Changes in household food insecurity rates in Canadian metropolitan areas from 2007 to 2012

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ABSTRACT

OBJECTIVES: The socio-demographic characteristics of food-insecure households in Canada have been well characterized, but there is little understanding of what drives the prevalence rates. This study was undertaken to estimate the prevalence of household food insecurity by census metropolitan area (CMA), compare prevalence rates within CMAs and within provinces over time, and assess the effect of local area economic characteristics on changes in CMA food insecurity rates.

METHODS: Data from the 2007–2012 annual components of the Canadian Community Health Survey were used to generate food insecurity rates for 33 CMAs and the corresponding nine provinces, and to compare changes in prevalence over time. Fixed-effects multiple linear regression analysis was applied to examine associations between changes in food insecurity and local area economic factors, considering peak unemployment rate, average number of Employment Insurance beneficiaries, vacancy rate, poverty rate and poverty gap.

RESULTS: Food insecurity rates ranged from 19.9% in Halifax to 9.0% in Quebec City in 2011–2012. Rates within and between CMAs were much more variable than provincial rates. Between 2007–2008 and 2011–2012, the prevalence increased significantly in Halifax, Montreal, Peterborough, Guelph, Calgary and Abbotsford, but decreased in Hamilton. Among the economic characteristics examined, only rising peak unemployment rates were linked to increases in food insecurity in CMAs.

CONCLUSIONS: Our results suggest that policy initiatives to expand employment opportunities, improve the quality and stability of employment, and increase benefits for disadvantaged workers could reduce the prevalence of food insecurity within CMAs.

KEY WORDS: Food insecurity; census metropolitan areas; unemployment; Canada

La traduction du résumé se trouve à la fin de l'article.

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Household food insecurity, defined as inadequate access to food due to financial constraints, is a growing public health concern. It affected 12.6% of Canadian households in 2012, representing a significant increase from 11.3% prevalence observed in 2008.¹ In Canada, household food insecurity is associated with heightened nutritional vulnerability² as well as compromises to individual health and well-being.^{3–12} Adults in food-insecure households report poorer physical and mental health outcomes, including higher rates of diabetes, heart disease and mental illness.^{4–10} The experience of food insecurity also leaves a permanent mark on children, making them more susceptible to such conditions as depression and asthma later in life.^{3,11,12}

There has been considerable research to examine the conditions that give rise to household food insecurity in Canada. Analyses of national population health survey data have revealed that the probability of food insecurity rises as income declines, but risk is also a function of income source (i.e., reliance on social assistance, Employment Insurance and Worker's Compensation), household structure (i.e., the presence of children or lack of a partner), lack of home ownership, Aboriginal status, and low education.^{1,8–10} In addition, recent research has highlighted the protective effect of the guaranteed annual incomes currently provided to Canadian seniors.^{13,14} With few exceptions,¹⁵ however, Canadian research into the determinants of food

insecurity has been focused on understanding associations at the household level.

With the consistent measurement of food insecurity on the Canadian Community Health Survey (CCHS) since 2005, we have begun to chart trends in food insecurity nationally and provincially.^{1,16} Yet we still have little understanding of what drives prevalence rates, and therefore limited evidence upon which to develop interventions. In the United States, analyses of inter-state variation in food insecurity rates have served to identify state-level policies that impact household vulnerability and provide valuable direction for intervention.^{17–19} However, analogous studies are not feasible in Canada because of our small number of provinces and territories. Although Census Metropolitan Areas (CMAs) are not political entities, analysis of contextual factors at this level is more viable. Understanding how CMA rates of food insecurity are affected by shifting economic conditions can inform strategies for intervention.

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Drawing on data from the CCHS from 2007 to 2012, this study was undertaken to 1) estimate the prevalence of household food insecurity by CMA, 2) compare prevalence rates within CMAs over time, 3) compare CMA prevalence rates with provincial rates of food insecurity, and 4) assess the effect of local area economic characteristics on changes in CMA food insecurity rates.

METHODS

The CCHS is an annual, population-representative health survey of approximately 65,000 individuals aged 12 years and over living in private dwellings in Canada. Excluded from the sampling frame are people living on Aboriginal Reserves, institutional residents, full-time members of the Canadian Forces and residents of certain remote locations. Although CCHS data have been collected and released annually since 2007, Statistics Canada also produces files combining two years of data (i.e., 2007–2008, 2009–2010, 2011–2012) to match previous biannual cycles of the survey.

