Grocery Shopping, Dinner Preparation, and Dietary Habits among Adolescents and Young Adults in Canada

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ABSTRACT

Purpose: The current study aimed to characterize grocery shopping and dinner preparation behaviours among young people in Canada and to examine associations with eating habits.

Methods: A cross-sectional online survey was conducted with 2008 participants aged 16–24 from across Canada. The survey measured self-reported grocery shopping and dinner preparation behaviours, frequency of eating breakfast and eating meals prepared away from home, frequency of vegetable and fruit intake, and socio-demographic characteristics. Chi-square tests examined differences in proportions; logistic and linear regressions examined dietary habits, including covariates for grocery shopping and dinner preparation and socio-demographics.

Results: Overall, 37.3% had helped with grocery shopping in the past week, and 84.3% had participated in dinner preparation at least 1 day in the past week. Engaging in shopping at least once weekly was associated with increased vegetable and fruit consumption only, whereas more frequent engagement in dinner preparation was associated with increased vegetable and fruit consumption, more frequent breakfast consumption, and fewer meals consumed that were prepared away from home ($P < 0.001$ for all).

Conclusions: Increased participation in grocery shopping and dinner preparation were associated with healthier dietary habits. Interventions that increase these behaviours may contribute to improving dietary behaviours among adolescents and young adults.

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RÉSUMÉ

Objectif. La présente étude visait à caractériser les comportements en lien avec l'achat des aliments et la préparation du souper chez les jeunes au Canada et à examiner les associations avec les habitudes alimentaires.

Méthodes. Une enquête transversale en ligne a été menée auprès de 2 008 participants âgés de 16 à 24 ans provenant de partout au Canada. L'enquête mesurait les comportements autodéclarés en lien avec l'achat des aliments et la préparation du souper, la fréquence de consommation d'un déjeuner et de repas préparés à l'extérieur de la maison, la fréquence de consommation de fruits et légumes, et les caractéristiques sociodémographiques. Les différences de proportions ont été vérifiées à l'aide de tests du khi deux; les habitudes alimentaires, dont les covariables pour les habitudes d'achat des aliments et de préparation du souper et pour les données sociodémographiques, ont été vérifiées à l'aide de régressions linéaires et logistiques.

Résultats. Dans l'ensemble, 37,3 % des participants avaient aidé à l'achat des aliments au cours de la semaine précédente, et 84,3 % avaient participé au moins une fois à la préparation du souper au cours de la même semaine. La participation à l'achat des aliments au moins une fois par semaine était seulement associée à une hausse de la consommation de fruits et légumes, tandis qu'une participation plus fréquente à la préparation du souper était associée à une hausse de la consommation de fruits et légumes, à la prise plus fréquente d'un déjeuner et à une quantité moins importante de repas préparés à l'extérieur de la maison ($P < 0{,}001$, pour tout).

Conclusions. Une plus grande participation à l'achat des aliments et à la préparation du souper a été associée à des habitudes alimentaires plus saines. Les interventions qui favorisent ces comportements pourraient contribuer à l'amélioration des comportements alimentaires chez les adolescents et les jeunes adultes.

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INTRODUCTION

Although diet is a critical component of health, most Canadians report poor diet quality [1]. Diet quality is particularly low among adolescents (aged 9–18 years) and young adults (aged 19–30 years) in Canada [1, 2]. Dietary patterns appear to worsen from adolescence to adulthood: research suggests lower fruit and vegetable consumption, higher fast-food consumption, and an overall decline in diet quality during this period [3–5]. Young people are a particularly important target for the promotion of healthy dietary habits, as dietary patterns established during adolescence and young adulthood often predict patterns later in life [6, 7].

Grocery shopping and dinner preparation have been associated with diet quality and health benefits; however, research exploring these behaviours among adolescents and young adults is lacking. These behaviours are commonly included in definitions of "food literacy", and contribute to an individual's ability to navigate food choices in the current food environment [8, 9]. Cross-sectional and longitudinal research from the US and Australia suggests that those who prepare food at home more frequently have improved diet quality, in part because they eat less food prepared outside the home [4, 10–13]; however, this is not consistent across all studies [14]. Research also suggests that those who engage in food

preparation during adolescence are more likely to continue these behaviours into early adulthood [10].

