

The effectiveness of voluntary policies and commitments in restricting unhealthy food marketing to Canadian children on food company websites

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Abstract: Marketing unhealthy foods and beverages to children (M2K) fosters poor dietary patterns, increasing obesity and noncommunicable disease risk. Federal restrictions on M2K have been under development in Canada since 2016; however, at present, M2K is mostly self-regulated by food companies. This study aimed to compare M2K on Canadian websites of food companies with and without voluntary policies or commitments in this area. A systematic content analysis of company websites was conducted in spring/summer 2017 for major packaged food ($n = 16$), beverage ($n = 12$), and restaurant chain ($n = 13$) companies in Canada. M2K policies were sourced from company websites and published corporate documents. Sixteen companies (43%) reported national and/or global M2K policies, while 21 companies (57%) had no published policies. The websites of Canadian companies ($n = 154$) were scanned for child-directed products and marketing; type and frequency of marketing techniques were recorded. Child-directed marketing appeared on 19 websites of 12 companies (32%), including 9 companies with M2K policies. Websites featured products with unconventional flavours, colours, shapes, or child-oriented packaging, and used promotional characters, contests, games, activities, or lettering and graphics appealing to children. The nutritional quality of products marketed to children was evaluated using a nutrient profile model developed by Health Canada for proposed M2K regulations. Of the 217 products marketed to children, 97% exceeded Health Canada's proposed ~5% Daily Value threshold for saturated fat, sodium, and/or sugars, 73% of which were products from 9 companies with policies. These findings highlight the limitations of self-regulation in restricting M2K on food company websites, reinforcing the need for government regulations.

Key words: marketing, children, policy, self-regulation, websites, food companies, nutrition.

Résumé : La commercialisation de boissons et d'aliments malsains auprès des enfants (« M2K ») favorise des habitudes alimentaires médiocres, une augmentation de l'obésité et un risque accru de maladies non transmissibles. Les restrictions fédérales au sujet de M2K sont en cours d'élaboration au Canada depuis 2016; toutefois, actuellement la M2K est en grande partie autoréglementée par les entreprises alimentaires. La présente étude compare la M2K dans les sites Internet canadiens d'entreprises alimentaires ayant ou non des politiques ou engagements volontaires dans ce domaine. On effectue au cours du printemps et de l'été 2017 une analyse de contenu des sites Internet des grandes entreprises d'aliments préemballés ($n = 16$), de boissons ($n = 12$) et de chaînes de restaurant ($n = 13$) au Canada. Les politiques de M2K proviennent des sites Internet des compagnies et des documents d'entreprise rendus publics. Seize entreprises (43 %) font état de politiques M2K nationales ou mondiales et 21 entreprises (57 %) n'ont pas de politiques publiées. On examine les sites Internet canadiens ($n = 154$) des entreprises comportant des produits destinés aux enfants; on note le type et la fréquence des techniques commerciales utilisées. La commercialisation visant les enfants est présente dans 19 sites Internet de 12 entreprises (32 %) incluant 9 entreprises avec des politiques M2K. Les sites Internet présentent des produits aux saveurs, couleurs, formes et emballages non conventionnels destinés aux enfants et utilisent des personnages promotionnels, des concours, des jeux, des activités ou des lettrages et des graphiques attrayants pour les enfants. On évalue la qualité nutritionnelle des produits destinés aux enfants au moyen du modèle de profil nutritionnel élaboré par Santé Canada dans le cadre de la proposition de règlements au sujet de M2K. Sur les 217 produits destinés aux enfants, 97 % renferment plus que le seuil de ~5 % de la valeur quotidienne des gras saturés, du sodium ou du sucre; 73 % de ces produits proviennent de 9 compagnies ayant des politiques. Ces observations mettent en lumière les limites de l'autorégulation en matière de restriction de la M2K dans les sites Internet des entreprises alimentaires, d'où la nécessité renforcée d'une réglementation gouvernementale. [Traduit par la Rédaction]

Mots-clés : commercialisation, enfants, politique, autorégulation, sites Internet, entreprises alimentaires, alimentation.

Introduction

Childhood obesity rates are rising rapidly in Canada and globally (Rao et al. 2016; World Health Organization 2017). Approximately 1 in 3 Canadians aged 5–17 years currently have overweight or obesity (Rao et al. 2016). Poor diet quality is a major risk factor

for obesity and noncommunicable diseases (NCDs) in children (Proimos and Klein 2012). Canadian children typically obtain nearly one-third of their dietary intake from unhealthy foods and beverages high in total fat, saturated fat, sugars and/or sodium, increasing their risk of obesity and NCDs (Jessri et al. 2016).

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Marketing of unhealthy foods and beverages to children increases their consumption of less healthful products and fosters a preference for calorie-dense foods with little nutritional value (Sadeghirad et al. 2016). The Internet is a medium through which companies can engage child audiences with their products using various marketing techniques, including interactive activities such as games, colouring pages, animations, or videos appealing to children, among others (Brady et al. 2010; Potvin Kent et al. 2013; Ustjanauskas et al. 2014; Boelsen-Robinson et al. 2016; Neyens and Smits 2017; Vandevijvere et al. 2017; Potvin Kent and Pauzé 2018). As frequent Internet users (Steeves 2014), children in Canada are vulnerable to food marketing on websites and the health consequences associated with consuming these products (Sadeghirad et al. 2016). A recent Canadian study found over 54 million food advertisements on child-preferred websites during a 1-year period, over 90% of which were for products high in fat, sodium, or sugars (Potvin Kent and Pauzé 2018).