Using geographic boundaries from the 2006 Census, 33 CMAs have been defined in the CCHS. A CMA consists of one or more neighbouring municipalities situated around a core and has a minimum total population size of 100,000. The 33 CMAs and the nine provinces in which they are situated comprise the focus of this study.

Data from the 2007–2012 annual components of the CCHS were used to estimate the prevalence of food insecurity within each CMA and its corresponding province, as well as examine the relationship between CMA characteristics and food insecurity rates over time. Prince Edward Island was the only province excluded from the analyses, as it does not contain a CMA. Household food security status over the previous 12 months was determined from participants' responses to the 18-item Household Food Security Survey Module (HFSSM).²⁰ The module was designated as core content on the CCHS in 2007–2008 and 2011–2012, but optional in 2009–2010. Only two provinces, New Brunswick and Prince Edward Island, elected not to include the measure for their population. Thus, prevalence rates are available for all CMAs except Moncton and Saint John for 2009–2010.

For this study, households whose respondents provided no affirmative responses to the HFSSM were classified as food secure, while those with one or more affirmative responses were

considered to be food insecure. This classification scheme includes marginal, moderate and severe food insecurity,¹⁶ recognizing the heightened vulnerability of individuals in households reporting any indication of this condition.^{10,21} Thus, our estimation of food insecurity prevalence encompasses a more comprehensive spectrum of the food-insecure population than the coding method originally proposed by Health Canada.²⁰

Changes in the prevalence of household food insecurity within CMAs were first examined by comparing estimates from 2011–2012 to those from 2007–2008. Adjacent years were pooled to maximize the sample size for each CMA and we applied two-sample tests of proportions to identify significant increases or decreases in prevalence. A similar analysis was conducted to assess changes in provincial prevalence rates over this period. As separate tests were carried out for each CMA or province, corrections for multiple comparisons were not required. Data from 2009–2010 were omitted to enable comparison of all 33 CMAs over this period.

The impact of CMA-level economic characteristics on changes in food insecurity prevalence was examined through fixed-effects linear regression. Data on CMA-level economic characteristics were available from 2007 through 2012 and included annual peak unemployment rate, rental vacancy rate, and average number of Employment Insurance (EI) beneficiaries per month. Summary statistics and data sources for these variables are presented in Table 1. CMA fixed effects were included to control for unobserved, stable characteristics of CMAs that could bias estimated associations between economic predictors and food insecurity. To track yearly changes in the prevalence of food insecurity within CMAs, variables for survey year were added to the fixed-effects model. Our analytic sample included food insecurity rates for all 33 CMAs from 2007 to 2012, but with data missing for the CMAs of Moncton and Saint John for 2009 and 2010.

A second model was conducted with the addition of income distribution statistics available for 20 select CMAs: the percentage of persons below the low-income measure after tax (LIM-AT) and the average low-income gap ratio (*Survey of Labour and Income Dynamics, CANSIM Table 202-0802*). The gap ratio represents the average difference between household income and the LIM-AT among low-income persons, expressed as a

Table 1. Data source information and summary statistics for census metropolitan area (CMA)-level economic characteristics; Statistics Canada, 2007–2012

Economic characteristic	Source	2007	2008	2009	2010	2011	2012
Mean (SD)*							
Peak unemployment rate† (%)	Labour Force Survey (CANSIM Table 282-0116) [§]	6.4 (1.5)	6.6 (1.7)	8.9 (2.3)	8.6 (1.8)	8.0 (1.6)	7.7 (1.7)
Rental vacancy rate (%)‡	Canada Mortgage and Housing Corporation (CANSIM Table 027-0035)	2.8 (2.1)	2.5 (2.4)	3.4 (2.3)	3.2 (1.9)	2.7 (1.7)	3.1 (1.9)
Average number of Employment Insurance beneficiaries per month (1000s)	Employment Insurance Statistics (CANSIM Table 276-0031)	7.16 (12.43)	7.35 (12.45)	12.60 (20.66)	11.79 (19.34)	9.46 (15.51)	8.50 (14.02)

* Represents annual average values for economic characteristics across all 33 CMAs. Each CMA was weighted equally.

