



# THE SCHOOL OF PUBLIC POLICY

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## MASTER OF PUBLIC POLICY CAPSTONE PROJECT

A GUARANTEED ANNUAL INCOME BENEFITS THE HEALTH OF CANADIANS WITH CHRONIC ILLNESS

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## **Capstone Executive Summary**

### A GUARANTEED ANNUAL INCOME BENEFITS THE HEALTH OF CANADIANS WITH CHRONIC ILLNESS

Chronic illness is currently the number one cause of death in Canada and the largest cost to our increasingly unsustainable healthcare system. Unfortunately, the massive fiscal and social cost of chronic illness is only expected to get worse as the Canadian population ages. Economists, researchers and politicians across Canada have suggested that novel approaches to health and wellness are required to reduce the rate of chronic illness in Canadian populations. One of these novel approaches is alleviating poverty through a guaranteed Annual Income (GAI).

For over forty years, the concept of a guaranteed annual income has been part of welfare discussions in Canada. Canadian research has suggested that a guaranteed income can reduce the cost of healthcare by addressing income security and poverty as upstream determinant of health. By manipulating extracted data from the Canadian Community Health Survey, this study also provides evidence that a guaranteed income is an effective healthcare innovation that warrants further research. This study concludes that a GAI policy is worth investigating as it can help alleviate poverty and the burden of chronic illness in Canada.

# A GUARANTEED ANNUAL INCOME BENEFITS THE HEALTH OF CANADIANS WITH CHRONIC ILLNESS

## Introduction

### The Burden of Chronic Illness in Canada

Chronic diseases are the leading cause of death in Canada. In fact, only four types of chronic diseases — cardiovascular disease, cancer, chronic obstructive pulmonary disease, and diabetes — account for more than 75% of death in the country.<sup>1</sup> Less lethal chronic conditions, like arthritis and rheumatism, also affect a huge number of Canadians (and a majority of Canadians over 75 years of age).<sup>2</sup>

As one can see from these numbers, the social and economic burden of chronic illness is one of the largest problems facing Canadian Healthcare. Unfortunately, most experts believe that the problem will only get worse as the Canadian population ages (see APPENDIX A). Interestingly, increasing rates of chronic illness are not solely linked to old age; the public health agency of Canada notes that chronic disease rates are increasing in all age groups, and fastest among Canadians aged 35-64.<sup>3</sup>

Many experts warn that the increasing rate of chronic illness is unsustainable. Canada is already one of the highest healthcare spenders per capita, and healthcare spending is consuming larger proportion of provincial budgets.<sup>4</sup> As the proportion of patients with chronic illnesses grows, scarce health resources will be harder to finance and

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<sup>1</sup>Michael Mirolla. "The Cost of Chronic Disease in Canada." *The Chronic Disease Prevention Alliance of Canada*. January 2004. <http://www.gpiatlantic.org/pdf/health/chroniccanada.pdf>

<sup>2</sup> Data extracted from the Canadian Community Health Survey (CCHS) 2014 suggests that 43% of Canadians over 65 and 50% of Canadians over the age of 75 have arthritis. CCHS data was extracted from the University of Calgary's Landru data retrieval system. See Appendix A for data regarding rates of chronic illness in Canada by age group.

<sup>3</sup> Kimberly Elmslie. "Against the Growing Burden of Disease." *Public Health Agency of Canada*. <http://www.ccgh-csih.ca/assets/Elmslie.pdf>

<sup>4</sup> Statistics Extracted from OECD Health Expenditure and Financing data. Canada is third highest after the United States and France (and tied with Germany) for health expenditure as a percentage of GDP, 2015. <http://stats.oecd.org/Index.aspx?DataSetCode=SHA>

justify. Work absenteeism, productivity loss and the resulting economic cost of chronic illness will only add to the already large fiscal burden. In economic terms, this means that chronic diseases account for the majority of direct healthcare costs — about 67% of total costs in 2006.<sup>5</sup> This does not include estimated productivity losses at an additional \$52 billion.<sup>6</sup>

The fiscal burden of that enormous cost is easily characterized by drug spending in Canada. Drug spending, the majority of which is for chronic illness, was the fastest growing category of health spending from 2000 to 2005, according to the Canadian Institute for Health Information (CIHI)<sup>7</sup>. Although the rate of drug spending is diminishing, it remains is one of the largest drivers for increased spending. It should come as no surprise, then, that the drugs that account for the largest percentage of total program spending in Canada are all related to chronic illnesses (See APPENDIX B). Among the top ten costing drugs in Canada are: tumor necrosis factor alpha inhibitors (treatment for rheumatism and arthritis), statins (cholesterol), proton-pump inhibitors (high blood pressure), ACE inhibitors/angiotensin II antagonists (high blood pressure), antineovascularization agents (cardiovascular diseases) and insulin (diabetes).<sup>8</sup> Drug spending as an example clearly showcases that increasing healthcare costs are closely linked with chronic illness in Canada.

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<sup>5</sup> Nurse One Canada. "Chronic Disease." Numbers from Public Health Agency of Canada. <https://www.nurseone.ca/en/knowledge-features/chronic-disease>

<sup>6</sup> Ibid.

<sup>7</sup> "Prescribed Drug Spending in Canada, 2012; A focus on Public Drug Programs." *Canadian Institute for Health Information*. Page vii. [https://secure.cihi.ca/free\\_products/Prescribed\\_Drug\\_Spending\\_in\\_Canada\\_EN.pdf](https://secure.cihi.ca/free_products/Prescribed_Drug_Spending_in_Canada_EN.pdf)

<sup>8</sup> "Prescribed Drug Spending in Canada, 2013: A Focus on Public Drug Programs — Top 100 Drug Classes, Data Tables." Information extracted from CIHI data tables.

Given the massive cost of drug spending and other health expenses, many would argue that the current focus on the medical aspects of healthcare, like drugs spending and acute care, is unsustainable. As such, to reduce the increasing burden associated with chronic illness Canada must consider novel solutions to the problem. One often discussed method to decreasing the cost is by tackling the social determinants of chronic illness, the chief determinant being poverty.

### Poverty and Chronic Illness

Researchers have long associated poverty and illness.<sup>9</sup> A multinomial logistic analysis of the Canadian Community Health Survey 2014 (CCHS) data clearly shows similar results. Take, for instance, Canadians in the four lowest income decile groups. These Canadians experience significantly greater rates of arthritis compared to Canadians in the highest decile group. This is not true for Canadians in who are in higher income decile groups (5<sup>th</sup> decile and above). Asthma also occurs significantly more in the 1<sup>st</sup>-9<sup>th</sup> income decile groups when each group is individually compared to Canadians in the 10<sup>th</sup> income decile group.<sup>10</sup>

In fact, this trend is true for all chronic illness analyzed in the CCHS 2014. According to our analysis, the following diseases all occur to a significantly greater degree in the lower income deciles when compared to the highest income decile: arthritis, fibromyalgia, cancer, diabetes, chronic obstructive pulmonary disease, asthma, chronic cardiovascular diseases, chronic high blood pressure, chronic migraines, chronic back problems, and

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<sup>9</sup> Michael Bury. "The sociology of chronic illness: a review of research and prospects." *Sociology of Health and Illness*, 1991. <http://onlinelibrary.wiley.com/doi/10.1111/j.1467-9566.1991.tb00522.x/epdf>

<sup>10</sup> CCHS 2014 data from LANDRU.



chronic fatigue syndrome.<sup>11</sup> That said, chronic bowel diseases and digestive disorders did not occur significantly more often in lower income deciles (see APPENDIX C for specific data).<sup>12</sup>

Interestingly, according to the US Centre for Disease Control, even though chronic diseases are the most common type of illness, they are also the most preventable.<sup>13</sup> As such, it is possible to diminish the ever increasing rate of chronic illness, although doing so necessitates innovative thinking in healthcare and poverty alleviation. One method to reduce poverty and improve health outcomes is a guaranteed annual income.

#### What is Guaranteed Annual Income?

An often discussed approach to support the income of the poorest Canadians is the Guaranteed Annual Income (GAI). This welfare scheme would provide all Canadians a set income floor without any restrictions. Since the public health agency of Canada contends that the main underlying factors for chronic illness are social determinants of health and aging, a GAI would be a method to limit poverty while providing income security for people with chronic illness.<sup>14</sup>

A GAI in Canada would be administered through a negative income tax; as an individual makes income from working, they would receive decreasing GAI payments until they meet a certain income threshold. In this way, a GAI provides welfare while remaining

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<sup>11</sup> CCHS 2014 data using SPSS to compare the dependent variable of having a certain illness against individuals in varying income deciles. See Appendix B for data.

<sup>12</sup> Ibid.

<sup>13</sup> James S. Marks, Virginia S. Bales Harris. "Indicators for Chronic Disease Surveillance." *National Centre for Chronic Disease Prevention and Health Promotion*. <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5311a1.htm>

<sup>14</sup> What determines health? *Public Health Agency of Canada*. <http://www.phac-aspc.gc.ca/ph-sp/determinants/index-eng.php>

a safety net for all citizens. Sociologists often contend that income and income security is an upstream determinant of health<sup>15</sup>; thus, securing the income of low-income, chronically ill Canadians with a GAI may be an efficient method to decrease poverty and to improve health among chronically ill populations.

