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National Dietary Survey of the children of Cyprus

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Abstract

The project CY 2014-2017-Lot1 is a dietary survey conducted in Cyprus and funded through an EFSA procurement under the EU Menu Project. Its objective is to use harmonised methodology for the food consumption survey for children aged zero to nine years old, in a way to be able to transfer the collected data to EFSA according to the specific requirements. A multistage sampling procedure was used for selection of the three age groups (infants 0 to 11 months old, toddlers 12 to 35 months old and children three to nine years old) using the list of private sector's paediatricians & public hospitals (for infants & toddlers) and pre-primary & elementary schools (for children) respectively. The sampling procedure ensured that 25% of selected participants in each age-group were surveyed in each season to capture inter-season variability in consumption. The target sample size was 300 participants for each age group. Well-trained personnel explained to the parents how to record what their child has consumed so as to extract the maximum possible detail. To determine portion size electronic scales and a picture book were given to parents. A short food frequency questionnaire was administered; measures of height and weight were taken. Interviewers were giving oral and written instructions to parents on how to fill in a three non-consecutive days dietary record on their first meeting at the participant's home. The "Greek Diet" software has been evaluated for its compatibility with EFSA requirements and updated/upgraded accordingly. All the food consumption data collected were coded according to FoodEx2 and were transmitted to EFSA. In total data from 848 children were collected. The overall response rate was 65%.

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Key words: Cyprus, dietary survey, food consumption, FoodEx2 coding, dietary record

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Summary

The National Dietary survey of the children in Cyprus (CY 2014-2017-Lot1) is the first harmonised consumption survey for the children, the previous being only for adolescents through the EXPOCHI EFSA Art.36 project. The current project was funded through an EFSA procurement under the EU-Menu Project for a period of 4.5 years (summer 2014 until February 2018). The methodology followed the EFSA Guidance for the EU-Menu Project. The survey included 848 children with response rate 65% and participation rate 98.7%.

For the survey a multistage sampling procedure was used for the selection of the three age groups (infants 0 to 11 months old, toddlers 12 to 35 months old and children three to nine years old) using the list of private sector's paediatricians and public hospitals (for infants and toddlers) and pre-primary & elementary schools (for children), respectively. The sampling procedure ensured that 25% of selected participants in each age-group were surveyed in each season to capture inter-season variability in consumption. The target sample size was 300 participants for each age group. Well-trained personnel explained parents how to record what their child has consumed so as to extract the maximum possible detail. To determine portion size electronic scales and a picture book were given to parents. A food propensity questionnaire was administered; measures of height and weight of the children were taken. The interviewers (dietitians/nutritionists) gave instructions to parents at home how to fill the dietary record so the dietary record was filled by the parents. The dietary recall (after the recording) was carried out by the interviewers. The "Greek Diet" software has been evaluated for its compatibility with EFSA requirements and updated/upgraded accordingly. All the food consumption data collected was coded according to FoodEx2 and was transmitted to EFSA

The "Greek Diet" Software was used for the data manipulation of collected data. It consisted of two MS access databases. The first database (EFSADatabaseCY) handled data regarding a) Demographic data, b) Anthropometry, c) Physical Activity questionnaire (Short IPAQ), and d) Food Frequency Questionnaire. The second database (GreekDietDatabase) handled the data from dietary records and the FoodEx2 coding of the food items

The food items recorded in the Greek Diet Database were coded according to EFSA FoodEx2 classification system. Decoding software was developed for quality control purposes, before transmission to EFSA. For harmonisation purposes, composite dishes were disaggregated into their ingredients according to standard recipes, or to the description given by the participant and classified both as consumed (after processing) and as raw. A database was developed for the conversion of the cooked to the raw ingredients using yield factors. For quality control purposes and before transmission to EFSA, a decoding FoodEx2 software tool was developed for checking the decoded description with the original one.

A pilot study was carried out in the summer of 2014 in order to determine any potential problems and assess the quality of instruments and software that were to be used in the survey. No potential problems were encountered during the pilot phase. Some of the problems encountered during the survey were: the complexity of the methodology and the complexity of the FoodEx2 classification and coding, the low interest of parents to participate, the continuous training of the interviewers (dietitians/nutritionists) and the technical problems of the data servers, where data was stored.

The information collected concerning the nutritional habits of the Cyprus children together with the experience gained in both the consumption data methodology and the FoodEx2 classification made the survey successful. The data collected will be further used for both nutritional analysis as well as more refined exposure assessment to chemicals and nutrients through food.

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1. Introduction and objectives

1.1. Background and terms of references as provided by the requestor

A long term objective of EFSA is the acquisition of a harmonised pan-European Food Consumption database within the framework of the EU Menu process “What’s on the Menu in Europe?” (EU Menu).

In October 2009, the EFSA Expert Group on Food Consumption Data (EGFCD) endorsed the Guidance of EFSA on “General principles for the collection of national food consumption data in the view of a pan-European dietary survey” (EFSA, 2009). The main objective of this Guidance was to recommend general principles for the collection of dietary information that can be used to estimate dietary exposure to food borne hazards and nutrients considered by EFSA’s Scientific Panels and Units.

In December 2009, EFSA started the Article 36 project (CFP/EFSA/DATEX/2009/02) “Pilot study for the Assessment of Nutrient intake and Food Consumption Among Kids in Europe” (PANCAKE), coordinated by RIVM (The Netherlands), to develop and test tools and procedures for the collection of individual food consumption data for infants, toddlers and other children up to 10 years of age. The final report of this project was published on the EFSA website in September 2012 (Ocke et al, 2012).

In December 2011, EFSA started the Article 36 project (CFP/EFSA/DATEX/2010/02) “Pilot study in the view of a Pan-European dietary survey – Adolescents, adults and elderly” (PANEU), coordinated by the Hungarian Food Safety Office to develop and test similar tools and protocols for the different adult population groups. The final results are described in the final report of this project published on the EFSA website in November 2013 (Ambrus et al, 2013).

The Guidance of EFSA on “General principles for the collection of national food consumption data in the view of a pan-European dietary survey” is scheduled to be updated in 2014 based on the outcomes of the above-mentioned pilot studies¹.

