# 2018 Global Access to Nutrition Index

# PRODUCT PROFILE METHODOLOGY

## Study undertaken by The George Institute for Public Health for the Access to Nutrition Foundation

## 2017

THE GEORGE INSTITUTE
for Global Health

ACCESS TO NUTRITION INDEX™

# ABBREVIATIONS

ATNF – Access to Nutrition Foundation

HSR – Health Star Rating

NPSC - Nutrient Profile Scoring Criteria

WHO – World Health Organization

WHO Euro – World Health Organization European Regional Office nutrient profile model

# DISCLAIMER

The George Institute for Global Health (The George Institute) prepared this report with input from the Access To Nutrition Foundation (ATNF). Sections of this report involving analysis of sales-weighted data were prepared by ATNF under the terms of their licence to use Euromonitor International data. ATNF is to assume responsibility for this aspect of the analysis.

While The George Institute has taken reasonable precautions to verify the information contained in the report, it gives no warranties and makes no representations regarding its accuracy or completeness. The George Institute excludes, to the maximum extent permitted by law, any liability arising from the use of or reliance on the information contained in this report.

Data for Mexico were provided by Centro de Investigación en Nutrición y Salud, Instituto Nacional de Salud Pública, Mexico (INSP).

## Introduction

This document sets out the methods used by The George Institute for the study: 'The comparative nutritional profile of food and beverage products marketed by the 21 largest global companies in 9 countries', carried out for ATNF during 2017, for use in the 2018 Global Access to Nutrition Index.

## Selection of countries

The nine countries included in this report were those countries for which extensive data for packaged food and beverage products were readily available at no cost and with no restriction to the use of product-level data. The George Institute holds a branded food database containing comprehensive nutrient information for eight countries, with country datasets updated regularly. Alongside this, Mexico's Institute for Public Health (INSP) has an annually-updated branded food database which they provided 2014/15 data from for this project. Hence, the nine countries included in this analysis are as follows:

1. Australia (AU)
2. China (CN)
3. Hong Kong (HK)
4. India (IN)
5. Mexico (MX)
6. New Zealand (NZ)
7. South Africa (ZA)
8. UK (UK)
9. USA (US)

The countries provide a good geographical spread with representation from Australasia, Europe, Africa, North America and Central America. However, these countries were not selected to be representative of global sales. Instead, they were selected based on availability of data and in order to get a broad view of differences in healthiness of global company portfolios in different countries and regions.

## Selection of companies

ATNF requested The George Institute to include the products of 22 global food and beverage manufacturers. The included companies, in alphabetical order, with the name used throughout this report in brackets are:

- Ajinomoto Co Inc (Ajinomoto)
- Arla Foods Amba (Arla)
- Brasil Foods
- Campbell Soup Co (Campbell's)
- Coca-Cola Co (Coca-Cola)
- ConAgra Brands Inc (ConAgra)
- Danone Groupe (Danone)
- Ferrero Group (Ferrero)
- General Mills Inc (General Mills)
- Grupo Bimbo SAB de CV (Grupo Bimbo)
- Kellogg Co (Kellogg's)
- Kraft Heinz Co (Kraft Heinz)
- Lactalis Groupe (Lactalis)
- Mars Inc (Mars)
- Meiji Holdings Co Ltd (Meiji)
- Mondelez International Inc (Mondelez)
- Nestlé SA (Nestlé)
- PepsiCo Inc (PepsiCo)
- Royal FrieslandCampina NV (FrieslandCampina)

- Suntory Holdings Inc (Suntory)
- Tingyi International Group (Tingyi)
- Unilever

However, only three Brasil Foods products were available for assessment across the nine countries covered in this study, therefore Brasil Foods was dropped from the study.

It's important to note that not all companies operated in each of the nine countries examined in this report. Table A below outlines which companies were examined in each country.

