

Baird, Katherine

Working Paper

Paying 'Til it Hurts: High Medical Spending among the Poor and Elderly in Ten Developed Countries

LIS Working Paper Series, No. 659

Provided in Cooperation with:

Luxembourg Income Study (LIS)

Suggested Citation: Baird, Katherine (2016) : Paying 'Til it Hurts: High Medical Spending among the Poor and Elderly in Ten Developed Countries, LIS Working Paper Series, No. 659, Luxembourg Income Study (LIS), Luxembourg

This Version is available at:

<https://hdl.handle.net/10419/169219>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

LIS

Working Paper Series

No. 659

Paying 'Til it Hurts: High Medical Spending among the Poor and Elderly in Ten Developed Countries

Katherine Baird

February 2016



CROSS-NATIONAL
DATA CENTER
in Luxembourg

Luxembourg Income Study (LIS), asbl

**Paying ‘Til it Hurts:
High Medical Spending among the Poor and Elderly in Ten Developed Countries**

By Katherine Baird
University of Washington Tacoma
kebaird@uw.edu

April 2015

Abstract:

This paper measures high medical expenses in ten developed countries, both overall and by income and age, providing some of the best evidence to date on the extent of high medical spending across and within countries. Using comparable household-level data on out-of-pocket (OOP) medical expenditures made available through the Luxembourg Income Study (LIS), we measure high spending when it exceeds a threshold share of household income. The results show that the U.S. is far from alone in its failure to protect individuals from large medical expenses. In five of the other nine countries, one-quarter or more of poor households devoted at least 5 percent of household income to OOP expenses. The rate of high spending in the US is similar to Japan’s, but below that in Russia, Poland, Israel, and Switzerland. The high levels of exposure to large medical expenses in most countries indicates the need to develop robust measures of excessive spending that capture both future risk as well as past burdens.

Key words: out-of-pocket spending, health care financing, financing equity, comparative health policy, Luxembourg Income Study

Note: A revised version of this paper is forthcoming in Health Services Research. An early online edition is available at <http://onlinelibrary.wiley.com/doi/10.1111/1475-6773.12444/abstract>

Acknowledgements: I thank the University of Washington Tacoma’s School of Interdisciplinary Arts and Sciences for financial support, and the Luxembourg Income Study (LIS) for training and technical support. Special thanks to Teresa Munzi of LIS for her interest in the project and unending assistance with helping me untangle some complications in the datasets.

In recent years, many health care systems have increased their reliance on individuals paying out-of-pocket to finance their country's health care.^{1,2} Among Americans covered by employer-offered health insurance, the percent with deductibles of at least \$1,000 grew from 10 to 41 percent between 2006 and 2014, and deductibles for one-in-five now stand between \$2,000 and \$4,500.³

This paper investigates the degree to which health care systems in ten countries place high financial burdens on their citizens, focusing particularly on the poor and elderly, two groups especially vulnerable to high health care costs. By using comparable nationally-representative household level data from 2010 on both income and out-of-pocket (OOP) spending, the study provides some of the best evidence to date on the extent of high medical spending across and within countries. Measuring OOP spending relative to income, the analysis shows that in half of the sample countries, more than 10% of the population lived in households with high medical expenses, and in seven countries more than a quarter of the poor did. While high spending is more common among the poor than the elderly, in eight countries more than one-in-ten elderly citizens lived in households with high medical expenses.

The results underscore the very high burden medical expenses place on Americans. But so too do they show that high spending is equally common among the poor and elderly in about half of the countries in our sample. The paper concludes that assessments of national health care systems' performance should include measures of high spending risks, especially important as pressure on private and social insurance schemes mounts. Equity in the financing of health care, as well as in access and outcomes, depends on ensuring that OOP spending does not become excessive.

A. Overview

The design of health insurance coverage, and the role of OOP payments in it, has become a key policy concern in many countries as rising health care expenses encourages the expansion of greater cost-sharing measures (Collins, Rasmussen, Doty, and Beutel, 2014; Tambor et al 2011; OECD 2013). Relying on the direct users of health care to pay some (or occasionally even all) of their medical expenses can help reduce the moral hazard associated with insurance, and in many instances paying out-of-pocket can be fair as some health expenses reflect individual preferences and income instead of medical necessity. Some forms of cost sharing can also improve efficiency if they reduce the administrative costs necessitated by third party payers.

Despite these potential benefits, OOP requirements can create inequitable burdens when the level requires forgoing essential household spending, or taking on high debt that can lead to bankruptcy (Himmelstein 2009). Most troubling is when it leads to delaying or forgoing medical care, pharmaceutical products, and other needed medical goods (Eaddy et al. 2012), and outcome more common among the poor (Tamblyn et al 2001, Lesen et al 2013; Schoen et al 2010, Chernew et al 2008), elderly (Tamblyn et al 2001), and those with chronic health problems (Hirth et al 2008; Rector and Venus 2004).

