

Advertising expenditures across media on food and beverage products heavily advertised on youth-appealing television stations in Canada

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Abstract

This research estimated and characterized advertising expenditures on food products heavily advertised on youth-appealing television stations in Canada in 2019 overall, by media, by food category, and compared expenditures in two policy environments (Quebec and the rest of Canada, excluding the territories) and on “healthier” versus “less healthy” products. Advertising expenditure estimates for 57 selected food categories promoted on television, radio, out-of-home media, print media, and popular websites were licensed from Numerator. Sixty-one products or brands were identified as heavily advertised on youth-appealing stations and classified as “healthier” or “less healthy” based on a nutrient profile model proposed by Health Canada. Total expenditures and expenditures per adolescent capita were calculated. Approximately, \$110.9 million was spent advertising food products heavily advertised to adolescents in Canada in 2019, with television accounting for 77% of total expenditures and fast food restaurants accounting for 51%. Most expenditures (77%; \$80.6 million) were devoted to advertising “less healthy” products. In Quebec, advertising expenditures on examined products were 23% lower per capita (\$45.15/capita) compared to the rest of Canada (\$58.44/capita). Advertising expenditures in Quebec were lower for energy drinks (−47%; −\$0.80/capita) and candy and chocolate (−41%; −\$1.00/capita) and higher for yogurt (+85%; +\$1.22/capita) and portable snacks (+25%; +\$0.15/capita). Quebec’s restriction of commercial advertising directed to children under 13 may explain lower per capita advertising expenditures on some “less healthy” foods heavily advertised to adolescents in Quebec. Nevertheless, this spending remains high in Quebec and nationally. Continued monitoring of these expenditures is warranted.

Key words: food and beverage advertising expenditures, nutritional quality, adolescents, monitoring, Canada, Consumer Protection Act

Introduction

Unhealthy diets characterized by the consumption of ultra-processed foods are a pervasive global health concern, as they can increase one’s risk of developing diet-related non-communicable diseases (Chen et al. 2020). Nutrition has a critical effect on the growth and development of youth, and any consistent deviation from healthy eating behaviour can have detrimental short- and long-term effects on dietary habits, physical health, and mental well-being (Craigie et al. 2011; Rankin et al. 2016). In Canada, 21%–24% of the total daily caloric intake for youths aged 4–18 years consists of food and beverages not recommended by national dietary guidelines (Hack et al. 2021). Concerningly, youth aged 9–13 years who are transitioning to adolescence have a higher average intake of foods high in sugars, fats, and sodium compared to other age groups and consume almost double the energy from high caloric beverages (Hack et al. 2021).

Excess weight and obesity affect approximately 30%–40% of adolescents in Canada and the United States (Government of Canada 2017; Fryar et al. 2021). Unhealthy food marketing can negatively influence the food attitudes, preferences, and intake of young people and is thought to be a powerful environmental determinant of poor diet and excess weight (McGinnis et al. 2006; Kelly et al. 2015; Norman et al. 2016; Qutteina et al. 2019; Harris et al. 2020). Research examining food advertising in several high-income countries, including Canada and the United States, has concluded that unhealthy products are heavily advertised to adolescents across media channels, including television, print media, outdoor advertising, and digital media (Powell et al. 2013; No et al. 2014; Potvin Kent and Pauzé 2018; Potvin Kent et al. 2019; Czoli et al. 2020; Huang et al. 2020). Adolescents are developmentally vulnerable as they are coping with identity development, self-monitoring challenges, peer pressure, and are ex-

periencing greater independent purchasing power (Buijzen et al. 2010; Harris et al. 2020). The food industry takes advantage of this vulnerable stage of life to increase their sales, by using many adolescent-appealing marketing techniques and themes, such as the use of slang, celebrities, popular music, and sports to market their products to this population more effectively (Qutteina et al. 2019; Truman and Elliott 2019; Harris et al. 2020). This is especially true in digital media where artificial intelligence is being used to deliver more targeted, personalized, and interactive advertising (Matz et al. 2017; World Health Organization 2017) and where adolescents are spending more of their time (Anderson and Jiang 2021). Although adolescents are known to be exposed and persuaded by unhealthy food and beverage advertising, existing statutory policies restricting such advertising to children often do not apply to adolescents, particularly older youth (Taillie et al. 2019).

Only one study to date has investigated how much food companies spend promoting their products to adolescents. In the United States, \$1.01 billion was spent on advertising food products directly to adolescents in 2009 with notable increases between 2006 and 2009 (Powell et al. 2013). The majority (90%) of these expenditures were spent on advertising products often classified as “unhealthy”, such as fast food, beverages, sugary cereal, and snacks, while healthier products such as fruits and vegetables were advertised the least, accounting for only 0.4% of total expenditures (Powell et al. 2013). Furthermore, research conducted in the United States concluded that fast food companies are investing more in advertising their products to adolescents compared to children, which is a cause for concern (Federal Trade Commission 2012). Another study based out of the United Kingdom estimated total expenditures on food and beverage advertising in digital media to be high, totalling £731 million in 2018 but did not provide expenditure estimates on products directly advertised to adolescents (Tatlow-Golden and Parker 2020).

