

Article

Disparities in children's sports participation and food advertising exposure in amateur sports settings in Canada

Elise Pauzé¹, Marie-Hélène Roy-Gagnon², Catherine L. Mah³, Lana Vanderlee⁴,
Christine M. White⁵, David Hammond⁵, Monique Potvin Kent^{2,*}

¹Interdisciplinary School of Health Sciences, Faculty of Health Sciences, University of Ottawa, 25 University Private, Ottawa, Ontario K1N 6N5, Canada

²School of Epidemiology and Public Health, University of Ottawa, 600 Peter Morand Crescent, Ottawa, Ontario K1G 5Z3, Canada

³School of Health Administration, Faculty of Health, Dalhousie University, 5850 College Street, Nova-Scotia, Halifax, Nova-Scotia B3H 4R2, Canada

⁴School of Nutrition, Centre NUTRISS (Nutrition, Santé, Société), Université Laval, 2440 boulevard Hochelaga, Québec, Québec G1V 0A6, Canada

⁵School of Public Health Sciences, University of Waterloo, 200 University Avenue West, Waterloo, Ontario N2L 3G1, Canada

*Corresponding author. School of Epidemiology and Public Health, University of Ottawa, 600 Peter Morand Crescent, Ottawa, Ontario K1G 5Z3, Canada. E-mail: monique.potvinkent@uottawa.ca

Abstract

This study examined social disparities in sports team participation and self-reported exposure to food advertising in amateur sports settings in Canada and examined differences in exposure between Quebec (where commercial advertising directed to children under 13 years, including sponsorship, is restricted) and other provinces (where there are no restrictions). Children aged 10–17 years ($n=3672$) completed a cross-sectional online survey in 2019 and answered questions on sports team participation and exposure to food advertising on signs at their sporting events and on their sports equipment. Multivariable logistic regressions were performed to examine differences among socio-demographic subgroups and policy environments. Sports team participation was reported by 39.5% of children, with male children and those who perceived their family's income as adequate being more likely to report this. In Quebec, 30.5% and 33.9% of children aged 10–12 and 13–17 years who play sports, respectively, reported exposure to food advertising on signs and/or sports equipment compared with 44.8% and 40.0% in other provinces. Male children were more likely to report exposure on signs and children who perceived their family's income as inadequate were more likely to report exposure on sports equipment. Children outside Quebec were more likely to report exposure on both signs (AOR = 1.39, 95% CI: 1.04, 1.84) and sports equipment (AOR = 1.49, 95% CI: 1.06, 2.09). Overall, many children in Canada are exposed to food advertising in amateur sports settings with some subpopulations being more likely exposed. Despite Quebec's restrictions, children under 13 years in the province still reported exposure to food advertising. More research is needed to assess the effectiveness of Quebec's law.

Keywords: food marketing; sports sponsorship; Consumer Protection Act; brand marketing; corporate social responsibility

Contributions to Health Promotion

- Social disparities in food marketing exposure may be contributing to disparities in diet and health.
- There is limited research on how food advertising in amateur sports settings may disproportionately affect some child subpopulations and how government policies may limit this exposure.
- The likelihood of reporting sports team participation and/or food advertising exposure was found to differ by sex, socio-economic status, and policy environment suggesting some child subpopulations in Canada are more at risk of being influenced by food advertising in amateur sports.
- Unique advertising restrictions in the province of Quebec may be limiting advertising exposure but more research is needed.

INTRODUCTION

In Canada, poor diet and excess weight among children constitute considerable population health issues. Over a quarter (27.5%) of children aged 5–17 years are living with excess weight or obesity (Statistics Canada 2020). Children are also

consuming too much sodium, free sugars, and foods not recommended by dietary guidelines (e.g. sugary beverages and other ultra-processed foods) while not consuming enough fruit and vegetables (Jones *et al.* 2019, Polsky *et al.* 2020, Polsky and Garriguet 2020, Smith *et al.* 2021, Bernstein

et al. 2023). Notably, poor diet is not experienced equally. Children from households of lower socio-economic status in Canada tend to consume a larger share of their calories from ultra-processed foods and have poorer diet quality (Olstad *et al.* 2021, Hutchinson and Tarasuk 2022). Some sex, age, and racial/ethnic-based disparities in dietary intake or quality also exist (Smith *et al.* 2021, Riediger *et al.* 2022, Warren *et al.* 2022). For instance, male children consume more sodium and sugary drinks, on average, than their female counterparts and are more likely to experience obesity (Statistics Canada 2020, Smith *et al.* 2021, Warren *et al.* 2022).

Children's poor dietary patterns are partly driven by the food industry's ubiquitous marketing which predominantly promotes highly processed foods (e.g. fast food, confectionaries, and sugary drinks) that are energy-dense and nutrient poor (Cairns *et al.* 2013, Norman *et al.* 2016, Boyland *et al.* 2022a). According to the hierarchy of unhealthy food promotion effects model, marketing shapes the dietary behaviours of children through a series of conscious and unconscious effects that are underpinned by several psychological theories and have been demonstrated empirically (Kelly *et al.* 2015, 2023, Norman *et al.* 2018, Boyland *et al.* 2021, Harris *et al.* 2022). These effects include increasing awareness of promoted products/brands, linking products/brands with positive attributes, shaping food preferences and social norms, prompting food requests and purchases, and encouraging higher and overconsumption of foods which may ultimately lead to weight gain (Kelly *et al.* 2015, Norman *et al.* 2018). Children are considered more susceptible to marketing because their cognitive abilities and/or emotional control are not yet fully developed (Wilcox *et al.* 2004, Carter *et al.* 2011, Harris *et al.* 2021).

Food companies are known to sponsor the sporting activities of children and/or community sports facilities in exchange for promotional benefits such as displaying signs and branding in facilities or at events and on sports equipment given to children (Collectif Vital n.d.-a, n.d.-b, Kelly *et al.* 2011a, Watson *et al.* 2016, Ooi *et al.* 2019, Pauzé *et al.* 2020, Prowse *et al.* 2025). According to national surveys conducted in 2021, 31%–43% of children aged 10–17 years who played on a sports team in Australia, Chile, Mexico, the United Kingdom, and the United States reported exposure to food advertising on signs at their sporting events while 27%–34% reported exposure on their sports equipment (Hammond *et al.* 2023). While this survey did not examine the type of brands children were exposed to in this environment, current evidence, most of which is from Australia, suggests children's sports are often sponsored by food companies associated with unhealthy brands or products (e.g. large fast food restaurant chains) (McDonald's UK n.d., Maher *et al.* 2006, Kelly *et al.* 2011a, Watson *et al.* 2016, Ooi *et al.* 2019, Gonzalez *et al.* 2020, Pauzé *et al.* 2020, Martino *et al.* 2021, Little League 2024). This is worrisome as studies examining the effects of sports sponsorship among children and/or adults have noted effects or associations consistent with the hierarchy of effects model including the development of implicit and positive brand associations, increased brand awareness, and higher purchase intentions and consumption (Kelly *et al.* 2011b, Pettigrew *et al.* 2013, Bestman *et al.* 2015, Brown 2016, Dixon *et al.* 2019).

Differential exposure to food marketing among subpopulations is thought to contribute to disparities in dietary patterns and health (Backholer *et al.* 2021, Castronuovo *et al.* 2021).

In amateur sports settings, differential exposure may stem from differences in sports participation and/or from inequitable distribution of sponsorship within sports. For instance, research in high-income countries, including Canada, has generally noted a higher prevalence of sports participation among males and children of higher socio-economic status (UK Department for Digital Culture Media and Sport 2017, Canadian Fitness and Lifestyle Research Institute 2022, Child and Adolescent Health Measurement Initiative 2022, Irvine *et al.* 2022, Owen *et al.* 2022, Demetriou *et al.* 2024, ParticpACTION 2024). As such, these groups may be more exposed to food advertising in amateur sports by virtue of higher participation. In terms of disparities in the distribution of sponsorship, evidence is very limited (Kelly *et al.* 2011a, Ooi *et al.* 2019, Martino *et al.* 2021). Some studies from Australia suggested that sponsorship by food-related companies was more likely or frequent among clubs located outside of metropolitan areas and those with predominantly younger participants while no differences were observed between sports clubs situated in areas with varying levels of socio-economic disadvantage (Kelly *et al.* 2011a, Ooi *et al.* 2019, Gonzalez *et al.* 2020, Martino *et al.* 2021).

In Canada, 68% of children aged 5–17 years in 2021 participated in sport (defined as physical activities involving 'competition, rules and the development of specific skills') (Canadian Fitness and Lifestyle Research Institute 2022). Existing evidence suggests food company sponsorship of children's sports is common, particularly in community settings (McDonald's Canada n.d.-a, Tim Hortons n.d., Pauzé *et al.* 2020). For instance, a website audit of 67 sports clubs located in Ottawa, Ontario for the five most popular sports among children, suggested 40% of clubs had at least one food company sponsor and 25% were sponsored by a fast food restaurant (Pauzé *et al.* 2020). Food advertising in recreational sports facilities, some of which may stem from sponsorship, has also been documented in Canada (Collectif Vital n.d.-a, n.d.-b, Prowse *et al.* 2018, Prowse *et al.* 2025). In schools, the extent of sports sponsorship has not been specifically examined (Velazquez *et al.* 2015, Potvin Kent *et al.* 2019, Vanderlee *et al.* 2024). However, some provincial high school athletic associations report having food-related sponsors (Alberta Schools' Athletic Association n.d., BC School Sports n.d., Manitoba High School Athletic Association n.d., PEI School Athletic Association n.d., School Sport Newfoundland and Labrador n.d.). Six of the 112 Canadian schools surveyed in 2023–24 also reported the presence of unhealthy food advertising on sports equipment or around athletic fields (Vanderlee *et al.* 2024).

In terms of the policy environment, Canada is unique. Since the 1980s the province of Quebec has prohibited commercial advertising directed to children under 13 years by law in various media and settings including schools and recreational environments (Office de la protection du consommateur 2012). According to the law's application guide, advertisements cannot promote products designed for children in media and settings where they can be reached nor can advertisements promote these products or those that appeal to children using content explicitly directed to this audience (Office de la protection du consommateur 2012). Notably, the sponsorship of children's activities is permitted. However, sponsors who sell products intended for or appealing to children (e.g. certain candy, fast food and desserts) are in theory not allowed to advertise in ways that 'arouse the interest of children' or use mascots and logos. The sponsor's name can be advertised 'discreetly' (e.g. signage

mentioning the name of the sponsoring company) ([Office de la protection du consommateur 2012](#)). In the rest of Canada, food advertising directed to children is self-regulated by industry. The food industry's former self-regulatory code (2007–20) did not apply to sponsorship ([Ad Standards n.d., 2020](#)). Industry's new code implemented in June 2023 applies to some sponsorship-related advertising; however, its scope is very limited ([Association of Canadian Advertisers et al. 2022](#)).