Out-of-pocket medical spending is commonly defined in one of two ways. Most frequently, it is measured by the costs to individuals of purchasing medical goods and

services through co-pays, co-insurance and deductibles; the expenses of those without health insurance; and the cost of goods and services not covered by insurance. A second, more comprehensive definition includes individuals' payments for insurance premiums. References to OOP spending in this paper refer to the first definition as this captures the unknown and risky component of health care spending, and is what can deter individuals from consuming appropriate levels of health care.

All countries rely to some degree on OOP expenditures to fund their health care system. According to the Organization for Economic Cooperation and Development (OECD), on average OECD member countries use OOP payments to fund 19 percent of their health care expenditures (Exhibit 1). Perhaps surprisingly, the U.S. depends on cost sharing less than do many countries, as it accounts for only 12 percent of total health spending. However, average *per-capita* dollar amounts in the U.S. are similar to those in other countries (Exhibit 1).

Exhibit 1 about here

The central concern with OOP spending is not with country-level averages, however, but with the potential burden it places on individual households. A common gauge of this risk, sometimes referred to in the literature as underinsurance, is when households' OOP spending exceeds a particular share of income—most commonly 10 percent, or 5 percent if the household is poor (Ziller et al 2006; Schoen et al. 2010; Collins et al. 2014; Cunningham 2009).¹ One shortcoming of this indicator is that it is a retrospective one, measuring the burden of actual health care expenses as opposed to the prospective risk of incurring them.²

Using this measure in the United States has revealed that a large percentage of Americans are underinsured. Ziller et al (2006) estimate that 63 percent of America's poor households were underinsured, while Collins et al. (2014) estimate that 40 percent of nonelderly, poor adults with health insurance are underinsured. High spending is also common among Americans in poor health (Cunningham 2009), and the elderly.³ Studies of the financial burden of OOP spending in other countries finds that it is often high, but also that it varies significantly (Schoen 2010; Tambor et al 2011 and 2013; Xu et al 2007).

The OECD and World Bank provide country-level estimates of per-capita OOP spending (Exhibit 1). However, their figures are based on nations' responses to health-financing questionnaires,⁴ and do not permit disaggregation to the household level; nor do they allow comparing the size of OOP health expenditures among different demographic groups, such as the elderly, the poor, or those in poor health.

Such lack of comparable data has hindered cross-national research on the financial burden of OOP expenses at the household level. As a rare exception, Schoen et al (2010) used telephone calls to collect primary data from thousands of randomly-selected citizens in

¹“Catastrophic” medical spending is sometimes similarly defined, although it also occasionally relies on a higher threshold (Xu et al 2007).

² Some researchers attempt to combine the two concepts by including in the numbers those without insurance and/or those with deductibles above a certain share of income (Collins et al 2014).

³Marshall, McGarry and Skinner (2010) found that during the last year of life, OOP expenses among older Americans averaged \$11,618, with the 95th percentile being \$49,907.

⁴ Personal email communication, Michael Mueller, Health Policy Analyst, OECD's Health Division, February 4, 2015.

eleven countries. Inquiring into households' OOP spending, they matched these levels with conjectures over the respondents' income, finding that high spending (above \$1,000/year) was common in the US, with Switzerland close behind, concluding that by international standards, the U.S. was an "outlier" when it comes to cost-sharing (Schoen, p. 2333). Another international comparison used OOP spending data from a large international sample of hemodialysis patients (Hirth et al 2008); the researchers found that among eleven countries, patients paid about twice the amount OOP on prescription medications than was the average in the other ten countries.

Other than through such examples as these, we know little about how countries compare in the degree to which citizens are exposed to the risk of high medical expenses. More rigorous and comprehensive cross-national data would improve assessments of the relative performance of health care systems and the inequities within them.

B. Study Data and Methods

To develop comparable international indicators of the degree to which national health care systems place individuals at financial risk, we use household OOP spending from national household budget survey (HBS) data made available through the Luxembourg Income Study (LIS). LIS produces harmonized versions of HBSs by aligning variables with international standards to encourage cross-national research. Numerous LIS datasets include OOP spending data; this paper excluded those where estimates differed significantly from OECD figures (Hungary and Italy), where the definition of OOP spending deviated from standard practice (Taiwan), where the data were old (Estonia and Romania), and where the country's income was low relative to the United States (China, Guatemala, India, Mexico, Peru, Serbia, and South Africa). Ten countries remained: Canada, France, Australia, Israel, Japan, Poland, Russia, the U.S., Slovenia, and Switzerland. For all countries except Japan (2008), and Switzerland (2004), the household data comes from calendar year 2010.