## **Literature Review**

### Guaranteed Income in Canada

According to an economist from the University of Manitoba, Dr. Evelyn Forget, the idea of a guaranteed income has long been discussed in Canada. In the early 1970's the Croll Committee Report, the Castonguay-Nepveu Commission, and a Canadian Social Security Review all advocated potential negative income tax schemes as a poverty reduction mechanism in Canada. Taking these recommendations into account, the Government of Canada and the Government of Manitoba piloted a five year income experiment in 1974; they created a guaranteed annual income "saturation site" to test the aggregate regional impact of a GAI. The experiment was dubbed MINCOME.<sup>16</sup>

MINCOME support was open to everyone in the saturation town of Dauphin Manitoba, and to randomly selected families in Winnipeg. If a family had no income, they would receive 60% of Statistics Canada low-income cutoff. MINCOME benefits were then reduced by fifty cents for every dollar earned from employment. Unlike prior GAI trials in the United States, the Manitoban study examined the comprehensive regional impact caused

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<sup>15</sup> Madonna Meyer, Debra Street and Jill Quadagno. "The impact of family status on income security and health care in old age: a comparison of western nations." *International Journal of Sociology and Policy*.; Emma Aguila, Claudia Diaz, Mary Manqing Fu, Arie Kapteyn, Ahsley Pierson. "Living Longer in Mexico: Income Security and Health." *The Rand Corporation*.

<sup>16</sup> Evelyn L Forget, "The Town With No Poverty: The Health Effects of a Canadian Guaranteed Annual Income Field Experiment," (University of Toronto Press: *Canadian Public Policy*, 2011), 2.

by the saturation site in Dauphin. Forget recently analyzed the experiment's health outcomes. Forget concluded that the "income security" awarded by MINCOME resulted in effective preventative health results.<sup>17</sup> All in all, categorized MINCOME data suggested several positive health outcomes:

1. Rate of Hospitalization decreased in the saturation site during the MINCOME period.

Prior to MINCOME, Dauphin residents experienced higher rates of hospitalization compared to the control group. The gap between Dauphin hospitalization rates and the control group began to fall when MINCOME supplements were administered; by 1978 hospitalization rates diminished significantly (8.5% lower). After the end of MINCOME, this health difference narrowed until 1985, where the difference was no longer significant between Dauphin and the control group. This applied to both hospital injuries and mental health related hospitalizations.

2. Mental health diagnoses decreased during MINCOME period.

Rate of physician use is measure of voluntary health seeking, which did not decrease during MINCOME. Physician use for accidents and injury also did not change; however, rate of physician diagnoses for mental health decreased in comparison to the control group.

3. No evidence of increased fertility in the saturation site.

American GAI studies raised concerns about increased fertility; Forget's research does not show any evidence to corroborate this claim. Weak evidence suggests that mothers choose to have children at a later age. The mean number of children born to women that are under the age of 25 is also significantly lower compared to the control group.

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<sup>17</sup> Ibid., 9.

The program cost \$17 million dollars, yet funds were insufficient to fully fund all of the project's research pillars. As a result, social, economic and statistical research was largely cut.

Despite the novel results from her study, Forget's health research was limited. Health outcomes were not a focus of the original experiment; consequently, Forget's analysis was done 30 years after MINCOME ended. That said, her research suggests that a GAI is an effective preventive health solution in an increasingly resource scarce health environment. Of note, however, is that Forget's research is unable to identify the extent to which the examined health benefits were due to income security, rather than poverty alleviation.

### Reducing the Burden of Chronic Illness with a Guaranteed Annual Income

Evidence from the Canadian MINCOME experiment suggests that a Guaranteed Annual Income is an effective preventative health solution.<sup>18</sup> If we hold to the theory that more income will increase the quality of life for the majority of Canada's population with chronic illnesses, then offering them income security with a GAI will better their lives, and reduce costs to society. The strain on healthcare and social services potentially decreases since increased income reduces the demand for these services.

If the current age-specific rates of chronic illness do not change, costs are certain to increase. Denton and Spencer show that from 2005 to 2030, hospital use would increase more than twice as rapidly as the population.<sup>19</sup> Research conducted by the Institute of

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<sup>18</sup> Forget. "The Town with no poverty."

<sup>19</sup> Denton and Spencer. "Chronic Health Conditions: Changing prevalence in Aging Populations and Some Implications for the Delivery of Health Care Services." Page 9.

Health Economics also suggests that the cost of preventing chronic disease is extremely low per person, compared to the cost of treatment for chronic illness.<sup>20</sup> As such, it is worthwhile to examine the effects that a guaranteed annual income can have on chronic illness in Canada.

## **Methodology**

### Studying Guaranteed Income in Canada

Emery, Fleisch, and McIntyre elegantly model basic income in their report, “Federal public pensions as a model for basic income: Examining the impact on food insecurity and health of low-income seniors in Canada.”<sup>21</sup> They were able to do this by comparing poverty outcomes for Canadians below and above the age of 65 years since Canadians over the age of 65 are guaranteed senior benefits through the Old age Security (OAS) and Guaranteed Income Supplement (GIS) programs. As such, people over 65 in Canada effectively have a guaranteed income (combined value of \$17, 157 for individuals with no income in 2016).<sup>22</sup>

Our study uses the same method to compare health outcomes in the Canadian Community Health Survey (CCHS). By comparing Canadians with chronic illness in the 65-69 age group to those in the 60-64 age group, it is possible to determine the health outcomes for Canadians with and without an income floor. As such, using the same methods as Emery et al., this study will attempt to model the impact of basic income on people with chronic illness.

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<sup>20</sup> Jacobs, Klarenbach, Ohinmaa, Golmohammadi, Demeter, Schopflocher. “Chronic Diseases in Alberta: Cost of Treatment and Investment in Prevention.” Page 22.

<sup>21</sup> Emery, Fleisch, McIntyre. “How a Guaranteed Annual Income Could Put Food Banks out Of Business.” The School of Public Policy. Volume 6, issue 37. December 2013.

<http://policyschool.ucalgary.ca/sites/default/files/research/emery-foodbankfinal.pdf>

<sup>22</sup>Old age security payment amounts. *Government of Canada*. <http://www.esdc.gc.ca/en/cpp/oas/payments.page>

The forthcoming analysis in our study is somewhat novel since there isn't much literature that connects chronic illness outcomes with GAI. Likewise, due to our ability to manipulate CCHS data, this study also provides evidence to support the notion that income security (rather than poverty alleviation in itself) plays a role in positive health outcomes.

### Data Source

The data in this study is from the Canadian Community Health Survey (CCHS) 2014. Of particular interest was CCHS data regarding income, chronic illness, and age. To select specific survey criteria, this study used the University of Calgary's Local Access to Networked Data Retrieval Utility (LANDRU) system. LANDRU data was then exported and analyzed in the SPSS analytical program.

This study selected CCHS respondents who were in the lowest two deciles of household income. In addition, the sample was limited to two age groups - the 60-64 age group and the 65-69 age groups. These age groups form the basis for the study's comparison. People aged 65-69 have an income floor due to OAS and GIS while respondents in the 60-64 group do not receive that support. For the purpose of this study, the 65-69 group serves as a stand-in for a population that has a guaranteed annual income. Emery, Fleisch and McIntyre also used this method to compare income groups with and without a guaranteed income.<sup>23</sup>

Our sample was limited to the lowest two quintiles for total household income. This accounts for every household (economic family and individuals) making \$22,500 or less in

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<sup>23</sup> Emery, Fleisch, McIntyre. "How a Guaranteed Annual Income Could Put Food Banks out Of Business."

2014.<sup>24</sup> Data from the territories was removed due to potential confounding factors (northern habitat and small population sizes). In our analysis, individuals in the lowest two decile group are referred to as “low income” individuals.

After selection for low income (bottom two deciles) with chronic illness, the sample had a response rate of 1007 individuals in the 60-64 group and 1253 in the 65-69 group.

### Statistical Analyses

Bilinear Logistic Regression and Multinomial Logistic Regression tests were used to compare the 60-64 and the 65 -69 age groups. The Parsons’s Chi-square statistic was used to determine the significance of ordinal information where linearity did not matter. Linear-by-linear Chi-square testing was used to categorize the significance of ordinal responses that were linked in terms of preference (survey questions asked respondents to rate outcomes from poor to excellent). Data was analyzed using IBM SPSS 23.<sup>25</sup>

### **Findings**

For all of the results in this study, chronic illness was defined as individuals who stated they had a chronic illness, or as individuals who stated that they have: arthritis, fibromyalgia, a chronic bowel disease/digestive disease, cancer, diabetes, chronic obstructive pulmonary disease, asthma, chronic cardiovascular diseases, chronic high blood pressure, chronic migraines, chronic back problems, or chronic fatigue syndrome.

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<sup>24</sup> Statistics Canada CANSIM table 206-0031, selecting for total income for all households (including economic families and persons not in an economic family).

<http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=2060031&pattern=&csid=>

<sup>25</sup> IBM Corp. (Armonk NY).

As previously mentioned, low-income individuals were defined as Canadians whose income was in the lowest two income deciles for 2014.

### Turning 65 changes the main personal income source for low-income Canadians with Chronic Illness

Emery, Fleisch and McIntyre's demonstrated that a shift occurs in the main income source for low income Canadians when they join the 65-69 age group.<sup>26</sup> To see if this shift occurs for people with chronic illness, this study selected CCHS data for low income individuals with chronic illness (using the definitions outlined previously). For low income respondents with a chronic illness, a sizable shift occurs; nearly 90% of people in the 65-69 group with chronic illness rely on senior benefits, and less than 5% on employment insurance or worker's compensation. 52% of those with chronic illness in the 60-64 age group rely on employment insurance and worker's compensation. An ordinal regression analysis suggest that the two groups differ in their main source of personal income significantly, at a p-value=0.002. Figure 1 and table 2 detail these results.

