FRASER BULLETIN



November 2017



Summary

- The dominant role played by government financing in Canada's single-payer health care system has led to an oversight related to demographics: senior migration.
- Health care spending is skewed towards the first year of life and after retirement. The average amount spent on health care by governments in a person's first year of life is \$10,800. For those between the ages of 65 to 69, that amount is \$6,424, but it rises to \$13,797 for those over 70.
- Taxes, on the other hand, start out quite low and then climb steadily to one's prime earning years (56-63), before beginning to decline as one nears and then enters retirement.
- When a senior migrates from one province to another, they are likely to have paid the bulk of

their lifetime taxes in one province but will consume the majority of their health care in another.

- Six provinces experienced a net inflow of seniors between 1980 and 2016: BC, AB, ON, NB, NS, and PEI. The remaining four provinces (SK, MB, QC, and NL) experienced a net outflow of seniors. British Columbia recorded the greatest inflow (40,512), while Quebec experienced the greatest outflow (37,305).
- Based on average annual health care costs by age, British Columbia had the largest cost at \$7.2 billion (in 2017 dollars) while Quebec had the largest savings at \$6.0 billion.
- A partial analysis of potential tax revenues provided by migrating seniors suggests that BC's costs could have been mitigated by as much as 36.3 percent while Quebec's savings could have been reduced by as much as 19.2 percent.

Introduction

Canada's single-payer health care system is unique amongst industrialized countries that, like Canada, maintain universal access. ¹ Canada's single-payer model relies on a prominenteven dominant-role for government in financing, regulating, and delivering covered health care services.

Covered health care services are delivered almost exclusively by the provinces while the financing of such activities is provided jointly by the provinces and the federal government. All government financing of health care is done on a pay-as-you-go basis, meaning that there is no pre-funding of expenses. Rather, annual tax revenues are used to finance annual health care spending in the same year.

Provinces use their own revenues to directly finance health care, but each year the federal government provides the provinces with resources for health care through the Canada Health Transfer (CHT),² which in 2017-18 is estimated to reach \$37.2 billion (Canada, Department of Finance, undated). The CHT is calculated per-person, so that the more populated a province is, the larger its CHT payment.

Given the importance of government financing to Canadian health care, this bulletin examines an important flaw in the design of government funding that relates to demographics. It brings to light an embedded problem within current government health care financing that benefits some provinces at the expense of others. It is, specifically, the migration of seniors and the

health care spending associated with them. The problem is not the migration of seniors per se, but the way health care spending is financed.

This bulletin is organized as follows. The first section presents data on health care spending and taxes by age groups. The second presents data on the net migration of seniors, by province, from 1980 through to 2016. The final section estimates the health care costs associated with the migration of seniors presented in the second section. A brief conclusion follows.

I. Health care spending and taxes by age group

Health care spending by age group

In general, the pattern of health care spending by age is fairly predictable. Data provided by the Canadian Institute for Health Information (CIHI) for 2014, as depicted in figure 1, indicate that government³ per-person health care spending for those under the age of 1 is, on average, \$10,800. Average annual per-person health care spending drops precipitously after the first year of life and remains relatively low until people reach age mid-50 or so. For example, the average annual per-person health care spending for those between the ages of 15 and 44 is \$2,093.4 This figure increases by threeand-a-half times for those aged 65 to 74, for whom average per-person health care spending is \$7,401 per year. For those between 75 and 84, average per-person health care spending increases to \$13,797 a year, and rises to \$26,235 for those over age 85.

¹ For further information please see Barua, Hasan, and Timmermans (2017) and Globerman (2016).

² See Canada, Department of Finance at https:// www.fin.gc.ca/fedprov/cht-eng.asp for a definition of and links for the Canada Health Transfer.

³ "Government" in this context refers to provincial and territorial spending.

⁴ This is a simple average across the cited age groups and is not, therefore, population-weighted.

