

REPORT ON THE COMPARATIVE NUTRITIONAL PROFILE OF 943 FOOD AND BEVERAGE PRODUCTS MARKETED BY 12 LARGE COMPANIES IN INDIA

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ABBREVIATIONS

ATNF – Access to Nutrition Foundation

HSR – Health Star Rating

NPSC - Nutrient Profile Scoring Criteria

SAIN-LIM – Nutrient profiling model developed by the French Food Safety Agency highlighting the positive (SAIN) and negative (LIM) aspects of a food's nutrition content

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) Expert Group, the ATNF staff and Professor Mike Rayner of the University of Oxford. Sections of this report involving analysis of sales-weighted data, specifically analysis questions 2, 4 and 6 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.

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EXECUTIVE SUMMARY

The overall goal of this work was to provide stakeholders, including companies, government, nutrition experts and others with a fuller understanding of the nutritional quality of packaged food and non-alcoholic beverage products sold by the largest manufacturers in India. Nutrient information for 943 packaged food and beverage products sold by 11 large manufacturers in India were included in this analysis. Nutrient information was obtained either from product packaging, directly from the manufacturer or from company websites. Price data were also obtained for a subset of 350 products. Three overarching sets of analyses were then undertaken.

First, two nutrient profiling methods were selected to evaluate each company's product portfolio. The Australian Health Star Rating (HSR) system was used to assess the healthiness of company product portfolios and the World Health Organization's European Regional Office (WHO EURO) nutrient profiling method was used to assess the proportion of products in each company's portfolio that could be marketed to children. The proportion of products that could be considered 'healthy' using HSR was examined using a cut-off of 3.5 out of 5.0 stars and was examined both by company and by sub-category. Each company was then ranked by both the mean HSR of their product portfolio, and the proportion of products meeting WHO EURO criteria. This part of the analysis was done both with and without sales-weighting using data from Euromonitor. Second, regression analysis was used to determine whether healthier products were more expensive than less healthy products using available price data. Finally, the proportion of each company's product portfolio that met both Indian labelling legislation and Codex labelling guidelines was determined.

The mean healthiness of companies' products was found to be low overall at 1.9 stars out of 5.0, with substantial variation between companies observed. A low proportion (about 1 in 6) of products met the HSR 'healthy' cut-off of 3.5 out of 5.0 stars. There were marked differences in the healthiness of similar products when the HSR of products within sub-categories of foods was compared. Only 9% of products overall were eligible to be marketed to children according to the WHO EURO criteria, and many companies had no products eligible for marketing to children at all. When sales-weighting was incorporated into the analysis, the rankings of the companies in relation to healthiness changed and this weighting generally increased the disparities observed between companies. Each of the 11 companies had high compliance (mean 96%; range 89-100%) with current Indian regulations for nutrition labelling but compliance with more comprehensive international Codex labelling guidelines was much lower (mean 23%; range 0-85%).

There were significant strengths and some important weaknesses to the analyses undertaken in this report. For example, many companies were not willing to provide a list of their product portfolio, making it difficult to determine what market coverage was achieved by the inclusion of these 943 products. On balance, however, it is reasonable to conclude that the average healthiness of the products provided and sold by the largest Indian food companies is sub-optimal. Further, there are important differences between companies that could be addressed by investments that target improvements in the product mix as well as the reformulation of less healthy products to better compositions. The low number of products eligible for marketing to children is indicative of the unhealthy nature of most of the products offered.

In addition to remedial actions by the companies, there is also a role for the Government of India. A new requirement to display information on saturated fats and trans fats on nutrition labels is a good step forwards, but labelling of sodium should also be required to align with Codex's global nutrition labelling guidelines. There is also a clear opportunity for effective and enforceable legislation that prevents the marketing of unhealthy products to children.

INTRODUCTION

The George Institute for Global Health's mission is to improve the health of millions of people worldwide. More specifically, the Food Policy Division works to reduce rates of death and disease caused by diets high in salt, saturated fat, sugar and excess energy, by undertaking research and advocating for a healthier food environment. The Division's main areas of activity are quantifying the healthiness of the food supply, encouraging food reformulation, and developing innovative approaches to encourage consumers to make healthier food choices.

In 2016, The George Institute was commissioned by the Access to Nutrition Foundation (ATNF) to produce the first-ever *Product Profile* for India that would input into the 2016 India Access to Nutrition Spotlight Index. The Index will score and rank the contribution of India's largest food and beverage manufacturers to tackling the country's double burden of malnutrition. It will combine an analysis of those companies' policies, practices and disclosures (the Corporate Profile) with an analysis of the nutritional quality of each company's food and beverage products in the Indian market (the Product Profile).

The George Institute was selected to undertake this study given its established presence in India with offices in Hyderabad, Bangalore and New Delhi, and its existing FoodSwitch India database, which contains food composition data for over 10,000 products in the Indian food supply. The work was conducted by a team at The George Institute for Global Health, with advice from Dr Mike Rayner at the University of Oxford, who led an earlier pilot project for ATNF and who is a member of ATNF's Expert Group. The methods for that pilot project can be found [online](#).¹ The ATNF team, who had access to sales data from the Euromonitor database through a licensing agreement, also did a series of subsidiary sales-weighted analyses that have been included in this report.

This report sets out the objectives, methods, results and interpretation of the India Product Profile analysis done in 2016.

¹ Access to Nutrition Index and Oxford University, Product Profile: Approach and Methods, 2013 https://www.accesstonutrition.org/sites/www.accesstonutrition.org/files/atni_product_profile_methodology_final.pdf

OVERALL GOAL AND SPECIFIC OBJECTIVES

The overall goal of this work was to provide stakeholders, including companies, government, nutrition experts and others with a fuller understanding of the nutritional quality of packaged food and non-alcoholic beverage products (hereafter “foods and beverages”) sold by the largest manufacturers in India.² Specific objectives were to answer the following questions:

1. *What is the average nutritional quality of each company's product portfolio and how do companies compare?* The metric used was the mean Health Star Rating of the product portfolio.
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 Health Star Rating of the product portfolio.
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 Health Star Rating of 3.5 stars or above.
4. *What proportion of each company's product sales are 'healthy' and how do companies compare?* The metric used was the sales-weighted proportion of products that had a Health Star Rating of 3.5 stars or above.
5. *What proportion of each company's products are eligible to be marketed to children and how do companies compare?* The metric used was the proportion of the product portfolio meeting WHO Europe Region criteria for marketing to children.
6. *What proportion of each company's product sales are eligible to be marketed to children and how do companies compare?* The metric used was the sales-weighted proportion of products meeting WHO Europe Region criteria for marketing to children.
7. *How much does the nutritional quality of similar products vary?* The metric used was the mean and range of Health Star Rating in selected food categories displayed by company, and overall.
8. *Are healthier products more expensive than less healthy products?* The metric used was the regression coefficient associating the Health Star Rating and the price per 100g (mLs) for all products from all companies combined and for all products from all companies by food category.
9. *What proportion of each company's products meets Indian nutrition content labelling regulations and how do companies compare?* The metric used was the proportion of the entire product portfolio meeting Indian regulatory requirements in force as of June 30th 2016.³
10. *What proportion of each company's products meets Codex nutrition content labelling guidelines and how do companies compare?* The metric used was the proportion of the product portfolio meeting Codex Alimentarius Guidelines on Nutrition Labelling CAC/GL-2-1985.

² Note that nutritional quality for the purposes of this report does not include assessment of whether products have been fortified with micronutrients.

³ At the time of publication, we are aware that the Indian Food Safety and Standards Authority had passed an amendment creating additional labelling requirements for saturated and trans fats for some packaged foods, but that this amendment does not come into force until at least 2 December 2016.

METHODOLOGY

Selection of companies

ATNF requested The George Institute to include the products of 12 food and beverage manufacturers in India: the ten included in the 2016 India Index, plus two other large companies – Karnataka Co-operative Milk Producers' Federation Ltd (whose products are marketed under the brand name Nandini) and ITC Limited – included by ATNF to give a wider picture of products available to consumers in India. The included companies, in alphabetical order, with the name used throughout this report in brackets are:

- Britannia Industries (Britannia)
- Coca-Cola India Pvt. Ltd. (Coca-Cola India)
- Gujarat Coop Milk Marketing Federation (Amul)
- Hindustan Unilever (Hindustan Unilever)
- ITC Limited (ITC)
- Karnataka Milk Federation (Nandini)
- Mondelez International (Mondelez)
- Mother Dairy (Mother Dairy)
- Nestlé India (Nestlé India)
- Parle Products Pvt. Ltd. (Parle)
- PepsiCo India Inc (PepsiCo India)
- Ruchi Soya (Ruchi)

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.⁴ 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 than 50 nutrient profile models was reviewed and updated.⁵ 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 in the Indian context

⁴ World Health Organization, Nutrient Profiling <http://www.who.int/nutrition/topics/profiling/en/>

⁵ World Health Organization (in press) Nutrient profiling: catalogue of nutrient profile models: Geneva: WHO

Of the 67 models included in the updated catalogue, three 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.⁶ 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](#).⁷

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 SAIN-LIM model** was developed by the French Food Safety Agency in 2008 and has been proposed for use in regulating health claims.⁸ In a modified form, the model provides the basis for the Simplified Nutrition Labelling System (SENS), one of several currently being considered for adoption on front-of-pack in France.⁹

The model produces two different scores: the SAIN ('healthy') score and the LIM ('limit') score. The final categorisation of a product is based on both scores. The model uses data on monounsaturated fat, α -linolenic acid, protein, fibre, vitamins C, D and E, iron, calcium, saturated fat, energy, added sugars and sodium.

- 3) **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 relevant Indian regulation in this area, the model was selected as a reasonable basis by which to determine products' suitability to be marketed to children.

⁶ See Australia New Zealand Food Standards Code, Standard 1.2.7

⁷ Department of Health, Australian Health Star Rating website: <http://healthstarrating.gov.au>

⁸ Agence Française de Sécurité Sanitaire des Aliments (2008) Setting of nutrient profiles for accessing nutrition and health claims: proposals and arguments, Paris.

⁹ Agence Française de Sécurité Sanitaire des Aliments (2016) Systems for the nutritional classification of foods: comparison of SENS and 5C (based on Rayner's score) (website) <https://www.anses.fr/en/lexique/food-labelling>; Maillot M, Braesco V, Darmon N (2016) The SENS adapted from the French SAIN,LIM nutrient profiling system classifies foods into 4 ordered classes (Presentation at EuroFIR Food Forum 2016, Brussels) http://ms-nutrition.com/wp-content/uploads/2016/02/Poster_Abstract.1final.pdf

Table 1 Comparison of the HSR, SAIN-LIM and WHO EURO models

	HSR	SAIN-LIM	WHO EURO
Country/region of origin	Australia	France	Europe
Date of development	2014	2008	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.	Mean percentage of dietary reference intakes for positive nutrients (SAIN) and of maximum recommended intakes for negative nutrients (LIM).	Products must not exceed category-specific thresholds per 100g/mL to be permitted to market to children.
Positive nutrients	Protein Fibre Fruit, vegetable nut and legume content (FVNL) Calcium	Protein Fibre, Monounsaturated fats, α -linolenic acid, Vitamins C, D and E, Iron, Calcium (all optional)	N/A
Negative nutrients	Energy Saturated fat Total sugars Sodium	Saturated fat Added sugars Sodium Energy	Total fat Saturated fat Total sugars Added sugars Artificial sweeteners Trans fat Sodium
Original purpose of development and existing applications	Front-of-pack nutrition labelling.	Eligibility to carry a health claim.	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.	The SAIN score is plotted on a graph against the LIM score to determine whether a product is eligible for a health claim.	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.

To work optimally, all the nutrient profile models rely on the availability of comprehensive nutrition information. In the Indian context, national nutrition labelling legislation generally only requires the display of energy content (in kilocalories), protein, carbohydrates, total sugars and total fats.¹⁰ Amounts of other nutrients are only required where a nutrient content claim is made. Table 2 below displays the alignment between nutrients required for the operation of the nutrient profile models, and those required to be declared on Indian nutrition labels.

¹⁰ *Food Safety and Standards (Packaging and Labelling) Regulations 2011* (India)

Table 2 Alignment of nutrients required for profiling models with those required by Indian labelling legislation

	Indian Regulations	HSR	SAIN-LIM	WHO EURO
Total number of nutrients required	5	8	12	5
Protein	✓	✓	✓	
Fibre		✓	✓	
Fruit and vegetable content		✓		
Energy	✓	✓	✓	✓
Total fat	✓			✓
Saturated fat		✓	✓	✓
Monounsaturated fat			✓	
Trans fat				✓
Carbohydrate	✓			
Total sugars	✓	✓		✓
Added sugars			✓	✓
Other sweeteners				✓
Sodium		✓	✓	✓
Calcium		✓	✓	
α-linolenic acid			✓	
Vitamin C			✓	
Vitamin D			✓	
Vitamin E			✓	
Iron			✓	
Number of nutrients aligned to Indian legislation		3/5	2/5	3/5

 = nutrients required by both specified profiling model and Indian labelling legislation

The majority of products produced by the included companies met national Indian nutrient labelling requirements (protein, energy, total fat, carbohydrate and sugar) but less than one third displayed information for sodium and saturated fat.¹¹ Information about added sugar, fibre, calcium, and other vitamins and minerals was much less frequently available.

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 India. This was particularly problematic for the SAIN-LIM model because a very large number of required nutrients were mostly missing from product nutrient declarations. As a result, analyses done using SAIN-LIM are included in [Appendix A](#) for information only and were not used to address the primary goal or specific objectives of this study.

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 available for purchase in India.'* 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).

¹¹ Codex Alimentarius, *Guidelines on Nutrition Labelling* CAC/GL 2-1985 <http://www.fao.org/ag/humannutrition/33309-01d4d1dd1abc825f0582d9e5a2eda4a74.pdf>

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. 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, 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).

Product identification

It was hoped that a complete product list could be compiled based on comprehensive information provided by each company. However, only three of the included companies (Hindustan Unilever, Mother Dairy and Britannia) accepted the offer to supply their full product list. Hindustan Unilever also provided nutrition information for its products.

