CORA Cork Open Research Archive
Cartlann Taighde Oscailte Chorcaí

Title	Strength of EU-level food environment policies and priority recommendations to create healthy food environments.
Authors	Djojosoeparto, Sanne K.;Kamphuis, Carlijn B. M.;Vandevijvere, Stefanie;Murrin, Celine;Stanley, Isobel;Romaniuk, Piotr;Harrington, Janas M.;Poelman, Maartje P.;PEN Consortium
Publication date	2022-06
Original Citation	Djojosoeparto, S. K., Kamphuis, C. B. M., Vandevijvere, S., Murrin, C., Stanley, I., Romaniuk, P., Harrington, J. M., Poelman, M. P. and PEN Consortium (2022) 'Strength of EU-level food environment policies and priority recommendations to create healthy food environments', European Journal of Public Health, 32 (3), pp. 504-511. doi: 10.1093/eurpub/ckac010
Type of publication	Article (peer-reviewed)
Link to publisher's version	10.1093/eurpub/ckac010
Rights	The Author(s) 2022. Published by Oxford University Press on behalf of the European Public Health Association. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (https://creativecommons.org/licenses/by/4.0/), - https://creativecommons.org/licenses/by/4.0/
Download date	2026-09-16 19:36:09
Item downloaded from	https://hdl.handle.net/10468/13882

UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

European Journal of Public Health, Vol. 32, No. 3, 504–511
© The Author(s) 2022. Published by Oxford University Press on behalf of the European Public Health Association.
This is an Open Access article distributed under the terms of the Creative Commons Attribution License (https://creativecommons.org/licenses/by/4.0/), which permits unrestricted reuse, distribution, and reproduction in any medium, provided the original work is properly cited.
https://doi.org/10.1093/eurpub/ckac010 Advance Access published on 9 March 2022

Strength of EU-level food environment policies and priority recommendations to create healthy food environments

Sanne K. Djojosoeparto[1], Carlijn B.M. Kamphuis[2], Stefanie Vandevijvere[3], Celine Murrin[4], Isobel Stanley [4], Piotr Romaniuk[5], Janas M. Harrington [6], Maartje P. Poelman[7] on behalf of the PEN Consortium

1 Department of Human Geography and Spatial Planning, Faculty of Geosciences, Utrecht University, Utrecht, The Netherlands
2 Department of Interdisciplinary Social Science, Faculty of Social and Behavioural Sciences, Utrecht University, Utrecht, The Netherlands
3 Sciensano, Department of Epidemiology and Public Health, Service of Lifestyle and Chronic Diseases, Brussels, Belgium
4 School of Public Health, Physiotherapy and Sports Science, University College Dublin, Dublin, Ireland
5 Department of Health Policy, School of Health Sciences in Bytom, Medical University of Silesia, Katowice, Poland
6 School of Public Health, University College Cork, Cork, Ireland
7 Chair group Consumption and Healthy Lifestyles, Wageningen University & Research, Wageningen, The Netherlands

Correspondence: Sanne K. Djojosoeparto, Department of Human Geography and Spatial Planning, Faculty of Geosciences, Utrecht University, Vening Meinesz building A, Princetonlaan 8a, Utrecht 3584 CB, The Netherlands, Tel: +31 619401472, e-mail: s.k.djojosoeparto@uu.nl

Background: Food environments impact on diets, obesity and non-communicable diseases (NCDs). Government policies are essential to create healthy food environments. This study aimed to assess the strength of European Union (EU)-level policies, and identify and prioritize actions for the EU to create healthy food environments. **Methods:** The Healthy Food Environment Policy Index (Food-EPI) was applied. The Food-EPI included 26 policy and 24 infrastructure support indicators. Independent experts ($n = 31$) rated the strength of EU-level policies and infrastructure support for each of these indicators (on a 5-point scale, from very weak to very strong) and identified and prioritized actions to improve food environments. **Results:** For 65% of the 26 policy indicators, EU-level policies were rated as weak and for 23% as very weak. For 63% of the 24 infrastructure support indicators, EU-level policies were rated as moderate and for 33% as weak. The experts recommended 18 policy and 19 infrastructure support actions to the EU. The Top 5 prioritized policy actions included three actions in the food composition domain (e.g. setting mandatory food composition targets), one action in the food prices domain and one action in the food promotion domain. The Top 5 prioritized infrastructure support actions included three actions in the leadership domain (e.g. developing a high-level NCDs Prevention Strategy) and two actions in the monitoring domain. **Conclusions:** There is large potential for the EU to strengthen its policies and infrastructure support in order to improve food environments. This study specifies priority actions for the EU to create healthy food environments.

Introduction

Overweight, obesity and diet-related non-communicable diseases (NCDs) pose a major public health problem in Europe. In 2017, more than 50% of the adult population in the European Union (EU) were overweight of which 15% were obese.[1] Unhealthy diets with excess foods containing too much sugar, saturated fat and salt (e.g. ultra-processed foods), and low in nutritious foods like fruits and vegetables, increase the risk of developing overweight, obesity and NCDs.[2,3] According to The Global Burden of Disease Study (2019), dietary risks are among the Top 5 risks for attributable deaths in females and males.[4]

Food environments can be defined as the physical, economic, policy and sociocultural surroundings, opportunities and conditions that influence people's food and beverage choices and nutritional status.[5] Commercial interests have been allowed to prevail over public health in the past decades. This has resulted in 'obesogenic' food environments in which ultra-processed, high-fat and sugar-rich products are abundantly available and heavily marketed, much more than healthy foods.[6–8] In European Member States, food environments often do not ensure that the healthy option is the easiest option to choose.[9]

Governments play a crucial role in reversing the obesogenic nature of food environments.[6,7,10] Structural, 'upstream' government policies (e.g. marketing regulations for unhealthy foods) have the potential to support healthy diets among the entire population[10–12] and are more likely to result in sustainable improvements in population nutrition than 'downstream' approaches (e.g. health mass media campaigns).[7,13]

Article 168 (1) of the Treaty on the Functioning of the EU states that a high level of human health protection shall be ensured in the definition and implementation of all Union policies and activities.[14] Until now, predominantly food environment policies across EU Member States have been analysed and compared.[15] A robust analysis at the supranational level is lacking. It is largely unknown to what extent the EU has implemented policies and infrastructure support that facilitate policy development and implementation to create healthy food environments. Moreover, little is known on how these policies and infrastructure support could be improved. Therefore, this study applied the Healthy Food Environment Policy Index (Food-EPI) developed by the International Network for Food and Obesity/NCDs Research, Monitoring and Action Support (INFORMAS).[10] Globally, the Food-EPI has already been

Downloaded from https://academic.oup.com/eurpub/article/32/3/504/6545820 by University College Cork user on 24 November 2022

applied in more than 30 countries, mainly to evaluate national level policies.[16] This is the first study that has adapted the Food-EPI to evaluate supranational level policies. In applying the Food-EPI tool, this study aims:

(1) to assess the strength of EU-level policies and infrastructure support and identify implementation gaps.
(2) to identify and prioritize policy and infrastructure support actions to improve food environments in EU Member States.

