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Household Food Insecurity Is a Stronger Marker of Adequacy of Nutrient Intakes among Canadian Compared to American Youth and Adults[1–4]

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Abstract

Background: The most recent statistics indicate that the prevalence of food insecurity in the United States is double that in Canada, but the extent to which the nutrition implications of this problem differ between the countries is not known.

Objective: This study was undertaken to compare adequacy of nutrient intakes in relation to household food insecurity among youth and adults in Canada and the United States.

Methods: Data from comparable nationally representative surveys, the 2004 Canadian Community Health Survey and the 2003–2006 NHANES, were used to estimate prevalences of inadequate intakes of vitamins A and C, folate, calcium, magnesium, and zinc among youth and adults in food-secure and food-insecure households. Potential differences in the composition of the populations between the 2 countries were addressed by using standardization, and analyses also accounted for participation in food and nutrition assistance programs in the United States.

Results: Larger gaps in the prevalences of inadequate intakes between those in food-secure and food-insecure households were observed in Canada than in the United States for calcium and magnesium. For calcium, the prevalences of inadequate intakes among those in food-secure and food-insecure households in Canada were 50% and 66%, respectively, compared with 50% and 51%, respectively, in the United States. For magnesium, the prevalences of inadequate intakes in Canada were 39% and 60% among those in food-secure and food-insecure households, respectively, compared with 60% and 61%, respectively, in the United States. These findings were largely unchanged after we accounted for participation in food and nutrition assistance programs in the United States.

Conclusions: This study suggests that household food insecurity is a stronger marker of nutritional vulnerability in Canada than in the United States. The results highlight the need for research to elucidate the effects of domestic policies affecting factors such as food prices and fortification on the nutritional manifestations of food insecurity. *J Nutr* 2015;145:1596–603.

Keywords: household food insecurity, usual dietary intake, National Cancer Institute method, nutrient inadequacies, 24-hour recalls, Dietary Reference Intakes, Estimated Average Requirement, between-country comparison, Canadian Community Health Survey, National Health and Nutrition Examination Survey

Introduction

Food security exists "when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life" (1). A substantial body of literature indicates that household food insecurity, which refers to a household's financial

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[3] Although this study includes analysis of data from Statistics Canada, the opinions expressed do not represent the views of Statistics Canada.

[4] Supplemental Table 1 is available from the ''Online Supporting Material'' link in the online posting of the article and from the same link in the online table of contents at http://jn.nutrition.org.

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ability to access adequate food (2, 3), is a marker of nutritional vulnerability. Studies in Canada, the United States, and New Zealand have shown compromised food and nutrient intakes among those struggling with food insecurity (4–19). Furthermore, food insecurity is associated with risk and management of diet-sensitive chronic diseases, including cardiovascular disease and diabetes, in both Canada and the United States (20–29). Although the consistent nature of the conclusions from these studies could be interpreted as indicating that the dietary and health implications of food insecurity are similar across countries, systematic comparisons of findings are precluded by the substantial differences in research methods.

In Canada and the United States, food insecurity is measured on national surveys by using the Household Food Security Survey Module (HFSSM)[11] (30), which is used to characterize households in which at least one member experienced compromised quality or quantity of foods consumed, typically over the past 12 mo (2, 3, 31). With this metric, the prevalence of household food insecurity in the United States appears to be double that observed in Canada (31, 32). In 2012, the most recent year for which comparable data are available, the problem affected 7% of Canadian households and 15% of US households (31).

Through an in-depth comparison of rates and correlates of food insecurity between the United States and Canada, Nord and Hopwood (33) found that the sociodemographic correlates of food insecurity were similar between the 2 countries and included low income, low education, unemployment, and living in a single-parent home. Some of the observed difference in prevalence rates was accounted for by the lower proportions of single-parent and low-education households in Canada, but the authors identified the need for further research to examine the role of potential influences, such as income and employment stability, supports for transitioning out of unemployment, tax policies, food and nutrition assistance programs in the United States, and universal health insurance in Canada, on differences in vulnerability to food insecurity between the 2 countries (33).

Building on this between-country analytic approach, the current study was undertaken to compare nutritional vulnerability among individuals in food-secure and food-insecure households in the 2 countries. We were interested in learning how the nutritional manifestations of food insecurity differ between countries with different food policies and programmatic responses to the problem. Specifically, comparable Canadian and US data sets were analyzed to examine differences in prevalences of inadequate nutrient intakes by household food security status between the 2 countries. Furthermore, given that public food and nutrition assistance programs form a key response to food insecurity in the United States (34), but not in Canada, a counterfactual was used to examine estimated prevalences of nutrient inadequacies in the United States if no one in that sample had been authorized to participate in such programs.