† Refers to the highest monthly unemployment rate in a given calendar year.

‡ Based on privately-initiated rental apartment structures of three or more units.

§ Table was terminated and replaced by CANSIM Table 282-0135 on January 28, 2015. CMA unemployment rates in Table 282-0135 are based on 2011 census boundaries and differ slightly from the values in Table 282-0116 which were used in this analysis (based on 2006 census boundaries).

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percentage of the LIM-AT.) As no significant associations were observed for these income variables, they were omitted from the final model.

All analyses were carried out using STATA version 12.1. CMA food insecurity rates were generated using survey commands with household and bootstrap weights provided by Statistics Canada. Coefficients of variation were used to confirm the reliability of these estimates.

RESULTS

Substantial variability in the prevalence of household food insecurity was observed across CMAs in 2011–2012, with rates ranging from a high of 19.9% in Halifax to a low of 9.0% in Quebec City (Table 1). Within provinces, rates also varied widely between CMAs. While the prevalence of household food insecurity in Ontario in 2011–2012 was 11.8%, CMA rates ranged from 17.3% in Barrie to 9.3% in Hamilton (Table 2). Similarly, the

prevalence of food insecurity in Quebec was 13.0%, while CMA rates ranged from 14.8% in Montreal to 9.0% in Quebec City (Table 2).

Between 2007–2008 and 2011–2012, there was considerable fluctuation in CMA food insecurity rates. Significant increases were observed in Halifax, Montreal, Peterborough, Guelph, Calgary and Abbotsford, but the food insecurity rate in Hamilton dropped significantly over this period (Table 2). Five provinces showed significant changes in food insecurity prevalence from 2007–2008 to 2011–2012: Newfoundland and Labrador, Nova Scotia, New Brunswick, Saskatchewan, and Alberta (Table 2). In many cases, provincial patterns paralleled those observed in CMAs (e.g., food insecurity increased significantly in Halifax and in Nova Scotia overall). However, the magnitude and direction of prevalence changes among CMAs in the three largest provinces were more variable in comparison to provincial rates.

Table 2. Prevalence of total household food insecurity (FI) by province and census metropolitan area; Canadian Community Health Survey, 2007–2008, 2011–2012