The alternative approach used for the other companies was to include:

- Products in the FoodSwitch India database with data entered or updated after 1 July 2014 (an approximately two-year period prior to this analysis)
- Products identified between June and August 2016 by in-store surveys done at retail and wholesale outlets in Hyderabad, Bangalore, Delhi and surrounding areas. Permission was obtained from store owners and using a smartphone app, data collectors attended each site and systematically photographed publicly available nutrition information displayed on the product packaging, which was then uploaded and added to the FoodSwitch India database. Where a product was captured more than once, nutrition information was extracted from the most recent photograph of the item.

An iterative process of review was used to obtain as complete a listing of products as possible whereby the products collected in-store were checked against any product portfolio information provided by companies, and information publicly available on company websites and in two large Indian online retailers. Products identified as missing were targeted for collection.

Data collection

Nutrient information was extracted from photographs of product packaging and entered into the FoodSwitch India database. Nutrient information obtained either directly from the manufacturer or from company websites (Hindustan Unilever, Mother Dairy, PepsiCo India, Coca-Cola India and some Britannia and Amul products) was used to supplement the data when necessary and available.

At the end of the collection period in July 2016, companies were provided with their data for review (product list and nutrient content) and offered an opportunity to make corrections or additions to information about their product range. Coca-Cola India, Britannia, Mondelez and Hindustan Unilever did so and any corrected or new information was updated in the project database. For one company, Ruchi, only four products were able to be identified and it was impossible to collect adequate data about product composition on these items. As such, Ruchi were excluded from any further analysis.

Imputation of essential missing data

Most product labels provided data on energy, protein, carbohydrates, total fat and total sugar content, as required by Indian labelling legislation. A minority displayed additional data for sodium and saturated fat content. For the majority of products the available nutritional

information was insufficient to apply the selected nutrient profile models. It was therefore necessary to impute missing data which was done as follows:

- Proxy values for total fat, saturated fat, total sugar, sodium, fibre and 'fruit vegetable nut and legume' (FVNL) content were developed by using available data for 515 food categories and more than 10,000 products in the full FoodSwitch India database (regardless of manufacturer). The average value of the products with available data was 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:
 - For cakes and desserts, confectionery, sauces and beverages (excluding milk), total sugar values were assigned as '*added sugars*'
 - For milks and yoghurts, an amount of sugar of up to 6g/100g and 8g/100g respectively was considered to be naturally occurring. These are reasonable values based upon known concentrations of lactose in these products. Any amount over this was assigned as '*added sugars*'.

Product price data

Price data were sought for all products. Unfortunately, the cost of purchasing price data was prohibitive and retail store owners were unwilling to allow this information to be collected during in-store surveys. Accordingly, the following approach was employed:

- Price data were sought from India's largest online retailer, BigBasket.com, over a two-day period in August 2016. The shopping location was nominated as a single postcode in Bangalore, one of India's largest cities, to maximise the range of products available.
- Regular retail prices (not discounted prices) were recorded
- Care was taken to assign correct prices by pack size
- Price per 100g (mL) of the product (unit price) was calculated
- Products for which no price could be obtained were recorded as missing

Product categorisation

Products were categorised in three ways:

- To one of 515 categories within the FoodSwitch India database.
- To one of 21 WHO Europe categories.
- To one of 50 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 and sub-categories – hereafter called 'Euromonitor subsets' - were made to generate subsets of products of sufficient size to allow nutritional analysis of comparable food products. Full definitions of these Euromonitor subsets are contained on ATNF's website.¹² Of note, results for milk drinks are presented as 'foods' not 'drinks' according to Euromonitor's method of classification but were considered beverages when calculating their nutrient profile scores.

¹² Access to Nutrition Index: <https://www.accesstonutrition.org/>

Table 3 Euromonitor subsets

Foods		
Bread	Ready meals	Other non-cola carbonates
Cake	Rice, pasta and noodles	Nectars
Hot beverages	Cooking sauces	Juice drinks
Savoury biscuits	Table sauces	Flavoured bottled water
Sweet biscuits	Soup	Sports drinks
Snack bars	Spreads	Energy drinks
Breakfast cereals	Savoury snacks	Liquid concentrates
Confectionery		Powder concentrates
Cheese	Beverages	Ready-to-drink (RTD) tea
Drinking milk products	Regular cola carbonates	Fruit-flavoured drinks
Yoghurt and sour milk	Low calorie cola carbonates	Hot beverages
Dairy whiteners	Lemonade/lime carbonates	
Ice cream and frozen desserts	Orange carbonates	
Fats and oils	Mixers	
Processed fruit and veg		

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

Euromonitor subsets were selected for secondary analysis where:

- At least two companies manufactured products in the category, *and*
- There were five or more products manufactured by each company within that category.

Application of imputed data in the nutrient profiling models

The three 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 the product label was not missing energy nor missing three or more of four key nutrients (saturated fat, sugar, sodium, protein) required for the analysis. If three or more of these nutrients were missing, then the product was excluded from the analysis. Products were not included in analysis if energy content was missing. Plain packaged water (whether still or carbonated) was assigned a Health Star Rating of 5.0 consistent with the HSR Guidelines.¹³
- 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 Health Star Rating. Eligibility was determined category-by-category as per the WHO model which uses different nutrients for each WHO-specified category.
- For the purpose of generating an outcome under the SAIN-LIM model, proxy values were required for a very large number of nutrients for almost every food. Accordingly, the SAIN-LIM findings were excluded from the main analysis (see [Appendix A](#)).

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. Table 4 outlines the sources of nutrient information used in generating nutrient profile scores.

¹³ 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)

Table 4 Sources of information relied upon in applying nutrient profile models

	HSR	WHO EURO*	SAIN-LIM
Total products analysed	918	937	930
All data direct from label	0	523	0
Proxy data required for one nutrient	9	NA	0
Proxy data required for two nutrients	174	NA	0
Proxy data required for three nutrients	104	NA	0
Proxy data required for three or more nutrients	632	NA	930
(Unable to be analysed due to insufficient data)	24	4	13

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

Sales data

Sales data were obtained at the Euromonitor subset level for each company. This was used to generate sales-weighted outcomes for 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 2015 period. Where a company did not command 0.1% or more market share in a category, no sales data were available. Accordingly, products that met these criteria were excluded from the respective analyses.

Analysis strategy

There were ten research questions 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 were done for all foods and beverages combined, foods alone and beverages alone. Companies that produced fewer than five foods or beverages were excluded from the respective analyses.
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. Companies that produced fewer than five foods or beverages were excluded from the respective analyses.
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 were done for all foods and beverages combined, foods alone and beverages alone. Companies that produced fewer than five foods or beverages were excluded from the respective analyses. 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."¹⁴

¹⁴ 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/health/Publications/health-star-rating-system.pdf>

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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. Companies that produced fewer than five foods or beverages were excluded from the respective analyses.
 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 were done for all foods and beverages combined, foods alone and beverages alone.
 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. Companies that produced fewer than five foods or beverages were excluded from the respective analyses.
 7. *How does the nutritional quality of similar products vary across companies and overall?* The metric used was the mean and range of HSR within Euromonitor subsets displayed by company, where at least two companies each had five or more products. In addition the overall mean and range HSR was provided for each of the Euromonitor subsets.
 8. *Are healthier products more expensive than less healthy products?* The metric used was the regression coefficient associating the HSR and the price per 100g (or 100mL) for all products from all companies combined and for all products from all companies by food category. Linear regressions were fitted and evidence for a non-zero slope of the regression line was sought.
 9. *What proportion of each company's products meets Indian nutrition content labelling regulations and how do companies compare?* The metric used was the proportion of the entire product portfolio meeting Indian regulatory requirements in force as of 30th June 2016. Indian regulation requires that nutritional information should be provided per 100g or mL or per serving of the product shall be given on the label and include: energy value in kilocalories; the amounts of protein, carbohydrate, total sugars and fat in grams (g); and the amount of any other nutrient for which a nutrient content claim or health claim is made. Nutritional information is not required to be displayed on certain foods such as raw agricultural commodities (wheat, rice, cereals, spices, spice mixes, herbs, condiments, table salt, sugar, jaggery), or non-nutritive products like soluble tea, coffee, soluble coffee, coffee-chicory mixture, packaged drinking water, packaged mineral water, alcoholic beverages or fruits and vegetables.¹⁵
 10. *What proportion of each company's products meets Codex nutrition content labelling guidelines and how do companies compare?* The metric used was the proportion of the product portfolio meeting Codex Alimentarius Guidelines on Nutrition Labelling CAC/GL 2-1985.¹⁶ At a global level, the *Guidelines* provide an agreed international standard and require: energy value, the amount of protein, available carbohydrate (i.e. carbohydrate excluding dietary fibre), total fat, saturated fat, sodium and total sugars; the amount of any other nutrient for which a claim is made; and the amount of any other nutrient considered to be relevant for

¹⁵ *Food Safety and Standards (Packaging and Labelling) Regulations 2011* (India), Section 3(v)(i)

¹⁶ Codex Alimentarius Guidelines on Nutrition Labelling CAC/GL 2-1985, last amended 2016 http://www.fao.org/fao-who-codexalimentarius/sh-roxy/es/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252Fstandards%252FCAC%252FBGL%252B2-1985%252FCXG_002e.pdf

maintaining a good nutritional status, as required by national legislation or national dietary guidelines.¹⁷

The data were analysed using STATA statistical software version 14.1.

¹⁷ Codex Alimentarius, *Guidelines on Nutrition Labelling* CAC/GL 2-1985
<http://www.fao.org/ag/humannutrition/33309-01d4d1dd1abc825f0582d9e5a2eda4a74.pdf>

RESULTS

Products included

There were 1,450 identified products manufactured by the 12 included companies. Of these, 59 were excluded as they were baby foods, plain cereal items, herbs and spices or non-nutritive tea or coffee products, 60 were excluded as they did not have sufficient baseline data to conduct nutrient profiling including the four products by Ruchi, and 388 were excluded as duplicate products of different pack size. This left 943 unique products for analysis from 11 companies.

Table 5 Number of food products by company in Euromonitor subsets

Euromonitor Subset		Britannia	Coca-Cola India	Amul	Hindustan Unilever	ITC	Nandini	Mondelez	Mother Dairy	Nestlé	Parle	PepsiCo India	Total
FOODS	Bread	7	0	0	0	0	0	0	0	0	0	0	7
	Cake	12	0	0	0	0	0	0	0	0	0	0	12
	Dessert mixes	0	0	0	0	2	0	0	0	0	0	0	2
	Savoury biscuits	8	0	0	0	3	0	0	0	0	10	0	21
	Sweet biscuits	46	0	0	0	29	1	7	0	1	45	0	128
	Breakfast cereals	0	0	0	2	1	0	0	0	2	0	14	19
	Confectionery	0	0	3	0	4	0	29	0	13	12	0	61
	Cheese	7	0	9	0	0	1	0	4	0	0	0	21
	Drinking milk products	3	2	19	0	0	17	0	16	4	0	0	62
	Yoghurt and sour milk	3	0	5	0	0	3	0	14	8	0	0	33
	Ice cream and frozen desserts	0	0	41	34	0	27	0	56	0	0	0	157
	Fats and oils	1	0	5	0	1	4	0	7	0	0	0	18
	Processed fruit and vegetables	0	0	0	0	5	0	0	3	0	0	0	8
	Ready meals	0	0	1	0	17	0	0	1	3	0	0	22
	Rice, pasta and noodles	0	0	0	5	9	0	0	0	7	0	0	21
	Cooking sauces	0	0	0	17	9	0	0	0	6	0	0	32
	Table sauces	0	0	0	8	5	0	0	7	4	0	0	24
	Soup	0	0	0	19	0	0	0	0	0	0	0	19
	Spreads	0	0	0	7	1	0	0	4	0	0	0	12
	Savoury snacks	0	0	0	0	19	0	0	0	0	9	92	120
Other dairy products	0	0	1	0	0	0	0	2	1	0	0	4	
Whitener	0	1	2	0	0	1	0	1	3	0	0	8	
Condensed milk	0	0	1	0	0	0	0	0	2	0	0	3	
SUBTOTAL FOOD	87	3	87	92	105	54	36	115	53	76	106	814	

 Euromonitor subsets meeting criteria for subcategory comparisons between companies.

Table 6 Number of beverage products by company in Euromonitor subsets

Euromonitor Subset		Britannia	Coca-Cola India	Amul	Hindustan Unilever	ITC	Nandini	Mondelez	Mother Dairy	Nestlé	Parle	PepsiCo India	Total
BEVERAGES	Regular cola carbonates	0	2	0	0	0	0	0	0	0	0	1	3
	Low calorie cola carbonates	0	2	0	0	0	0	0	0	0	0	1	3
	Lemonade/lime carbonates	0	4	0	0	0	0	0	0	0	0	2	6
	Orange carbonates	0	1	0	0	0	0	0	0	0	0	1	2
	Mixers	0	5	0	0	0	0	0	0	0	0	2	7
	Other non-cola carbonates	0	3	0	0	0	0	0	0	0	0	1	4
	Nectars (25-99% juice)	0	1	0	6	3	0	0	0	0	0	0	10
	Juice drinks (up to 24% juice)	0	7	0	0	5	0	0	7	0	0	19	38
	Still bottled water	0	2	0	0	0	0	0	0	0	0	1	3
	Sports drinks	0	0	0	0	0	0	0	0	0	0	3	3
	Liquid concentrates	0	0	0	1	0	0	0	0	2	0	0	3
	Powder concentrates	0	0	0	2	0	0	7	0	4	0	2	15
	Ready-to-drink tea	0	2	0	1	0	0	0	0	0	0	2	5
	Hot beverages	0	1	1	8	0	0	5	0	12	0	0	27
SUBTOTAL BEVERAGE		0	30	1	18	8	0	12	7	18	0	35	129
TOTAL FOOD AND BEVERAGE		87	33	88	110	113	54	48	122	71	76	141	943

= Euromonitor subsets meeting criteria for subcategory comparisons between companies.