Methods

Study design

This mixed-methods study is conducted as part of the Policy Evaluation Network (PEN) (https://www.jpi-pen.eu/) and under the umbrella of INFORMAS (informas.org). In 2019–20, we applied the Food-EPI at EU-level.[10] All procedures performed were in accordance with the ethical standards of the institutional committee [Science-Geosciences Ethics Review Board, Utrecht University, The Netherlands (ERB Review Geo L-19254)] and the Helsinki declaration. All participants signed an informed consent and conflict of interest form before participation.

Study procedure

The Food-EPI is an international standardized tool and process to identify important gaps in policies and infrastructure support, and to identify and prioritize future actions to improve food environments.[10] The tool comprises indicators across seven food environment 'policy' domains (food composition, labelling, promotion, prices, provision, retail and trade) and six 'infrastructure support' domains (leadership, governance, monitoring and intelligence, funding and resources, platforms for interaction and health-in-all-policies) that support policy development and implementation to improve food environments (figure 1).[10] There are indicators contained in each of the domains that encompass actions necessary to improve the healthiness of food environments (Supplementary file S1).

This study consisted of six steps (Supplementary file S2), which are further outlined below.

Step 1: tool adaptation

Before applying the Food-EPI to European countries and the EU, PEN researchers reviewed the 47 original Food-EPI indicators (February–May 2019). For each indicator, it was assessed whether the jurisdiction lies with the EU, national governments or both. In addition, as indicators were originally developed for assessing national policies, we adapted the formulation to supranational level. Furthermore, some indicators were disaggregated or added. This resulted in a total of 50 indicators included in this study, i.e. 26 policy and 24 infrastructure support indicators (Supplementary file S1).

Step 2: evidence document

In Step 2, evidence for EU-level policies for each of the 50 Food-EPI indicators was collected and summarized in an 'evidence document'[17] (February–December 2019). The Farm to Fork Strategy[9] was not included in the evidence document, as this strategy was published after finalizing the evidence document. The evidence document was verified for completeness and accuracy by EU governmental officials working at DG SANTE, JRC, Eurostat, the OECD and EFSA.

Step 3: online rating survey

We conducted a workshop (February 2019) with PEN researchers to identify organizations specialized in food, nutrition, public health, obesity and diet-related chronic diseases. For each organization, we then invited one or two representatives to participate in the EU Food-EPI expert panel (November 2019–January 2020). Where specific representatives were unknown, we sent an invitation to the general e-mail addresses of the organizations. When experts declined, they could put forward a replacement. In total, 61 independent experts were invited.

In Step 3, experts were supplied with the evidence document[17] and asked to assess the strength of EU-level policies and infrastructure support during an online survey. A total of 31 experts filled out the survey (February–March 2020), of which 29 experts fully completed and two partly. Participants rated the strength of each of the 26 policy and 24 infrastructure support indicators separately on a five-point Likert scale, indicating whether 'The EU has put forward . . .', 1 = non-existent/very

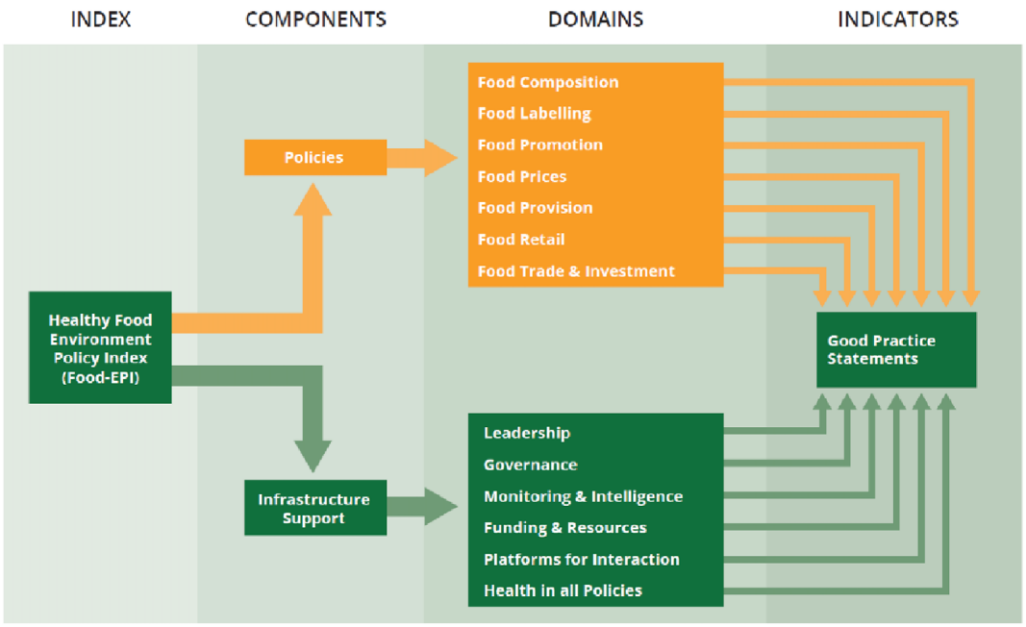

Figure 1 The Food-EPI, as developed by Swinburn B, Vandevijvere S, Kraak V, Sacks G, Snowdon W, Hawkes C, et al. (2013). (Food-EPI EU study, 2019–20)

Downloaded from https://academic.oup.com/eurpub/article/32/3/504/6545820 by University College Cork user on 24 November 2022

weak, 2 = weak, 3 = moderate, 4 = strong or 5 = very strong policies. There was also a 'cannot rate' option and experts could comment on their rating. Moreover, experts were asked to formulate actions (for each policy and infrastructure domain) for the EU to create healthy food environments.

