The Food System

Food classification. Public health
NOVA. The star shines bright

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Introduction

NOVA is the food classification that categorises foods according to the extent and
purpose of food processing, rather than in terms of nutrients. In recent decades
some attention has been paid to the increasing importance of food processing in
global food supplies and dietary patterns, and its role in the pandemics of diet-related
non-communicable diseases. But the specific types of processing that modify food
attributes and risks of disease – either negatively or positively – have not been
precisely defined. Food processing has remained a side issue.

Set out here in its adjusted and refined form, *NOVA* (a name, not an acronym)
classifies all foods and food products into four clearly distinct and in our view
meaningful groups. It specifies which foods belong in which group, and provides
precise definitions of the types of processing underlying each group.

NOVA is now recognised as a valid tool for nutrition and public health research,
policy and action, in reports from the Food and Agriculture Organization of the
United Nations and the Pan American Health Organization. We owe thanks to many
colleagues throughout the world for support in the work set out here, for responses
to our papers and other publications published since 2009, and for discussions
during conferences and other meetings at which *NOVA* and its implications have
been presented.

The *NOVA star is born*

Top: fruits; grains and legumes; meat stew with beans and vegetables; water.
Then: fruit flavour popsicles; breakfast 'cereals'; reconstituted meat product; soft drinks.
The ultra-processed products below are not variants of the foods and meal above.
They are formulated from industrial ingredients and contain little or no intact foods.
By their nature they are unhealthy, and should be grouped together, and avoided

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The significance of industrial processing – and in particular methods and ingredients developed or created by modern food science and technology – on the nature of food and on the state of human health, is so far understated. This relative neglect is found in reports and other documents that include dietary recommendations, in epidemiological studies, and in policies and strategies designed to improve population nutrition and health.

Historically this is understandable. When early dietary guidelines were compiled and published in the first half of the last century, most food was combined with culinary ingredients and consumed in the form of dishes and meals, or was eaten as such. But in the second half of the century, packaged, branded, ready to eat, to drink or to heat 'fast' or 'convenient' products became increasingly prominent in the food supplies and dietary patterns of high-income countries.

Since the 1980s a monolithic global industrial food system has emerged. The food supplies of high-income countries with less strong culinary traditions, such as the US, Canada, the UK, and Australia, have become dominated by packaged, ready-to-consume products. In other high-income countries and settings, and in middle- and low-income countries, these products are rapidly displacing traditional dietary patterns based on minimally processed foods and freshly prepared dishes and meals. Rates of obesity and diabetes have correspondingly risen very rapidly.

In 2009, in a commentary signed by one of us (1), we argued that the extent and purpose of food processing had changed globally, and that these changes were driving the emergence of a harmful global food system and the pandemic of obesity and other nutrition-related chronic non-communicable diseases. We also argued that classifying foods into two groups of unprocessed and processed foods is useless,

because most foods as now consumed are processed in some way. We then proposed a new system to classify foods and food products based on the extent and purpose of the industrial processes applied to preserve, extract, modify or create them.

The new classification, detailed in a later paper (2), included one group made up of snacks, drinks, ready meals and many other products created mostly or entirely from substances extracted from foods or derived from food constituents with little if any intact food, which often contain flavours, colours and other additives that imitate or intensify the sensory qualities of foods or culinary preparations made from foods.

The formulation and the ingredients of these products make them highly convenient (ready-to-consume), highly attractive (hyper-palatable), highly profitable (low cost ingredients), and – of great importance – highly competitive with foods that are naturally ready to consume and freshly prepared dishes and meals. As a result of their formulation, products belonging to this food group are intrinsically nutrient-unbalanced and tend to be consumed in great amounts. We termed this group 'ultra-processed food and drink products' (1,2).

This *NOVA* classification has now been applied in several countries. Applications so far include description of changes over time in national dietary shares of ultra-processed products; analyses of the association of this share with the nutrient profile of diets and with health outcomes; development of dietary guidelines; and orientation of nutrient profile systems. Based on these applications and on questions raised by users, groups and criteria specifications with comprehensive lists of examples have been developed in successive updated versions of *NOVA* (3-7). Next, we present the most recent *NOVA* update, and a summary of its uses and findings up to now.