Further, since December 2010, EFSA collaborates with the International Agency for Research on Cancer (IARC) through a negotiated procedure contract (NP/EFSA/DATEX/2010/01) in order to develop and adapt the EPIC-SOFT dietary software according to the needs of EFSA and to ensure that this software can be used by EU Member States for their dietary surveys within the context of the EU Menu process. The final report of this project called EMP-PANEU was published on the EFSA website in June 2013 (IARC, 2013)

The first and second support to national dietary surveys was provided by means of the calls for tender CFT/DCM/2011/02 and CFT/DCM/2012/01. Support for seven surveys from six Member States (Estonia, France, Latvia, Portugal, Spain, The Netherlands) was granted in 2011 and 2012

The aim of this procurement procedure is to award direct contracts to organizations from EU Member States, which have a governmental mandate to carry out a dietary survey at national level in the period from 2013 to 2018. Resources will be made available to support the adaptation of the methodology used in these surveys according to the EFSA Guidance document on the general principles for the collection of national food consumption data in the view of a pan-European dietary survey⁴. The dietary data collected through the activity should be available for EFSA’s scientific activities without restrictions on its use.

The objectives of the contract resulting from the present procurement procedure are as follows:

- objective 1: to adapt the methodology to be used in the national food consumption survey according to the EFSA Guidance document on the general principles for the collection of national food consumption data in the view of a pan-European dietary survey,
- objective 2: to prepare and transfer to EFSA the national food consumption data and related information collected during the survey according to the format required by EFSA.

¹ The guidance of EFSA has been updated in December 2014 and is available as Guidance on the EU Menu Methodology at <http://www.efsa.europa.eu/en/efsajournal/pub/3944>

This contract was awarded by EFSA to: State General Laboratory, Kimonos Street 44, 1451 Nicosia, Cyprus

Contractor: State General Laboratory of Cyprus

Contract title: "Support to National Dietary Surveys in compliance with EFSA Guidance on General Principles for the collection on national food consumption data in the view of a pan-European dietary survey covering children from 0 up to 9 years old"

Contract number: CT/EFSA/DCM/2013/02-LOT 1-CT03

2. Description of the protocol of the survey

This National Dietary survey is the first official survey for the nutritional habits of the Cypriot children aiming to collect food consumption data in a harmonised way in order to support exposure assessment to chemicals and other risks of the Cypriot children through food.

The survey was carried out in the context of the European Food Safety Authority's "EU Menu" Project that aims to collect harmonised food consumption data at EU level – harmonised both in the collection and the coding.

The project was awarded to the State General Laboratory (SGL) and the Research and Education Institute of Child Health (REF) through an EFSA contract within the EU Menu project. The contract was signed between EFSA and SGL in 2013 with duration 4.5 years.

The Research and Education Institute of Child Health was responsible for the survey stage of the project with extensive experience in conducting national dietary surveys. It was responsible for the following tasks: develop the sampling methodology, selection of participants, contacting participants, perform face-to-face home visits, anthropometric measurements, collection of dietary recall data, administering Food Frequency Questionnaire (FFQ) and household questionnaires. Each of these issues will be described in more detail in the following sections.

The SGL with the experience gained from participating in the FoodEx2 pilot project and in sending data electronically to EFSA according to specific requirements carried out the FoodEx2 coding and was responsible for the data quality and data transmission to EFSA.

The fieldwork and the data collection were carried out from the summer 2014 to summer 2017.

The survey followed the EFSA guidelines (EFSA, 2009 & EFSA, 2014) and specifications for the report and the data transmission.

2.1. Study population and exclusion criteria

According to the 2011 census, the total population as at census date (1st October 2011) in the Government Controlled Areas of Cyprus was 840,407. The total population in ages 0-74 years of age was 794,302 according to census but according to the estimations of Statistical Service of the Ministry of Finance of Cyprus (personal communication) this number increased to 818,422 at the end of 2012.

The nationality of the inhabitants of Cyprus according to the 2011 census was:

- Cypriots 79.41%
- Other EU citizens 12.65%
- Other nationalities 7.63%
- Unknown 0.31%

Exclusion Criteria:

The exclusion criteria for the children was children hospitalized with severe illness.

2.2. Sampling frame

The REF team undertaken the LOT 1 survey. For LOT 1 three age groups were recruited as follows:

- 1) Infants 0 to 11 months old, 478 subjects.
- 2) Toddlers 12 to 35 months old, 462 subjects.
- 3) Children 3 to 9 years old, 370 subjects.

For the present survey the REF invited more than 300 subjects in each age group aiming to cover 260 subjects in each age group (i.e. envisaged response rate higher than 86%). However, the response rate was unexpectedly lower than this, so REF increased the number of invited subjects in the second year of survey.

In order to select the most representative sample possible for each of the three groups mentioned above, it had been decided to choose different sampling frames for each of the three groups as shown in the Table 1.

Table 1: Sampling frame used for the different population groups and number of participants

Age-Group	Sampling Frame	Number of responders	Number of participants ^(a)
Infants 0 to 11 months old	-List of private sector's paediatricians -List of public hospitals providing primary paediatric care	266	269
Toddlers 12 to 35 months old	-List of private sector's paediatricians -List of public hospitals providing primary paediatric care	275	279
Children 3 to 9 years old	-Pre-primary Schools -Elementary schools (1st to 4 th grade)	296	300
Total		837	848

(a): people accepted participation

The reasoning of the sampling frames mentioned in the Table 1 is as follows:

- All children (100%) are attending elementary schools and pre-primary schools (aged >3 years old).
- The percentage of immunised (vaccinated) children from birth to 35 months olds in certain vaccines is over 90%. These children are attending paediatric care at the private and public sectors. As in all European countries, a number of children is not vaccinated due to parental concerns and beliefs against vaccines. Non-vaccinated children do have a paediatric care either at the private or public sector, although there is no evidence if and how many children do not attend a paediatric clinic.

2.3. Sampling method and design

2.3.1. Sampling of 3 age groups (0 to 9 years old)

A stratified sampling technique was utilised for each of the three age-groups taking into account the following strata:

- District: The freely-accessible areas of Cyprus (i.e. excluding occupied areas from the Turkish troops since 1974) are divided into five districts: 1) Nicosia, 2) Limassol, 3) Larnaca, 4) Paphos, and 5) Famagusta.
- Area of living, i.e. urban or rural areas: According to the 2011 census, approximately 67% of Cyprus population live in urban areas and 33% in rural areas. The proportion in each district

is different. The district of Famagusta consists entirely of rural population given that the city of Famagusta is occupied by the Turkish troops.

