SMART Survey Report

Nutrition in Al Lajat, Dar'a
South Syria

September 2017

Contents

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List of Acronyms

CDC	Centers for Disease Control and Prevention
CHW	Community Health Worker
CI	Confidence Interval
ENA	Emergency Nutrition Assessment
GAM	Global Acute Malnutrition
HAZ	Height-for-Age Z-Scores
HFA	Height-for-Age
IYCF	Infant and Young Child Feeding
IYCF-E	Infant and Young Child Feeding in Emergencies
MAM	Moderate Acute Malnutrition
MUAC	Mid-Upper Arm Circumference
NGO	Non-Governmental Organization
PAC	Physicians Across Continents – Turkey (NGO)
PLW	Pregnant and Lactating Women
PPS	Probability Proportional to Size
RC	Reserve Cluster
SAM	Severe Acute Malnutrition
SD	Standard Deviation
SMART	Standardized Monitoring and Assessment of Relief and Transitions
SRD	Syria Relief and Development (NGO)
UNICEF	United Nations International Children's Emergency Fund
UOSSM	Union of Medical Care and Relief Organizations (NGO)
WAZ	Weight-for-Age Z-Scores
WFA	Weight-for-Age
WFH	Weight-for-Height
WHO	World Health Organization
WHZ	Weight-for-Height Z-Scores
WVI -GRRT	World Vision International – Global Rapid Response Team
WVI	World Vision International

Executive Summary

Six years of on-going conflict significantly impact the health and well-being of children and families in Syria. Health and nutrition services are among some of the most affected sectors in the country. This has particularly affected the most vulnerable population groups in Syria - children under five years of age and pregnant and lactating women.

The Dar'a governorate was the first area affected by the conflict in Syria. In 2014, a nutrition survey was conducted in the areas under the control of the Syrian Army by the Syrian Ministry of Health and revealed a rate of 7.2 per cent of global acute malnutrition (GAM) in the Dar'a governorate and severe acute malnutrition (SAM) of 2.3 per cent. In order to have a more comprehensive understanding of the nutrition situation, this SMART survey was undertaken in accessible areas of the opposition-controlled areas of Al Lajat where the situation has been changing rapidly since the start of the conflict.

Al Lajat is located in eastern Dar'a governorate. It is a rural area with a mix of internally displaced persons (IDPs) and host communities. It is somewhat different to, and separated from other areas controlled by the opposition in southern Syria as it was cut off from access to traditional service centres by conflict lines. Access can currently only be gained by unpaved rural tracks, making it difficult for women and children to travel to access services, and for humanitarians to access the area. The main goal of the survey was to determine the prevalence of acute malnutrition among children under five years old and pregnant and lactating women, (PLW) and to determine the level of the Infant and young children feeding (IYCF) practices.

The field data was collected between 21 and 25 August 2017 by six teams of trained nutritionists and community health workers. A two-stage cluster sampling methodology was used among 35 communities. 30 clusters from the area were randomly selected and from each cluster, 15 households were randomly selected using the simple random sampling method. Each household was visited and all questionnaires and measurements were completed. In total, 449 households were visited where 663 children under 5 years old were surveyed for malnutrition and infant and young children feeding practices and 139 pregnant and lactating women were measured by the mid-upper arm circumference (MUAC) method to determine their nutrition status.

The overall plausibility score of the survey was 13, which is considered good (Annex 1). The GAM rate in children aged 6-59 months was 7.8 per cent, which is classified as "medium[1] in severity. However, in the Syrian context, it is a higher prevalence if compared to other SMART surveys conducted in Syria in recent years. The severity of stunting was 27.5 per cent, which is also classified as "medium" based on the World Health Organisation (WHO) classification. The GAM rate of pregnant and lactating women was 11.51 per cent.

The survey points to a clear need for ongoing support to address nutrition in Al Lajat, with a particular focus on pregnant and lactating women, and infant and young child feeding. It suggests a number of areas for further intervention by nutrition actors:

- Undertake a follow up nutrition survey in the area in the future to measure the impact of nutrition programmes which began in May 2017.

[1] WHO classification of severity of malnutrition
http://www.who.int/nutgrowthdb/about/introduction/en/index5.html

- Conduct an Infant and Young Child Feeding (IYCF) survey to better understand the actual IYCF practices and to explore the causes behind the IYCF malpractices.
- Implement ongoing nutrition programmes in the area and enhance the on-going programmes.
- Implement and enhance IYCF programmes to engage mothers and provide them with the proper feeding practices for infants and young children.
- Scale up Community Health Worker programs in the area to focus on improving the knowledge and practices of caregivers at the community level.
- Continue and scale up treatment programs for all malnourished pregnant and lactating women in the area.

Map of the surveyed area

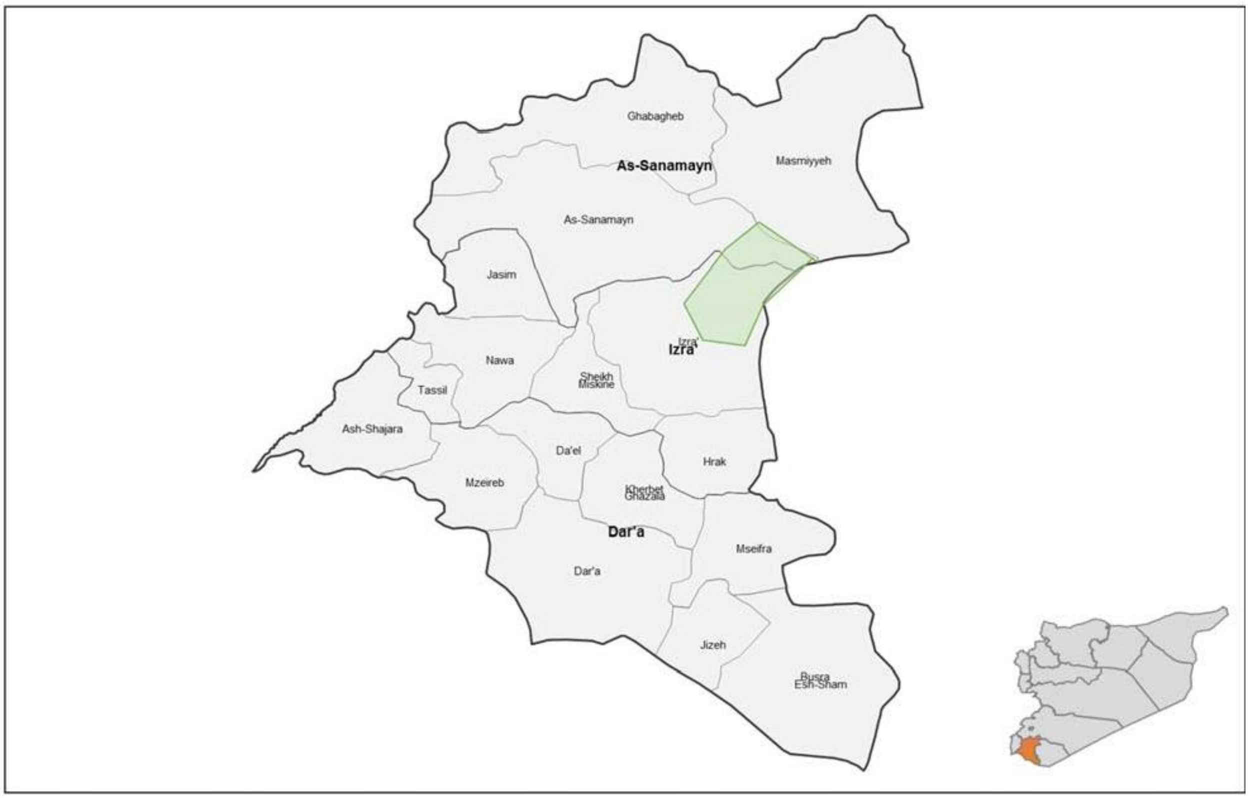


Table 1: Summary of key indicators

Prevalence of acute malnutrition based on weight-height z-scores[2]	**(n)**	**%**	**95 % CI**
Prevalence of global acute malnutrition (WFH <-2 z-score and/or oedema)	44	7.8	5.6- 10.9 95% C.I.
Prevalence of moderate acute malnutrition (WFH <-2 z-score and >=-3 z-score, no oedema)	39	6.9	4.8 – 9.9 95% C.I.
Prevalence of severe acute malnutrition (WFH <-3 z-score and/or oedema)	5	0.9	0.4 – 2.1 95% C.I.
Prevalence of acute malnutrition based on MUAC			
Prevalence of global malnutrition (< 125 mm and/or oedema)	31	5.5	3.5 – 8.5 95% C.I.
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	24	4.3	2.7 – 6.7 95% C.I.
Prevalence of severe malnutrition (< 115 mm and/or oedema)	7	1.2	0.6 – 2.8 95% C.I.
Prevalence of underweight based on weight-for-age z-scores[1]			
Prevalence of underweight (WFA <-2 z-score)	89	16.0	12.2 – 20.8 95% C.I.
Prevalence of moderate underweight (WFA <-2 z-score and >=-3 z-score)	72	12.9	9.5 – 17.3 95% C.I.
Prevalence of severe underweight (WFA <-3 z-score)	17	3.1	1.8 – 5.1 95% C.I.
Prevalence of stunting based on height-for-age z-scores[1]			
Prevalence of stunting (HFA <-2 z-score)	148	27.5	23.0 – 32.4 95% C.I.
Prevalence of moderate stunting (HFA <-2 z-score and >=-3 z-score)	118	21.9	17.7 – 26.7 95% C.I.
Prevalence of severe stunting (HFA <-3 z-score)	30	5.6	4.0 – 7.6 95% C.I.
Prevalence of overweight based on weight for height cut-offs[1]			
Prevalence of overweight (WHZ > 2)	5	0.9	0.4 – 2.1 95% C.I.
Prevalence of severe overweight (WHZ > 3)	0	0	0.0 – 0.0 95% C.I.

[2] Based on WHO Child Growth Standards (2006) and exclusion of z-scores from observed mean (SMART flags: WHZ -4 to 4; HAZ -3 to 3; WAZ -3 to 3).

Prevalence of malnutrition in the PLWs based on MUAC	**(n)**	**%**
Prevalence of malnutrition (MUAC < 230 mm)	16	11.51
IYCF indicators		
Exclusive breastfeeding under 6 months (Proportion of infants 0-5 months of age who are fed exclusively with breast milk)	30	32.60
Continued breastfeeding at 1 year: (Proportion of children 12-15 months of age who are fed breast milk)	28	48.28
Continued breastfeeding at 2 years: (Proportion of children 20-23 months of age who are fed breast milk)	2	5.0
Introduction of complementary foods: Introduction of solid, semi-solid or soft foods (Proportion of infants 6-8 months of age who receive solid, semi-solid or soft foods)	30	58.82

1. Introduction

The survey was conducted in all accessible communities in the Al Lajat area of the Dar'a governorate. The 35 rural communities in two districts (Izra' and As-sanamayn) were included in the sampling frame (Annex 2). Maps and the location of the surveyed area are provided in Annex 9.

The surveyed population

- Some 44,000 people live in the surveyed area.
- The people are a mix of host community residents and IDPs.
- The area was considered to be poor even before the war in Syria.
- The population is dependent on pastoral farming and agriculture despite the volcanic rock, rugged environment and scarcity of agricultural land.

Services and humanitarian assistance

- Mobility among the community is difficult as the area is characterised by volcanic rock and is rugged and lacks proper infrastructure. The area has been cut off from traditional service centres in Izraa, Damascus and South Dar'a by conflict lines.
- Difficultly in accessing the area from other areas under the control of the opposition in Dar'a, means there was a lack of humanitarian services in the area, particularly, health and nutrition services, in the first four years of the conflict. A concerted effort by UNICEF, World Vision, UOSSM and other partners to increase services beginning in late 2016 is helping to address this gap. However, ongoing support is needed to address vulnerabilities.