For the United States, LIS data originates with the Current Population Survey's Annual Social and Economic Supplement (CPS). Among the ten countries in this study, the U.S. is unique in providing separate household spending data on both premiums and non-premium (OOP) expenses. CPS's OOP spending data has been found comparable to the Medical Expenditure Panel Survey's (MEPS) data, generally viewed as the U.S.'s best source for household OOP spending (Cohen et al., 2009). The CPS also offers three advantages over the MEPS: its sample size is five times larger; it provides better estimates of household expenditures on insurance premiums (Caswell and O'Hara 2010); and it contains much more detailed and accurate information on household income.

All Medical spending data from all countries except Canada measure households' OOP spending only; Canada's includes OOP spending plus the cost of private health insurance premiums. Because of this discrepancy, medical spending in the U.S. is measured both with premiums (designated by US*) and without; the "with" measure is used exclusively for comparisons with Canada. The sample size of observations used ranged from 7,938 in Switzerland to 203,799 in the United States. In most countries, we used nearly the entire set of observations, but in three, more than 25 percent of observations were missing key variables and were dropped. Appendix A provides detail on each country's data set and variables.

Definitions

Out-of-pocket spending: The LIS variable “consumption of health,” measures total household expenditures on medical products, appliances and equipment, outpatient services and hospital services, excluding payments for health insurance. LIS does not verify or enforce compliance with its definition, and there is some variation among countries in what they include, as indicated by the example Canada above.

Because of potential inconsistencies or inaccuracies in estimates of household OOP derived from HBSs (Heijink et al 2010), we first compared estimates of per-capita OOP spending from LIS with those from the OECD (or in the case of Russia, the World Bank). Column 3 in Exhibit 1 presents LIS’s estimate, and Column 4 shows it relative to the OECD’s (column 1). As shown, LIS’s estimate for Canada is noticeably above the OECD’s, which is to be expected since LIS’s includes private insurance spending. For all other countries, LIS estimates fall between 68 and 96 percent of the OECD’s. These discrepancies can be at least partly explained by two differences between the two sources: household budget surveys generally exclude the institutionalized population (e.g., those in long-term care facilities) as well as individuals who died earlier in the year; for both these populations, OOP spending can be significant (Marshall, McGarry and Skinner 2010; Cubanski et al. 2014).

Such differences indicate one shortcoming of using nations’ HBSs for OOP estimating household-level OOP spending. However, there are few good alternatives, especially for comparative purposes, and LIS data present a unique opportunity for the latter. While downwardly biased, LIS’s validation with OECD data indicates that a reasonable degree of trustworthiness. And as mentioned earlier, LIS’s OOP spending data for the U.S. is of especially good quality. Moreover, LIS’s income data is excellent and highly consistent across countries.

Income. To measure the resources available to pay for medical expenses, we define income as disposable income, meaning income after accounting for government taxes and social transfers. As with OOP spending, income is measured at the household level.

To examine the burden medical spending places among households with different incomes, we also classify each country’s population into four income categories. For this purpose, we use the equivalized form of household disposable income (disposable income divided by the square root of household size) to account for economies of scale in household size. All members of the same household are assigned identical values of equivalized income. The four income categories are “extreme poverty,” if equivalized disposable income falls below 40 percent of the nation’s median value; “poverty” is measured using the European Commission’s definition of income below 60 percent of the median;⁵ “near poor” for those with income falling in the range of 60 to 100 percent of median income; and “above median income”, which consists of 50 percent of the population. Exhibit 1 columns 5-8 show the percentage of citizens in each country falling within each income category.

High Medical Expenses. We measure high OOP spending (frequently called underinsurance) by calculating household health expenses as a share of household income. If this exceeds 10 percent--or 5 percent if the person is in poverty—then all individuals in the household are regarded as having high medical expenses. This measure is conservative

⁵ In the US, this results in a poverty threshold equal to about 162 percent of the 2010 federal poverty level.

because it employs an ex-post definition rather than citizens' ex-ante exposure to high medical expenses. It also entails an arbitrary division between the "poor" and the "non-poor:" someone with 59 percent of median income is poor, whereas another with 61 percent is not. Our measurement of high spending is also conservative because it does not capture those who register low OOP spending because they defer or forgo medical treatment rather than paying the cost. Finally, as discussed above, LIS estimates of OOP spending are below the OECD's, and therefore likely underestimate the phenomenon of high medical spending, particularly among the elderly population.

Our measurement of high spending could overestimate its incidence for a couple of reasons. One, we do not consider household wealth, and especially among the elderly, wealth makes otherwise high levels of OOP affordable. Second, we only measure OOP spending in a single year, and many households may be capable of smoothing out one year of high medical expenses. High OOP spending is most problematic when it is either very high, or persists over time; our estimates take no account of such distinctions.⁶

Age. We investigate high spending among the elderly (65 and over) and non-elderly population (below 65); among the elderly, we further distinguish between 65 to 74 years-olds and those 75 and over.

