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Science & Technology in childhood Obesity Policy



Science and Technology in
childhood Obesity Policy

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D4.4 - Report on Food-EPI implementation in selected EU countries

Policy implementation and priorities to create healthy food environments across six European Union countries using the healthy food environment policy index (FOOD-EPI)

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Abbreviation	Definition
Food- EPI	Health food environment policy index
NCDs	Non communicable diseases
EU	European Union
INFORMAS	International Network for Food and Obesity / Non-communicable Diseases (NCDs) Research, Monitoring and Action Support
FOPL	Front-of-pack labeling
UPF	Ultra-processed foods



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2 Executive Summary

This STOP deliverable (D4.4) reports on Food-EPI implementation in selected EU countries. The deliverable is for task 4.5: Assessment of government fiscal and regulatory policy implementation in comparison with international best practice. This task is based on the INFORMAS framework using the Healthy Food Environment Policy Index (Food-EPI), aimed at assessing the extent of government policy implementation on food environments in comparison with international best practice. The Food-EPI tool was adapted specifically for the European context with the support of the STOP network of national public health agencies.

Food environments have been recognised as highly influential on dietary behaviours. They represent the link between the food system and the population as the physical, economic, policy, and sociocultural surroundings, opportunities and conditions that influence people's food choices and nutritional status. Government policies have the potential to create healthy food environments to support the promotion of healthy diets. This study aimed to evaluate food environment policies in a selection of European Union (EU) countries (N=6) and to prioritise actions to create healthy food environments.

The Healthy Food Environment Policy Index (Food-EPI), developed by the International Network for Food and Obesity, NCDs Research Monitoring and Action Support (INFORMAS) was adapted to the EU context and used to evaluate the level of food environment policy implementation compared to best practice in Estonia, Finland, Italy, Portugal, Slovenia, and Spain in 2020-21. Evidence on the extent of implementation of all good practice food environment related policies, as well as infrastructure support for policy development and implementation was compiled in each country and validated by government officials. National experts were asked to evaluate the level of implementation for the good practice policies and infrastructure support indicators at the national level, compared to international best practices. Workshops were then convened to identify actions and prioritise those according to importance and achievability criteria.

Finland and Portugal had the highest proportion of policies on food environments (32% and 29% respectively) rated at the level of international best practice. Slovenia, Spain, and Estonia had the highest proportion of policies rated at very little if any implementation (42%, 25% and 21% respectively). *Food retail, labelling, prices and marketing policies, funding, platforms for interaction, and health in all policies*, were identified by experts as the most important gaps across the EU countries. Experts recommended immediate action to implement standards for nutrients of concern in processed foods, improve school food environments, provide subsidies for fresh fruit and vegetables, unhealthy foods and beverages taxation, and regulate unhealthy food marketing to children.

There is vast potential in EU countries to improve policies and infrastructure support to create healthy food environments, and thus immediate action on this is urgently required to help address the burden of obesity and NCDs in EU countries.



3 Introduction

More than half (53%) of the European adult population live with overweight or obesity¹. The obesity epidemic is a major public health concern, and increases the risk of non-communicable diseases (NCDs), such as cardiovascular disease, type-2 diabetes, hypertension, and some types of cancer, and mental health problems². It also has substantial direct and indirect costs that on healthcare systems and social resources³.

Obesity is a multifactorial and preventable disease⁴. Dietary intake is one of the many root causes of obesity. Unhealthy dietary patterns, rich in sugar, saturated fat, and salt (e.g., ultra-processed foods), and low in fruits, vegetables, pulses, nuts, and whole grains have been linked to a higher risk of obesity and NCDs⁵. In Europe, 36% of the population do not consume the recommended intake of fruits and vegetables per day whilst sugar, saturated fat, salt, and total energy intake surpass the daily intake recommendations⁶. However, dietary behaviours are not merely the result of individual decisions but result from a myriad of factors that are strongly influenced by the food environment⁷.

The food environment is the link between the food system and people's food choices. It can influence populations' food preferences, dietary patterns and habits, and health status throughout the life course. It encompasses people's surroundings in terms of structure (food availability, accessibility, quality, marketing), economy (food affordability), politics (subsidies and regulations), sociocultural (norms and beliefs), opportunities and conditions⁸. Growing access to obesogenic food environments in Europe and globally has been associated with unhealthy diets and the ongoing increasing risk of obesity and non-communicable diseases.

Lower-income populations have been observed to have reduced access to affordable and healthy foods which may contribute to unhealthy dietary patterns and a higher risk of obesity and NCDs^{10,11}. Despite the commitment to address this issue as part of the European Food and Nutrition Action Plan 2015–2020, health inequities across Europe continue to widen and have been further exacerbated by the COVID-19 pandemic¹².

Over the past two years, food supply chains have been disrupted, affecting dietary patterns in particular where healthy food environments and policies to promote them are not in place. The World Health Organization has emphasised the importance of monitoring and benchmarking food environments and policies around the globe to improve the food environment and reduce the prevalence of obesity and NCDs¹³. The International Network for Food and Obesity/Non-communicable Diseases Research, Monitoring and Action Support (INFORMAS)⁸ has developed the Healthy Food Environment Policy Index (Food-EPI) as a tool and process for national governments to assess their policies, identify and prioritise policy and infrastructure support actions for the creation of healthy food environments⁸.

National governments are the stakeholders with the greatest capacity to modify food environments and population diets^{14,15}. Effective government policies and regulatory actions on the food industry are essential to coordinate efforts to support the consumption of healthy diets and to reduce the physical, psychosocial, and economic burden of NCDs¹⁵. Due to the rising prevalence of obesity, some states and national governments have taken action to improve the healthiness of food environments. The progress of food environment policies in other countries can serve as best practice examples or benchmarks for other countries to learn lessons from and improve their food environments.



However, despite the global recognition of the influence of the food environment on dietary intake and the impact on health outcomes, slow, siloed and insufficient government action limit food environment improvements¹⁵.