Fewer studies have examined the impact of involvement in grocery shopping on diet quality, with one study finding that shopping for food was unrelated to most dietary behaviours but was associated with significantly higher fried food consumption among female adolescents [15]. Two studies have examined associations between shopping at various store types and diet and health outcomes; however, these studies have not examined overall frequency of grocery shopping among young adults in Canada [16, 17].

Little research has been conducted examining dinner preparation and shopping behaviours in Canada in general, particularly among adolescents and young adults. A Health Canada report examining food skills in Canada found that children helped prepare or cook foods in 59% of households with children, and 68% participate in shopping for groceries; however, the frequency of these behaviours was not reported [18]. Additional analysis by Slater et al. [19] found that women had higher self-reported proficiency at cooking than men, and that older Canadians reported greater food skills than younger Canadians, with those aged 12–29 years having the poorest self-reported food skills.

Eating behaviours, such as eating meals prepared outside the home and meal patterns, are typically associated with dietary intake and overall diet quality and may influence, or be influenced by, food preparation and shopping behaviours. It is well established that eating meals prepared outside of the home has been associated with overall poorer diet quality [20]. Meal patterns such as routine consumption of breakfast and evening meals also influence diet quality [21], with evidence suggesting that skipping breakfast has been associated with weight gain from adolescence to adulthood [22, 23].

Given that late adolescence and early adulthood (from 16–24 years) generally coincide with important lifestyle changes, including greater independence, this is a unique population to examine [24]. To our knowledge, no research has examined dinner preparation or grocery shopping among young Canadians in this age category. The purpose of the current study was: (*i*) to examine engagement in grocery shopping and dinner preparation; (*ii*) to identify individual characteristics associated with these behaviours; and (*iii*) to examine associations with these behaviours, meal patterns, and fruit and vegetable intake among adolescents and young adults in Canada.

METHODS

This cross-sectional study was conducted in August 2014 as a component of a larger online experimental study examining the impact of nutrition labels among young people in Canada [25–28].

Participants

Participants aged 16–24 years were recruited by Nielsen Consumer Insights Panel from their previously established online commercial panel. A stratified random sample of Nielsen online panelists was sent an email invitation to complete the survey. Sample quotas were set to include 50% females and 50% of participants ages 16–18 years. A total of 2011 participants completed the survey; one participant was excluded due to data quality concerns and two due to geographic region being out of scope, for a final sample size of 2008 included in the overall analysis.

Participants were remunerated with approximately $2–$3. Sample weights were constructed using population estimates from the Canadian 2011 National Household Survey for age, gender, and geographic region [29]. Surveys were conducted online on personal computers or tablets and were offered in English only, and participant consent was obtained. Ethical approval for the study was received from University of Waterloo Research Ethics Committee.

Measures

The complete wording for measures used in the study can be found in Supplementary File 1.[1] A series of measures adapted from studies conducted in the US determined responsibility for food prepared in the home to examine engagement in preparing dinner, helping to shop for groceries, and responsibility for grocery shopping and dinner preparation in their household [30]. Participants also reported how many days in the past 7 days they had consumed breakfast, how many meals were consumed that were prepared away from home, and how many meals prepared outside of the home were from fast-food or pizza restaurants. Participants were asked a series of 5 questions to determine whole vegetable and fruit intake during the past 7 days, adapted from measures used by the Centers for Disease Control and Prevention's *Youth Risk Behaviour Surveillance System* [31].

Participants self-reported age, gender (male or female), and race (using categories for reporting of ethnicity from the Canadian Community Health Survey) [32]. Self-reported height and weight were used to calculate body mass index (BMI). Province of residence was characterized according to region: British Columbia, Prairies (Alberta, Saskatchewan, Manitoba), Ontario, Quebec, and Atlantic Canada (Nova Scotia, Newfoundland and Labrador, New Brunswick, Prince Edward Island). Residents of the Territories were excluded from this analysis. Participants also reported their level of nutrition knowledge and weight-related behaviours.

