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National dietary survey on the children population in the Republic of North Macedonia

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Abstract

This National Dietary Survey, first in kind in the Republic of North Macedonia, provided a base for collection of accurate and reliable dietary data on food consumption and other information about eating habits in toddlers and children. Data on 1079 children at the age of one to nine years old were obtained in line with the "Guidance on EU Menu methodology" provided by the European Food Safety Authority and it will be included in the EFSA Comprehensive European Food Consumption Database. The survey was funded through an EFSA procurement contract and included in the EU Menu Project. The pilot study was performed prior to the data collection process. For the purposes of data collection process, three-stage random probability sampling was used according to the latest "Assessment of population" by State Statistical Office. Within the fieldwork data on the foods consumed as well as the food habits was collected for 534 toddlers (1-3 years old) and 545 other children aged 3-9 years old. Overall response rate in the survey was 85%. Data collection period was divided into four quarters (3-monthly samples) with equal distribution of weekdays and weekend days. Two non-consecutive food diaries were implemented to collect the information about the food consumption, as well as the food propensity questionnaire about the habitual food intake. Information about breastfeeding and complementary feeding practices, food allergies, and food supplements consumption was also collected. Food items consumed were coded according to the FoodEx2 classification. Diet Assess & Plan (DAP) software was used for dietary intake data collection and assessment. Anthropometry measurements of body weight and height/length were performed to assess the current anthropometric characteristics on nutritional status and the children's trends of growth.

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Key words: dietary survey, food consumption, EU Menu, North Macedonia, toddlers, children

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Summary

In 2016 the Food and Veterinary Agency and the Institute of Public Health submitted a proposal for the EFSA'S tender for the implementation of a food consumption survey in children population and the proposal was successful to receive funding. The project started in December 2016 and ended in November 2021; the fieldwork was conducted from October 2018 to September 2019.

This survey, first in kind in the Republic of North Macedonia, provided accurate and reliable data about the food consumption and food habits of children aged one to nine years old. Implementation complied with the EU Menu methodology that is utilized in EFSA's dietary surveys.

At the end of the survey a fully completed data was collected for 1079 participants of whom 534 were toddlers and 545 other children. In four seasons during a one-year-long data gathering process, data for 270 participants was collected in each season (autumn, winter, spring and summer), taking into consideration both working days and weekends, equal number of male and female children, equal number of toddlers (1-3 years old) and other children (3-9 years old). Overall response rate in the survey was 85%. The food consumption survey was complemented with a Food Propensity Questionnaire (FPQ) carried out at individual level, with the use of a 24-hour food diary recommended for these age groups. This diary was applied twice, with at least seven days long interval between them. The data from the questionnaires and diaries were entered into the Diet Assess & Plan (DAP) software within three days after being collected from the participants.

The last census in the Republic of North Macedonia was carried out in 2002 with demographical characteristic of the population. Each year the State Statistical Office conducts an "Assessment of population" and the latest one of 2015 was used for the design of the model for the implementation of the survey. Multi - stage random probability sample was used covering eight regions, both urban and rural. About 25 interviewers from the research agency in addition to the representatives from the Faculty for Nutrition Science conducted the face-to-face survey. The survey was bilingual - in Macedonian and Albanian language.

The core questionnaire was consisted of all relevant questions (variables) for collection of basic (raw) data for nutrition and was introduced in the (DAP) software, which was used for dietary intake data collection and assessment. This is a nutritional tool, which allows extensive diet evaluation and planning, based on dietary intake assessment and nutrient recommendations. DAP is developed in line with EFSA guidance on EU Menu methodology and represents important research infrastructure for nutrition epidemiology and public health nutrition research.

After the preparation of Portion size picture book and Guideline for interviewers and nutritionists and in order to collect accurate and reliable dietary data, few series of trainings and workshops were held, both for interviewers and nutritionists.

Several quality control measures were taken during different phases of the project to guarantee a high quality of collected data. A Pilot study was carried out and covered 60 participants. The data from the questionnaires and diaries were entered into the DAP software immediately after being collected from the participants.

The main results of the survey will be presented in separate publication which will be available at the websites of Food and Veterinary Agency and the Institute of Public Health. As the survey is also included in the EU Menu project, the food consumption data coded according to the FoodEx2 classification will be included and available in the EFSA Comprehensive European Food Consumption Database.

Table of contents

Abstract.....	1
Summary.....	3
1. Introduction and objectives	5
1.1. Background and terms of references as provided by the requestor.....	5
2. Description of the protocol of the survey	6
2.1. Study population and exclusion criteria.....	7
2.2. Sampling frame	8
2.3. Sampling method and design.....	8
2.4. Sample size	9
2.5. Strategy to achieve an adequate response rate and the initial sampling size	9
2.6. Legal and ethical aspects.....	12
3. Dietary survey tools	12
3.1. Food propensity questionnaire	12
3.2. Dietary record.....	13
3.2.1. Food description	13
3.2.2. Determination of portion sizes	13
3.2.3. Dietary software	14
3.3. Other information	14
3.3.1. Questionnaires.....	14
3.3.2. Measurement of body weight and height	14
3.3.3. Food supplements.....	15
4. Administration of the interview	15
4.1. Selecting the examination site	15
4.2. Content and organization of the study visits	15
4.2.1. First (initial) contact	15
4.2.2. First interview	16
4.2.3. Second interview.....	16
4.2.4. Interviewing and checking questionnaires.....	16
4.3. Recruitment and training of the staff	16
4.3.1. Selection of the fieldwork staff.....	16
4.3.2. Training.....	17
5. Quality assurance.....	17
6. Data management	20
7. Dissemination and publicity	20
8. Special issues/challenges.....	20
Conclusions.....	21
References.....	23
Abbreviations	25

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 December 2014, EFSA published the guidance on the EU Menu methodology (EFSA, 2014). This guidance was based on the 2009 EFSA guidance (EFSA, 2009), two EU Menu feasibility pilot studies and two methodological projects, and its aim is to cover the EU Menu methodology and therefore facilitate the collection of more harmonised food consumption data from all European Union Member States by the year 2020. This guidance has been developed by the EFSA Evidence Management Unit (DATA) and the EU Menu Working Group with Advisory Function, and has been endorsed by the EFSA Network on Food Consumption Data. It provides recommendations for the collection of more harmonised food consumption data among the EU Member States for use in dietary exposure assessments of food-borne hazards and nutrient intake estimations under the remit of EFSA’s scientific panels. The main objective is to refine the methods and protocols described in the previous guidance, and to indicate criteria for the collection of high-quality dietary information that can be used to perform exposure assessments of food-borne hazards and nutrient intake estimations in the remit of EFSA’s scientific committee and scientific panels. The methodology used in the national food consumption survey is expected to follow the general principles described in the 2014 EFSA Guidance. The most important requirements are reported here below.