- Sex: According to the 2011 census, the proportion of sex is different in the three age-groups, districts and area of living.

In order to get a representative sample the most recent estimations of the population size by the Statistical Service of the Ministry of Finance of the Republic of Cyprus, which refer to the end of year 2012, were used.

For each of the three age-groups, a table with the estimation of the population at the end of 2012, in the above 3 strata was built. For example the distribution of the population (in numbers) at the end of 2012 for infants from birth to 11 months old is shown in the table below:

Table 2: Population from birth to 11 months old years old per district

District	Urban		Rural	
	Males	Females	Males	Females
Nicosia	1463	1402	558	495
Limassol	1097	977	339	295
Larnaca	565	532	403	359
Paphos	383	341	160	144
Famagusta	0	0	315	296
Total	3508	3252	1775	1589

The total number of the population in this age-group is 10.124. In order to calculate the number of needed sample in each strata we used the formula:

$$[300] / [\text{tot population}] * [\text{strata population}]$$

Where, 300 refers to the needed number of subjects per age-group, [tot population] refers to the total population of the age group and the [strata population] refers to the number of the population in the strata. Thus, in order to calculate the number of needed males living in Urban areas in the district of Nicosia we calculated it as:

$$300/10124*1463 = 43 \text{ (see table 3)}$$

2.4. Sample size

2.4.1. Sample size of three age-groups

According to the EFSA EU Menu mandate of this survey, a minimum of 260 subjects (130 males and 130 females) were required for each of the three age groups. Tables 3 and 4 present the sample size per district per age and gender.

Table 3: Calculated Distribution of participants per district, age and gender

Age Group	District	Urban		Rural	
		Males	Females	Males	Females
0 to 11 months	Nicosia	43	17	42	15
	Limassol	33	10	29	9
	Larnaca	17	12	16	11
	Paphos	11	5	10	4
	Famagusta	0	0	9	9
1-2 years	Nicosia	42	16	42	15
	Limassol	33	10	31	10
	Larnaca	15	11	16	11
	Paphos	11	5	11	4
	Famagusta	0	0	10	8
3-9 years	Nicosia	42	16	41	14
	Limassol	33	10	31	9
	Larnaca	16	11	16	11
	Paphos	12	5	11	5
	Famagusta	0	0	10	9

Table 4: Final Sampling distribution per district, per age, and per gender for LOT1 age groups

District	Age						Number of participants
	Infants 0-11 months		Toddlers 12-35 months		Children 3-9 years old		
	Male	Female	Male	Female	Male	Female	
Nicosia	48	64	42	47	63	55	319
Limassol	31	30	43	43	33	37	217
Paphos	35	25	31	34	37	29	191
Larnaca	9	8	10	7	7	13	54
Famagusta	10	9	14	8	13	13	67
Total	269		279		300		848

To capture the seasonal variability, the study was organised accordingly to capture the consumption patterns over the four seasons in the above five mentioned districts. The percentage of full responders per season is found in Table 5.

Table 5: Distribution per season of the full responders Lot 1 age group

	Winter (%)	Spring (%)	Summer (%)	Fall (%)
0-9 years old	27	25	22	26

2.5. Sampling size

The response rate was over 66% with a participation rate of 92%. The reasons for the relatively low response could be the time required by parents to fill in all the information required as well as the three recalls together with the low interest shown by a lot the parents. To calculate response and participation rates, the EFSA Guidance (EFSA, 2014) document was used.

Therefore the following calculations were carried out:

Response rate = (participants/ approached eligible) x 100

Participation rate = (full responders/ participants) x 100

Table 6: Response and participation rates for LOT 1 age groups

	Age class			Total
	Infants 0-11 months	Toddlers 12-35 months	Children 3-9 years old	
Conducted eligible	478	462	370	1310
Participants^(a) (n)	269	279	300	848
Full responders^(b) (n)	266	275	297	838
Response rate (%)	56.3	60.4	81.1	64.7
Participation rate (%)	98.9	98.6	98.7	98.7

(a): accepted participation

(b): provided two or three 24hr dietary recalls

Table 7: Final participation per age group of the Lot 1 participants

Age group	Participants ^(a) (N)	Partial responders ^(b) (N)	Full responders ^(c) (N)
Infants 0 to 11 months old	269	3	266
Toddlers 12 to 35 months old	279	4	275
Children 3 to 9 years old	300	4	296
Total	848	11	837 ^(d)

(a): Number of participants that agreed to participate

(b): Number of participants with one or two 24hr dietary records

(c): Number of participants with two or three 24hr dietary records

Table 8: Sample size of the three age groups and gender of Lot 1

	Age			Number of participants
	Infants 0-11 months	Toddlers 12-35 months	Children 3-9 years old	
Males	133	140	153	426
Females	136	139	147	422
Total	269	279	300	848

2.5.1. Increase project awareness

A brochure was prepared both in Greek and English. This brochure provided simple, but comprehensive information regarding the project. It was enclosed within utility bills so that every household was informed about the project.

2.5.2. Individualised report

An individualised report was prepared and delivered to each participant. This report provided individualised evaluation of body measurements (weight, BMI, waist circumference), blood pressure and dietary status. KIDMED-(Mediterranean Diet Quality Index in Children and Adolescents) score was calculated for children based on FFQs . This report also provided general advice as to the need to improve any aspects that will be indicated as out of normal range.

2.5.3. Modified sampling procedure

The REF had to modify the initial sampling procedure regarding all of the Lot1 age groups, in order to achieve adequate response rate and at the same ensuring that the representative sample of participants would be achieved. There was low interest by the paediatricians, leading to a problem reaching the parents of infants and toddlers. In order to anticipate that:

- Almost all paediatricians registered in Cyprus were invited
- All the paediatricians that were involved in the study the first year were re-invited during the second year

2.6. Legal and ethical aspects

The protocol of the study has been approved by the national bioethics committee in Cyprus. All the parents/ caretakers gave written consent for their participating children. Additionally, approval was also requested and granted from the Ministry of Education for entering the schools to conduct the survey.

3. Dietary survey tools

3.1. Food propensity questionnaire

A short FFQ including fifty-four food items/ groups was used together with short questions in regards to diet habits of the participants: breakfast habits, orthodox fasting pattern and food supplementation intake. According to the answers, the KIDMED Score for children was automatically computed to give feedback to participants on their adherence to the Mediterranean Diet.