Analysis

Analyses were conducted using SPSS version 22 (Armonk, NY). Data were weighted using National Household Survey data for

[1]Supplementary data are available with the article through the journal Web site at http://dcjournal.ca.www.nrcresearchpress.com/doi/suppl/10.3148/cjdpr-2018-025.

age, gender, and region [30] Descriptive statistics examined proportions of individuals engaging in each of the behaviours. Unadjusted ANOVA tests were used to test for significant differences among socio-demographic characteristics in the frequency of assisting with dinner preparation in the past 7 days, and unadjusted Pearson χ^2 tests were used to examine the proportion of participants who participated in grocery shopping at least once in the past week. Spearman correlations were used to examine the relationship between grocery shopping and dinner preparation.

Three linear regression models were conducted to examine sociodemographic correlates for each of three dietary behaviour outcomes: (*i*) frequency of consuming breakfast (range 0–7 days), (*ii*) frequency of eating meals prepared outside of the home (range 0–21 meals), and (*iii*) the number of times whole vegetables or fruit were consumed each day. Predictor variables included a continuous variable for frequency of helping with dinner preparation (range 0–7 days) and a variable for participation in grocery shopping once per week or more (0 = less than once per week, 1 = once or more per week). Models were adjusted for gender, race, age, region, self-reported nutrition knowledge, and weight loss behaviour. Reported estimates are weighted, with the exception of the sample characteristics data shown in Table 1.

Table 1. Unweighted socio-demographic and psychosocial characteristics of sample (n = 2008).

	No. (%)
Gender	
Male	1001 (49.9)
Female	1007 (50.1)
Race	
White	1173 (58.4)
Non-White	771 (38.4)
Not stated	64 (3.2)
Body mass index (BMI)	
Underweight (BMI ≤ 18.5)	209 (10.4)
Normal weight (BMI 18.5–24.9)	1129 (56.2)
Overweight (BMI 25–29.9)	297 (14.8)
Obese (BMI ≥ 30)	140 (7.0)
Not stated	233 (11.6)
Age group	
16–18 y	1004 (50.0)
19–21 y	503 (25.0)
22–24 y	501 (25.0)
Region	
British Columbia	368 (18.3)
Prairies	468 (23.3)
Ontario	839 (41.8)
Quebec	124 (6.2)
Atlantic Canada	173 (8.6)
Not reported	36 (1.8)
Self-reported nutrition knowledge	
Not at all knowledgeable	72 (3.6)
A little knowledgeable	483 (24.2)
Somewhat knowledgeable	998 (50.0)
Very knowledgeable	387 (19.4)
Extremely knowledgeable	55 (2.8)
Don't know/refused	13 (0.6%)
Weight goal	
Lose weight	798 (39.7)
Gain weight	310 (15.4)
Stay the same weight	467 (23.3)
Not trying to do anything	408 (20.3)
Don't know/refused	25 (1.2)

RESULTS

Study participants

Table 1 shows the unweighted sample characteristics. The majority of the sample was White and had a normal BMI. When participants were asked about their level of food and nutrition knowledge, most considered themselves "not at all", "a little", or "somewhat" knowledgeable. The vast majority (78%) of participants reported they were actively trying to do something with their weight, including 40% who were trying to lose weight.

Grocery shopping and dinner preparation behaviours

When asked about shopping behaviours, 10% had not helped with grocery shopping in the past month (see Figure 1). Overall, 16% were never involved with dinner preparation on any day, and 11% helped with dinner preparation every day (see Figure 2).

For household roles, 65% were not primarily responsible for either grocery shopping or dinner preparation, 8% were the person most responsible for grocery shopping, 7% were most responsible for dinner preparation, and 20% were the person most responsible for both. There was a significant, although only fair, positive correlation between the frequency of grocery shopping and frequency of helping to prepare dinner ($r_s = 0.40$ $P < 0.001$).

Table 2 shows the unadjusted frequency of participating in grocery shopping at least once per week and frequency of helping to prepare food for dinner in the past 7 days stratified by sociodemographic characteristics. Females, those in older age groups, those in British Columbia and Quebec, and those with greater levels of self-reported nutrition knowledge were more likely to have participated in grocery shopping in the past week ($P < 0.001$). For dinner preparation, females, those who were White, those in older age groups, those with greater levels of self-reported nutrition knowledge, and those who were trying to stay the same weight had increased frequency of participation.

Figure 1. Frequency of helping to shop for groceries during the past 30 d (n = 1979).