- The piloting activities have included the following projects: 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) (Ocke et al., 2012), 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, protocols and questionnaires produced by this project were published on the EFSA website in September 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” (PILOT-PANEU) (Ambrus et al., 2013), to develop and test similar tools and protocols for the different adult population groups. The report, protocols and questionnaires produced by this project were published on the EFSA website in November 2013.
- Further, EFSA has collaborated 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).
- In August 2012, to get a broader view of the dietary tools available for dietary surveys, EFSA started the procurement project “Dietary Monitoring Tools for Risk Assessment” (Mandate number M-2012-0027). This project carried out a review of dietary assessment tools mainly available in Europe, evaluated 11 European tools and tested in collaboration with EFSA six tools in a standardised ring-trial setting and provided a critical analysis of data accumulated through this project. The final report of this project is available on the EFSA website (Gavrieli et al., 2014).
- Since 2011, EFSA has supported 30 dietary surveys in 16 Member States, as part of the EU MENU process. The five supports to national dietary surveys were provided by means of the calls for tender CFT/DCM/2011/02, CFT/DCM/2012/01 and CFT/DCM/2013/02,

The children survey

CFT/EFSA/DATA/2014/02, OC/EFSA/DATA/2015/03. So far both children and adults are covered by contracts with 14 Member States, namely France, Estonia, Spain, Belgium, Latvia, The Netherlands, Cyprus, Portugal, Greece, Hungary, Italy, Romania, Slovenia and Poland; only adults are covered by contracts with Austria and Finland.

The aim of this procurement procedure is to award direct service contracts to organizations from EU Member States, Norway, Iceland, Switzerland, FYROM, Albania, Montenegro, Serbia, Bosnia and Herzegovina and Liechtenstein, which have a governmental mandate to carry out a dietary survey at national level in the period from 2016 to 2021 or 2017 to 2022 and a national dietary survey has not been carried out within the country in the last 5 years for the planned target group. Under the resulting contract(s) the contractor(s) should either adapt or develop the methodology to be used in these surveys according to the EFSA guidance on the EU Menu methodology. The dietary data collected through the contracts 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 either adapt or develop the methodology to be used in the national food consumption survey according to the EFSA guidance on the EU Menu methodology and to prepare and provide to EFSA the national protocols and related documents, and to pilot and carry out the data collection.
- Objective 2: to prepare and transfer to EFSA the food consumption data and related information collected during the survey according to the format required by EFSA.

This contract was awarded by EFSA to: Food and Veterinary Agency as Consortium leader and coordinator of the Project.

Contractor: Food and Veterinary Agency and Institute for Public Health of the Republic of North Macedonia

Contract title: Support to National Dietary Surveys in Compliance with the EU Menu methodology (sixth support) "The children's survey"

Contract number: OC/EFSA/DATA/2016/02 CT2

2. Description of the protocol of the survey

The survey was planned by a team composed by Food and Veterinary Agency, Institute of Public Health staff (partner institutions), the Faculty for Nutrition Science, Brima Galup and Delta Electronics, both private companies, according to the EFSA Guidance and the contract requirements signed with EFSA.

Food and Veterinary Agency, Institute of Public Health were responsible for designing tools, organizing and supervising each task in order to fulfil the contract requirements and deadlines. In addition, quality control and food codification were carried out by both partner institutions staff. The sampling design, field work and data processing were done by Brima Galup (private, independent research agency that conducts public opinion and market and media surveys) and the Faculty for Nutrition Science.

The project began in December 2016. The survey design and adaptation of the materials were done by autumn 2017. Trainings for field workers and data entering staff were done in the period February-April 2018. A pilot study started in May 2018. The field work and the food consumption data collection started in autumn 2018 and finished one year later and the data was sent to EFSA in August 2021 following the extensive process of data entrance and cleaning through the DAP platform. It is worth mentioning that following COVID-19 pandemic, some of the deliverables of the contract were postponed, as communicated between the EFSA and the implementing agencies in North Macedonia.

The children survey

Dietary information was collected by means of two dietary records, separated at least by seven days. In both population groups, the two dietary records by the means of food diaries (Annex A), were complemented by FPQ (Annex B), and especially designed for toddlers and young children.

Other information collected:

- General information
- Anthropometric data (height and weight).

The survey calendar was organized in such a way that the appropriate proportion of working days and weekend days was taken. Individuals were uniformly distributed over the four seasons of the year and the geographical distribution and urban and rural populations were also taken into account.

Table 1: Time distribution for the survey

	2017	2018	2019	2020	2021
Preparation period	✓				
Drafting of questionnaires and translation for the platform	✓	✓			
Preparation of guideline for interviewers and data collectors, translation of Portion size picture book	✓	✓			
Publication of guidelines, Portion size picture books		✓			
Trainings and seminars		✓			
Pilot survey		✓			
Data collection (main phase)			✓		
Preparation of data according to EFSA guidelines			✓		
Data cleaning and data transfer					✓

2.1. Study population and exclusion criteria

The study population were toddlers and children three to nine years old, in accordance with the EFSA Guidance (EFSA, 2014). As the survey was designed to be a population survey, it was provisioned that

the children will be recruited from the households and not from the facilities taking care of children of the targeted age. Institutionalised subjects were excluded from the survey. The survey was bilingual - in Macedonian and Albanian language. Macedonians and other nationalities were surveyed in Macedonian language and the ethnic Albanians were surveyed in Albanian.