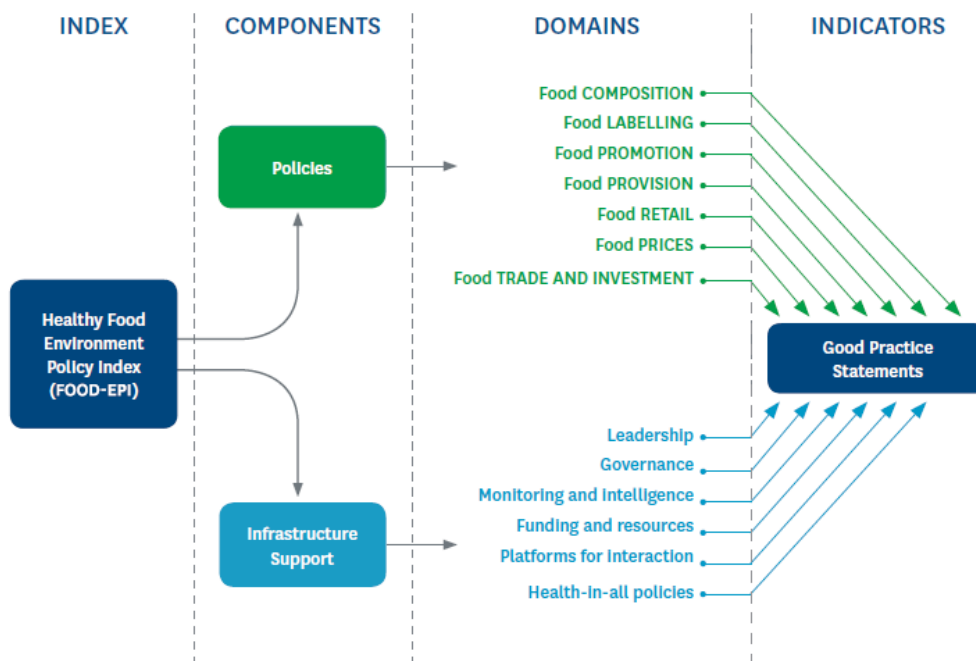
In the EU, Article 168 of the Treaty on the Functioning of the European Union states that a high level of human health protection shall be ensured in the definition and implementation of all EU policies and activities^{7,16}. In addition, the Farm to Fork Strategy¹⁷ and the WHO European Food and Nutrition Action Plan 2015-2020 indicates that more ambitious food environment-related policies are required for countries to achieve global nutrition targets (e.g., policies for front-of-package labelling, restrictions on marketing of unhealthy foods)¹². However, there is a lack of evidence on the level of implementation of food environment policies across Europe. In addition, there is insufficient knowledge on how countries across Europe could improve their food environments. Therefore, this study aimed to identify and assess the level of implementation of food environment policies and infrastructure support and to determine required actions and their priorities to create healthy food environments in European countries⁷.

This STOP deliverable (D4.4) reports on Food-EPI implementation in selected EU countries. The deliverable is for task 4.5: Assessment of government fiscal and regulatory policy implementation in comparison with international best practice. This task is based on the INFORMAS framework using the Healthy Food Environment Policy Index (Food-EPI), aimed at assessing the extent of government policy implementation on food environments in comparison with international best practice. The Food-EPI tool was adapted specifically for the European context with the support of the STOP network of national public health agencies.

4 Methods

The level of implementation of food environment policies and infrastructure support was assessed, and key government recommendations were identified and prioritized in Estonia, Finland, Portugal, Slovenia, Italy and Spain. The established Food-EPI tool and process was the framework that guided this study.

The Food-EPI tool includes seven policy domains that represent key aspects of food environments— *food composition, food labelling, food promotion, food prices, food provision, food retail, and food trade and investment*) In addition, the Food-EPI tool encompasses six infrastructure support domains— *leadership, governance, funding, and resources, monitoring and intelligence, platforms for interaction and health-in-all-policies*). The domains contain a total of 50 good practice indicators that incorporate the directions necessary to improve the healthiness of food environments and to help prevent obesity and diet related NCDs.



Components and domains of the Healthy Food Environment Policy Index (Food-EPI)

To implement Food-EPI a process of different steps was undertaken.

Firstly, the Food- EPI was adapted to the European context and the context of Estonia, Finland, Portugal, Slovenia, Italy and Spain. The domains of *trade* and some aspects of *labelling* were disregarded as they fall under EU jurisdiction. Evidence on the implementation of food environment-related policies was collected and verified by national governmental officials.

Key stakeholders including academics, government officials and non-governmental organisations (NGOs) assessed the implementation of food environment policies at the national level. The overall process was conducted between 2020-2021. A mixed-methods design was used to obtain the ratings on the level of implementation of policies and infrastructure support and to identify and prioritise concrete actions towards healthy food environments in the participating European countries.



4.1 National expert panels

Expert panels were created with individuals specialising in public health, nutrition, food- or health policy, obesity or chronic diseases. They were invited to participate in an online rating survey, and workshops to identify recommendations and their level of priority. All experts consented to take part in the panel and declared the existence of potential conflicts of interest. Representatives from industry were excluded in the Food-EPI process except in Finland, where the Finnish Food and Drink Industries' Federation and Finnish Grocery Trade Association participated in the workshops. Appendix 1 includes the organisations of the experts who consented to include this information. Ethics approvals were carried out independently by each participating country (Appendix 2).

4.2 Evidence compilation and verification

For each country, a document on the current extent of implementation of all good practice policy and infrastructure support indicators across the 13 policy and infrastructure support Food-EPI domains was prepared.

Information was compiled from publicly available information (e.g. annual reports, press-release statements, policy documents, and budgets retrieved from websites), direct communication with organisations/government officials, and/or through Freedom of/Access to Information requests. A broad view of relevant evidence was taken, so as to include, among others, regulations and legislation; policy briefs or proposals under consideration; evidence of commitments from government to explore policy options; reports on the evaluation of policies or monitoring food environments, consumption, and/or obesity and NCDs; allocation of responsibility to an individual or team; establishment of steering committees, working groups or expert panels; reviews, audits, scoping studies, or consultation processes undertaken; and regulatory, economic, or health impact assessments. For each of the good practice indicators, evidence for the existence and degree of implementation of policies was collected by the local team of researchers for each of the participating countries. All policies identified at the national level with a potential influence on food environments were summarized into an evidence document for each country. This document was verified for completeness and accuracy by local governmental officials.

4.3 Rating the extent of implementation compared with international best practices

Experts rated the level of implementation of the identified policies for each indicator. Before rating each indicator, the experts were provided with instructions and the evidence document.

In the online rating survey, experts were asked to benchmark the implementation the 26 policy and 24 infrastructure support indicators against international best practices using a five-point Likert scale. For each indicator, they indicated whether 'the level of implementation for the policy or infrastructure support was 1= very low, 2= low, 3= moderate, 4= high, 5= very high compared to best practice. There was also a 'cannot rate' option.

The mean score on each indicator was calculated and used to determine the level of implementation of policies with respect to the 50 policy and infrastructure support indicators.

4.4 Action and prioritisation workshops

One or more workshops were organized by the EU countries where experts were asked to formulate recommendations for governments on priority policy and infrastructure support domains in their



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countries. The proposed actions of the experts were compiled and prioritisation according to their importance and feasibility was undertaken by experts.

They were asked to consider the relative need, impact, effects on equity, and any other positive and negative effects of the action when rating “importance”. They were also asked to consider the relative feasibility, acceptability, affordability, and efficiency of the action when rating “achievability”.

4.5 Data analysis

Descriptive statistics were carried out to analyse expert response rates to the level of policy and infrastructure support implementation in the participating countries. Response rates were assessed in Excel and Inter-rater reliability was measured through the Gwet AC2, for the Food-EPI rating process.



5 Results

5.1 Characteristics of experts and response rates across countries

The expert panels across the countries were varied, with individuals from academia (12% to 43%), NGO and other organisations (30% to 52%), policy experts (5% to 56%). These results are presented in Table 1. Response rates of experts varied considerably, between 20% (Estonia) and 66% (Portugal) for the online rating exercise, and between 20% (Estonia) and 56% (Spain) for the actions and prioritisation exercises.