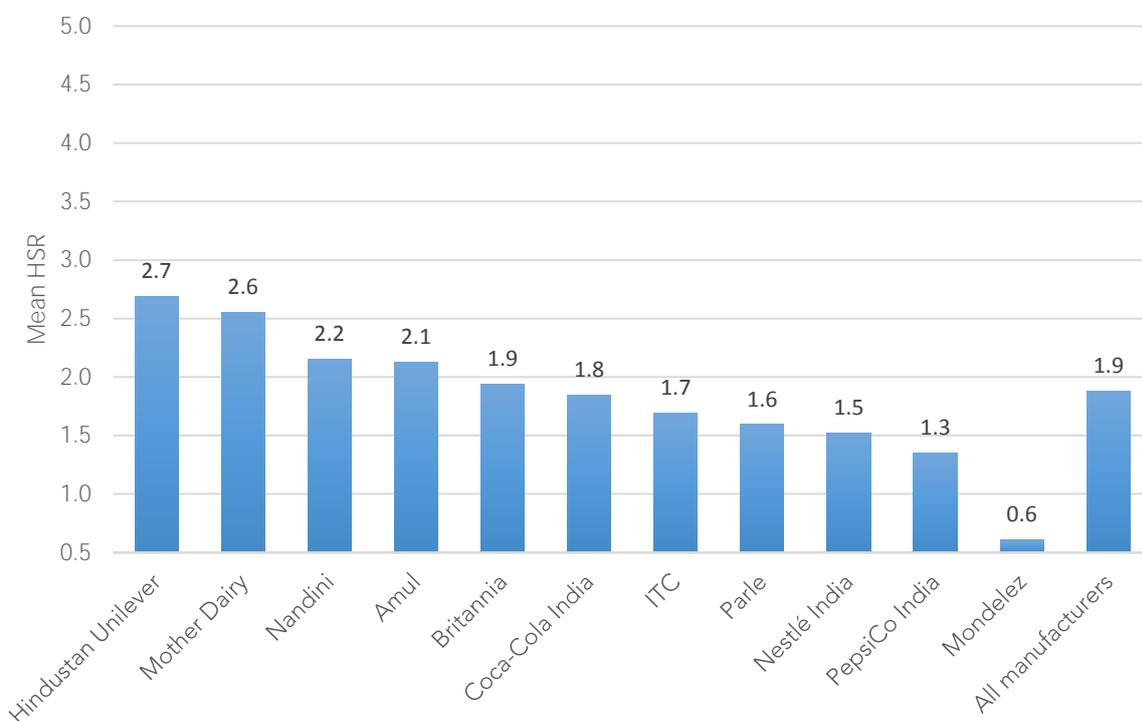
PepsiCo India offered the largest number of products for sale (n=141), around two thirds of which were savoury snacks (potato chips, extruded snacks, Indian namkeen), including multiple flavour variants across its Lay's, Kurkure and Lehare brands. Hindustan Unilever and Mother Dairy both exceeded 120 products; the biggest Euromonitor subsets for both were ice-creams and frozen desserts. By contrast, Coca-Cola India sold the smallest number of products, with 33 beverages and three products that were defined as foods within the Euromonitor definitions.

Most companies only sold products across four or five categories; for example, Mother Dairy, Karnataka and Amul almost exclusively sold dairy products. Britannia and Parle sold predominantly sweet and savoury biscuits and snacks. In some categories, only one company sold products, such as ITC Limited's ready meals or Hindustan Unilever's soups. The biggest category, with six companies contributing products, was sweet biscuits.

ANALYSIS 1 *Corporate rankings based upon mean nutrient profile of products*

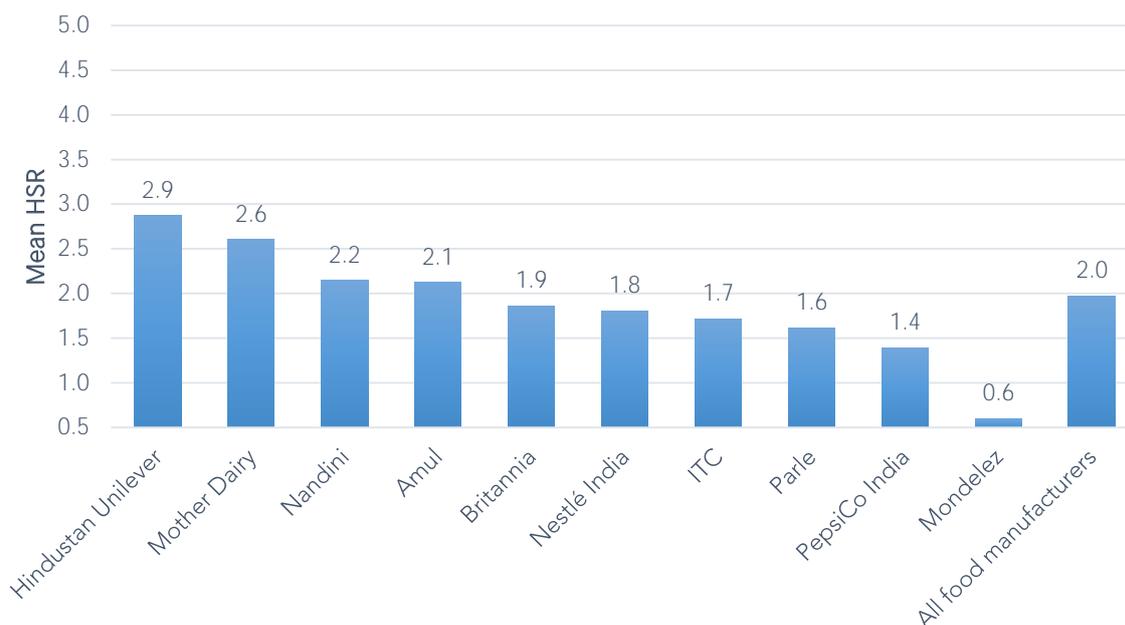
Out of the 943 products included in analysis, there was sufficient nutrient information for 918 products to generate a Health Star Rating.

Figure 1 *Mean Health Star Rating by company – overall product portfolio (11 companies)*



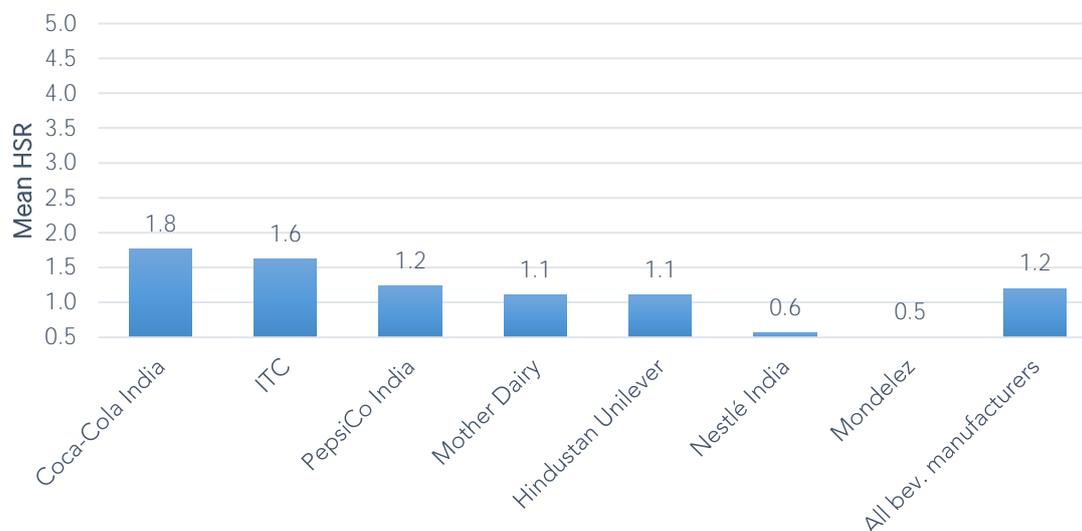
Hindustan Unilever had the highest average HSR of 2.7 out of 5.0, slightly ahead of Britannia, Coca-Cola India and Mother Dairy. Mondelez had by far the lowest mean score of 0.6 out of 5.0 as its portfolio comprised predominantly confectionery items. Overall, average HSR was low at only 1.9 stars out of 5.0 for all companies combined.

Figure 2 Mean Health Star Rating by company – foods (10 companies)



Hindustan Unilever again had the highest average HSR of 2.9, slightly ahead of Mother Dairy, Nandini and Amul. Overall mean HSR for foods was low at only 2.0 stars out of 5.0 for all companies combined.

Figure 3 Mean Health Star Rating by company – beverages (7 companies)



Ratings for beverages were even lower than for foods. Coca-Cola India had the highest average HSR, and Nestlé and Mondelez the lowest.

Results for individual products within some company portfolios were skewed at each end of the HSR spectrum. For example, companies which made plain bottled still and carbonated water benefited from the HSR rule that these products receive a HSR of 5.0 by virtue of their being essential to life. Nearly all other beverages received low HSRs.

A number of companies made juices, including some with names that included the words '100% juice.' However, when nutrition labels were examined, nearly all juices were found to contain a low proportion of fruit and were high in sugar, resulting in low HSR outcomes.

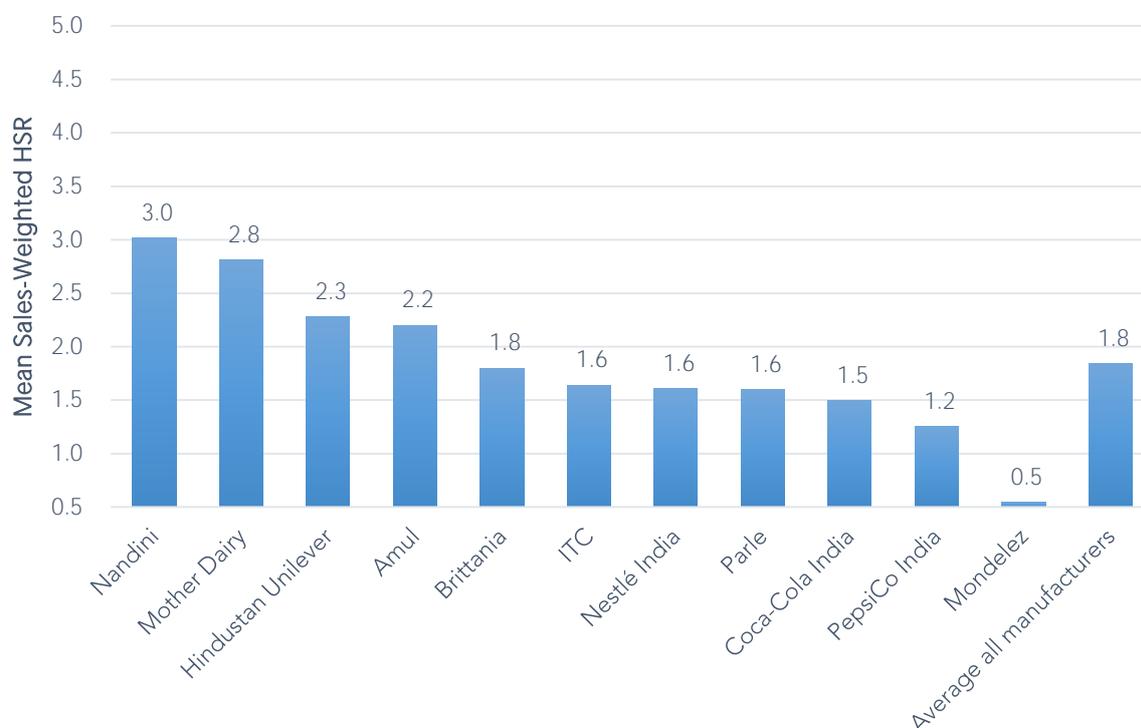
Table 7 Number of products with each Health Star Rating overall and by company

Star rating (HSR model): 3.5 stars or more = healthy product											
	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	Total
Britannia	11	8	23	23	2	9	4	6	1	0	87
Coca-Cola India	6	11	5	4	0	1	1	0	0	5	33
Amul	12	10	8	19	15	6	5	8	1	1	85
Hindustan Unilever	4	12	8	12	7	24	13	23	0	0	103
ITC	17	23	26	17	13	5	4	5	0	0	110
Nandini	8	8	11	3	4	4	0	7	4	1	50
Mondelez	41	2	2	0	1	0	0	0	0	0	46
Mother Dairy	4	7	23	27	20	8	7	8	12	4	120
Nestlé India	35	3	5	5	4	9	1	4	2	0	68
Parle	14	12	26	5	8	8	1	1	0	0	75
PepsiCo India	70	20	20	8	4	4	1	3	7	4	141
Total no. of products	222	116	157	123	78	78	37	65	27	15	918
% of total products	24.2%	12.5%	17.1%	13.4%	8.5%	8.5%	4.0%	7.1%	2.9%	1.8%	100%

Table 7 above shows the spread of results achieved by all companies across the HSR spectrum. The 11 companies assessed offered products with a range of HSRs but a large number scored poorly. Just over half (54%) of all products on the market scored 1.5 stars or below. The products that scored 3.5 and above totalled 144, accounting for only 16% of all products.

ANALYSIS 2 *Corporate rankings based upon sales-weighted mean nutrient profile*

Figure 4 Mean sales-weighted Health Star Rating by company – overall product portfolio (11 companies)



Once 2015 sales were taken into account, the picture changed somewhat. Nandini ranked first, with an estimated 2015 sales-weighted result of 3.0 out of a possible 5.0 stars. This was due to the large proportion of its sales deriving from drinking milks, with a mean HSR of 2.9, and a smaller but sizeable amount of its sales from yoghurt and sour milk products with an average HSR of 4.0 out of 5.0.¹⁸ Similarly, Mother Dairy generated the majority of its sales from drinking milks in 2015, which on average received 2.8 out of 5.0 stars. Hindustan Unilever was estimated to have derived more than half of its 2015 packaged food sales revenue from ice creams, and achieved the highest mean HSR of any company in this subset (2.5 stars), while another 12% of 2015 sales were generated by soups with an average HSR of 3.8. Amul ranked fourth in this analysis, also due to the large proportion of its sales consisting of dairy products which rated reasonably well.

Britannia, ITC, Nestlé India and Parle all received very low and similar estimated 2015 sales-weighted HSRs of below 2.0; they all sold products across a range of subsets with varying mean HSRs, many of which were low.