Although amateur sports settings constitute a source of exposure to food advertising among children, little is known about the extent and nature of this exposure in Canada and the existence of social disparities in this exposure has yet to be investigated ([Prowse 2017, Potvin Kent et al. 2022](#)). Furthermore, no research has assessed the potential effectiveness of Quebec's sponsorship-related advertising restrictions, which may serve as a potential model for other jurisdictions, particularly as it is one of the few globally to have such restrictions ([Boyland et al. 2018, Taillie et al. 2019](#)). As such, the purpose of this study was to (i) estimate the prevalence of exposure to food advertising in amateur sports settings among children in Canada, (ii) examine socio-demographic disparities (i.e. social disparities) in sports participation and exposure to this food advertising, and (iii) examine differences in exposure to food advertising in amateur sports settings between the country's two policy environments (i.e. Quebec and other Canadian provinces). It was hypothesized *a priori* that children under 13 years protected by Quebec's advertising restrictions would be less likely to report exposure to food advertising than older children in Quebec and those of the same age or older living in other provinces.

METHODS

Data are from the Canadian arm of the 2019 International Food Policy Study Youth Survey, an annual repeat cross-sectional survey. Data were collected via self-completed web-based surveys conducted in November–December 2019 with youth aged 10–17 years. Respondents were recruited through parents/guardians enrolled in the Nielsen Consumer Insights Global Panel and their partners' panels. Email invitations with unique survey links were sent to adult panellists. Those who confirmed they had a child aged 10–17 years living in their household were asked to provide consent for their child to complete the survey (only one child per household was invited). After eligibility screening, all potential child respondents were provided with information about the study and asked to provide assent. Surveys were conducted in English or French. Members of the research team who were native Francophones reviewed the French translation independently. The child's parent/guardian received remuneration in accordance with their panel's usual incentive structure (e.g. points-based or monetary rewards, chances to win prizes). The primary data collection and this secondary analysis were reviewed by and received ethics clearance through a University of Waterloo Research Ethics Committee (ORE# 41477) and the University of Ottawa (H-06-20-5908), respectively. A full description of the study methods can be found in the International Food Policy Study: Technical Report—2019 Youth Survey ([Hammond et al. 2024](#)).

Outcome measures

To measure sports team participation, children were asked 'do you play on a sports team?' and could respond 'yes', 'no',

'don't know', or 'refuse to answer'. The latter two responses were considered missing and related cases were excluded from the sample. If children responded yes, their exposure to food advertising in sports settings was assessed by asking them whether there were any names or logos of food or restaurant companies on (i) their 'sports equipment (like uniforms or water bottles)' and (ii) on 'signs or banners at their sports practices, games, tournaments, or competitions'. Response options included 'yes', 'no', 'does not apply', 'don't know', and 'refuse to answer'. Respondents who selected 'yes' were categorized as exposed. Those who responded 'no', 'does not apply', or 'don't know' were considered not exposed as none of these respondents recalled being exposed, independent of whether they were in fact exposed or not. Participants were also categorized as exposed to food advertising on signs and/or sports equipment if they reported being exposed to at least one of these two types of advertising.

Socio-demographic characteristics

Child respondents were asked to specify their age, sex, race, perceived income adequacy and province/territory of residence and whether they were born in Canada. Children's province or territory of residence were classified into five regions including the Atlantic provinces (Newfoundland and Labrador, Prince Edward Island, Nova Scotia, and New Brunswick), Quebec, Ontario, the Prairies (Manitoba, Saskatchewan and Alberta), and British Columbia. These regions were also grouped by policy environment (i.e. Quebec and other provinces). Sex was reported as male or female. Age was grouped as 10–12 years or 13–17 years to allow for comparisons between children protected by Quebec's advertising restrictions (<13 years) and those not protected in Quebec and other provinces. Respondents were asked to select the race categories that best described them. Responses included White, East/Southeast Asian, South Asian, Black, Indigenous, Latino, Middle Eastern, West Asian descent, or another race that they could identify using an open text box. Responses were collapsed into five categories: White, East/Southeast Asian, Black, Indigenous inclusive, and Mixed/Other racial minority groups. Perceived income adequacy was measured by asking children whether their family had enough money to pay for things their family needed. Responses included 'not enough money', 'barely enough money', 'enough money', or 'more than enough money'. Respondents were also asked whether, yes or no, they were born in Canada. For all measures described above (excluding age and sex), respondents also had the option of responding 'don't know' or 'refuse to answer'. These responses were treated as missing.

Urbanicity

The city or town in which children resided was specified by parents using an open text box. Responses were classified as 'rural', 'small population centre (1000–29 999)', 'medium population centre (30 000–99 999)', or 'large population centre (100 000 or greater)' as per Statistics Canada's definitions ([Statistics Canada 2021](#)). It should be noted that Statistics Canada's classification does not necessarily align with city boundaries. For instance, some cities or towns are located at the periphery of larger population centres and some part of their territory is located within a population centre while other parts are considered rural. In these cases, cities were classified as being part of the population centre. In the specific case of Ottawa, parts of the city are considered rural while other parts are

located within population centers of different sizes. If ‘Ottawa’ was reported, this was classified under large population centre. If respondents named a town or area within Ottawa that was considered rural or located in a smaller population centre, these were classified as such. In cases where the city or town reported by parents conflicted with the province of residence reported by children ($n = 18$), the parent’s response was assumed to be correct, and the region and policy environment category was revised accordingly.

Data analysis

A total of 3825 children completed the survey. Respondents were excluded for the following reasons: region was either missing, ineligible or reported as being one of Canada’s northern territories; invalid response to a data quality question; and/or survey completion time under 10 minutes ($n = 143$). The eight respondents from the Canadian territories were excluded because the number of cases for this region was too small (<15) for the development of data weights. An additional 10 respondents were excluded for missing data on sports team participation. The analytic sample included 3672 children. Data were weighted with post-stratification sample weights constructed using a raking algorithm with population estimates from the census based on age group, sex, and region. Estimates reported are weighted unless otherwise specified.

Sample characteristics and the prevalence of outcomes were described using absolute and relative frequencies and 95% confidence intervals, overall and by socio-demographic subgroups. Sample characteristics of children who reported playing on a sports team were similarly described by policy environment and potential differences/confounders were explored using standardized differences in proportions (Austin 2009). The prevalence of reported exposure to food advertising among those who participated on a sports team was also described by policy environment and age group.

Simple and multivariable logistic regression models were used to examine differences in sports team participation among socio-demographic subpopulations. Socio-demographic characteristics considered for inclusion in the multivariable model were those that have been previously associated with this outcome in Canada (Clark 2008, Guèvremont et al. 2008, Canadian Fitness and Lifestyle Research Institute 2022, Irvine et al. 2022, ParticipACTION 2024, Public Health Ontario 2024). These included region, urbanicity, and child age, sex, race/ethnicity, perceived income adequacy (as an indicator of socio-economic status) and whether they were born in Canada. Urbanicity was excluded as an independent variable as it did not improve the model based on the likelihood ratio test nor meaningfully change other parameter estimates (per a threshold of $<10\%$) when included in the model (Hosmer et al. 2013). Simple and multivariable logistic regression models were also conducted to examine socio-demographic differences in reported exposure to food advertising in amateur sports settings including on (i) signs, (ii) sports equipment, and (iii) signs and/or sports equipment. Independent variables included region, age, sex, race/ethnicity, and perceived income adequacy. For multivariable models, race was collapsed into two categories (White/Racial minority groups) due to low frequencies. Urbanicity was considered for inclusion as research has suggested the prevalence of food company sponsorship may vary between metropolitan and more remote regional areas (Ooi et al. 2019, Gonzalez et al. 2020, Martino et al.

2021). This variable was ultimately excluded from models as it reduced the power of our analysis due to missing data and did not improve the model based on the likelihood ratio test. Similar models were used to examine whether reported exposure to food advertising differed by policy environment and between children aged 10–12 years protected by Quebec’s advertising restrictions and those not protected in Quebec or other provinces. These models included policy environment (Quebec/other provinces, instead of region) and age group and were adjusted for the same socio-demographic variables described above for potential confounding. In separate models, an interaction term (age * policy environment) was included, and least square mean differences were systematically generated to examine differences in reported exposure between subgroups of interest within and between the two policy environments. In all multivariable models, independent variables were included simultaneously. P -values of <0.05 were considered statistically significant. Analyses were performed using SAS and procedures for complex surveys (i.e. proc surveyfreq and proc surveylogistic). Cases with missing or invalid data for socio-demographic characteristics or advertising exposure outcomes (described in Supplementary Table S1, Additional File 1) were excluded from analyses on a case-by-case basis (i.e. pairwise deletion).

RESULTS

Sample characteristics

An equal number of participants identified themselves as male (51.0%) and female (49.0%). Most participants were aged 13–17 years (62.1%), identified as White (74.3%), were born in Canada (90.0%), lived in a large urban centre (67.4%) and perceived their family as having enough or more than enough money to meet their needs (82.4%; Table 1). The largest share of participants lived in Ontario (39.6%), followed by Quebec (21.5%), the Prairies (20.5%), British Columbia (12.3%) and the Atlantic provinces (6.1%).

Prevalence of reported sports team participation and differences by socio-demographic subgroup

Overall, 39.5% of children reported playing on a sports team. This prevalence varied among socio-demographic subgroups (Table 1). As shown in the adjusted model in Table 2, the odds of reporting playing on a sports team were higher among children living in the Atlantic provinces [adjusted odds ratio (AOR) = 1.62, 95% confidence interval (CI): 1.24, 2.12; $P < 0.001$], Ontario (AOR = 1.37, 95% CI: 1.14, 1.64; $P < 0.001$), the Prairies (AOR = 1.43, 95% CI: 1.15, 1.78; $P = 0.001$), and British Columbia (AOR = 2.19, 95% CI: 1.69, 2.84; $P < 0.001$) compared to those living in Quebec, independent of other socio-demographic characteristics. The odds of reporting playing on a sports team were also higher among males compared to females (AOR = 1.37, 95% CI: 1.19, 1.58; $P < 0.001$) and among children who perceived their family as having enough (AOR = 1.97, 95% CI: 1.25, 3.10; $P = 0.004$) and more than enough money (AOR = 2.62, 95% CI: 1.64, 4.20; $P < 0.001$) to meet their needs compared to those who perceived their family as not having enough. The odds of reporting playing on a sports team were lower among children who identified as East/Southeast Asian (AOR = 0.59, 95% CI: 0.43, 0.80; $P < 0.001$) compared to those who identified as White.