C. Study Results

Exhibit 2 presents country-level estimates of the frequency of high medical expenses in each of the countries during the study year. Rates for the US* and Canada are based on premium and non-premium expenses; for the US and all the other countries, it is based on OOP spending only. Comparing the US* with Canada reveals that over four times more Americans than Canadians had high medical expenses in 2010 (26 versus 6 percent, see Appendix B for more detail). In five nations (U.S., Poland, Israel, Switzerland and Poland), more than 10% of individuals lived in households with high medical spending. Only France had less than 5% of its population with high spending, although Canada is a close second.

- ***High Spending Rates by Income***

To explore how the financial burden of health care consumption varies by income, we calculate high-spending rates within the four income groups discussed above. Exhibit 3 displays estimates of underinsurance rates for each of these four income classifications, showing a strong negative association within countries between income and the frequency of high spending. The significantly lower rates among the near-poor compared with the poor is partially an artifact of measurement (spending exceeding 10 percent of income among the former but only 5 percent among the latter). However, in all countries underinsurance rates are lower among those with above-median income compared with the near-poor, and only in Israel and the US* are rates among those in extreme poverty slightly below the rate of those in poverty--perhaps reflecting underutilization of services within this group rather than superior insurance.

<*Exhibit 3 here*>

⁶ In the U.S., about 40 percent of those in the top 10 percent of OOP spending in one year were found to also be in it the following year (Cohen and Yu 2012).

Pronounced income-based differences in underinsurance rates are apparent in every country; the difference in rates between those in extreme poverty and those with above-median income is lowest in France (16.4 percentage points) and largest in Japan and Australia (35.6 and 34.5 percentage points respectively), with the United States (27.5 percentage point difference) just above the average. In absolute terms, those in poverty in France are the least likely (11.5 percent) to have high medical expenses.

The results reveal that a large share of poor Americans were underinsured in 2010. Counting the cost of insurance, 40 percent had high medical expenses; not counting it, more than one-in-four (28.7 percent) did. This latter rate is similar to those in Japan, Australia and Poland, but lower than those in Israel and Switzerland. Only France (11.5 percent) and to a lesser extent Slovenia, had significantly lower rates. Including the cost of insurance, poor Americans are more than twice as likely as poor Canadians to have high medical expenses (40 versus 17.4 percent). Rates of underinsurance among all income groups of Americans jump significantly once accounting for the expense of insurance premiums, but the increase is particularly marked among the near poor, where the percentage of high spenders increases from 11.1 to 29.7 percent (see Appendix B).

- ***Underinsurance Rates by Age***

Exhibit 4 compares underinsurance rates for the non-elderly (below 65), the young-elderly (between 65 and 74), and the old-elderly (75 and above). With two minor exceptions (Slovenia and Japan), underinsurance rates increase with age, with this growth most pronounced in Switzerland (29.9 percentage point difference), Poland (24 percentage points) and the United States* (21.9 percentage points). Unlike with income, however, age-related differences in rates are small in some countries, with a less than 10 percentage point difference in Canada, France, Slovenia and Japan.

<Exhibit 4 here>

The underinsurance rate among America's 65 to 74 year-olds (18.2 percent) is similar to rates in Japan and Australia, but considerably below those in Poland, Russia, Israel and Switzerland. France (2.7 percent) has by far the lowest rate, followed by Slovenia (15 percent). Accounting for premium expenses and compared with their Canadian counterparts, older Americans were nearly four times more likely to have high medical expenses in 2010 (37.7 versus 9.6 percent).

Comparing underinsurance rates in the US with and without insurance premiums reveals the premium's disproportionate burden on the elderly. With this inclusion, underinsurance rates among the non-elderly increase from 10.9 to 23.7 percent, but grow by a considerable 19.5 percentage points among 65 to 74 year-olds, and then double from 23.2 to 45.6 percent among the 75 and older population.

D. Discussion

These estimates provide some of the best comparative evidence to date of variation within and between countries in the percentage of citizens exposed to high medical expenses. In seven of the ten countries (U.S., Japan, Australia, Poland, Israel, Russia, and Switzerland), one-quarter or more of poor households devoted at least 5 percent of their income to non-

premium expenses; and in no country did fewer than one-in-ten poor citizens experience high medical costs. Underinsurance rates among the elderly are somewhat lower, yet we find that one-in-four elderly citizens had high spending in Switzerland, Russia, Poland and Israel, while more than 15 percent did in Australia, Slovenia, Japan and the US. Prior cross national research indicates Americans are the most exposed to OOP spending (Schoen et al 2010; Hirsch et al 2008); yet the results here indicate high levels of spending are far from limited to the U.S. Looking strictly at the poor and elderly populations, we find similar or larger underinsurance rates in Slovenia, Japan, Poland, Israel, Russia and Switzerland. These numbers are especially alarming because they likely underestimate, perhaps by a considerable degree, citizens' true exposure to the risk of high medical expenses. The estimates indicate that the degree of protection from high OOP spending provided in France and Canada is rare.

