

Title: Could Google help curb online advertising of unhealthy foods to US children?

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Abstract

1 **Introduction:** In 2020, Google took voluntary action to restrict food and beverage
2 advertising through its online channels in the EU/UK using Google's own nutrient profiling
3 model (NPM) to identify products eligible to be marketed to children through its Google
4 Display Network. The objective of this study was to evaluate the potential impact of the
5 Google policy, if applied to the US market, on restricting online advertising of the top selling
6 packaged foods and beverages in the US.

7 **Methods:** The top 25 US food and beverage manufacturers were identified. Nutrient data for
8 products from these manufacturers were sourced from Label Insight (a Nielsen IQ company)
9 in 2021. Each product was examined against four NPMs – the Google NPM, the WHO
10 Europe NPM, the PAHO NPM and the Chilean Government NPM.

11 **Results:** Under Google's NPM, 18% of 14,188 products were eligible to be advertised to
12 children, representing US\$44 billion in revenue for the top 25 US manufacturers out of
13 the >\$240 billion generated annually. The Google NPM permitted the most products to be
14 advertised to children of all four NPMs examined.

15 **Conclusions:** US children engage extensively with online media. In lieu of government
16 regulation, the Google advertising policy and related NPM would limit online advertising of
17 the most unhealthful products to children, if the policy were to be applied to the US market.
18 The effectiveness of the policy would be strengthened by refining the Google NPM to better
19 align with NPMs developed by authoritative health agencies, including the WHO.

20 **Introduction**

21 More than two-thirds of American consumers' daily calories are derived from packaged food
22 and beverages.¹ The wide availability and heavy marketing of these products makes it
23 challenging for the US population to eat healthily and maintain a healthy body weight,
24 particularly for children.² Food marketing to children is pervasive³ and has been linked to
25 increased preference and intake of unhealthy foods.⁴ Young people's exposure to digital
26 marketing, in particular, is prevalent^{5,6} and is associated with poor diet-related outcomes.⁷

27
28 In recent years, there has been a substantial shift in children's media practices, from
29 predominantly television-based to online such as social media, content-sharing platforms
30 (e.g., YouTube), subscription video on demand services (e.g., Netflix and Hulu) and online
31 games (e.g., Fortnite).^{8,9} Globally, one-third of internet users are children <18 years.^{8,9}

32 Where children have gone, marketers have followed: expenditure on digital marketing to
33 children <18 years in the US reached USD 1.7 billion by 2021 and is estimated to increase
34 by up to 22% in the next decade.^{8,9} Studies have shown that foods and beverages are
35 advertised online more frequently than any other product category.¹⁰

36
37 Google has been the market leader in online advertising for over a decade.¹¹ Despite being
38 commonly known as a search engine company, Google's main business is in online
39 advertising.¹¹ The Google Display Network enables targeted advertising to consumers while
40 they browse at least 35 million websites, watch YouTube videos, check their Gmail account,
41 or use mobile apps.¹² In 2020, Alphabet (parent company for Google) generated almost \$183
42 billion in revenue; more than 80% of which came from Google's ads business.¹¹

43

44 In October 2020, Google updated their ‘Other restricted businesses [advertising] policy,’ to
45 restrict high fat, sugar, salt (HFSS) food and non-alcoholic beverage advertising across the
46 Google Display Network to users under 18 in the United Kingdom (UK) and European Union
47 (EU).¹³ The policy was likely a response to anticipated regulation from the UK Government,
48 which has since legislated to restrict ‘paid for’ HFSS online advertising to children.¹⁴
49 Google’s policy includes its own HFSS Food and Beverage Nutrient Profile Model (hereafter
50 Google NPM), which provides nutritional criteria that a food or beverage must meet to be
51 advertised to children through the Google Display Network.

52
53 In the absence of government-led policy in the US, the Children’s Food and Beverage
54 Advertising Initiative (CFBAI)¹⁵ is a self-regulatory code of practice launched in 2007 under
55 which 20 food and beverage companies have voluntarily pledged to limit direct advertising to
56 children to only foods and beverages that meet specific criteria, including in digital media.
57 The limitations of the CFBAI in effectively protecting children from exposure to unhealthy
58 food advertising are well known,¹⁶⁻¹⁸ including the lenience of the nutritional criteria used to
59 determine which products are eligible to be marketed to children.