	2011–2012			2007–2008			Δ FI (%)
	Total households† (000s)	Food-insecure households (%)	95% CI	Total households (000s)	Food-insecure households (%)	95% CI	
Newfoundland & Labrador	190.6	12.0	(10.5, 13.6)	177.9	15.1	(13.8, 16.6)	–3.1**
St John's	82.9	11.1	(8.6, 14.2)	73.2	13.3	(10.9, 16.4)	–2.2
Nova Scotia	339.4	17.3	(15.8, 19.0)	338.8	14.0	(12.8, 15.3)	3.3**
Halifax	161.0	19.9	(16.9, 23.3)	149.7	13.3	(10.9, 16.0)	6.6**
New Brunswick	270.0	16.1	(14.8, 17.5)	266.8	14.5	(13.4, 15.7)	1.6
Moncton	62.1	17.8	(14.7, 21.5)	54.2	15.9	(13.1, 19.0)	–1.9
Saint John	52.1	14.4	(11.4, 18.0)	49.3	10.2	(7.6, 13.8)	4.2
Quebec	2957.4	13.0	(12.3, 13.8)	2961.7	10.2	(9.6, 10.8)	2.8***
Saguenay	66.0	12.4	(10.0, 15.5)	68.2	9.2	(7.1, 12.0)	3.2
Quebec City	315.3	9.0	(7.2, 11.2)	301.0	10.8	(8.9, 13.0)	–1.7
Sherbrooke	84.3	8.6	(6.4, 11.5)	81.5	9.0	(6.6, 12.1)	–0.4
Trois-Rivières	67.9	11.6	(8.6, 15.2)	61.8	11.4	(9.1, 14.3)	0.1
Montreal	1571.7	14.8	(13.5, 16.1)	1538.4	10.0	(9.2, 11.0)	4.7***
Ontario	4460.7	11.8	(11.3–12.5)	4208.8	12.0	(11.5, 12.6)	–0.2
Ottawa-Gatineau	467.0	10.3	(8.8–12.0)	434.9	11.0	(9.5, 12.7)	–0.7
Kingston	59.2	10.7‡	(7.5–15.1)	56.5	12.1	(9.4, 15.3)	–1.4
Peterborough	43.7	15.9	(12.1–20.4)	41.7	10.0	(7.4, 13.8)	5.8*
Oshawa	129.9	13.2	(10.3–16.7)	118.0	11.1	(8.6, 14.2)	–2.1
Toronto	2102.4	12.0	(10.8–13.2)	1973.2	12.5	(11.4, 13.7)	–0.5
Hamilton	286.5	9.3	(7.6–11.4)	258.1	12.4	(10.5, 14.6)	–3.1*
St. Catharines-Niagara	152.0	11.1	(9.0–13.7)	147.0	12.2	(9.9, 15.0)	–1.1
Kitchener	180.6	13.9	(11.1–17.3)	172.7	11.8	(9.6, 14.4)	2.1
Brantford	50.2	13.2	(10.4–16.6)	48.7	14.1	(10.5, 18.6)	–0.9
Guelph	58.6	16.4	(13.2–20.2)	48.0	10.8‡	(7.8, 14.9)	5.6*
London	183.4	10.4	(8.3–13.0)	174.9	11.2	(9.3, 13.6)	–0.8
Windsor	116.8	13.1‡	(8.5–19.7)	118.8	14.1	(11.5, 17.1)	–0.9
Barrie	68.0	17.4	(13.3–22.3)	71.4	3.0	(10.1, 16.5)	4.4
Greater Sudbury	57.6	9.4	(6.9–12.7)	56.5	11.2	(9.1, 14.1)	–1.9
Thunder Bay	44.2	13.9	(10.9–17.7)	44.7	15.0	(12.6, 18.1)	–1.1
Manitoba	422.0	12.3	(10.9–13.9)	394.5	12.7	(11.4, 14.1)	–0.4
Winnipeg	298.9	11.5	(9.6–13.8)	277.6	14.2	(12.3, 16.4)	–2.7
Saskatchewan	372.0	12.2	(10.8–13.8)	344.3	9.7	(8.8, 10.6)	2.5**
Regina	88.6	13.6‡	(9.4–19.2)	79.5	11.0	(9.0, 13.3)	2.6
Saskatoon	111.4	12.7	(9.8–16.3)	95.9	10.7	(8.6, 13.4)	2.0
Alberta	1299.7	12.0	(10.9–13.1)	1172.2	9.6	(8.9, 10.4)	2.4***
Calgary	479.8	12.1	(10.1–14.4)	416.1	8.1	(6.8, 9.6)	4.0**
Edmonton	453.2	13.1	(11.0–15.5)	397.8	10.6	(9.1, 12.2)	2.5
British Columbia	1611.3	11.9	(11.0–12.9)	1501.7	11.2	(10.5, 12.0)	0.7
Kelowna	75.5	14.2‡	(10.0–20.0)	60.8	11.8‡	(7.5, 17.9)	2.5
Abbotsford	59.3	14.8	(11.0–19.7)	63.7	8.3	(6.0, 11.4)	6.5**
Vancouver	941.0	10.4	(9.1–11.8)	849.9	10.5	(9.4, 11.7)	–0.2
Victoria	139.4	14.0	(11.1–17.6)	132.2	12.0	(9.8, 14.4)	2.1

† Includes all households with a response to the Household Food Security Survey Module.

‡ Use with caution (coefficient of variation 16.6% to 33.3%).

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 3. Fixed-effects linear regression analysis of the impact of economic characteristics on census metropolitan area food insecurity rates ($N = 194$); Canadian Community Health Survey, 2007–2012

	Regression coefficient	95% CI
Peak unemployment rate* (%)	0.78	(0.41, 1.15)
Rental vacancy rate† (%)	−0.01	(−0.34, 0.32)
Average number of EI beneficiaries per month (1000s)	−0.02	(−0.10, 0.07)
Year 2007	1.63	(0.28, 2.97)
Year 2008	1.34	(0.04, 2.65)
Year 2009	0.38	(−0.70, 1.46)
Year 2010	ref	
Year 2011	1.24	(0.13, 2.34)
Year 2012	2.31	(1.17, 3.45)
Additional parameters		
rho (fraction of variance due to CMA‡)	0.431	

* Refers to the highest monthly unemployment rate in a given year.

† Based on privately-initiated rental apartment structures of three or more units.

