

Reduction of Food Insecurity among Low-Income Canadian Seniors as a Likely Impact of a Guaranteed Annual Income

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Le revenu annuel garanti (RAG), en tant que stratégie de réduction de la pauvreté, a régulièrement fait l'objet de débats au Canada, et l'idée retient aujourd'hui de plus en plus l'attention. Dans cet article, nous évaluons l'efficacité d'une telle stratégie, en utilisant l'insécurité alimentaire comme indicateur de la pauvreté chez les adultes célibataires de 55 à 74 ans à deux moments : avant l'âge de l'admissibilité aux pensions publiques, c'est-à-dire 65 ans, puis après. Les données de l'Enquête sur la santé dans les collectivités canadiennes (2007–2013) montrent que la prévalence de l'insécurité alimentaire est 50 % moins élevée chez les Canadiens de plus de 65 ans que chez les Canadiens à faible revenu de moins de 65 ans. Les pensions publiques versées aux personnes âgées, considérées comme un exemple de RAG, sont donc une stratégie efficace de réduction de la pauvreté.

Mots clés : revenu annuel garanti; la pauvreté; l'insécurité alimentaire; les personnes âgées; Sécurité de la vieillesse; Canada

Canada has episodically discussed guaranteed annual income (GAI) as a poverty reduction strategy, and the idea has garnered renewed attention. We investigate the potential effectiveness of such a strategy by examining food insecurity as an indicator of poverty in unattached low-income adults age 55 to 74 years before and after they become age-eligible for publicly financed pensions at age 65. Results from the Canadian Community Health Survey (2007–2013) showed that Canadians over age 65 have half the prevalence of food insecurity of low-income Canadians under 65. Seniors' public pensions, as an example of GAI, are an effective poverty reduction strategy.

Keywords: guaranteed annual income, poverty, food insecurity, seniors, Old Age Security, Canada

Introduction

Persistently high poverty rates engender adverse social, economic, health, and legal ramifications (Canadian Public Health Association 1996; Chunn and Gavigan 2004; Raphael 2011; Sarlo 2013). In Canada approximately 12.9 percent of Canadians, or 4.3 million people, live on incomes below the low-income cut-off (LICO)

poverty threshold (Raphael 2011; Statistics Canada 2013b).¹ Canadian poverty rates over the last decade have exceeded the average for Organisation for Economic Co-operation and Development (OECD) nations (OECD 2011b), even though Canada sits within the top tier of OECD nations benchmarked against national income (OECD 2015). In contrast, less than 6 percent of

Canadians over age 65 live on incomes below the poverty threshold, and Canada has one of the lowest elderly poverty rates in the OECD (Emery, Fleisch, and McIntyre 2013a; OECD 2011a). Canada's success with addressing elderly poverty has been attributed to its public pension schemes (Osberg 2001), which establish a minimum income, or guaranteed annual income (GAI), for Canadians age 65 and over.²

Despite an awareness in Canada of GAI as a potential poverty reduction strategy, few studies have empirically tested whether a GAI can effectively mitigate poverty. This timely study addresses this research gap by investigating the reduction in risk of food insecurity in unattached low-income seniors across age groups that are age-eligible and age-ineligible for publicly financed old-age pensions. Food insecurity is a unique and compelling indicator of poverty representing the situation of those who have insufficient financial resources to acquire adequate food (Anderson 1990). Because unattached low-income seniors are highly vulnerable to food insecurity and associated poverty (Bazel and Mintz 2014), this study provides an opportunity to examine the ability of seniors' pensions qua GAI to mitigate the effects of poverty as indicated by changes in the valid and reliable metric of food insecurity.

Seniors' Pensions: A Form of GAI in Canada

Canadians age 65 years and older receive public pensions through the Old Age Security (OAS) program, which is publicly funded through the federal tax system. Seniors are eligible for three pension plans in the OAS program: the OAS pension, which is a universal demogrant; the Guaranteed Income Supplement (GIS), which is an income-tested benefit; and the Canada Pension Plan (CPP)/Quebec Pension Plan (QPP), which are earnings-related contributory pension benefits.³

To be eligible for OAS and GIS, seniors must be Canadian citizens or legal residents, and must have lived in Canada for a minimum of ten years after 18 years of age.⁴ OAS is a universal benefit as seniors 65 years and above⁵ are eligible for the same OAS income regardless of their employment history and marital status.⁶ The maximum OAS payment in 2015 amounted to \$564.74 per month (Service Canada 2016b).⁷ Unattached low-income seniors who earned an individual annual income less than \$17,136 (in 2015) are also eligible for GIS in addition to OAS. The maximum GIS income received by low-income seniors is \$765.93 per month (in 2015, for a senior with an annual income between \$0 and \$23.99) (Service Canada 2015). However, the GIS income varies depending on an individual's marital status and annual income earned. In addition, some provinces, such as Ontario, top up the GIS benefit depending on the recipient's income (Pasma 2014). Low-income seniors who

have previously worked in Canada, and who have earned an annual income greater than \$3,500, may also receive CPP or QPP; however, eligibility for CPP and QPP is contingent on employment conditions and the individual's monetary contribution to these programs.⁸ In 2015, the average CPP/QPP payment provided to contributors amounted to \$639.44 per month, yet the maximum amount provided to seniors can reach \$1,065.00 per month (Service Canada 2016a). Based on OAS and GIS benefits as a sole income source, unattached low-income seniors can expect to receive a minimum annual non-taxable income of \$15,949.68 (in 2015). CPP/QPP payments are counted as income, which reduces GIS benefits but not OAS, and hence they do not alter the minimum annual income for seniors.

Because OAS and GIS are provided to unattached low-income seniors on a monthly basis, they are, combined, analogous to a GAI. As such, this similarity provides us with the unique chance to investigate the reduction in risk of food insecurity in vulnerable seniors before and after 65 years of age, which is when seniors become age-eligible for publicly financed pensions and "treated" with a GAI.

