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Children's exposure to Television Advertising of Unhealthy Foods and Beverages Across 4 Countries of WHO European Region

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Abstract:	<p>Objective: To compare the frequency and healthfulness of foods being advertised to children and adolescents in four countries of World Health Organization (WHO) European region.</p> <p>Design: Cross-sectional quantitative study, guided by an adapted version of the WHO protocol. All recorded food advertisements were categorized by categories and as either "permitted" or "not permitted" for advertising to children in accordance with WHO Regional Office for Europe Nutrient Profile Model (NPM).</p> <p>Settings: Four countries: Russia, Turkey, Kazakhstan, and Kyrgyzstan</p> <p>Participants: TV channels most popular among children and adolescents</p> <p>Results: Analysis included 70 days of TV broadcasting for all channels, during which time there were 28,399 advertisements. The mean number of advertisements per hour varied from 11 in Turkey and Kazakhstan to 8 and 2 in Russia and Kyrgyzstan. In all countries the majority of the food and beverages advertised should not be permitted for advertising to children according to the WHO NPM. The mean number of non-permitted</p>

	<p>food and beverage advertisements per hour was high in Turkey and Kazakhstan (8.8 and 8.5 ads) compared with Russia (5.1) and Kyrgyzstan (1.9). Turkey was the only country where nutritional information was fully available and no values were missing that prevented coding for some product categories.</p> <p>Conclusions: Results revealed that children and adolescent of four countries are exposed to a considerable volume of food and beverage advertisements, including sugary products on broadcast television. As such, policymakers should consider protecting youth by developing regulations to restrict these marketing activities within media popular with children.</p>

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1 **Introduction**

2 The prevalence of childhood obesity has risen substantially in recent decades, making it a serious
3 public health problem. The determinants of childhood obesity are complex and include individual,
4 family, and environmental factors [1]. One of the factors that has been demonstrated to have an
5 impact on children's eating behavior and body weight is children's exposure to marketing of foods
6 and drinks high in saturated fat, trans fatty acids, free sugars and/or salt (hereafter "HFSS") [2].
7 Numerous studies have demonstrated that television-based food and beverage marketing directed at
8 children predominantly promotes HFSS foods and drinks. Sugary breakfast cereals, soft drinks,
9 confectionery, snack foods, ready meals and fast-foods are the advertised products most often
10 targeted at or seen by children around the world [3]. Experimental evidence shows that exposure to
11 HFSS foods and drinks advertising results in a higher intake of energy-dense, sweet and salty foods
12 among those exposed [4,5], particularly in children with overweight and obesity [6], and that this
13 effect meets epidemiological criteria for a causal relationship [7].

14 Child-oriented food and beverage television advertising also influences children's preferences and
15 food requests and has been associated with increased pestering of parents to purchase advertised
16 products, otherwise known as "pester power" [8]. Adolescents and young adults, in particular, are
17 autonomous in their spending habits and are a particularly valuable target for fast food marketing,
18 due to their independent spending power [9]. In addition to these known behavioural effects, there
19 is also evidence that food marketing exposure impacts upon dietary norms, population level shifts
20 in food and drink category preferences and in the cultural values underpinning food behaviours
21 [10].

22 Based on this evidence, in May 2010, Member States of the World Health Organization (WHO)
23 endorsed Resolution WHO 63.14, calling for limits on the marketing of food and non-alcoholic
24 beverage products to children. Subsequently, the WHO released the Set of Recommendations to
25 guide efforts by Member States in designing new and/or strengthening existing policies on food
26 marketing communications [11]. The WHO has explicitly called on Member States to introduce
27 comprehensive restrictions on marketing of HFSS foods and drinks to children in all media,
28 including television. Governments in a number of European countries have introduced regulations
29 to restrict the advertisement of HFSS foods and drinks on TV (UK, Denmark, Norway, Sweden,

30 France, Slovenia, Turkey, Latvia, Lithuania, Portugal) [12–16], however the effectiveness of these
31 policies has often been limited due to weak policy designs as well as the migration of advertising to
32 less regulated platforms [17]. Many other countries have yet to introduce any advertising
33 restrictions [12], this policy inaction may reflect a lack of specific data on food advertising in these
34 countries.

35 To be effective, policies should be evidence-based and respond to specific challenges identified,
36 therefore in states where food marketing restrictions do not currently exist, a first essential step in
37 the policy development process is monitoring the current advertising landscape to build the case for
38 action [11,12]. As an important tool for implementing restrictions on the marketing of foods to
39 children, a nutrient profiling tool is recommended. This tool makes it possible to differentiate
40 between foods and non-alcoholic beverages (hereafter "foods") that are more likely to be part of a
41 healthy diet from those that are less likely (in particular, those foods that may contribute to excess
42 energy intake, saturated fats, trans fats, sugar or salt) [18]. The WHO European Nutrient Profile
43 Model (WHO-ENPM) for marketing food to children is used by many researchers [18,19].

44 Existing studies describing the extent and nature of television food advertising are typically based
45 on Australia, Western Europe, and North America [3].

46 There is very limited data on the food advertising children and adolescents are exposed to on
47 television in the Commonwealth independent states (CIS) countries and Eastern Europe. However,
48 a recent paper from the authors of the current study demonstrated the substantial exposure of
49 Russian children and adolescents to HFSS foods and drinks advertising on the 5 TV channels
50 popular with these audiences [20]. A recent report from Turkey also demonstrated high exposure to
51 HFSS foods and drinks marketing [21] and, to the authors' knowledge, is the only Middle East
52 country to have published data on this issue.

