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3 **Differences in Canadian public medication insurance plans and the impact on out-of-pocket**
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5 **costs**
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ABSTRACT (250 words)

Background: Research from 2006 documented significant variation in medication coverage for residents across Canada. Since then, provinces have undertaken major medication plan reforms. We sought to describe the differences across Canada and the resultant difference in out-of-pocket costs.

Methods: A synthesis was completed using data from public medication plan websites and other public source documents. Using two hypothetical clinical case scenarios, we determined the amount and type of a patient's out-of-pocket costs for five different patient subtypes: social assistance beneficiary, high income senior, low income senior, high income non-senior and low income non-senior.

Results: There is a public medication plan available for all Canadians. Cost sharing is employed across all provinces. Some residents must pay a premium to receive insurance or pay 100% of their medications costs until reaching a deductible amount, above which government funding covers a portion of medication costs. The out of pocket costs for the low medication burden scenario (~ \$500 medication cost) ranged from \$0-\$2100 while the costs for the high burden scenario (~\$1800 in medication cost) ranged from \$0-\$2500 with the variation due to province of residence, age and income.

Interpretation: Despite the lack of a national pharmacare program, there is a medication insurance plan, offering some level of government support, available for all Canadians. However, there continues to exist variations across the provinces with some groups facing large out of pocket expenses. Future work should focus on lack of affordability due to the cost-sharing structures rather than the ability to obtain medication insurance.

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3 **Background:**
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6 Although the Canada Health Act ensures universal coverage of medically necessary physician
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8 and hospital care, outpatient medications are not included in the Canada Health act and there is
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10 no requirement for provinces to provide outpatient medication coverage for all residents. As
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12 such, many studies have noted that Canada lacks universal medication insurance (1). Recent
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14 studies show that 14% of Western Canadians with chronic diseases do not have medication
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16 insurance (2). Even those Canadians that have medication insurance (public or private) generally
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18 pay a portion of the costs of their prescription medications. An estimated 10% of Canadians who
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20 are prescribed medications experience financial difficulties leading to cost-related non-
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22 adherence (i.e. not taking medications when indicated, not filling medications when needed and
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24 stretching prescriptions to last longer) (3). In addition, 8-22% of Western Canadians with chronic
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26 diseases perceive a financial barrier to care (2, 4). Individuals who perceive a financial barrier
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28 were found to be half as likely to receive preventive medications (1), and had higher
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30 hospitalization and mortality rates, compared to those who didn't perceive financial barriers (4).
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41 Each individual province and territory has developed their own publicly funded medication
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43 plans to cover different segments of their populations – often described as a 'patchwork' (5). In
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45 addition, a variety of cost-sharing and cost-containment mechanisms are employed across
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47 Canada including co-insurance, co-payments, deductibles and generic substitution rules
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49 (definitions in Box 1). Recent Canadian work has demonstrated that the risk of cost-related
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51 nonadherence increases significantly when out-of-pocket payments exceed a threshold of
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53 approximately 5% of household income (6).
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6 In 2006, interprovincial differences in public medication plans were documented, and the
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8 implications for patients were examined through a series of hypothetical case scenarios
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10 illustrating the amount of out-of-pocket expenditures by province (7). Since 2006, several
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12 provinces have undertaken major redesigns to their public medication plans, including the
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14 populations eligible, the cost-sharing between the government and patients, generic medication
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16 use and the use of premiums. Thus, we sought to update the information on publicly funded
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18 medication insurance plans available across Canada, and compare out-of-pocket costs for
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20 Canadians from across the country, based on medication burden, age and income. We provide
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22 illustrative examples to aid in understanding the current financial burden of typical patients and
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24 identify the types of patients most likely to experience high out-of-pocket costs.
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33 **Methods:**