The *NOVA* classification

The *NOVA* classification outlined below groups foods according to the extent and purpose of the processing they undergo. Food processing as identified by *NOVA* involves physical, biological and chemical processes that occur after foods are separated from nature, and before they are consumed or used in the preparation of dishes and meals. Methods used in the culinary preparation of food in home or restaurant kitchens, including disposal of non-edible parts, fractioning, cooking, seasoning, and mixing various foods, are not taken into account by *NOVA*.

Foods may be consumed by themselves (such as fruits, nuts, milk); or are a main item in a culinary preparation (such as vegetables, grains, flours, meat, eggs); or are accompanying items (such as oil, salt, sugar, herbs, spices); or are food products ready to consume or heat (such as bread, cheese, ham; packaged snacks, soft drinks, pre-prepared frozen dishes). *NOVA* classifies all foods and food products, including the individual items of culinary preparations obtained from recipes, into the following four groups.

Group 1
Unprocessed or minimally processed foods

The first *NOVA* group is of unprocessed or minimally processed foods. Unprocessed (or natural) foods are edible parts of plants (seeds, fruits, leaves, stems, roots) or of animals (muscle, offal, eggs, milk), and also fungi, algae and water, after separation from nature.

Minimally processed foods are natural foods altered by processes such as removal of inedible or unwanted parts, drying, crushing, grinding, fractioning, filtering, roasting, boiling, pasteurisation, refrigeration, freezing, placing in containers, vacuum packaging, or non-alcoholic fermentation. None of these processes adds substances such as salt, sugar, oils or fats to the original food.

The main purpose of the processes used in the production of group 1 foods is to extend the life of unprocessed foods, allowing their storage for longer use, such as chilling, freezing, drying, and pasteurising. Other purposes include facilitating or diversifying food preparation, such as in the removal of inedible parts and fractioning of vegetables, the crushing or grinding of seeds, the roasting of coffee beans or tea leaves, and the fermentation of milk to make yoghurt.

Group 1 foods include fresh, squeezed, chilled, frozen, or dried fruits and leafy and root vegetables; grains such as brown, parboiled or white rice, corn cob or kernel, wheat berry or grain; legumes such as beans of all types, lentils, chickpeas; starchy roots and tubers such as potatoes and cassava, in bulk or packaged; fungi such as fresh or dried mushrooms; meat, poultry, fish and seafood, whole or in the form of steaks, fillets and other cuts, or chilled or frozen; eggs; milk, pasteurised or powdered; fresh or pasteurised fruit or vegetable juices without added sugar, sweeteners or flavours; grits, flakes or flour made from corn, wheat, oats, or cassava; pasta, couscous and polenta made with flours, flakes or grits and water; tree and ground nuts and other oil seeds without added salt or sugar; spices such as pepper, cloves and cinnamon; and herbs such as thyme and mint, fresh or dried; plain yoghurt with no added sugar or artificial sweeteners added; tea, coffee, drinking water.

Group 1 also includes foods made up from two or more items in this group, such as dried mixed fruits, granola made from cereals, nuts and dried fruits with no added sugar, honey or oil; and foods with vitamins and minerals added generally to replace nutrients lost during processing, such as wheat or corn flour fortified with iron or folic acid.

Group 1 items may infrequently contain additives used to preserve the properties of the original food. Examples are vacuum-packed vegetables with added anti-oxidants, and ultra-pasteurised milk with added stabilisers.

Group 2
Processed culinary ingredients

The second *NOVA* group is of processed culinary ingredients. These are substances obtained directly from group 1 foods or from nature by processes such as pressing, refining, grinding, milling, and spray drying.

The purpose of processing here is to make products used in home and restaurant kitchens to prepare, season and cook group 1 foods and to make with them varied and enjoyable hand-made dishes, soups and broths, breads, preserves, salads, drinks, desserts and other culinary preparations.

Group 2 items are rarely consumed in the absence of group 1 foods. Examples are salt mined or from seawater; sugar and molasses obtained from cane or beet; honey extracted from combs and syrup from maple trees; vegetable oils crushed from olives or seeds; butter and lard obtained from milk and pork; and starches extracted from corn and other plants.

Products consisting of two group 2 items, such as salted butter, group 2 items with added vitamins or minerals, such as iodised salt, and vinegar made by acetic fermentation of wine or other alcoholic drinks, remain in this group.

Group 2 items may contain additives used to preserve the product's original properties. Examples are vegetable oils with added anti-oxidants, cooking salt with added anti-humectants, and vinegar with added preservatives that prevent microorganism proliferation.