Coca-Cola India's 2015 estimated sales-weighted HSR of only 1.5 out of 5.0 was because its lemon/lime carbonates accounted for a significant proportion of its sales, and this subset received only 1.3 stars, as did regular cola carbonates which received on average 1.0 star. Another large fraction of its 2015 sales were from juice drinks which only received 0.8 stars on average, as they also have a relatively high sugar content.

PepsiCo India received only a 1.2 of out 5.0 HSR because nearly half of its 2015 packaged food sales were from savoury snacks with an average HSR of only 1.1, and a sizeable proportion of its

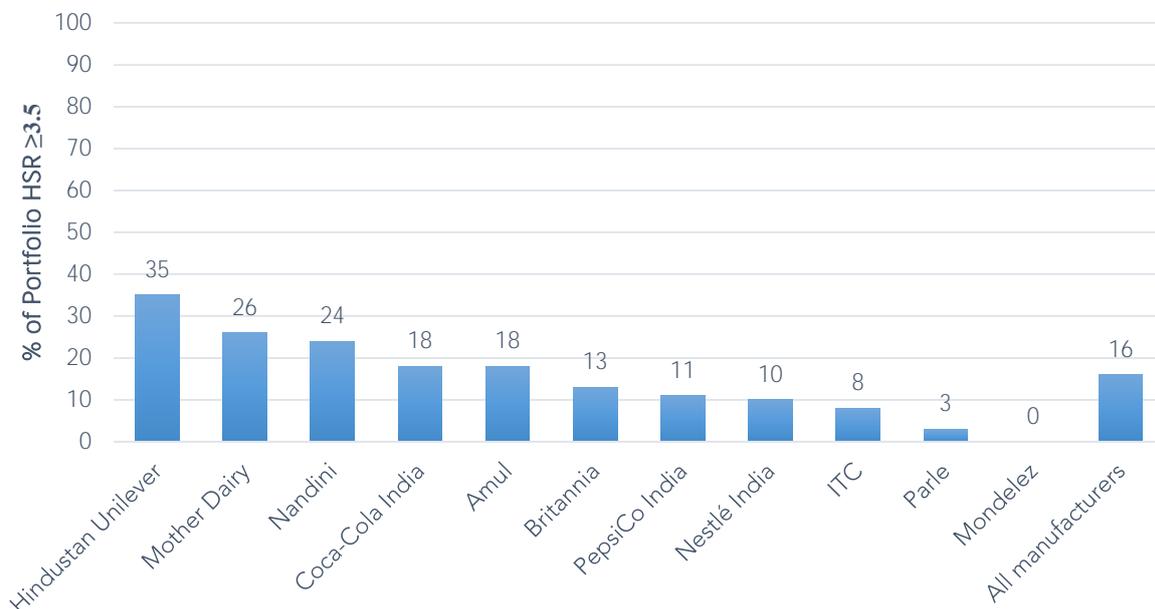
¹⁸ Notably, although the company makes a range of ice creams and frozen desserts, Euromonitor reports that its market share is less than 0.1% and so it does not provide data for their sales. These products are therefore not included within these calculations, even though they may make up a significant percentage of the company's sales.

sales were from juice drinks that achieved an average HSR of only 0.7. Much of the rest of its 2015 sales were generated by regular cola carbonates that received an HSR of only 1.0 out of 5.0.

Mondelez ranked last with an estimated 2015 sales-weighted HSR of only 0.6 out of 5.0, with an estimated 97% of its products falling into categories with a mean HSR of 0.5.

ANALYSIS 3 *Corporate rankings based upon proportion of 'healthy' products*

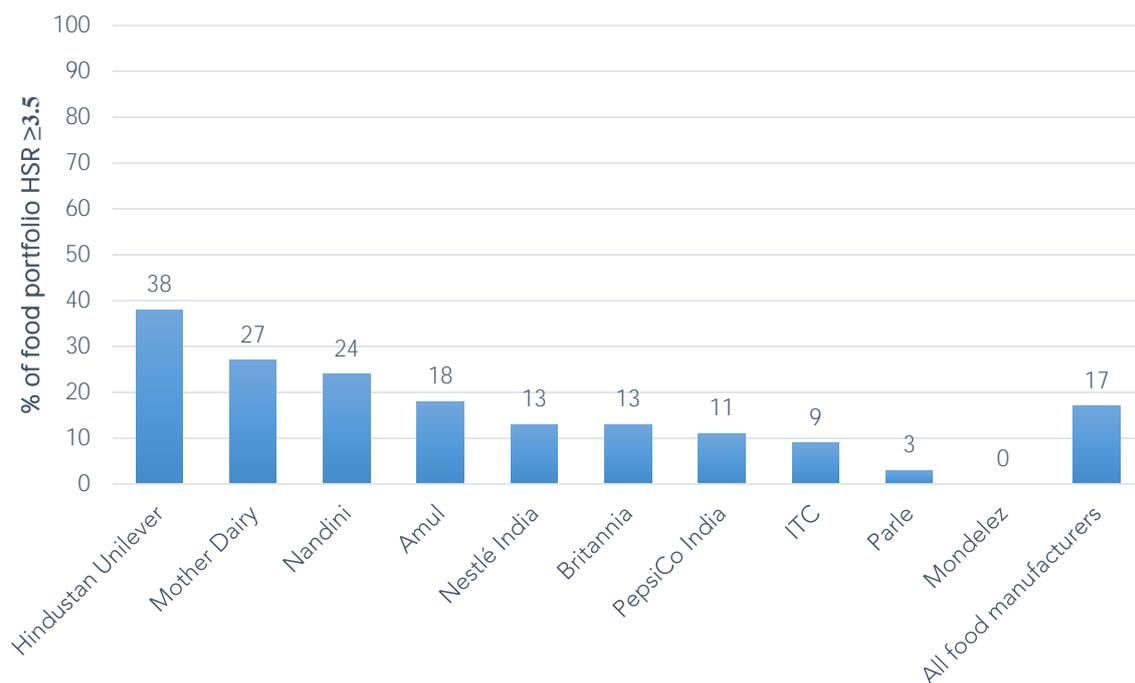
Figure 5 Proportion of 'healthy' products by company – overall product portfolio (11 companies)



Hindustan Unilever had the highest proportion of its portfolio achieving an HSR of 3.5 or above. Products that typically scored higher within its portfolio included soups and cooking sauces. Mother Dairy scored well for its processed vegetable products, some drinking milks and yoghurts (classified by Euromonitor as foods). Nandini also made a number of drinking milks and yoghurts that received an HSR of 3.5 or above. Parle and Mondelez had the lowest proportion of 'healthy' products: both predominantly make confectionery and biscuits that received low HSRs.

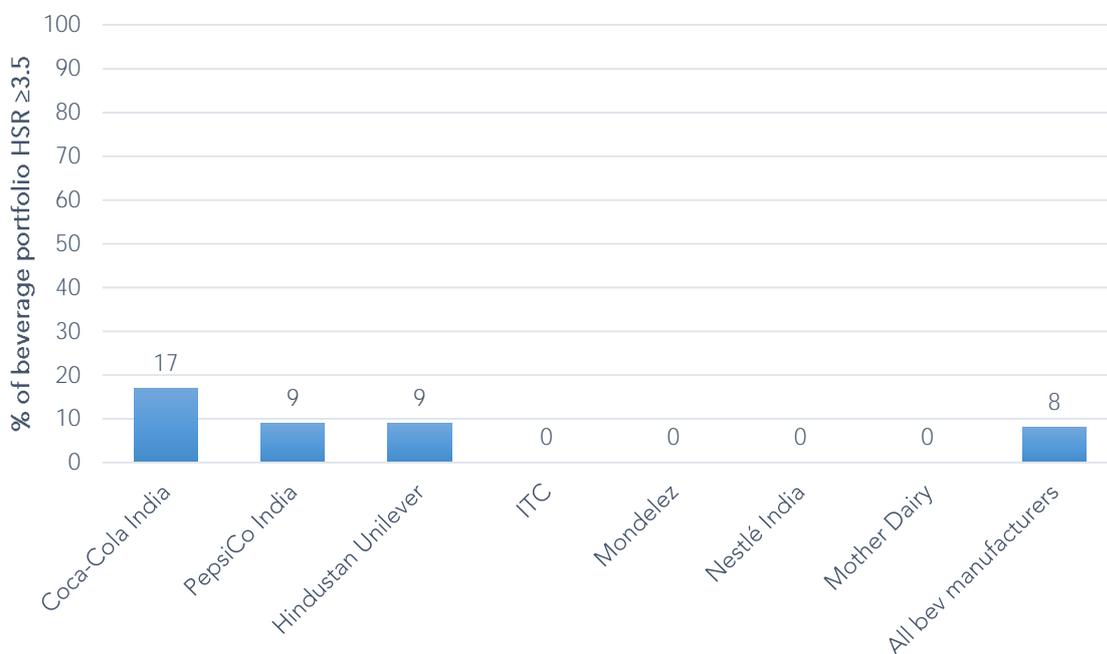
Only 16% of products from all manufacturers were classified as 'healthy' by this metric.

Figure 6 Proportion of 'healthy' products by company – foods (10 companies)



Results for foods were very similar to overall product portfolios. Hindustan Unilever had the highest proportion of foods receiving a HSR of 3.5 or above, followed by Mother Dairy, Nandini and Amul, all of whom make a large number of dairy products.

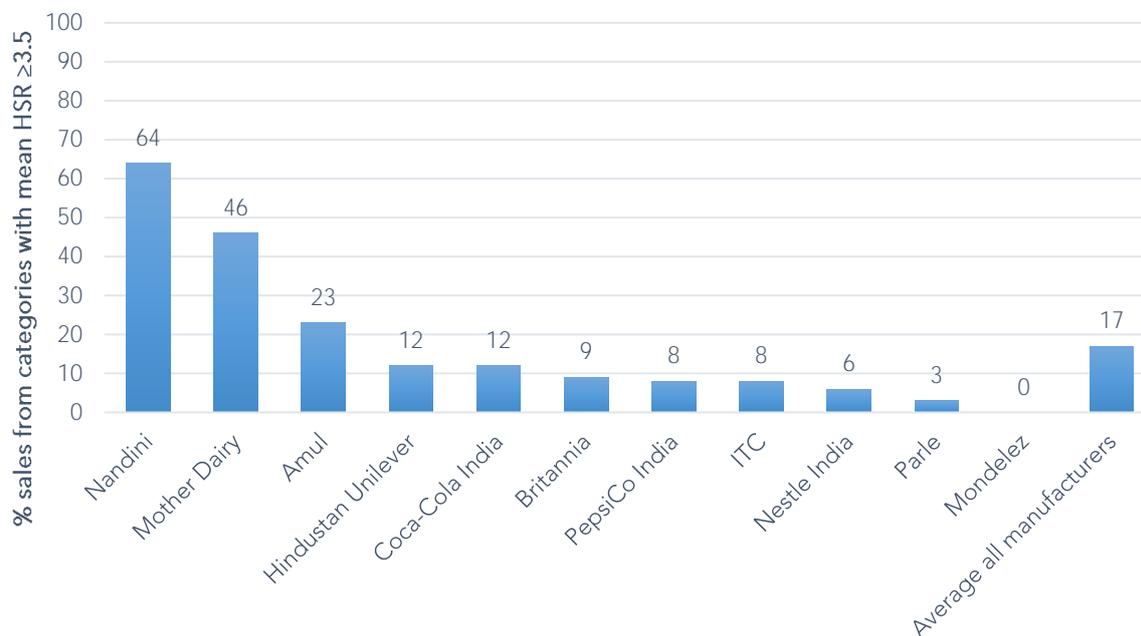
Figure 7 Proportion of 'healthy' products by company – beverages (7 companies)



Very few beverages were considered 'healthy'. Coca-Cola India ranked first, based on several varieties of plain bottled water and plain soda water mixers it produces which received an HSR of 5.0. The vast majority of all companies' beverages – sugar and artificially sweetened carbonated beverages, powder concentrates, energy drinks, juice drinks and hot beverages - received HSR results ≤ 2.0.

ANALYSIS 4 *Corporate ranking based upon sales-weighted proportion of healthy products*

Figure 8 Proportions of sales from healthy products by category – overall product portfolio (11 companies)



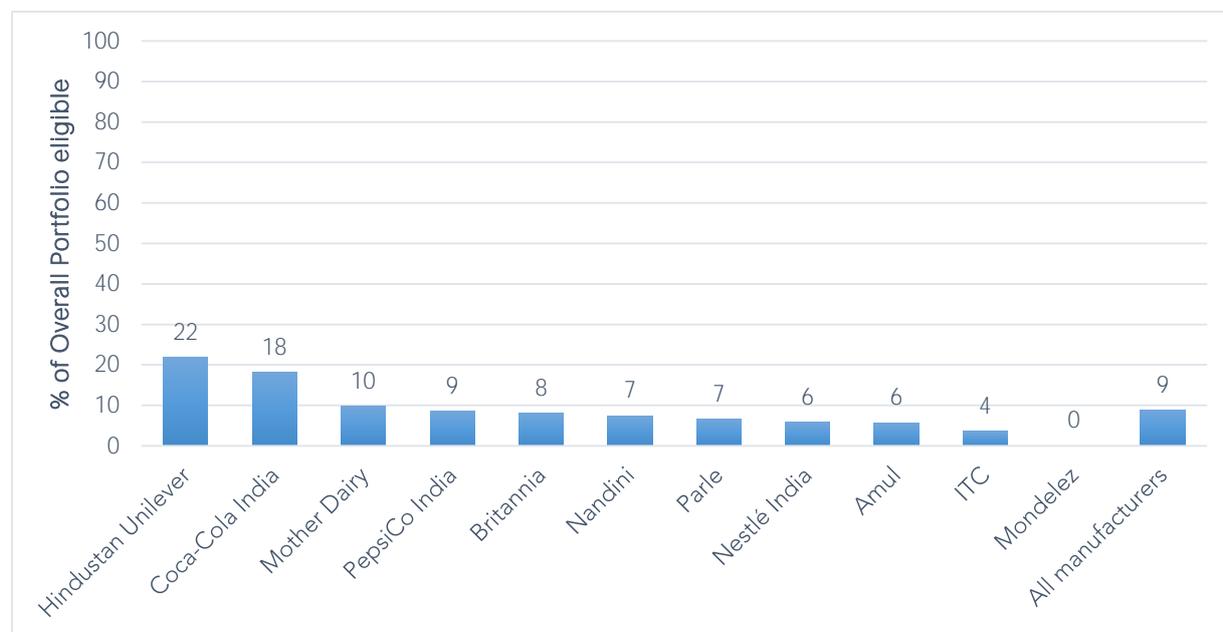
Nandini was estimated to generate the highest proportion of 2015 sales from healthy products, i.e. those rated with an HSR of 3.5 or above, followed by Mother Dairy with nearly half of its sales from healthy products. Amul, another dairy cooperative, generated much less of its sales from healthy products – 23%. The remainder of the companies were estimated to have generated 12% or less of 2015 sales from healthy products.

