

This article has been published in a revised form in Public Health Nutrition. <https://doi.org/10.1017/S1368980019001034>. This version is free to view and download for private research and study only. Not for re-distribution or re-use. © Cambridge University Press.

**National Dietary Guidelines of Greece for Children and Adolescents:
A tool for promoting healthy eating habits**

Christina-Maria Kastorini¹, Elena Critselis^{1,2}, Dina Zota¹, Alexandra L. Coritsidis^{1,3*}, Meera K. Nagarajan^{1,4*}, Papadimitriou Eleni¹, Katerina Belogianni⁵, Vassiliki Benetou⁶ and Athena Linos^{1,6} on behalf of the Greek National Dietary Guidelines Scientific Team

* These authors have contributed equally to this work

¹ Institute of Preventive Medicine, Environmental & Occupational Health, Athens, Greece.

² First University Department of Pediatrics, National and Kapodistrian University of Athens School of Medicine, Greece

³ Fordham University, New York, NY, U.S.A.

⁴ Ohio State University, Columbus, OH, U.S.A.

⁵ Faculty of Health, Social Care and Education, Kingston University, London and St. George's, University of London

⁶ Department of Hygiene, Epidemiology and Medical Statistics, National and Kapodistrian University of Athens School of Medicine, Greece

Running title: Greek Dietary Guidelines for Children

Corresponding author:

Athena Linos, MD, MPH, PhD

Professor & Chair,

Department of Hygiene, Epidemiology and Medical Statistics,

75 M. Asias Street, 11527 Athens, Greece

Tel. +30 210 746 2059

Fax. +30 210 746 2058

Email: a.linos@proleptis.gr

Keywords: dietary guidelines; Greece; childhood obesity; adolescent obesity;

ACKNOWLEDGEMENTS

The authors would like to thank Enav Horwitz for her valuable contribution for the preparation of supplementary Table 1.

The authors would like to express their gratitude to all members of the National Dietary Guidelines Scientific Committee for their generous contribution of their time and valuable knowledge:

Ioannis Alamanos⁴ Former Associate Professor, Patras Medical School; **Maria Alevizaki**¹ Professor of Endocrinology, Athens Medical School; **Aristides Antsaklis**³ Professor of Obstetrics and Gynaecology, Athens Medical School; **Vassiliki Benetou**^{1, 2, 3, 4} Pediatrician, Associate Professor of Hygiene and Epidemiology, Athens Medical School; **Maria Chasapidou**², Professor of Nutrition - Dietetics, Alexander Technological Educational Institute of Thessaloniki; **George P. Chrousos**², Professor of Pediatrics, Athens Medical School; **Aikaterini Dakou-Voutetaki**² Professor Emeritus of Pediatric Endocrinology, Athens Medical School; **George Dedoussis**⁴ Professor of Human Cellular and Molecular Biology, Harokopio University; **Evanthia Diamanti-Kandarakis**¹ Professor of Internal Medicine – Endocrinology, Athens Medical School; **Stella Egglezou**³ Pediatrician–Neonatologist, Director of the Neonatal Department of the «ELENA VENIZELOU» Hospital, Athens, Greece; **Eustathia Fouseki**^{1, 2, 3, 4}, Director of Directorate of Counseling, Career Guidance and Educational Activities of the Ministry of Culture, Education and Religious Affairs; **Ioannis Karaitianos**⁴ Unr. Associate Professor of Surgery, Athens Medical School - Director of the «Agios Savvas» Cancer Hospital, Chairman of the Board of Directors,

Hellenic Association of Gerontology & Geriatrics; **Eugenio Koumantakis**³ Professor Emeritus of Obstetrics and Gynaecology, University of Crete; **Dimitrios Linos**^{1, 2, 3, 4} Professor of Surgery, Athens Medical School; **Evangelia Magklara-Katsilabrou**⁴ Clinical Nutritionist – Dietitian; **Ioannis Manios**^{1, 2} Associate Professor in Nutrition Education – Assessment, Harokopio University; **Anastasios Mortoglou**¹ Internist - Endocrinologist, Head of Endocrinology Department, Athens Medical Center; **Demosthenes Panagiotakos**¹ Professor in Biostatistics-Epidemiology of Nutrition, Harokopio University; **Permanthia Panani**³ Midwife, President of SEMMA, ICM (International Confederation of Midwives) representative, European Midwives Association representative; **Anastasia Pantazopoulou-Foteinea**^{1, 2, 3, 4} Public Health Physician – Occupational Physician, former General Principal of Public Health, Ministry of Health; **Evangelos Polychronopoulos**^{3, 4} Associate Professor in Preventive Medicine & Nutrition, Harokopio University; **Theodora Psaltopoulou**^{1, 4} Internist, Associate Professor of Epidemiology and Preventive Medicine, Athens Medical School; **Eleftheria Roma-Giannikou**², Professor Emeritus of Pediatric Gastroenterology, Athens Medical School; **Panagiota Sourtzi**⁴, Professor, Faculty of Nursing, University of Athens, Secretary, Board of Directors, Hellenic Association of Gerontology & Geriatrics; **Chrysa Tzoumaka-Mpakoula**^{2, 3}, Professor Emeritus of Pediatrics, Athens Medical School; **Antonis Zampelas**^{1, 3} Professor of Human Nutrition, Agricultural University of Athens.

¹Committee of the National Dietary Guidelines for Adults

² Committee of the National Dietary Guidelines for Infants, Children and Adolescents

³ Committee of the National Dietary Guidelines for Women (including women during pregnancy, lactation, and menopause)

⁴ Committee of the National Dietary Guidelines for adults aged 65 years and older

The National Dietary Guidelines of Greece Scientific Implementation Team

(<http://www.diatrofikoiodigoi.gr/?Page=summary-who-we-are>):

Scientific Coordinator

Athena Linos, MD, MPH, PhD, Professor & Chair of Dept. of Hygiene, Epidemiology & Medical Statistics, Athens Medical School, NKUA

Team of Authors

Vassiliki Benetou, MD, PhD, (Scientific consultant) Pediatrician, Assistant Professor of Hygiene and Epidemiology, University of Athens Medical School, **Dina (Konstantina) Zota, MSc**, (Project manager), Health Promotion Specialist, Prolepsis Institute, **Katerina Belogianni, MSc**, Clinical Nutritionist – Dietician, Prolepsis Institute, **Anna Kandaraki, MSc**, Clinical Psychologist, **Christina-Maria Kastorini, PhD**, Clinical Nutritionist – Dietitian, Prolepsis Institute, **Rena Kosti, MSc, PGCert, PhD**, Food Scientist – Dietician, **Eleni Papadimitriou, MD, PhD**, Physician, Prolepsis Institute, **Fani Pechlivani, MSc, PhD**, Midwife, Assistant Professor, Midwifery Department, Technological Educational Institute of Athens, **Anastasia Samara, PhD**, Clinical Nutritionist – Dietician, **Ioannis Spyridis, PhD**, Health Promotion Specialist, Prolepsis Institute, **Panagiota Karnaki, MSc**, Health Promotion Specialist, Prolepsis Institute, **Afroditi Veloudaki, MA**, Health Communications Specialist, Prolepsis Institute

FINANCIAL SUPPORT: The development of the 2014 National Dietary Guidelines of Greece was funded by the NSRF 2007-2013 Program (MIS code 346818, as part of the Operational Program “Human Resources Development), the Hellenic Ministry of Occupation, Social Insurance and Welfare, and the Hellenic Ministry of Health.

CONFLICT OF INTEREST: All authors report no conflict of interest.

AUTHORSHIP: EC, ALC and MKN drafted the first version of the manuscript; CMK and DZ drafted the revised version of the manuscript; DZ, CMK, PE, KB, VB and AL are part of the scientific team of the national dietary guidelines. All authors contributed to the revising of the manuscript for important content and gave their final approval of the version submitted for publication.

ABSTRACT

Objective: Dietary guidelines are an essential policy tool for facilitating optimal dietary patterns and healthy eating behaviors. We report a) the methodological approach adopted for developing the National Dietary Guidelines of Greece (NDGGr) for Infants, Children and Adolescents, b) the guidelines for children 1-18 years.

Design: An evidence-based approach was employed to develop food-based recommendations according to the methodologies of the World Health Organization, Food and Agriculture Organization, and European Food Safety Authority. Physical activity recommendations were also compiled. Food education and healthy eating tips and suggestions were also provided.

Setting: The NDGGr encompass food-based nutritional and physical activity recommendations for promoting healthy dietary patterns and eating behaviors and secondarily to serve as a helpful tool for the prevention of childhood overweight and obesity.

Subjects: Not applicable.

Results: The NDGGr includes food-based recommendations, food education and health promotion messages, regarding: i) fruits; ii) vegetables; iii) milk and dairy products; iv) cereals; v) red and white meat; vi) fish and seafood; vii) eggs; viii) pulses; ix) added lipids, olives, and nuts; x) added sugars and salt; xi) water and beverages, and xii) physical activity. A Nutrition Wheel, consisting of the 10 most pivotal key messages was developed so as to enhance the adoption of optimal dietary patterns and a healthy lifestyle. The NDGGr additionally provide recommendations regarding the optimal frequency and serving sizes of main meals, based on the traditional Greek diet.

Conclusions: As a policy tool for promoting healthy eating, the NDGGr has been disseminated in public schools across Greece.