Methods

Data and measures. For Canada, the most recent population-level dietary intake and household food security data available were from the 2004 Canadian Community Health Survey (CCHS), cycle 2.2 (35). Comparable data for the United States were drawn from the NHANES (36); to obtain a sufficient sample surveyed at a similar point in time, two 2-y cycles covering 2003–2006 were used. CCHS and NHANES are both nationally representative cross-sectional surveys of the respective populations carried out through complex, stratified, multistage probability sampling. Additional details on CCHS and NHANES are available elsewhere (35, 36).

Analyses were restricted to individuals aged ≥9 y. Young children were excluded because preliminary analyses showed few differences in nutrient intakes by food security status in either country, consistent with previous research (8, 10) and with the notion that adults' intakes are typically affected by problems of food insecurity before the quality and quantity of food consumed by children are compromised (37). Pregnant and breastfeeding women were excluded given their small numbers in each sample. Additional exclusion criteria included missing data for household food security and invalid (CCHS) or unreliable (NHANES) dietary recall data. The final analytic samples included 28,668 persons for CCHS and 13,850 persons for NHANES.

Both surveys measured food security over the past 12 mo by using the 18-item HFSSM (30). The coding used by the USDA was applied, meaning that the affirmation of ≤2 fewer items on the HFSSM is indicative of a food-secure household and the affirmation of ≥3 items is indicative of household food insecurity (3).

Dietary intake data were collected by using 24-h recall (24HR) methodology in both surveys under protocols calling for one recall to be administered to all individuals by in-person interview and a second to be administered to a subsample of individuals in Canada and to all respondents in the United States by telephone administration 3–10 d after the first recall (35, 36). The data drawn on for these analyses capture intakes from food and drinks with the use of a total of 37,703 24HRs for the Canadian population and 26,541 24HRs for the US population. For the CCHS, intake data were converted to nutrient estimates by using the Canadian Nutrient File, which is based on data from the USDA but applies modifications to account for fortification and other differences between the 2 countries' food supplies (38). For NHANES, the Food and Nutrient Database for Dietary Surveys was used (39). We focused on nutrients identified as being of public health import (40, 41), that the existing evidence suggest may be deleteriously affected by food insecurity (8, 10), and for which Estimated Average Requirements (42–46) are available, enabling estimation of prevalences of inadequacy (47). These included vitamins A and C, calcium, folate, magnesium, and zinc.

In addition to sex and age, demographic characteristics considered for inclusion in analyses were the 2 factors, education and living arrangements, which were found to have contributed substantially to national-level differences in food insecurity between Canada and the United States in Nord and Hopwood's analysis (33). Because food security is a household-level phenomenon, these variables were defined at the household level. For the CCHS, the highest level of education in the household was available, whereas in NHANES the highest educational level of the household reference person and his or her spouse (if applicable) was used. Both surveys included information on the number of persons in the household and the presence of children aged <18 y; these variables were used to indicate living arrangements.

Statistical methods. To improve the comparability of the Canadian and US populations, the distributions of covariates of interest in the food-secure and food-insecure groups in each country were first standardized to the distribution of these covariates in the US population (48). Following a similar logic to age standardization (49), this procedure was designed to account for the potential confounding effects of the covariates on between-group comparisons, recognizing their relation to food insecurity. To conduct the standardization, poststratification weights were applied to match the distribution of the food-secure and food-insecure groups in both countries by education, the number of persons and presence of children in households, age, and sex to the overall US population.

Data from the 24HRs were used to estimate distributions of usual dietary intake with the use of the National Cancer Institute method (50, 51). Models were stratified by household food security status to allow within- and between-person variances in intake to differ in relation

[11] Abbreviations used: CCHS, Canadian Community Health Survey; HFSSM, Household Food Security Survey Module; SNAP, Supplemental Nutrition Assistance Program; WIC, Special Supplemental Nutrition Program for Women, Infants, and Children; 24HR, 24-h recall.

to this factor (the deprivation associated with food insecurity suggests that within-person variation may be greater among those in food-insecure households, which was confirmed by preliminary analyses). Models were also stratified by sex, and categorical variables for age were included to allow age-sex-specific nutrient requirement estimates to be applied. The stratification resulted in 4 models for each of the 6 nutrients; for brevity, estimated prevalences of inadequate intake by food security status for each nutrient are provided for all age-sex groups combined. Finally, covariates to account for education and the number of persons and presence of children in households and variables to account for nuisance effects (whether the dietary data were from the first or second recall and whether they were collected on a weekend day or weekday) were included (52).

