

## Article

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*by David J.T. Campbell, Kathryn King-Shier, Brenda R. Hemmelgarn, Claudia Sanmartin, Paul E. Ronksley, Robert G. Weaver, Marcello Tonelli, Deidre Hennessy and Braden J. Manns*

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- .. not available for a specific reference period
- ... not applicable
- 0 true zero or a value rounded to zero
- 0<sup>s</sup> value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded
- P preliminary
- r revised
- X suppressed to meet the confidentiality requirements of the *Statistics Act*
- E use with caution
- F too unreliable to be published
- \* significantly different from reference category ( $p < 0.05$ )

# Self-reported financial barriers to care among patients with cardiovascular-related chronic conditions

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## Abstract

### Background

People with chronic conditions who do not achieve therapeutic targets have a higher risk of adverse health outcomes. Failure to meet these targets may be due to a variety of barriers. This article examines self-reported financial barriers to health care among people with cardiovascular-related chronic conditions.

### Data and methods

A population-based survey was administered to western Canadians with cardiovascular-related chronic conditions (n = 1,849). Associations between self-reported financial barriers and statin use, the likelihood of stopping use of prescribed medications, and emergency department visits or hospitalizations were assessed.

### Results

More than 10% respondents reported general financial barriers (12%) and lack of drug insurance (14%); 4% reported financial barriers to accessing medications. Emergency department visits or hospitalizations were 70% more likely among those reporting a general financial barrier. Those reporting a financial barrier to medications were 50% less likely to take statins and three times more likely to stop using prescribed medications. Individuals without drug insurance were nearly 30% less likely to take statins.

### Interpretation

In this population, self-reported financial barriers were associated with lower than recommended medication use and increased likelihood of emergency department visits or hospitalization.

## Keywords

Health insurance, health services accessibility, socio-economic factors, socio-economic status

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Even in a system with universal health care, financial barriers may reduce access to medical care and can affect health outcomes. Because many provincial health insurance plans do not cover prescription drugs for all citizens,<sup>1</sup> some patients may not obtain prescribed medications.<sup>2</sup> Even those with drug coverage may still bear financial burdens, such as copayments and deductibles.<sup>3</sup>

Financial barriers may be especially important for people with cardiovascular-related chronic conditions, who typically require ongoing monitoring and long-term use of costly prescription medications.<sup>4,5</sup> People with lower socio-economic status<sup>6,7</sup> are particularly vulnerable to experiencing poor health outcomes.<sup>8,9</sup>

Earlier research has examined the affordability of health care in Canada, including types of provincial drug coverage,<sup>10</sup> out-of-pocket expenditures,<sup>1</sup> and cost-related non-adherence.<sup>2</sup> Several studies indicate that provision of drug insurance, particularly to people with cardiovascular conditions, increases the use of preventive medications.<sup>11-14</sup> Others have shown that such insurance is associated with improved clinical outcomes, for instance, with respect to blood pressure<sup>14</sup> and cardiac events.<sup>3</sup> Some studies also suggest that the outcome of insurance provision may be reduced costs in other health care areas, such as emergency department visits and hospitalizations.<sup>13</sup>

However, relationships between different types of financial barriers and care indicators or adverse outcomes in patients with chronic conditions are not clear.

A survey conducted in the four western provinces collected data on self-reported financial barriers to health care among adults who reported that they had been diagnosed with hypertension, diabetes, heart disease and/or stroke. The goals were to determine the prevalence of various types of self-reported financial barriers, factors associated with experiencing these barriers, and their implications. The present analysis sought to determine if self-reported financial barriers were associated with lower use of guideline-recommended medications, stopping use of one or more recommended medications, and greater out-of-pocket expenditures. The association between self-reported financial barriers and chronic condition-related emergency department visits and hospitalization was also assessed.

## Data and methods

### Survey design

From February 1 to March 31 2012, Statistics Canada conducted a survey designed by the Interdisciplinary Chronic Disease Collaboration<sup>15</sup>—“Barriers to Care for People with Chronic Health Conditions” (BCPCHC)<sup>16</sup>—using computer-assisted telephone interviews. The survey collected information about aspects of care and potential barriers, including financial barriers, access barriers, geographical barriers, and health-care-system-related barriers among people with at least one of four cardiovascular-related chronic conditions. With respondent consent, their BCPCHC responses were linked to their 2011 Canadian Community Health Survey (CCHS) responses to provide detailed information about hospitalizations and socio-demographic and health characteristics.

The present study was approved by the Conjoint Health Research Ethics Board of the University of Calgary and the Health Research Ethics Board of the University of Alberta. In accordance with Statistics Canada procedures, the survey underwent pilot testing and multiple revisions to ensure that the questionnaire content was relevant to the patient population.<sup>16</sup>

### Respondents

The initial sampling frame for the BCPCHC consisted of all 2011 CCHS respondents who: (1) resided in British Columbia, Alberta, Saskatchewan or Manitoba; (2) were aged 40 or older; and (3) self-reported having at least one of heart disease, stroke, diabetes, or hypertension.

Of an initial 4,331 CCHS respondents, 2,582 were considered “in scope” for the BCPCHC; that is, they had not participated in another Statistics Canada CCHS sub-survey in 2011; they confirmed that they had a cardiovascular-related chronic condition; and they agreed to have their BCPCHC results linked to their CCHS responses. From this sampling pool, 2,316 were randomly selected for the BCPCHC. The response rate was 80%, yielding a final study population of 1,849.