***Table A** Country datasets used for each company's analysis*

| **Company** | **AU** | **CN** | **HK** | **IN** | **MX** | **NZ** | **ZA** | **UK** | **US** | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| Ajinomoto | X | √ | √ | X | X | X | √ | √ | X | **4** |
| Arla | √ | X | √ | X | X | X | X | √ | √ | **4** |
| Campbell's | √ | X | √ | √ | √ | √ | X | √ | √ | **7** |
| Coca-Cola | √ | √ | √ | √ | √ | √ | √ | √ | √ | **9** |
| ConAgra | X | X | X | √ | √ | √ | √ | X | √ | **5** |
| Danone | √ | √ | √ | X | √ | X | √ | √ | √ | **7** |
| Ferrero | √ | √ | √ | √ | √ | √ | √ | √ | √ | **9** |
| General Mills | √ | √ | √ | √ | √ | √ | √ | √ | √ | **9** |
| Bimbo | X | √ | X | X | √ | X | X | √ | √ | **4** |
| Kellogg's | √ | X | √ | √ | √ | √ | √ | √ | √ | **8** |
| Kraft Heinz | √ | √ | √ | √ | √ | √ | √ | √ | √ | **9** |
| Lactalis | √ | X | √ | X | √ | √ | √ | √ | √ | **7** |
| Mars | √ | √ | √ | √ | √ | √ | √ | √ | √ | **9** |
| Meiji | √ | √ | √ | X | X | X | X | X | X | **3** |
| Mondelez | √ | √ | X | √ | √ | √ | √ | √ | √ | **8** |
| Nestlé | √ | √ | √ | √ | √ | √ | √ | √ | √ | **9** |
| PepsiCo | √ | √ | √ | √ | √ | √ | √ | √ | √ | **9** |
| FrieslandCampina | X | X | √ | X | X | X | X | √ | X | **2** |
| Suntory | √ | √ | √ | X | X | √ | √ | √ | X | **6** |
| Tingyi | X | √ | X | X | X | X | X | X | X | **1** |
| Unilever | √ | √ | √ | √ | √ | √ | √ | √ | √ | **9** |
| TOTAL number of companies per country | **16** | **15** | **17** | **12** | **15** | **14** | **15** | **18** | **16** | |

* Note Brasil Foods not shown as no data available

## Choice of nutrient profile models

Nutrient profiling is the science of classifying or ranking foods according to their nutritional composition for the purpose of preventing disease and promoting health.[1] Nutrient profile models have been developed by academics, government departments, health-related charities and the food industry for a variety of applications including: to underpin food labelling; to regulate advertising of products to children; and to regulate health and nutrition claims. Although nutrient profiling is a tool to quantify aspects of individual foods, not diets, nutrient profile models are commonly used to underpin policies designed to improve the overall nutritional quality of diets.

There is no international consensus about the superiority of one particular nutrient profiling model, in part due to the different purposes and contexts in which each model has been developed. Therefore, this study started from the position that multiple models should be used to assess products if possible. A catalogue developed for the World Health Organization in 2011 of more

[1] World Health Organization, Nutrient Profiling http://www.who.int/nutrition/topics/profiling/en/

than 50 nutrient profile models was reviewed and updated.[2] With the guidance of the ATNF Expert Group, this study sought to select systems that met the following criteria:

- Developed with appropriate stakeholder consultation
- Covered the majority of categories of processed food and beverage products
- Took into account both positive and negative nutrients
- Was not designed solely to address school foods, given requirement to assess foods in the general market
- Well-validated with results published in the peer-reviewed literature demonstrating that the models produce internally consistent classifications of 'healthy' and 'unhealthy' foods, consistent with general nutrition principles
- Enabled differentiation of nutritional quality within and between categories
- Algorithm in the public domain so as to be able to access and apply it
- Able to generate meaningful results across all countries

Of the 67 models included in the updated catalogue, two were selected as the best fit for these criteria:

1) **The Australian Health Star Rating (HSR)** is a front-of-pack interpretive nutrition labelling system designed to assist consumers in making healthier choices. The underlying nutrient profile model assesses risk nutrients (overall energy, sodium, total sugar, saturated fat) and positive nutrients (fruit and vegetable content, protein, fibre and in some cases, calcium) to score products on the basis of nutritional composition per 100g or 100mL across one of six categories. These scores are then converted to a 'Health Star Rating' from ½ to 5 stars. Development was led by the Australian government in collaboration with industry, public health and consumer groups, and builds upon the Nutrient Profiling Scoring Criteria (NPSC) previously developed by the Australian and New Zealand Governments to regulate health claims.[3] The NPSC itself was developed from United Kingdom's Ofcom model. The HSR has been implemented in Australia since June 2014 on a voluntary basis. The system has also been adopted in New Zealand. Further detailed information is available online.[4] The prior pilot study by Rayner et al. utilised the Australian NPSC but since the HSR has refined and built upon the NPSC, the HSR was selected for this analysis.

2) **The WHO Euro model** is a nutrient profile model for use and adaptation by Member States of the WHO European Region when developing policies to restrict food marketing to children. The model operates by first requiring foods to be allocated to one of 20 categories. Products are then checked against category-specific compositional thresholds for nutrients and other food components. A product must not exceed on a per 100g/mL basis any of the relevant thresholds for that product category if marketing is to be permitted. Results under this model are simply expressed on a binary basis i.e. 'marketing permitted' or 'marketing not permitted'. Although originally developed in Europe, the model is being adapted for other WHO Regions. In the absence of standardised regulation in this area, the model was selected as a reasonable basis by which to determine products' suitability to be marketed to children in all countries included in analysis.

[2] Catalogue prepared for the World Health Organization by Professor Mike Rayner of the University of Oxford: Nutrient profiling: catalogue of nutrient profile models.
[3] See Australia New Zealand Food Standards Code, Standard 1.2.7
[4] Department of Health, Australian Health Star Rating website: http://healthstarrating.gov.au

***Table B*** *Comparison of the HSR and WHO Euro models*

| | HSR | WHO Euro |
|---|---|---|
| Country/region of origin | Australia | Europe |
| Date of development | 2014 | 2015 |
| Scoring method | Negative nutrients score is combined with positive nutrients score to arrive at a final 'score' which is then converted to a Health Star Rating from 0.5 to 5.0. | Products must not exceed category-specific thresholds per 100g/mL to be permitted to market to children. |
| Positive nutrients | Protein<br>Fibre<br>Fruit, vegetable, nut and legume content (FVNL)<br>Calcium | N/A |
| Negative nutrients | Energy<br>Saturated fat<br>Total sugars<br>Sodium | Total fat<br>Saturated fat<br>Total sugars<br>Added sugars<br>Artificial sweeteners<br>Trans fat<br>Sodium |
| Original purpose of development and existing applications | Front-of-pack nutrition labelling. | Regulation of marketing to children. |
| Original scoring system | Depending on which category the product falls in, the 'score' is converted to a Health Star Rating from 0.5 to 5.0 stars that can be displayed in a logo on the front of pack. | Depending on the product category, marketing to children is either never permitted (e.g. for confectionery), or only permitted if the product does not exceed specified thresholds of negative nutrients per 100g/mL. |

Calculating a nutrient profile score for a product requires values for all data points used by the nutrient profile model and imputation of missing data was therefore required for some countries.

As noted, these two models were also used in the 2016 India Product Profile study and proved suitable for such studies.

## Eligibility of food and beverage products

Foods and beverages eligible for inclusion were defined as *'all packaged foods and non-alcoholic beverages manufactured by the included companies.'* A food or beverage was considered a unique item based upon the brand name and description irrespective of serving size and packaging (i.e. a specific brand of cola sold in 330mL cans was considered to be the same food item as the same specific brand of cola sold in 600mL bottles).

