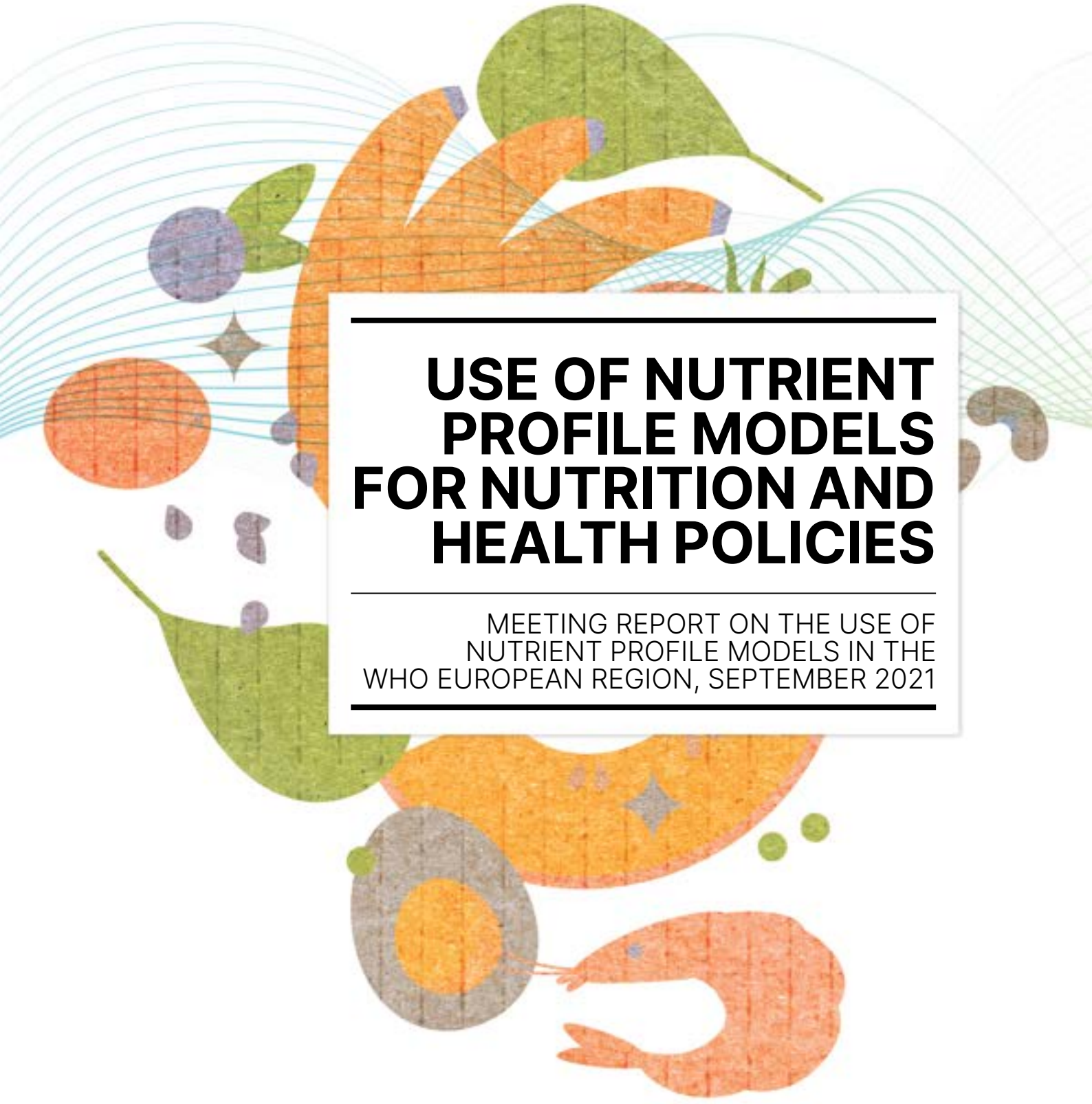

USE OF NUTRIENT PROFILE MODELS FOR NUTRITION AND HEALTH POLICIES

MEETING REPORT ON THE USE OF NUTRIENT PROFILE MODELS IN THE WHO EUROPEAN REGION, SEPTEMBER 2021

World Health Organization
European Region

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ABSTRACT

Nutrient profiling is "the science of classifying or ranking foods according to their nutritional composition for reasons related to preventing disease and promoting health". Nutrient profile models can be used for various purposes. Classification of foods and drinks according to their nutritional composition allows comparisons. The WHO Regional Office for Europe developed a nutrient profile model in 2015 in order to restrict the marketing of unhealthy foods and drinks to children in the Region and, in 2019, launched a draft nutrient profile model to address inappropriate marketing of commercially available complementary foods for infants and young children. This report summarizes the proceedings of an expert meeting on use of nutrient profile models in the WHO European Region in September 2021, convened by the WHO European Office for the Prevention and Control of Noncommunicable Diseases, with proposed revisions to the regional nutrient profile model for restricting marketing of unhealthy foods and finalization of the baby food model, exploring use of nutrient profile models for front-of-pack labelling and the possibilities of applying nutrient profiling to health taxes on food and for healthy, sustainable diets.

KEYWORDS

Noncommunicable disease
Europe
Nutrition
Policy
Nutrient profiling

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EXECUTIVE SUMMARY

An unhealthy diet is a major risk factor for noncommunicable diseases (NCDs), which account for almost 90% of all deaths in the WHO European Region. Nutrient profiling is "the science of classifying or ranking foods according to their nutritional composition for reasons related to preventing disease and promoting health", and nutrient profile models (NPM) are used by governments in making evidence-based decisions and formulating policies to promote public health.

In 2015, the WHO Regional Office for Europe developed an NPM to restrict the marketing of unhealthy foods and non-alcoholic beverages to children. This NPM — referred to as the WHO European Region model — has been adapted and applied by some countries of the Region. In 2019, as part of efforts to address inappropriate marketing of baby and toddler foods, the Regional Office also launched a draft NPM for commercially available complementary foods.

In response to requests from several Member States to update the WHO European Region model and to develop an NPM for front-of-pack labelling, the WHO European Office for the Prevention and Control of NCDs convened a virtual expert meeting on 21–22 September 2021. The aim was to support updating of the regional NPM for restricting marketing to children, updating and finalization of the draft NPM for baby and toddler foods and development of a model for front-of-pack labelling schemes. The meeting also explored potential use of NPM for health taxes on foods and the possibility of integrating sustainability criteria into NPM.

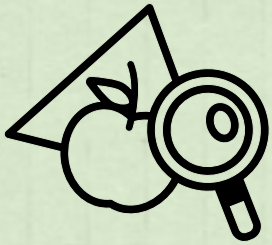
Updating the WHO European Region NPM for restricting marketing of unhealthy foods to children

A number of revisions to the 2015 model were proposed, in collaboration with the Best-ReMaP Joint Action of the European Union. The recommendations were made on the basis of a comparison of the NPMs developed by the WHO regional offices and feedback from Best-ReMaP Joint Action. Relatively few changes have been made to the 2015 model, the main ones being that thresholds should be set:

- ideally, for free sugars rather than for total sugars and/or added sugars; however, in recognition of the difficulty of assessing free-sugar levels in foods, we provide alternative sugar thresholds for total and/or added sugars; and
- for all categories (except fresh fruit and vegetables) rather than prohibiting the marketing of all products in some categories and allowing the marketing of all foods in other categories (besides fresh fruit and vegetables).

The proposed updated WHO European Region model was tested against the food composition databases of Türkiye and the United Kingdom, which had been used previously to compare the WHO regional models, and also a food composition database from Portugal.

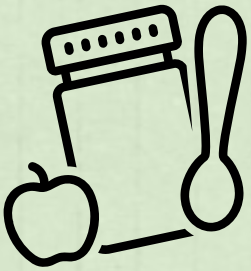
Key points of discussion at the expert meeting included whether total fat should be included in the model (as was proposed), some concern about the proposal to remove energy from the criteria, the difficulty of obtaining data on free sugars and concern about the inclusion of free sugars instead of total and added sugars. It was also suggested that consideration be given to extending the thresholds for non-nutritive sweeteners, which currently apply only to beverages, to foods.



Nutrient profiling for front-of-pack nutrition labelling

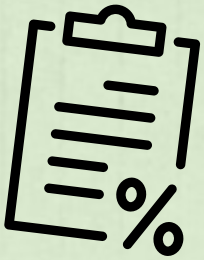
Use of NPMs to derive governmental or government-endorsed front-of-pack labelling schemes is increasing worldwide. Key questions that were discussed during the meeting included which nutrients should be included in an NPM for front-of-pack labelling, whether a regional or global model should be defined for this purpose and whether a combined NPM for front-of-pack labelling and marketing restrictions should be considered. There was support for development of Europe-wide NPMs for application to the most common front-of-pack labelling schemes in use in the Region. The desirability and logic of a common NPM for both marketing and labelling were stressed, but the practical challenges of developing such a model were recognized. It was noted that a support package would be required with guidance for countries on adaptation and implementation of the models.

Updating the NPM for baby and toddler foods



Since WHO European Region published a draft NPM for commercially available complementary foods in 2019, work has been under way to develop an updated version, collect feedback from Member States and develop an online tool to make the model more accessible. In response to the feedback received, a number of revisions were proposed to simplify the model and make it more user-friendly, while ensuring that it remains scientifically sound. The specifications for packaging and marketing remain unchanged from the previous model. Another topic of discussion during the meeting was whether an NPM for foods for infants and young children should include other criteria, such as the extent of processing. Further multinational testing of the proposed revised model is planned, with further consultation on potential inclusion of wider criteria, such as the extent of processing.

Using nutrient profiling as a basis for food taxes

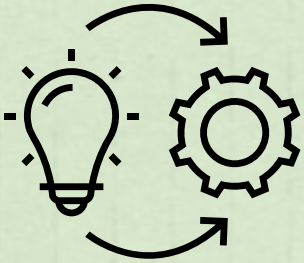


A background paper was presented on use of NPMs in fiscal policies and the associated challenges and opportunities. Although there is increasingly strong evidence of the effectiveness of taxes on food, current taxes have some limitations: the risk of unwanted substitutions may be high, and most current taxes are on sugar-sweetened beverages and are of a simple, unsophisticated design. An NPM-based approach would have several advantages over current taxation approaches, including a holistic measure of the nutritional quality of foods, applicability to all type of food products, creation of stronger incentives for reformulation and potentially stronger public support. Participants expressed support for further work on an NPM-based approach to food taxes. The background discussion paper will be published as a basis for further debate on this issue.

Food profiling for healthy, sustainable diets

Food systems and diets have a substantial impact on the environment, contributing up to one third of greenhouse gas emissions, up to 80% of biodiversity loss and 70% of freshwater use. The importance of transforming food systems to deliver healthy diets from sustainable food systems is now widely recognized. Nutrient or food profiling may be one means to make such changes, with incorporation of sustainability criteria (with or without nutritional criteria). A background paper on the potential development and application of a sustainable food profiling model was presented, with a review of current models for assessing the environmental impact of food products. Further research is necessary to determine the most appropriate approach to a food profile model, including definition of the scope, categories, components, reference amounts and calculations.

Country experience of implementing NPMs



Four countries — Austria, Estonia, Portugal and Slovenia — described their experience in adopting and adapting the WHO European Region NPM for use in national policy. The challenges encountered included opposition from some sectors of the industry (which, in turn, fuelled media misinformation), difficulty in aligning the food categories used in national food-based dietary guidelines with NPM categories and constraints related to the laws that mandat use of the NPM. Despite these challenges, all four countries reported successful implementation of the NPM in national policy.

Conclusions

In view of the conclusions of the expert meeting, the WHO NCD Office proposes to further test the revisions to the 2015 WHO European Region NPM for marketing restrictions against national food databases, further revise and simplify the NPM for baby and toddler foods (with a toolkit for its application) and publish and solicit views on the discussion papers on the use of NPMs for front-of-pack labelling, taxes and environmental sustainability. Together, the revised models and the discussion papers will assist countries in the Region to make progress in using nutrient profiling for healthy, sustainable diets.

INTRODUCTION

An unhealthy diet is one of the main risk factors for noncommunicable diseases (NCDs), which account for almost 90% of all deaths in the WHO European Region. Nutrient profiling is "the science of classifying or ranking foods according to their nutritional composition for reasons related to preventing disease and promoting health" *(1)*. Nutrient profile models (NPM) can be used for various purposes and, by classifying foods and drinks according to their nutritional composition, allow comparisons of foods. NPMs are developed through scientific research and are used by governments in making evidence-based decisions and policies to promote public health.

The WHO Regional Office for Europe developed an NPM in 2015 for use in restricting the marketing of unhealthy foods and non-alcoholic beverages to children in the Region (hereafter referred to as the WHO European Region model). Subsequently, various countries adapted the WHO European Region model to create their own NPMs to limit marketing to children. NPMs have also been proposed by industry, but these are not necessarily endorsed by governments or by WHO. In 2019, the Regional Office for Europe also launched a draft NPM to address inappropriate marketing of commercially available complementary foods for infants and young children. Robust, evidence-based NPMs that are supported and recognized by international governments can support successful implementation of regulations to restrict the promotion of unhealthy products to or for children.

Several Member States in the European Region requested that the NPMs for restricting marketing of unhealthy products to children be updated on the basis of new evidence and requested development of an NPM to inform implementation of front-of-pack labelling. The wide variety of unhealthy food and drink products available on the market, misleading health claims on products and inconsistent nutritional information can result in unhealthy choices and diets that increase the risk of NCDs. Front-of-pack nutrition labelling on food and drink products can help consumers make better choices by helping to rank products according to their healthiness. This may influence consumer choice away from less healthy products towards healthier alternatives, which may improve their diet and reduce their NCD risk. Additionally, front-of-pack nutrition labelling may create incentives for manufacturers to reformulate the nutritional composition of food products. Various front-of-pack labelling systems are in use in the Region, but, regardless of the system, clear NPMs are necessary as a basis for defining the criteria for a classification system. There is also increasing interest in the potential use of NPMs for other policies, including health taxes on foods, and in the possibility of integrating sustainability criteria into NPMs.

The WHO Regional Office for the Prevention and Control of NCDs (NCD Office) has initiated updating of the regional NPM for restricting marketing to children, updating and finalizing the draft NPM for inappropriate marketing of commercially available complementary foods for infants and young children and developing an NPM for front-of-pack labelling schemes as the first of a suite of models. The NCD Office therefore convened a virtual expert meeting on 21–22 September 2021 as a first step in updating the NPMs and drafting a report to be sent to Member States. The programme of the meeting is provided in Annex 1 and the list of participants in Annex 2. In total, 53 experts participated, with 10 WHO staff. This report summarizes the proceedings of the expert meeting, a pre-meeting to discuss criteria for assessing baby foods and a series of background papers (see annexes 3–5).

NUTRIENT PROFILE MODEL FOR RESTRICTING MARKETING OF UNHEALTHY FOODS TO CHILDREN

Exposure of children and adolescents to marketing of foods high in fats, sugars and/or salt increases the likelihood that they will pester for, buy and consume those foods *(2–5)*. The World Health Assembly therefore adopted a *Set of recommendations on the marketing of food and non-alcoholic beverages to children* in 2010 *(6)*. In the WHO European Region, reducing food marketing pressure to children was included as a commitment in the *Vienna declaration on nutrition and noncommunicable diseases in the context of Health 2020 (7)*. Nutrient profile models are a useful tool for classifying foods for which marketing should be restricted, and development of a regional NPM was included as a key activity in the *WHO European food and nutrition action plan 2015–2020 (8)*.

In 2015, the WHO Regional Office for Europe published a regional NPM for use and adaptation by Member States in the Region when developing policies to restrict food marketing to children *(9)*. The nutrient profile was developed by a process that included an expert meeting to agree on the principles, a series of consultations on the draft NPM and pilot-testing in countries. Several countries have since adapted and adopted the WHO European Region model to create their own NPMs in order to limit inappropriate marketing to children. More than 5 years since publication of the regional NPM, WHO has initiated updating and strengthening of the regional NPM.

Professor Mike Rayner, Oxford University, United Kingdom, and Dr Margarida Bica, Directorate General for Health, Portugal, made some recommendations for changes to strengthen the 2015 regional NPM. (See Annex 3, *Recommendations for changes to strengthen the 2015 WHO European Region nutrient profile model*.) The recommendations were based on:

- an internal paper providing comparisons of all the NPMs developed by WHO regional offices and two national government models (Türkiye and the United Kingdom); and
- alignment with the proposal of the Best ReMaP Joint Action of the European Union (see below).

Best ReMaP proposal

One of the main deliverables of the Best ReMaP *(10)* Joint Action of the European Union (EU) is development of an EU-coordinated NPM based on the 2015 WHO European Region model. For this coordinated model, some adjustments were proposed, in coordination with the WHO NCD office. The suggested adjustments are to:

- update the definition of foods high in fats, sugars and/or salt to include products with non-nutritive sweeteners;
- define a general rationale;
- define thresholds for free sugars instead of total sugars;
- update the salt thresholds for some food categories (in line with the recently issued WHO Global sodium benchmarks *(11)*);
- classify products in the categories of processed meat and soft drinks as "not permitted; and
- clarify use of the NPM for composite or combined meals (i.e., meals with more than one component).

This first proposal from Best-ReMaP received feedback from EU Member State partners and will be aligned with the updated WHO European Region NPM. The model will then be tested against national food databases and further updated as required.

Proposed changes to the 2015 WHO European Region nutrient profile model

Precise changes to the 2015 WHO European Region model are recommended in four areas: foods excluded from the model, nutrients and other components, product categories and thresholds.

Foods excluded from the model

The foods and drinks excluded from the updated model, and which should not be marketed to children regardless of their nutrient composition, should be the same as in the original 2015 WHO European Region model, namely:

- products containing > 1 g/100 total fat in the form of industrially produced trans fatty acids;
- beverages in which ⩾ 0.5% of total energy is in the form of alcohol; and
- breastmilk substitutes, follow-up formulas and "growing-up" milks.

In addition, it is proposed that foods for particular nutritional uses and supplements be excluded explicitly.

Nutrients and other components

The nutrients and other components in the 2015 WHO European Region model were: energy, total fat, saturated fat, total sugars, added sugars, non-sugar sweeteners and sodium/salt. It was proposed that the updated model set thresholds for total fat, saturated fat, free sugars, non-sugar sweeteners and sodium. It was proposed there be no threshold for energy. The only category for which an energy threshold was set in the 2015 WHO European Region model was ready-made and convenience foods. It is suggested that the thresholds for both total fat and free sugars make a threshold for energy unnecessary for that category, as for other categories.

The 2015 WHO European Region model set thresholds for the presence and absence of total sugars and/or added sugars for 10 product categories. WHO's guideline on sugars refers to free sugars rather than total sugars or added sugars *(12)*. It was proposed that the thresholds in the updated model ideally be for free sugars rather than for total or added sugars; however, it may be difficult to determine the free sugars content of a food or drink, and it may be more practical to set thresholds for total and added sugars, as was done in the 2015 WHO European Region model. In any case, the free sugars content is calculated as a combination of total and added sugars. An alternative set of thresholds for total and added sugars might be used instead of that for free sugars. Sugar thresholds were proposed for 16 of the 18 categories in the revised model.

The 2015 WHO European Region model set thresholds for non-sugar sweeteners for two beverage categories but for no food categories. It was proposed that thresholds for non-sugar sweeteners continue to be set for all four beverage categories but not for any food categories.

The 2015 WHO European Region model set thresholds for total fat and/or saturated fat for 11 categories and for salt (sodium) for 11 categories. A slight increase in the number of fat and sodium thresholds to 16 and 14 categories, respectively, was proposed in order to set thresholds for all the food categories in the model (except fresh fruit and vegetables) and to create an extra category (see below).