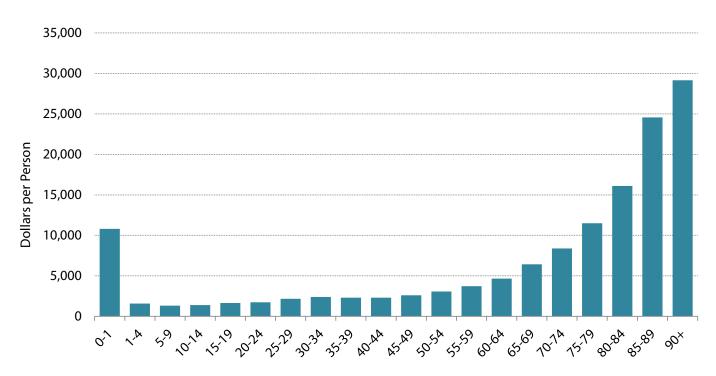


Figure 1: Government per Capita Spending by Age Group on Health Care, 2014

Sources: Canadian Institute for Health Information [CIHI] (2016); calculations by authors.

The years after age 65 are by far the most costly. For instance, the average per-person health care costs for Canadians between the ages of 65 and 69 (\$6,424) was 1.8 times that of Canadians aged 45 to 64 and almost triple the average annual spending for those aged 1 to 59. In one study, Brimacombe and his colleagues (2001) found that individuals consume more than 50 percent of their lifetime health care costs after the age of 65. More telling though, is that aver-

age per person health care costs for someone over the age of 90 were 8.3 times that of the average costs for Canadians between the ages of 45 and 64.

In summary, the typical pattern for health care spending is that it is quite high in a person's first year of life, quite low for most of their youth and working age, and then increases markedly during retirement (post age-65).

Taxes by age group

Figure 2 illustrates the average taxes paid (in dollars) by age group for 2016, the most recent

minority of the population with chronic illnesses that tend to require more intensive medical attention with age." However, CIHI also notes that "[t]here is some evidence that proximity to death rather than aging is the key factor in terms of health expenditure."

⁵ Interestingly, studies of the US health care system indicate that between 27 and 30 percent of all expenditures on those over age 65 are related to care consumed in the last year of life (Calfo et al., 2004). There is also work on this issue pertaining to Canada. For instance, CIHI (2011: 16-17) suggests that "[o]lder seniors consume more health care dollars largely as a consequence of two factors: the cost of health care in the last few months of life, and the

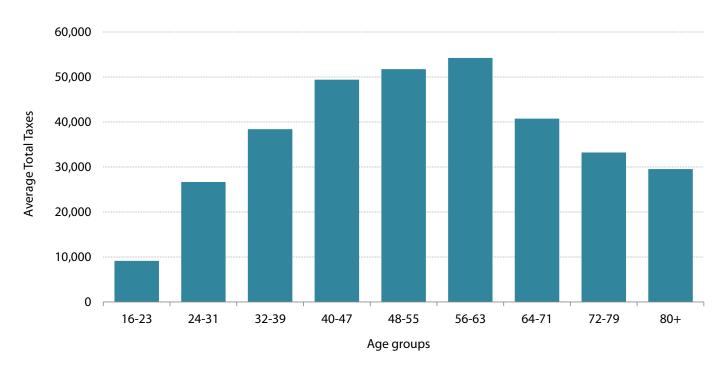


Figure 2: Average Total Taxes Paid, by Age Group, in 2016

Source: The Fraser Institute's Canadian Tax Simulator, 2017.

year of available data. This includes taxes paid to the federal, provincial, and local governments. It is, therefore, a broad assessment of the tax burden incurred by different age groups.

The pattern of taxes paid by age group is distinctly different than the pattern of health care spending illustrated in Figure 1. Specifically, individuals in their learning years (ages 16 to 23) and those just beginning their careers (ages 24 to 31) pay comparatively low levels of taxes relative to those well into their working lives (32-

39) and those in their prime earning years (40-63). For instance, the average taxes paid by an individual aged 16-23 was \$9,129 compared to someone 56-63 who, on average, paid \$54,226 in total taxes.