Country	Year	N experts invited	response rate ratings	N (%) academia	N (%) NGO & other org	N (%) policy experts	Response rate actions	Response rate prioritization
Finland	2020	57	34 (59,6%)	12%	32%	56%	24 (42,1%)	29 (50,9%)
Estonia	2020-21	46	9 (19,6%)	30%	52%	17%	9 (19,6%)	9 (19,6%)
Italy	2021	30	12 (40,0%)	58%	42%	0%	12 (40%)	12 (40%)
Slovenia	2021	70	19 (27,1%)	27%	30%	43%	21 (30,0%)	21 (30,0%)
Spain	2021	50	31 (62,0%)	36%	52%	12%	28 (56,0%)	28 (56,0%)
Portugal	2021	32	21 (65,6%)	43%	52%	5%	15 (47%)	13 (41%)

Table 1 Characteristics of expert panels across European countries implementing the Healthy Food Environment Policy Index (2020-2021)

5.2 Level of implementation of policies on food environments and infrastructure support for policy development and implementation

The inter-rater reliability, measured through the Gwet AC2, for the Food-EPI rating process was lowest in Slovenia (0.29; 95%CI=0.17-0.40), followed by Portugal (0.40; 95%CI=0.29-0.50), Italy (0.44 (95%CI=0.25-0.63), Finland (0.45; 95%CI=0.35-0.55), Spain (0.49; 95%CI=0.39-0.59), and Estonia (0.52; 95%CI=0.39-0.64) (data not shown). The percentage of missing ratings on the level of implementation varied between 1.3% (Finland) and 12.2% (Italy) (data not shown).

Finland and Portugal were the countries with the highest proportion of policies on food environments at the level of international best practice (32% and 29% respectively) whilst Estonia and Spain had the lowest proportion of policies on food environments at the level of international best practice (2% and 4% respectively). Slovenia, Spain, and Estonia had the highest proportion of policies rated at very low if any implementation (42%, 25% and 21% respectively) and Italy had the highest rating for policies at a medium level of implementation (10%) (Figure 1).

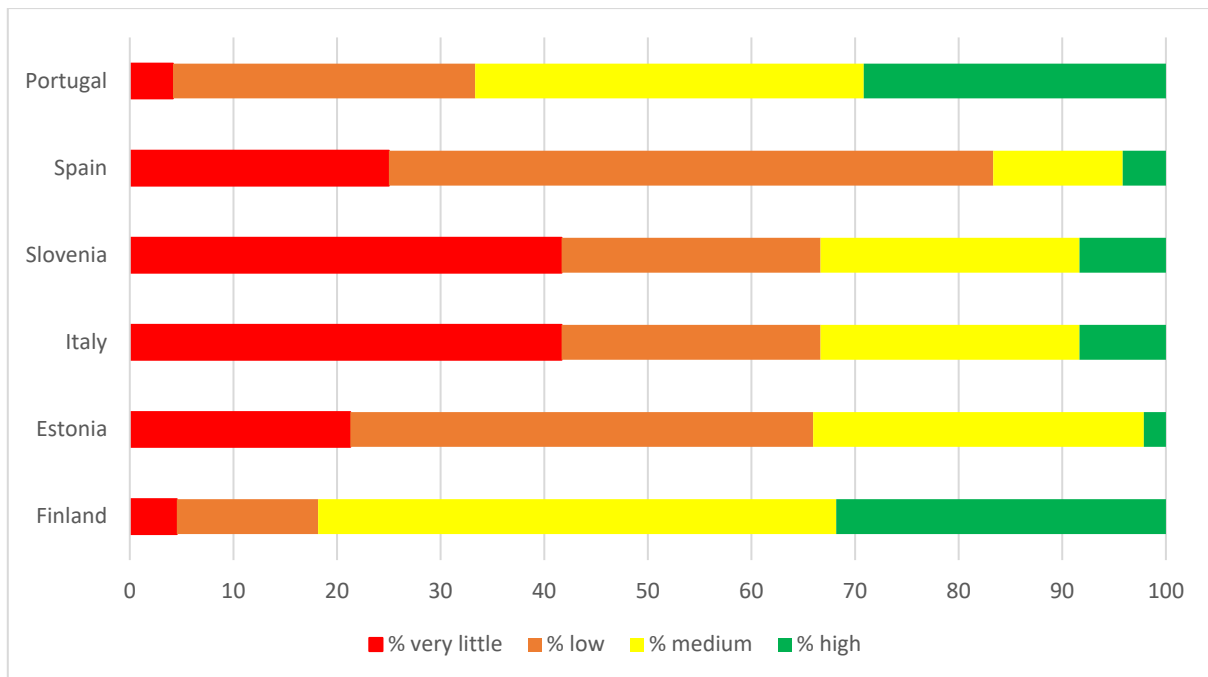


Figure 1. Percentage of good practice policy indicators at different levels of implementation across six European countries using the Healthy Food Environment Policy Index

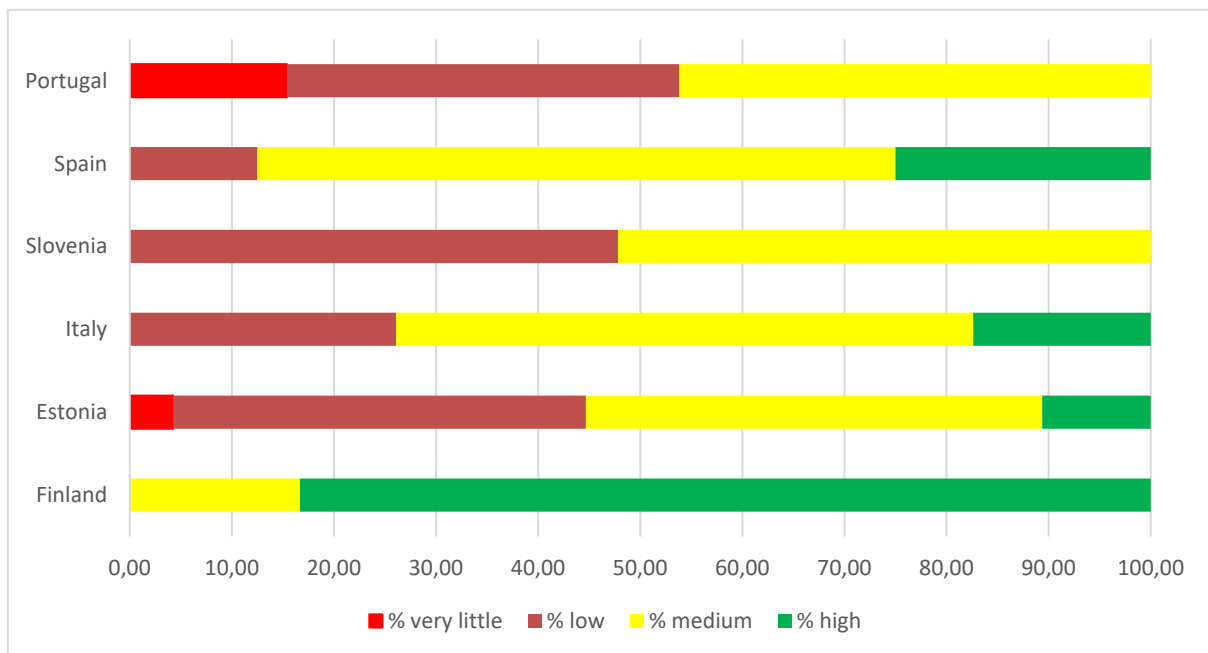


Figure 2. Percentage of good practice infrastructure support (below) indicators at different levels of implementation across six European countries using the Healthy Food Environment Policy Index

Finland had the highest proportion of infrastructure support indicators rated at a high level of implementation (83%), and Italy had the highest level of infrastructure support indicators rated at a



medium level of implementation. The majority of the assessed countries (4/6) did not have any good practice indicators implemented at a very low level (Figure 2).