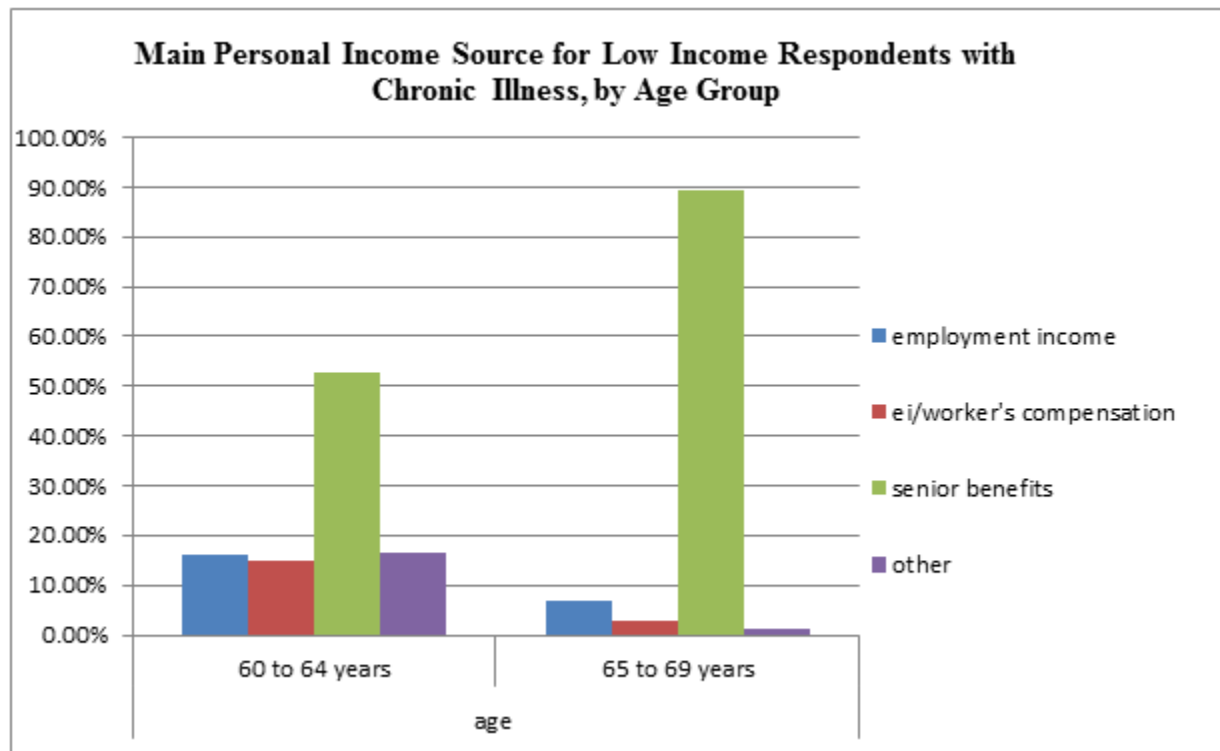
A multinomial regression of these responses suggests that, when compared to the group whose main source of income was *other*, the two age groups rely on *employment income* and *seniors benefits* to a significantly different degree. There was no statistical difference for the amount by which the two age groups relied on *workers compensation and EI*. In other words, individuals in the 60-64 age groups rely on employment income significantly more than individuals in the 65-69 age group. Likewise, individuals in the 60-64 are significantly less likely to rely on seniors benefits as their main income source.

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<sup>26</sup> Emery, Fleisch, McIntyre. "How a Guaranteed Annual Income Could Put Food Banks out Of Business."



**Figure 1: Main Personal Income Source of Low Income Respondents who have Chronic Illness, by Age Group**



**Table 2: Main Personal Income Source of Low Income Respondents with Chronic Illness, by Age Group**

		Age group	
		60 to 64 years	65 to 69 years
Main source of Total Household Income	Employment Income	16.0%	6.9%
	Employment insurance /worker's compensation	14.70%	2.7%
	Senior Benefits	52.90%	89.30%
	Other	16.4%	1.1%

### Changing the main income source at age 65 to senior's benefits results in better perceived health for people with chronic illness

Again, selecting for low income individuals who have chronic illness, we compared the 60-64 age group with the 65-69 age group that receives OAS/GIS. The results suggest that those in the 65-69 age group are significantly more likely to have better self-perceived health after their main income source changes. Table 3 outlines the percent of chronic illness in each group.

A general ordinal regression shows that the 65-69 group has a significantly self-perceived health than the 60-64 group, with a Wald statistic of 15.341, significant at a p-value <0.001.

Table 4 is the multinomial logistic estimate comparing differences between 65-69 age group to the 60-64 group for *Excellent/Very good/Good/Fair* levels of perceived health relative to *Poor* self-health ratings. The multinomial logit for the *Very Good* rating in the 65-69 age group is 0.646 units lower than the 60-64 age group, which is significant in this test. In other words, those in the 65-69 group are more significantly likely than the 60-65 group to rate their health as *very good*, relative to the *poor* rating (if the other variables are constant). It is also significantly true that the 65-69 group perceives selects *good* levels of health significantly more often than the 60-64 (relative to the group who selects the *poor* rating).

This is also true if we select for only low income, chronically ill individuals whose main source of income is senior's benefits. If we select for respondents whose main source of income is *senior benefits*, the 65-69 age group significantly selects *very good* and *good*

health ratings more often when compared to the 60-64 age group, relative to the *poor* rating. This is shown in table 5.

**Table 3: Self-Perceived Health for Low income people who have Chronic Illness**

		Age group			
		60-64 years		65-69 years	
		%	Count	%	Count
<b>Self-Perceived Health</b>	excellent	4.6%	36	5.2%	51
	very good	16.2%	126	21.4%	211
	good	34.1%	265	36.5%	359
	fair	28.2%	219	25.2%	248
	poor	16.9%	131	11.7%	115

**Table 4: Multinomial Logistic comparing self-perceived health ratings between the 65-69 and 60-64 age groups, *Poor* health being the reference category**

Self-Perceived health	B	Std. Error	Wald Statistic	Sig.	95% Confidence interval for B	
					Lower Bound	Upper Bound
Excellent	-0.479	.252	3.595	.058	.378	1.016
Very good	-0.646	.170	14.381	.000	.375	.732
Good	-0.434	.151	8.224	.004	.482	.872
Fair	-0.255	.158	2.601	.107	.569	1.056

**Table 5: Self-Perceived Health for Low income people who have Chronic Illness and whose main source of income is senior's benefits**

		Age group	
		60-64 years	65-69 years
<b>Self-Perceived Health for those whose main income is senior benefits</b>	excellent	6.5%	6.2%
	very good	18.5%	21.6%
	good	28.2%	34.7%
	fair	28.2%	23.0%
	poor	18.5%	14.6%

Changing the main income source at age 65 to senior's benefits results in better perceived mental health for people with chronic illness

A general ordinal regression shows that the 65-69 chronic illness group has a significantly different selection criteria for self-perceived mental health than the 60-64 group, with a Wald statistic of 11.556, significant at a p-value =0.001. The multinomial logistic test suggest that the 65-69 age group, when compared to the 60-64 age group, is significantly more likely to select either *excellent* or *very good* self-rated mental health relative to *poor* self-rated health. Table 5 and 6 outline these results.

**Table 5: Self-Perceived Health for Low income people who have Chronic Illness**

		Age group			
		60-64 years		65-69 years	
		%	Count	%	Count
<b>Self-Perceived Health</b>	excellent	23.9%	182	26.1%	253
	very good	25.0%	191	30.9%	299
	good	31.7%	242	30.1%	291
	fair	14.3%	109	9.8%	95
	poor	5.1%	39	3.1%	30

**Table 6: Multinomial logistic for self-perceived health between people with chronic illness in each age group, *Poor* health being the reference category**

Self-Perceived health	B	Std. Error	Wald Statistic	Sig.	95% Confidence interval for B	
					Lower Bound	Upper Bound
Excellent	-.0592	.262	5.118	.024	.331	.924
Very good	-.0711	.260	7.473	.006	.295	.818
Good	-.0447	.258	2.999	.083	.386	1.061
Fair	-.0125	.280	.198	.656	.509	1.529

Perceived life stress, Satisfaction with Life, and Barrier to Improving health responses compared between the 60-64 and the 65-69 age groups

Although the multinomial logistic test shows no significance difference between the specific choices that individuals with chronic illnesses select in each age groups, ordinal regression tests suggests that there is, in general, a difference in choices between the two groups, significant at a p value= 0.002. The choices are outlined in table 7.

An ordinal regression comparing the age groups for self-rated *Satisfaction with Life* shows that the 65-69 group significantly selects for different life-satisfaction ratings than the 60-64 age group, at a p-value = 0.017. The respondent's answers are detailed in table 8. In table 9, a binomial regression also shows that the 60-64 age group with chronic illness will state that they have a barrier to improving their health significantly more often than the 65-69 group, significant with a p-value =0.045.