Retired people (generally over the age of 65) also pay a markedly lower level of total tax since, by definition, retirees work less and earn less than those working full time. For instance, people just entering the age of retirement, those aged 64-71, paid on average \$40,754 in total taxes in 2016.

An assessment of the *share* of total taxes paid by age group further highlights this pattern. (Recall that the previous figure examined the average dollar value of total taxes). Figure 3 illustrates the share of total taxes contributed by each age group. Almost three-quarters (73.4)

⁶ Taxes paid include income taxes, property taxes, and sales taxes, as well as profit taxes, health, social security and employment taxes, import duties, license fees, taxes on the consumption of alcohol and tobacco ("sin" taxes), fuel taxes, hospital taxes, and a host of other levies. This analysis excludes direct natural resource revenues.

25 20 Percent of Total Taxes Paid 72-79 16-23 24-31 32-39 40-47 48-55 56-63 64-71 **80+** Age groups

Figure 3: Share of Total Taxes Paid, by Age Group, in 2016

Source: The Fraser Institute's Canadian Tax Simulator, 2017.

percent) of the total tax burden is shouldered by the working-age population (aged 24-64). The remaining 25.9 percent of the total tax burden is paid for by those under 23 (0.6 percent) and those over the age of 65.

Together, figures 1 to 3 demonstrate an interesting and important contrast between health care spending by age group and the taxes collected to pay for it. While health care spending by age begins at a relatively high level, it quickly declines to a relatively low level for most of one's working life before beginning to increase rapidly in the later age groups-around the time of retirement (age 65).

Taxes, on the other hand, begin at near zero and climb steadily to one's prime earning years (age 56-63), before beginning to decline as one

nears and then enters retirement. In terms of demographics, health care costs, and taxes, there is an important gap: seniors consume a disproportionate amount of health care spending but pay relatively low taxes. As will be demonstrated later, this isn't a material issue for the structure of health care spending and financing in Canada except when seniors migrate to another province which means they would have paid a majority of their taxes in one province but consumed a majority of their lifetime health care spending in another.

II. Migration of seniors in Canada

Like many Canadians, seniors move between jurisdictions. Data on the migration of seniors indicate that there is a meaningful movement of seniors within Canada. Table 1 contains in-

Table 1: Net Migration of those Aged 65 and Older

Province	Total Net Migration of People Aged 65 and Older (1980-2016)	Average Annual Net Migration as a Percent of the Annual Population Aged 65 & older (1980-2016)	Cumulative Net Migration as a Percent of the Current Population Aged 65 & older (1980-2016)
NL	-1,227	-0.06%	-1.21%
PE	847	0.11%	3.02%
NS	1,962	0.04%	1.06%
NB	1,096	0.02%	0.74%
QC	-37,305	-0.13%	-2.48%
ON	9,304	0.03%	0.41%
MB	-9,263	-0.16%	-4.68%
SK	-15,554	-0.29%	-9.12%
AB	11,404	0.12%	2.25%
ВС	40,512	0.23%	4.76%

Sources: Statistics Canada, Cansim tables 051-0012 & 051-0001

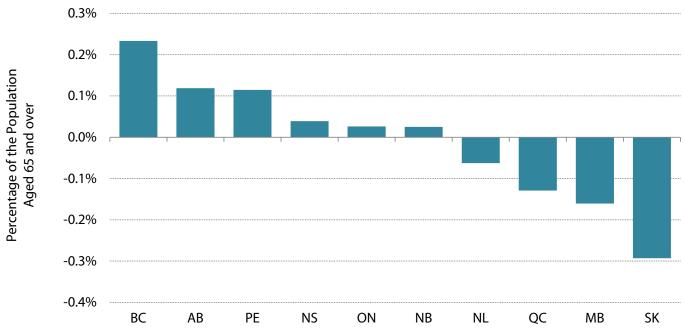
formation on the net migration of seniors between 1980 and 2016 (latest data available), while figures 4 and 5 illustrate certain aspects of the data from table 1.

