

The financial burden of out-of-pocket expenses in the United States and Canada: How different is the United States?

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Abstract

Background: This article compares the burden that medical cost-sharing requirements place on households in the United States and Canada. It estimates the probability that individuals with similar demographic features in the two countries have large medical expenses relative to income.

Method: The study uses 2010 nationally representative household survey data harmonized for cross-national comparisons to identify individuals with high medical expenses relative to income. Using logistic regression, it estimates the probability of high expenses occurring among 10 different demographic groups in the two countries.

Results: The results show the risk of large medical expenses in the United States is 1.5–4 times higher than it is in Canada, depending on the demographic group and spending threshold used. The United States compares least favorably when evaluating poorer citizens and when using a higher spending threshold.

Conclusion: Recent health care reforms can be expected to reduce Americans' catastrophic health expenses, but it will take very large reductions in out-of-pocket expenditures—larger than can be expected—if poorer and middle-class families are to have the financial protection from high health care costs that their counterparts in Canada have.

Keywords

Pharmacoeconomics, health economics, public health

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Introduction

Extensive research investigates the impact of medical cost-sharing requirements, often referred to as out-of-pocket (OOP) medical spending. Theoretically, these requirements help constrain the demand for health care, and therefore its cost; however, cost-sharing practices also tend to be regressive,^{1,2} can result in cost-related reductions in medical care, and can contribute to worse health outcomes. A common way to assess the impact of OOP measures is to examine the financial burden they create. Cross-national studies of the financial burden that cost-sharing measures place on citizens in different countries are rare, but those few that do exist find that Americans face the highest burden.^{3,4} A recent Commonwealth Fund study comparing the health care systems in 11 countries placed the United States last in terms of both access and equity, rankings in large part due to the United States' high OOP spending requirements.⁵

This article uses international-comparable household data from the Luxembourg Income Study (LIS) for both the

United States and Canada to present a unique comparison between these two countries of the financial burden that OOP requirements create in each. We divide each country's population into 10 distinct groups based on age and income and make cross-national comparisons for citizens with identical age and income profiles. Canada makes a relevant reference point for the United States because of its physical proximity as well as the degree of similarity between the two countries. Moreover, OOP expenditures in each account for

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a similar share of total health expenditures and have been trending upward.^{6–11}

Canada is also typical of other wealthy countries in terms of the financial burden that OOP spending places on households.^{4,5} As health reform in the United States strives to provide Americans with the level of financial security more typical elsewhere, and thus improve the overall performance of its health care system, Canada serves as a benchmark to measure how far from the norm America is, and for speculating how much closer it will be to this norm after the Patient Protection and Affordable Care Act (ACA) is fully implemented.

This article begins with a brief conceptual discussion of optimal cost-sharing practices, followed by a short portrayal of health care financing in Canada and the United States. It then uses comparable household data from 2010 in the two countries to measure and compare the probability of high household medical expenses, where high is defined relative to income.

New contribution

Measuring the financial burden created by medical spending requirements has become an increasingly common research topic within a wide range of countries. Greater cost-sharing measures commonly accompany rising health care costs, and researchers have been monitoring the burden these place on vulnerable populations within their countries, as cost-based underutilization of health care is becoming a growing public health concern.

But it is difficult to arrive at cross-country comparisons based on single country studies, because the data and/or variable definitions are often not comparable. This article presents a unique cross-national comparison of the burden that cost-sharing measures place on household budgets. While it is well accepted that health care financing policy in the United States results in a higher burden on health care users than it does in other countries, the article provides concrete measures of this difference. Canada makes a relevant reference point for the United States because OOP expenditures in each country account for a similar share of total health expenditures (see Table 1), and both have been rising over time. The article's direct, rigorous comparisons provide compelling evidence of the disparate impact the United States' unusual manner of financing health care has on its citizens.

Background

Theory of cost sharing

The primary purpose of health insurance is to reduce the risk of high health care expenditures; however, insurance can also give rise to oversupply and overconsumption of health care. In theory, cost sharing can balance the competing objectives of financial protection with the careful use of health care dollars.^{12,13} Theoretical considerations of how to

Table 1. Comparison of total health care and OOP expenditures in Canada and the United States (2011).