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36 A synthesis of all provincial publicly funded medication plans was completed. Data were
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38 extracted from public medication plan websites and other public source documents. Key data
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40 elements included the relevant policies and rules of insurance plans (including generic
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42 substitution and first payer policies), populations covered by the publicly funded plans, the cost
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44 sharing mechanisms and the cost-containment strategies used by each plan. All data are current
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46 to November 2016, and the accuracy of the data abstracted was confirmed with provincial
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48 experts. The Territories and federal plans were not included in this analysis as these jurisdictions
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50 have limited information available publicly.
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3 To assess the variation in out-of-pocket costs across the country, we developed two clinical
4 scenarios that would be commonly seen by Canadian physicians. We assumed that patients
5 would all hold the public medication insurance that was available to them based on their age
6 and income. For each of the clinical scenarios (Box 1), we simulated five different age and
7 income scenarios to illustrate variations in the provincial medication plan coverage. Specifically,
8 we considered how a patient's age (under or over age 65), household income (above or below
9 low income cut-offs), and social assistance beneficiary status impacted out of pocket cost (Box
10 1).
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26 For each clinical scenario and patient demographic profile, we calculated the annual patient-
27 borne out-of-pocket costs based on the eligibility rules and regulations of the applicable
28 provincial insurance plan. Each component of the total cost was reported separately (i.e.
29 deductible, copayment and premium). We assumed that all prescriptions were dispensed in 3-
30 month supplies as the majority of provinces allow a maximum of 100 days per dispense. To
31 ensure that the differences in out-of-pocket costs were due to the different cost-sharing
32 mechanisms employed in each plan, and not due to different absolute medication prices
33 negotiated by provinces with pharmaceutical companies, we used the 2016 Alberta medication
34 prices for all provinces and territories (8). The province-specific dispensing fee was added to the
35 total cost of each prescription. All costs are expressed in 2016 Canadian dollars.
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51 **Results:**

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54 *Comparison of medication plans across Canada:*
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3 All provinces have generic payment rules which generally state that the provincial payer will
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5 only pay the amount for generic equivalents, where available. With the exception of QC, all
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7 provinces use multiple medication insurance plans, ranging from 5 plans (MB, NL, NS) to 27
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9 distinct plans (PEI) (Table 1). All provinces have generous plans for social assistance beneficiaries
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11 that leave patients with minimal, or no, out-of-pocket expenditures. All of the provinces have
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13 different plans for those under and over 65 years of age except Manitoba and British Columbia
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15 (who is in the process of phasing out their age-based plan). Some provinces rely on premium-
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17 based systems, while most use primarily some mix of copayments and deductibles to cost-share
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19 with beneficiaries. In general, the amount of out-of-pocket expenditures paid by Canadians
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21 varies by medication burden and/or income level, except within Alberta, where all individuals
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23 under 65 years of age with an individual income more than of \$20,970 (or family income of
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25 \$33,240), have the same out-of-pocket burden (Appendix 1). Other characteristics of the plans
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27 that vary across Canada include the adoption of first-payer policy (BC, AB, SK, ON, QC) and the
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29 mandatory requirement to carry medication insurance (QC).
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41 *Clinical scenarios:*

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43 For individuals receiving social assistance, nearly all provinces provide comprehensive coverage
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45 without cost-sharing. In the few provinces that require copayments, it is a nominal amount (ie.
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47 \$2-5 per prescription). Thus, such individuals in both the low and high medication burden
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49 scenarios, experience limited or no expenses for their prescription medications.
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3 In the low medication burden scenario, out-of-pocket costs vary across Canada, ranging from
4 \$250 to \$2100 for those with higher incomes (Figure 1: a and b), and from \$0 to \$700 for lower
5 income individuals (Figure 1: c and d). The out-of-pocket costs were generally lower for Seniors
6 than for younger residents and for lower income individuals compared to those with higher
7 incomes. There are several provincial outliers, particularly notable are the provinces that use
8 premiums (AB [non-seniors], QC and NB [seniors]). Due to the premium costs in these
9 provinces, individuals with low medication burdens were found to potentially contribute more
10 than their actual medication costs (approx. \$500).
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26 In the high medication burden scenario, out-of-pocket costs ranged \$250 to \$2500 for higher
27 income individuals (Figure 2: a and b), and from \$0 to \$1100 for lower income individuals
28 (Figure 2: c and d). In all provinces, patient income level, or in some cases income-to-
29 medication-burden ratio, is used to determine cost sharing. This feature of means-testing is less
30 prominent in Alberta, meaning that Albertans, irrespective of income, pay nearly the same
31 amount for their medications (there is a slight premium subsidy for those with incomes
32 <\$20,970). Therefore, lower income Albertans experience among the highest out-of-pocket
33 costs for seniors and the highest out-of-pocket costs for non-seniors.
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48 Discussion