Table 1. Sample characteristics and prevalence of sports team participation and self-reported exposure to food advertising in amateur sports settings among children aged 10–17 years in Canada in 2019, overall and by socio-demographic subgroup (weighted).

	Total sample			Children who reported playing on a sports team					
	N (% of total) ^a		N (% of total) ^c	Reported exposure on signs at their sporting events		Reported exposure on their sports equipment		Reported exposure on signs and/or sports equipment	
	n	% yes ^b (95% CI)		n	% yes ^d (95% CI)	n	% yes ^e (95% CI)	n	% yes ^f (95% CI)
Total	3672 (100)	1451 (39.5; 37.8; 41.1)	1451 (100)	495 (34.1; 31.6; 36.6)	319 (22.0; 19.8; 24.2)	583 (40.2; 37.6; 42.8)			
Age									
10–12	1393 (37.9)	582 (41.8; 39.1; 44.4)	582 (40.1)	214 (36.8; 32.8; 40.8)	136 (23.4; 19.9; 26.8)	245 (42.1; 38.0; 46.2)			
13–17	2278 (62.1)	869 (38.1; 36.1; 40.2)	869 (59.9)	281 (32.4; 29.1; 35.6)	183 (21.1; 18.3; 23.9)	338 (39.0; 35.6; 42.3)			
Sex									
Male	1871 (51.0)	810 (43.3; 41.0; 45.6)	810 (55.8)	304 (37.5; 34.1; 40.9)	192 (23.7; 20.7; 26.6)	353 (43.6; 40.1; 47.0)			
Female	1801 (49.0)	641 (35.6; 33.3; 37.9)	641 (44.2)	191 (29.9; 26.1; 33.6)	127 (19.8; 16.6; 23.1)	230 (36.0; 32.1; 39.9)			
Race/ethnicity									
White	2678 (74.3)	1061 (39.6; 37.8; 41.5)	1061 (74.6)	365 (34.4; 31.5; 37.3)	234 (22.1; 19.5; 24.6)	432 (40.7; 37.7; 43.8)			
Racial minority groups	927 (25.7)	362 (39.1; 35.8; 42.4)	362 (25.4)	126 (34.8; 29.6; 40.0)	80 (22.2; 17.6; 26.7)	145 (40.2; 34.9; 45.6)			
East/Southeast Asian	274 (7.6)	86 (31.5; 25.6; 37.4)	86 (6.1)	23 (26.7; 16.8; 36.5)	16 (18.2; 9.7; 26.6)	26 (30.6; 20.3; 40.9)			
South Asian	153 (4.2)	66 (43.3; 34.9; 51.6)	66 (4.6)	28 (42.2; 29.7; 54.7)	19 (29.0; 17.4; 40.7)	32 (49.1; 36.4; 61.8)			
Black	96 (2.7)	39 (40.4; 30.2; 50.6)	39 (2.7)	10 (25.1; 10.7; 39.6)	10 (27.2; 12.0; 42.4)	13 (35.0; 18.8; 51.1)			
Indigenous inclusive	149 (4.1)	57 (37.9; 29.6; 46.3)	57 (4.0)	22 (39.5; 25.6; 53.4)	9 (15.4; 4.9; 26.0)	25 (43.7; 29.7; 57.8)			
Mixed/Other	254 (7.1)	114 (44.8; 38.5; 51.2)	114 (8.0)	43 (37.6; 28.4; 46.8)	26 (22.9; 15.0; 30.8)	48 (42.4; 33.0; 51.8)			
Perceived income adequacy									
Not enough	109 (3.0)	29 (26.6; 18.1; 35.1)	29 (2.0)	15 (51.3; 32.6; 70.1)	13 (43.4; 24.7; 62.2)	18 (61.2; 43.2; 79.3)			
Barely enough	530 (14.6)	169 (31.8; 27.7; 35.9)	169 (11.7)	58 (34.6; 27.2; 42.1)	37 (22.3; 15.7; 29.0)	69 (41.2; 33.5; 49.0)			
Enough	2238 (61.8)	884 (39.5; 37.4; 41.6)	884 (61.6)	276 (31.2; 28.0; 34.3)	182 (20.5; 17.8; 23.3)	335 (37.8; 34.6; 41.1)			
More than enough	746 (20.6)	354 (47.4; 43.7; 51.1)	354 (24.6)	141 (39.8; 34.6; 45.0)	86 (24.4; 19.8; 28.9)	156 (44.2; 38.9; 49.5)			
Urbanicity									
Large population centre	2351 (67.4)	939 (39.9; 37.9; 42.0)	939 (67.9)	311 (33.1; 30.0; 36.2)	209 (22.3; 19.5; 25.1)	373 (39.7; 36.5; 43.0)			
Medium population centre	391 (11.2)	151 (38.7; 33.7; 43.6)	151 (10.9)	56 (36.9; 29.0; 44.8)	32 (21.4; 14.7; 28.0)	62 (41.0; 32.9; 49.1)			
Small population centre	565 (16.2)	223 (39.4; 35.3; 43.4)	223 (16.1)	80 (36.0; 29.5; 42.4)	34 (15.4; 10.5; 20.3)	87 (38.9; 32.3; 45.5)			
Rural	181 (5.2)	70 (38.8; 31.8; 45.7)	70 (5.1)	23 (32.5; 21.9; 43.2)	14 (19.6; 10.4; 28.8)	29 (40.7; 29.3; 52.0)			
Born in Canada									
Yes	3298 (90.0)	1300 (39.4; 37.7; 41.1)	1300 (89.7)	446 (34.3; 31.7; 37.0)	288 (22.1; 19.8; 24.5)	528 (40.7; 37.9; 43.4)			
No	367 (10.0)	150 (40.8; 35.6; 46.0)	150 (10.3)	49 (32.6; 24.9; 40.3)	31 (20.8; 14.2; 27.4)	55 (36.6; 28.7; 44.5)			
Region									
Quebec	788 (21.5)	259 (32.9; 29.9; 35.9)	259 (17.9)	73 (28.3; 23.4; 33.3)	44 (16.9; 12.7; 21.0)	84 (32.5; 27.3; 37.6)			
Atlantic provinces	225 (6.1)	96 (42.7; 37.2; 48.3)	96 (6.6)	40 (41.9; 33.4; 50.4)	26 (27.1; 19.5; 34.8)	46 (47.8; 39.2; 56.5)			
Ontario	1453 (39.6)	572 (39.4; 36.8; 42.0)	572 (39.4)	188 (32.8; 28.8; 36.8)	134 (23.5; 19.9; 27.0)	230 (40.3; 36.1; 44.5)			

Table 1. Continued

	Total sample		Children who reported playing on a sports team					
	N (% of total) ^a		Reported exposure on signs at their sporting events		Reported exposure on their sports equipment		Reported exposure on signs and/or sports equipment	
	n	% yes ^b (95% CI)	n	% yes ^d (95% CI)	n	% yes ^c (95% CI)	n	% yes ^f (95% CI)
Prairies	754 (20.5)	39.8 (36.0; 43.6)	300 (20.7)	114 (38.1 (32.0; 44.1)	54 (18.2 (13.3; 23.1)	131 (43.7 (37.5; 49.8)	92 (41.2 (34.0; 48.4)	
British Columbia	453 (12.3)	49.4 (44.1; 54.6)	223 (15.4)	80 (35.6 (28.7; 42.6)	61 (27.1 (20.8; 33.5)			

CI, confidence interval. ^aSample characteristics of the total sample. Denominator by socio-demographic characteristic: age ($n = 3672$), sex ($n = 3672$), race ($n = 3672$), perceived income adequacy ($n = 3624$), urbanicity ($n = 3489$), born in Canada ($n = 3665$), and region ($n = 3672$). ^bPercentage of participants within the subgroup that reported playing on a sports team. ^cSample characteristics of participants who reported playing on a sports team. Denominator by socio-demographic characteristic: age ($n = 1451$), sex ($n = 1451$), race ($n = 1451$), perceived income adequacy ($n = 1383$), urbanicity ($n = 1383$), born in Canada ($n = 1450$), and region ($n = 1451$). ^dPercentage of sports team participants within the socio-demographic subgroup that reported exposure to food advertising on signs at their sporting event. ^ePercentage of sports team participants within the socio-demographic subgroup that reported exposure to food advertising on their sports equipment. Outcome data missing for one case. ^fPercentage of sports team participants within the socio-demographic subgroup that reported exposure to food advertising on signs at their sporting event and/or their sports equipment. Outcome data missing for one case.

Prevalence of reported exposure to food advertising in amateur sports settings and differences among socio-demographic subgroups

Among children who reported playing on a sports team, 34.1% and 22.0% reported exposure to food advertising on signs at their sporting event and on their sports equipment, respectively and 40.2% reported exposure to at least one type of advertising. The prevalence of reported exposure by socio-demographic subgroups is presented in [Table 1](#) and simple regression models examining differences in reported exposure between these subgroups are presented in [Supplementary Table S2, Additional File 1](#).

According to adjusted models in [Table 3](#), the odds of reporting exposure to food advertising on signs were higher among male children compared to female children (AOR = 1.43, 95% CI: 1.13, 1.81; $P = 0.003$). The odds were also higher among children living in Atlantic provinces (AOR = 1.81, 95% CI: 1.16, 2.82; $P = 0.009$) and the Prairies (AOR = 1.61, 95% CI: 1.12, 2.33; $P = 0.011$), respectively compared to those living in Quebec. Conversely, the odds of reporting exposure to food advertising on signs were lower among children who perceived their family as having enough money to meet their needs compared to those who perceived their family as not having enough (AOR = 0.44, 95% CI: 0.21, 0.95; $P = 0.035$).

In terms of food advertising on sports equipment, the odds of reporting exposure were higher among children living in Atlantic provinces (AOR = 1.72, 95% CI: 1.04, 2.84; $P = 0.034$), Ontario (AOR = 1.51, 95% CI: 1.04, 2.19; $P = 0.030$), and British Columbia (AOR = 1.87, 95% CI: 1.20, 2.92; $P = 0.006$), compared to those living in Quebec. The odds of reporting exposure were also lower among children who perceived their family as having barely enough money (AOR = 0.38, 95% CI: 0.16, 0.90; $P = 0.028$), enough money (AOR = 0.35, 95% CI: 0.16, 0.76; $P = 0.008$), and more than enough money (AOR = 0.42, 95% CI: 0.19, 0.94; $P = 0.034$) to meet their needs, compared to those reporting their family as not having enough.

