1.650), WAZ (2.150), Age may be incorrect
Line=26/ID=167: HAZ (1.556), Age may be incorrect
Line=56/ID=69: HAZ (1.292), Age may be incorrect
Line=59/ID=70: **WHZ (2.568),** Height may be incorrect
Line=67/ID=53: HAZ (-4.861), Height may be incorrect
Line=73/ID=63: HAZ (1.876), Age may be incorrect
Line=77/ID=6: **WHZ (-3.939),** Weight may be incorrect
Line=94/ID=45: HAZ (-6.630), WAZ (-6.090), Age may be incorrect
Line=115/ID=334: **WHZ (-5.333),** Height may be incorrect
Line=116/ID=336: **WHZ (-4.139),** HAZ (2.473), Height may be incorrect
Line=117/ID=328: **WHZ (-4.276),** Weight may be incorrect
Line=174/ID=109: **WHZ (-5.261),** Height may be incorrect
Line=176/ID=115: HAZ (4.798), Age may be incorrect
Line=183/ID=100: HAZ (-5.095), Height may be incorrect
Line=187/ID=104: HAZ (1.982), Age may be incorrect
Line=222/ID=179: HAZ (-5.541), Age may be incorrect
Line=234/ID=870: **WHZ (-4.056),** HAZ (-5.282), WAZ (-6.048)
Line=266/ID=343: HAZ (-4.848), Age may be incorrect
Line=287/ID=411: HAZ (-6.048), WAZ (-4.732), Age may be incorrect
Line=315/ID=518: **WHZ (-5.732),** Weight may be incorrect
Line=323/ID=605: HAZ (-4.857), Age may be incorrect
Line=354/ID=828: HAZ (-4.928), Age may be incorrect
Line=438/ID=302: **WHZ (-4.303),** Weight may be incorrect
Line=465/ID=433: **WHZ (-5.369),** HAZ (-6.569), WAZ (-7.395)
Line=467/ID=434: HAZ (-5.012), Height may be incorrect
Line=478/ID=586: **WHZ (-7.670),** WAZ (-7.279), Weight may be incorrect
Line=487/ID=576: HAZ (-6.091), Age may be incorrect

Line=491/ID=729: **WHZ (-4.941)**, WAZ (-5.549), Weight may be incorrect
Line=494/ID=731: WAZ (-4.666), Weight may be incorrect
Line=507/ID=721: **WHZ (-4.502)**, Weight may be incorrect
Line=515/ID=792: WAZ (-4.864), Weight may be incorrect
Line=519/ID=793: WAZ (-4.481), Weight may be incorrect
Line=520/ID=796: **WHZ (-3.802)**, WAZ (-4.946), Weight may be incorrect
Line=522/ID=798: HAZ (-5.711), Age may be incorrect
Line=526/ID=786: **WHZ (-3.731)**, Weight may be incorrect
Line=547/ID=282: HAZ (-4.839), WAZ (-4.513), Age may be incorrect
Line=550/ID=381: **WHZ (2.574)**, HAZ (-5.021), Height may be incorrect
Line=559/ID=375: HAZ (1.830), Height may be incorrect
Line=574/ID=142: **WHZ (-3.758)**, WAZ (-4.666), Weight may be incorrect
Line=575/ID=141: HAZ (2.450), Height may be incorrect
Line=579/ID=143: HAZ (-5.911), Age may be incorrect
Line=588/ID=152: HAZ (-5.720), Age may be incorrect
Line=591/ID=155: HAZ (-5.275), Age may be incorrect
Line=593/ID=157: HAZ (-5.517), Age may be incorrect
Line=598/ID=158: **WHZ (-4.034)**, WAZ (-4.528), Weight may be incorrect
Line=636/ID=660: **WHZ (-4.784)**, WAZ (-4.968), Weight may be incorrect
Line=646/ID=635: HAZ (-5.473), Age may be incorrect
Line=648/ID=653: **WHZ (-5.050)**, WAZ (-4.540), Weight may be incorrect
Line=653/ID=542: **WHZ (-5.070)**, Weight may be incorrect
Line=714/ID=564: **WHZ (-4.332)**, Weight may be incorrect
Line=725/ID=218: HAZ (2.306), Age may be incorrect
Line=735/ID=213: HAZ (2.593), Age may be incorrect
Line=741/ID=250: HAZ (1.635), WAZ (1.873), Age may be incorrect
Line=768/ID=445: **WHZ (-3.717)**, Height may be incorrect
Line=774/ID=754: **WHZ (-4.909)**, Weight may be incorrect
Line=814/ID=256: **WHZ (2.393)**, Weight may be incorrect
Line=823/ID=954: WAZ (1.555), Weight may be incorrect
Line=829/ID=956: WAZ (1.698), Age may be incorrect
Line=852/ID=220: **WHZ (2.957)**, Weight may be incorrect
Line=854/ID=235: **WHZ (-4.681)**, WAZ (-5.628), Weight may be incorrect
Line=863/ID=884: HAZ (1.783), Height may be incorrect
Line=878/ID=1018: **WHZ (2.348)**, Weight may be incorrect
Line=893/ID=1007: HAZ (3.198), Age may be incorrect
Line=898/ID=1012: HAZ (-5.273), Age may be incorrect
Line=924/ID=1041: **WHZ (-4.081)**, WAZ (-5.700), Weight may be incorrect
Line=925/ID=1040: HAZ (-6.329), WAZ (-5.178), Age may be incorrect
Line=939/ID=1121: **WHZ (-4.345)**, HAZ (-5.834), WAZ (-5.594)
Line=947/ID=1132: HAZ (-5.959), WAZ (-5.406), Age may be incorrect
Line=949/ID=1134: **WHZ (-5.096)**, Weight may be incorrect
Line=956/ID=1116: HAZ (-5.037), Age may be incorrect
Line=975/ID=671: HAZ (-4.922), Age may be incorrect
Line=984/ID=989: HAZ (1.304), Age may be incorrect
Line=1030/ID=1063: **WHZ (2.348)**, Weight may be incorrect
Percentage of values flagged with SMART flags:WHZ: 3.4 %, HAZ: 4.4 %, WAZ: 2.5 %