### Variables

Three types of self-reported *financial barriers* were examined: general financial barriers (difficulty paying for services, equipment or medications); financial barriers to accessing medications (not obtaining medications because of cost); and lack of insurance coverage for prescription medications (Appendix).

Respondents were asked if they used *statins* and *acetylsalicylic acid (Aspirin/ASA)* regularly in the past month. These drugs are recommended for most patients at high risk of cardiovascular events.<sup>17,18</sup> Compared with ASA (about \$50 a year), statins are relatively expensive (\$500 to \$700 a year<sup>19</sup>), so patients reporting financial barriers may be less likely to use them on a daily basis. ASA use was selected as a secondary outcome and negative control; it was hypothesized that financial barriers would be less relevant for the use of ASA than for the use of statins. Therefore, people with cardiovascular-related chronic conditions who were not using ASA might have reasons other than cost for non-use.

To identify respondents who, ideally, should be taking these medications, a subset of the total study population at higher cardiovascular risk was defined using an algorithm modified from the Canadian Diabetes Association (CDA) practice guidelines<sup>17</sup> and Canadian Hypertension Education Program (CHEP) recommendations.<sup>18</sup> Although some of the clinical information needed to make this determination (for instance, blood pressure control, family history, symptoms) was lacking, available data were used to generate a high-risk cohort. This was comprised of people who self-reported having heart disease or stroke; those who had both hypertension and diabetes; current smokers; those with hypertension only who were aged 55 or older; and those with diabetes only who were aged 45 or older (men) or 50 or older (women).

*Non-adherence to prescribed medication* was defined as respondents reporting that they had stopped taking one or more of their medications for at least one week in the past 12 months.

Respondents reported their estimated 12-month *out-of-pocket expenses for medications*. The estimate was extrapolated from a three-month recall if this was easier for the respondent than recalling the total amount over 12 months.

Respondents were asked if, in the past 12 months, they had visited an *emergency department* or been *hospitalized* for care of their cardiovascular-related chronic condition. Their answers were used to derive a binary variable differentiating those who had had an emergency department visit or who had spent at least one night in hospital from those who did neither.

Based on the literature, a list of potential covariates was generated to identify variables that were theoretical confounders (potentially independently associated with both the exposure and the outcome): age, sex, multimorbidity (having more than one of the four selected chronic conditions), having a regular family physician, and selected socio-demographic characteristics. Because multidisciplinary teams have been shown to improve the quality of care for people with chronic conditions,<sup>20</sup> the models also controlled for involvement of a non-physician health care provider.

### Statistical analyses

All analyses were performed using STATA 11.0 (Statacorp, College Station, Texas). Frequency weights were calculated by Statistics Canada to account for non-representative sampling and to reflect the adult population with chronic conditions in the four western provinces.<sup>21</sup> All percentages and models used these weights, and proportions were stratified by the presence of multimorbidity. Bootstrapping procedures with 500 replications were used to calculate standard errors and confidence intervals around the estimates. As recommended by Statistics Canada, the coefficient of variation was used to determine the reliability of reported percentages.<sup>22</sup>

Log-binomial regression models were used to calculate unadjusted and adjusted prevalence rate ratios (PRR), using a stepwise approach. Initially, bivariate models

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were generated to test independent associations between the covariate and outcome of interest. Each covariate that was significant in bivariate modelling was then tested in simplified models that included the covariate of interest, the exposure, and the outcome. If the covariate was a potential confounder (change in point estimate

of at least 10%), it was included in the full model. The final model was obtained through a process of backwards elimination. Covariates with p-values > 0.10 on the Wald test were removed sequentially; if there was no evidence of confounding (point estimate did not change by at least 10%), the variable was eliminated from the

model. Each variable in Table 1 was considered a possible confounder and tested in this way. In addition, joint confounding and effect measure modification were assessed using modelling with interaction terms between lack of drug insurance and province, lack of drug insurance and age, and multimorbidity and age.

**Table 1**  
**Percentage distribution of selected socio-demographic and health characteristics, by number of chronic conditions, household population aged 40 or older,<sup>†</sup> Manitoba, Saskatchewan, Alberta and British Columbia, 2012**

