

A stylized map of the Americas, including North, Central, and South America, rendered in a solid blue color. The map is positioned on the left side of the page, with the title text overlaid on it.

# Pan American Health Organization Nutrient Profile Model



Pan American  
Health  
Organization



World Health  
Organization

REGIONAL OFFICE FOR THE Americas

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# Preface

In October 2014, Member States at the 53rd session of the Directing Council of the Pan American Health Organization (PAHO), unanimously approved the Plan of Action for the Prevention of Obesity in Children and Adolescents. This development reflected the awareness among governments of the alarming prevalence of obesity in the Americas—the highest in the world—and was an unequivocal sign that countries in the Region were committed to taking action.

The Plan of Action mandates that PAHO provide evidence-based information for the development of fiscal and other types of policies and regulations to prevent the consumption of unhealthy foods, including front-of-package (FOP) labeling and Regional nutrition guidelines for school food environments (feeding programs and food and beverages sold in schools). The development and provision of Regional criteria for acceptable amounts of critical nutrients such as salt, sugar, saturated fats and trans fats, in the form of a Nutrient Profile (NP) Model, is a key step towards compliance with this mandate.

The PAHO NP Model presented here is based on robust scientific evidence and is the result of rigorous work by an Expert Consultation Group composed of recognized authorities in the field of nutrition. It is my hope that this model will be adopted by Member States and used to create environments conducive to healthy eating.

Carissa F. Etienne

*Director, Pan American Health Organization*

## Development process

An Expert Consultation Group was commissioned by PAHO in December 2014 to develop a nutrient profiling scheme for use by Member States for the development of norms and regulations for energy-dense/nutrient-poor food and nonalcoholic beverages. The following experts participated in the consultation group<sup>1</sup>: Ricardo Uauy (chair),<sup>2</sup> Carlos A. Monteiro,<sup>3</sup> Juan Rivera,<sup>4</sup> Lorena Rodriguez,<sup>5</sup> Dan Ramdath (vice chair),<sup>6</sup> and Mike Rayner.<sup>7</sup> Participants in the model development process from the PAHO/WHO Secretariat included Enrique Jacoby, Chessa Lutter, and Chizuru Nishida.

The consultation began in January 2015 with group discussion of a working paper developed by Ricardo Uauy. Discussions were conducted by email and phone during the first few months and resulted in several updates of the working paper. A draft report was presented at a face-to-face meeting in Bogota, Colombia, 9–10 April 2015. During this process, Marcela Reyes<sup>8</sup> provided invaluable technical and logistic support. The final model was presented to the PAHO/WHO Secretariat (in July 2015), reviewed, and edited for readability. The work of Cintia Lombardi<sup>9</sup> was instrumental in that process.

The PAHO NP Model described in this report replaces Recommendation No. 10 in the PAHO publication *Recommendations from a Pan American Health Organization Expert Consultation on the Marketing of Food and Non-Alcoholic Beverages to Children in the Americas*.<sup>10</sup> The current NP model is based on all of the upda-

ted evidence, including the WHO guidelines on sugar and other nutrients, and was designed for multiple applications, including regulation of marketing, front-of-package labelling, and fiscal policies related to foods and beverages with high energy content and poor nutritional value. The development of this model coincides with the completion of similar models from WHO's Western Pacific and Europe regions.

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- 1 Dariush Mozaffarian, dean of the Gerald J. and Dorothy R. Friedman School of Nutrition Science and Policy at Tufts University (Medford/Somerville, United States), was a participant in the initial work but subsequently withdrew.
  - 2 Professor of Public Health Nutrition, London School of Hygiene & Tropical Medicine, London, United Kingdom; Director, Instituto de Nutrición y Tecnología de los Alimentos, and Professor, Universidad de Chile, Santiago, Chile.
  - 3 Professor of Nutrition, School of Public Health, Universidad de São Paulo, São Paulo, Brazil.
  - 4 Director, Centro de Investigación en Nutrición y Salud, Instituto Nacional de Salud Pública, Cuernavaca, Mexico.
  - 5 Coordinator, Nutrition Department, Ministry of Health, Santiago, Chile.
  - 6 Honorary Professor, Faculty of Medical Sciences, University of the West Indies, St. Augustine, Trinidad & Tobago; Advisor, Caribbean Public Health Agency, Port of Spain, Trinidad & Tobago.
  - 7 Director, British Heart Foundation Centre on Population Approaches for Non-Communicable Disease Prevention, Medical Sciences Division, Nutfield Department of Population Health, Oxford University, Oxford, United Kingdom.
  - 8 Investigator, Public Health Nutrition Unit, Instituto de Nutrición y Tecnología de los Alimentos, Universidad de Chile, Santiago, Chile.
  - 9 Member of the PAHO/WHO Nutrition Team, Washington DC, United States.
  - 10 <http://iris.paho.org/xmlui/handle/123456789/3594>



# I. Introduction

The purpose of nutrient profiling<sup>11</sup> is to provide a tool to classify food and drink products that are in excess of free sugars, salt, total fat, saturated fat and trans-fatty acids.

The Expert Consultation Group described in this report was commissioned to develop a Nutrient Profile Model for the Pan American Health Organization – the PAHO NP Model – to be used as a tool in the design and implementation of various regulatory strategies related to the prevention and control of obesity/overweight, including the following:

- Restriction in the marketing of unhealthy food and beverages to children
- Regulation of school food environments (feeding programs and food and beverages sold in schools)
- Use of front-of-package (FOP) warning labels
- Definition of taxation policies to limit consumption of unhealthy food
- Assessment of agricultural subsidies
- Identification of foods to be provided by social programs to vulnerable groups.