Survey objectives

- To determine the prevalence of acute malnutrition in children aged between 6-59 months of age in the Al Lajat – Dar'a area.
- To determine the prevalence of acute malnutrition in pregnant and lactating woman in the Al Lajat – Dar'a area.
- To determine the level of Infant and Young Child Feeding practices among the mothers/primary caregivers children aged between 0-23 months of age in the Al Lajat – Dar'a area

2. Methodology

2.1 Sample size

The following assumptions (based on the given context) were used to calculate the sample size in the number of children, which were then converted into the number of households to survey. All calculations were made using the July 2015 version of ENA Software for SMART.

Parameters for Anthropometry	Value	Assumptions based on context (See footnote for any references used)
Parameters	Al Lajat-Dar'a	Assumption
Estimated Prevalence of GAM (%)	5 %	According to 2014 survey conducted by the Syrian ministry of health GAM rate was 7.2 per cent but there is maybe an overestimation and we don't expect more than 5 per cent.
± Desired precision	±3 %	The desired precision for this survey (± 3%) was chosen based on SMART recommendations for the estimated GAM prevalence (± 3% for estimated prevalence <10%).
Design Effect *(if applicable)*	1.5	The design effect chosen for this survey (1.5) was chosen to reflect potential differences between rural, urban and camp/informal settlements in conflict-affected communities.
	331	Children to be included in the survey

The SMART Methodology recommends converting the number of children into number of households (fixed household method) for numerous reasons:

- It is easier to create lists of households than lists of children in the field.
- Sample sizes calculated in number of children can encourage teams to skip households without any children (thus introducing a bias for household-level indicators.)
- Households can provide a common metric for comparing sample size of many indicators.

In order to do the conversion of number of children to sample into number of households, the following assumptions were made:

Parameters	Al Lajat – Dar’a	Assumption
Average household size	5.5	According to some studies in the south of Syria.
% Children under-5	16 %	The proportion of under-5’s based on the Nutrition Cluster data for the 2017 response. The concentrations of under-5 years old in some locations are higher as noted in the earlier surveys. Nevertheless, 16 per cent is used for this survey.
% non-response households	8 %	A non-response rate of 8.2 per cent was observed during the MUAC assessment in Dar’a in 2016. The same rate is expected.
	454	Households to be included in the survey

- Due to the large number of communities and the distances between them, the cluster sampling method was used to get a representative sample of the surveyed area.
- The number of households to be completed per day was determined according to the time the team could spend in the field excluding travel other procedures and break times. The details below were taken into consideration when performing this calculation based on the given context:

1. Departure from office at 8am and return at 5pm.
2. Average travel time to reach each cluster (one-way): 30 minutes.
3. Duration for initial introduction and selection of households: 1.5hours.
4. Time spent to move from one household to the next: 10 minutes.
5. Average time in the household: 15 minutes.
6. Lunch 30 minutes.

- On average: 6 hours (360 minutes) of working time in each cluster. 15 minutes in each household and 10 minutes traveling from one household to another, 15 households could be reached per day.

- The total number of households in the sample was divided by the number of households to be completed in one day in order to find the number of clusters to be included in the survey. The number of clusters was based on visiting 15 household per day based on the assumption of one day in each area (cluster):

454 households/ 15 households per day ≈30 clusters

2.2 Sampling procedure: selecting clusters

- To have a representative sample of all accessible communities of Al Lajat area in the Dar’a governorate, all the population data of every accessible community in the area was collected. The data was updated and collected by the Union of Medical Care and Relief Organisation teams working in the area and obtained from local authorities.
- The data covers two sub districts (Izra' and As-sanamayn) from the Dar’a governorate.

- The population data was listed to generate the sampling frame then transferred into ENA software for SMART and randomly selected 30 clusters and 4 reserve clusters. The clusters have been selected using the probability proportional to size (PPS) method.
- Annex 2 shows the sampling frame and the selected clusters.

2.3 Sampling procedure: selecting households and children

- The survey teams visited 15 households in each selected cluster.
- To select 15 households in each cluster, all teams were trained to use simple random sampling or systematic random sampling methods according to cluster size and the availability of household list or the ability to build a household list.
- In some communities, the teams used the segmentation, especially in communities, which are fairly large in size and contain more than one cluster.
- The larger communities were segmented to small segments, then the teams using the segmentation table (Annex 7), and using the PPS methods, selected one or more segments according to how many clusters were in this community to be visited.
- The simple random sampling method was used in all clusters; this means that there was an updated list of all households in the clusters or the team then created a list.
- All abandoned households had already been excluded before starting the selection. If however, the selected household was absent during the first visit then the teams revisited it at the end of the day and if it remained absent the team only put a notice on the cluster control form and did not replace the household.
- If a child was absent in the selected household, the team revisited at the end of the day and if the child had returned they measured the child, if not they put a note on the cluster control form.

2.4 Case definitions and inclusion criteria

- For this survey, we used the following definition of household: All members who live under the same roof and eat from the same spot.
- All under-5's (0-59 months) were included in the survey.

- All children aged 6 – 59 months that lived in the selected household were included in the anthropometry survey as the criteria was based on age.
- For measuring the length and height, all children less than 2 years of age (6 – 23 months) were measured lying down (length) and all children more than 2 years of age (24 – 59 months) were measured standing up (height).
- The WHO 2006 standards were used to analyse and report the anthropometry data.
- The MUAC was used with all pregnant and lactating women living in the selected household.
- All children aged between 0– 23 months were included in the IYCF practice survey. The caregivers were also asked about breastfeeding and complementary feeding during the previous 24 hours.
- Data was also about children who are not living with their mother or father and confirmed with whom the children were living. See Annex 4 and Annex 5.

2.5 Questionnaire, training and supervision

Questionnaire

- The questionnaire was prepared in Arabic and all the interviews were conducted in Arabic. All the team members were Arabic speakers.
- No translation was required for the questionnaire, which ensured no mistakes were made in understanding responses.
- There were two questionnaire forms: the questionnaire for children aged 0 – 59 months had three parts; one for anthropometric measurement, one for IYCF, and the other for children separated from and no longer living with their parents. (Annex 4).
- The second questionnaire was for PLW (Annex 5).
- The cluster control form was used by teams to manage all aspects of the household visits and to ensure that all selected households were indeed visited. (Annex 6).

Survey teams and supervision

- There were six teams working in the field for five days. Each team consisted of three members; one team leader, one measurer and one assistant. Five teams consisted of one male and two females and one team consisted of three females.
- 18 enumerators (six teams) had been chosen and participated in the survey according to their results during the standardisation test.
- The supervisor was chosen at the end of training according to their participation during the training and according to the standardisation test.
- The participants were community health workers with a background in malnutrition and others were health staff working in the area.
- The supervisor was responsible for all teams and accompanied one or more team each day of fieldwork.
- The equipment used for the survey:
    1. SECA, Scale, electronic, mother/child,150kgx100g
    2. Portable baby/child L-hgt mea.syst/SET-2
    3. MUAC, Child 11.5 Red/PAC-50
    4. MUAC, Adult, without colour code/PAC-50

Training

- The enumerators were trained online for five days and based in the UOSSM training center in Saida, Eastern Dar'a, while the trainers were from PAC-Turkey based in Gaziantep – Turkey.

- 25 trainees attended the training. (8 male and 17 female).
- The training covered the following topics: general survey objectives, overview of survey design, household selection procedures, anthropometric measurements, signs and symptoms of malnutrition, data collection, interviewing skills, how to fill in the questionnaire and how to determine the age of the children.
- The training contained a practical training for anthropometric measurements with online supervision.
- On the final training day a standardisation test was carried out with all teams measuring 10 different children aged between 6 – 59 months twice; for weight, length or height and MUAC. These measurements were then entered to the ENA software for SMART and analysed to select the best teams.
- According to the standardisation test results (Annex 3) the best six teams were selected to participate in the fieldwork.

2.6 Data analysis

- Each survey team finished one cluster per day.
- On a daily basis, the collected data was entered, scanned and the scanned files sent to data entry.
- Two people were responsible for separate data entry on a daily basis. The data was entered to the ENA software for SMART (July 2015 version).
- The data was reviewed every day and if there was any feedback in general or for a specific team the survey manger sent feedback before the start of the next day to ensure quality control of the data.
- To ensure high quality of data entry, a double data entry check was applied (comparing the two data sets) to check the quality of the data entry and to correct any mistake in the data entry (if there was any difference between the two sets the teams went back to the paper questionnaires and corrected the mistakes).
- Data analyses begun after ensuring all the data was correct.
- When analysed the data some outliers (extremely Z-scores) had been excluded using SMART flag exclusion criteria[3].

2.7 Characteristic of the sample

- A total of 663 children 0– 59 months of age were surveyed for nutrition status and IYCF practices.
- 564 children, 269 boys and 295 girls, aged between 6-59 months from 449 households in 30 clusters in Al Lajat – Dar'a were included in the Anthropometric measurements. This total number of children included in the survey exceeded the planned requirement of 331 children (170 per cent). See Table 2.1.
- The exact age of 97 per cent of children aged from 6-59 months was determined using family cards or any other documents and an event calendar (which can be found in Annex 8) was used to determine the remaining 3 per cent.
- 560 children (267 boys and 263 girls) were included in the Weight for Height Z scored (WHZ) anthropometric analysis (two were missing weight and height and two excluded using SMART flags).
- 450 households were to be surveyed. The household non-response was 1 (1 absent

[3] Exclusion of z-scores from observed mean SMART flags: WHZ -4 to 4; HAZ -3 to 3; WAZ -3 to 3

household) and there were no cases where the teams were refused entry. 0.2 per cent of households were absent on the first and second visit on the day of data collection (Table 2.2).

- 30 clusters were planned for the survey and all clusters had been visited.
- 398 households from the 449 surveyed were host community (88.64 per cent) and 11.36 per cent were IDPs.
- The distribution of the assessed children shows boys and girls were equally represented with the overall sex ratio of 0.91 as expected (Table 3.1).
- The finding of the age ratio of 6-29 months to 30-59 months (1.37) means that there are more young children aged 6-29 months than older children (30-59 months). This result was found in most SMART surveys conducted in Syria: Hama 2015 1.1, Eastern Ghouta 2016 1.32, Idleb 2017 1.21. This finding is possibly due to the high birth rate in the area and by the migration of the older children. The Statistical evaluation of sex and age ratios (using the Chi squared statistic) can be found in the ENA Plausibility Report (Annex 1).
- The total number of children aged 6-59 months included in the survey was 563, which exceeded the planned requirement of 331 children (170 per cent).
- The percentage of eligible children included in the survey refers to the total number of eligible children aged 6-59 months that live in the randomly selected households, as compared to the number of eligible children that were actually measured. For example, a randomly selected household may contain two 6-59 month old children but only one was included in the survey because the second child was away playing or visiting their grandparents. A total of 99.8 per cent of eligible children aged 6-59 month old were included in the survey.

Table 2.1: Number of planned, included, eligible 6-59 month old children in the Aleppo survey

Number of children aged 6-59 months planned	Number of children aged 6-59 months included	% of children aged 6-59 months included/ planned	Number of eligible children aged 6-59 months	Number of eligible children aged 6-59 months included	% of eligible children aged 6-59 months included
331	564	170%	565	564	99.8%

As shown above, we found more children in the households we visited, this is due to the under estimation of the household size and for the prevalence of children under five years of age in the calculation of the sample size. The non-response rate was also lower than estimated; however, the extra children were an advantage in calculating the IYCF indicators.