The odds of reporting exposure to food advertising on signs and/or sports equipment were higher among male children compared to female children (AOR = 1.38, 95% CI: 1.10, 1.74; $P = 0.005$) and higher among those living in the Atlantic provinces (AOR = 1.83, 95% CI: 1.19, 2.83; $P = 0.006$), Ontario (AOR = 1.40, 95% CI: 1.03, 1.90; $P = 0.030$), and the Prairies (AOR = 1.68, 95% CI: 1.17, 2.39; $P = 0.005$) compared to Quebec. The odds of reporting advertising exposure on signs and/or sports equipment were lower among children who perceived their family's income as being enough to meet their needs compared to those who perceived their income as not being enough (AOR = 0.40, 95% CI: 0.18, 0.87; $P = 0.022$).

Sample characteristics of sports team participants and reported exposure to food advertising by policy environment

The distribution of participants who reported playing on a sports team by age, sex, perceived income adequacy and urbanicity was similar between those living in Quebec compared to those in other provinces ([Supplementary Table S3, Additional File 1](#)). A greater share of children reporting sports team participation in Quebec identified themselves as White exclusively (89.2%) compared to other provinces (71.4%).

In Quebec, 24.7% of children aged 10–12 years and 30.9% aged 13–17 years who played on a sports team reported

Table 2. Logistic regression models examining socio-demographic disparities in reported participation on a sports team among children aged 10–17 years in Canada in 2019 (weighted).

	Simple logistic regressions ^a		Multiple logistic regression (<i>n</i> = 3562) ^b	
	OR (95% CI)	<i>P</i> -value	AOR (95% CI)	<i>P</i> -value
Region				
Quebec	[ref]		[ref]	
Atlantic provinces	1.52 (1.17; 1.98)	0.002	1.62 (1.24; 2.12)	<0.001
Ontario	1.33 (1.11; 1.58)	0.002	1.37 (1.14; 1.64)	<0.001
Prairies	1.35 (1.09; 1.66)	0.005	1.43 (1.15; 1.78)	0.001
British Columbia	1.99 (1.55; 2.55)	<0.001	2.19 (1.69; 2.84)	<0.001
Age				
10–12 years	1.16 (1.01; 1.34)	0.032	1.15 (1.00; 1.33)	0.053
13–17 years	[ref]		[ref]	
Sex				
Male	1.38 (1.20; 1.58)	<0.001	1.37 (1.19; 1.58)	<0.001
Female	[ref]		[ref]	
Race/ethnicity				
White	[ref]		[ref]	
East/Southeast Asian	0.70 (0.53; 0.93)	0.014	0.59 (0.43; 0.80)	<0.001
South Asian	1.16 (0.82; 1.65)	0.399	1.02 (0.70; 1.49)	0.913
Black	1.03 (0.67; 1.59)	0.885	1.16 (0.74; 1.81)	0.517
Indigenous inclusive	0.93 (0.65; 1.34)	0.698	0.90 (0.62; 1.32)	0.600
Mixed/Other	1.24 (0.95; 1.62)	0.118	1.17 (0.88; 1.56)	0.282
Perceived income adequacy				
Not enough	[ref]		[ref]	
Barely enough	1.29 (0.80; 2.07)	0.301	1.32 (0.81; 2.15)	0.264
Enough	1.80 (1.15; 2.81)	0.010	1.97 (1.25; 3.10)	0.004
More than enough	2.49 (1.57; 3.94)	<0.001	2.62 (1.64; 4.20)	<0.001
Born in Canada				
Yes	[ref]		[ref]	
No	1.06 (0.84; 1.33)	0.624	1.12 (0.86; 1.45)	0.411
Urbanicity				
Large population centre	[ref]			
Medium population centre	0.95 (0.76; 1.19)	0.645		
Small population centre	0.98 (0.81; 1.18)	0.804		
Rural	0.95 (0.70; 1.29)	0.752		

AOR, adjusted odds ratio; CI, confidence interval; OR, odds ratio; ref, reference category. ^aNumber of cases included in models: region (*n* = 3672), age (*n* = 3672), sex (*n* = 3672), race (*n* = 3604), perceived income adequacy (*n* = 3624), urbanicity (*n* = 3489), and born in Canada (*n* = 3665). ^bComplete case analysis: 120 cases or 3.3% of total sample excluded.

exposure to food advertising on signs at their sporting event while 17.4% and 16.5%, respectively reported exposure on their sports equipment (Table 4). In other provinces, 39.5% of children aged 10–12 years and 32.7% aged 13–17 years reported exposure to food advertising on signs while 24.7% and 22.0%, respectively reported exposure on sports equipment.

According to the adjusted models in Table 5, the odds of reporting exposure to food advertising on signs (AOR = 1.39, 95%CI: 1.04, 1.84; *P* = 0.025), sports equipment (AOR = 1.49, 95%CI: 1.06, 2.09; *P* = 0.022), or to at least one type of advertising (AOR = 1.51, 95%CI: 1.15, 1.99; *P* = 0.003), were greater among children living in other provinces compared to those living in Quebec. Some differences in reported exposure between children protected by Quebec's advertising restrictions and those not protected were found to be statistically significant. The odds of reporting exposure to food advertising on signs were

higher among children aged 10–12 years living in other provinces compared to children of the same age living in Quebec (AOR = 1.98, 95% CI: 1.24, 3.16; *P* = 0.005; Table 6). The odds of reporting exposure to food advertising on signs and/or sports equipment were also higher among both children aged 10–12 and 13–17 years in other provinces compared to those aged 10–12 years in Quebec (AOR = 1.86, 95% CI: 1.19, 2.91; *P* = 0.006 and AOR = 1.55, 95% CI: 1.01, 2.40; *P* = 0.047, respectively).

DISCUSSION

Summary

Overall, our study found that exposure to food advertising in amateur sports settings was prevalent. Among the 39% of children aged 10–17 years who reported playing on a sports team, one in three reported this exposure on signs at their sporting

Table 3. Multiple logistic regression models examining socio-demographic disparities in reported exposure to food advertising on signs at sporting events and on sports equipment among children aged 10–17 years in Canada in 2019 who reported playing on a sports team (weighted).

	Reported exposure on signs at their sporting events (<i>n</i> = 1411) ^a		Reported exposure on their sports equipment (<i>n</i> = 1410) ^b		Reported exposure on signs and/or sports equipment (<i>n</i> = 1410) ^b	
	AOR (95% CI)	<i>P</i> -value	AOR (95% CI)	<i>P</i> -value	AOR (95% CI)	<i>P</i> -value
Age						
10–12 years	1.19 (0.95; 1.50)	0.136	1.15 (0.89; 1.50)	0.292	1.13 (0.90; 1.42)	0.284
13–17 years	[ref]		[ref]		[ref]	
Sex						
Male	1.43 (1.13; 1.81)	0.003	1.26 (0.96; 1.65)	0.097	1.38 (1.10; 1.74)	0.005
Female	[ref]		[ref]		[ref]	
Perceived income adequacy						
Not enough	[ref]		[ref]		[ref]	
Barely enough	0.49 (0.22; 1.13)	0.093	0.38 (0.16; 0.90)	0.028	0.45 (0.19; 1.03)	0.059
Enough	0.44 (0.21; 0.95)	0.035	0.35 (0.16; 0.76)	0.008	0.40 (0.18; 0.87)	0.022
More than enough	0.64 (0.29; 1.41)	0.268	0.42 (0.19; 0.94)	0.034	0.52 (0.23; 1.16)	0.109
Race/Ethnicity						
White	[ref]		[ref]		[ref]	
Other	1.04 (0.79; 1.38)	0.769	0.96 (0.70; 1.32)	0.787	0.97 (0.75; 1.27)	0.845
Region						
Quebec	[ref]		[ref]		[ref]	
Atlantic provinces	1.81 (1.16; 2.82)	0.009	1.72 (1.04; 2.84)	0.034	1.83 (1.19; 2.83)	0.006
Ontario	1.21 (0.88; 1.66)	0.234	1.51 (1.04; 2.19)	0.030	1.40 (1.03; 1.90)	0.030
Prairies	1.61 (1.12; 2.33)	0.011	1.13 (0.72; 1.78)	0.597	1.68 (1.17; 2.39)	0.005
British Columbia	1.36 (0.91; 2.03)	0.133	1.87 (1.20; 2.92)	0.006	1.44 (0.98; 2.12)	0.064

AOR, adjusted odds ratio; CI, confidence interval; ref, reference category. ^aComplete case analysis: 40 cases or 2.8% of participants who reported playing on a sports team were excluded. ^bComplete case analysis: 41 cases or 2.8% of participants who reported playing on a sports team were excluded.

events and one in five reported exposure on their sports equipment. The likelihood of reporting sports team participation and exposure differed by sex, level of perceived income adequacy and region suggesting some child subpopulations in Canada were more at risk of being exposed to this advertising and potentially influenced by it. In Quebec, children who played on a sports team were less likely than those in other provinces to report exposure to food advertising on signs and their sports equipment suggesting Quebec's advertising restrictions may be conferring some protection from exposure to food advertising. Notwithstanding, nearly one in three children aged 10–12 years who played on a sports team and were in theory protected by Quebec's law still recalled being exposed to food advertising on signs and/or sports equipment. Overall, these findings are concerning in terms of children's health as existing evidence in Canada suggests that large restaurant chains, whose menu items are predominantly high in calories, sugar, salt, and/or saturated fat (Yang *et al.* 2023), constitute a large share of food-related companies who sponsor children's sports clubs (Pauzé *et al.* 2020). Observational audits have also found that most food products, brands, and retailers promoted in recreational facilities in Canada are considered less healthy (Prowse *et al.* 2018, Vanderlee *et al.* 2025).

Social disparities and implications

Notably, our study identified social disparities in reported exposure to food advertising among children who played on a

sports team. Specifically, children who identified as male and those who perceived their family's income as inadequate were more likely to report exposure to food advertising than their respective counterparts while no statistically significant differences were noted by age or race/ethnicity. The reasons underpinning disparities by sex and socio-economic status are unclear. They may be related to unequal distribution of sponsorship between sports and differential patterns of sports participation among subgroups. For example, boys are more likely to play hockey in Canada than girls (Hockey Canada 2024) and current evidence, albeit exploratory, suggests hockey clubs are more likely to be sponsored by food companies than some other sports (Pauzé *et al.* 2020) and arenas are more likely to display food marketing than other types of sporting areas in recreational facilities (Prowse *et al.* 2018). Disparities in exposure may also stem from differential sponsorship seeking behaviours. For instance, clubs in lower income areas may be more likely to seek out sponsorship to support their activities and subsidize participation resulting in higher advertising exposure. Furthermore, our findings depart from research conducted in Australia which found that food-related companies constituted a larger share of sponsors among clubs with mostly ($\geq 75\%$) younger participants aged 5–14 years (Kelly *et al.* 2011a). Other studies also did not observe any differences in food company sponsorship between sports clubs situated in areas of varying levels of socio-economic disadvantage (Ooi *et al.* 2019, Gonzalez *et al.*

Table 4. Prevalence of reported exposure to food advertising in amateur sports settings by age and policy environment among children aged 10–17 years in Canada in 2019 who reported playing on a sports team (*n* = 1449, weighted).