60
61 The objective of this study was to evaluate the potential impact of the Google policy, if
62 applied to the US market, on restricting online advertising to children of the top selling
63 packaged foods and beverages through the Google Display Network. The eligibility of
64 products to be advertised based on their nutritional quality according to the Google NPM was
65 compared to their eligibility using three other validated NPMs (from the World Health
66 Organization (WHO) Europe, Pan American Health Organization (PAHO) and the Chilean
67 Government). As a secondary objective, this study compared eligibility to advertise under the
68 CFBAI (as identified on the CFBAI website), against eligibility using the Google NPM.

69

70 **Methods**

71 **Study Sample**

72 Sales revenue data for the top 25 US food and beverage manufacturers for 2020 were sourced
73 from Euromonitor Passport. Nutrient data for all products from these 25 manufacturers were
74 then sourced from Label Insight (a NielsenIQ company) in May 2021. The database contains
75 information for >400,000 barcoded food and beverages, representing >80% of the US
76 market.¹⁹ The most recent entry for each product was used to ensure data represented current
77 products. Information on brand name, product description, nutrient content per 100g (energy,
78 saturated fat, total sugars, added sugars and sodium), ingredients list and product category
79 were extracted.

80

81 A comprehensive list of brands owned by the 25 manufacturers was developed using global
82 and US-based company websites. As sales data for 2020 were used for this analysis, any new
83 brands or brand acquisitions since 2020 were excluded. Each product was assigned to one of
84 23 Euromonitor Passport food and beverage categories, one of the Google NPM's 13
85 categories, one of the WHO Europe NPM's 21 categories and classified as either a food or a
86 beverage for the Chilean Government NPM. The PAHO NPM does not use category-specific
87 criteria.

88

89 **Measures**

90 The Google NPM is publicly available on Google's website¹³ and consists of a set of nutrient
91 thresholds for 13 categories (Appendix Table 2), and a description of the types of products
92 included/excluded. Products such as donuts, sweetened beverages and pizzas are examples of

93 products that are HFSS and ineligible. Plain water, 100% juice, fresh fruits and vegetables are
94 considered outside the scope of the policy and are considered eligible.

95

96 The WHO Europe NPM was the first multi-country nutrient criteria developed specifically to
97 restrict the marketing of unhealthy foods to children.²⁰ Foods and beverages are defined
98 under 21 categories and must not exceed category-specific nutrient thresholds to be eligible
99 for marketing to children (Appendix Table 3). Five categories, including
100 chocolate/confectionery, sweet bakery items, fruit juices, energy drinks and frozen desserts
101 are not permitted to be marketed to children.

102

103 The PAHO NPM was developed after the WHO Europe NPM to guide marketing restrictions
104 for the Americas.²¹ It is based on the WHO Population Nutrient Intake Goals, with nutrient
105 thresholds based on the energy contribution of foods (e.g., <10% of energy from free sugars),
106 rather than an amount per 100g/ml.

107

108 The Chilean Government was the first country in the Americas to have a NPM enacted into
109 law (in 2016), applying to taxation, front-of-pack warning signs and marketing restrictions.²²

110 The nutrient thresholds were set to become increasingly stringent over a series of three
111 implementation dates. The phase 2 criteria were utilized for this analysis (Appendix Table 4)
112 as they have been adopted by other countries as final thresholds.²³

113

114 The CFBAI criteria were set by US food and beverage manufacturers to determine whether a
115 product is eligible for advertising to children. Applying these criteria is complex, given the
116 manufacturer-led process is not transparent and some elements required are not listed on
117 product packaging. The December 2021 approved product list was used in this analysis. The

118 Google NPM was then applied to the nutrient information for each of these products to
119 determine the proportion eligible under the Google NPM.

120

121 **Statistical Analysis**

122 Data were analysed using Stata V17. The number of products in each category was
123 calculated, as was the revenue (in USD \$million) of included categories and companies. The
124 proportion of products eligible under each NPM was calculated for each company, and by
125 category, as well as the revenue derived from eligible products under each NPM. Results for
126 each company were weighted by category sales to generate sales-weighted proportions.

127 Fleiss' kappa statistic was used to explore agreement between the proportion of products
128 eligible under the four NPMs. The proportion of products listed as eligible to be marketed to
129 children by the CFBAI policy was compared to the proportion eligible under the Google
130 NPM. As secondary data were used, IRB approval was not required.