In Canada, food marketing to children is largely self-regulated by industry (Prowse 2017). The Canadian Children's Food and Beverage Advertising Initiative (CAI) was established in 2007 as a voluntary commitment among food companies to promote healthy diets and lifestyles in all child-directed marketing activities (Advertising Standards Canada 2017). Since 2015, the 18 participating companies have pledged to either completely refrain from marketing their products to children or to only market products that satisfy the CAI's Uniform Nutrition Criteria (Advertising Standards Canada 2014, 2017). Several of these companies are also members of the International Food & Beverage Alliance (IFBA), a group of 12 multinational food companies that developed a set of voluntary commitments aimed at supporting healthy diets and lifestyles, such as through responsible marketing to children (IFBA 2017).

In the absence of government regulations on food marketing to children, monitoring of food company policies, commitments, and practices in this area is crucial for prompting and informing interventions aimed at limiting children's exposure to unhealthy food marketing (World Health Organization Regional Office for Europe 2016). Research examining food marketing on children's preferred television programs and websites in Canada has demonstrated the limited effectiveness of the CAI in restricting unhealthy food marketing to children via these media (Potvin Kent et al. 2011, 2018; Potvin Kent and Pauzé 2018). To our knowledge, only 2 Canadian studies have evaluated child-directed marketing on the websites of CAI companies (Brady et al. 2010; Potvin Kent et al. 2013), both of which found that many of these companies are intensively marketing products to children online. However, these studies did not examine relevant policies and commitments beyond the CAI or evaluate the nutritional quality of products marketed to children on food company websites.

The purpose of this study was therefore to determine how food companies with and without voluntary policies and commitments compare in terms of their marketing unhealthy products to children on Canadian company websites. This research was designed to build on previous studies (Brady et al. 2010; Potvin Kent et al. 2013) by identifying and evaluating all national and global policies on marketing to children reported by food companies in Canada, and by assessing the nutritional quality of products marketed to children on company websites using a nutrient profile model recently suggested by Health Canada as part of proposed regulations on food marketing to children (Health Canada 2017).

Materials and methods

Data were collected in spring/summer 2017. Companies with the largest Canadian market shares in the packaged food, beverage,

and foodservice sectors were identified using data from Euromonitor International (2016a, 2016b, 2016c). Companies holding greater than 1% of the national market share for packaged food or beverage sales – or, for restaurants, at least 0.7% of the consumer foodservice share – were selected for study. Market shares became increasingly diluted beyond these cutoffs; thus, no additional companies were included. This resulted in a sample of 16 packaged food, 12 beverage, and 13 restaurant companies in Canada (Table 1), representing a combined 52%, 74%, and 34% of the market share in each industry sector, respectively. Four companies were among the leading manufacturers of both packaged food and beverages, resulting in a total of 37 companies. Of the 24 packaged food and beverage companies in this sample, 18 were multinational, 3 were Canadian subsidiaries, and 3 were national retailers offering private-label brands. Among the 13 restaurant companies, 9 were multinational and 4 operated exclusively in Canada.

Identification and evaluation of policies on food marketing to children

Company corporate and brand websites, annual reports, press releases, and CAI Participant Commitments were scanned by the first author to identify policies concerning promotion to children on websites. National policy information was sourced from the CAI and companies' Canadian websites. Global commitments included those published on international websites that acknowledged implementation in Canada. Policies of parent companies were also noted, where applicable. For example, because Frito-Lay is a subsidiary of PepsiCo, policies and commitments of PepsiCo were considered applicable to Frito-Lay unless stated otherwise. Relevant policy information reported on websites and in public corporate documents were downloaded and archived as PDF files. Policies and commitments were evaluated in terms of (i) their age group(s) and viewership threshold(s) used to define child-directed marketing; (ii) whether they used a particular set of nutrition criteria to determine the eligibility of products for marketing to children; or (iii) whether they included a commitment to avoid marketing any products to children. A summary of the policy scan and criteria that were used to identify and evaluate applicable company policies and commitments is provided in Supplementary Fig. S1¹.

Marketing to children on company websites

Marketing to children on websites was captured for analysis using Snagit screen recording software (version 4.1.5; TechSmith Corp.). Google searches were conducted for each company to identify relevant Canadian websites. Product webpages linked to food and beverage manufacturers' Canadian websites were scanned to detect child-directed products and, ultimately, child-directed marketing content. Identifying child-directed products and marketing content separately made it possible to determine if some companies offered child-directed products but were not marketing them on their websites. The website scan included 154 Canadian company and brand websites (Supplementary Table S1¹). Websites of company-owned foodservice providers (e.g., catering services), nonfood brands, brands associated with alcohol consumption, and online ordering systems were excluded ($n = 15$).