Table 2.2: Per cent of household non-response

Number of household planned*	Number of household surveyed	% household non-response
450	449	0.22 %

3. Results

3.1 Anthropometric results (based on WHO standards 2006)

Exclusion of z-scores from observed mean SMART flags: WHZ -4 to 4; HAZ -3 to 3; WAZ -3 to 3

Table 3.1: Distribution of age and sex of sample

	Boys		Girls		Total		Ratio
AGE (mo)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy/girl**
6-17	79	45.1	96	54.9	175	31.0	0.8
18-29	69	45.7	82	54.3	151	26.8	0.8
30-41	63	49.2	65	50.8	128	22.7	1.0
42-53	33	50.0	33	50.0	66	11.7	1.0
54-59	25	56.8	19	43.2	44	7.8	1.3
Total	269	47.7	295	52.3	564	100.0	0.9

3.1.1 Prevalence of acute malnutrition based on weight-for-height z-scores

The prevalence of Global Acute Malnutrition (GAM) defined as Weight-for-height Z scores (WHZ) <-2 and/or oedema was 7.8 per cent (5.6 – 10.9 95% CI), and the prevalence of severe acute malnutrition (SAM), defined as WHZ <-3 and/or oedema, was 0.9 per cent (0.4- 2.1 95% CI), with no cases of oedema found (Table 3.2).
There was no statistical difference between the GAM in boys (8.6 per cent) and girls (7.1 per cent) (P=0.539). Figure 3.1 shows the distribution of Z-scores.
The prevalence of acute malnutrition (WHZ<-2 and/or oedema) was highest among the younger age group of children aged 6 – 17 months. (Table 3.2) This indicates more problems and a low level of IYCF practices in the area.

Table 3.2: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema)

	All n = 562	Boys n = 267	Girls n = 295
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(44) 7.8 % (5.6 - 10.9 95% C.I.)	(23) 8.6 % (5.4 - 13.4 95% C.I.)	(21) 7.1 % (4.6 - 10.9 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(39) 6.9 % (4.8 - 9.9 95% C.I.)	(21) 7.9 % (4.7 - 12.8 95% C.I.)	(18) 6.1 % (3.9 - 9.4 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(5) 0.9 % (0.4 - 2.1 95% C.I.)	(2) 0.7 % (0.2 - 3.0 95% C.I.)	(3) 1.0 % (0.3 - 3.2 95% C.I.)

The prevalence of oedema is 0.0 % (No cases had been detected)

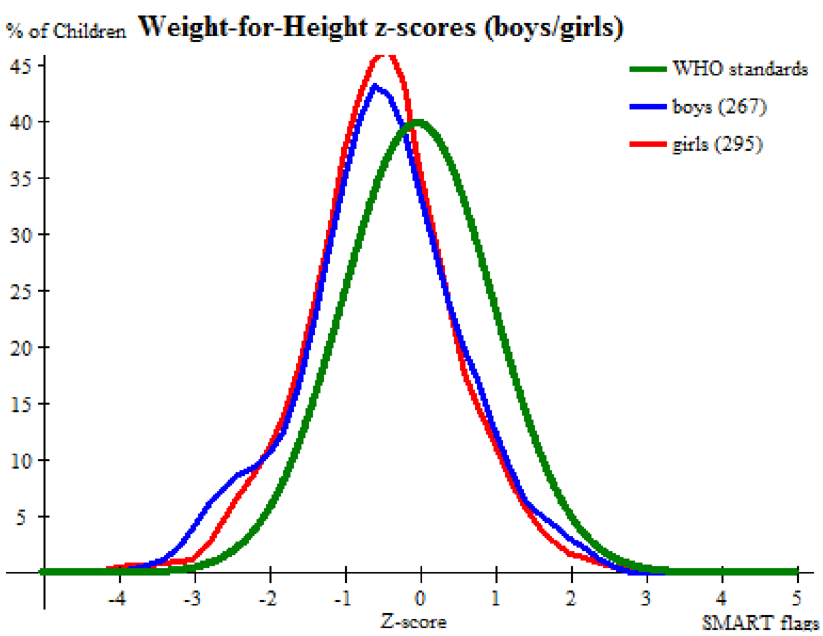
Table 3.3: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema

		Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2z score)		Oedema	
Age (mo)	**Total**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	174	3	1.7	22	12.6	149	85.6	0	0.0
18-29	151	2	1.3	6	4.0	143	94.7	0	0.0
30-41	128	0	0.0	5	3.9	123	96.1	0	0.0
42-53	66	0	0.0	3	4.5	63	95.5	0	0.0
54-59	43	0	0.0	3	7.0	40	93.0	0	0.0
Total	562	5	0.9	39	6.9	518	92.2	0	0.0

Table 3.4: Distribution of acute malnutrition and oedema based on weight-for-height z-scores

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 5 (0.9 %)	Not severely malnourished No. 557 (99.1%)

Figure 3.1: WHZ distributions:



3.1.2 Prevalence of acute malnutrition based on MUAC cut off's (and/or oedema)

The prevalence of global acute malnutrition (GAM) in children aged 6 – 59 months old, defined as MUAC <125 mm was 5.5 per cent (3.5 – 8.5 95 per cent C.I) and the prevalence of severe acute malnutrition (SAM), defined as MUAC < 115 mm was 1.2 per cent (0.6 – 2.8 95 per cent C.I), No cases of oedema were found.

The GAM rate was higher between girls (7.1 per cent) more than boys (3.7 per cent), but there was no statistical difference between them (p=0.081).

As shown in the GAM rate by WHZ, the prevalence of GAM rate was highest in the age group of 6 -17 month old children (Table 3.6.).

Table 3.5: Prevalence of acute malnutrition based on MUAC cut off's (and/or oedema) and by sex

	All n = 563	**Boys** n = 268	**Girls** n = 295
Prevalence of global malnutrition (< 125 mm and/or oedema)	(31) 5.5 % (3.5 - 8.5 95% C.I.)	(10) 3.7 % (1.8 - 7.7 95% C.I.)	(21) 7.1 % (4.7 - 10.7 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(24) 4.3 % (2.7 - 6.7 95% C.I.)	(7) 2.6 % (1.2 - 5.8 95% C.I.)	(17) 5.8 % (3.4 - 9.5 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(7) 1.2 % (0.6 - 2.8 95% C.I.)	(3) 1.1 % (0.2 - 5.0 95% C.I.)	(4) 1.4 % (0.5 - 3.5 95% C.I.)

Table 3.6: Prevalence of acute malnutrition by age, based on MUAC cut off's and/or oedema

		Severe wasting (< 115 mm)		**Moderate wasting** (>= 115 mm and < 125 mm)		**Normal** (> = 125 mm)		**Oedema**	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	174	7	4.0	21	12.1	146	83.9	0	0.0
18-29	151	0	0.0	3	2.0	148	98.0	0	0.0
30-41	128	0	0.0	0	0.0	128	100.0	0	0.0
42-53	66	0	0.0	0	0.0	66	100.0	0	0.0
54-59	44	0	0.0	0	0.0	44	100.0	0	0.0
Total	563	7	1.2	24	4.3	532	94.5	0	0.0

3.1.3 Prevalence of underweight based on weight-for-age z-score (WAZ)

The prevalence of underweight in children aged 6-59 months, defined as weight- for-age Z scores (WAZ) <-2 was 16.0 per cent (12.2 – 20.8 95 per cent C.I.) with 3.1 per cent (1.8 – 5.1 95 per cent C.I.) severely underweight, defined as Weight-for-Age Z scores (WAZ) <-3 (Table 3.7). A higher prevalence of underweight by age group was observed among the age groups 42 - 53 months and 54 – 59 months (Table 3.8).

Table 3.7: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 556	**Boys** n = 265	**Girls** n = 291
Prevalence of underweight (<-2 z-score)	(89) 16.0 % (12.2 - 20.8 95% C.I.)	(42) 15.8 % (10.9 - 22.6 95% C.I.)	(47) 16.2 % (12.0 - 21.3 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and > =-3 z-score)	(72) 12.9 % (9.5 - 17.3 95% C.I.)	(34) 12.8 % (8.5 - 19.0 95% C.I.)	(38) 13.1 % (8.9 - 18.7 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(17) 3.1 % (1.8 - 5.1 95% C.I.)	(8) 3.0 % (1.4 - 6.5 95% C.I.)	(9) 3.1 % (1.7 - 5.5 95% C.I.)

Table 3.8: Prevalence of underweight by age, based on weight-for-age z-scores

		Severe underweight (<-3 z-score)		**Moderate underweight** (>= -3 and <-2 z-score)		**Normal** (> = -2 z score)		**Oedema**	
Age (mo)	**Total**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	170	7	4.1	28	16.5	135	79.4	0	0.0
18-29	148	3	2.0	9	6.1	136	91.9	0	0.0
30-41	128	3	2.3	15	11.7	110	85.9	0	0.0
42-53	66	3	4.5	11	16.7	52	78.8	0	0.0
54-59	44	1	2.3	9	20.5	34	77.3	0	0.0
Total	556	17	3.1	72	12.9	467	84.0	0	0.0

3.1.4 Prevalence of stunting based on height-for-age z-score (HAZ)

The prevalence of stunting, defined as Height-for-age Z scores (HAZ) <-2 in children 6-59 months was 27.5 per cent (23.0 – 32.4 95 per cent C.I.) with 5.6 per cent (4.0 – 7.6 95 per cent C.I.) severely stunted, defined as height-for-age Z scores (HAZ) <-3 (Table 3.9).

The stunting rate was higher among boys (33.1 per cent) than girls (22.3 per cent) and statistically there were significant differences between boys and girls (p=0.008).

Stunting peaked amongst the age group of 42 - 53 months (25.4 per cent moderate stunting and 12.7 per cent severe stunting) (Table 3.10).

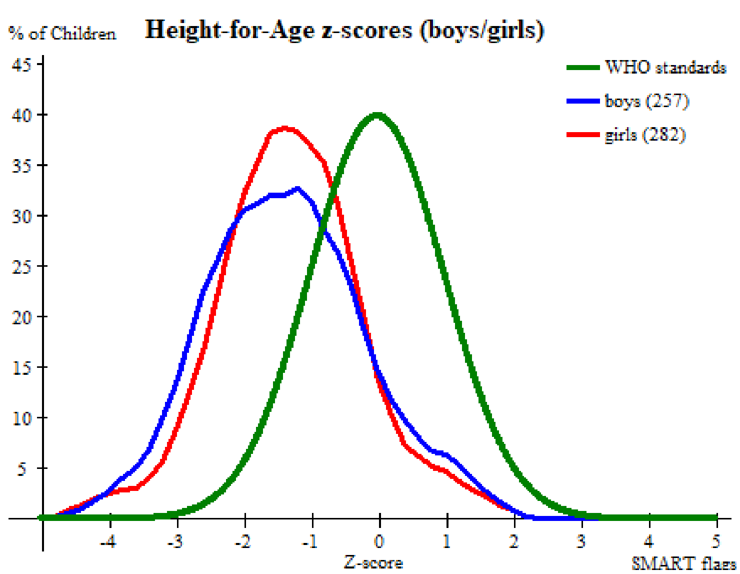
Table 3.9: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 539	Boys n = 257	Girls n = 282
Prevalence of stunting (<-2 z-score)	(148) 27.5 % (23.0 - 32.4 95% C.I.)	(85) 33.1 % (26.4 - 40.5 95% C.I.)	(63) 22.3 % (18.7 - 26.4 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(118) 21.9 % (17.7 - 26.7 95% C.I.)	(68) 26.5 % (20.4 - 33.6 95% C.I.)	(50) 17.7 % (14.0 - 22.1 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(30) 5.6 % (4.0 - 7.6 95% C.I.)	(17) 6.6 % (4.4 - 9.8 95% C.I.)	(13) 4.6 % (2.6 - 8.1 95% C.I.)