2.2. Sampling frame

The last census in the Republic of North Macedonia has been carried out in 2002 with demographical characteristic of the population. Each year the State Statistical Office conducts "Assessment of population". The latest one was from 31.12.2015 and was used for the design of the model for the implementation of the survey. According to the Law on territorial organization of the local self-government ("Official Journal of the Republic of North Macedonia" No. 55/2004, 12/2005 and 10/2014), Republic of North Macedonia has 84 municipalities (units of the local self-government). According to the existing classification NTES (The Nomenclature of Territorial Units - NTES is based on the territorial organization of the local self-government in Republic of North Macedonia and it is harmonised with the classification of the European Union - Nomenclature of Territorial Units for Statistics – NUTS, established by Regulation (EC) No 1059/2003) ("Official Journal of the Republic of North Macedonia" No. 158/2007), the Republic of North Macedonia, on the third level, is divided into eight statistical regions as presented in Figure 1; Vardar region, Eastern region, South-eastern region, Pelagonija region, Polog region, North-eastern region, Skopje region.



Figure 1: Eight statistical regions of the Republic of North Macedonia

2.3. Sampling method and design

For the purposes of implementation of the survey – phase for data collection, multi-stage random probability sample was used. In the first phase, the model was stratified according to the socio-

The children survey

demographical structure of population from the census in 2002, last assessments of population and territorial distribution according to NTES. In the second phase, each sector (sampling point, each region was divided into sectors) consisted of four participants, thus, obtaining a number of 65 sectors with four participants each = 260 participants during one season. The number of sectors in each region was proportional with the size of the regions.

In the Albanian subset the sectors in Skopje, South-western, Polog and North-eastern regions were covered and the survey was carried out in Albanian language.

In the third phase, the sectors in each residential area were randomly allocated on the basis of the list of election units, defined with street name/neighbourhood and number. Each sector was dedicated with starting point within the framework of the number of addresses in the certain street. The names of the streets and the existing numbers are published by the State Election Commission (SEC). In case the address was not corresponding with the one from the SEC, in consultation with the Head of the survey network, substitution were made with another starting unit. For each starting unit further direction according to a protocol for selecting households was defined – in ascending or descending numbers of houses in the street or movement to a certain part of the settlement. Selection of the household was according to the quota defined by the Food and Veterinary Agency and the Institute of Public Health of Republic of North Macedonia. The selection based on the gender was taking place during the recruitment phase. The interviewer was screening - whether the household has/does not have children aged 1-9 years old by checking the set survey pattern (gender: male or female, by age group: toddlers (from one year old to strictly below three years old and other children from three to nine years old). Out of 1270 eligible families contacted, 1080 accepted to participate in the survey.

2.4. Sample size

The requirements in the tender documentation indicate the distribution (implementation) of the research (data collection) in equal number during all seasons (spring, summer, autumn, winter). The proposed number of participants was 1040 i.e. 260 in each season, equal number of male and female children, equal number of toddlers aged 1-3 years (from one year old to strictly below three years old) and other children aged 3-9 years (older than three years to strictly below 10 years of age). For each season approximately 4% oversample was foreseen. In total, 1080 children were recruited:

- Toddlers (from one year old to strictly below three years old): 540 individuals;
- Children aged 3-9 years (older than three years to strictly below 10 years of age): 540 individuals.

2.5. Strategy to achieve an adequate response rate and the initial sampling size

The web pages of the Food and Veterinary Agency and the Institute of Public Health, as well as the national television channels were used for advertising the survey. This assured familiarisation of the general population with the survey.

In addition, abstract and poster presentation were submitted to Nutricon 2018 Congress, which took place from 13th to 15th of June 2018, in Ohrid, Republic of North Macedonia.

Vouchers (coupons - which are worth a certain monetary value and may be spent throughout supermarkets on the territory of the country) were provided to the participants as incentive after the study completion.

The Food and Veterinary Agency and the Institute of Public Health, also highlighted the importance of the research through media campaign, which improved the response rate.

Sample size was pre-defined with included 4% oversample (270 respondents by Season – 1080 in total). Still, it was agreed with the field workers to continuously update coordinators of the survey about the

The children survey

advancement in reaching the targeted population as well as the obstacles they were facing during the field work. It was agreed that if the sample size at certain time points of reporting doesn't satisfy, to strengthen the media campaign about the importance of this survey at national level. At regional level, regional representatives of the local governments were reached in order to foster the process of engagement of the population into the survey through their communication channels with the local population.

The final number of valid participants, with two days data and their distribution per wave are presented in Table 2 and 3 respectively.

The children survey

Table 2: Number of subjects interviewed per age group

Wave of data gathering	Approached households with toddlers	Refused to participate / Interrupted interviews	Households surveyed, toddlers		Response rate (%)	Approached households with other children	Refused to participate/ Interrupted interviews	Households surveyed, other children		Response rate (%)	Total response rate (%)
			boys	girls				boys	girls		
Autumn 2018	151	16/3	75	57	87.4	158	17/3	76	62	87.3	87
Winter 2019	167	25/6	61	75	81.4	161	24/3	58	76	83.2	82
Spring 2019	150	13/7	70	60	86.7	163	18/6	80	59	85.3	86
Summer 2019	162	18/8	61	75	84.0	159	19/6	58	76	84.3	84
Total	630	72/24	267	267	84.8	641	78/18	272	273	85.0	85
			534					545			

Table 3: Households and children surveyed per wave of data gathering

Wave of data gathering	Households surveyed, toddlers	Toddlers		Households surveyed, other children	Other children		Response rate (%)
		boys	girls		boys	girls	
Autumn 2018	132	75	57	138	76	62	87
Winter 2019	136	61	75	134	58	76	82
Spring 2019	130	70	60	139	80	59	86
Summer 2019	136	61	75	134	58	76	84
Total	534	267	267	545	272	273	85

The children survey

The Response rate (RR) for the study was calculated as follows:

RR = number of surveyed households / (number of approached households)

RR for toddlers = 534 / 630 = 84,8%

2.6. Legal and ethical aspects

Ethical consent (No. 03-5532/2 from 14.11.2017) was obtained by the Ethical commission for research performed on humans situated at the Faculty of Medicine, Ss. Cyril and Methodius University in Skopje. Ethical principles for medical research involving human subjects were considered. Moreover, participants were informed that personal data gathered in the survey will be treated as confidential and kept in automated data files authorised according to the Law on Personal Data Protection.