Methods

Data Set

To study the change in food insecurity among low-income seniors who are age-eligible versus not age-eligible for seniors' benefits, we used the master files of the Canadian Community Health Survey (CCHS), cycles 2007–2008, 2009–2010, 2011–2012, and 2013, accessed through the Prairie Regional Research Data Centre. The CCHS is a repeated cross-sectional survey representative of the Canadian population age 12 years and older. The survey covers all provinces and territories, but excludes about 3 percent of the population (individuals living in institutions, on Aboriginal reserves, and in remote areas, as well as full-time members of the Canadian Armed Forces). The decision to participate in the CCHS is entirely voluntary, and the survey is typically administered over the telephone but can be conducted in person (Statistics Canada 2013a).

Measures

From the CCHS cycles, we retrieved information on the respondents' age, sex, personal level of income, main source of income, home ownership status, and food security status. Respondents were from all provinces, other than Prince Edward Island and Territorial residents, who were excluded because of their small population size and because food insecurity in the Territories is related to remoteness as well as income (Council of Canadian Academies 2014). Since our interest was in testing the impact of the GAI available to Canadians

over age 65 on food insecurity rather than estimating the prevalence of food insecurity and its broader determinants, we selected a sample of unattached low-income respondents who would most likely be reliant on public pensions as their main source of income after age 65 years, and who would also be most likely to be food insecure. Our sample was restricted to respondents age 55 to 74 years (for ordinal age testing, those older than 70 were counted as 70 because of the small sample size) whose marital status was never married/single or divorced/separated,⁹ whose personal annual income was \$20,000 or less, and who provided full information on the variables of interest. We stratified low-income respondents into three levels of annual income: (a) under \$10,000, (b) \$10,000–\$14,999, and (c) \$15,000–\$20,000. Although LICOs vary by community size and by year, LICOs from 2007 to 2013 remained under \$20,000 per year for all community sizes, and thus our use of that threshold represents economic vulnerability for a single-person household.

For the income-source variable, we constructed four categories using the Research Data Centre microdata: (a) “wages,” which includes income from the labour market and from self-employment; (b) “income assistance,” which includes Employment Insurance, Workers’ Compensation, social assistance, and CPP disability coverage (which can be awarded before age 65; while these programs are unique, these are conditional income sources and were grouped following Statistics Canada protocol for the public-use file on account of the sample size), (c) “seniors’ benefits,” which includes OAS, GIS, and CPP/QPP above age 65, and (d) “other income” such as job-related pensions, retirement savings plans (Registered Retirement Savings Plan (RRSP)/Registered Retirement Income Fund (RRIF)), alimony, dividends and interest, and other sources of income not captured by the first three categories. Because income may not reflect the full resources available to a household for consumption, we also included home ownership as a proxy for wealth in this study. For this variable, we investigated food insecurity among home owners and non-home owners in which the latter includes renters of market and subsidized housing.

Household food insecurity in Canada is officially measured using the Household Food Security Survey Module (HFSSM), which has been incorporated into the CCHS since 2004. The HFSSM for adults, which is applicable to this sample, is measured through a series of ten questions that are related to a lack of income as a reason for restricting households from purchasing food, anytime in the past 12 months.¹⁰ The module measures income-related constraints in accessing food that affect the quality and quantity of food, in accordance with socially acceptable means of food procurement (e.g., through purchas-

ing, not charity), and psychological factors (e.g., worrying about running out of food) (Radimer, Olson, and Campbell 1990). The food insecurity construct measured by the HFSSM is unrelated to non-monetary issues in accessing food that might affect seniors, such as lack of transportation or mobility problems, or to the quality of food consumed (e.g., cooking from scratch) that is not related to affordability. Based on the number of affirmative answers, individuals are classified into differing levels of food security: (a) food secure (0–1 affirmative responses), (b) food insecure—moderate (2–5 affirmative responses, denoting qualitative and/or quantitative changes in food intake), or (c) food insecure—severe (≥ 6 affirmative responses, representing dietary deprivation and sometimes characterized as hunger) (Health Canada 2007). Using the Health Canada food insecurity threshold (2 or more affirmative responses), we combined all respondents who were classified as food insecure (moderate and severe) into one category so that food insecurity status could be considered as a dichotomous variable: food secure and food insecure. Because the HFSSM was optional in some cycles, not all provinces were included in all cycles, precluding analyses by province.¹¹

The HFSSM was developed in the United States and has been internationally validated and reliability tested (Bickel et al. 2000; Health Canada 2007; Nord, Andrews, and Carlson 2009), and its value has been recently reaffirmed after 20 years of widespread use (Nord 2014). Reporting bias has not been described despite the extensive validation of this metric. However, it was determined in a recent study that women in married households reported higher levels of food insecurity than men in similar households, likely representing differential information rather than reporting bias (Matheson and McIntyre 2014). Similarly, response bias has not been described within the validation studies of the food insecurity module, except for mode of administration, in which face-to-face and telephone administration yielded higher levels of food insecurity,¹² not response rates (Nord and Hopwood 2007).

Statistical Analyses

We used descriptive statistics and probit regression to investigate food insecurity status and its variation by age, sex, income source, income level, and home ownership in the pooled CCHS data set. Probit regression was used to model the probability of food insecurity by ordinal age and income source, while controlling for co-variables such as sex, income level, and home ownership. We also tested for any interaction between age and sex on food insecurity and considered whether urban and rural home owners varied in their risk of food insecurity. We conducted post hoc modelling that tested the robustness

of our findings. All statistical analyses were conducted with STATA 11.0 (Stata Corp, College Station, TX, USA). All data were reported in accordance with Research Data Centre disclosure rules, including appropriate weights and bootstrapping.