Product categories

The 2015 WHO European Region model included 17 product categories, with some subcategories. It was proposed that the product categories for the updated model include the same categories, with addition of one extra category, plant-based foods/meat analogues. This reflects the growing popularity of these products and their inclusion in the model for the WHO Western Pacific Region *(13)* and in the new WHO Global Sodium Benchmarks *(11)*.

Thresholds

The thresholds for the 2015 WHO European Region model were based mainly on two NPMs used for marketing restrictions in Europe: a Danish and a Norwegian model. For the updated model, a simpler, more systematic method for setting thresholds was proposed, based on WHO's nutrient guidelines and healthy eating guidance. This method is similar to that proposed in the model for the WHO South-East Asian Region and involves converting the nutrient recommendations into reference intakes (in g) on the basis of a diet containing 2000 kcal/day and then calculating "no", "low", "medium" or "high" levels of nutrients as standard percentages of the reference intakes (Table 1).

Table 1. Proposed thresholds for total fat, saturated fat, free sugars and sodium based on reference intakes

	Total fat	Saturated fat	Free sugars	Sodium
WHO recommendation[a]	30% total energy	10% total energy	10% total energy	< 2 g/day
Recommended intake (RI) (g/day)	66.67	22.22	50.00	2.00
Low: 5% of RI (g/100g)	3	1	2.5	0.1
Medium: 25% of RI (g/100 g)	17	6	12.6	0.5
High: 95% of RI (g/100)	63	21	48	1.9
Codex low food (g/100 g)[b]	3	1.5	None	0.12
Codex low drink (g/100 mL)	1	0.75	None	0.12
EU low food (g/100 g)[c]	3	1.5	5 (total sugar)	0.12
EU low drink (g/100 mL)	1	0.75	2.5 (total sugar)	0.12

[a] Reference *14*; [b] Reference *15*; [c] Reference *16*

It was proposed that the choice of a no, low, medium or high threshold for a particular product category be based on:

- other nutrients that are typically present in high amounts in that category. All other aspects being equal, a no or a low threshold should be selected when products in that category generally do not provide nutrients that are necessary for good health (e.g., fibre, minerals, vitamins) in the average diet. High or medium thresholds should apply for products that generally do provide those nutrients to the average diet.

- the energy density of foods in that category. All other aspects being equal, thresholds for foods that are very energy dense (e.g., butter, other fats and oils) should be higher than those for products that contain a lot of water (such as beverages, yoghurts, sour milk and cream).

Since publication of the WHO regional NPMs, WHO has published global sodium benchmarks for different food categories *(12)*. The possibility of using those benchmarks directly for setting sodium thresholds for the updated WHO European Region model was assessed; however, it was suggested that they could not be applied directly because of necessary differences in categorization. The thresholds proposed for sodium in the updated model are, however, well aligned with the global benchmarks.

In accordance with the principles outlined above, the thresholds shown in Table 2 are proposed. Sugar thresholds were proposed for 16 categories, with an alternative set of thresholds for total and added sugars that could be used instead of the free sugar thresholds (Table 3).

Table 2. Proposed thresholds for the updated WHO European Region model and comparison with the thresholds of the previous 2015 WHO European Region model (in parentheses)

Product category	Total fat (g)	Saturated fat (g)	Free sugars (g)	NSS (g)	Sodium (g)	Energy (kcal)	Same components as in 2015 WHO European Region model
Chocolate and sugar confectionery	3		0				But thresholds for low total fat and no free sugars rather than the whole category being not permitted
	(Not permitted)						
Cakes and sweet biscuits	3		0		0.1		But a thresholds for low total fat, no free sugars and a low threshold for sodium rather than the whole category being not permitted
	(Not permitted)						
Savoury snacks			0 (0 AS)		0.1 (0.04)		Same threshold for free sugars as the previous one for added sugars but a low threshold for sodium
Beverages							
Juices			0	0			But no thresholds for free sugars and NSS rather than the whole category being not permitted
	(Not permitted)						
Milk drinks	3 (2.5)		0 (0 AS)	0 (0)			Same thresholds for free sugars as the previous one for added sugars and for NSS but a low threshold for fat
Energy drinks			0	0			But no thresholds for free sugars and NSS rather than the whole category being not permitted
	(Not permitted)						
Other drinks			0 (0 AS)	0 (0)			Same threshold for free sugars as the previous one for added sugars and the same threshold for NSS

Edible ices	3		0	0.1		But a low threshold for total fat and no threshold for free sugars and a low threshold for sodium rather than the whole category being not permitted
	(Not permitted)					
Breakfast cereals	17 (10)		12.5 (15 TS)	0.5 (0.64)		But medium thresholds for total fat, free sugars and sodium and no threshold for added sugars
Yoghurts, sour milk and cream	3 (2.5)	1 (2)	2.5 (10 TS)	0.1 (0.08)		But low thresholds for total fat, saturated fat, free sugars and sodium and no threshold for total sugars
Cheese	17 (20)			0.5 (0.52)		But medium thresholds for total fat and sodium
Ready-made and convenience foods	17 (10)	6 (4)	12.5 (10 TS)	0.5 (0.4)	(225)	But medium thresholds for total fat, saturated fat, free sugars and sodium and no thresholds for total sugars and energy
Butter, other fats and oils		21 (20)		0.5 (0.52)		But a high threshold for saturated fat and a medium threshold for sodium
Bread, bread products and crisp breads	17 (10)		0 (10 TS)	0.5 (0.48)		But a medium threshold for total fat, no threshold for free sugars and a medium threshold for sodium and no threshold for total sugars
Fresh or dried pasta, rice and grains	3 (10)		0 (10 TS)	0.5 (0.48)		But a low threshold for total fat, no threshold for free sugars, a medium threshold for sodium and threshold for total sugars
Fresh and frozen meat	17					But a medium threshold for total fat rather than the whole category being permitted
	(Permitted)					
Processed meat	17 (20)			0.5 (0.68)		But medium thresholds for total fat and sodium
Fresh and frozen fruit and vegetables	Permitted					All thresholds effectively the same
	(Permitted)					
Processed fruit and vegetables	3 (5)		0 (0 AS, 10 TS)	0.5 (0.4)		Same threshold for free sugars as the previous one for added sugars but a low threshold for total fat, a medium threshold for sodium and no threshold for total sugars
Sauces, dips and dressings	17 (10)		0 (0 AS)	0.5 (0.4)		Same threshold for free sugars as the previous one for added sugars but medium thresholds for total fat and sodium
Plant-based foods/ meat analogues	17		0	0.5		New category: a medium threshold for total fat, no threshold for free sugars and a medium threshold for sodium

In parentheses, 2015 WHO European Region threshold

AS, added sugars; TS, total sugars; NSS, non-sugar sweeteners

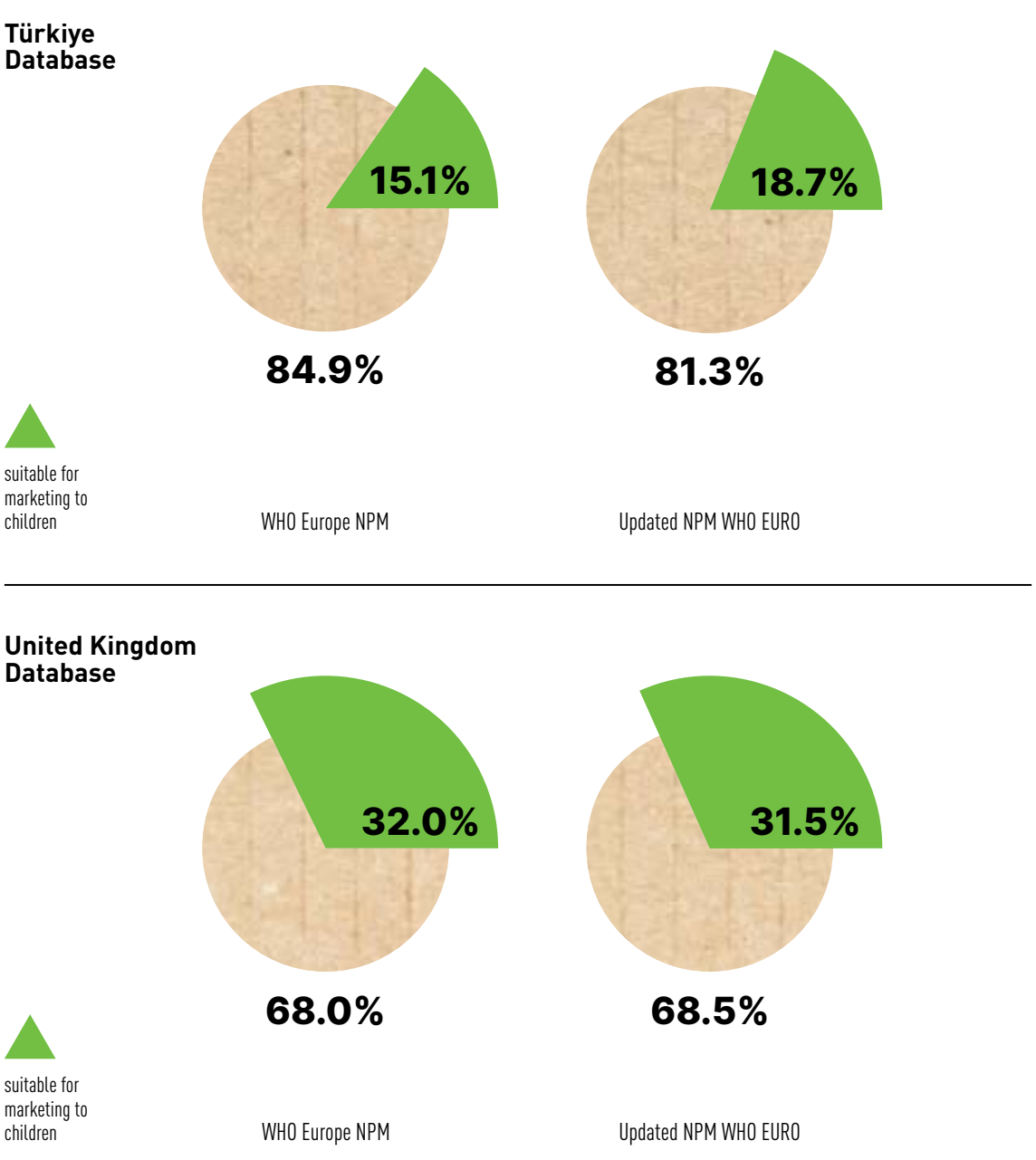
Table 3. Alternative thresholds for sugars in an updated WHO European Region model (and for Best-ReMaP proposal)

	2015 WHO European Region model		Draft updated WHO European Region model	Alternative sugar thresholds for updated WHO E uropean Region model		Assumptions for analysis when no information available on added sugars or free sugars		Best-ReMaP proposal
						Updated WHO European Region model	Alternative sugar thresholds	
Product category	**Total sugars (g)**	**Added sugar (g)**	**Free sugars (g)**	**Total sugars (g)**	**Added sugars (g)**	**Total sugars (g)**	**Total sugars (g)**	**Free sugars (g)**
Chocolate and sugar confectionery	Not permitted		0		0	0	0	Not permitted
Cakes and sweet biscuits	Not permitted		0		0	0	0	Not permitted
Savoury snacks		0	0		0	0	0	0
Beverages								
Juices	Not permitted		0	0		0	0	Not permitted
Milk drinks		0	0		0	Any permitted	0	0
Energy drinks	Not permitted		0		0	0	0	Not permitted
Other drinks		0	0		0	0	0	0
Edible ices	Not permitted		0		0	0	0	Not permitted
Breakfast cereals	15		12.5	12.5		12.5	12.5	15
Yoghurts, sour milk and cream	10		2.5	12.5		2.5	12.5	6.25
Cheese								
Ready-made and convenience foods	10		12.5	12.5		12.5	12.5	6.25
Butter, other fats and oils								
Bread, bread products and crisp breads	10		0	12.5		Any permitted	12.5	6.25
Fresh or dried pasta, rice and grains	10		0	12.5		Any permitted	12.5	6.25
Fresh and frozen meat								
Processed meat								
Fresh and frozen fruit and vegetables	Permitted		Permitted	Permitted				Permitted
Processed fruit and vegetables	10	0	0		0	0	0	0
Sauces, dips and dressings		0	0		0	0	0	3.125
Plant-based foods/ meat analogues	NA	NA	0		0	0	0	Not available

Testing the proposed updated WHO European Region regional nutrient profile models

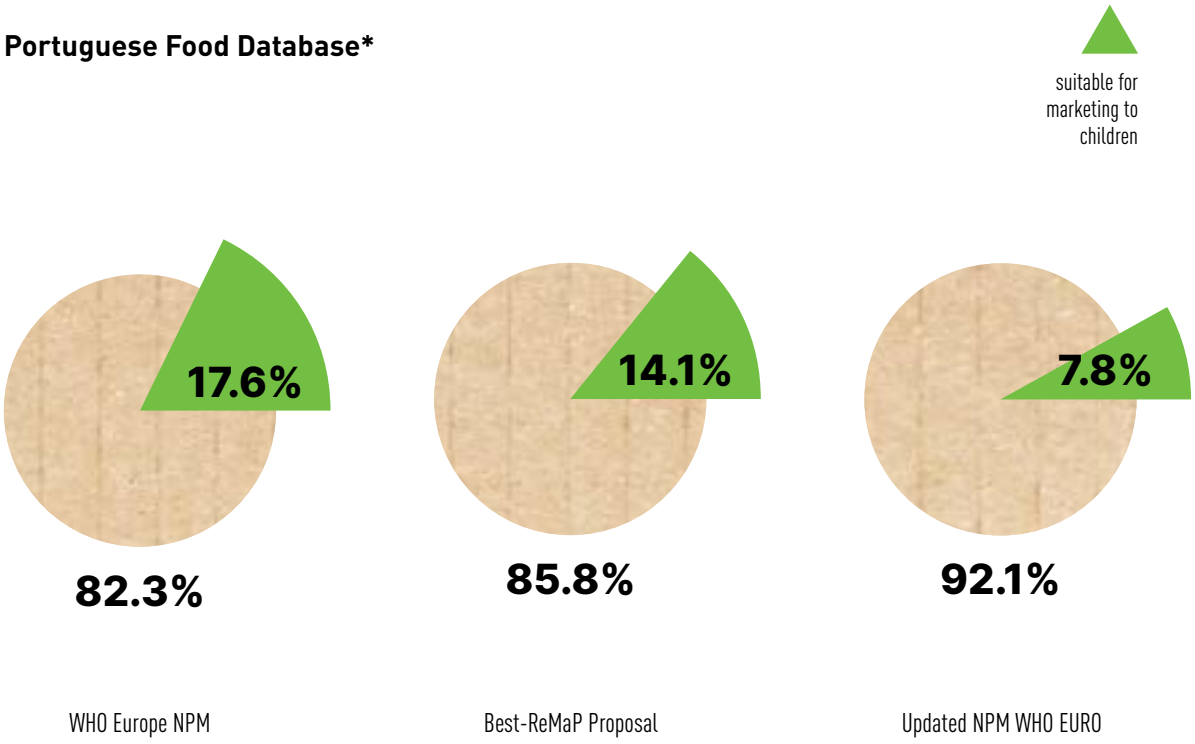
Some preliminary testing of the proposed updated WHO European Region model was conducted with two food composition databases, one from Türkiye and one from the United Kingdom (Fig. 1). The databases had previously been used to compare the WHO regional model adaptations.

Fig. 1. Comparison of the percentages of foods in two food composition databases that are classified as suitable for marketing to children (in green), according to the proposed updated WHO European Region regional NPM and the 2015 WHO European Region model



The proposal for an updated regional NPM was also tested against a Portuguese food dataset (Fig. 2). The advantage of this dataset is that it includes total, added and free sugars; therefore, fewer assumptions had to be made in testing the models. This database includes only the food categories most usually marketed to children and adolescents and the food categories that contribute most to sugar intake in these age groups. For this test, the updated WHO European Region proposal was also compared with the model proposed in the Best-ReMaP project.

Fig. 2. Comparison of the percentages of foods in a Portuguese food composition database that are classified as suitable for marketing to children (in green), according to the 2015 WHO European Region NPM, the Best-ReMaP proposal and the proposed updated WHO European Region regional model



* Fewer categories tested – the categories included sugary products

Generally, the tests showed that the updated WHO European Region model performs similarly to the 2015 WHO European Region model. (See Annex 3 for more detail.) The test also showed how difficult it is to apply the updated model (at least to the foods in a food composition database) when free sugars information is not available in order to make comparisons between the models. This is particularly true in categories such as processed fruit and vegetables and yoghurts, sour milk and cream, where the sugars are often a combination of free and non-free sugars.

The next steps in updating the regional NPM include soliciting feedback on the proposal and revisions to take into account the feedback followed by further testing against national food composition databases. The revised WHO European Region model will then be available for Member States to adapt for their own context as appropriate.

Discussion

The importance of ensuring that the WHO European Region model, which applies to the whole WHO European Region, and the Best-ReMaP model for the EU are well aligned was emphasized, as this is critical to avoid creating confusion or discrepancies for Member States. The teams involved in developing or updating the models are ensuring a coordinated approach.

A number of the proposed changes to the WHO regional NPM were discussed at the expert meeting, in the plenary session and in subsequent working groups.

Total fat: There was some discussion of whether it is necessary to include total fat in the model and whether there should be more emphasis on the quality of fat. Total fat is included in the proposed revision to the model because WHO has a (draft) guideline on total fat intake, but its inclusion does not result in dramatic changes to the performance of the model.

Energy density: Concern was raised about the proposal to exclude energy density from the model. It was explained that, in the 2015 WHO European Region NPM, energy density was used only for composite dishes, which, in effect, duplicates the effect of the thresholds for total fat and total sugars. An alternative would be to keep energy density but not to include total fat in the updated model.

Sugars: The difficulty of obtaining data on free sugars was highlighted and raised repeatedly as a potential problem. Total sugars were included in the model because the data are readily available; however, this would unfairly penalize foods that contain intrinsic sugars such as those in fruits and vegetables. Some products are now being sweetened with very sweet fruits, such as dates; when the fruit is dried, these should be considered free sugars. Added sugars were also used in some categories. Neither definition is aligned with the WHO Guideline, which concerns free sugars. Because of the difficulty of obtaining data on free sugars for updating the regional NPM, alternative thresholds were also proposed for total and added sugars. Setting thresholds for total sugars for different sub-categories would be one means to overcome the issue; in liquid dairy, for example, lactose can be assumed to be present at 4–5%, and a total sugars content of 10% would equate to 5–6% of free sugars. Calculation of free sugars from label information on total sugars would, however, be problematic. It was suggested that total, added and free sugars all be kept in the model.

Non-nutritive sweeteners: The scientific justification for allowing the marketing of foods but not drinks containing non-nutritive sweeteners was questioned. Some adapted WHO regional NPMs do include thresholds for non-nutritive sweeteners in foods. Extension of thresholds for non-nutritive sweeteners to foods does, therefore, warrant consideration.

Baby foods: While breastmilk substitutes, follow-up formulas and growing-up milks were specifically excluded from the proposed revised model, there was confusion about baby foods (commercial complementary foods). It was explained that such foods should

be excluded, and this will be more explicit in the revised model.

Strictness: The updated regional model would maintain the degree of strictness, i.e., the proportion of foods for which marketing would be permitted, as in the 2015 model.

Not permitted categories: In the existing WHO European Region NPM, several categories were "not permitted". In the proposed revisions, thresholds for "low total fat", "no free sugars" and "low sodium" were used instead of the whole category being "not permitted" per se. This approach was challenged, as the objective would be to eliminate children's exposure to marketing of chocolate, confectionery, cakes, biscuits and energy drinks rather than to promote reformulation of such products to meet the thresholds. It was suggested, however, that application of strict thresholds to categories such as confectionery may have the same effect as designating the category "not permitted". The two are different ways to achieve the same outcome. There was also discussion of how to improve the nutritional quality of products for which marketing is not permitted; e.g., Portugal has issued a law to specify limits on sugars and salt in such products.