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50 All Canadian provinces have publicly-funded medication insurance plans that provide some level
51 of support to all residents. However, each province and occasionally the different plans within a
52 province, utilize a variety of cost-sharing mechanisms. A few provinces have premium-based
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3 systems for certain segments of the population (non-seniors in AB, those with higher incomes in
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5 NB & NS, those without private insurance in QC), while several have adopted models with
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7 deductibles and others rely predominantly on copayments or co-insurance. Some provinces
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9 provide more generous coverage to those over the age of 65 while others have across the board
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11 means-testing, regardless of age.
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18 This study is particularly relevant in the current climate with frequent discussion in the
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20 academic literature regarding the need for a system of national pharmacare to replace the
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22 current patchwork system of pharmaceutical insurance in Canada (9). However, as
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24 demonstrated in the present work, there are no circumstances where public medication
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26 insurance, in some form, is unavailable to an individual. Given that there is a publicly-funded
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28 plan available for all Canadians, one could argue that Canadian provinces have achieved
29
30 universality in medication coverage. Despite this achievement, 1 in 10 Canadians experience
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32 cost-related non-adherence (3). This suggests that the main gap in contemporary medication
33
34 coverage is not the ability to obtain medication insurance per se, but rather the affordability of
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36 medications within insurance plans. Affordability may be addressed by policy changes targeting
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38 cost-sharing structures, rather than focusing on national pharmacare, which would require
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40 significant and expensive administrative restructuring. Recent work has demonstrated that
41
42 there is a threshold of out of pocket expenditures above which patients may be more likely to
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44 perceive financial barriers. While the exact threshold remains unknown, it is likely between 3-
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46 5 % of household income (6). Changes in cost-sharing that limit patients' out-of-pocket
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3 exposure to less than 5% of household income may reduce the number of Canadians who are
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5 forced to engage in cost related non-adherence.
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10 While it is known that cost-sharing is associated with decreased adherence for individuals with
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12 lower incomes (10), it remains unclear which form of cost-sharing has less impact on adherence
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14 or is preferred by patients. The only data published on this topic comes from a recent US study
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16 which demonstrated that while higher deductible *health* insurance plans often lead to higher
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18 out-of-pocket expenses, they do not result in patients choosing to delay seeking care due to
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20 costs (11); there are not data published that assess the relationship specifically for medication
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22 insurance. Given the differences in medication insurance coverage across Canada, additional
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24 research on the association between plan design, appropriate medication use, adherence and
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26 outcomes could inform policy.
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36 Only a few provincial medication plans use premiums. A reliance on premiums may lead to
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38 situations where it is advantageous for individuals to remain uninsured. These would be cases
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40 when an individual's medication burden, even when paying 100% of the cost, remains less than
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42 the cost of premiums and copayments. This insurance selectivity may lead to an unbalanced
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44 risk pool in the insurance market and leave the publicly funded plans insuring only those at
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46 highest risk (or with greatest expense). In order to address this issue, Quebec has instituted a
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48 mandatory insurance policy although publications assessing the impact of this policy are lacking
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53 (12, 13). Further study assessing the implications of mandatory insurance for private insurance,
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3 public support for legislative changes, and the impact on out-of-pocket costs would be required
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5 before other provinces consider adopting mandatory insurance.
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9 Another way to achieve lower out-of-pocket costs is to decrease the price of medications paid
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11 by the provinces. Proposed ways to accomplish this include mandatory generic substitution
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13 regulations, and active negotiations between united provincial payers and the pharmaceutical
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15 industry (14). The Patented Medications Price Review Board was one mechanism put in place to
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17 accomplish more effective negotiations, yet to date this has been largely unsuccessful in
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19 reducing prices for a number of reasons (15). There is some optimism surrounding the more
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21 recently formed Pan-Canadian Pharmaceutical Alliance with hopes that it will be more
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23 successful in increasing the bargaining power of the individual Canadian provinces in order to
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25 lower total medication costs resulting in savings to payers and ultimately to patients (through
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27 lower copayments) (16).
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37 **Limitations**