That high OOP spending in the U.S. is on par with its scale in about half of the study's countries could overlook the extreme levels of spending to which Americans are uniquely exposed. While the 90th percentile of OOP expenses as a share of income among both the poor and elderly are similar in the US, Poland, Israel, and Russia, and is much larger in Switzerland (see Appendix B), it is still possible (even probable) that America's extreme tail of the spending distribution lies significantly beyond those in other countries (see Cohen and Yu 2012).

A second reason to question the similarity we find between the U.S. and other countries is that (except for Canada) country-level comparisons are based on non-premium OOP spending, which sidesteps Americans' significant expenditures for health insurance. While private insurance pays for 35 percent of America's health expenses, it pays less than 10 percent in five of the nine other countries (Exhibit 1 Column 9). It could be argued, then, that a more accurate cross-national comparison of health care's financial burden should include Americans' distinctly high expenditures on insurance premiums.

Addressing this claim extends beyond the scope of this paper. But were we to make this adjustment, we indeed find that one-in-four Americans had high medical expenses in 2010, a rate far exceeding those in the other nine countries (Exhibit 2). Yet as Exhibit 3 showed, even with this broader measure of Americans' medical spending, few countries provided their poorest citizens with far superior protection, and among the elderly population, several countries approach the financial burden America's elderly face. What may distinguish the U.S., then, is the extent to which the cost of premiums push middle class and non-elderly populations into the category of high medically-related spending.

E. Policy Implications

Out-of-pocket medical expenditures place significant financial burdens on large numbers of people across the ten countries in this study. Given the strong evidence that cost-sharing can cause individuals to forgo health care and not adhere to recommended drug therapies, the magnitude of high medical spending we uncover implicates OOP requirements not just in financing inequities, but also in contributing to inequitable access to health care and medical outcomes.

Such effects on core features of nations' health care systems point to the clear need to better monitor high medical spending at the household level. Such monitoring, though, requires two important developments. First is the need to grapple with defining when the

financial burden of health expenses becomes excessive. The “underinsurance” measure used in this paper is common in the literature in part because it is straightforward to measure. But new gauges of affordability are needed to capture future risks (including that of underconsumption) as well as past burdens, and tackle numerous other conceptual difficulties such as a recent National Research Council and Institute of Medicine report outlines (2012).

Along with better measurements is the need for accurate data, ideally collected to permit international comparisons. The dual need for more robust measures backed by good data can be inferred by the existence of high levels of OOP spending despite policies in most countries to limit them (Paris Devaux and Wei 2010; The Commonwealth Fund Nov 2013). The complex nature of health care and health insurance design, and the various ways in which consumers respond to its quality, convenience, and range of choices can result in higher-than-expected OOP spending in practice (Rosenthal 2015; Domenighetti et al 2010). Developing measures and data sources allowing cross-national comparisons, such as advocated by numerous international organizations (Rannan-Eliya and Lorenzoni, 2010), could foster more rigorous and comprehensive analyses of health insurance design, analyses that would also improve assessments of the relative performance of health care systems and the role of OOP expenditures in it.

Notes

Caswell and O'Hara (December 29, 2010). "Medical Out-of-pocket expenses, poverty, and the uninsured". SEHSD Working Paper 2010-17.

Chernew, Michael, Teresa Gibson, Kristina Yu-Isenberg et al. (2008). "Effects of Increased Patient cost sharing On socioeconomic Disparities in Health Care," J Gen Intern Med 23(8): 1131-6.

Cohen, Joel W., Steven B. Cohen, and Jessica S. Banthin (2009, July). "The Medical Expenditure Panel Survey: A national information resource to support healthcare cost research and inform policy and practice." Medical Care 47(7, Supplement 1), S44–S50.

Cohen, Steven. and Yu, William. The Concentration and Persistence in the Level of Health Expenditures over Time: Estimates for the U.S. Population, 2008–2009. Statistical Brief #354. January 2012. Agency for Healthcare Research and Quality, Rockville, MD.
http://www.meps.ahrq.gov/mepsweb/data_files/publications/st354/stat354.pdf

Cohen RA, Gindi RM, Kirzinger WK. Burden of medical care cost: Early release of estimates from the National Health Interview Survey, January–June 2011. National Center for Health Statistics. March 2012. Available from: <http://www.cdc.gov/nchs/nhis/releases.htm>.