In Canada, no research has examined advertising expenditures on products heavily advertised to adolescents. Examining these expenditures in Canada is interesting because of the country’s unique policy context. In most Canadian provinces, two self-regulatory industry initiatives, namely the *Canadian Children’s Food and Beverage Advertising Initiative* and the *Broadcast Code for Advertising to Children*, attempt to restrict food and beverage advertising to children under 12, but do so ineffectively (Potvin Kent et al. 2011; Ad Standards Canada 2020; Ad Standards Canada 2022), while in Quebec, the provincial *Consumer Protection Act* bans all commercial advertising to children under the age of 13 and has done so for more than four decades (Office de la protection du consommateur 2012). The latter has been shown to have some positive impact on the use of child-appealing design elements in food advertising (Potvin Kent 2022, under review; Potvin Kent et al. 2011; Office de la protection du consommateur 2012). A recent study also found that per child capita advertising expenditures on child-targeted food products across media, including broadcast television, radio, print media, digital media, and outdoor advertising in 2019, were lower in Quebec compared to all other Canadian provinces (Potvin Kent et al., under review). Both the self-regulatory initiatives and

Quebec’s Consumer Protection Act exclude adolescents older than 11 or 12 years old. The objectives of this study were to estimate food advertising expenditures on products heavily advertised to adolescents in Canada, to compare these expenditures in Quebec and the rest of Canada overall, by food category, by media, and to determine how much of these expenditures promoted healthier versus less healthy products. It was hypothesized that nationally, food advertising expenditures on products heavily advertised to adolescents would be high and that most of these expenditures would be devoted to promoting “less healthy” products as opposed to healthier ones. Given the statutory nature of Quebec’s advertising restrictions and its exclusion of adolescents, it is possible that food and beverage companies in this province allocate advertising dollars that would otherwise be spent on promoting child-targeted products to advertise to adolescents. As such, it was hypothesized that advertising expenditures on products heavily advertised to adolescents would be higher in Quebec compared to the rest of the country.

Materials and methods

Data source

Expenditure data from 2019 on advertisements for 57 select food categories were licensed from a private consumer profiling and advertising monitoring company called Numerator. A list of these licensed food categories has been published elsewhere (see Supplementary Table 1; Potvin Kent et al. 2022). Numerator monitors the advertising environment in Canada and estimates advertising expenditures for 94 television stations, 41 radio stations, 6 out-of-home suppliers, 64 newspapers, 95 magazines, and more than 1000 websites. Expenditures are estimated using advertising data collected by Numerator (e.g., data on ad content, frequency and/or size in print publications, on websites, and on television) and media use and billing information provided by third parties, including broadcasters and radio stations, among others. Television-advertising spending estimates capture advertising on live broadcast television, excluding on-demand and streaming television services. Out-of-home expenditure estimates include advertisements in malls and airports (e.g., ads in bathrooms) and in outdoor media (e.g., ads on transit service exteriors and shelters and billboards). For print media, spending estimates are based on all advertisements that exceed 1/16th of the page in size, excluding independent flyers or inserts. Digital media expenditure estimates include display and pre-roll video advertisements seen on the 1000 most visited websites in Canada accessed via web browsers on mobile and desktop devices and exclude websites or apps where a login is required (e.g., social media and streaming services). A detailed overview of Numerator’s methodology for estimating advertising expenditures for each media has been published elsewhere (see Supplementary Table 2; Potvin Kent et al. 2022). Numerator’s Ad Quest software was used to generate the data for this study, which only includes advertising expenditures for Canada’s 10 provinces and excludes any spending in the three territories. Net expenditure estimates are reported per product or brand by food category (as de-

fined by Numerator) and exclude the standard 15% mark-up that advertising agencies charge to advertisers.