Results

Weighted summary statistics for the CCHS sample are presented in Table 1. Overall, our unweighted sample size was 8,019 individuals. As expected, for our sample of unattached low-income individuals, food insecurity was high in the sample, at 29 percent of respondents. The sample was evenly distributed across age groups other than the oldest; more than half were female (57

percent); the majority did not own their home (75 percent); and few individuals received income from wages. Table 1 shows a dramatic change in income source after age 64. Before 65 years of age, our sample of low-income individuals was mostly reliant on income assistance programs. After 65 years of age, seniors' benefits were the main source of income for 74 percent of our sample (Table 1). The prevalence of food insecurity was low in seniors over 65 years who were reliant on seniors' benefits (15–16 percent), and highest in individuals dependent on income assistance programs for all age groups (40–53 percent). When income level was examined by age, for seniors 65 years and over, there was a decrease in the proportion of individuals in the

Table 1: Socio-Demographic Summary Statistics from the Pooled Weighted Canadian Community Health Survey Data, 2007–2013

	Proportion (95% CI)				
	Age Group (years)				
Variable	55 to 59 (n = 2,257)	60 to 64 (n = 2,264)	65 to 69 (n = 2,093)	70 to 74 (n = 1,405)	Total
Sex					
Male	0.47 (0.42–0.51)	0.46 (0.42–0.49)	0.39 (0.34–0.44)	0.41 (0.35–0.46)	0.43 (0.41–0.45)
Food insecurity	0.43 (0.39–0.47)	0.35 (0.32–0.39)	0.16 (0.13–0.20)	0.16 (0.11–0.22)	0.29 (0.27–0.31)
Age group	0.30 (0.28–0.31)	0.28 (0.26–0.30)	0.26 (0.24–0.27)	0.16 (0.15–0.18)	1.00
Annual income level (C\$/year)					
< 10,000	0.33 (0.29–0.37)	0.31 (0.28–0.34)	0.08 (0.06–0.09)	0.04 (0.03–0.07)	0.21 (0.19–0.23)
10,000 to 14,999	0.42 (0.39–0.46)	0.43 (0.40–0.46)	0.40 (0.36–0.44)	0.36 (0.32–0.41)	0.41 (0.39–0.43)
15,000 to 19,999	0.25 (0.22–0.28)	0.26 (0.23–0.29)	0.53 (0.48–0.57)	0.60 (0.55–0.64)	0.38 (0.36–0.40)
Income source					
Wages	0.24 (0.21–0.29)	0.17 (0.15–0.20)	0.04 (0.02–0.05)	0.006 (0.002–0.01)	0.13 (0.12–0.15)
EI/WC/SA	0.62 (0.57–0.66)	0.65 (0.61–0.68)	0.04 (0.03–0.07)	0.005 (0.002–0.01)	0.38 (0.36–0.40)
Seniors' benefits	0.005 (0.001–0.02)	0.01 (0.005–0.03)	0.74 (0.71–0.77)	0.81 (0.78–0.84)	0.33 (0.31–0.35)
Other	0.13 (0.11–0.15)	0.17 (0.15–0.19)	0.18 (0.15–0.20)	0.18 (0.15–0.21)	0.16 (0.15–0.17)
Home ownership					
Home owners	0.22 (0.20–0.25)	0.26 (0.24–0.29)	0.26 (0.23–0.29)	0.26 (0.23–0.30)	0.25 (0.24–0.26)
Non-home owners	0.78 (0.75–0.80)	0.74 (0.71–0.76)	0.74 (0.71–0.77)	0.74 (0.70–0.77)	0.75 (0.74–0.76)
Food insecurity by income source					
Wages	0.20 (0.15–0.27)	0.22 (0.16–0.30)	0.07 (0.02–0.26)	n/a ^a	0.20 (0.16–0.24)
EI/WC/SA	0.53 (0.49–0.58)	0.41 (0.37–0.45)	0.43 (0.25–0.63)	0.40 (0.04–0.91)	0.47 (0.44–0.50)
Seniors' benefits	0.07 (0.01–0.37)	0.23 (0.06–0.60)	0.16 (0.13–0.19)	0.15 (0.11–0.21)	0.16 (0.13–0.19)
Other	0.28 (0.21–0.37)	0.23 (0.18–0.31)	0.16 (0.11–0.23)	0.15 (0.09–0.24)	0.21 (0.18–0.25)
Food insecurity by income level (C\$/year)					
< 10,000	0.52 (0.43–0.60)	0.49 (0.43–0.54)	0.32 (0.21–0.46)	0.09 (0.04–0.21)	0.47 (0.43–0.52)
10,000 to 14,999	0.44 (0.39–0.49)	0.32 (0.28–0.37)	0.17 (0.14–0.21)	0.14 (0.10–0.20)	0.30 (0.27–0.32)
15,000 to 19,999	0.24 (0.19–0.31)	0.22 (0.17–0.30)	0.14 (0.11–0.18)	0.16 (0.11–0.23)	0.18 (0.16–0.21)

Notes: Total weighted sample $N \approx 310,000$. Wages include income from market labour and from self-employment. Income assistance includes Employment Insurance (EI), Workers' Compensation (WC), and social assistance (SA); the latter includes provincial or municipal social assistance. Seniors' benefits include income from Old Age Security, the Guaranteed Income Supplement, and the Canada Pension Plan/Quebec Pension Plan. Other income includes dividends and interest, job-related retirement pensions, superannuation and annuities, RRSP/RRIF (Registered Retirement Savings Plan/Registered Retirement Income Fund), child tax benefits, child support, alimony, and other (e.g., rental income, scholarships).

^a Sample size insufficient for analysis.

Source: Authors' calculations from Canadian Community Health Survey, cycles 2007–2008, 2009–2010, 2011–2012, and 2013.

Table 2: Probit Regression Models for Food Insecurity, Canadian Community Health Survey Pooled Data, 2007–2013

Variable	Marginal Effect	Standard Error
Sex (reference = female)		
Male	−0.033	0.017
Income level (C\$/year) (reference = <\$10,000/year)		
10,000–14,999	−0.114*	0.023
15,000–19,999	−0.176*	0.024
Home owners (reference = non-home owner)	−0.136*	0.017
Age (years) (reference = 55 years)		
56	0.124*	0.052
57–63 were removed, all were not statistically significant		
64	−0.072	0.040
65	−0.164*	0.030
66	−0.120*	0.038
67	−0.117*	0.043
68	−0.147*	0.038
69	−0.207*	0.028
70 ^a	−0.164*	0.033
Baseline probability of food insecurity = 0.271		

Notes: Total weighted sample $N \approx 310,000$. Standard errors are bootstrapped.