‡ CMA = census metropolitan area.

Food insecurity prevalence within a CMA was positively associated with peak unemployment rate, but not significantly related to the rental vacancy rate or the average number of EI beneficiaries per month (Table 3). A 1-percentage-point increase in peak unemployment rates led to a 0.78-percentage-point increase in the prevalence of food insecurity (Table 3). Coefficients for year variables showed a decline in the average rate of food insecurity among CMAs from 2007 to 2010 followed by a rise in 2011 and 2012 (Table 3).

DISCUSSION

Our results document marked differences in the prevalence of food insecurity across CMAs and highlight substantial intra-provincial variation. Considerable fluctuation in the prevalence of food insecurity over time was also observed within individual metropolitan areas. Food insecurity prevalence rates within and between CMAs appeared much more variable than provincial rates. Some of this volatility can be attributed to the smaller survey samples and consequently greater instability of CMA prevalence estimates (as indicated by the wider confidence intervals around these estimates). However, we detected significant changes within CMAs over time where no such changes were observed provincially, and vice versa. These findings suggest that provincial estimates of food insecurity do not necessarily reflect the conditions in individual CMAs and point to the importance of continued surveillance to monitor the prevalence of food insecurity locally.

Examining the contribution of metropolitan area characteristics to changes in food insecurity rates over time highlighted a strong positive effect of peak unemployment rate, a finding consistent with US studies of state-level variation in food insecurity^{17–19} and variation in the national prevalence over time.²² High unemployment rates can exert upward pressure on the prevalence of food insecurity because residents are less able to garner sufficient income to meet their food needs. Although average unemployment rate was also significantly associated with food insecurity in this study (data not shown), the use of peak rather than average unemployment rate yielded a stronger

association because it provides a better estimate of the share of the labour force experiencing job loss and related income shocks in a given year.²²

The strong positive association between food insecurity prevalence rates and peak unemployment in CMAs underscores the centrality of employment conditions to this problem. Almost two thirds of food-insecure households in Canada are reliant on income from salaries or wages.¹ An in-depth examination of this phenomenon, drawing on data from CCHS 2007–2008, revealed the particular vulnerability of low-waged workers and households dependent on one rather than multiple earners.²³ The importance of employment was also evident in a follow-up study of food insecurity among a large sample of low-income families in Toronto; families' food security improved significantly with a gain in the number of household members with paid work.²⁴ Policy initiatives to expand employment opportunities, improve the quality and stability of employment, and increase compensation benefits for disadvantaged workers would appear to be critical in reducing the prevalence of food insecurity within CMAs.

The lack of a significant association between the number of Employment Insurance (EI) beneficiaries in CMAs and food insecurity prevalence likely reflects the relatively small number of households affected by fluctuations in this measure. While food insecurity is more prevalent among households reliant on EI or Workers' Compensation than those reliant on salaries or wages,^{1,8–10} the former comprised less than 3% of food-insecure households in Canada in 2012.¹ EI beneficiaries accounted for less than half of all unemployed individuals,²⁵ suggesting that this measure may miss those segments of the population most vulnerable to food insecurity.

Our failure to detect significant associations between food insecurity rates and measures of low income may be due to minimal fluctuations in these variables over the six years of observation. However, it likely also reflects subtle differences in what is being captured by these measures. Though closely linked to household income,^{1,8–10,16,20} the material deprivation denoted by food insecurity reflects the interplay of household resources (e.g., income, assets, access to credit) and household expenditures (e.g., shelter, food, other necessities), as well as household debt.

The observed decline in CMA food insecurity rates from 2007 to 2010 and the subsequent rise in 2011 through 2012 do not track provincial estimates of food insecurity measured over the same period.¹ However, this pattern was observed after adjustment for metropolitan area economic characteristics and is not directly comparable to unadjusted provincial trends. It is also important to note that this yearly trend refers to the average prevalence across CMAs and may not reflect changes within each individual CMA. One possible explanation for the rise in CMA food insecurity rates in 2011 and 2012 may be a lagged effect of the 2008–2009 economic recession. The slow job market recovery which characterized the post-recession period, coupled with Canada's declining social safety net, would have increased financial strain among low-income households, leaving them more vulnerable to food insecurity.^{26,27} Another explanation stems from a recent US study which highlighted strong effects of annual inflation (as measured by the Consumer Price Index (CPI)) and relative food price on changes in the national

prevalence of food insecurity.²² Although post-recession increases in inflation and food prices have been charted nationally and provincially in Canada,²⁸ these economic measures are not available across all CMAs. Post-hoc analyses within a small sample of CMAs with available CPI data showed no significant association between inflation and CMA rates of food insecurity; however, this may be due to insufficient sample size and limited years of data (analyses not shown). This suggests that more years of follow-up data are required to fully understand the relationship between temporal trends in CMA food insecurity rates and the economic impacts of this recession.