Energy drinks: The caffeine content of energy drinks is another issue of concern for children, and this concern should be addressed in the revised NPM. It was suggested that caffeine be included in the model.

Fresh meat: Inclusion of a threshold for red meat, as has been done in other regional NPMs, was proposed, given that interest has been expressed in restricting red meat consumption and increasing awareness about the sustainability of red meat consumption.

Degree of processing: The issue of whether the model should differentiate between minimally and highly processed foods was raised.

Other: A new category, "other", was suggested for inclusion of specific products in each country.

Broader discussion included how the approach of classifying foods as healthy or unhealthy is related to overall diets and underlined the importance of WHO guidance and support to Member States for policy planning and implementation with the regional NPM (and other models).

NUTRIENT PROFILE MODELS FOR FRONT-OF-PACK LABELLING

Placing simple nutrition information in a prominent place on the front of food packages can guide consumers towards healthier food choices and can encourage manufacturers to reformulate their food products *(17–20)*. There is growing use of front-of-pack labelling *(21)*, which, in relation to salt intake, is recommended as one of WHO's "best buys" for reducing unhealthy diet *(22)*.

Dr Marie-Eve Labonté, Université Laval, Canada, provided an overview of the main characteristics of government-based or government-endorsed NPMs that have been prepared in the context of front-of-pack labelling worldwide. A systematic review by Dr Labonté and colleagues in 2018 *(23)* identified 387 potential models, and 78 models were included, all of which had been developed or endorsed by governmental or intergovernmental organizations and used in government nutrition-related policies and regulations. As of May 2016, 12 of the 78 models had been developed primarily for front-of-pack labelling. Of these, about one third each had been developed in the Americas, Europe and the Middle East and Asia and Pacific combined. The systematic review is currently being updated and some preliminary results are available.[1]

Use of NPMs to derive governmental or government-endorsed front-of-pack labelling schemes is increasing worldwide. Almost 30 NPMs have been published in the past 13 years, six of which were developed in countries in the WHO European Region: Heart symbol (Finland), NutriScore (France), Keyhole (Sweden), traffic light labelling (United Kingdom), Choices (international) and Healthy Living Mark (Croatia). Israel, another Member State of the WHO European Region, has also implemented front-of-pack nutrition labelling.

Comparison of the period since June 2016 with that between 2008 and May 2016 shows an increase in the proportion of governmental or government-endorsed models for front-of-pack labelling (67% vs 15%), an increase in use of nutrient-specific systems rather than summary ratings and a decrease in the proportion of models of nutrients to be encouraged. In the past 5 years, the trend has been towards nutrient-specific systems with limits. Fewer models have been tested for validity; less than a third of models for front-of-pack labelling have been validated to some extent, so that the validity and effectiveness of many models remain to be determined. Some characteristics have remained relatively constant, such as limits on sodium, saturated fats and total sugars as nutrients and the wide range of food categories considered (from 1 to 99).

Discussion

The increase in nutrient-specific systems was noted, although the industry tends to oppose systems that limit targeted nutrients. One reason suggested for their increasing use is their relative simplicity, although the difficulty for consumers of determining the relative importance of different nutrients was acknowledged. The increase may be due to the extension of the use of warning labels in the Americas Region, which are nutrient-specific by design. Selection of a front-of-pack labelling scheme and the related NPM depends to a certain degree on the regional and regulatory context and whether governments can implement mandatory schemes. Member States of the EU, for example, cannot implement mandatory additional front-of-pack labelling schemes within the framework of EU food labelling law; as a result, front-of-pack labelling has been introduced only on a voluntary basis. Similarly, the framework legislation in Canada allows Health Canada to propose mandatory

1 Martin et al. (in press).

front-of-pack labelling solely when based on an NPM that includes nutrients to be limited. A front-of-pack labelling scheme that included nutrients to be encouraged could be implemented only on a voluntary basis.

Working group discussions

During the expert meeting, working groups were asked to discuss a number of questions.

What should or could be included in an NPM for front-of-pack labelling?

A group discussed the merits of including both nutrients to be encouraged and nutrients and elements to be limited. While there may be benefits to including positive nutrients, there may also be negative consequences, such as development by industry of ultra-processed foods with increased fibre content and potential creation of inappropriate "health halos" for products.

They agreed that front-of-pack labels must be easily understood by consumers, and threshold criteria should be translated into simple labels. Further work may be required to assess how labels are understood and whether they will change purchases and/or reformulation. The European Commission is assessing the models for consumer perceptions and feasibility.

Should a regional or global model be defined for front-of-pack labelling?

The NPM for front-of-pack labelling may guide the format of the labelling scheme. As there is no single, unified scheme, agreement on a single NPM would be difficult. If there were agreement within the Region on a particular type of front-of-pack label, there could be a harmonized NPM.

Several approaches were identified to take the issue forward:

- a framework of rules and principles that could align different NPMs;
- a comprehensive set of thresholds for any type of front-of-pack labelling scheme, although the question of consistent application of such thresholds in algorithms remains; and
- multiple NPMs, depending on the type of labelling scheme selected.

Consistency of the NPMs used by Member States was recognized as essential, and mandatory implementation was considered to be extremely important. It was recognized that development of a mandatory, harmonized system for the Region would be a major step forward, although many challenges remain. It was acknowledged that different NPMs work in different ways, and full alignment might not be possible without constraining the label formats and what can be achieved with front-of-pack labelling.

To the question of whether the aim should be a global or a regional model, support was expressed for an NPM specific for the European Region, while recognizing the importance of a global approach. Even within the Region and within the EU, countries are acting at different speeds with diverse approaches and requirements for support.

Should there be separate NPMs for front-of-pack labelling and for marketing restrictions, or should they be combined? If so, how?

The desirability and logic of a common NPM for both marketing restrictions and labelling were stressed, as this would simplify integration of the model into policy by Member States.

The practical challenges of developing such a model were recognized, which would depend on the front-of-pack labelling system. The fact that different types of front-of-pack labelling scheme are used in the Region may make it more difficult to reach agreement on a single, unified NPM, and particularly to adapt the current (or proposed) regional NPM for use as a summary front-of-pack labelling system. Summary scoring systems, such as NutriScore, could be adapted. It was proposed that some general rules and principles would support alignment of different NPMs for both marketing restrictions and labelling policy.

It was acknowledged that there are some issues which will be difficult to resolve — such as the lack of alignment on number or type of food categories and whether or not to include nutrients such as fibre. Some Member States have experienced difficulties in attempting to adapt the regional marketing NPM for labelling purposes, and the difficult process of trying to combine different models may increase the possibility of interference from industry and other vested interests.

More generally, marketing restrictions and labelling requirements should be seen as complementary elements of an overall regulatory package — this is particularly important for marketing of breastmilk substitutes and foods for infants and young children. The importance of an NPM for labelling as a strong instrument to advocate for better and more comprehensive labelling was highlighted. Implementation of front-of-pack labelling, for example, can drive progress in addressing the lack of nutrition data.

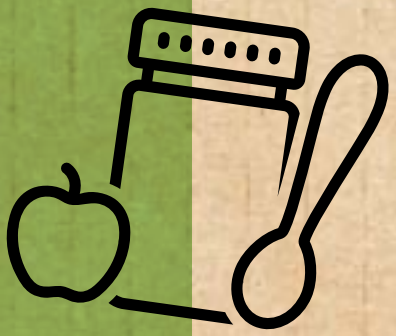
Next steps

Member States clearly require support for introducing front-of-pack labelling. In order to expedite support, it was suggested that WHO European Region could summarize the scientific discussions and develop support materials for countries. WHO European Region could begin by developing models for the two or three most common front-of-pack labelling schemes in use in the Region and a support package with guidance for countries on adaptation and implementation of the models.

It was noted that the NPM for one of the front-of-pack labelling schemes currently in use in Europe, NutriScore, is under review, and an international scientific committee of scientists from the countries that have adopted NutriScore has produced an intermediary report with an updated algorithm.[2]

2 The draft report was approved in January 2022 and is available at: https://solidarites-sante.gouv.fr/IMG/pdf/annual_report_2021.pdf.

NUTRIENT PROFILE MODEL FOR BABY FOOD



Good nutrition in infancy and early childhood is key to ensuring optimal child growth and development and also better health later in life. There is growing concern that inappropriate promotion of commercially produced baby and toddler foods (often called "complementary foods") may be undermining breastfeeding and/or parents' and carers' confidence in home-produced foods. There is also concern that high levels of salt, saturated or *trans*-fatty acids and sugars in some baby or toddler foods may promote dietary habits that increase the risks for obesity and NCDs later in life. In response to those concerns, in 2010, the World Health Assembly called on Member States to end inappropriate promotion of foods for infants and young children *(22)*; in 2016, new global guidance was agreed to help countries take action on this issue *(23)*.

The guidance on ending inappropriate promotion of foods for infants and young children recommends that such foods be promoted only if they meet all the relevant standards for composition, safety, quality and nutrient levels and are in line with national dietary guidelines. It also recommends that NPMs should be developed and used to guide decisions on which foods are inappropriate for promotion.

To provide specific NPMs for baby foods, WHO European Region published a draft NPM for commercially available complementary foods in 2019 *(24)*. The aim of this model, developed by the University of Leeds WHO Collaborating Centre for Nutritional Epidemiology, was to drive changes in product composition, labelling and promotion practices throughout the Region to protect this vulnerable age group. Further analysis of the draft NPM by the Collaborating Centre at Leeds University and a series of updates and changes have been proposed. (See Annex 4.)

Ali Morpeth, University of Leeds, United Kingdom, described the updated NPM and the feedback received, which had raised a number of issues.

- Should positive nutrition or health claims be permitted if the products are fortified (e.g., iron, zinc, iodine)?
- Clarification is required for foods that cannot be categorized, such as dried puddings.
- The model is difficult to apply because nutrition information is not presented consistently on labels in different countries.
- The categories in the NPM are too complex for use in the real world.
- Clearer instructions are necessary on categorization of foods.

An online tool has since been developed to make the model more accessible and usable.[3]

Dr Diane Threapleton, University of Leeds, presented some proposed revisions to the model in response to the feedback, which consist of simplifying the model and rendering it more user friendly, while ensuring that it remains scientifically sound. Four main changes were proposed to the categories.

- Separate non-permitted (e.g., sweet snacks and drinks) and permitted food categories to simplify the model.
- Separate requirements that differ by category from those that apply to all. The criteria for nutrient requirements, front-of-pack age limits and front-of-pack sugar flag differ by category, while the promotional and labelling specifications apply to all products.
- The specifications are presented in columns to facilitate differentiation of category requirements.
- Product categories are simplified, such as combining "pureed" and "non-pureed" meals and separating "savoury meals" from "purees, sauces and meal components".

The proposed updated model fits into a single table (Table 4).

3 Instructions on use of the model can be found at https://youtu.be/lcDIahvJfCU.

Table 4.

Proposed revised nutrient profile model for commercially available complementary foods

Product group	Code	Sub-category description	Details and examples	Content and labelling specifications[13]								
				Energy density (kcal/ 100g)	Sodium (mg/ 100kcal)	Total sugar (%/ Energy)	Protein (g/100kcal) (% total weight)	Total fat (g/100kcal)	Fruit content[3] (% weight)	Age on pack (months)[1]	FOP high-sugar flag [6] (%/ Energy)	Labelling and promotional specifications
Dry foods: dry, powdered, and instant cereal/ starchy foods	1	Dry cereals[2] to be made up or cooked with milk or water	Cereals to be eaten with milk/ equivalent non-sweetened nutritious liquid or water/ equivalent protein-free liquid e.g., Instant porridge, baby rice or dry pasta	≥80 as eaten	50	/	If made with milk: ≤ 5.5g & added protein ≥2g[10]	≤ 4.5g or ≤ 3.3g (if eaten with milk)[12]	≤ 10% dry weight	6-36	>30%	All specifications apply to all categories as detailed in Table 1b
Dairy foods	2	Dairy-based foods, desserts and cereals	The largest ingredient is dairy e.g., "Porridge", "Rice pudding", "Yogurt", "Fromage frais", "Custard". [If fruit content > 5% use cat.3.1]	≥60	50 (100 if name cheese)	/	/	≤4.5g	≤5% (max. 2% dry weight)	6-36	>40%	
Simple purees, sauces, meal components or desserts	3.1	Fruit-containing product	Any product containing fruit[3] (except low fruit dairy cat. 2 or snacks cat. 5) e.g., smoothie, fruit and yogurt, fruit pudding	≥60	50	/	/	≤4.5g	/	6-36 (6-12 for puree)	>30%	
	3.2	Vegetable only puree	Single or mixed vegetables or legumes	<25% added water	50	/	/	≤4.5g	None	6-36 (6-12 for puree)	>30%	
	3.3	Protein source is the only named food	Pureed cooked meat. May contain a small quantity of grain/starch e.g., "Rabbit" or "Lamb" with some rice flour or cornstarch.	≥60	50	/	≥ 7 g named protein[9] & ≥ 40%[7]	≤6g	≤ 5% (max. 2% dry)	6-36 (6-12 for puree)	>15%	
Meals: Savoury food with or without a named protein source or cheese [4, 5]	4.1	Meal WITHOUT a named protein or cheese	Vegetables/legumes with cereals/starches. May contain protein/cheese not listed in product name e.g., "Vegetable pasta", "Risotto", "Carrot and quinoa", "Lasagne"	≥60	50	/	≥ 3 g total protein	≤4.5g	≤5% (max. 2% dry)	6-36 (6-12 for puree)	>15%	
	4.2	Meal WITH CHEESE in product name	Cheese and no other proteins are in the product name e.g., "Cheesy pasta"	≥60	100	/	≥ 3 g total & ≥ 2.2 dairy protein	≤6g	≤5% (max. 2% dry)	6-36 (6-12 for puree)	>15%	
	4.3	Protein source is FIRST named food	e.g., "Rabbit and potatoes", "Beef stew", "Tasty chicken risotto", "Chicken and mozzarella pasta"	≥60	50 (100 if name cheese)	/	≥ 4 g named protein[9] & ≥10%[7,8]	≤6g	≤5% (max. 2% dry)	6-36 (6-12 for puree)	>15%	
	4.4	Protein source is NOT the first named food	Protein source is within name but not the first named food, "Vegetable lamb curry" "Potato and chicken pie"	≥60	50 (100 if name cheese)	/	≥3g total, ≥2.2g named[9] & ≥8%[7,8]	≤4.5g	≤5% (max. 2% dry)	6-36 (6-12 for puree)	>15%	
Snacks and finger foods	5.1	Fruit	Fresh fruit or whole dry fruits or pieces e.g., dry apple slices or raisins. Excludes pulverised/ pureed dry fruits.	<50 kcal per serve	50	/	/	≤4.5g	100%	6-36	>30%	
	5.2	Dry or semi-dry snacks and finger foods	Any grain, starch or root vegetable snack, cracker, bread, crisp/ chip, biscuit, pastry, cake or pancake etc. Includes rusks, crackers and biscuits intended to be eaten dry or pulverised with liquid.[2]	<50 kcal per serve	50	≤15%	Biscuits, if made with high protein food, added protein ≥1.5g[11]	≤4.5g	≤15%	6-36	/	

The promotional specifications for packaging and marketing are unchanged from the previous model. These requirements are designed to stimulate changes in the market and to influence consumer behaviour. They are:

- minimum age on the label, 6 months;
- no claims (compositional, nutritional, health or marketing);
- clear product name (to address misleading names for products);
- clear ingredient list (percentage of largest ingredient, water, fruit and protein source);
- requirements in relation to protecting and promoting breastfeeding; and
- products with a spout must state that they are not to be drunk through the spout.

A number of further issues may be worth consideration:

- Should the model be renamed "nutrient and promotion profile model"?
- Should an assessment be made of how front-of-pack "high sugar" labels are understood by consumers and whether they incite reformulation?
- What is the real impact of very stringent requirements (e.g., no added sugar)? Do they drive consumers to buy foods for general consumption (not baby foods) that are high in sugar and/or salt to feed to babies and toddlers?
- Does and should the NPM cater for the requirements of vegetarian and vegan diets (e.g., ensuring sufficient micronutrients such as iodine, iron and zinc)?
- Are nutrient requirements required for saturated fat and some micronutrients (e.g., iron)?
- Should positive claims be permitted for fortified foods or those with better nutritional content (e.g., "fortified with iron")?
- Should the NPM consider covering emerging products (e.g., baby herbal tea, baby oil) and dairy substitutes (e.g., soy yoghurt, coconut milk porridge)?

Discussion

Experts in the field are discussing whether a model that is designed to end inappropriate promotion of foods for infants and young children should only set requirements for nutrients and labelling or whether other criteria, such as the level of processing, should be included. (See next section.)

When fruit is pureed, the sugars naturally present become free sugars; fruit juice, fruit juice concentrate and dried fruit also contain free sugars. Sugary foods mask bitter flavours, so that babies develop a preference for sweet over savoury foods and thus influence what their parents buy. Total sugars should be included in the NPM to cover all sugars. In the existing model and the proposed revisions, all fruit purees would have to have a "high sugar" flag on the front of the pack. Other suggestions for labelling changes might be considered, e.g., to help consumers understand that sugars in highly pureed fruit become free sugars, that could help to change consumer behaviour and product development. Some families may buy adult and child fruit purees for all the family, including for babies, and these also have a high content of free sugars. A texture score has been suggested on front-of-pack labels, with guidance to stop feeding purees to babies.

Emphasis should not be placed only on changing consumer behaviour but also on policies to create healthy food environments. This will require a combination of policies to inform and enable parents, and caregivers and to convince the industry to change its products and how it promotes them. This implies that stricter thresholds are necessary to drive reformulation and modified product portfolios. It should be noted that the behaviour of parents and caregivers in relation to infant and young child feeding is an extremely sensitive topic, and careful communication is required.

The next step will be to test the revised model. One difficulty in testing is that, although many countries in the European Region have labelling rules that ensure sufficient information on product labels for testing the NPM, others do not or provide only patchy information. In those cases, testing may be conducted against existing product databases.

BROADER CRITERIA FOR ASSESSING FOODS FOR INFANTS AND YOUNG CHILDREN

The criteria of the WHO European Region NPM developed for baby foods relate mainly to nutritional content and labelling; however, additional considerations could be taken into account to assess the healthiness of foods for this vulnerable age group. These issues were explored by a separate group of experts in a meeting before the expert meeting on use of NPMs for nutrition and health policies in the WHO European Region. One additional consideration was the degree of processing. A model based mainly on nutritional content and labelling does not distinguish between ultra-processed foods and less highly processed products. There is some concern that, in order to fully assess the healthiness of baby foods, a hybrid model would be necessary for combined food and nutrient profiling that takes factors such as processing into account.

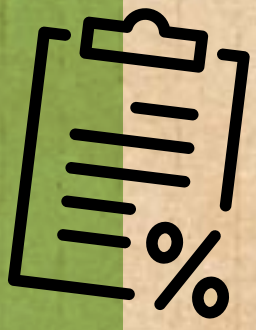
While there is emerging evidence of the effects of ultra-processed foods in the diets of older children and adults, there is very limited evidence in relation to infants and young children. A number of studies have shown that a considerable proportion of baby foods in some countries are ultra-processed *(25, 26),* and there is some debate about whether focusing on nutrient requirements will push the baby food industry to create even more ultra-processed foods for babies and toddlers. In Australia and New Zealand, use of the NPM for the "health star rating", which does not apply to baby foods, does not discriminate between nutrients that are naturally present in foods and those that added by manufacturers to influence the star rating (e.g., protein isolates, non-nutritive sweeteners). Other issues in relation to ultra-processed baby foods include the potential impact on satiety of physical changes to the matrix and texture of food, chemical modifications to ingredients and potential displacement of whole foods and breast milk in the diets of older infants and young children.

