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Quantitative Research Methods for Public Policy

Final Paper

Revisiting Geographic and Socioeconomic Determinants of Household Insecurity in Canada: A Cross-sectional Investigation based on CCHS 2017-2018

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1. Introduction

Household food insecurity refers to inadequate or uncertain access to food because of financial constraints (Tarasuk et al., 2020). Drawing on the data for 103,500 households from Statistics Canada's Canadian Community Health Survey (CCHS) conducted during 2017 -2018, 12.75% of households experienced some levels of food insecurity in the past 12 months. By contrast, the prevalence of household food security at the national level fluctuated between 7.6% and 8.5% every year from 2007 to 2012 (Statistics Canada, 2015). The rate of food insecurity during 2017-2018 was higher than any prior national estimate (Tarasuk et al., 2020). Moderate food insecurity is a major issue of public health in high-income countries around the world (Roser & Ritchie, 2013). The relationship between food insecurity and health in Canada is graded, with a greater likelihood of adverse health outcomes, such as nutritional vulnerability among adults (Muldoon et al., 2012), chronic physical and mental conditions (Jessiman-Perreault, et al., 2017), greater risk of poor health among children (Belsky et al., 2010). Food insecurity also serves as a predictor of health-care utilization and costs incurred by working-aged adults (Tarasuk et al.,2015).

The prevalence of household food insecurity and its implications of severe consequences to public health highlights the need to identity its determinants and targeted policy interventions. Building upon the previous studies that examine the household-level conditions associated with food insecurity, this paper did a cross-sectional investigation on the geographic and socioeconomic determinants of household food insecurity in Canada using the most recent survey data during 2017-2018. The analysis results suggest that: (1) indicators of socioeconomic vulnerability increase the probability of household food insecurity among all income groups in Canada; (2) high-income female-led single-parent households have higher probability of reporting food insecurity;

(3) high-income households with respondents smoking increase the likelihood of household food insecurity.

2. Literature Review

Previous studies on household food insecurity in Canada have focused on the household-level determinants of conditions. In general, the prevalence of food insecurity is always related to socioeconomic vulnerability. First, the low household income level is one of the most important economic predictors of food insecurity. The lack of household savings and investments has been associated with higher odds of food insecurity (Guo 2011). The odds of reporting food insecurity rates have also been associated with macroeconomic conditions like high unemployment rate (Loopstra et al. 2016) and low wages and salaries (Bartfeld&Dunifon, 2006). The lack of homeownership (McIntyre et al, 2015), reliance on social assistance (Bharagava 2008) are also contributing factors to household food insecurity in Canada. Second, the social positions of the household's primary earners also play a significant role in determining Canadian household food insecurity. Mclntyre et al (2014) find that Canadian households rely on primary earners with less education and lower incomes were significantly more likely to experience food insecurity. In particular, visible minority workers with comparable low education levels experienced higher rates of food insecurity than European-origin workers (Mclntyre, 2014). Indigenous households led by single mothers (Willows et al.,2009) are also more likely to experience severe food insecurity. Last, geographic characteristics are also associated with the prevalence of food insecurity. Households reside in remote provinces and rural areas (Tarasuk et al., 2019, McIntyre et al 2002) are more prone to experience food insecurity than households residing in provinces with high population density and prosperous metropolitans.

Though most scholars have focused on investigating the low-income households experiencing food insecurity, some scholars also found that not all poor households are food insecure and not all food insecure households are poor (Olayemi & Mclntyre, 2014: 434). The probability of reporting food insecurity among high-income households may increase under several circumstances. Nord & Brent (2002) implicates that fluctuating household income, discretionary household spending and unexpected events such as sudden increase in housing costs, chronic health conditions can contribute to food insecurity in high-income household in the United States. Similarly, Olayemi & Mclntyre (2014) find that living with either an occasional or regular cigarette smoker (designed as a proxy measurement of discretionary spending) compromises food security in high-income Canadian households. These studies provide critical insights to identify the potential contributing factors to household food insecurity among high-income households.

3. Research Question and Hypothesis

In light of the previous studies on the socioeconomic and geographic determinants of household food insecurity (Tarasuk et al., 2019, Willows et al.,2009, Mclntyre, 2014) and discerning factors that affect high-income households (Olayemi &Mclntyre 2014), this paper intends to examine a series of covariates that may increase the probability of household food insecurity. The research questions and objectives are as follows:

1. Which households are most vulnerable to food insecurity?

- Use descriptive statistics to find the socioeconomic and geographic household characteristics of food insecure.