53 CIS countries in the framework of Eurasian economic union have common legislation in some
54 aspects, so there is an opportunity to explore the possibility of introducing regional legislation
55 aimed to restricting HFSS foods and drinks marketing.

56 Poor nutrition, characterised by high salt, low fruit and vegetable intake is a common problem in
57 the CIS [22,23]. The WHO HBSC survey demonstrated that low percentage of Russian and Turkish
58 adolescents aged 11, 13 and 15 years old consume fruit and vegetables daily and over 20-30%

59 consume sweets every day [24]. In WHO European Childhood Obesity Surveillance Initiative
60 (COSI) study with 6-9 year old children results were more variable, but still only half of children
61 consumed fruit and vegetables daily in Russia and less than 20% in Kyrgyzstan [25]. In accordance
62 with these sub-optimal dietary intakes, growing rates of overweight and obesity, including
63 childhood obesity, have been demonstrated as a substantial problem in many countries in recent
64 years, especially in Russian, Eastern Europe and Central Asia countries [26–28]. While the overall
65 rate of increase in children's body mass index seems to have plateau (at a high level) in
66 high-income countries since 2000, rates continue to increase in low- and middle-income countries
67 [29].

68 Therefore, the primary aim of the current study was to compare the frequency and healthfulness of
69 foods being advertised to children and adolescents in four countries of WHO European region (CIS
70 and Middle Eastern countries) for the purposes of informing the development of future policies
71 aimed at restricting its impact on the eating behaviors and health of young people.

72 **Methods**

73 Four countries (Russia, Turkey, Kazakhstan, and Kyrgyzstan) contributed data on television food
74 advertising that had been collected using an adapted version of the WHO protocol “Monitoring
75 food and beverage marketing to children via television and the Internet” [30]. The Russian and
76 Turkish studies were performed in spring 2017, and the Kazak and Kyrgyz studies in spring 2018.
77 Training and support in the use of the protocol and in the coding procedure were provided by the
78 authors of the protocol – WHO (JM, JB) and academic (EB) experts for Russia and Turkey and by
79 Russian experts (JB and AI) for Kazakhstan and Kyrgyzstan.

80 ***Sampling***

81 In each country, television channels most popular among children and adolescents were identified
82 for monitoring so that the data would best reflect the likely exposure of this demographic to HFSS
83 foods and drinks advertising.

84 In Russia, publicly available television viewing data were consulted [31] to inform this decision,
85 and the study focused on federal channels as they are broadcast throughout the country. The
86 following channels were selected: «Карусель»/«Karusel», «Disney», (both child-oriented
87 channels) «СТС»/STS, «ТНТ»/TNT, and «Пятница»/«Piatnitsa» (adolescent-oriented channels).

88 In Turkey, the five commercial TV channels (A HABER, ATV, KANAL D, SHOW TV, STAR)
89 most popular among young people under 16 years were selected according the viewing ratings for
90 TV channels as of 1 April 2017 (CanlıTV, 2017) were selected. National channels were chosen as
91 these are the only ones subject to regulation by the national broadcast authority [32].

92 In Kazakhstan television broadcasting is done through national and regional distribution channels,
93 cable and satellite channels. There was one national channel for children "Balapan" with the
94 Kazakh language of broadcasting. The other 5 channels (1 Channel Eurasia, NTK, 31 Channel,
95 Astana TV, Qazaqstan) were selected taking into account national data providing relevant
96 information on the following criteria: popularity, accessibility, national broadcasting, coverage of a
97 children's audience (children under 16) [33].

98 All television channels in Kyrgyzstan can be divided into 2 groups: federal channels, available
99 throughout the country and included in the basic television package, and regional and cable
100 channels. The monitored channels were selected based on the results of media research, social
101 surveys, and official statistics, taking into account their popularity and data on the size of the child
102 and adolescent audience. The following 6 national television channels were chosen for the current
103 study: "Balastan", "312 cinema", "KTRK", "KTRK Muzyka", "KTRK Sport", "Tumar".

104 *Data collection*

105 Data collection was performed in 2017-2018. In all countries, TV broadcasts on each channel were
106 recorded by the research team for weekdays and weekend days, from 06 am to 10 pm (16 hours).

107 The recording days were chosen by random sampling and excluded periods of national holidays.

108 The total number of recording days varied by country. In Russia the sample comprised of 20 days
109 of recording (10 weekdays and 10 weekend days) between March and May 2017. In Turkey it
110 included only two days (one weekday and one weekend day) during the first week of April 2017
111 (on 6th and 9th of April). In Kazakhstan and Kyrgyzstan samples included 24 days of recording (12
112 weekdays and 12 weekend days) between March and May 2018.

113 The full sets of recordings were coded for food marketing to children.

114 Adaptations to the WHO protocol "Monitoring food and beverage marketing to children via
115 television and the Internet" [30] to meet the specifics of the Russian Federation included
116 incorporating social marketing, sausage factories, dairy production, infant formula, and advertising

117 the product range without highlighting any particular dish (i.e. promoting the assortment that the
118 company offered in its product portfolio), as advertisement types, and adding some culturally
119 relevant categories to the coding system for **food and beverages advertisements** (specifically non-
120 alcoholic beer and tea were included in the category beverages).

121 As a result, the list of advertisement types for coding has been extended (Table S1). The study
122 protocols for Kyrgyzstan and Kazakhstan were modified, according to the countries specificities,
123 by adding such categories as social advertising, sports goods and entertainment via SMS format.