Group 3
Processed foods

The third *NOVA* group is of processed foods. These are relatively simple products made by adding sugar, oil, salt or other group 2 substances to group 1 foods. Most processed foods have two or three ingredients. Processes include various preservation or cooking methods, and, in the case of breads and cheese, non-alcoholic fermentation.

The main purpose of the manufacture of processed foods is to increase the durability of group 1 foods, or to modify or enhance their sensory qualities.

Typical examples of processed foods are canned or bottled vegetables, fruits and legumes; salted or sugared nuts and seeds; salted, cured, or smoked meats; canned fish; fruits in syrup; cheeses and unpackaged freshly made breads

Processed foods may contain additives used to preserve their original properties or to resist microbial contamination. Examples are fruits in syrup with added anti-oxidants, and dried salted meats with added preservatives.

When alcoholic drinks are identified as foods, those produced by fermentation of group 1 foods such as beer, cider and wine, are classified here in Group 3.

Group 4
Ultra-processed food and drink products

The fourth *NOVA* group is of ultra-processed food and drink products. These are industrial formulations typically with five or more and usually many ingredients. Such ingredients often include those also used in processed foods, such as sugar, oils, fats, salt, anti-oxidants, stabilisers, and preservatives. Ingredients only found in ultra-processed products include substances not commonly used in culinary preparations, and additives whose purpose is to imitate sensory qualities of group 1 foods or of culinary preparations of these foods, or to disguise undesirable sensory qualities of the final product. Group 1 foods are a small proportion of or are even absent from ultra-processed products.

Substances only found in ultra-processed products include some directly extracted from foods, such as casein, lactose, whey, and gluten, and some derived from further processing of food constituents, such as hydrogenated or interesterified oils, hydrolysed proteins, soy protein isolate, maltodextrin, invert sugar and high fructose corn syrup. Classes of additive only found in ultra-processed products include dyes and other colours, colour stabilisers, flavours, flavour enhancers, non-sugar sweeteners, and processing aids such as carbonating, firming, bulking and anti-bulking, de-foaming, anti-caking and glazing agents, emulsifiers, sequestrants and humectants.

Several industrial processes with no domestic equivalents are used in the manufacture of ultra-processed products, such as extrusion and moulding, and pre-processing for frying.

The main purpose of industrial ultra-processing is to create products that are ready to eat, to drink or to heat, liable to replace both unprocessed or minimally processed foods that are naturally ready to consume, such as fruits and nuts, milk and water, and freshly prepared drinks, dishes, desserts and meals. Common attributes of ultra-processed products are hyper-palatability, sophisticated and attractive packaging, multi-media and other aggressive marketing to children and adolescents, health claims, high profitability, and branding and ownership by transnational corporations.

Examples of typical ultra-processed products are: carbonated drinks; sweet or savoury packaged snacks; ice-cream, chocolate, candies (confectionery); mass-produced packaged breads and buns; margarines and spreads; cookies (biscuits), pastries, cakes, and cake mixes; breakfast 'cereals', 'cereal' and 'energy' bars; 'energy' drinks; milk drinks, 'fruit' yoghurts and 'fruit' drinks; cocoa drinks; meat and chicken extracts and 'instant' sauces; infant formulas, follow-on milks, other baby products; 'health' and 'slimming' products such as powdered or 'fortified' meal and dish substitutes; and many ready to heat products including pre-prepared pies and pasta and pizza dishes; poultry and fish 'nuggets' and 'sticks', sausages, burgers, hot dogs, and other reconstituted meat products, and powdered and packaged 'instant' soups, noodles and desserts.

When products made solely of group 1 or group 3 foods also contain cosmetic or sensory intensifying additives, such as plain yoghurt with added artificial sweeteners, and breads with added emulsifiers, they are classified here in group 4. When alcoholic drinks are identified as foods, those produced by fermentation of group 1 foods followed by distillation of the resulting alcohol, such as whisky, gin, rum, vodka, are classified in group 4.

NOVA in use

Studies using *NOVA* have been published regularly. In Brazil, it has been used to assess the socioeconomic and demographic distribution of dietary patterns (4,8); time changes in dietary patterns (9,10); the impact of dietary share of ultra-processed products on the dietary content of macro- and micronutrients (9,11-13); and the association between consumption of ultra-processed products with obesity (14,15), metabolic syndrome (16), and dyslipidemias (17). It has also been used in Brazil to study the relationship between household food purchase patterns and relative prices of ultra-processed and all other food items (18); influence of the food environment (19-21) and of food advertising (22) on the consumption of ultra-processed products; and to evaluate the impact of a nutrition education intervention (23).