Our study was also limited by the lack of data on costs of living and infrastructure at the CMA level over the time period of interest. As a result, we were unable to explore the effect of potentially important explanatory factors, such as housing costs and characteristics of the local food environment (i.e., food prices and food retail access). Multi-level modeling of CMA characteristics among a subset of 20 CMAs suggests that housing affordability exerts an important influence on household food insecurity.²⁹ However, we lacked the data to carry this variable into the current analysis. Our examination of factors affecting temporal trends was also limited by the number of years of available data for CMAs with comparable measures of food insecurity. Although the HFSSM was included as optional content on the CCHS in 2005, Newfoundland and Labrador, New Brunswick, Manitoba and Saskatchewan opted out of the module, so the data were excluded from this study.

As with other studies, our findings are not generalizable beyond the unit of analysis, which in this case is CMAs. Nonetheless, given that 69.7% of the Canadian population resides in the 33 CMAs that comprised our analytic sample,³⁰ we would argue that our results are relevant to discussions on reducing the prevalence of food insecurity in this country. More research is needed, however, to determine how shifts in unemployment affect prevalence rates nationally as well as in individual provinces and territories.

CONCLUSION

The current study makes a unique contribution to research on household food insecurity in Canada by examining trends in food insecurity rates across metropolitan areas and identifying contextual factors of particular importance to this problem. Given the extraordinary burden of ill health associated with household food insecurity and the growing prevalence of food insecurity nationally, there is a pressing need for evidence-based interventions to address this problem. We found that the rate of unemployment in a CMA contributes significantly to the observed prevalence of food insecurity. Thus federal, provincial and municipal policy initiatives designed to strengthen employment opportunities for low-waged workers may be an effective strategy to reduce household food insecurity in metropolitan areas.