A consent form containing information regarding the purpose of the survey, as well as information about the method of conducting the survey was signed by the participants.

Data storage will be provided by the FVA and the IPH. Any further use of the survey data can be made by other institutions, only upon prior consent from the FVA and the IPH, where the interested institution will have to sign a declaration for protection and securing confidentiality of the data.

3. Dietary survey tools

3.1. Food propensity questionnaire

As recommended by EFSA and by the PANCAKE project the food consumption survey was complemented with a Food Propensity Questionnaire (FPQ) covering the past year. The FPQ in a printed form was completed together with the general questionnaire and the anthropometric measurement part during the first (initial) contact.

About 66 foods (divided in 14 categories) and about 19 food supplements were included into the FPQ. Questions about the frequency of consumption were included in the different columns for each food item. The questionnaire looked like the one presented in Figure 2:

Milk and dairy products								
Food		never	less than once a month	1 – 3 times a month	once a week	2 – 3 times a week	4 – 5 times a week	6 – 7 times a week
breast milk								
infant formula								
Milk								
Cheese								
white soft cheese								
yogurt, kefir								
Cream								

Figure 2: Example of the Food Propensity Questionnaire

3.2. Dietary record

The food consumption survey was carried out at individual level, with the use of a 24-hour food diary recommended for the age-group of children (toddlers and other children aged 3-9 years old). The food diaries in printed form were left to the parents/caretakers to be filled in by writing on the scheduled day. The day of the first interview, the interviewer together with the nutritionist visited the household. The first diary was checked for completeness and within three days it was inserted into the DAP system. Same procedure was followed for the second diary. The parents/caretakers were contacted for filling in the second diary on the specific day, previously determined. The day of the second interview the nutritionist this time alone visited the household. The second diary was checked for completeness and within three days it was inserted into the DAP system. Both diaries were inserted into the DAP system by the nutritionists.

The diaries are structured by food consumption occasion (three main meals i.e. breakfast, lunch and dinner), but it is possible to include additional occasions (before breakfast, snacks between main meals and unspecified occasion). A section on food supplements is included. Besides, parents (or other responsible to fill in the diary) will be asked to give information on the place and time of the meal. Interviewers will also make specific questions on food items that could be easily forgotten, such as bread, water, oil, etc. In order to assess chronic exposure, dietary information was collected for two non-consecutive days with at least seven days interval between them, according to the sampling calendar prepared before the start of the pilot study.

3.2.1. Food description

For every food reported during the survey, information about their quantity as raw (edible part) and as consumed were collected. Composite dishes were disaggregated into their ingredients, according to standard recipes incorporated in the software or manufacturer information. If the recipe was not present in the database, nutritionists were instructed to enter the data (recipe) in the platform (section recipe), as recorded in the questionnaire. Designated coordinator was checking the recipe and controlling if all the data were entered correctly, and also making necessary corrections, if needed. Then, the recipes were incorporated in the database of the platform. For example, if there was a recipe for meatballs, but the participant reported different recipe for meatballs (few different ingredients) this recipe was also entered into the platform. This way, two recipes for the same dish will be present in the database reflecting regional variations of preparation of the dish with the same name in the country. Interviewers were trained to collect as much information as possible, including brand and product names. Information on food brands was recorded, as foreseen in the questionnaire, and the information was entered into the database.

Information through standard questions incorporated in the software tool were collected for certain facet descriptors, according to the EFSA FoodEx2 classification and description system (EFSA, 2015). For example: there is milk with brand name "Bitolsko", but few types of milk with the same brand name. If the participant wrote that his child had "Bitolsko" with vitamins, interviewer will write the codes for all vitamins (AOEXM for vitamin D, AOEXL for E etc.) with which milk is fortified from the information present on the packaging.

3.2.2. Determination of portion sizes

Consumed amounts of foods were estimated using a Portion Size Estimation Tool, containing photographs of portion sizes of most frequently consumed foods in the Republic of North Macedonia and in the Balkan region. This picture book is based on previously conducted surveys, covers the cuisine of the whole region and was validated during different occasions, the last one being during the CAPNUTRA Symposium, in September 2017, in Serbia, during which a regional training on the Diet Assess & Plan (DAP) Application took place. Accordingly, portion size can be selected from pre-suggested

The children survey

options - S, M, L, and XL and data regarding amount of consumed foods could be recorded in grams (g), milliliters (ml), and liters. At the end of the picture book there are also household measures, e.g. spoons, cups, bottles. For example a spoon is found in picture No. 5 in the book, and there are 4 different sizes A, B, C and D. For each size there is quantity behind in grams.

3.2.3. Dietary software

Diet Assess & Plan (DAP) software was used for dietary intake data collection and assessment. It is a nutritional tool, software based, which allows extensive diet evaluation and planning based on dietary intake assessment and nutrient recommendations. DAP is developed in line with EFSA's guidance on EU Menu methodology and represents important research infrastructure for nutrition epidemiology and public health nutrition research. DAP platform consists of: DAP software tool, Food Composition Data Base Management (FCDM) web application, Balkan food platform with Regional Food Composition Database (FCDB), and Nutrient recommendation datasets. Also, standard recipe database and yield factor database are present in the platform and the picture book is incorporated. The DAP tool, based on electronic versions of standard food consumption questionnaires - 24 hour dietary recalls (24HDR), Food Frequency Questionnaire (FFQ), Food Records (FR) and Food Propensity Questionnaire (FPQ), has been created according to EuroFIR guidelines in Microsoft VisualFoxPro relied on two types of database: MySQL database for FCDB and local Microsoft VisualFoxPro database engine. More information on the characteristics of this tool can be found in the external scientific report describing the national food consumption survey among children from one to nine years old in Serbia (Centre of Research Excellence in nutrition and Metabolism et al, 2021).