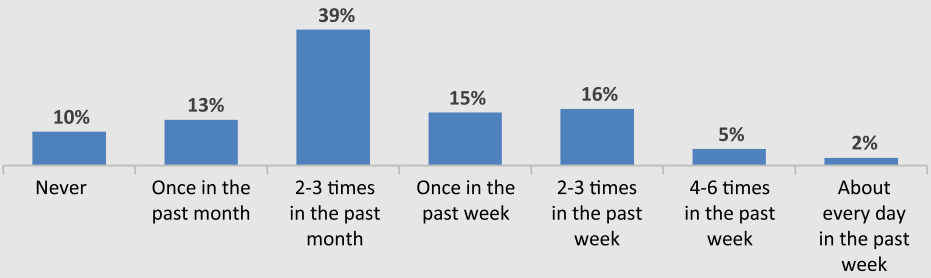
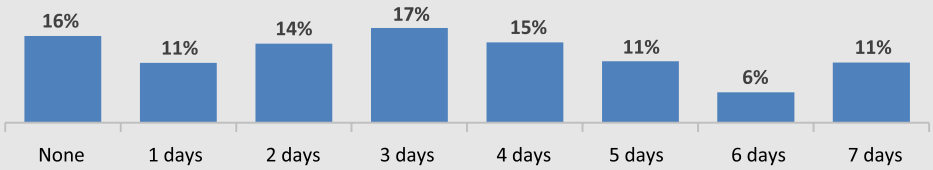


Figure 2. Frequency of helping to prepare food for dinner during the past 7 d (n = 1981).



Eating behaviours and patterns

In the past 7 days, 54% of participants had consumed breakfast on all 7 days, and 4% had not had breakfast on any days in the previous 7 days, with an average of breakfast consumed 5.4 times per week (SD = 2.1 times). Overall, 82% of the sample consumed one or more meals prepared away from home in the past 7 days, with an average of 3.2 meals out in the past 7 days (SD = 3.2 times) and a median of 2.0 times per week; 18% did not consume any meals prepared away from home, and 11% had meals prepared away from home daily. Of the sample, 2% consumed 14 or more meals prepared away from home per week (at least 2 per day on average). When considering fast-food restaurants only, 57% of participants consumed at least one meal from a fast-food or pizza restaurant, and 7% consumed 4 or more meals from a fast-food restaurant in the past week.

Vegetable and fruit consumption

Participants reported consuming whole vegetables and/or fruit an average of 3.7 times per day in the past 7 days; 24% consumed vegetables and fruit at least 5 times per day.

Correlates of vegetable and fruit consumption, breakfast consumption, and eating meals prepared away from home

In the adjusted linear regression models, both engaging in shopping at least once weekly and more frequent engagement in dinner preparation were associated with more frequent consumption of vegetables and fruit ($\beta = 0.15$, 95% CI 0.28–0.70, $P < 0.001$, and $\beta = 0.19$ 95% CI 0.14–0.24, $P < 0.001$, respectively). Those who prepared dinner more frequently also consumed breakfast more times per week ($\beta = 0.62$, 95% CI 0.017–0.11, $P = 0.007$), and consumed meals prepared away from home less often ($\beta = -0.31$, 95% CI −0.39 to −0.25, $P < 0.001$). There were no significant associations between grocery shopping and breakfast consumption or between grocery shopping and eating meals prepared away from home.

DISCUSSION

The majority of adolescents and young adults in this sample were not primarily responsible for either grocery shopping or dinner preparation, and they seldom or never engaged in grocery shopping or helped with dinner preparation. Less than half had helped with grocery shopping in the past week, and only 1 out of 10 participants reported helping with dinner preparation daily.

Not surprisingly, engagement in grocery shopping and involvement in dinner preparation was higher among older age groups, likely due to greater independence among young people as they transition from adolescence to young adulthood, which is often associated with living independently. Given the poor diet quality over this transitional period, having young people engage in grocery shopping and instilling cooking skills earlier in life may facilitate healthier behaviours as they enter adulthood. Females were more likely to engage in grocery shopping and dinner preparation, which has also been reported in other literature, and is consistent with traditional roles of food preparation in households [4, 14, 33]. This is also consistent with recent Canadian research, which found that 64% of women prepare most meals in the household compared with 19% of men [18] and found that women self-reported greater levels of cooking skills than men [19]. There were also significant differences in engaging in these food