	Canada	United States	OECD Avg ^a
Source of health care spending (%) ^b			
General government	69	6	35
Social insurance	1	43	37
Private insurance	13	35	6
Out of pocket (OOP)	16	12	20
Other	1	4	2
Health care spending by function (%) ^b			
Inpatient care	20	18	29
Outpatient care	35	51	33
Long-term care	15	6	12
Medical goods	20	14	20
Collective services	10	11	6
Health care expenditures ^b			
Per capita ^c	US\$4522	US\$8508	US\$3322
Percentage of GDP	11.2	17.7	9.2
Distribution of OOP expenditures (%) ^d			
Hospital	3.4	8.8	
Nursing and residential care	14.2	12.8	
Medical goods	54.1	36.7	
Ambulatory health care	25.7	40.8	
Other	2.6	0.9	

OECD: Organisation for Economic Co-operation and Development; GDP: gross domestic product.

^aOECD34 average for source of health care spending and health care expenditures; OECD27 average for health care spending by function.

^bOECD Health at a Glance 2013.

^cBased on purchasing power parity in USD.

^dOECD Stat. Health Expenditure and Financing, <http://www.oecd.org/health/health-systems>.

strike this balance suggest that cost sharing is more appropriate for the smaller and more certain expenses that can be anticipated, and for health expenses that might be considered more discretionary.¹³

The complex, interrelated, and intertemporal nature of health products and services, however, renders these simple guidelines difficult in practice to implement. For instance, when demand for a product or service is elastic, optimal cost sharing will depend on the efficacy and cost of its substitutes, the demand for which will likely increase with larger cost-sharing requirements on the former. And some elective procedures make subsequent prescription medicines or follow-up procedures essential, which complicates any optimal cost-sharing calculation.

A separate shortcoming of using cost sharing to manage medical care costs is that for this to have its intended effect, consumers must be able to judge the value of a particular medical course of action vis-à-vis its alternatives, in terms of both immediate and long-term benefits. Having done that, they must also make rational decisions over the best course of action given the costs of each possible action. The first assumption is highly problematic given the often complex

nature of health problems. The second requires full information on insurance benefits, which in practice individuals often lack or misjudge.^{14,15} Cost sharing may instead encourage patients to wait out a problem or delay a follow-up, without giving due consideration to whether immediate medical care is essential or not.¹³

Empirical studies of OOP spending requirements clearly show that price features into health care choices,^{16–21} a finding most famously revealed in the RAND Health Insurance Experiment.²² Not surprisingly, some individuals are more price-sensitive than others, particularly those with lower incomes,^{4,13,15,23–26} the elderly,^{12,27} and people of color.²⁸ Careful studies have also shown that greater cost-sharing requirements not only reduce the use of medical services and adherence to medication therapies but also can lead to poorer health outcomes or more expensive alternatives.^{17,25,27,29,30}

Such complications make it nearly impossible to ascertain a priori which cost-sharing practices strike the right balance between risk spreading and economic efficiency.¹² While no consensus exists on clear rules and simple measures to assess cost sharing's overall impact, the most common practice (also employed here) is to judge them based on the extent to which they result in citizens devoting a large share of their income to OOP costs.^{9,10,31,32} This measure offers a straightforward gauge of citizens' protection from the risk of large medical bills and the inequities in health care financing, access, and outcomes that can result when they are not. That medical expenses are an important contributing factor to the financial distress of families, as well as the frequency with which they declare bankruptcy^{33,34} adds a separate reason why large OOP expenses are usually viewed as socially undesirable.