3.2. Dietary record

For infants, toddlers and children, the food consumption dietary survey was conducted using the dietary record method including three to four non-consecutive, independent days, at least 14 days apart, (two to three weekdays and one weekend day). Interviewers had been trained to extensively explain/ train parents how to record what their child had consumed during the recorded day. Parents were given diary sheets to fill in the consumption information (Appendix C). After completing all the records, the parent/caretaker was asked to participate on a face-to-face or telephone interview with the dietician, where the records were checked and the data were entered in the dietary software i.e. the "Greek Diet" Software.

3.2.1. Food description

Parents were trained concerning how to record the details of food items to gather all the information including: exact portions of every beverage and food including water, chewing gum, sauces etc.,

brands for all food and beverage items, flavour (i.e. for yogurt), fat/ sugar content, fortification information (probiotics, fibres, calcium etc.), cooking procedure (as well as temperature of cooking/ boiling/ frying), report in case of re-heating, physical characteristic of the packaging (glass, paper, plastic, aluminium) etc. Infant formulae were recorded as detailed as possible (brand and special characteristics). It was also specified in case of homemade food items that are typically purchased (i.e. bread, yogurt, jam etc.).

The interviewers were completing the questionnaires in hard copies that were later entered electronically in the Greek DietDataBase via their computer, which was connected on line to a central server where all the information was stored.

According to the Guidance on EU Menu methodology (EFSA, 2014) « all self-made composite dishes should be disaggregated and described on the component/ingredient level “as purchased”/ “as ingredient”. The disaggregation should be based on information provided by the subject or if this is not possible by means of standard recipes». Therefore the composite dishes as defined by EFSA were disaggregated case by case: a) For sandwiches, salads and similar dishes that the participants defined the portion of each ingredient as well as the cooking method and b) the traditional “recipes” were disaggregated into their ingredients according to a standard recipe (either from the Cyprus Food Museum (CFM), the Hellenic Health Foundation (HHF) or as provided by experienced Cypriot chefs). In total the GreekDiet Database contains 1435 foods of which the 156 are standard “RECIPES”. After disaggregation the raw ingredients, were converted using a yield factor to the cooked ingredient and then both processed and raw ingredients were expressed per 100gr of edible portion to anticipate the amount consumed that was recorded in the Greek Diet Database. A database in the Microsoft office excel format was developed for the calculations for the conversion factors that was incorporated into the “Greek Diet” Software and is explained in Appendix A.

Then all the ingredients both raw and cooked were coded by the FoodEx2 browser.

3.2.2. Determination of portion sizes

Electronic scale was given to almost all the parents to use for dietary record. When weighing of food was not possible for the parents, food items were extensively described according to their size in centimetres in all three dimensions, package size, household measurements and standard units (mugs, cups, tablespoon, teaspoon, cans of 330ml, bottles of 500ml etc.) and a picture book was made available to parents. Permission to use the GloboDiet® Picture Book was obtained by International Agency for Research on Cancer. The coloured GloboDiet® Picture Book presents 128 food items presented in 4-6 portion sizes (4-6 pictures for each food item) in grams. Popular food items in Cyprus were chosen from the original Picture Book. However, since there are no baby foods in the GloboDiet Picture Book, nutritionist/ dietitians were using internet to retrieve information regarding the baby food amounts/ portions/ brands

In case of breastfeeding babies the recorded breast milk intake was calculated as follows:

- ml as fed in bottle (in case the mother used a pump machine)
- calculated as 150ml/kg and divided in reported meals in case of exclusive breastfeeding i.e. if the baby had 10 meals (breast milk) and weighted 5kg then total amount per meal was $(5\text{kg} \times 150\text{ml}) / 10 \text{ meals} = 75\text{ml}$
- in case of breastfeeding (with solids or not) in combination to infant milk formula the same calculations applied: formula intake was subtracted from total amount i.e. if an infant 10kg had: 2 meals of 200ml infant formula + 5 meals of breast milk then the breast milk per meal was calculated = $((10\text{kg} \times 150\text{ml}) - (2 \times 200\text{ml})) / 5 \text{ meals} = 220\text{ml}$

Parents of toddlers and pre-schoolers were also advised to ask for help from child’s nursery school in recording the food consumption of the child.

3.2.3. Dietary software

The "Greek Diet" Software is composed of two MS access databases which have been used for data manipulation of collected data. The first database (EFSAdatabaseCY) handled data regarding a) Demographic data, b) Anthropometry, c) Food supplements intake and d) Diet Questionnaire (Including FFQ). The second database (GreekDietDatabase) handled the data of three days diet records from participants.

The "Greek Diet" Software originally was updated with the latest Cypriot Food Composition Table, popular food items from the United States Department of Agriculture food composition table and known food items frequently consumed available from commercial labels. Also, the updated and upgraded software allows the interviewer to enter all the food item's characteristics: brands, flavour, fat/ sugar content, fortification information, cooking procedure, report in case of re-heating, physical characteristic of the packaging (glass, paper, plastic, aluminium), specification in case of homemade food items that are typically purchased.

The software was continuously upgraded during this survey in order a) to accommodate the disaggregated recipes with their ingredients, b) to accept the in-house FoodEx2 decoding tool, c) to add new food items/recipes that were reported by participants and d) to check the data entry a new application (max portion tool) had been incorporated on the Greek Diet Database, where if quantities appear to be unreasonable a question pops up: "Is this the right amount?".

The food description and coding in FoodEx2 was built in the GreekDietDatabase using all the available information via the FoodEx Browser and then inserted in a specific column embedded in the software. The disaggregated recipes were also included. In order to ensure high quality of the coding, each FoodEx2 code was double-checked against the "core code" of the corresponding food item, which was already incorporated in the software. Additionally a decoding tool was developed and incorporated for quality control purposes to check automatically the decoded description with the original one.

3.3. Other information

The Diet Questionnaires collected information on: sleep duration, infant feeding practices, breakfast frequency consumption, religion fasting habits and dietary supplements' intake. All this data was entered manually by the interviewers/dieticians in the Access database (EFSAdatabaseCy) developed in order to be used for the data entry. The consumption data and the FoodEx2 coding were entered manually in the Greek Diet Database using 10 legacy MS Access databases connected in a central server located at SGL. Access to the databases was given accordingly.

The response rate/ reason of no acceptance to participate in the National Dietary Survey, was recorded. In total 864 subjects were approached but only 848 agreed to participate and the results are shown in Table 9.