Once the usual intake distributions were estimated, the Estimated Average Requirement cut-point approach (47) was used to quantify the proportions of individuals with inadequate intakes for each of the nutrients examined. Given the standardization described above, these estimated prevalences of inadequate nutrient intakes in food-secure and food-insecure households assume that the distribution of the covariates is identical across the 2 countries. *t* Tests were used to compute differences between countries in the prevalences of inadequacy among individuals in food-secure and in food-insecure households. Also with the use of *t* tests, a difference of differences approach was used to assess whether the gap in prevalences of inadequate nutrient intakes by food security status differed between Canada and the United States.

For the NHANES analysis only, we repeated the models with the addition of a variable indicating whether the household in which the individual lived reported being authorized for food stamps [now known as the Supplemental Nutrition Assistance Program (SNAP)] or the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) in the past 12 mo. By using the resulting model variables, predicted marginals were calculated to allow the generation of estimated prevalences of inadequate nutrient intakes among the food-secure and food-insecure subgroups that assumed that no one in the US sample was authorized to participate in food stamps or WIC.

For the CCHS, variance estimation was carried out by using bootstrap weights provided by Statistics Canada. For NHANES, variance estimation was carried out with the Balanced Repeated Replication technique with the use of replicate weight sets developed by one of the authors (KWD). These techniques account for the stratification, clustering, and weighting of these complex survey samples (48). A *P* value <0.05 was considered to indicate significant differences between groups.

Results

Table 1 provides an overview of the characteristics of each sample by household food security status, considering sex, age, and the covariates included in the analysis. Unweighted cell sizes and weighted proportions are provided with the use of each survey's sampling weights to reflect the characteristics of the respective populations. The weighted prevalences of individuals living in households characterized as food insecure in the past 12 mo were 6.5% in the Canadian sample and 11.7% in the US sample.

Table 2 shows the prevalences of inadequacy for all age and sex subgroups combined in each country. Significantly larger differences between the prevalences of inadequate intakes among those in food-secure and food-insecure households were observed in Canada than in the United States for calcium and magnesium. In both cases, the prevalences were higher among those in food-insecure than in food-secure households in Canada. For no nutrient was the difference between the food-secure and food-insecure subgroups greater in the United States compared with Canada. Among the food-secure subgroups, higher prevalences of inadequate intakes of vitamins A and C and magnesium were observed in the United States than in Canada. Considering the food-insecure groups, the prevalences of inadequate intakes were higher in the United States for vitamin C and in Canada for calcium. To provide context for the interpretation of the between-country analyses, we summarize the prevalences of inadequacy by food security status within each country (i.e., without standardization) for individual age and sex subgroups in **Supplemental Table 1**.

Almost half of individuals (46.6%) in the US sample who lived in a food-insecure household also lived in a household that reported authorization for food stamps or WIC in the past 12 mo, compared with 10.0% of those in food-secure households. **Table 3** provides the prevalences of inadequacy for all age and sex subgroups combined in each country, with standardization applied and assuming no participation in food stamps or WIC among individuals living in the United States. There was little change from the previous analysis, which did not account for food stamps or WIC. As with the previous analysis, the gap in the prevalences of inadequate intakes between those in food-secure and food-insecure households was larger in Canada than in the United States for magnesium. Several of the between-country differences in the prevalences among the food-secure subgroups and among the food-insecure subgroups persisted. In addition, the prevalence of inadequate zinc intakes was higher among those living in food-insecure households in Canada vs. the United States. Further examination of the results suggested that the contribution of the program authorization variable to the model was statistically negligible the majority of the time (data not shown). In only 6 of the 24 models did the variable meet the *P* value of 0.05, providing little evidence that authorization for food stamps or WIC was associated with usual intake.