Across the six policy domains (Table 2), *food composition* was rated at high implementation across two out of six countries, *food labelling* was rated at low implementation across all six countries, and *food marketing* was rated at low implementation in three countries and medium implementation in three countries. The policy domain of *food prices* was rated at medium implementation in Portugal and Finland but low or very low if any implementation in the other four countries. The policy domain of *food provision* was rated at high implementation in Finland whilst medium or low implementation across the other countries (Table 2). Across most of the infrastructure support domains across the six countries, implementation compared with the best practice was rated medium. Both Portugal and Finland rated leadership at high implementation whilst Finland also rated the implementation of most of the other infrastructure support domains (apart from *funding*) as high.

	Finland	Estonia	Slovenia	Spain	Portugal	Italy
Policies						
Food composition	HIGH	LOW	MEDIUM	LOW	HIGH	LOW
Food labelling	LOW	LOW	LOW	LOW	LOW	LOW
Food marketing	MEDIUM	LOW	MEDIUM	LOW	MEDIUM	LOW
Food prices	MEDIUM	LOW	VERY LOW	LOW	MEDIUM	LOW
Food provision	HIGH	MEDIUM	MEDIUM	LOW	MEDIUM	MEDIUM
Food retail	MEDIUM	LOW	VERY LOW	VERY LOW	LOW	LOW
Infrastructure Support						
Leadership	HIGH	MEDIUM	MEDIUM	MEDIUM	HIGH	MEDIUM
Governance	HIGH	MEDIUM	MEDIUM	LOW	MEDIUM	MEDIUM
Monitoring	HIGH	MEDIUM	MEDIUM	MEDIUM	MEDIUM	MEDIUM
Funding	MEDIUM	MEDIUM	MEDIUM	LOW	LOW	LOW
Platforms	HIGH	LOW	MEDIUM	LOW	MEDIUM	VERY LOW
Health in all policies	HIGH	MEDIUM	MEDIUM	LOW	LOW	LOW

Table 2 Overall level of implementation of different policy and infrastructure support domains across EU countries using the Healthy Food Environment Policy Index

5.3 Priority actions to create healthy food environments

Across policy and infrastructure support domains, the total number of actions prioritised varied from 5 in Spain, 10 in Slovenia, 10 in Portugal, 11 in Estonia, to 18 in Finland, Italy 5 (Table 3). Across the 60 actions, 11 were for food provision, 8 were for food promotion, 5 for food composition, 4 for food labelling, 7 for food prices and 4 for food retail. Regarding infrastructure domains, 6 were for funding, 4 for governance, 4 for leadership, 5 for monitoring and 1 for platforms for interaction (Table 3). For all countries most of the prioritised policy actions were for indicators that were rated at either

low (20-33%) or medium (20-67%) level implementation. Slovenia, Estonia, and Portugal (20-40%) also proposed some actions for indicators that were already rated at the level of best practice (Figure 3). Similar results were found for the priority actions related to infrastructure support across countries (Figure 4).

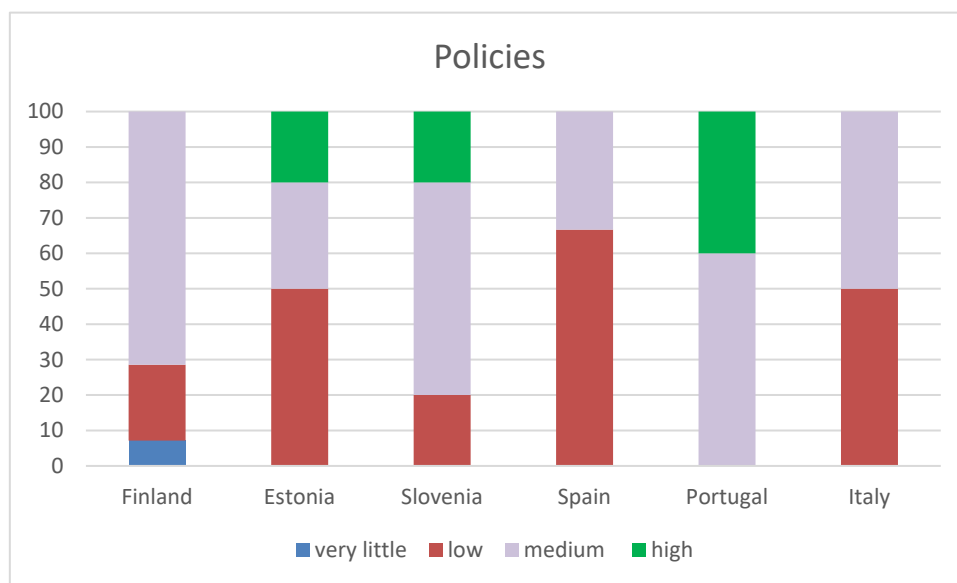


Figure 3. Proportion of priority actions for policy indicators rated at different levels of implementation using the Healthy Food Environment Policy Index

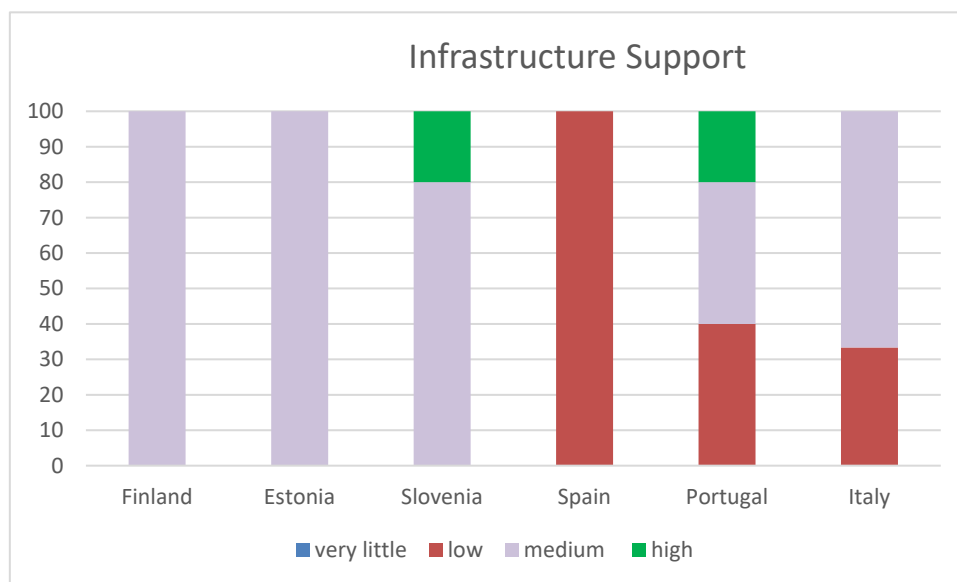


Figure 4. Proportion of priority actions for infrastructure support indicators rated at different levels of implementation using the Healthy Food Environment Policy Index