Table 9: Non responders

	Total number approached	Total participants	Partial responders (completed one dietary record)		Full response (completed two or three dietary records)		Non responders ^(a)	
			n	%	n	%	n	%
Lot 1	864	848	848	100	837	98.7	16	1.9

(a): Non responders = (total approached- partial responders)

3.3.1. Questionnaires

Socio demographic information

A questionnaire retrieving information for socio economic status was used for parents or caretakers. The questionnaire includes information on participant's gender and date of birth. Information also includes the parents/ caretakers' educational level, professional qualification, current professional status (employed/unemployed etc.) and family income.(Annexes A & B)

3.3.2. Measurement of body weight and height

Paediatricians were taking measures of infants (both weight and height using his/her own measuring tool in his/her consulting room

For toddlers and children the REF dietitians/nutritionists were using TANITA BC 420 MA (A Body Composition Analyser for the measurement of weight in Kg (Accuracy ± 0.1 Kg, Min=2Kg, Max=270Kg) and the telescopic height with the measuring instrument (SECA 225 Height Rod) in cm (Range = 2-230cm, Graduation = 1mm height).

3.3.3. Food supplements

Information was collected using an extensive list of all possible supplements that parents were administering their children. The nutrient(s) that the supplement contained and/ or the brand name were recorded along with the quantity consumed. Information was collected via the FFQ and the records.

Table 10: Food supplements- information gathered via questionnaire

	Food Supplements % not using	Multivitamins % using	Number of participants asked
Infants	43	9	272
Toddlers	56	5	280
Children	62	6	311

4. Administration of the interview

4.1. Selecting the examination site

Since selection was conducted through lists of public hospitals/ private sectors paediatricians/ obstetricians/ schools the first visit was arranged accordingly. Usually for the first interview home visits were taking place. The participants were motivated to visit Research and Educational Institute of Child Health offices for the rest of the interviews; otherwise telephone interviews were taking place.

4.2. Content and organization of the study visits

4.2.1. First contact

According to the stratified sampling technique described above, participants were selected from lists contacted through lists of public hospitals, private sectors paediatricians and obstetricians and schools. Invitation letters were sent to selected individuals' parents/ caretakers to arrange the first visit.

4.2.2. First interview

The first interview included: a) directions to parents and caretakers for the completion of the dietary records, b) anthropometric measurements, c) completing and collection of questionnaires. For the

portion size estimation, parents had the option to be provided with a picture book or an electronic scale. If they did not wish to use any of them, instructions of other measuring methods were given to them (mugs/ tsp/ tbs/ etc.).

4.2.3. Second interview

The second interview included revision of the dietary records (filled in by parents/ guardians) by fieldwork staff, i.e. nutritionists/ dieticians who were also responsible for entering all the data in the "Greek Diet" software. Missing information and/or clarifications was requested from the parents as soon as possible, and if possible, within the same day. The parents on the other hand were provided with the dietitians personal contact information such as name and telephone numbers.

4.2.4. Interviewing and checking questionnaires

The fieldwork staff (nutritionist/dieticians) carried out the following activities in the following order:

- a) response questionnaire (Annex A); This is where basic information was captured like address, sex, area of living, age, birth date, reason of not participating (in case of refusal)
- b) anthropometric measurements (Annex A)
- c) providing instructions for completing the dietary record (Annex C)
- d) diet questionnaire (including the short Food Frequency Questionnaire (Annex D)
- e) sociodemographic questionnaire (Annex B)

After having received the instruction on how to fill in the dietary record (Annex C) any time the participants wanted to "abandon" the procedure, the fieldworker stopped during the first interview. In case the parent of the participant did not wish to participate any further, he/she was not contacted for a second interview therefore needed to be replaced by a new participant in the corresponding age group. The new participant had two to four contacts. One face to face for the instructions and then depending on the willingness of the parents he/she was contacted after each record or once at the end to check the completion of the record with the interviewer

4.3. Recruitment and training of the staff

4.3.1. Selection of the fieldwork staff

Ten registered dietitians and nutritionist carried out the fieldwork. Candidates' compliance within the pilot study period was assessed before final selection by the Research and Education Institute of Child Health (REF). More specifically, there was an interview for the job after a call to the Cyprus Dietetic Association. The criteria for recruitment were the following: a) experience, b) accepted flexible working hours, c) pleasant/ polite character. Dietitians came from all districts so that they wouldn't have to travel long distances (except from Paphos because of no interest- Limassol's dietitians covered Paphos' population).

The coding of foods according to the food classification and description system FoodEx2 was carried out by trained scientists from the State General Laboratory (SGL).

4.3.2. Training

Training of the interviewers – dieticians/nutritionists - was continuous as due to the complexity of the methodology several interviewers resigned and new were employed.

Four extensive trainings and relevant presentations were conducted for all involved in the survey:

- 1) Training of registered dietitians/ nutritionists: on interviewing, diet recalls/records methodology, anthropometry and other procedures according to survey requirements- Duration 20 hours;

- 2) Training of registered dietitians/ nutritionists: on the use of the two software packages that were built/ upgraded for this survey Access-EFSAdatabaseCY and GreekDietdatabase. The EFSAdatabaseCY was for data regarding a) Demographic data, b) Anthropometry, c) Smoking habits, d) Physical Activity questionnaire (Short IPAQ), and e) Food Frequency Questionnaire and the GreekDietdatabase was for the data of two days diet recalls from participants. Duration 20 hours;
- 3) Training of SGL personnel on the FoodEx2 Browser classification and coding system. Duration 2 days with the participation of EFSA expert;
- 4) Training on the coding within the GreekDietdatabase. Duration 20 hours (either at SGL or EFSA);
- 5) Presentations (conducted by SGL) on how EFSA carries out risk assessment and risk communication in order to ensure EU's food safety and how EFSA has developed the standardized food classification and description system FoodEx2. Duration 16 hours.