The WHO European Region NPM for baby foods includes some criteria for texture and also specifies that no added sugars, salt or non-nutritive sweeteners be added. This could be broadened, with a longer list of ingredients commonly used in ultra-processed foods.

Potential difficulties in incorporating factors such as processing into the NPM were acknowledged. The lack of direct evidence for the age group of interest would leave such a model vulnerable to challenge. Addition of extra criteria might make the model more complex and more difficult to apply, particularly in Member States where labelling laws are less comprehensive. Additional guidance could be prepared for Member States, indicating other classification systems (e.g., NOVA *(27)*) that could be applied separately to foods for infants and young children.

To further explore these issues, and particularly potential inclusion of level of processing and other criteria, further consultations will be held with those using the baby food NPM, and discussions will be held with experts. Lessons might be learnt from experience in other WHO regions, such as the Region of the Americas and the South-East Asian Region.

USING NUTRIENT PROFILE MODELS AS A BASIS FOR FOOD TAXES



The potential role of NPMs in setting food taxes was recognized in the 2015 WHO report on *Fiscal policies for diet and prevention of noncommunicable diseases (28)*. The report noted that

> the development of a nutrient profile model is considered important in identifying the categories of foods subject to the tax and the nutrient thresholds that apply, thus providing a tool for countries to implement fiscal policies.

A background paper on fiscal policies in which NPMs or similar systems are used, and a discussion of the challenges and opportunities involved in using nutrient profiling in designing fiscal policies was written by Professor Franco Sassi and Mathilde Gressier, Imperial College London Business School, United Kingdom (Annex 5). Professor Sassi summarized that work.

Discourse on use of NPMs for taxation purposes has evolved recently and the evidence has become stronger. At a strategy meeting in 2017, an increasing focus on nutrient profiling to improve overall diet quality was noted, but the evidence of a correlation between nutrient profiles and health outcomes was limited. The challenges for tax administration and political acceptability were noted.

The current picture of health taxes on food is encouraging, as there is now much stronger evidence of the effectiveness of such taxes. Current health taxes on food are, however, low and have limited impact on people's diets. The risk of unwanted substitutions, whereby consumers shift to products that are not part of a healthy diet, may be high, and most current taxes are on a single nutrient (such as sugar-sweetened beverages, SSB) and have a simple, unsophisticated design. In addition, the incentives of other consumption taxes (e.g., value added tax (VAT), sales tax) on food and drink products can vastly outweigh those of other food-related taxes. In the United Kingdom, for example, the average household pays £468 in VAT on purchases of food and non-alcoholic beverages, whereas the tax on SSBs (the soft drinks industry levy) is £14.80.

Use of general consumption taxes to improve diets raises a number of issues. Ad valorem taxes are not ideal once nutritional quality is correlated with price, as healthier foods tend to be more expensive *(29)*. Although there are commonly a number of general consumption tax rates in the food sector, they mainly relate to distribution and industrial concerns. Furthermore, consumers are not aware that they are paying higher general consumption taxes, particularly sales taxes, on particular products or why. This is a missed opportunity for an extra signalling effect and raising awareness. Use of nutrient profiling might offer an opportunity to ensure that taxation is a function of nutritional quality, making rate differentiation a function of nutritional quality and making taxes and their rationale more salient.

Very few current health taxes on food are based on NPMs. Among those that do are the Public Health Product Tax for food categories rich in sugar, salt or stimulants in Hungary and the tax on non-essential energy-dense foods in Mexico.

An NPM-based approach has several advantages over current taxation approaches.

- The approach permits a holistic measure of the nutritional quality of foods and not only one dimension. This prevents substitutions that undermine or offset the benefits of a tax. In addition, a tax based on an NPM that covers several nutrients is less likely to target core foods in a healthy diet.
- The model can be applied to all foods, which increases the scope of existing health taxes (which

target a limited number of categories) and can help to avoid difficulty in defining the products to be included in a taxed category. In addition, products with a similar nutrient profile can be taxed consistently, obviating claims of discriminatory taxation.

- NPM-based taxes create stronger incentives for manufacturers to reformulate their products in order unequivocally to improve their nutrient profile.
- There may be strong support for NPM-based taxes, as the public appears to accept taxes that consistently target less healthy foods. Both the soft drinks industry levy in the United Kingdom and the SSB tax in Mexico received 70% support from the public *(30, 31)*.
- Synergies may be achieved with other policy objectives, as, in principle, the same NPM could be used for food taxes, procurement, labelling and dietary guidelines to create clear, consistent incentives for consumers.
- The effect of a tax on less healthy foods could be undermined by price promotions for taxed products that may be larger than taxes on the same products, leading some countries to regulate price promotions. It may, however, be possible to harmonize taxation and regulation of price promotions on the basis of a consistent NPM.

The two main design features for a tax are the tax type and the tax rate and structure. Tax types include specific excise taxes and ad valorem taxes (excise, VAT, sales tax). Ad valorem taxes are not generally seen as desirable for health taxes, because they can widen the gap between cheaper and more expensive products, with the risk that consumers will "trade down" to products of lower quality. If an NPM approach is used, however, this risk will be mitigated, and ad valorem taxes may be preferable to specific excise taxes. The complex distributional impacts of an NPM-based tax require fine balancing of tax design features, including characteristics such as use of nutrient thresholds or overall scores, application of category-specific or across-the-board taxes, which nutrients to include in the NPM and the reference amount and the availability of information on the relevant nutrients and components on food labels.

One means to advance health taxes on food would be a new vision of consumption taxes on food and drink products, i.e., a single ad valorem tax applied to all foods and non-alcoholic beverages, with tax rate differentiation according to NPM scores. The effective tax rate would differ by individuals, and the distributional impact would have both benefits and risks. Some compensatory mechanism might be required. Ideally, this type of ad valorem tax would be a salient tax (i.e., one of which consumers are aware), strengthened by complementary behavioural incentives based on a consistent approach, such as policies on food labelling, advertising regulation and other policies.

Discussion

The work to advance health taxes on food by adoption of an NPM-based approach was warmly welcomed. Finland had expressed particular interest in the work, and interest in other Member States will be explored.

As opposed to tobacco taxation, health taxes on food can shape markets powerfully through use of tiers and thresholds. Consumer awareness and understanding of taxes (salience) is also important. In order for taxes to have a real impact on both supply and demand, they should be designed with NPMs in order to signal to consumers and drive industry action.

A large challenge with respect to health taxation on food is the relative price effect. In many low- and middle-income countries, for example, juices tend to be more expensive and have higher sugar levels than soft drinks or sodas. Thus, taxation of soft drinks could drive a shift towards drinks with higher sugar levels. The potential protection by an NPM-based tax against such a relative price effect and unwanted substitution is very important. The possibility that the industry would use strategic pricing to counter the effect of taxation was raised, as has been seen in relation to SSB taxation, as was the possibility of brand-based competition, which could still result in considerable substitution to cheaper products. More work is needed to explore potential industry responses to an NPM-based tax.

A difficulty with ad valorem taxes is that they are difficult to collect, and introduction of a tiered system of VAT or other consumption taxes may make the system less efficient and more complex. In reality, however, very few countries currently apply a flat general sales tax, and most countries are applying different taxation rates to different products. The question of international trade and whether some governments would argue that such taxes are non-tariff barriers is an important one, which deserves further research and consideration on how best to address the issue.

In order to design appropriate NPMs for taxation, all countries should have comprehensive food composition databases. This is not yet the case, and work is under way, for example in the Balkans. The availability of data on food composition varies considerably within the European Region, with varying needs for WHO support.

Next steps

The background discussion paper presented by Professor Sassi will be further developed and published to inform debate and action on this issue. Three Member States have requested specific support, and a small working group of relevant experts will take this issue forward.

NUTRIENT PROFILE MODELS FOR HEALTHY, SUSTAINABLE DIETS

Food systems and diets have a substantial impact on the environment, contributing up to one third of greenhouse gas emissions, up to 80% of biodiversity loss and 70% of freshwater usage *(32)*. The importance of transforming food systems and shifting consumption towards healthy, sustainable diets is now widely recognized. Nutrient or food profiling may be one means for achieving such changes.

Professor Mike Rayner, Oxford University, United Kingdom, reviewed issues related to sustainable food profiling, which can be defined as

> the science of classifying or ranking foods for reasons related to preventing disease and promoting health and/or reducing the environmental impact of diets *(33)*.

A sustainable food profiling model is, therefore, an algorithm for classifying or ranking foods according to their nutritional composition to prevent disease and promote health or to classify or rank foods to reduce the environmental impact of diets or both. Specific applications of sustainable food profiling include policies for voluntary food product reformulation or product composition regulations, front-of-pack labelling and/or claims, place or price-based promotions, public food procurement and fiscal policies (e.g., agricultural subsidies, consumer taxes and subsidies).

The three types of food profiling models are:

- NPMs: component-specific (nutrients) or overall ratings;
- environmental impact models: component-specific (e.g., water use, climate change, water pollution, biodiversity) or overall ratings; and
- health and environmental impact models: component-specific or overall ratings.

The basic elements of a sustainable food profiling model are:

- the scope (e.g., the products to be included and whether it includes alcoholic beverages);
- the number and types of category (e.g., whether there are different criteria for "meats" and for "vegetables");
- the components (e.g., fat, greenhouse gas emissions); and
- the calculation (e.g., involving thresholds and Boolean operators or an equation).

Academic work is under way, for example, to develop a method for generating an environmental impact score for different foods.

Ms Anne Charlotte Bunge, Stockholm Resilience Centre, summarized a systematic review of current models *(34)*. The review included models developed after January 2000 for assessing environmental and the (not mandatory) nutritional impact of food products, integrating data for two or more environmental indicators, allowing ranking or scoring of individual foods (and not meals, diets or food systems) and generating a score or classification. Ten models were identified in the literature search conducted in May 2020.

Most of the models (70%) were developed by researchers and 60% in the WHO European Region (France, Germany and Switzerland). A total of 18 environmental impact factors were included, the most common being greenhouse gas emissions, water use and land use. The most common reference value for calculating a score was mass basis (g, kg, tonne) (46.2%), followed by energy basis (kcal) (30.8%), serving size (15.4%) and per 100 g protein (7.7%). The review also included the

system boundaries set to assess indicators and found that "cradle to farm gate" were the most common (40%), followed by "cradle to consumer" (30%), "cradle to grave" (20%) and adjustable boundaries (10%).

Of the models identified, only three combined environmental and nutritional components. Since the systematic review search was conducted in 2020, a number of new sustainable food profile models have been launched (e.g., the Eco Score implemented in Lidl shops and the Planet Score in France); other launches are planned.

In conclusion, food profile models are necessary for various food policies apart from labelling. Research should be conducted to determine the best way of developing a food profile model (scope, categories, components, reference amount and calculation). It was suggested that WHO and/or national governments endorse or develop food profile models.

Discussion

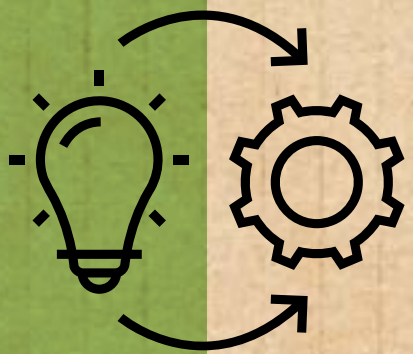
Participants discussed whether there is consensus on the most important environmental indicators to be included. Greenhouse gas emissions, water use, land use and water eutrophication are generally considered to be important, as, together, they provide a good overall picture of the environmental impact of a food.

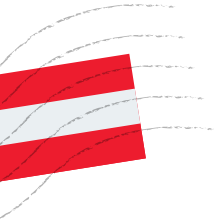
The important concept of social sustainability was raised, and it was noted that this aspect is generally not included in the models developed so far, possibly because the concept is not well understood or precisely defined.

To build a meaningful food profiling model, reliable, comparable indicators are important. The best data are available for greenhouse gas emissions; the availability and quality of data should be improved. It was noted that some data are available on diets *(35)* but much less for individual foods. More information is required about specific foods for the development of policies on labelling, taxation and other aspects, although progress can still be made. Public food procurement was suggested as a suitable entry point for applying sustainable food profiling. It was noted, however, that simple, easy-to-use models or tools are necessary for the approach to be applied in schools and hospitals.

COUNTRY EXPERIENCES OF IMPLEMENTING NUTRIENT PROFILE MODELS

Four countries reflected on their experience in implementing NPMs.





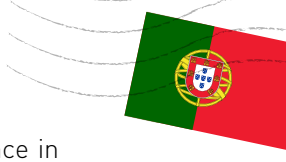
Austria

Dr Karin Schindler, Federal Ministry of Social Affairs, Health, Care and Consumer Protection, Republic of Austria, described the Austrian experience and some of the challenges encountered during NPM development. A working group within the National Nutrition Commission was established in 2016 to develop an NPM, which included food industry representation. After two and a half years, no draft NPM had been produced. The Minister of Health then requested a comparison between the WHO European Region regional model and the EU Pledge for food products on the Austrian market. Some media published misinformation that the Ministry was about to prohibit all food advertisements. The Ministry therefore received many submissions and many interventions, and the support of the WHO Regional Office had been helpful for responding to the arguments and submissions. It was then decided to organise a stakeholder meeting with academia and the agri-food industry. This showed that achieving a consensus on an NPM would not be possible. The proposed NPM was then approved by the National Nutrition Commission (although the approval is not binding). The next steps will be to advocate for the advertising regulatory body to apply the model and create relevant guidelines. Technical support from WHO had been important throughout the process.

Estonia

Ms Haidi Kanamäe, National Institute for Health Development, described the Estonian experience in developing an NPM. Marketing of food to children in Estonia is covered by two acts: the Media Services Act, which regulates broadcast advertising, and the Advertising Act. Furthermore, a document on self-regulation of marketing of unhealthy foods to children was developed by the Association of Estonian Broadcasters in 2011, which covers children under 12 years of age and the marketing techniques that are not permitted on television and radio when children make up 50% of the audience and during children's television and radio programming. The document is general and does not include a specific NPM.

In order to transpose the EU Audiovisual Media Services Directive into national legislation, the Ministry of Social Affairs and the National Institute for Health Development are preparing guidelines for aspects that should be covered by self-regulation. These guidelines will also require an NPM for restrictions on marketing of foods to children, and the WHO European Region regional NPM was used as the basis for the national model. A major difficulty encountered was in aligning the guideline with Estonian food categories and the principles of the Estonian food pyramid. To overcome this problem, the structure of the food categories and sub-categories was amended, and some foods were added. In addition, the names of foods were reviewed to bring them into line with Estonian legislation, and the model thresholds were assessed against food composition data for foods marketed in Estonia. The results suggest that the Estonian NPM is stricter than the regional model in some cases but less strict in others. The proposed revisions to the WHO European Region model will be reviewed and tested in the Best-ReMaP project before considering whether any changes are necessary.



Portugal

Dr Maria João Gregório, Directorate-General of Health, described the Portuguese experience in implementing an NPM for national restrictions on food advertising to children. National legislation (Law No 30/2019) specified that an NPM was necessary to define foods high in energy, salt, sugars, saturated fat and *trans*-fatty acids. The Directorate-General of Health was charged with developing the model using thresholds based on WHO and EU recommendations. A draft model was developed with input from an expert group and a stakeholder group that included the private sector, public health and civil society, with the WHO European Region regional model as a reference. Some adaptations to the model were necessary because of legal constraints, namely, that the law setting the mandate for the NPM did not include total fat or non-nutritive sweeteners and that thresholds were necessary rather than classification of any category as "not permitted". The model was therefore aligned with the law, EU regulations on claims, other policies (such as the reformulation programme) and the nutritional composition of foods available on Portuguese markets.

For the categories defined as "not permitted" in the WHO model, thresholds were set according to the "low in" thresholds in the EU nutrition claims regulation. For other categories, in particular for those recognized as nutrient-rich food categories, two approaches were used to define thresholds: 25% of the recommended intake or "best in class" of products in that category. For *trans*-fatty acids, the EU regulatory threshold was used. In order to test the differences between the Portuguese model and the WHO European Region regional model, 2 816 products in a Portuguese branded food composition database were entered into both models. There was strong agreement between the two models, the main differences relating to soft drinks and plant-based milk alternatives, as the Portuguese model did not include non-nutritive sweeteners.

In the discussion of the presentation, the speaker said that it had been difficult to adapt the NPM to include thresholds for saturated fat but not total fat. Dietary guidelines on fat intakes were used as a basis, and the draft NPM was tested against the WHO regional NPM in order to achieve similar results. The participants noted that Portugal is to be congratulated on its law to tackle food advertising to children and for underpinning the regulation with an NPM. This is a clear case of good practice to be shared with other Member States.

Slovenia

Dr Mojca Gabrijelcic, National Institute of Health, described the country's experience in developing a national NPM when transposing the EU Audiovisual Media Services Directive. The model was based on the WHO European Region model, with a few adaptations. The Slovenian consumer organization is now evaluating the impact of the legislation. National television chains tend to respect the restrictions on food marketing during programmes for which children are the main audiences, but other media channels do not necessarily comply, and loopholes remain. The Slovenian consumer body has joined the initiative of the Bureau Européen des Unions de Consommateurs [European Office of Consumer Unions] to collect examples of advertising to children of foods high in fats, sugars and/or salt and

to transmit the examples to the accountability mechanism of the EU, a report of which has been published *(36)*. The report includes, for example, the case of an advertisement for foods high in fats, sugars and/or salt shown during a Saturday morning Slovenian children's cooking programme. The Pledge responded that the advertisement was not in breach as no children were watching the programme, which, however, appeared to be due to lack of reliable data. The report noted that

> given the childish nature of the show in question and the time it was broadcast, it would have been prudent for the food company to avoid advertising unhealthy products to reduce the exposure of children to such marketing.

Discussion

Consultation on NPMs often results in calls for greater differentiation of food categories and for the addition of new categories, which may increase the complexity and result in less user-friendly models. Furthermore, there is often no scientific justification for further division of categories. Given the intense discussion on NPMs, however, it may be a pragmatic solution to build support and acceptance.

In Finland, a Commission evaluated children's exposure to marketing of foods high in fats, sugars and/or salt, including through social media. Then, a Government-initiated expert group involving five ministries examined the issue and made recommendations. When the report of the expert group was made available (pre-publication), industry reacted furiously and the issue was covered widely in the media. It was suggested that guidance on dealing with industry lobbying and common arguments in relation to NPMs would be useful. Member States require support on this issue, and exchanges of experience among Member States are very valuable.

The question was raised of the best approach for developing NPMs in the Balkans. With recent and ongoing work on food composition databases, research infrastructure and food consumption surveys, the Balkan countries are now well equipped to move forward. Methodological, technical and financial support will be necessary and will be discussed further with WHO.

Hungary is working on research infrastructure and a branded food composition database, which will be an important basis for development of an NPM.

NEXT STEPS

The WHO NCD Office proposed to define its work in accordance with the conclusions of the expert meeting, with a timeline. Revisions of the regional NPM for marketing will be further discussed with the Best-ReMaP Joint Action, and Member States participating in the Joint Action will test the updated NPM in their national food-branded databases. Testing and feedback on application of the model will contribute to the final version of a new WHO European Region NPM for marketing. The NPM for baby foods will be further revised to update and simplify the model and create a toolkit for countries to build capacity in applying the model. The discussion papers on NPM for front-of-pack labelling, taxes and sustainability will be developed further and used as a basis for work on NPMs in those areas. Taken together, they will form a package of resources for countries in the Region to make progress in nutrient profiling for healthy, sustainable diets.