**Table 7: Perceived life stress for Low income people who have Chronic Illness**

		age			
		60 to 64 years		65 to 69 years	
		%	Count	%	Count
<b>perceived life stress</b>	not at all	14.7%	114	17.7%	173
	not very	23.5%	182	26.7%	261
	a bit	38.8%	301	37.7%	368
	quite a bit	17.7%	137	13.2%	129
	extremely	5.4%	42	4.6%	45

**Table 8: Satisfaction with Life in general for Low income people who have Chronic Illness**

		age			
		60 to 64 years		65 to 69 years	
		%	Count	%	Count
<b>Satisfaction with life in general</b>	Very satisfied	24.6%	186	27.6%	262
	Satisfied	48.7%	369	51.7%	491
	Neither nor	15.3%	116	13.0%	123
	Dissatisfied	7.9%	60	4.5%	43
	Very dissatisfied	3.4%	26	3.2%	30

**Table 9: Barrier to improving health for people with chronic illness by age group**

		age (g)	
		60 to 64 years	65 to 69 years
		%	
<b>barrier to improving health</b>	yes	67.8%	55.8%
	no	32.2%	44.2%

#### Chronic Illness Rates for Low Income individuals in the 60-64 and 65-69 age groups

A 2x2 contingency analysis of individuals who self-identify with chronic illness on the CCHS suggests that the 65-69 age group has significantly lower levels of chronic illness in general; however, this comparison does not take into the all individuals with arthritis, fibromyalgia, a chronic bowel disease/digestive disease, cancer, diabetes, chronic obstructive pulmonary disease, asthma, chronic cardiovascular diseases, chronic high blood pressure, chronic migraines, chronic back problems, or chronic fatigue syndrome. This is due to the fact that our definition of chronic illness combines the above cases from the CCHS data; separating them out for a general 2x2 contingency comparison was not possible.

Table 11 compares the incidence of chronic illness in each group and takes comorbidities into account. Our analysis of this data suggests that there are number of chronic illnesses that occur less frequently in the 65-69 age group, particularly those that are not age related like high-blood pressure and arthritis.

Chronic untreated high blood pressure and arthritis occur significantly more in the 65-69 age group. Chronic cardiovascular disease, chronic back problems, chronic anxiety and chronic fatigue syndrome occur significantly less in the 65-69 age group, even with other comorbidities as covariates. CCHS data did not have a method to adjust these comparisons for the difference in each age group.

**Table 11: Chronic Illness rates between the age groups, with comorbidities as covariates**

Chronic Illness	Age Group		Wald Statistic	sig.
	60 to 64 years	65 to 69 years		
Arthritis	43.2%	46.9%	6.603	0.010
Chronic/Untreated High Blood Pressure	40.1%	44.7%	5.196	0.023
Chronic Obstructive Pulmonary Disease	14.4%	12.9%	0.461	NS
Chronic Cardiovascular Disease	2.8%	0.3%	24.23	<0.001
Asthma	11.9%	11.7%	0.001	NS
Chronic Bronchitis	1.3%	0.6%	2.58	NS
Diabetes	20.1%	20.9%	0.041	NS
Chronic Back Problems	5.4%	1.5%	27.44	<0.001
Cancer	4.5%	4.8%	0.367	NS
Digestive Disease	9.2%	8.2%	0.344	NS
Fibromyalgia	9.1%	6.5%	0.212	NS
Anxiety Disorder	14.6%	10.5%	5.075	0.024
Chronic Fatigue Syndrome	9.7%	4.3%	18.462	<0.001

Low income individuals with Chronic Illness in the 65-69 age group use certain health resources to a significantly lesser degree than the 60-64 age group

The 2x2 contingency analysis suggests that the 65-69 age group consults with social workers, dentists, orthodontists, and psychologists to a significantly lesser degree. They also have significantly lower total number of consultations with doctors, dentists/orthodontist, and social workers psychologists. This data cannot take into account age related factors; nevertheless, there is a sizable difference in certain use of



health resources between the age groups of individuals who are low income and chronically ill.

**Table 11: Use of Health Resources for people with Chronic Illness**

Health Resource	Age Group		Pearson Chi-Square or Linear-by-Linear Association Statistic	sig.
	60 to 64 years	65 to 69 years		
Has a regular medical doctor	93.6%	93.0%	0.241	NS
# of nights as patient	0 :83.7% 1 :3.7% 2 :1.7%	0 : 83.4% 1 :4.1% 2 :2.0%	0.543	NS
Consulted with family doctor in 2014	88.7%	87.6%	0.481	NS
# of doctor consultations	0 : 11.4% 1 :14.7% 2 :10.8% 3+: 63.1%	0 : 12.5% 1 :16.4% 2 :11.7% 3+: 59.4%	9.441	0.004
Consulted with an eye specialist	46.9%	49.8%	1.446	NS
Consulted with other medical doctor	44.6%	41.6%	1.589	NS
Consulter with nurse	17.7%	17.4%	0.022	NS
Consulted with dentist or orthodontist	45.2%	38.8%	7.336	0.007
# of consultations with dentist or orthodontist	0 : 54.6% 1 :19.3% 2 :14.2%	0 : 61.6% 1 :18.2% 2 :11.4%	7.314	0.007
Consulted with chiropractor	8.3%	9.7%	1.018	NS
Consulted with physiotherapist	10.5%	10.6%	0.009	NS
Consulter with psychologist	4.9%	1.8%	13.095	<0.001
# of consultations with a psychologist	0: 95.3% 1 :1.2% 2 :0.8%	0 : 98.2% 1 :0.6% 2 :0.3%	11.552	0.001
Consulted with a social worker	12.7%	5.3%	30.407	0.000
# of consultations with a social worker	0: 87.7% 1 :3.3% 2 :1.4%	0: 95.0% 1 :0.9% 2 :0.7%	11.552	0.001
Consulted with a speech/audiologist/occupational therapist	4.5%	4.8%	0.78	NS

## **Policy Implications**

### Discussion of Findings

This study shows that there are significant differences in outcomes for chronically ill, low-income Canadians in the studied age groups. In particular, although the our analysis couldn't confirm that there is a lower incidence of chronic illness in the 65-69 age group, a significantly smaller amount of people in who qualify for OAS/GIS will describe themselves as having a chronic illness compared to the 60-64 age group that does not receive OAS/GIS.

Likewise, self-reported health, self-reported mental health, and perceived life stress were significantly better in the low-income, chronically ill population that receives OAS/GIS. Most importantly, even if both population groups have the same source of income (senior's benefits) the 65-69 group that receives OAS/GIS rates their health significantly higher. This result is especially interesting because, despite having the same source of income, and despite being in the same income group, health-outcomes are significantly better in the group with an income floor. As such, this finding suggest that the income floor that the 65-69 age group receives (rather than the income itself) may have a pronounced effect on improving certain health measures for low-income and chronically ill Canadians.

In general, the findings from this study suggest at the least that public pension benefits improve health outcomes for low-income and chronically ill Canadians. It also suggests that an income floor can benefit health in addition to the benefits provided by the income received mainly from senior benefits.

### *The importance of the income floor*

The relationship between income and illness is not new. Several Canadian studies have shown that the incidence of chronic illness in the population is poverty. However, the extent to which a guaranteed income can benefit health is less understood. Forget's research on Dauphin's guaranteed income experiment suggest that the income floor offered in the dauphin saturation site significantly resulted in better health outcomes.

The analysis in table 5 adds a bit more information with regards to the health outcome for those with chronic illness. Despite having the same main source of income in the form of senior benefits, the group with the income floor in the form of OAS/GIS had better self-perceived health. Although that comparison does not account for age factors, it at least suggests that there could be health benefits to the chronically ill population if they have a guaranteed income.

Taking into account all health comparisons between the two age groups, our analysis suggests that an income floor is better for the health of chronically ill patients. Both groups of individuals have the same level of income, but only one has income security in the form of OAS/GIS; incidentally, that group has better health outcomes. This could be due to the fact that the income floor increases economic security, since economic security linked with stress and other health determinants.<sup>27</sup>

Although not exactly a new idea, our analysis provides novel support to the notion widely held by many sociologist; income security, as a concept separate from income, is itself a social determinant of health.<sup>28</sup>

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<sup>27</sup> Laura Choi. « Financial Stress and Its Physical Effects On Individuals and Communities, » *Community Development Investment Review*. <http://www.frbsf.org/community-development/files/choi.pdf>

<sup>28</sup> Ibid, 2.

### *The income floor reduces the barriers to improving health*

Despite the fact that illness generally increase with age, significantly less chronically ill individuals in the 65-69 group believe that they have a barrier to improving their health, compared to the 60-64 age group. This may be because GOA/OAS offers income security, or it may be because the 65-69 age group is less likely to work; however, it would be unlikely for low-income, chronically ill persons to work if they could reasonably live off a guaranteed income that offers a similar income. As such, this data suggests that it is possible that the income floor, either by reducing the incentive to work or by providing security, diminishes the barriers to increasing health.

This data also suggests that it isn't the income itself that reduces the barrier, since all respondents have reasonably low incomes. Rather, the income floor provides some sort of support that improves the ability to overcome health barriers. All in all, chronically ill individuals have a better ability to increase their health if they have an income floor in the form of OAS/GIS.

### *Less use of health resources*

Outcomes from this study also suggests that low income, chronically ill individuals in the 65-69 age group uses significantly less health resources. The 65-69 age group consults with less dentists and orthodontists, social workers, and psychologists. This group also requires fewer visits on average with social workers, psychologists, doctors and dentists/orthodontists.