Steps 4–6: identification and prioritization of actions to improve food environments

Due to the 2020 Covid-19 bans on travel and meetings, face-to-face workshops with the expert panel to discuss the proposed actions, were not possible. Therefore, a different approach than outlined in the Food-EPI protocol[18] was taken, described below in Steps 4–6.

Step 4: online workshops

Two online workshops were held in July 2020 with a selected group of experts, specialized in public health, nutrition or food law/politics ($n = 3$), who also had completed the online rating survey. During the workshops, all actions formulated by the entire expert panel in the online rating survey were discussed. The proposed actions were combined, narrowed down and precisely formulated. For each domain, the experts were asked whether the actions aligned with the EU competences to regulate a certain area and whether any important actions were missing.

Step 5a: refining actions

We made final adjustments to the action list according to the input received during the workshops. This adjusted action list was then verified by the three experts who participated in the workshops. Following this verification, the action list was sent to the full expert panel ($n = 31$) to ask whether they agreed with the actions formulated and whether any actions were missed. Final adjustments were made to the action list according to the expert panel input.

Step 5b: online survey to investigate which actions to recommend

The expert panel ($n = 31$) was invited for a second online survey in September 2020. A total of 16 experts participated in this survey. They were asked to indicate for each action whether they would recommend implementation of the action by the EU, using a five-point Likert scale: 1 = very much disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = very much agree.

Step 6: prioritization of recommended actions

In the final online survey (September–October 2020), the expert panel ($n = 31$) was asked to prioritize the recommended actions. A total of 21 experts completed this survey. Experts ranked the policy actions three times on (i) importance, (ii) achievability and (iii) equity, i.e. whether the action would lead to a reduction of socioeconomic inequalities in dietary intake. Experts ranked the infrastructure support actions twice on (i) importance and (ii) achievability. Supplementary file S3 includes a description of the three criteria. When an action was ranked as #1 it was considered to be most important, achievable or equitable.

Data analysis

The mean score on the five-point Likert scale was calculated for each indicator to determine the strength of EU-level policies. The Gwet AC2 inter-rater reliability coefficient and its variance were determined using AgreeStat software (Agreestat 2015.6.1, Advanced Analytics, Gaithersburg, USA). For estimation of the variance, the sample of subjects to rate was set at 100% since all indicators of the Food-EPI were included for rating, while the sample of raters was set at 51% (as per the response rate of experts invited), and the finite population correction was applied (Step 3).

Regarding Step 5b, the mean score was calculated for each action based on the five-point Likert scale. Actions with a mean score of 4.0 or higher were included in Step 6.

In Step 6, we identified the highest prioritized policy and infrastructure actions by summing the ranking scores for each action. First, we calculated the scores for importance and achievability separately. Second, we calculated the total score for each action by summing the scores on importance and achievability. Sum scores could vary from 42 to 798 (policy domains) or from 42 to 756 (infrastructure support domains). A lower sum score indicated a higher perceived priority. We initially identified the Top 10 policy actions based on importance and achievability. Of this Top 10, we identified the five actions, which scored highest on equity. For the infrastructure support actions, the Top 5 was only based on importance and achievability.

Results

Expert panel

The 31 experts that participated in this study were working in academia, international health and food organizations, national governments, and non-governmental, professional health/food organizations and associations. The experts were specialized in food, nutrition, public health, obesity and/or diet-related chronic diseases (Supplementary file S4).

Strength of EU-level policies and infrastructure support

Figures 2 and 3 present the mean implementation score of EU-level policies and infrastructure support for each Food-EPI indicator separately, according to the experts. The Inter-rater reliability (Gwet's AC2) for all Food-EPI indicators was 0.67 (95% CI = 0.61–0.72), which indicates that there was good agreement among experts about the strength of EU-level policies. There was more agreement on the policy indicators (Gwet's AC2 was 0.77; 95% CI = 0.73–0.81) than on the infrastructure support indicators (Gwet's AC2 was 0.62; 95% CI = 0.53–0.72).

Policy domains

The strength of EU-level policies regarding most policy indicators (17 of the 26 indicators; 65%) was rated as weak (figure 2). While the strength of EU-level policies for 6 of the 26 indicators (23%) was evenly rated as non-existent or very weak. The expert panel considered the strength of EU-level policies for 3 of the 26 indicators (12%) to be moderate.

Infrastructure support domains

The strength of EU-level policies regarding most infrastructure support indicators was rated as moderate (15 of the 24 indicators; 63%) (figure 3). In contrast to the policy domains, no EU-level policies with respect to the infrastructure domains were rated as very weak or non-existent. However, the EU was assessed as having weak infrastructure support for 8 of the 24 indicators (33%). Only 1 of the 24 indicators (4%) was rated as strong, namely 'public access to nutrition information' ('Governance').

Identification and prioritization of EU-level policy and infrastructure support actions to improve food environments

Based on Steps 3 (rating survey), 4 (workshops) and 5a (refinements), 30 policy and 32 infrastructure support actions were proposed by the expert panel. In Step 5b (selection survey), 19 policy

Downloaded from https://academic.oup.com/eurpub/article/32/3/504/6545820 by University College Cork user on 24 November 2022