^a Includes individuals between 70 and 74 years of age; individuals were collapsed into one age category owing to small sample sizes.

* $p < 0.05$.

Source: Authors' calculations from the Canadian Community Health Survey, cycles 2007–2008, 2009–2010, 2011–2012, and 2013.

lowest income bracket (<\$10,000/year) and a concurrent increase in the proportion of individuals in the highest income bracket (\$15,000 to \$19,999/year).

Examining the prevalence of food insecurity by income level and age also showed a gradient in the lower age groups, where the highest income level (\$15,000 to \$19,999/year) corresponded to a lower prevalence of food insecurity than for the lower income levels. This gradient was still evident at age 65 to 69 and disappeared for those 70 or older. Yet, for the lowest income group, seniors over 65 had a lower prevalence of food insecurity compared with younger age groups. When the descriptive statistics were considered together, a lower prevalence of food insecurity was observed in our sample of low-income Canadians reliant on seniors' benefits.

To examine whether the decrease in food insecurity prevalence observed in low-income seniors at 65 years was due to an artifact of the age groups or to the covariates, we performed regressions that examined the probability of food insecurity by ordinal age, while controlling for sex, income level, and home ownership. The results in Table 2 show that the probability of food insecurity in seniors at age 65 years decreased 0.164 from the baseline probability of food insecurity and continued to be lower than the baseline for all ages higher than 65. This large drop in food insecurity risk is coincident with the shift in income source to seniors' benefits. Figure 1 also demonstrates this relationship as it shows

the fitted probability of food insecurity across age. The consistently higher probabilities of food insecurity in individuals younger than 65 contrasts with the markedly lower probabilities in all individuals beyond 65 years. Interactions between age and sex were not statistically significant in probit regressions, suggesting that the relationship between food insecurity and age did not differ between males and females for unattached low-income individuals over age 54.

We attempted several different specifications of our models of interest, and our results are robust to all of them. Table 2 presents the estimate of the influence of age on food insecurity prevalence with age dummy variables. We used a regression-discontinuity-type model with continuous age, a dummy for GAI eligibility, and the control variables. That model indicated a result similar to the one reported in Table 2 (data not shown); eligibility for the GAI is associated with a notably lower prevalence of food insecurity. Using age dummies allowed us to show the discontinuity more clearly than with fitted lines across age, so we elected that approach. Similarly, the main results in Table 2 are robust to the addition of cycle dummies for each CCHS cycle (which approximate cohort controls) and dummies for province of residence. The cycle dummies are statistically insignificant, the province dummies are jointly statistically significant, but both sets of dummies are orthogonal to the GAI eligibility–food insecurity relationship (data not shown). We therefore used the model presented in Table 2.

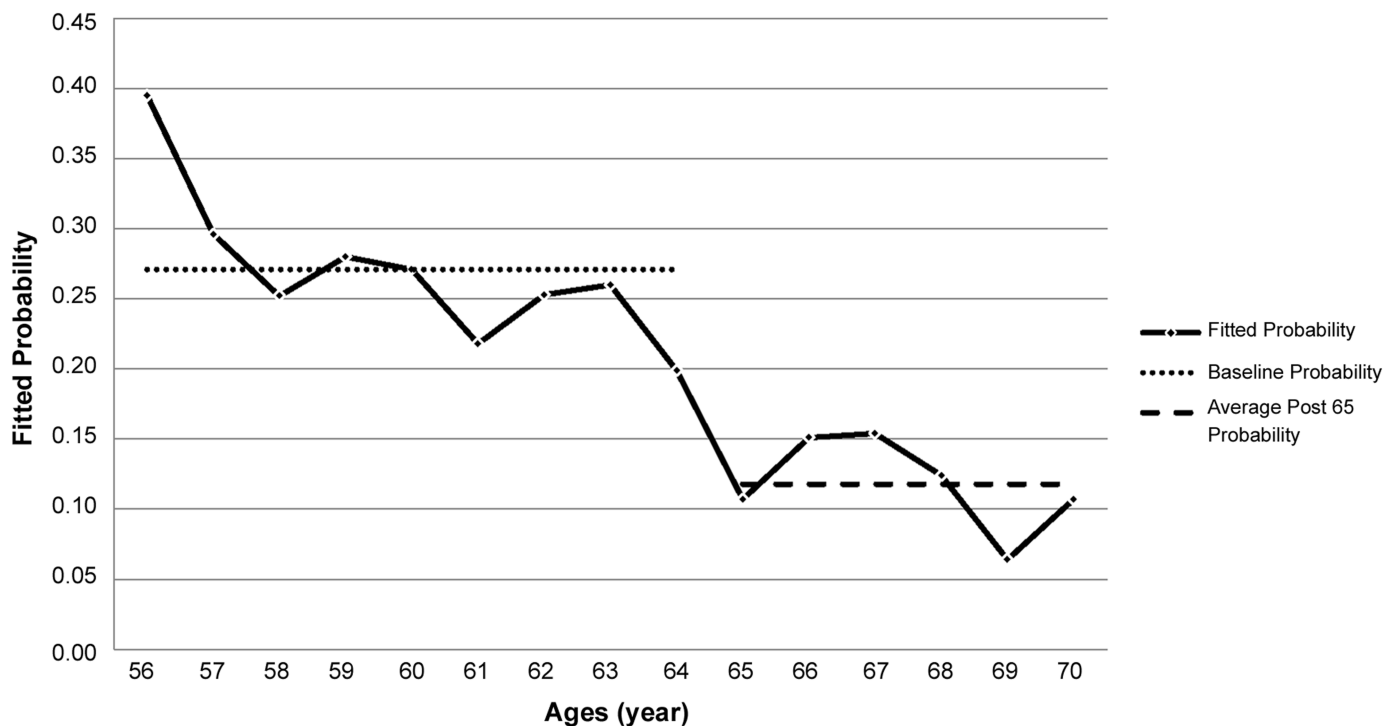


Figure 1: Fitted Probability of Food Insecurity by Age from Probit Regression, Canadian Community Health Survey Pooled Data, 2007–2013

Source: Authors' calculations from the Canadian Community Health Survey, cycles 2007–2008, 2009–2010, 2011–2012, and 2013.