Financing of health care in Canada and the United States

Canada's public insurance covers all citizens, is paid for by tax revenue, and accounts for 70% of the country's total health expenditures.³⁵ Since public insurance excludes a number of services and products, about two-thirds of Canadians supplement their public insurance with private,³⁶ usually purchased at subsidized rates through their employer. Private insurance covers about 13% of all health expenses, and the balance of expenses (about 16%) is paid OOP (see Table 1).³⁵

In the United States, about half of all health expenses are paid for by the government, financed by both general and social insurance taxes; public insurance covers eligible poor citizens (Medicaid) and the elderly (Medicare). Medicaid requires little OOP spending, while Medicare has limited coverage and high cost-sharing requirements.³⁷ Most citizens with Medicare purchase supplemental insurance to reduce their cost-sharing expenses, although this can still leave them with high OOP expenses.^{37,38} Most Americans without Medicaid or Medicare are covered by private insurance, the cost of which is roughly split between employees and their

employers. Private insurance accounts for about 35% of all health expenditures, and while private insurance plans vary widely, they commonly result in large OOP expenses.^{6,8,11,39,40} About 16% of Americans were uninsured in 2010 and all of their health expenses were either paid for OOP or went uncompensated. OOP spending in the United States accounts for about 12% of all health expenditures.³⁵

Table 1 summarizes key features of health care and OOP expenditures in the two countries, and where available, averages in OECD countries. It shows health care's sources of revenue, spending by function, the magnitude of health care expenses, and the distribution of OOP dollars.

Methods

Logistic regression based on nationally representative individual-level household survey data is used to measure and compare Canadians' versus Americans' probability of having high medical bills, where "high" is defined relative to income. While both data sets are for 2010, more recent estimates suggest that the probability of high household medical spending in both countries has been holding steady or slowly rising over the last few years.^{7,9,10,35} To date, health care reform in the United States, which was initiated in 2010, remains too recent and too partial to evaluate its complete effect on OOP spending; however, after presenting the results, we offer some conjectures over the degree to which the ACA will reduce the differences measured here.

Data description

Household survey data from both countries are obtained through the LIS.⁴¹ LIS produces harmonized versions of nationally representative household surveys by aligning variables with international standards to facilitate cross-national research, and 2010 is the last year for which both countries provided it with data.

For the United States, LIS uses the US Census Bureau's Current Population Survey's Annual Social and Economic Supplement (CPS), which very recently added a household-level variable capturing health expenses. The quality of this variable in the CPS has been found comparable to that in the Medical Expenditure Panel Survey (MEPS).⁴² While the MEPS is the most common nationally representative data source for estimating Americans' OOP expenses, the CPS data ($n=203,799$ in this study) provide a far larger sample size and more detailed and accurate information on household income; as such, it is becoming increasingly used for investigations into Americans' OOP expenses.^{39,42} The OOP expenditures in the CPS data also feature into official estimates of the United States' Supplemental Poverty Index,⁴² a poverty index that takes household medical expenses into account.

Canada's household survey data are derived from Statistics Canada's Survey of Labour and Income Dynamics

($n=60,313$), which also contains household OOP expenditures from Statistics Canada's Survey of Household Spending, where the latter is used for official estimates of Canadians' spending patterns.¹⁰ The analyses for both countries are based on all individuals with household income above zero, or more than 99% of those sampled.

Definitions

OOP expenses. The United States and Canada employ similar but not completely identical definitions of OOP spending. OOP expenditures are typically measured by the expenses incurred while consuming health care and include deductibles, co-insurance, copayments, and expenses not covered by insurance (which for the uninsured would include everything). This is how it is defined in the United States; but in Canada, it includes households' spending on secondary (private) health insurance premiums. While some, primarily elderly, Americans purchase secondary health insurance, these expenses are not accounted for in the United States' data set. For this reason, the two sources are not completely compatible, and Canada's more comprehensive measure of OOP spending will, all else equal, give rise to a greater likelihood of registering large medical expenses. However, since very few non-elderly Americans purchase secondary insurance, this problem of comparability primarily applies to the elderly, for whom Canadians' estimates will be biased upward relative to Americans'. For others, the estimates should be relatively free of bias.

Income. To measure resources available to meet OOP expenses and gauge the extent to which OOP spending remains affordable, this study uses household disposable income, meaning income after accounting for both government taxes and social transfers, or that available to meet household expenses. Since LIS standardizes this variable, it is defined in an identical fashion across the two nations.