Table 3.10: Prevalence of stunting by age based on height-for-age z-scores

		Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
Age (mo)	**Total**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	165	7	4.2	31	18.8	127	77.0
18-29	142	7	4.9	32	22.5	103	72.5
30-41	126	6	4.8	29	23.0	91	72.2
42-53	63	8	12.7	16	25.4	39	61.9
54-59	43	2	4.7	10	23.3	31	72.1
Total	539	30	5.6	118	21.9	391	72.5

Figure 3.2: HAZ Z-score distribution:



3.1.5 Prevalence of overweight based on weight for height z-score (HAZ)

The prevalence of overweight, defined as weight-for-height z scores (WHZ) > 2 in children aged 6-59 months was 0.9 per cent (0.4 – 2.1 95 per cent C.I.). With 0.0 per cent (0.0 – 0.0 95 per cent C.I.) of severely overweight, defined as weight-for-height Z scores (WHZ) > 3 (Table 3.11). Prevalence of overweight by age group (Table 3.12).

Table 3.11: Prevalence of overweight based on weight for height cut off's and by sex (no oedema)

	All n = 560	Boys n = 267	Girls n = 293
Prevalence of overweight (WHZ >2)	(5) 0.9 % (0.4 - 2.1 95% C.I.)	(3) 1.1 % (0.3 - 3.6 95% C.I.)	(2) 0.7 % (0.2 - 2.8 95% C.I.)
Prevalence of severe overweight (WHZ > 3)	(0) 0.0 % (0.0 - 0.0 95% C.I.)	(0) 0.0 % (0.0 - 0.0 95% C.I.)	(0) 0.0 % (0.0 - 0.0 95% C.I.)

Table 3.12: Prevalence of overweight by age, based on weight for height (no oedema)

		Overweight (WHZ > 2)		Severe Overweight (WHZ > 3)	
Age (mo)	**Total**	**No.**	**%**	**No.**	**%**
6-17	172	3	1.7	0	0.0
18-29	151	2	1.3	0	0.0
30-41	128	0	0.0	0	0.0
42-53	66	0	0.0	0	0.0
54-59	43	0	0.0	0	0.0
Total	560	5	0.9	0	0.0

Table 3.13: Mean z-scores, Design Effects and excluded subjects

Indicator	**n**	**Mean z-scores ± SD**	**Design Effect** (z-score < -2)	**z-scores not available***	**z-scores out of range**
Weight-for-Height	562	-0.51±0.99	1.30	2	0
Weight-for-Age	556	-1.09±0.96	1.82	1	7
Height-for-Age	539	-1.34±1.10	1.42	1	24

* contains for WHZ and WAZ the children with oedema.

3.2 Infant and Young Child Feeding (IYCF) results

Infant and young child feeding-is so important for the health of young children generally. In Syria, poor IYCF practices were found in most areas and overall poor IYCF practices were mainly found in the rural areas.

In this survey, the caregiver was asked about all children from 0 to 23 months with regard to breastfeeding and complementary feeding during the previous day (24 hours). The data was collected and analysed around some main indicators

3.2.1 Exclusive breastfeeding under 6 months

Proportion of infants 0–5 months of age who are fed exclusively with breast milk
Infants 0–5 months of age who received only breast milk during the previous day
Infants 0–5 months of age

Notes:
• Indicator is based on a 24-hour period and includes living infants.
• Recalling the previous day period will cause the proportion of exclusively breastfed infants to be overestimated, as some infants who are given other liquids irregularly may not have received them in the day before the survey.

98 children under 6 months old (0 -5 month) had been included in the survey, 92 of them were breastfed in this time period and six were not breastfed,

From these 98 children, 30 of them were solely breastfed and not having any other foods or anything else (during the last 24 hours), which means that the exclusive breastfeeding rate is 30/98*100=32.60 p.er cent

3.2.2 Continued breastfeeding/Continued breastfeeding at 1 year

Proportion of children 12–15 months of age who are fed breast milk
Children 12–15 months of age who received breast milk during the previous day
Children 12–15 months of age

58 children were aged between 12 – 15 months, 28 of them were breastfed during a 24 hour period, which means that the rate of continued breastfeeding at 1 year is: 28/58*100 = **48.28 %**

3.2.3 Continued breastfeeding/Continued breastfeeding at 2 years

Proportion of children 20–23 months of age who are fed breast milk
Children 20–23 months of age who received breast milk during the previous day
Children 20–23 months of age

40 children from 20 – 23 months old were surveyed, just two of them were still breastfed, which means that the continued breastfeeding at 2-year rate is: 2/40*10 = **5 %**

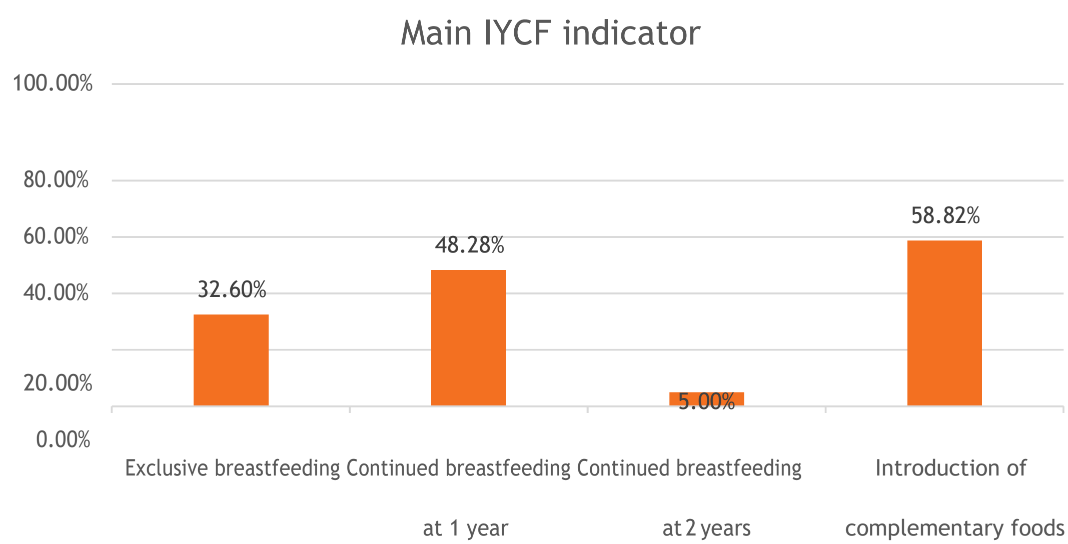
3.2.4 Introduction of complementary foods/Introduction of solid, semi-solid or soft foods

Proportion of infants aged 6-8 months of age who receive solid, semi-solid or soft foods
Infants 6-8 months of age who received solid, semi-solid or soft foods during the previous day

Infants 6–8 months of age

51 children aged 6 – 8 months were included in the survey, 30 of them had been given a solid, semi-solid or soft food during the last 24 hours, this means that the Introduction of complementary foods rate is: 30/51*100 = 58.82 %,

Figure 3.3: main IYCF indicators



3.3 PLW MUAC results

The survey included a questionnaire about the MUAC measurement of the pregnant and lactating woman in the selected households
The definition of cases:
MUAC ≥ 230 ⇨ Normal
MUAC < 230 ⇨ Malnutrition

139 pregnant and lactating women were measured for MUAC; 49 of them were pregnant and 90 were lactating.
11 of them were under 18 years old (all of them were lactating woman)
The prevalence of PLW malnutrition was 11.51 per cent (7.2-17.9 95 per cent CI)

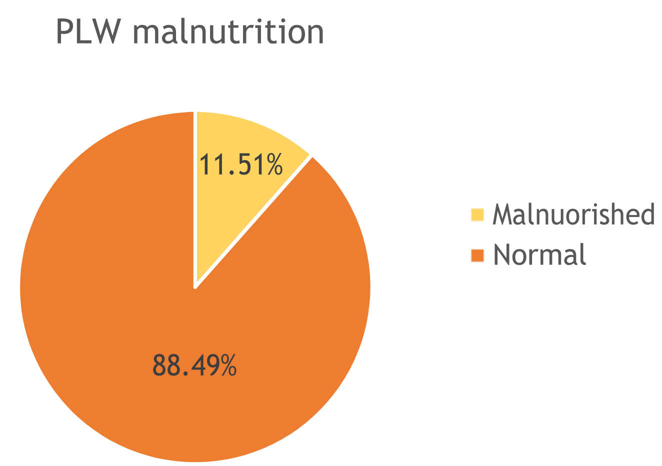
Table 3.14 Prevalence of PLW malnutrition based on MUAC cut off's

Indicator	All n = 139
Normal (MUAC ≥ 230 mm)	(123) 88.49 %

Malnutrition (MUAC < 230 mm)	(16) 11.51 % (7.2-17.9 95% CI)

PLW: (n=139); mean±SD: 263.91 ± 38.50; range: (183.00 - 393.00); 95% CI: (257.51 - 270.31); median: 256.00

Figure 3.4: PLW malnutrition



3.4 Separated children result (Child Protection)

Data was collected about children who live separate from their parents. The survey asked if they are living with their mother or father and, if not, there was a question on what the relationship is between the head of the household and the child. (Annex 4)

644 children out of 655, (98.3 per cent) were living with their parents and 1.7 per cent of them (11 children) were separated from their parents; 7 children were living with their grandparents, two with their uncles and two were living with people to whom they were not related.

4. Discussion

4.1 Nutritional status

Good nutrition is essential for optimum child development throughout the first 1,000 days of life and beyond. Suboptimal growth (stunting, wasting and underweight) increases the risk of childhood morbidity and mortality among children under five years of age.

Acute malnutrition or wasting is a global public health concern during crisis. The nutrition SMART survey conducted in Al Lajat found the prevalence of global acute malnutrition (GAM) at 7.8 per cent and SAM rate of 0.9 per cent, with no cases of oedema found. This rate, without considering all other aggravating factors, classifies as medium severity (GAM rate between 5 per cent to 10 per cent) according to the WHO classification of severity of malnutrition.

The GAM rate found in Al Lajat is approximately the same as the GAM rate found by the nutrition survey conducted by Syrian Ministry of Health in Dar'a in 2014 (7.2 per cent), although, it is higher than those found in all other SMART surveys carried out in Syria. It is worth noting, that these results are not directly comparable due to differences in the population and in the context and methodology used in conducting the survey.

Prevalence of GAM appears higher in boys (8.6 per cent) than girls (7.1 per cent), however this difference is not statistically significant (p=0.539).

However, when the prevalence of acute malnutrition is determined using MUAC (<125mm), the prevalence was found to be 5.5 per cent and the prevalence of GAM appears to be higher in girls (7.1 per cent) than boys (3.7 per cent), but again the difference is not statistically significant (p=0.081).

The higher prevalence was found in younger children aged between 6-17 months (14.4 per cent). This higher prevalence in younger children may be due to the poor IYCF practices found in the area.

Chronic malnutrition or stunting, as indicated by low height for age, has an impact on children's health and chance of survival, contributing to over one million childhood deaths worldwide (UNICEF Global Report, 2014). The main causes of stunting include intrauterine growth retardation, inadequate nutrition to support the rapid growth and development of infants and young children and frequent infections during early life. In the Al Lajat area, the SMART nutrition survey found 27.5 per cent of children 6-59 months stunted with 5.6% severely stunted. Stunting often increases with age and is best prevented before a child's second birthday. Stunting peaked amongst the children aged 42-53 months (48.1 per cent). The stunting rate was found to be high in most SMART surveys conducted in Syria and similar to what had been found in the Al Lajat area. However, the stunting rate in Syria was high compared to pre-crises levels, 27.5per cent in 2009 (worldbank.org[4])

Children who are overweight are vulnerable to immediate and long-term health risks. Among the immediate risks are metabolic abnormalities including increased risks of diabetes type 2, and high blood pressure. Being overweight in childhood is also a high risk

[4] https://data.worldbank.org/indicator/SH.STA.STNT.ZS?locations=SY

factor for developing adult obesity and the health consequences that come with that. In Al Lajat, the prevalence of overweight children was 0.9 per cent.