As a company that sells both foods and beverages, it was estimated that PepsiCo India made only 4% of its sales from healthy foods, whereas healthy beverages made up 12%. While Hindustan Unilever was estimated to have generated 14% of its 2015 sales of foods from healthy products, none of that year's sales were thought to have been generated by healthy beverages.

ANALYSIS 5 *Corporate ranking based upon proportions of products meeting WHO EURO criteria*

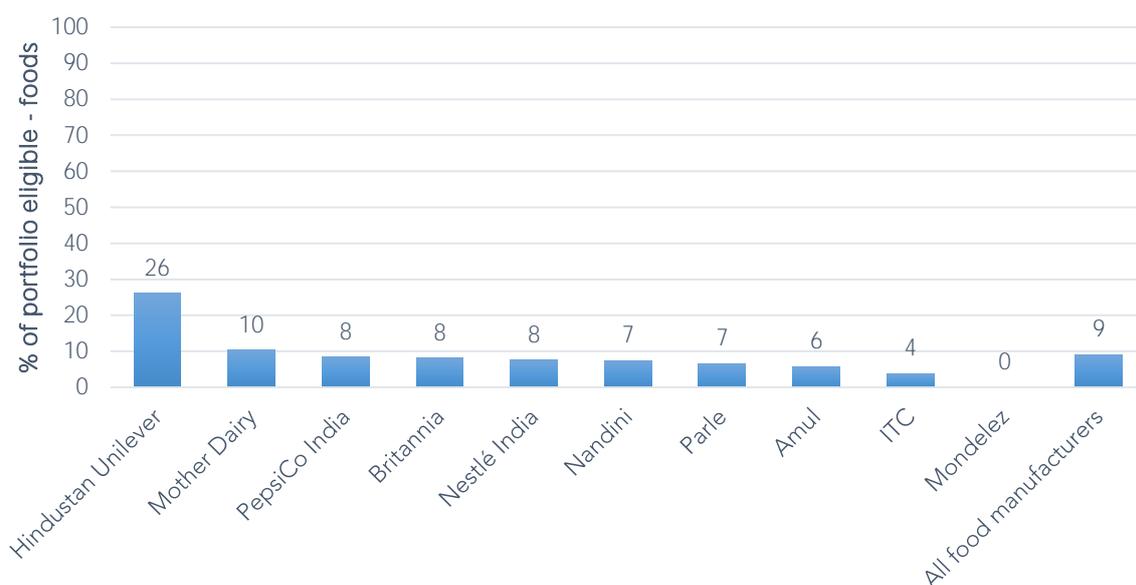
Of the 943 products available for analysis, 937 had sufficient nutrient data to be assessed under the WHO EURO model.

Figure 9 *Proportions of products meeting WHO EURO criteria for marketing to children – overall product portfolio (11 companies)*



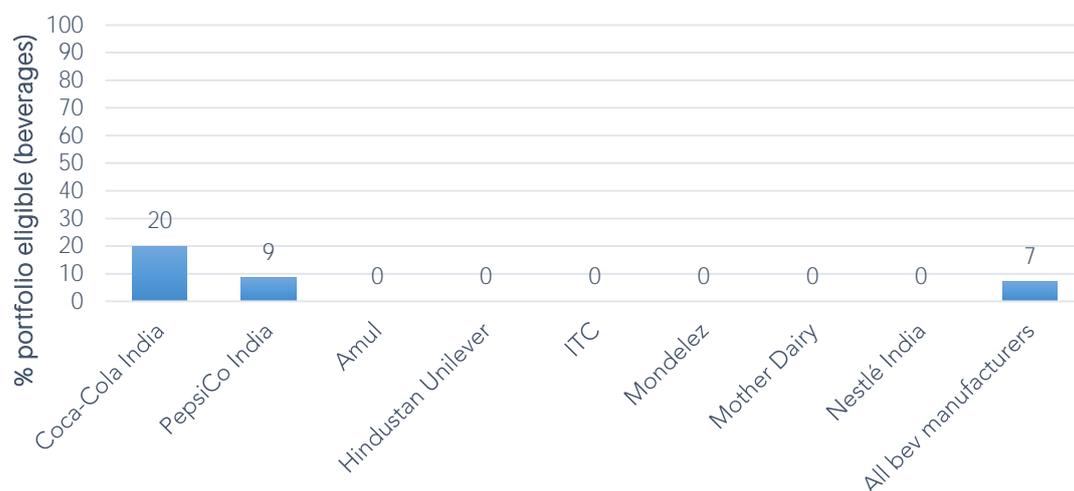
A low proportion of products across all companies overall (9%) would be eligible for marketing to children under WHO EURO criteria. No company scored well using this nutrient profiling method. The company that has the highest proportion overall of products that could be marketed to children was Hindustan Unilever at 22%, closely followed by Coca-Cola India at 18%. For all of the other companies, the figure was 10% or less.

Figure 10 Proportions of products meeting WHO EURO criteria for marketing to children – foods (10 companies)



Again, a very low proportion of food products offered by the companies could be marketed to children. Hindustan Unilever’s comparatively high result was made up predominantly of soup products, a category where none of the other companies made products in India. Other products eligible for marketing included healthier dairy products from Mother Dairy, Nandini and Amul and PepsiCo India’s cereals. Categories such as confectionery, cakes and sweet biscuits are not eligible for marketing irrespective of nutrient content, affecting the companies that make a large number of these products.

Figure 11 Proportions of products meeting WHO EURO criteria for marketing to children – beverages (8 companies)

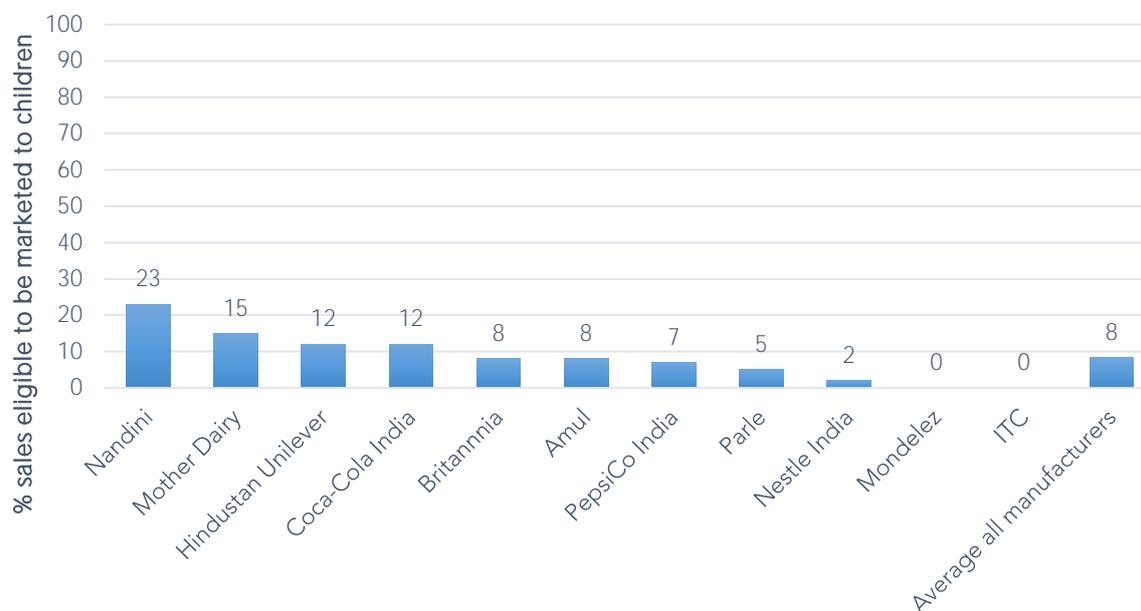


Results from beverages were even poorer than foods. Noting that results for milks are displayed as foods under Euromonitor classifications, the only drinks eligible for marketing were bottled water and plain carbonated waters such as club sodas (sparkling waters). Coca-Cola India also made one ice tea with a low enough sugar content for it to be marketed to children.

Note that these results do not imply that any of the companies marketed (or did not market) these products to children. Rather, the model provides a useful supplementary method to assess the healthiness of products.

ANALYSIS 6 *Corporate ranking based upon sales-weighted proportions of products meeting WHO EURO criteria*

Figure 12 Proportion of 2015 sales meeting WHO EURO criteria for marketing to children – overall product portfolio (11 companies)



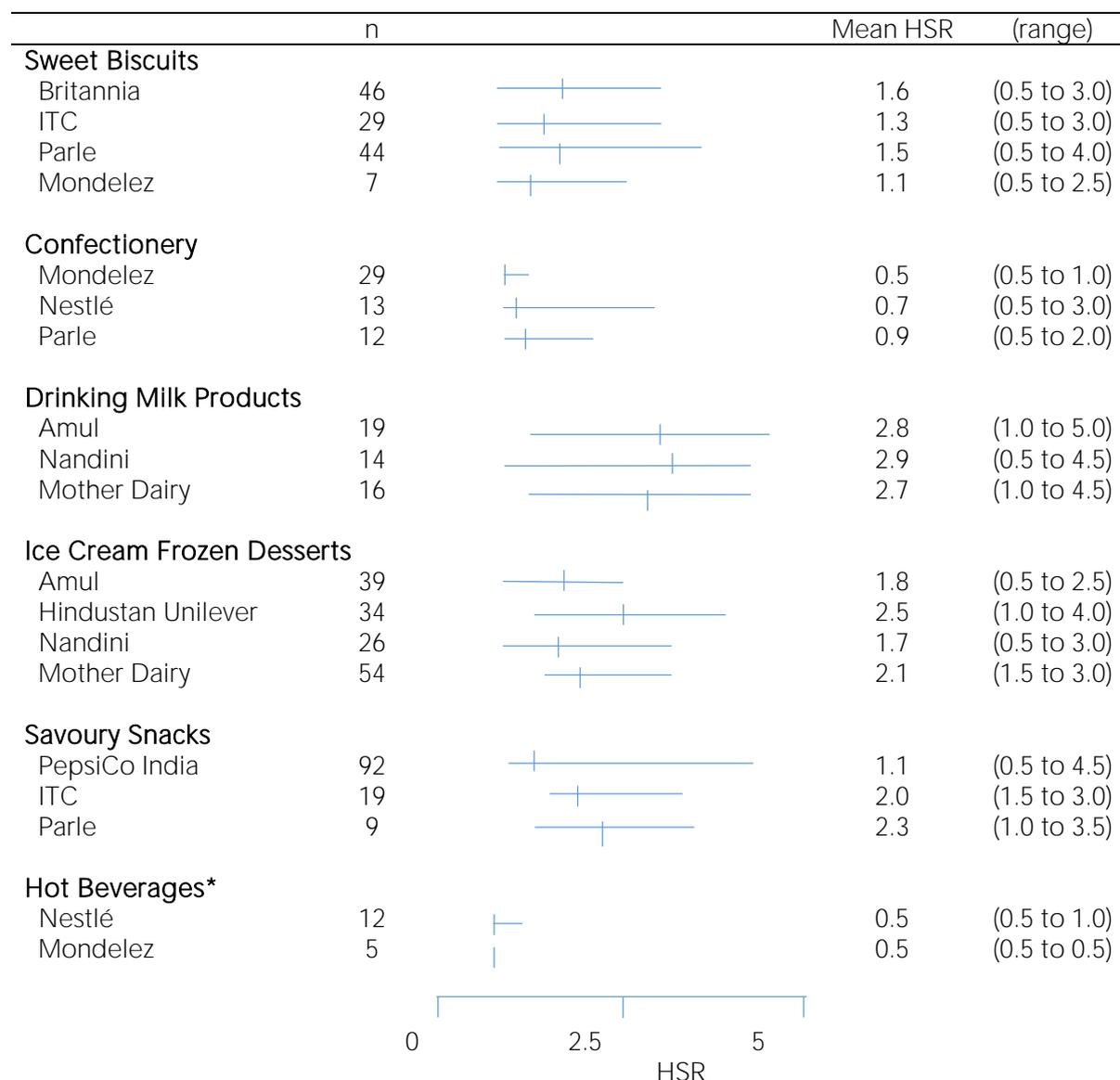
Once sales-weighted data was added to the analysis, a somewhat different picture emerged. Nandini was elevated to first position, with an estimated 23% of its 2015 sales derived from products suitable to be marketed to children under the WHO EURO mode. Similarly, while only 10% of Mother Dairy's product portfolio was suitable for marketing, these products made up 15% of sales in 2015. Hindustan Unilever and Coca-Cola India generated an estimated 12% of sales each from products suitable for marketing. For all other companies the figure was 8% or less.

Again, results for Hindustan Unilever here represent foods only, as none of its beverages met this threshold. For PepsiCo India, only 2% of its food sales were estimated to be of products suitable to be marketed to children whereas 12% of its beverage sales met this threshold.