3.3. Other information

3.3.1. Questionnaires

Socio demographic information –general questionnaire

The general questionnaire consists of several parts, with the first part containing information about the subject such as name, surname and birth date of the child and the other part contains information for the parent/caretaker: sex, age, family relation with the child, marital status, nationality, occupation, number of members in the household. Moreover, questions about health status of the child are included: special diet, any medicines, prescribed or not, chronic or acute diseases etc. The gender and the age of the children will be predefined in the questionnaires.

Physical activity

No data on physical activity was collected. Since the overall goal of the survey was to collect accurate and reliable data on food consumption and other information related eating habits in toddlers and children, the national project team concluded not to pursue the physical activity data in children during this exercise.

3.3.2. Measurement of body weight and height

Height and weight were measured using protocols, adapted according to the Protocol and the Data collecting procedures of the Childhood Obesity Surveillance Initiative (World Health Organization, Regional Office for Europe). A measuring tape of 0,1 cm accuracy was used to measure children able to stay in standing position, and recumbent length was used for smaller children from the toddlers group that are unable to stand. A digital weight scale –brand Fuego, with accuracy of 0.1 kg was used. The measuring tools are newly purchased for this survey. The measurement took place during the first interview.

3.3.3. Food supplements

Information on food supplements consumption was collected, both, in the dietary record (consumed during the survey) and also in the FPQ, which asks about consumption in the time before interview.

The dietary diary instructions include recommendations about avoiding to forget to report the consumption of food supplements (name, brand name, strength and amount taken). In the dietary record interviewer wrote down the details of any supplements parents/caretaker gave to their children on each diary recording day e.g. name of the product, active component, technological form: tablets, drops, liquid and quantity consumed (e.g. 5 drops/day, the amount in grams of one drop or tablet are reported in the foods dataset, not in a diary record). It was impossible to collect information about nutritional value of the consumed food supplement as this information is not always available on the most packages of food supplements, so the supervisor made some additional research (online specifications from manufactures of food supplement or weighing of particular supplement).

The FPQ also collected usual consumption frequency from 19 categories of the most common food supplements (vitamins: A, D, E, C; folic acid, beta carotene, calcium, magnesium, iron, zinc, selenium, multivitamins for kids, multivitamins with minerals, multivitamins without minerals, fish oil-Omega3, herbal food supplements, probiotics and prebiotics, algae and others) in the last 12 months period before the interview. The frequency options were: never, once a month, 2-3/month, once per week, 3-4/week, 5-6/week and daily.

Food supplements were incorporated into the food list of the dietary software with their FoodEx2 codes.

4. Administration of the interview

4.1. Selecting the examination site

Face to face interviews and anthropometric measurements were performed at the interviewee's home with an interval of at least seven days. The presence of parent/caretaker was mandatory.

4.2. Content and organization of the study visits

The responsible team for performing the dietary survey performed a screening and identified households that had/did not have children aged 1-9 years old by checking the set survey pattern (gender: male or female, by age group: 1-3 years or 3 - 9 years old). If the household was eligible for the survey, a family member (parent/caretaker), fully familiar with the child's diet, was selected. In case the household had more children eligible to participate in the survey, the child that more suited to the set pattern (gender, age) was selected. Only one child per household was surveyed. Three physical meetings at the participant's home were foreseen to take place.

4.2.1. First (initial) contact

The first (initial) contact was done by the interviewer during the first home visit. There was no letter sent to the family beforehand, but the interviewer him/herself explained the survey and its purpose to the parent/caretaker. If the selected person didn't want to participate, it was recorded. Interviewers recorded the number of persons who refused to participate in the survey. If the participant (parent foster parent) was not able to be interviewed at that time, the next visit was scheduled. After the explanation of the study the participant was provided with Letter for consent, containing information

The children survey

regarding the purpose of the survey, as well as information about the method of conducting the survey and data protection. The form was signed by the participant's parent/caretaker.

After accepting to be part of the survey during the first initial face to face contact, the interviewer was conducting the general questionnaire and the anthropometric measurements, as well as a Food Propensity Questionnaire (FPQ). The paper diaries were left for completion on the agreed dates.

The interviewer explained in detail how both diaries should be completed and the dates for filling both diaries were set. Afterwards, one day before the set date for the completion of the second diary the interviewer contacted the participant by phone to remind him/her.

4.2.2. First interview

The day of the first interview, the interviewer together with the nutritionist visited the household. The first diary was checked for completeness and within three days it was inserted into the DAP system. The first interview lasted approximately 30 to 40 minutes.

4.2.3. Second interview

Following the recommendations proposed in the EFSA EU Menu guidance (EFSA, 2014), at least seven days after the first diary, the date for filling in the second diary was agreed with the participants through a phone call.

The day of the second interview the nutritionist visited the household. The second diary was checked for completeness and within three days it was inserted into the DAP system. A voucher was given to the parent/caretaker upon completion of both diaries. During the survey there was no dropouts on the second interview, there was only one case where the participant's family moved out from the city and did not finish the survey.

4.2.4. Interviewing and checking questionnaires

During both the first and the second interview, the interviewer together with the participant went through the diary and collected all the necessary and possibly missing data. All the data from first and second interview were entered in the Diet Assess & Plan (DAP) software, no later than three days after each interview. After each season ended, the supervisor controlled (double checked) the inserted data in the DAP software and if there were some missing data or erroneous reporting they were corrected in consultation with the interviewer. In two cases the supervisor contacted the participant by phone about wrong birthday date (they wrote the oldest child birthday date and the food consumed in the questionnaire was baby food including breastfeeding).