Identification of products heavily advertised to adolescents

Food and beverage products or brands heavily advertised to adolescents were identified using Numerator's television advertising data from 2019. Products were considered heavily advertised to adolescents if they met at least one of the following criteria: (1) the product or brand ranked among the 50 most advertised products on two adolescent-appealing television stations (i.e., Much and MTV) broadcast across four major media markets outside of Quebec and (2) $\geq 25\%$ of a product's or brand's advertisements were broadcast on these adolescent-appealing television stations. If instances of brand advertising met our criteria, then all expenditures tied to that brand were included in the study. MTV was considered adolescent-appealing because its programming in 2019 focused on adolescent-targeted or adolescent-appealing reality television shows (e.g., *Teen Mom* and *Ex on The Beach*), celebrities (e.g., Lindsay Lohan's *Beach Club* and *TMZ Live*), comedies (e.g., *Ridiculousness*), and pop culture (e.g., MTV movie and music awards), among other programming. Much was considered as such because its programming was focused on youth-appealing comedy shows (e.g., *South Park*, *American Dad!*, *Inside Amy Schumer*, and *Tosh.O*), reality television (e.g., *American Ninja Warrior* and *Most Expensivest*), and music (e.g., *Playlist*).

Nutrient profiling

Products or brands identified as heavily advertised to adolescents were classified as either "less healthy" or "healthier", according to their classification as being "restricted" or "permitted" for advertising to children by Health Canada's proposed nutrient profiling model. To do so, nutrition information for these products was collected in priority from the University of Toronto's 2017 Food Label Information Program (FLIP), a branded food composition database (Franco-Arellano et al. 2020), followed by Canadian food company websites, the websites of Canadian food retailers (e.g., Loblaws, Walmart, and Amazon), American food company websites, the websites of American food retailers (e.g., Walmart), and previously collected data from other Canadian studies on food advertising (Potvin Kent and Pauzé 2018; Potvin Kent et al. 2018). For restaurant items, the nutritional information was collected in priority from the restaurant's Canadian website, followed by the restaurant's American website, the University of Toronto's 2016 Menu-FLIP food composition database for the 90 largest Canadian restaurant chains (Murphy et al. 2020), and nutritional data collected for previous studies (Potvin Kent and Pauzé 2018; Potvin Kent et al. 2018). Nutritional information for restaurant items (excluding entrees) was consistently collected for the medium size when available as the nutrient profiling of these items is conducted according to the serving sizes in which they are sold. When nutritional information for a specific product was not available, data were instead collected using a similar product (e.g., different flavour), or if no comparable product was found, the in-

formation was deemed missing. When expenditures were reported by brand, nutritional information was collected for the "original"- or "classic"-flavoured product associated with the brand, or a product was selected at random if all the associated products were deemed similar. Brands associated with multiple and very different products had expenditures classified corresponding to the classification of most products ($> 50\%$) when it was possible to collect nutritional information on all products. In terms of expenditures on restaurant items associated with multiple products, as in the case of meal combos, the entire menu item was classified as "restricted" (i.e., less healthy) if one or more items were classified as such. Data from FLIP and Menu-FLIP were collected and validated by trained research assistants from the L'Abbé Lab at the University of Toronto. Nutritional information for additional products was collected by trained research assistants (MB, LR, MP, and AP) and reviewed by graduate students trained in nutrition (JS and EP).

Advertised products were classified using Health Canada's proposed Nutrient Profile Model (NPM), defining which products would or would not be subject to advertising restrictions (L'Abbé et al. 2020). Developed to be consistent with Canada's Food Guide, this NPM classifies products according to their content in saturated fats, total sugars, and sodium. Each product that contained added fat, free sugars, and/or sodium was classified as "restricted" and considered "less healthy" if they surpassed Health Canada's "low-in" threshold for any of these nutrients. Nutrient thresholds are only applied on a nutrient-by-nutrient basis. In other words, products are only assessed against a specific nutrient threshold if it contains an added source of that nutrient in the ingredient list. Products were classified as "permitted" and considered "healthier" if the contents did not exceed any of the nutrient thresholds or if they did not contain any added fat, free sugars, or sodium. The nutrient thresholds for packaged food and beverages were applied to standard serving sizes that vary by product type. For restaurants, nutrient thresholds were applied to 100 g servings for entrees or to the serving sizes in which products are sold for all other restaurant items. Additional information on the nutrient thresholds used for classifying products have been published elsewhere (Potvin Kent et al. 2022).

Analysis

Descriptive analyses were conducted. Advertising expenditures for products heavily advertised to adolescents were described overall, by food category, by media, including television, print media (i.e., newspapers and magazines), out-of-home media, and digital media (i.e., mobile and desktop display and video), and by region (Quebec, the rest of Canada, and total Canada). The products or brands identified as heavily advertised to adolescents were categorized into 8 product categories and 11 subcategories. To compare spending in Quebec to that in the rest of Canada, advertising spending per adolescent aged 13–17 years old was calculated by dividing advertising expenditures by adolescent population estimates for 2019 published by Statistics Canada (Government of Canada 2021). To characterize differences in advertising

expenditures per capita between Quebec and the rest of Canada, absolute and relative differences were computed.

Results

Products/brands heavily advertised to adolescents

Overall, 61 products or brands met our inclusion criteria. As shown in **Table 1**, fast food restaurants accounted for 37.7% of all products/brands, followed by snacks (24.6%) and candy and chocolate (11.5%).