124 All recordings were viewed and screened for spot advertisements (those shown between and during
125 programs). Other forms of marketing such as product placement and program sponsorship were not
126 included. All advertisements were coded into one of 27 different types (Table S1) by two
127 researchers. **In cases where there was more than one food item** in the advertisement, the one that
128 was presented first was coded.

129 In order to ensure reliability of coding across the two researchers, both researchers initially coded
130 one day of data for one channel, according to the predefined criteria set out in the research
131 protocol. After that, project managers checked the coding to remove any inconsistencies, the results
132 were compared, discrepancies discussed, and agreement was reached for all instances of
133 disagreement. Then the research assistants coded these advertisements again.

134 Food and beverages advertisements (defined as those featuring a food item for sale, such as from a
135 food retailer or fast food restaurant) were then additionally coded in accordance with 17 food and
136 beverages categories described in the WHO Regional Office for Europe Nutrient Profile Model
137 (NPM) [34].

138 ***Nutritional analysis***

139 The WHO NPM was used to classify foods and beverages as permitted or not permitted to be
140 marketed to children. The model does this using first a category level classification and then, for
141 some categories, there are additional nutrient thresholds that must be met for marketing to be
142 permitted. For example, a product categorized as “chocolate and sugar confectionery” is not
143 permitted to be marketed to children regardless of the nutrient content, but within the category
144 “breakfast cereals” a product may be permitted to be marketed to children if the total fat, total sugar
145 and salt levels per 100g of product are below the stated thresholds. Therefore, for some products it

146 was necessary to obtain the nutrition information, and where possible this information was sourced
147 from product packaging (accessed online or at point of sale in retail stores) [34]. In the Russian
148 Federation, as well as in two other CIS countries, nutritional information on product packaging on
149 the amount of salt, added sugar or trans-fat is not a mandatory and so often is not provided.
150 Therefore, in some cases, it was not possible to make a judgement as to whether the marketing of
151 that product would be permitted according to WHO NPM.

152 *Data analysis*

153 Coding for all variables was entered directly into Microsoft Excel while viewing the TV
154 recordings. All final datasets were then provided to the Russian team for the combined analysis.
155 Statistical analysis was performed using SPSS version 21.0 software for Windows (SPSS Inc,
156 Chicago, IL).

157 Analyses were conducted to address the following research questions:

- 158 1. What is the quantity of food and beverage advertising on TV popular with children and
159 adolescents in these four countries, and does this differ by country?
- 160 2. What WHO Europe NPM food and beverage categories are promoted the most and does this
161 differ between countries?
- 162 3. What proportion of food and beverage ads on TV stations popular with children and adolescents
163 are classified as permitted and non -permitted according to the WHO Europe NPM and does this
164 differ by country?
- 165 4. Does the **hourly** rate of “not permitted” food and beverage advertising differ by country?

166 **RESULTS**

167 **Sample description**

168 Four research groups from 4 countries contributed data for this research. The final compiled dataset
169 spanned countries from the Russian Federation, Turkey, Kazakhstan, and Kyrgyzstan (Table 1).
170 During the analysis, it was observed that three channels in Kyrgyzstan had no advertisements,
171 while one channel in Kazakhstan broadcast only 100 advertisements over 32 hours.

172 Table 1. Recorded TV sample description, by country

	Time Period of Data Collection	Number of channels monitored	Weekdays / Weekend Days per channel	Total Number of Days / Hours	Total Advertisements Recorded
Russian Federation	18.03.17 – 31.05.17	5	2/2	20/320	11638
Turkey	06.04.17 – 09.04.17	5	1/1	10/160	3962
Kazakhstan	29.03.18 – 20.05.18	6	2/2	24/384	10641
Kyrgyzstan	25.03.18 - 27.05.18	6	2/2	24/384	2158

173

174 **Overall volume of food and beverage advertising by country**

175 Analysis included 78 days of TV broadcasting for all channels, during which time there were
 176 28,399 advertisements. The mean number of advertisements per day varied from 584,0 in Russia to
 177 89,9 in Kyrgyzstan. Across countries, 14-32% of advertisements were for food or beverage
 178 products with the greatest proportion in Kazakhstan (32.8%) and the lowest in Kyrgyzstan (14.2%)
 179 (Figure 1). The rate of food advertising per day was highest in Turkey and Kazakhstan (141.2 and
 180 145.5 respectively) but substantially lower in Kyrgyzstan (12.8).

181

182 Figure 1.

183

184 **Nutritional quality of foods and beverages advertised by country**

185 There was some diversity in the top five most commonly advertised food and beverage categories
 186 by country, with some similarity between Kazakhstan and Kyrgyzstan (Table 2). The most
 187 frequently advertised food and beverage categories in Turkey were the following: chocolate and
 188 sugar confectionery (20.7% of food ads), edible ices, including ice cream(18,8%), mineral and
 189 sweetened beverages, including cola, lemonade, mineral and/or flavoured waters (14.1%), savoury
 190 snacks (7.6%), and cakes, sweet biscuits, pastries(6.9%). In Kyrgyzstan and Kazakhstan, the most
 191 frequent advertised category was mineral and sweetened beverages, including cola, lemonade,
 192 mineral and/or flavored waters (21.9% and 49.7% respectively). Chocolate and sugar confectionery