Based on criteria adopted from literature (Elliott 2008; Colby et al. 2010), a packaged food or beverage product was considered "child-directed" if it satisfied at least 1 of the following: (i) product had an unconventional name, flavour, colour, and/or shape (e.g., birthday cake-flavoured cookies, animal-shaped crackers); (ii) product packaging featured child-oriented lettering or graphics, spokes characters, language referring to children (e.g., "mini", "nano"), or made reference to fun, play, games, or toys. For res-

¹Supplementary data are available with the article through the journal Web site at <http://nrcresearchpress.com/doi/suppl/10.1139/apnm-2018-0528>.

Table 1. Published national and global policies concerning marketing to children, offering of child-directed products, and presence of child-directed marketing on Canadian company website(s) (1 = yes; 0 = no) among the leading packaged food, beverage, and restaurant chain companies in Canada.

Food sector	Company ^a	Policies		Child-directed products ^c	Child-directed marketing ^d	
		National ^b	Global			
Packaged food	Loblaw Companies Ltd./George Weston Ltd. ^{e,f}	1	0	1	0	
	Saputo Inc.	0	0	0	0	
	Nestlé Canada Inc. ^f	1	1	1	0	
	Agropur Cooperative Ltd.	0	0	1	0	
	Parmalat Canada Ltd.	1	0	1	1	
	Kraft Heinz Company	1	0	1	0	
	Frito-Lay Canada/PepsiCo Beverages Canada ^{e,f}	1	1	1	1	
	General Mills Canada Corp.	1	1	1	1	
	Sobeys Inc. ^f	0	0	1	0	
	Schneider Corp./Maple Leaf Foods Inc. ^e	1	0	1	0	
	Unilever Canada Inc.	1	1	1	1	
	Kellogg Canada Inc.	1	1	1	1	
	Canada Bread Co.	0	0	0	0	
	Danone Canada Inc.	1	1	1	1	
	Mondelez Canada Inc.	1	1	1	1	
	Campbell Soup Co.	1	1	1	1	
	Subtotal (/16)	12 (75%)	8 (50%)	14 (88%)	8 (50%)	
Beverage	Coca-Cola Ltd./Minute Maid Co. of Canada ^e	1	1	0	0	
	Canada Dry Motts Inc.	0	1	1	0	
	A Lassonde Inc.	0	0	1	1	
	Aquaterra Corp.	0	0	0	0	
	Naya Waters Inc.	0	0	0	0	
	Metro Inc.	0	0	0	0	
	Sun-Rype Products Ltd.	0	0	1	0	
	Ocean Spray Cranberries Inc.	0	0	0	0	
		Subtotal (/8)	1 (13%)	2 (25%)	3 (38%)	1 (13%)
	Restaurant ^g	Tim Hortons (Restaurant Brands International Inc.)	0	0	0	0
McDonald's (McDonald's Corp.)		1	1	1	1	
Subway (Doctor's Associates Inc.)		0	0	1	0	
A&W (A&W Food Services of Canada Inc.)		0	0	0	0	
Boston Pizza (Boston Pizza International Inc.)		0	0	1	1	
Starbucks (Starbucks Corp.)		0	0	0	0	
Swiss Chalet (Cara Operations Ltd.)		0	0	1	1	
KFC (Yum! Brands Inc.)		0	0	1	0	
St Hubert (Cara Operations Ltd.)		0	0	1	0	
Wendy's (Wendy's Co., The)		0	0	1	0	
Pizza Pizza (Pizza Pizza Ltd.)		0	0	0	0	
Pizza Hut (Yum! Brands Inc.)	0	0	0	0		
Dairy Queen (International Dairy Queen Inc.)	0	0	1	0		
	Subtotal (/13)	1 (8%)	1 (8%)	8 (62%)	3 (23%)	
	Total (/37)	14 (38%)	11 (30%)^h	25 (68%)	12 (32%)	

^aCompanies are listed in descending order of national market share within each industry sector, based on sales data from Euromonitor International (2016a, 2016b, 2016c).

^bThe only national-level policies identified were Canadian Children's Food and Beverage Advertising Initiative (CAI) commitments (Advertising Standards Canada 2017).

^cCompanies manufactured and sold products directed at children.

^dCompanies marketed products to children on their website(s).

^eFor companies where both the brand and national brand owner (i.e., part of the same parent company) were among the top packaged food or beverage manufacturers, the higher ranking company was listed first, followed by the affiliated company.

^fCompanies that were among the top-selling manufacturers in both the packaged food and beverage sectors were only listed as the former.

^gRestaurants are listed as consumer foodservice brands, with the global brand owner noted in parentheses.

^hNine of the 11 companies with global policies were also participants of the CAI.

restaurants, child-directed products were considered to be those listed on the children's menu on the restaurant's Canadian website. A total of 356 child-directed products and 7 children's menus were identified on 45 websites of 25 companies. Websites of companies with child-directed products were subsequently scanned for evidence of marketing of these products to children.