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ANNEX 1

Meeting programme

Expert Meeting on the use of Nutrient Profile Models for nutrition and health policies in WHO European Region	**/3**
Virtual meeting	
21–22 September 2021	Original: English

Agenda

Day 1. 21 September, 13:00–16:00 CET

12:45–13:00	***Participants' log-on***
13:00–13:10	**Welcome and opening remarks** Kremlin Wickramasinghe, WHO Regional Office for Europe *Overall structure and purpose of the meeting*
13:10 –13:40	**Expert presentations** *Mike Rayner and Margarida Bica – NPM for marketing restriction of unhealthy foods to children – comparative proposals* *Marie-Eve Labonté – NPM for front-of-pack labelling*
13:40 –14:00	**Discussion on expert presentations** *Moderator: Kremlin Wickramasinghe*
14:00–14:15	**Active break**
14.15 -15:15	**Discussions in rotating working groups** Facilitator: Clare Farrand Each group to nominate a spokesperson to report back. *Group 1 - NPM for restricting marketing of unhealthy foods to children* *Group 2 - NPM for front-of-pack labelling*

15:00–15:50	**Discussion summaries** Facilitator: Holly Rippin *Discussion summary from Group 1 - NPM for restricting marketing of unhealthy foods to children (5 min)* *Discussion summary from Group 2 - NPM for front-of-pack labelling (5 min)* *Discussion summary (5 min)* *Overall discussion facilitated by Kremlin Wickramasinghe*
15:50 –16:00	**Final remarks and next steps** *Kremlin Wickramasinghe*

Day 2. 22 September, 13:00–16:00 CET

12:45–13:00	***Participants' log-on***
13:00–13:05	**Welcome and resumé of day 1** *Kremlin Wickramasinghe*, WHO Regional Office for Europe
13:05–13:50	**Expert presentations**
13:05–13:35	NPM for baby food *Janet Cade, Diane Threapleton and Ali Morpeth* *15 min discussion*
13:35–14:05	NPM for fiscal policies and taxation *Franco Sassi* *15 min discussion*
14:05–14:35	NPM for healthy, sustainable diets *Mike Rayner and Charlotte Bunge* *15 min discussion*
14:35–14:50	**Active break**
14:50–15:00	**Country experiences in implementation of NPM** Facilitator: Kremlin Wickramasinghe Portugal – *Maria João Gregório, Director, National Healthy Eating Promotion Programme, Directorate-General of Health* Slovenia - *Mojca Gabrijelcic, National Institute of Public Health*
15:00–15:20	**Discussion** Facilitator: Kremlin Wickramasinghe
15:20–15:30	**Country experiences of challenges in NPM development and support required from WHO** Austria - *Karin Schindler, Federal Ministry of Social Affairs, Health, Care and Consumer Protection* Estonia – *Haidi Kanamäe, Head, Nutrition and Exercise Unit, Centre for Health Risks Prevention, National institute for Health Development*
15:30–15:50	**Discussion of country experiences and next steps** Facilitator: Kremlin Wickramasinghe
15:50–16:00	**Final remarks** *Kremlin Wickramasinghe*

ANNEX 2

List of participants

Participants

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ANNEX 3

Recommendations for changes to strengthen the 2015 WHO European Region nutrient profile model

Contents

1. Summary

In this paper, we make recommendations for changes to update and strengthen the 2015 WHO European Region model on the basis for an ongoing project for WHO, which involves comparing the NPMs developed by the WHO regional offices (for Africa, the Americas, for the Eastern Mediterranean, for Europe, for South-East Asia and for the Western Pacific) and also two national government models, those of Türkiye and the United Kingdom. The recommendations are for relatively small changes to the 2015 model.

The main changes we propose are that thresholds should be set:

- ideally, for free sugars rather than for total sugars and/or added sugars; however, recognizing the difficulty of assessing free-sugar levels in foods, we provide alternative sugar thresholds for total and/or added sugars;
- for all categories (except fresh fruit and vegetables) rather than prohibiting the marketing of all products in some categories and allowing the marketing of all foods in other categories (besides Fresh Fruit and Vegetables); and
- in a more systematic way (along the lines proposed by the developers of the WHO South-East Asia Region model), which are more explicitly linked to WHO's nutritional recommendations.

We tested the proposed updated WHO European Region model against the food composition databases of Türkiye and the United Kingdom, which we used previously to compare the WHO regional models, and also a food composition database from Portugal. We now propose a few minor changes to the updated model, although we consider that further testing (and some changes to) the updated model will be required before publication.

2. Changes recommended

2.1 Foods excluded from the model

The foods and drinks excluded from the updated model and which should not be marketed to children regardless of their nutrient composition should be the same as in the original 2015 WHO European Region model:

- products containing > 1 g/100 g total fat in the form of industrially produced *trans*-fatty acids,
- beverages in which ⩾ 0.5% of total energy is in the form of alcohol and
- breast-milk substitutes, follow-up formulas and growing-up milks.

In addition, the following should be explicitly excluded from the model:

- foods for particular nutritional uses and supplements

2.2 Nutrients and other components

The nutrients and other components in the 2015 WHO European Region model were: energy, total fat, saturated fat, total sugars, added sugars, non-sugar sweeteners and sodium/salt. We propose that the updated model set thresholds for total fat, saturated fat, free sugars, non-sugar sweeteners and sodium.

In the updated model, we propose that there should be no threshold for energy. An energy threshold was set for only one category in the 2015 WHO European Region model, i.e., ready-made and convenience foods. We suggest that the thresholds for both total fat and free sugars make a threshold for energy unnecessary for that category, as for other categories.

The 2015 WHO European Region model set thresholds for totals sugars and/or added sugars for 10 product categories. WHO's nutritional recommendations relate to free sugars rather than to total sugars or added sugars. Therefore, we propose that the updated model should ideally include thresholds for free sugars rather than for total or added sugars. Assessing the free sugar content of a food or drink may, however, be difficult, and it may be more practical to set total and added sugar

thresholds as in the 2015 WHO European Region model. Free sugar content has, in any case, to be calculated as a combination of total sugar and added sugar. Accordingly, we suggest an alternative set of thresholds for total and added sugars that could be used instead of free sugar thresholds. We propose sugar thresholds for 16 categories.

The 2015 WHO European Region model set thresholds for non-sugar sweeteners for two beverage categories but for no food categories. We propose that thresholds for non-sugar sweeteners should continue to be set for all four beverage categories but not for food categories.

The 2015 WHO European Region model set thresholds for total fat and/or saturated fat for 11 categories and for salt (sodium) for 11 categories. We propose a slight increase in the number of fat and sodium thresholds (to 16 and 14 categories, respectively) in order to set thresholds for all the food categories in the model (except fresh fruit and vegetables) and creation of an extra category (see below).

2.3 Product categories

The product categories in the updated model should be the same as in the 2015 WHO European Region model, with one additional category, "Plant-based foods/meat analogues" (as in the WHO Western Pacific model and the new WHO Global Sodium Benchmarks).

2.4 Thresholds

The thresholds for the 2015 WHO European Region model were based based on two NPMs used for marketing restrictions in Europe: a Danish and a Norwegian model. We propose a simpler, more systematic method for setting thresholds, based on WHO's nutritional recommendations. This method is similar to that proposed by the developers of the WHO South-East Asia model and involves converting the nutrient recommendations into reference intakes in g, based on a diet with 2 000 kcal per day and then calculating no, low, medium or high levels of nutrients as standard percentages of the reference intakes (Table A3.1).

Table A3.1. Proposed thresholds for total fat, saturated fat, free sugars and sodium based on reference intakes

	Total fat	Saturated fat	Free sugars	Sodium
WHO recommendation[a]	30% total energy	10% total energy	10% total energy	< 2 g/day
Recommended intake (RI) (g/day)	66.67	22.22	50.00	2.00
Low: 5% of RI (g/100g)	3	1	2.5	0.1
Medium: 25% of RI (g/100 g)	17	6	12.6	0.5
High: 95% of RI (g/100)	63	21	48	1.9
Codex low food (g/100 g)[b]	3	1.5	None	0.12
Codex low drink (g/100 mL)	1	0.75	None	0.12
EU low food (g/100 g)[c]	3	1.5	5 (total sugar)	0.12
EU low drink (g/100 mL)	1	0.75	2.5 (total sugar)	0.12

[a] Reference *1*, [b] Reference *2*, [c] Reference *3*

We propose that the choice of a no, low, medium or high threshold for a particular product category depend on:

- other nutrients that are typically present in high amounts in that category. We propose that, all else being equal, a no or low threshold should be selected when products in that category generally do not provide nutrients that are necessary for good health (e.g., fibre, minerals, vitamins) to the average diet and a high or medium threshold when they do.
- the energy density of foods in that category. We propose that, all else being equal, thresholds for foods that are very energy dense (e.g., butter, other fats and oils) be higher than those for products containing a lot of water (such as beverages but also yoghurts, sour milk and cream).

We note that, since publication of the WHO regional NPMs, WHO has set global benchmarks for sodium in different food categories *(4)*. We assessed whether those benchmarks could be used directly for setting sodium thresholds for the updated WHO European Region model and found that they cannot; however, the thresholds we propose for sodium in the updated model are well aligned with the global benchmarks.

On the basis of the principles outlined above, the following thresholds are proposed (Table A3.2). Table A3.3 shows alternative sugar thresholds for an updated WHO European Region model (and for the Best ReMaP proposal).

Table A3.2. Proposed thresholds for the updated 2015 WHO European Region model (4 August 2021) as compared with the thresholds in the 2015 WHO European Region model (in parentheses)

Product category	Total fat (g)	Saturated fat (g)	Free sugars (g)	NSS (g)	Sodium (g)	Energy (kcal)	Same components as in 2015 WHO European Region model
Chocolate and sugar confectionery	3		0				But thresholds for low total fat and no free sugars rather than the whole category being not permitted
	(Not permitted)						
Cakes and sweet biscuits	3		0		0.1		But a thresholds for low total fat, no free sugars and a low threshold for sodium rather than the whole category being not permitted
	(Not permitted)						
Savoury snacks			0 (0 AS)		0.1 (0.04)		Same threshold for free sugars as the previous one for added sugars but a low threshold for sodium
Beverages							
Juices			0	0			But no thresholds for free sugars and NSS rather than the whole category being not permitted
	(Not permitted)						
Milk drinks	3 (2.5)		0 (0 AS)	0 (0)			Same thresholds for free sugars as the previous one for added sugars and for NSS but a low threshold for fat
Energy drinks			0	0			But no thresholds for free sugars and NSS rather than the whole category being not permitted
	(Not permitted)						
Other drinks			0 (0 AS)	0 (0)			Same threshold for free sugars as the previous one for added sugars and the same threshold for NSS

Edible ices	3		0	0.1		But a low threshold for total fat and no threshold for free sugars and a low threshold for sodium rather than the whole category being not permitted
	(Not permitted)					
Breakfast cereals	17 (10)		12.5 (15 TS)	0.5 (0.64)		But medium thresholds for total fat, free sugars and sodium and no threshold for added sugars
Yoghurts, sour milk and cream	3 (2.5)	1 (2)	2.5 (10 TS)	0.1 (0.08)		But low thresholds for total fat, saturated fat, free sugars and sodium and no threshold for total sugars
Cheese	17 (20)			0.5 (0.52)		But medium thresholds for total fat and sodium
Ready-made and convenience foods	17 (10)	6 (4)	12.5 (10 TS)	0.5 (0.4)	(225)	But medium thresholds for total fat, saturated fat, free sugars and sodium and no thresholds for total sugars and energy
Butter, other fats and oils		21 (20)		0.5 (0.52)		But a high threshold for saturated fat and a medium threshold for sodium
Bread, bread products and crisp breads	17 (10)		0 (10 TS)	0.5 (0.48)		But a medium threshold for total fat, no threshold for free sugars and a medium threshold for sodium and no threshold for total sugars
Fresh or dried pasta, rice and grains	3 (10)		0 (10 TS)	0.5 (0.48)		But a low threshold for total fat, no threshold for free sugars, a medium threshold for sodium and threshold for total sugars
Fresh and frozen meat	17					But a medium threshold for total fat rather than the whole category being permitted
	(Permitted)					
Processed meat	17 (20)			0.5 (0.68)		But medium thresholds for total fat and sodium
Fresh and frozen fruit and vegetables	Permitted					All thresholds effectively the same
	(Permitted)					
Processed fruit and vegetables	3 (5)		0 (0 AS, 10 TS)	0.5 (0.4)		Same threshold for free sugars as the previous one for added sugars but a low threshold for total fat, a medium threshold for sodium and no threshold for total sugars
Sauces, dips and dressings	17 (10)		0 (0 AS)	0.5 (0.4)		Same threshold for free sugars as the previous one for added sugars but medium thresholds for total fat and sodium
Plant-based foods/ meat analogues	17		0	0.5		New category: a medium threshold for total fat, no threshold for free sugars and a medium threshold for sodium

AS, added sugars; TS, total sugars; NSS, non-sugar sweeteners

Table A3.3. Alternative sugar thresholds for an updated WHO European Region model (and for Best ReMaP proposal)

	2015 WHO European Region model		Draft updated WHO European Region model	Alternative sugar thresholds for updated WHO European Region model		Assumptions for analysis when no information available on added sugars or free sugars		Best-ReMaP proposal
						Updated WHO European Region model	Alternative sugar thresholds	
Product category	**Total sugars (g)**	**Added sugar (g)**	**Free sugars (g)**	**Total sugars (g)**	**Added sugars (g)**	**Total sugars (g)**	**Total sugars (g)**	**Free sugars (g)**
Chocolate and sugar confectionery	Not permitted		0		0	0	0	Not permitted
Cakes and sweet biscuits	Not permitted		0		0	0	0	Not permitted
Savoury snacks		0	0		0	0	0	0
Beverages								
Juices	Not permitted		0	0		0	0	Not permitted
Milk drinks		0	0		0	Any permitted	0	0
Energy drinks	Not permitted		0		0	0	0	Not permitted
Other drinks		0	0		0	0	0	0
Edible ices	Not permitted		0		0	0	0	Not permitted
Breakfast cereals	15		12.5	12.5		12.5	12.5	15
Yoghurts, sour milk and cream	10		2.5	12.5		2.5	12.5	6.25
Cheese								
Ready-made and convenience foods	10		12.5	12.5		12.5	12.5	6.25
Butter, other fats and oils								
Bread, bread products and crisp breads	10		0	12.5		Any permitted	12.5	6.25
Fresh or dried pasta, rice and grains	10		0	12.5		Any permitted	12.5	6.25
Fresh and frozen meat								
Processed meat								
Fresh and frozen fruit and vegetables	Permitted		Permitted	Permitted				Permitted
Processed fruit and vegetables	10	0	0		0	0	0	0
Sauces, dips and dressings		0	0		0	0	0	3.125
Plant-based foods/ meat analogues	NA	NA	0		0	0	0	Not available

3. Testing of the updated WHO European Region model and comparison with the previous 2015 WHO European Region model

The next step in this project was to compare the proposed model with the 2015 WHO European Region model with regard to the way in which it classifies foods as suitable or not for marketing to children. We conducted a preliminary comparison with two food composition databases, from Türkiye and from the United Kingdom, which we previously used to compare the WHO regional models and the two national models and to make provisional recommendations about further updating the updated model. The results are shown in Table A3.4. We also tested the updated model with a Portuguese food composition dataset, the advantage of which is that it contains data for total, added and free sugars, so that fewer assumptions need be made when testing models. This database contains only the food categories most usually marketed to children and adolescents and also the food categories that contribute most to the sugar intake of these age groups. We also compared the updated WHO European Region model against the model proposed in the Best-ReMaP project. The results are shown in Table A3.5.

Generally, testing showed that the updated WHO European Region model performs similarly to the 2015 WHO European Region model. The marketing of unquestionably unhealthy foods such as chocolate and sugar confectionery is (almost without exception) not permitted in either model, marketing of unquestionably healthy foods such as fresh and frozen fruit and vegetables is generally permitted in both models, and marketing of intermediate foods such as breakfast cereals is permitted in similar proportions in both models: 29% in the United Kingdom dataset in the 2015 WHO European Region model and 26% in the updated model; and 13% and 16%, respectively, in the Portuguese dataset.

For two categories, ready-made and convenience foods and processed fruit and vegetables, the testing suggested that the thresholds might have to be modified in the updated model. The testing also showed, however, that when information on free sugar was not available it was difficult to compare the models (at least for foods in a food composition database), particularly in categories such as processed fruit and vegetables and yoghurts, sour milk and cream, in which the sugars are often a combination of free and non-free sugars.

Table A3.4. Percentages of foods in two composition databases (a Turkish (TK) and a United Kingdom (UK) database) classified as suitable for marking to children by model and model category

Nutrient profile model food category	2015 WHO European Region		Updated WHO European Region		Alternative sugar thresholds		Comments
	TR	UK	TR	UK	TR	UK	
Chocolate and sugar confectionery	0	0	1.8	0.1	1.8	0.1	
Cakes and sweet biscuits	0	0	0	0.2	0	0.2	
Savoury snacks	1.1	0.1	2.3	0.1	2.3	0.1	
Beverages	5.2	9.4	35.9	29.4	5.6	5.0	The differences in the proportions of products passing the models reflect the differences discussed below for beverage subcategories.
Juices	0	0	3	0	3	0	
Milk drinks	0	3.5	73.6	74.6	0	3.5	The proportion of products that pass the model is higher for the updated WHO European Region that for the 2015 WHO European Region because, in testing, we assumed that all total sugars were "not free"; the result is therefore not a true reflection of how the models compare. In testing the 2015 WHO European Region model and the alternative sugar thresholds for updated WHO European Region, we assumed that all total sugars were added sugars, so that the result is not a true reflection of how the models perform.
Energy drinks	0	0	20	8.3	20	8.3	As no data on NSS were available in the food composition databases, in the updated WHO European Region (and the alternative sugar thresholds), the proportion of products that pass the model is higher than in reality, and the result is not a true reflection of how the models compare.
Other drinks	8.8	26.2	8.8	26.2	8.8	26.2	As no data on NSS were available in the food composition databases, the proportions of products that pass in both model is higher than in reality.
Edible ices	0	0	0	0	0	0	
Breakfast cereals	55.6	29	44.4	25.8	44.4	25.8	
Yoghurts, sour milk and cream	2	12	0	0.4	0	16.0	The proportion of products that pass the model is lower in the updated WHO European Region model because we assumed that all total sugars were free sugars; the result is therefore not a true reflection of how the models compare. For testing the 2015 WHO European Region and the alternative sugar thresholds in the updated WHO European Region, we did not have to make any assumptions, so the results are a true reflection of how these models compare.
Cheese	9	13.5	5.3	11.3	5.3	11.3	
Ready-made and convenience foods	40.4	53.8	47.7	71.8	47.7	71.8	The proportion of products that passed the model was higher in the updated WHO European Region. The question arises of whether medium fat and/or medium saturated fat thresholds should be changed to low.
Butter, other fats and oils	42.9	65.3	42.9	65.3	42.9	65.3	
Bread, bread products and crisp breads	86.8	64.7	90	83.6	86.8	71.8	
Fresh or dried pasta, rice and grains	100	93.1	63.3	72.9	63.3	70.1	
Fresh and frozen meat	100	100	100	86.6	100	86.6	
Processed meat	40	67.8	10.7	51.4	10.7	51.0	

Fresh and frozen fruit and vegetables	100	100	100	100	100	100	
Processed fruit and vegetables	14.3	34.1	4.1	0.9	4.1	0.9	The proportion of products that passed is much lower for the updated WHO European Region model because it was assumed no total sugars were free; it is therefore not a true reflection of how the model performs. In testing for alternative sugar thresholds in the updated WHO European Region, we assumed that all total sugars were added sugars. The result is therefore not a true reflection of how the model performs. The updated WHO European Region (alternative sugar thresholds) has no threshold for added sugars, rather than a threshold of 10 g total sugars. Should the no added sugar threshold be moved to a medium total sugars threshold?
Sauces, dips and dressings	0	0.5	0	0.5	0	0.5	
Plant based foods/ meat analogues				0		0	
Total	**15.1**	**32.0**	**18.7**	**31.5**	**13.9**	**32.4**	

TR, Turkish dataset, consisting of composition data for 1 234 individual foods collected between December 2018 and January 2019 from labels of packaged foods from one large outlet of one supermarket (Migros) and three discounters (A101, BIM and ŞOK).