Characteristics	Number of chronic conditions								
	Total			One			Two or more		
	%	95% confidence interval		%	95% confidence interval		%	95% confidence interval	
		from	to		from	to		from	to
<b>Total</b>	100.0	...	...	67.8	64.8	70.8	32.2	29.2	35.2
<b>Sex</b>									
Men	49.9	46.0	53.8	47.9	43.1	52.7	54.2	48.0	60.4
Women	50.1	46.2	54.0	52.1	47.3	56.9	45.8	39.6	52.0
<b>Age group (years)</b>									
40 to 64	48.8	45.7	52.1	54.4	50.3	58.5	37.2	31.1	43.4
65 to 74	26.9	23.9	29.8	25.4	21.7	29.0	30.0	24.7	35.4
75 or older	24.3	21.5	27.0	20.2	16.9	23.6	32.7	27.0	38.4
<b>Marital status</b>									
Married/Common-law	66.9	63.2	70.6	69.2	64.7	73.7	62.2	56.6	67.8
Widowed/Separated/Divorced/Never married	33.1	29.4	36.8	30.8	26.3	35.3	37.8	32.2	43.4
<b>Ethnicity</b>									
White	86.7	83.5	89.9	87.3	83.2	91.4	85.4	80.6	90.1
Aboriginal	4.2	2.9	5.5	3.3	1.8	4.9	6.0	3.3	8.7
Other	9.1	6.0	12.2	9.4	5.3	13.4	8.7	4.6	12.7
<b>Education</b>									
Less than secondary graduation	21.3	18.6	24.1	18.7	15.5	21.9	26.8	21.6	32.0
Secondary graduation/Some postsecondary	22.0	18.9	25.1	22.3	18.3	26.2	21.5	16.2	26.8
Postsecondary graduation (less than bachelor's degree)	37.7	33.9	41.5	37.1	32.2	42.0	38.8	33.0	44.6
Bachelor's degree or higher	19.0	15.6	22.4	21.9	17.3	26.5	12.9	9.1	16.7
<b>Household income</b>									
Less than \$30,000	21.8	18.9	24.7	18.5	15.2	21.8	28.6	23.1	34.1
\$30,000 to \$54,999	27.4	24.3	30.4	23.8	20.2	27.3	34.9	29.5	40.4
\$55,000 to \$94,999	24.9	21.5	28.4	27.0	22.4	31.6	20.6	15.7	25.4
\$95,000 or more	26.0	22.3	29.6	30.7	25.8	35.6	15.9	11.4	20.4
<b>Location</b>									
Urban	82.5	79.5	85.4	82.9	79.1	86.6	81.7	77.5	85.9
Rural	17.5	14.6	20.5	17.1	13.4	20.9	18.3	14.1	22.5
<b>Province of residence</b>									
British Columbia	44.5	41.3	47.7	43.8	39.2	48.4	46.0	40.7	51.3
Alberta	31.7	28.8	34.6	33.9	29.8	37.9	27.0	22.5	31.6
Saskatchewan	10.8	9.4	12.1	9.7	8.0	11.5	13.0	9.7	16.2
Manitoba	13.0	11.1	15.0	12.6	9.9	15.4	14.0	10.1	17.9
<b>Body mass index category (corrected for self-report bias<sup>23</sup>)</b>									
Normal/Underweight (less than 25)	23.3	19.8	26.7	24.7	20.3	29.2	20.0	14.7	25.4
Overweight (25 to 29.9)	36.7	32.5	40.8	38.0	32.9	43.2	33.7	27.6	29.9
Obese (30 or more)	40.1	36.2	44.0	37.2	32.2	42.3	46.2	40.1	52.3
<b>Health literacy</b>									
Adequate	84.8	81.9	87.7	89.0	86.0	92.0	75.7	70.0	81.5
Inadequate	15.2	12.3	18.1	11.0	8.0	14.0	24.3	18.5	30.0

<sup>†</sup> reported diagnosis of diabetes, heart disease, hypertension and/or stroke

... not applicable

Source: 2012 Barriers to Care for People with Chronic Health Conditions Survey.

## What is already known on this subject?

- Despite Canada's universal health care system, patients may perceive financial barriers when seeking care.
- Perceived financial barriers may be especially important for people with cardiovascular-related chronic conditions.
- Several studies have examined the cost of medical care in Canada, but relationships between different types of financial barriers and health care indicators or adverse outcomes in patients with chronic conditions are not clear.

## What does this study add?

- Perceived financial barriers were relatively common among people with cardiovascular-related chronic conditions.
- Patients who reported financial barriers were less likely to use statins, more likely to stop using prescribed medications, and more likely to have an emergency department visit or hospitalization related to their cardiovascular-related chronic condition.

## Results

### Study population

Just over half (52%) of BCPCHC respondents were aged 65 or older; two-thirds (67%) were married; and a large majority (83%) lived in urban areas (Table 1). Respondents who had more than one of the selected cardiovascular-related conditions (multimorbidity) were more likely to be men, to live in lower-income households, and to have relatively low levels of education.

### Prevalence of self-reported barriers

An estimated 12% of respondents reported general financial barriers to health care; 4% reported financial barriers specifically to accessing medications; and 14% lacked prescription drug insurance (Table 2).

The prevalence of self-reported financial barriers varied by the number of chronic conditions respondents reported. Compared with people who had just one condition, those with at least two were more likely to report general financial barriers (PRR: 2.7; 95% CI: 1.7-4.2) and financial barriers to accessing medications (PRR: 7.6; 95% CI: 2.7-21.7), but they were no more likely to lack drug insurance (PRR: 1.0; 95% CI: 0.7-1.4) (Table 2).

Several patient factors were associated with reporting general financial barriers and lacking drug insurance (Table 3). Lower income, obesity, and non-White ethnicity were each associated with general financial barriers. Living in a rural area or in a province other than Alberta was associated with not having drug insurance.

### Medication use

Almost half (48%) of respondents were using statins (Table 4). The prevalence of statin use was similar among people who did and did not report general financial barriers (Table 5). However, those who reported difficulty accessing medications because of cost were 50% less likely to be taking statins (adjusted PRR 0.5; 95% CI: 0.3-0.9), compared with those who did not report this difficulty. People without drug insurance were nearly 30% less likely to take statins (adjusted PRR 0.7; 95% CI: 0.6-0.9) than were those with drug insurance.

When the influence of all the variables in the analysis was taken into account, none of the three types of self-reported financial barriers was associated with ASA use (Table 5).