We considered education as a potential confounder in the relationship between low-income status and food insecurity. Multiple models considering the potential confounding effect of education in this low-income sample showed that education has virtually no impact. Highest level of education completed was measured in our sample as one of four levels: some high school, completed high school, some post-secondary, or completed post-secondary. The education variables themselves were statistically insignificant in our sample, and their inclusion did not affect the coefficients of interest on the age dummy variables. This is true whether we modelled educational attainment as binary (e.g., completed high school or not, completed some post-secondary or not) or included dummies for each level of education (data not shown).

To understand whether income source impacts the probability of food insecurity in seniors over 65, probit regression was performed (Table 3). Due to the high degree of collinearity between income source and age, it was not possible to include both age and income-source controls in the models. The results show that what is driving the change in food insecurity prevalence in seniors older than 65 is the shift away from Employment Insurance, Workers' Compensation, and social assistance as income sources for this group compared

with those under 65. After controlling for sex, income level, and home ownership, respondents receiving seniors' benefits had statistically similar probabilities of being food insecure compared to those relying on employment earnings (Table 3, model 1). In contrast, seniors 65 years and older reliant on income from Employment Insurance, Workers' Compensation, or social assistance had a statistically significantly higher probability of food insecurity compared with those receiving wages and other sources of income (Table 3, model 2).

Table 3 shows that the source of income and associated stability is important even when controlling for income level, and one of our checks for robustness was to interact those two variables. The resultant model adds some nuance to the relationship between income source and food insecurity, but the overall relationship remains the same and the interaction terms do not add to the understanding of income source's effect from Table 3 as presented here.

A concern that arises when considering the relationship between food insecurity and seniors' benefits is that income may not reflect the full resources available to a household for consumption. For example, upon retirement from paid employment individuals' employment income may fall abruptly, but their wealth (accumulated savings, stock of assets) may not. These

	Model 1 (Wages) ^a		Model 2 (Other Income) ^a	
Variable	Marginal Effect	Standard Error	Marginal Effect	Standard Error
Sex (reference = female)				
Male	−0.040 *	0.016	−0.040 *	0.016
Income level (C\$/year) (reference = <\$10,000/year)				
10,000 to 14,999	−0.104 *	0.022	−0.104 *	0.022
15,000 to 19,999	−0.141 *	0.025	−0.141 *	0.025
Home owners (reference = non-home owners)	−0.113 *	0.017	−0.113 *	0.017
Income source				
Wages			−0.021	0.032
EI/WC/SA	0.227 *	0.034	0.205 *	0.026
Seniors' benefits	−0.037	0.033	−0.058 *	0.025
Other	0.021	0.034		

Notes: Total weighted sample $N \approx 310,000$. Standard errors are bootstrapped. Wages include income from market labour and from self-employment. Income assistance includes Employment Insurance (EI), Workers' Compensation (WC), and social assistance (SA); the latter includes provincial or municipal social assistance. Seniors' benefits include income from Old Age Security, the Guaranteed Income Supplement, and the Canada Pension Plan/Quebec Pension Plan. Other income includes dividends and interest, job-related retirement pensions, super-annuation and annuities, RRSP/RRIF (Registered Retirement Savings Plan/Registered Retirement Income Fund), child tax benefits, child support, alimony, and other (e.g., rental income, scholarships).

* $p < 0.05$.

individuals would be at a low risk of food insecurity owing to access to credit attributable to wealth, but would appear in the low-income group in our data set upon retirement at age 65. Similarly, home owners without a mortgage will have lower living costs to cover with their income than a household that must pay rent out of its income each month. Therefore, our results might be driven by wealthy (asset-holding) people retiring at age 65.

of food insecurity among home owners was lower than among non-home owners for all ages (Figure 2). The fitted probability of food insecurity was lower for seniors over 65, regardless of their housing status, although the decline by age was greater for non-home owners. We also considered home ownership according to community size (rural versus urban); as the income from seniors' benefits falls below the established LICO for urban environments (Bazel and Mintz 2014), low-income seniors living in an urban environment may be at higher risk of food insecurity. Results by age did not change when we examined the probability of food insecurity according to an urban-rural dichotomy (data not shown).

Using a cross-sectional approach, we examined food insecurity in different age cohorts of seniors and near seniors as a means to investigate the effectiveness of a GAI to reduce poverty among unattached low-income older adults in Canada. While our results agree with the bottom-line findings in previous work (Emery, Fleisch, and McIntyre 2013a, 2013b), this study is novel because of our use of pooled microdata from multiple CCHS cycles, which not only significantly increased sample