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39 This study is limited by the complexity of each province's multitude of public medication
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41 insurance plans. We gathered information from publicly available sources (ie. provincial
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43 websites) to obtain accurate and up-to-date information on each medication plan, yet specifics
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45 regarding how each province administers their plans was not uniformly available. While we tried
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47 to be comprehensive with our clinical cases and age/demographic scenarios, it is difficult to
48
49 represent all possible combinations of the important contributing variables, especially given the
50
51 very high number of plans that are available in certain provinces. Of particular note, we only
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53 considered the standard population based plans across the provinces. Many provinces also
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3 have a variety of specialized programs that support patients with exceptional needs such as
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5 palliative care, high-cost medications, infectious diseases and cancer. There may be
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8 interprovincial variation in these plans but this was not the focus of this study.
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11 12 13 **Conclusions** 14

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16 Canada's delivery of pharmaceutical insurance has been described as a patchwork, with each
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18 province having separate medication insurance plans leading to some variations in out of pocket
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20 payments across the provinces. Despite this variation, there is a publicly available plan for all
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22 Canadians. Taken in concert with past studies that have shown that 10-12% of Canadians
23
24 experience financial barriers that result in cost-related non-adherence, the ability to obtain
25
26 medication insurance may not be the main issue, but rather the affordability of that insurance
27
28 based on the cost-sharing structures that are in place. Cost sharing that varies with income may
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30 lead to more equitable access to medications. Medication plan reform targeted towards
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32 supporting those that may be at highest risk of financial barriers may achieve the greatest
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Figure legend

Figure 1: Out-of-pocket expenditures by province, Low medication burden scenario

Figure 2: Out-of-pocket expenditures by province, High medication burden scenario

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Box 1: Overview of the clinical scenarios and patient demographic profiles considered

Clinical Scenarios
<ol style="list-style-type: none"> <li data-bbox="233 327 1365 590">1. Case 1: hypothyroidism, osteoporosis, depression and anxiety currently taking levothyroxine (75 mcg daily), alendronate sodium (70 mg weekly), lorazepam (1 mg nightly) and escitalopram (20 mg daily). Approximate medication cost: \$500 (Low cost) <li data-bbox="233 636 1365 978">2. Case 2: type 2 diabetes mellitus and coronary artery disease currently taking atorvastatin (40 mg daily), carvedilol (12.5 mg twice daily), irbesartan (150 mg daily), clopidogrel (75 mg daily), nitroglycerin (0.4 mg/hr transdermally 12hrs daily), metformin (1000mg twice daily), and insulin glargine (50 units subcutaneously twice daily). Approximate medication cost: \$1800 (High cost)
Patient Demographic Profiles
<ol style="list-style-type: none"> <li data-bbox="233 1104 1268 1209">1. Social assistance beneficiary: a 35 year old who is receiving social assistance benefits. <li data-bbox="233 1255 1341 1444">2. Low income Senior: a 67 year old with an annual after-tax income of \$14,000 who receives the Old Age Supplement (OAS) and the Guaranteed Income Supplement (GIS). <li data-bbox="233 1491 1284 1596">3. High income Senior: a 72 year old with an annual after-tax income of \$55,000 including CPP and private pensions. <li data-bbox="233 1642 1357 1673">4. Low income Non-Senior: a 52 year old with an annual after-tax income of \$14,000. <li data-bbox="233 1719 1365 1751">5. High income Non- Senior: a 45 year old with an annual after-tax income of \$55,000.

Table 1. Overview of Characteristics of Publicly Funded Medication Plans across Canadian Provinces/Territories

Province and Territory	Number of Plans	Common target populations for publicly funded medication plans (✓) and whether coverage is subject to a premium			Generic Payment Rules	Government First Payer
		General Population	Seniors ¹	Social Assistance/Low Income		
Alberta	10	Premiums	✓	✓	✓	✓
British Columbia	10	✓	Born before 1939	✓	✓	✓
Saskatchewan	11	✓	✓	✓	✓	✓
Manitoba	5	✓	Same as general population	✓	✓	✗
Ontario	7	✓	✓	✓	✓	✓
Quebec ²	1	Premiums	Premiums	✓	✓	✓
Newfoundland and Labrador	5	✓	✓	✓	✓	✗
Nova Scotia	5	✓	Premiums	✓	✓	✗
New Brunswick	10	Premiums	Low income only	✓	✓	✗
Prince Edward Island	27	Combination of plans ³	✓	✓	✓	?