Collins et al (Nov 2014). Too High a Price: Out-of-Pocket Health Care Costs in the United States. Commonwealth Fund pub. 1784 Vol. 29.

Commonwealth Fund (Nov 2013). "International Profiles of Health Care Systems, 2013" Commonwealth Fund Publication #1717

Cubanski et al (2014). How Much Is Enough? Out-of-Pocket Spending Among Medicare Beneficiaries. Kaiser Family Foundation report, July.

Cunningham, Peter J. (July 2009). Chronic Burdens: the persistently high OOP health care expenses faced by many American with chronic conditions" Commonwealth Fund Issue Brief 1303, Vol 63.

Domenighetti, Gianfranco , Paolo Vineis, Carol De Pietro, and Angelo Tomada (2010). "Ability to pay and equity in access to Italian and British National Health Services," European Journal of Public Health 20(5): 500-503.

Eaddy, MT, CL Cook, K O'Day, SP Burch, and CR Cantrell (2012). "How patient cost-sharing trends affect adherence and outcomes: a literature review." P T: 37(1): 45-55.

Richard Heijink, Ke Xu, Priyanka Saksena and, David Evans. (2010). Validity and Comparability of Out-of-pocket Health Expenditure from Household Surveys: A review of the literature and current survey instruments. WHO Discussion Paper 1-2011. World Health Organization.

Hirth, Richard A., Scott L Greer, Justin M Albert, Eric W. Young, and John D. Piette (2008). OOP spending and medication adherence among dialysis patients in twelve countries” HA 27(1): 89-102.

Kaiser Family Foundation. 2014. “Employer Health Benefits, 2014 Annual Survey, Employee Cost Sharing”.

Lesen, Sundell, Carlsten, Mardby and Jonsson (2013). “Is the level of patient co-payment for medicines associated with refill adherence in Sweden? European Journal of Public Health, 24(1): 85-90.

Luxembourg Income Study (LIS) Database, <http://www.lisdatacenter.org> (Australia, Canada, France, Israel, Japan, Poland, Slovenia, Russia, Switzerland, United States; August 2014-March 2015). Luxembourg: LIS.

Marshall, Samuel, Kathleen M. McGarry, and Jonathan S. Skinner (July 2010). “The risk of OOP health care expenditure at end of life”, NBER WP 16170.

National Research Council and Institute of Medicine. (2012). Medical Care Economic Risk: Measuring Financial Vulnerability from Spending on Medical Care. Panel on Measuring Medical Care Risk in Conjunction with the New Supplemental Income Poverty Measure, M.J. O’Grady and G.S. Wunderlich, Eds. Committee on National Statistics, Division of Behavioral and Social Sciences and Education, and Board on Health Care Services, Institute of Medicine. Washington, DC: The National Academies Press.

OECD (2013), Health at a Glance 2013: OECD Indicators, OECD Publishing. http://dx.doi.org/10.1787/health_glance-2013-en

Paris, V., M. Devaux and L. Wei (2010), “Health Systems Institutional Characteristics: A Survey of 29 OECD Countries”, OECD Health Working Papers, No. 50, OECD Publishing. <http://dx.doi.org/10.1787/5kmfxfq9qbnr-en>

Rannan-Eliya, R. P. and L. Lorenzoni (2010), “Guidelines for Improving the Comparability and Availability of Private Health Expenditures Under the System of Health Accounts Framework”, OECD Health Working Papers, No. 52, OECD Publishing. <http://dx.doi.org/10.1787/5kmbrcg0clvc-en>

Rector, Thomas S. and Paricia J. Venus (2004). Do Drug Benefits help medicare beneficiaries afford prescribed drugs? HA 23(4): 213-222.

Rosenthal, Elizabeth 2015. “Insured but not covered,” New York Times. February 7.

Schoen, Cathy, Robin Osborn, David Squires, Michelle Doty, Roz Pierson, and Sandra Applebaum. 2010. “how health insurance design affects access to care and costs, by income, in eleven countries. HA 29(12): 2323-2334.

Tambor et al (2013). “The inability to pay for health services in Central and Eastern Europe”. European J of Public Health 24(3): 378-385.

Tambor et al. 2011. Diversity and dynamics of patient cost sharing “ European J of Public Health A21(5): 585=590.

Tamblyn, Robyn, Rejean Laprise, James A. Hanley; Michael Abrahamowicz,; Susan Scott,; Nancy Mayo,; Jerry Hurley,; Roland Grad, Eric Latimer; Robert Perreault; Peter McLeod; Allen Huang; Pierre Larochelle; Louise Mallet (2001) “Adverse events associated with prescription drug cost sharing among poor and elderly persons.” Journal of American Medical Association” 285(4):421-429.