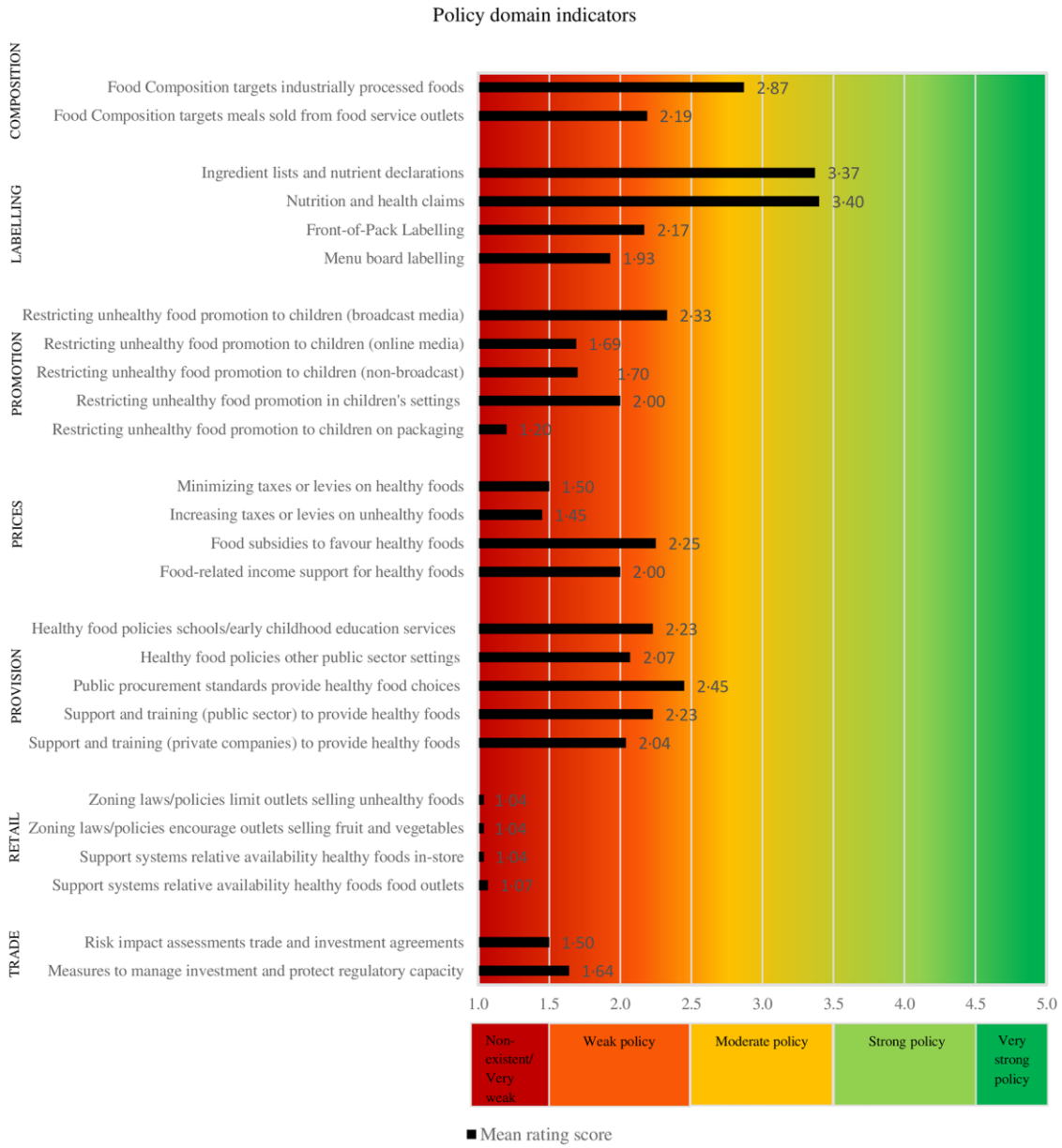

Figure 2 Strength of EU-level policies influencing food environments (Food-EPI EU study, 2019–20)

and 18 infrastructure support actions scored a 4.0 or higher and were thereby recommended to the EU to create healthy food environments in EU Member States.

Recommended and prioritized policy actions

The 19 policy actions recommended by the experts are detailed in Supplementary file S5. The Top 5 prioritized actions based on importance, achievability and equity (table 1) include: set mandatory, ambitious food composition targets for (i) all food categories and (ii) for processed foods and meals at quick service restaurants specifically; (iii) adopt a legislated ban for trans-fats instead of the recently introduced (2019) maximum limit of 2 g per 100 g of fat;[19] (iv) allow Member States to implement a 0% VAT exemption on fruit and vegetables; and (v) ban marketing of unhealthy foods to children <19 years. In Supplementary file S6, the scores on importance and achievability for each action are plotted in a graph, and the five actions with the greatest potential to reduce socioeconomic inequalities in diet are indicated by a yellow shadow.

Recommended and prioritized infrastructure support actions

The 18 infrastructure support actions recommended by the Food-EPI expert panel are detailed in Supplementary file S7. The Top 5 prioritized actions based on importance and achievability (table 1) were: (i) develop a high-level NCDs prevention strategy; (ii) include clear priorities to reduce health inequalities in EU work programmes; (iii) harmonize the promotion of healthy foods with other issues of concern; (iv) benchmark food policies and coordinate good practices among Member States; and (v) support Member States to monitor the status of national food environments. Each infrastructure support action is plotted on importance and achievability in Supplementary file S8.

Discussion

Overall, the experts' ratings point to a clear need to strengthen and increase the development and implementation of EU-level food

Downloaded from https://academic.oup.com/eurpub/article/32/3/504/6545820 by University College Cork user on 24 November 2022