Website content was described as "child-directed" if it included: (i) promotional characters, contests, games, activities; or (ii) lettering and graphics appealing to children (Elliott 2008; Colby et al. 2010; Potvin Kent et al. 2013). The website scan included Canadian website homepages, webpages of all child-directed brands and

products linked to the company's Canadian website, and any designated children's areas (e.g., www.ClubKelloggs.ca). Companies' usage of several marketing techniques was recorded for all webpages with child-directed content. Definitions and general coding rules for each marketing technique are provided in Supplementary Table S2¹ and included manufacturer or brand logos, product packaging, a product as consumed, items included with purchase of child-directed products or restaurant meals, product benefit claims, nutrient content claims, health claims, branded characters, licensed characters, celebrities, appearances of children in images or videos, tie-ins with entertainment or sports industries,

Table 2. Number and percentage of companies with national or global policies, which included specific criteria for target audience, viewership thresholds, and products permitted to be marketed to children.

	Policy criteria	Type of policy			
		National, n = 14 ^a		Global, n = 11 ^b	
		n	%	n	%
Target audience	Children under age 12 y ^c	14	100	9	82
	Unknown ^d	0	0	2	18
Viewership threshold	≥35% ^e	14	100	9	82
	Unknown ^d	0	0	2	18
Products marketed	Only those meeting nutrition criteria ^f	8	57	6	55
	No marketing ^g	4	29	2	18
	Unknown ^d	2	14	3	27

^aThe only national-level policies identified were Canadian Children's Food and Beverage Advertising Initiative (CAI) commitments (Advertising Standards Canada 2017).

^bNine of the 11 companies with global policies were also participants of the CAI and are included in the summary of national policies.

^cCompany commitments defined "child-directed" websites as those primarily directed at children under age 12 years.

^dPolicy information concerning target audience and/or audience threshold and/or products allowed to be marketed to children was not identified.

^eCompany commitments defined "child-directed" websites as those where 35% or more of annual visitors were under age 12 years.

^fCompany committed to only promote products to children satisfying either the company's own nutrition criteria or that of an industry initiative.

^gCompany committed to not market products to children, irrespective of their nutrient profile.

advergames (interactive video games with embedded child-targeted advertising), contests, social sharing buttons (links to share content on social media), membership opportunities, promotional images and videos (featuring child-directed products and/or children), branded downloads, recipes promoting child-directed products, use of audio or visual techniques (e.g., sound effects, animations), and messages encouraging healthy eating and/or physical activity on webpages with child-directed marketing. Identification of child-directed products and marketing content and coding of marketing techniques were conducted independently by 2 researchers. Discrepancies were reviewed together until consensus was reached for all companies and websites.

Assessment of the nutritional quality of products marketed to children

The nutritional quality of products marketed to children on websites was evaluated using a nutrient profile model proposed by Health Canada in June 2017 to identify foods exceeding either ~5% or 15% of the Daily Value (DV) for saturated fat, sodium, and/or total sugars, which would be prohibited from child-directed marketing under pending federal regulations (Health Canada 2017). The saturated fat, sodium, and total sugars content of the products marketed to children on websites was evaluated according to the nutrient thresholds proposed in Table 1 of Health Canada's 2017 discussion paper for public consultation concerning restrictions on unhealthy food and beverage marketing to children. Nutritional information was collected from company websites and Nutrition Facts tables on product packaging. For restaurant companies, meal components were itemized based on how nutritional information was provided on the restaurant's website (i.e., entrée, side, beverage, dessert). Products for which nutritional information could not be retrieved were excluded from this analysis (n = 23, 10%). The remaining 217 products were categorized based on Health Canada's *Table of Reference Amounts for Food*, and their saturated fat, sodium, and total sugars content was converted to the amounts present in the appropriate Reference Amount and Serving of Stated Size (Health Canada 2016b, 2017).

Statistical analysis

Descriptive analysis examined the proportion of companies with policies and commitments that included (i) national and/or global application; (ii) specific child audience definitions in terms of age and/or viewership thresholds (e.g., applicable to websites with ≥35% of viewers <12 years of age); and (iii) restrictions on the nutritional quality of foods eligible for marketing to children (e.g., the CAI Uniform Nutrition Criteria) or pledges to refrain from child-directed marketing altogether. A χ^2 test assessed differences in the presence of child-directed marketing on websites of companies with and without policies on marketing to children. The proportion of companies that used each technique and the total number of times that each marketing technique appeared on child-directed websites was calculated for companies with and without policies. Finally, the proportion of products marketed to children by companies with and without policies that exceeded the ~5% and 15% DV for saturated fat, sodium, and sugars in each product category was calculated according to Health Canada's nutrient profile model (Health Canada 2017).

Results

Policy analysis

Sixteen of 37 companies (43%) published policies concerning marketing to children on websites, including 15 multinational packaged food and beverage manufacturers and 1 multinational restaurant chain (Tables 1 and 2). No policies were identified for retailers with private-label brands or restaurant chains with exclusively national operations. The only national-level policies identified were the CAI commitments of 14 companies in this sample. Notably, although the CAI has required participants to adhere to its Uniform Nutrition Criteria since December 2015, the Participant Commitments of 2 companies made no reference to the criteria as they predated its implementation. Global commitments were identified for 11 companies (30%), 9 of which were participants of the IFBA (as well as the CAI).