✓ = yes; ✗ = no; ? = unclear

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¹ Over 65 years of age unless otherwise denoted.

² All persons are mandated to have insurance (private or public).

³ Prince Edward Island has a variety of disease- and medication-based plans for those under 65 years of age.

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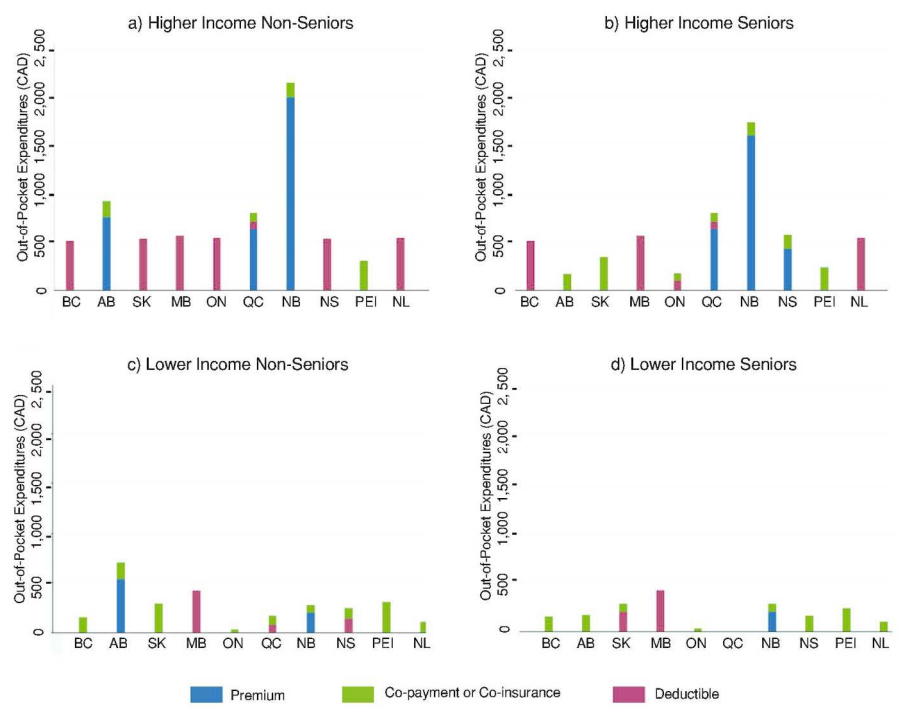


Figure 1: Out-of-pocket expenditures by province, Low medication burden scenario
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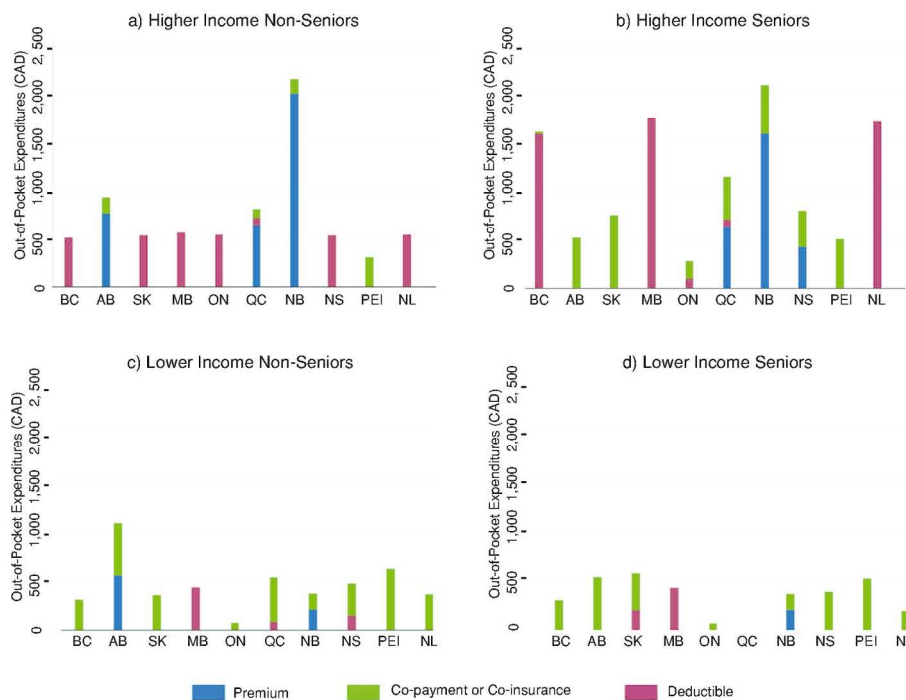