An estimated 13% of respondents had stopped taking one or more prescription medications (Table 4).

A financial obstacle to accessing medications was the only barrier associated with having stopped using prescribed

**Table 2**  
Prevalence of self-reported financial barriers to receipt of health care services, by type of barrier and number of chronic conditions, household population aged 40 or older,<sup>†</sup> Manitoba, Saskatchewan, Alberta and British Columbia, 2012

Type of barrier	Number of chronic conditions						Comparison (one versus two or more conditions)					
	Total			One			Two or more					
	95 % confidence interval			95 % confidence interval			95 % confidence interval					
	%	from	to	%	from	to	%	from	to	Prevalence rate ratio	from	to
General financial barrier	12.0	9.3	14.7	7.8 <sup>E</sup>	4.9	10.7	20.9 <sup>E</sup>	15.7	26.2	2.7	1.7	4.2
Financial barrier to medications	3.9 <sup>F</sup>	2.2	5.6	F	...	...	9.5 <sup>E</sup>	4.8	14.2	7.6	2.7	21.7
Lack of prescription drug insurance	14.1	11.2	17.0	14.2	10.3	18.0	13.9	10.0	17.7	1.0	0.7	1.4

<sup>†</sup> reported diagnosis of diabetes, heart disease, hypertension and/or stroke

<sup>E</sup> interpret with caution

<sup>F</sup> too unreliable to be published

... not applicable

Source: 2012 Barriers to Care for People with Chronic Health Conditions Survey.

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medications for more than a week in the past year (adjusted PRR: 3.5; 95% CI: 1.7-7.3) (Table 5).

**Out-of-pocket drug expenditures**

Mean annual out-of-pocket drug expenditures amounted to \$539 (Table 6), but were significantly higher for people with more than one chronic condition (\$714 versus \$460). However, this difference was concentrated among

seniors; for people younger than age 65, out-of-pocket drug expenditures did not differ significantly by the number of cardiovascular-related conditions they reported.

Compared with people who reported no barriers, those who reported general financial barriers had significantly higher out-of-pocket expenditures on medications (\$466 versus \$1,077, p = 0.004) (Table 4). And compared with those who

had drug insurance, those who did not reported higher out-of-pocket spending on medications (\$480 versus \$894, p = 0.003)

Among people reporting financial barriers to medications specifically, the trend was toward higher out-of-pocket expenditures, compared with people who did not report such barriers (\$900 versus \$524). The difference, however, was not statistically significant (p = 0.139), likely because of the small number of respondents identifying this barrier.

**Table 3**  
**Prevalence rate ratios associating selected socio-demographic and health factors with self-reported general financial barriers and lack of drug insurance, household population aged 40 or older,<sup>†</sup> Manitoba, Saskatchewan, Alberta and British Columbia, 2012**

Characteristics	General financial barrier						Lack of drug insurance					
	Prevalence			Unadjusted prevalence rate ratio (PRR)			Prevalence			Unadjusted prevalence rate ratio (PRR)		
	95 % confidence interval			95 % confidence interval			95 % confidence interval			95 % confidence interval		
	%	from	to	PRR	from	to	%	from	to	PRR	from	to
<b>Sex</b>												
Women <sup>‡</sup>	11.7	8.6	14.8	...	...	...	13.0	9.7	16.3	...	...	...
Men	12.3	7.9	16.6	1.0	0.7	1.6	15.1	10.6	20.0	1.2	0.8	1.7
<b>Age (years)</b>												
Younger than 65 <sup>‡</sup>	11.8 <sup>E</sup>	7.4	16.1	...	...	...	14.3 <sup>F</sup>	9.5	19.1	...	...	...
65 to 74	13.5 <sup>E</sup>	8.8	18.2	1.1	0.7	1.9	11.2 <sup>E</sup>	7.5	14.9	0.8	0.5	1.3
75 or older	10.8 <sup>E</sup>	7.2	14.4	0.9	0.6	1.5	16.8	11.9	21.7	1.2	0.8	1.8
<b>Ethnicity</b>												
White <sup>‡</sup>	10.7	8.4	12.9	...	...	...	14.9	11.7	18.1	...	...	...
Aboriginal/Other	21.1 <sup>E</sup>	8.5	33.6	2.0*	1.0	3.9	8.7 <sup>E</sup>	3.2	14.2	0.6	0.3	1.1
<b>Education</b>												
Less than secondary graduation <sup>‡</sup>	14.0	9.6	18.4	...	...	...	14.2	9.8	18.6	...	...	...
Secondary graduation or more	11.4	8.3	14.6	0.8	0.5	1.2	14.0	10.5	17.6	1.0	0.7	1.5
<b>Household income</b>												
Less than \$30,000 <sup>‡</sup>	21.7	15.1	28.4	2.3*	1.5	3.6	15.7	11.5	19.9	1.2	0.8	1.6
\$30,000 or more	9.4	9.5	12.2	...	...	...	13.6	10.2	17.0	...	...	...
<b>Location</b>												
Urban <sup>‡</sup>	12.6	9.5	15.7	...	...	...	12.6	9.7	15.5	...	...	...
Rural	9.1 <sup>E</sup>	5.2	13.0	0.7	0.4	1.2	21.3 <sup>E</sup>	12.6	30.0	1.7*	1.1	2.8
<b>Province</b>												
Alberta <sup>‡</sup>	9.7 <sup>E</sup>	6.3	13.1	...	...	...	6.5 <sup>E</sup>	3.2	9.9	...	...	...
Manitoba/Saskatchewan/British Columbia	13.1	9.5	16.7	1.4	0.9	2.1	17.6	13.7	21.1	2.7*	1.5	4.8
<b>Body mass index (kg/m<sup>2</sup>)(corrected for self-report<sup>23</sup>)</b>												
Less than 30 kg/m <sup>2</sup> <sup>‡</sup>	9.0	6.3	11.7	...	...	...	15.8	11.2	20.3	...	...	...
30 kg/m <sup>2</sup> or more	17.0	12.0	22.1	1.9	1.3	2.9	12.0	8.5	15.5	0.8	0.5	1.2
<b>Health literacy<sup>24</sup></b>												
Adequate <sup>‡</sup>	10.7 <sup>E</sup>	7.8	13.5	...	...	...	13.8	10.6	17.0	...	...	...
Inadequate	20.2 <sup>E</sup>	12.3	28.1	1.9*	1.2	3.1	16.2 <sup>E</sup>	9.2	23.3	1.2	0.7	1.9
<b>Regular family doctor</b>												
Yes	11.3	9.0	13.6	0.4	1.0	1.9	13.8	10.9	16.8	0.7	0.4	1.5
No <sup>‡</sup>	F	...	...	...	...	...	F	...	...	...	...	...