Table 3. Number and proportion of companies with child-directed websites that used each technique^a to market to children, presented overall (in descending order of usage) and according to whether companies had policies on marketing to children.

Marketing technique	Total		Companies with policies ^b		Companies without policies ^c	
	n	%	n	%	n	%
TOTAL	12	100.0	9	75.0	3	25.0
Social sharing buttons	12	100.0	9	75.0	3	25.0
Product packaging	10	83.3	8	66.7	2	20.0
Product benefit claims	10	83.3	8	66.7	2	20.0
Manufacturer logo	9	75.0	6	50.0	3	33.3
Product as consumed	9	75.0	6	50.0	3	33.3
Branded characters	9	75.0	7	58.3	2	22.2
Brand logo	8	66.7	7	58.3	1	12.5
Promotional images	7	58.3	5	41.7	2	28.6
Children	6	50.0	4	33.3	2	33.3
Tie-ins	6	50.0	5	41.7	1	16.7
Nutrient content claims	5	41.7	4	33.3	1	20.0
Promotion of physical activity	5	41.7	3	25.0	2	40.0
Membership opportunities	5	41.7	4	33.3	1	20.0
Promotional videos	4	33.3	4	33.3	0	0.0
Special effects	4	33.3	4	33.3	0	0.0
Licensed characters	3	25.0	2	16.7	1	33.3
Branded downloads	3	25.0	2	16.7	1	33.3
Promotional items included with purchase	2	16.7	2	16.7	0	0.0
Health claims	2	16.7	1	8.3	1	50.0
Promotion of healthy eating	2	16.7	1	8.3	1	50.0
Celebrities	2	16.7	2	16.7	0	0.0
Advergamed ^d	2	16.7	2	16.7	0	0.0
Recipes	2	16.7	2	16.7	0	0.0
Contests	1	8.3	1	8.3	0	0.0

^aDefinitions and coding rules for each marketing technique are provided in Table S2¹.

^bCompany had national and/or global policies or commitments on marketing to children.

^cNo company policies on marketing to children were identified.

^dAdvergamed, interactive video games with embedded child-targeted advertising.

Marketing to children on websites

Of the 25 companies with child-directed products, 14 had public policies on marketing to children (Supplementary Table S1¹). Marketing of these products to children was observed on 19 websites of 12 (32%) of the 37 companies (Table 1). Of the 12 companies with child-directed marketing, 11 were multinational packaged food ($n = 8$), beverage ($n = 1$), or restaurant ($n = 2$) companies, and 1 was a Canadian restaurant chain. This included 9 of the 14 CAI participants in this sample, as well as 3 companies without published policies on marketing to children (Supplementary Table S3¹). The proportion of companies with policies on marketing to children that had child-directed marketing on their websites ($n = 9/16$, 56%) was significantly greater than the proportion of companies without policies that had child-directed marketing on their websites ($n = 3/21$, 14%; $\chi^2 = 7.30$, $p = 0.03$). A breakdown of companies' usage of specific marketing techniques is presented in Tables 3 and 4, showing that 75% of the 12 companies that marketed to children on their websites had policies (Table 3) and accounted for 93% of total usages of these marketing techniques (Table 4). Thirteen companies offered child-directed products but did not market them on their websites, including 5 companies with policies and 8 with no public policies.

Two of the 9 CAI companies only marketed products on their websites that were listed in their Participant Commitment as satisfying the CAI Uniform Nutrition Criteria (Table 2). Four CAI participants marketed products not specified in their commitments as meeting the criteria, while 3 participants that committed not to promote products to children under 12 years of age (regardless of nutritional quality) had child-directed marketing on their websites. Eight CAI companies with global policies marketed products to children on their websites, 5 of which pledged

to only promote products satisfying specific nutrition criteria (either company- or initiative-derived) on websites where at least 35% of total visitors are under 12 years of age, and 3 that committed not to promote products on any media directed to children under 12 years of age.

Nutritional quality of products marketed to children

Bakery ($n = 77$) and dairy ($n = 45$) products were the food categories most commonly marketed to children (Table 5). An overview of the nutrient levels of the 217 products marketed to children is provided in Table 5. In total, 97% ($n = 211$) of products marketed to children exceeded the ~5% DV for ≥ 1 of saturated fat, sodium, or total sugars, and 60% ($n = 131$) of products exceeded the 15% DV for ≥ 1 of these nutrients (Table 5). Companies with policies accounted for 73% and 79% of the products exceeding the ~5% and 15% DV thresholds, respectively (Table 5). For all companies, the ~5% DV threshold for saturated fat, sodium, and/or total sugars was exceeded by 100% of the products in 10 categories: bakery products; beverages; fruit and fruit juices; meat, poultry, and substitutes; potatoes, sweet potatoes and yams; salads; sauces; snacks; sugars and sweets; and vegetables (Table 5). The proportion of products that exceeded the ~5% and/or 15% DV thresholds for each individual nutrient (i.e., saturated fat, sodium, and total sugars) are presented overall and by food category in Supplementary Figs. S2–S4.¹

Discussion

Less than half of the top food companies in Canada had a policy concerning marketing to children, and this was particularly salient within the beverage manufacturing and restaurant sectors. Having such policies, however, did not prevent many companies

Table 4. Number of occurrences and percentage of each marketing technique^a used by companies on child-directed websites, presented overall (in descending order of usage) and according to whether companies had policies or commitments on marketing to children.