The decreased need to consult social workers and psychologist fits in with other results in this study since the 60-65 age group is less likely to be stressed and less likely to have anxiety disorders. Ultimately, since the data suggests that the 65-69 group has better self-perceived health, it is likely that uses less health resources because they are healthier; it is not likely that the 65-69 age group is using less health resources simply because they are older.

Although the CCHS did not collect comparable data regarding medication, older people on average use more drugs. Even so, this trend may not be true for low-income individuals who are chronically ill; as such, drug use for people with GAI is worth investigating as a method to reduce drug spending. In any case, the effect of an income floor on medication/health resource use is something that deserves further research.

### *Health Comparisons*

The 65-69 age group that is low-income and chronically ill is more likely to have arthritis and high-blood pressure. Both these illnesses are strongly associated with age. However, several other illnesses, ones that are associated with income security and stress, are less likely in the 65-69 age group.<sup>29</sup>

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<sup>29</sup> The following research links chronic back problems, anxiety disorders, chronic cardiovascular diseases and chronic fatigue syndrome with stress.  
Gwen Kennedy, Vance A Spence, Margaret McLaren et al. "Oxidative stress levels are raised in chronic fatigue syndrome and are associative with clinical symptoms. *Free Radical Biology and Medicine*. <http://www.sciencedirect.com/science/article/pii/S0891584905002121>;  
Herta Flor, Dennis Turk, Niels Birbaumer. "Assessment of stress-rated psychophysiological reactions in chronic back pain." *Journal of Consulting and Clinical Psychology*. <http://psycnet.apa.org/journals/ccp/53/3/354/>;  
Lisa Shin and Israel Liberzon. "The Neurocircuitry of Fear, Stress, and Anxiety Disorders." *Neuropsychopharmacology Reviews*. <http://www.nature.com/npp/journal/v35/n1/abs/npp200983a.html>; Peter Vitaliano, James Scanlan, Jianping Zhang et al. "A Path Model of Chronic Stress, the Metabolic Syndrome, and Coronary health Disease. *Psychosomatic Medicine*.

The group with the income floor is significantly less likely to have chronic back problems, anxiety disorders, chronic cardiovascular diseases and chronic fatigue syndrome.<sup>30</sup> However, due to the inability to account for age differences, there remains the possibility that these illness actually decrease with age. In any case, this study provides some justification for further researching the benefits that a guaranteed income can have on the incidence of illness.

### *Guaranteed Annual Income discussion*

Ultimately, the analysis of our results suggests that Canadians with chronic illnesses would receive health benefits from a guaranteed income; further, it supports the idea that a guaranteed income for Canadians under the age of 65 is a policy worth investigating. A reduction in the use of health resources can potentially justify the increase in welfare cost associated with a guaranteed income for people with chronic illness. However, as Emery, Fleisch and McIntyre note, concerns remains regarding the cost of guaranteed income and the work disincentives from the program.

Forget's analysis of the Canadian Mincome experiment showed that work disincentive effects from a guaranteed income were minimal;<sup>31</sup> in fact, research suggests that decreased health costs and increase labour productivity could result in savings to the government.<sup>32</sup>

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[http://journals.lww.com/psychosomaticmedicine/Abstract/2002/05000/A\\_Path\\_Model\\_of\\_Chronic\\_Stress,\\_the\\_Metabolic.6.aspx](http://journals.lww.com/psychosomaticmedicine/Abstract/2002/05000/A_Path_Model_of_Chronic_Stress,_the_Metabolic.6.aspx)

<sup>30</sup> Ibid.

<sup>31</sup> Derek Hum and Wayne Simpson. "A Guaranteed Annual Income? From Mincome to the Millennium." *Policy Options*, 2001. <http://policyoptions.irpp.org/wp-content/uploads/sites/2/assets/po/2001-our-space-odyssey/hum.pdf>

<sup>32</sup> K. Widerquist, M. Lewis and S. Pressman, Aldershot, U.K.: Ashgate. "The Cost of Eliminating Poverty in Canada: Basic Income with an Income Test Twist." *The Ethics and Economics of the Basic Income Guarantee*, 2005.

Along with labour disincentives, the cost of a GAI is another concern. However, researchers suggest that the cost of a GAI in Canada is not excessively expensive. Forget's showed that that only a third of people receiving a GAI stipend in the MINCOME experiment received the full benefit. Likewise, Senator Hugh Segal's analysis suggests that the total cost of the program in Canada would be 30 billion if the average top-up per person below the poverty line was \$10,000 annually.<sup>33</sup> This is less than the cost of OAS/GIS and spousal allowances in 2010-2011 – 35.6 billion dollars. This amount does not consider the savings from programs that would be cut; EI costs 20 billion in 2010-2011 and that would not be necessary given a GAI.<sup>34</sup> Additionally, Segal notes that due to “simplicity, flexibility and improved social determinants of health and incentives to work,” a GAI may actually result in savings.<sup>35</sup>

Meredith and Chia also estimate that the Canadian governments and insurance carriers provided \$29 billion in direct income support to individuals dealing with a personal illness or disability<sup>36</sup>; this value would presumably decrease if a GAI increases health outcomes.

It is also important to note potential benefits of GAI beyond better health outcomes. Forget also contends that the positive hospital and physician impacts may be larger than expected due to a “social multiplier effect.”<sup>37</sup> Forget postulated that since the basic income security could apply to everyone, the behaviours of all residents changed — including those

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<sup>33</sup> Hugh Segal. “Scrapping Welfare.” *Literary Review of Canada*. <http://www.thepearsoncentre.ca/platform/scrapping-welfare/>

<sup>34</sup> Your Tax Dollar. *Department of Finance Canada*. <http://www.fin.gc.ca/tax-impot/2011/html-eng.asp>

<sup>35</sup> Segal. “Scrapping Welfare.”

<sup>36</sup> Tyler Meredith and Colin Chia. “Leaving Some Behind: What Happens When Workers Get Sick.” *Institute for Research on Public Policy*. <http://irpp.org/research-studies/report-2015-09-03/>

<sup>37</sup> A. Levine et al. “Looking Back at the Negative, Income Tax Experiments from 30 Years on.” *The Ethics and Economics of the Basic Income Guarantee*, 2005.

not receiving the MINCOME supplement. Only a third of subjects received MINCOME assistance at any one time, many of which did not receiving the full benefit. Thus, evidence exists of widespread benefits beyond the cost of the program. Beyond the tested medical outcomes, the MINCOME experiment also led to increases in health related social outcomes; high-school graduation, a leading determinant of health, increased significantly.<sup>38</sup>

Forget additionally identified that the benefits of income security persists after the money stops. Dauphin's medical outcomes were worse than the control group prior to MINCOME; however, after the end of the experiment hospitalization was no longer significantly larger when compared to the control group. With that said, Forget's health evidence is not comprehensive. Specific health outcomes and disease rate identification were not possible due to the MINCOME's experimental design. Forget's results do suggest that research into GAI is necessary to understand precise health outcomes.

Although many arguments can be made in favour or against a GAI, our discussion needs to consider the costs and benefits in order to justify a GAI for people with chronic illness. If Canadian population with chronic illness works less on average, there would incur less labour disincentives. However, data extracted from the CCHS shows no significant difference in employment rate for Canadians with chronic illness in every age group (see APPENDIX D).<sup>39</sup> As such, little evidence suggests that Canadians with chronic illness are working less, and there is little evidence that a Guaranteed Income would discourage labour participation to a lesser degree.

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<sup>38</sup> "Healthy People 2020 Leading Health Indicators: Progress Update." *Department of health and human services USA, 2014.*

<sup>39</sup> Chi-square analysis in SPSS.



As noted above, many studies suggest that there are little labour disincentives associated with creating a guaranteed income. That said, this conclusion may not be necessary true for people with chronic illness. Canadians with chronic illness they may choose to participate in the labour force to a significantly lesser degree than those without chronic illness, given the option to live off a GAI.

This disincentive should not hold back research and implementation for GAI for people with chronic illness, however. Emery, Fleisch and McIntyre suggest that a “phased-in introduction of a GAI with the intent of determining the extent of the ultimate coverage of the scheme” can be used to analyze the labour-supply response of a guaranteed annual income.<sup>40</sup> This can be applied to a GAI scheme for people chronic illness as well. The program can begin by funding only certain illnesses; the resulting market shifts in labour can then be analyzed. Likewise, the potential healthcare benefit can also be examined during the phase-in process.

## CURRENT STATUS

In 2009, the Standing Senate Committee on Social Affairs recommended the government to “further examine a basic annual income based on a negative income tax” as a means for poverty reduction.<sup>41</sup> The media mirrored this sentiment: “the time has come” for a GAI, according to the *Globe and Mail*’s Noralou Roos<sup>42</sup>. Political will is also abundant; Ontario has

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<sup>40</sup> Emery, Fleisch, McIntyre. “How a Guaranteed Annual Income Could Put Food Banks out Of Business.”

<sup>41</sup> Art Eggleton and Hugh Segal. “In From the Margins: A Call to Action on Poverty, Housing and Homelessness”. *Senate Standing Committee on Social Affairs, Science and Technology*, 2014.

<sup>42</sup> Noralou Roos. “The time for Guaranteed Annual Income might have finally come.” *Globe and Mail*, 2014.

committed funding for GAI research and the Mayors of Edmonton and Calgary have also voiced support for a GAI (See APPENDIX E for political discussion of GAI in Canada).<sup>43</sup>

New research from the Fraser Institute also suggests that replacing current welfare policy with a GAI is a cost effective solution; however, they note that the scope of implementation renders it politically unfeasible.<sup>44</sup> Researchers from The University of Calgary's School of Public Policy likewise advocate more GAI research, given the success Old Age Security had in poverty reduction.<sup>45</sup> Our analysis further provides additional evidence that the policy is useful for promoting health among people with chronic illness.