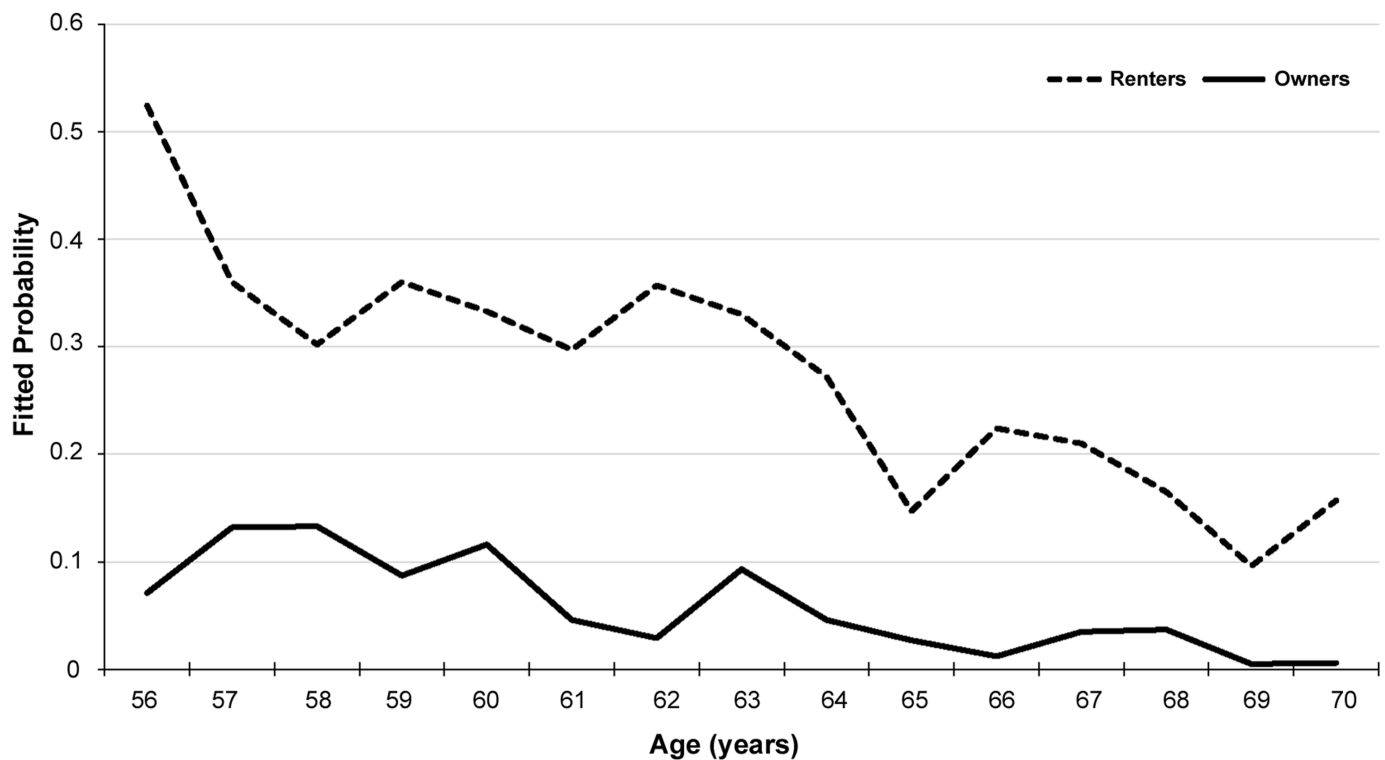


Figure 2: Fitted Probability of Food Insecurity by Age for Home Owners and Renters. Data Probit Regression Marginal Effects, Canadian Community Health Survey Pooled Data, 2007–2013

Source: Authors' calculations from the Canadian Community Health Survey, cycles 2007–2008, 2009–2010, 2011–2012, and 2013.

size but permitted detailed analyses and the consideration of additional variables such as the inclusion of ordinal age and fine income-source categories, the exclusion of widows and widowers from other unattached individuals, inclusion of home owner status, and rurality, all analyzed using probit regressions. For example, unlike other published studies using public-use CCHS data, we can determine that the lower probability of food insecurity observed in seniors over 65 years of age is not a by-product of the grouping of CCHS responses into the broad age categories available in the public-use data.

Our study provides unique information relevant to current public policy debates on GAI because our sample mimics the structure of a hypothetical GAI program, as eligibility for OAS/GIS is similar to that for a GAI. While our results are specific to unattached, unwidowed older adults with an annual income lower than \$20,000, this sample of individuals was selected because they represent a demographic group, namely, single retirees living alone, that are highly vulnerable to poverty (Bazel and Mintz 2014) and that would benefit a great deal from a GAI. Our use of a consumption-based indicator of poverty, food insecurity, is considered a more accurate measure of poverty compared with income-related measures, which tend to suffer from reporting bias

(Brzozowski and Crossley 2011; Meyer and Sullivan 2003). Food insecurity itself is an important poverty indicator because of its association with poor self-reported health, chronic illness, and mental health problems (McLeod and Veall 2006; Muldoon et al. 2013; Tarasuk, Mitchell, McLaren, and McIntyre 2013). Food insecurity also leads to higher utilization of health services and health care costs, over and above the contribution of other poverty indicators to such outcomes (Tarasuk et al. 2015).

Whereas it has been previously reported that seniors over 65 on the whole have lower food insecurity rates than other age groups in Canada (Che and Chen 2001; Health Canada 2007; Tarasuk and Vogt 2009), our study also advances previous work because of its ability to provide adjusted estimates of the magnitude of the effect of GAI on food insecurity. Our results show that seniors' benefits, or GAI, are a highly effective poverty reduction strategy, benchmarked against food insecurity as a poverty indicator. We found that the probability of food insecurity was reduced by half in a cohort of individuals over 65 compared to a cohort age 55–64 years, even when ordinal age, sex, income level, and home ownership were taken into account. Our analysis was able to clarify that a decrease in the probability of food

insecurity is visible in a sample of individuals who are 65 years of age, and that this finding is not an artifact of sampling seniors 65–69 years of age who had changed their income level after the usual age of retirement but may not necessarily have changed their level of wealth.

When we examine our results in conjunction with Loopstra, Dachner, and Tarasuk's (2015) study of food insecurity reduction observed during implementation of a multi-pronged poverty reduction initiative in Newfoundland and Labrador between 2007 and 2012, we suggest that the level of increase of monetary assistance needed to reduce food insecurity in public safety net programming has been demonstrated in real-life social policy to be both feasible and highly effective. For example, in Newfoundland and Labrador, among households reliant on social assistance, the prevalence of food insecurity fell 44 percent (from 59.9 percent in 2007 to 33.5 percent in 2012), largely attributable to social assistance rate increases to this subpopulation of food-insecure households.