	Quebec				Other provinces							
	10–12 years (<i>n</i> = 108)		13–17 years (<i>n</i> = 151)		10–12 years (<i>n</i> = 474)		13–17 years (<i>n</i> = 716)		Total (<i>n</i> = 1190)			
	<i>n</i>	% (95% CI)	<i>n</i>	% (95% CI)								
Exposure on signs at their sporting event	27	24.7 (17.0; 32.5)	47	30.9 (24.5; 37.4)	73	28.3 (23.4; 33.3)	187	39.5 (35.0; 44.1)	234	32.7 (29.1; 36.4)	421	35.4 (32.6; 38.3)
Exposure on their sports equipment	19	17.4 (10.6; 24.3)	25	16.5 (11.3; 21.7)	44	16.9 (12.7; 21.0)	117	24.7 (20.7; 28.7)	158	22.0 (18.8; 25.3)	275	23.1 (20.6; 25.6)
Exposure on signs and/or sports equipment	33	30.5 (22.2; 38.7)	51	33.9 (27.3; 40.5)	84	32.5 (27.3; 37.7)	212	44.8 (40.2; 49.4)	287	40.0 (36.2; 43.9)	499	41.9 (39.0; 44.9)

CI, confidence interval.

2020, Martino *et al.* 2021). Our study however is not directly comparable to previous research. We examined disparities in reported exposure to food advertising in amateur sports settings, some of which may or may not stem from the sponsorship of children’s sports, using individual-level data, whereas the research from Australia explored disparities based on club-level characteristics and data on sponsorship.

In addition to noted disparities in exposure among children who play on a sports team, some subgroups may be more likely exposed to food advertising in amateur sports settings in absolute terms due to higher sports participation. For instance, our study found that male children, those from households with an income perceived as adequate and children living outside Quebec were more likely to report playing on a sports team than their respective counterparts. These findings are consistent with other Canadian research, though regional differences in children’s sports participation vary between studies and depart somewhat from our findings (Canadian Fitness and Lifestyle Research Institute 2022, Irvine *et al.* 2022, ParticipACTION 2024). Conversely, children who identified as East/Southeast Asian, were female and who perceived their family’s income as inadequate were less likely to report sports team participation. At the population level, these groups are probably less likely to be exposed to food advertising in amateur sports settings; however, they may be less likely to benefit from the positive health and social outcomes associated with playing sports (Eime *et al.* 2013, Boelens *et al.* 2022, Eather *et al.* 2023). While reducing social inequities in sports participation is a laudable goal that should be pursued, our findings suggest it may come at a cost if it is not paired with limiting food marketing in amateur sports settings. For instance, other analyses from the International Food Policy Study (IFPS) noted that children in Canada with lower perceived income adequacy were more likely to report exposure to certain types of unhealthy food marketing compared to those with higher perceived income adequacy (Acton *et al.* 2023). Without addressing food marketing, such as sponsorship, increased sports participation among children from lower income households may inadvertently increase existing disparities in food marketing exposure and diet among this subpopulation in Canada (Olstad *et al.* 2021, Hutchinson and Tarasuk 2022, Acton *et al.* 2023).

The extent to which social disparities in food advertising exposure in amateur sports settings contribute to disparities in total exposure across all media and settings and to dietary disparities is difficult to determine. Although male children in our study were more likely to report both playing on a sports team and exposure to food advertising, existing research from the IFPS did not provide evidence that male children are overall more frequently exposed to unhealthy food advertising, including for fast food, than their female counterparts (Acton *et al.* 2023). The same IFPS research did find that children who identify as East/Southeast Asian in Canada were less likely to report at least weekly exposure to advertising for some unhealthy food categories, namely fast food and sugary drinks, compared to those who identified as White (Acton *et al.* 2023). While authors suggested these disparities may be attributable to differences in media use, as some data suggested, it is also possible this subpopulation is less exposed to such advertising due to lower participation on sports teams, as our study found (Acton *et al.* 2023). Given that disparities in exposure by age, sex, race/ethnicity, or socio-economic status may be specific to certain media, settings, or promotional

Table 5. Multiple regression models^a examining differences in reported exposure to food advertising in amateur sports settings among children aged 10–17 years in Canada who reported playing on a sports team in 2019 by policy environment (weighted).

	Reported exposure on signs at their sporting events ^b (<i>n</i> = 1411)		Reported exposure on their sports equipment ^c (<i>n</i> = 1410)		Reported exposure on signs and/or sports equipment ^d (<i>n</i> = 1410)	
	AOR (95% CI)	<i>P</i> -value	AOR (95% CI)	<i>P</i> -value	AOR (95% CI)	<i>P</i> -value
Age						
10–12 years	1.19 (0.95; 1.50)	0.135	1.15 (0.88; 1.49)	0.305	1.13 (0.90; 1.42)	0.282
13–17 years	[ref]		[ref]		[ref]	
Policy environment						
Other provinces	1.39 (1.04; 1.84)	0.025	1.49 (1.06; 2.09)	0.022	1.51 (1.15; 1.99)	0.003
Quebec	[ref]		[ref]		[ref]	

AOR, adjusted odds ratio; CI, confidence interval; ref, reference category. ^aModels are adjusted for sex (male/female), perceived income adequacy (not enough/barely enough/enough/more than enough) and race (White exclusively/Racial minority groups). ^bThe *P*-value for the age * policy environment interaction term tested in a separate model with the same independent and control variables was 0.043. ^cThe *P*-value for the age * policy environment interaction term tested in a separate model with the same independent and control variables was 0.788. ^dThe *P*-value for the age * policy environment interaction term tested in a separate model with the same independent and control variables was 0.209.

Table 6. Multiple logistic regression models^a examining differences in reported exposure to food advertising in amateur sports settings between select age groups within and between Canada's two policy environments among children aged 10–17 years who reported playing on a sports team in 2019 (weighted).

	Reported exposure on signs at their sporting events (<i>n</i> = 1411)		Reported exposure on their sports equipment (<i>n</i> = 1410)		Reported exposure on signs and/or sports equipment (<i>n</i> = 1410)	
	AOR (95% CI)	<i>P</i> -value	AOR (95% CI)	<i>P</i> -value	AOR (95% CI)	<i>P</i> -value
Children aged 10–12 years in other provinces versus those aged 10–12 years in Quebec	1.98 (1.24; 3.16)	0.005	1.57 (0.92; 2.69)	0.098	1.86 (1.19; 2.91)	0.006
Children aged 10–12 years in Quebec versus those aged 13–17 years in Quebec	0.72 (0.43; 1.22)	0.220	1.06 (0.57; 1.95)	0.862	0.84 (0.51; 1.38)	0.495
Children aged 13–17 years in other provinces versus those aged 10–12 years in Quebec	1.50 (0.95; 2.37)	0.084	1.35 (0.80; 2.28)	0.261	1.55 (1.01; 2.40)	0.047
Children aged 10–12 years in other provinces versus those aged 13–17 years in the same provinces	1.32 (1.02; 1.71)	0.036	1.16 (0.87; 1.55)	0.304	1.20 (0.93; 1.55)	0.152

AOR, adjusted odds ratios; CI, confidence interval. ^aLeast mean square differences between subgroups of interest were calculated using multiple logistic models that included age (10–12 years/13–17 years), policy environment (Quebec/other provinces) and the age * policy environment interaction term and were adjusted for sex (male/female), perceived income adequacy (not enough/barely enough/enough/more than enough), and race (White exclusively/Racial minority groups).

strategies (Acton *et al.* 2023), comprehensive marketing restrictions will likely be needed to ensure that all child subpopulations are equally protected from the harmful influence of unhealthy food marketing.

Policy implications

As highlighted above, children who reported playing on a sports team in Quebec were overall less likely to report exposure to food advertising on both signs at their sporting events and on their sports equipment than children living in other Canadian provinces. Children aged 10–12 years in Quebec were also less likely to report exposure on signs compared to children of the same age in other provinces. These findings may be attributable to Quebec's advertising restrictions; however, this is difficult to ascertain with certainty and if the case, the mechanism underpinning their effect is unclear. Although the province permits advertising in settings frequented by children, this advertising cannot be explicitly directed to children. Sponsorship-related advertising is also permitted; however, sponsors that sell products intended for or appealing to children under 13 years can only be

advertised discreetly and without using a logo or mascot (Office de la protection du consommateur 2012). Given that advertising is not prohibited outright, it is unclear whether children in Quebec are less likely to report exposure because there is less sponsorship and food advertising or because children are less likely to notice and recall this advertising because it is in fact less appealing and/or prominent, consistent with the province's advertising restrictions. Notably, there is reason to believe the province's sponsorship-related restrictions are not being followed or interpreted consistently. For example, both McDonald's and Tim Hortons have large sports sponsorship programmes in Canada that distribute branded jerseys and other items to children; however, their activities in Quebec diverge. McDonald's sponsorship programme is directed to children over 13 years in Quebec while being directed to children aged 9 and 10 years in the rest of Canada (McDonald's Canada n.d.-a, n.d.-b). Tim Hortons' programme, on the other hand, is directed to children under 13 years, specifically those aged 4–8 years, including in Quebec (Tim Hortons n.d.). Considering Tim Hortons likely appeals to children and its programme distributes jerseys with their name

prominently featured, one would suspect this promotional activity to be inconsistent with Quebec's restrictions.

However, it should be noted that current guidance on the application of Quebec's advertising restrictions contains few details, particularly as it pertains to sponsorship. Little guidance is provided as to what types of companies or brands are considered appealing to children and what constitutes 'discreet' forms of advertising ([Office de la protection du consommateur 2012](#)). For instance, it is unclear whether displaying the name of a company or brand on children's sports equipment is in and of itself considered a prominent form of advertising that attracts children's attention or whether this type of advertising could be considered discreet, and as such permitted, depending on the location, size and font of the company or brand name. In addition to this lack of clarity, a survey conducted among a small sample of sports clubs in Quebec in 2022–23 noted little to no awareness of the province's restrictions pertaining to the sponsorship of children's activities, including sports (Pauzé *et al.* unpublished). Compliance with Quebec's advertising restrictions is also not actively monitored by the government and relies exclusively on complaints made by civil society or members of the public. While some food companies have pleaded guilty to violating Quebec's advertising restrictions and were required to pay a fine, which can reach up to \$100 000 for legal persons, we are not aware of any such instance related to the sponsorship of children's sports ([Collectif Vital n.d.-c](#), [Office de la protection du consommateur 2012](#)). Notwithstanding, the lack of awareness and clear guidance combined with the absence of active monitoring suggests non-compliance may be widespread. Public awareness campaigns, clearer application guidelines and more robust monitoring and enforcement mechanisms are likely needed to ensure the application of Quebec's law.