Overall, there is sufficient evidence that a Guaranteed Income for People with Chronic Illness may be an effective policy; further research, including a another trial study like the MINCOME experiment, is likely a worthwhile investment

## CONCLUSION

Ultimately, since healthcare costs in Canada are ballooning unsustainably, a new approach to healthcare is required. That new approach— the game changing innovation — might just be a guaranteed annual income. As such, broader GAI research, with proper health data analysis (as well as strong economic and social data collection), can help identify the potential value of a GAI in Canada. Although political will and targeted policy remain challenges when it comes to GAI studies in Canada, failing to research GAI

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<sup>43</sup> Ibid.

<sup>44</sup> Charles Lammam and Hugh MacIntyre. "The Practical Challenges of Creating Guaranteed Annual Income in Canada." *The Fraser Institute*, 2015.

<sup>45</sup> Emery, Fleisch, McIntyre. "How a Guaranteed Annual Income Could Put Food Banks out Of Business."

implementation is a disservice to all Canadians — particularly those who are chronically ill and living in poverty.

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## APPENDIX A

### Rate of Arthritis in the Canadian Population by Age, CCHS 2014

Age Group				
60 to 64 years	65 to 69 years	70 to 75 years	75 to 79 years	80+ years
33.9%	40.1%	43.4%	49.8%	52.8%

### Rate of Fibromyalgia in the Canadian Population by Age, CCHS 2014

Age Group									
35 to 39 years	40 to 44 years	45 to 49 years	50 to 54 years	55 to 59 years	60 to 64 years	65 to 69 years	70 to 74 years	75 to 79 years	80 years or more
3.9%	3.5%	5.2%	11.3%	16.2%	16.5%	16.8%	10.8%	6.5%	6.5%

### Rate of Asthma in the Canadian Population by Age, CCHS 2014

Age Group									
35 to 39 years	40 to 44 years	45 to 49 years	50 to 54 years	55 to 59 years	60 to 64 years	65 to 69 years	70 to 74 years	75 to 79 years	80 years or more
6.5%	6.8%	6.0%	8.8%	10.8%	9.7%	10.7%	7.8%	5.6%	6.7%

### Rate of Chronic Obstructive Pulmonary Disease in the Canadian Population by Age, CCHS 2014

Age Group									
35 to 39 years	40 to 44 years	45 to 49 years	50 to 54 years	55 to 59 years	60 to 64 years	65 to 69 years	70 to 74 years	75 to 79 years	80 years or more
1.6%	2.3%	3.1%	8.2%	12.3%	13.7%	16.3%	14.7%	13.1%	14.7%

### Rate of Cancer in the Canadian Population by Age, CCHS 2014

Age Group									
35 to 39 years	40 to 44 years	45 to 49 years	50 to 54 years	55 to 59 years	60 to 64 years	65 to 69 years	70 to 74 years	75 to 79 years	80 years or more
1.2%	2.6%	3.1%	5.7%	10.9%	14.6%	18.2%	15.3%	12.7%	14.0%

## APPENDIX B

Top Drug Class use in Alberta <sup>a</sup>	TPS (\$ 000)	Proportion of TPS	Rate of Use
Tumour necrosis factor alpha inhibitors (anti-TNF drugs) <sup>b</sup>	91,337,600.0	13.3%	0.9%
Antineovascularization agents <sup>b</sup>	54,532,700.0	7.9%	1.1%
Adrenergics in combination with corticosteroids or other drugs, excluding anticholinergics	29,655,000.0	4.3%	9.5%
HMG-CoA reductase inhibitors	29,362,900.0	4.3%	38.6%
Proton pump inhibitors	26,166,200.0	3.8%	29.2%
ACE inhibitors, plain	18,853,000.0	2.7%	22.9%
Natural opium alkaloids	16,200,000.0	2.4%	16.1%
Anticholinergics	14,462,300.0	2.1%	6.0%
Interferons	13,698,700.0	2.0%	0.2%
Dihydropyridine derivatives	13,451,500.0	2.0%	17.0%
Other antidepressants	12,554,200.0	1.8%	9.0%
Selective serotonin reuptake inhibitors	11,849,300.0	1.7%	10.5%
Other immunostimulants	11,360,300.0	1.7%	0.2%
Insulins and analogues for injection, long-acting	10,940,400.0	1.6%	2.6%

Data Extracted from Top 100 Drug Classes, CIHI.

- Comparing the Proportion of *Total program Spending* to the *Rate of Use* is a particularly useful indicator; it shows clearly the cost and benefit for drug use in terms of the number of individuals who benefit from program spending.
- Antineovascularization agents and tumour necrosis factor alpha inhibitors use a significantly larger proportion of total program spending if you consider the number of individuals who benefit from that spending (although not the degree to which each individual benefits). This data is for Alberta drug spending, but the trend is also constant across Canada.

## APPENDIX C

### Multinomial logistic for Incidence of Asthma per Income Decile

Income Decile	B	Std. Error	Wald Statistic	Sig.	95% Confidence interval for B	
					Lower Bound	Upper Bound
Decile 1	.685	.066	109.385	.000	1.745	2.257
Decile 2	.408	.066	38.374	.000	1.322	1.711
Decile 3	.298	.067	20.020	.000	1.182	1.536
Decile 4	.278	.067	17.343	.000	1.158	1.505
Decile 5	.139	.069	4.028	.045	1.003	1.316
Decile 6	.134	.069	3.735	.053	.998	1.309
Decile 7	.130	.071	3.389	.066	.992	1.309
Decile 8	.237	.068	11.998	.001	1.108	1.449
Decile 9	.181	.068	7.005	.008	1.048	1.370
Decile 10	0 <sup>b</sup>					
a. The reference category is: no.						
b. This parameter is set to zero because it is redundant.						

### Multinomial logistic for Incidence of Fibromyalgia per Income Decile

Income Decile	B	Std. Error	Wald Statistic	Sig.	95% Confidence interval for B	
					Lower Bound	Upper Bound
Decile 1	1.655	.144	132.309	.000	3.946	6.935
Decile 2	1.297	.146	79.005	.000	2.749	4.872
Decile 3	1.186	.147	65.039	.000	2.455	4.370
Decile 4	.936	.151	38.196	.000	1.894	3.430
Decile 5	.735	.157	21.920	.000	1.533	2.837
Decile 6	.688	.158	19.010	.000	1.461	2.712
Decile 7	.558	.164	11.503	.001	1.265	2.411
Decile 8	.498	.164	9.179	.002	1.192	2.271
Decile 9	.457	.164	7.748	.005	1.145	2.178
Decile 10	0 <sup>b</sup>					
a. The reference category is: no.						
b. This parameter is set to zero because it is redundant.						



### Multinomial logistic for Incidence of Arthritis per Income Decile

Income Decile	B	Std. Error	Wald Statistic	Sig.	95% Confidence interval for B	
					Lower Bound	Upper Bound
Decile 1	.931	.047	395.665	.000	2.314	2.780
Decile 2	1.134	.044	650.916	.000	2.849	3.392
Decile 3	.990	.045	494.351	.000	2.467	2.937
Decile 4	.808	.045	322.586	.000	2.054	2.450
Decile 5	.683	.046	220.256	.000	1.809	2.167
Decile 6	.512	.047	120.354	.000	1.523	1.829
Decile 7	.314	.049	41.188	.000	1.244	1.507
Decile 8	.222	.049	20.438	.000	1.134	1.374
Decile 9	.245	.048	25.924	.000	1.163	1.405
Decile 10	0 <sup>b</sup>					
a. The reference category is: no.						
b. This parameter is set to zero because it is redundant.						

### Multinomial logistic for Incidence of High Blood Pressure per Income Decile

Income Decile	B	Std. Error	Wald Statistic	Sig.	95% Confidence interval for B	
					Lower Bound	Upper Bound
Decile 1	.591	.046	165.760	.000	1.651	1.976
Decile 2	.930	.043	470.476	.000	2.330	2.757
Decile 3	.859	.043	402.927	.000	2.171	2.567
Decile 4	.750	.043	304.158	.000	1.946	2.304
Decile 5	.574	.044	169.613	.000	1.629	1.937
Decile 6	.410	.045	84.012	.000	1.381	1.646
Decile 7	.279	.047	35.871	.000	1.206	1.448
Decile 8	.088	.047	3.483	.062	.996	1.198
Decile 9	.090	.047	3.718	.054	.999	1.199
Decile 10	0 <sup>b</sup>					
a. The reference category is: no.						
b. This parameter is set to zero because it is redundant.						

**Multinomial logistic for Incidence of Chronic Obstructive Pulmonary Disease  
Pressure per Income Decile**

Income Decile	B	Std. Error	Wald Statistic	Sig.	95% Confidence interval for B	
					Lower Bound	Upper Bound
Decile 1	1.856	.115	262.106	.000	5.110	8.009
Decile 2	1.676	.113	220.153	.000	4.281	6.665
Decile 3	1.351	.116	136.710	.000	3.079	4.842
Decile 4	1.183	.117	101.754	.000	2.593	4.106
Decile 5	1.009	.121	69.394	.000	2.163	3.476
Decile 6	.769	.125	37.816	.000	1.688	2.756
Decile 7	.503	.134	13.976	.000	1.270	2.152
Decile 8	.369	.137	7.293	.007	1.107	1.892
Decile 9	.438	.132	10.941	.001	1.195	2.008
Decile 10	0 <sup>b</sup>					
a. The reference category is: no.						
b. This parameter is set to zero because it is redundant.						