2. Which characteristics are associated with high probability of food insecurity among low-income and high-income households in Canada?

- Use binominal logistic regression analysis to explore which characteristics of households are associated with high odds of food insecurity based on previous studies.

The research hypotheses are as follows:

- Do poor social and economic household conditions contribute to the prevalence of household food insecurity in Canada?

  H_1: Socioeconomic vulnerability indicators (such as low income, lack of dwelling) increase the likelihood of household food insecurity.

- Whether discerning factors increase the likelihood of self-reported household food insecurity among high-income households?

  H_2: Discerning factors (Consumption of smoking and alcohol) increase the probability of food insecurity in high-income households.

4. Research Design

4.1 Data

Data on food insecurity are drawn from the Canada Community Health Survey (CCHS) 2017-2018. The CCHS is a cross-sectional survey administrated by Statistics Canada that collects health-related information related to health status, health care utilization, and health determinants for the Canadian population from about a sample of 130,000 Canadians over a two-year period, with 120,000 aged 18 and over, and 10,000 aged 12 to 17 years (Statistics Canada, 2020). The sample is supposed to be representative of the ten provinces and three territories, while it excludes full-time members of the Canadian Forces, individuals living on First Nations reserves, Crown Lands, or in the Quebec health regions of Région du Nunavik and Régions de Terres-Cries-de-la-Baie-James, and persons in prisons or care facilities (Tarasuk and Mitchell, 2020). Altogether, these inclusions represent less than 3% of the Canadian population aged 12 and over (Statistics Canada,

2020). Since 2004, the Household Food Security Survey Module (HFSSM) (See Appendix-1)has been included in the CCHS to monitor household's experiences of food insecurity over the previous 12 months. The survey contains 18 questions asking the respondent whether members in the households have experienced the conditions described, which range in severity from experiences of anxiety that food will run out before household members have money to buy more, to modify the amount of food consumed, to experiencing hunger, and in the extreme, going a whole day without eating (Health Canada, 2005).

4.2 **Variable**

Outcome Variable

According to the methodology of HFSSM, households are classified as either food secure or marginally, moderately, or severely food insecure. The food-secure households report no indications of the income-related problem of access to food. Those who are marginally food insecure have reported some concern or problem of food access over the past 12 months. Households classified moderately food insecure have reported compromises in the quality and or quantity of food consumed among adults and or children. Sever food-insecure households report more extensive compromises, including reduced food intake among adults and children because of income-related constraints (Health Canada, 2005).

Control Variables

To answers the research question and test the research hypotheses as delineated in section 3, this paper includes the following control variables for either descriptive purpose or regression analysis:

- Geographic variables include: (1) Residency of province (Ontario, Quebec, etc.); (2) urban/rural residency (See table 2, p.8)

- Socioeconomic variables include: (1) levels of household income (>$20,000/$20,000-$39,999/$40,000-$59,999/<$80,000) (2) source of household income (Wages/Social assistance/pension/child benefit); (3) Household structure (Single/Married with children/lone-parent); (4) Dwelling ownership (Rented/owned); (5) Canadian/Foreign-born; (6) Aboriginal identity; (7) levels of education (>Secondary/secondary/post-secondary)

- Discretionary spending variables include: (1) Types of Smoker (Regular smoker/occasional smoker/non-smoker); (2) Alcohol use (Regular drinker/occasional smoker/non-drinker);

Dummy coding strategy will be used to compare each level of a control variable to the reference level in regression analysis.

4.3 Empirical Strategies

To fit the assumptions of logistic regression, the original outcome variable "food security" will be recoded as binary outcomes as "food insecure" (aggregated "marginally food insecure", "moderately food insecure", and "severely food insecure") and "food secure". As the HFSSM measures food security at household level, only variables that share household features will be included in regression analysis.

The basic regression model is as follows:

$$\log \frac{p(Food\ Insecure)}{1 - p(Food\ Insecure)} = \beta_0 + \beta_1 Income\ source + \beta_2 Income + \beta_3 Household + \beta_4 Regions + \cdots \beta_k Education + U_i$$

where the log (p (food insecure/1-p (food insecure)) represents the logit or log-odds of the household's food insecurity, β_1 to β_7 represent the change in the logit of probability associated change in the control variables holding all other variables constant, and U_i indicates stochastic errors independents of predictors.