UK, United Kingdom dataset consisting of composition data for 44 652 individual foods. The data were provided by Brand View, a private analytics company that collects product information, including nutrient composition data, from the websites of the four leading United Kingdom retailers: Asda, Sainsbury's, Tesco and Morrisons. These data were collected on the same date: 13 December 2017

Assumptions for testing:

For all categories in the 2015 WHO European Region model (and the updated model with alternative sugar thresholds) with added sugar thresholds, all sugars were assumed to be added sugars.

For the updated model, all total sugars were assumed to be free sugars except for milk drinks; bread, bread products and crisp breads; and fresh or dried pasta, rice and grains, in which all total sugars were not free.

Table A3.5. Percentages of foods in a Portuguese food database that are classified as suitable for marketing to children by model and model category

Nutrient profile model food category	2015 WHO European Region	Updated WHO European Region	Best-ReMaP Proposal	Comments
Chocolate and sugar confectionery	0	0	0	
Cakes and sweet biscuits	0	0	0	
Savoury snacks	2.3	0	0	
Beverages				
Juices	0	0	0	
Milk drinks	8.6	0	0	
Energy drinks	0	0	0	
Other drinks	0	0	0	
Edible ices	-	-	-	Not available in the dataset
Breakfast cereals	12.8	15.6	10.6	The slight difference between the models is due to a slightly higher threshold for total fat in the updated WHO European Region model.
Yoghurts, sour milk and cream	37.3	13.0	34.8	The updated WHO European Region model is more restrictive because of a lower threshold of free sugars in this category.
Cheese				Not available in the dataset
Ready-made and convenience foods	-	-	-	Not available in the dataset

Butter, other fats and oils	-	-	-	Not available in the dataset
Bread, bread products and crisp breads	-	-	-	Not available in the dataset
Fresh or dried pasta, rice and grains	-	-	-	Not available in the dataset
Fresh and frozen meat	-	-	-	Not available in the dataset
Processed meat	-	-	-	Not available in the dataset
Fresh and frozen fruit and vegetables	-	-	-	Not available in the dataset
Processed fruit and vegetables	24.1	20.7	20.7	
Sauces, dips and dressings	-	-	-	Not available in the dataset
Plant based foods/ meat analogues	NA	6.6	4.9	
Total	**17.6**	**8.2**	**14.5**	

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ANNEX 4

Nutrient profile model for commercially available complementary foods for infants and young children up to 36 months: Proposed updates and changes to the draft nutrient profile model

Contents

1. Recommended approaches for disseminating nutrient profile models

- Update the NPM model, and prepare a concise report for dissemination.
- Create a new version of the online tool to align NPM updates and to facilitate wide application of the NPM and support legislation and market changes:

- Provide users with easy tools to enter data and to quantify the quality of products on the market.
- Provide users with a report function to summarize how many and which products fail and why (or how products and promotional material can be modified to pass) for product reformulation or changes in local legislation.
- Collate results from different users of the website on NPM application and suitability.

- Launch an online tool for relevant audiences to encourage engagement and widespread use.

2. Recommended simplifications to the NPM product categories and tables

i. Remove excluded food categories (e.g., snacks and drinks) currently in the draft NPM table.

a. Excluded categories are now presented separately in Table A4.2 of the draft revised NPM below.

ii. Separate nutrient requirements, front-of package limits and high sugar flags (which differ by food category) from the "Promotional and labelling specifications" (which apply to all categories) to simplify the tables and avoid repetition.

a. Now presented as Table A4.1a and A4.1b in draft revised NPM below.

iii. Present the main NPM specifications in columns for each food category for easy differentiation of categories (as in the 2015 WHO European Region NPM for marketing to children).

a. The draft NPM presented all nutrient specifications for each category in one box, making it difficult to see how specifications differ by category and sub-category.
b. Now presented by column in Table A4.1a below.

iv. Combine and simplify product categories:

a. Combine "pureed" and "non-pureed tray-type meals". These were previously listed in different categories because of a pack specification for purees to be marketed for only 6-12 months, although the nutrient specifications for pureed and lumpy foods are aligned. See Table A4.1a, and note that the age recommendation for purees was retained.
b. Separate "Savoury meals" from "Purees, sauces and meal components" to simplify product categories.

3. Recommended areas for consideration before finalizing the NPM

i. Consider renaming the NPM "Nutrient and Promotion Profile Model" to emphasize that promotional and marketing issues are as important as product formulation and because the name "NPM" does not accurately reflect the model we propose, which has a strong focus on promotion and marketing.

ii. Limits on total sugar content have not been set for many categories that are naturally high in sugar (e.g., fruit, fruit puree and dairy foods). Rather than restricting the sale of these products, front-of-pack (FOP) indicators are suggested; however, different FOP thresholds are proposed for categories in the draft NPM. These could be simplified by removing the requirement for savoury meals to have a FOP high-sugar label when energy provided by sugar exceeds 15% and instead set a limit of 15% on the percentage of energy from sugar, for instance. This would result in reductions in use of sweet vegetables (e.g., carrot, parsnip and sweet potato).

iii. Consider how FOP high-sugar indicators will be applied by producers and understood by consumers.

a. The NPM currently recommends that dairy foods have an indicator when the sugar exceeds 40%, fruit and vegetables purees when the sugar exceeds 30% and meals when the sugar exceeds 15%.

b. Dairy foods have a higher allowance to reflect their naturally occurring high sugar content, so consumers are not dissuaded from purchasing them.

c. Meals have a lower threshold, as they are typically considered to have a lower sugar content so that consumers will be aware when particularly sweet vegetables are used (e.g., sweet potato, carrot).

d. A meal with 16% energy from sugar will have a high sugar flag, but a vegetable puree with 29% energy from sugar will not. Consumers may select the less nutritious simple vegetable puree in place of a meal that does not have a high sugar flag. This issue could be resolved by setting a maximum sugar content (as noted above).

e. Consider how labels should be positioned on products and the text size etc. (e.g., black text on white background stating "High in sugar" with text size 0.5 times the size of the product name).

f. Consult user groups on application and presentation of high-sugar flags.

iv. Consider that the stringent requirements for added sugar in particular will render many snack products unmarketable (and not all can be reformulated). For example, rusk-type biscuits that are sold dry but are often pulverised with milk or water for young infants are often high in added sugar.

a. Gaps in the market may drive caregivers to purchase high sugar alternatives marketed for older children or adults.

b. Manufacturers may simply remove the age specification of currently available products and sell them for older children. Knowledge of consumers about brands and marketing might mean they are still purchased for children under 3 years.

v. Consider whether the model sufficiently caters for the nutrient requirements of vegetarian or plant-based diets, as these products are becoming more popular.

a. This will ensure adequate nutrient content (e.g., protein) for products marketed as meals.

vi. Further consideration is required to determine the need, and requirements, for setting thresholds for saturated fat.

a. A small number of vegan puree products contain coconut milk or coconut water. The draft NPM does not consider this. The saturated fat content of coconut milk and how widespread use of coconut milk is should be considered and specifications set if appropriate.

vii. Consider a requirement for purees, sauces and meal components to include a pack statement that they do not contain varied nutrients to promote selection of nutrient-rich savoury meal products.

viii. The draft NPM does not permit any packet claims. Evaluate whether any nutritional statements should be permitted to signal "good" products that are fortified, e.g., "Fortified with iron".

ix. Include details for manufacturers that micronutrient specifications as detailed in EC regulations or other local, regional or national requirements must be adhered to but that the NPM otherwise supersedes existing recommendations (or regulations). It will be important to notify where the NPM supersedes existing Codex or EC regulations.

4. Proposed simplified nutrient and promotional profile model (draft)

Table A4.1a. Proposed nutrient and promotional profile model for CACFs – Nutrient and front-of-pack specifications

Product group	Code	Sub-category description	Details and examples	Content and labelling specifications[13]								
				Energy density (kcal/ 100g)	Sodium (mg/ 100kcal)	Total sugar (%/ Energy)	Protein (g/100kcal) (% total weight)	Total fat (g/100kcal)	Fruit content[3] (% weight)	Age on pack (months)[1]	FOP high-sugar flag [6] (%/ Energy)	Labelling and promotional specifications
Dry foods: dry, powdered, and instant cereal/ starchy foods	1	Dry cereals[2] to be made up or cooked with milk or water	Cereals to be eaten with milk/ equivalent non-sweetened nutritious liquid or water/ equivalent protein-free liquid e.g., Instant porridge, baby rice or dry pasta	≥80 as eaten	50	/	If made with milk: ≤ 5.5g & added protein ≥2g[10]	≤ 4.5g or ≤ 3.3g (if eaten with milk)[2]	≤ 10% dry weight	6-36	>30%	All specifications apply to all categories as detailed in Table 1b
Dairy foods	2	Dairy-based foods, desserts and cereals	The largest ingredient is dairy e.g., "Porridge", "Rice pudding", "Yogurt", "Fromage frais", "Custard". [If fruit content > 5% use cat.3.1]	≥60	50 (100 if name cheese)	/	/	≤4.5g	≤5% (max. 2% dry weight)	6-36	>40%	
Simple purees, sauces, meal components or desserts	3.1	Fruit-containing product	Any product containing fruit[3] (except low fruit dairy cat. 2 or snacks cat. 5) e.g., smoothie, fruit and yogurt, fruit pudding	≥60	50	/	/	≤4.5g	/	6-36 (6-12 for puree)	>30%	
	3.2	Vegetable only puree	Single or mixed vegetables or legumes	<25% added water	50	/	/	≤4.5g	None	6-36 (6-12 for puree)	>30%	
	3.3	Protein source is the only named food	Pureed cooked meat. May contain a small quantity of grain/starch e.g., "Rabbit" or "Lamb" with some rice flour or cornstarch.	≥60	50	/	≥ 7 g named protein[9] & ≥ 40%[7]	≤6g	≤ 5% (max. 2% dry)	6-36 (6-12 for puree)	>15%	

Meals: Savoury food with or without a named protein source or cheese [4,5]	4.1	Meal WITHOUT a named protein or cheese	Vegetables/legumes with cereals/starches. May contain protein/cheese not listed in product name e.g., "Vegetable pasta", "Risotto", "Carrot and quinoa", "Lasagne"	≥60	50	/	≥ 3 g total protein	≤4.5g	≤5% (max. 2% dry)	6-36 (6-12 for puree)	>15%	All specifications apply to all categories as detailed in Table 1b
	4.2	Meal WITH CHEESE in product name	Cheese and no other proteins are in the product name e.g., "Cheesy pasta"	≥60	100	/	≥ 3 g total & ≥ 2.2 dairy protein	≤6g	≤5% (max. 2% dry)	6-36 (6-12 for puree)	>15%	
	4.3	Protein source is FIRST named food	e.g., "Rabbit and potatoes", "Beef stew", "Tasty chicken risotto", "Chicken and mozzarella pasta"	≥60	50 (100 if name cheese)	/	≥ 4 g named protein[9] & ≥10%[7,8]	≤6g	≤5% (max. 2% dry)	6-36 (6-12 for puree)	>15%	
	4.4	Protein source is NOT the first named food	Protein source is within name but not the first named food, "Vegetable lamb curry" "Potato and chicken pie"	≥60	50 (100 if name cheese)	/	≥3g total, ≥2.2g named[9] & ≥8%[7,8]	≤4.5g	≤5% (max. 2% dry)	6-36 (6-12 for puree)	>15%	
Snacks and finger foods	5.1	Fruit	Fresh fruit or whole dry fruits or pieces e.g., dry apple slices or raisins. Excludes pulverised/ pureed dry fruits.	<50 kcal per serve	50	/	/	≤4.5g	100%	6-36	>30%	
	5.2	Dry or semi-dry snacks and finger foods	Any grain, starch or root vegetable snack, cracker, bread, crisp/ chip, biscuit, pastry, cake or pancake etc. Includes rusks, crackers and biscuits intended to be eaten dry or pulverised with liquid.[2]	<50 kcal per serve	50	≤15%	Biscuits, if made with high protein food, added protein ≥1.5g[11]	≤4.5g	≤15%	6-36	/	

Footnotes to Table A4.1a

Note that specifications as detailed in the NPM supersede existing Codex and EC regulations relating to cereal foods and commercial baby foods (details provided below).

[1] A narrower age range than indicated may be displayed on pack according to product consistency (e.g., 12-36 months for crunchy snacks). The age range of 6-12 months for purees refers to products that are blended/pureed which are typically eaten unpureed and which should only be sold for use by babies who are not yet able to chew or handle textured foods e.g., pureed banana or cooked apple sauce.

[2] Minimum 25% cereal.

[3] Notes on fruit: i) Tomatoes, avocados and coconut are not classed as fruits for this purpose; ii) Unsweetened whole or chopped fruits, and dry whole or chopped 100% fruits are permitted as in category 5.1; iii) Blended, pulped, puréed or powdered 100% fruits (including dried fruit which has been puréed) are only permitted to be added as an ingredient in certain categories in limited amounts, as they are high in free sugars.

[4] Note that traditional protein sources include any meat, offal, poultry or fish.

[5] Note that the front of pack and legal product names and order of foods may differ. Follow the FOP names for product categorisation where possible.

[6] A FOP indicator, label or flag is required when the total energy from sugar exceeds specified thresholds [15% total energy = 3.75 g/100 kcal; 20% total energy = 5 g/100 kcal; 30% total energy = 7.5 g/100 kcal; 40% total energy = 10 g/100 kcal]. The label should be clearly positioned with moderate size text (e.g., black text on white background stating "High in Sugar" with text size 0.5 times the size of the product name).

[7] Total protein must be higher than 8, 10 or 40% of the total product weight (according to product category) and each source of protein named in the FOP or legal product name must be ≥ 25% by weight of the total named protein weight.

[8] Protein from dairy must be ≥2.2g/100kcal if cheese is mentioned in the product name.

[9] Relates to the protein from the named source

[10] Any dry cereal products made with a high protein food must include ≥2g/100kcal added protein[12]

[11] For biscuits made with the addition of a high protein food, and presented as such, the added protein shall not be less than 0.36 g/100 kJ (1.5 g/100 kcal)[12].

[12] The chemical index of the added protein shall be equal to at least 80 % of that of the reference protein (casein as defined in Annex III of EUROPEAN COMMISSION DIRECTIVE 2006/125/EC), or the protein efficiency ratio (PER) of the protein in the mixture shall be equal to at least 70 % of that of the reference protein. In all cases, the addition of amino acids shall be permitted solely for the purpose of improving the nutritional value of the protein mixture, and only in the proportions necessary for that purpose.

[13] **Products with vitamin, mineral and amino acid additions** must adhere to existing EC specifications or other local, regional or national guidelines, where applicable. See "Processed cereal-based food and baby food" (Chapter 1, Article 1, part b) of *REGULATION (EU) No 609/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 12 June 2013 on food intended for infants and young children, food for special medical purposes, and total diet replacement for weight control and repealing Council Directive 92/52/EEC, Commission Directives 96/8/EC, 1999/21/EC, 2006/125/EC and 2006/141/EC, Directive 2009/39/EC of the European Parliament and of the Council and Commission Regulations (EC) No 41/2009 and (EC) No 953/2009".*

Table A4.1b. Proposed nutrient and promotional profile model for CACFs – Promotional (packet and marketing) specifications

Promotional specification	Details and examples
Minimum age 6 months	All packaging and related marketing or promotional materials (promotional communications/ websites etc.) must clearly state that products are not suitable for babies under 6 months of age or not suggest suitability for babies under 6 months.
Pureed foods are not appropriate for older infants	The age range of 6-12 months is applied to puree products which are typically eaten unpureed and where older infants can handle more textured foods and do no need to be exposed to the high free sugar content of highly macerated foods.
Total sugar content flag	A clear front-of-pack flag/label is required for the following food categories when the total sugar content exceeds the following thresholds: i. ≥40% of total energy or 10g/100kcal for Dairy items (category 2) ii. ≥30% of total energy or 7.5g/100kcal for Dry cereals/starches, made up as directed (category 1), Fruit-containing product (Category3.1) vegetable product (category 3.2) and fruit snacks (category 5.1) iii. ≥15% of total energy or 3.75g/100kcal for savoury meals (category 4) and a blended protein (category 3.3)
No compositional, nutritional, health or marketing claims	No claims are permitted on packs or related marketing materials (promotional communications/websites etc.). This is in line with the Codex guidelines for the use of nutrition and health claims CAC/GL 23-1997. Refer to Table 3 for examples of claims.
Product name clarity	The front-of-pack product name and legal product name must clearly represent the main ingredients, be listed in an appropriate order and indicate when fruit/vegetables (single or in combination) comprise the majority of the product weight. The largest ingredient should be listed first in the product name, where appropriate except when the largest ingredient is implied in the name, such as milk in porridge or potato in cottage pie. Note that fruit or vegetables are considered the largest ingredient if the sum of all fruits or vegetables is the largest ingredient; the front-of-pack name must therefore indicate that fruits or vegetables constitute the majority of the product. Note that all ingredients do not need to be listed in name. Product name examples: a) "Spinach and sweet potato" with 30% apple, 20% sweet potato and 10% spinach should be named "Apple, sweet potato and spinach"; b) "Chicken meal/dinner" with 35% carrot, 30% parsnip, 20% potato and 15% chicken must indicate that vegetables are the largest ingredient, such as "Root vegetable and chicken dinner" or "Carrot and potato mash with chicken"; c) "Baby rice/porridge/yogurt with strawberry" with 30% pear, 20% apple, 20% rice/oats/dairy and 10% strawberry must indicate fruit is the largest ingredient and strawberry is not the primary fruit and be named "Pear and apple porridge/rice/yogurt with strawberry" or "Fruity mix baby rice/porridge/yogurt".
Ingredient list clarity	The ingredient list must clearly indicate the proportion (%) of: i. the largest single ingredient (including water/stock, except where used for rehydration of legumes/grains etc.); ii. the amount of added water/stock (except where used for rehydration of legumes/grains etc.); iii. the total or individual proportions of fresh or dried fruit; and iv. the amount of fish, poultry, meat or other traditional source of protein.
Liquid products with spout opening	Ready-to-eat puréed foods sold in packs with a spout must include a clear statement to discourage caregivers from allowing infants and young children to suck the food directly via the spout, such as: "Infants and young children must not be allowed to suck directly from the pouch/container".
Dry cereals/starches (category 1)	i. Must state that the proportion of added dried or powdered fruit as a percent of the dry product weight. ii. Must state that the liquid used to reconstitute the product should have no added sodium or sugar/sweetening agent.
Snack and finger foods (category 5)	i. Must state the proportion of total fruit as percent of the total product weight. ii. Any other snack and finger-food products aimed at children OVER 36 months and with total sugar content ≥15% total energy must include a statement such as "Not suitable for infants and young children under 36 months/3 years".
In relation to breast feeding	i. No cross-promotions are permitted between products that function as breast-milk substitute and CACFs marketed as suitable for infants and young children > 6 months; ii. All products must include a statement on the importance of continued breastfeeding for up to two years or beyond and the importance of not introducing complementary feeding before 6 months of age; iii. No products should include any image, text or other representation that is likely to undermine or discourage breastfeeding, that makes a comparison to breast-milk, or that suggests that the product is nearly equivalent or superior to breast-milk; iv. All products must state the suitable age of introduction (≥ 6 months); v. No products should include any image, text or other representation that might suggest use for infants under the age of 6 months (including references to milestones and stages); vi. No product should convey an endorsement or anything that may be construed as an endorsement by a professional or other body, unless this has been specifically approved by relevant national, regional or international regulatory authorities.