INTRODUCTION

Healthy eating is important in all life stages. For children and adolescents in particular, healthy eating is essential for ensuring optimal physical and cognitive development⁽¹⁻³⁾. Dietary patterns and eating behaviours established during childhood and adolescence are likely to persist into adulthood⁽⁴⁾. Thus, promoting healthy eating as early as possible is of particular importance. Furthermore, achieving and maintaining normal body weight is vital for favorable health outcomes throughout the life-course^(3,5). In more detail, childhood obesity is associated with a wide array of adverse health outcomes, both physical and psychosocial⁽⁶⁾. Not only is excess weight in childhood and adolescence associated with dental caries and asthma^(7,8), but is also likely to lead to lifelong overweight and obesity⁽⁹⁾. Furthermore, childhood obesity is associated with greater risk and earlier onset of chronic disorders such as hypertension, hypercholesterolemia and type 2 diabetes^(3, 9-11).

Be that as it may, the dietary patterns of children and adolescents in Greece over the last decades are shifting away from the traditional Greek diet, towards an unhealthier direction⁽¹²⁻¹⁶⁾. At the same time, approximately 40% of children and adolescents are either overweight or obese, exhibiting one of the highest prevalence rates of pediatric overweight and obesity in Europe⁽¹⁶⁻¹⁸⁾. Hence, the promotion of healthy dietary patterns, based on the principles of the traditional Greek diet, as well as prevention and control of childhood obesity, is of notable importance in this particular European region.

Dietary guidelines constitute an essential policy tool for facilitating optimal dietary patterns and healthy eating behaviors. An evidence-based approach was employed to develop the 2014 National Dietary Guidelines of Greece (NDGGr) for adults⁽¹⁹⁾, as well as for specific population groups, including a) infants, children and adolescents⁽²⁰⁾, b) women (including women during pregnancy, lactation, and menopause)⁽²¹⁾, and c) adults aged 65 years or older⁽²²⁾. We report the methodology adopted for the development of the food-based National Dietary Guidelines of Greece for Infants, Children and Adolescents, as well as the innovative aspects adopted for promoting healthy eating. In

the present work we focus on the guidelines for children and adolescents aged 1-18 years. It should be also noted that through the promotion of healthy dietary patterns and physical activity, the NDGGr aim to serve as a policy tool for preventing childhood obesity.

MATERIALS AND METHODS

The NDGGr⁽¹⁹⁻²²⁾ were developed under the Operational Program “Human Resources Development” 2007 – 2013 of the Hellenic Ministry of Health. The private nonprofit scientific organization Institute of Preventive Medicine, Environmental and Occupational Health, Prolepsis, was selected to develop a methodological protocol for the optimal development and to compile the NDGGr. The WHO, Food and Agriculture Organization of the United Nations (FAO), and European Food Safety Authority (EFSA) methodologies⁽²³⁻²⁵⁾ were used for the development of the food-based NDGGr, so as to take into consideration valuable experiences and relevant methodology for developing such guidelines. A multidisciplinary research team (including nutritionists, physicians, health promotion specialists, and food technologists) was selected to implement the entailed research tasks, compilation and authorship of the NDGGr, as well as its production and dissemination following Scientific Committee approval. In more detail, the synthesis and critical appraisal of the most robust peer-reviewed epidemiological evidence was undertaken by the Prolepsis team, which was responsible for compiling the final NDGGr and related health promotion materials for the general and scientific publics.

Additionally, Prolepsis selected and appointed an independent multidisciplinary Scientific Committee, responsible for the critical review and appraisal of the compiled NDGGr. The Scientific Committee consisted of 28 experts in the nutritional sciences, including physicians, research scientists and academics, as well as representatives of relevant Ministries. Financial compensation was not awarded for Committee participation. Committee members were assigned to four Subcommittees (i.e. NDGGr Subcommittees for: a) Infants, Children, and Adolescents (ages 0 to <18 years old), b) Adults; c) Women (including women during pregnancy, lactation, and menopause); and d) Adults aged 65

years or older) based on their particular field of expertise. Subcommittee members were responsible for reviewing the critically appraised literature regarding the potential etiological association between the consumption of nutrients, foods, and/or dietary patterns and subsequent risk of developing the most prevalent diet-related chronic diseases (including cardiovascular diseases, type 2 diabetes mellitus, metabolic syndrome, obesity, and most prevalent cancers) and for approving the final dietary guidelines, as will be discussed below. The Committee members met regularly with the Prolepsis team to discuss the critically appraised evidence until a consensus was reached.

Synthesis of evidence

Firstly, for the development of the dietary guidelines the following were taken into consideration: (a) The consumption of food items and/or food groups, particularly in relation to the traditional Greek diet, in Greece was assessed based on the Food and Agricultural Organization food balance sheets⁽²⁶⁾, Hellenic National Statistics Authority household budget surveys⁽²⁷⁾, and food consumption surveys⁽²⁸⁾; (b) Related scientific publications, including population-based epidemiological investigations regarding the consumption of food items and/or meals at the individual level in Greece; (c) The regional seasonal availability, financial cost, and related environmental considerations (including i.e. the bioeconomy and biodiversity of foods), when applicable; (d) The pre-existing Dietary Guidelines for Adults of the Supreme Scientific Health Council of the Hellenic Ministry of Health and Welfare⁽²⁹⁾. In addition, a systematic literature search was conducted to identify the most recent and related Scientific Reports and Dietary Guidelines published by international organizations, governmental entities, and scientific societies in Greece, Europe, and worldwide.⁽³⁰⁻³³⁾

Secondly, the epidemiological trends and public health importance of nutrition-related chronic diseases in Greece was evaluated based on a systematic literature search in PubMed, as well as the WHO European Health for All Database and GLOBOCAN databases. Additionally, a systematic search was conducted to retrieve the most robust epidemiological evidence (i.e. meta-analyses of

randomized trials or prospective cohort studies) regarding the consumption of nutrients, foods, and/or dietary patterns, as well as physical activity, with the subsequent risk of developing the aforementioned most prevalent diet-related chronic diseases.

Evidence level grading and compilation of the NDGGr

The retrieved evidence was graded based on the methodology of the European Society of Cardiology (*Recommendations for Guidelines Production* www.escardiol.org/knowledge/guidelines/rules)⁽³⁴⁾, modified to accommodate for the particularities of nutritional data⁽³⁵⁾. In particular, the following three Levels of Evidence were applied: i) Level A: evidence arising from ≥ 1 meta-analysis of either prospective cohort studies or randomized clinical trials and/or ≥ 1 multicenter randomized clinical trial; ii) Level B: evidence arising from ≥ 2 randomized clinical trials or ≥ 2 prospective cohort studies or ≥ 5 case-control studies or ≥ 5 non-randomized clinical trials; or iii) Level C: Expert consensus and/or evidence arising from cross-sectional and/or case-control studies. The preliminary dietary guidelines were compiled based on the evidence-level grading and presented for review to all Subcommittee Members. A series of expert panel meetings among Subcommittee members was conducted for the refinement of dietary guidelines until a consensus was reached. Finally, an analytical Report was compiled detailing the retrieved findings and associated strength of recommendation for each NDGGr food item/category. This Report served as the basis for further developing two volumes of the NDGGr targeting a) the general public and b) health professionals, as detailed below.

Development of the NDGGr

Food-based NDGGr, with nutritional education and health promotion messages for consumers, were subsequently developed, including the following food items/categories: i) fruits; ii) vegetables; iii) milk and dairy products; iv) cereals; v) red and white meat; vi) fish and seafood; vii) eggs; viii) legumes; ix) added lipids, olives, and nuts; x) added sugars and salt; and, xi) water and beverages.

Physical activity recommendations were also compiled. To facilitate uptake, a “Nutrition Wheel” consisting of the 10 most vital nutrition and health promotion messages was developed (Figure 1). Pictorial “Healthy Meal” recommendations were incorporated regarding the optimal frequency and serving sizes of main meals, based on the traditional Greek diet (Figure 2). Specifically, the “Healthy Meal” depicts indicative serving sizes for adults and combinations of foods based on the traditional Greek diet (including a traditional main dish, salad and fruit) and prepared according to the NDGGr recommendations.

Finally, two volumes of the NDGGr were developed targeting a) the general public and b) health professionals, respectively. Regarding the NDGGr for the general public, dietary recommendations were presented analytically in text and pictorial formats, as detailed above. With respect to the NDGGr for the health professionals, a detailed description of the evidence reviewed and strength of recommendations was compiled. To enhance uptake the NDGGr was disseminated in print format and additionally made freely accessible in electronic format.

RESULTS

The NDGGr for Infants, Children and Adolescents primarily include food-based guidelines, as well as recommendations regarding the frequency of meals and parenting tips for promoting healthy dietary patterns and eating behaviours. Specifically, the NDGGr for children and adolescents (aged 1 to <18 years old) encompass age-specific recommendations regarding 10 food groups and/or items, water and/or beverages, and physical activity. Age-specific recommended dietary intakes, as well as indicative serving/portion sizes, are summarized below and detailed in Table 1. In conjunction, a “Nutrition Wheel”, consisting of the ten most pivotal recommendations, was developed (Figure 1).