<sup>†</sup> reported diagnosis of diabetes, heart disease, hypertension and/or stroke

<sup>‡</sup> reference category

\* significantly different from reference category

<sup>E</sup> interpret with caution

F too unreliable to be published

Source: 2012 Barriers to Care for People with Chronic Health Conditions Survey.

## Emergency department visits and hospitalization

Overall, 9% of respondents reported an emergency department visit or hospitalization related to their cardiovascular condition in the past year (Table 4). Emergency department visits or hospitalizations were 70% more likely among those who reported a general financial barrier (adjusted PRR: 1.7; 95% CI: 1.0-2.3) than among those who did not (Table 5). However, self-reported financial barriers to medications or lacking drug insurance were not associated with an increased risk of an emergency department visit/hospitalization. Interaction terms between multimorbidity and age, province and age, and province and insurance status were not significant in any of the models.

## Discussion

In the four western provinces, reporting general barriers to health care and lacking drug insurance were relatively common among people aged 40 or older with cardiovascular-related chronic conditions (12% to 14%).

A Commonwealth Fund/Health Council of Canada<sup>25</sup> survey found a similar percentage of people with chronic conditions reporting financial barriers. The results of the BCPCHC survey provide additional information about health outcomes. Reporting financial barriers seemed to be clinically relevant, as indicated by the 70% increased likelihood of a chronic-condition-related hospitalization or emergency department visit. This increased risk may be the result of a lack of access to preventive measures, such as monitoring, screening, educational programs and treatments, due to the direct or incidental costs of these services. The findings of the present study are consistent with those of earlier Canadian and American research reporting that ambulatory-care-sensitive hospital admissions are more common among people with limited financial resources.<sup>26,27</sup>

Living in a rural location was significantly associated with not having drug insurance. This association may reflect a greater tendency for people in these areas to be self-employed or to work for small businesses that do not provide extended health benefits.

Compared with people who had drug insurance, those who did not were 30% less likely to use statins. People who reported a financial barrier to accessing medications were 50% less likely than those who did not to use statins. These differences may be related to the annual costs of statin use, which range from \$500 to \$700.<sup>19</sup> By contrast, use of ASA (a much less expensive medication) did not vary by the perception of financial barriers. The disparity lends further support to the hypothesis that non-use of statins may be related to finances rather than to other unmeasured factors (for instance, an aversion to taking medications), and is similar to what has been noted in other Canadian studies of initiation of statin therapy.<sup>28</sup>

Overall, people without drug insurance had mean annual out-of-pocket medication expenses of \$894, compared with \$480 for people who had drug insurance. However, individuals who did not have drug insurance were no more likely to report an emergency room visit or hospitalization.

Several characteristics were significantly associated with reporting financial barriers—multimorbidity, non-White

**Table 4**  
Quality indicators and out-of-pocket drug expenditures, by type of self-reported financial barrier, household population aged 40 or older,<sup>†</sup> Manitoba, Saskatchewan, Alberta and British Columbia, 2012

Type of barrier	Quality indicator															p-value
	Appropriate statin use			Appropriate ASA use			Stopped taking prescribed medication			Chronic-disease-related hospitalization or emergency department visit			Mean out-of-pocket drug expenditures			
	95 % confidence interval			95 % confidence interval			95 % confidence interval			95 % confidence interval			95 % confidence interval			
	%	from	to	%	from	to	%	from	to	%	from	to	\$	from	to	
<b>Total</b>	48.2	44.1	52.3	49.2	45	53.4	12.9	9.9	15.9	9.2	7.2	11.3	539	474	605	...
<b>General financial barrier</b>																
Yes	52.5	40.6	64.5	52.6	40.7	64.5	19.8 <sup>E</sup>	9.9	29.7	17.4 <sup>E</sup>	10.4	24.5	1,077	666	1,488	p = 0.004
No	47.6	43.3	51.9	48.7	44.1	53.2	12.0	8.8	15.2	7.8	5.6	10.1	466	412	521	
<b>Financial barrier to medications</b>																
Yes	F	...	...	71.3	49.5	93.1	37.7 <sup>E</sup>	14.7	60.7	F	...	...	900	408	1,392	p = 0.139
No	49.3	45.2	53.4	48.2	43.9	52.4	11.9	8.8	14.9	8.7	6.6	10.8	524	457	591	
<b>Drug insurance</b>																
Yes	50.1	45.6	54.6	50.4	45.9	54.9	12.9	9.6	16.2	9.1	6.9	11.3	480	412	548	p = 0.003
No	36.2	27.1	45.4	41.4	32	50.9	13.3 <sup>E</sup>	6.5	20.1	8.2	3.3	13.1	894	639	1,149	