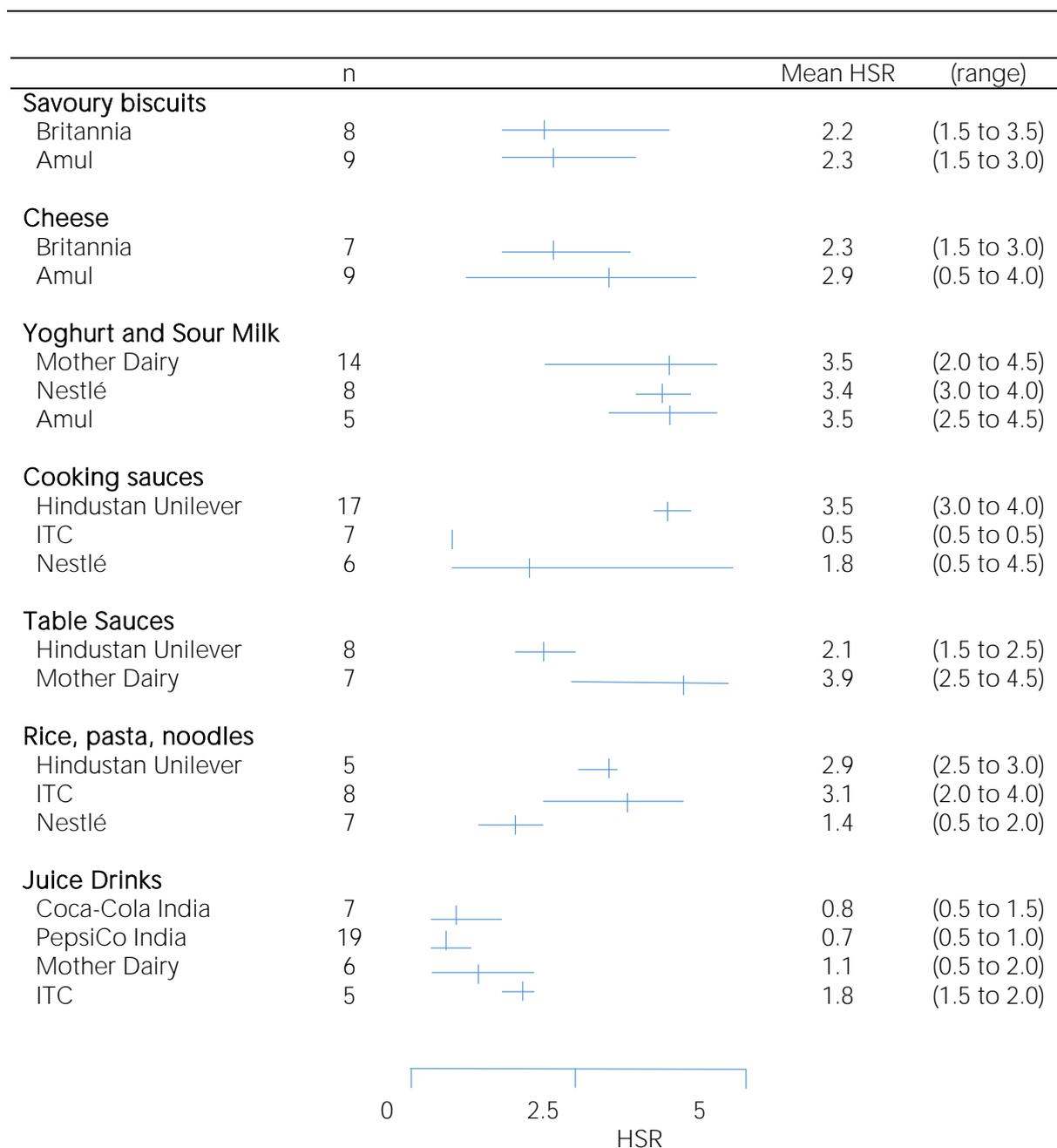
ANALYSIS 7 - Comparative nutritional quality of products in same subsets provided by different companies

There were 13 food subsets for which at least two companies had five or more products each. The mean Health Star Rating is illustrated by the short vertical line and the range of Health Star Ratings by the horizontal lines.

Figure 13 Mean and range of Health Star Rating for selected Euromonitor subsets



* As set out in our methodology, plain teas and coffees were excluded from this analysis as these products are generally non-nutritive and do not require a nutrient declaration.



Subsets where there was a significant difference in the mean HSR of companies' products illustrate which companies have scope to reformulate their products. For example, ITC's rice, pasta and noodles received 3.1 stars on average, above those of Hindustan Unilever (2.9) and much further above Nestlé (1.4), which had most room for improvement. A similar picture emerged with ice creams and savoury snacks, for example.

In other subsets such as yoghurt and sour milks, companies' mean HSRs were similar, indicating consistency in the nutritional profile of products in these subsets. However, this does not imply that all companies should not look to improve the nutritional quality of their products, especially where this mean is low overall.

Comparative nutritional quality of similar products can also be usefully illustrated by examining the subset mean and range HSR for all companies combined.

Table 8 Mean and range HSR of food products by Euromonitor subsets

Euromonitor Subset		Mean HSR	Range HSR
FOODS	Bread	3.8	3.5 to 4.0
	Cake	1.4	0.5 to 2.0
	Dessert mixes	2.3	2.0 to 2.5
	Savoury biscuits	2.0	1.5 to 3.0
	Sweet biscuits	1.5	0.5 to 4.0
	Breakfast cereals	3.1	0.5 to 5.0
	Confectionery	0.7	0.5 to 3.0
	Cheese	2.8	0.5 to 5.0
	Drinking milk products	2.8	0.5 to 5.0
	Yoghurt and sour milk	3.5	2.0 to 4.5
	Ice cream and frozen desserts	2.0	0.5 to 4.0
	Fats and oils	1.2	0.5 to 4.5
	Processed fruit and vegetables	4.0	2.5 to 5.0
	Ready meals	1.5	1.0 to 4.0
	Rice, pasta and noodles	2.5	0.5 to 4.0
	Cooking sauces	2.5	0.5 to 4.5
	Table sauces	2.8	1.5 to 4.5
	Soup	3.8	0.5 to 4.0
	Spreads	2.0	1.5 to 3.5
	Savoury snacks	1.3	0.5 to 4.5
	Other dairy	1.3	0.5 to 1.5
	Whitener	1.2	0.5 to 3.5
Condensed milk	1.3	0.5 to 3.0	

Table 9 Mean and range HSR of beverage products by Euromonitor subsets

Euromonitor Subset		Mean HSR	Range HSR
BEVERAGES	Regular cola carbonates	1.0	1.0
	Low calorie cola carbonates	2.0	2.0
	Lemonade/lime carbonates	1.2	1.0 to 2.0
	Orange carbonates	0.8	0.5 to 1.0
	Mixers	4.0	1.0 to 5.0
	Other non-cola carbonates	0.9	0.5 to 1.0
	Nectars (25-99% juice)	1.0	0.5 to 2.0
	Juice drinks (up to 24% juice)	0.9	0.5 to 2.0
	Still bottled water	5.0	5.0
	Sports drinks	1.5	1.5
	Liquid concentrates	0.5	0.5
	Powder concentrates	0.7	0.5 to 1.5
	Ready-to-drink tea	1.4	1.0 to 2.0
	Hot beverages	0.7	0.5 to 4.0

As with results by company, the large range in HSR within some subsets such as drinking milk products and cooking sauces suggests that healthier formulations of these products can be made.

ANALYSIS 8 – Association between price and healthiness overall and by food category

Limited availability of price data meant that this analysis was done on only 350 of the 943 total products available.

Table 10 Regression co-efficient and p-value for association of HSR and price (\$/100g or \$/100mLs) overall and by Euromonitor subsets for foods

	Euromonitor Subset	n	Regression co-efficient	p-value testing non-zero slope
FOODS	Bread	1	-	-
	Cake	8	-6.5	0.27
	Dessert mixes	0	-	-
	Savoury biscuits	18	1.5	0.18
	Sweet biscuits	74	0.01	0.99
	Snack bars	1	-	-
	Breakfast cereals	8	-6.6	0.39
	Confectionery	32	-22.8	0.17
	Cheese	16	-8.3	<0.001
	Drinking milk products	25	-6.6	<0.001
	Yoghurt and sour milk	15	-18.1	0.004
	Ice cream and frozen desserts	5	0.4	0.98
	Fats and oils	2	-	-
	Processed fruit and vegetables	2	-	-
	Meat substitutes	0	-	-
	Ready meals	7	-	-
	Rice, pasta and noodles	12	0.2	0.97
	Cooking sauces	15	0.5	0.95
	Table sauces	6	-6.4	0.26
	Soup	9	-	-
	Spreads	7	2.3	0.75
	Savoury snacks	18	7.6	0.03
	SUBTOTAL FOOD	281	-2.9	0.06

A dash indicates there was insufficient sample size (or range of HSR) to allow regression analyses in the product category

There were 14 out of 22 Euromonitor food subsets for which it was possible to fit regression lines exploring the association between price and healthiness. Overall for the 281 food products there was no detectable association between price and healthiness ($p=0.06$). For four food categories, there was a significant association detected – in three cases (cheese, drinking milk, yoghurt and sour milk) the healthier products were cheaper (negative regression co-efficients with p values <0.05) and in one (savory snacks) the healthier products were more expensive (positive regression co-efficient with p value <0.05). For every other food category, there was no detectable association of price with healthiness (p values >0.05).

Table 11 Regression co-efficient and p-value for association of HSR and price (\$/100g or \$/100mls) overall and by Euromonitor subsets for beverage (and foods and beverages combined)

Euromonitor Subset		n	Regression co-efficient	p-value testing non-zero slope
BEVERAGES	Regular cola carbonates	0	-	-
	Low calorie cola carbonates	2	-	-
	Lemonade/lime carbonates	4	-32.1	0.08
	Orange carbonates	5	-16.0	0.33
	Mixers	2	-	-
	Other non-cola carbonates	2	-	-
	Nectars (25-99% juice)	9	-1.3	0.64
	Juice drinks (up to 24% juice)	26	0.7	0.007
	Flavoured bottled water	1	-	-
	Sports drinks	0	-	-
	Liquid concentrates	1	-	-
	Powder concentrates	3	-	-
	Ready-to-drink tea	3	-	-
	Other dairy	2	-	-
	Whitener	0	-	-
	Condensed milk	0	-	-
	Hot beverages	8	-	-
	ALL BEVERAGE	68	-10.8	<0.001
ALL FOOD AND BEVERAGE	350	-6.0	<0.001	

A dash indicates there was insufficient sample size (or range of HSR) to allow regression analyses in the product category

There were four out of 17 Euromonitor beverage subsets for which it was possible to fit regression lines exploring the association between price and healthiness. Overall for the 68 beverage products there was a highly significant ($p < 0.001$) negative association between price and healthiness – i.e. healthier products were less expensive. There was only one beverage subset for which there was evidence of a significant positive association between price and healthiness and that was for juice drinks ($p = 0.007$) where healthier drinks were more expensive.

When the 350 food and beverage products with price and HSR were examined together, there was a highly significant inverse association ($p < 0.001$) indicating that healthier products tended to be less expensive.

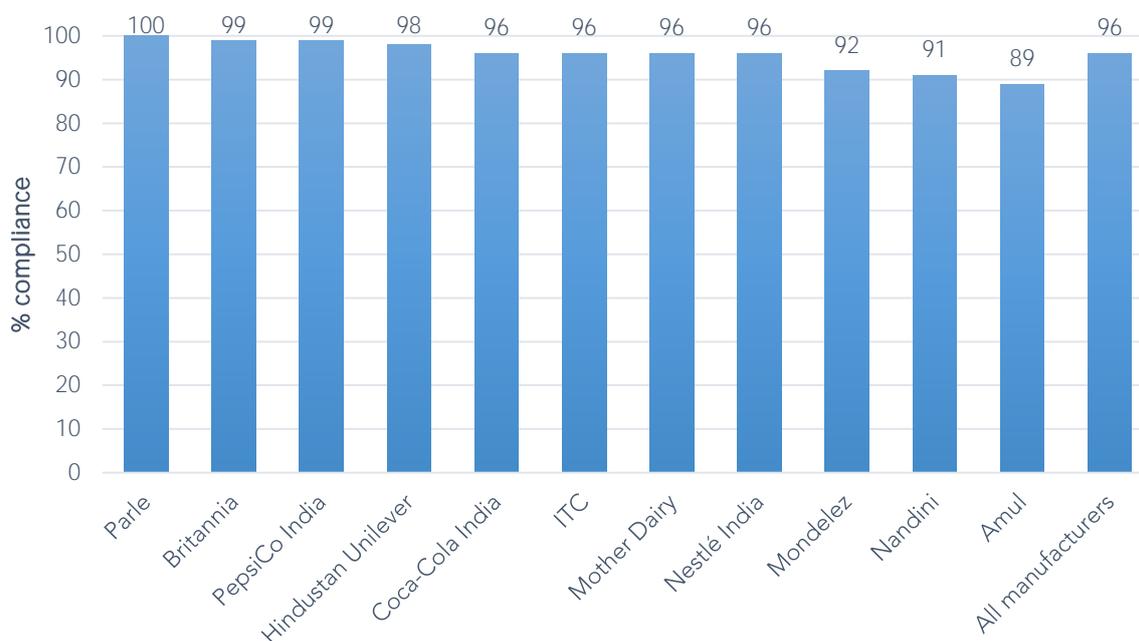
These observations are consistent with the findings of a recent Australian project but not with other similar analyses.¹⁹ The limited data available mean that the results must be interpreted with substantial caution.²⁰

ANALYSIS 9 - Corporate ranking based upon proportion of products meeting Indian nutrition content labelling regulations

¹⁹ Jones NR, Conklin AI, Suhrcke M, Monsivais P. The growing price gap between more and less healthy foods: analysis of a novel longitudinal UK dataset. PLoS One. 2014 Oct 8;9(10):e109343

²⁰ M de Abreu, K Charlton, Y Probst, N Li, M Crino, B Neal, J Wu, 'Do Healthier Packaged Foods Cost More? A Pilot Study Evaluating Health Stars and Food Prices', abstract presented at Nutrition Society of Australia Annual Scientific Meeting, 29 November – 2 December.

Figure 14 Percent compliance with Indian labelling regulations by company – overall product portfolio (11 companies)



All companies exhibited a high level of compliance with the Indian labelling regulations in force at the time of the study.²¹ One company demonstrated complete compliance – Parle. Two further companies achieved 99% compliance – Britannia and PepsiCo India. Mondelez, Amul and Nandini had the lowest compliance rates at 92%, 89% and 91% respectively.