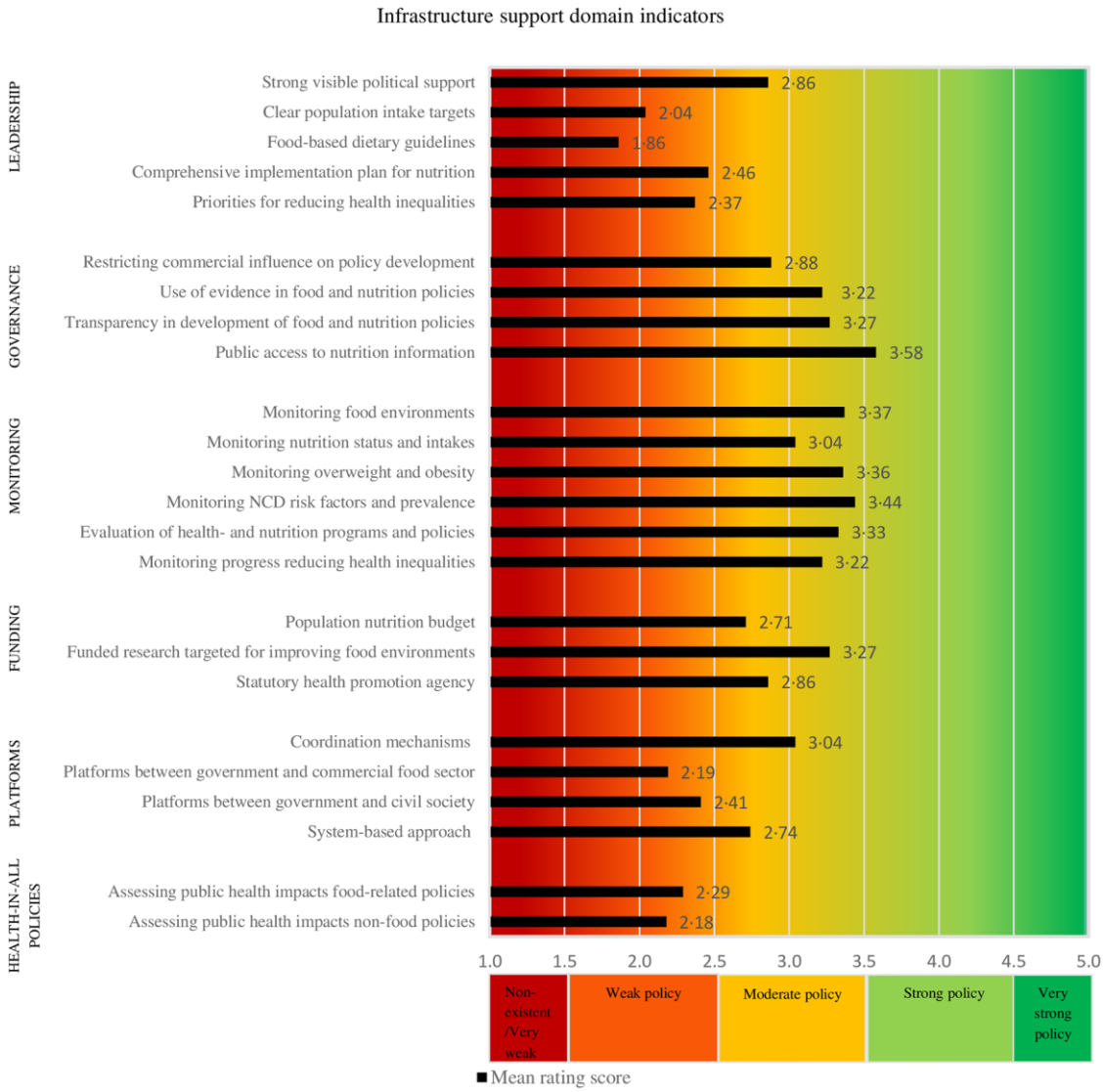

Figure 3 Strength of EU-level infrastructure support influencing food environments (Food-EPI EU study, 2019–20)

environment policies and infrastructure support. Specifically, experts rated the implementation of most food environment policy indicators as weak and most infrastructure support indicators as moderate. A total of 19 policy and 18 infrastructure support actions for the EU to create healthier food environments have been identified.

The EU performs relatively better with regard to infrastructure support than with policies directly influencing food environments, which is in line with country-level observations. An 11-country Food-EPI comparison study showed that the implementation of infrastructure support was rated higher than the implementation of food environment policies in all countries, except Chile.[20] In the Netherlands, Ireland and Norway, implementation of infrastructure support was also rated higher than implementation of policies.[21–23]

There are a number of possible explanations for the weakness of EU-level policies directly influencing food environments. Firstly, this might be related to the competences the EU has in developing and implementing healthy food environment policies. Article 5(1) of the Treaty on the European Union[24] states that the EU should act only when the objectives of a proposed action can be better achieved by the EU than by Member States. Article 168 (1) of the TFEU states further that EU action directed towards improving public health and preventing diseases shall complement national policies.[14] Legislative harmonization at EU-level in the field of public health is excluded by Article 168 (5) of the TFEU, except in narrowly defined areas.[25] Therefore, EU action in this field is mostly limited to the adoption of soft law measures such as recommendations and opinions.[25]

Secondly, national governments may have a preference to address social issues domestically rather than at EU-level.[26] Member States may resist EU power as, in most Member States, health spending is one of the largest chunks of the national social welfare budget and citizens may expect public health policies as an expression of solidarity organized by the nation state.[27]

Thirdly, the weakness of EU-level policies might be explained by influential and dominant strategies of the food industry on governmental policies, such as lobbying and promoting industry-preferred solutions.[28–30] Moreover, much decision-making power has been directly devolved to corporations[29], such as the EU Platform on Diet, Physical Activity and Health, which consists of industry, NGO's and the European Commission.[29,30] Another example is the EU Pledge, a voluntary initiative by food and beverage companies to change advertising to children.[31]

With the Farm to Fork Strategy (2020), the EU has made positive progress in that the strategy integrates all stages of the food system (from production to consumption)[32] and refers to the creation of a favourable food environment that makes it easier to choose healthy and sustainable diets.[8] Some actions in the Strategy are similar to actions recommended by the experts in our study, e.g. 'set nutrient

Downloaded from https://academic.oup.com/eurpub/article/32/3/504/6545820 by University College Cork user on 24 November 2022

Table 1 Top 5 EU policy actions based on importance, achievability and equity and Top 5 EU infrastructure support actions based on importance and achievability, recommended and prioritized by the Food-EPI expert panel (Food-EPI EU study, 2019–20)