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<sup>11</sup> Nutrient profiling is defined as ‘the science of classifying or ranking foods according to their nutritional composition for reasons related to preventing disease and promoting health’ [26]. Nutrient profiling provides a practical approach to classifying specific foods and not dietary patterns, which are dealt with in food based dietary guidelines.

## II. Background

Over the past few decades, obesity/overweight and related non-communicable chronic diseases (NCDs) have progressively increased in every age group and have become the major cause of death and disability in the Americas Region (55% of all causes in 2012, according to WHO Global Health Estimates<sup>12</sup>). The growing problem of NCDs is occurring in tandem with several nutritional deficits (e.g., low intake of iron, zinc, vitamin A, folate, and other micronutrients) that result from poverty and monotonous (non-diverse) diets and remain significant in the Andean, Central America, and Caribbean subregions.

The prevalence of obesity and overweight in the Americas (62% of adults more than 20 years old) is the highest among all WHO regions. Obesity and overweight affect around 7 in every 10 adults in Mexico, Chile and the United States. Likewise, in children and adolescents, prevalence rates have grown steadily and available data show that 20% to 25% are overweight or obese (1).

Scientific knowledge about the influence of specific dietary intake patterns on the development of obesity/overweight and other NCDs is fairly robust (2, 36). Collectively, the evidence supports the need to protect and promote the consumption of unprocessed and minimally processed foods, and freshly prepared dishes made with them, plus certain culinary ingredients (butter, honey, lard, plant oils, salt, sugar, and other single substances extracted directly from food or nature and used as ingredients in culinary preparations) to discourage the consumption of processed and ultra-processed food products.<sup>13</sup>

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12 [http://www.who.int/healthinfo/global\\_burden\\_disease/en/](http://www.who.int/healthinfo/global_burden_disease/en/)

13 Definitions of terms used in this document can be found in the Glossary.

There are clear and alarming trends in the Americas indicating rapid replacement of unprocessed or minimally processed foods and freshly prepared dishes by ultra-processed products. For example, the relative contribution of ultra-processed products to the overall energy supply of families increased from 19% to 32% in Brazil between 1987 and 2008, and from 24% to 55% in Canada between 1938 and 2001 (3, 4). In Latin America, food sales data in 13 countries show that between 2000 and 2013, sales of sugar-sweetened beverages (SSBs) increased by an average of 33%, whereas sales of ultra-processed snacks have risen by 56% (5, 6). These changes are significantly related to simultaneous increases in the general population's average body mass index (BMI) in the same countries (6). While this type of food consumption data are not available in the Caribbean, surveys in a few countries in that sub-region indicate high consumption of SSBs and limited intake of fruit, vegetables, and water—trends that are significantly associated with obesity/overweight in children and adults (7). A recent survey in the Region shows that 50%–60% of respondents who reported consuming ultra-processed snacks in the past month did so for meal replacement, suggesting displacement of traditional diets (8).

These trends are worrisome because population-based studies undertaken in the Region (3, 9–14) show that traditional diets (based on fresh or minimally processed foods, and dishes made from those foods, plus culinary ingredients) have a lower content of sodium, unhealthy fats, and free sugars and a higher content of fiber, vitamins, and minerals than average ultra-processed products. In addition, these studies demonstrate that traditional diets tend to have a nutrient profile consistent with WHO Population Nutrient Intake Goals (PNIGs), defined as the average dietary intake recommended for maintenance of good health in a population (15).

During the past few decades, “calls for action” to promote healthy diets and limit intake of energy, sodium, unhealthy fats, and free sugars have been launched by various international organizations (WHO, PAHO, the United Nations, the Food and Agriculture Organization (FAO), the World Cancer Research Fund (WCRF), and the Caribbean Public Health Agency (CARPHA), among others). Proposed actions include the development of regulatory measures and food-based dietary guidelines (FBDGs) to promote the consumption of a great variety of fresh or minimally processed foods (16, 18).

Simultaneously, many countries have issued food-related norms, regulations, and policies, particularly in Latin America, where strategies have included the taxation of SSBs (in Mexico); policies to improve the school food environment (in Brazil, Costa Rica, Ecuador, United States and Uruguay); regulation of food marketing to children (in Brazil, Chile, Mexico, and Quebec in Canada); and FOP labeling (in Ecuador). Experiences with these policies and regulations have shown the need to define the food that should be regulated and the difficulties encountered in defining these.

### **III. Principles and rationale of the PAHO Nutrient Profile Model**

1. The inclusion criteria for the critical nutrients addressed in the PAHO NP Model (free sugars, sodium, saturated fat, total fat, and trans-fatty acids) were based on the WHO Population Nutrient Intake Goals to Prevent Obesity and Related NCDs (PNIGs) to prevent obesity and related NCDs described in *WHO/FAO Diet, Nutrition and the Prevention of Chro-*

*nic Diseases* (15), a publication that 1) provides guidance on which nutrients should be analyzed and 2) indicates maximum acceptable levels of consumption. These PNIGs were formulated after careful review of all updated evidence relating critical nutrient intake to public health outcomes.

2. In addition to critical nutrients, “other sweeteners” (see Glossary) were included in the model. The rationale for their inclusion is that habitual use of sweet flavors (sugar-based or not) promotes the intake of sweet food and drinks, including those that contain sugars. This outcome is particularly important in young children because consumption at an early age defines lifelong consumption patterns (28, 29).
3. The PAHO NP model classifies a food product as “excessive” in one or more critical nutrients if its relative nutrient content is higher than the corresponding maximum level recommended in the WHO PNIGs (15). It was reasoned that population nutrient intake goals are aimed at guiding overall daily food intake rather than individual foods. However, because the consumption of food products classified as excessive in one or more critical nutrients increases the likelihood that the diet will exceed the recommended nutrient goals, consumers should be aware of these recommendations and limit their intake of these foods in order to achieve a healthy diet.
4. The PAHO NP Model also takes into account the updates of the PNIGs (15), including recent WHO guidelines on sugars (23) and sodium (27), and the expert consultation on fats (24), which provided recommendations on maximum intake of the critical nutrients.
5. The food and beverage products that should be evaluated with the PAHO NP Model are limited to processed and ultra-pro-

cessed products, which typically contain elevated amounts of sodium, free sugars, saturated fat, total fat, and trans-fatty acids added by the manufacturer. A detailed list of these products is provided in Panel A.