Malnutrition in pregnant and lactating woman will affect the health of their children, so it is important to find and treat these cases to prevent any consequences for the children's health. In Al Lajat the GAM rate for pregnant and lactating women (MUAC <230mm) was 11.51 per cent. This high rate requires targeted interventions to protect the mothers and their children.

As already mentioned, the high rate of GAM in young children may be due to the poor IYCF practices in the area. In the Al Lajat – Dar'a survey, the exclusive breastfeeding rate was 32.6 per cent, the continued breastfeeding at 1 year was 48.28 per cent, while the continued breastfeeding at 2 years was 5 per cent, and, the introduction of complementary foods was 58.82 per cent. All these indicators show a low level of IYCF practices in the area, which is similar to the situation in most other areas of Syria and requires improved nutrition programmes, specifically for IYCF.

For the sample characteristic, the boys and girls were equally represented (sample sex ratio 0.91), the age ratio of 6-29 months to 30-59 months was 1.37 which means that there were more young children than older children which can be explained by the high birth rate and by the migration of the older children.

4.2 Causes of malnutrition

The prevalence of acute malnutrition was high in comparison with all other SMART surveys conducted in Syria and this may be due to the poverty already existing in the area, and the challenges accessing traditional economic and service centres in Izraa, South Dar'a and Damascus due to conflict lines.

The peak of acute malnutrition among young children can be explained by the poor IYCF practices found in the survey, especially the poor exclusive breastfeeding.

It could also be that the difficulty in traveling between this area and other areas in southern Syria has affected the availability of foods.

5. Conclusions

Despite the presence of risk factors for under nutrition, such as poor IYCF practices, increased food insecurity, poor hygiene and sanitation due to limited water availability, decreased availability and accessibility to health services and on-going conflict and displacement in Syria, the survey results showed a medium prevalence of global acute malnutrition in Al Lajat – Dar'a area in accordance with the WHO classification for severity of nutrition (between 5-10 per cent). This medium severity, with all other aggravating factors, is a moderate situation and needs to be taken into consideration when planning nutrition programmes in the area.

Nevertheless, the severity of chronic malnutrition is categorised as medium (prevalence between 20-29 per cent), potentially reflecting longer term inadequate dietary intake, including lack of micronutrients, repeated infections such as diarrhoea in younger children as well as poor feeding practices. Inappropriate IYCF practices remain an issue of concern. Future interventions should focus on improving IYCF practices to address this issue in the long term.

In addition, the GAM rate between pregnant and lactating women was high and also needs further interventions to prevent any health implications for the children.

Furthermore, there is a need to better understand the nutrition situation in all other areas in the Dar'a governorate.

Due to the accessibility issue, the training and supervision for this survey was done online with supervision from the consultant. Despite these limitations, the quality of collected data was acceptable and considered as good in the Plausibility Report (Annex 1).

6. Recommendations and priorities

- Undertake a follow up nutrition survey in the area in the future to measure the impact of nutrition programmes which began in May 2017 (intermediate term).
- Conduct an IYCF survey to better understand the actual IYCF practices and to explore the causes behind the IYCF malpractices (intermediate term).
- Implement ongoing nutrition programmes in the area and enhance the on-going programmes. (Immediate term).
- Implement and enhance IYCF programmes to engage mothers and provide them with the proper feeding practices for infants and young children. (Immediate term).
- Scale up Community Health Worker programs in the area to focus on improving the knowledge and practices of caregivers at the community level (intermediate term).
- Continue and scale up treatment programs for all malnourished pregnant and lactating women in the area. (Immediate term).

7. Annexes

Annex 1: Plausibility report

Plausibility check for Syria – Dar'a -Al Lajat SMART survey as Standard/Reference used for z-score calculation: WHO standards 2006. (If it is not mentioned, flagged data is included in the evaluation. Some parts of this plausibility report are more for advanced users and can be skipped for a standard evaluation)

Overall data quality

Criteria Flags* Unit Excel. Good Accept Problematic **Score**

Flagged data Incl % 0-2.5 >2.5-5.0 >5.0-7.5 >7.5
(% of out of range subjects) 0 5 10 20 **0** (0.4 %)

Overall Sex ratio Incl p >0.1 >0.05 >0.001 <=0.001
(Significant chi square) 0 2 4 10 **0** (p=0.274)

Age ratio(6-29 vs 30-59) Incl p >0.1 >0.05 >0.001 <=0.001
(Significant chi square) 0 2 4 10 **10** (p=0.000)

Dig pref score - weight Incl # 0-7 8-12 13-20 > 20
0 2 4 10 **0** (5)

Dig pref score - height Incl # 0-7 8-12 13-20 > 20
0 2 4 10 **2** (10)

Dig pref score - MUAC Incl # 0-7 8-12 13-20 > 20
0 2 4 10 **0** (6)

Standard Dev WHZ Excl SD <1.1 <1.15 <1.20 >=1.20
. and and and or
. Excl SD >0.9 >0.85 >0.80 <=0.80
0 5 10 20 **0** (0.97)

Skewness WHZ Excl # <±0.2 <±0.4 <±0.6 >=±0.6
0 1 3 5 **0** (-0.01)

Kurtosis WHZ Excl # <±0.2 <±0.4 <±0.6 >=±0.6
0 1 3 5 **1** (0.27)

Poisson dist WHZ-2 Excl p >0.05 >0.01 >0.001 <=0.001
0 1 3 5 **0** (p=0.122)

OVERALL SCORE WHZ = 0-9 10-14 15-24 >25 **13** %

The overall score of this survey is 13 %, this is good.

There were no duplicate entries detected.

Missing or wrong data:

WEIGHT: Line=74/ID=15
HEIGHT: Line=74/ID=15

Percentage of children with no exact birthday: 3 %

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=20: HAZ (8.263), Height may be incorrect
Line=100/ID=1: **WHZ (-3.776)**, HAZ (-6.510), WAZ (-6.085)
Line=101/ID=2: **WHZ (-3.555)**, Weight may be incorrect
Line=109/ID=4: HAZ (-5.707), WAZ (-5.713), Age may be incorrect
Line=110/ID=13: HAZ (2.396), Height may be incorrect
Line=117/ID=1: HAZ (3.887), Height may be incorrect
Line=143/ID=6: HAZ (4.326), Age may be incorrect
Line=169/ID=15: HAZ (-5.397), WAZ (-4.211), Age may be incorrect
Line=234/ID=11: HAZ (3.416), Age may be incorrect
Line=270/ID=18: HAZ (10.550), WAZ (3.549), Age may be incorrect
Line=278/ID=9: HAZ (2.054), Age may be incorrect
Line=340/ID=23: HAZ (3.152), Age may be incorrect
Line=365/ID=18: HAZ (-5.595), Age may be incorrect
Line=393/ID=7: HAZ (-4.921), Age may be incorrect
Line=448/ID=22: HAZ (-4.458), Age may be incorrect
Line=476/ID=14: HAZ (2.345), Age may be incorrect
Line=530/ID=13: HAZ (1.823), Age may be incorrect
Line=593/ID=12: HAZ (3.109), WAZ (1.959), Age may be incorrect
Line=595/ID=12: HAZ (4.614), WAZ (2.314), Age may be incorrect
Line=605/ID=23: HAZ (-5.588), Age may be incorrect
Line=612/ID=19: HAZ (-4.704), Height may be incorrect
Line=619/ID=24: HAZ (-4.489), Height may be incorrect
Line=642/ID=1: HAZ (1.795), Age may be incorrect
Line=657/ID=17: HAZ (-4.923), Height may be incorrect
Line=659/ID=4: WAZ (2.239), Age may be incorrect
Line=663/ID=11: HAZ (-5.390), Height may be incorrect

Percentage of values flagged with SMART flags:WHZ: 0.4 %, HAZ: 4.3 %, WAZ: 1.2 %

Age distribution:

Month 6: #########
Month 7: ########################
Month 8: #############
Month 9: ########

Month 10: ###########
Month 11: ##################
Month 12: #################
Month 13: ################
Month 14: ##########
Month 15: ###########
Month 16: #################
Month 17: ##############
Month 18: ####################
Month 19: ###################
Month 20: #########
Month 21: ###########
Month 22: ############
Month 23: ########
Month 24: #################
Month 25: #############
Month 26: ##########
Month 27: ################
Month 28: #############
Month 29: #########
Month 30: #####
Month 31: ###########
Month 32: ########
Month 33: ##########
Month 34: #######
Month 35: ##########
Month 36: ##########
Month 37: ##########
Month 38: ###########
Month 39: ##########
Month 40: ###################
Month 41: ###############
Month 42: ######
Month 43: ##
Month 44: #####
Month 45: ##
Month 46: ###
Month 47: ########
Month 48: ###
Month 49: #############
Month 50: ####
Month 51: #####
Month 52: ##########
Month 53: ####
Month 54: ######
Month 55: ############
Month 56: ##############
Month 57: ##########
Month 58: ##
Month 59: ###
Month 60: #

Age ratio of 6-29 months to 30-59 months: 1.37 (The value should be around 0.85).: p-value = 0.000 (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	79/62.4 (1.3)	96/68.4 (1.4)	175/130.9 (1.3)	0.82
18 to 29	12	69/60.9 (1.1)	82/66.7 (1.2)	151/127.6(1.2)	0.84
30 to 41	12	63/59.0 (1.1)	65/64.7 (1.0)	128/123.7(1.0)	0.97
42 to 53	12	33/58.0 (0.6)	33/63.7 (0.5)	66/121.7 (0.5)	1.00
54 to 59	6	25/28.7 (0.9)	19/31.5 (0.6)	44/60.2 (0.7)	1.32
6 to 59	54	269/282.0 (1.0)	295/282.0 (1.0)		0.91

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

Overall sex ratio: p-value = 0.274 (boys and girls equally represented)
Overall age distribution: p-value = 0.000 (significant difference)
Overall age distribution for boys: p-value = 0.002 (significant difference)
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: **5** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)
p-value for chi2: 0.133

Digit preference Height:

Digit .0: ###
Digit .1: ############################
Digit .2: ###############################
Digit .3: ##############################
Digit .4: ################################
Digit .5: ##########################
Digit .6: ########################
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Digit .8: ######################
Digit .9: ####################

Digit preference score: **10** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)
p-value for chi2: 0.000 (significant difference)

Digit preference MUAC:

Digit .0: ##################################
Digit .1: ################################
Digit .2: ######################
Digit .3: ########################
Digit .4: ##################################
Digit .5: ##################################
Digit .6: ##############################
Digit .7: ######################
Digit .8: ######################
Digit .9: #############################

Digit preference score: **6** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)
p-value for chi2: 0.023 (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:	0.99	0.99	0.97
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:			
calculated with current SD:			
calculated with a SD of 1:			
HAZ			
Standard Deviation SD:	1.50	1.35	1.10
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	28.2%	28.2%	27.5%
calculated with current SD:	31.8%	30.6%	27.3%
calculated with a SD of 1:	23.9%	24.8%	25.4%
WAZ			
Standard Deviation SD:	1.05	1.03	0.96
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			

observed:	16.3%	16.2%
calculated with current SD:	19.3%	18.6%
calculated with a SD of 1:	18.1%	17.9%