Country	Domain	Priority action	Implementation level
SLOVENIA	Labelling	Defining and adopting clear symbols for the labelling of quality food, for a better understanding of consumers	LOW
	Provision	Maintaining and upgrading school nutrition	MEDIUM
	Provision	Introduction of food subjects in secondary schools	MEDIUM
	Provision	Improving the situation on student nutrition (new guidelines, vouchers)	HIGH
	Provision	Employment, training and education of staff in public institutions in the field of nutrition	MEDIUM
	Leadership	Composition and publication of FBDG (Nutrition Guidelines) for Slovenia	MEDIUM
	Governance	Strengthening communication with the public	MEDIUM
	Governance	Improving the communication platform	MEDIUM
	Platforms	Improving cooperation mechanisms	MEDIUM
	Monitoring	Improving the monitoring of body weight, especially of adolescents and adults	HIGH
SPAIN	Composition	Current standards require improvement. According to the WHO criteria should be more ambitious and be aligned to products that are most consumed and available in Spain and according to their nutritional information. Monitoring of the progress in the establishment of these standards should be carried out.	MEDIUM
	Labelling	To implement a clear mandatory front of pack labelling system.	LOW
	Promotion	To implement plain packaging policies and ban the use of cartoons or celebrities as well as food endorsement for unhealthy foods.	LOW
	Leadership	Mandatory industry regulation should be established as current strategies are based on voluntary regulations which have not worked.	LOW
	Monitoring	To develop monitoring systems for the monitoring of food composition and promotion of unhealthy foods in the media.	LOW
ESTONIA	Promotion	Restricting the advertising of products high in saturated fat, sugar and energy content through different media and settings	LOW
	Promotion	Raise the awareness on nutrition of companies ordering advertising.	LOW
	Promotion	Promote the advertising of healthy food options, in particular raw materials like fresh fruit and vegetables	LOW



Country	Domain	Priority action	Implementation level
	Provision	Scientific support for service procurement for out of home service providers	HIGH
	Provision	Provide and ensure healthy children's menus at schools and kindergartens	MEDIUM
	Provision	Modification of school education system to introduce nutrition subjects	HIGH
	Provision	Training client servants on nutrition	MEDIUM
	Provision	Ensure the provision and sale of healthy drinks for children	MEDIUM
	Prices	Implementation of tax policies that support healthy food choices	LOW
	Retail	Support and incentivize businesses to improve availability, placement, and prominence of healthy foods in stores and services	LOW
	Funding	Provide campaigns, practical guidelines, tools, training, and instructions to support healthy food choices by the public	MEDIUM
FINLAND	Composition	Making the nutritional quality of a meal a requirement for a tax-subsidized lunch or food benefit.	MEDIUM
	Labelling	Exploring the possibility of introducing a national mandatory labelling system for packaged foods on the front of the food packaging, indicating the nutritional value of the product.	LOW
	Labelling	Exploring the possibility of introducing a mandatory national (the Heart Symbol or similar) nutrition labelling system in fast food restaurants to communicate nutritionally better meal options.	VERY LOW
	Promotion	Exploring the possibilities for national legislation and enforcement of such legislation and self-regulation regarding the marketing of unhealthy foods to children. Prohibiting the marketing of unhealthy foods and beverages to children by law.	MEDIUM
	Promotion	Investigating children's exposure to the marketing of unhealthy foods in the digital environment.	MEDIUM
	Promotion	Adding the use of minimum nutritional quality requirements as a procurement criterion in the supplement of the state contribution of the promotion of well-being and health used for municipalities and provinces. Investigating children's exposure to the marketing of foods in certain environments.	MEDIUM
	Promotion	Monitoring children's exposure to the marketing of unhealthy foods in different operational environments.	MEDIUM
	Prices	Exploring fiscal measures and other measures that would allow the price of vegetables to fall.	MEDIUM
	Prices	Introducing a health-based taxation on food/foodstuff.	LOW



Country	Domain	Priority action	Implementation level
	Prices	The development of a holistic and health-promoting nutrition is considered in research funding priorities.	MEDIUM
	Prices	Integrating a nutrition guidance and low-threshold lifestyle groups into service activities provided by social services and non-profit organizations. Taking the financial possibilities for healthy eating into account in families with children when assessing the need for social benefits.	MEDIUM
	Retail	Restricting the sale and supply of unhealthy foods by legislative means in the living environment of young people and children, such as at school and in hobbies.	LOW
	Retail	Developing recommendations and guidelines for grocery stores to create a selection environment conducive to health-promoting choices, for example through product placement and presentation.	MEDIUM
	Retail	Encouraging the food industry and public / private food service operators to improve the nutritional quality of their products by adopting the use of Heart Symbol. Exploring the possibilities of making the Heart Symbol system free of charge for users. Clarifying the legislation regarding the criteria for free school and student meals so that it would be mandatory to take nutrition recommendations into account.	MEDIUM
	Governance	Interfering the lobbying in the food environment.	MEDIUM
	Monitoring	Launching a national nutrition monitoring for children and young people.	MEDIUM
	Funding	Funding the research of monitoring the implementation of nutrition recommendations and research related to it.	MEDIUM
	Funding	Investing in long-term sustainability in funding systems for research on the food environment and non-communicable diseases.	MEDIUM
PORTUGAL	Composition	Extend the plan in force in Portugal regarding the food products reformulation, involving in particular the food service outlets. This plan should encompass the definition of short and medium-term priorities and objectives.	MEDIUM
	Composition	Define a nutrient profile model which will work as the foundation for the implementation of measures to promote healthy eating environments (food products reformulation, taxation of unhealthy foods, among others)	HIGH
	Provision	Ensure the effective implementation of the existing guidelines for food provision in schools by defining a model to monitor the compliance with the standards/guidelines in place	HIGH
	Prices	Reduce taxes on healthy foods (pulses, fruit, and vegetables).	MEDIUM



Country	Domain	Priority action	Implementation level
	Prices	Propose an amendment to the Value Added Tax (VAT) to include other criteria for assigning VAT rates. Besides the criteria of essentiality, it is proposed to consider the food products' nutrient profile and/or their inclusion in a healthy dietary pattern	MEDIUM
	Leadership	Strengthen the strong and visible political support to improve food environments, to improve population nutrition, and to prevent and control diet related NCDs and their inequalities	MEDIUM
	Leadership	Include, in national programmes on nutrition and healthy eating, the most vulnerable population groups, namely the elderly, pregnant women, children, adolescents and immigrants, as priority action groups	HIGH
	Monitoring	Set indicators for regular monitoring of dietary intake, nutritional status and health outcomes related to food and nutrition. (MONIT 2 and 3)	MEDIUM
	Funding	Include the healthy eating promotion programme in the basic portfolio of primary healthcare services	LOW
	Funding	Improve the nutrition and public health workforce by adjusting the ratio of nutritionists in Primary Health Care and by integrating at least one nutritionist in each Public Health Unit at primary health care level.	LOW
Italy	Provision	Upgrading school menu	MEDIUM
	Governance	Education of the general population on healthy and balanced diet	MEDIUM
	Funding	Increase funding for nutrition	LOW
	Composition	Reformulation of food products	LOW
	Monitoring	Data collection on dietary habits (including breastfeeding) and overweight/obesity	MEDIUM