Products with the highest advertising expenditures

Nationally, of the top 10 products heavily advertised to adolescents with the highest advertising expenditures, the advertisement of milk by a dairy association dominated expenditures (\$10.8 million; \$5.41/capita), followed by a fast food restaurant's sandwich (\$7.9 million; \$3.94/capita) and a fast food restaurant's coffee (\$7.5 million; \$3.76/capita) (**Table 2**). The top 10 products were the same for Quebec and the rest of Canada; however, their ranking differed. For all products, advertising expenditures per capita were lower in Quebec compared to the rest of Canada.

Advertising expenditures by media

In Canada, approximately \$110.9 million overall (\$55.67/capita) was spent advertising food and beverage products heavily advertised to adolescents in 2019 (**Table 3**). Nationally, 77.1% (\$42.93/capita) was devoted to advertising on television, followed by 7.6% (\$4.25/capita) on out-of-home media and 7.5% (\$4.19/capita) on the radio. In Quebec, advertising expenditures across media on products heavily advertised to adolescents were 23% lower per capita (\$45.15/capita) compared to the rest of Canada (\$58.44/capita). Advertising expenditures per capita in Quebec were also lower on television (−\$9.04/capita; −20.2%), radio (−\$2.10/capita; −45.4%), digital media (−\$1.91/capita; −42.1%), and out-of-home media (−\$0.32/capita; −7.4%) and were higher in print media (+\$0.09/capita; +60.1%) compared to the rest of Canada.

Advertising expenditures by food category

According to **Table 4**, nationally, of the \$110.9 million spent on advertising products heavily advertised to adolescents in 2019, the greatest spending by food category was on fast food restaurants (\$28.55/capita; 51.3%), followed by beverages (\$8.96/capita; 16.1%) and dairy products (\$7.75/capita; 13.9%), whereas the lowest spending was on cookies (<\$0.01/capita; <0.01%) and processed meats (\$1.35/capita; 2.4%). Per capita advertising expenditures were lower in Quebec for most food categories compared to the rest of Canada, including fast food restaurants (−\$9.95/capita; −32.5%), milk (−\$2.38/capita; −40.2%), and candy and chocolate (−\$1.00/capita; −41%). In contrast, advertising expenditures in Quebec were higher for six food categories, including yogurt (+\$1.22/capita; +84.7%), food manufacturers (+\$0.47/capita; +30.8%), and portable snacks (+\$0.15/capita; +24.5%).

Advertising for products classified as “less healthy”

In Canada overall, approximately \$80.6 million (77.1% of total expenditures) was spent promoting food products heavily advertised to adolescents classified as “less healthy”, and over 80% of expenditures in all categories but three were classified as such (Supplementary Table S1). In Quebec specifically, approximately \$14 million (77.6%; \$33.77/capita) of provincial advertising expenditures were classified as “less healthy”, and approximately \$66.6 million (77%; \$42.22/capita) in the rest of Canada was also classified as such (**Table 5**). Advertising spending per capita on “less healthy” products overall was lower in Quebec than in the rest of Canada (−20%; −\$8.46/capita).

Discussion

As predicted, estimated advertising expenditures devoted to food and beverage products heavily advertised on youth-appealing television stations are high across all media channels, and most expenditures are devoted to advertising “less healthy” products. Fast food restaurants accounted for about half of all expenditures across Canada, followed by beverages (primarily soft drinks). High levels of spending on fast food is worrisome as this advertising can greatly influence adolescents' independent purchases and preferences for fast food that as a result may negatively impact their dietary patterns (McGinnis et al. 2006; Kelly et al. 2015; Norman et al. 2016). Equally concerning are the high expenditures on beverages such as soft drink products or brands, energy drinks, and fruit beverages, given their content in free sugars and/or artificial sweeteners and the increased risk of type 2 diabetes, cardiovascular disease, and other health consequences associated with their consumption (Meng et al. 2021; Pan et al. 2021).

Contrary to what was expected, our study found that advertising expenditures on products heavily promoted on adolescent-appealing stations were generally lower per adolescent capita in Quebec compared to the rest of Canada, except for spending on dairy brands and associations, yogurt, soft drinks, portable snacks, food manufacturers, and print advertising. It is possible that variable advertising costs in Quebec and the rest of Canada account for noted differences in per adolescent capita advertising expenditures between these two regions. Quebec's *Consumer Protection Act* could also be a reason for lower expenditures in this province; however, this is hard to establish. Given that our study identified products advertised to adolescents using advertising data for stations broadcast outside of Quebec, it is possible that companies advertise different products on youth-appealing stations in Quebec, which may account for noted differences in spending. Data on the frequency of food and beverage advertising in May 2019 in Montreal (Quebec) and Toronto (ON) suggest that the frequency of food advertising on child- and youth-appealing stations and generalist stations may be lower in Quebec (90.1 and 90.1 ads/day/station, respectively) than in ON, a neighbouring province (186.8 and 111.9 ads/day/station, respectively) (Pauzé and Potvin Kent

Table 1. Number of products/brands heavily advertised on youth-appealing television stations[†] in Canada in 2019 by food category.