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: 0.99 (The value should be around 0.85).:
p-value = 0.021 (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	124/109.7 (1.1)	145/109.7 (1.3)	269/219.5 (1.2)	0.86
18 to 29	12	101/107.0 (0.9)	100/107.0 (0.9)	201/214.0 (0.9)	1.01
30 to 41	12	107/103.7 (1.0)	111/103.7 (1.1)	218/207.4 (1.1)	0.96
42 to 53	12	81/102.1 (0.8)	69/102.1 (0.7)	150/204.1 (0.7)	1.17
54 to 59	6	60/50.5 (1.2)	48/50.5 (1.0)	108/101.0 (1.1)	1.25
6 to 59	54	473/473.0 (1.0)	473/473.0 (1.0)		1.00

```
The data are expressed as observed number/expected number (ratio of obs/expect)
Overall sex ratio: p-value = 1.000 (boys and girls equally represented)
Overall age distribution: p-value = 0.000 (significant difference)
Overall age distribution for boys: p-value = 0.077 (as expected)
Overall age distribution for girls: p-value = 0.000 (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: 3 (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)
p-value for chi2: 0.804
```

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: **3** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)
p-value for chi2: 0.340

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: **3** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)
p-value for chi2: 0.576

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:	1.31	1.23	1.11
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	12.6%	11.8%	10.2%
calculated with current SD:	15.3%	13.1%	9.8%
calculated with a SD of 1:	9.0%	8.4%	7.6%
HAZ			
Standard Deviation SD:	1.45	1.41	1.23
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	40.2%	39.9%	39.2%
calculated with current SD:	45.1%	44.3%	43.0%
calculated with a SD of 1:	42.9%	41.9%	41.5%
WAZ			
Standard Deviation SD:	1.22	1.17	1.07
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	26.1%	25.7%	24.6%
calculated with current SD:	33.4%	32.1%	28.9%
calculated with a SD of 1:	30.0%	29.2%	27.6%

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

WHZ	p= 0.000	p= 0.000	p= 0.000
HAZ	p= 0.000	p= 0.000	p= 0.000
WAZ	p= 0.000	p= 0.000	p= 0.000

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

Skewness

WHZ	-0.81	-0.49	-0.26
HAZ	-0.14	-0.02	-0.20
WAZ	-0.85	-0.63	-0.44

If the value is:
-below minus 0.4 there is a relative excess of wasted/stunted/underweight subjects in the sample
-between minus 0.4 and minus 0.2, there may be a relative excess of wasted/stunted/underweight subjects in the sample.
-between minus 0.2 and plus 0.2, the distribution can be considered as symmetrical.
-between 0.2 and 0.4, there may be an excess of obese/tall/overweight subjects in the sample.
-above 0.4, there is an excess of obese/tall/overweight subjects in the sample