Figure 2: Out-of-pocket expenditures by province, High medication burden scenario

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Web Appendix:

Table 1. Characteristics of Publicly Funded Medication Plans for those on Social Assistance/Low Income

	Name of Plan	Premium	Fixed Copayment	Co-Insurance	Deductible	Maximum Out-of-Pocket
Alberta	Alberta Adult Health Benefit (AAHB)	x	x	x	x	N/A
British Columbia	PharmaCare Plan C	x	x	x	x	N/A
Saskatchewan	Supplementary Health Program – Prescription Medications	x	Up to \$2 per prescription dispensed for adults	x	x	x
Manitoba	Employment and Income Assistance (EIA) – Prescription Medications Assistance for Participants	x	x	x	x	N/A
Ontario	Ontario Medication Benefit (ODB) Program	x	\$2 per prescription dispensed	x	x	x
Quebec	Public Prescription Medication Insurance Plan	x	x	x	x	x

	Name of Plan	Premium	Fixed Copayment	Co-Insurance	Deductible	Maximum Out-of-Pocket
Newfoundland and Labrador	Foundation Plan (income support recipients)	✘	✘	✘	✘	N/A
	Access Plan (low income families and individuals)	✘	✘	20% - 70% of total prescription costs, varies with income	✘	✘
Nova Scotia	Pharmacare Benefit	✘	\$5 per prescription dispensed	✘	✘	✘
New Brunswick	Plan E (Adults in Licensed Residential Facilities)	?	\$4 per prescription dispensed	✘	?	\$250 annually
	Plan F (Social Development Clients)	?	\$4 per prescription dispensed for adults (> 18 yrs.) and \$2 for children (< 18 yrs.)	✘	?	\$250 per family unit annually
	Plan G (Special needs children and children in care of the Minister of Social Development)	✘	✘	✘	✘	N/A
Prince Edward Island	Financial Assistance Medication Program	✘	✘	✘	✘	N/A

✘ = no; N/A = not applicable; -- = not covered; ? = unclear

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Table 2. Characteristics of Publicly Funded Medication Plans for Seniors

	Name of Plan	Premium	Fixed Copayment	Co-Insurance	Deductible	Maximum Out-of-Pocket
Alberta (Over age of 65)	Coverage for Seniors	✘	✘	30% of the cost of the prescription dispensed.	✘	\$25 maximum per prescription dispensed
British Columbia (Born before 1939)	Fair Pharmacare	✘	✘	After deductible, 25% of the cost of the prescription dispensed	Annually 0-2% of net income, varies with income	Annually 1.25-3% of net income, varies with income
Saskatchewan (Over age of 65)	Seniors' Medication Plan	✘	Maximum \$20 per prescription medication dispensed	✘	✘ (Unless GIS recipient, Seniors Income Plan [SIP], or supplemented with Special Support Program)	N/A
Manitoba	Same as general population. No age-based plan					
Ontario (Over age of 65)	Ontario Medication Benefit (ODB) Program	✘	\$2 per prescription dispensed if income <\$16,018 (single),	✘	\$0 if income <\$16,018 (single), <\$24,175 (couple)	N/A