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

WHZ	p= 0.015	p= 0.015	p= 0.033
HAZ	p= 0.000	p= 0.000	p= 0.032
WAZ	p= 0.000	p= 0.000	p= 0.402

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

Skewness

WHZ	-0.10	-0.10	-0.01
HAZ	1.48	0.38	0.15
WAZ	-0.14	0.03	-0.08

If the value is:

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

Kurtosis

WHZ	0.42	0.42	0.27
HAZ	10.48	2.33	0.16
WAZ	2.07	1.50	0.15

Kurtosis characterises 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=1.31 (p=0.122)
WHZ < -3: ID=0.93 (p=0.572)
GAM: ID=1.31 (p=0.122)
SAM: ID=0.93 (p=0.572)
HAZ < -2: ID=1.42 (p=0.065)
HAZ < -3: ID=0.76 (p=0.820)
WAZ < -2: ID=1.64 (p=0.016)

WAZ < -3: ID=1.06 (p=0.382)

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: 1.21 (n=30, f=1) #################
02: 1.21 (n=28, f=1) #################
03: 1.12 (n=23, f=0) #############
04: 1.12 (n=25, f=0) ##############
05: 0.62 (n=24, f=0)
06: 0.91 (n=22, f=0) #####
07: 0.91 (n=28, f=0) #####
08: 0.95 (n=26, f=0) ######
09: 1.16 (n=25, f=0) ###############
10: 0.77 (n=28, f=0)
11: 1.15 (n=25, f=0) ###############
12: 1.02 (n=23, f=0) #########
13: 1.03 (n=26, f=0) ##########
14: 0.92 (n=28, f=0) #####
15: 0.92 (n=26, f=0) #####
16: 1.05 (n=30, f=0) ###########
17: 1.06 (n=21, f=0) ###########
18: 0.61 (n=18, f=0)
19: 0.82 (n=21, f=0) #
20: 0.85 (n=18, f=0) ##
21: 0.90 (n=15, f=0) ####
22: 1.12 (n=13, f=0) OOOOOOOOOOOOOO
23: 1.06 (n=11, f=0) OOOOOOOOOOOO
24: 0.69 (n=08, f=0)
25: 0.87 (n=07, f=0) OOO
26: 0.93 (n=05, f=0) ~~~~~~
27: 0.22 (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 =	97	92	85	84	101	105
Percentage of values flagged with SMART flags:						
WHZ:	0.0	2.2	0.0	0.0	0.0	1.9
HAZ:	5.2	8.8	0.0	3.6	3.0	4.8
WAZ:	2.1	2.2	0.0	3.6	0.0	1.0
Age ratio of 6-29 months to 30-59 months:						
	1.55	1.42	1.43	2.11	0.94	1.19
Sex ratio (male/female):						
	1.26	0.92	0.81	0.83	0.91	0.81
Digit preference Weight (%):						
.0 :	4	4	11	14	18	9
.1 :	18	12	14	5	7	7
.2 :	13	12	13	13	11	14
.3 :	10	12	13	4	7	10
.4 :	10	16	5	15	6	12
.5 :	1	12	7	8	10	9
.6 :	12	7	11	15	8	15
.7 :	13	9	6	5	8	8
.8 :	7	8	13	13	17	10
.9 :	10	8	8	7	9	7
DPS:	15	11	11	15	13	10

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

Digit preference Height (%):						
.0 :	1	8	19	17	23	35
.1 :	20	11	5	7	8	8
.2 :	6	14	16	11	12	8
.3 :	11	11	13	10	13	8
.4 :	16	10	14	12	9	8
.5 :	4	13	6	12	10	11
.6 :	11	8	11	5	8	9
.7 :	8	3	2	14	9	5
.8 :	10	12	6	11	3	6
.9 :	11	10	8	2	6	4
DPS:	17	10	17	14	17	29

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

Digit preference MUAC (%):						
.0 :	8	12	4	25	9	16
.1 :	9	23	13	14	3	8
.2 :	9	7	13	7	4	7
.3 :	6	3	14	7	9	11
.4 :	13	12	19	5	14	10
.5 :	13	8	7	14	14	14
.6 :	10	11	9	5	17	10
.7 :	11	10	6	6	8	5
.8 :	10	3	1	12	13	6

.9 :	8	11	14	5	10	13
DPS:	7	18	17	21	14	12

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

Standard deviation of WHZ:

SD	1.11	1.01	0.82	0.98	0.92	1.01
Prevalence (< -2) observed:						
%	16.5	7.7				8.7
Prevalence (< -2) calculated with current SD:						
%	14.0	6.6				5.9
Prevalence (< -2) calculated with a SD of 1:						
%	11.5	6.4				5.7

Standard deviation of HAZ:

SD	1.81	1.62	1.17	1.42	1.20	1.55
observed:						
%	42.3	27.5	32.9	19.0	28.7	19.0
calculated with current SD:						
%	39.8	33.5	36.2	23.8	32.6	23.7
calculated with a SD of 1:						
%	32.0	24.6	34.0	15.5	29.4	13.3

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	21/12.5 (1.7)	19/10.0 (1.9)	40/22.5 (1.8)	1.11
18 to 29	12	10/12.2 (0.8)	9/9.7 (0.9	19/21.9 (0.9)	1.11
30 to 41	12	14/11.8 (1.2)	10/9.4 (1.1)	24/21.3 (1.1)	1.40
42 to 53	12	7/11.7 (0.6)	4/9.3 (0.4)	11/20.9 (0.5)	1.75
54 to 59	6	2/5.8 (0.3)	1/4.6 (0.2)	3/10.4 (0.3)	2.00
6 to 59	54	54/48.5 (1.1)	43/48.5 (0.9)	1.26	

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

Overall sex ratio: p-value = 0.264 (boys and girls equally represented)
Overall age distribution: p-value = 0.000 (significant difference)
Overall age distribution for boys: p-value = 0.028 (significant difference)
Overall age distribution for girls: p-value = 0.007 (significant difference)
Overall sex/age distribution: p-value = 0.000 (significant difference)

Team 2:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	14/10.2 (1.4)	15/11.1 (1.3)	29/21.3 (1.4)	0.93
18 to 29	12	14/10.0 (1.4)	11/10.9 (1.0)	25/20.8 (1.2)	1.27
30 to 41	12	10/9.6 (1.0)	14/10.5 (1.3)	24/20.2 (1.2)	0.71
42 to 53	12	5/9.5 (0.5)	5/10.4 (0.5)	10/19.9 (0.5)	1.00
54 to 59	6	1/4.7 (0.2)	3/5.1 (0.6)	4/9.8 (0.4)	0.33

6 to 59	54	44/46.0 (1.0)	48/46.0 (1.0)	0.92	

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

Overall sex ratio: p-value = 0.677 (boys and girls equally represented)
Overall age distribution: p-value = 0.013 (significant difference)
Overall age distribution for boys: p-value = 0.088 (as expected)
Overall age distribution for girls: p-value = 0.189 (as expected)
Overall sex/age distribution: p-value = 0.006 (significant difference)

Team 3:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	14/8.8 (1.6)	14/10.9 (1.3)	28/19.7 (1.4)	1.00
18 to 29	12	8/8.6 (0.9)	14/10.6 (1.3)	22/19.2 (1.1)	0.57
30 to 41	12	9/8.3 (1.1)	8/10.3 (0.8)	17/18.6 (0.9)	1.13
42 to 53	12	6/8.2 (0.7)	6/10.1 (0.6)	12/18.3 (0.7)	1.00
54 to 59	6	1/4.1 (0.2)	5/5.0 (1.0)	6/9.1 (0.7)	0.20
6 to 59	54	38/42.5 (0.9)	47/42.5 (1.1)	0.81	

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

Overall sex ratio: p-value = 0.329 (boys and girls equally represented)
Overall age distribution: p-value = 0.123 (as expected)
Overall age distribution for boys: p-value = 0.197 (as expected)
Overall age distribution for girls: p-value = 0.386 (as expected)
Overall sex/age distribution: p-value = 0.027 (significant difference)

Team 4:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	14/8.8 (1.6)	21/10.7 (2.0)	35/19.5 (1.8)	0.67
18 to 29	12	8/8.6 (0.9)	14/10.4 (1.3)	22/19.0 (1.2)	0.57
30 to 41	12	6/8.3 (0.7)	8/10.1 (0.8)	14/18.4 (0.8)	0.75
42 to 53	12	5/8.2 (0.6)	3/9.9 (0.3)	8/18.1 (0.4)	1.67
54 to 59	6	5/4.1 (1.2)	0/4.9 (0.0)	5/9.0 (0.6)	
6 to 59	54	38/42.0 (0.9)	46/42.0 (1.1)	0.83	

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

Overall sex ratio: p-value = 0.383 (boys and girls equally represented)
Overall age distribution: p-value = 0.000 (significant difference)
Overall age distribution for boys: p-value = 0.266 (as expected)
Overall age distribution for girls: p-value = 0.000 (significant difference)
Overall sex/age distribution: p-value = 0.000 (significant difference)

Team 5:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	7/11.1 (0.6)	8/12.3 (0.7)	15/23.4 (0.6)	0.88
18 to 29	12	17/10.9 (1.6)	17/12.0 (1.4)	34/22.8 (1.5)	1.00
30 to 41	12	10/10.5 (1.0)	15/11.6 (1.3)	25/22.1 (1.1)	0.67
42 to 53	12	4/10.4 (0.4)	4/11.4 (0.3)	8/21.8 (0.4)	1.00
54 to 59	6	10/5.1 (2.0)	9/5.7 (1.6)	19/10.8 (1.8)	1.11
6 to 59	54	48/50.5 (1.0)	53/50.5 (1.0)		0.91

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

Overall sex ratio: p-value = 0.619 (boys and girls equally represented)
Overall age distribution: p-value = 0.000 (significant difference)
Overall age distribution for boys: p-value = 0.009 (significant difference)
Overall age distribution for girls: p-value = 0.023 (significant difference)
Overall sex/age distribution: p-value = 0.000 (significant difference)

Team 6:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	9/10.9 (0.8)	19/13.5 (1.4)	28/24.4 (1.1)	0.47
18 to 29	12	12/10.6 (1.1)	17/13.1 (1.3)	29/23.8 (1.2)	0.71
30 to 41	12	14/10.3 (1.4)	10/12.7 (0.8)	24/23.0 (1.0)	1.40
42 to 53	12	6/10.1 (0.6)	11/12.5 (0.9)	17/22.7 (0.8)	0.55
54 to 59	6	6/5.0 (1.2)	1/6.2 (0.2)	7/11.2 (0.6)	6.00
6 to 59	54	47/52.5 (0.9)	58/52.5 (1.1)		0.81

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

Overall sex ratio: p-value = 0.283 (boys and girls equally represented)
Overall age distribution: p-value = 0.316 (as expected)
Overall age distribution for boys: p-value = 0.446 (as expected)
Overall age distribution for girls: p-value = 0.074 (as expected)
Overall sex/age distribution: p-value = 0.008 (significant difference)