131

132 **Results**

133 There were 14,188 products from the top 25 companies eligible for inclusion in analyses
134 (Appendix Figure 1). The number of products associated with each company ranged from
135 n=17 (across two food categories) for *McKee Foods Corp* to n=1,783 (across 10 food
136 categories) for *Kraft Heinz* (Table 1).

137

138 Overall, 18% of products were eligible for advertising to children under the Google NPM.
139 *Dean Foods Co* and *Danone Groupe* had the highest proportion of sales-weighted products
140 eligible (77% and 74%, respectively), more than double the remaining 23 companies (Table
141 1). *McKee Foods Corp* and *Ferrero* had the lowest proportion of products eligible (0% and

142 1%, respectively) (Appendix Table 1). Six companies showed an increase in the proportion of
143 products eligible for advertising under the Google NPM once sales-weighting was applied,
144 indicating that a higher proportion of sales derived from eligible products under the Google
145 NPM. Eight companies showed a decrease once sales-weighting was applied, with unhealthy
146 products responsible for higher sales for these companies.

147

148 Figure 1 and Table 1 show the differences in proportion of products eligible for advertising to
149 children under each NPM. Overall, there was “fair” agreement between all four NPMs
150 (Fleiss’ $k = 0.41$), with the highest agreement between the Google NPM and the Chilean
151 Government NPM. The Google NPM was the least strict, with 18% of all products (sales-
152 weighted) eligible for marketing to children followed by the Chilean Government NPM
153 (14%), WHO Europe NPM (13%) and the PAHO NPM (6%). There were discrepancies in
154 the relative proportion of eligible products for some companies when using the PAHO NPM
155 and other NPM to classify products. For example, under the PAHO NPM, *Danone Groupe*
156 had only 16% of sales-weighted products eligible for marketing to children, compared with
157 41% for the WHO Europe NPM, 49% for the Chilean Government NPM and 74% for the
158 Google NPM. Companies that fared better under the Google NPM compared to the other
159 three NPMs included those dominated by dairy products (*Danone Groupe*), breakfast cereals
160 (*Kellogg, Post Holdings*), and sugar-sweetened beverages (*Coca-Cola, KDP, PepsiCo*). 13 of
161 the 25 companies fared better under the Google NPM compared to the remaining NPMs.

162

163 Although differences in proportion of products that were eligible to be advertised across the
164 NPMs were, in some cases, small, the revenue these represent were large. For example, 16%
165 of PepsiCo products were eligible under the Google NPM. When using the PAHO NPM, only
166 8% of products were eligible. This 8% difference represents over US\$5 billion in revenue for

167 PepsiCo. Across all 25 companies, products representing US\$21 billion more revenue were
168 eligible to be marketed under the Google NPM (\$35 billion) compared to the PAHO NPM
169 (\$14 billion) (Figure 1). While the differences in product marketing eligibility were much
170 smaller between the Google NPM and the Chilean Government NPM, this still represented an
171 increase in eligible products for the Google NPM worth US\$11 billion in revenue.

172

173 When examining differences in eligibility by food category, there was no substantial
174 agreement between all four NPMs (Fleiss' k range from -0.04 in *Concentrates* to 0.55 in
175 *Bottled Water* (Table 2)). A larger proportion of products were eligible under the Google
176 NPM in *Breakfast Cereals* (30%), *Carbonated Beverages* (21%), *Confectionery* (14%), *Ice*
177 *Cream and Frozen Desserts* (18%) and *Ready Meals* (92%) compared to the remaining three
178 NPMs. Appendix Figure 2(A-E) shows the top five categories for overall revenue (A) and the
179 categories representing the largest proportion of eligible products revenue for each of the four
180 NPMs (B-E). The *Dairy* and *Bottled Water* categories were in the top five for each of the
181 NPMs examined. However, these categories combined represent only 12% revenue for the
182 top 25 companies. In comparison, other food categories individually represent a higher
183 proportion of revenue, such as *Carbonated Beverages* (14%) and *Savoury Snacks* (15%).

184

185 Of the 99 products that were identified in the CFBAI approved products list database, less
186 than half (43%) met the eligibility criteria for the Google NPM (Appendix Table 5).