5. Quality assurance

- The "Greek Diet" Software was not used during the interview. Dietitians were trained to probe questions like water consumption, snacks, gums etc. and then entered them on the software. Within the software, there was a tool to probe the question: Are you sure that the portion is correct? (if the portion was too high – max portions were defined for each food item)
- During the pilot phase in 2014 all measures, questionnaires and methods have been tested and any alterations and/or amendments needed had been made and everything was ready before the beginning of the survey phase. The pilot study included five toddlers (12-35 months) and four children (3-9 years old) within a month (July 2014). The pilot study aimed to determine risks and/or issues with the methodology;
- Interviewers (dietitians/nutritionists) conducting face-to-face home visits and telephone interviews were well-trained and were monitored on a regular basis to ensure that they are handing out instructions correctly and gathering all the necessary detailed information EFSA requires from the dietary records. Randomly for quality control purposes, the interviewers were checked as to how they were carrying out the interview;
- Interviewers were extensively trained in order to be able to accurately carry out the data entry into the "Greek Diet" software. Their work was routinely monitored and checked by a registered dietitian and nutritionist of the REF so as to ensure the quality of the data by checking the Energy intake. If lower than 500 calories or higher than 2500 calories were entered, the record was double checked with the dietitian, and if necessary with the parents to assure that the written information was correct;
- Personnel of the SGL were trained to carry out the FoodEx2 coding in the Greek Diet Software. The same personnel were responsible for the regular updating of the FoodEx2 codes;
- For quality control purposes a decoding tool of the FoodEx2 was developed and imbedded in the GreekDietDatabase. The tool was built specifically to handle the 10 legacy MS Access databases used in the survey in order to check whether the decoded description was the same as the original one;
- All the data was stored remotely in a central server at the SGL. The server was under continuous inspection by the IT of the SGL together with the IT of the REF.

6. Data management

- The dietary survey of the children in Cyprus was carried out with the permission of the national bioethics committee in Cyprus;

- The participation of the individuals involved in the survey was on a voluntary basis and all the collected information is confidential;
- All the personnel involved in the survey are obliged by the law for the protection personal data;
- The registered dieticians and nutritionists of the REF were responsible for the cleaning up of unrealistic food consumption data and any outliers in the energy etc.;
- In case of unrealistic food consumption data and any outliers in the energy, parents/guardians were asked to clarify if the amount(s) of food(s) was correct; if not he/she would be asked to report their child's usual amount of consumption in case of not being able to recall the true amount of food;
- Every user of the "Greek Diet "Software had a personal identification and password with different level of access and each participant was assigned a unique code number;
- All the collected information was entered into 10 legacy MS Access databases which were connected online to a hosting central server;
- The food items were classified and coded according to FoodEx2 in the GreekDietDatabase;
- For the final transmission to EFSA, the data files were converted in .xml format according to "EFSA Data Transmission schema".

7. Dissemination and publicity

Initially a brochure containing simple but comprehensive information regarding the project had been prepared and disseminated both in Greek and English in order to inform people of what was expected. The same material was enclosed in utility bills (i.e. Cyprus Electricity Authority bills) so that every household received the information before hand in order to increase project awareness.

Information about the progress of the project was continuously uploaded in the websites of the State General Laboratory and the Ministry of Health as well as in newspapers and TV programs.

The Cyprus Dietary Survey methodology was presented at several conferences.

Both the SGL and REF, as owners of the collected data and supporters of public health research, will ensure that the outputs from the survey will be used to maximise knowledge and potential health benefits at national level. It is expected that upon completion of the evaluation of the data, all the outputs will be disseminated accordingly with presentations and publications.

The availability of the data to other institutions will be bound by terms of use. Data sharing with other institutions is subject to data governance standard operation procedure of SGL and REF. On the basis of this procedure, any institute, at national or international level, interested in obtaining the survey data, must proceed in a written request to SGL and REF in order to obtain the official approval of both data owners for data release. Any unauthorised use of the survey data is considered to be illegal.

8. Special issues/challenges

Issues that were confronted with the methodology used include the following:

- To determine any potential problems and assess the quality of instruments that will be used and their translations, a pilot study was carried out in July 2014. Nine children: five toddlers of age 12-35 months and four children 3-9 years old were recruited for the pilot study. The pilot study was carried out by the trained staff according to the protocol;
- The pilot phase was useful. Minor problems were easily addressed i.e. rephrasing a term or a question, so it could be easily understood. Average 60 ± 15 minutes was the duration of the first visit. Twenty-four-hour dietary recall took around 30-40 minutes. Both databases in the "Greek Diet" Software worked out as expected;

- During the survey, there was low interest by the paediatricians leading to a problem reaching required number of parents of infants and toddlers. The REF had to modify the initial sampling procedure regarding the whole Lot1 groups in order to achieve adequate response rate. To anticipate that invited almost all paediatricians registered in Cyprus and all the paediatricians that were involved in the study the first year were re-invited during the second year;
- Continuous updating and upgrading was needed for the "Greek Diet" Software in order to accommodate in the GreekDietdatabase the FoodEx2 coding, as well as the composite dishes and the recipes – after disaggregation – for coding purposes. Additionally, the in-house decoding FoodEx2 was also incorporated;
- The number of dieticians/fieldworkers had to be raised to ten in order to cover the whole of the freely-accessible areas of Cyprus, and further training/control was needed;
- The Cyprus team had to undertake several measures in order to achieve adequate response rate. Among others blood tests free of charge were offered to the participant's parents and all the members of their family;
- The task of FoodEx2 coding needed effort and dedication. The data transmission to EFSA was implemented by SGL, since SGL had already carried out the FoodEx2 pilot project and had established procedure for sending data electronically to EFSA according to specific requirements;
- However, the transmission of data electronically to EFSA using the xml schema presented some problems which were overcome with the error reports sent by EFSA;
- Mandatory information according to Foodex2 was not always collected and the personnel working on FoodEX2 coding faced difficulties in order to capture to the highest degree the food description system (packaging, cooking, flavour, brand name etc.);
- More people have been trained on FoodEx 2 coding to cover the high number of data due to the disaggregation of the recipes;
- Further challenge was the disaggregation of the recipes into their ingredients and the conversion with a yield factor to the cooked ingredients. This was successfully anticipated using the CY Recipe Database for the disaggregation and conversion. The disaggregated recipes were then incorporated into the "GreekDietDatabase" software and FoodEX2 coding and classification of all the ingredients raw and cooked was carried out.

Conclusions

The National dietary survey of the children of Cyprus has been completed successfully. The two objectives of the project (a) the preparation of a methodology for the food consumption survey in Cyprus for children aged zero to nine years old, according to the EFSA Guidance and (b) the description of the collected data according to EFSA FoodEx2 food classification system have been successfully accomplished within the agreed timeframe.

The response rate was 65% with high participation rate of 98%. The percentage of non-responders was 1.9 % for the participants of the LOT 1 age 0-9 years old (including infants, toddlers and children).