Table A4.2. Products, ingredients and nutrients not suitable for CACFs for infants and young children under 36 months

Category	Details and examples
Added sugar or sweetening agents	i. All mono- and disaccharides (including sugars derived from fruits, sugarcane, palms or root vegetables etc.); ii. All syrups, nectars and honey (including molasses/agave/maple/blossom nectar/malted barley syrup/brown rice syrup etc.); iii. fruit juices or concentrated/powdered fruit juice, excluding lemon or lime juice; iv. non-sugar sweeteners (such as saccharin, acesulfame, aspartame, sucralose or stevia etc.).
Sweet confectionery and fruit chews	Chocolate and other products containing cocoa; white chocolate; jelly sweets and boiled sweets; chewing gum and bubble gum; caramels; liquorice sweets; marzipan; sweetened or "yogurt"-coated fruit etc. Fruit chews include any dried and processed fruit products such as fruit gums, bars or fruit strips/leathers/roll-ups (i.e. a dense chewy food made from fruit juice or pulped and dehydrated/dried fruit), including fruit pieces coated in sugar or oils/fats (such as banana chips, sweetened cranberries or yogurt raisins)
Sweet spreads, syrups or honey	Spreadable chocolate and any other sweet sandwich or toast topping such as jam, marmalade or honey and sweet nut spreads etc. or maple syrup etc.
Juices and other drinks (except breast milk substitutes)	Includes: i. any drinkable product containing crushed, blended, pulped or puréed fruit or vegetable, fruit or vegetable juice and/or water, with or without added sugar or sweetening agents, including 100% juices, reconstituted juice from concentrate, smoothies with added juice or water. Also includes drinks ready made from cordials, energy drinks, ices, cola, lemonade, orangeade, other soft drinks, and mineral and/or flavoured waters (including aerated) with added sugars or sweetener; ii. whole cow's milk and milk alternatives including soya, oat or almond milk with added sugar or sweetening agent. Excludes: i. smoothies or purées made without the addition of juice or water (see category 3.1 or 3.2 in Table 1a); i. all products that function as breast-milk substitutes (see footnote on "Products outside the scope of the NPM"); ii. unsweetened cow's milk and unsweetened milk alternatives (such as soya, oat, almond) marketed for consumption by the general population.
Trans-Fatty acids	Any product containing industrially produced trans-fatty acids is not permitted

CACF, commercially-available complementary foods; NPM, nutrient profile model

Table A4.2 footnotes

Products outside NPM scope:

1. **Products not specifically marketed for children younger than 3 years** of age or whose labels state that they are intended only for pregnant women, mothers or children older than 3 years.
2. **Vitamin and mineral food supplements**, whether to be consumed as tablets/drops or added to foods at home (such as home fortification products such as micronutrient powders, lipid nutrient powders).
3. **Products that function as breast-milk substitutes**; these should not be promoted at all. These include any milks (or products that could be used to replace milk, such as fortified soya milk alternatives), in either liquid or powdered form, that are specifically marketed for feeding infants and young children up to the age of 3 years. This includes milk or milk-like formulations commonly marketed for infants from 6 months of age and prepared in accordance with relevant international or national standards. The upper age indication on the product label varies country to country but is usually between 12 and 36 months. Any milk product that is marketed or represented as suitable as a partial or total replacement of the breast milk part of the young child's diet is a breast-milk substitute and therefore falls under the scope of the International Code. This product always replaces breast milk, as breastfeeding is recommended to continue for 2 years or beyond. Follow-up formula should therefore not be promoted. These provisions also apply to growing-up milk (also known as growing-up formula, toddler milk or formulated milk), which is targeted at infants and young children from 1 year old (sometimes younger) to 3 years old. Often, the product name is similar to a company's formula products, with a figure "3" added on. Where growing-up milks are marketed as suitable for feeding young children up to the age of 36 months, they fall under the International Code definition of "breast-milk substitute" read together with WHA resolution 58.32 from 2005, which recommends breastfeeding should continue for up to 2 years or beyond.

Table A4.3. Examples of compositional, health and marketing claims on product packaging, marketing and promotional materials

Examples of claims that would not be permitted	
Composition and nutrition claims include statements like the following examples	• No / no added [sugar, salt, seasoning, condiments, artificial flavour/colour, maltodextrin, modified starch, additives, preservatives, GMO, etc.] • Contains only naturally [sugars, salt etc.], low sodium etc. • Contributes one of your five-a-day [fruit/vegetables], contains three types of vegetables, organic food, natural, fresh, contains vegetables, wholegrain • Nutritionally balanced, Perfect/unique balance of vitamins/minerals, contains [minerals or vitamins e.g., iron or calcium], contains a host of nutrients, contains dietary fibre, contains ω-3, contains probiotics or prebiotics, contains protein or amino acids, contains phospholipid, contains DHA, contains carbohydrate, contains arachidonic acid etc. **Permissible composition statements** • Statements relating to **common allergens** (such as containing, or free from, gluten, dairy/lactose, or nuts etc.) • Statements relating to **religious or cultural food requirements** (such as: meat-free, or vegetarian, or contains meat; Kosher; Halal) • **Descriptive words** may be used within the ingredient list (such as organic carrots and wholegrain wheat flour)
Health claims include statements like the following examples	Good for/ supports / improves/ needed for [healthy growth, development, digestion, appetite, learning to chew, learning to hold, constipation/ defecation, bones and teeth, enteric flora, the brain, eyes/vision, skin health, thyroxine synthesis, red blood cell synthesis and preventing iron deficiency anaemia, collagen synthesis, metabolism, cognitive development, immune system etc.]. Healthy, provides good nutrition to children, goodness of cereals, infant cereal is the ideal foundation to a healthy and balanced diet, perfectly balanced for growing babies, "Draws inspiration from the Mediterranean approach to health and well-being", "extra goodness with wholegrain oats" etc.
Marketing claims include statements like the following examples	**Taste and quality**: delight for tiny taste buds; tasty; yummy; delicious; suitable for picky eaters; in my home the whole family loves them; picked at the peak of ripeness; truly tasty; bursting with goodness and flavour; my flavours are a new journey for tiny taste buds; exotic dishes are full of variety and flavour; our delicious new range of jars; individually steam cooked; we use over 27 different fruits and vegetables. **Texture**: smooth; easy-to-swallow texture and a simple flavour that is great for helping your little one as they start to explore solid foods; I'm textured; not lumpy and my yummy crispy bits will encourage your baby to begin to chew; ideally suited to promote exposure to textures; no bits/chunks; wider spout; perfectly smooth texture has been specially developed as an ideal first weaning food. **Convenience/lifestyle**: convenient; great for a busy and active life; ideal for breakfast or meals on the go; simply to top up between meals; great way to make fruit fun; closest thing to homemade with all of the goodness and none of the guilt; inspired by my favourite home-cooked recipes; encourages self-feeding. **Conveying ideals on optimum feeding**: making the right feeding choices for you and your baby; helps to build confidence and enjoyment with food; we've been pioneering research into infant and toddler nutrition for over 50 years to help you give your baby the best start in life; carefully prepared by our baby-food experts; we only use specially selected ingredients; grown by farmers we know and trust; we select the finest; nothing unnecessary; no junk; nothing nasty; setting standards; real fruit/vegetables; perfect for small hands; perfect; ideal; optimum; perfect way to start introducing your baby to solid food; breakfast is one of the most important meals of the day. **Others**: "The government advises that you don't need to wean your little one until they are 6 months old. Every baby is different!"; "Committed to giving 10% of profits to help fund food education charities"; "quality approved by Mumsnet Mums"; "The Department of Health and the World Health Organization recommend exclusive breastfeeding for the first six months. However, if you choose to wean earlier, our ingredients are suitable from 4 months."

5. Notes on where the NPM supersedes/differs from existing Codex and EC standards

Note that Codex [Codex/STAN 074-1981 REVISED 2017 ON CEREAL BASED FOODS] and EC Directive Annex I specifications are identical in terms of nutrient requirements.

EUROPEAN COMMISSION DIRECTIVE 2006/125/EC of 5 December 2006 on processed cereal-based foods and baby foods for infants and young children

- The draft NPM differs from the directive Article 8 a) labelling specification that products may state an age of introduction from 4 months

- Annex I ESSENTIAL COMPOSITION OF PROCESSED CEREAL-BASED FOODS FOR INFANTS AND YOUNG CHILDREN:

    1. Cereal content definition (>25% of final dry mix weight) is specified in the NPM.

    2. Protein and lipid content specifications for different dry cereal product categories are detailed within the draft NPM but categories are not differentiated. The NPM has one cereal category instead of 4 [dry cereals to be eaten with milk, without milk, dry pastas etc., rusks and crackers].

    3. "Rusks, biscuits and crackers" have a maximum fat content of 3.3g/100kcal, presumably because they can be reconstituted with milk. The NPM has adopted a higher threshold of 4.5 for all snack foods for simplicity and because the higher fat threshold may better accommodate product reformulation if added sugars are removed.

    4. The total fat content for cereal products intended to be made up or eaten with milk (or equivalent unsweetened liquid) is 3.3 g/100 kcal, or 4.5 g/100 kcal if intended to be made up or eaten with water (or equivalent protein-free liquid). If total fat ≥3.3 g/100 kcal: i) the amount of lauric acid shall not exceed 15% of the total lipid content, ii) the amount of myristic acid shall not exceed 15% of the total lipid content, iii) the amount of linoleic acid (in the form of glycerides = linoleates) shall not be less than 70 mg/100 kJ (300 mg/100 kcal) and shall not exceed 285 mg/100 kJ (1 200 mg/100 kcal). These details were not adopted within the NPM for simplicity, as i) the fat specifications only relate to products that lie between 3.3 and 4.5 g/100 kcal, ii) specifications only apply to products intended to be made up with water, and iii) such products form only part of the complementary diet.

    5. Carbohydrate specifications for products with added sugar are superseded by the NPM specification to disallow products with added sugars.

    6. Mineral, vitamin and trace element specifications, except sodium, are not detailed in the draft NPM. A footnote is included that products must adhere to existing EC specifications or other local, regional or national guidelines, where applicable. The sodium threshold of 100 mg/100 kcal was lowered to 50 mg/100 kcal in the draft NPM. Note that Codex and EC Directive requirement that Sodium salts may only be added to processed cereal-based food for technological purposes is unclear/open to misuse and was not adopted into the NPM.

- Annex II ESSENTIAL COMPOSITION OF BABY FOODS FOR INFANTS AND YOUNG CHILDREN

    1. Protein specifications for foods containing traditional protein sources named singularly or in combination have already been adopted in the draft NPM. An error in the [old version] NPM category 2.8 for a minimum of 30% of the named protein source by weight of the total product has been amended to 40% to align with the directive. EC directive specifications for protein contents of "meals" "sauces" and "sweet dishes" are vague and open to misuse/ misinterpretation. The NPM now includes protein specifications for different meal categories.

2. Carbohydrate specifications have not been transferred to the NPM:

    2.1 Some specifications relate to drinks, and are disallowed in the NPM.

    2.2 The specification for fruit-only dishes and desserts/puddings to contain <20 g/100 g and <25 g/100 g carbohydrate, respectively are replaced by the focus on added sugars and front-of-pack sugar flags.

    2.3 The NPM does not set maximum carbohydrate thresholds to avoid the addition of low energy density foods (or water) to products.

3. Fat specifications have been adopted in the NPM.

4. Mineral, vitamin and trace element specifications, except sodium, are not detailed in the draft NPM. A footnote is included that products must adhere to existing EC specifications or other local, regional or national guidelines, where applicable. The sodium specification of 200 mg/100 kcal or 200 mg/100 g (or 300 mg if cheese is the only named ingredient) has been lowered to 50 mg in the NPM (or 100 mg if cheese is listed in the product name).

- Annex III relates to amino acid composition of casein in cereal-based foods. Details are not included in the NPM but a note of reference to the directive is included.

- The directive states that "Only the nutritional substances listed in Annex IV may be added in the manufacture of processed cereal-based foods and baby foods." The draft NPM does not make reference to this.

REGULATION (EU) No 609/2013 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 12 June 2013 on food intended for infants and young children, food for special medical purposes, and total diet replacement for weight control and repealing Council Directive 92/52/EEC, Commission Directives 96/8/EC, 1999/21/EC, 2006/125/EC and 2006/141/EC, Directive 2009/39/EC of the European Parliament and of the Council and Commission Regulations (EC) No 41/2009 and (EC) No 953/2009.

- Requirements were reviewed for "Processed cereal-based food and baby food" (Chapter 1, Article 1, part b). These micronutrient specifications are not detailed with the NPM but footnote is included that products must adhere to existing EC specifications or other local, regional or national guidelines, where applicable.

ANNEX 5

Use of nutrient profiling models as a basis for food taxes

Contents

Nutrient profiling models (NPMs) are increasingly used in nutrition policies, mainly in defining criteria for public procurement of foods, in the design of front-of-pack labelling systems and in regulating food advertising regulation *(1)*. Given the high rates of noncommunicable diseases (NCDs) and the important role of the diet in causing NCDs, governments have been urged to act to improve people's

diets. They have become increasingly interested in fiscal policies and especially in taxes on food and non-alcoholic beverages as a means to provide incentives for healthier diets. Taxes are used both to discourage the consumption and production of less healthy products and to raise revenue, sometimes directed to uses in public health and health care. The use of NPMs in fiscal policies is being discussed but not yet widely adopted. This paper provides an overview of existing fiscal policies based on NPMs or similar systems and a discussion of the challenges and opportunities in using an NPM in the design of fiscal policies.

1. Limitations of current taxes designed to improve the quality of diets

Current taxes on food and non-alcoholic beverages (referred to as "food taxes" in the remainder of this document) are typically small, and they are applied to a limited range of food products; therefore, their impact on consumption is correspondingly small. While computer-based simulation models have consistently predicted improvements in disease and mortality outcomes, empirical studies have shown limited or no impacts on body mass index and other health outcomes *(2–4)*. The lack of clear evidence of health impacts is due partly to the long-term nature of health outcomes, which makes it difficult to observe them in unconfounded empirical studies. Despite good evidence that food taxes have been effective in reducing the consumption of taxed products, the impacts of food taxes on consumers' overall diets remain uncertain because little is known about the substitutions that they trigger.

2. Countries that use a nutrient profiling model or a similar system as a basis for fiscal policies

2.1 Taxes based on nutrient profiling methods

A systematic review of nutrient profiling models used in government-led nutrition policies identified 78 models *(1)*. Of these, only one was used in a taxation policy: only Hungary had a tax relying on an NPM to distinguish taxed from untaxed products. Three other countries have implemented taxation schemes that rely on a principle similar to NPMs, but with criteria for only one nutrient (in Mexico, South Africa and the United Kingdom). Use of NPMs to define the products that should be taxed is being debated in some countries.

Hungary

In September 2011, Hungary implemented an excise tax for various food categories rich in sugar, salt or stimulants *(5)*. The tax was introduced in order to improve food choices but also to raise income for health-oriented policies *(6)*. The tax was designed to incentivize substitution of healthier food and beverage products; therefore, the taxed products were those for which a healthier alternative existed. A further aim of the policy was to incentivize product reformulation.

The NPM used to identify taxed products was created specifically for the tax. It is a category-specific model, with thresholds for contents of salt, sugars and specific ingredients, when appropriate. The nutrient–category pairs were defined on the basis of identified excess nutrient consumption from those categories. There are additional ingredient criteria to define included and exempted products in some categories; for example, juice concentrates are subject to the 8 g/100 mL threshold on sugar only if they contain < 25% fruit. The tax was launched in 2011 and was adjusted in 2012, 2013, 2015 and 2019. From 2016, manufacturers who were subject to the tax could divert 10% of the tax payment towards their own programmes for promoting health, such as a better diet or more sports *(5)*.

Taxed products were estimated to represent about 12% of total food expenditures *(7)*. After about 1 year of implementation of the tax, the quantities of processed foods purchased had decreased by 3.4% (no distinction was made between taxed and untaxed products) *(7)*. Expenditure for these products increased by 6.5%. At the same time, there was no change in the quantities purchased or expenditure on unprocessed products *(7)*. The effect of the tax was stronger in 2012 when additional categories were taxed *(7)*. A study of the longer-term effect of the tax showed that the short-term decrease in sales volume of foods high in sugar was reversed in the long-term. From 2014 (3 years after introduction of the the tax), sales volumes were not significantly different from baseline levels *(8)*.

Mexico

In 2018, Mexico implemented an ad-valorem tax on foods considered "non-essential", defined according to their food category and with an energy density > 275 kcal/100 g. Food categories in which products are eligible for the tax are salty snacks, cereal-based sweets, ready-to-eat cereals and non-cereal-based sweets. Foods in such categories are estimated to contribute to about 14% of energy intake *(9)*. The level of the ad-valorem tax is 8%. The tax was found to have decreased purchases of taxed products by 5% 1 year after its introduction *(10)*. Evaluations have, however, produced conflicting results of the effect of the tax on total energy purchased *(10–13)*. The tax on non-essential foods was accompanied by an excise tax on SSBs.

2.2 Taxes on soft drinks based on sugar content

Although taxes based on one nutrient only are not considered to be taxes based on NPMs, they can indicate the benefits and drawbacks of taxes based on NPMs.

United Kingdom: a tiered tax based on sugar content of SSB

In 2018, the United Kingdom implemented a tiered tax on SSBs. SSBs are subject to the tax if they have a sugar content ⩾ 5 g/100 mL. SSBs with a sugar content > 8 g/100 mL are subject to a higher rate of the tax. As the sugar content of drinks is used to define the level of the tax, it may be considered to be based on a nutrient profile system. Evaluations of the tax showed that it effectively drove reformulation *(14)* and reduce the sugar purchased from soft drinks *(15)*.

South Africa: a tax on SSBs proportional to their sugar content

In 2018, South Africa implemented a tax proportional to the sugar content of soft drinks. This was considered as an innovative approach, as almost no country had yet implemented a tax the amount of which was based on the nutrient profile of products *(16)*. Soft drinks with > 4 g/100 mL of sugar were taxed at 0.021 South African rand per gram of sugar they contained (in 100 mL). Evaluation showed that the volume of taxed drinks decreased by about 30%, as did sugar purchases from these drinks *(17)*.

2.3 Taxes under discussion

A systematic review by Labonté et al. (2018) on the use of NPM in government-led nutrition policies showed that most of the models used were created during the past 10 years *(1)*. Most of the models are used for regulating foods served in schools, labelling or restricting marketing to children. Although not widely implemented yet, there is growing interest in taxes based on NPMs, and discussions are under way in several countries. Chile is one example.

Chile: a possible tax based on the same NPM as warning labels

In 2016, Chile implemented front-of-pack labelling consisting of warning labels for products high in sugar, salt or saturated fats. The thresholds are the same for all product categories. They were implemented in three successive steps, each making the thresholds stricter *(18)*. One reason for the gradual introduction was to give manufacturers time to reformulate their products. Evaluation of the products available before and after implementation of the labels showed that at least 10% of products had been reformulated *(18)*. The same nutrient profiling that defines products that must carry a warning label is used to define foods that cannot be sold in schools or marketed to children. Use of this NPM in designing a tax was discussed in 2017 *(19)*. The other type of tax discussed was a tax based on sugar content only. At the time this paper was written (2021), there had been no further progress, but the idea of establishing a tax based on the labels was still supported *(20)*.