This paper includes two regression models. The first regression model intends to examine the socioeconomic and geographic covariates associated with a higher probability of household food insecurity among all income groups. The second regression model restricts the sample to the households with the total household income of more than $60,000. It aims to examine whether discerning spending increases the likelihood of household food insecurity among high-income households.

5. Findings and Interpretations

5.1 Descriptive Statistics

As table 1 shows, during 2017-2018, household food insecurity was most prevalent among households with low income (35.72% of households report food insecurity with less than $20,000 household income). Food insecurity affected 53.07% of households reliant on social assistance, 6.41% of households reliant on pension, and 11.33% of households reliant on child benefit. 26.47% lone-parents' families, especially 28.83% female-led lone-parent households (as opposed to 18.08% of male-led lone parent), and those who rely on rent (24.35%) rather than those own housing with low levels of education (20% of households with less than a secondary degree) have experienced food insecurity. Food insecurity also exerted impacts on 25.69% of indigenous households and 13.87% of foreign-born households. About 15.63% of high-income households are affected by food insecurity. Among the high-income groups, 12.69% of daily smokers and 10.37% of occasional smokers have reported food insecurity.

The prevalence of food insecurity was most prevalent in Nunavut than in any other part of Canada. About 66.59% of households in Nunavut reported some level of food insecurity and 27% of these households are severely food insecure. The territories had 28.42% of households report some degrees of food insecurity. The lowest prevalence of food insecurity was 10.41% in Quebec.

Indeed, Quebec was the only place where the rates of food insecurity fell significantly between 2015-16 and 2017-18 (Tarasuk et al., 2020). Since the CCHS 2017-2018 did not include the geographic variable that explicit classifies the respondents' urban or rural residency, this paper adopts a proxy measurement of the residency or urban and rural areas. This paper regroups the health regions from the original dataset into eight groups based on the methodology of the *2018 Health Region Peer Group Working Paper*. The methodology of creating the peer groups is to use cluster analysis attempts to assign observations to groups based on a measure of their distance from each other so that observations within each group are similar to one another with respect to variables or attributes of interest (Statistics Canada, 2018). The second column in table 2 selects the principal characteristics of the urban and rural classification at the health region level. The third column also chooses the representative cities or counties of the regions. The most urbanized region is Group H. This group includes cities like Montreal (Group H is chosen as the reference group in regression analysis). By contrast, Group F is the most remote region that includes regions like Nunavut. As the last column shows, food insecurity affected more people residing in remote and rural areas.

Table 1 Sociodemographic Characteristics of Food Secure and Food Insecure Canadian Household (Weighted Frequency)

	Food Insecure (%)	Food Secure (%)		Food Insecure (%)	Food Secure (%)
Total Household Income			*Dwelling Ownership* Owned		
<$20,000	35.72	64.28		6.64	93.36
$20,000-$39,999	21.58	78.42	Rented	24.35	75.56
$40,000-$59,999	14.62	85.38	*Education (Highest level) in household* <Secondary	20.05	79.50
$60,000-$79,999	10.52	89.48	Secondary school	17.78	82.22
>$80,0000	5.11	94.89	Post-secondary	9.86	90.14
Income Source Wages and Employment	11.08	88.92	*Ethnic Background* Canadian-born	10.95	89.05
EI or Social Assistance	53.07	46.93	Foreign-born	13.87	86.13

Pension	6.41	93.59	*Aboriginal Identity* Non-aboriginal	10.15	89.85
Child Benefit	11.33	88.67	Aboriginal	25.96	74.04
Household Structure			*Discerning Factor*		
No Children	10.85	89.15	*With Household Income> $60000*		
Married Children	10.93	89.07	Daily smoker	12.69	87.31
Lone parent	26.47	73.53	Occasional smoker	10.37	89.63
Male-lone parent	18.08	81.92	Non-smoker	5.35	94.65
Female-lone parent	28.83	71.17	Regular Drinker	5.07	94.93
Region			Occasional Drinker	9.42	90.58
Atlantic Canada	13.58	86.42			
Quebec	10.41	89.59	Non-drinker	9.25	90.75
Ontario	12.81	87.19			
Western Canada	12.98	87.02			
B.C.	12.20	87.80			
Territories	28.42	71.58			
Nunavut	66.59	33.41			