The previous experience of the REF personnel in conducting similar but less demanding food consumption surveys proved very important in the successful design, management and implementation of the survey. Experienced and well-trained interviewers-dieticians conducted the necessary dietary recalls.

The previous experience of the SGL personnel in the preparation and transmission of data to EFSA proved very valuable in the transmission of the survey food consumption data to EFSA.

The “GreekDietBase” software was used for the dietary recall data entry and for the FoodEx2 coding.

The Cyprus partners in this project, the SGL and REF, have gained a lot of experience in the harmonisation methodology concerning the food classification and coding system required by EFSA. The benefits and the experience gained exceeded the problems faced during the project.

- The “Greek Diet “Software has been upgraded according to EFSA specifications for harmonized dietary surveys
- A lot of experience was gained on the use of the FoodEx2 coding system, needed for the harmonization procedure in carrying out future dietary risk assessments at European level.
- The in house decoding tool for the FoodEx2 is a tool built specifically to handle the 10 legacy MS Access databases but the concept of decoding, validation and the subsequent XML generation can inspire future projects.

From the evaluation of the findings of the survey, several useful conclusions will be drawn. As this is the first harmonised consumption survey of the children in Cyprus, the results obtained apart from the national exposure assessment purposes and nutritional studies will be used for the development of nutritional policy, any related projects as well as for the assessment of the nutritional habits of the children and any related diseases.

References

- Ambrus Á, Horváth Zs, Farkas Zs, Cseh J, Petrova S, Dimitrov P, Duleva V, Rangelova L, Chikova-Iscener E, Ovaskainen M-L, Pakkala H, Heinemeyer G, Lindtner O, Schweter A, Naska A, Sekuła W, Guiomar S, Lopes C and Torres D, 2013. Pilot study in the view of a Pan-European dietary survey - adolescents, adults and elderly. EFSA supporting publications 2013:EN-508, 104 pp and Annexes. Available online: <http://www.efsa.europa.eu/en/supporting/pub/508e.htm>
- European Food Safety Authority (EFSA), 2009. General principles for the collection of national food consumption data in the view of a pan-European dietary survey. EFSA Journal 2009; 7(12):1435. [51 pp.]. doi:10.2903/j.efsa.2009.1435.
- EFSA 2011. The food classification and description system FoodEx 2 (draft-revision 1). Supporting Publications 2011:215. [438 pp.]. Available online: www.efsa.europa.eu
- EFSA, 2014. Guidance on the EU Menu methodology. EFSA Journal 2014;12(12):3944, 77pp. doi:10.2903/j.efsa.2014.3944
- EFSA, 2015. The food classification and description system FoodEx2 (revision 2). EFSA supporting publication 2015:EN-804, 90pp
- GloboDiet®* picture book for the estimation of food portion sizes. Van Kappel AL, Amoyel J, Slimani N, Vozar B, Riboli E. Lyon: International Agency for Research on Cancer. Copyright IARC 1995* GloboDiet®* formely named EPIC-Soft
- International Agency for Research on Cancer (IARC), 2013. Food Consumption Data Collection Methodology for the EU Menu Survey (EMP-PANEU) Final Report (Phase 3). EFSA supporting publication 2013:EN-485, 85 pp. Available online: http://www.efsa.europa.eu/sites/default/files/scientific_output/files/main_documents/485e.pdf
- Kafatos A, Verhagen H, Moschandreass J, Apostolaki I, Van Westerop JJ. Mediterranean diet of Crete: foods and nutrient content. *J Am Diet Assoc*. 2000 Dec;100(12):1487-93.
- Kakouri E, Anastasi A, Hadjiminias N, Stavroulakis G, 2013. Pilot project on the implementation of FoodEx2 in Cyprus as part of the Standard Sample Description for the electronic transmission of harmonised chemical occurrence data to EFSA (NP/EFSA/DCM/2012/02/02). EFSA supporting publication 2013:EN-461. [11pp.]. Available online: www.efsa.europa.eu/publications
- Kakouri E, Anastasi A, Electronic Transmission of Chemical Occurrence Data in Cyprus (CFP/EFSA/DATEX/2011/01/03) Supporting Publications 2013:EN-457 [19 pp.]. Available online: www.efsa.europa.eu/publications
- Ocké M., de Boer E., Brants H., van der Laan J., Niekerk M., van Rossum C., Temme L., Freisling H., Nicolas G., Casagrande C., Slimani N., Trolle E., Ege M., Christensen T., Vandevijvere S., Bellemans M., De Maeyer M., Defourny S., Rupich J., Dofkova M., Rehurkova I., Jakubikova M., Blahova J., Piskackova Z., Maly M.; PANCAKE – Pilot study for the Assessment of Nutrient intake and food Consumption Among Kids in Europe. Supporting Publications 2012:EN-339 [120 pp.]. Available online: www.efsa.europa.eu/publications.
- Serra-Majem L, Ribas L, Ngo J, Ortega RM, García A, Pérez-Rodrigo C, Aranceta J Food, youth and the Mediterranean diet in Spain. Development of KIDMED, Mediterranean Diet Quality Index in children and adolescents. *Public Health Nutr*. 2004 Oct;7(7):931-5

Abbreviations

CFM	Cyprus Food Museum
EFSA	European Food Safety Authority
EGFCD	Expert Group on Food Consumption Data
FoodEx2	Food classification and description system
FFQ	Food Frequency Questionnaire
HHF	Hellenic Health Foundation
IARC	International Agency for Research on Cancer
IPAQ	International Physical Activity Questionnaire
KIDMED	Mediterranean Diet Quality Index in Children and Adolescents
SGL	State General Laboratory
REF	Research and Education Institute of Child Health

Appendix A – CY Recipe Database

Methodology for conversion of raw ingredients into cooked ones using yield factors

According to the Guidance on EU Menu methodology, 2014, « all self-made composite dishes should be disaggregated and described on the component/ingredient level “as purchased”/ “as ingredient”. The disaggregation should be based on information provided by the subject or if this is not possible by means of standard recipes».

Therefore, the composite dishes as defined by EFSA, were disaggregated case by case and the recipes were disaggregated into their ingredients according to a standard recipe (either from the Cyprus Food Museum (CFM) or the Hellenic Health Foundation (HHF).