Table 2. Unadjusted frequency of dinner preparation and grocery shopping among socio-demographic sub-groups with population-level weights applied.[a]

	Grocery shopping			Dinner preparation			
	Once or more in the past week No. (%)	χ^2 test	*P* value	Mean days per week ± SE	SD	*F* test	*P* value
Gender (n = 1979)		**6.19**	**0.013**			**14.39**	**<0.001**
Male	357 (35.3)	—	—	3.96 ± 0.07	2.23	—	—
Female	394 (40.7)	—	—	4.33 ± 0.07	2.14	—	—
Race (n = 1979)		**2.17**	**0.34**			**14.82**	**<0.001**
White	464 (39.2)	—	—	4.36 ± 0.63	2.20	—	—
Non-White	273 (36.3)	—	—	3.82 ± 0.08	2.16	—	—
Not stated	14 (33.1)	—	—	3.80 ± 0.32	2.16	—	—
Body Mass Index (n = 1979)		**1.9**	**0.75**			**1.65**	**0.16**
Underweight	67 (35.0)	—	—	3.82 ± 0.16	2.25	—	—
Normal weight	421 (37.9)	—	—	4.14 ± 0.07	2.19	—	—
Overweight	117 (37.1)	—	—	4.33 ± 0.12	2.15	—	—
Obese	66 (41.4)	—	—	4.21 ± 0.17	2.10	—	—
Not stated	82 (39.7)	—	—	4.08 ± 0.16	2.28	—	—
Age group (n = 1979)		**32.99**	**<0.001**			**38.92**	**<0.001**
16–18 y	242 (32.1)	—	—	3.66 ± 0.077	2.11	—	—
19–21 y	189 (35.4)	—	—	4.14 ± 0.094	2.16	—	—
22–24 y	321 (46.3)	—	—	4.66 ± 0.083	2.19	—	—
Region (n = 1979)		**23.41**	**<0.001**			**1.59**	**0.16**
British Columbia	154 (48.9)	—	—	4.08 ± 0.12	2.19	—	—
Prairies	144 (32.1)	—	—	4.03 ± 0.098	2.07	—	—
Ontario	348 (36.9)	—	—	4.15 ± 0.072	2.22	—	—
Quebec	40 (42.0)	—	—	4.32 ± 0.25	2.42	—	—
Atlantic Canada	54 (37.3)	—	—	4.52 ± 0.18	2.20	—	—
Not reported	11 (36.4)	—	—	3.64 ± 0.40	2.21	—	—
Nutrition knowledge (n = 1973)		**40.83**	**<0.001**			**34.33**	**<0.001**
Not at all/a little knowledgeable	172 (30.1)	—	—	3.72 ± 0.92	2.21	—	—
Somewhat knowledgeable	359 (37.3)	—	—	4.07 ± 0.68	2.12	—	—
Very/extremely knowledgeable	218 (49.6)	—	—	4.84 ± 0.10	2.16	—	—
Weight behaviour (n = 1965)		**2.52**	**0.47**			**3.31**	**0.019**
Lose weight	321 (39.1)	—	—	4.24 ± 0.75	2.14	—	—
Gain weight	107 (34.6)	—	—	3.86 ± 0.13	2.23	—	—
Stay the same weight	177 (39.1)	—	—	4.27 ± 0.10	2.21	—	—
Not trying to do anything	141 (36.6)	—	—	4.00 ± 0.11	2.21	—	—

Note: SE, standard error; SD, standard deviation.
[a]Sample size varies due to participants responding "don't know" or "refused" for dependent or independent variables.
*$P < 0.05$ considered significant

behaviours among those with higher levels of nutrition knowledge. Self-reported nutrition knowledge may relate to self-efficacy in cooking skills, which can increase engagement in food preparation and improve diet quality [11]. Self-reported nutrition knowledge was fairly low among the sample: <1 in 4 rated themselves as very or extremely knowledgeable about nutrition. The study also found that White young adults helped with dinner preparation more frequently, similar to research from the US [4]. Finally, those who were trying to gain weight or not trying to do anything about their weight prepared dinner less often; it could be hypothesized that these individuals are less concerned about the quality of food they are consuming and thus participate in dinner preparation to a lesser extent or may seek out food sources that are more energy dense and prepared out of the home.