Vegetables and fruits

The category “Vegetables and Fruits” encompasses all raw and cooked vegetables (including starchy vegetables, such as peas, corn, and pumpkins), as well as raw and dried fruits, inclusive of along freshly squeezed fruit juices (i.e. without added sugars). Potatoes are not included in this category. Frequent consumption of vegetables and fruits is associated with a reduced risk of cardiovascular diseases, type 2 diabetes, and gastrointestinal cancers in adulthood⁽³⁶⁻⁴¹⁾. Additional health benefits of such consumption patterns include the prevention of overweight and obesity in both childhood and adulthood⁽³⁴⁾. Hence, the NDGGr recommendation entails the consumption of a variety of fruits and vegetables (preferentially those in season) several times per day in every main meal (Figure 2).

Milk and dairy products

This category includes milk and dairy products, including yoghurt and cheese. Butter is excluded as it pertains to an added source of oils and fats. Moderate consumption of milk and dairy products is associated with a reduced risk of cardiovascular diseases, type 2 diabetes, and colorectal cancer in adulthood⁽⁴²⁻⁴⁵⁾. Additional health benefits include increased bone density and a reduced likelihood of hypertension⁽⁴⁶⁾. Thus, the NDGGr recommendation endorses that children and adolescents consume milk and dairy products daily. Additionally, children >2 years old may consume either full fat or semi-skimmed milk.

Cereals

Rice, potatoes, cereals and grains, as well as their by-products (e.g. flour, bread and rusks, pasta, and traditional savory pies) are included in this food category. Whole grain cereals and their by-products are a rich source of carbohydrates, as well as dietary fiber, B complex vitamins, and minerals. Increased consumption of whole grains is associated with a reduced risk of cardiovascular diseases, type 2 diabetes and colorectal cancer, as well as a reduced likelihood of overweight and/or obesity^(36, 47-49).

The NDGGr recommends that children and adolescents consume a variety of grains and cereals (preferably whole grain) daily.

Red meat and white meat

This category encompasses all red (e.g. beef, pork, lamb, goat, deer, and wild boar) and white (e.g. chicken, turkey, duck, rabbit, pheasant, and game birds) meats, as well as their related processed products. While meats are a rich source of proteins, iron, vitamins B and E, magnesium, and zinc, increased consumption of processed meats is associated with several adverse health outcomes⁽⁵⁰⁻⁵³⁾. Hence, the NDGGr advises that children older than 2 years old should consume red and/or white meats 2-3 times per week. However, all processed meats should be avoided at all ages.

Fish and seafood

All types of fish and seafood, including shellfish, are included in this food category. Fish and seafood are a primary source of high biological value proteins (whilst concomitantly a poor source of saturated fats), and a rich source of vitamin D, selenium, and zinc. The elevated consumption of oily fish rich in omega-3 fatty acids is essential for optimal brain development and related health outcomes in adulthood^(36, 54-59). Thus, the NDGGr recommendation endorses children and adolescents to consume a variety of fish and seafood, corresponding to 2-3 servings per week. Additionally, at least one serving per week ought to regard the consumption of oily fish rich in omega-3 fatty acids.

Eggs

Eggs are a readily available protein source with high biological value. Due to their high nutrient content (e.g. vitamins A, D, and B₁₂, thiamine and riboflavin, as well as carotenoids, selenium, and choline), and taking into consideration the associations of egg consumption on various health outcomes^(36, 60-62),

children of all ages should consume 4-7 eggs per week. It is of note that children with hyperlipidemia are advised to first consult with their physician.

Legumes

The “Legumes” category, an integral component of the traditional Greek diet, includes lentils, beans, chickpeas, fava beans, and broad beans. Pulses and legumes constitute a rich source of proteins and fiber, as well as several vitamins and minerals, including iron, calcium, magnesium and zinc, with favorable health outcomes^(48, 63-64). Hence, the NDGGr recommend that children and adolescents should consume pulses and legumes at least once per week.

Added lipids, olives, and nuts

This category includes added fats and oils (e.g. olive oil, seed and/or other vegetable oils, margarine, and butter), olives, and nuts, as well as their by-products (e.g. tahini). The consumption of added fats and oils is essential for normal childhood development. In particular, olive oil is a vital component of the traditional Greek diet, being concomitantly a rich source of monounsaturated fats, vitamin E, and polyphenols. In contrast, the consumption of saturated and trans fatty acids is associated with hyperlipidemia, cardiovascular diseases, as well as overweight/obesity^(36,65-70). Thus, the NDGGr recommends that olive oil ought to be the preferred choice of added oils in the preparation of cooked meals and/or salads. Furthermore, the consumption of added fats arising from animal sources (e.g. butter) should be limited and/or substituted with olive oil. Finally, the consumption of trans fatty acids (e.g. in prepared food products, sweets, and/or fast food items) should be avoided.

Added sugars and salts

The “Added sugars” and “Salt” categories encompass all added sugars (e.g. granulated white and brown sugar, cane sugar, glucose powder, and fructose powder) and honey, as well as table salt.

Consumption of added sugars, including sweetened beverages and soft drinks, is associated with an increased risk of dental caries and childhood overweight/obesity⁽⁷¹⁻⁷³⁾. Hence, the NDGGr recommends that the consumption of foods with added sugars should be limited to a minimum. In particular, it is recommended that the consumption of sweetened beverages, soft drinks, and fruit juices with added sugars is avoided. In addition, table salt, as most often made available in the Greek market, is an essential source of iodine. However, consumption of elevated levels during childhood and adolescence is associated with an increased risk of hypertension and cardiovascular diseases in adulthood⁽⁷⁴⁻⁷⁷⁾. As a result, the dietary guideline developed was that total consumption of salt should be limited in children and adolescents.

Physical activity

Physical activity is associated with a wide array of health benefits in childhood and adolescence, including optimal physical and psychosocial development, normal body weight, and the prevention of several chronic diseases in adulthood, including hypercholesterolemia and type 2 diabetes^(78, 79). With respect to young children (aged 3-6 years old), the NDGGr recommends that total screen time should be limited to a minimum and children should be physically active, in a wide range of activities, for at least 1 hour per day. Within this context, parental participation is also recommended. Regarding older children and adolescents (aged 7-18 years old), it is also recommended that total screen time is limited and at least 1 hour per day is dedicated to either athletic and/or sports training activities. However, it is recommended that children aged younger than 10 years old should not be involved in high intensity training activities.

Other recommendations

The NDGGr include several additional recommendations regarding the types and frequencies of meals. Particular emphasis is placed on the importance of consuming a healthy breakfast, including items of

at least 3 food groups (i.e. dairy products, cereals, and fruits or vegetables). Additionally, for main meals, illustrations of a Healthy Meal (including a main dish, salad, and fruit) based on the traditional Greek diet are illustrated for clarity. Furthermore, behavioural techniques are included as a separate chapter of the NDGGr, aiming to provide practical tips to parents for the promotion of healthy eating. The issues addressed include the influence of parental behaviors (e.g. acting as role models) for encouraging healthy dietary patterns^(80, 81), the importance of consuming family meals ^(82, 83), tips and ideas for improving the consumption of less preferred food, as well as specific tips for adolescents. The aforementioned recommendations are summarized in the Nutrition Wheel Guidelines as follows: “Be a role model for your children by encouraging healthy eating. Eat 3 main meals and at least one snack every day. Eat breakfast every day. Drink plenty of water. Eat together as a family as frequently as possible. Turn the TV off. Cook at home healthy and safe food. Choose seasonal products.”

DISCUSSION

We report the methodological approach adopted for the development of the 2014 NDGGr for Infants, Children and Adolescents. Within this context, an evidence-based approach was employed to develop recommendations for promoting healthy dietary patterns and physical activity, as well as a Nutrition Wheel, so as to ultimately enhance the adoption of the aforementioned recommendations and promote healthy eating habits. The NDGGr have been adopted by the Hellenic Ministry of Education, while the Hellenic Institute for Educational Policies has approved their use and widespread dissemination in public schools nationwide. Additionally, the Ministry of Health, as well as the Hellenic Central Health Council has endorsed their use as a tool for promoting healthy dietary patterns through their widespread dissemination to the general public (including students, parents and educators), as well as healthcare professionals. To enhance extensive uptake, the NDGGr have been disseminated nationwide and are electronically freely accessible (English summary available at: <http://www.diatrofikoiodigoi.gr/?Page=summary-children>). Finally, scientific volumes of the NDGGr,

including a detailed description of the evidence reviewed and strength of recommendation in both print and electronic forms, have been made accessible to nutritionists and healthcare professionals alike.

Food-based dietary guidelines for children and/or adolescents have been previously published from 29 (including Greece) out of 51 WHO European region countries (57%). Of the 28 countries (presented in Suppl. Table 1), 24 adopt a pictorial illustration for the presentation of the guidelines; 12 adopt the pyramid, 10 use other forms of pictorial models (mostly circles, plates or pies) and 2 countries (Finland⁽⁸⁴⁾ and Slovenia⁽⁸⁵⁾) use both the food pyramid and plate. The NDGGr also use two types of illustration; a Nutrition Wheel and pictorial “Healthy Meal” recommendations (Figures 1 and 2). Furthermore, the NDGGr are one of the few guidelines which encompass the greatest number of distinct food categories, including 10 food groups, as well as physical activity (other dietary guidelines with 8 or 9 distinct food categories are those of Belgium⁽⁸⁶⁾, Finland⁽⁸⁴⁾, Luxembourg⁽⁸⁷⁾, Netherlands⁽⁸⁸⁾ and Slovenia⁽⁸⁵⁾).