Discussion

Our results indicate that food insecurity is a more potent marker of nutritional vulnerability in Canada than in the United States. Earlier studies also suggest that food insecurity is a marker of nutrition inequity in Canada (10, 18). Studies conducted in the United States have similarly suggested compromises in diet associated with food insecurity (7, 9, 15, 16), although our study revealed less difference by food security status in the United States than has been reported previously. This finding may be due to methodologic differences, including comparisons of prevalences of inadequate (rather than mean) intakes by food security status and the use of a comprehensive measure of food insecurity. Even sharper contrasts might have been observed had we used a less stringent threshold to demarcate food insecurity, given reported differences between those in marginally food-insecure and fully food-secure households (53). Nonetheless, the current study indicates that the nutritional manifestations of food insecurity differ between the 2 countries, suggesting that although food insecurity has been conceptualized similarly in the 2 settings, studies from one may not be directly extrapolated to the other.

Given procedures to minimize the impact of compositional differences between the populations, differences in prevalences of inadequate intakes are hypothesized to arise from contextual factors. Although the social policy context differs in a number of ways, one salient difference relevant to food insecurity is the existence of extensive public food programs in place in the United States to provide assistance to vulnerable households as part of a "domestic hunger safety net" (34), whereas Canada has no such array of programs. Within the US landscape, key programs include SNAP and WIC, which are intended to

TABLE 1 Characteristics of the Canadian (2004 CCHS 2.2) and US (2003–2006 NHANES) samples, including individuals ≥9 y[1]

	Canada			United States		
		Weighted,[2] %			Weighted,[2] %	
	Unweighted, *n*	Food secure	Food insecure	Unweighted, *n*	Food secure	Food insecure
Total	28,668	93.5	6.5	13,850	88.3	11.7
Age and sex groups						
9–13 y						
Males	2132	88.4	11.6	982	79.9	20.1
Females	2023	92.3	7.7	1013	82.1	17.9
14–18 y						
Males	2353	94.7	5.3	1298	85.1	14.9
Females	2310	94.1	5.9	1291	83.1	16.9
19–30 y						
Males	1881	90.6	9.4	1059	84.5	15.5
Females	1911	88.9	11.1	1340	84.3	15.7
31–50 y						
Males	2734	94.2	5.8	1408	88.4	11.6
Females	2844	92.7	7.3	1495	86.9	13.1
51–70 y						
Males	2716	95.6	4.4	1183	94.1	5.9
Females	3403	94.4	5.6	1213	92.7	7.3
>70 y						
Males	1598	98.4	1.6	792	96.3	3.7
Females	2763	98.6	1.4	776	95.9	4.1
Education						
Less than high school	4423	89.6	10.4	3347	73.1	26.9
High school graduation	3786	89.9	10.1	3129	84.9	15.1
Some postsecondary education	2105	89.4	10.6	4178	88.7	11.3
Completed postsecondary education	17,863	95.0	5.0	2951	97.7	2.3
Missing	491	92.9	7.1	245	86.1	13.9
Living arrangements						
≤3 persons in household	20,474	93.8	6.2	7159	91.2	8.8
>3 persons in household	8194	93.0	7.0	6691	83.7	16.3
Children <18 y in household	11,035	91.6	8.4	8126	83.7	16.3
No children <18 y in household	17,633	96.4	5.6	5724	92.5	7.5
Food program participation						
Lived in household authorized for food stamps or WIC in past 12 mo	—	—	—	3066	61.7	38.3
Lived in household not authorized for food stamps or WIC in past 12 mo	—	—	—	10,782	92.7	7.3

[1] CCHS 2.2, Canadian Community Health Survey, cycle 2.2; WIC, Special Supplemental Nutrition Program for Women, Infants, and Children.
[2] Indicates proportions of individuals within each sample characterized as living in food-secure vs. food-insecure households.

improve access to healthy foods for low-income individuals and households (54). To the extent that these programs affect food access and food selection patterns among those struggling with compromised food security, they could contribute to a blunting of differences between food-secure and food-insecure households in the United States relative to Canada. The literature on the effects of food programs on nutrition is complex, with a recent review finding limited high-quality evidence of the impacts of food subsidy programs (including SNAP and WIC) on the health and nutrition of recipients, although there was evidence of small increases in targeted nutrients and foods in relation to WIC participation (55). If these programs were to reduce dietary compromises associated with food insecurity, we would have expected significant effects of the program authorization variable on usual intake and larger gaps between those in food-secure and food-insecure households in the United States once we statistically removed those significant effects, neither of which was observed. However, this aspect of our analysis was admittedly crude, given our reliance on variables indicating whether a given respondent lived in a household authorized for food stamps or WIC in the past 12 mo; thus, we were not able to account for varying levels or duration of participation in these programs. Furthermore, we did not consider other potentially relevant programs, such as school breakfast and lunch programs. It is also important to note that eligibility for these programs is based on factors such as income (34), not food security status per se; thus, some households characterized as food secure report authorization for food stamps and WIC. As a result, any contributions that these food programs made to differences in nutrient adequacy by food security status were potentially blunted.