**Multinomial logistic for Incidence of Diabetes Pressure per Income Decile**

Income Decile	B	Std. Error	Wald Statistic	Sig.	95% Confidence interval for B	
					Lower Bound	Upper Bound
Decile 1	.936	.070	177.239	.000	2.221	2.926
Decile 2	1.114	.067	278.095	.000	2.672	3.471
Decile 3	1.016	.067	229.092	.000	2.422	3.151
Decile 4	.796	.069	133.939	.000	1.937	2.536
Decile 5	.625	.071	77.624	.000	1.626	2.148
Decile 6	.426	.073	33.912	.000	1.326	1.766
Decile 7	.376	.075	24.890	.000	1.256	1.688
Decile 8	.092	.079	1.353	.245	.939	1.279
Decile 9	.176	.076	5.280	.022	1.026	1.385
Decile 10	0 <sup>b</sup>					
a. The reference category is: no.						
b. This parameter is set to zero because it is redundant.						

### Multinomial logistic for Incidence of Diabetes per Income Decile

Income Decile	B	Std. Error	Wald Statistic	Sig.	95% Confidence interval for B	
					Lower Bound	Upper Bound
Decile 1	.936	.070	177.239	.000	2.221	2.926
Decile 2	1.114	.067	278.095	.000	2.672	3.471
Decile 3	1.016	.067	229.092	.000	2.422	3.151
Decile 4	.796	.069	133.939	.000	1.937	2.536
Decile 5	.625	.071	77.624	.000	1.626	2.148
Decile 6	.426	.073	33.912	.000	1.326	1.766
Decile 7	.376	.075	24.890	.000	1.256	1.688
Decile 8	.092	.079	1.353	.245	.939	1.279
Decile 9	.176	.076	5.280	.022	1.026	1.385
Decile 10	0 <sup>b</sup>					
a. The reference category is: no.						
b. This parameter is set to zero because it is redundant.						

### Multinomial logistic for Incidence of Cancer per Income Decile

Income Decile	B	Std. Error	Wald Statistic	Sig.	95% Confidence interval for B	
					Lower Bound	Upper Bound
Decile 1	.493	.125	15.540	.000	1.282	2.093
Decile 2	.695	.116	35.677	.000	1.595	2.517
Decile 3	.734	.115	40.758	.000	1.663	2.611
Decile 4	.519	.119	19.115	.000	1.332	2.122
Decile 5	.494	.120	16.845	.000	1.295	2.076
Decile 6	.475	.121	15.517	.000	1.269	2.036
Decile 7	.157	.132	1.431	.232	.904	1.515
Decile 8	.114	.131	.756	.384	.867	1.449
Decile 9	-.014	.133	.012	.914	.759	1.280
Decile 10	0 <sup>b</sup>					
a. The reference category is: no.						
b. This parameter is set to zero because it is redundant.						

**Multinomial logistic for Incidence of Chronic Fatigue Syndrome per Income Decile**

Income Decile	B	Std. Error	Wald Statistic	Sig.	95% Confidence interval for B	
					Lower Bound	Upper Bound
Decile 1	1.859	.157	139.558	.000	4.715	8.739
Decile 2	1.343	.162	68.954	.000	2.790	5.261
Decile 3	1.144	.165	48.276	.000	2.273	4.333
Decile 4	.976	.168	33.873	.000	1.911	3.687
Decile 5	.531	.181	8.614	.003	1.193	2.426
Decile 6	.633	.177	12.731	.000	1.330	2.667
Decile 7	.308	.193	2.561	.110	.933	1.986
Decile 8	.389	.187	4.315	.038	1.022	2.129
Decile 9	.406	.185	4.841	.028	1.045	2.155
Decile 10	0 <sup>b</sup>					
a. The reference category is: no.						
b. This parameter is set to zero because it is redundant.						

**Multinomial logistic for Incidence of Chronic Anxiety Disorders per Income Decile**

Income Decile	B	Std. Error	Wald Statistic	Sig.	95% Confidence interval for B	
					Lower Bound	Upper Bound
Decile 1	1.394	.072	370.575	.000	3.499	4.648
Decile 2	.707	.076	85.840	.000	1.746	2.356
Decile 3	.640	.077	69.751	.000	1.632	2.203
Decile 4	.587	.077	57.971	.000	1.546	2.091
Decile 5	.491	.079	38.586	.000	1.399	1.907
Decile 6	.436	.080	30.116	.000	1.324	1.808
Decile 7	.338	.083	16.727	.000	1.193	1.649
Decile 8	.295	.082	12.870	.000	1.143	1.579
Decile 9	.188	.083	5.124	.024	1.026	1.421
Decile 10	0 <sup>b</sup>					
a. The reference category is: no.						
b. This parameter is set to zero because it is redundant.						

### Multinomial logistic for Incidence of Chron's Disease Disorders per Income Decile

Income Decile	B	Std. Error	Wald Statistic	Sig.	95% Confidence interval for B	
					Lower Bound	Upper Bound
Decile 1	-.272	.310	.769	.380	.415	1.398
Decile 2	-.758	.315	5.787	.016	.252	.869
Decile 3	-.528	.306	2.971	.085	.323	1.075
Decile 4	-.351	.318	1.217	.270	.377	1.314
Decile 5	-.128	.322	.159	.690	.468	1.652
Decile 6	-.355	.312	1.300	.254	.380	1.291
Decile 7	-.367	.343	1.147	.284	.354	1.356
Decile 8	.103	.337	.093	.761	.573	2.145
Decile 9	-.120	.327	.135	.713	.467	1.683
Decile 10	0 <sup>b</sup>					
a. The reference category is: no.						
b. This parameter is set to zero because it is redundant.						

### Multinomial logistic for Incidence of Ulcerative Colitis Disorders per Income Decile

Income Decile	B	Std. Error	Wald Statistic	Sig.	95% Confidence interval for B	
					Lower Bound	Upper Bound
Decile 1	-.416	.231	3.235	.072		
Decile 2	-.250	.306	.671	.413	.428	1.417
Decile 3	-.330	.293	1.272	.259	.405	1.276
Decile 4	-.682	.311	4.824	.028	.275	.929
Decile 5	-.180	.307	.345	.557	.457	1.524
Decile 6	.202	.305	.439	.508	.673	2.223
Decile 7	-.277	.305	.825	.364	.417	1.378
Decile 8	-.101	.324	.097	.755	.479	1.706
Decile 9	-.002	.339	.000	.996	.514	1.941
Decile 10	0 <sup>b</sup>					
a. The reference category is: no.						
b. This parameter is set to zero because it is redundant.						

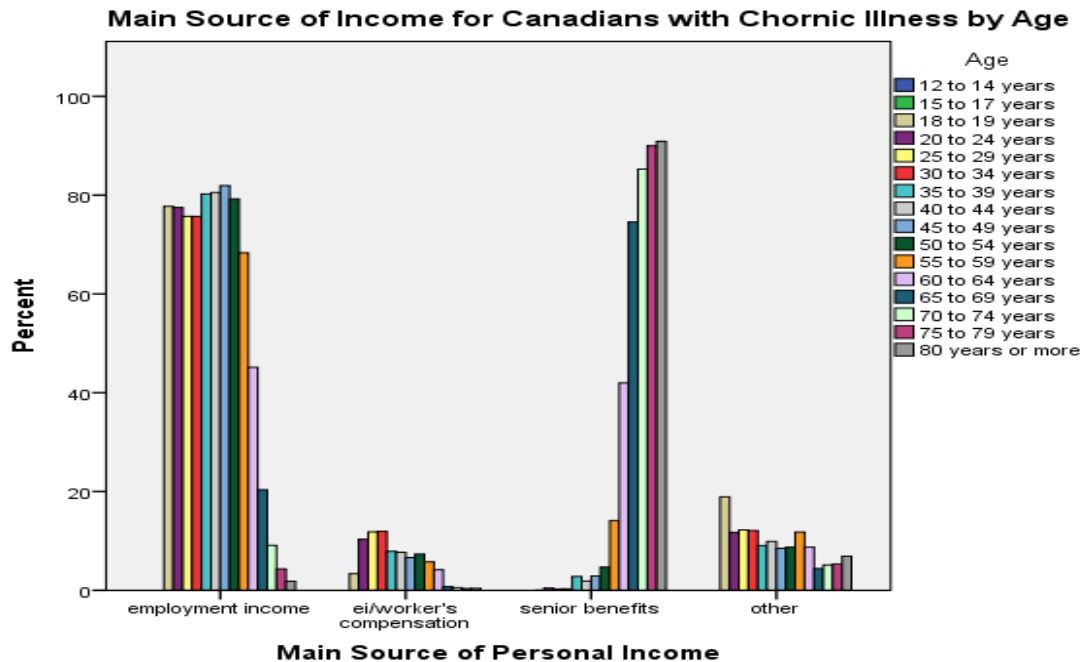
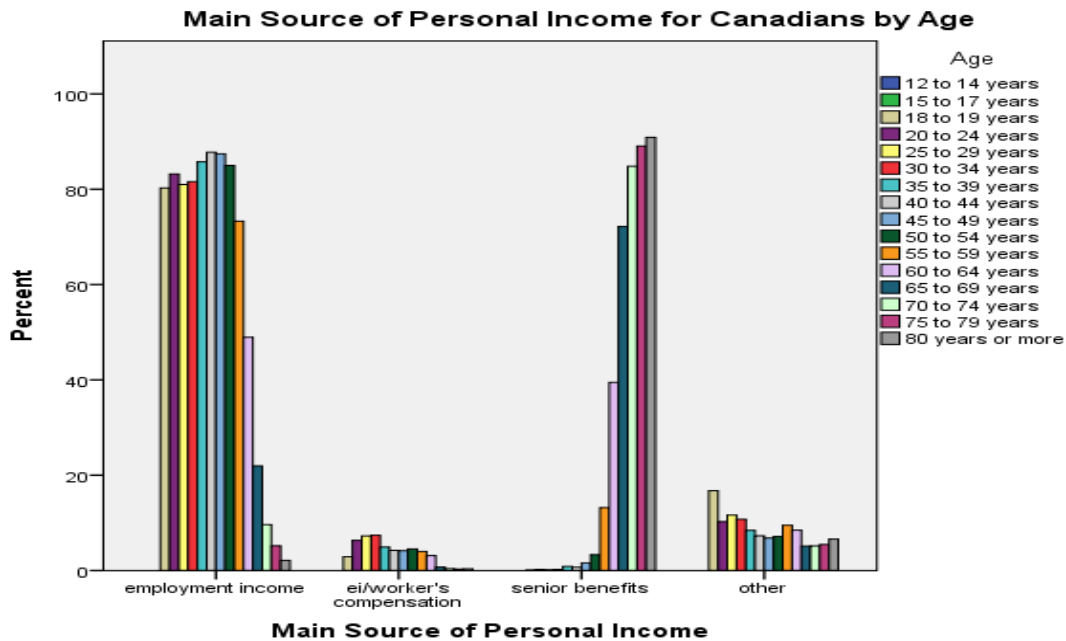
### Multinomial logistic for Incidence of Irritable Bowel Disease per Income Decile