	Name of Plan	Premium	Fixed Copayment	Co-Insurance	Deductible	Maximum Out-of-Pocket
			<\$24,175 (couple) Maximum \$6.11 per prescription dispensed otherwise		\$100 otherwise	
Quebec (Over age of 65, not eligible for private insurance)	Public Prescription Medication Insurance Plan	Annually \$0 - \$607, varies with income	✘	After deductible, 34% of the cost of the prescription dispensed	\$18 monthly	Monthly: \$85.75 Annual: \$1029
Newfoundland and Labrador (Over age of 65 and receiving Old Age Security Benefits and Guaranteed Income Supplement)	65Plus Plan	✘	Maximum \$6 of dispensing fee per prescription	✘	✘	✘
Nova Scotia (Over age of 65)	Senior's Pharmacare	Annually \$0-\$424, varies with income	✘	30% of the cost of the prescription dispensed	✘	Annual limit including premium and copayments \$382-\$806, varies

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	Name of Plan	Premium	Fixed Copayment	Co-Insurance	Deductible	Maximum Out-of-Pocket
						with income
New Brunswick	New Brunswick Seniors Plan A (Over 65 yrs. and receiving Guaranteed Income Supplement (GIS) or are low income)	✘	GIS recipients: Maximum \$9.05 per prescription dispensed \$15 per prescription dispensed otherwise	✘	✘	Annual for GIS recipients: \$500 No maximum otherwise
	Medavie Blue Cross Seniors Prescription Medication Program (over 65 yrs. of age)	\$115 monthly	Up to \$15 per prescription dispensed	✘	✘	✘
Prince Edward Island (Over age of 65)	Seniors' Medication Cost Assistance Program	✘	Maximum \$8.25 per prescription dispensed plus pharmacy professional fee up to \$7.69	✘	✘	✘

✘ = no; N/A = not applicable; -- = not covered; ? = unclear

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Table 3. Characteristics of Publicly Funded Medication Plans for the General Population Under Age 65

	Name of Plan	Premium	Fixed Copayment	Co-Insurance	Deductible	Maximum Out-of-Pocket
Alberta (AB resident, under 65 yrs. of age)	Non-Group Coverage	Monthly premium Single = \$63.50 Family = \$ 118 Billed quarterly	✘	30% of the cost of the prescription dispensed	✘ (deductible applies to other health benefits, excludes medications)	\$25 maximum per prescription dispensed
British Columbia (BC resident)	Fair Pharmacare	✘	✘	After deductible, 30% of the cost of the prescription dispensed	Annually 0-3% of net family income, varies with income	Annually 2-4% of net family income, varies with income
Saskatchewan (Sask. resident)	Special Support Program	✘	✘	Before deductible, varies with income and monthly medication expenditures After deductible, 35% of	3.4% of net family income Paid semi-annually	✘

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	Name of Plan	Premium	Fixed Copayment	Co-Insurance	Deductible	Maximum Out-of-Pocket
				prescription dispensed		
Manitoba (MB resident)	Pharmacare Program	✘	✘	✘	Annually 2.97-6.73% of net income, varies by income, minimum of \$100	N/A
Ontario (ON resident, no or limited private insurance)	Trillium Medication Program	✘	After deductible, maximum \$2 per prescription dispensed	✘	Annually ~4% of net income Paid quarterly.	✘
Quebec (those not eligible for private insurance)	Public Prescription Medication Insurance Plan	Annual premium \$0 - \$660, varies with income	✘	After deductible, 34% of the cost of the prescription dispensed	\$18 monthly	Monthly: \$85.75 Annual: \$1029
Newfoundland and Labrador (NFLD resident, experience high medication costs)	Assurance Plan	✘	✘	Rate= (family income*cap rate)/total medication expenditure of family	✘	Annually 5-10% of net income, varies with income
Nova Scotia	Family	✘	✘	20% of the cost of the	Annually 1-20% of net	Annually 6-35% of net

	Name of Plan	Premium	Fixed Copayment	Co-Insurance	Deductible	Maximum Out-of-Pocket
(NS resident)	Pharmacare			prescription dispensed	income, varies by income	income, varies by income
New Brunswick (NB resident, no or limited private insurance)	New Brunswick Medication Plan	Annual premium \$200-\$2,000, varies with income	✘	30% of the cost to a maximum of \$5-\$30 per prescription dispensed, varies with income	✘	✘
Prince Edward Island (PEI residents, no private insurance)	Generic Medication Program, 8 disease-based medication plans, 4 medication-specific plans and 2 high-cost medication plans. Limited details of coverage available.					

✘ = no; N/A = not applicable; -- = not covered; ? = unclear