193 was the second most commonly advertised category in Kazakhstan (17.4%) and the fourth in
 194 Kyrgyzstan (7.2%). The fifth category was also similar - milk drinks, including milks and
 195 sweetened milks (6.4% and 7.2%). In Russia, the most frequently advertised product category was
 196 yoghurts, sour milk, and cream (15.5%), which was also in the third position in Kazakhstan
 197 (10.6%) but was not in the top five categories in the other two countries. In Russia, the next most
 198 frequently advertised product category was chocolate and sugar confectionery (12.3%) which was
 199 rather frequent in all countries in this analysis. Mineral and sweetened beverages, including cola,
 200 lemonade, mineral and/or flavoured waters (another commonly advertised product in all countries)
 201 was third in Russia (10.9%). Detailed information for each channel included in the analysis is
 202 presented in the supplementary materials (Table S2)

203 Table 2. Top five food and beverage categories advertised by country, using WHO Regional Office
 204 for Europe nutrient profiling model

	1 st	2 rd	3 rd	4 th	5 th
Turkey (N=1273)	20.7% (chocolate, sugar confectionery etc.)	18.8% (edible ices, including ice cream etc.)	14.1% mineral and sweetened beverages, including cola, lemonade, mineral and/or flavoured waters etc.)	7.6% (savoury snacks etc.)	6.9% (cakes, sweet biscuits, pastries etc.)
Kazakhstan (N=3494)	21.9% mineral and sweetened beverages, including cola, lemonade, mineral and/or flavoured waters etc.)	17.4% (chocolate, sugar confectionery etc.)	10.6% (yoghurts, sour milk, cream etc.)	7.7% (tea, coffee)	6.4% (milk drinks (including milks and sweetened milks) etc.)

Kyrgyzstan (N=153)	49.7% mineral and sweetened beverages, including cola, lemonade, mineral and/or flavoured waters etc.)	18.3% (juices)	17.0% (savory snacks etc.)	7.2% (chocolate, sugar confectionery etc.)	7.2% (milk drinks (including milks and sweetened milks) etc.)
Russian Federation (N=2248)	15.0% (yoghurts, sour milk, cream etc.)	12.3% (chocolate, sugar confectionery etc.)	10.9% mineral and sweetened beverages, including cola, lemonade, mineral and/or flavoured waters etc.)	10.0% (ready-made and convenience foods, composite dishes etc.)	9.8% (tea, coffee)

205

206 In all countries the majority of the **advertised** food and beverages **should not be permitted for**
 207 **advertising** to children according to the WHO NPM (Fig. 2). Turkey was the only country where
 208 nutritional information was fully available and no values were missing that prevented coding for
 209 some product categories. In other countries the percentage of advertisements that couldn't be
 210 classified according to the **WHO NPM** varied from 20% to 7%.

211

212 Figure 2.

213

214 The mean number of non-permitted food and beverage advertisements per hour was high in Turkey
 215 and Kazakhstan (8.8 and 8.5 ads) compared with Russia (5.1) and Kyrgyzstan (1.9). The mean
 216 number of ads that couldn't **be** classified using the WHO NPM for three CIS countries were 2.1,
 217 1.1 and 2.3 **ads** per hour in Kazakhstan, Kyrgyzstan and Russian Federation, respectively) (Table
 218 3). Detailed information for each channel included in the analysis is presented in the
 219 supplementary materials (Table S3, S4).

220 Table 3. Average frequency of food and beverage advertising, applying the WHO Regional Office
221 for Europe nutrient profiling model per hour

Countries/channels	Not Permitted (mean ± SD)	Permitted (mean ± SD)	Unknown (mean ± SD)	All food (mean ± SD)
Turkey	8.8 ± 4.7	2.9 ± 1.8	-	11.1 ± 5.8
Kazakhstan	8.5 ± 5.9	2.9 ± 2.0	2.1 ± 1.6	11.4 ± 8.2
Kyrgyzstan	1.9 ± 1.1	1.0 ± 0.0	1.1 ± 0.3	2.1 ± 1.3
Russian Federation	5.1 ± 7.4	2.2 ± 4.2	2.3 ± 1.9	7.9 ± 11.8

222 Note: SD – standard deviation

223 Discussion

224 This study is the first to report comparative data on the frequency and healthfulness of foods being
225 advertised to which children and adolescents in 4 countries of the WHO European regions
226 (including CIS countries) are likely to be exposed, and therefore may be used to inform policy
227 development across this region.

228 The proportion of food advertisements ranged from 14.2%-32.8%. This is consistent with the
229 proportion of food advertising found in previous studies in Germany (18.5%) [35], Australia and
230 China (both 25%) [36,37] and slightly higher than in the United Kingdom (12.8%), although it
231 should be noted that the statutory regulation of food marketing was partly implemented in the
232 United Kingdom when this study was conducted [38].

233 The study shows problems with classification of foods due to poor information about **food**
234 **composition** in CIS countries, as 7-20% of advertisements couldn't be classified according to the
235 WHO Nutrient Profile Model for Europe. It is a clear sign to improve the food labelling in these
236 countries, as the lack of the data is a serious barrier to healthy food choice [39].

237 The highest number of not permitted food advertisements per hour were in Turkey and in
238 Kazakhstan (8.8 and 8.5 respectively). However, in Turkey all advertisements could be classified
239 into categories whereas this was not the case for Kazakhstan or the other two countries.

240 The lowest rate of exposure for not permitted food advertisement was in Kyrgyzstan (1.9 per hour),
241 but this reflects a much lower frequency of TV advertising overall compared with other countries

242 in this analysis rather than a more healthy profile of advertising (indeed, the proportion of not
243 permitted food advertisements was highest here – 82,3%). The average frequency was higher in the
244 other three countries compared to the published results from 22 countries [3] and in some recent
245 studies [40].