Food category	Products n (%)	Brands n (%)	Total n (%)
Candy and chocolate	7 (13.2)	0 (0)	7 (11.5)
Dairy products	3 (5.7)	2 (25)	5 (8.2)
Dairy brands and associations	0 (0)	1 (12.5)	1 (1.6)
Milk	1 (1.9)	0 (0)	1 (1.6)
Yogurt	2 (3.8)	1 (12.5)	3 (4.9)
Processed meats	4 (7.5)	0 (0)	4 (6.6)
Luncheon meat	3 (5.7)	0 (0)	3 (4.9)
Weiners and franks	1 (1.9)	0 (0)	1 (1.6)
Beverages	3 (5.7)	2 (25)	5 (8.2)
Energy drinks	1 (1.9)	0 (0)	1 (1.6)
Juices, drinks, and nectars	1 (1.9)	0 (0)	1 (1.6)
Soft drinks	1 (1.9)	2 (25)	3 (4.9)
Snacks	13 (24.5)	2 (25)	15 (24.6)
Crackers	1 (1.9)	0 (0)	1 (1.6)
Portable snacks	6 (11.3)	0 (0)	6 (9.8)
Snack foods	6 (11.3)	2 (25)	8 (13.1)
Fast food restaurants	23 (43.4)	0 (0)	23 (37.7)
Food manufacturers, brokers, and exporters	0 (0)	2 (25)	2 (3.3)
Total	53 (100)	8 (100)	61 (100)

2021; Pauzé et al. 2021). It is currently unknown whether differences in advertising frequency between Quebec and the rest of Canada exist in other media channels and settings. While it is possible that Quebec's law confers some protection to youth aged 13 years and over, further research is needed to establish whether this is the case. Even if Quebec's *Consumer Protection Act* were responsible for lower per capita expenditures on food products heavily advertised to adolescents, provincial expenditures are still high, with \$45.15 per adolescent capita being spent on advertising these products across examined media. As such, one could expect this age group to be highly exposed to "less healthy" food advertising.

Our study found that television accounted for more than three quarters of advertising expenditures on food products heavily advertised to adolescents. This result may partly stem from the fact that products included in our study were identified based on their frequent promotion on youth-appealing television stations. However, noted differences in advertising expenditures by media are mostly attributable to the variable cost of advertising. Advertising on broadcast television is a lot more expensive than in other media. Although digital media accounted for less than 10% of advertising expenditures on products heavily advertised to adolescents, sums spent in both geographic areas and in Canada overall are high. Direct comparison of this spending with that in other media channels is not possible, as advertising costs are reported as being lower in digital media (Top Draw 2021). It's likely that adolescent exposure to advertising in this media is high, as adolescents are heavy users of digital media. In the United Kingdom, it was shown that adolescents aged 12–15 spend an average of 20.5 h on the internet each week and 16.8 h on a mobile device (Ofcom 2020). Adolescents are also con-

sumers that can be universally reached by digital advertisers, as 95% of American adolescents reportedly own a smartphone (Anderson and Jiang 2021). This is concerning, as these digital platforms introduce more targeted and personalized advertising using artificial intelligence to produce more effective advertisements (Matz et al. 2017; World Health Organization 2017). Along with the use of these targeted techniques, evidence has shown that food and beverage companies promoting their products in settings where exposure to adolescents is high (such as in areas near high schools and on television and digital media) mainly advertise products high in fat, sugar, and sodium (Powell et al. 2013; No et al. 2014; Potvin Kent and Pauzé 2018; Potvin Kent et al. 2019; Czoli et al. 2020; Huang et al. 2020).

Adolescents are key consumers for the food and beverage industry due to their vulnerability and independent purchasing power; however, the downstream effects of marketing on this population, including weight gain, chronic disease, and psychological comorbidities, are detrimental to their health (Craigie et al. 2011; Rankin et al. 2016). Supporting the multi-pronged federal strategy to promote healthy eating and prevent these adverse health outcomes (Government of Canada 2016), Bill C-252, an Act to amend the Food and Drugs Act, was introduced in the Canadian House of Commons in February 2022 and intends to restrict advertising promoting foods containing excess sugar, saturated fats, or sodium directed to children under 13 (Parliament of Canada 2022). Although this law would not apply to adolescents if adopted, the Act highlights the importance of monitoring food and beverage advertising to those aged 13–16 years old (Parliament of Canada 2022), lending support to the current research. Given that expenditures on food products heavily advertised to adolescents are high in both Quebec and the rest of Canada, it is

Table 2. Top 10 products with the highest advertising expenditure among the select food and beverage products[†] heavily advertised to adolescents in Quebec and the rest of Canada.