**Panel A. Examples of processed and ultra-processed food products to be classified using the PAHO NP Model criteria \***

**Processed products:** Vegetables such as carrots, cucumbers, peas, heart of palm, onions, and cauliflower preserved in salt, or by pickling; tomato extract or concentrates (with salt or sugars); fruits in sugars and candied fruits; beef jerky and bacon; canned sardine and tuna; other salted, smoked, or cured meat or fish; cheeses; breads and baked products (in general).

**Ultra-processed products:** Sweet or salty packaged snacks, biscuits (cookies), ice cream, and candies and confectionery (in general); cola, soda, and other soft drinks; sweetened juices and "energy" drinks; sweetened breakfast cereals; cakes and cake mixes and cereal bars; sweetened and flavored yogurts and dairy drinks; canned, packaged, dehydrated, and other "instant" soups, noodles, and seasonings; preprepared meat, fish, vegetables, pizza and pasta dishes, burgers, hot dogs, sausages, poultry and fish "nuggets" and "sticks"; and other products made from animal byproducts.

*\* Adapted from the 2014 edition of the Brazilian Dietary Guidelines (33).*

6. There is no reason to apply the PAHO NP Model to unprocessed or minimally processed foods, such as vegetables, legumes, grains, fruits, nuts, roots and tubers, meat, fish, milk, and eggs, and freshly prepared dishes made with those foods. Most if not all FBDGs recommend regular consumption of a variety

of natural unprocessed or minimally processed foods (18), and food regulatory actions aimed at reducing the consumption of unhealthy foods must obviously be in line with FBDGs. A detailed list of foods that should NOT be classified using the PAHO NP Model is provided in Panel B.

**Panel B. Examples of foods that should NOT be classified using the PAHO NP Model\***

**Unprocessed or minimally processed foods** (without added oils, fats, free sugars, other sweeteners, or salt): Natural, packaged, cut, chilled, or frozen vegetables, fruits, potatoes, cassava, and other roots and tubers; bulk or packaged white, parboiled, and wholegrain rice; whole grains of wheat and other cereals; granola made from cereal grains, nuts and dried fruits, cassava, corn, or wheat grits and flours; all types of beans; lentils, pigeon peas, chickpeas, and other legumes; dried fruits, fresh or pasteurized fruit juices without added sugars; nuts, peanuts, and other oilseeds without added salt; fresh and dried mushrooms and other fungi; fresh, frozen, dried beef, pork, poultry and other meat and fish; pasteurized, UHT liquid and powdered milk; fresh and dried eggs, yogurt; and tea, herbal infusions, coffee, and tap, spring, and mineral water.

**Culinary ingredients:** Oils made from soybeans, corn, sunflower, or olives; butter, lard, coconut fat; white, brown, and other types of sugar and honey; refined or coarse salt.

**Freshly prepared dishes:** Freshly prepared, handmade soups, salads, vegetable dishes, rice dishes, pasta dishes, meat dishes, omelets, pies, breads, cakes, pastries, and milk and fruit desserts.

*\* Adapted from the 2014 edition of the Brazilian Dietary Guidelines (33).*

7. The PAHO NP Model was not developed for classifying culinary ingredients, such as salt, plant oils, butter, lard, sugar, honey, and other single substances directly extracted from foods or nature, based on the rationale that those substances are used to season and cook unprocessed or minimally processed foods to produce palatable, freshly prepared dishes. Furthermore, in practice, these substances are rarely consumed alone, so it was considered inappropriate to assess their individual nutrient profile. Panel B contains examples of foods, culinary ingredients, and freshly prepared dishes that should not be classified using the PAHO NP Model.
8. The decision to exclude unprocessed or minimally processed foods, culinary ingredients, and freshly prepared dishes made from those foods and ingredients is supported by population-based studies undertaken in several countries in the Americas (3, 9–13) that show that diets based on those foods, ingredients, and dishes generally meet WHO PNIGs (15, 23, 27). However, countries concerned about high intakes of certain minimally processed foods and culinary ingredients, such as whole fat milk, fatty cuts of meat, fruit juices made exclusively from fruits, table sugar, or table salt, may wish to address this issue in their national FBDGs.
9. Foods and beverages for special uses, such as "breast milk substitutes," food supplements, and alcoholic drinks, should be subjected to specific regulations and thus have been excluded from the PAHO NP model.
10. Changes in the WHO PNIGs (15) based on new evidence that supports the inclusion of a new nutrient or sets the maximum recommended level of a given nutrient in the diet will be automatically incorporated in the PAHO NP model.

## IV. Criteria used in the PAHO Nutrient Profile Model

As a result of its alignment with the WHO PNIGs, and based on examination of food labels or equivalent sources of information, the PAHO NP Model classifies processed and ultra-processed products as (Panel C):

- **Excessive in sodium**, if the ratio between the amount of sodium (mg) in any given quantity of the product and the energy (kcal) is equal to or higher than 1:1<sup>14</sup>
- **Excessive in free sugars**, if in any given quantity of the product, the amount of energy (kcal) from free sugars (g of free sugars x 4 kcal) is equal to or higher than 10% of the total energy (kcal);
- **Containing other sweeteners**, if the list of ingredients includes either artificial or natural non-caloric sweeteners or caloric sweeteners (polyols)
- **Excessive in total fats**, if in any given quantity of the product the amount of energy (kcal) from total fats (g of total fats x 9 kcal) is equal to or higher than 30% of the total energy (kcal)
- **Excessive in saturated fats**, if in any given quantity of the product the amount of energy (kcal) from saturated fats (g of saturated fats x 9 kcal) is equal to or higher than 10% of the total energy (kcal)

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<sup>14</sup> This ratio is derived from a maximum recommended daily intake of 2 000 mg of sodium—the WHO upper limit for adults—and total daily energy intake of 2 000 kcal.