187

188

189 **Discussion**

190 If Google's NPM restrictions were applied to the US market, only 18% of products sold by
191 the top 25 US food and beverage manufacturers would be eligible to be advertised to children

192 across the Google Display Network, representing US\$44 billion of their US\$240 billion
193 annual revenue. This analysis suggests the Google NPM performs relatively similarly to the
194 WHO Euro NPM and the Chilean Government NPM in the overall proportion of foods it
195 classifies as eligible to be marketed to children (18% vs. 13% and 14% of products), although
196 variation in the types of products that would be eligible to be advertised was seen among all
197 NPMs. While there is no information publicly available on development of the Google NPM,
198 its overall alignment with the three validated NPMs in this study suggests that some
199 authoritative nutrition guidance was considered. The exception to this is the PAHO NPM
200 which was much stricter than the other three NPMs examined.

201

202 Studies have shown that foods and beverages are advertised online more frequently than any
203 other product category,¹⁰ and that less healthy foods such as cakes, cookies,
204 chocolate/confectionery, sugar-sweetened beverages and ice cream are among the most
205 frequently advertised food and beverage product types online.^{6,24} In a previous study
206 measuring the extent of food advertising on television across 22 countries, ~one-third of all
207 food advertisements derived from just 10 companies.²⁵ All 10 companies were transnational
208 with a combined market value of >\$900 billion and all signed up to the International Food
209 and Beverage Alliance. Globally, the top five food categories advertised to children on
210 television are sugar-sweetened beverages, chocolate/confectionery, ready-meals, breakfast
211 cereals, and cakes/biscuits/pastries.²⁵ Under the Google NPM, only 8% of top 25 US food
212 and beverage manufacturers' products in these categories would be eligible for marketing to
213 children, representing 45% of company revenue.

214

215 This analysis suggests the Google NPM is stricter than the nutrition criteria underpinning the
216 CFBAI, the only currently operating measure in the US. More than half the products that

217 were eligible under CFBAI were not eligible under the Google NPM, despite the Google
218 NPM being the most lenient of the four NPMs examined in this study. The eligibility of some
219 products to be marketed to children according to the CFBAI (e.g breakfast cereals containing
220 30% added sugar) highlights the permissiveness of the nutrition criteria. Such products would
221 not be eligible under any other existing NPM applicable to the US market nor the NPMs in
222 this study. The CFBAI criteria appear to mostly consider the nutrient contents of companies'
223 own products, and establish cut-off points above these values so as to permit products to be
224 advertised without restriction.

225

226 These findings provide insight into the potential impact of any move by Google to extend the
227 application of its policy to the US market. However, while the strength of the NPM is
228 important, it must be noted that the overall effectiveness of restrictions on marketing to
229 children depends upon more than how unhealthy foods are defined. Factors such as the form
230 of regulation used, how the measure defines 'children' and advertising 'directed to' children,
231 as well as what media platforms and advertising techniques are covered, also contribute to
232 overall public health impact. As does whether the measure is developed, implemented,
233 monitored and enforced in a transparent and accountable way.²⁶

234

235 This broader perspective is reflected in existing literature demonstrating the limited progress
236 made by the CFBAI in protecting children from unhealthy marketing.¹⁶⁻¹⁸ Along with the
237 permissiveness of its nutrition criteria, weaknesses include its voluntary nature and poor
238 participation (only 16/25 companies included in this study are signatories). The CFBAI only
239 applies to marketing that is 'primarily directed to children under 13', meaning that marketing
240 that appeals to a broader audience remains unrestricted.²⁷ The CFBAI is administered and
241 enforced by industry themselves.

242

243 Compared to the CFBAI, Google's Policy has some benefits in its application to digital
244 media. As well as having a more restrictive NPM, Google's policy ads which do not meet the
245 NPM are only shown to users aged 18+. The Google policy was implemented rapidly in the
246 UK/EU, first published in August 2020 and in force in October 2020. Like the CFBAI,
247 Google's policy has limitations, including its scope being restricted to the Google Display
248 Network and YouTube rather than broader media platforms, and that it would still allow
249 advertising to those aged 18+ where younger children may still experience passive exposure.