After disaggregation, the raw ingredients were converted using a yield factor [1,2,3] to the cooked ingredient in relation to the cooking method specified by the recipe. The yield factors were expressed as the weight percentage change (either +ve e.g. 20% meaning an increase in the weight e.g. pasta, boiling, or -ve e.g. -15% meaning a reduction in the weight, e.g. burger, oven). If more than one cooking method was applied to the ingredient, a compounded yield factor was calculated using formula (1):

$$\text{Compounded Yield Factor} = (y1+y2+y1*y2) \quad (1)$$

For example, assuming cooking method 1: $y1=-15\%$, cooking method 2: $y2=-25\%$, then the compounded yield factor is -36.25% . =, meaning that the raw ingredient will lose 36.25% of its weigh to the application of the two cooking methods.

The resulting weight of the cooked ingredient, was then expressed per 100gr of edible portion (*Amount of COOKED ingredient (g) per 100g edible portion*) using formula (2):

$$\text{Amount of COOKED ingredient (g) per 100g edible portion} = \frac{\text{Cooked ingredient (g)}}{\text{Total Cooked Recipe (g)}} * 100 \quad (2)$$

The results of (2) was then used to calculate the amount of COOKED FOOD consumed (for each ingredient) using formula (3) where the *Total Edible Portion* is the food portion stated by the consumer.

$$\text{COOKED FOOD} = \frac{(\text{Amount of COOKED ingredient (g) per 100g edible portion}) * (\text{Total Edible Portion})}{100} \quad (3)$$

Moreover, the raw ingredient weight was also expressed per 100gr of edible portion (*Amount of RAW ingredient (g) per 100g edible portion*) using the formula (4):

$$\text{Amount of RAW ingredient (g) per 100g edible portion} = \frac{\text{Raw ingredient (g)}}{\text{Total Cooked Recipe (g)}} * 100 \quad (4)$$

The result from (3) was then used to calculate, using the yield factor, the amount of raw food consumed using formula (5):

$$\text{Amount of RAW FOOD} = \frac{\text{COOKED FOOD}}{(100+\text{Yield Factor})/100} \quad (5)$$

All the calculations were performed in an excel spreadsheet (see Figure 1). The resulting amounts were incorporated into the “Greek Diet” software for further processing.

For instance if the pastitsio portion consumed is 300gr, then the amount of the cooked ingredients of the pastitsio recipe sum up to the 300g (Figure 1, column Amount of COOKED ingredients). Then all the ingredients both raw and cooked with their resulting amounts were incorporated into the “Greek Diet” software for further processing and the final FoodEx2 [4] coding is shown in Figure 2 as it is extracted from the Consumption file submitted to EFSA.

Ingredients Ready to Cook (Raw)_EN	Base Recipe (in g)	Cooking method 1	Cooking method 2	% Weight Change 1	% Weight Change 2	Compound % Weight Change	Ingredients in Cooked Recipe (g)	Amount of COOKED ingredient (g) per 100g edible portion	Amount of RAW ingredient (g) per 100g edible portion	Amount of COOKED ingredients in 300 g	Amount of RAW ingredients in 300g
macaroni, spaghetti	500	boiled	oven	182	140	576.8	3384	62.3	9.2	187	28
pork mince	500	soft fried	baked	-47	-23	-59.19	204.05	3.8	9.2	11	28
tomato paste	15	sauteed/ fried	baked	-20	0	-20	12	0.2	0.3	1	1
parsley	40	sauteed	oven	0	0	0	40	0.7	0.7	2	2
cinnamon	2.5	sauteed		0		0	2.5	0.0	0.0	0	0
olive oil	190	sauteed		0		0	190	3.5	3.5	10	10
milk	1000	oven		0		0	1000	18.4	18.4	55	55
egg	290	boiled	oven	-10	-17	-25.3	216.63	4.0	5.3	12	16
flour	96			0		0	96	1.8	1.8	5	5
olive oil	200	oven		0		0	200	3.7	3.7	11	11
anari cheese	100	oven	oven	-5	-5	-9.75	90.25	1.7	1.8	5	6
								100.0	54.0	300	162

Figure 1: Example of calculations for a cooked food portion of 300gr of pastitsio

ORFOODCD	AMOUNTRAW	FOODEXCODE	ENRECIPES	AMOUNTRE	FOODEXCOD	AMOUNTFCOOK
1433	28	A007L#F28.A07GL\$F28.A07GX	Pastitsio	300	A040N	187
1421	28	A04AC#F28.A07GS\$F28.A07GX	Pastitsio	300	A040N	11
200	1	A00ZF#F28.A07GS\$F28.A07GX	Pastitsio	300	A040N	1
165	2	A00YE#F28.A07GS\$F28.A07GX	Pastitsio	300	A040N	2
458	0.1	A019V#F03.A06JD\$F28.A07GS\$F28.A07GX	Pastitsio	300	A040N	0.1
2	10	A037D#F28.A07GS\$F28.A07GX	Pastitsio	300	A040N	10
53	55	A02LY#F28.A07GL\$F28.A07GX	Pastitsio	300	A040N	55
757	16	A031G#F28.A07GJ\$F28.A07GX\$F28.A0CRL	Pastitsio	300	A040N	12
10	5	A003X#F28.A07GL	Pastitsio	300	A040N	5
2	11	A037D#F28.A07GL	Pastitsio	300	A040N	11
759	6	A02QV#F28.A07KJ\$F28.A07GL\$F28.A07GX	Pastitsio	300	A040N	5

Figure 2: Extract (Screenshot) from the Consumption file for the consumption of 300gr of pastitsio

References:

1. Bergström Lena, 1994. Nutrient Losses and Gains in the Preparation of Foods. Report No. 32/1994, National Food Administration. Sweden: Uppsala.
2. Bognar Antal, 2002. Tables on weight yield of food and retention factors of food constituents for the calculation of nutrient composition of cooked foods (dishes). Federal Research Center for Nutrition and Food (BFE-R-02-03), Karlsruhe. ISSN 0933-5463
3. Vásquez-Caicedo A.L., Bell S & Hartmann B. 2002. Report on recipe calculation procedures for composite foods (D2.2.9). European Food Information Resource (EuroFir).
4. FoodEx2 browser v.1.0 copyright 2012-2017 EFSA

Annex A – Response and Anthropometric measurement Questionnaire

Annex B – Sociodemographic Questionnaire

Annex C – Dietary record

Annex D – Food Frequency Questionnaire_children