Further, both this study and that of Loopstra et al. (2015) show that income transfers have a direct impact, separate from that of other poverty reduction strategies, such as employment supports or subsidies for expenditures on such necessities as medication or housing. We demonstrate that the monetary amount provided in seniors' benefits/GAI is a necessary benchmark for food insecurity reduction in contrast to the levels provided by current income assistance and other safety net programs. For example, low-income seniors reliant on "other" sources of income and income assistance programs (Employment Insurance, Workers' Compensation, social assistance) exhibit significantly higher probabilities of food insecurity compared with individuals receiving seniors' benefits/GAI.

Another important finding is that seniors' benefits/GAI were able to reduce the probability of food insecurity in low-income seniors in the lowest income bracket (<\$10,000/year), individuals who are likely living at a level of deprivation considered to be unacceptable by most Canadians. The Newfoundland and Labrador paper discussed above also found that for those living in the lowest income quintile, income shifting to the next highest level was related to significant drops in food insecurity, particularly severe food insecurity (Loopstra et al. 2015). In quantitative terms, our study shows that the current seniors' benefit/GAI amount is sufficient to alleviate deep poverty and lift individuals out of the undignified condition of food insecurity even though it is below the LICO level (80 percent of the after-tax LICO in 2013; Statistics Canada 2014b)¹³ used as a nominal poverty line in Canada. Specifically, seniors' benefits (\$15,949.68 per year) as a hypothetical GAI fall below the recent LICO for a single-person household in

an urban setting (e.g., the LICO was \$19,744 in 2013; Statistics Canada 2014b).

Limitations

There are several limitations to this study. The cross-sectional nature of CCHS survey data limits the ability to trace whether changes in food insecurity occurred in a cohort of seniors as they aged. Our sample included individuals between 55 and 74 years who are at elevated risk for poor health and mortality because of associated poverty, creating a potential bias of differential attrition between cohorts. A separate cohort analysis generating pseudo-panels, however, showed no cohort effect for individuals age 65 in 2007 compared with those in 2013 (data not shown).

We followed the Health Canada food insecurity cut-offs and did not consider individuals who were marginally food insecure despite its correlation with various negative health outcomes (Seligman et al. 2007; Tarasuk et al. 2015). However, the inclusion of marginally food-insecure individuals in our study within the food-secure population would create a bias toward the null.

We were limited to a single merged income assistance category constituted by Employment Insurance, Workers' Compensation, and social assistance payments. These sources provide different levels of income but, more importantly, different income volatility and sourcing experiences related to the application of strict eligibility criteria (devised to deter fraud) and the need for continual proof of eligibility.

Another potential bias in our study is that the report of income level often suffers from a high level of non-response and reporting bias (Meyer and Sullivan 2003). It is possible that seniors sampled in our study incorrectly reported income. However, we did show that income source was important even when controlling for income level. It may be possible to address this concern in future CCHS data sets as they will be linked to the respondents' income tax files, which will provide an accurate estimate of income.

As we measured only proxy wealth using home ownership, it is possible that some of the non-home owners in our study are actually wealthier than was measured. However, we did include some forms of monetary wealth in the "other income" category (i.e., RRSP/RRIF, savings, rental income, alimony, and child support), which would help to identify asset-holding individuals in our study. Even with this bias and our modest estimate of wealth, as measured by home ownership, the cohort demonstrated a lower probability of food insecurity after 65 years of age. As such, we do not expect this bias to have a profound effect on the relationship between GAI and food insecurity.

Policy Implications

Under the former Conservative government, the age of eligibility for the maximum OAS and GIS benefit was set to change incrementally from 65 to 67 years starting in April 2023, with the change in full effect by January 2029 (Service Canada 2016b). Not surprisingly, this change was widely criticized by opposition parties (Kennedy 2012) and after the 2015 federal election, the new government announced that the age of eligibility for OAS and GIS would remain at age 65 (Government of Canada 2016, 175). Given that the findings of this study demonstrate high levels of food insecurity among low-income near seniors and the association of a GAI with lower food insecurity in low-income seniors, we recommend that consideration be given to lowering the age of eligibility for OAS and GIS progressively from 65 to 60 years. Such consideration would include a costing, which is beyond the scope of this study. However, if the change were gradual, monitoring and surveillance of food insecurity rates throughout this process would indicate whether the association of GAI with lower food insecurity is causal and would provide ongoing verification of any cost assumptions.

Beyond a suggestion for the reversal of planned changes to OAS and GIS, however, lies the question of whether an age-based demogrant makes sense in an era of changing socio-demographics, increased longevity, and occupational diversity among older adults. Grignon and Spencer (2015) argue that a fixed age marker for “old age” is poor social policy. Presenting data on longevity, health, and the ability to live in the community, they suggest that poverty reduction policies might strive to become age-neutral and thus accommodate individual circumstances. They further propose that introducing a GAI could provide a basis for testing policies that could be expected to produce better social outcomes (Grignon and Spencer 2015). Our finding of high levels of food insecurity among unattached low-income near seniors provides a pilot age group from whom a stratum might be selected to test the feasibility of an expanded GAI program. Such an amendment to the existing seniors’ benefits program would not be difficult to implement given that a federal program is already in place.

The findings of our study also suggest that food insecurity may be an appropriate indicator of success in poverty reduction efforts, be they related to a GAI or based on more expansive programming efforts, such as those implemented for a time in Newfoundland and Labrador (Loopstra et al. 2015). In a study of how Canadian legislators problematize food insecurity, based on Hansard extracts for almost a 20-year period, McIntyre and colleagues (2016) found that legislators understand that food insecurity is a problem of insufficient income.