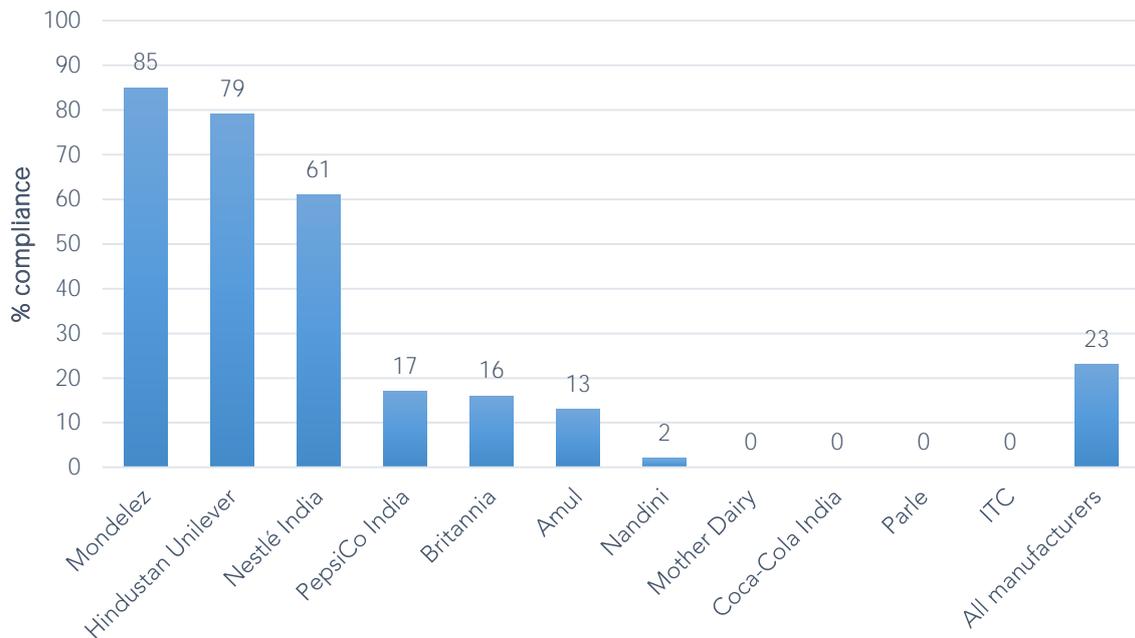
These results compare favourably to an earlier analysis of labelling compliance completed by The George Institute. In 2010, a sample of products available from a broader range of companies in Hyderabad found 52% compliance with the minimum Indian requirements. Higher results here may be linked with the focus on the ATNF covered companies, as well as overall improvements in food labelling since the introduction of new labelling legislation in India in 2011.²²

²¹ Note that Gujarat Cooperative Milk Marketing Federation (Amul) displayed added but not total sugar amounts for the majority of its products. This was assessed as compliant with Indian regulation which does not specify which type of sugar content should be displayed, but not with the Codex Guidelines which state that total sugars be displayed.

²² Dunford EK, Guggilla RK, Ratneswaran A, Webster JL, Maulik PK, Neal BC. The adherence of packaged food products in Hyderabad, India with nutritional labelling guidelines. *Asia Pacific journal of clinical nutrition*. 2015 Sep 1;24(3):540-5.

ANALYSIS 10 - Corporate ranking based upon proportion of products meeting Codex nutritional labelling guidelines

Figure 15 Percent alignment with Codex guidelines by company – overall product portfolio (11 companies)



Compliance with the more comprehensive Codex Guidelines was much lower with overall only 23% of all products labelled in line with them. However, Mondelez achieved the highest level of compliance, at 85%, followed by Hindustan Unilever with 79%. Most of Nestlé's products also complied (61%). Four companies did not label any products in line with Codex – Coca-Cola India, Parle, Mother Dairy and ITC. Nandini only labelled 2% of their products per the Codex guidelines.

These results were similar to The George Institute's 2010 analysis, and likely reflects the voluntary nature of the Codex Guidelines in India.²³ Even among multinational companies with a significant proportion of compliant products, no company had 100% compliance, suggesting changes may have been implemented only on some brands and product lines.

²³ Dunford EK, Guggilla RK, Ratneswaran A, Webster JL, Maulik PK, Neal BC. The adherence of packaged food products in Hyderabad, India with nutritional labelling guidelines. *Asia Pacific journal of clinical nutrition*. 2015 Sep 1;24(3):540-5.

CONCLUSIONS AND INTERPRETATION

Key findings

Mean healthiness of products

- The overall mean healthiness of companies' products was low and the mean healthiness of product portfolios varied substantially between companies. Differences in mean healthiness between companies reflect primarily differences in product mix but also to a lesser extent differences in the healthiness of products within the same categories.
- Estimates of the comparative healthiness of product portfolios weighted by sales changed some rankings and generally increased the disparities between companies. Some companies derived quite different proportions of their sales from healthy versus unhealthy products. Robust sales-weighted estimates will provide the best idea of the impact of a company's products on consumer health.
- Rankings of companies also varied depending upon whether the comparison was based upon all products, foods alone or beverages alone reflecting the importance of product mix in determining the average healthiness of the product portfolio.

Proportions of products defined as healthy or eligible for marketing to children

- The overall proportion of companies' products defined as healthy was very low. The proportion of products defined as healthy varied between companies but not as much as the variation observed in mean healthiness.
- The proportion of companies' products defined as eligible for marketing to children was even lower and many companies had no products eligible for marketing to children. This metric highlights the poor nutritional quality of most of the foods included but is less able to discriminate between the relative performances of companies.
- The proportion of sales eligible for marketing to children was also very low, and lower than the proportion of sales defined as 'healthy' using the HSR cut point. This reflects the more stringent criteria applied for eligibility to market to children.

Comparative healthiness of similar products

- There were marked differences in the healthiness of similar products highlighting the potential for the reformulation of unhealthy products to more healthy compositions.

Product price and healthiness

- There was no evidence that healthier products cost more and some evidence that healthier products were less expensive. However, the available data were few and the findings need to be interpreted with caution.

Product labelling

- There was a very high level of compliance with Indian regulations for labelling but many fewer products met Codex guidelines for nutrient labelling which require key additional data on sodium and saturated fat. However, it is recognised that the Government of India introduced new labelling requirements in June 2016 (expected to come into force in December 2016) that require saturated fat (and trans fats) to be labelled. Future analyses will assess compliance with the new requirements.

Methodological limitations

The results of this research should be considered in relation to the following limitations:

The limited nutrition data available. While the majority of companies complied with Indian labelling regulations for the majority of their products, the data available were mostly insufficient to evaluate the nutritional value of the products according to established profiling methods which are based on more nutrition data than current Indian regulations require to be listed on packs. The problem was addressed by using proxy data to enable nutrient profiling unless a large proportion of data was missing. In the latter circumstance products were excluded from analysis, and in the case of the SAIN-LIM model which required multiple nutrients missing for most products, the model was removed entirely from the analysis. Of note, no alternative nutrient profiling model has been identified that would make better use of the limited data available. The most likely impact of using proxy nutrient values was underestimation of the real differences between products (because proxy values were imputed at the sub-category level), and correspondingly, therefore, underestimation of the real differences between companies.

The absence of a complete list of all marketed products. Listings of all products sold in India were sought from the companies but most did not provide them. The solution was to compile listings based upon data extracted from company websites, the FoodSwitch India database, in-store surveys and online stores. Each data source is likely to be incomplete but combining data from all should have achieved reasonable coverage for all companies. It seems unlikely that incomplete data collection has resulted in significant biases in the results.

Restriction of the analysis to 12 large companies. The assessment of 12 of the largest food and beverage manufacturers (11 excluding Ruchi) was a pragmatic compromise designed to ensure feasibility and meaningful comparisons based upon the average nutritional composition of the majority of products made by each company. This strategy will not have affected the primary conclusions of the project about the relative nutritional quality of the products provided by the included companies but how the included companies compare to other smaller companies, artisanal/street food providers, quick service restaurants or home-cooked meals is unknown. The available data for food labelling suggest that the included companies performed much better than Indian food companies more broadly and the data presented here are therefore unlikely to be widely generalizable across other smaller corporations in India.

Low degree of industry participation. Most companies elected not to engage in the research process despite being invited several times. Industry participation would have enabled more complete, up-to-date data and more reliable and informative analyses with reduced reliance on imputed values. It would also have been possible to better explore some labelling anomalies – for example Indian fruit juices were labelled in an extremely misleading manner and it was necessary to make several assumptions to correct this problem. It would have been helpful to have manufacturer feedback to better understand the issue identified.

Limitations of the nutrient profiling tools. The HSR and WHO EURO models are both still in early stages of implementation and subject to ongoing evaluation and refinement. While both are based upon extensive research and validation, there is continuing discussion of how each operates for some food categories. Those fruit juices that are '100% fruit juices', for example, are able to receive high HSRs despite being high in fruit sugar because they receive positive points for fruit content. By contrast, the WHO EURO model deems juice not eligible to be marketed to children given its role as a significant source of free sugars for children regardless of other nutritional value. However, it also recognises that countries may, according to national context, take the decision to permit the marketing of 100% fruit juices in small portions. In addition, the HSR model does not score 'non-nutritive' products, such as tea and instant coffee. As a result, these products have not been included in the analysis. This means that the results for Hindustan Unilever, for example, are based on the 25% of its sales of products only, as 75% of its sales are generated by tea and coffee. The other company affected to a lesser degree was Nestlé (about 21% of sales from instant coffee).

Differences in rankings. The different methods of nutritional assessment of the product portfolio (mean HSR, proportion HSR \geq 3.5 and proportion eligible for marketing to children) consistently identified Hindustan Unilever as a top ranked company and Mondelez as a bottom ranked company based upon the nutritional profiles of the overall product portfolio ([Appendix C](#)). For the company rankings in between there was variation in the specific rankings assigned by each assessment method. This varied again with sales weighting. As such, the various profiling methods proved an effective way to discriminate between companies based upon the healthiness of products but did not give consistent findings. This is unsurprising given the different elements that contribute to each method and the similar mean scores of several companies for some measures. This latter observation means that there is the potential for changes in the scores of just a few products to switch around the positions of companies in the rankings.

No consideration of serving size. Overweight and obesity are importantly determined by the quantity of food people choose to consume at one sitting (portion size) and the serving size recommended on packs may influence the quantity of a product eaten. This may particularly be the case for products provided in packages eaten at a single sitting (although not all such products have a serving size that corresponds to the package size). The association between serving size and portion size for products provided in packages that contain multiple servings is also not always strong. It has been argued that nutrient profiling models should include consideration of serving size but the absence of agreed national and international standards has meant that this has not proved possible to date.

Few data on price. Indian retailers were reluctant to allow in-store collection of data on product prices. Price data were therefore collected from online sources where possible and matched to products in the database resulting in substantively incomplete data, particularly for perishable items such as dairy that are generally not offered for sale online. The findings of analyses done across all categories combined might reflect the different mean prices of different categories of products that score mostly badly or mostly well in terms of HSR, rather than differences in price and healthiness of comparable types of products.

Limited granularity of sales data. The 2015 sales data accessible from Euromonitor are provided by category not by individual product. This limits the capacity to obtain robust sales-weighted estimates of metrics because it is not possible to precisely match a sales figure to an HSR value. Accordingly, for the overall sales-weighted results, the sales of the company within each category were matched to the mean HSR for all company products within that category. Under this strategy it is possible that erroneous results could be obtained because it is unlikely that sales volumes of every item sold by a company within a given category were the same. So, while the process should give a reasonable sales-weighted estimate of the mean healthiness of products it is imperfect. Similarly, the sales-weighted results relating to sales of healthy products and sales of products eligible to be marketed to children are estimates, as it is unlikely that the proportion of sales of healthy products or those eligible to be marketed to children in any category is directly proportional to the total sales of that category. The exclusion of company data for categories in which the company makes up less than 0.1% of market share is, by contrast, likely to have had little impact on the results.

Recommendations for companies

- Companies need to direct investment toward improving the healthiness of the products they sell by enhancing the mix of products sold and reformulating unhealthy products to healthier compositions.
- Companies need to increase the proportion of sales deriving from healthy foods and decrease their reliance on sales of unhealthy foods. One way in which this can be done is by redirecting marketing towards healthier products.
- Reformulation to achieve healthier product nutrient composition should be a priority, particularly for established brands and market leading products unlikely to be discontinued. Companies have a particular opportunity to improve the nutrient composition of products important in children's diets to ensure they are suitable for them and can therefore be marketed to them.
- Companies need to explore the association between price and healthiness within their product portfolios and ensure that healthy products are maximally affordable.
- Companies should revise their labels to include all nutrients that Codex recommends be labelled, particularly sodium which is not yet required by Indian regulations, even after their recent revision to include saturated fats and trans fats.

Recommendations for the Government of India

- The low number of products eligible for marketing to children under the WHO EURO model is indicative of the unhealthy nature of many of the products offered by the largest food and beverage companies in India. There is an urgent need for effective and enforceable legislation that prevents the marketing of unhealthy products to children.
- Nutrition labelling requirements need to be strengthened to include, at a minimum, an additional requirement for labelling of sodium/salt as recommended by the Codex Guidelines on Nutrition Labelling (recognising the recently introduced requirements to label saturated fat and trans fat). Growing consumer interest in added sugar content has recently led countries such as the United States to announce it will also place added sugar content on its nutrient declaration and India may also wish to consider this in any legislative reform.
- Compile and maintain a comprehensive list of the nutritional content of all packaged food products such that areas requiring action can be identified, targets set and progress monitored.
- A government-led national program should be implemented with haste to address the very poor nutritional quality of many of the products provided by India's leading food and beverage manufacturers.