Table 3. List of priority actions by country, policy domain and level of implementation using the Healthy Food Environment Policy Index



6 Discussion

Food environments have been recognised as highly influential on dietary behaviours and health. Unhealthy food environments promote and facilitate access to unhealthy foods, such as ultra-processed, energy-dense, and nutrient-poor products¹⁸. They limit access to healthy affordable diets and are a product of policy action or inaction across multiple sectors (e.g., business, agriculture, environment, healthcare, education)¹⁹.

This is the first study assessing the level of food environment policy and infrastructure support implementation and identified priority actions in ten European countries, including Estonia, Finland, Italy, Portugal, Slovenia, and Spain. We identified a vast potential for the participating EU countries to improve their policies and infrastructure support to enable healthier diets through healthier food environments.

6.1 Policy implementation levels

There are differences between countries, with some adopting much more ambitious approaches whilst others lag in implementing policy. Finland and Portugal were the countries with the highest proportion of policies on food environments at the level of international best practice whilst Estonia and Spain had the lowest proportion of policies on food environments at the level of international best. Slovenia, Spain, and Estonia had the highest proportion of policies rated at very low if any implementation. Finland had the highest proportion of infrastructure support indicators rated at a high level of implementation, whilst four out of five countries had zero percentage of indicators rated at very low if any implementation. Experts identified that the most deficiently implemented domains in the participating EU countries were *food retail*, *labelling*, *prices*, and *marketing*, for policies, and *funding*, *platforms*, and *health in all policies*, for infrastructure support. Table 4 shows examples of policies from countries with a high policy implementation level.

Domain	Example
Policies	
Food composition	<p>In Finland, the Decree of the Ministry of Agriculture and Forestry on declaring certain foods high-salt (1010/2014) food packaging must be labeled as "high salt" or "high in salt" if the salt content of the food is exceeded.</p> <p>Government Decree (54/2012) on the criteria for supporting the meals of university students: granting of a state subsidy to student restaurants to reduce the price of a student meal (meal-specific subsidy). The prerequisite is e.g. that the student meal meets general health and nutritional requirements.</p> <p>Finland has developed a Nutrition Commitment, which is a tool for food sector and industrial food product design. The voluntary nutrition commitment can be made in eight different content areas that are subject to key change objectives in the nutrition recommendation.</p> <p>In Portugal, an extended commitment to reformulate salt, sugar and trans fatty acids content in different food product categories was signed in May 2019. The protocol was established between the Directorate-General of Health, the National Health Institute, the Portuguese Association of Distribution Companies and the Federation of the Portuguese Agri-Food Industry.</p>
Food labelling	Low level of implementation among all countries



Domain	Example
Food marketing	<p>In Portugal, the Law No. 30/ 2019 of 23 April introduces restrictions on advertising to children under 16 years old of food products and drinks containing high energy value, salt, sugar, saturated fatty acids and trans fatty acids content. The law covers schools, public playgrounds and a 100 m-radius around these places; television, on-demand media services and radio, in the 30 minutes preceding and following children's programmes, as well as programmes with an audience of at least 25 % below 16 years old; cinemas, in movies for children under 16; and websites, social networks and mobile applications where the contents are intended for children under 16 years of age. The food and beverage products must meet the nutritional criteria defined in the Portuguese Nutrient Profile Model, developed by the Directorate-General of Health, based on WHO Regional Office for Europe Nutrient Profile Model.</p>
Food prices	<p>From February 2017, Portugal implemented an excise duty on drinks containing added sugar or other sweeteners. The revenue from the application of the tax is allocated to the National Health Service Budget. The Law No. 71/2018 of 31 December - State Budget for 2019 - introduced a revision to this tax, creating new taxation tiers to allow this measure to continue encouraging food industry to reduce sugar in these drinks.</p>
Food provision	<p>In Finland, national nutrition guidelines exist for all population groups and several support in tools like Heart Symbol in healthy foods, voluntary nutrition commitment for industry and other stakeholders as well as the School Lunch Diploma are at place.</p> <p>Portugal has legislation on food provision in school and on food supply for Healthcare Institutions. In 2016, the Order No. 7516-A/2016 determined the conditions for the limitation of unhealthy products in vending machines, available in the institutions of the Ministry of Health. By the end of 2017, the Order No. 11391/2017 extended the limitation of unhealthy products based on the nutritional profile defined by the National Healthy Eating Promotion Program to bars, cafeterias, and buffets, in the same institutions. More recently, in August 2021, the Order No. 8127/2021 extended the limitation of unhealthy products to school buffets and vending machines of public educational establishments of the Ministry of Education.</p>
Food retail	
Infrastructure Support	
Leadership	<p>According to the Constitution of Finland Public authorities shall ensure adequate social and health services for all and promote the health of the population. Health Care Act's 30.12.2010 / 1326 purpose is to promote and maintain the health, well-being, ability to work and function and social security of the population and reduce health inequalities between population groups. Finland has national nutrition guidelines for all population groups.</p> <p>Portugal has, since 2017, an Integrated Strategy for the Promotion of Healthy Eating, that was published by an Order of the Assistant Secretary of State for Health, the Minister of Agriculture, Forestry and Rural Development, the Minister of the Sea, the Secretary of State for Fiscal Affairs, the Secretary of State for Local Authorities, the Secretary of State for Education, the Assistant Secretary of State for Commerce, the Secretary of State for Industry, and the Secretary of State for Tourism (Order No. 11418/2017, of 29 December). This strategy aims to place "healthy eating in all public policies" and has the mission to encourage adequate food consumption and the consequent improvement of the nutritional</p>



Domain	Example
	status of citizens, with direct impact on the prevention and control of chronic diseases.
Governance	<p>Finnish legislation's (e.g., Administrative Law 434/2003, Act on the Publicity of the Activities of Authorities. 21.5.1999 / 621) purpose is to implement and promote good governance and legal security in administrative matters and to promote the quality and efficiency of administrative services.</p> <p>National nutrition recommendations are based on a joint Nordic scientific assessment of the evidence and are published on the website. Finland also have Current Care Guidelines, e.g., for obesity. Recommendations are independent and research based.</p>
Monitoring	In Finland, several approaches and supporting mechanisms to monitor nutrition such as national food composition data base, national nutrition surveys for adults, health examination surveys to monitor overweight and food habits, surveys/questionnaire surveys to assess food habits of both adults and children and national register data on children's weight and height exist.
Funding	
Platforms	<p>The Finnish government program coordinates and commits various branches of government and actors. Legislation, e.g., Health Care Act 30.12.2010 / 1326. obliges the various sectors of the municipality to cooperate in promoting health and well-being.</p> <p>Finland has advisory boards, e.g., Nutrition Advisory Board and Public Health Advisory Board.</p>
Health in all policies	In Finland, the principle of Health in All Policies must be considered in all decision-making. All legislation must consider the assessment of the effects of laws on the health and well-being of the population.