Kurtosis

WHZ	1.86	0.70	-0.03
HAZ	0.85	0.70	-0.43
WAZ	1.74	0.78	0.01

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=1.34 (p=0.051)
WHZ < -3: ID=1.49 (p=0.013)
Oedema: ID=1.00 (p=0.474)
GAM: ID=1.32 (p=0.060)
SAM: ID=1.44 (p=0.022)
HAZ < -2: ID=2.11 (p=0.000)
HAZ < -3: ID=1.56 (p=0.006)
WAZ < -2: ID=1.91 (p=0.000)
WAZ < -3: ID=1.63 (p=0.003)

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 point	SD for WHZ 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: 1.21 (n=52, f=2)	##################
02: 1.03 (n=47, f=0)	##########
03: 1.16 (n=39, f=0)	###############
04: 1.29 (n=47, f=2)	######################
05: 0.98 (n=49, f=1)	#######
06: 1.24 (n=48, f=2)	##################
07: 1.10 (n=47, f=0)	##############
08: 1.21 (n=45, f=1)	##################
09: 1.30 (n=44, f=1)	######################
10: 1.55 (n=44, f=3)	################################
11: 1.33 (n=49, f=1)	######################
12: 1.25 (n=45, f=1)	###################
13: 1.33 (n=45, f=1)	######################
14: 1.20 (n=42, f=1)	##################
15: 1.62 (n=44, f=3)	##################################
16: 1.54 (n=38, f=1)	##############################
17: 1.23 (n=30, f=1)	##################
18: 1.95 (n=31, f=6)	##
19: 1.52 (n=28, f=1)	##############################
20: 1.42 (n=23, f=2)	###########################
21: 0.84 (n=21, f=0)	##
22: 1.26 (n=18, f=0)	OOOOOOOOOOOOOOOOOO
23: 0.79 (n=15, f=0)	
24: 1.87 (n=13, f=2)	OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
25: 0.97 (n=07, f=0)	~~~~~~~
26: 1.82 (n=04, f=0)	~~~~~~
27: 1.32 (n=06, f=0)	~~~~~~~~~~~~~~~~~~~~~~
28: 0.82 (n=05, f=0)	~
29: 0.97 (n=04, f=0)	~~~~~~~
30: 0.15 (n=02, f=0)	
31: 2.49 (n=02, f=0)	~~~~~~
34: 0.37 (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 =	194	115	175	235	103	124
Percentage of values flagged with SMART flags:						
WHZ:	2.6	7.9	4.0	1.7	2.9	4.0

HAZ: 3.1 4.3 8.6 5.1 2.9 1.6
WAZ: 1.5 7.9 2.9 1.7 1.0 3.2

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

0.98 1.35 1.08 0.91 0.75 0.97

Sex ratio (male/female):

0.96 0.92 1.16 0.96 1.15 0.91

Digit preference Weight (%):

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

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

Digit preference Height (%):

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

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

Digit preference MUAC (%):

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

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

Standard deviation of WHZ:

SD 1.17 1.47 1.34 1.27 1.23 1.31

Prevalence (< -2) observed:

% 10.3 21.9 16.0 12.3 6.8 8.1

Prevalence (< -2) calculated with current SD:

% 11.3 30.2 17.2 13.8 10.6 11.2

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

% 7.8 22.4 10.2 8.4 6.3 5.5

Standard deviation of HAZ:

SD 1.38 1.33 1.72 1.41 1.11 1.23

observed:

% 41.2 55.7 52.0 38.5 14.6 32.3

calculated with current SD:

% 45.3 60.7 51.9 45.7 19.6 34.4

calculated with a SD of 1:

% 43.6 64.0 53.3 43.9 17.1 31.1

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	35/22.0 (1.6)	26/23.0 (1.1)	61/45.0 (1.4)	1.35
18 to 29	12	13/21.5 (0.6)	22/22.4 (1.0)	35/43.9 (0.8)	0.59
30 to 41	12	21/20.8 (1.0)	24/21.7 (1.1)	45/42.5 (1.1)	0.88
42 to 53	12	14/20.5 (0.7)	15/21.4 (0.7)	29/41.9 (0.7)	0.93
54 to 59	6	12/10.1 (1.2)	12/10.6 (1.1)	24/20.7 (1.2)	1.00