The following products were excluded from analyses:

1. Unprocessed meat, poultry, fish and raw agricultural commodities such as plain cereals (on the basis that such foods are not generally required to carry a nutrient declaration)
2. Plain tea and coffee (on the basis that these make an inherently low nutritional contribution and are thereby not required to display a nutrient declaration)
3. Some condiments such as herbs, salt, pepper, vinegars and spices (on the basis that these make an inherently low nutritional contribution and are thereby not required to display a nutrient declaration)
4. Infant formulas, medical nutrition supplements and baby food and baby beverages (excluded because these products are not consumed by the general population and the selected models are not appropriate for their evaluation).

## Data collection

Nutrient information was extracted from photographs of product packaging and entered into The George Institute's Food*Switch* database, or in the case of Mexico, into INSP's data entry system. Products in The George Institute's Food*Switch* database with data entered or updated from 2013 onwards were used to generate product lists for each company. For each company, the top five Euromonitor categories (according to sales data) were identified by ATNF, and that list was provided to The George Institute. In September 2017, the 21 companies were provided with their product lists from the top five Euromonitor subsets in each market for review (product list and nutrient content were provided) and offered an opportunity to make corrections or additions to information about their product range. Eleven of the included companies (Danone, Ferrero, General Mills, Bimbo, Kellogg's, Meiji, Mondelez, Nestle, PepsiCo, FrieslandCampina and Unilever) accepted the offer to supply their full product list, with an additional two companies (Campbell's and Coca-Cola) providing product lists for selected countries. For products that required additional ingredients to be added before consumption (e.g. a beverage powder or dry cake mix), companies were asked to provide information for the product "as consumed" for this project. However, if these values were not available, the "as sold" nutrient values were used in analysis.

## Imputation of essential missing data

For many products the available nutritional information was insufficient to apply the selected nutrient profile models. This is due to differences in legislation around what nutrients are required to be displayed on the label (for example, fibre is mandatory in the USA but not in all countries included in our analysis). It was therefore necessary to impute missing data which was done as follows:

- For countries that do not require certain nutrients to be displayed on pack, proxy values for those nutrients (most commonly saturated fat, total sugar, sodium, fibre and 'fruit vegetable nut and legume' (FVNL) content) were used. These proxy values were developed by The George Institute using the average value of the products with available data. These proxy values were estimated for each category and assigned to those products in that category with missing data.
- For added sugars a standard proportion of total sugars was assumed and was specified at the category level.

It is worth noting that some companies provided the required missing information such as added sugar content and FVNL content, so imputation was not necessary in all cases.

## Product categorisation

Products were categorised in three ways:

- To one of The George Institute's categories
- To one of 21 WHO Euro categories
- To one of 23 categories within the Euromonitor International food and beverage categorisation system. Euromonitor is a privately-owned market research firm providing data and analysis on total market sizes, market shares and trends in a range of industries, including food. This categorisation was made to enable the nutrition analysis to be combined with sales data.

Groupings of Euromonitor categories - hereafter called 'Euromonitor subsets' - were made to generate subsets of products of sufficient size to allow nutritional analysis of comparable food products.

***Table C** Euromonitor subsets*

| Foods | Beverages |
|---|---|
| **Baked Goods** | Bottled Water |
| **Breakfast Cereals** | Carbonates |
| **Confectionery** | Concentrates |
| **Dairy** | Juice |
| **Ice Cream and Frozen Desserts** | Other Hot Drinks |
| **Processed Fruit and Vegetables** | RTD Coffee |
| **Ready Meals** | RTD Tea |
| **Rice, Pasta and Noodles** | Sports and Energy Drinks |
| **Sauces, Dressings and Condiments** | |
| **Savoury Snacks** | |
| **Soup** | |
| **Spreads** | |

Definitions of these category and sub-category subsets are provided on ATNF's website.