<sup>†</sup> reported diagnosis of diabetes, heart disease, hypertension and/or stroke

<sup>E</sup> interpret with caution

F too unreliable to be published

... not applicable

Source: 2012 Barriers to Care for People with Chronic Health Conditions Survey.

ethnicity (including Aboriginal), and an annual household income less than \$30,000. Age was not a significant modifier or confounder in any model. This may be due to a dilution of effect, because Alberta is the only province with

differential insurance coverage for people aged 65 or older; seniors in the other three western provinces receive no additional benefits. (Provisions of the public drug programs in the western provinces are outlined in Appendix Text Table A.)

**Limitations**

This study has several limitations. BCPCHC data were self-reported and subject to the accompanying limitations. Despite adjustment, the potential for residual confounding exists, and differences in outcomes between groups may be related to unmeasured patient differences. For most variables, covariates were stratified into only two groups, and some detail may have been lost. Moreover, some subgroups were small, thereby limiting the statistical power to detect differences. Further, the lack of data on blood pressure control and chronic condition severity may have resulted in misclassification of the need for statins or ASA. The survey lacks the sensitivity to identify respondents who choose to prioritize medications and spend less on other necessities such as food.<sup>29</sup> Finally, the survey was administered only to residents of the four western provinces, which potentially limits the generalizability of the findings.

**Table 5**  
Unadjusted and adjusted associations between self-reported financial barriers and quality indicators, household population aged 40 or older,<sup>†</sup> Manitoba, Saskatchewan, Alberta and British Columbia, 2012

Quality indicator/Type of barrier	Prevalence rate ratio (PRR)					
	Unadjusted			Adjusted		
	PRR	95 % confidence interval		PRR	95 % confidence interval	
from		to	from		to	
<b>Appropriate statin use</b>						
General financial barrier	1.1	0.9	1.4	1.0 <sup>‡</sup>	0.8	1.2
Financial barrier to medications	0.5	0.3	1.0	0.5 <sup>**</sup>	0.3	0.9
Lack of drug insurance	0.7	0.6	0.9	0.7 <sup>**</sup>	0.6	0.9
<b>Appropriate ASA use</b>						
General financial barrier	1.1	0.8	1.4	1.0 <sup>‡</sup>	0.8	1.2
Financial barrier to medications	1.5	1.0	2.1	1.3 <sup>§</sup>	0.9	1.8
Lack of drug insurance	0.8	0.7	1.1	0.8 <sup>‡</sup>	0.7	1.0
<b>Stopped taking prescribed medication</b>						
General financial barrier	1.7	0.9	3.1	1.7 <sup>††</sup>	0.9	3.1
Financial barrier to medications	3.2	1.2	6.7	3.5 <sup>††*</sup>	1.7	7.3
Lack of drug insurance	1.0	0.6	1.9	1.1 <sup>††</sup>	0.6	2.0
<b>Chronic-disease-related hospitalization or emergency department visit</b>						
General financial barrier	2.2	1.3	3.8	1.7 <sup>**</sup>	1.0	2.9
Financial barrier to medications	1.8	0.8	4.4	1.1 <sup>‡</sup>	0.5	2.8
Lack of drug insurance	0.9	0.5	1.8	0.9 <sup>‡</sup>	0.5	1.7

<sup>†</sup> reported diagnosis of diabetes, heart disease, hypertension and/or stroke

<sup>\*</sup> significantly different from reference category

<sup>‡</sup> adjusted for age, sex and multimorbidity

<sup>§</sup> adjusted for sex and multimorbidity

<sup>††</sup> adjusted for age, sex and health literacy

Note: Reference category is absence of barrier.

Source: 2012 Barriers to Care for People with Chronic Health Conditions Survey.

**Conclusion**

Lack of drug coverage and general perceived cost barriers were reported by more than one in ten adults in western Canada with cardiovascular-related chronic conditions. These barriers were associated with lower use of guideline-recommended medications, an increased likelihood of non-adherence, and an increased likelihood of hospitalizations or emergency department visits. Because those who reported financial barriers comprised a heterogeneous group, and because the relationship between general financial barriers and increased risk of hospitalization is not clear, further research is warranted to better understand the association. ■

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**Table 6**  
Mean out-of-pocket drug expenditures, by number of chronic conditions and age group, household population aged 40 or older,<sup>†</sup> Manitoba, Saskatchewan, Alberta and British Columbia, 2012

	Number of chronic conditions									Comparison (one versus two or more conditions)
	Total			One			Two or more			
	95 % confidence interval			95 % confidence interval			95 % confidence interval			
	\$	from	to	\$	from	to	\$	from	to	
<b>Total</b>	539	474	605	460	375	546	714	613	814	p < 0.001
65 or older	631	562	700	533	447	620	782	668	897	p = 0.001
Younger than 65	453	345	562	406 <sup>E</sup>	272	540	606	450	763	p = 0.06

<sup>†</sup> reported diagnosis of diabetes, heart disease, hypertension and/or stroke

<sup>E</sup> interpret with caution

Source: 2012 Barriers to Care for People with Chronic Health Conditions Survey.