Marketing technique	Total		Companies with policies ^b		Companies without policies ^c	
	n	% ^d	n	% ^e	n	% ^f
TOTAL	1170	100.0	1092	93.3	78	6.7
Manufacturer logo	206	17.6	196	95.1	10	4.9
Social sharing buttons	195	16.7	187	95.9	8	4.1
Brand logo	140	12.0	137	97.9	3	2.1
Nutrient content claims	119	10.2	107	89.9	12	10.1
Branded characters	110	9.4	105	95.5	5	4.5
Product benefit claims	73	6.2	67	91.8	6	8.2
Product packaging	52	4.4	49	94.2	3	5.8
Promotional images	46	3.9	42	91.3	4	8.7
Promotion of physical activity	40	3.4	35	87.5	5	12.5
Advergaming ^g	29	2.5	29	100.0	0	0.0
Product as consumed	28	2.4	23	82.1	5	17.9
Membership opportunities	27	2.3	26	96.3	1	3.7
Promotional videos	22	1.9	22	100.0	0	0.0
Tie-ins	20	1.7	19	95.0	1	5.0
Children	16	1.4	14	87.5	2	12.5
Branded downloads	13	1.1	6	46.2	7	53.8
Special effects	7	0.6	7	100.0	0	0.0
Celebrities	7	0.6	7	100.0	0	0.0
Promotion of healthy eating	5	0.4	1	20.0	4	80.0
Recipes	5	0.4	5	100.0	0	0.0
Promotional items included with purchase	4	0.3	4	100.0	0	0.0
Licensed characters	3	0.3	2	66.7	1	33.3
Health claims	2	0.2	1	50.0	1	50.0
Contests	1	0.1	1	100.0	0	0.0

^aDefinitions and coding rules for each marketing technique are provided in Table S2¹.

^bCompany had national and/or global policies or commitments on marketing to children.

^cNo company policies on marketing to children were identified.

^dPercentage of the total number of occurrences of the technique on child-directed websites of all companies.

^ePercentage of the total number of occurrences of the technique on child-directed websites that was accounted for by the websites of companies with policies on marketing to children.

^fPercentage of the total number of occurrences of the technique on child-directed websites that was accounted for by the websites of companies without policies on marketing to children.

^gAdvergaming, interactive video games with embedded child-targeted advertising.

from marketing to children on their websites, as we found that a significantly greater proportion of companies with CAI (or similar) commitments marketed products to children, compared with companies without policies in this area. This finding is consistent with those of a previous study examining child-directed marketing on food manufacturer and restaurant websites in Canada, which showed that several marketing techniques — such as licensed characters, contests, and healthy lifestyle messages — were used more frequently by CAI companies to market food to children than nonparticipants (Potvin Kent et al. 2013). A similar trend has been documented on children's preferred websites in Canada and the United States, with research suggesting that companies participating in the CAI or similar voluntary pledges often engage in more child-directed marketing of unhealthy foods online than companies without such commitments (Ustjanauskas et al. 2014; Potvin Kent and Pauzé 2018).

While voluntary, industry-led initiatives to limit unhealthy food marketing to children are preferable to no policy action, their effectiveness is limited by loopholes that can be exploited by companies, such as narrow definitions of marketing to children and high child-audience thresholds (Potvin Kent et al. 2011; Galbraith-Emami and Lobstein 2013; Raine et al. 2013; Roberto et al. 2015). For example, most CAI and globally implemented company commitments consider websites to be directed to children if 35% or more of the total audience is under age 12 years. After completing our research, post hoc analysis of comScore data for June

through August 2017 revealed that the only website in our study that met the 35% threshold was Kellogg's clubkelloggs.ca, a child-directed gaming website (comScore Inc. 2018). Consequently, companies not meeting the 35% threshold can market unhealthy products to children on their websites without violating CAI or similar commitments. For example, Parmalat, a CAI participant with a children's gaming website (<https://cheestrings.ca>) with significant marketing to children, did not meet the 35% child viewership threshold; this form of child-targeted marketing would therefore not be precluded under their current commitments but violates the spirit and intention of the CAI. Food company websites appeal to a broad age-range of visitors (e.g., children, adolescents, and adults) and thus children typically constitute a relatively low proportion of total visitors even though these websites may reach a large number of children (Potvin Kent and Pauzé 2018). As a result, children are often exposed to marketing of unhealthy foods on websites that do not fall under companies' definitions of "child-directed" (World Health Organization Regional Office for Europe 2016). Regulations to restrict unhealthy food marketing to children should therefore include food company websites and other digital media that appeal to children, even if children are not the primary audience.