In the US, *NOVA* has been used to assess the impact of ultra-processed products on consumption of added sugar (24) In Canada, it has been used to assess secular trends in national dietary patterns (25), and the impact of ultra-processed products on indicators of nutrient profile of diets (26). In the UK, it has been used to study the relationship between household food purchase patterns and relative prices of ultra-processed and all other food items (18), and to estimate the potential for reduction of cardiovascular disease by reducing consumption of ultra-processed products (27). In Chile, it has been used to assess the impact of the consumption of ultra-processed products on the nutritional quality of diets (28). It has been used in New Zealand to describe the nutrient profile of supermarket foods (29), and in Sweden to correlate time trends in consumption of ultra-processed products and of adult obesity (30).

Internationally, *NOVA* has been used to study time trends in sales of ultra-processed products in 79 low-middle, upper-middle, and high-income countries (31), and also in 14 Asian countries (32). A policy paper has used *NOVA* to compare strategies used by the manufacturers of tobacco, alcohol and ultra-processed products, with implications for prevention and control of non-communicable diseases (33). An ecologic study has used *NOVA* to analyse the association between changes in sales of ultra-processed products and changes in population body mass in 15 Latin American countries (34).

Altogether, these studies document exponential growth in production and consumption of ultra-processed products; confirm that they displace unprocessed or minimally processed foods and freshly prepared dishes and meals made from these foods; document their aggressive marketing; and show their huge negative impact on the quality of diets and on obesity, metabolic syndrome and blood lipid profiles.

The proportion of dietary energy in ultra-processed products has been recommended as an indicator of the quality of diets by the INFORMAS initiative (35). The utility of *NOVA* has been recognised in reports from the Pan American Health Organization (34) and the UN Food and Agriculture Organization (36). Also (see below), the *NOVA* four food groups are the basis for the main recommendations of the current official Brazilian national food and nutrition guide (37,38).

The Brazilian food and nutrition guide

Brazilian dietary guidelines
Four recommendations and one golden rule*

NOVA group 1
Make unprocessed or minimally processed foods the basis of your diet

Unprocessed or minimally processed foods, in great variety, mainly of plant origin, preferably produced by agro-ecological methods, are the basis for diets that are nutritious, delicious, appropriate, and supportive of socially and environmentally sustainable food systems.

NOVA group 2
Use processed culinary ingredients in small amounts for seasoning and cooking foods and to create culinary preparations

As long as they are used in moderation in culinary preparations based on natural or minimally processed foods, oils, fats, salt, and sugar contribute towards diverse and delicious diets without making them nutritionally unbalanced.

NOVA group 3
Limit the use of processed foods, consuming them in small amounts as components of culinary preparations or as part of meals based on natural or minimally processed foods

The ingredients and techniques used in the manufacture of processed foods—such as vegetables in brine, fruits in syrup, cheeses and breads – unfavourably alter the nutritional composition of the foods from which they are derived.

NOVA group 4
Avoid ultra-processed products

Because of their ingredients, ultra-processed products – such as packaged snacks, soft drinks, and instant noodles – are nutritionally unbalanced. As a result of their formulation and presentation, they tend to be consumed in excess, and displace natural or minimally processed foods. Their means of production, distribution, marketing, and consumption damage culture, social life, and the environment.

The golden rule
Always prefer natural or minimally processed foods and freshly made dishes and meals to ultra-processed products

Opt for water, milk, and fruits instead of soft drinks, dairy drinks, and biscuits. Do not replace freshly prepared dishes (broths, soups, salads, sauces, rice and beans, pasta, steamed vegetables, pies) with products that do not require culinary preparation (packaged snacks and soups, instant noodles, pre-prepared frozen dishes, sandwiches, cold cuts and sausages, industrialised sauces, ready-mixes for cakes). Choose homemade desserts and avoid industrialised formulations.

*Adapted from (37)

References

1   Monteiro CA. Nutrition and health. The issue is not food, nor nutrients, so much as processing. *Public Health Nutrition* 2009, **12,** 5, 729-731.