Advertised product/brand	Quebec		Rest of Canada			Total Canada		
	Expenditures CAD	Expenditures per capita [‡] CAD	Advertised product/brand	Expenditures CAD	Expenditures per capita [‡] CAD	Advertised product/brand	Expenditures CAD	Expenditures per capita [‡] CAD
Restaurant A—coffee	1 507 648	3.63	Dairy association—milk	9 311 490	5.91	Dairy association—milk	10 776 066	5.41
Dairy Association—milk	1 464 576	3.53	Restaurant B—sandwich 1	6 971 789	4.42	Restaurant B—sandwich 1	7 851 057	3.94
Restaurant B—sandwich 1	879 268	2.12	Restaurant A—coffee	5 985 061	3.80	Restaurant A—coffee	7 492 709	3.76
Restaurant C—breakfast sandwich	786 613	1.90	Restaurant C—breakfast sandwich	4 465 765	2.83	Restaurant C—breakfast sandwich	5 252 378	2.64
Restaurant A—meal deal	731 598	1.76	Food company A—soft drink	3 253 956	2.06	Food company A—soft drink	3 965 782	1.99
Food company A—soft drink	711 826	1.72	Restaurant C—reward card	3 155 626	2.00	Restaurant C—rewards card	3 843 153	1.93
Restaurant C—reward card	687 527	1.66	Restaurant B—sandwich 2	3 091 091	1.96	Restaurant A—meal deal	3 761 940	1.89
Restaurant C—sandwich 2	548 295	1.32	Restaurant A—meal deal	3 030 342	1.92	Restaurant B—sandwich 2	3 639 386	1.83
Restaurant A—app	476 534	1.15	Restaurant A—hot beverage promotion	2 773 012	1.76	Restaurant A—hot beverage promotion	3 218 698	1.62
Restaurant A—hot beverage promotion	445 686	1.07	Restaurant A—restaurant app	2 705 153	1.72	Restaurant A—app	3 181 687	1.60

Note: CAD, Canadian dollars. [†]Based on products from 57 select food categories advertised on two adolescent-appealing stations broadcast outside Quebec. [‡]Expenditure per adolescent capita aged 13–17 years.

Table 3. Advertising expenditures on products heavily advertised to adolescents[†] in 2019, by geographic region and media.

	QC		ROC		QC versus ROC		Total Canada	
	Total expenditures CAD (%)	Expenditures per adolescent capita [‡] CAD	Total expenditures CAD (%)	Expenditures per adolescent capita [‡] CAD	Absolute difference CAD/capita	Relative difference %	Total Expenditures CAD (%)	Expenditures per capita [‡] CAD
Television	14 840 787 (79.2)	35.77	70 643 366 (76.7)	44.82	−9.04	−20.2	85 484 153 (77.1)	42.93
Radio	1 049 283 (5.6)	2.53	7 303 098 (7.9)	4.63	−2.10	−45.4	8 352 381 (7.5)	4.19
Out-of-home	1 658 017 (8.9)	4.00	6 806 822 (7.4)	4.32	−0.32	−7.4	8 464 839 (7.6)	4.25
Print media	97 254 (0.5)	0.23	230 767 (0.3)	0.15	0.09	60.1	328 021 (0.3)	0.16
Digital media	1 086 957 (5.8)	2.62	7 138 659 (7.7)	4.53	−1.91	−42.1	8 225 616 (7.4)	4.13
Total	18 732 298 (100)	45.15	92 122 712 (100)	58.44	−13.29	−22.7	110 855 010 (100)	55.67

Note: CAD, Canadian dollars; QC, Quebec; ROC, rest of Canada. [†]Based on products from 57 select food categories advertised on two adolescent-appealing stations broadcast outside QC. [‡]Expenditure per adolescent capita aged 13–17 years.

Table 4. Advertising expenditures on products heavily advertised to adolescents[†] in Canada in 2019 across all examined media by food category.