The effectiveness of the nutrition criteria adopted by the CAI and other industry initiatives or food companies have also been questioned (Potvin Kent et al. 2018). The CAI introduced its Uniform Nutrition Criteria in 2014 to standardize the nutritional

Table 5. The number of products marketed to children on company websites ($n = 217$) and the proportion that exceeded $\sim 5\%$ or 15% of the Daily Value (DV) for saturated fat, sodium, and/or total sugars, presented overall and according to whether companies had policies or commitments on marketing to children.^a

Food category ^b	No. of products			> $\sim 5\%$ DV						> 15% DV					
	TOTAL	Policy ^c	No policy ^d	Total		Policy ^c		No policy ^d		Total		Policy ^c		No policy ^d	
				n	%	n	%	n	%	n	%	n	%	n	%
TOTAL	217	160	57	211	97.2	154	73.0	57	27.0	131	60.4	104	79.4	27	20.6
Bakery products	77	73	4	77	100.0	73	94.8	4	5.2	56	72.7	52	92.9	4	7.1
Dairy products and substitutes	45	42	3	44	97.8	41	93.2	3	6.8	24	53.3	23	95.8	1	4.2
Sugars and sweets	14	8	6	14	100.0	8	57.1	6	42.9	8	57.1	8	100.0	0	0.0
Cereal and other grain products	13	12	1	12	92.3	11	91.7	1	8.3	9	69.2	9	100.0	0	0.0
Combination dishes	12	4	8	11	91.7	3	27.3	8	72.7	5	41.7	2	40.0	3	60.0
Desserts	10	8	2	7	70.0	5	71.4	2	28.6	4	40.0	4	100.0	0	0.0
Fruit and fruit juices	9	3	6	9	100.0	3	33.3	6	66.7	7	77.8	3	42.9	4	57.1
Beverages	8	1	7	8	100.0	1	12.5	7	87.5	3	37.5	1	33.3	2	66.7
Meat, poultry, and substitutes	6	1	5	6	100.0	1	16.7	5	83.3	5	83.3	1	20.0	4	80.0
Sauces	6	0	6	6	100.0	0	0.0	6	100.0	2	33.3	0	0.0	2	100.0
Snacks	6	6	0	6	100.0	6	100.0	0	0.0	4	66.7	4	100.0	0	0.0
Potatoes, sweet potatoes, and yams	4	2	2	4	100.0	2	50.0	2	50.0	3	75.0	2	66.7	1	33.3
Vegetables	4	0	4	4	100.0	0	0.0	4	100.0	0	0.0	0	0.0	0	0.0
Salads	3	0	3	3	100.0	0	0.0	3	100.0	1	33.3	0	0.0	1	100.0

^aCalculated according to the nutrient profile model for restricting marketing of unhealthy foods and beverages to children proposed by Health Canada in Table 1 of their 2017 discussion paper for public consultation (Health Canada 2017).

^bProducts are categorized according to Health Canada's Table of Reference Amounts for Food (Health Canada 2016b) and presented in descending order of the number of products within each food category that was marketed to children on company websites.

^cCompany had public policies or commitments on marketing to children.

^dNo company policies on marketing to children were identified.

quality of products eligible for promotion to children under 12 years by participating companies (Advertising Standards Canada 2014). The criteria limit the calorie, fat, sodium, and sugar content of foods and encourage promotion of products richer in vitamins, minerals, and fibre (Advertising Standards Canada 2014). A recent study indicated that three-quarters of all Canadian packaged foods and beverages with child-directed marketing on their packaging did not satisfy the CAI Uniform Nutrition Criteria, with over two-thirds of the child-directed products offered by CAI companies failing to meet these standards (Mulligan et al. 2018). While assessing compliance with the Uniform Nutrition Criteria was beyond the scope of the present study, we did find that CAI companies contributed approximately three-quarters of the products marketed to children on company websites that exceeded $\sim 5\%$ and 15% of the DV for saturated fat, sodium, and/or total sugars. These findings are consistent with a previous Canadian study, which showed that products marketed by CAI companies on children's preferred websites were 2.2 times more likely to be excessive in fat, sodium, and/or free sugars and 2.5 times more likely to be deemed less healthy (according to the Pan American Health Organization Nutrient Profile Model) than products marketed by companies not participating in the CAI (Potvin Kent and Pauzé 2018). The authors also found that products marketed by CAI companies were, on average, higher in calories, sugar, and sodium per 100 g serving, compared with those of non-CAI companies. In combination, these results suggest that irrespective of the stringency of the Uniform Nutrition Criteria, its effectiveness in restricting unhealthy food marketing to children is currently limited by the voluntary nature of the CAI.

In light of the limitations of voluntary, self-regulated industry initiatives for limiting marketing of unhealthy foods to children, the Government of Canada has committed to implementing mandatory restrictions in this area. In 2016, Health Canada began developing regulations on marketing to children as part of its Healthy Eating Strategy initiatives to improve the national food environment (Health Canada 2016a). This was accompanied by the introduction of a bill to prohibit unhealthy food and beverage marketing to children under age 17 years (Bill S-228) in the Senate of Canada, which is currently under examination by the House of

Commons, but has been amended to only apply to children under age 13 years (Senate of Canada 2017). Health Canada has proposed a new nutrient profile model to identify foods with more than $\sim 5\%$ or 15% of the DV for saturated fat, sodium, and/or total sugars, which would be prohibited from child-directed marketing under Bill S-228 (Health Canada 2017). In this study, virtually all products marketed to children on company websites contained greater than $\sim 5\%$ of the DV for at least 1 of saturated fat, sodium, or total sugars. This finding suggests that implementing a mandatory $\sim 5\%$ DV threshold for these nutrients would prove highly effective in limiting marketing of unhealthy products to children on food company websites.