2   Monteiro CA, Levy RB, Claro RM, Castro IR, Cannon G. A new classification of foods based on the extent and purpose of their processing. *Cadernos Saude Publica* 2010, **26**, 11, 2039-2049.

3   Monteiro C. The big issue is ultra-processing. *World Nutrition* November 2010, **1**, 6, 237-269.

4   Monteiro CA, Levy RB, Claro RM, Castro IR, Cannon G. Increasing consumption of ultra-processed foods and likely impact on human health: evidence from Brazil. *Public Health Nutrition* 2011, **14**, 1, 5-13.

5   Monteiro CA, Cannon G, Levy RB, Claro RM, Moubarac J-C. The Food System. Ultra-processing. The big issue for nutrition, disease, health, well-being. Position paper 2. *World Nutrition* 2012**, 3,** 12, 527-569.

6   Moubarac JC, Parra D, Cannon G, Monteiro CA. Food classification systems based on food processing: significance and implications for policies and actions. A systematic literature review and assessment. *Current Obesity Reports* 2014, **3**, 2, 256-272.

7   Monteiro CA, Cannon G, Levy RB, Claro RM, Moubarac J-C. (2015). Ultra-processing and a new classification of foods. In: Neff R (ed) *Introduction to the US Food System. Public Health, Environment, and Equity*. Johns Hopkins Center for a Livable Future. San Francisco, CA: Jossey-Bass, 2015.

8   Sparrenberger K, Friedrich RR, Schiffner MD, Schuch I, Wagner MB. Ultra-processed food consumption in children from a Basic Health Unit. *Jornal de Pediatria* 2015, **91**, 6, 535-542.

9   Martins AP, Levy RB, Claro RM, Moubarac JC, Monteiro CA. Increased contribution of ultra-processed food products in the Brazilian diet (1987-2009). *Revista Saude Publica* 2013, **47**, 4, 656-665.

10 Louzada ML, Martins AP, Canella D, Baraldi L, Levy R, Claro R, *et al* .Alimentos ultraprocessados e perfil nutricional da dieta no Brasil. *Revista Saude Publica* 2015, **49**, 38.

11 Louzada ML, Martins AP, Canella DS, Baraldi LG, Levy RB, Claro RM, *et al.* Impacto de alimentos ultraprocessados sobre o teor de micronutrientes da dieta no Brasil. *Revista Saude Publica* 2015, **49**, 1-8.

12 Barcelos GT, Rauber F, Vitolo MR. Produtos processados e ultraprocessados e ingestão de nutrientes em crianças. *Revista Ciência & Saúde* 2014, **7**, 3, 155-161.

13 Bielemann RM, Santos Motta JV, Minten GC, Horta BL, Gigante DP. Consumption of ultra-processed foods and their impact on the diet of young adults. *Revista Saude Publica* 2015, **49**, 28, 1-10.

14 Louzada ML, Baraldi LG, Steele EM, Martins AP, Canella DS, Moubarac JC, *et al.* Consumption of ultra-processed foods and obesity in Brazilian adolescents and adults. *Preventive Medicine* 2015, **81**, 9-15.

15 Canella DS, Levy RB, Martins AP, Claro RM, Moubarac JC, Baraldi LG, *et al.* Ultra-processed food products and obesity in Brazilian households (2008-2009). *PLoS One* 2014, **9**, 3, e92752.

16 Tavares LF, Fonseca SC, Garcia Rosa ML, Yokoo EM. Relationship between ultra-processed foods and metabolic syndrome in adolescents from a Brazilian family doctor program. *Public Health Nutrition* 2012, **15**, 1, 82-87.

17 Rauber F, Campagnolo PD, Hoffman DJ, Vitolo MR. Consumption of ultra-processed food products and its effects on children's lipid profiles: a longitudinal study. *Nutrition, Metabolism and Cardiovascular Diseases* 2015, **25**, 1, 116-122.

18 Moubarac JC, Claro RM, Baraldi LG, Levy RB, Martins AP, Cannon G, *et al.* International differences in cost and consumption of ready-to-consume food and drink products: United Kingdom and Brazil, 2008-2009. *Global Public Health* 2013, **8**, 7, 845-856.

19 Leite FH, Oliveira MA, Cremm EC, Abreu DS, Maron LR, Martins PA. Availability of processed foods in the perimeter of public schools in urban areas. *Jornalde Pediatrica* 2012, **88**, 4, 328-334.