4.3. Recruitment and training of the staff

4.3.1. Selection of the fieldwork staff

According to the technical offer submitted to EFSA, the fieldwork was performed by professional interviewers from the subcontractor Brima Galup (private, independent research agency that conducts public opinion and market and media surveys). The survey team included about 25 interviewers trained and experienced in conducting face-to-face survey. Additionally, after authorisation given by EFSA the Faculty for Nutrition Science was also included as subcontractor to the contract. So, the fieldwork was performed both by professional interviewers and nutritionists who gave added value to the process of interviewing. The survey included 12 nutritionists per season. The interview was organized in three different visits, first initial visit to the participant's home was made by Brima Galup's interviewer, the second visit was realized with both interviewer and nutritionist and the third visit was done only by nutritionist who was taking the second diary interview from the participant.

4.3.2. Training

During the preparation period a Guideline for interviewers and nutritionists was prepared, containing detailed instructions on how to conduct the interview and especially how to enter the data into DAP. Series of trainings and workshops were held by FVA and IPH staff, both for interviewers and nutritionists. The trainings comprised two main parts. First part reflected the overall aspects of the study, highlighting the rationale and need of obtaining food consumption data for children in the country, since it is the first time that this type of study according to EFSA guidance is performed. After that, the methodology for data gathering and steps needed to be followed were explained. Then questionnaires were passed, question by question, with explanation of filling in and possible clarifications that should be explained to participants. Special attention was given to the part of the gathering data about the food consumed and on a manner of recording data for foods and recipes. Three trainings were held both for interviewers and nutritionists. First one was introductory training and it lasted four hours, afterwards two more trainings one four hours and the other six hours. Besides this, two workshops were held only for nutritionists. The aim of these workshops was to train them for data entering into the platform since during the previous trainings there was no sufficient time to address specific details about data entering process and its importance for the survey. Both workshops for nutritionists lasted for four hours. The training quality was assessed and evaluated by the survey coordinator after the pilot survey and additional meetings were held for better communication between interviewers and nutritionists.

5. Quality assurance

To ensure the quality of the organization of the survey, tasks, competences and responsibilities of all partners involved were clarified before the fieldwork started. Additionally, numbers of meetings were held for team communication, between consortium partners, and with subcontractors. To ensure a high representativeness of the study population and an equal distribution across days of the week and seasons, the sampling procedure was monitored regularly. To guarantee high standardised interviews and a high quality of the consumption data, all interviewers and nutritionists were trained (see 4.3.2), the interviews were monitored regularly (the supervisor had access to the whole entered data and regularly checked it, after each season ended made a report for data validation) and standard quality checks were performed (time of the interviews, data for foods and recipes, quality checks at nutrient and energy intake level etc.).

As a part of the quality assurance, a pilot study was done to test the methodology, questionnaires and tools. The pilot study included 60 participants and it was conducted in 28 households with children from one to just below three years old (2.99 years) (14 male and 14 female children) and 32 households with children aged three to nine years old (16 male and 16 female children). The study included children of different nationalities, of whom 42 Macedonians and 18 of Albanian nationality. In order to cover various statistical parameters, 38 households were from an urban environment (city) and 22 households from a rural environment (village). The study was conducted in 14 municipalities on the territory of the city of Skopje.

17 out of the 77 contacted households did not take part in the pilot study. Out of these, 15 refused to participate and two households stopped their participation, although they initially agreed to participate.

The Response rate (RR) for the pilot study was calculated as follows:

RR = number of effective surveyed households / (number of deductions + effective surveyed households)

$$RR = 60 / (17 + 60) = 17/77 = 77.9\%$$

The most commonly mentioned reasons for refusal to participate in the study were:

- I don't have time

The children survey

- I do not want my child to be part of this study

The pilot study was conducted by 11 interviewers with many years of experience coordinated by a field supervisor and two office coordinators of the Brima agency, as well as nutritionists from the sub-contracting Faculty. The interviewers/nutritionists visited three training seminars conducted by the Food and Veterinary Agency and the Institute for Public Health of the Republic of North Macedonia.

The pilot study was conducted from May 29, 2018 to June 17, 2018.

The pilot study didn't result in changes in methodology, questionnaires and tools. What the study influenced was the necessary improvements in communication of the field workers and nutritionists related to the household visits, scheduled collection of the diaries and questionnaires. Additional two meetings were organized among coordinating team of the survey after the pilot study that highlighted the communication improvements needed and addressed it. At the additional trainings before the start of the survey clear instructions about this were provided to field workers and nutritionists.

Several quality control measures were taken during different phases of the project to ensure the quality of the survey:

Organization of the survey

- Tasks, competences and responsibilities of all personnel were well defined
- Qualified, motivated and responsible personnel participated in each step of the survey
- Communication between different teams and members was previously organized. Meetings were organised on a regular basis with main partners of the survey. Communication via e-mails and telephone conversations was continuous.

Sampling

- The sampling was performed according to the EFSA requirements
- The sampling protocol selected ensured representativeness by age, gender, region, house hold type and size and nationality
- The proportional distribution of the interview days (week/weekend) and the seasons were continuously controlled
- Response and non-response rates were controlled

Field work

- The field work data was performed both by professional interviewers and nutritionists. Interviewers were professionals with strong background in interviewing techniques, and nutritionists with background in human nutrition, dietetics or food sciences
- All interviewers were trained about the EU MENU Methodology before the pilot study. Additional training was organised after the pilot study, focusing on the use of the feature of the DAP software
- Interviewers conducting face-to-face home visits were well-trained and were monitored on a regular basis to ensure that they are handing out instructions correctly and gathering all necessary detailed information
- Comprehensive protocol was developed and distributed to nutritionists with the user's manual of the software
- Supervisor was available by phone / e-mail every day in case of any questions

The children survey

- Fieldwork nutritionists who quit from the project during data collection period were replaced shortly in order to cover all regions. The newcomers were also successfully trained for the project
- The payment of interviewers depended on the completeness of the collected data for each individual participant. Incomplete or missing questionnaires were not paid.