- **Excessive in trans fats**, if in any given quantity of the product the amount of energy (kcal) from trans fats (g of trans fats x 9 kcal) is equal to or higher than 1% of the total amount of energy (kcal).

**Panel C. PAHO NP Model criteria for identifying processed and ultra-processed products excessive in sodium, free sugars, other sweeteners, saturated fat, total fat, and trans fat**

Sodium	Free sugars	Other sweeteners	Total fat	Saturated fat	Trans fat
≥ 1 mg of sodium per 1 kcal	≥ 10% of total energy from free sugars	Any amount of other sweeteners	≥ 30% of total energy from total fat	≥ 10% of total energy from saturated fat	≥ 1% of total energy from trans fat

If free sugars are not declared in food labels, they need to be estimated. There are several algorithms for estimating free sugars (or, sometimes, added sugars) that yield reliable estimates (30–32). The Expert Consultation Group considered these algorithms appropriate but developed a simpler method for estimating the amount of free sugars in a food product based on the information provided on the amount of total sugars (Panel D).

A sample application of the PAHO NP Model is shown in Appendix 1. The Expert Consultation Group applied the model criteria to both processed and ultra-processed food products from Brazil, Chile, Jamaica, and Trinidad & Tobago using information provided by nutrition fact panels and ingredient lists on packages. Selection of products was based on volume of sales or household purchases, so the data used in the model may not be representative of all local foods and drinks in each category.

Appendix 2 compares the PAHO NP Model’s classification of packaged foods with that of other models—including those developed by two WHO regional offices (Europe and Eastern Mediterranean). The results of the comparison show that the PAHO NP model criteria for food classification are similar to but more stringent than those of the other three models.

**Panel D. Method for estimating free sugars based on the amount of total sugars declared on food/beverage product packaging**

If the manufacturer declares ...	Then estimated free sugars equal ...	Examples of products
0 g of total sugars	0 g	Canned fish
added sugars	declared added sugars	Any product that declares added sugars
total sugars, and the product is part of a group of foods with no or a minimal amount of naturally occurring sugars	declared total sugars	Regular soft drinks, sport drinks, sweet biscuits, breakfast cereals, chocolate, and savory and sweet biscuits
total sugars and the product is yogurt or milk, with sugars in the list of ingredients	50% of declared total sugars	Flavored milk or yogurt
total sugars, and the product is a processed fruit item with sugars in the list of ingredients	50% of declared total sugars	Fruit in syrup
total sugars, and the product has milk or fruit in the list of ingredients	75% of declared total sugars	Cereal bar with fruit

## V. Use and implementation of the PAHO Nutrient Profile Model

1. Use of the PAHO NP Model requires mandatory labeling of prepackaged foods that includes the following:
  - a) Declaration of nutrient content for energy, sodium, total sugars, total fat, saturated fat, and trans fat, and
  - b) A list of all ingredients in the product including non-sugar sweeteners.
2. Although nutrient content can be expressed in absolute terms (“per serving”), PAHO recommends it be expressed relative to total weight or volume (“per 100 g” or “per 100 mL” of the food product).
3. Examples of policies that may benefit from the use of the PAHO NP model include but are not limited to the following:
  - Establishment of restrictions on the marketing/promotion of unhealthy food and beverages to children
  - Regulation of school food environments
  - FOP warning labels
  - Establishment of taxation policies to limit consumption of unhealthy foods
  - Assessment or reexamination of agricultural subsidies
  - Development of guidelines for foods provided by social programs to vulnerable populations.

Examples of regulatory experiences in various countries in the Americas that require or may benefit from the PAHO NP Model can be found in Appendix 3.

4. National, subnational, and local policies that require the use of an NP model are implemented through a mandatory legal norm. Once a country decides to implement a specific policy, the Ministry of Health should assume leadership of the process, building consensus among key sectors of the government (e.g., education, agriculture, and social development) and engaging other stakeholders, primarily civil society, legislators, and academia.
5. Evaluation of the impact of policies that are based on the PAHO NP Model is an important part of the process because it provides critical feedback during implementation as well as measurement of the impact.

## VI. Glossary<sup>15</sup>

**Added sugars:** Free sugars added to foods and beverages during manufacturing or home preparation.

**Culinary ingredients:** Substances extracted directly from unprocessed or minimally processed foods or from nature and commonly consumed (or consumable) as ingredients of culinary preparations. The extraction process can include pressing, grinding, crushing, pulverizing, and drying. These substances are used to season and cook unprocessed or minimally processed foods and create freshly prepared dishes. Additives help preserve foods' properties or avoid the proliferation of microorganisms.

**Energy:** The total chemical energy available in food (in kilocalories or kcal) and its macronutrient constituents (carbohydrates, fats, and proteins).

**Free sugars:** Monosaccharides and disaccharides added to foods and beverages by the manufacturer, cook, and/or consumer plus sugars that are naturally present (e.g., honey, syrups, and fruit juices).

**Freshly prepared dishes:** Handmade preparations mostly or entirely composed of unprocessed or minimally processed foods and culinary ingredients.