3. Challenges and opportunities for increased use of nutrient profiling methods in fiscal policies

Existing health taxes on food and non-alcoholic beverages are narrowly targeted. First, the taxes generally apply to one or a small number of food categories. The taxes adopted in Hungary and Mexico, for instance, cover only 12% of food expenditure and 14% of caloric intake, respectively *(7,9)*, despite having a wider tax base than those applied in most other countries. Secondly, health taxes applied to foods and non-alcoholic beverages focus on a single aspect of the nutritional quality of foods (e.g., sugar or energy content). In contrast, a taxation model based on an NPM would be uniformly applicable to a wide range, if not to all, foods (depending on the design). An NPM-based tax would address multiple dimensions of the nutritional quality of foods and would target all foods with the same criteria.

3.1 Advantages of nutrient profiling method-based taxes over current taxation approaches

Advantages over taxing foods for a single dimension of nutritional quality

Taxes based solely on one nutrient may be relevant for beverages, as sugar accounts for most of their energy content (except for milk-based beverages or alternatives containing fat). Taxing food products on a single dimension of nutritional quality might, however, have important limitations, as it may result in misclassification of foods with a poor nutrient profile. Mexico's tax on energy-dense foods (based on energy content per 100 g of weight), for instance, does not apply to most ice creams, despite their poor nutrient profile *(16)*.

In addition, a tax based on a single nutrient might not be entirely consistent with dietary guidelines, most of which are based on food groups rather than nutrients. Conversely, a tax based on an NPM that includes several nutrients is less likely to target core foods recommended in dietary guidelines *(21)*.

Overall, a tax based on a single nutrient might have detrimental consequences for the consumption of other nutrients *(21)*. Conversely, a tax based on an NPM would take into consideration the overall nutritional quality of foods and would hence be unlikely to result in the inconsistencies described above.

Advantages over taxing product categories

Most current taxes on soft drinks target entire categories of products, variously defined, with a uniform tax. As discussed previously, South Africa and the United Kingdom are exceptions as they levy different tax rates according to sugar content. In Mexico, all non-dairy and non-alcoholic beverages containing added sugar are taxed *(22)*. In France and other countries, both SSBs and artificially sweetened beverages are taxed. Taxes that target an entire category of products uniformly are chosen because they are considered simpler to implement and administer; taxable products are readily identifiable, and all products in a category are taxed at the same rate, regardless of their nutrient composition. In countries that impose taxes on product categories, a new food tax based on the same category definitions would be easy to apply *(23)*.

Nonetheless, taxing all products in a category presents some challenges. First, the definition of a category to be taxed may be debated. For example, the United Kingdom tax on soft drinks does not apply to pure fruit juices or milk-based beverages, as most (if not all) of the sugar occurs naturally in the fruits or milk used in such products *(24)*. This exclusion has been controversial, because it implies that the metabolic consequences of added sugar are different from those of sugar in fruit juices or milk. The inclusion or exclusion of artificially sweetened beverages from the tax base of soft drink taxes has also been intensely debated, and countries that tax soft drinks are almost evenly split between the two approaches.

In addition, problems may arise from the choice of product category classification upon which a tax is based. For example, the use of customs tariff codes to tax sweet products in Finland was challenged legally, as some products that were nutritionally similar to taxed products were not taxed because they did not belong in the targeted categories *(25)*. Taxing products on the basis of an NPM, rather than on categories, might avoid difficulties linked to the definition of the products included

in a taxed category *(26)*, and products with a similar nutrient profile would be taxed consistently, obviating claims of discriminatory taxation.

A better incentive for food product reformulation

An NPM-based tax is a greater potential incentive for food product reformulation than current taxes. Uniform taxes that target entire food categories do not promote reformulation, as improvement of the nutrient profile of a product would not result in a lower tax. The United Kingdom Soft Drinks Industry Levy was designed primarily as an incentive for product reformulation, by differentiating tax rates according to the sugar density of beverages, and it has been successful in this pursuit *(14)*. Reformulation of SSBs can hardly worsen the nutrient profile of beverages, while reformulation of foods is more complex, as it will probably involve substitutions of ingredients and nutrients, with uncertain effects on the overall nutrient profile. There is at least some evidence that reformulation in the context of England's sugar reduction programme (based on voluntary targets rather than taxes) led in some instances to unwarranted changes in the nutrient profile of certain foods *(27)*.

An NPM-based tax provides a stronger incentive for manufacturers to reformulate their products in ways that would unequivocally improve the nutrient profile of reformulated foods.

Greater acceptability of taxes

Taxes usually have less support from the public than policy options that do not place a financial burden on consumers. For example, in a survey in five countries, 43% of respondents supported a tax on sugary drinks, while 65% supported calorie labelling in chain restaurants *(28)*. Nonetheless, the acceptability of a tax could be higher if the tax consistently targeted less healthy foods. In the above survey, support for a selective ban on marketing of unhealthy foods to children was higher than that for a generalized ban of all types of marketing to children *(28)*.

Support for SSB taxes has been higher. Both the SSB tax in Mexico and the United Kingdom soft drinks industry levy were supported by 70% of the public *(29,30)*.

3.2 Nutrient profiling methods would strengthen synergies between fiscal and other policies

A consistent basis for diet and nutrition policies

Use of an NPM in a tax system is supported by the fact that an NPM could be used for a wide range of public health-oriented policies. NPMs are currently used in front-of-pack labelling, regulation of marketing to children and regulation of food procurement in public institutions such as schools and hospitals *(1)*. Use of a consistent NPM approach for several policies in a country could contribute to implementation of those policies and provide stronger, more consistent incentives to consumers. Administrative and compliance costs would be reduced, as manufacturers and regulators would have to assess products according to a single approach.

In Chile, the same NPM is used to define products that must carry nutritional warning labels, that cannot be sold in schools and that cannot be advertised to children under 14 years of age. Recommendations have also been made to use the same approach for taxation *(20)*.

Potential synergies between NPM-based front-of-pack labelling and taxes

Several studies have investigated the interaction between a front-of-pack labelling system that highlights foods that should be preferred and a tax on foods the consumption of which should be reduced, defined with the same NPM. The studies were conducted in online supermarkets to test how consumers would respond to the labels, the tax or the two combined. Two studies found no interaction between a front-of-pack labelling and a taxation scheme based on the same NPM *(31,32)*, indicating that the effects of front-of-pack labelling and taxes are likely to be additive, and the effects of implementing a second policy would not decrease (or increase) the effects of the first policy.

Taxes and price promotions

The effect of a tax on less healthy foods could be undermined by price promotions for taxed products *(33)*. Price promotions are often larger than taxes on the same products. Therefore, some taxes might be offset by retailers or manufacturers by offering price promotions on taxed products.

While widespread price promotions were recorded just before implementation of the United Kingdom soft drinks tax, introduction of the tax was linked to an increase in the price of beverages taxed at the high rate, with a 31% average pass through *(14)*. The price promotions were therefore short-lived and did not offset the tax.

Price promotions can, however, be very lucrative for retailers and manufacturers when consumers are particularly price-sensitive, and demand can be increased considerably by lowering prices (e.g., during public holidays or sports events). The profitability of price promotions may derive from offering reduced-price products as "loss leaders", attracting consumers to purchase other products. In either case, price promotions have potentially detrimental effects on the nutritional quality of consumers' food and beverage purchases, which has led some countries to regulate promotions.

The interaction effect between taxes and price promotions should be studied further *(33)*, but there is clear scope for harmonizing approaches to taxation and regulation of price promotions with a consistent NPM.

3.3 Potential impacts of nutrient profiling method-based taxes on purchases and health: Insights from modelling studies

Although NPMs have had limited use in actual fiscal policies, NPM-based approaches have been investigated in modelling studies of the effects of different fiscal policy options or use of different NPMs.

In a study in the United Kingdom, taxing foods based on only one nutrient, saturated fatty acids, was compared with taxing foods based on an NPM *(34)*. Taxation of foods according only to their saturated fatty acids content was linked to an increase in deaths from cardiovascular disease due

to increased salt intake. In contrast, taxing products that are classified as less healthy by the NPM tested resulted in decreased mortality. Nnoaham et al. *(35)* extended that study to model broader effects on health, including cancer, and found that taxing less healthy products, in the absence of incentives for switching to healthier options, was linked to adverse health outcomes. This result was explained by a decrease in purchases of fruit and vegetables due to the price increase for less healthy products for which the demand is price inelastic, whereby consumers spend more on these products when their price is increased, even if they consume less of them. This adverse effect was reversed when a subsidy on healthier products was added.

Darmon et al. *(36)* used a similar fiscal policy approach, in which healthier products were subsidized while less healthy products were taxed, but using the Score of Nutritional Adequacy of Individual Foods and Score of Nutrients to be Limited (the SAIN-LIM System) NPM. They tested the effect of a 30% increase in the prices of less healthy products or a 30% decrease in healthier products in a virtual shopping setting. The NPM-based price changes improved the nutrient profile of the basket of products purchased by consumers but could not eliminate or reduce differences in dietary quality among baseline income groups.

In a further study, household purchase data were used to estimate the impact of a 20% ad valorem tax on less healthy products, including sweet snacks, desserts and puddings *(37)*. The authors concluded that the tax would lead to decreases of 3.7 g and 4.0 g of sugar per capita and per day in the two product categories, accounting for cross-category substitutions. They estimated that the effect of a combined 20% tax on less healthy products and a 20% subsidy on healthier products would lead to a decrease in per capita energy purchased of 68 kcal/day. Purchases of sugar, saturated fat and salt would decrease, while purchases of fibre and proteins would increase. The effect of the fiscal policy would be larger in the direction of an improvement of the diet for low-socioeconomic status than for high- socioeconomic status households.

In Chile, a tax based on the NPM used for restricting advertising and labelling was modelled and compared with a tax based on the added sugar content of products *(38)*. In the NPM scenario, the prices of items with levels of sugar, sodium, saturated fatty acids or energy above the threshold were increased by 18%. After consideration of cross-category purchases resulting from the tax, the authors found that an NPM-based tax would be more effective in reducing calories, sugar, saturated fat and sodium purchased than a tax on added sugars only or on SSBs only *(38)*.

4. Nutrient profiling method-based taxes and tax design issues

Tax type

Consensus has been achieved on the key features of health taxes to be applied to food and non-alcoholic beverages. The type of tax that is widely recommended is a specific excise, i.e., a tax levied as a fixed amount on a given quantity of a product with certain characteristics, usually, a product that belongs to a defined category and/or one that contains levels of a given nutrient above a fixed threshold. The recommendation for a specific excise is the opposite of use of an ad valorem tax, i.e., a tax levied as a proportion of the price of a product. Other, more widely used consumption taxes

such as VAT and sales taxes are typically ad valorem, but an ad valorem design is widely opposed for health taxes because of the risk that consumers will "trade down" to cheaper products, since an ad valorem tax typically widens the price gap between cheaper and more expensive products *(39)*. The risk of trading down has two aspects: first, that consumers may maintain their consumption volumes largely unchanged by purchasing cheaper products, and, secondly, even more insidious, is the correlation often observed between food prices and nutritional quality, which means that consumers may worsen the quality of their diet by switching to cheaper products.

A review undertaken in the USA to determine the "administrative feasibility" of a federal tax on "junk food and SSBs" by analogy with existing taxes concluded that excise taxes levied on manufacturers are common, suggesting the administrative feasibility and efficiency of this design *(23)we systematically searched (1*. Levying excise taxes on manufacturers might also provide a stronger incentive for reformulation and would increase compliance, as the tax would be levied regardless of where and how the product is finally delivered to consumers *(23)*.

Application of an NPM-based tax would change the recommendations outlined above in important ways. The rationale for ostracising ad valorem taxes would be largely void. Products of lower nutritional quality would be taxed more heavily, preventing, or at least reducing, the risk that consumers may worsen the quality of their diet by trading down to cheaper products. If the risks associated with trading down were effectively mitigated, ad valorem would become the design of choice, because it presents a number of advantages over a specific excise design. In particular, an ad valorem tax automatically keeps up with inflation and does not require regular adjustments as specific excises do. In addition, the tax burden of an ad valorem tax is more equitably (or less inequitably) distributed among households of different socioeconomic status, because households that spend more have a larger tax burden. Of course, the distributional impact of health taxes on food and non-alcoholic beverages is compounded by the unequal distribution of the consumption of products of poor nutritional quality, which tends to be larger in households of low socioeconomic status (hence the potential for the latter to bear a greater tax burden). Addressing the complex distributional impacts of an NPM-based tax requires fine balancing of tax design features beyond the choice of tax type.

Tax rate and structure

No specific recommendations have been made regarding the tax rate to be applied in health taxes on food and non-alcoholic beverages, although it is often emphasized that the tax should result in a meaningful price increase in order to improve dietary quality and health effectively. Some sources have identified this as a price increase of ⩾ 20% but with no clear supporting evidence. In the case of SSB taxes, recent analyses have recommended a tiered taxation approach *(40)* as in the examples of taxes implemented in countries like Chile, Portugal, Spain and the United Kingdom. Evidence has been produced for at least for some of these countries of additional benefits in terms of product reformulation, incentivized by the particular tax structure.

In the case of an NPM-based tax, a tiered rate approach would be viable for all types of food, as long as the NPM used as a basis for taxation provides a summary rating of the nutritional quality of the foods to which it is applied. Tax rates may also be envisaged to vary with the continuous NPM score, as for the South African tax on SSBs, in which the tax rate is proportional to the sugar content of

the drink. The relation between tax rates and NPM score could even be envisaged as a non-linear function, for instance, with increasingly heavy penalties for foods of a poor nutritional quality. This design would effectively be equivalent to a tiered rate design with as many tiers as score values on the NPM scale.

A tiered-rate NPM-based tax would strongly incentivize product reformulation, as long as the rate tiers are set to ambitious but attainable reformulation targets. For example, the tax adopted in Hungary has been designed for categories in which healthier options are available, with thresholds that can be reached in each product category, showing that reformulation to avoid the tax is possible *(41)*.

5. Strengths and weaknesses of nutrient profiling methods relative to a use in tax design

The existing NPM-based taxes and those tested in modelling studies rely on different NPMs and different tax structures. NPMs used in various regulation policies (such as front-of-pack labelling or regulation of marketing to children) could be used in the design of a tax. The WHO regional offices for the Americas and for Europe have their own models for use in restricting marketing to children. All the systems have different characteristics that would result in fiscal policies of different structures. The main characteristics that influence the design of NPM-based fiscal policies are:

- whether the NPM is general or category-specific,
- whether it encompasses multiple ratings based on different criteria or combines the criteria into a summary rating through an algorithm and,
- the nutrients accounted for in the NPM.

To be effective in promoting reformulation, a fiscal policy must ensure that the reformulation can reduce the amount of the tax. For example, the Hungarian tax had category-specific criteria that could distinguish better foods in each taxed category *(7)*. Promotion of reformulation may be easier with a category-specific NPM than with a general model. Nonetheless, taxing all food products on category-specific criteria could limit the incentive to switch to healthier alternatives in other categories, and such a tax could create a similar loophole to that observed in Mexico, where ice cream is mostly untaxed *(16)*.

Another desirable feature of an NPM for its potential use in fiscal policy design is the possibility of making the tax proportional to the nutritional quality of the food. An NPM based on a continuous score would be better than an NPM based on thresholds. With an NPM that creates an overall score for a food, the tax amount could be proportional to the quality of the food. With an NPM based on thresholds, a solution would be to tax (at the same rate) all products that do not comply with one criterion, although this would raise the question of the equivalence of different nutrient criteria. Moreover, a tax based on a continuous score may provide incentives for all manufacturers to improve their products and not just those who have products that score close to the thresholds. The information used in an NPM is either on nutrients that can be "qualifying", e.g., fibres or vitamins, or "disqualifying", e.g., sugar or sodium, or on food ingredients or components, e.g., content of fruits and vegetables and stimulants in energy drinks. For easy use by manufacturers and regulators, the

NPM used in a fiscal policy should be based on information on food products that is readily available. A system based on information commonly included on food labels would be easier to monitor but might be limited by the absence of information on qualifying nutrients commonly accounted for in NPMs (e.g., fruit and vegetable content).

The dimensions of five possible candidate NPMs to be used in fiscal policies are compared in Table A5.1. Two distinct groups are shown: one with the models developed by Chile and WHO, in which (category-specific) thresholds discriminate between two groups of foods, and a second that includes the United Kingdom NPM and its derivative Nutri-Score, in which foods are rated in a summary score. The second could be used to derive a tax proportional to the nutritional quality of foods and beverages. As the systems have the same thresholds for all foods, they tend to differentiate more across than within categories; therefore, a fiscal policy that was based on them would be less likely encourage intra-category substitutions for better products. Some categories would be taxed more than others. Nonetheless, in studies, foods in almost all categories scored at different levels, suggesting differentiation of products according to their nutritional quality in each category *(42–44)*. In addition, the last two systems could be used to create a tax solely for products defined as "less healthy", based on a given thresholds for the overall score. Conversely, the WHO European Region or WHO/Americas NPM could be used in a strategy to tax the worst products in each category. Such a system would not be proportional to the nutritional quality of foods but might provide stronger incentives for intra-category substitutions and product reformulation. The Chilean NPM could be used to tax less healthy products across the board.

6. Conclusion

Given the amount and strength of the evidence available today that links NPMs to health outcomes, the design of health taxes on food and non-alcoholic beverages for improving the nutritional quality of food purchases could usefully be supported by an NPM. Moreover, NPMs are increasingly used in other domains of food and nutrition policy, and use of a unified system for different policies would facilitate policy implementation and provide clearer, stronger incentives for consumers to choose healthier foods. The choice of the dimensions of the NPM in the context of fiscal policies should be further investigated, as current NPMs have strengths and weaknesses for possible use in the design of fiscal policies. A few countries have implemented taxes loosely based on NPMs or similar systems. Early evaluations, including modelling, show promising results in terms of reducing purchases of taxed foods and improving the overall nutritional quality of purchases; however, the longer-term consequences of such policies on diet and health require further research.

Table A5.1. Dimensions of the NPM suggested to be used in fiscal policies

	WHO European Region	WHO/Americas	United Kingdom NPM	Nutri-Score	Chilean system
First aim of the NPM (i.e., designed for)	Restricting marketing to children	Various possible policies (fiscal policies, front-of-package labelling and nutrition guidelines for school food environments)	Restricting marketing to children	Front-of-pack labelling	Front-of-pack labelling, marketing to children and regulating school food environment
Score or thresholds	Nutrient/component thresholds	Nutrient/component thresholds	Scoring with a threshold	Scoring with a threshold	Nutrient thresholds
Category-specific or across the board algorithm	Category-specific	Category-specific	Across the board (different threshold of the score for foods and drinks)[b]	Across the board (different threshold of the score for foods and beverages)[b]	Across the board (different nutrient thresholds for solids and liquids)[b]
Qualifying nutrients/ components	None	None	Protein, fibre, fruit, vegetable and nut	Protein, fibre, fruit, vegetable and nut	Added sugars, saturated fats, sodium
Disqualifying nutrients/components	Total fat, saturated fat, total sugars, added sugars and salt energy[a], non-sugar sweeteners[a]	Sodium, free sugars, other sweeteners, total fat, saturated fat, trans-fat	Energy, saturated fat, total sugars, sodium	Energy, saturated fat, total sugars, sodium	
Components that are not easily accessible	None	Free sugars (method of estimation given)	Fibre, fruit, vegetable and nut content	Fibre, fruit, vegetable and nut content	Added sugars
Reference amount	Per 100 g	Percentage energy	Per 100 g/100 mL	Per 100 g/100 mL	Per 100 g/100 mL
Source of information	(45)	(46)	(47)	(48)	(18)

[a] In some categories only

[b] The terminology used in the reference paper is used in the table

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