It should be also noted that despite different geographical, socio-economic and cultural contexts among countries, the majority of the pivotal nutritional recommendations are similar. In fact, the principal messages include daily consumption of adequate amounts of fruits, vegetables, dairy products, as well as starches, cereals and grains and moderate-to limited intake of fats. In more detail, guidelines from all countries include recommendations regarding fruit and vegetable intake and most of which suggest the intake of 5 servings per day or at least 500g/day. The NDGGr are one of the guidelines recommending the highest suggested intake of fruits and vegetables, as the lowest suggested intake of (for children 1-3 y) is >300 g/day, reaching for adolescents more than 1000 g/day. Furthermore, 19 of the 28 countries (68%) incorporate specific recommendations regarding the increased consumption of whole grains or provide the recommended dietary fiber intake. The NDGGr also promote the intake of whole grain cereals with specific tips facilitating their consumption. Furthermore, it should be noted that even if the recommended intake of protein food and red meat is more or less common in the majority of the countries, it is noteworthy that only 11 of the 28 guidelines

(39%) explicitly recommend the avoidance of processed meat. Finally, it should be mentioned that the majority of the WHO European region countries (22 out of 28) provide physical activity recommendations. Of these countries, only 11 recommend physical activity for 60 minutes per day (or longer) - the highest recommendation, similar as the NDGGr.

All things considered, the recently developed NDGGr for Infants, Children and Adolescents have employed an evidence-based approach to develop food-based nutritional and physical activity recommendations. The NDGGr novel aspects lie in the evidence-based approach applied, as well as the development of an age-specific Nutrition Wheel and indicative examples of “Healthy Meals” with pictorial depictions providing recommendations regarding the optimal frequency and serving sizes of main meals, based on the traditional Greek diet. Future longitudinal investigations are necessary to elucidate whether the application of the NDGGr is effective for promoting healthy dietary patterns, and serves as a useful tool for childhood obesity prevention and maintenance of an optimal body weight throughout adolescence and subsequent adulthood.

LEGENDS FOR FIGURES AND TABLES

Figure 1: The 2014 Greek Dietary Guidelines for infants, children and adolescents. The 2014 Greek Dietary Guidelines are depicted as a Nutrition Wheel entitled “Ten steps to healthy eating for children and adolescents”.

Figure 2: Indicative examples of the “Healthy Meals” included in the Greek National Dietary Guidelines for Infants, Children and Adolescents.

Table 1. Recommendations and indicative serving sizes* for the consumption of food items and food groups based on the 2014 Greek Dietary Guidelines for children and adolescents

Suppl. Table 1. Comparison of national dietary recommendations for children and adolescents from WHO European Region countries

REFERENCES

1. Jacka FN, Kremer PJ, Berk M, et al. A prospective study of diet quality and mental health in adolescents. *PloS one*. 2011;6(9):e24805.
2. Shepherd J, Harden A, Rees R, et al. Young people and healthy eating: a systematic review of research on barriers and facilitators. *Health education research*. Apr 2006;21(2):239-257.
3. Park MH, Falconer C, Viner RM, et al. The impact of childhood obesity on morbidity and mortality in adulthood: a systematic review. *Obesity reviews : an official journal of the International Association for the Study of Obesity*. Nov 2012;13(11):985-1000.
4. Scaglioni S, De Cosmi V, Ciappolino V, et al. Factors Influencing Children's Eating Behaviours. *Nutrients*. 2018 May 31;10(6)
5. Lloyd LJ, Langle-Evans SC, McMullen S. Childhood obesity and adult cardiovascular disease risk: a systematic review. *Int J Obes (Lond)*. Jan 2010;34(1):18-28.
6. Quek YH, Tam WW, Zhang MW, et al. Exploring the association between childhood and adolescent obesity and depression: a meta-analysis. *Obes Rev*. 2017;18:742–754.
7. Hayden C, Bowler JO, Chambers S, et al. Obesity and dental caries in children: a systematic review and meta-analysis. *Community dentistry and oral epidemiology*. Aug 2013;41(4):289-308.
8. Tashiro H, Shore SA. Obesity and severe asthma. *Allergol Int*. 2018 Nov 30. pii: S1323-8930(18)30158-8.
9. Singh AS, Mulder C, Twisk JW, et al. Tracking of childhood overweight into adulthood: a systematic review of the literature. *Obes Rev*. 2008;9:474–488.
10. Friedemann C, Heneghan C, Mahtani K, et al. Cardiovascular disease risk in healthy children and its association with body mass index: systematic review and meta-analysis. *BMJ*. Sep 25 2012;345:e4759.
11. Abdullah A, Wolfe R, Stoelwinder JU. The number of years lived with obesity and the risk of all-cause and cause-specific mortality. *Int J Epidemiol*. 2011;40:985–996
12. Tambalis KD, Panagiotakos DB, Moraiti I, et al.; EYZHN Study Group. Poor dietary habits in Greek schoolchildren are strongly associated with screen time: results from the EYZHN (National Action for Children's Health) Program. *Eur J Clin Nutr*. 2018 Apr;72(4):572-580.
13. Kastorini CM, Lykou A, Yannakoulia M, et al.; DIATROFI Program Research Team. The influence of a school-based intervention programme regarding adherence to a healthy diet in

- children and adolescents from disadvantaged areas in Greece: the DIATROFI study. *J Epidemiol Community Health*. 2016 Jul;70(7):671-7.
14. Manios Y, Kourlaba G, Kondaki K, et al. Diet quality of preschoolers in Greece based on the Healthy Eating Index: the GENESIS study. *J Am Diet Assoc*. 2009b Apr;109(4):616-23
 15. Kontogianni MD, Vidra N, Farmaki AE, et al. Adherence rates to the Mediterranean diet are low in a representative sample of Greek children and adolescents. *J Nutr*. 2008 Oct;138(10):1951-6.
 16. Farajian P, Risvas G, Karasouli K, et al. Very high childhood obesity prevalence and low adherence rates to the Mediterranean diet in Greek children: the GRECO study. *Atherosclerosis*. 2011 Aug;217(2):525-30.
 17. Tambalis KD, Panagiotakos DB, Kavouras SA, et al. Eleven-year prevalence trends of obesity in Greek children: first evidence that prevalence of obesity is leveling off. *Obesity (Silver Spring)*. Jan 2010;18(1):161-166.
 18. OECD 2014, <http://www.oecd.org/els/health-systems/Obesity-Update-2014.pdf>
 19. Eu Dia...Trofin. Greek National Dietary Guidelines for Adults. <http://diatrofikoiidigoi.gr/?page=summary-adults>. Accessed June 7, 2017.
 20. Eu Dia...Trofin. Greek National Dietary Guidelines for Infants, Children and Adolescents. <http://diatrofikoiidigoi.gr/?Page=summary-children>. Accessed June 7, 2017.
 21. Eu Dia...Trofin. Greek National Dietary Guidelines for Women including Women in Pregnancy, Lactation & Menopause. <http://diatrofikoiidigoi.gr/?page=summary-women>. Accessed June 7, 2017.
 22. Eu Dia...Trofin. Greek National Dietary Guidelines for Adults aged 65 Years or Older. <http://diatrofikoiidigoi.gr/?Page=summary-elderly>. Accessed June 7, 2017.
 23. EFSA Publication (2010). EFSA Panel on Dietetic Products, Nutrition, and Allergies (NDA); Scientific Opinion on establishing Food-Based Dietary Guidelines. Parma, Italy: European Food Safety Authority. The EFSA Journal, No. 1460, DOI: 10.2903/j.efsa.2010.1460
 24. WHO. Global Strategy on Diet, Physical Activity and Health Resolution WHA 55.23: World Health Organization;2004.
 25. WHO. Preparation and Use of Food-Based Dietary Guidelines. Report of a Joint FAO/WHO Consultation. Geneva 1998.

26. Food and Agriculture Organization of the United Nations. FAO-STAT. 2013; <http://faostat.fao.org/site/291/default.aspx.%202013>. Accessed July, 2013.
27. The Data Food Networking (DAFNE) project. 2013; <http://www.nut.uoa.gr/dafnesoftweb>, July, 2013.
28. De Henauw S, Brants HA, Becker W, et al. Operationalization of food consumption surveys in Europe: recommendations from the European Food Consumption Survey Methods (EFCOSUM) Project. *European journal of clinical nutrition*. May 2002;56 Suppl 2:S75-88.
29. Hellenic Ministry of Health and Welfare. Dietary guidelines for adults in Greece. *Archives of Hellenic Medicine*. 1999;16(5):516-524.
30. WHO. Joint WHO/FAO Expert Consultation on Diet, Nutrition and the Prevention of Chronic Diseases. Diet, nutrition, and the prevention of chronic diseases: report of a joint WHO/FAO expert consultation. Geneva2003.
31. WCRF. Food, Nutrition, Physical Activity, and the Prevention of Cancer: a Global Perspective. Washington DC, USA2007.
32. FAO. Fats and fatty acids in human nutrition: Report of an expert consultation. Rome2010.
33. National Health and Medical Research Council (NHMRC). A review of the evidence to address targeted questions to inform the revision of the Australian Dietary Guidelines. Canberra2011.
34. Perk J, De Backer G, Gohlke H, et al. European Guidelines on cardiovascular disease prevention in clinical practice (version 2012). The Fifth Joint Task Force of the European Society of Cardiology and Other Societies on Cardiovascular Disease Prevention in Clinical Practice (constituted by representatives of nine societies and by invited experts). *European heart journal*. Jul 2012;33(13):1635-1701.
35. Mann JI. Evidence-based nutrition: Does it differ from evidence-based medicine? *Annals of medicine*. Oct 2010;42(7):475-486.
36. Mente A, de Koning L, Shannon HS, et al. A systematic review of the evidence supporting a causal link between dietary factors and coronary heart disease. *Arch Intern Med*.2009 Apr 13;169(7):659-69.
37. Cooper AJ, Forouhi NG, Ye Z, et al. Fruit and vegetable intake and type 2 diabetes: EPIC-InterAct prospective study and meta-analysis. *Eur J Clin Nutr*. 2012 Oct;66(10):1082-92.