**Minimally processed foods:** Unprocessed foods that have undergone cleaning, removal of inedible or unwanted parts, drying, grinding, fractionation, roasting, boiling, pasteurization, cooling, freezing, vacuum packing, and/or non-alcoholic fermentation. Minimally processed foods also include the following: combinations of two or more unprocessed or minimally processed foods; minimally pro-

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<sup>15</sup> Definitions adapted from: (24, 33, 35)

cessed foods added of vitamins and minerals to restore the original micronutrient content or for public health purposes; and minimally processed foods with additives designed to preserve their original properties, such as antioxidants and stabilizers.

**Other sweeteners:** Food additives that impart a sweet taste to a food, including artificial non-caloric sweeteners (e.g., aspartame, sucralose, saccharin, and acesulfame potassium); natural non-caloric sweeteners (e.g., stevia); and caloric sweeteners such as polyols (e.g., sorbitol, mannitol, lactitol, and isomalt). This category does not include fruit juices, honey, or other food ingredients that can be used as a sweetener.

**Processed food products:** Food products manufactured by industry in which salt, sugar, or other culinary ingredients have been added to unprocessed or minimally processed foods to preserve them or make them more palatable. Processed food products are derived directly from natural foods and are recognized as a version of the original foods. Most of them have two or three ingredients. The processes used in the manufacture of these food products may include different methods of cooking, and, in the case of cheeses and breads, nonalcoholic fermentation. Additives may be used to preserve the properties of these products or to avoid the proliferation of microorganisms.

**Saturated fat:** Fat molecules with no double bonds between carbon molecules. The saturated fatty acids used most often in current food products are C14, C16, and C18. In the case of milk and coconut oil, however, saturated fatty acids range from C4 to C18.

**Sodium:** A soft, silver-white element found in salt; 1 g of sodium equals about 2.5 g of salt.

**Total fat:** The total fat content of a food product composed of fatty acids from the three main groups (saturated fatty acids, monoun-

saturated fatty acids, and polyunsaturated fatty acids), which are differentiated based on chemical composition.

**Total sugars:** All sugars from all sources in a food, defined as "all monosaccharides and disaccharides other than polyols." This concept is used for labeling purposes.

**Trans fat:** A form of fat that results from the hydrogenation of unsaturated fatty acids or occurs naturally in the milk and meat of certain animals. The most common trans-fatty acids in current food products are isomers (18:1 trans) derived from partial hydrogenation of vegetable oils.

**Unprocessed foods:** Foods obtained directly from plants or animals that do not undergo any alteration between their removal from nature and their culinary preparation or consumption.

**Ultra-processed food products:** Industrial formulations manufactured with several ingredients. Like processed products, ultra-processed products include substances from the culinary ingredients category, such as fats, oils, salt, and sugar. Ultra-processed products can be distinguished from processed products based on the presence of other substances that are extracted from foods but have no common culinary use (e.g., casein, milk whey, protein hydrolysate, and protein isolates from soy and other foods); substances synthesized from food constituents (e.g., hydrogenated or interesterified oils, modified starches, and other substances not naturally present in foods); and additives used to modify the color, flavor, taste, or texture of the final product. Unprocessed or minimally processed foods usually represent a tiny proportion of or are absent in the list of ingredients of ultra-processed products, which often have 5, 10, or 20 or more items. Several techniques are used in the manufacture of ultra-processed products, including extrusion, molding, and pre-processing, through frying. Examples include soft drinks, packaged snacks, "instant" noodles, and chicken nuggets.

## VII. References

1. Pan American Health Organization. Plan of action for the Prevention of Obesity in Children and Adolescents. 53rd Directing Council, 66th Session of the Regional Committee of WHO for the Americas, Washington, D.C., USA, 29 September-3 October 2014. Washington: PAHO; 2014. Available from: <http://www.paho.org/nutricionydesarrollo/wp-content/uploads/2014/09/Plan-of-Action-for-the-Prevention-of-Obesity-in-Children-and-Adolescents.pdf>. Accessed on April 28, 2015.
2. Institute for Health Metrics and Evaluation. The global burden of disease: generating evidence, guiding policy. Seattle: IHME; 2013. Available from: <http://www.healthdata.org/policy-report/global-burden-disease-generating-evidence-guiding-policy>
3. Monteiro CA, Levy RB, Claro RM, de Castro IR, Cannon G. Increasing consumption of ultra-processed foods and likely impact on human health: evidence from Brazil. *Public Health Nutr.* 2011;14(1):5–13.
4. Martins AP, Levy RB, Claro RM, Moubarac JC, Monteiro CA. Increased contribution of ultra-processed products in the Brazilian diet (1987–2009). *Rev Saude Publica.* 2013;47(4):656–65.
5. Aburto TC et al. Contribution of food groups to the total dietary energy intake of Mexican population. *J Nutr.* 2015; in press.
6. Pan American Health Organization. Consumption of ultra-processed food and drink products in Latin America: trends, impact on obesity, and policy implications. Washington: OPAS; 2015.
7. Caribbean Public Health Agency. Safeguarding our future development. Plan of Action for Promoting Healthy Weights in the Caribbean: prevention and control of childhood obesity 2014–2019. Port of Spain: CARPHA; 2015. Available from: <http://carpha.org/Portals/0/docs/HealthyWeights.pdf> Accessed on April 28, 2015.
8. Nielsen. Snack attack: what consumers are reaching for around the world [Internet]. New York: Nielson; 2014. Available from: <http://www.nielson.com/us/en/insights/reports/2014/snack-attack-what-consumers-are-reaching-for-around-the-world.html> Accessed on April 28, 2015.