High medical expenses. To measure high medical spending, each household's OOP spending is expressed as a share of its disposable income. Consistent with the literature, high spending is defined as expenditures in excess of a threshold value of income.^{9,10,31,32,39,40,43} This study uses expenditures of at least 5%, and alternatively 10% of income, which are the two most common thresholds in the literature. All individuals in the same household are assigned the same spending ratio, and thus all have the same indicator (either 1 or 0) for high medical expenses.

Demographic characteristics. How affordable any level of OOP expenditures is will depend on income; moreover, the risk of high OOP tends to be especially large among the elderly population because of their more substantial medical needs. In order to compare the prevalence of high spending between the two countries, we take these two characteristics

Table 2. Summary statistics.

	United States (US\$)	Canada (US\$)
Median income		
Elderly	\$26,367	\$24,734
Non-elderly	\$30,617	\$28,876
Income quintile (percentile) cutoff		
20	\$16,206	\$16,900
40	\$25,049	\$24,526
60	\$35,684	\$32,302
80	\$50,903	\$43,937
95	\$83,045	\$66,400
High spending (%)		
≥ 5	20.9	11.2
≥ 10	9.4	3.1
OOP/income (percentile)		
50	2.0%	0.9%
75	4.2%	2.4%
90	9.3%	5.4%
No. of observations	203,799	60,313

Source: Authors' calculations are from 2010 LIS data (<http://www.lisdatacenter.org>). Results for Canada are converted to US\$ based on OECD's Purchasing Power Parity for consumption, http://stats.oecd.org/Index.aspx?datasetcode=SNA_TABLE4.

OOP: out-of-pocket; LIS: Luxembourg Income Study; OECD: Organisation for Economic Co-operation and Development. All calculations are based on weighted observations. Median income is defined as median equivalized disposable income. Disposable income is bottom coded to zero. Income quintiles are based on equivalized disposable income.

into account by calculating the probability of high OOP spending separately for the elderly and non-elderly, and for five different income categories (defined below). Probabilities in each country are calculated for these 10 different demographic groups.

To control for income, each nation's population is partitioned into income quintiles based on the standard practice of using individuals' equivalized household disposable income (disposable income divided by the square root of household size). All members of the same household receive identical values of equivalized household disposable income, and thus are placed in the same income quintile. Because this group is so economically heterogeneous, the top income quintile is separated into the 80th–95th income percentile and the top 5% of income. We distinguish the elderly from the non-elderly by classifying those aged 65 years and older as elderly.

Table 2 presents summary statistics for the two countries.

Estimation technique

To estimate the probability that elderly and non-elderly individuals in each of the income quintiles have high

Table 3. Estimated β coefficients and standard errors from logistic regressions.

	-----OOP/income 5%-----				-----OOP/income 10%-----			
	United States		Canada		United States		Canada	
	β	SE	β	SE	β	SE	β	SE
Elderly income	0.624	0	1.061	0.001	0.661	0.004	1.031	0.002
Quintile 1	0.341	0	0.048	0.002	0.772	0.001	0.748	0.003
Quintile 2	0.146	0	0.263	0.002	0.329	0.001	0.435	0.003
Quintile 4	-0.305	0	-0.490	0.002	-0.522	0.001	-0.195	0.004
80%–95%	-0.845	0.001	-1.041	0.002	-1.228	0.001	-1.215	0.006
Top 5%	-1.501	0.001	-1.930	0.006	-1.874	0.002	-2.492	0.017
Constant	-1.320	0	-2.109	0.001	-2.424	0	-3.791	0.002
No. of observations	203,799		60,313		203,799		60,313	

Source: Authors' calculations are from 2010 LIS data (<http://www.lisdatacenter.org>).

SE: standard error; OOP: out-of-pocket; LIS: Luxembourg Income Study.