Source: CCHS 2017-2018

Table 2 Health Region Peer Groups 2018
(Weighted Frequency)

Peer Group	Principal Characteristics	Example Cities/Counties	Food Insecure (%)
Group A	• Mainly rural and remote regions in Western Provinces and Territories	Yukon	13.89
Group B	• Mainly urban centers with moderately high population density	Ottawa	11.61
Group C	• Sparsely populated urban-rural mix from coast to coast	Moncton County	12.59
Group D	• Mainly rural region in Quebec, Ontario, and Prairies	Grey Bruce County	11.41
Group E	• Mainly rural Eastern regions with low population density	Côte Nord	10.58
Group F	• Northern and remote regions with very low population density	Nunavut	36.59
Group G	• Largest metro center with an average population density of 4389 people per km^2	Montreal	13.82
Group H	• Mainly urban centers in Ontario and B.C with high population density	Richmond	11.97

Source: *2018 Health Region Peer Group Working Paper*

5.2 Regression Analysis

Table 3 shows the regression outputs based on the empirical strategies indicated in section 4.3. The first model (N=66, 748, see column 1) examines socioeconomic and geographic covariates associated with the probability of food insecurity among all income groups. Income is the most important predictor of household food insecurity. Compared with the households with more than $80,000 total household income, the odds ratio of reporting food insecurity for those with less than $20,000 is exp (2.26) =9.58 when holding other covariates constant. Similarly, the

odds ratio of food insecurity is also higher among households that lack the ownership of house (OR=exp (0.88) =2.41), reliant on social assistance (OR=exp (0.64) =1.90) with secondary education (OR=exp (0.16) =1.17). It is also notable that the odds of food insecurity are lower among households that rely on pensions and child benefits. In comparison with single or married households, lone-parent households are more likely to report food insecurity. In particular, the odds ratio is higher in female-led lone-parent (OR=exp (0.54) =1.72) than male-led lone-parent (OR=exp (0.44) =1.55). Indigenous households (OR=exp (0.63) =1.87) are also more prone to report food insecurity as opposed to the non-indigenous. Figure 2 plots the logit coefficients in model 1 that includes geographic determinants. It can be learned that compared with prosperous provinces and urban areas with higher population density, the odds of reporting food insecurity are higher in remote and rural areas. For example, the odds ratio of food insecurity in Territories is exp (0.80) =2.23 as opposed to Ontario (OR=exp (0.50) =1.65), when using the Quebec as the reference group. Contrary to the previous studies, being foreign-born decreases the odds of food insecurity compared with the native-born.

The second column (N=38, 083, see column 2) examines seven socioeconomic covariates and another two covariates that measure discretionary spending associated with the increase of likelihood of food insecurity among high-income households. Figure 1 compares the coefficients of the two models. We can tell that household with relatively low income, low levels of education, the lack of homeownership, being aboriginal are more likely to experience food insecurity. Since high-income households most have their income from wages and salaries, the coefficient on social assistance is not statistically significant. It is quite notable that the odds ratio of food insecurity among high-income female-led lone-parent (OR=exp (0.66) =1.93) households is higher than that in the first model (OR=exp (0.44) =1.55). The examination of discerning factors shows that the

consumption of tobacco increases the odds of food insecurity. The coefficients of the alcohol are

conflicted and less interpretable as being regular drinkers decreases the odds of food insecurity

while occasional drinkers increase the odds of food insecurity (at 10% significance level).

Table 3 Multivariate Logistic Regression Output
(Logit Coefficients)