9. Moubarac JC, Martins AP, Claro RM, Levy RB, Cannon G, Monteiro CA. Consumption of ultra-processed foods and likely impact on human health. Evidence from Canada. *Public Health Nutr.* 2013;16(12):2240–8.
10. Martines et al. Ultra-processed foods and dietary quality in the U.S. Manuscript in preparation.
11. Louzada ML, Martins AP, Canella DS, Baraldi LG, Levy RB, Claro RM, et al. Impact of ultra-processed foods on micronutrient content in the Brazilian diet. *Rev Saude Pub.* 2015;49:1–8. DOI:10.1590/S0034-8910.2015049006211
12. da Costa Louzada ML, Bortoletto Martins AP, Silva Canella D, Galastri Baraldi L, Bertazzi Levy R, Moreira Claro R, et al. Ultra-processed foods and the nutritional dietary profile in Brazil. *Rev Saude Pub.* 2015;49:38. DOI:10.1590/S0034-8910.2015049006132.
13. Croveto MM, Uauy R, Martins AP, Moubarac JC, Monteiro C. [Household availability of ready-to-consume food and drink products in Chile: impact on nutritional quality of the diet]. *Rev Med Chil.* 2014;142(7):850–8.
14. Parra DC, Levy R, Moubarac JC, Monteiro CA. Consumption of ready-to-consume products and its association with diet quality in Colombian adults [abstract]. World Public Health Nutrition Association 2014 Conference “Building Healthy Global Food Systems,” Keble College, Oxford, UK, 8–9 September, 2014. London: WPHNA; 2014.
15. World Health Organization; Food and Agricultural Organization. Diet, nutrition and the prevention of chronic diseases. Report of the joint WHO/FAO expert consultation. Geneva: WHO; 2003. (WHO Technical Report Series No. 916). Available from: <http://www.who.int/dietphysicalactivity/publications/trs916/en/>
16. Food and Agricultural Organization. Food-based dietary guidelines [Internet]. Rome: FAO; 2015. Available from: <http://www.fao.org/nutrition/nutrition-education/food-dietary-guidelines/en/> Accessed on April 28, 2015.
17. World Health Organization; Food and Agricultural Organization. Preparation and use of food-based dietary guidelines, Joint FAO/WHO Consultation. Geneva: WHO; 1998. (WHO Technical Report Series 880). Available from: [http://www.who.int/nutrition/publications/nutrientrequirements/WHO\\_TRS\\_880/en/](http://www.who.int/nutrition/publications/nutrientrequirements/WHO_TRS_880/en/) Accessed on April 28, 2015.

18. Food and Agricultural Organization. Guías alimentarias basadas en alimentos: América Latina y el Caribe [Internet]. Rome: FAO; 2014. Available from: <http://www.fao.org/nutrition/educacion-nutricional/food-dietary-guidelines/regions/latin-america-caribbean/es/> Accessed on April 28, 2015.
19. Etienne CF. Countries pledge action to reduce child obesity in the Americas. *Lancet*. 2014;384(9959):2021.
20. Jacoby E, Rivera J, Cordero S, Gomes F, Garnier L, Castillo C, et al. Legislation, children, obesity: standing up for children's rights in Latin America [Commentaries]. *World Nutr*. 2012;3(11):483–516.
21. Corvalán C, Reyes M, Garmendia ML, Uauy R. Structural responses to the obesity and non-communicable diseases epidemic: the Chilean Law of Food Labeling and Advertising. *Obes Rev*. 2013;14 Suppl 2:79–87.
22. Barquera S, Campos I, Rivera JA. Mexico attempts to tackle obesity: the process, results, push backs and future challenges. *Obes Rev*. 2013;14 Suppl 2:69–78.
23. World Health Organization. Guideline: sugars intake for adults and children. Geneva: WHO; 2015. Available from: [http://apps.who.int/iris/bitstream/10665/149782/1/9789241549028\\_eng.pdf](http://apps.who.int/iris/bitstream/10665/149782/1/9789241549028_eng.pdf) Accessed on April 28, 2015.
24. Food and Agricultural Organization. Fats and fatty acids in human nutrition. Report of an expert consultation. Rome: FAO; 2010. (Food and Nutrition Paper No. 91). Available from: [http://www.who.int/nutrition/publications/nutrientrequirements/fatsandfattyacids\\_humannutrition/en/](http://www.who.int/nutrition/publications/nutrientrequirements/fatsandfattyacids_humannutrition/en/) Accessed on April 28, 2015.
25. U.S. Department of Agriculture. Scientific Report of the 2015 Dietary Guidelines Advisory Committee. Advisory Report to the Secretary of Health and Human Services and the Secretary of Agriculture. Washington: USDA; 2015. Available from: <http://health.gov/dietaryguidelines/2015-scientific-report/pdfs/scientific-report-of-the-2015-dietary-guidelines-advisory-committee.pdf>
26. World Health Organization. Guiding principles and framework manual for the development or adaptations of nutrient profile models. Geneva: WHO; 2015 (in press).
27. World Health Organization. Guideline: sodium intake for adults and children. Geneva: WHO; 2012. Available from: [http://apps.who.int/iris/bitstream/10665/77985/1/9789241504836\\_eng.pdf](http://apps.who.int/iris/bitstream/10665/77985/1/9789241504836_eng.pdf) Accessed on April 28, 2015.