The first data column in table 1 shows the total number of seniors that migrated to (positive) or from (negative) each of the provinces between 1980 and 2016. These numbers show the net movement of seniors, which means they compare the total number of seniors leaving and moving to each province and present only the net number. In total, six provinces experienced a net inflow of seniors between 1980 and 2016: British Columbia, Alberta, Ontario, New Brunswick, Nova Scotia, and Prince Edward Island. The remaining four provinces (Saskatchewan, Manitoba, Quebec, and Newfoundland & Labrador) experienced a net outflow of seniors. Based on the raw number of seniors migrating,

Quebec recorded the largest net out-migration of over 37,000 seniors while British Columbia experienced the largest net in-migration of seniors of a little over 40,500.

The raw migration numbers miss an important component of population analysis: base population. Figures 4 and 5 as well as columns 3 and 4 in table 1 include migration data expressed as percentages of the senior population. Specifically, figure 4 and the second data column in table 1 illustrate the average annual net senior migration as a percentage of the annual population of those aged 65 and over for each province. As a share of the senior population, Saskatchewan recorded the highest net outmigration (0.29 percent). At the other end of the spectrum, British Columbia recorded a net in-migration of seniors (0.23) percent each year between 1980 and 2016.

Figure 4: Average Annual Net Migration of those Aged 65 and Older as a Percent of the Population Aged 65 and Over, 1980-2016



Sources: Statistics Canada, Cansim tables 051-0012 & 051-0001.

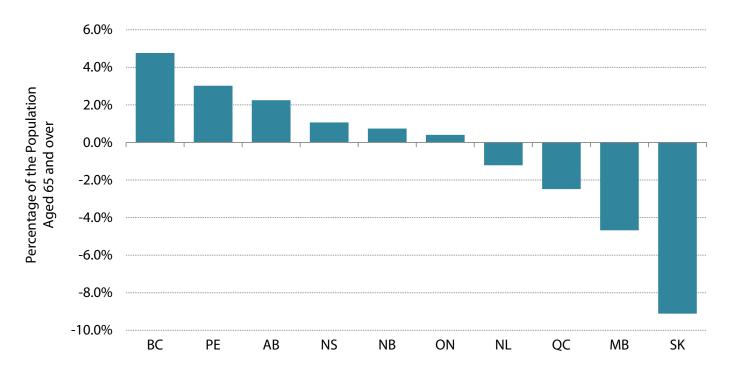
Figure 5 and the last data column in table 1 indicate the cumulative net senior migration from 1980 to 2016, which is distinct from the annual average depicted in figure 4 because it accounts for the migration of seniors over the entire period. Saskatchewan recorded the highest net out-migration of seniors as a share of the senior population: 9.1 percent. British Columbia experienced the highest net in-migration of seniors at 4.8 percent.

Figures 4 and 5 show that between 1980 and 2016, more seniors left the provinces of Newfoundland & Labrador, Quebec, Manitoba, and Saskatchewan than moved to those provinces. These out-migrating seniors arrived in the remaining six provinces.

III. Fiscal pressures from spending on health care for migrating seniors

The interaction between average government health care spending by age (nearly half of the total is for those over the age of 65) and the financing of health care through taxes (largely during one's working life, ages 25 to 64) results in an imbalance. Provinces like British Columbia attract seniors, while they leave provinces such as Saskatchewan, Manitoba, and Quebec. The imbalance exists because migrating seniors will generally have paid the bulk of their lifetime taxes in one province, but consume a large portion of their lifetime spending on health care in another. Thus, the burden of public health care in provinces like British Columbia (which experienced an in-migration of seniors) is more than it would be in the absence of senior migration,

Figure 5: Cumulative Net Migration of those Aged 65 and Older as a Percent of the Population Aged 65 and Over, 1980-2016



Sources: Statistics Canada, Cansim tables 051-0012 & 051-0001.