Non-compliance may partly explain why as many as 25% and 17% of surveyed children aged 10–12 years who reported playing on a sports team in Quebec reported exposure to food advertising on signs and on their sports equipment, respectively. It is also possible that children's reported exposure, particularly on signs at sporting events, stemmed from the sponsorship of older children or other advertising within recreational sports facilities ([Collectif Vital n.d.-a](#), [n.d.-b](#), [Prowse *et al.* 2018](#), [Vanderlee *et al.* 2025](#)). These factors might also explain why, contrary to our hypothesis, no statistically significant differences in reported exposure to food advertising were observed between children aged 10–12 years protected by Quebec's law and their older counterparts who are not protected. Since our survey did not or could not assess the full nature of the food advertising recalled by children—such as whether it stemmed from sponsorship at all, promoted brands appealing to children, used logos or mascots or was very visible rather than discreet—our study cannot assess compliance with Quebec's law nor assess its potential effect on the nature/content of the advertising recalled by children. More research is needed to examine these questions and determine whether noted differences in reported exposure between Quebec and other provinces are in fact attributable to Quebec's advertising restrictions. Relatedly, our study found that reported exposure to food advertising was not consistently lower in Quebec compared to other provinces when these were disaggregated by region in our models. For instance, observed differences in reported exposure to food advertising on signs at sporting events among children who played on a sports team in Ontario and British Columbia compared to those in Quebec

were not found to be statistically significant. Similarly, the observed difference in reported exposure to food advertising on sports equipment between children in the Prairies and those in Quebec was also not statistically significant. These findings cast some doubt as to whether Quebec's law explains noted differences between policy environments and suggest other factors may be at play. While the example of McDonald's sponsorship programme being directed to an older age group in Quebec does provide some evidence the province's law is having an impact, differences between policy environments could also partly stem from differences in the cost of—and the level of public funding for—recreational sports (influencing the need for sponsorship), the number and types of sports played by children and the predominant environment in which children play on sports teams (e.g. school vs community organizations; influencing opportunities for food advertising exposure). Future studies should consider these potentially confounding factors.

Outside Quebec, 35% of children aged 10–17 years who played on a sports team reported exposure to food advertising on signs at their sporting events and 23% reported exposure on their sports equipment. At the time of the survey, the food industry's self-regulatory initiative in Canada did not limit any sponsorship-related advertising ([Ad Standards n.d.](#), 2020). Industry's new advertising code, implemented in June 2023, seems to consider the advertisement of any product in the context of children's sports sponsorship permissible, so long as the advertisement does not feature content deemed 'primarily' directed to children under 13 years ([Association of Canadian Advertisers *et al.* 2022](#)). Notably, the food industry's definition of child-directed content is very narrow. For example, the presence of children or the use of imaginary characters (e.g. cartoon brand characters), the latter of which is known to be particularly persuasive among children ([Packer *et al.* 2022](#)), are not considered to be child-directed content ([Association of Canadian Advertisers *et al.* 2022](#)). In addition, the self-regulatory code does not limit any brand advertising, such as branding on sports equipment, nor limit other forms of promotion tied to sponsorship like the provision of vouchers or free food ([Association of Canadian Advertisers *et al.* 2022](#)). Given its limited scope, the food industry's new self-regulatory code is unlikely to reduce children's exposure to unhealthy food advertising stemming from sponsorship nor other forms of marketing in recreational sports facilities. As such, governments outside Quebec should consider statutory restrictions on unhealthy food advertising in children's amateur sports settings, including sponsorship, particularly as self-regulation is known to be ineffective ([Boyland *et al.* 2022b](#)). Whether they should emulate Quebec's sponsorship-related restrictions remains an open question. As previously mentioned, the full scope of these restrictions and the extent to which they are in fact being implemented in Quebec are unclear. As a result, their full effect on the frequency and nature of sponsorship-related advertising and children's exposure to—or recall of—this advertising is unknown. The important gaps that may undermine the effectiveness of Quebec's restrictions are also difficult to ascertain without clearer guidance on their application.

Strengths and limitations

This study is one of the few outside Australia that has examined children's exposure or potential exposure to food advertising

related to the sponsorship of children's sports (Maher *et al.* 2006, Kelly *et al.* 2011a, Watson *et al.* 2016, Ooi *et al.* 2019, Gonzalez *et al.* 2020, Pauzé *et al.* 2020, Martino *et al.* 2021, Hammond *et al.* 2023). This study is also the first in Canada to examine social disparities in food advertising exposure in amateur sports settings and did so using a large national sample. Notably, this research sheds light on the potential effectiveness of Quebec's advertising restrictions, which are unique particularly as it pertains to the sponsorship of children's activities. Nevertheless, the study limitations are important to note. First, respondents were recruited using nonprobability-based sampling; therefore, although the data were weighted by age group, sex and region, the findings do not provide nationally representative estimates. Second, the study's cross-sectional design precludes making any inferences about the impact of Quebec's law. Third, our measure of sports team participation did not specify a recall period nor define 'sports team'. It is therefore unclear how this measure was interpreted by respondents. In addition to those who played team sports, it is possible some children engaged in individual sports (e.g. tennis, swimming, and athletics) at a competitive level may have also identified as playing on a sports team, particularly as these individuals are often a member of a broader competitive team. Fourth, our measure of exposure to food advertising was self-reported and was thus subject to measurement error and recall bias. Notwithstanding, self-reported exposure to marketing has been associated with objective measures of marketing frequency or exposure (Davis *et al.* 2016, Feighery *et al.* 2006, Romberg *et al.* 2020, Southwell *et al.* 2002) and is known to be sensitive to differences in policy environments and policy changes (Yong *et al.* 2008, Wadsworth *et al.* 2018, Hammond *et al.* 2020). It is thus an appropriate measure for population-level studies. Fifth, although we would have liked to exclusively measure advertising exposure stemming from the sponsorship of children's sports, the source of the recalled food advertising in this study cannot be ascertained. For instance, recalled food advertising on signs at sporting events could have stemmed from the sponsorship of sporting facilities or from point-of-sale marketing in these facilities (Prowse *et al.* 2018, 2025). Also, given that our survey items did not refer to a specific environment, it is unclear whether children's exposure to food advertising while playing on a sports team occurred in or outside of school. Future research in Canada should attempt to investigate food marketing in these environments in isolation as they are generally subject to different provincial policies or guidelines (Prowse 2017, Prowse *et al.* 2018). Finally, it should be noted that this secondary analysis was not pre-registered. This study also analysed data collected before the COVID-19 pandemic and as such may not reflect subsequent patterns or levels of sports participation or food company sponsorship and related advertising.

CONCLUSION

Our findings suggest many children are exposed to food advertising in amateur sports settings with some subpopulations (e.g. males, children outside Quebec) being more likely exposed. Despite a provincial law limiting the visibility and appeal of sponsorship-related advertising among children under 13 years, children aged 10–12 years in Quebec still reported exposure to food advertising in this setting. More research is needed to assess the nature and potential impact of this

advertising and the effectiveness of Quebec's law in limiting children's exposure.

Author Contributions

E.P., M.P.K., C.L.M., M-H.R.G., and L.V. conceptualized this secondary analysis. C.M.W., L.V., and D.H. secured the research funding and collected the data. C.M.W. and D.H. were involved in or oversaw the curation of the data and the administration of the project. E.P. analysed the data with the assistance of M-H.R.G. and M.P.K. supervised this secondary analysis. E.P. prepared the presentation of the results and wrote the first draft. All authors reviewed and approved the final manuscript.

Supplementary data

Supplementary data is available at *Health Promotion International* online.

Conflict of interest

E.P. has received an honorarium from the Stop Marketing to Kids Coalition (2018) and Heart & Stroke (2023) for doing policy and advocacy work related to food marketing to children. She was recently (2023–24) employed by Heart & Stroke on a part-time basis to do work on this topic area. This work and compensation were not related to the current research. D.H. has provided paid expert testimony on behalf of public health authorities in response to legal claims from the food and beverage industry. All remaining authors declare no conflicts of interest.

Funding

Funding for the 2019 IFPS Youth Survey was provided by an International Health Grant from the Public Health Agency of Canada (PHAC). Additional funding for the IFPS project is provided by a project grant from Canadian Institutes of Health Research (CIHR) project grant (PJT-162167). E.P. is supported by the Canada Graduate Scholarship to Honour Nelson Mandela awarded by CIHR (2019–22) and a doctoral research award from Fonds de recherche du Québec—santé (2022–24). C.L.M. and L.V. receive funding from the Canada Research Chairs programme.

Ethical approval and consent

Informed consent/assent was obtained from participating children and their parent/guardian. The primary data collection and this secondary analysis were reviewed by and received ethics clearance through a Research Ethics Committee at the University of Waterloo (ORE# 41477) in November 2019 and the University of Ottawa (H-06-20-5908) in August 2020, respectively.

Data availability

The dataset analysed during the current study is available upon reasonable request to the IFPS Principal Investigator David Hammond (dhammond@uwaterloo.ca).