	QC		ROC		QC versus ROC		Total Canada	
	Total expenditures CAD (%)	Expenditures per adolescent capita [‡] CAD	Total expenditures CAD (%)	Expenditures per adolescent capita [‡] CAD	Absolute difference CAD/capita	Relative difference %	Expenditures CAD (%)	Expenditures per adolescent capita [‡] CAD
Candy and chocolate	593 733 (3.2)	1.43	3 825 414 (4.2)	2.43	-1.00	-41.0	4 419 147 (4.0)	2.22
Cookies	720 (<0.01)	<0.01	0 (0)	0.00	0.00	-	720 (0.0)	<0.01
Dairy products	2 839 569 (15.2)	6.84	12 582 337 (13.7)	7.98	-1.14	-14.2	15 421 906 (13.9)	7.75
Dairy brands and associations	273 310 (1.5)	0.66	1 004 976 (1.1)	0.64	0.02	+3.3	1 278 286 (1.2)	0.64
Milk	1 464 576 (7.8)	3.53	9 311 490 (10.1)	5.91	-2.38	-40.2	10 776 066 (9.7)	5.41
Yogurt	1 101 683 (5.9)	2.66	2 265 871 (2.5)	1.44	1.22	+84.7	3 367 554 (3.0)	1.69
Processed meat	370 665 (2.0)	0.89	2 323 405 (2.5)	1.47	-0.58	-39.4	2 694 070 (2.4)	1.35
Luncheon meat	186 609 (1.0)	0.45	747 903 (0.8)	0.47	-0.02	-5.2	934 512 (0.8)	0.47
Weiners and franks	184 056 (1.0)	0.44	1 575 502 (1.7)	1.00	-0.56	-55.6	1 759 558 (1.6)	0.88
Beverages	3 548 715 (18.9)	8.55	14 285 684 (15.4)	9.06	-0.51	-5.6	17 834 399 (16.1)	8.96
Energy drinks	379 451 (2.0)	0.91	2 695 424 (2.9)	1.71	-0.80	-46.5	3 074 875 (2.8)	1.54
Juices, drinks, and nectars	306 782 (1.6)	0.74	1 058 151 (1.1)	0.67	0.07	+10.2	1 364 933 (1.2)	0.69
Soft drinks	2 862 482 (15.3)	6.90	10 532 109 (11.4)	6.68	0.22	+3.3	13 394 591 (12.1)	6.73
Snacks	1 972 002 (10.5)	4.75	8 422 774 (9.1)	5.34	-0.59	-11.0	10 394 776 (9.4)	5.22
Crackers	319 943 (1.7)	0.77	1 328 897 (1.4)	0.84	-0.07	-8.5	1 648 840 (1.5)	0.83
Portable snacks	314 902 (1.7)	0.76	960 907 (1.0)	0.61	0.15	+24.5	1 275 809 (1.2)	0.64
Chips, popcorn, and rice chips	1 337 157 (7.1)	3.22	6 132 970 (6.7)	3.89	-0.67	-17.2	7 470 127 (6.7)	3.75
Fast food restaurants	8 578 341 (45.8)	20.68	48 275 450 (52.4)	30.63	-9.95	-32.5	56 853 791 (51.3)	28.55
Food manufacturers	828 553 (4.4)	2.00	2 407 648 (2.6)	1.53	0.47	+30.8	3 236 201 (2.9)	1.63

Note: CAD, Canadian dollars; QC, Quebec; ROC, rest of Canada. [†]Based on products from 57 select food categories advertised on two adolescent-appealing stations broadcast outside QC. [‡]Expenditure per adolescent capita aged 13–17 years.

Table 5. Advertising expenditures on products heavily advertised to adolescents[†] classified as “less healthy” in 2019 across all examined media by food category.

	QC			ROC			QC versus ROC	
	Expenditures on “less healthy” products CAD (% within category)	Expenditures per adolescent capita [‡] CAD	Spending classified by the NPM (%)	Expenditures on “less healthy” products CAD (% within category)	Expenditures per adolescent capita [‡] CAD	Spending classified by the NPM (%)	Absolute difference CAD/capita	Relative difference %
Candy and chocolate	593 733 (100)	1.43	100	3 825 414 (100)	2.43	100	-1.00	-41.0
Cookies	720 (100)	<0.01	100	0 (0)	0.00	-	+<0.01	-
Dairy products	1 317 923 (46.4)	3.18	100	3 270 847 (26.0)	2.07	100	+1.10	+53.1
Dairy brands and associations	273 310 (100)	0.66	100	1 004, 976 (100)	0.64	100	+0.02	+3.3
Milk	0 (0)	0.00	100	0 (0)	0.00	100	0.00	-
Yogurt	1 044 613 (94.8)	2.52	100	2 265 871 (100)	1.44	100	+1.08	+75.2
Processed meat	370 665 (100)	0.89	100	2 323 405 (100)	1.47	100	-0.58	-39.4
Luncheon meat	186 609 (100)	0.45	100	747 903 (100)	0.47	100	-0.02	-5.2
Weiners and franks	184 056 (100)	0.44	100	1 575 502 (100)	1.00	100	-0.56	-55.6
Beverages	2 998 701 (84.5)	7.23	100	12 176 550 (85.2)	7.72	100	-0.50	-6.4
Energy drinks	379 451 (100)	0.91	100	2 695 424 (100)	1.71	100	-0.80	-46.5
Juices, drinks, and nectars	306 782 (100)	0.74	100	1 058 151 (100)	0.67	100	+0.07	+10.2
Soft drinks	2 312 468 (80.8)	5.57	100	8 422 975 (80.0)	5.34	100	+0, 23	+4.3
Snacks	1 904 556 (96.6)	4.59	100	8 168 074 (97.0)	5.18	100	-0.59	-11.4
Crackers	319 943 (100)	0.77	100	1 328 897 (100)	0.84	100	-0, 07	-8.5
Portable snacks	247 456 (78.6)	0.60	100	706 207 (73.5)	0.45	100	0.15	+33.1
Chips, popcorn, and rice chips	1 337 157 (100)	3.22	100	6 132 970 (100)	3.89	100	-0.67	-17.2
Fast food restaurants	6 355 424 (76.9)	15.32	96.3	35 404 365 (81.3)	22.46	90.3	-7.14	-31.8
Food manufacturers	467 632 (100)	1.13	56.4	1 391 477 (100)	0.88	57.8	+0.24	+27.7
Total	14 009 354 (77.6)	33.77	96.4	66 560 132 (77.0)	42.22	93.8	-8.46	-20.0