All calculations are based on weighted observations. Dependent variable is indicator of household OOP spending exceeding 5% or 10% of household disposable income.

medical spending, we use logistic regression, with high spending alternatively defined as exceeding a 5% and a 10% of income threshold. The dependent variable, high health expenses, is a binary variable. The independent variables are income quintile (the third quintile is the reference), and an elderly dummy variable that takes the value of 1 for those aged 65 years and older. To estimate the probability of high expenses P occurring for individual i (P_i), the β coefficients from the logistic regression with n characteristics of the population are used to calculate the probability as follows⁴⁴

$$P_i = \frac{\exp(\beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_n X_{ni})}{1 + \exp(\beta_0 + \beta_1 X_{1i} + \dots + \beta_n X_{ni})} \quad (1)$$

As an illustration, the X variables for non-elderly citizens in the third (reference) quintile all take the value of 0; accordingly, the estimated probability of high health expenses P for this group is

$$P = \frac{\exp(\beta_0)}{1 + \exp(\beta_0)} \quad (2)$$

Results

Table 3 presents the estimated β coefficients (and standard errors) from the logistic regressions; Table 4 uses these values to estimate the probability of high spending for each of the 10 demographic groups based on equation (1).

As columns 1 and 2 in Table 4 show, Americans in all 10 demographic groups are much more likely than their Canadian counterparts to have health expenses exceeding 5% of their income. In the United States, the risk of this occurring is most common among poor elderly citizens (those in the bottom quintile, see row 1); among this group,

we estimate a 41% probability of high medical expenses compared with a 27% probability among Canadians. In absolute terms, the largest difference in probabilities occurs between the non-elderly poor in the two countries: the probability of high expenses in the United States is 27%, versus 11% in Canada.

Column 3 in Table 4 presents relative risk levels by showing the US rate relative to Canada's (e.g. 41%/27% in the case of poor elderly citizens). As shown, elderly Americans face between 1.2 and 2.1 times the risk faced by elderly Canadians. Among non-elderly Americans, the relative risk of spending at least 5% of one's income on medical expenses ranges from 1.7 to 3.2 times that in Canada.

Examining the risk of large medical bills when "large" is defined as exceeding 10% of income (Table 4, columns 4–5) also shows that the risk in the United States is highest among poor elderly citizens (27% versus 12% in Canada). The absolute gap is also largest among this group. The relative risk of high expenses in the United States compared with that in Canada (column 6) is larger when measured by the 10% threshold instead of a 5% one. Excluding those with income in the top 5% (where the relative risk in the United States is exceptionally high because Canada's numbers are so low), elderly Americans face 2–2.5 times the risk faced by elderly Canadians, and non-elderly Americans face around 3–4 times the risk of Canadians.

The analysis thus finds large differences between the two countries in the risk of high health expenses among all demographic groups, with the relative risk especially elevated when using the higher threshold of 10% of income, and when comparing non-elderly citizens in the two countries. In absolute terms, the largest differences are among poorer citizens, with those in the United States facing a particularly large chance of having high medical expenses compared with their Canadian counterparts.

Table 4. The probability of high out-of-pocket (OOP) expenses by income group and elderly status, Canada versus the United States.

	Estimated probability high spending = I					
	OOP/income 5%		Relative	OOP/income 10%		Relative
	United States (%)	Canada (%)	Prob. (1/2)	United States (%)	Canada (%)	Prob. (4/5)
Elderly						
Q1	41.2	26.9	1.5	27.1	11.8	2.3
Q2	36.6	31.3	1.2	19.2	8.9	2.2
Q3	33.3	26.0	1.3	14.6	6.0	2.5
Q4	26.9	17.7	1.5	9.2	5.0	1.9
Q5: 80–95	17.6	11.0	1.6	4.8	1.8	2.6
Top 5	10.0	4.8	2.1	2.6	0.5	4.9
Non-elderly						
Q1	27.3	11.3	2.4	16.1	4.6	3.5
Q2	23.6	13.6	1.7	11.0	3.4	3.3
Q3	21.1	10.8	1.9	8.1	2.2	3.7
Q4	16.5	6.9	2.4	5.0	1.8	2.7
Q5: 80–95	10.3	4.1	2.5	2.5	0.7	3.8
Top 5	5.6	1.7	3.2	1.3	0.2	7.2

Source: Authors' calculations are from 2010 LIS data (<http://www.lisdatacenter.org>).

Q: quintile; OOP: out-of-pocket; LIS: Luxembourg Income Study.

All calculations are based on estimated logistic regression coefficients in Table 3. See text for detail (n = 203,799 (United States) and 60,313 (Canada)).