The food supply, food prices, and food access may also play roles. At the time that these surveys were conducted, food fortification policies differed substantially between the 2 countries, with the United States permitting more voluntary food fortification than Canada (56). Although research into the effects of food fortification on nutrient intakes in Canada has

TABLE 2 Standardized prevalences of inadequate nutrient intakes by household food security status in males and females ≥9 y in Canada (2004 CCHS 2.2) and the United States (2003–2006 NHANES)[1]

	Canada, % (SE)		United States, % (SE)		Between-country comparison,[2] P		
	Food secure	Food insecure	Food secure	Food insecure	Difference between food-secure groups	Difference between food-insecure groups	Difference between food-insecure and food-secure groups
Vitamin A	36 (1.88)	45 (6.60)	48 (1.97)	53 (4.66)	<0.01	0.38	0.50
Vitamin C	16 (1.15)	16 (6.16)	39 (1.97)	33 (4.87)	<0.01	0.04	0.41
Folate	13 (1.35)	26 (5.10)	11 (0.99)	15 (3.40)	0.15	0.09	0.20
Calcium	50 (1.36)	66 (4.09)	50 (1.85)	51 (4.00)	0.90	0.01	0.02
Magnesium	39 (1.36)	60 (5.38)	60 (1.82)	61 (4.07)	<0.01	0.85	<0.01
Zinc	13 (1.52)	29 (5.13)	12 (1.10)	17 (3.94)	0.43	0.07	0.13

[1] The food-secure and food-insecure groups in both countries were standardized to the overall US population on the basis of household education and living arrangements. Prevalences of inadequate intakes were computed by using the Estimated Average Requirement cut-point approach. CCHS 2.2, Canadian Community Health Survey, cycle 2.2.
[2] P values were calculated by using t tests and are for the difference between the 2 countries in the prevalences of inadequacy among individuals in food-secure households, in food-insecure households, and in food-secure vs. food-insecure households, respectively.

been largely restricted to specific nutrients of concern (e.g., folic acid, vitamin D) (57, 58), Fulgoni et al. (59) examined the contribution of fortificants to dietary intakes among Americans across the full spectrum of micronutrients. They found that enrichment and/or fortification dramatically reduced prevalences of inadequacy for vitamin A and folate but had much less effect for vitamin C, calcium, magnesium, and zinc. Further research examining sources of key nutrients may shed light on the role of fortified foods in mediating associations between food security and diet.

Pricing of staple foods may also play a role in differences in nutritional vulnerability associated with food insecurity. Higher milk prices have been observed in Canada than in the United States, perhaps due to supply management policies and tariffs in place in Canada (60) and agricultural subsidies in the United States. Interestingly, the prevalence of inadequate calcium intakes among those in food-secure households in Canada was similar to that observed for those in both food-secure and food-insecure households in the United States. However, the prevalence among those in food-insecure Canadian households was higher, highlighting the need for attention to factors affecting access to milk and milk products among resource-constrained households in Canada.

Differences in food availability could also be postulated to play a role in associations between food security and nutrition. Poorer access to healthy food in areas characterized by low-income households appears to be a greater problem in the United States than in Canada (61, 62). If such disadvantage disproportionately affects those vulnerable to food insecurity, greater differences in nutrient intakes by food security status would be expected in the United States. However, this is not what was observed, raising questions about the extent to which the food environment influences food access and diet in the context of financial constraints, consistent with other work (63–65).

Previous studies suggest that the diets of both the Canadian and US populations deviate significantly from dietary guidance (66–71). Interestingly, the current analyses indicate that inadequate intakes of key nutrients of public health import, vitamins A and C and magnesium, are a larger problem in the United States than in Canada.