Food-EPI domain	Policy actions recommended and prioritized by the Food-EPI expert panel
Food prices	Allow Member States to implement a Value-Added Tax (VAT) exemption of 0% for all fresh fruit and vegetables, by adopting the proposal of the Commission[a] and encourage Member States to implement this VAT exemption to encourage healthy food choices.
Food composition	Set mandatory, ambitious, comprehensive and time-specific food composition targets for added sugars, salt and saturated fat for all food categories (including processed and ultra-processed foods) sold in EU Member States (e.g. saturated fat reduction for savoury snacks of a minimum of 5% in 4 years and a minimum of an additional 5% reduction by 2026 against the individual baseline levels at the end of 2020).
Food composition	Adopt a legislated ban on trans-fats (i.e. no trans-fats are allowed instead of the maximum limit of 2 g per 100 g of fat) in processed and ultr-processed foods sold in EU Member States.
Food composition	Set mandatory, ambitious and comprehensive reformulation targets for added sugars, salt and saturated fat for processed and ultra-processed foods and meals sold at quick service restaurants (including snack food outlets) in EU Member States.
Food promotion	Introduce a new Directive [amending the Audiovisual Media Services Directive (2010/13/EU[b])], which requires Member States to implement (i) minimum and time-based restrictions or bans on the (online) marketing of foods high in saturated fat, trans fat, salt or added sugars to children and adolescents up to 19 years old in all digital (including broadcast, online and social) media and (ii) bans on food packages for marketing foods high in saturated fat, trans fat, salt or added sugars to children and adolescents up to 19 years old.
Food-EPI domain	**Infrastructure support actions recommended and prioritized by the Food-EPI expert panel**
Leadership	Develop a high-level EU Non-Communicable Diseases (NCDs) Prevention Strategy.
Monitoring	Benchmark food environment policies regarding food reformulation, food labelling (incl. claims and front-of-pack labelling), food marketing, food prices, food provision in public spaces and retail (zoning laws and policies, in-store product placement) and support and coordinate the exchange of good practices between Member States (e.g. via the Open Method of Coordination).
Leadership	Include clear priorities to reduce inequalities or protect vulnerable populations in the multi-annual work programmes/annual State of the Union (e.g. by the year X we want to have reduced health inequalities in relation to diet within/between EU Member States).
Leadership	Harmonize the promotion of healthy diets with other issues of concern, such as climate change and environmental protection (e.g. showing leadership via the forthcoming eighth Environmental Action Programme and engaging with the European Environmental Agency, with its theme 'environment and health').
Monitoring	Recommend and support Member States to set up a monitoring system to assess the status of food environments, and to measure progress on achieving the goals of nutrition and health plans.

a: EUR-Lex. Proposal for a COUNCIL DIRECTIVE amending Directive 2006/112/EC as regards rates of value-added tax COM/2018/020 final—2018/05 (CNS). https://ec.europa.eu/taxation_customs/sites/taxation/files/18012018_proposal_vat_rates_en.pdf.

b: DIRECTIVE (EU) 2018/1808 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 14 November 2018 amending Directive 2010/13/EU on the coordination of certain provisions laid down by law, regulation or administrative action in Member States concerning the provision of audiovisual media services (Audiovisual Media Services Directive) in view of changing market realities. EUR-Lex: https://eur-lex.europa.eu/legal-content/EN/TXT/%20PDF/?uri=CELEX:32018L1808&from=HR.

profiles to restrict nutrition and health claims of food high in salt, sugars and/or fat', and a 'proposal for a harmonized mandatory front-of-pack nutrition labelling'.[9] The Farm to Fork actions address key aspects of the food environment, although not as comprehensive as those suggested by the experts in our Food-EPI EU. Specific actions related to food promotion, retail and trade are lacking in the Farm to Fork strategy, whereas this Food-EPI EU recommends e.g. restrictions or bans on the (online) marketing of unhealthy foods to children, an EU-wide retail sector commitment to remove ultra-processed foods from near checkout counters and mandatory health impact assessments for new trade agreements. Moreover, most actions in the Farm to Fork strategy are self-regulatory, voluntary measures (e.g. expecting food companies to take action on reformulation and adapting marketing strategies), whereas this Food-EPI EU goes further and recommends that the EU develops and implements mandatory structural interventions, such as ambitious, mandatory food composition targets. However, the need for binding legislation in the form of a legislative framework for a sustainable food system has been addressed in the Farm to Fork Strategy.[9] A recent paper outlined proposals on the scope and focus of this legislative framework, including the principle to 'Enhance the food environments in which consumer choices are made to encourage healthy, just, affordable and sustainable outcomes'.[33] Some EU Member States have already progressed by developing or implementing more mandatory, structural interventions, such as Denmark with a trans-fat ban[15] and Spain with their plans to ban advertising of unhealthy foods aimed at children.[34] This suggests that the EU could do more to commend these pioneering achievements, and encourage other Member States to better them.

Such structural policies are more likely to result in sustainable changes in food consumption.[7,35] And as the impact of combined interventions is greater than the impact of individual interventions,[36,37] the experts in this study emphasized that measures should be part of a high-level EU Strategy for the prevention of NCDs and recommend harmonization of the promotion of healthy diets with other issues of concern, such as environmental protection. Thus, this Food-EPI EU could be used in addition to the Farm to Fork Strategy, as the actions complement each other well in the ambition to create healthier and more sustainable food environments in EU Member States.

This study has a number of important strengths. It is the first study at EU-level that applied a comprehensive mixed-methods approach to generate insight into policy and infrastructure support gaps, as well as actions to improve food environments in the EU. Secondly, policies studied were verified by EU governmental officials and evaluated by independent experts. Thirdly, experts in this study were asked to prioritize the policy actions on equity, in addition to their importance and achievability.

Nevertheless, some limitations should be acknowledged. Firstly, due to the Covid-19 restrictions, the workshop (Step 4) was conducted online with a small group of experts instead of the face-to-face meeting with the entire expert panel. In addition, we experienced a drop-out in participation, as fewer experts participated in the follow-up surveys ($n = 16$, $n = 21$) compared to the first survey ($n = 31$), highlighting the limitations of an online format. Yet, compared to other Food-EPI studies, the number

Downloaded from https://academic.oup.com/eurpub/article/32/3/504/6545820 by University College Cork user on 24 November 2022

of participants in our prioritization survey ($n = 21$) was in line with other countries.[21–23]

We also have recommendations for future research. First, this Food-EPI EU constructed scorecards (figures 2 and 3) on the strength of EU-level policies, which facilitates monitoring over time. In the long-term, this study can contribute to a global database for monitoring and evaluating policies directed at improving food environments. A second recommendation is to identify 'why' recommended policies have or have not been successfully implemented, which can support uptake of policies.[38] A third recommendation is to incorporate sustainability indicators in future Food-EPI studies.[16] Fourth, it is recommended to monitor policies and practices implemented by the food industry, as a multisector response is needed in the prevention of NCDs[39] and this could inform efforts to hold the private sector accountable.[40] A final recommendation is to compare the outcomes of this study, with outcomes of the national Food-EPI studies conducted as part of PEN (Ireland, the Netherlands, Norway, Poland and Germany) and the H2020 Science and Technology in childhood Obesity Policy (STOP) project (Slovenia, Spain, Portugal, Estonia and Finland).

Conclusions

Experts considered most EU-level policies directly influencing food environments in EU Member States as weak, while most infrastructure support was rated as moderate. Recommended actions should be implemented by the EU to create healthy food environments in EU Member States.

Supplementary data

Supplementary data are available at *EURPUB* online.