Control Variables	Food Insecurity N=66, 748	Food Insecurity N=38,083
Levels of Income		
<$20,000	2.26***	--
	(.052)	
$20,000-$39,999	1.68***	--
	(.044)	
$40,000-$59,999	1.08***	--
	(.045)	
$60,000-$79,999	.79***	.69***
	(.049)	(.050)
>$80,000	0 (Reference Group)	0 (Reference Group)
Source of Income		
Wages and Employment Income	0 (Reference Group)	0 (Reference Group)
EI/Provincial Social Assistance	0.64***	.32
	(.50)	(.23)
Pension	-1.17***	-1.47***
	(.038)	(.11)
Child Benefit	-.704***	-.66***
	(.057)	(.15)
Education		
Less than secondary school	.073*	.29***
	(.041)	(.11)
Secondary school	.16***	.18***
	(.034)	(.064)
Post-secondary	0 (Reference Group)	0 (Reference Group)
Dwelling Ownership		
Owned by household	0 (Reference Group)	0 (Reference Group)
Rented	.88***	.79***
	(.030)	(.053)
Household Structure		
Single & Married	0 (Reference Group)	0 (Reference Group)
Male lone parent	.44***	.40***
	(.096)0	(.12)
Female lone parent	.54***	.66***
	(.048)	(.071)
Aboriginal Identity		

Yes	.63***	.80***
	(.047)	(.076)
No	0 (Reference Group)	0 (Reference Group)

Immigrant Status

Canadian-born	0 (Reference Group)	0 (Reference Group)
Foreign-born	-.29**	.047
	(.10)	(.073)

Regions

Atlantic Canada	.69***	--
	(.049)	
Quebec	0(Reference Group)	
Ontario	.50***	
	(.040)	
Western Canada	.55***	
	(.049)	
B.C.	.59***	
	(.050)	
Territories	.80***	
	(.11)	

Urban/Rural Residency --

Group A	.35***	
	(.095)	
Group B	.24***	
	(.069)	
Group C	.24***	
	(.069)	
Group D	.26***	
	(.26)	
Group E	.16***	
	(.16)	
Group F	.81***	
	(.81)	
Group G	0(Reference Group)	
Group H	-.034	
	(.098)	

Discretionary Spending

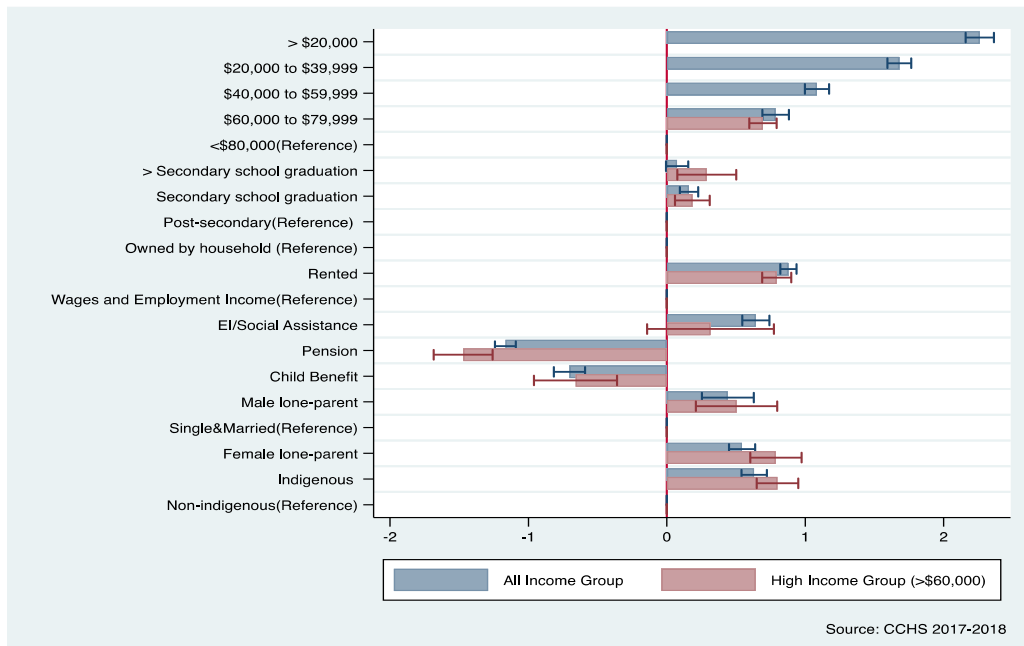|		
Daily Smoker	--	.87***
		(.057)
Occasionally Smoker		.58***
		(.096)
Non-Smoker		0 (Reference Group)
Regular Drinker	--	-.21***
		(.072)
Occasional Drinker		.22*
		(.085)
Non-Drinker		0(Reference Group)

Probability>chi2=0.00
***p<.001
**P<.05
*p<.1

Figure 1 Socioeconomic Determinates of Household Food Insecurity
(Logit Coefficients)