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: 0.97 (n=05, f=0) #######
02: 1.04 (n=04, f=0) ##########
03: 1.86 (n=05, f=0) #############################################
```

04: 1.23 (n=05, f=0) ##################
05: 0.61 (n=04, f=0)
06: 0.67 (n=05, f=0)
07: 0.60 (n=05, f=0)
08: 0.62 (n=05, f=0)
09: 1.53 (n=04, f=0) ###############################
10: 1.02 (n=05, f=0) #########
11: 1.18 (n=04, f=0) ################
12: 0.32 (n=03, f=0)
13: 0.90 (n=05, f=0) ####
14: 1.35 (n=05, f=1) #######################
15: 1.11 (n=03, f=0) OOOOOOOOOOOOO
16: 0.85 (n=05, f=0) ##
17: 1.42 (n=04, f=0) ##########################
18: 0.63 (n=05, f=0)
19: 0.88 (n=04, f=0) ####
20: 0.71 (n=04, f=0)
22: 0.65 (n=03, f=0)
23: 0.48 (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: 2.05 (n=05, f=1)
##
02: 1.12 (n=05, f=0) ##############
03: 0.29 (n=04, f=0)
04: 0.54 (n=05, f=0)
05: 0.80 (n=04, f=0)
06: 0.87 (n=03, f=0) ###
07: 1.05 (n=04, f=0) ###########
08: 0.86 (n=03, f=0) ###
09: 0.87 (n=05, f=0) ###
10: 0.80 (n=04, f=0)
11: 1.64 (n=02, f=0)
OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
12: 2.23 (n=02, f=0)
OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
OOOOOOOOOOOOOOOOO
13: 0.44 (n=04, f=0)
14: 1.36 (n=05, f=0) ########################
15: 1.38 (n=04, f=0) ########################
16: 0.57 (n=05, f=0)
17: 0.70 (n=05, f=0)
20: 0.47 (n=04, f=0)
21: 1.23 (n=04, f=0) ##################
22: 0.96 (n=02, f=0) OOOOOOO

23: 1.14 (n=03, f=0) ##############
24: 0.38 (n=02, f=0)
25: 0.48 (n=02, f=0)
26: 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: 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: 0.96 (n=05, f=0) #######
02: 0.87 (n=05, f=0) ###
03: 0.84 (n=03, f=0) ##
04: 0.64 (n=02, f=0)
05: 0.42 (n=03, f=0)
06: 1.14 (n=04, f=0) ##############
07: 0.84 (n=04, f=0) ##
08: 0.87 (n=04, f=0) ###
09: 0.07 (n=03, f=0)
10: 0.29 (n=05, f=0)
11: 0.55 (n=05, f=0)
12: 0.27 (n=03, f=0)
13: 0.80 (n=04, f=0)
14: 0.55 (n=05, f=0)
15: 0.64 (n=05, f=0)
16: 0.72 (n=05, f=0)
17: 0.52 (n=02, f=0)
18: 0.64 (n=03, f=0)
19: 1.36 (n=04, f=0)  #######################
20: 0.64 (n=02, f=0)
21: 0.86 (n=03, f=0) ##
22: 1.40 (n=02, f=0) OOOOOOOOOOOOOOOOOOOOOOOO
23: 0.25 (n=02, f=0)
```

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

Team: 4

```
Time                          SD for WHZ
point          0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
01: 0.89 (n=05, f=0) ####
02: 0.85 (n=04, f=0) ##
03: 0.62 (n=05, f=0)
04: 1.32 (n=04, f=0)  ######################
05: 0.87 (n=05, f=0) ###
06: 0.77 (n=03, f=0)
07: 0.97 (n=05, f=0) #######
```

08: 1.31 (n=05, f=0) #####################
09: 1.24 (n=04, f=0) ##################
10: 0.90 (n=05, f=0) ####
11: 1.21 (n=05, f=0) #################
12: 1.15 (n=05, f=0) ###############
13: 0.92 (n=05, f=0) #####
14: 0.28 (n=05, f=0)
15: 0.54 (n=05, f=0)
16: 1.23 (n=05, f=0) ##################
17: 0.23 (n=02, f=0)
18: 0.72 (n=02, f=0)
19: 0.92 (n=02, f=0) OOOOO
20: 0.11 (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: 0.86 (n=05, f=0) ###
02: 0.89 (n=05, f=0) ####
03: 0.81 (n=04, f=0)
04: 0.68 (n=04, f=0)
05: 0.56 (n=03, f=0)
06: 0.16 (n=03, f=0)
07: 0.78 (n=05, f=0)
08: 0.80 (n=05, f=0)
09: 1.21 (n=04, f=0) #################
10: 0.58 (n=04, f=0)
11: 0.70 (n=05, f=0)
12: 0.74 (n=05, f=0)
13: 1.64 (n=03, f=0) ###################################
14: 0.79 (n=04, f=0)
15: 0.74 (n=05, f=0)
16: 0.90 (n=05, f=0) ####
17: 0.77 (n=03, f=0)
18: 0.57 (n=04, f=0)
19: 0.53 (n=05, f=0)
20: 1.34 (n=03, f=0) #######################
21: 1.17 (n=03, f=0) ###############
22: 0.05 (n=02, f=0)
23: 2.01 (n=02, f=0)
OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
OOOOOOO
24: 0.99 (n=02, 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: 6

Time SD for WHZ
point 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
01: 0.89 (n=05, f=0) ####
02: 1.94 (n=05, f=1) ###
03: 1.00 (n=02, f=0) OOOOOOOO
04: 1.05 (n=05, f=0) ##########
05: 0.32 (n=05, f=0)
06: 0.74 (n=04, f=0)
07: 0.82 (n=05, f=0) #
08: 0.44 (n=04, f=0)
09: 1.25 (n=05, f=0) ###################
10: 0.67 (n=05, f=0)
11: 1.05 (n=04, f=0) ###########
12: 1.12 (n=05, f=0) ##############
13: 1.11 (n=05, f=0) #############
14: 0.62 (n=04, f=0)
15: 1.00 (n=04, f=0) ########
16: 1.27 (n=05, f=0) ####################
17: 0.76 (n=05, f=0)
18: 0.58 (n=03, f=0)
19: 0.59 (n=05, f=0)
20: 1.52 (n=03, f=0) OOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
21: 0.31 (n=04, f=0)
22:1.67(n=03, f=0)
OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
23: 0.97 (n=02, f=0) OOOOOOO
24: 0.84 (n=02, f=0) OO
25: 1.17 (n=02, f=0) OOOOOOOOOOOOOOOO
26: 0.77 (n=02, f=0)

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

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

Annex 2: Assignment of Clusters

Geographical unit	Population size	Cluster
AL Najeeh	1115	1
Al Zebaier	2032	2
Asem	2525	3,4
Al Zebera	560	5
Al rwesat	476	
Est + Wst Al-Shayah	2500	6,7
Al Jesri	812	8
Al Buir	1875	RC
Jadal	5000	9,10,11,12
Jamera	550	
Western Musikeh	1300	13
Estern Musikeh	1410	14
Musikeh Madares	1810	15,16
Motella	1216	RC
Hamer	880	
Sur	1800	17,18
Shomreh	1000	19
Al Balana	510	
Al Kasir	270	
Sateh Al Kadan	785	20
Al Modawarh	475	
Mazrea al Sheeh	559	21
Al Bekri	720	
Al Dlafa	300	
Brikta	341	22
Al Batgasha	325	
Al Aaed	375	
Al Darkhawi	345	
Sanooa Al Hamam	460	RC
Al teraa	450	
Thalaj	620	23
Jamreh	462	
Om Al khraz	255	
Karim AL Janobi	6800	24,25,26,RC,27
EIB	3000	28,29,30

Annex 3: Evaluation of Enumerators (Standardisation test result)

The mean from enumerators' measurement had been used instead of supervisor measurement.

Standardisation test results					Precision				Accuracy		OUTCOME		
Weight		subjects	mean	SD	max	Technical error	TEM/ mean	Coef of reliability	Bias from superv	Bias from median	result		
		#	kg	kg	kg	TEM (kg)	TEM (%)	R (%)	Bias (kg)	Bias (kg)			
	Supervisor	9	14.2	2.3	0.1	0.05	0.3	100	-	-0.38	TEM acceptable	R value good	Bias good
	Enumerator 1	9	14.2	2.2	0.2	0.06	0.4	99.9	0.01	-0.37	TEM acceptable	R value good	Bias good
	Enumerator 2	9	14.2	2.3	0.4	0.12	0.8	99.7	-0.01	-0.38	TEM poor	R value good	Bias good
	Enumerator 3	9	14.2	2.2	0.2	0.08	0.5	99.9	-0.01	-0.38	TEM acceptable	R value good	Bias good
	Enumerator 4	9	14.3	2.3	0.6	0.19	1.3	99.3	0.03	-0.35	TEM poor	R value good	Bias good
	Enumerator 5	9	14.2	2.2	0.4	0.14	1	99.6	0.01	-0.37	TEM poor	R value good	Bias good
	Enumerator 6	9	14.2	2.3	0.5	0.17	1.2	99.4	0.02	-0.36	TEM poor	R value good	Bias good
	Enumerator 7	9	14.2	2.3	0.2	0.1	0.7	99.8	0.01	-0.37	TEM acceptable	R value good	Bias good
	Enumerator 8	9	14.2	2.2	0.4	0.13	0.9	99.7	-0.01	-0.38	TEM poor	R value good	Bias good
	enum inter 1st	8x9	14.2	2.2	-	0.18	1.2	99.4	-	-	TEM acceptable	R value good	
	enum inter 2nd	8x9	14.3	2.2	-	0.12	0.9	99.7	-	-	TEM acceptable	R value good	
	inter enum + sup	9x9	14.2	2.2	-	0.14	1	99.6	-	-	TEM acceptable	R value good	
	TOTAL intra+inter	8x9	-	-	-	0.2	1.4	99.2	0.01	-0.37	TEM acceptable	R value good	Bias good
	TOTAL+ sup	9x9	-	-	-	0.19	1.3	99.3	-	-	TEM acceptable	R value good	
Height		subjects	mean	SD	max	Technical error	TEM/mean	Coef of reliability	Bias from superv	Bias from median	result		
		#	cm	cm	cm	TEM (cm)	TEM (%)	R (%)	Bias (cm	Bias (cm)			
	Supervisor	9	93.1	7.9	0.5	0.17	0.2	100	-	-1.93	TEM good	R value good	
	Enumerator 1	9	93.1	8	0.6	0.26	0.3	99.9	0	-1.93	TEM good	R value good	Bias good
	Enumerator 2	9	93	8.1	1.2	0.37	0.4	99.8	-0.06	-1.99	TEM good	R value good	Bias good
	Enumerator 3	9	93.3	7.6	0.7	0.27	0.3	99.9	0.23	-1.71	TEM good	R value good	Bias good
	Enumerator 4	9	92.8	8.1	0.7	0.18	0.2	100	-0.32	-2.25	TEM good	R value good	Bias good
	Enumerator 5	9	93	7.6	0.7	0.26	0.3	99.9	-0.08	-2.01	TEM good	R value good	Bias good
	Enumerator 6	9	92.8	8	1.1	0.46	0.5	99.7	-0.24	-2.18	TEM acceptable	R value good	Bias good
	Enumerator 7	9	93.3	7.8	1.8	0.47	0.5	99.6	0.22	-1.71	TEM acceptable	R value good	Bias good
	Enumerator 8	9	93.3	7.8	1.4	0.51	0.5	99.6	0.27	-1.67	TEM acceptable	R value good	Bias good
	enum inter 1st	8x9	93.1	7.7	-	0.56	0.6	99.5	-	-	TEM acceptable	R value good	
	enum inter 2nd	8x9	93	7.7	-	0.49	0.5	99.6	-	-	TEM good	R value good	
	inter enum + sup	9x9	93.1	7.7	-	0.49	0.5	99.6	-	-	TEM good	R value good	
	TOTAL intra+inter	8x9	-	-	-	0.64	0.7	99.3	0	-1.93	TEM acceptable	R value good	Bias good
	TOTAL+ sup	9x9	-	-	-	0.6	0.6	99.4	-	-	TEM acceptable	R value good	