246 The top five most frequently advertised food and beverage categories in four countries included
247 several similar food groups, such as chocolate and confectionery, ready-made food and dishes
248 (including fast food), 78,6% of which were unhealthy versions that exceeded the WHO NPM
249 threshold criteria for fats, sugar, sodium, and/or energy. Recent systematic review and meta-
250 analysis demonstrated that food marketing was associated with increased intake, choice,
251 preference, and purchase requests in children and adolescents [41].

252 Fast food advertisements have previously been associated with an increase in fast food
253 consumption, and an increased risk of obesity in children [6,42] and sugar sweetened beverages
254 have been shown to be the main source of added sugar in young people's diets, contributing to
255 poorer lipid profiles that increase risk of negative health outcomes such as cardiovascular diseases
256 and stroke [42].

257 Findings from the current study may have important policy implications. Results revealed that
258 children and adolescent of four countries, including three CIS, are likely exposed to a considerable
259 volume of food and beverage advertisements, including sugary products on broadcast television. As
260 such, policymakers should consider protecting youth by developing regulations to restrict these
261 marketing activities within media popular with children. Evaluations from countries with
262 restrictive food marketing policies in place show that it is possible to achieve desirable reductions
263 in exposure and associated behavioral outcomes, such as purchasing of unhealthy products [43,44].

264 To maximise effectiveness, policymakers should seek to apply regulations to all programming to
265 which children are exposed, not just that which is directed specifically at youth audiences [45]. To
266 address this some countries such as the UK have proposed so called 'watershed' bans whereby
267 HFSS foods and drinks advertising cannot be shown until after 9 or 10 pm. Modelling studies
268 suggest such policies would be cost effective and achieve meaningful reductions in childhood
269 obesity, particularly for more deprived children [46,47].

270 It is clear that the countries in which restrictive food marketing policies have been implemented are
271 typically also those countries with substantial data on advertising prevalence derived from
272 monitoring studies [3]. In line with the WHO recommendations, which note the importance of
273 monitoring and evaluation mechanisms to underpin the policy cycle, it is crucial that national
274 monitoring systems are established to gather robust data on key indicators (such as exposure and
275 behavioral impacts). No CIS country currently has regulations on food marketing for children.
276 Considering that 3 CIS countries have common legislation in certain aspects, there is a window of
277 opportunity to introduce new legislation at the level of Eurasian economic union, and this study
278 provides timely data to support initial discussions towards this important public health policy
279 target.

280 **Limitations**

281 This study did not measure all aspects of food marketing on television, for example program
282 sponsorship or product placement in children's movies [47], nor did it consider other platforms for
283 food marketing (such as sports sponsorship, outdoor advertising) for a more comprehensive
284 assessment of children's likely exposure. It was possible only to estimate the potential exposure
285 without considering the number of children viewing the advertisement (i.e. the reach of the
286 advertisement). Also we focused on the TV channels most popular with children and adolescents,
287 and did not monitor food advertising on the other channels watched by young people (such as those
288 carrying family entertainment shows), and as a result not all food advertising was evaluated.

289 **Conclusion**

290 This study adds to the body of the literature examining television food advertising directed at
291 children and adolescents, by describing the current television food advertising environment in the
292 WHO European region, including 3 CIS countries. **The large volumes of television advertising for**
293 **HFSS foods and drinks impact on children worldwide, including in the four countries that have**
294 **been analyzed in this study.** Across all countries, television food and beverage advertisements are
295 predominantly for products that exceed WHO maximum thresholds for saturated fat, sodium,
296 and/or sugar for foods and beverages that are considered appropriate to be marketed to children.
297 Monitoring data such as those presented in this study can be used as part of evidence informed
298 policymaking.

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For Peer Review

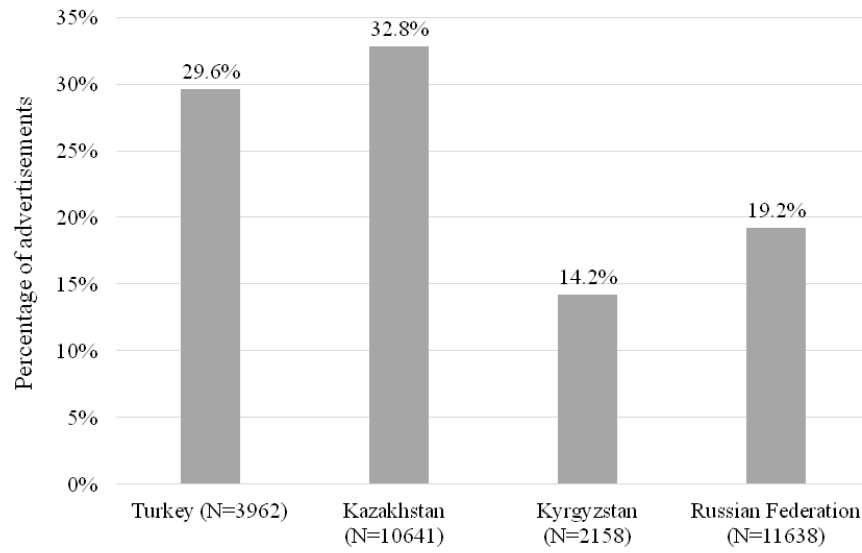


Figure 1. Proportion of advertisements that were for foods or beverages in the four countries studied.