Source: CCHS 2017-2018

Figure 2 Geographic Determinants of Household Food Insecurity
(Logit Coefficient)

Source: CCHS 2017-2018

- 13 -
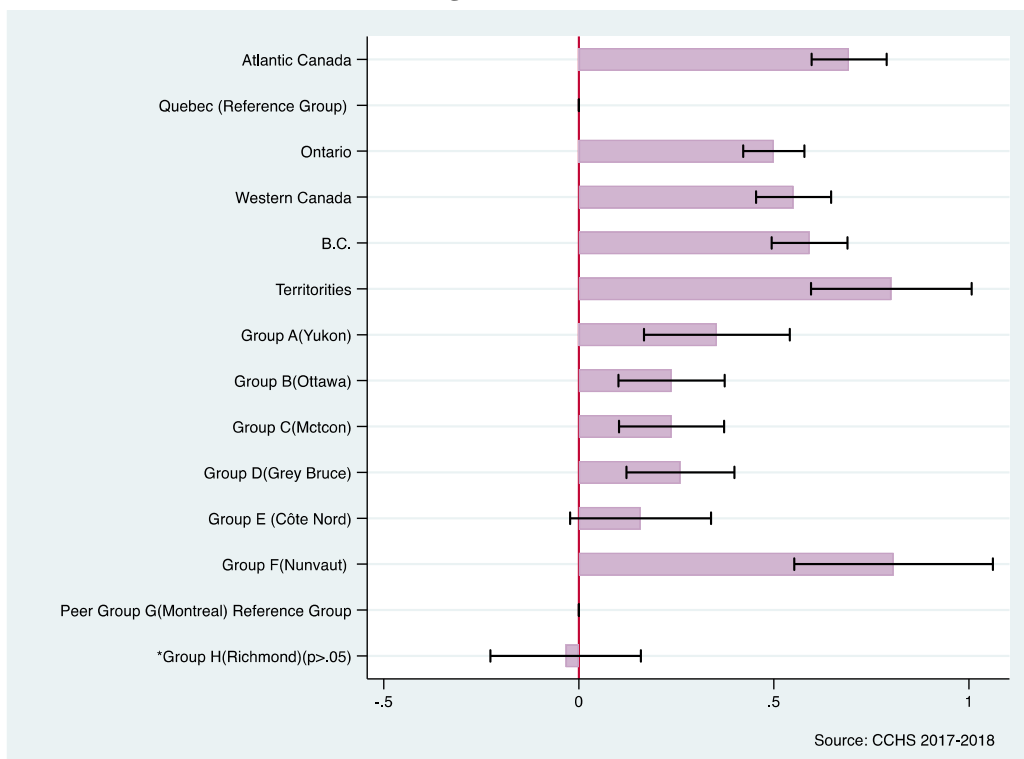
6. Discussions and Implications

The descriptive statistics and regression analysis together implicate that: (1) indicators of socioeconomic vulnerability such as low income, lack of homeownership, low level of education , province of residency increase the probability of household food insecurity among all income groups in Canada during 2017-2018; (2) high-income female-led single-parent households have higher probability of reporting food insecurity; (3) high-income households with respondents smoking increase the likelihood of household food insecurity. Building upon these findings, this paper will briefly discuss research and policy implications in understanding and addressing the issue of food insecurity in Canada.

First, the significance of household income, homeownership, the main source of income as the predictor of household food insecurity is consistent with the previous research (Tarsuk, et al 2019). The low risk of food insecurity among households reliant on seniors' incomes resonates with studies that indicate pensions are proactive against food insecurity (Emery et al, 2013). Studies that provided implications for addressing the prevalence of food insecurity at provincial level are always in tandem with income-based interventions. Substantial investments in social protection programs (Li, et al 2016) and old-age pension (Emery et al, 2013) can reduce the risk of food insecurity of targeted groups. Existing studies have consistently demonstrated that female-headed single parenthood households are more vulnerable in terms of food insecurity than other types of household structure. It is also considered as a phenomenon of gendered poverty. McIntyre (2014: 442) points out that "even in high-income female-headed lone-parent households, resources may be insufficient to stave off food insecurity, possibly due to the costs associated with childcare, health, recreation being borne primary by the custodial parent."