Xu, Ke et al. (2007). “Protecting households from catastrophic health spending”, Health Affairs 26(4): 972-983.

Ziller, Erika C. Andrew Coburn, and Anush E. Yousefina (2006). “OOP Health Spending and the rural underinsured” Health Affairs 25(6): 1688-1699.

EXHIBIT 1: Out of Pocket Expenses and Distribution of Population by Income Categories, by Country

	OOP as %	OECD	LIS	LIS/OECD	-----Percent of Population (c):-----			
	Health 2010(a)	Per-Capita OOP 2010(a)	Per-Capita OOP (2010)(b)	Per-capita OOP	Extreme Poverty	Near Poverty	Poor	Above Median
Australia	19.3%	\$730	\$498	68%	6%	21%	29%	50%
Canada	14.4%	\$637	\$993	156%	7%	20%	30%	50%
France	7.5%	\$300	\$235	78%	5%	16%	34%	50%
Israel	18.2%	\$501	\$372	74%	12%	28%	22%	50%
Japan	14.4%	\$436	\$419	96%	7%	18%	32%	50%
Poland	22.1%	\$317	\$285	90%	5%	16%	34%	50%
Slovenia	12.2%	\$300	\$255	85%	6%	16%	34%	50%
Russia	36.4%	\$472	\$387	82%	10%	21%	29%	50%
Switzerland	25.1%	\$1,253	\$958	76%	4%	15%	35%	50%
US	12.0%	\$988	\$739	75%	11%	24%	26%	50%
US*	n/a	n/a	\$1,495	n/a	11%	24%	26%	50%
OECD AVG	19.0%							

SOURCES:

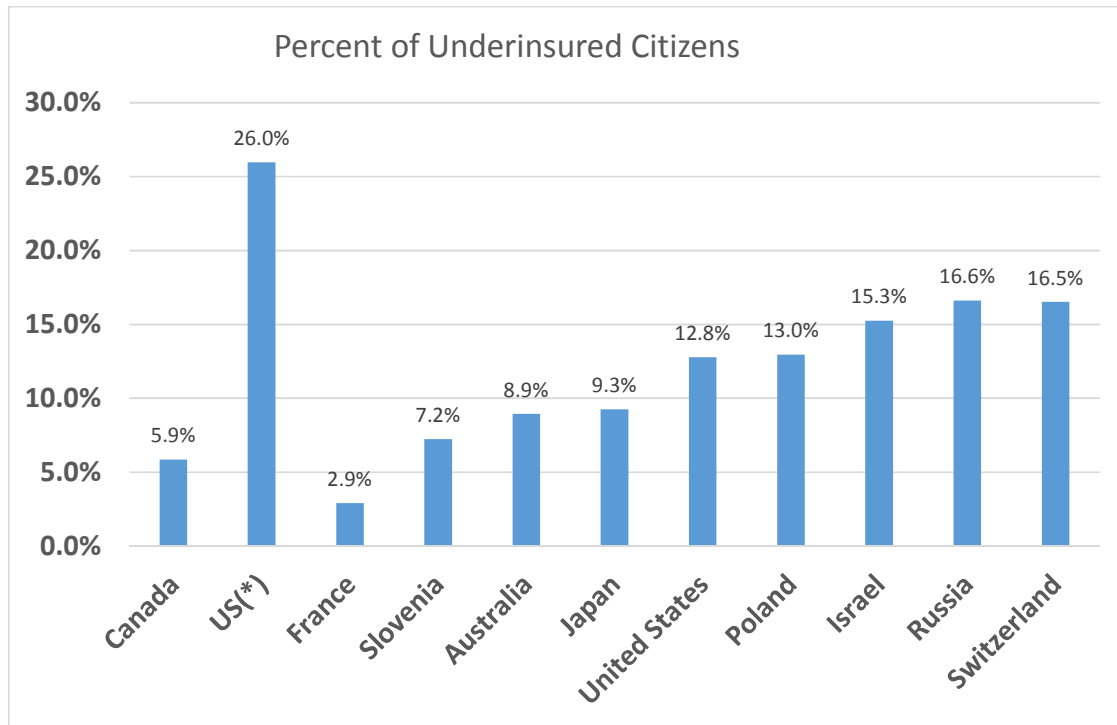
(a) OECD Health Statistics 2014, available at <http://stats.oecd.org/Index.aspx?DataSetCode=SHA>. Per-capita expressed in 2010 purchasing power parity dollars (PPP\$). Data for Switzerland from 2004, expressed in 2004 PPP\$; data for Japan from 2008, and expressed in 2008 PPP\$. Russia data from World Bank available at <http://data.worldbank.org/indicator/SH.XPD.OOPC.ZS>

(b) Author calculation from LIS data. All amounts expressed in PPP\$ for 2010, except for Switzerland (2004) and Japan (2008). PPP\$ conversion based on OECD figures available at http://stats.oecd.org/Index.aspx?datasetcode=SNA_TABLE4

(c) Author calculation based on LIS data (www.lisdatacenter.org). See text for definition of income categories.