6 to 59	54	95/97.0 (1.0)	99/97.0 (1.0)	0.96

The data are expressed as observed number/expected number (ratio of obs/expect)
Overall sex ratio: p-value = 0.774 (boys and girls equally represented)
Overall age distribution: p-value = 0.017 (significant difference)
Overall age distribution for boys: p-value = 0.010 (significant difference)
Overall age distribution for girls: p-value = 0.603 (as expected)
Overall sex/age distribution: p-value = 0.003 (significant difference)

Team 2:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	17/12.8 (1.3)	31/13.9 (2.2)	48/26.7 (1.8)	0.55
18 to 29	12	7/12.4 (0.6)	11/13.6 (0.8)	18/26.0 (0.7)	0.64
30 to 41	12	12/12.1 (1.0)	10/13.2 (0.8)	22/25.2 (0.9)	1.20
42 to 53	12	8/11.9 (0.7)	3/12.9 (0.2)	11/24.8 (0.4)	2.67
54 to 59	6	11/5.9 (1.9)	5/6.4 (0.8)	16/12.3 (1.3)	2.20
6 to 59	54	55/57.5 (1.0)	60/57.5 (1.0)		0.92

The data are expressed as observed number/expected number (ratio of obs/expect)
Overall sex ratio: p-value = 0.641 (boys and girls equally represented)
Overall age distribution: p-value = 0.000 (significant difference)
Overall age distribution for boys: p-value = 0.049 (significant difference)
Overall age distribution for girls: p-value = 0.000 (significant difference)
Overall sex/age distribution: p-value = 0.000 (significant difference)

Team 3:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	17/21.8 (0.8)	22/18.8 (1.2)	39/40.6 (1.0)	0.77
18 to 29	12	31/21.3 (1.5)	21/18.3 (1.1)	52/39.6 (1.3)	1.48
30 to 41	12	20/20.6 (1.0)	21/17.8 (1.2)	41/38.4 (1.1)	0.95
42 to 53	12	21/20.3 (1.0)	8/17.5 (0.5)	29/37.8 (0.8)	2.63
54 to 59	6	5/10.0 (0.5)	9/8.6 (1.0)	14/18.7 (0.7)	0.56
6 to 59	54	94/87.5 (1.1)	81/87.5 (0.9)		1.16

The data are expressed as observed number/expected number (ratio of obs/expect)
Overall sex ratio: p-value = 0.326 (boys and girls equally represented)
Overall age distribution: p-value = 0.119 (as expected)
Overall age distribution for boys: p-value = 0.088 (as expected)
Overall age distribution for girls: p-value = 0.154 (as expected)
Overall sex/age distribution: p-value = 0.003 (significant difference)

Team 4:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	28/26.7 (1.0)	32/27.8 (1.1)	60/54.5 (1.1)	0.88
18 to 29	12	26/26.0 (1.0)	26/27.1 (1.0)	52/53.2 (1.0)	1.00
30 to 41	12	29/25.2 (1.2)	29/26.3 (1.1)	58/51.5 (1.1)	1.00
42 to 53	12	12/24.8 (0.5)	19/25.9 (0.7)	31/50.7 (0.6)	0.63
54 to 59	6	20/12.3 (1.6)	14/12.8 (1.1)	34/25.1 (1.4)	1.43
6 to 59	54	115/117.5 (1.0)	120/117.5 (1.0)		0.96

The data are expressed as observed number/expected number (ratio of obs/expect)
Overall sex ratio: p-value = 0.744 (boys and girls equally represented)
Overall age distribution: p-value = 0.016 (significant difference)
Overall age distribution for boys: p-value = 0.017 (significant difference)
Overall age distribution for girls: p-value = 0.576 (as expected)
Overall sex/age distribution: p-value = 0.005 (significant difference)

Team 5:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	12/12.8 (0.9)	15/11.1 (1.3)	27/23.9 (1.1)	0.80
18 to 29	12	10/12.4 (0.8)	7/10.9 (0.6)	17/23.3 (0.7)	1.43
30 to 41	12	12/12.1 (1.0)	12/10.5 (1.1)	24/22.6 (1.1)	1.00
42 to 53	12	13/11.9 (1.1)	9/10.4 (0.9)	22/22.2 (1.0)	1.44
54 to 59	6	8/5.9 (1.4)	5/5.1 (1.0)	13/11.0 (1.2)	1.60
6 to 59	54	55/51.5 (1.1)	48/51.5 (0.9)		1.15