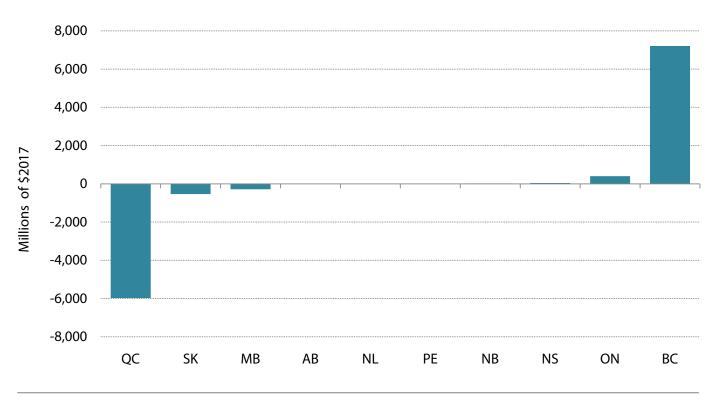
while the burden in provinces like Quebec and Saskatchewan (which experienced out-migrations of seniors) is lower than it would be without such migration. Again, though, this is not to say the problem is the migration of seniors per se, but rather that none of this fiscal pressure is accounted for in the calculation of financial transfers, either between the provinces, or from the federal government to the provinces.

This section calculates the estimated costs or savings each province garnered between 1980 and 2016 from the migration of seniors. First, a summary of the methodology used to arrive at these estimates. This analysis was compiled from a number of data sets. The data presented in section II, "Migration of seniors in Canada" by age, was used to calculate the movement of seniors between provinces based on five-year incremental age groups: 65-69, 70-74, 75-79, 80-84, 85-89, and 90 and above. These data were calculated for each year between 1980 and 2016. We used mortality statistics from Statistics Canada to adjust the number of seniors that migrated over time for the probable death of some portion of them.8

⁷ This period was selected based on data availability.

⁸ Mortality rates were available for the years 1991 to 2013. In order to have a complete series, assumptions were used to apply these mortality rates across the entire period. Specifically, mortality rates for 1980 through 1990 were assumed to be the same as in 1991. Mortality rates from 2014 and on were assumed to be the same as in 2013.

Figure 6: Estimated Costs or Savings for Provincial Health Care Spending from Seniors Migration, 1980-2016



Seniors were followed in each of the provinces until, according to mortality statistics, those who migrated between 1980 and 2016 had become deceased. This means that seniors were analyzed through to 2047, which is the last year that seniors migrating between 1980 and 2016 are assumed to have survived. This analysis gives the number of seniors migrating from or to each province between 1980 and 2016, as well as the cumulative net number of seniors who migrated over that time. In other words, this methodology allows us to calculate the total cost or savings from the cumulative number of seniors migrating between 1980 and 2016.

The data for average government health care costs per person by age group (figure 1), which were obtained from the Canadian Institute for

Health Information (CIHI), were used to calculate aggregated health care costs by age group for migrating seniors. 9 More specifically, we

⁹ Limited data were available for per-person health care spending by government from 1980 to 1997. We used the ratio of health care spending to total spending for 1998 to calculate per-person health care spending for this period. Specifically, we applied the ratios of age-specific, per-capita provincial health care spending to overall per-capita provincial health care spending in 1998 to per-capita provincial health care expenditures by year, to estimate the implied age-specific, per-person provincial health care spending for 1980 through 1997. Per-capita provincial health care spending values for 2015 and beyond were estimated based on 2014 values using CIHI forecasts for 2015 and 2016, and growth rates from the health spending model developed for Barua

multiplied the sum of migrating seniors (cumulative) by age group for each province by the average per-person health care costs for that age group. For instance, in 2010, the average government health care costs for those aged 70-74 would have been applied to the number of seniors migrating to or from each of the provinces for 2010, as well as the cumulative number starting from 1980, to arrive at a total cost (or savings) for migrating seniors ages 70-74. This process was repeated for all age groups that had positive numbers of seniors migrating either in or out of the individual province.