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## References

- Demers V, Melo M, Jackevicius C, et al. Comparison of provincial prescription drug plans and the impact on patients' annual drug expenditures. *Canadian Medical Association Journal* 2008; 178(4): 405-9.
- Law MR, Cheng L, Dhalla IA, et al. The effect of cost on adherence to prescription medications in Canada. *Canadian Medical Association Journal* 2012; 184(3): 297-302.
- Choudhry NK, Avorn J, Glynn RJ, et al. Full coverage for preventive medications after myocardial infarction. *New England Journal of Medicine* 2011; 365(22): 2088-97.
- Wagner E. The role of patient care teams in chronic disease management. *British Medical Journal* 2000; 320: 569-72.
- Glasziou P, Irwig L, Mant D. Monitoring in chronic disease: a rational approach. *British Medical Journal* 2005; 330(7492): 644-8.
- Dalstra JA, Kunst AE, Borrell C, et al. Socioeconomic differences in the prevalence of common chronic diseases: an overview of eight European countries. *International Journal of Epidemiology* 2005; 34(2): 316-26.
- Ross N, Gilmour H, Dasgupta K. 14-year diabetes incidence: The role of socio-economic status. *Health Reports* 2010; 21(3): 19-28.
- Wen CP, Cheng TY, Tsai MK, et al. All-cause mortality attributable to chronic kidney disease: a prospective cohort study based on 462,293 adults in Taiwan. *Lancet* 2008; 371(9631): 2173-82.
- Campbell D, Ronksley P, Barnabe C, et al. The association of enrolment in Primary Care Networks on diabetes care and outcomes in low income and First Nations Albertans. *Open Medicine* 2012; 6(4): E155-65.
- Daw JR, Morgan SG. Stitching the gaps in the Canadian public drug coverage patchwork?: a review of provincial pharmacare policy changes from 2000 to 2010. *Health Policy* 2012; 104(1): 19-26.
- Brook RH, Ware JE, Jr., Rogers WH, et al. Does free care improve adults' health? Results from a randomized controlled trial. *New England Journal of Medicine* 1983; 309(23): 1426-34.
- Zhang Y, Lave JR, Donohue JM, et al. The impact of Medicare Part D on medication adherence among older adults enrolled in Medicare-Advantage products. *Medical Care* 2010; 48(5): 409-17.
- Zhang Y, Donohue JM, Lave JR, et al. The effect of Medicare Part D on drug and medical spending. *New England Journal of Medicine* 2009; 361(1): 52-61.
- Keeler EB, Brook RH, Goldberg GA, et al. How free care reduced hypertension in the health insurance experiment. *Journal of the American Medical Association* 1985; 254(14): 1926-31.
- Interdisciplinary Chronic Disease Collaboration. The research to health policy cycle: a tool for better management of chronic noncommunicable diseases. *Journal of Nephrology* 2008; 21(5): 621-31.
- Interdisciplinary Chronic Disease Collaboration. Barriers to Care for People with Chronic Health Conditions (BCPCHC) Survey. Calgary, Alberta: Interdisciplinary Chronic Disease Collaboration, 2013. Available at: [http://www.icdc.ca/images/Paper-Mar\\_19\\_2013.pdf](http://www.icdc.ca/images/Paper-Mar_19_2013.pdf). Accessed April 4, 2013.
- Canadian Diabetes Association. CDA Clinical Practice Guidelines. *Canadian Journal of Diabetes* 2008; 32(Suppl. 1). Available at: <http://www.diabetes.ca/files/cpg2008/cpg-2008.pdf>
- Hypertension Canada. *CHEP 2013 Recommendations*. Markham, Ontario: Hypertension Canada, 2011. Available at: [http://www.hypertension.ca/images/CHEP\\_2013/2013\\_CompleteCHEPRecommendations\\_EN\\_HCP1009-1.pdf](http://www.hypertension.ca/images/CHEP_2013/2013_CompleteCHEPRecommendations_EN_HCP1009-1.pdf). Accessed November 25, 2013.
- Conly J, Clement F, Tonelli M, et al. Cost-effectiveness of the use of low- and high-potency statins in people at low cardiovascular risk. *Canadian Medical Association Journal* 2011; 183(16): E1180-8.
- Manns BJ, Tonelli M, Zhang J, et al. Enrolment in primary care networks: impact on outcomes and processes of care for patients with diabetes. *Canadian Medical Association Journal* 2012; 184(2): E144-52.
- Brisebois F, Thivierge S. The weighting strategy of the Canadian Community Health Survey. *Proceedings of the American Statistical Association Meeting, Survey Research Methods Section, 2001*. Available at: <http://www.amstat.org/sections/srms/Proceedings/>. Accessed July 15, 2013.
- Statistics Canada. *Health Indicators: Indicators based on Statistics Canada Surveys*. Ottawa: Statistics Canada, 2013. [cited 2013 June 23]. Available at: <http://www.statcan.gc.ca/pub/82-221-x/2012002/quality-qualite/qua4-eng.htm>. Accessed June 23, 2013.
- Shields M, Gorber S, Janssen I, Tremblay M. Bias in self-reported estimates of obesity in Canadian health surveys: An update on correction equations for adults. *Health Reports* 2011; 22(3): 35-45.
- Chew L, Griffin J, Partin M, et al. Validation of screening questions for limited health literacy in a large VA outpatient population. *Journal of General Internal Medicine* 2008; 23(5): 561-5.
- Health Council of Canada. *How Do Sicker Canadians with Chronic Disease Rate the Health Care System?* Ottawa: Health Council of Canada, 2011. Available at: [http://www.healthcouncilcanada.ca/rpt\\_det\\_gen.php?id=312](http://www.healthcouncilcanada.ca/rpt_det_gen.php?id=312). Accessed April 19, 2013.
- Billings J, Anderson GM, Newman LS. Recent findings on preventable hospitalizations. *Health Affairs* 1996; 15(3): 239-49.
- Pappas G, Hadden WC, Kozak LJ, Fisher GF. Potentially avoidable hospitalizations: inequalities in rates between US socioeconomic groups. *American Journal of Public Health* 1997; 87(5): 811-6.
- Hanley GE, Morgan S, Reid RJ. Income-related inequity in initiation of evidence-based therapies among patients with acute myocardial infarction. *Journal of General Internal Medicine* 2011; 26(11): 1329-35.
- Bengle R, Sinnett S, Johnson T, et al. Food insecurity is associated with cost-related medication non-adherence in community-dwelling, low-income older adults in Georgia. *Journal of Nutrition for the Elderly* 2010; 29(2): 170-91.