The data are expressed as observed number/expected number (ratio of obs/expect)
Overall sex ratio: p-value = 0.490 (boys and girls equally represented)
Overall age distribution: p-value = 0.633 (as expected)
Overall age distribution for boys: p-value = 0.843 (as expected)
Overall age distribution for girls: p-value = 0.541 (as expected)
Overall sex/age distribution: p-value = 0.301 (as expected)

Team 6:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	15/13.7 (1.1)	19/15.1 (1.3)	34/28.8 (1.2)	0.79
18 to 29	12	14/13.3 (1.0)	13/14.7 (0.9)	27/28.1 (1.0)	1.08
30 to 41	12	13/12.9 (1.0)	15/14.3 (1.1)	28/27.2 (1.0)	0.87
42 to 53	12	13/12.7 (1.0)	15/14.0 (1.1)	28/26.8 (1.0)	0.87
54 to 59	6	4/6.3 (0.6)	3/6.9 (0.4)	7/13.2 (0.5)	1.33
6 to 59	54	59/62.0 (1.0)	65/62.0 (1.0)		0.91

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

Overall sex ratio: p-value = 0.590 (boys and girls equally represented)
Overall age distribution: p-value = 0.405 (as expected)
Overall age distribution for boys: p-value = 0.910 (as expected)
Overall age distribution for girls: p-value = 0.469 (as expected)
Overall sex/age distribution: p-value = 0.290 (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: 0.94 (n=10, f=0)  ######
02: 0.95 (n=10, f=0)  ######
03: 1.25 (n=09, f=0)  ###################
04: 1.15 (n=10, f=0)  ################
05: 0.78 (n=10, f=0)
06: 0.94 (n=10, f=0)  ######
07: 0.97 (n=10, f=0)  #######
08: 0.79 (n=08, f=0)
09: 1.27 (n=08, f=0)  ####################
10: 1.82 (n=07, f=1)  ##########################################
11: 1.21 (n=10, f=0)  #################
12: 1.18 (n=09, f=0)  ################
13: 1.21 (n=10, f=0)  #################
14: 1.02 (n=07, f=0)  #########
15: 2.08 (n=07, f=1)  ########################################################
16: 0.95 (n=07, f=0)  ######
17: 1.26 (n=08, f=0)  ###################
18: 0.86 (n=07, f=0)  ##
19: 2.19 (n=07, f=1)  ##############################################################
20: 1.42 (n=07, f=1)  ############################
21: 0.89 (n=07, f=0)  ####
22: 0.91 (n=06, f=0)  #####
23: 0.46 (n=05, f=0)
24: 0.56 (n=02, f=0)
```

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

Team: 2

```
Time                                          SD for WHZ
point                 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
01: 1.37 (n=07, f=0)  ########################
02: 1.31 (n=07, f=0)  ####################
03: 0.42 (n=05, f=0)
04: 0.65 (n=05, f=0)
05: 0.74 (n=07, f=0)
06: 1.47 (n=07, f=1)  ############################
07: 1.69 (n=06, f=0)  ####################################
08: 2.07 (n=05, f=1)  ##################################################
09: 1.03 (n=07, f=0)  ##########
10: 1.30 (n=07, f=0)  ####################
11: 1.52 (n=06, f=0)  ##############################
12: 0.91 (n=07, f=0)  #####
13: 0.74 (n=06, f=0)
14: 2.04 (n=06, f=1)  ################################################
15: 1.46 (n=05, f=0)  ############################
16: 2.75 (n=07, f=1)  ###################################################################
17: 0.81 (n=03, f=0)  O
```

```
18: 2.26 (n=05, f=1)  ############################################################
19: 0.50 (n=03, f=0)
20: 1.95 (n=02, f=0)  ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
```

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

Team: 3