250

251 In light of the known limitations of self-regulation, the WHO continues to call for Member
252 States to introduce government-led restrictions on marketing of unhealthy foods to
253 children.^{2,28} In the US, legal barriers such as the First Amendment's protection for
254 commercial speech have deterred political resolve to implement regulations on traditional
255 media, and will need to be overcome to enact protections for children in the digital sphere.²⁹
256 Due to the potential lead time to develop and implement regulation - particularly in the face
257 of industry opposition – Google's policy could be a useful first step or just one part of a more
258 comprehensive approach. As a starting point, the inclusion of the US market in Google's
259 policy to restrict unhealthy food advertising for minors would improve protections for
260 children in digital advertising. Of course, online media represents only one source of food
261 marketing exposure for children, with children also heavily exposed to food marketing in all
262 settings where they live and play.³

263

264 **Limitations**

265 This study has some limitations. Euromonitor sales data were not available at the individual
266 product level. The US food and beverage market has ~400,000 products available for sale,

267 and without knowing sales information for every product, results should be interpreted in a
268 generalised manner. The Google NPM itself has limitations, with elements of the model not
269 made clear in Google's policies. The study also did not specifically look at which products
270 were being advertised to children through the Google Display Network. Future research
271 combining product information with information about which products are being advertised
272 will undoubtedly enhance the strength of the evidence base in this research area. The
273 strengths of this study include the use of Label Insight's large database. Linking these data
274 with Euromonitor sales data allowed for an in-depth look at foods purchased by US
275 consumers and shows the huge amount of money generated by unhealthy products.

276

277 **Conclusions**

278 Best practice recommendations for policies to protect children from the harmful impacts of
279 unhealthy food marketing call for comprehensive restrictions across media and settings. Self-
280 regulatory codes of practice introduced by the food and beverage industries, including the
281 US, apply permissive nutrition criteria to determine products that are eligible for marketing to
282 children. In the absence of regulatory measures, the Google advertising policy applied to the
283 US market offers an opportunity to curb online advertising to children and adolescents, led by
284 one of the most powerful organizations in the world.

285

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Table 1: Proportion of products eligible for advertising to children under each nutrient profile model, by manufacturer

Manufacturer	Total revenue (US \$million)	Google NPM	Google NPM	WHO Europe NPM	WHO Europe NPM	PAHO NPM	PAHO NPM	Chilean NPM	Chilean NPM	Fleiss' Kappa ^a
		% products eligible	% sales-weighted eligible	% products eligible	% sales-weighted eligible	% products eligible	% sales-weighted eligible	% products eligible	% sales-weighted eligible	
Dean Foods Co	2799	50%	77%	33%	57%	43%	74%	36%	60%	0.69
Danone Groupe	5944	74%	74%	41%	41%	16%	16%	49%	49%	0.3
Conagra	11727	25%	33%	39%	37%	6%	7%	38%	34%	0.39
Post Holdings	2029	33%	33%	13%	13%	10%	10%	0%	0%	0.22
Nestlé	16748	19%	28%	42%	40%	17%	26%	38%	35%	0.45
Hormel Foods Corp	4955	25%	25%	26%	32%	1%	2%	19%	17%	0.36
Tyson Brands Inc	6822	12%	21%	16%	24%	1%	1%	10%	13%	0.43
Keurig Dr Pepper	10472	27%	20%	22%	0%	30%	3%	16%	10%	0.52
Unilever	6479	21%	20%	0%	0%	0%	0%	3%	6%	0.03
General Mills	11947	15%	18%	15%	14%	4%	3%	13%	12%	0.45
Mondelez	9535	27%	17%	0%	0%	2%	2%	12%	6%	0.17
PepsiCo	49340	17%	16%	8%	4%	10%	6%	13%	12%	0.37
Coca-Cola	24690	17%	15%	25%	6%	32%	11%	9%	9%	0.21
Mars	9224	18%	15%	7%	4%	3%	2%	13%	11%	0.51
Campbell's	10899	11%	14%	20%	23%	6%	5%	13%	13%	0.28
Kellogg	9865	17%	14%	9%	6%	1%	0%	2%	1%	0.24
Hershey	9335	10%	10%	0%	0%	0%	0%	6%	6%	0.29
Kraft Heinz	22957	10%	10%	12%	12%	0%	0%	14%	10%	0.28