## Application of imputed data in the nutrient profile models

The two nutrient profile models were applied with the following use of proxy information from imputed values:

- For the purposes of generating a Health Star Rating, proxy values were used for saturated fat, sugar, fibre and sodium, but *only* if information was not missing for three or more of four key nutrients (saturated fat, sugar, sodium, protein). If three or more of these nutrients were missing, then the product was excluded from the analysis. Products were not included in the analysis if energy content was missing. Plain packaged water was assigned a Health Star Rating of 5.0 consistent with the HSR Guidelines.[5]
- For the purposes of generating an outcome under the WHO Euro model, proxy values were used for total fat, saturated fat, sugar and sodium, but *only* if the product was not missing three or more nutrients required for analysis under a similar strategy to that described above for the HSR. Eligibility was determined category-by-category as per the WHO model which uses different nutrient criteria for each WHO-specified category.

These decisions were a pragmatic compromise between enabling analysis of the majority of identified products versus basing analysis on mostly proxy data. Due to differences in the models and nutrients involved, some products were eligible for scoring under one model but not another. The two tables on the following page show the number of products from each country with proxy data used in analysis.

## Sales data

Sales data were obtained at the Euromonitor subset level for each company. This was used to generate sales-weighted outcomes for the three sets of analyses. As ATNF held the licence for the Euromonitor data, ATNF did the analyses and provided The George Institute with results. ATNF accepts full responsibility for these components of the report. The sales data were those for the 2016 period. Where a company did not command 0.1% or more market share in a category in a country, no sales data were available.

Sales-weighted HSRs were calculated per company in two steps. As the comparison between companies was the main objective of this assessment, sales weighting was performed from a company perspective and not from a country perspective. Company's sales-weighted mean HSRs in each country were calculated as the first step, based on the category sales relative to the total combined sales for all the company's categories assessed in that country. As a second step, sales-

[5] Australian Government, Health Star Rating System 'Guide for Industry', available at http://healthstarrating.gov.au/internet/healthstarrating/publishing.nsf/Content/guide-for-industry-document (accessed 11 November 2016)

weighted HSRs were calculated per company, based on the country sales relative to the total combined sales of all relevant countries for the company. This approach was taken to apply a weighting that is most relevant for health impact (assuming sales are correlated with consumption) as well as company commercial value.

To calculate the total value of sales at the country-level generated by healthy products, a similar two-step approach was taken. For the first step, total sales of the company within each category in each country was multiplied by the percentage of healthy products (i.e. products with an HSR of 3.5 of more) in the category, a figure generated by TGI. The second step was similar to the second step of the sales-weighted HSRs, to calculate the company's overall weighted value. The same approach was taken to calculate the total values of sales generated by products suitable to be marketed to children under the WHO Euro criteria.

Ideally, sales values of individual products would have been used to generate a more accurate sales-weighted data; however, such product-level data were not available for this analysis. Using category sales data was the most accurate available option.

***Table D*** *Number of products from each country where proxy values were used in analysis for the Health Star Rating*

| | AU | CN | HK | IN | MX | NZ | ZA | UK | US |
|---|---|---|---|---|---|---|---|---|---|
| **Total products analysed (n)** | 2931 | 1022 | 736 | 498 | 1284 | 2412 | 980 | 3510 | 9640 |
| **All data direct from label (n)** | 126 | 0 | 3 | 0 | 135 | 49 | 21 | 271 | 0 |
| **Proxy data required for one component (n)** | 1063 | 201 | 398 | 259 | 1110 | 960 | 861 | 2424 | 7817 |
| **Proxy data required for two components (n)** | 1627 | 54 | 300 | 42 | 2 | 1315 | 12 | 386 | 1240 |
| **Proxy data required for three components (n)** | 0 | 213 | 5 | 50 | 0 | 0 | 0 | 0 | 0 |
| **Proxy data required for more than three components (n)** | 0 | 453 | 0 | 122 | 0 | 0 | 0 | 0 | 0 |
| **Unable to be analysed due to insufficient data (n)** | 115 | 101 | 30 | 25 | 37 | 88 | 86 | 429 | 583 |

China and India required proxy data for a larger proportion of products due to differences in labelling requirements in these countries. In China, sugar and saturated fat are not mandatory to display on nutrition labels, and in India saturated fat and sodium are not mandatory. See Table 1 in Appendix A for a breakdown of each country's nutrients that are mandated to appear on nutrition labels.