Discussion

The article finds the risk of incurring large expenses to be about 1.5–4 times higher in the United States, depending on the demographic group and how large the definition of “large expenses” is. The nature and depth of these differences (see Table 4) indicate that this difference is not only due to the United States' more costly medical system but also due to the nature of health care policy that places a greater financial burden on those poor and middle-class citizens in need of medical care.

Having consumers of medical care and health products pay some portion of their costs has some merit as a policy tool to manage demand. While the appropriate reliance on such a financing mechanism and its precise form remain unsettled and important questions not addressed here, what is not is that from an equity standpoint, health insurance should provide citizens with appropriate levels of financial protection against high health care costs.

The need for this protection is particularly important among the most vulnerable populations—the elderly, the poor, and the sick—because these groups are the most prone to cost-related underusage of health care. The large effect that costs can have on the undertreatment of health problems, such as Piette et al.²⁴ document, underscores the public health dimension of large OOP expenses. The prevalence of large OOP requirements may help explain why the United States has such wide disparities in access to health care among different socioeconomic groups,^{45,46} disparities that contribute to its recent rating by the Commonwealth Fund⁵

as the most inequitable health care system among the 11 that it compared.

Canada serves as the article's benchmark; it is included not because of its status as the ideal,¹⁰ but rather because it is typical of other wealthy nations for which comparable data have been compiled (see Table 1). Canada provides a vantage from America's backyard of how political choices and health care costs affect the extent to which health care's financial burden falls on those needing medical care, and is a reasonable basis for judging the adequacy of health care financing reform in the United States.

Limitations

Three main limitations to this study suggest that its findings underestimate both the degree of financial risk in the United States and the differences in risks between the United States and Canada. The article estimates the risk of high OOP spending by actual spending patterns, thus failing to capture those who do not register high OOP spending only because they defer or forgo medical treatment rather than pay its cost; this omission may seriously underestimate the risk of high medical costs.⁴⁷ If the deterrent effect of OOP requirements increases as the cumulative burden of OOP expenditures grows,²⁰ the estimates here fall especially short of measuring Americans' true exposure to medical care's financial risks. And while the article represents a rare cross-national examination of OOP spending using data that has been harmonized for exactly that purpose, Canada's employment of a more expansive definition of OOP implies that the true difference

between the elderly in the United States and Canada is likely larger than estimated here. A final limitation of the study is that it does not account for the potential impact of differences in the health of Americans versus Canadians. As shown elsewhere,⁴⁸ those in poorer health are typically exposed to significantly higher levels of OOP spending.

Policy implications

An important goal of health care reform in the United States is to limit the burden that cost-sharing practices place on individual households. Will recent policy changes with the ACA significantly improve Americans' financial protection so that it might approach the level provided in Canada and other countries?

For sure, the expansion in insurance levels that have already begun to occur will reduce the large and catastrophic expenses of the uninsured population.^{49–52} The ACA's intent to match the actuarial value of insurance to income, and to place more stringent limits on maximum OOP expenses, is also a significant step in reducing very high OOP costs.⁵³ However, the ACA's coverage expansion may continue to leave some groups of vulnerable citizens without insurance.⁴⁷ And the Act still permits the running-up of large medical bills, amounts which can easily exceed 20% of income for poor and middle-class households.^{54–56} It also may not do much to reduce the high health care expenses of poor elderly citizens, those who despite being eligible for both Medicaid and Medicare, often have high health expenses.³⁸ For the elderly, a large part of their high OOP expenses comes from services not covered by Medicare.³⁸ A significant share of OOP expenses for others can be traced to the contribution of out-of-network expenses, and protection against these costs may not be adequate under the ACA.¹⁴

In short, once fully in place, the ACA should noticeably decrease the high costs associated with medical care and health products. However, there is reason to believe that it will not accomplish as much reduction as needed. Moreover, in the absence of effective measures to reduce the cost of health care in the United States, shifting away from cost sharing and toward a greater reliance on insurance could help, but only at a cost of increasing insurance premiums and taxes. Without addressing America's high health care costs, attaining financial protection on par with that in Canada is best achieved through stricter, more comprehensively defined, and binding income-based limits on OOP spending than is currently provided for in the ACA.

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