Figure 6 shows the results of the analysis outlined above, which estimates the cost or savings from health care based on senior migration between 1980 and 2016. Generally speaking, provinces with a net inflow of seniors experienced a net increase in health care costs, while provinces with a net outflow of seniors recorded savings. British Columbia incurred the largest health care costs (\$7.2 billion in 2017 dollars) from seniors migrating to the province, while Quebec had the largest savings (\$6.0 billion) from seniors leaving the province. Again, the core problem is not that seniors are migrating, but that such migration is overlooked in the financing arrangements that support health care funding in Canada.

Saskatchewan (\$534 million), Manitoba (\$288 million), and Newfoundland and Labrador (\$8 million) recorded net savings from seniors migrating away from those provinces from 1980 to 2016. Ontario (\$403 million), Nova Scotia (\$46 million), and New Brunswick (\$23 million)

et al. (2017). Annual numbers were converted to 2017 dollars using Canada's all-items consumer price index in order to adjust for inflation over time. A 2.0 percent discount rate was applied to values beyond 2017.

incurred net costs from seniors migrating to those provinces. Prince Edward Island, one of the remaining provinces with positive inmigration of seniors, recorded essentially no costs or savings, which is largely attributable to the small net number of seniors migrating to the province over the 25-year period: 847.

The remaining province of Alberta is an interesting case and worth delving into in greater detail. At first glance, one would expect the costs to Alberta to be roughly one-quarter of those to British Columbia since Alberta's net migration of seniors was roughly one-quarter of British Columbia's rate (40,512 vs. 11,404). The reality, however, is that Alberta actually saved \$13 million over this period (see figure 6). The explanation for this counter-intuitive result exists in the nature and flow of seniors' migration in Alberta.

The easiest way to understand the anomalous result for Alberta is to compare its seniors' migration with British Columbia. Between 1997 and 2006, the seniors migrating to British Columbia were decidedly younger than those moving to Alberta. Specifically, 86.7 percent of British Columbia's seniors who migrated during this period were between the ages of 65 and 74 compared to only 41.0 percent for Alberta. Similarly, 34.3 percent of Alberta's seniors who migrated during this time were over the age of 80 compared to British Columbia, which actually recorded a net out-migration of seniors (1.4 percent of the total) over the age of 80 during this period. This compositional difference matters because younger seniors have a statistical tendency to live longer and thus incur greater health care costs based on the model used to estimate such costs in this paper.

Equally as important is the fact that while British Columbia has an almost uninterrupted in-

migration of seniors, patterns of migration to Alberta are more varied. For instance, between 2007 and 2010, and again from 2013 to 2015, the last year of analysis, the migration of seniors to Alberta was negative, meaning that more seniors left the province than moved into it. 10 In fact, the out-migration of seniors in Alberta in 2014 and 2015 (a total of 2,038 people) was quite marked. In addition, those seniors leaving the province from 2007 to 2016 tended to be quite young, which resulted in large savings for the province. Specifically, a little over 82 percent of the net 3,782 seniors who left Alberta from 2007 to 2016 were under age 74.

Of course migrating seniors also provide their destination province with additional tax revenues, though these revenues are a lot less than they would have contributed to their home province during their working lives (see figure 2). Unfortunately, a full tax model covering the entire period in question was not available because detailed estimates of provincial taxes by age group and by province from 1980 through 1996 are not readily available. The resources required to complete such an analysis are outside the confines of this essay.