38. Dauchet L, Amouyel P, Dallongeville J. Fruit and vegetable consumption and risk of stroke: a meta-analysis of cohort studies. *Neurology*. 2005 Oct 25;65(8):1193-7.
39. He FJ, Nowson CA, Lucas M, et al. Increased consumption of fruit and vegetables is related to a reduced risk of coronary heart disease: meta-analysis of cohort studies. *J Hum Hypertens*. 2007 Sep;21(9):717-28.
40. Carter P, Gray LJ, Troughton J, et al. Fruit and vegetable intake and incidence of type 2 diabetes mellitus: systematic review and meta-analysis. *BMJ*. 2010 Aug 18;341:c4229.
41. Aune D, Lau R, Chan DS, et al. Nonlinear reduction in risk for colorectal cancer by fruit and vegetable intake based on meta-analysis of prospective studies. *Gastroenterology*. 2011 Jul;141(1):106-18.
42. Soedamah-Muthu SS, Ding EL, Al-Delaimy WK, et al. Milk and dairy consumption and incidence of cardiovascular diseases and all-cause mortality: dose-response meta-analysis of prospective cohort studies. *The American journal of clinical nutrition*. Jan 2011;93(1):158-171.
43. Aune D, Lau R, Chan DS, et al. Dairy products and colorectal cancer risk: a systematic review and meta-analysis of cohort studies. *Annals of oncology : official journal of the European Society for Medical Oncology / ESMO*. Jan 2012;23(1):37-45.
44. Huncharek M, Muscat J, Kupelnick B. Colorectal cancer risk and dietary intake of calcium, vitamin D, and dairy products: a meta-analysis of 26,335 cases from 60 observational studies. *Nutrition and cancer*. 2009;61(1):47-69.
45. Elwood PC, Pickering JE, Givens DI, et al. The consumption of milk and dairy foods and the incidence of vascular disease and diabetes: an overview of the evidence. *Lipids*. Oct 2010;45(10):925-939.
46. Ralston RA, Lee JH, Truby H, et al. A systematic review and meta-analysis of elevated blood pressure and consumption of dairy foods. *Journal of human hypertension*. Jan 2012;26(1):3-13.
47. Ye EQ, Chacko SA, Chou EL, et al. Greater whole-grain intake is associated with lower risk of type 2 diabetes, cardiovascular disease, and weight gain. *The Journal of nutrition*. Jul 2012;142(7):1304-1313.
48. Aune D, Chan DS, Lau R, et al. Dietary fibre, whole grains, and risk of colorectal cancer: systematic review and dose-response meta-analysis of prospective studies. *BMJ*. Nov 10 2011;343:d6617.

49. Hauner H, Bechthold A, Boeing H, et al. Evidence-based guideline of the German Nutrition Society: carbohydrate intake and prevention of nutrition-related diseases. *Annals of nutrition & metabolism*. 2012;60 Suppl 1:1-58.
50. Chen GC, Lv DB, Pang Z, et al. Red and processed meat consumption and risk of stroke: a meta-analysis of prospective cohort studies. *European journal of clinical nutrition*. Jan 2013;67(1):91-95.
51. Kaluza J, Wolk A, Larsson SC. Red meat consumption and risk of stroke: a meta-analysis of prospective studies. *Stroke*. Oct 2012;43(10):2556-2560.
52. Feskens EJ, Sluik D, van Woudenberg GJ. Meat consumption, diabetes, and its complications. *Current diabetes reports*. Apr 2013;13(2):298-306.
53. Aune D, Chan DS, Vieira AR, et al. Red and processed meat intake and risk of colorectal adenomas: a systematic review and meta-analysis of epidemiological studies. *Cancer causes & control : CCC*. Apr 2013;24(4):611-627.
54. Innis SM. Omega-3 Fatty acids and neural development to 2 years of age: do we know enough for dietary recommendations? *Journal of pediatric gastroenterology and nutrition*. Mar 2009;48 Suppl 1:S16-24.
55. McCann JC, Ames BN. Is docosahexaenoic acid, an n-3 long-chain polyunsaturated fatty acid, required for development of normal brain function? An overview of evidence from cognitive and behavioral tests in humans and animals. *Am J Clin Nutr*. 2005 Aug;82(2):281-95.
56. Zheng J, Huang T, Yu Y, et al. Fish consumption and CHD mortality: an updated meta-analysis of seventeen cohort studies. *Public Health Nutr*. 2012 Apr;15(4):725-37.
57. Chowdhury R, Stevens S, Gorman D, et al. Association between fish consumption, longchain omega 3 fatty acids, and risk of cerebrovascular disease: systematic review and meta-analysis. *BMJ*. 2012 Oct 30;345:e6698.
58. Larsson SC, Orsini N. Fish consumption and the risk of stroke: a dose-response meta-analysis. *Stroke*. 2011 Dec;42(12):3621-3.
59. Xun P, Qin B, Song Y, et al. Fish consumption and risk of stroke and its subtypes: accumulative evidence from a meta-analysis of prospective cohort studies. *Eur J Clin Nutr*. 2012 Nov;66(11):1199-207.

60. Li Y, Zhou C, Zhou X, et al. Egg consumption and risk of cardiovascular diseases and diabetes: A meta-analysis. *Atherosclerosis*. 2013 Aug;229(2):524-30.
61. Rong Y, Chen L, Zhu T, et al. Egg consumption and risk of coronary heart disease and stroke: dose-response meta-analysis of prospective cohort studies. *BMJ*. 2013 Jan 7;346:e8539.
62. Shin JY, Xun P, Nakamura Y, et al. Egg consumption in relation to risk of cardiovascular disease and diabetes: a systematic review and meta-analysis. *Am J Clin Nutr*. 2013 Jul;98(1):146-59.
63. Bernstein AM, Pan A, Rexrode KM, et al. Dietary protein sources and the risk of stroke in men and women. *Stroke*. 2012 Mar;43(3):637-44.
64. Bazzano LA, Thompson AM, Tees MT, et al. Non-soy legume consumption lowers cholesterol levels: a meta-analysis of randomized controlled trials. *Nutr Metab Cardiovasc Dis*. 2011 Feb;21(2):94-103.
65. FAO. Fats and fatty acids in human nutrition. Report of an expert consultation. *FAO Food Nutr Pap*. 2010;91:1-166.
66. Jakobsen MU, O'Reilly EJ, Heitmann BL, et al. Major types of dietary fat and risk of coronary heart disease: a pooled analysis of 11 cohort studies. *Am J Clin Nutr*. 2009 May;89(5):1425-32.
67. Mozaffarian D, Micha R, Wallace S. Effects on coronary heart disease of increasing polyunsaturated fat in place of saturated fat: a systematic review and meta-analysis of randomized controlled trials. *PLoS Med*. 2010 Mar 23;7(3):e1000252.
68. Bendsen NT, Christensen R, Bartels EM, et al. Consumption of industrial and ruminant trans fatty acids and risk of coronary heart disease: a systematic review and meta-analysis of cohort studies. *Eur J Clin Nutr*. 2011 Jul;65(7):773-83.
69. EFSA Panel on Dietetic Products, Nutrition, and Allergies (NDA); Scientific Opinion on Dietary Reference Values for fats, including saturated fatty acids, polyunsaturated fatty acids, monounsaturated fatty acids, trans fatty acids, and cholesterol. *EFSA Journal* 2010; 8(3):1461. [107 pp.]. doi:10.2903/j.efsa.2010.1461. Available online: www.efsa.europa.eu
70. Psaltopoulou T, Kostis RI, Haidopoulos D, et al. Olive oil intake is inversely related to cancer prevalence: a systematic review and a meta-analysis of 13,800 patients and 23,340 controls in 19 observational studies. *Lipids Health Dis*. 2011 Jul 30;10:127.
71. Anderson CA, Curzon ME, Van Loveren C, et al. Sucrose and dental caries: a review of the evidence. *Obes Rev*. 2009 Mar;10 Suppl 1:41-54.