28. Swithers SE. Artificial sweeteners are not the answer to childhood obesity. *Appetite*. 2015;93:85–90.
29. Mennella JA. Ontogeny of taste preferences: basic biology and implications for health. *Am J Clin Nutr*. 2014;99(3):704S–11S.
30. Roodenburg AJ, Popkin BM, Seidell JC. Development of international criteria for a front of package food labelling system: the International Choices Programme. *Eur J Clin Nutr*. 2011;65(11):1190–200.
31. Louie JC, Moshtaghian H, Boylan S, Flood VM, Rangan AM, Barclay AW, et al. A systematic methodology to estimate added sugar content of foods. *Eur J Clin Nutr*. 2015;69(2):154–61.
32. Kelly SA, Summerbell C, Rugg-Gunn AJ, Adamson A, Fletcher E, Moy-nihan PJ. Comparison of methods to estimate non-milk extrinsic sugars and their application to sugars in the diet of young adolescents. *Br J Nutr*. 2005;94(1):114–24.
33. Ministry of Health (BR). Dietary guidelines for the Brazilian population. 2nd ed. Brasilia; MH; 2014. Available from: <http://www.foodpolitics.com/wp-content/uploads/Brazilian-Dietary-Guidelines-2014.pdf> Accessed on April 28, 2015.
34. World Health Organization. WHO Regional Office for Europe—nutrient profile model. Copenhagen: WHO-EURO; 2015.
35. Cummings JH, Stephen AM. Carbohydrate terminology and classification. *Eur J Clin Nutr*. 2007. 61 Suppl 1:S5–18.
36. World Cancer Research Fund; American Institute for Cancer Research. Food, nutrition, physical activity, and the prevention of cancer: a global perspective. Washington: AICR; 2007. Available from: [http://www.aicr.org/assets/docs/pdf/reports/Second\\_Expert\\_Report.pdf](http://www.aicr.org/assets/docs/pdf/reports/Second_Expert_Report.pdf) Accessed on April 28, 2015.

**Appendix 1. Percentage of processed and ultra-processed food products classified as having amounts of 1) critical nutrients (fats, salt, and sugars) that exceed PAHO NP model criteria and/or 2) other sweeteners<sup>a</sup>, in Brazil, Chile, Jamaica and Trinidad & Tobago (TRT)<sup>a</sup>**

Food product	Country (number of products)	Excess of sodium (%)	Excess of free sugars (%)	Presence of other sweeteners (%)	Excess of total fat (%)	Excess of saturated fat (%)	Excess of trans fat (%)	Excess of one or more critical nutrient and presence of other sweeteners (%)
Breakfast cereals	Chile (12)	25	100	50	0	0	0	100
	Brazil (30)	53	89	10	3	17	0	100
Cereal bars	Jamaica + TRT (22)	62	82	5	45	0	27	100
	Chile (20)	5	75	30	65	33	0	95
Packaged bread	Brazil (25)	0	83	24	36	32	0	97
	Jamaica + TRT (24)	4	100	0	46	50	4	100
Milk with added sugar	Chile (56)	93	6	0	14	0	2	98
	Brazil (29)	93	8	17	7	3	0	100
Yogurt with added sugar	Jamaica + TRT (22)	96	33	0	4	7	22	100
	Chile (27)	63	70	63	0	70	33	100
Ice cream	Brazil (35)	11	75	20	34	63	0	100
	Jamaica + TRT (20)	26	100	5	40	47	70	95
Cheese with added salt	Chile (89)	25	85	52	13	57	13	97
	Brazil (23)	9	50	13	17	65	0	100
Ham	Jamaica + TRT (18)	0	100	6	6	17	0	100
	Chile (155)	1	93	3	83	98	32	99
Savory snacks	Brazil (28)	0	89	11	89	89	0	100
	Jamaica + TRT (28)	0	96	7	89	89	11	100
Sugar-sweetened beverages	Chile (0)b	-	-	-	-	-	-	-
	Brazil (53)	85	0	0	94	98	0	98
Caramel and chocolate	Jamaica + TRT (34)	93	10	0	97	90	32	100
	Chile (0)b	-	-	-	-	-	-	-
Savory snacks	Brazil (10)	100	0	0	100	90	0	100
	Jamaica + TRT (0) <sup>b</sup>	-	-	-	-	-	-	-
Sugar-sweetened beverages	Chile (83)	63	0	0	94	10	1	98
	Brazil (34)	97	7	0	77	41	3	100
Ice cream	Jamaica + TRT (58)	57	4	0	94	51	8	100
	Chile (185)	1	94	6	50	75	7	97
Packaged bread	Brazil (56)	7	90	14	57	57	0	100
	Jamaica + TRT (18) <sup>b</sup>	0	94	0	94	100	22	100
Cereal bars	Chile (50)	44	66	34	0	0	0	100
	Brazil (55)	18	82	22	2	0	0	100
Jamaica + TRT (0)	-	-	-	-	-	-	-	-

<sup>a</sup> The following countries' food products did not include the percentage of certain critical nutrients on their nutrient panels: Brazil, total sugar content (sugar declaration is not mandatory), Jamaica (true for other nutrients).

<sup>b</sup> No data available.

## Appendix 2. Comparison of the PAHO Nutrient Profile (NP) Model with three other nutrient models: WHO- EURO, WHO-EMRO, and UK FSA/Ofcom

Four NP criteria models were applied to 1 992 packaged foods and nonalcoholic beverages from five European countries (Germany, Netherlands, Slovenia, Spain, and United Kingdom). The database was compiled during implementation of a project on food labeling funded by the European Union (EU).<sup>16</sup> The models included PAHO's NP model, a model published by WHO's European Regional Office (WHO-EURO),<sup>17</sup> a draft model under development by WHO's Eastern Mediterranean Regional Office (WHO-EMRO), and a model published by the United Kingdom's Food Standards Agency (FSA) and independent regulator and competition authority for UK communications industries (Ofcom).<sup>18</sup> The WHO-EURO, WHO-EMRO, and UK FSA/Ofcom models were developed to help regulate the marketing of food to children. The table below shows the percentages of foods classified as having excessive amounts of critical nutrients by the four different models.