20 Costa JC, Claro RM, Martins AP, Levy RB. Food purchasing sites. Repercussions for healthy eating. *Appetite* 2013, **70**, 99-103.

21 Vedovato GM, Trude AC, Kharmats AY, Martins PA. Degree of food processing of household acquisition patterns in a Brazilian urban area is related to food buying preferences and perceived food environment. *Appetite* 2015, **87**, 296-302.

22 Mallarino C, Gomez LF, Gonzalez-Zapata L, Cadena Y, Parra DC. Advertising of ultra-processed foods and beverages: children as a vulnerable population. *Revista Saude Publica* 2013, **47**, 5, 1006-1010.

23 Franco P, Rosa G, Luiz RR, de Oliveira G. Assessment of the quality of hypoenergetic diet in overweight women. *International Journal of Cardiovascular Science* 2015, **28**, 3, 244-250.

24 Martinez E, Baraldi L, Louzada ML, Mozaffarian D, Monteiro CA. Ultra-processed foods and added sugars in the US diet: evidence from a nationally representative cross-sectional study. *BMJ Open* 2015; **5**: e009892. doi:10.1136/bmjopen-2015-009892.

25 Moubarac JC, Batal M, Martins AP, Claro R, Levy RB, Cannon G, *et al.* Processed and ultra-processed food products: consumption trends in Canada from 1938 to 2011. *Canadian Journal of Dietetic Practice and Research* 2014, **75**, 1, 15-21.

26 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 Nutrition* 2013, **16**, 12, 2240-2248.

27 Moreira PV, Baraldi LG, Moubarac JC, Monteiro CA, Newton A, Capewell S, *et al.* Comparing different policy scenarios to reduce the consumption of ultra-processed foods in UK: impact on cardiovascular disease mortality using a modelling approach. *PLoS One* 2015, **10**, 2, :e0118353.

28 Crovetto 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]. *Revista Medica de Chile* 2014, **142**, 7, 850-858.

29 Luiten CM, Steenhuis IH, Eyles H, Ni Mhurchu C, Waterlander WE. Ultra-processed foods have the worst nutrient profile, yet they are the most available packaged products in a sample of New Zealand supermarkets. *Public Health Nutrition.*2015, **29**, 1-9.

30 Juul F, Hemmingsson E. Trends in consumption of ultra-processed foods and obesity in Sweden between 1960 and 2010. *Public Health Nutrition.* 2015, **25**, 1-12.

31 Monteiro CA, Moubarac JC, Cannon G, Ng SW, Popkin B. Ultra-processed products are becoming dominant in the global food system. *Obesity Reviews* 2013. **14** Suppl 2, 21-28.

32 Baker P, Kay A, Walls H. Trade and investment liberalization and Asia's noncommunicable disease epidemic: a synthesis of data and existing literature. *Global Health* 2014, **10,** 66, 1-20.

33   Moodie R, Stuckler D, Monteiro C, Sheron N, Neal B, Thamarangsi T, *et al.* Profits and pandemics: prevention of harmful effects of tobacco, alcohol, and ultra-processed food and drink industries. *The Lancet* 2013, **381**, 9867, 670-679.

34   Pan American Health Organization. *Ultra-Processed Food and Drink Products in Latin America: Trends, Impact on Obesity, Policy Implications.* Washington DC: PAHO, 2015.

35   Vandevijvere S, Monteiro C, Krebs-Smith SM, Lee A, Swinburn B, Kelly *B et al.* Monitoring and benchmarking population diet quality globally: a step-wise approach. *Obesity Reviews* 2013**, 14** Suppl 1, 135-149.

36   Food and Agriculture Organization of the United Nations. Guidelines on the collection of information on food processing through food consumption surveys. Rome: FAO, 2015.

37   Brazilian Ministry of Health.*Dietary Guidelines For the Brazilian Population.* Available in Portuguese, and in Spanish and English translations. Brasília: Ministério da Saúde, 2014.

38   Monteiro CA, Cannon G, Moubarac J-C, Martins AP, Martins CA, Garzillo J, Canella D, Baraldi L, Barciotti M, Louzada ML, Levy RB, Claro R, Jaime P. Dietary guidelines to nourish humanity and the planet in the twenty-first century. A blueprint from Brazil. *Public Health Nutrition* 2015, **18,** 13, 2311-2322.

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