Overall, most young people consumed vegetables and fruit infrequently, and many were engaging in unhealthy food patterns including skipping breakfast and frequently consuming food outside of the home. In the current study, greater participation in dinner preparation was associated with positive diet behaviours, including consuming breakfast and eating meals prepared at home more often, and positive diet

outcomes as measured by frequency of vegetable and fruit intake. Similar outcomes have been identified in cross-sectional and longitudinal studies among US adolescents and young adults [10, 11]. Self-reported food skills were not assessed, as in previous research [18, 19]; however, the study did examine self-reported nutrition knowledge, and few participants considered themselves very or extremely knowledgeable about food and nutrition, which is likely to be associated with food skills. The results suggest that helping with dinner preparation and, to some extent, grocery shopping may be part of a healthier dietary "lifestyle" that can promote healthier food choices.

The association between grocery shopping and healthy eating patterns was less clear: while increased grocery shopping was consistent with greater frequency of vegetable and fruit intake, there were no associations with breakfast eating or consuming meals prepared at home. Other literature has also found that being involved in shopping does not necessarily translate to healthier eating patterns; however, there is limited literature in this area and further research is needed [4]. The association between grocery shopping and health may relate to the type of shopping outlets that young adults use, and this is also an area for further study among this population [17].

Strengths and limitations

The current study has several limitations, including a non-probability-based sample. However, the sample demographics were broadly consistent with population estimates and the sample was weighted. The study was cross-sectional and did not allow for examination of the temporal relationship between engaging in grocery shopping and dinner preparation and trends in diet and health outcomes. The eating patterns that were assessed (breakfast consumption, meals consumed outside the home, and frequency of vegetable and fruit intake) were proxies for diet quality, and the study was not able to examine associations with overall diet quality. Measures were not available to assess income among this age group, and the study did not assess living situation, such as living with family or independently, which has been known to influence involvement in food behaviours and diet quality [34, 35]. In addition, the response options for the shopping variable were not mutually exclusive and did not examine the type of shopping outlet and therefore led to limitations in analysis. The study was conducted in August, which may not represent typical behaviours during the school year for high school and university students, although this has not been examined in the literature. Lastly, participants were exposed to experimental food labelling conditions as part of the larger study prior to completing the measures analyzed; however, all participants took part in the experimental task and it is not expected that the different experimental conditions would have a differential impact on reporting any of the information presented in this paper. Strengths include a large sample size that recruited participants beyond school or university settings, which is typical for research among this age group, and novel content area in the Canadian context and North America more generally.

RELEVANCE TO PRACTICE

The current study found that a significant proportion of young adults do not regularly engage in grocery shopping and dinner preparation. Together with the low levels of self-reported nutrition knowledge, these findings suggest that food literacy may be low among adolescents and young adults in Canada. The study also suggests that engaging in grocery shopping and dinner preparation is associated with several healthier eating patterns. Although the directionality of the relationship is not clear, this preliminary evidence suggests that those who take part in grocery shopping and dinner preparation also engage in a suite of healthier eating habits. The nature of this relationship deserves further consideration.

Previous research has shown that community- and school-based food skills interventions may improve food behaviours in adults [36] and school-aged children [37]. Community-based food skills programs and embedding cooking skills within school curricula are identified in the World Cancer Research Fund's NOURISHING framework as policy options that have strong potential to improve diet quality and downstream health outcomes, such as obesity and noncommunicable diseases [38]. Innovative strategies that target late adolescence and early young adulthood to promote healthy food purchasing and preparation techniques may help encourage healthy food patterns and behaviours during this critical period. In addition, identifying and addressing barriers to grocery shopping and dinner preparation among young adults, which may be related both to lifestyle and economic factors, may improve health behaviours and outcomes over the longer term.

Research evaluating interventions that promote and support involvement in dinner preparation in particular, but also grocery shopping, is warranted. In addition, future research following these behaviours over time, as well as more detailed measures for shopping and preparation, such as where young people conduct most of their shopping and their specific shopping patterns, will strengthen evidence of the link between dinner preparation and shopping and diet quality.

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Conflict of interest: David Hammond has provided paid expert testimony on behalf of governments in response to legal challenges to public health regulations from the beverage industry. The authors have no other conflicts of interest to declare.

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