Data entry

- DAP software was carefully adapted to the EU MENU Methodology and was thoroughly tested and piloted
- Every user of DAP has a personal identification and password. Moreover, different levels of accessibility are established: e.g. nutritionists are only allowed to the data entry level and coordinator has higher level of accessibility
- Systematic quality controls were performed through the data input procedure to avoid missing collecting of mandatory information and foods that are easily forgotten to be recorded during interviews
- Built-in functions warned the interviewers in case of inconsistent or impossible record.

Data cleaning of the food consumption data

- Supervisor from IPH regularly checked to assure quality criteria in this project
- All recorded data from fieldwork nutritionists were checked in dietary software. Further data cleaning was carried out to describe foods as precise as possible using the FoodEx2 system using EFSA Catalogue Browser. Finally, all recorded, checked and cleaned data were verified using FoodEx2- Interpreting and Checking tool
- Unknown quantities were dealt with, especially with food supplements For example there were reported consumed five drops of vitamin D without exact amount in mL, so the supervisor had to research brand's user instructions to find the amount in one drop.
- Other specific checks were done to identify and correct errors (e.g. check full amount consumed)
- During the process of data entrance and cleaning, North Macedonia took advantage of the TAIEX Expert mission on food consumption, Reference code: AGR IND/EXP 69991 instrument, available for EU candidate countries and shared knowledge about the data management with the Croatian agency for Agriculture and Food (HAPIH). Country team assessed the training as valuable and productive, fulfilling its goals to strength national capacities related to management of food consumption data.

Food consumption amounts

- The inconsistencies related to food intake were checked (very high or very low intake, meal shifting reported foods, reported food improper for toddlers or school children, same food eaten the entire day etc.).

Anthropometric measurements

- Anthropometric measurements followed the protocol. All team members, fieldwork professional interviewers and nutritionists were trained in collecting these measurements. During the training, the way of measuring was demonstrated and the protocol was distributed included in user's manual

The children survey

- Quality of anthropometric measurements was checked detecting odd numbers when height and weight of children of that age is considered
- Validation and control of the instruments were performed.

Energy intake

- Energy intake was randomly checked as a final control. The estimated energy was compared to standard requirements calculated for the age and sex of the subject.

6. Data management

The National dietary survey on the children population in the Republic of North Macedonia was carried out with a mandate from the Government of the Republic of North Macedonia and an approval by the Ethical Committee for human research. The participation of the individuals involved in the survey was on a voluntary basis and all the collected information is confidential.

The subcontractors were responsible for the collection of data and for ensuring their quality, consistency and confidentiality during the fieldwork.

Collected data from the fieldwork, were entered into the DAP platform and checked by IPH to assure quality criteria in the project. Every user of DAP had a personal identification and password. Moreover, different levels of accessibility were established: e.g. nutritionists were only allowed to the data entry level and coordinator had higher level of accessibility.

The IPH project team was responsible for the data cleaning (missing values, outliers, etc.), and analysis. The food items, recipes items and facets descriptors were recoded using the Foodex2 nomenclature in order to get national food consumption data in a format in accordance with the EFSA requirements.

For the final transmission to EFSA, the data files were converted in .xml format according to EFSA Data Transmission schema and submitted to EFSA through the Data Collection Framework (DCF) platform.

7. Dissemination and publicity

The web pages of the Food and Veterinary Agency and Institute of Public Health of the Republic of North Macedonia as well as the national television channels were used for advertising the survey. This assured the familiarisation of the general population with the survey. In addition, abstract and poster presentation were submitted for Nutricon 2018 Congress, presenting the general information about the EFSA's EU Menu project and the implementation of the EU Menu methodology of in North Macedonia.

The results of the survey will be disseminated by means of presentations, short publications and scientific papers.

It is foreseen that individual food consumption data obtained through this national survey will be available for institutions involved in research, risk assessment, nutritional studies, etc.

8. Special issues/challenges

There was no deviation from the EFSA guidance and technical specification until this moment of the survey. A delay in initiating the pilot survey was noted. This was because it took longer than planned to coordinate participating partners in the project in order all of them to take responsibility for the undertaken tasks. Additionally, there was a need for a restructure of the process. The survey was initially planned to be done by one face to face and one telephone interview, but after the preparation process and consultation we saw that it is a better option to proceed with two face-to-face meetings, having in mind the targeted population. This reorganisation needed more coordination and explanation, particularly for field workers. Eventually, the field management plan was introduced and the field

The children survey

workers followed the provisions of that plan. The sampling process, according to EFSA criteria was also challenging since sampling calendar initially done didn't reflected all of the EFSA criteria. This issue, however, was more easily managed than the previous one, in coordination with EFSA and statisticians of the subcontracting company that was responsible for sampling.

However, different challenges had to be faced and were solved without any disruption of the survey progress. Most of the challenges were foreseen thanks to previous experience of the team with pilot project and similar surveys, therefore preventive actions better than solutions were taken.