Health Canada has also proposed restrictions on several techniques used to market food and beverages in child-directed media channels and settings (Health Canada 2017). This proposal is supported by our results, which indicate that approximately one-third of the largest food companies in Canada are employing a variety of marketing techniques at high frequencies to market products to children on their websites. Consistent with the results of similar content analyses, this study found manufacturer and brand logos, images of product packaging, and brand or product benefit claims to be among the most widely and frequently used techniques for marketing foods to children online (Weber et al. 2006; Kelly et al. 2008; Henry and Story 2009; Potvin Kent et al. 2013; Neyens and Smits 2017). Recent studies have also indicated that social sharing buttons are becoming a widely used technique for marketing to children on food company websites (Neyens and Smits 2017; Vandevijvere et al. 2017). Featuring social sharing buttons on websites encourages visitors to actively engage with brands and enables companies to reach wider audiences via social media (Tsimonis and Dimitriadis 2014). The especially frequent use of social sharing buttons observed in our study may be a reflection of the growing prevalence and intensity of food advertising on social media (Freeman et al. 2014; Boelsen-Robinson et al. 2016; Vandevijvere et al. 2018; Vassallo et al. 2018). Even at 10–12 years of age, few children can identify basic static advertisements on websites (Ali et al. 2009). Using these marketing techniques on websites visited by children increases children's ability to recall branded unhealthy products and strengthens their preference for

these foods (Cornwell and McAlister 2011). Children have also demonstrated strong visual memory of food packaging and brand logos (McNeal and Ji 2003), indicating that repeated exposure to these company identifiers affects their consumer behaviour (Kotler et al. 2012). The influence of these techniques on children's food preferences (Sadeghirad et al. 2016), combined with the lack of public regulations and limitations of existing voluntary commitments (Prowse 2017), suggests a need for federal legislation to restrict child-directed marketing of unhealthy foods on websites in Canada. Similar legislation has already been enacted in countries such as Chile and Brazil (World Cancer Research Fund International 2018). Data from this study may serve as a benchmark for imminent developments in policies and regulations concerning food marketing to children in Canada.

This study provides an overview of the commitments and actions concerning promotion to children on websites of food companies with the largest Canadian market shares, capturing the policies and behaviours of companies with the greatest influence on the national food environment. Compared with much of the previous research on food marketing to Canadian children, this work examined the marketing actions of a broader range of companies across 3 industry sectors. This study was also novel in its evaluation of global and domestic policies beyond the CAI, and in its comparison of the strength of these commitments to companies' child-directed marketing practices on their websites. It was also one of the first studies to investigate the stringency of Health Canada's proposed nutrient profile model for restricting marketing of unhealthy foods and beverages to children. Furthermore, since 81% of companies in this sample have North American or global operations, these results may be generalizable to other countries. Despite the strengths of this research, it is not without limitations. For example, some companies may have additional commitments beyond what is published online, and it is sometimes unclear whether policies reported within global corporate websites or documents apply to Canada. In addition, this study presents a snapshot of food company websites in spring/summer 2017; however, the volume and nature of child-directed food advertisements online may vary seasonally. Finally, advertising on company websites is only 1 medium for marketing to children; this analysis did not consider other media which are likely greater contributors, such as broadcast and social media and on-package marketing.

Conclusion

While some food companies are taking strides towards limiting marketing to children on company websites, voluntary industry commitments are not uniformly preventing packaged food, beverage, and restaurant companies in Canada from promoting unhealthy food and beverage products to children. These findings emphasize a need for mandatory government regulations to protect Canadian children from the marketing of unhealthy food and beverages on company websites. Our results suggest that applying marketing restrictions to all websites and digital media featuring content that appeals to children, rather than only restricting marketing on websites with high proportions of child visitors, would reduce children's exposure to a plethora of unhealthy food and beverage marketing techniques. In addition, defining "unhealthy" food and beverages as those exceeding ~5% of the DV for saturated fat, sodium, and/or total sugars would significantly reduce the number of products to which children would be exposed on company websites. Data from this study provide a baseline for future research examining the effectiveness of imminent federal policy action concerning marketing to children. There will also be a need for continual monitoring of food marketing to children on company websites given the rapidly evolving nature of digital marketing techniques and the online environment.

Conflict of interest statement

Mary R. L'Abbé reports grants from Retail Council of Canada, Program for Food Safety, Nutrition and Regulatory Affairs at the University of Toronto (with partial funding from Nestlé Canada), and Dairy Farmers of Canada, unrelated to the submitted work. The other authors have no conflicts of interest related to this manuscript.

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