However, many legislators fail to appreciate that food insecurity rates are relatively low among seniors and hence may undervalue the potential of transfers at the level of current public pensions to reduce food insecurity. Empirical studies, such as this one, have shown that seniors have been relatively protected from food insecurity, and consistently so since food insecurity monitoring became regularized in Canada (Ledrou and Gervais 2005; Tarasuk, Mitchell, and Dachner 2013). Given that lower rates of food insecurity among seniors are at least partly attributable to seniors’ pensions, legislators’ disassociation of seniors’ pensions (a form of GAI) and low food insecurity has created a missed opportunity to advance GAI as a potential policy solution to reduce food insecurity. Cross-sectional studies like this, while still lacking the ability to demonstrate a causal association, may be part of the evidence needed to support a direct relationship between seniors’ pensions/GAI and poverty reduction as indicated by lower food insecurity rates.

Conclusion

We observed a significant reduction in food insecurity among unattached low-income seniors between 55 to 74 years of age from the CCHS data sets (2007–2013) as the older cohort became age-eligible for seniors’ benefits such as OAS and GIS at 65 years. This relationship persisted among low-income seniors regardless of sex, income level, and home ownership. Using our findings as an analogy for a study on the effects of a GAI on poverty, we show that GAI is an effective poverty reduction strategy, particularly for low-income individuals who experience food insecurity.

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Notes

- 1 Canada does not have an official poverty line. The LICO is the oldest and most widely used metric to examine economic vulnerability (Raphael 2011). LICOs calculated by Statistics Canada represent an income threshold at which a family will spend 20 percentage points more of its annual income on food, shelter, and clothing than the average family. One limitation with the LICO is that it is based on household consumption patterns from the 1992 Family Expenditure Survey, yet LICOs are adjusted every year for inflation using the Consumer Price Index. Community and family size is further considered in the calculation in which before- and after-tax LICOs are published yearly (Statistics Canada 2015). Other low-income measures used in Canada are the Low Income Measure and the Market-Basket Measure. All three measures capture the proportion of low-income families from different perspectives but vary in

- "sensitivity and inclusion" (Bazel and Mintz 2014, 2; Zhang 2010). While there is debate over which low-income measurement is the most appropriate measure of income inadequacy (see MacKinnon 2013; Zhang 2010), we use the LICO metric as it can be easily compared to the Canadian Community Health Survey data set examined in our study.
- 2 The terms *basic income* and *guaranteed annual income* are sometimes used interchangeably, yet differences exist between these two models (Hum and Simpson 2005; Lammam and MacIntyre 2015; Simpson 2015; Van Parijs 2004; Young and Mulvale 2009). Basic Income provides every citizen with the same monetary allowance, regardless of family arrangement and other sources of income they receive. In contrast, GAI, as provided through a negative income tax, is offered to a household, and the allowance provided varies depending on a household's external income.
 - 3 The working model for the universal OAS program in Canada was introduced in 1952 under the *Old Age Security Act*. The CPP/QPP in 1966, and the GIS followed in 1966. Pension plans did exist before 1952, but they were means tested and not all seniors were eligible for these benefits. Widespread criticism of the previous pensions led to reform and development of the OAS program, which was intended to tackle the high rates of senior poverty in the early twentieth century (Osberg 2001). OAS eligibility was initially set at 70 years, yet the age of eligibility was incrementally lowered to 65 years beginning in 1965; eligibility at age 65 was in full effect by 1970 (Bryden 1974).
 - 4 Non-citizens and non-resident Canadians may be eligible for OAS, GIS, and CPP/QPP depending on the number of years they have lived in Canada and whether they were previously employed in a country that has a social security agreement with Canada (Service Canada 2016a).
 - 5 Seniors between 60 and 64 years of age are eligible to receive partial OAS payments. In this scenario, the amount received is calculated based on the number of years they have resided in Canada after 18 years of age. For every full year spent in Canada, seniors receive 1/40th of the full pension (Service Canada 2016a). Mandatory retirement at 65 years was abolished in 2012, and seniors currently have the option of receiving a larger pension at 70 years of age (Service Canada 2016a).
 - 6 In 2015 seniors 65 years and above with an annual income between \$72,809 and \$117,954 had part of their OAS payments "clawed back." Seniors with an annual income greater than \$117,954 are not eligible for OAS payments (Service Canada 2016a).
 - 7 All funds in this study are reported in Canadian dollars.
 - 8 The CPP contribution rate in all provinces and territories except Quebec is set at 9.9 percent of the pensionable earnings. In Quebec the QPP rate is set at 10.5 percent. The CPP/QPP contribution is equally split between employers and employees, yet self-employed citizens/residents are responsible for contributing the full amount (Régie des Rentes Québec 2015; Service Canada 2016b).
 - 9 Widows and widowers may have different income circumstances from other categories of unattached individuals. LaRoche-Côté, Myles, and Picot (2012) found that in the lowest income group, separation/divorce has a larger negative impact on income replacement rates than being widowed. While our sample is not directly comparable to that study because LaRoche-Côté, Myles, and Picot removed individuals with less than \$10,000 annual income, it supports the case that widows might have access to more resources in the face of relationship termination compared with the other groups in our study. We also conducted our analysis on a sample that included widows and widowers and found that our results remained robust to their inclusion in the sample.
 - 10 The HFSSM also evaluates food insecurity in children using a separate scale that consists of eight questions. For additional details on the adult and child food security scales and questionnaires see Health Canada (2007).
 - 11 The food security module is optional in most CCHS cycles, and when it is optional, it is surveyed in a province only if health region officials consider it a health priority (Statistics Canada 2013a). Food security was surveyed for all provinces in CCHS cycles 2007–2008 and 2011–2012, when it was mandatory. For CCHS cycle 2009–2010, food insecurity was not surveyed in New Brunswick and Prince Edward Island (Statistics Canada 2011). Similarly, in CCHS cycle 2013, food security was not measured in Newfoundland and Labrador, Manitoba, British Columbia, and the Yukon Territories (Statistics Canada 2014a).
 - 12 The preferred mechanism of administration of the metric used to measure household food insecurity is face-to-face because it yields higher rates; the relative under-reporting in national survey data has been explored by Emery et al. (2012).
 - 13 This is based on the seniors' benefit/GAI proposed in this study, approximately \$16,000/\$20,000 for a single individual in an urban environment.

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