Acknowledgements

We would like to thank all the experts who participated in study for their time, efforts and valuable contributions. This research is part of the Policy Evaluation Network (PEN): https://www.jpi-pen.eu/. PEN is funded by the Joint Programming Initiative: a Healthy Diet for a Healthy Life (JPI-HDHL): https://www.healthydietforhealthylife.eu/, a research and innovation initiative of EU member states and associated countries. The funding agencies supporting this work are (in alphabetical order of participating countries): France: Institut National de la Recherche Agronomique (INRA); Germany: Federal Ministry of Education and Research (BMBF); Ireland: Health Research Board (HRB); Italy: Ministry of Education, University and Research (MIUR); The Netherlands: The Netherlands Organization for Health Research and Development (ZonMw); New Zealand: The University of Auckland, School of Population Health; Norway: The Research Council of Norway (RCN); Poland: The National Centre for Research and Development (NCBR).

Funding

The authors declare that this study received funding from The Netherlands Organization for Health Research and Development (ZonMw), project number 529051020.

Disclaimer

ZonMw had no role in the design, collection, analysis, interpretation of data, the writing of this article or the decision to submit it for publication.

Data availability

The evidence document is available at: https://www.jpi-pen.eu/images/reports/20200904_Food-EPI_EU.pdf.
Data from the rating, selection and prioritization surveys can be provided anonymously upon request.

Ethical declarations

The study was conducted according to the ethical standards declared in the Declaration of Helsinki. This study was granted ethical approval by the Science-Geosciences Ethics Review Board (SG-ERB), Utrecht University, The Netherlands (ERB Review Geo L-19254).

Informed consent

Informed consent was obtained from all individual participants included in the study.

Conflicts of interest: The authors declare that they have no conflicts of interest. All participants signed a conflict of interest form before participation.

Key points

- Experts rated EU-level policies directly influencing food environments largely as weak or very weak, while most infrastructure support was rated moderate.
- There is large potential for the EU to strengthen its policies and infrastructure support in order to improve food environments in EU Member States.
- Recommended actions should be implemented by the EU to create healthy food environments and reduce overweight, obesity and diet-related chronic diseases in EU Member States.

References

1 EUROSTAT. Obesity in Europe, 2021. Available at: https://ec.europa.eu/eurostat/databrowser/view/sdg_02_10/default/table?lang=en (April 2021, date last accessed).

2 World Health Organization. Factsheet Obesity and Overweight, 2020. Available at: https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight (April 2021, date last accessed).

3 Branca F, Lartey A, Oenema S, et al. Transforming the food system to fight non-communicable diseases. *BMJ* 2019;364:l296.

4 GBD 2019 Risk Factors Collaborators. Global burden of 87 risk factors in 204 countries and territories, 1990-2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet* 2020;396:1223–49.

5 Swinburn B, Sacks G, Vandevijvere S, et al.; INFORMAS. INFORMAS (International Network for Food and Obesity/non-communicable diseases Research, Monitoring and Action Support): overview and key principles. *Obes Rev* 2013;14:1–12.

6 Moodie DR, Swinburn B, Richardson J, Somaini B. Childhood obesity – a sign of commercial success, but a market failure. *Int J Pediatr Obes* 2006;1:133–8.

7 Swinburn BA, Sacks G, Hall KD, et al. The global obesity pandemic: shaped by global drivers and local environments. *Lancet* 2011;378:804–14.

8 White M, Aguirre E, Finegood DT, et al. What role should the commercial food system play in promoting health through better diet? *BMJ* 2020;368:m545.

9 European Union. Farm to Fork Strategy. For a Fair, Healthy, and Environmentally-Friendly Food System, 2020. Available at: https://ec.europa.eu/food/sites/food/files/safety/docs/f2f_action-plan_2020_strategy-info_en.pdf (April 2021, date last accessed).

10 Swinburn B, Vandevijvere S, Kraak V, et al.; INFORMAS. Monitoring and benchmarking government policies and actions to improve the healthiness of food environments: a proposed government Healthy Food Environment Policy Index. *Obes Rev* 2013;14:24–37.

Downloaded from https://academic.oup.com/eurpub/article/32/3/504/6545820 by University College Cork user on 24 November 2022

11 Gorski MT, Roberto CA. Public health policies to encourage healthy eating habits: recent perspectives. *J Healthc Leadersh* 2015;7:81–90.

12 Mozaffarian D, Angell SY, Lang T, Rivera JA. Role of government policy in nutrition-barriers to and opportunities for healthier eating. *BMJ* 2018;361:k2426.

13 Story M, Kaphingst KM, Robinson-O'Brien R, Glanz K. Creating healthy food and eating environments: policy and environmental approaches. *Annu Rev Public Health* 2008;29: 253–72.

14 European Union. Consolidated version of the Treaty on the Functioning of the European Union. *OJ* 2012; C;326:47–390. Available at: EUR-Lex: https://eur-lex.europa.eu/legalcontent/EN/T XT/P DF/?uri=CELEX:12012E/T XT&from=EN (April 2021, date last accessed).

15 Lloyd-Williams F, Bromley H, Orton L, et al. Smorgasbord or symphony? Assessing public health nutrition policies across 30 European countries using a novel framework. *BMC Public Health* 2014;14:1195.

16 Sacks G, Kwon J, Vandevijvere S, et al. Benchmarking as a public health strategy for creating healthy food environments: an evaluation of the INFORMAS initiative (2012–2020). *Annu Rev Public Health* 2021;42:345–62.

17 Djojosoeparto SK, Kamphuis CBM, Vandevijvere S, et al.; for the Food-EPI project team. JPI-HDHL Policy Evaluation Network. The Healthy Food Environment Policy Index (Food-EPI): European Union. An Overview of EU-Level Policies Influencing Food Environments in EU Member States. Utrecht, Utrecht University, 2021. Available at: https://www.jpi-pen.eu/images/reports/20200904_Food-EPI_EU.pdf (April 2021, date last accessed).

18 Vandevijvere S. INFORMAS PROTOCOL PUBLIC SECTOR MODULE. Healthy Food Environment Policy Index (Food-EPI). Extent of Implementation of Food Environment Policies by Governments Compared to International Best Practice & Priority Recommendations, 2017. Available at: https://figshare.com/articles/journal_contribution/INFORMAS_Protocol_Public_Sector_Module_-_Healthy_Food_Environment_Policy_Index_Food-EPI_/5673439 (April 2021, date last accessed).