254x190mm (96 x 96 DPI)

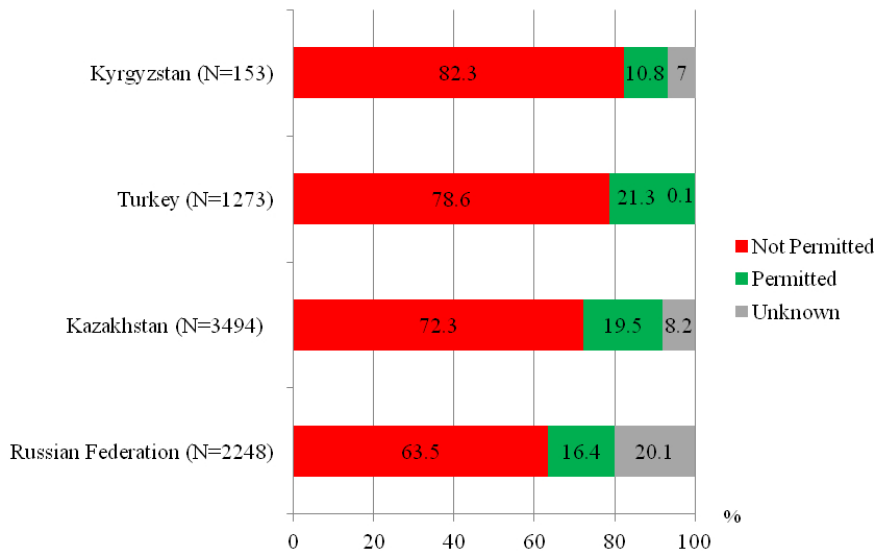


Figure 2. The proportion of food advertisements per country classified as permitted, not permitted or unknown for advertising to children according to the WHO Nutrient Profile Model for Europe.

254x190mm (96 x 96 DPI)

Annex 1

Table S1. List of type of advertisements

Type of advertisement
1. Pharmaceuticals
2. Channel promotions
3. Education
4. Information announcements, sponsored by food companies
5. Infant formula
6. Financial
7. Household cleaners/detergents
8. Toiletries
9. Utilities
10. Social advertisements
11. Clothes/Shoes
12. Food and beverages
13. Household equipment
15. Retailing and mail order
16. Toys
17. Milk processing plant/ meat processing plant
18. Motoring
19. Entertainment
20. Publishing
21. Pet products
22. Travel/Transport/Holidays
23. Public service announcements
24. Food company
25. Cultural and sporting events
26. Sports goods

Table S2. Top five food and beverage categories advertised by country, using WHO Regional Office for Europe nutrient profiling model (% of food and beverage advertisements for that channel)

Countries / channels	1 st	2 nd	3 rd	4 th	5 th
Turkey (N=1273)	20.7% (chocolate, sugar confectionery etc.)	18.8% (edible ices, including ice cream etc.)	14.1% (mineral and sweetened beverages, including cola, lemonade, mineral and/or flavoured waters etc.)	7.6% (savoury snacks etc.)	6.9% (cakes, sweet biscuits, pastries etc.)
Channel 1 (N=7)	85.7% (mineral and sweetened beverages, including cola, lemonade, mineral and/or flavoured waters etc.)	14.3% (chocolate, sugar confectionery etc.)	-	-	-
Channel 2 (N=298)	24.2% (chocolate, sugar confectionery etc.)	14.4% (edible ices, including ice cream etc.)	13.1% (mineral and sweetened beverages, including cola, lemonade, mineral and/or flavoured	7.7% (cakes, sweet biscuits, pastries etc.)	6.7% (ready-made and convenience foods, composite dishes etc.)

			waters etc.)		
Channel 3 (N=279)	21.5% (edible ices, including ice cream etc.)	17.9% (chocolate, sugar confectionery etc.)	15.4% (mineral and sweetened beverages, including cola, lemonade, mineral and/or flavoured waters etc.)	11.8% (savory snacks etc.)	6.8% (cakes, sweet biscuits, pastries etc.)
Channel 4 (N=376)	21.3% (edible ices, including ice cream etc.)	17.8% (chocolate, sugar confectionery etc.)	13.3% (mineral and sweetened beverages, including cola, lemonade, mineral and/or flavoured waters etc.)	9.6% (savory snacks etc.)	7.4% (cakes, sweet biscuits, pastries etc.)
Channel 5 (N=313)	23.5% (chocolate, sugar confectionery etc.)	18.0% (edible ices, including ice cream etc.)	13.2% (mineral and sweetened beverages, including cola, lemonade, mineral and/or flavoured waters etc.)	8.0% (ready-made and convenience foods, composite dishes etc.)	7.4% (fresh and frozen meat, poultry, fish etc.)
Kazakhstan (N=3494)	21.9% (mineral and sweetened beverages, including cola, lemonade, mineral and/or flavoured waters etc.)	17.4% (chocolate, sugar confectionery etc.)	10.6% (yoghurts, sour milk, cream etc.)	7.7% (tea, coffee)	6.4% (milk drinks (including milks and sweetened milks) etc.)
Balapan (N=39)	79.5% (chocolate, sugar confectionery etc.)	20.5% (mineral and sweetened beverages, including cola, lemonade, mineral and/or flavoured waters and etc.)	-	-	-
NTK (N=731)	26.6% (chocolate, sugar confectionery etc.)	23.4% (mineral and sweetened beverages, including cola, lemonade, mineral and/or flavoured waters etc.)	8.1% (sauces, dips, dressings etc.)	8.1% (ready-made and convenience foods, composite dishes etc.)	7.3 (tea, coffee)
Channel 1 Eurasia (N=564)	26.6% (chocolate, sugar confectionery etc.)	21.1% (mineral and sweetened beverages, including cola, lemonade, mineral and/or flavoured waters etc.)	10.6% (sauces, dips, dressings etc.)	9.9% (tea, coffee)	9.0% (yoghurts, sour milk, cream etc.)
Channel 31 (N=1206)	19.8% (mineral and sweetened beverages, including cola, lemonade, mineral and/or flavoured waters etc.)	12.8% (chocolate, sugar confectionery etc.)	11.1% (yoghurts, sour milk, cream etc.)	8.1% (savory snacks etc.)	7.4% (milk drinks (including milks and sweetened milks) etc.)
Astana TV (N=671)	21.9% (mineral and sweetened beverages, including cola, lemonade, mineral and/or flavoured waters etc.)	15.4% (yoghurts, sour milk, cream etc.)	8.6% (milk drinks (including milks and sweetened milks) etc.)	8.6% (cheese (including medium-hard, hard and soft cheeses) etc.)	7.5% (sauces, dips, dressings etc.)
Qazaqstan (N=283)	28.6% (mineral and sweetened beverages, including cola,	18.0% (yoghurts, sour milk, cream etc.)	15.2% (tea, coffee)	12.4% (chocolate, sugar	6.4% (milk drinks (including milks and sweetened