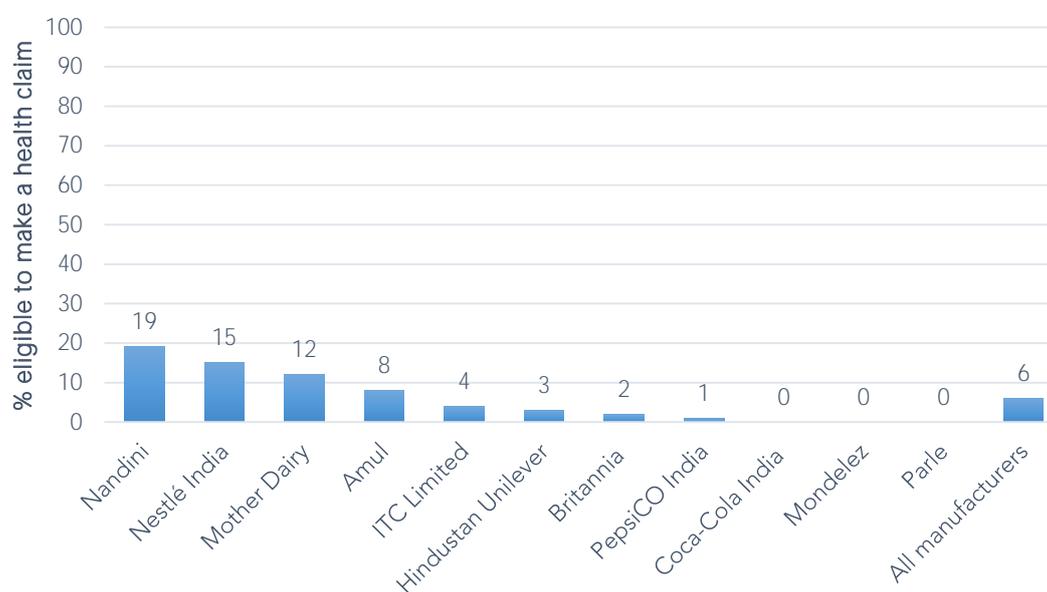
APPENDIX A – Results of SAIN-LIM analysis

The French SAIN-LIM model was initially selected for use but disparity between the level of nutrient information required to generate results and the data available in India required more extensive use of proxy information than was considered justifiable for the main analyses.

Consistent with the approach under HSR and WHO EURO, the following rules were applied:

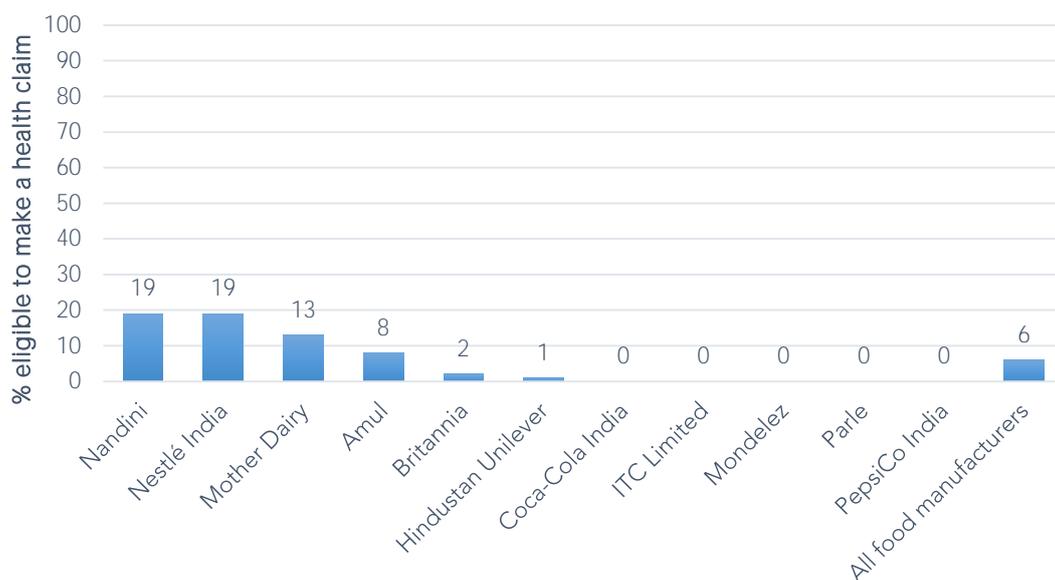
- For the purposes of generating results under SAIN-LIM, additional information on sodium and saturated fat were obtained from the label where available, otherwise proxy values from the FoodSwitch India database were assigned.
- SAIN-LIM confers an optional benefit for monounsaturated fats, α -linolenic acid, Vitamin C, D, and E, Iron and Calcium. Where information was not directly provided on the product label, a value of zero was assumed.
- SAIN-LIM requires added sugar information. We assumed that in certain categories, a significant proportion of total sugars in the product were *added sugars*.
 - For cakes and desserts, confectionery, sauces and beverages (excluding milk), total sugar values were assigned as '*added sugars*'
 - For milks and yoghurts, an amount up to 6g/100g and 8g/100g respective were considered to be naturally occurring. These are reasonable values based upon known concentrations of lactose in these products. Any amount over this was assigned as '*added sugars*'.
- A score was then determined and compared to identify whether it qualifies to make a health claim based on thresholds in the nutrient profile model.

Figure 16 Proportion of products eligible to make a health claim under SAIN-LIM—overall product portfolio (11 companies)



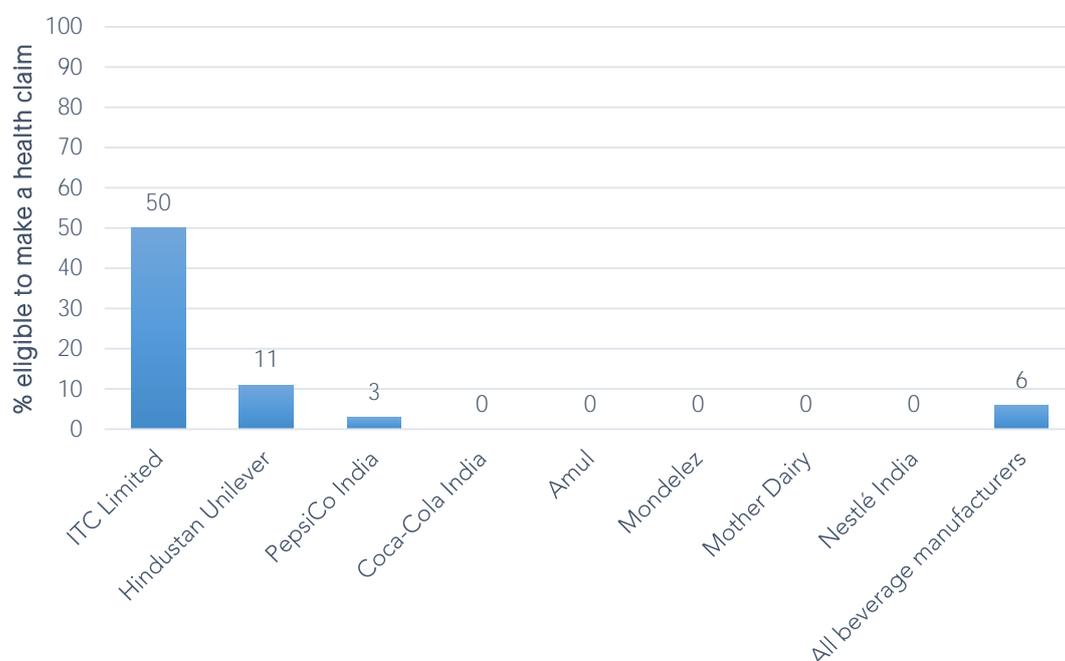
Only 6% of products overall would be eligible to carry a health claim under SAIN-LIM. Nandini had the highest percentage of products (19%) eligible, followed by Nestlé, Mother Dairy and Amul, suggesting dairy products were more likely to be eligible to carry a claim. Coca-Cola India, Mondelez and Parle did not have any products that would be eligible to carry a claim.

Figure 17 Proportion of products eligible to make a health claim under SAIN-LIM - foods (10 companies)



Only 6% of food products would be eligible to carry to carry a health claim under SAIN-LIM. Nandini, Nestlé, Mother Dairy and Amul all had a number of dairy drinks (classified as foods under Euromonitor) that would be eligible. Mother Dairy also had a handful of processed vegetable products that would be eligible to carry a health claim.

Figure 18 Proportion of products eligible to make a health claim under SAIN-LIM - beverages (7 companies)



Very few beverages were eligible to carry a health claim under SAIN-LIM. ITC made eight beverage products, of which three juice drinks and one nectar would be eligible. Two of Hindustan Unilever's hot beverages and one of PepsiCo India's juice drinks would be eligible to carry a health claim under SAIN-LIM.

APPENDIX B – Euromonitor subsets mapped to HSR Categories

The following table is provided to assist interpretation of results where products are categorised differently for the purpose of generating a nutrient profile outcome under the Health Star Rating to how these results are displayed in the analysis in this report.

Table 12 Euromonitor Food and Beverage subsets mapped to Health Star Rating Categories

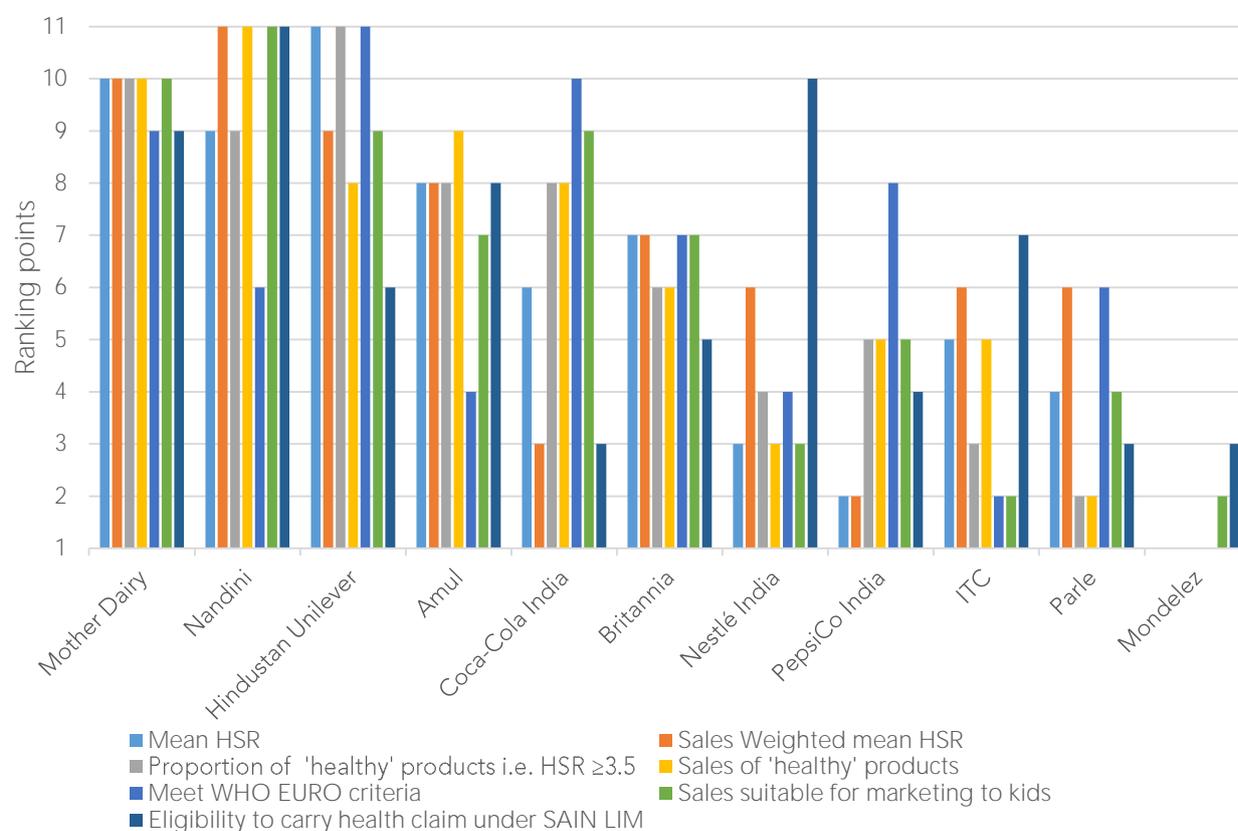
HSR	1. Non-dairy beverage	1D. Dairy Beverage	2. Non-Dairy Foods	2D. Dairy foods	3. Oils and spreads	3D. Cheese
Euromonitor	Beverages	Foods				
	Regular cola carbonates Low-calorie cola carbonates Lemonade / lime carbonates Orange carbonates Mixers Other non-cola carbonates Hot beverages Juice drinks Liquid concentrates Nectars Powder concentrates RTD tea Sports drinks Still bottled water	Condensed milk Drinking milk products Whiteners	Bread Breakfast cereals Cake Confectionery Cooking sauces Dessert mixes Ice cream and frozen desserts* Other dairy* Processed fruit and vegetable products Ready meals Rice, pasta and noodles Savoury biscuits Savoury snacks Soup Spreads Sweet biscuits Table sauces	Cheese products not in category 3D Yoghurt and sour milk	Fats and oils	High calcium cheese products**

* Custards, desserts, cream cheese, ice-cream and cream are not considered as dairy foods but are classified as Category 2 foods for the purpose of HSR. For further explanation see the HSR Guide for Industry <http://healthstarrating.gov.au/internet/healthstarrating/publishing.nsf/Content/guide-for-industry-document>

** Defined for the purposes of HSR as cheeses with calcium content $\geq 320\text{mg}/100\text{g}$

APPENDIX C - Comparative rankings of companies based upon the different evaluation methods

Figure 19 Ranking of companies based upon overall product portfolio for each method (11 companies)



The figure above demonstrates the comparative ranking of companies across the different analysis methods used. Where a company ranked 1st (of the eleven companies) it received 11 points.

Table 13 Ranking of companies based upon overall product portfolio (11 companies)

	Mean HSR	Sales weighted mean HSR	Proportion healthy i.e. products ≥3.5 and above	Sales from healthy products	Meet WHO criteria	Sales from products meeting WHO criteria	Eligibility to carry a health claim under SAIN LIM
Amul	=9	4	=5	3	=8	=5	4
Britannia	2	5	7	6	5	=5	7
Coca-Cola India	=3	9	=5	4	2	=3	= 9
Hindustan Unilever	1	3	1	4	1	=3	6
ITC	5	=6	9	7	10	=10	5
Mondelez	11	11	11	11	11	=10	= 9
Mother Dairy	=3	2	2	2	3	2	3
Nandini	=6	1	3	1	6	1	1
Nestlé	=6	=6	4	9	=8	9	2
Parle	=6	=6	10	10	7	8	= 9
PepsiCo India	=9	10	8	8	4	7	8

= equal ranking