19 European Commission. COMMISSION REGULAT ION (EU) 2019/649 of 24 April 2019 amendingannex III to regulation (EC) no 1925/2006 of the European Parliament and of the Council as regards transfat, other than trans fat naturally occurring in fat of animal origin. *OJ* 2019, L;110:17–20. Available at: https://eur-lex.europa.eu/legal-content/EN/T XT/P DF/?uri=CELEX:32019R0649&from=EN (April 2021, date last accessed).

20 Vandevijvere S, Barquera S, Caceres G, et al. An 11-country study to benchmark the implementation of recommended nutrition policies by national governments using the healthy food environment policy index, 2015-2018. *Obes Rev* 2019;20: 57–66.

21 Harrington JM, Leydon CL, Twohig CH, Vandevijvere S, for the Food-EPI project team. Policies for Tackling Obesity and Creating Healthier Food Environments in Ireland: Food-EPI 2020. Current Policies and Priority Actions. Cork, School of Public Health, University College Cork, 2020. Available at: https://www.jpi-pen.eu/images/reports/IE_Food-EPI%20Report_19Nov20.pdf (April 2021, date last accessed).

22 Torheim LE, Løvhaug AL, Huseby CS, et al. Norwegian Food-EPI Report. Sunnere matomgivelser i Norge. Vurdering av gjeldende politikk og anbefalinger for videre innsats. Food-EPI 2020. Oslo, OsloMet – storbyuniversitetet, 2020. Available at: https://www.jpi-pen.eu/images/reports/FoodEPI-Report-Norway-2020.pdf (April 2021, date last accessed).

23 Djojosoeparto SK, Kamphuis CBM, Vandevijvere S, Poelman MP, on behalf of the JPI-HDHL Policy Evaluation Network. The Healthy Food Environment Policy Index (Food-EPI): the Netherlands. An Assessment of National Governmental Policies Affecting the Food Environment in the Netherlands and Policy Actions for Creating a Healthy Food Environment. Utrecht, Utrecht University, 2021. Available at: https://www.jpi-pen.eu/images/reports/Dutch_Food-EPI_FinalReport_Jan2021_mod.pdf (April 2021, date last accessed).

24 European Union. Consolidated version of the Treaty on the European Union. *OJ*, 2012, C;326:13–45. Available at: https://eur-lex.europa.eu/resource.html?uri=cellar:2bf140bf-a3f8-4ab2-b506-fd71826e6da6.0023.02/DOC_1&format=PDF (April 2021, date last accessed).

25 Garde A. *EU Law and Obesity Prevention*. Alphen aan den Rijn, The Netherlands: Kluwer Law International BV, 2010.

26 Greer SL, Fahy N, Elliot HA, et al. *Everything you always wanted to know about European Union health policies but were afraid to ask*. Copenhagen, Denmark: World Health Organization, The European Observatory on Health Systems and Policies, 2014.

27 De Ruijter A. The silent revolution of EU health law & policy. In: De Ruijter A. *EU Health Law & Policy: The Expansion of EU Power in Public Health and Health Care*. Oxford, United Kingdom: Oxford University Press, 2019; 1–23.

28 Mialon M. An overview of the commercial determinants of health. *Global Health* 2020;16:74.

29 Miller D, Harkins C. Corporate strategy, corporate capture: food and alcohol industry lobbying and public health. *Crit Soc Policy* 2010;30:564–89.

30 Tselengidis A, Östergren P. Lobbying against sugar taxation in the European Union: analysing the lobbying arguments and tactics of stakeholders in the food and drink industries. *Scand J Public Health* 2019;47:565–75.

31 EU Pledge. About the EU Pledge. Available at: https://eu-pledge.eu/about-the-eu-pledge/ (April 2021, date last accessed).

32 Food and Agricultural Organization. Agroecology Knowledge Hub. European Union's Farm to Fork Strategy – For a Fair, Healthy and Environmentally-Friendly Food System. Available at: http://www.fao.org/agroecology/database/detail/en/c/1277002/ (May 2021, date last accessed).

33 Baldock D, Hart K. Pathways Towards a Legislative Framework for Sustainable Food Systems in the EU. Institute for European Environmental Policy 2021. Available at: https://ieep.eu/uploads/articles/attachments/e197c2ac-39e7-4770-bf40-87f71d2e36ee/Sustainable%20food%20systems%20report_IEEP_October%202021.pdf?v=63802403042 (November 2021, date last accessed).

34 Reuters. Europe- No Chocolate or Ice Cream Ads for Kids as Spain Tackles Obesity, 2021. Available at: https://www.reuters.com/world/europe/no-chocolate-or-ice-cream-ads-kids-spain-tackles-obesity-2021-10-28/ (November 2021, date last accessed).

35 Backholer K, Beauchamp A, Ball K, et al. A framework for evaluating the impact of obesity prevention strategies on socioeconomic inequalities in weight. *Am J Public Health* 2014;104:e43–50.

36 Raine KD. Addressing poor nutrition to promote heart health: moving upstream. *Can J Cardiol* 2010;26:21C–4C.

37 Kumanyika SK, Obarzanek E, Stettler N, et al. Population-based prevention of obesity: the need for comprehensive promotion of healthful eating, physical activity, and energy balance: a scientific statement from American heart association council on epidemiology and prevention, interdisciplinary committee for prevention (formerly the expert panel on population and prevention science). *Circulation* 2008;118: 428–64.

38 Phulkerd S, Sacks G, Vandevijvere S, et al. Barriers and potential facilitators to the implementation of government policies on front-of-pack food labeling and restriction of unhealthy food advertising in Thailand. *Food Policy* 2017;71:101–10.

39 The Lancet Diabetes Endocrinology. Food policies: in times of COVID-19 and beyond [editorial]. *Lancet Diabetes Endocrinol* 2021;9:319.

40 Sacks G, Swinburn B, Kraak V, et al.; INFORMAS. A proposed approach to monitor private-sector policies and practices related to food environments, obesity and non-communicable disease prevention. *Obes Rev* 2013;14:38–48.

Downloaded from https://academic.oup.com/eurpub/article/32/3/504/6545820 by University College Cork user on 24 November 2022