References

Acton RB, Bagnato M, Remedios L *et al.* Examining differences in children and adolescents' exposure to food and beverage marketing in

- Canada by sociodemographic characteristics: findings from the International Food Policy Study Youth Survey, 2020. *Pediatr Obes* 2023;18:e13028. <https://doi.org/10.1111/ijpo.13028>
- Ad Standards. *Canadian Children's Food and Beverage Advertising Initiative (CAI)—archived*. n.d. <https://adstandards.ca/resources/library/childrens-food-and-beverage-advertising-initiative-cai/> (15 February 2025, date last accessed).
- Ad Standards. *The Canadian Children's Food and Beverage Advertising Initiative. 2019 Compliance Report*, 2020. <https://adstandards.ca/wp-content/uploads/CAI-Compliance-Report-2019.pdf> (15 February 2025, date last accessed).
- Alberta Schools' Athletic Association. *Partners*. n.d. <https://www.asaa.ca/partners> (15 February 2025, date last accessed).
- Association of Canadian Advertisers, Canadian Beverage Association, Food Health and Consumer Products Canada and Restaurant Canada. *Guide for the Responsible Advertising of Food and Beverage Products to Children*, 2022. <https://adstandards.ca/wp-content/uploads/FoodAndBeverageAdvertisingGuide-EN20220804.pdf> (15 February 2025, date last accessed).
- Austin PC. Using the standardized difference to compare the prevalence of binary variable between two groups in observational research. *Commun Stat Simul Comput* 2009;38:1228–34. <https://doi.org/10.1080/03610910902859574>
- Backholer K, Gupta A, Zorbas C *et al*. Differential exposure to, and potential impact of, unhealthy advertising to children by socioeconomic and ethnic groups: a systematic review of the evidence. *Obes Rev* 2021;22:e13144. <https://doi.org/10.1111/obr.13144>
- BC School Sports. *BCSS Partners*, n.d. <https://www.bcschoolsports.ca/bcss-partners> (15 February 2025, date last accessed).
- Bernstein JT, Christoforou AK, Ng A *et al*. Canadian free sugar intake and modelling of a reformulation scenario. *Foods* 2023;12:1771. <https://doi.org/10.3390/foods12091771>
- Bestman A, Thomas SL, Randle M *et al*. Children's implicit recall of junk food, alcohol and gambling sponsorship in Australian sport. *BMC Public Health* 2015;15:1022. <https://doi.org/10.1186/s12889-015-2348-3>
- Boelens M, Smit MS, Raat H *et al*. Impact of organized activities on mental health in children and adolescents: an umbrella review. *Prev Med Rep* 2022;25:101687. <https://doi.org/10.1016/j.pmedr.2021.101687>
- Boyland E, Garde A, Jewell J *et al*. *Evaluating Implementation of the WHO Set of Recommendations on the Marketing of Foods and Non-alcoholic Beverages to Children: Progress, Challenges and Guidance for Next Steps in the WHO European Region*. World Health Organization, 2018. <https://iris.who.int/handle/10665/345153> (15 February 2025, date last accessed).
- Boyland E, McGale L, Maden M *et al*. Association of food and non-alcoholic beverage marketing with children and adolescents' eating behaviors and health: a systematic review and meta-analysis. *JAMA Pediatr* 2022a;176:e221037. <https://doi.org/10.1001/jamapediatrics.2022.1037>
- Boyland E, McGale L, Maden N *et al*. Systematic review of the effect of policies to restrict the marketing food and non-alcoholic beverages to which children are exposed. *Obes Rev* 2022b;23:e13447. <https://doi.org/10.1111/obr.13447>
- Boyland E, Muc M, Kelly B *et al*. Indirect associations between commercial television exposure and child body mass index. *J Nutr Educ Behav* 2021;53:20–7. <https://doi.org/10.1016/j.jneb.2020.10.016>
- Brown K. Association between alcohol sports sponsorship and consumption: a systematic review. *Alcohol Alcohol* 2016;51:747–55. <https://doi.org/10.1093/alcalc/agw006>
- Cairns G, Angus K, Hastings G *et al*. Systematic reviews of the evidence on the nature, extent and effects of food marketing to children. A retrospective summary. *Appetite* 2013;62:209–15. <https://doi.org/10.1016/j.appet.2012.04.017>
- Canadian Fitness and Lifestyle Research Institute. *Spotlight Series: Sport Participation among Children and Youth*, 2022. <https://cflri.ca/wp-content/uploads/2024/04/CFLRI-Summary-1.-Sport-participation-of-children-and-youth.pdf> (15 February 2025, date last accessed).
- Carter OBJ, Patterson LJ, Donovan RJ *et al*. Children's understanding of the selling versus persuasive intent of junk food advertising: implications for regulation. *Soc Sci Med* 2011;72:962–8. <https://doi.org/10.1016/j.socscimed.2011.01.018>
- Castronuovo L, Guarnieri L, Tiscornia MV *et al*. Food marketing and gender among children and adolescents: a scoping review. *Nutr J* 2021;20:52. <https://doi.org/10.1186/s12937-021-00706-4>
- Child and Adolescent Health Measurement Initiative. *NSCH 2022: Participation in Sports Teams or Sports Lessons after School or on Weekends, Nationwide, Sex of child*, 2022. <https://nschdata.org/browse/survey/results?q=10365&g=1073&cr=1> (15 February 2025, date last accessed).
- Clark W. *Canadian Social Trends: Kids' Sports*. Statistics Canada, 2008. <https://www150.statcan.gc.ca/n1/en/pub/11-008-x/2008001/article/10573-eng.pdf?st=qv1X-BVL> (15 February 2025, date last accessed).
- Collectif Vital. *Brand Advertising Directed at Children and Teenagers. The Case of Fast Food Restaurants*, n.d.-a. https://collectifvital.ca/files/P8-Publicites_enfants/Publicites_marque/Fast-Food_Restaurants.pdf (15 February 2025, date last accessed).
- Collectif Vital. *Brand Advertising Directed at Children and Teenagers. The Case of Sugar-sweetened Beverages*, n.d.-b. https://collectifvital.ca/files/P8-Publicites_enfants/Publicites_marque/Sugary-drinks.pdf (15 February 2025, date last accessed).
- Collectif Vital. *Complaints*, n.d.-c. <https://collectifvital.ca/en/complaints> (25 March 2025, date last accessed).
- Davis KC, Shafer PR, Rodes R *et al*. Does digital video advertising increase population-level reach of multimedia campaigns? Evidence from the 2013 tips from former smokers campaign. *J Med Internet Res* 2016;18:e235. <https://doi.org/10.2196/jmir.5683>
- Demetriou Y, Beck F, Sturm D *et al*. Germany's 2022 report card on physical activity for children and adolescents. *Ger J Exerc Sport Res* 2024;54:260–75. <https://doi.org/10.1007/s12662-024-00946-6>
- Dixon H, Lee A, Scully M. Sports sponsorship as a cause of obesity. *Curr Obes Rep* 2019;8:480–94. <https://doi.org/10.1007/s13679-019-00363-z>
- Eather N, Wade L, Pankowiak A *et al*. The impact of sports participation on mental health and social outcomes in adults: a systematic review and the 'Mental Health through Sport' conceptual model. *Syst Rev* 2023;12:102. <https://doi.org/10.1186/s13643-023-02264-8>
- Eime RM, Young JA, Harvey JT *et al*. A systematic review of the psychological and social benefits of participation in sport for children and adolescents: informing development of a conceptual model of health through sport. *Int J Behav Nutr Phys Act* 2013;10:98. <https://doi.org/10.1186/1479-5868-10-98>
- Feighery EC, Henriksen L, Wang Y *et al*. An evaluation of four measures of adolescents' exposure to cigarette marketing in stores. *Nicotine Tob Res* 2006;8:751–9. <https://doi.org/10.1080/14622200601004125>
- Gonzalez S, Kingsland M, Hall A *et al*. Alcohol and fast-food sponsorship in sporting clubs with junior teams participating in the "Good Sports" program: a cross-sectional study. *Aust N Z J Public Health* 2020;44:145–51. <https://doi.org/10.1111/1753-6405.12954>
- Guèvremont A, Findlay L, Kohen D. Organized extracurricular activities of Canadian children and youth. *Health Rep* 2008;19:65–9.
- Hammond D, Acton RB, White CM *et al*. *International Food Policy Study Youth Surveys: Summary of Findings 2019–2021*, 2023. <https://foodpolicystudy.com/wp-content/uploads/2024/02/2023-IFPS-Youth-2021-Report-Sept-8.pdf> (25 March 2025, date last accessed).
- Hammond D, Reid JL, Burkhalter R *et al*. E-cigarette marketing regulations and youth vaping: cross-sectional surveys, 2017–2019. *Pediatrics* 2020;146:e20194020. <https://doi.org/10.1542/peds.2019-4020>
- Hammond D, White CM, Rynard VL *et al*. *International Food Policy Study: Technical Report—2019 Youth Surveys*, 2024. <https://foodpolicystudy.com/methods/> (15 February 2025, date last accessed).