## Appendix

### Barriers to Care for People with Chronic Health Conditions Survey questions

#### Exposures/Financial barriers

##### Perceived general financial barrier

"In the past 12 months, how often did you have difficulty paying for services, equipment, medications for chronic conditions?"

Yes = always, often, sometimes

No = rarely, never

##### Financial barrier to drugs

"In the past 12 months, how often were you unable to access medications for your chronic condition due to cost?"

Yes = always, often, sometimes

No = rarely, never

##### Lack of drug insurance

"Do you currently have insurance that covers all or part of the cost of prescription medications?"

#### Quality indicators

##### Use of statins

"In the past month, did you take prescription medication such as Crestor, Lipitor or Zocor to control blood cholesterol?"

##### Use of acetylsalicylic acid (ASA)

"In the past month, did you take aspirin or other ASA (acetylsalicylic acid) medication every day or every second day?"

##### Adherence to prescribed medication

"Over the past 12 months, have you ever stopped taking one or more of your drugs as prescribed for a week or more?"

##### Out-of-pocket expenditures

"In the past 12 months, what were the out-of-pocket costs for your prescribed medicines, drugs and pharmaceutical products? Estimate the costs incurred by you. Include amounts not covered by insurance, such as exclusions, deductibles and expenses over limits. Exclude payments for which you have been or will be reimbursed. If it is easier for you, estimate your out-of-pocket costs in a 3-month period."

##### Chronic-disease-related emergency room visit

"How many times have you personally used a hospital emergency department for your condition in the past 12 months?"

##### Chronic-disease-related hospital admission

"In the past 12 months, have you been a patient overnight in a hospital for your condition?"

#### Covariates

##### Regular medical doctor

"Do you have a regular medical doctor?"

##### Self-perceived health

"In general, would you say your health is . . . ?"

At least very good = excellent, very good

Less than very good = good, fair, poor

##### Self-perceived mental health

"In general, would you say your mental health is . . . ?"

At least very good = excellent, very good

Less than very good = good, fair, poor

##### Inadequate health literacy

Imputed variable based on validated 3-item questionnaire <sup>24</sup>

**Text Table A****Characteristics of drug insurance plans, by patient type and income, Manitoba, Saskatchewan, Alberta and British Columbia**

Patient type, income, province	Characteristics of drug plan			
	Universal coverage	Copayment	Catastrophic coverage	Deductible (% of household income)
<b>General public younger than 65</b>				
<b>Higher income</b>				
Manitoba	✓	x	✓	4.6% to 6.1%
Saskatchewan	✓	Up to 35%	✓	3.4%
Alberta	x	...	x	...
British Columbia	✓	30%	✓	3%
<b>Lower income</b>				
Manitoba	✓	x	✓	2.4% to 4.3%
Saskatchewan	✓	Up to 35%	✓	3.4%
Alberta	x	...	x	...
British Columbia	✓	30%	✓	0 to 2%
<b>Seniors (65 or older)</b>				
<b>Higher income</b>				
Manitoba	✓	x	✓	4.6% to 6.1%
Saskatchewan	✓	Up to 35%	✓	3.4%
Alberta	✓	30% to max. \$25	x	x
British Columbia	✓	30%	✓	3%
<b>Lower income</b>				
Manitoba	✓	x	✓	2.4% to 4.3%
Saskatchewan	✓	\$15	x	...
Alberta	✓	30% to max. \$25	x	x
British Columbia	✓	30%	✓	0 to 2%
<b>Social assistance beneficiaries</b>				
Manitoba	✓	x	x	x
Saskatchewan	✓	x	x	x
Alberta	✓	x	x	x
British Columbia	✓	x	x	x

x province does not have this feature

✓ province has this feature

... not applicable

Source: Daw and Morgan.<sup>10</sup>