		Google NPM	Google NPM	WHO Europe NPM	WHO Europe NPM	PAHO NPM	PAHO NPM	Chilean NPM	Chilean NPM	
Manufacturer	Total revenue (US \$million)	% products eligible	% sales-weighted eligible	% products eligible	% sales-weighted eligible	% products eligible	% sales-weighted eligible	% products eligible	% sales-weighted eligible	Fleiss' Kappa ^a
Grupo Bimbo	6289	7%	7%	33%	31%	1%	1%	9%	8%	0.19
JM Smucker	2142	6%	6%	3%	2%	0%	0%	7%	6%	0.4
Schwan Food Co	2219	6%	6%	7%	7%	0%	0%	8%	7%	0.39
Flowers Foods	2675	5%	5%	12%	12%	0%	0%	4%	4%	0.28
McCormick	3034	6%	5%	4%	2%	1%	0%	3%	3%	0.53
Ferrero	4215	1%	1%	0%	0%	0%	0%	1%	1%	0.22
McKee Foods Corp	2234	0%	0%	0%	0%	0%	0%	0%	0%	NA
Total for all companies	248574	18%	18%	18%	13%	5%	6%	16%	14%	0.41

a Values presented for weighted values. P<0.0001 for all. NPM = Nutrient Profile Model

Table 2: Proportion of products eligible for advertising to children under each nutrient profile model, by category

	Google NPM	Google NPM	WHO Europe NPM	WHO Europe NPM	PAHO NPM	PAHO NPM	Chilean NPM	Chilean NPM		
Manufacturer	No. products	% revenue eligible	No. products	% revenue eligible	No. products	% revenue eligible	No. products	% revenue eligible	Fleiss' Kappa	p value
Baked Goods	1791	5%	1851	20%	1633	0%	1962	6%	0.23	<0.001
Bottled Water	173	61%	311	73%	248	89%	311	43%	0.55	<0.001
Breakfast Cereals	969	30%	683	11%	668	6%	1022	0%	0.15	<0.001
Carbonated Beverages	156	21%	155	0%	154	0%	411	13%	0.15	<0.001
Concentrates	248	1%	250	1%	231	0%	292	12%	-0.04	0.93
Confectionery	1456	14%	1637	0%	1457	0%	1856	8%	0.24	<0.001
Dairy	1183	49%	1264	27%	1191	18%	1496	26%	0.44	<0.001
Ice Cream and Frozen Desserts	404	18%	431	0%	404	0%	471	1%	0.01	0.30
Juice	151	11%	152	0%	184	22%	245	16%	0.37	<0.001
Other Hot Drinks	91	0%	90	0%	78	2%	106	0%	0.00	0.53
Processed Fruit and Vegetables	473	36%	444	34%	441	26%	497	61%	0.53	<0.001
Processed Meat and Seafood	554	25%	673	28%	548	1%	705	11%	0.30	<0.001
Ready Meals	24	92%	27	19%	24	17%	31	29%	0.31	<0.001
Rice, Pasta and Noodles	70	21%	69	7%	69	0%	168	24%	0.54	<0.001
RTD Coffee	2261	11%	2119	36%	2120	1%	2499	35%	0.08	0.18
RTD Tea	35	43%	35	52%	35	22%	39	30%	0.13	0.00
Sauces, Dressings and Condiments	925	5%	1220	3%	932	0%	1340	3%	0.34	<0.001
Savoury Snacks	1556	4%	1642	1%	1544	1%	1866	0%	0.15	<0.001
Soup	374	15%	456	69%	373	0%	558	50%	0.03	0.10

Sports Drinks	75	15%	58	0%	58	0%	95	30%	0.08	0.04
Sweet Biscuits, Snack Bars and Fruit Snacks	1133	8%	1233	0%	1131	1%	1349	0%	0.03	0.01
Sweet Spreads	86	3%	99	0%	86	0%	102	1%	0.22	<0.001
Total for all categories	14188	18%	14899	13%	13609	6%	17423	14%	0.41	<0.001

Note: Boldface indicates statistical significance ($p < 0.05$). NPM = Nutrient Profile Model

Figure legends:

Figure 1: 2020 Revenue (in USD millions) for the top 25 food and beverage manufacturers from included categories and from products eligible for advertising under the Google, WHO Europe , PAHO and Chilean Government nutrient profile models (NPM).

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