- Harris JL, Sacco SJ, Fleming-Milici F. TV exposure, attitudes about targeted food ads and brands, and unhealthy consumption by adolescents: modeling a hierarchical relationship. *Appetite* 2022; 169:105804. <https://doi.org/10.1016/j.appet.2021.105804>
- Harris JL, Yokum S, Fleming-Milici F. Hooked on junk: emerging evidence on how food marketing affects adolescents' diets and long-term health. *Curr Addict Rep* 2021;8:19–27. <https://doi.org/10.1007/s40429-020-00346-4>
- Hockey Canada. *Building the Future of Women's and Girls' Hockey*, 2024. <https://cdn.hockeycanada.ca/hockey-canada/Hockey-Programs/Female/Downloads/womens-and-girls-paper-e.pdf> (15 February 2025, date last accessed).
- Hosmer DW, Lemeshow S, Sturdivant RX. *Applied Logistic Regression*. 3rd edn. Hoboken, NJ: John Wiley & Sons, Inc., 2013. Chapter 3. 67.
- Hutchinson J, Tarasuk V. The relationship between diet quality and the severity of household food insecurity in Canada. *Public Health Nutr* 2022;25:1013–26. <https://doi.org/10.1017/S1368980021004031>
- Irvine DS, Lee E-Y, Janssen I et al. Gendered associations between e-cigarette use, cigarette smoking, physical activity, and sedentary behaviour in a sample of Canadian adolescents. *Dialogues Health* 2022;1:100029. <https://doi.org/10.1016/j.dialog.2022.100029>
- Jones AC, Kirkpatrick SI, Hammond D. Beverage consumption and energy intake among Canadians: analyses of 2004 and 2015 national dietary intake data. *Nutr J* 2019;18:60. <https://doi.org/10.1186/s12937-019-0488-5>
- Kelly B, Baur LA, Bauman AE et al. Food and drink sponsorship of children's sport in Australia: who pays? *Health Promot Int* 2011a;26:188–95. <https://doi.org/10.1093/heapro/daq061>
- Kelly B, Baur LA, Bauman AE et al. Tobacco and alcohol sponsorship of sporting events provide insights about how food and beverage sponsorship may affect children's health. *Health Promot J Austr* 2011b;22:91–6. <https://doi.org/10.1071/HE11091>
- Kelly B, Boyland E, Tatlow-Golden M et al. Testing a conceptual hierarchy of effects model of food marketing exposure and associations with children and adolescents' diet-related outcomes. *Public Health Nutr* 2023;27:e10. <https://doi.org/10.1017/S1368980023002616>
- Kelly B, King L, Chapman K et al. A hierarchy of unhealthy food promotion effects: identifying methodological approaches and knowledge gaps. *Am J Public Health* 2015;105:e86–95. <https://doi.org/10.2105/AJPH.2014.302476>
- Little League. *Little League® and Dairy Queen® Team Up With \$1 Cone Offer This Season*. Little League, 2024. <https://www.littleleague.org/news/little-league-and-dairy-queen-team-up-with-1-cone-offer-this-season/> (15 February 2025, date last accessed).
- Maher A, Wilson N, Signal L et al. Patterns of sports sponsorship by gambling, alcohol and food companies: an internet survey. *BMC Public Health* 2006;6:95. <https://doi.org/10.1186/1471-2458-6-95>
- Manitoba High School Athletic Association. *Sponsors*, n.d. <https://www.mhsaa.ca/sponsors/> (15 February 2025, date last accessed).
- Martino F, Chung A, Potter J et al. A state-wide audit of unhealthy sponsorship within junior sporting clubs in Victoria, Australia. *Public Health Nutr* 2021;24:3797–804. <https://doi.org/10.1017/S1368980021002159>
- McDonald's Canada. *McDonald's AtoMc Hockey—Home*, n.d.-a. <https://www.atomchockey.ca/en-CA> (15 February 2025, date last accessed).
- McDonald's Canada. *Équipe McDo—Program Overview*, n.d.-b. <https://www.equipemcdo.ca/en-QC/program-overview> (15 February 2025, date last accessed).
- McDonald's UK. *Grassroots Football UK*, n.d. <https://www.mcdonalds.com/gb/en-gb/football.html> (15 February 2025, date last accessed).
- Norman J, Kelly B, Boyland E et al. The impact of marketing and advertising on food behaviours: evaluating the evidence for a causal relationship. *Curr Nutr Rep* 2016;5:139–49. <https://doi.org/10.1007/s13668-016-0166-6>
- Norman J, Kelly B, McMahon A-T et al. Sustained impact of energy-dense TV and online food advertising on children's dietary intake: a within-subject, randomised, crossover, counter-balanced trial. *Int J Behav Nutr Phys Act* 2018;15:37. <https://doi.org/10.1186/s12966-018-0672-6>
- Office de la protection du consommateur. *Advertising Directed at Children Under 13 Years of Age—Guide to the Application of Sections 248 and 249 Consumer Protection Act*. Gouvernement du Québec, 2012. https://cdn.opc.gouv.qc.ca/media/documents/consommateur/sujet/publicite-pratique-illegale/EN_Guide_publicite_moins_de_13_ans_vf.pdf (15 February 2025, date last accessed).
- Olstad DL, Nejatnamini S, Victorino C et al. Trends in socioeconomic inequities in diet quality between 2004 and 2015 among a nationally representative sample of children in Canada. *J Nutr* 2021;151:3781–94. <https://doi.org/10.1093/jn/nxab297>
- Ooi JY, Wiggers JH, Kingsland M et al. Exposure to fast-food and sweetened-drink marketing at community sports clubs in Australia. *Public Health Res Pract* 2019;29:2941929. <https://doi.org/10.17061/phrp2941929>
- Owen KB, Nau T, Reece LJ et al. Fair play? Participation equity in organised sport and physical activity among children and adolescents in high income countries: a systematic review and meta-analysis. *Int J Behav Nutr Phys Act* 2022;19:27. <https://doi.org/10.1186/s12966-022-01263-7>
- Packer J, Russell SJ, McLaren K et al. The impact on dietary outcomes of licensed and brand equity characters in marketing unhealthy foods to children: a systematic review and meta-analysis. *Obes Rev* 2022;23:e13443. <https://doi.org/10.1111/obr.13443>
- ParticipACTION. *Rallying for Resilience: Keeping Children and Youth Active in a Changing Climate. The 2024 ParticipACTION Report Card on Physical Activity for Children and Youth*, 2024. <https://www.participaction.com/wp-content/uploads/2024/05/2024-Children-and-Youth-Report-Card-Technical-Report.pdf> (15 February 2025, date last accessed).
- Pauzé E, Ekeh O, Kent MP. The extent and nature of food and beverage company sponsorship of children's sports clubs in Canada: a pilot study. *Int J Environ Res Public Health* 2020;17:3023. <https://doi.org/10.3390/ijerph17093023>
- PEI School Athletic Association. *Sponsors*, n.d. http://peisaa.pe.ca/page.php?page_id=109395 (15 February 2025, date last accessed).
- Pettigrew S, Rosenberg M, Ferguson R et al. Game on: do children absorb sports sponsorship messages? *Public Health Nutr* 2013;16:2197–204. <https://doi.org/10.1017/S1368980012005435>
- Polsky JY, Garriguet D. Change in vegetable and fruit consumption in Canada between 2004 and 2015. *Health Rep* 2020;31:3–12. <https://doi.org/10.25318/82-003-x202000400001-eng>
- Polsky JY, Moubarac J-C, Garriguet D. Consumption of ultra-processed foods in Canada. *Health Rep* 2020;31:3–15. <https://doi.org/10.25318/82-003-x202001100001-eng>
- Potvin Kent M, Hatoum F, Wu D et al. Benchmarking unhealthy food marketing to children and adolescents in Canada: a scoping review. *Health Promot Chronic Dis Prev Can* 2022;42:307–18. <https://doi.org/10.24095/hpcdp.42.8.01>
- Potvin Kent M, Velazquez CE, Pauzé E et al. Food and beverage marketing in primary and secondary schools in Canada. *BMC Public Health* 2019;19:114. <https://doi.org/10.1186/s12889-019-6441-x>
- Prowse R. Food marketing to children in Canada: a settings-based scoping review on exposure, power and impact. *Health Promot Chronic Dis Prev Can* 2017;37:274–92. <https://doi.org/10.24095/hpcdp.37.9.03>
- Prowse RJL, Naylor P-J, Olstad DL et al. Food marketing in recreational sport settings in Canada: a cross-sectional audit in different policy environments using the Food and Beverage Marketing Assessment Tool for Settings (FoodMATS). *Int J Behav Nutr Phys Act* 2018;15:39. <https://doi.org/10.1186/s12966-018-0673-5>
- Prowse R, Warken M, Tran T et al. Frequency of food marketing in recreation and sport facilities differs by presence of food sponsorship agreements and food service contracts in Canada. *Appl Physiol*

- Nutr Metab* 2025;50:1–9. <https://doi.org/10.1139/apnm-2024-0517>
- Public Health Ontario. *Physical Activity Indicators using Data from the Canadian Health Survey on Children and Youth*, 2024. https://www.publichealthontario.ca/-/media/Documents/C/24/chscy-physical-activity-data.pdf?&sc_lang=en (15 February 2025, date last accessed).
- Riediger ND, LaPlante J, Mudryj A *et al.* Diet quality among indigenous and non-indigenous children and youth in Canada in 2004 and 2015: a repeated cross-sectional design. *Public Health Nutr* 2022;25:123–32. <https://doi.org/10.1017/S1368980021002561>
- Romberg AR, Bennett M, Tulsiani S *et al.* Validating self-reported ad recall as a measure of exposure to digital advertising: an exploratory analysis using ad tracking methodology. *Int J Environ Res Public Health* 2020;17:2185. <https://doi.org/10.3390/ijerph17072185>
- School Sport Newfoundland and Labrador. *School Sports NL*, n.d.. <https://www.schoolsportsnl.ca/> (15 February 2025, date last accessed).
- Smith BT, Hack S, Jessri M *et al.* The equity and effectiveness of achieving Canada's voluntary sodium reduction guidance targets: a modelling study using the 2015 Canadian Community Health Survey-Nutrition. *Nutrients* 2021;13:779. <https://doi.org/10.3390/nu13030779>
- Southwell BG, Barmada CH, Hornik RC *et al.* Can we measure encoded exposure? Validation evidence from a national campaign. *J Health Commun* 2002;7:445–53. <https://doi.org/10.1080/10810730290001800>
- Statistics Canada. *Overweight and Obesity based on Measured Body Mass Index based on Age Group and Sex*, 2020. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1310037301> (June 16 2025, date last accessed).
- Statistics Canada. *Dictionary, Census of Population, 2021—Population Centre (POPCTR)*, 2021. <https://www12.statcan.gc.ca/census-recensement/2021/ref/dict/az/Definition-eng.cfm?ID=geo049a> (15 February 2025, date last accessed).
- Taillie LS, Busey E, Stoltze FM *et al.* Governmental policies to reduce unhealthy food marketing to children. *Nutr Rev* 2019;77:787–816. <https://doi.org/10.1093/nutrit/nuz021>
- Tim Hortons. *Timbits Sports*, n.d. <https://www.timhortons.ca/timbits-sports> (15 February 2025, date last accessed).
- UK Department for Digital, Culture Media and Sport. *Taking Part Survey 2016/17 Annual Child Report*, 2017. https://assets.publishing.service.gov.uk/media/5a820a61ed915d74e623576d/Taking_Part_child_statistical_release.pdf (15 February 2025, date last accessed).
- Vanderlee L, McLachlan A, Vaillancourt C *et al.* *School food environment survey in Canada—Final Report*, 2024. <https://informascanada.com/publications> (15 February 2025, date last accessed).
- Vanderlee L, Vaillancourt C, McLaughlin A *et al.* *An In-depth look at Canada's Food Environments: Results from INFORMAS Canada*, 2025. <https://informascanada.com/publications> (15 February 2025, date last accessed).
- Velazquez CE, Black JL, Ahmadi N. Food and beverage promotions in Vancouver schools: a study of the prevalence and characteristics of in-school advertising, messaging, and signage. *Prev Med Rep* 2015;2:757–64. <https://doi.org/10.1016/j.pmedr.2015.08.020>
- Wadsworth E, McNeill A, Li L *et al.* Reported exposure to E-cigarette advertising and promotion in different regulatory environments: findings from the International Tobacco Control Four Country (ITC-4C) Survey. *Prev Med* 2018;112:130–7. <https://doi.org/10.1016/j.ypmed.2018.04.022>
- Warren C, Hobin E, Manuel DG *et al.* Socioeconomic position and consumption of sugary drinks, sugar-sweetened beverages and 100% juice among Canadians: a cross-sectional analysis of the 2015 Canadian Community Health Survey-Nutrition. *Can J Public Health* 2022;113:341–62. <https://doi.org/10.17269/s41997-021-00602-8>
- Watson WL, Brunner R, Wellard L *et al.* Sponsorship of junior sport development programs in Australia. *Aust N Z J Public Health* 2016;40:326–8. <https://doi.org/10.1111/1753-6405.12541>
- Wilcox BL, Kunkel D, Cantor J *et al.* *Report of the APA Task Force on Advertising and Children*. American Psychology Association, 2004. <https://www.apa.org/pi/families/resources/advertising-children.pdf> (15 February 2025, date last accessed).
- Yang Y, Weippert M, Ahmed M *et al.* Cross-sectional nutritional information and quality of Canadian chain restaurant menu items in 2020. *Am J Prev Med* 2023;64:42–50. <https://doi.org/10.1016/j.amepre.2022.07.015>
- Yong H-H, Borland R, Hammond D *et al.* Levels and correlates of awareness of tobacco promotional activities among adult smokers in Malaysia and Thailand: findings from the International Tobacco Control Southeast Asia (ITC-SEA) Survey. *Tob Control* 2008;17:46–52. <https://doi.org/10.1136/tc.2007.021964>