72. Te Morenga L, Mallard S, Mann J. Dietary sugars and body weight: systematic review and meta-analyses of randomized controlled trials and cohort studies. *BMJ*. 2012 Jan 15;346:e7492.
73. Vartanian LR, Schwartz MB, Brownell KD. Effects of soft drink consumption on nutrition and health: a systematic review and meta-analysis. *Am J Public Health*. 2007 Apr;97(4):667-75.
74. Aburto NJ, Ziolkovska A, Hooper L, et al. Effect of lower sodium intake on health: systematic review and meta-analyses. *BMJ*. 2013 Apr 3;346:f1326.
75. Strazzullo P, D'Elia L, Kandala NB, et al. Salt intake, stroke, and cardiovascular disease: meta-analysis of prospective studies. *BMJ*. 2009 Nov 24;339:b4567.
76. Li XY, Cai XL, Bian PD, et al. High salt intake and stroke: meta-analysis of the epidemiologic evidence. *CNS Neurosci Ther*. 2012 Aug;18(8):691-701.
77. D'Elia L, Rossi G, Ippolito R, et al. Habitual salt intake and risk of gastric cancer: a meta-analysis of prospective studies. *Clin Nutr*. 2012 Aug;31(4):489-98.
78. Goran MI, Treuth MS. Energy expenditure, physical activity, and obesity in children. *Pediatric clinics of North America*. Aug 2001;48(4):931-953.
79. Must A, Tybor DJ. Physical activity and sedentary behavior: a review of longitudinal studies of weight and adiposity in youth. *Int J Obes (Lond)*. Sep 2005;29 Suppl 2:S84-96.
80. Schwartz C, Scholtens PA, Lalanne A, et al. Development of healthy eating habits early in life. Review of recent evidence and selected guidelines. *Appetite*. Dec 2011;57(3):796-807.
81. Krolner R, Rasmussen M, Brug J, et al. Determinants of fruit and vegetable consumption among children and adolescents: a review of the literature. Part II: qualitative studies. *The international journal of behavioral nutrition and physical activity*. Oct 14 2011;8:112.
82. Hammons AJ, Fiese BH. Is frequency of shared family meals related to the nutritional health of children and adolescents? *Pediatrics*. Jun 2011;127(6):e1565-1574.
83. Scaglioni S, Arrizza C, Vecchi F, et al. Determinants of children's eating behavior. *The American journal of clinical nutrition*. Dec 2011;94(6 Suppl):2006S-2011S.
84. Finnish National Nutrition Council. Finnish nutrition recommendations 2014. <http://www.fao.org/nutrition/education/food-based-dietary-guidelines/regions/countries/finland/en>. Accessed June 7, 2017.
85. CINDI-Slovenia. [Zdrav Kroznik]. <http://www.fao.org/3/a-az910o.pdf>. Accessed June 7, 2017.

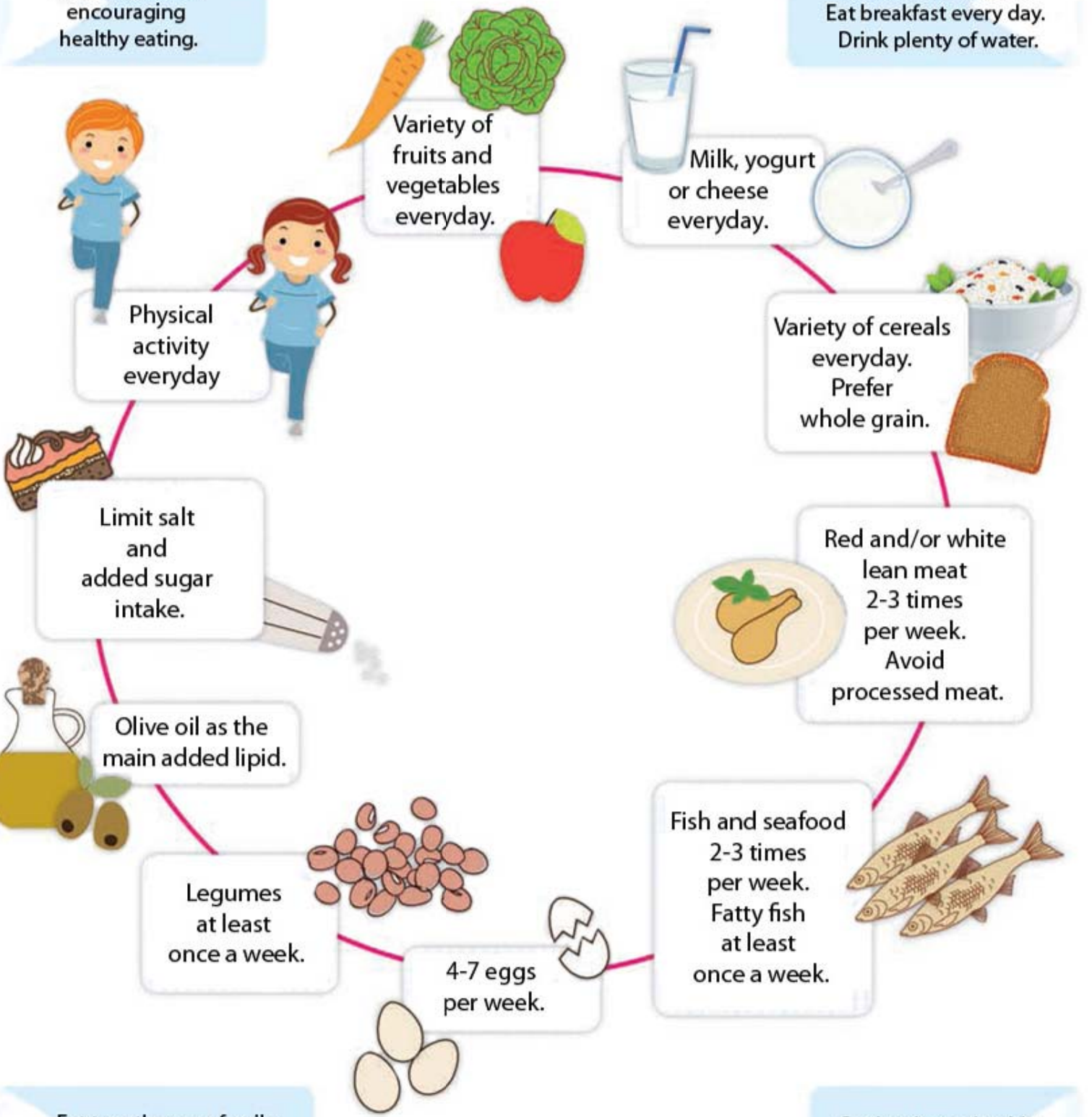
86. Belgian Federal Public Service of Public Health. Practical Guidelines for Healthy Eating. 2005; <http://www.fao.org/nutrition/education/food-based-dietary-guidelines/regions/countries/belgium/en/>. Accessed June 7, 2017.
87. Alkerwi A, Sauvageot N, Nau A, et al. Population compliance with national dietary recommendations and its determinants: findings from the ORISCAV-LUX study. *The British journal of nutrition*. Dec 14 2012;108(11):2083-2092.
88. Kromhout D, Spaaij CJ, de Goede J, et al. The 2015 Dutch food-based dietary guidelines. *European journal of clinical nutrition*. Aug 2016;70(8):869-878.
89. Albanian Ministry of Health Department of Public Health. Recommendations on Healthy Nutrition in Albania. 2008; <http://www.fao.org/3/a-as658e.pdf>. Accessed June 7, 2017.
90. Austrian Ministry of Health. Die österreichische Ernährungspyramide. 2010; http://www.bmgf.gv.at/cms/home/attachments/7/3/0/CH1046/CMS1290513144661/folder_erpyr_web.pdf. Accessed June 7, 2017.
91. Federation of Bosnia and Herzegovina Institute of Public Health. [Vodic o ishrani za odraslu populaciju]. 2004; <http://www.fao.org/3/a-as669o.pdf>. Accessed June 7, 2017.
92. Bulgarian Ministry of Health National Center of Public Health Protection. Food-Based Dietary Guidelines for Adults in Bulgaria. 2006; <http://ncpha.government.bg/files/hranene-en.pdf>. Accessed June 7, 2017.
93. Croatian Dietary Guidelines. <http://www.fao.org/nutrition/education/food-dietary-guidelines/regions/countries/croatia/en/> Accessed June 7, 2017.
94. Cypriot Ministry of Health. Cypriot National Guidelines for Diet and Physical Activity in Children Aged 6-12 Years Old. 2007; <http://www.fao.org/3/a-as674o.pdf>. Accessed June 7, 2017.
95. Danish Ministry of Food Agriculture and Fisheries. [Die officiele Kostrad] 2013; <http://www.fao.org/3/a-as675o.pdf>. Accessed June 7, 2017.
96. Estonian Society of Nutritional Sciences. [Laste ja Noorte Toidusoovitused]. 2009; <http://www.fao.org/3/a-as678o.pdf>. Accessed June 7, 2017.
97. French National Nutrition and Health Programme. [La santé vient en mangeant et en bougeant: Le guide Parents 0-18 ans]. 2011; <http://www.mangerbouger.fr/PNNS/Guides-et-documents/Guides-nutrition>. Accessed June 7, 2017.