This study's strengths include the use of comparable, high-quality population surveys and sophisticated statistical methods (50, 51) to estimate usual intake distributions. Furthermore, standardization was applied to minimize the effects of compositional differences between the 2 populations on our findings, using previous comparative work (33) to inform our approach. By taking advantage of "natural contrasts" (72) between jurisdictions, our analyses bring to the surface potential policy effects unobservable through within-country studies in which

TABLE 3 Standardized prevalences of inadequate nutrient intakes by household food security status in males and females ≥9 y in Canada (2004 CCHS 2.2) and the United States (2003–2006 NHANES), assuming no authorization for food stamps or WIC among those in US households[1]

	Canada, % (SE)		United States, % (SE)		Between-country comparison,[2] P		
	Food secure	Food insecure	Food secure	Food insecure	Difference between food-secure groups	Difference between food-insecure groups	Difference between food-insecure and food-secure groups
Vitamin A	36 (1.88)	45 (6.60)	47 (2.20)	51 (4.31)	<0.01	0.47	0.48
Vitamin C	16 (1.15)	16 (6.16)	39 (1.90)	32 (4.43)	<0.01	0.48	0.33
Folate	13 (1.35)	26 (5.10)	10 (0.98)	16 (3.19)	0.09	0.89	0.23
Calcium	50 (1.36)	66 (4.09)	49 (1.94)	51 (3.90)	0.65	< 0.01	0.21
Magnesium	39 (1.36)	60 (5.38)	59 (1.87)	61 (3.73)	<0.01	0.94	<0.01
Zinc	13 (1.52)	29 (5.13)	11 (1.11)	16 (3.89)	0.35	0.04	0.08

[1] The food-secure and food-insecure groups in both countries were standardized to the overall US population on the basis of household education and living arrangements. Prevalences of inadequate intakes were computed by using the Estimated Average Requirement cut-point approach. Predicted marginals were computed to estimate prevalences of inadequate nutrient intakes, assuming no authorization for food stamps or WIC among the US sample. CCHS 2.2, Canadian Community Health Survey, cycle 2.2; WIC, Special Supplemental Nutrition Program for Women, Infants, and Children.
[2] P value were calculated by using t tests and are for the difference between the 2 countries in the prevalences of inadequacy among individuals in food-secure households, in food-insecure households, and in food-secure vs. food-insecure households, respectively.

the entire population is exposed to a given policy (e.g., milk supply management).

A number of limitations must also be noted. Reporting error is a ubiquitous problem in dietary intake data (72), and it cannot be ruled out that differential misreporting between the 2 populations played a role in observed differences in the prevalences of inadequate nutrient intakes. For example, given links between body weight and energy underreporting (73, 74), the higher prevalence of overweight and obesity in the United States than in Canada (75, 76) might point to greater underreporting in NHANES compared with CCHS. However, the higher prevalences of inadequacy in Canada for some nutrients suggest that differential misreporting is an unlikely explanation for our results. Furthermore, although known recovery biomarkers permit us to examine misreporting of only a few dietary components, the existing data suggest less error in estimation of potassium intake compared with energy and protein (73, 77), suggesting that foods such as fruits and vegetables may be underreported to a lesser extent than more energy-dense foods and drinks. Given our focus on micronutrients largely provided by fruits and vegetables (vitamins A and C, folate) and milk products (calcium) (78–83), our results may be less biased by misreporting than analyses of energy or macronutrients might be. Although differential error in reporting between the food-secure and food-insecure groups within countries is also likely, the impossibility of determining systematic errors in reporting within the context of the involuntary food deprivation and dietary compromise that defines food insecurity precludes any assessment of this problem. We limited our analyses to nutrient intakes from foods and drinks. Patterns of supplement usage by food security status documented elsewhere (10) suggest that supplements are unlikely to compensate for compromises in dietary intakes associated with food insecurity.

It also should be noted that the food insecurity data pertained to the previous 12 mo, whereas dietary intake data were collected for 1 or 2 d for each individual. However, given the modeling used, the prevalences of inadequate intake are based on estimated usual intake distributions for each sample (52). By denoting households within which financially mediated food deprivation occurs, food insecurity is a potent marker of material deprivation. This is reflected both in the sociodemographic characteristics of food-insecure households (3, 31) and the compromised health status of individuals in food-insecure households (20–29); thus, it is not surprising that measures of usual nutrient intake also highlight vulnerability.

The results of this study suggest that food insecurity is more strongly associated with nutritional vulnerability in Canada than in the United States, highlighting the need for careful attention to contextual differences in interpreting the results of studies on household food security and on dietary intake. Future research on the association between food insecurity and diet should consider factors related to the food supply, food pricing, and food and nutrition assistance programs, as well as other policies and programs targeted at alleviating poverty.

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