Second, geographic location is an important contributing factor in household food insecurity, as remote, rural, or isolated environments can limit success to food or food choices and result in higher food prices. (Howard et al., 2017). The food cost in Quebec is one of the lowest in Canada . By contrast, communities in remote and northern parts of the country pay higher prices for food. The prices of food in the North is often very high due to transportation costs by ships and air (Walker et al., 2014). The differences in food insecurity rates across the provinces and territories also point to the important roles that provincial and territorial governments can play in protecting their populations from food insecurity. Provincial governments are increasingly interested in addressing food security concerns and using food security program as opportunities for health promotion, economic development, and environmental conservations (Food Secure Canada, 2017).

The last finding is consistent with the previous study that smoking increases the odds of food insecurity (Tarasuk et al., 2013). A further explanation is that the financial burden of smoking compromises household's financial resources from purchasing nutritionally healthy, and more expensive food (Olabiyi & McIntyre, 2014: 443). Consideration of discerning factors can inform studies on how the structural changes of household spending affect food budget and provide further policy implications to social policies and health promotions.

Appendix

Appendix 1-Houshold Food Security Module

	Food Secure	Moderately Insecure	Severely Insecure
Household Food Insecurity Status	91.57%	5.81%	2.62%
Food Security (Adults Status)	94.54%	5.04%	0.42%
Food Security (Child Status)	91.75%	5.65%	2.60%
	Often true	**Sometimes true**	**Never true**
Worried food would run out	1.8%	7.15%	91.5%
Food did not last and no money to buy more	1.36%	5.73%	92.91%
Could not afford to eat balanced meal	1.91%	6.18%	91.91%
Relied on low-cost food to feed children	1.40%	7.75%	90.85%
Could not feed children a balanced meal	0.8%	5.95%	94.05%
Children were not eating enough	1.92%	11.81%	86.27%
	Yes	**No**	
Adults skipped or cut size of meal	31.90%	68.10%	
Ate less than felt should	34.95%	65.05%	
Was hungry but couldn't afford new food	20.60%	79.40%	
Lost weight because not enough money for food	13.62%	86.38%	
Adults did not eat for whole day	17.49%	82.51%	
Cut size of children's meals	9.68%	90.32%	
Children skipped meals	5.73%	94.27%	
Children were hungry but could not afford food	10.02%	89.98%	
Children did not eat for whole day	1.26%	98.74%	
	Almost every month	**Some month**	**Only 1 or 2 months**
Adults skipped or cut size of meals-Frequency	35.62%	33.10%	31.28%
Adults did not eat whole day-Frequency	43.07%	31.78%	25.14%