	lemonade, mineral and/or flavoured waters etc.)			confectionery etc.)	milks) etc.)
Kyrgyzstan (N=153)	49.7% (mineral and weetened beverages, including cola, lemonade, mineral and/or flavoured waters etc.)	18.3% (juices)	17.0% (savory snacks etc.)	7.2% (chocolate, sugar confectionery etc.)	7.2% (milk drinks (including milks and sweetened milks) etc.)
312 Kino*	-	-	-	-	-
TumarTV *	-	-	-	-	-
Balastan*	-	-	-	-	-
KTRK (N=38)	28.9% (mineral and sweetened beverages, including cola, lemonade, mineral and/or flavoured waters etc.)	26.3% (savory snacks etc.)	23.7% (juices)	13.2% (milk drinks (including milks and sweetened milks) etc.)	7.9% (chocolate, sugar confectionery etc.)
KTRK Muzyka (N=80)	41.3% (mineral and sweetened beverages, including cola, lemonade, mineral and/or flavoured waters etc.)	23.8% (juices)	20.0% (savory snacks etc.)	7.5% (milk drinks (including milks and sweetened milks) etc.)	7.5% (chocolate, sugar confectionery etc.)
KTRK Sport (N=35)	91.4% (mineral and sweetened beverages, including cola, lemonade, mineral and/or flavoured waters etc.)	5.7% (chocolate, sugar confectionery etc.)	2.9% (ready-made and convenience foods, composite dishes etc.)	-	-
Russian Federation (N=2248)	15.0% (yoghurts, sour milk, cream etc.)	12.3% (chocolate, sugar confectionery etc.)	10.9% (mineral and sweetened beverages, including cola, lemonade, mineral and/or flavoured waters etc.)	10.0% (ready-made and convenience foods, composite dishes etc.)	9.8% (tea, coffee)
Disney (N=349)	30.1% (yoghurts, sour milk, cream etc.)	16.0% (chocolate, sugar confectionery etc.)	13.8% (tea, coffee)	9.7% (mineral and weetened beverages, including cola, lemonade, mineral and/or flavoured waters etc.)	7.2% (juices)
Karusel (N=151)	32% (yoghurts, sour milk, cream etc.)	16.7% (chocolate, sugar confectionery etc.)	13.3% (juices)	11.3% (mineral and sweetened beverages, including cola, lemonade, mineral and/or flavoured waters etc.)	9.3% (tea, coffee)
Pyatnitsa (N=581)	14.5% (mineral and sweetened beverages, including cola, lemonade, mineral and/or flavoured waters etc.)	13.1% (chocolate, sugar confectionery etc.)	11.4% (yoghurts, sour milk, cream etc.)	9.1% (processed meat, poultry, fish and similar (including sausage) etc.)	9.0% (ready-made and convenience foods, composite dishes etc.)
STS (N=583)	15.4% (ready-made and convenience	12.5% (chocolate, sugar confectionery	11.0% (yoghurts, sour milk, cream etc.)	11.0% (tea, coffee)	9.8% (mineral and sweetened

	foods, composite dishes etc.)	etc.)			beverages, including cola, lemonade, mineral and/or flavoured waters etc.)
TNT (N=584)	15.1% (processed meat, poultry, fish and similar (including sausage) etc.)	14.2% (ready-made and convenience foods, composite dishes etc.)	9.9% (tea, coffee)	9.4% (yoghurts, sour milk, cream etc.)	9.1% (mineral and sweetened beverages, including cola, lemonade, mineral and/or flavoured waters etc.)