98. German Nutrition Society. 10 guidelines of the German Nutrition Society (DGE) for a wholesome diet. 2013; <https://www.dge.de/index.php?id=322>. Accessed June 7, 2017.
99. Hungarian Ministry of Health. [Táplálkozási ajánlások a magyarországi felnőtt lakosság számára felnőtt lak]. 2004; <http://www.fao.org/3/a-as684o.pdf>. Accessed June 7, 2017.
100. Icelandic Directorate of Health. [Ráðleggingar um mataraði: Fyrir fullorðna og börn frá tveggja ára aldri]. 2014; <http://www.landlaeknir.is/servlet/file/store93/item25796/radleggingar-um-mataraedi-2015.pdf>. Accessed June 7, 2017.
101. Irish Department of Health. Healthy Food for Life. 2015; <http://www.healthyireland.ie/wp-content/uploads/2016/12/M9481-Food-Pyramid-Leaflet.pdf>. Accessed June 7, 2017.
102. Israeli Ministry of Health Public Health Services. Moving to a healthy lifestyle. 2008; <http://www.fao.org/3/a-as685e.pdf>. Accessed June 7, 2017.
103. Italian National Research Institute on Diet and Nutrition. [Linee Guida per una Sana Alimentazione Italiana]. 2003; <http://www.fao.org/3/a-as686o.pdf>. Accessed June 7, 2017.
104. Latvian Ministry of Health. [Veselīga uztura ieteikumi zīdaiņu barošanai]. 2008; <http://www.fao.org/3/a-as689o.pdf>. Accessed June 7, 2017.
105. Maltese Health Promotion and Disease Prevention Directorate. Dietary Guidelines for Maltese Adults. 2016; <https://health.gov.mt/en/health-promotion/Documents/library/publications/Dietary%20Guidelines%20for%20Professionals%20final.pdf>. Accessed June 7, 2017.
106. Nordic Council of Ministers. [Anbefalinger om kosthold, ernæring og fysisk aktivite]. 2014; <https://helsedirektoratet.no/Lists/Publikasjoner/Attachments/806/Anbefalinger-om-kosthold-ernering-og-fysisk-aktivitet-IS-2170.pdf>. Accessed June 7, 2017.
107. Polish National Food and Nutrition Institute. Principles of healthy eating. 2010; <http://www.fao.org/nutrition/education/food-based-dietary-guidelines/regions/countries/poland/en/>. Accessed June 7, 2017.
108. Portuguese Health Directorate. [Dia Alimentar]. 2003; <http://www.fao.org/3/a-ax434o.pdf>. Accessed June 7, 2017.
109. Romanian Ministry of Health and Romanian Nutrition Society. Guidelines for a healthy diet <http://www.fao.org/nutrition/education/food-based-dietary-guidelines/regions/countries/romania/en/>. Accessed June 7, 2017.

110. Public Health Authority of the Slovak Republic. 10 Rules of a Healthy Plate. 2014; http://www.uvzsr.sk/en/docs/info/Letak_Zdravy_tanier_EN.pdf. Accessed June 7, 2017.
111. Spanish Ministry of Health and Social Services. Eat healthy and move: 12 healthy decisions. 2005. http://www.aecosan.msssi.gob.es/AECOSAN/docs/documentos/nutricion/educanaos/alimentacion_ninos.pdf
112. Swedish National Food Agency. Find your way to eat greener, not too much and to be active! . 2015; <http://www.fao.org/nutrition/education/food-based-dietary-guidelines/regions/countries/sweden/en/>. Accessed June 7, 2017.
113. Swiss Nutrition Society. Nutrition disk for children. 2016; <http://www.sge-ssn.ch/ich-und-du/essen-und-trinken/von-jung-bis-alt/jugend/>. Accessed June 7, 2017.
114. The FYROM Institute of Public Health. The FYROM Dietary Guidelines. 2014; <http://zdravstvo.gov.mk/vodich-za-ishrana/>. Accessed June 7, 2017.
115. Turkish Ministry of Health. Dietary Guidelines for Turkey. 2006; <http://www.fao.org/nutrition/education/food-based-dietary-guidelines/regions/countries/turkey/en>. Accessed June 7, 2017.
116. Public Health England. Eatwell Guide. 2016; <http://www.fao.org/nutrition/education/food-based-dietary-guidelines/regions/countries/united-kingdom/en/>. Accessed June 7, 2017.

Be a good role model for your children, encouraging healthy eating.

Eat 3 main meals and at least one snack every day. Eat breakfast every day. Drink plenty of water.



Variety of fruits and vegetables everyday.

Milk, yogurt or cheese everyday.

Physical activity everyday

Variety of cereals everyday. Prefer whole grain.

Limit salt and added sugar intake.

Red and/or white lean meat 2-3 times per week. Avoid processed meat.

Olive oil as the main added lipid.

Legumes at least once a week.

4-7 eggs per week.

Fish and seafood 2-3 times per week. Fatty fish at least once a week.

Eat together as a family as frequently as possible. Turn the TV off.

Cook at home healthy and safe food. Choose seasonal products.

Table 1. Recommendations and indicative serving sizes* for the consumption of food items and food groups based on the 2014 Greek Dietary Guidelines for children and adolescents

Age	12 to <24 months	2 to 3 years	4 to 8 years	9 to 13 years	14 to <18 years
Fruits ^a	1 serving per day	1 serving per day	1-2 servings per day	2-3 servings per day	3 servings per day
Vegetables ^b	1 serving per day	1 serving per day	1-2 servings per day	2-3 servings per day	3-4 servings per day
Milk and dairy products ^c	2 servings per day	2 servings per day	2-3 servings per day	3-4 servings per day	3-4 servings per day
Cereals ^d	2 servings per day	3 servings per day	4-5 servings per day	5-6 servings per day	6-8 servings per day
Red and white meat	3-4 servings (serving size: 40-60g) per week	2-3 servings (serving size: 60g) per week	2-3 servings (serving size: 60-90g) per week	2-3 servings (serving size: 90-120g) per week	2-3 servings (serving size: 120-150g) per week
Fish and seafood	2 servings (serving size: 60g) per week	2 servings (serving size: 60-90g) per week	2-3 servings (serving size: 90-120g) per week	2-3 servings (serving size: 120-150g) per week	2-3 servings (serving size: 150g) per week
Eggs	4-7 eggs per week	4-7 eggs per week	4-7 eggs per week	4-7 eggs per week	4-7 eggs per week
Legumes	1-2 servings (serving size: 40-60g) per week	≤3 servings (serving size: 60-90g) per week	3 servings (serving size: 90-120g) per week	>3 servings (serving size: 120-150g) per week	>3 servings (serving size: 150-200g) per week
Added lipids, olives and nuts ^e	1 serving per day	1-2 servings per day	2-3 servings per day	3-4 servings per day	4-5 servings per day
Added sugars ^f and salt ^g	Limit intake	Limit intake	Limit intake	Limit intake	Limit intake
Fluids	5 glasses per day	5 glasses per day	6-7 glasses per day	8-10 glasses per day	10-12 glasses per day
Of them Water	3-4 glasses per day	3-4 glasses per day	4-5 glasses per day	6-8 glasses per day	8-10 glasses per day

* *The nutritional needs of children and adolescents may differ according to sex, physical activity level and stage of development*

^a 1 serving corresponds to 120-200g of fruit or 125 ml fresh fruit juice without added sugars

^b 1 serving corresponds to 150-200g of raw or cooked vegetables

^c 1 serving corresponds to 150ml milk or 200g yoghurt or 30g hard cheese or 60g soft cheese

^d 1 serving corresponds to 1 slice of bread, or 120ml cooked rice or pasta, or 120-150g of cooked potatoes

^e 1 serving corresponds to 15ml olive oil or vegetable oil, 15ml margarine or butter, or 10-12 olives

^f Avoid consumption of sweetened beverages, soft drinks, and fruit juices with added sugars

^g For table salt, it is recommended that infants aged 1-3 years old consume <2g/day, children aged 4-6 years old consume <3g/day, and children and adolescents aged 7-18 years old consume <5g/day

Suppl. Table 1. Comparison of national dietary recommendations for children and adolescents from WHO European Region countries

Country	Age	Total fat	Fruits and Vegetables	Starches, Cereals and Grains		Milk and Dairy Products	Proteins (including red and processed meats)		Physical Activity	Pictorial depiction
				Total Carbohydrates	Whole Grains		Proteins	Red & Processed Meats		
Albania ⁽⁸⁹⁾	4-18 y	6-12 y: 25-35% daily energy intake	4-6 y: 250 g fruit/d and 200 g vegetables/d 13-18 y: 2-3 portions fruit/d, 2-3 portions vegetables/d	4-6 y: bread 100-150 g/d, potatoes 150 g/d, pasta, rice 80 g/d 13-18y: 3-4 portions	priority to integral products	4-6 y: 500 mL milk/yogurt, 25-30 g cheese 13-18 y: 2-3 portions	4-6 y : 50-80 g/wk 13-18 y: meat <360g/wk, 100g/wk fish, 2-3 eggs/wk, 60 gr legumes/wk	Limit processed meat	3-18 y: 60 min/d	Food Pyramid (4 levels, 6 food groups)
Andorra	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Armenia	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Austria ⁽⁹⁰⁾	Dietary guidelines for adults are provided.									
Azerbaijan	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Belarus	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Belgium ⁽⁸⁶⁾	3-18 y	Limit intake and prefer a variety of sources	5 times/day, in every meal	in every meal	Prefer whole grains	2-3 times/day, of which 1 should be cheese	1-2 times/day	-	30 min/d	Food Pyramid (6 levels, 8 food groups)
Bosnia and Herzegovina ⁽⁹¹⁾	Dietary guidelines for adults are provided.									
Bulgaria ⁽⁹²⁾	Dietary guidelines for adults are provided.									
Croatia ⁽⁹³⁾	7-15 y	Guidelines regarding the type of fat	5 serv/d	in every meal	-	0,5L milk or dairy products	fish: 2 times/week	-	60 min/d	Food Pyramid (4 levels, 4 food groups)
Cyprus ⁽⁹⁴⁾	6-12 y	Eat modestly	Fruits: 2-4 serv/d Vegetables: 3 servings/d	6-9 servings/d	-	2-3 serv/d	2-3 servings/d (150-180gr)	-	Recommendations for PA promotion	Food Pyramid (4 levels, 5 food groups)