Income Decile	B	Std. Error	Wald Statistic	Sig.	95% Confidence interval for B	
					Lower Bound	Upper Bound
Decile 1	-.454	.213	4.552	.033	.419	.964
Decile 2	-.616	.204	9.126	.003	.362	.806
Decile 3	-.541	.204	7.003	.008	.390	.869
Decile 4	-.256	.214	1.441	.230	.509	1.176
Decile 5	-.162	.222	.534	.465	.551	1.313
Decile 6	-.381	.211	3.269	.071	.452	1.033
Decile 7	-.177	.227	.611	.434	.537	1.306
Decile 8	.162	.237	.471	.493	.740	1.871
Decile 9	-.049	.224	.049	.826	.613	1.477
Decile 10	0 <sup>b</sup>					
a. The reference category is: no.						
b. This parameter is set to zero because it is redundant.						

### Multinomial logistic for Incidence of Incontinence per Income Decile

Income Decile	B	Std. Error	Wald Statistic	Sig.	95% Confidence interval for B	
					Lower Bound	Upper Bound
Decile 1	1.561	.564	7.660	.006	1.577	14.389
Decile 2	1.185	.564	4.407	.036	1.082	9.888
Decile 3	1.067	.571	3.496	.062	.950	8.890
Decile 4	1.225	.579	4.473	.034	1.094	10.604
Decile 5	.986	.605	2.657	.103	.819	8.768
Decile 6	.698	.601	1.349	.246	.619	6.529
Decile 7	.122	.700	.030	.862	.286	4.458
Decile 8	.830	.649	1.637	.201	.643	8.174
Decile 9	-.408	.790	.267	.606	.142	3.126
Decile 10	0 <sup>b</sup>					
a. The reference category is: no.						
b. This parameter is set to zero because it is redundant.						

## APPENDIX D



\*No statistical difference between any age groups for Main Source of Income. Graphs created using SPSS with data from CCHS 2014.

## APPENDIX E

### **The Politics of Guaranteed Income in Canada**

The possibility of a guaranteed income in Canada must reflect the polity of the nation. Political will and regional distribution of welfare-responsibility are notable barriers to incorporating a drastic new welfare regime. And although a large portion of the electorate supports guaranteed income, (46% of Canadians, according to a poll commissioned by the Trudeau Foundation), public support doesn't necessary translate into political resolve, particularly when economic concerns are at the forefront of politics.<sup>46</sup>

Interestingly, ideology is not as large a barrier to guaranteed income as one might first believe. Proponents across the political spectrum have offered support for a guaranteed income in Canada; left ideologues see guaranteed income as a change to redistribute wealth and to support the poorest of Canadians. Right-leaning pundits suggest that it is a method to limit administrative costs in a way that offers individuals personal control.

That said, the ideological agreements stop there. Experts and pundits would certainly disagree to the details of a GIA scheme — especially regarding the cash bounty provided. Even so, the researched benefits of a GAI suggest that the policy is worth serious consideration.

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<sup>46</sup> Environics, "Responsible Citizenship A National Survey of Canadians," EnvironicsInstitute.org, October 31, 2013.



## Policy Implications

- *Individuals Flexibility and Greater Utility for welfare recipients*

Replacing in-kind benefits with a cash-transfer scheme allows recipients to maximize their income utility; individuals are not forced to receive certain in-kind support that they may not fully need.

- *Administrative Simplicity*

The Fraiser Institute notes that a major reason to implement a negative income tax welfare scheme is to encourage administrative simplicity.<sup>47</sup> If there is no need to identify requirements other than income, welfare administration becomes exponentially easier. More productive use of social services can be financed by fewer resources.

- *Eliminating the welfare trap*

People who may find part-time work may forgo getting that job due to the binary nature of welfare and employment insurance in Canada; you get the assistance only if you do not have a job or income. This limits one's ability to gain experience and to self-support. It also increases the strain on the welfare system. GAI would eliminate this trap.

## Ideological Barriers to Implementing a GAI

Despite the potential improvements associated with a GAI, it may be difficult for ideologues to accept it. Although conceptually similar to in-kind and cash-transfer welfare programs in

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<sup>47</sup> Charles Lamman and Hugh MacIntyre. "The Practical Challenges of Creating a Guaranteed Annual Income in Canada," Page 5. <https://www.fraserinstitute.org/sites/default/files/practical-challenges-of-creating-a-guaranteed-annual-income-in-canada.pdf>

Canada, there is no conditions attached to a GAI. Paternalists will believe that individuals may not use the cash to their greatest advantage and might prefer funding in-kind transfers.

A GAI is also, essentially, a cash transfer; wealthier Canadians are taxed to support those who are poorest. Some may believe that individuals do not deserve cash if they haven't earned it, even if they support current welfare programs.

### Barriers due to Federalism

Barriers also exist due to the way welfare is distributed in Canada. A guaranteed income is contingent on the fact that savings in other administrative programs are possible; however, those programs are spread into several levels of governments and communities.

Provinces are responsible for most healthcare but not employment insurance. Communities and municipalities fund shelters, foodbanks, and low-income activities. All levels of government are involved in housing. As such, choosing cut off support for these in favour of a GAI is a hard political sell; regions that benefit disproportionately from these supports might push-back against decreases in direct funding, even though they should technically gain the most from a GAI. This would be a substantial political barrier to implementing a GAI. The Fraser Institute's analysis of Guaranteed Annual Income came to the same conclusion; GAI in Canada could replace up to \$120 billion in spending across all levels of government, although doing so is practically unfeasible.<sup>48</sup> However, this conclusion may not be true as of today, as there appears to be growing support for a GAI in Canada.

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<sup>48</sup> Ibid.

### Recent support for a GAI

In the past, famed economists like Friedman and Hayek have supported the idea of a GAI. The last 40 years in Canada has also seen smatterings of GAI discussion among federal and provincial governments, including those in power. Senator Hugh Segal, in particular, has been advocating for the scheme. Despite this history, it seems that GAI appeal has developed massively in the last few years.

GAI is now part of the Green Party Platform. It is also a policy endorsed by the Liberal Party (although it is not in their current platform). Ontario's government has budgeted for GAI research, and Quebec has declared intent to move forward with a basic income policy.<sup>49</sup> Alberta's Finance Minister, Joe Ceci, has also noted interest. Political will has not developed to the point what a GAI is inevitable, but political interest is certainly growing.

### Consultation, Communication and Implementation

There are several barriers to a GAI in Canada, but these barriers are worth surpassing given the extensive research showing the benefits of a GAI. If there is no federal will, GAI can begin at the provincial level. Rather than the current binary welfare that provides support to non-working Canadians, provinces can administer the support they provide through a negative income tax.

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<sup>49</sup> Shella Regehr. "Basic income in real life: politics and policy." *Basic Income Canada Network*.

Federal Government can also create policy to encourage provinces to seek GAI funding. Rather than providing the provinces with a Canada Social Transfer, federal policy can also redistribute to poor individuals directly by negative income tax administered by Canada Revenue Agency.

Federal and Provincial cooperation is likewise possible. We see it currently with EI programs and health and social transfers. The notion that federal/provincial coordination is insurmountable is not historically true for Canada's most extensive social policies.

Communication between provinces is also at a high point in Canadian politics. After years of federal indifference, provinces have come to the realization that they can benefit from health innovation and drug procurement cooperation. As such, a GAI is possible despite the distribution of responsibility in Canadian Government.