Note: * - no food and beverage advertisements

Table S3. Average frequency of food and beverage advertising per day, applying the WHO Regional Office for Europe nutrient profiling model

	All Food	Permitted	Not Permitted	Unknown
Turkey (N=1273)	141.2 ± 54.3	33.8 ± 11.0	111.1 ± 41.2	-
Channel 1	3.5 ± 0.0	-	3.5 ± 0.0	-
Channel 2	149.0 ± 9.9	33.0 ± 7.1	115.5 ± 17.7	-
Channel 3	139.5 ± 7.8	20.5 ± 6.4	119.0 ± 1.4	-
Channel 4	188.0 ± 22.6	45.5 ± 10.6	142.5 ± 12.0	-
Channel 5	155.5 ± 3.5	36.0 ± 2.8	119.5 ± 0.7	-
Kazakhstan (N=3494)	145.5 ± 98.1	34.2 ± 20.0	105.2 ± 67.3	17.8 ± 14.4
Balapan	9.8 ± 0.5	-	9.8 ± 0.5	-
NTK	182.5 ± 44.8	28.3 ± 8.4	149.0 ± 37.4	5.3 ± 0.5
1 channel Eurasia	141.0 ± 26.8	28.8 ± 8.1	103.5 ± 22.0	11.7 ± 1.2
31 channel	301.5 ± 13.4	61.3 ± 23.0	202.3 ± 22.2	38.0 ± 6.1
Astana TV	167.8 ± 55.6	33.3 ± 20.0	115.5 ± 25.8	19.0 ± 10.9
Qazaqstan	70.8 ± 29.1	19.3 ± 10.8	51.3 ± 20.7	-
Kyrgyzstan (N=153)	12.8 ± 6.0	1.2 ± 0.4	10.8 ± 6.2	3.7 ± 2.1
312 kino*	-	-	-	-
TumarTV*	-	-	-	-
Balastan*	-	-	-	-
KTRK	9.5 ± 2.5	1.0 ± 0.0	7.3 ± 3.5	2.5 ± 0.7
KTRK Muzyka	20.0 ± 3.6	1.5 ± 0.6	18.5 ± 3.5	-
KTRK Sport	8.8 ± 2.5	0.5 ± 0.0	6.8 ± 1.0	1.5 ± 0.0
Russian Federation (N=2248)	112.4 ± 54.1	19.3 ± 12.2	69.5 ± 35.7	23.6 ± 17.5
Pyatnitsa	145.3 ± 33.2	16.3 ± 3.3	86.0 ± 18.1	43.0 ± 20.9
Disney	87.3 ± 27.2	22.0 ± 6.4	52.8 ± 21.6	12.5 ± 7.7
Karusel	37.5 ± 6.6	7.8 ± 3.2	22.8 ± 6.8	7.0 ± 3.4
STS	145.8 ± 23.0	23.5 ± 7.7	92.8 ± 15.4	29.5 ± 11.8
TNT	146.0 ± 58.0	26.8 ± 22.9	93.3 ± 43.2	26.0 ± 14.7

Note: * - no food and beverage advertisements

Table S4. Average frequency of food and beverage advertising per hour, applying the WHO Regional Office for Europe nutrient profiling model

Countries/channels	Not Permitted	Permitted	Unclassified	All food
Turkey (N=1273)	8.8 ± 4.7	2.9 ± 1.8	-	11.1 ± 5.8
Channel 1	1.4 ± 0.55	-	-	1.4 ± 0.55
Channel 2	8.6 ± 4.9	3.1 ± 1.7	-	11.0 ± 5.8
Channel 3	8.5 ± 4.3	2.0 ± 1.1	-	10.0 ± 4.5
Channel 4	11.4 ± 4.5	3.5 ± 2.2	-	14.5 ± 6.5
Channel 5	8.5 ± 3.9	2.9 ± 1.7	-	11.1 ± 4.5
Kazakhstan (N=3494)	8.5 ± 5.9	2.9 ± 2.0	2.1 ± 1.6	11.4 ± 8.2
Balapan	1.3 ± 0.6	-	-	1.3 ± 0.6
NTK	10.8 ± 5.1	2.3 ± 1.4	1.0 ± 0.0	13.0 ± 6.0
1 channel Eurasia	7.0 ± 3.1	2.4 ± 1.4	1.3 ± 0.5	9.4 ± 4.3
31 channel	13.5 ± 6.6	4.2 ± 2.4	2.9 ± 1.6	20.1 ± 8.2
Astana TV	10.3 ± 4.8	3.3 ± 2.2	2.4 ± 1.9	13.4 ± 7.7
Qazaqstan	4.1 ± 3.0	2.0 ± 1.3	-	5.5 ± 4.0
Kyrgyzstan (N=153)	1.9 ± 1.1	1.0 ± 0.0	1.1 ± 0.3	2.1 ± 1.3
312 kino*	-	-	-	-
TumarTV*	-	-	-	-
Balastan*	-	-	-	-
KTRK	2.1 ± 1.1	1.0 ± 0.0	1.0 ± 0.0	2.5 ± 1.4
KTRK Muzyka	2.1 ± 1.2	1.0 ± 0.0	-	2.2 ± 1.4
KTRK Sport	1.4 ± 0.7	1.0 ± 0.0	1.2 ± 0.4	1.6 ± 0.9
Russian Federation (N=2248)	5.1 ± 7.4	2.2 ± 4.2	2.3 ± 1.9	7.9 ± 11.8
Pyatnitsa	5.3 ± 2.6	1.6 ± 0.7	3.0 ± 1.7	8.9 ± 3.3
Disney	3.5 ± 2.1	2.0 ± 1.1	1.6 ± 0.7	5.5 ± 2.7
Karusel	2.0 ± 1.1	1.6 ± 0.8	1.2 ± 0.5	2.8 ± 1.9
STS	5.8 ± 2.2	1.9 ± 0.9	2.3 ± 1.2	9.1 ± 2.9
TNT	6.3 ± 3.1	2.4 ± 1.6	2.1 ± 1.2	9.4 ± 4.2

Note: * - no food and beverage advertisements