**Table 2. Percentage of packaged foods classified as having excessive amounts of critical nutrients, by model and food category**

	WHO-EURO (%)	WHO-EURO (%)	UK FSA/Ofcom (%)	PAHO NP (%)
All packaged foods <sup>a</sup> (n = 1 992)	68	76	53	78
Categorized according to United Kingdom National Health Service food guide (the "eatwell plate")				
Bread, cereals, and potatoes (n = 161)	43	44	27	46
Composite food <sup>b</sup> (n = 154)	58	58	38	95
Fatty and sugary food (n = 830)	88	89	70	91
Fruits and vegetables (n = 110)	42	42	13	14
Meat, fish, and meat/fish alternatives (n = 295)	48	93	53	79
Milk and dairy (n = 177)	77	81	54	99
Miscellaneous (n = 265)	50	57	43	92
Categorized by level of processing				
Unprocessed or minimally processed or culinary ingredients (n = 359)	22	33	20	0
Processed and ultra-processed (n = 633)	78	85	61	95

- a Muestra de alimentos envasados excepto los que tienen usos nutricionales especiales (por ejemplo, preparaciones para lactantes o alimentos con fines médicos, requisitos corporales en casos de esfuerzo físico intenso, especialmente para deportistas, trastornos del metabolismo de los carbohidratos o dietas con bajo contenido de sodio o sin gluten, etc.).
- b Alimentos que contienen productos procesados de origen animal y productos de origen vegetal.

16 <http://www.clymbol.eu/> (Note: a report describing the methods used to compile the database was under review at the time of this publication.)

17 [http://www.euro.who.int/\\_data/assets/pdf\\_file/0005/270716/Nutrient-Profile-Model\\_Version-for-Web.pdf?ua=1](http://www.euro.who.int/_data/assets/pdf_file/0005/270716/Nutrient-Profile-Model_Version-for-Web.pdf?ua=1)

18 <https://www.gov.uk/government/publications/the-nutrient-profiling-model>

### Appendix 3. Sample regulatory experiences in various countries that require or may benefit from the PAHO Nutrient Profile Model, Americas Region

**United States of America:** Measures differ by state; school food environments are being modified through 1) programs that, in some schools, subsidize fruits and vegetables; 2) the banning of vending machines; and 3) the setting of FAO/WHO standards for school-based nutrition/food programs and other programs for institutional settings as hospitals, prisons, children's day care, etc.

**Canada:** Taxation of soft drinks, chips, and candy is currently being discussed in several provinces. In Ontario, the Healthy Food for Healthy Schools Act and Trans Fat Regulation came into effect on 1 September 2008. The act addresses healthy eating in schools, including eliminating trans fats from and establishing mandatory nutrition standards for food and beverages sold in schools.

**Caribbean:** Currently, CARICOM standards are in place for labeling of foods. However, nutrition labeling is voluntary, except when a nutrient claim is made. Several countries are in the process of developing standards and guidelines for food sold in schools that address fat, sugars, and other nutrients. The Caribbean Public Health Agency (CARPHA) Nutrition Advisory Committee has recommended different areas of action for improving nutrition, including 1) food labeling; 2) nutrition standards and guidelines for schools and other institutions; 3) food marketing; 4) nutritional quality of food supply (levels of harmful ingredients); 5) trade and fiscal policy measures; and 6) food chain incentives.

**Mexico:** A 1-peso-per-liter (approximately 10%) tax on SSBs and an 8% tax on energy-dense (i.e., > 275 kcal/100 g) non-basic, processed foods (excluding minimally processed foods) have been applied since January 2014. Food marketing on TV has been limited for programs with a large audience of children under 12 years old, and mandatory FOP labeling based on the guideline daily amount (GDA) scheme has been approved and will be implemented soon. Mandatory food and beverage guidelines for schools are now in place that limit the availability of or completely ban SSBs and packaged food, based on nutritional criteria.

**Costa Rica:** A decree regulates school cafeterias, which cannot offer 1) prepackaged beverages and snacks with sugars or fats as the primary ingredient or without nutritional content labels, 2) carbonated beverages or energy drinks, 3) other beverages with more than 15 g of sugars per serving, 4) sausages not labeled as "light," and 5) processed food that might have trans fat for which the labeling does not indicate otherwise.

**Ecuador:** Mandatory warning labels (not necessarily FOP) based on a "traffic light" theme have been implemented since August 2014, using the cutoff levels proposed by the Food Standards Agency in 2007 ("FSA 2007"). A bill regulating the marketing of food and beverages to children is being discussed in Congress.

**Brazil:** In 2010, a law was published stating that food and beverages with high levels of saturated and trans fats, sodium, and sugars must advertise such content when promoted by mass media (TV, radio, and written media). However, the law has not been enacted because its opponents have argued that it is unconstitutional.

**Peru:** A law regulating the marketing of food and beverages to children was proposed in 2013 but its regulation was still being discussed at the time of publication of this document. The proposed limits to be applied correspond to those in PAHO's *Recommendations on the Marketing of Food and Non-Alcoholic Beverages to Children in the Americas* (2011) and endorsed by the Plan of Action for the Prevention of Obesity in Children and Adolescents (1).

**Chile:** A law that 1) regulates marketing of food and beverages to children on TV, in packaging, and in other media, and food that can be sold in school kiosks and 2) initiated FOP labeling with warning messages was promulgated in 2012. The government agreed to use an NP model to guide policies and regulations following a discussion forum with participants from several different sectors. Application of the law is expected to begin in June 2016. Taxes on SSBs are in place, and an additional tax on solid foods high in sugar is being considered. A bill calling for restrictions on ultra-processed products was being discussed in Parliament at the time of publication of this document.

**Argentina:** A law was promulgated with mandatory limits on salt levels for specific food products. This law is being implemented gradually.

**Most countries:** mandate nutrient lists on packaged foods and regulate health/nutrition requirement claims on packaging. Following the PAHO/WHO *Trans Fat-Free Americas* initiative and the Rio de Janeiro Declaration, several countries began regulating trans fats.