Table 4. Examples of high level of policy implementation.

6.2 Action recommendations and prioritisation

Policy actions were generated and prioritised by experts considering a combination of its importance and potential to reduce the prevalence of obesity and NCDs, and to narrow widening socioeconomic inequalities in access to healthy diets.

6.2.1 Improving school food environments

All participating countries highlighted the importance of improving school food environments. EU countries specifically highlighted the need to regulate marketing to children, the introduction of nutrition and food related subjects in educational institutions. Countries also indicated the importance of the provision of healthy meals in schools and to regulate the sale and supply of unhealthy foods to children and to monitor compliance of these policies.

School food environments have previously been associated with spaces that can provide children with the opportunity to develop healthy dietary patterns that track into adulthood²⁰. Other countries have taken steps further in the regulation of the food environment aimed at improving children's health. For example, the UK has implemented zoning laws around schools to restrict the availability of fast-food outlets²¹. Similarly, Mexico has implemented a law in one of its states that bans the sale of unhealthy and calorie-dense foods to children in convenience stores²².



6.2.2 Restricting the marketing of unhealthy food products to children

Experts endorsed actions on the regulation of processed goods, unhealthy food marketing, food labelling, the implementation of fruit and vegetable subsidies, and taxation on unhealthy foods and beverages that were prioritised highest in terms of their importance and long-term impacts on health.

Regarding the recommendation to regulate food marketing towards children, successful lessons can be taken from Quebec, Canada, where unhealthy food advertising bans resulted in lower childhood obesity rates compared to other Canadian provinces⁷.

In terms of food labelling, participating countries expressed the need for front-of-pack labelling (FOPL) for consumers to identify unhealthy food items. Best-practice examples of food labelling that could be implemented in EU countries include the warning labels successfully implemented in Chile and now being followed by other countries²³.

6.2.3 Implementation of fiscal policies

Additionally, fiscal policies were identified as important and feasible priorities. Although multiple countries have begun implementing sugar-sweetened beverage taxes²⁴, country experts also expressed the need to increase tax rates which are often too low. Expanding the tax base to include unhealthy ultra-processed foods (UPFs), and ensuring that tax revenues are directed toward public health or human capital investments was also advised. In addition, experts highlighted the need for healthy food (e.g., fruit and vegetables) subsidies and more affordable healthy foods to enable consumers to be able to shift towards healthy dietary patterns.

Some of the expert recommendations identified in this study overlap with those provided in the Farm to fork strategy¹⁷, which mentions several policy actions to improve food environments. In addition, the assessment of EU-level policies report⁷ and the improving dietary intake and achieving the WHO food product improvement report²⁵ highlight that a focus on children is considered an important stepping-stone in the prevention of obesity and NCDs and which additionally suggests that EU enforcement and focus on improving food environments is highly recommended.

Furthermore, some of the expert recommendations, such as the regulation of processed foods, overlap with the WHO 'Best Buys' interventions which include UPF reformulation such as the elimination of *trans*-fatty acid and food portion size reduction²⁶.

6.2.4 Improving monitoring and surveillance

Among infrastructure support domains, compliance, monitoring and health in all policies were a contended issue. Although many forces contribute to unhealthy dietary patterns and obesity, food industry behaviours raised calls for government regulation and require urgent preventive actions. Currently, the food industry is marketing unhealthy foods to children, promoting large portions and between-meal snacks, and exploiting schools for commercial gain. Addressing this will require policy compliance, monitoring and the prioritisation of 'health in all' policies to coordinate action across health and non-health sectors^{27,28}.

The WHO encourages member states to monitor nutrition and health status by strengthening and expanding nationally representative health and nutrition surveys. Regular monitoring surveys ensure successful policy implementation and allow impact assessment and identification of concern areas and inequality, thereby contributing to the improvement of food environments and the prevention of obesity and NCDs²⁹. In addition, the current food environments across the studied EU countries require monitoring and further investigation to identify areas for improvement and to develop a policy to tackle pressing concerns related to unhealthy diets, obesity and NCDs.



For example, Slovenia has tested the option to use the Food EPI study for the mid-term evaluation of the national food and nutrition action plan (FNAP). Food EPI indicators were with no major problems aligned with the indicators of FNAP.

Taking into consideration the obesity and NCD prevalence in the participating EU countries, the identified evidence on the implementation of food environment policies and expert recommendations, legislative bans must be considered as important tools to improve and regulate retail food environments, marketing, FOPL to contribute to the reduction of obesity and NCDs^{30,31}.

6.3 Strengths and limitations

There were several limitations when applying the Food EPI method. Due to the Coronavirus (COVID-19) pandemic, workshops were conducted online which may have affected the discussion and network process. However, the workshops still presented an opportunity to focus on policy implementation gaps and to generate recommendations around a common set of advocacy messages by experts. Socioeconomic inequalities and their impact on risk factors or health was not specifically assessed in this study. Nor did the tool assess policies relating to food insecurity or food sustainability.

This study presents several advantages. First, the Food-EPI tool and process is an established method that provided an 'upstream' perspective of the policies and infrastructure that influence the food environment and dietary choices³². The consultation process with experts allowed an accurate and realistic picture of policy action and gaps and helped identify relevant and feasible policy actions to improve food environments in the participating EU countries. By using the same Food-EPI method as an overall framework, inter-country comparisons were possible and accurate. Having carried out the first Food-EPI in the participating EU countries will allow to re-apply Food EPI in the future to measure progress over time. The evidence document generated for each participating EU country is a useful resource for actors wishing to examine policy gaps and coherence moving forward.

6.4 Next steps

The final and most important phase of the Food EPI process involves advocating to the government for a change in policies and infrastructure support to improve the food environment³². It is important to ensure accountability and maintain momentum despite changes in government leadership and other dynamic contextual factors. It is advisable to conduct the Food-EPI study every four to five years. Follow-up studies will be key to demonstrating the development and strength of food environment policies occurring in the participating EU countries. This can be used to measure the improvement of EU-level policies targeting the food environment. In the long-term, this EU Food-EPI research will contribute to a global database for monitoring and evaluating policies directed at improving the food environment and continuing obesity and NCD prevention commitments. Through another EU project (JPI Policy Evaluation Network) another five countries implemented the Food-EPI. A joint publication and report is underway. As multiple countries complete the Food-EPI process, there will be continued expansion of the inventory of effective, innovative, and sustainable policy and infrastructure support actions, which the EU may adopt.

The process of monitoring progress in the implementation of food environment policies will contribute to establishing healthier food environments that enable healthier diets and reduce the prevalence of obesity and NCDs.