```
Time                                          SD for WHZ
point                 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
01: 1.44 (n=09, f=0)  ############################
02: 1.35 (n=08, f=0)  ########################
03: 0.68 (n=05, f=0)
04: 1.39 (n=07, f=0)  ########################
05: 1.14 (n=08, f=0)  ##############
06: 1.06 (n=09, f=0)  ###########
07: 0.97 (n=08, f=0)  #######
08: 1.17 (n=07, f=0)  ################
09: 1.88 (n=06, f=1)  ##############################################
10: 1.25 (n=06, f=0)  ##################
11: 1.43 (n=08, f=0)  ############################
12: 1.11 (n=07, f=0)  #############
13: 1.17 (n=08, f=0)  ################
14: 1.07 (n=09, f=0)  ###########
15: 1.69 (n=09, f=0)  ####################################
16: 0.64 (n=05, f=0)
17: 1.67 (n=06, f=1)  ####################################
18: 2.35 (n=08, f=3)  ######################################################################
19: 1.23 (n=08, f=0)  ##################
20: 0.68 (n=06, f=0)
21: 1.00 (n=07, f=0)  #########
22: 0.81 (n=04, f=0)  O
23: 1.27 (n=04, f=0)  OOOOOOOOOOOOOOOOOOO
24: 2.39 (n=05, f=2)  ######################################################################
25: 0.58 (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: 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: 1.02 (n=10, f=0)  #########
02: 0.80 (n=09, f=0)
03: 1.19 (n=09, f=0)  ################
04: 0.72 (n=10, f=0)
05: 0.64 (n=09, f=0)
06: 1.60 (n=09, f=1)  ################################
07: 0.84 (n=10, f=0)  ##
08: 1.11 (n=10, f=0)  #############
09: 1.18 (n=08, f=0)  ################
10: 1.86 (n=10, f=1)  ############################################
11: 0.66 (n=09, f=0)
12: 1.94 (n=10, f=1)  ##################################################
13: 1.43 (n=09, f=0)  ############################
14: 1.12 (n=08, f=0)  #############
15: 1.37 (n=10, f=0)  ########################
16: 1.40 (n=09, f=0)  ########################
17: 1.05 (n=07, f=0)  ###########
18: 1.90 (n=08, f=1)  ################################################
19: 1.58 (n=08, f=0)  ################################
20: 1.49 (n=07, f=0)  ##############################
21: 0.71 (n=06, f=0)
22: 1.65 (n=08, f=0)  ####################################
23: 0.78 (n=06, f=0)
24: 1.74 (n=06, f=0)  ########################################
25: 1.22 (n=03, f=0)  OOOOOOOOOOOOOOOOO
```

```
26: 2.03 (n=03, f=0)  OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
27: 1.04 (n=04, f=0)  OOOOOOOOOO
28: 0.99 (n=03, f=0)  OOOOOOOO
29: 1.07 (n=03, f=0)  OOOOOOOOOO
31: 2.49 (n=02, f=0)  ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
34: 0.37 (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: 0.77 (n=08, f=0)
02: 0.91 (n=07, f=0)  #####
03: 2.16 (n=05, f=0)  ############################################################
04: 2.23 (n=08, f=2)  ##################################################################
05: 0.53 (n=08, f=0)
06: 1.04 (n=06, f=0)  ##########
07: 1.22 (n=06, f=0)  ##################
08: 1.00 (n=08, f=0)  #########
09: 1.48 (n=07, f=1)  ##############################
10: 0.73 (n=08, f=0)
11: 1.18 (n=08, f=0)  ################
12: 0.61 (n=05, f=0)
13: 2.04 (n=05, f=1)  ######################################################
14: 0.80 (n=05, f=0)
15: 1.09 (n=05, f=0)  ############
16: 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: 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: 1.25 (n=08, f=1)  ###################
02: 1.07 (n=06, f=0)  ############
03: 0.91 (n=06, f=0)  #####
04: 1.11 (n=07, f=0)  #############
05: 1.42 (n=07, f=0)  ##########################
06: 0.88 (n=07, f=0)  ###
07: 1.28 (n=07, f=0)  ####################
08: 0.91 (n=07, f=0)  #####
09: 1.18 (n=08, f=0)  ################
10: 1.77 (n=06, f=1)  ########################################
11: 1.89 (n=08, f=0)  ##############################################
12: 1.02 (n=07, f=0)  #########
13: 1.45 (n=07, f=0)  ############################
14: 1.10 (n=07, f=0)  ############
15: 1.77 (n=08, f=1)  ########################################
16: 1.11 (n=07, f=0)  #############
17: 1.49 (n=05, f=0)  ############################
18: 2.24 (n=03, f=1)  OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
19: 1.62 (n=02, f=0)  ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
```

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

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