REFERENCES

1. Tarasuk V, Mitchell A, Dachner N. *Household Food Insecurity in Canada, 2012*. Research to identify policy options to reduce food insecurity (PROOF). Toronto, ON, 2014. Available at: http://nutritionalsciences.lamp.utoronto.ca/wp-content/uploads/2014/01/foodinsecurity2011_final.pdf (Accessed November 9, 2014).
2. Kirkpatrick SI, Tarasuk V. Food insecurity is associated with nutrient inadequacies among Canadian adults and adolescents. *J Nutr* 2008;138:604–12. PMID: 18287374.
3. Broughton MA, Janssen PS, Hertzman C, Innis SM, Frankish CJ. Predictors and outcomes of household food insecurity among inner city families with preschool children in Vancouver. *Can J Public Health* 2006;97:214–16. PMID: 16827410.
4. Muldoon K, Duff P, Fielden S, Anema A. Food insufficiency is associated with psychiatric morbidity in a nationally representative study of mental illness among food insecure Canadians. *Soc Psychiatry Psychiatr Epidemiol* 2012;48:795–803. PMID: 23064395. doi: 10.1007/s00127-012-0597-3.
5. Normen L, Chan K, Braitstein P, Anema A, Bondy G, Montaner J, et al. Food insecurity and hunger are prevalent among HIV-positive individuals in British Columbia, Canada. *J Nutr* 2005;135:820–25. PMID: 15795441.
6. Gucciardi E, DeMelo M, Vogt J, Stewart D. Exploration of the relationship between household food insecurity and diabetes care in Canada. *Diabetes Care* 2009;32:2218–24. PMID: 19720843. doi: 10.2337/dc09-0823.
7. Marjerrison S, Cummings E, Glanville NT, Kirk S, Ledwell M. Prevalence and associations of food insecurity in children with diabetes mellitus. *J Pediatr* 2011;158:607–11. PMID: 21126743. doi: 10.1016/j.jpeds.2010.10.003.
8. Che J, Chen J. Food insecurity in Canadian households. *Health Rep* 2001;12:11–22. PMID: 15069808.
9. Vozoris N, Tarasuk V. Household food insufficiency is associated with poorer health. *J Nutr* 2003;133:120–26. PMID: 12514278.
10. Tarasuk V, Mitchell A, McLaren L, McIntyre L. Chronic physical and mental health conditions among adults may increase vulnerability to household food insecurity. *J Nutr* 2013;143:1785–93. PMID: 23986364. doi: 10.3945/jn.113.178483.
11. Kirkpatrick SI, McIntyre L, Potestio ML. Child hunger and long-term adverse consequences for health. *Arch Pediatr Adolesc Med* 2010;164:754–62. PMID: 20679167. doi: 10.1001/archpediatrics.2010.117.
12. McIntyre L, William J, Lavorato D, Patten S. Depression and suicide ideation in late adolescence and early adulthood are an outcome of child hunger. *J Affect Disord* 2013;150:123–29. PMID: 23276702. doi: 10.1016/j.jad.2012.11.029.
13. Emery JH, Fleisch V, McIntyre L. How a guaranteed annual income could put food banks out of business. *SPP Research Papers* 2013;6:1–20.
14. Emery JH, Fleisch V, McIntyre L. Legislated changes to federal pension income in Canada will adversely affect low income seniors' health. *Prev Med* 2013;57:963–66. PMID: 24055151. doi: 10.1016/j.ypmed.2013.09.004.
15. Emery JH, Fleisch V, Matheson J, Ferrer A, Kirkpatrick SI, Tarasuk V, et al. Evidence of the association between household food insecurity and heating cost inflation in Canada, 1998–2001. *Can Public Pol* 2012;38:181–215. doi: 10.1353/cpp.2012.0016.
16. Tarasuk V, Mitchell A, Dachner N. *Household Food Insecurity in Canada, 2011*. Research to identify policy options to reduce food insecurity (PROOF). Toronto, ON, 2013. Available at: http://nutritionalsciences.lamp.utoronto.ca/wp-content/uploads/2014/05/Household_Food_Insecurity_in_Canada-2012_ENG.pdf (Accessed November 9, 2014).
17. Tapogna J, Suter A, Nord M, Leachman M. Explaining variation in state hunger rates. *Fam Econ Nutr Rev* 2004;16:12–22.
18. Bartfeld J, Dunifon R. State-level predictors of household food security among households with children. *J Policy Anal Manag* 2006;25:921–42. doi: 10.1002/pam.20214.
19. Gunderson C, Waxman E, Engelhard E, Satoh A, Chawla N. *Map the Meal Gap 2014: Technical Brief*. Chicago, IL: Feeding America, 2014. Available at: <http://www.feedingamerica.org/hunger-in-america/our-research/map-the-meal-gap/2012/2012-map-the-meal-gap-tech-brief.pdf> (Accessed November 9, 2014).
20. Office of Nutrition Policy and Promotion. *Income-related Household Food Security in Canada*. Ottawa, ON: Health Canada, 2007. Report No. H164-42/2007E. Available at: http://www.hc-sc.gc.ca/fn-an/surveill/nutrition/com-mun/income_food_sec-sec_alim-eng.php (Accessed November 9, 2014).
21. Coleman-Jensen A. U.S. food insecurity status: Toward a refined definition. *Soc Indic Res* 2010;95:215–30. doi: 10.1007/s11205-009-9455-4.
22. Nord M, Coleman-Jensen A, Gregory C. *Prevalence of U.S. Food Insecurity is Related to Changes in Unemployment, Inflation and the Price of Food*. Washington, DC: U.S. Department of Agriculture, Economic Research Service, 2014. Report No. ERR-167. Available at: <http://www.ers.usda.gov/media/1489984/err167.pdf> (Accessed March 2, 2015).
23. McIntyre L, Bartoo A, Emery J. When working is not enough: Food insecurity in the Canadian labour force. *Public Health Nutr* 2013;17:49–57. PMID: 22958521. doi: 10.1017/S1368980012004053.
24. Loopstra R, Tarasuk V. Severity of household food insecurity is sensitive to change in household income and employment status among low-income families. *J Nutr* 2013;143:1316–23. PMID: 23761648. doi: 10.3945/jn.113.175414.
25. Canadian Employment Insurance Commission. *2012/13 EI Monitoring and Assessment Report*. Ottawa, ON: Canadian Employment Insurance Commission, 2014. Catalogue No. CEIC-001-05-14E. Available at: <http://www.esdc.gc.ca/en/reports/ei/monitoring2013/index.page> (Accessed November 9, 2014).
26. Federation of Canadian Municipalities. *Theme Report #6: Mending Canada's Frayed Social Safety Net: The Role of Municipal Governments*. Ottawa, ON: Federation of Canadian Municipalities, 2006. Available at: <https://www.fcm.ca>.