Source: CCHS 2017-2018

Appendix 2- Stata Syntax

Data Cleaning

```
tab INCG015, nol
recode FSCDVHF2 (0=0 "Food Secure") (1/3=1 "Food Insecure"), gen (FS)
recode INCG015 (1=1 "Wages and Employment Income") (2=2"EI Work Compensation and Provincial Social
Assistance") (3=3"Pension") (4=4"Child Benefit"),gen(Income source)
tab GEO_PRV, nol
tab GEO_PRV
recode GEO_PRV (10/13=1 "Atlantic Canada") (24=2 "Quebec") (35=3 "Ontario") (46/48=4 "Western Canada")
(59=5 "B.C.")(60/62=6 "Territorities"),gen(region)
drop if FS==.d
recode DHHDGLVG (1/3=1 "No Children") (4=2 "Married Children") (5/6=3 "lone-Parent")(7=2 "Married
Children")(8=4 "Others"),gen (household)
gen gender=household
replace gender=5 if household==3&DHH_SEX==1
tab household DHH_SEX
label var gender "gender"
label define label 1 "No Children" 2 "Married and Children" 3 "Female lone Parent" 4 "Others" 5 "Male lone parent"
label values gender label
rename gender household_structure
```

```
tab GEODGHR4, nol
gen peer_group=GEODGHR4
replace peer_group=1 if (GEODGHR4==48933)
replace peer_group=1 if (GEODGHR4==48935)
replace peer_group=1 if (GEODGHR4==61901)
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replace peer_group=3 if (GEODGHR4==12901)
replace peer_group=3 if (GEODGHR4==13901)
replace peer_group=3 if (GEODGHR4==12902)
replace peer_group=3 if (GEODGHR4==13902)
replace peer_group=3 if (GEODGHR4==13903)
replace peer_group=4 if (GEODGHR4==24912)
```

```
replace peer_group=4 if (GEODGHR4==59911)
replace peer_group=4 if (GEODGHR4==35933)
replace peer_group=4 if (GEODGHR4==35934)
replace peer_group=4 if (GEODGHR4==46903)
replace peer_group=4 if (GEODGHR4==24908)
replace peer_group=4 if (GEODGHR4==35943)
replace peer_group=4 if (GEODGHR4==59953)
replace peer_group=4 if (GEODGHR4==59952)
replace peer_group=4 if (GEODGHR4==59951)
replace peer_group=4 if (GEODGHR4==35949)
replace peer_group=4 if (GEODGHR4==35952)
replace peer_group=4 if (GEODGHR4==46902)
replace peer_group=4 if (GEODGHR4==24914)
replace peer_group=4 if (GEODGHR4==24915)
replace peer_group=4 if (GEODGHR4==35957)
replace peer_group=4 if (GEODGHR4==35960)
replace peer_group=4 if (GEODGHR4==48931)
replace peer_group=4 if (GEODGHR4==46905)
replace peer_group=4 if (GEODGHR4==35966)
replace peer_group=5 if (GEODGHR4==24909)
replace peer_group=5 if (GEODGHR4==10912)
replace peer_group=5 if (GEODGHR4==24911)
replace peer_group=5 if (GEODGHR4==12903)
replace peer_group=6 if (GEODGHR4==46904)
replace peer_group=6 if (GEODGHR4==62901)
replace peer_group=7 if (GEODGHR4==35995)
replace peer_group=7 if (GEODGHR4==24906)
replace peer_group=7 if (GEODGHR4==59932)
replace peer_group=8 if (GEODGHR4==35970)
replace peer_group=8 if (GEODGHR4==59931)
replace peer_group=8 if (GEODGHR4==35953)
replace peer_group=8 if (GEODGHR4==59933)
replace peer_group=8 if (GEODGHR4==59922)
replace peer_group=8 if (GEODGHR4==59923)
```

/*Label the Variable*/

```
label var peer_group "Peer Group"
label define label 1 "Peer Group A" 2 "Peer Group B" 3 "Peer Group C" 4 "Peer Group D" 5 "Peer Group E" 6 "Peer
Group F" 7 "Peer Group G" 8 "Peer Group H"
label values peer_group label
```

Descriptive Statistics

```
tab FS INCDGHH [aw=WTS_M], row nofreq
tab FS EHG2DVH3 [aw=WTS_M], row nofreq
tab FS DHH_OWN [aw=WTS_M], row nofreq
tab Income_source [aw=WTS_M], row nofreq
tab gender_loneparent [aw=WTS_M], row nofreq
*Ibid: tab FS varname [aw=WTS_M], row nofreq
```

Regression+Coefplot

```
/*Model 1 */
logit   FS   ib5.INCDGHH   ib2.region   ib3.EHG2DVH3   i.DHH_OWN   ib7.peer_group   i.Income_source
ib2.gender_loneparent ib2.SDC_015 i.SDCDGCB,allbaselevel
```

```
coefplot,xline(0)drop(_cons)keep(*.INCDGHH *.Income_source *.DHH_OWN *.EHG2DVH3 *.gender_loneparent
*.SDC_015)omitted baselevels recast(bar)ciopts(recast(rcap))citop barwidt(0.5)color(*.6)
coefplot,xline(0)drop(_cons)keep(*.peer_group     *.region)omitted     baselevels     recast(bar)ciopts(recast(rcap))citop
barwidt(0.5)color(*.6)
/*Model 2*/
logit  FS  ib5.INCDGHH  ib3.EHG2DVH3  i.Income_source  i.DHH_OWN  ib2.gender_loneparent  ib3.SMK_005
ib3.ALCDVTTM ib2.SDC_ 015 i.SDCDGCB if INCDGHH>3,allbaselevel
coefplot,xline(0)drop(_cons) keep(*.INCDGHH *.Income_source *.EHG2DVH3 *.DHH_OWN *.gender_loneparent
*.SMK_005)omitted baselevels recast(bar)ciopts(recast(rcap))citop barwidt(0.5)
```

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