MUAC		subjects	mean	SD	max	Technical error	TEM/mean	Coef of reliability	Bias from superv	Bias from median	result		
		#	mm	mm	mm	TEM (mm)	TEM (%)	R (%)	Bias (m	Bias (mm)			
	Supervisor	9	157.7	8.7	2.1	0.81	0.5	99.1	-	0.71	TEM good	R value good	
	Enumerator 1	9	159	9.4	6	2.26	1.4	94.3	1.29	2	TEM acceptable	R value poor	Bias acceptable
	Enumerator 2	9	156.1	8.5	7	2.31	1.5	92.7	-1.6	-0.89	TEM acceptable	R value poor	Bias good
	Enumerator 3	9	158.6	9.1	1	0.33	0.2	99.9	0.84	1.56	TEM good	R value good	Bias good
	Enumerator 4	9	156.9	7.8	1	0.53	0.3	99.5	-0.77	-0.06	TEM good	R value good	Bias good
	Enumerator 5	9	159.1	8.6	5	2.21	1.4	93.4	1.4	2.11	TEM acceptable	R value poor	Bias acceptable
	Enumerator 6	9	156.3	9.4	6	2.38	1.5	93.6	-1.38	-0.67	TEM acceptable	R value poor	Bias good
	Enumerator 7	9	157	8.8	7	2	1.3	94.8	-0.71	0	TEM good	R value poor	Bias good
	Enumerator 8	9	158.5	9.9	9	3.5	2.2	87.4	0.79	1.5	TEM reject	R value reject	Bias good
	enum inter 1st	8x9	157.5	9	-	3.1	2	88.1	-	-	TEM poor	R value reject	
	enum inter 2nd	8x9	157.9	8.7	-	2.14	1.4	94	-	-	TEM acceptable	R value poor	
	inter enum + sup	9x9	157.7	8.8	-	2.45	1.6	92.1	-	-	TEM acceptable	R value poor	
	TOTAL intra+inter	8x9	-	-	-	3.44	2.2	84.8	-0.02	0.7	TEM reject	R value reject	Bias good
	TOTAL+ sup	9x9	-	-	-	3.24	2.1	86.4	-	-	TEM poor	R value reject	

Suggested cut-off points for acceptability of measurements

Parameter		MUAC m	Weight	Height cm
individual	good	<2.0	<0.04	<0.4
TEM	acceptable	<2.7	<0.10	<0.6
(intra)	poor	<3.3	<0.21	<1.0
	reject	>3.3	>0.21	>1.0
Team TE	good	<2.0	<0.10	<0.5
(intra+inter	acceptable	<2.7	<0.21	<1.0
and Total	poor	<3.3	<0.24	<1.5
	reject	>3.3	>0.24	>1.5
R value	good	>99	>99	>99
	acceptable	>95	>95	>95
	poor	>90	>90	>90
	reject	<90	<90	<90
Bias	good	<1	<0.04	<0.4
From sup	acceptable	<2	<0.10	<0.6
outcome,	poor	<3	<0.21	<1.4
from medi	reject	>3	>0.21	>1.4

Annex 4: Children 0 – 59 months questionnaire in Arabic

SMART NUTRITION SURVEY – Dara, Syria – Aug 2017

تاريخ المقابلة (dd/mm/yyyy)	رقم العنقود	رقم الفريق
I___I___I/I___I___I/ 2017	I___I___I	I___I

الأطفال من عمر ٠ ــ ٥٩ شهر ولدو من تاريخ ٢٠١٢/٩ وما بعد					الأطفال من عمر (٦ ــ ٥٩ شهر) ولدوا بين ٢٠١٢/٩ و ٢٠١٧/٢				الأطفال ٠ ــ ٢٣ شهر ولدو بعد ٢٠١٥/٩				مسح الأطفال المنفصلين كل الأطفال من ٠ ــ ٥٩ شهر	
A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15
رقم الطفل	HH رقم الأسرة	الجنس (f/m)	تاريخ الميلاد (DD/MM/YYYY) اذا ملئت العمود **A4** ، انتقل الى العمود **A6**	العمر (شهور) **فقط إذا لم يوجد لدينا تاريخ الميلاد بشكل دقيق**	الوزن (kg) (00.0)	الطول (cm) (000.0) *: إذا تم قياس الطفل بطريقة مغايرة لما اتفق عليه	الوذمة ثنائية الجانب (y/n)	**MUAC** **قياس محيط منتصف العضد** **(mm)** (000) الذراع اليسرى	**الإرضاع الوالدي** هل رضع (الاسم) من الثدي البارحة خلال النهار أو في الليل. ١ = نعم ٢ = لا ٨ = لا أعلم	**التغذية التكميلية** هل تلقى (الاسم) البارحة، خلال اليوم أو في الليل اي من التالي؟ ١= نعم ٢= لا 8= لا أعلم ماء	حليب صناعي أو طبيعي	أي طعام آخر/ سوائل أخرى	**هل أنت الأم/الأب الحقيقي لهذا الطفل؟ (نعم أو لا)** نعم = ١ لا = ٢ في حال الإجابة ب لا أجب عن **A12**السؤال	**ما هي العلاقة بين رب الأسرة (أنت) والطفل** ٠٨ = حفيد ٠٩ = ابن أو ابنة أخ/ أخت ١٠=أخ أو أخت ١١=ابن أو ابنة عم ١٢ = ليسوا أقارب
1			/ /											
2			/ /											
3			/ /											
4			/ /											
5			/ /											
6			/ /											

Children 0 – 59 month questionnaire in English (translated – not used in the field)

SMART NUTRITION SURVEY – Dara – Aug 2017

Date of interview (dd/mm/yyyy)	Cluster Number	Team Number
I___I___I/I___I___I/ 2017	I___I___I	I___I

CHILDREN from 0 to less than 5 years (0 to 59 months), born in 09/2012 and after.					**CHILDREN from 6-59 months, born between 09/2012 and 02/2017.**				**Children from 0-23 months, born in 09/2015 and after.**				Unaccompanied and Separated Children **(All)**	
A1	**A2**	**A3**	**A4**	**A5**	**A6**	**A7**	**A8**	**A9**	**A10**	**A11**	**A12**	**A13**	**A14**	**A15**
Child ID	**HH**	**Sex** (f/m)	**Birthday** (DD/MM/YYYY) **If A4 is filled out, SKIP to A6.**	**Age** (months) **Only if don't have exact birthdate.**	**Weight** (kg) (00.0)	**Height** (cm) (000.0) *: if child is measured opposite to protocol	**Bilateral Oedema** (y/n)	**MUAC** (mm) (000) Left arm	**Breastfeeding** Was [NAME] breastfed yesterday during the day or at night? 1=Yes 2=No 8=Don't know	**Complementary** Yesterday, during the day or at night, did [NAME] receive any of the following? (y/n) 1 = Yes 2 = No 8 = Don't know			Are you the biological mother/ father of this child? (Y/N) (YES=01, NO=02) **If you answered no answer question A12**	What is the relationship between the head of HH (you) and child? 08 = grandchild 09 = niece/nephew 10 = sibling 11 = cousin 12 = not related
										Water	Formula or Raw Milk	Any other food/ liquid		
1			/ /											
2			/ /											
3			/ /											
4			/ /											

Annex 5: PLW questionnaire in Arabic

SMART NUTRITION SURVEY – Dara, Syria – Aug 2017

تاريخ المقابلة (dd/mm/yyyy)	رقم العنقود	رقم الفريق
I___I___I/I___I___I/ 2017	I___I___I	I___I

الحوامل والمرضعات لأطفال بعمر أقل من ٦ أشهر					
A1	A2	A3	A4	A5	A6
الرقم المتسلسل رقم الحامل أو المرضع	HH رقم الأسرة	حامل أو مرضع 1= حامل 2= مرضع	العمر ضع إشارة X تحت الفئة العمرية المناسبة		MUAC قياس محيط منتصف العضد (mm) (000) الذراع اليسرى
			أصغر من ١٨ سنة	أكبر من ١٨ سنة	

Annex 6: Cluster control form Arabic

نموذج ادارة العنقود – درعا، سوريا

تاريخ المسح (يوم/ شهر/ سنة): _ _ / _ _ / ٢٠١٧ اسم القرية/المدينة/المخيم: ________________________ رقم العنقود: __________ رقم الفريق: _________

تواريخ ميلاد الأطفال المشمولين في القياس (٠٩ / ٢٠١٢ إلى ٠٢/ ٢٠١٧)

* يجب ادخال جميع الارقام بالإنجليزية (0,1,2,3,4,5,6,7,8,9)

ترتيب الزيارة	اسم رب الأسرة	هل الأسرة نازحة (نعم = y) (لا = n)	عدد الأطفال القابلين للقياس (٦-٥٩ شهر)	عدد الأطفال القابلين للقياس الذين تم قياسهم (بعد الزيارة الثانية) (٦-٥٩ شهر)	نتيجة أول زيارة ١ = تم اكمالها ٢ = تم اكمالها جزئيا * ٣ = تم الرفض ٤ = تغيب *	يلزم تكرار محاولة زيارة الاسرة (نعم = y) (لا = n)	تم تكرار محاولة الزيارة (نعم = y) (لا = n)	نتيجة ثاني زيارة (ان لزم) ١ = اكتملت ٢ = اكتملت جزئيا ٣ = تم الرفض ٤ = تغيب	ملاحظات
1									
2									
3									
4									
5									
6									

Annex 7: Segmentation table

SMART

Segment Selection PPS Table

جدول الاختيار العشوائي للقطاعات في التجمعات الكبيرة

SEGMENT القطاع	POPULATION (HHS) عدد المنازل المستهدفة	CUMULATIVE POPULATION العدد التراكمي للمنازل المستهدفة	RANGES المدى (المسافة الفاصلة)

Annex 8: Calendar events

	2012		2013		2014		2015		2016		2017	
كانون الثاني	رأس السنة الميلادية	67	رأس السنة الميلادية	55	رأس السنة الميلادية-المولد النبوي الشريف	43	رأس السنة الميلادية -المولد النبوي الشريف	31	رأس السنة الميلادية –المولد النبوي الشريف	19	رأس السنة الميلادية	7
شباط	المولد النبوي الشريف	66	المولد النبوي الشريف	54		42	تحرير بصرى الشام	30	مجزرة الكتيبة المهجورة	18		6
آذار	بدء الثورة السورية عيد الأم	65	عيد الأم	53	عيد الأم	41	تحرير الجمرك القديم ، عيد الأم	29	عيد الأم	17	عيد الأم	5
نيسان		64		52		40	معركة الأفغان	28		16		4
أيار		63		51		39	ليلة الاسراء والمعراج	27	ليلة الاسراء والمعراج	15		3
حزيران	ليلة الاسراء والمعراج	62	ليلة الاسراء والمعراج احتلال خربة غزالة	50	ليلة الاسراء والمعراج ،تحرير اللواء 52	38	بداية شهر رمضان	26	بداية شهر رمضان(18)	14	بداية رمضان	2
تموز		61	بداية شهر رمضان	49	بداية شهر رمضان	37	ليلة القدر- عيد الفطر	25	ليلة القدر + عيد الفطر(18)	13	عيد الفطر	1
آب	بداية شهر رمضان- حصار الحراك -ليلة القدر-عيد الفطر	60	ليلة القدر- عيد الفطر -نقل كتيبة التسليح	48	ليلة القدر- عيد الفطر - كيماويي الغوطة	36		24		12		0
أيلول		59	احتلال قاعدة الجسري	47		35		23		11	عيد الأضحى	
تشرين أول		58	عيد الأضحى	46	عيد الأضحى	34	عيد الأضحى - رأس السنة الهجرية	22	بدء القصف الروسي	10		
تشرين ثاني	عيد الأضحى- رأس السنة الهجرية	57	رأس السنة الهجرية	45	رأس السنة الهجرية	33	تحرير جمرك نصيب	21		9		
كانون أول		56	معركة عامود حوران	44		32		20		8		