***Table E*** *Number of products from each country where proxy values were used in analysis for the WHO Euro criteria*

| | AU | CN | HK | IN | MX | NZ | ZA | UK | US |
|---|---|---|---|---|---|---|---|---|---|
| **Total products analysed (n)** | 2936 | 1022 | 736 | 498 | 1284 | 2412 | 980 | 3510 | 9640 |
| **All data direct from label (n)** | 1729 | 627 | 458 | 305 | 793 | 1385 | 653 | 2771 | 6871 |
| **Proxy values used* (n)** | 1117 | 351 | 250 | 171 | 489 | 971 | 295 | 452 | 2455 |
| **Unable to be analysed due to insufficient data (n)** | 90 | 44 | 28 | 22 | 2 | 56 | 32 | 287 | 314 |

* Requirements differ depending on which WHO category is being observed.

## Analysis strategy

Six research questions were addressed:

1. *What is the average nutritional quality of each company's product portfolio and how do companies compare?* This question was addressed by calculating the mean HSR of the product portfolio for each company and ranking companies accordingly. Separate analyses (included as Appendices in this report) were also done by Euromonitor subset and by country.

2. *What is the average sales-weighted nutritional quality of each company's product portfolio and how do companies compare?* The metric used was the sales-weighted mean HSR of the product portfolio. ATNF calculated this for each company by: (1) calculating the mean HSR for each Euromonitor subset; (2) multiplying the mean HSR of the food category by the percentage sales for the subset; (3) summing the values obtained for all subsets.

3. *What proportion of each company's products are 'healthy' and how do companies compare?* The metric used was the proportion of the product portfolio that had a HSR of 3.5 stars or above. Separate analyses (included as Appendices) were also done by Euromonitor subset and by country. The cut point of 3.5 or above (≥3.5 HSR) is based on work commissioned by the New South Wales Ministry of Health in Australia examining the alignment of HSR with existing school food service provision standards and the Australian 2013 Dietary Guidelines. That work found that "healthy core foods with a HSR of ≥3.5 can be confidently promoted in public settings as healthier choices."[6]

4. *What proportion of each company's product sales are 'healthy' and how do companies compare?* The metric used was the proportion of a company's sales that were products with a HSR of 3.5 or above. ATNF estimated this for each company by: (1) calculating the percentage of products in each Euromonitor subset with an HSR of 3.5 or above; (2) multiplying that percentage by the percentage sales for the subset; (3) summing these values for all subsets.

5. *What proportion of each company's products is eligible to be marketed to children and how do companies compare?* The metric used was the proportion of the product portfolio meeting WHO Euro criteria for marketing to children. Separate analyses (included as Appendices) were also done by Euromonitor subset and by country.

6. *What proportion of each company's product sales is eligible to be marketed to children and how do companies compare?* The metric used was the proportion of a company's sales that were products eligible to be marketed to children under the WHO Euro model. ATNF estimated this for each company by: (1) calculating the percentage of eligible products in each Euromonitor subset; (2) multiplying that percentage by the percentage sales for the subset; (3) summing these values for all subsets.

The data were analysed using STATA statistical software version 14.1.

[6] Dunford E, Cobcroft M, Thomas M, Wu JH. Technical Report: Alignment of the NSW Healthy Food Provision Policy with the Health Star Rating System. Sydney, NSW: NSW Ministry of Health; 2015. Available at http://www.health.nsw.gov.au/heal/Publications/health-star-rating-system.pdf