- fc.m.ca/Documents/reports/Mending_Canadas_Frayed_Social_Safety_Net_The_role_of_municipal_governments_EN.pdf (Accessed November 9, 2014).
27. Yalnizyan A. *The Problem of Poverty Post-recession*. Ottawa, ON: Canadian Centre for Policy Alternatives, 2010. Available at: <http://www.policyalternatives.ca/sites/default/files/uploads/publications/reports/docs/Poverty%20Post%20Recession.pdf> (Accessed November 9, 2014).
 28. Statistics Canada. *The Consumer Price Index, December 2012*. Ottawa, ON: Consumer Prices Division, Statistics Canada, 2013. Catalogue No. 62-001-X Vol. 91 no. 12. Available at: <http://www.statcan.gc.ca/pub/62-001-x/62-001-x2012012-eng.pdf> (Accessed November 9, 2014).
 29. Sriram U, Tarasuk V. Assessing the influence of metropolitan area economic characteristics on household food insecurity in Canada. *J Hunger Environ Nutr* (In press).
 30. Statistics Canada. *Annual Demographic Estimates: Subprovincial Estimates, 2006–2013*. Ottawa: Demography Division, Statistics Canada, 2014. Catalogue No. 91-214-X. Available at: <http://www.statcan.gc.ca/pub/91-214-x/91-214-x2012000-eng.pdf> (Accessed November 9, 2014).

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RÉSUMÉ

OBJECTIFS : Les caractéristiques sociodémographiques des ménages en situation d'insécurité alimentaire au Canada ont été bien étudiées, mais on connaît mal les éléments moteurs des taux de prévalence. Nous avons cherché à estimer la prévalence de l'insécurité alimentaire des ménages par région métropolitaine de recensement (RMR), à comparer les taux de prévalence au sein des RMR et des provinces au fil du temps, ainsi qu'à évaluer l'effet des caractéristiques économiques locales sur les changements dans les taux d'insécurité alimentaire des RMR.

MÉTHODE : Nous avons utilisé les données des composantes annuelles de 2007 à 2012 de l'Enquête sur la santé dans les collectivités canadiennes pour générer les taux d'insécurité alimentaire dans 33 RMR et les neuf provinces correspondantes, et pour comparer les changements temporels dans la prévalence. Nous avons appliqué une analyse de régression linéaire multiple à effets fixes pour examiner les associations entre les changements dans l'insécurité alimentaire et les facteurs économiques locaux, compte tenu du sommet du taux de chômage, du nombre moyen de prestataires de l'assurance-emploi, du taux d'inoccupation, du taux de pauvreté et de l'écart de pauvreté.

RÉSULTATS : Les taux d'insécurité alimentaire se situaient entre 19,9 % à Halifax et 9 % à Québec en 2011–2012. Les taux à l'intérieur et entre les RMR étaient beaucoup plus variables que les taux provinciaux. Entre 2007–2008 et 2011–2012, la prévalence de l'insécurité alimentaire a considérablement augmenté à Halifax, Montréal, Peterborough, Guelph, Calgary et Abbotsford, mais elle a diminué à Hamilton. De toutes les caractéristiques économiques examinées, seule la hausse du sommet du taux de chômage était liée à l'augmentation de l'insécurité alimentaire dans les RMR.

CONCLUSIONS : Nos résultats indiquent que des initiatives stratégiques pour développer les occasions d'emploi, améliorer la qualité et la stabilité de l'emploi et bonifier les prestations des travailleurs défavorisés pourraient réduire la prévalence de l'insécurité alimentaire dans les RMR.

MOTS CLÉS : insécurité alimentaire; régions métropolitaines de recensement; chômage; Canada