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7 Conclusion

The Food-EPI tool was adapted specifically for the European context with the support of the STOP network of national public health agencies. The assessment of the strength of EU-level policies and infrastructure support by key experts in this study shows there is a vast potential for EU countries to improve their policies and infrastructure support influencing food environments. The immediate action of policies and infrastructure support that make healthy food options accessible and affordable, are urgently required to tackle the burden of obesity and NCDs in EU countries. The findings will be disseminated, in collaboration with the JPI Policy Evaluation Network, into a scientific publication, as well as a report.



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9 Appendix 1. Expert panels in participating EU countries

9.1 Estonia

National Institute for Health Development

Taltech University, Division of Food Technology

Tallinn Health Care College

Ministry of Social Affairs, Public Health Department, Analysis and Statistics Department

Estonian Traders Association

Baltic Restaurants Estonia

9.2 Finland

Ministry of Social Affairs and Health

Ministry of Education and Culture

Ministry of the Environment

Ministry of Agriculture and Forestry of Finland

Finnish Food Authority

Finnish Heart Association

Finnish Diabetes Association

Cancer Society of Finland

Martha Organization

Finnish Parents' League

Finnish Society for Food Education, Ruukku ry

Finnish Association of Public Health Nurses

Association of Home Economic Teachers

Professional Kitchen Experts' Association

Association of Clinical and Public Health Nutritionists in Finland, RTY

Finnish Dental Association

Central Union of Agricultural Producers and Forest Owners (MTK)

Childcare Association

Early Childhood Education Teacher's Union of Finland

Trade Union of Education in Finland, OAJ

Finnish Food and Drink Industries' Federation (ETL)



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Finnish Grocery Trade Association (PTY)

University of Helsinki

University of Eastern Finland

University of Turku

Tampere University

Folkhälsan

Pirkanmaa Hospital District

Päijät-Häme Hospital District

Satakunta Hospital District

Oulu Hospital District

Central Finland Health Care District

Hospital District of Southwest Finland

City of Salo

City of Espoo

Joint Municipal Authority of Wellbeing in Raahe District

Saimaan Tukipalvelut Oy (Health-promoting food services)

The municipal enterprise Service Centre in Helsinki

HUS Helsinki University Hospital District

Finnish Institute for Health and Welfare

Finnish Institute of Occupational Health

9.3 Italy

Research Center for Food and Nutrition, Roma, Italy

Research Center for Food and Nutrition, Roma, Italy

Unit of Food Science and Human Nutrition, Sapienza University, Roma, Italy

Department of Clinical Nutrition, Health Unit Roma C, Roma, Italy

Department of Clinical Nutrition, Ospedale San Giovanni Bosco, Torino, Italy

Section of Clinical Nutrition and Nutrigenomic, Department of Biomedicine and Prevention, University of Roma Tor Vergata, Roma, Italy

Section of Clinical Nutrition and Nutrigenomic, Department of Biomedicine and Prevention, University of Rome Tor Vergata

Department of Clinical Nutrition, Ospedale Città della Salute, Torino, Italy

Department of Clinical Nutrition, Health Unit, Bolzano, Italy

Full Professor of Human Nutrition, Sapienza University, Roma, Italy



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Full Professor of Human Nutrition, University of Naples Federico II

Italian Consumers Union

9.4 Portugal

The Portuguese expert panel is constituted by independent experts from academia, scientific associations or societies, professionals from the national health service and former Government members. From these, some of the represented institutions include Faculty of Nutrition and Food Science of the University of Porto, Institute of Public Health of the University of Porto, NOVA National

School of Public Health, Regional Health Administrations of North, Regional Health Administrations of Algarve, National Nutrition Association, Portuguese Council of Nutritionists and Portuguese Association of Public Health Doctors.

9.5 Slovenia

The expert panel consisted of 23 representatives from: Chamber of Commerce and Industry of Slovenia, National Institut of Publich Health Slovenia, University of Ljubljana - Biotechnical Faculty, Court of Audit of the Republic of Slovenia, Slovenian Heart Foundation, Ministry of Agriculture, Forestry and Food of R of Slovenia, Europa Donna; Tourism and Hospitality Chamber of Slovenia, Institute of Nutrition, University of Ljubljana - Faculty of Education, University of Primorska - Faculty of Health Sciences, National Laboratory of Health, Environment and Food, and Ministry of Health of R of Slovenia.

9.6 Spain

Marta Arroyo Izaga, University of the Basque Country; Nancy Elvira Babio Sánchez, University Rovira i Virgili; Néstor Benítez Brito, Spanish Academy of Nutrition and Dietetics; Cristina Bouzas Velasco, CIBEROBN and University of the Balearic Islands; Irene Breton Lesmes, University General Hospital Gregorio Marañón; Carmen del Campo Arroyo, Official College of Pharmacists, Ciudad Real; Ana Canals Caballero, Spanish Agency of Food Safety and Nutrition; Pilar De Miguel Etayo, University of Zaragoza; Patricia Esteras Pérez, Department of Health, Government of the Region of Murcia; Carlos Fernández Escobar, Institute of Health Carlos III; Carlos Franco Abuin, University of Santiago de Compostela and Scientific Committee of the Spanish Agency of Food Safety and Nutrition; Clara Gómez Donoso, University of Navarra; Carlos A. González, Catalan Institute of Oncology; Adriana Jiménez Herrero, Department of Health, Government of Aragón; María Teresa Jiménez López, Spanish Council of Scientific Research; Rosaura Leis Trabazo, University of Santiago de Compostela; Jordi Mañes Vinuesa, University of Valencia, and member of the Scientific Committee of the Spanish Agency of Food Safety and Nutrition; Ascensión Marcos Sánchez, Spanish Council of Scientific Research; Miguel Mariscal Arcas, University of Granada; Emilio Martínez de Victoria Muñoz, University of Granada, former President of the Scientific Committee of the Spanish Agency of Food Safety and Nutrition; Naiara Martínez Pérez, University of the Basque Country; Pilar Matía Martín, Clinic Hospital San Carlos of Madrid; Luis Moreno Aznar, University of Zaragoza; Joan Quiles Izquierdo, Department of Health, Generalitat Valenciana; Amelia Rodríguez Martín, University of Cádiz; Miguel Ángel Royo Bordonada, Institute of Health



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Carlos III; Juan Manuel Ruíz Liso, Scientific Foundation, Caja Rural of Soria; María José Santi Cano, University of Cádiz; Francisca Vaquer Suñer, Department of Health, Government of the Balearic Islands; Rafael Urrialde de Andrés, University Complutense of Madrid.



10 Appendix 2. Ethical committee approvals for each country

10.1 Estonia

The permission of the Ethics Committee was not required as no personal data is processed.

10.2 Finland

The permission of the Ethics Committee is not required as no personal data is processed.

10.3 Portugal

In Portugal, the experts signed a consent form which indicated their consent to participate in all the phases of the Food-EPI evaluation.

10.4 Slovenia

No personal data were collected or assessed in the study.

10.5 Spain

Clinical Research Ethics Committee of the Balearic Islands, Palma de Mallorca, Spain (ref. IB/3814/18PI).

10.6 Italy

The permission of the Ethics Committee was not required as no personal data is processed.



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