We completed a partial analysis based on estimated provincial revenues using data from 1997 through to 2016. The estimates for provincial revenues coming from the migration of seniors were based on national age group tax data. In other words, the data looked at tax revenues by age group for the country as a whole rather

¹⁰ Between 1980 and 2016, there was a net cost to Alberta from health care costs incurred by migrating seniors: \$836 million. However, the pool of seniors that migrated from Alberta late in this time period was sufficient to create savings from 2017 to 2042 (the last year it is expected that a migrating senior will have survived), of \$849 million, which results in the net savings for the entire period of \$13 million.

than individually within each province. In addition, the estimated total amount of provincial taxes were adjusted by the share of health care spending relative to total spending in order to estimate the share of taxes provided by migrating seniors that would have conceptually been linked with health care spending. The analysis incorporated the same population, mortality data, and inflation adjustment as was used in the estimate for health care spending.

The partial analysis indicates that provincial tax revenues coming from migrating seniors would offset some of the costs or savings for outlays on health care. Specifically, from 1997 through 2016, the estimates indicate that seniors migrating to British Columbia could contribute as much as \$1.0 billion in health-specific tax revenues, which represents 36.3 percent of the additional health care costs BC will spend over the same period. Similarly, seniors leaving Quebec from 1997 through 2016 could have cost the Quebec treasury \$651 million in foregone revenues, or 19.2 percent of Quebec's savings over the same period.

Conclusion

There is clearly a discrepancy in the current financial arrangement between the provinces and the federal government regarding the migration of seniors. This discrepancy benefits some provinces at the expense of others; it exists in the fact that most people earn the bulk of their income (and so pay a majority of their lifetime taxes) during their working years. This contrasts starkly with the pattern of health care consumption, which is heavily skewed towards the later years of one's life. When seniors choose to migrate, the bulk of their taxes are paid in one province, but most of their health care costs are borne by another.

The problem this bulletin identifies will likely be exacerbated because the number of seniors is projected to increase from 16.9 percent of the population in 2017 to 23.1 percent by 2031. As the proportion of seniors rises, so too, will the proportion migrating between Canadian jurisdictions (Barua et al., 2017: 9).

Between 1980 and 2016, British Columbia experienced the largest net inflow of senior migrants of any province; Quebec and Saskatchewan, among others, experienced a net outflow. Seniors who migrated to BC between 1980 and 2016 will end up costing the province \$7.2 billion, while Quebec will ultimately experience a savings of almost \$6.0 billion over the same period. The results reveal a disparity between the provinces in terms of expenditures to cover the health care costs of migrating seniors.

These costs or savings are mitigated to some extent by the tax revenues that migrating seniors provide to the destination province. Specifically, our partial analysis indicates that up to 36.3 percent of the health care costs for migrating seniors in British Columbia would be mitigated by new tax revenues from them, while up to 19.2 percent of the savings in Quebec would be lost due to lower tax revenues.

The straightforward solution to this problem is to adjust transfers either from the federal government or between the provinces to account for migration patterns. However, this is a narrow solution to a narrow problem and it misses the larger issue with health care funding. That issue relates to how the entire health care system has been designed, particularly when compared to other universal-access health care countries. The real opportunity for reform rests in larger scale-even wholesale reform-of the country's universal health care system.

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Acknowledgments

This essay is based on a Fraser Forum article from February 2005 entitled "Migration of Seniors, Health Care Spending, and Fiscal Pressure." The content of this essay has been updated based on the latest available data.

The authors would like to express their sincerest appreciation to Bacchus Barua, the Institute's Associate Director of Health Care Studies for his comments on preliminary drafts and further helpful suggestions, and to an anonymous reviewer who specializes in health care economics. Their comments and suggestions were exceptionally valuable in making this bulletin better than it otherwise would have been. Any remaining errors or omissions are the sole responsibility of the authors. As the researchers have worked independently, the views and conclusions expressed in this paper do not necessarily reflect those of the Board of Directors of the Fraser Institute, the staff, or supporters.

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ISSN 2291-8620

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