Czech Republic Denmark ⁽⁹⁵⁾	NA >3 y	NA Limit saturated fat intake. Guidelines regarding the type of fat	NA 600 g/d of fruits and vegetables	NA -	NA 75 g/d	NA 250- 500 mL/d milk products 25g/d lean cheese	NA Red meat: 500 gr/week Fish: at least 2 times/week (350g/wk)	NA 500 g/wk, limit processed meat	NA -	NA Food plate model
Estonia ⁽⁹⁶⁾	General population including children and adolescents	Increase the consumption of nuts and seeds.	5 servings of vegetables and fruits/d	Everyday	Prefer whole grains	Consume unsweetened milk and milk products.	Red meat: 1/3 of all meat. Fish up to 3 times/week	Limit processed meat	>60 min/d	Food Pyramid (6 food groups)
Finland ⁽⁸⁴⁾	General population including children and adolescents	Prefer the good fats	≥ 500 g/d fruits and vegetables	Prefer whole grain	25-35 g/d dietary fiber	Dairy:5-6 dl/day, 2-3 slices of low fat cheese/day	Fish:2-3 serv/week	≤ 500 g/wk	150 min/wk (moderate activity) 75 min/wk (brisk activity)	Food Pyramid (6 levels, 9 food groups) and Food plate model
France ⁽⁹⁷⁾	3-18 y	moderation and variety	≥ 5/d	in every meal	-	3/d	1-2 times/d, variety fish >2 times/week avoid processed meat	-	30-60 min/d	-
Georgia Germany ⁽⁹⁸⁾	NA General population including children and adolescents	NA Eat small quantities of fat and high-fat foods.	NA 5 servings of fruits and vegetables/d	NA Eat plenty of cereals, preferably wholegrain, and potatoes	NA ≥ 30 g/d dietary fiber	NA Eat milk and dairy products every day	NA Eat fish once or twice a week; and meat, sausages and eggs in moderation.	NA White (not red) meat recommended	NA 30-60 min/d	NA Nutrition circle (7 food groups)

Hungary ⁽⁹⁹⁾	Dietary guidelines for adults are provided.										
Iceland ⁽¹⁰⁰⁾	> 2 y	-	5 servings fruits & vegetables/d (500 g/d)	-	Whole grains at least 2 times/d	500 ml/d dairy products or 25 g/d of cheese	Fish 2-3 times/week Meat in moderation	Red meat <300-600g/wk	Red meat <500 g/wk, Limit processed meat	-	Food circle (6 groups) and Food plate model
Ireland ⁽¹⁰¹⁾	>5 y	In very small amounts	5-7 serv/d	>5 y: 3-5 serv/d, up to 7 serv/day for teenage boys	Consume wholemeal cereals	5-8 y: 3 serv/d 9-18 y: 5 serv/d	2 serv/d Oily fish, up to twice/wk	Limit processed meat	60 min/ d	Food pyramid (6 levels, 6 food groups)	
Israel ⁽¹⁰²⁾	6-18 y	-	5-7 serv/day	-	Prefer whole grains	>3 serv/day	2 total day, 1 serv meat or poultry/d 1-2 serv/d Eggs 2-4 times/wk	-	60 min/d	Food Pyramid (6 levels, 6 food groups) No	
Italy ⁽¹⁰³⁾	>6 y	3-4 serv/d	5 serv/d Vegetables: 2 serv/d, fruits: 3-4 serv/d	Bread: 3-6 serv/d, bakery products: 1-2 serv/d, pasta/rice: 1-2 serv/d, potatoes: 1-2 serv/wk	Prefer whole grains	Milk/yoghurt: 3 serv/d Cheese: 2-3 serv/wk	1-2 serv/d Eggs 2-4 times/wk	Avoid red and processed meat	>60 min/d	No	
Kazakhstan	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Kyrgyzstan	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Latvia ⁽¹⁰⁴⁾	2-18 y	≤ 35% of total energy intake	every day	in every meal	-	every day	Fish 2 times/wk	-	-	Food pyramid (6 levels, 6 food groups)	
Lithuania	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	

Luxembourg ⁽⁸⁷⁾	General population including children and adolescents	≤ 35% of total energy intake	≥5 serv/d of fruits and/or vegetables	Every meal, ≥3 times/d	-	≥3 serv/d	Meat, poultry, fish, eggs: 1-2 times/d Fish: ≥2t/week	Limit processed meat	30 min/d	Food pyramid (6 levels, 8 food groups)	
Malta ⁽¹⁰⁵⁾	Dietary guidelines for adults are provided.										
Monaco	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Montenegro	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Netherlands* ⁽⁸⁸⁾	-	-	Vegetables:10 0-150 g/day fruits: 1.5 serv/day	-	2-4 slices of whole grain bread/day, 2-3 serving spoons of whole grain cereal or 2-3 potatoes/day	70-90g whole grains/d, dietary fiber 2-3 g/d/MJ	2 portions of dairy and 20 g cheese daily	Fish/legumes/meat: 1 serv/d	-	Pie (5-8 food groups)	
Norway ⁽¹⁰⁶⁾	>1 y	Guidelines regarding the type of fat 25-40% total energy intake _m	5 serv/d	-	-	-	-	Fish: 2-3 times/week, 300-450g/week	Limit red and processed meat, <500g/week	60 min/d	No
Poland ^{‡ (107)}	-	-	-	-	-	-	-	-	-	Yes	Food Pyramid (5 food groups)
Portugal ⁽¹⁰⁸⁾	>1 y	1-3 serv/d	Vegetables 3-5 serv/d, Fruits: 3-5 serv/d fruits	4-11 serv/d	-	2-3 serv/d	1.5-4.5 serv/d	-	-	Yes	Food Wheel (7 groups)
Republic of Moldova	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Romania ⁽¹⁰⁹⁾	General population	-	Vegetables: 3-4 serv/d	6-11 serv/day	-	2-3 serv/day	2-3 serv/day, emphasizing the	-	> 30 min/day	Food Pyramid (5 levels, 7 food groups)	

			Fruits: 2-4 serv/d				importance of eggs for children			
San Marino	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Serbia	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Slovakia ⁽¹¹⁰⁾	NA	Guidelines regarding the type of fat	1/3 of total daily consumption.	NA	Prefer whole grains	2 portions of milk or dairy products	Variety of proteins	-	30 min/d	Healthy plate (4 food groups)
Slovenia ⁽⁸⁵⁾	>2 y	-	Fruits: 150-250 g/d; Vegetables: 250-400 g/d	9-17 units/d (1 unit = half slice of bread)	-	2-4 servings/d	3-5 servings/day Poultry: 1-3 times/wk >1 time/week oily fish	Red meat: 2-3 times/wk Limit processed meat	60 min/d	Food Pyramid (6 levels, 8 food groups) and Healthy Plate (5 categories) and examples of main meals
Spain ⁽¹¹¹⁾	3-16 y	<30% daily energy intake	5 portions of fruits and vegetables/d	-	>25g/d dietary fiber	>500 mL/d	Protein from various sources, prefer fish and oily fish, <4-5 eggs/d	-	Yes	Food Pyramid (3 levels)
Sweden ⁽¹¹²⁾	>2 y	-	≥ 500 g/d fruits and vegetables	-	Switch to wholemeal	2-5 dL/d milk, or fermented milk	Fish: 2-3 serv/w	<500 g/wk, only a small amount should be processed meat	>30 min/d	Keyhole symbol
Switzerland ⁽¹¹³⁾	4-12 y	20 g/d vegetable oil, 20g/d nuts.	2 servings of fruits and 3 of vegetables/d (serving size increases with age)	3-4 serv/d (serving size increases with age)	Prefer whole grains	3-4 serv/d (serving size increases with age)	4-6 y: 50 g/d 7-9 y: 75 g/d 10-12 y: 90 g/d	-	-	Nutrition disk (5 food groups)
Tajikistan	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

The Former Yugoslav Republic of Macedonia ⁽¹¹⁴⁾	>2 y	1-3 y: 30-40% daily energy intake 4-18 y: 25-35% daily energy intake Guidelines regarding the type of fat	>400 g of various fruits and vegetables/d >500 g/d fruits and vegetables	45-65% daily energy intake	At least half of the intake should be from whole grain cereals	2-3 y: 450-500 mL/d 4-18 y: 600mL/d skimmed milk and low-fat dairy products	2-3 y: 5-20% daily energy intake 4-18 y: 10-30% daily energy intake	-	5-17 y: >60 min/d	-
Turkey ⁽¹¹⁵⁾	Children and adolescents	4-18 y: 25-35% daily energy intake	Fruits and vegetables: 5 serv/day, at least 2 green leaf/citrus	1-18 y: 50-60% daily energy intake	Consume whole grain cereal	3-4 serv/d	4-18 y: 2 serv/day Fish: 2 times/week Egg: 1 serv/day	-	- General recommendations, no specific duration	4-leaf clover (4 food groups)
Turkmenistan United Kingdom ⁽¹¹⁶⁾	NA >2 y	NA Guidelines regarding the type of fat	NA 5 portions/d	NA Base of every meal	NA Choose whole grain versions where possible	NA -	NA 2 portions (2*140 g/wk) fish	NA Red and processed meat <70 g/d	NA -	NA Eatwell Guide (6 food groups)
Uzbekistan	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA: Not applicable

Serv/d: Servings per day

* in Polish, detailed guidelines could not be extracted

*Personalized guidelines are provided – Data presented here are for a 6-year old