Note: CAD, Canadian dollars; NPM, Nutrient Profile Model; QC, Quebec; ROC, rest of Canada. [†]Based on products from 57 select food categories advertised on two adolescent-appealing stations broadcast outside QC. [‡]Expenditure per adolescent capita aged 13–17 years.

recommended that such spending continue to be monitored across media nationally. Such tracking in digital media is particularly important as the use of this media channel continues to evolve (World Health Organization 2017). Here, monitoring ensures that trends can be established over time and that the population-level impact of child-protecting policies can be examined.

Strengths and limitations

As far as we are aware, this study is the first to estimate expenditures on advertising products heavily advertised to adolescents across multiple product categories and media channels in Canada. Nevertheless, this study is not without its limitations. First, it should be highlighted that our study does not capture expenditures used to explicitly target adolescents. Since these data are not available, expenditures that are potentially adolescent targeted were estimated based on products heavily advertised on youth-appealing television stations. Since products heavily advertised to youth are likely not exclusively advertised to this age group, it cannot be assumed that expenditures on these select products were specifically dedicated to advertising to adolescents. Second, products considered heavily advertised to adolescents were selected based on their advertisement on adolescent-appealing television stations and did not consider advertising in other media. This approach was taken as we did not have access to advertising data in other media. It is likely that different products are being heavily advertised or targeted to adolescents in other media, particularly in digital media. As such, advertising expenditures on these products were not captured by our study. Third, it is possible that some of the advertised products were misclassified as “less healthy” as per Health Canada’s NPM, as in some cases, Numerator’s data reported advertising spending by brand name rather than by specific product. In such cases, spending was either classified based on numerous products tied to the brand or based on assumptions that were made as to the promoted product. As food products are often reformulated, it is also possible that misclassification may have occurred due to the nutritional data being collected retrospectively using FLIP data sets from 2016 to 2017 or from company or retailer websites after 2019. Additionally, the nutritional information for some seasonal restaurant items was unavailable, resulting in the substitution with a similar product. However, the number of misclassified products resulting from these substitutions is likely low as most restaurant items surpass the NPM nutrient content thresholds by a large margin, particularly for sodium. Fourth, there are limitations related to certain media channels. On television, only advertisements during broadcast programming were included in advertising expenditure estimates, whereas advertising in on-demand or online streaming television services was not captured. In addition, digital media advertising expenditures only included display and pre-roll video advertisements viewed on internet browsing apps from the 1000 most visited websites in Canada containing advertisements (excluding adult websites). As such, advertising expenditures in these media are likely underestimated. Lastly, our expenditure estimates did not include all

advertised food product categories available from Numerator. Only 57 of these categories were included in the study.

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Data availability

The data that support the findings of this study are available from Numerator and were obtained under license for the current study. They are not publicly available.

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Competing interests

In 2018, EP received a small honorarium from the Stop Marketing to Kids Coalition, a coalition of non-governmental health organizations, for reviewing policy recommendations and supporting evidence. In 2020, EP, JS, and CM were also employed by Health Canada, on a casual basis, to conduct research on food marketing in Canada. In the past 36 months, MPK has completed research contracts for the Heart and Stroke Foundation and ML and CM have completed research contracts for Health Canada. These contracts were for other research in the area of food marketing.

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Supplementary material

Supplementary data are available with the article at <https://doi.org/10.1139/apnm-2022-0219>.

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