Table 4: Main faced challenges and issues in EuMenu MK CId 2018/2019 dietary survey

Special issues / challenges Work package	
Adaptation and development of the survey methodology according to the EFSA EU Menu methodology	<p>The survey was conducted in two languages Macedonian and Albanian, this implied that every document, questionnaire, program, training, guideline report always had to be provided in both languages. This was quite time-consuming and substantially increased cost. The survey team consisted both of native Macedonian- and Albanian-speaking members</p> <p>Cooperation was needed with many other institutions</p>
Adaptation and development of dietary software and supporting tools according to the EFSA EU MENU methodology	<p>Avoid easily forgotten foods, the software was structured with specific probes to help respondent remember all the foods consumed throughout the day not to miss information from the diary. At the end of the interview there was a checklist with foods that might be easily forgotten (e.g. water, salt, snacking, seasoning)</p> <p>Only one member of the team has been trained on FoodEx2 coding to cover the high number of data due to the disaggregation of the recipes.</p>
Methodological guidelines for interviewers training and the pilot project	<p>Difference between interviewers with and without nutrition background, therefore they had communication on daily level with supervisor during the fieldwork.</p> <p>Interviewers with nutritious background should not participate in any dietary or health advice giving</p>
Preparation of the sample, collecting the data from fieldwork	<p>Response rate achievement, vouchers was provided to the participants as incentive upon completion of both diaries.</p> <p>The number of nutritionists was variable for every season and further training was needed at start of every season. This was because nutritionists were in their final year of studies and depending on their study and exams curriculum some of them had to end their involvement in the project at the end of the season</p>
Data preparation and harmonization to the EFSA	<p>Datasets validation (double-check and correction in datasets)</p> <p>The task of FoodEx2 coding needed effort and dedication, using EFSA Browser Catalogue and FoodEx2-ICT was very helpful. However, the transmission of data electronically to EFSA using xml schema presented some problems which were overcome with the error reports send by EFSA</p>

Due to the coronavirus crisis several extra challenges have occurred primarily regarding the execution of the personal meetings of the different team members and delay of the scheduled timeline especially because team members working on data preparation, harmonization and transfer to EFSA were included in IPH's Covid Center as a priority.

Conclusions

The organisation of this process and preparation of this dietary survey in the Republic of North Macedonia was complex and challenging. Strong partnership between Food and Veterinary Agency and the Institute of Public Health was initiated and formed to face the comprehensive challenges of the survey, particularly because it was the first time to perform study according to the EFSA's EU Menu

The children survey

protocols. During the process of the implementation, both human and institutional capacities in the country have developed in order to stay up to the challenge. Given the available data about the food habits of children in North Macedonia and the alarming trends of obesity and severe obesity in the country, this survey may serve as valuable asset to the policy creators and decision makers to fine tune nutrition policies in the country and implement corrective measures to reverse the worrying trends. Furthermore, inclusion of the dataset from North Macedonia into the EFSA Comprehensive European Food Consumption Database will provide comparable data from the country along with other European countries and will facilitate process of adoption of pan-European nutrition policies along the process of the EU approximation.

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>
- Centre of Research Excellence in nutrition and Metabolism, Institute for medical Research, National Institute of the Republic of Serbia, University of Belgrade, Serbia, Zekovic M, Gurinovic M, Milesevic J, Glibetic M., 2021. National Food Consumption Survey among children from 1–9 years in Serbia. EFSA supporting publication 2021:EN-699427pp.doi:10.2903/sp.efsa.2021.EN-6994
- 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.].
- EFSA, 2014. Guidance on the EU Menu methodology. EFSA Journal 2014;12(12):3944, 77pp. doi:10.29003/j.efsa.2014.3944
- EFSA, 2015. The food classification and description system FoodEx 2 (revision 2). EFSA Supporting Publications. 2015;12(5):EN - 804. 90 pp
- Gavrieli A, Naska A, Berry R, Roe M, Harvey L, Finglas P, Glibetic M, Gurinovic M and Trichopoulou A, (2014). Dietary monitoring tools for risk assessment. EFSA Supporting Publication:EN-607. [287 pp.]. Available online: www.efsa.europa.eu/publications
- 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
- 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
- Popovska S, Spiroski I and Jonovska K, 2018. Initiation of the national dietary survey in children in Macedonia. Book of Abstracts of NUTRICON. June 13th – 15th 2018; Ohrid, North Macedonia.
- Spinelli A, Buoncristiano M, Kovacs VA, Yngve A, Spiroski I, Obreja G, Starc G, Pérez N, Isabel Rito A, Kunešová M, Sant'Angelo VF, Meisfjord J, Holden Bergh I, Kelleher C, Yardim N, Pudule I, Petrauskienė, Duleva V, Sjöberg A, Gualtieri A, Hassapidou M, Hyska J, Burazeri G, Petrescu CH, Heinen M, Takacs H, Zamrazilová H, Bosi TB, Sacchini E, Pagkalos I, Cucu A, Nardone P, Gately P, Williams J and Breda J, 2019. Prevalence of severe obesity among primary school children in 21 European countries. *Obes Facts*. 2019; 12:244–58.
- Spiroski I, Nikolic M and Memeti Sh, 2021. Eating habits of children in North Macedonia: Results from the fifth round of the Childhood obesity surveillance initiative (COSI). *Acad Med J*. 2021; 1(1):80-88.
- Spiroski I, Mikik V, Miloradovska N, Veljanovski M, Shaqiri J, Petrova A, Dzikovska B, Shahini B and Kitanovska Spasev J, 2019. Changes in weight status of 7-year-old children in North Macedonia

The children survey

between 2010 and 2019. *Arch Pub Health.* 2021; 13(1):5-13. DOI:
<https://doi.org/10.3889/aph.2021.5828>

State Statistical Office; Census of population, households and dwellings in the Republic of North Macedonia. 2002

World Health Organization Regional Office for Europe; WHO European Childhood Obesity Surveillance Initiative. Protocol. WHO Regional Office for Europe, Copenhagen, Denmark, 2017.

World Health Organization Regional Office for Europe; WHO European Childhood Obesity Surveillance Initiative. Data collection procedures. WHO Regional Office for Europe, Copenhagen, Denmark, 2017.

Abbreviations

DAP	Diet Assess & Plan
DCF	Data Collection Framework
EFSA	European Food Safety Authority
FCDB	Food Composition Database
FCDM	Food Composition Data Base Management
FFQ	Food Frequency Questionnaire
FPQ	Food Propensity Questionnaire
FR	Food Records
FVA	Food and Veterinary Agency
IPH	Institute of Public Health
NUTS	Nomenclature of Territorial Units
NTES	Nomenclature of Territorial Units of the local self-government in Republic of North Macedonia
SEC	State Election Commission
24HDR	24-hour dietary recall

Annex A – Food diary

Annex B – Food Propensity Questionnaire