NOTES: All calculations from LIS data based on person-weighted observations.

EXHIBIT 2: Percent of Citizens with High Out-of-Pocket Health Expenditures, By Country and Select Year

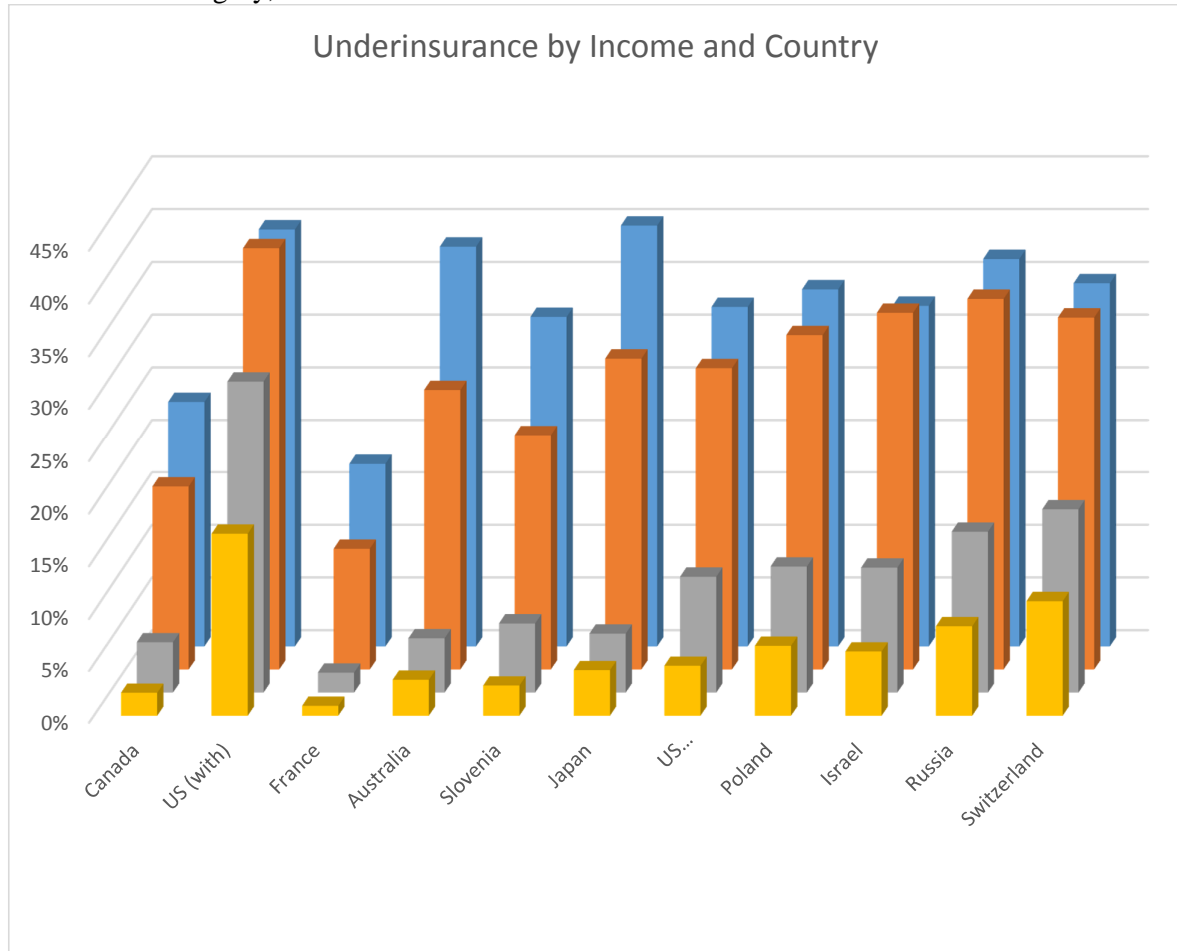


SOURCE: Author calculation from LIS data (www.lisdatacenter.org). Based on weighted observations. Year is 2010 except for Japan (2008) and Switzerland (2004)

NOTES: High OOP defined as above 10% of household income, or 5% if poor. Poverty, income and OOP defined in text.

US* includes expenditures on private insurance premiums. Canada also includes private insurance premiums. All other countries percent based on OOP expenditures only.

EXHIBIT 3: Percent of Citizens with High Out-of-Pocket Health Expenditures, By Country and Income Category, Select Year

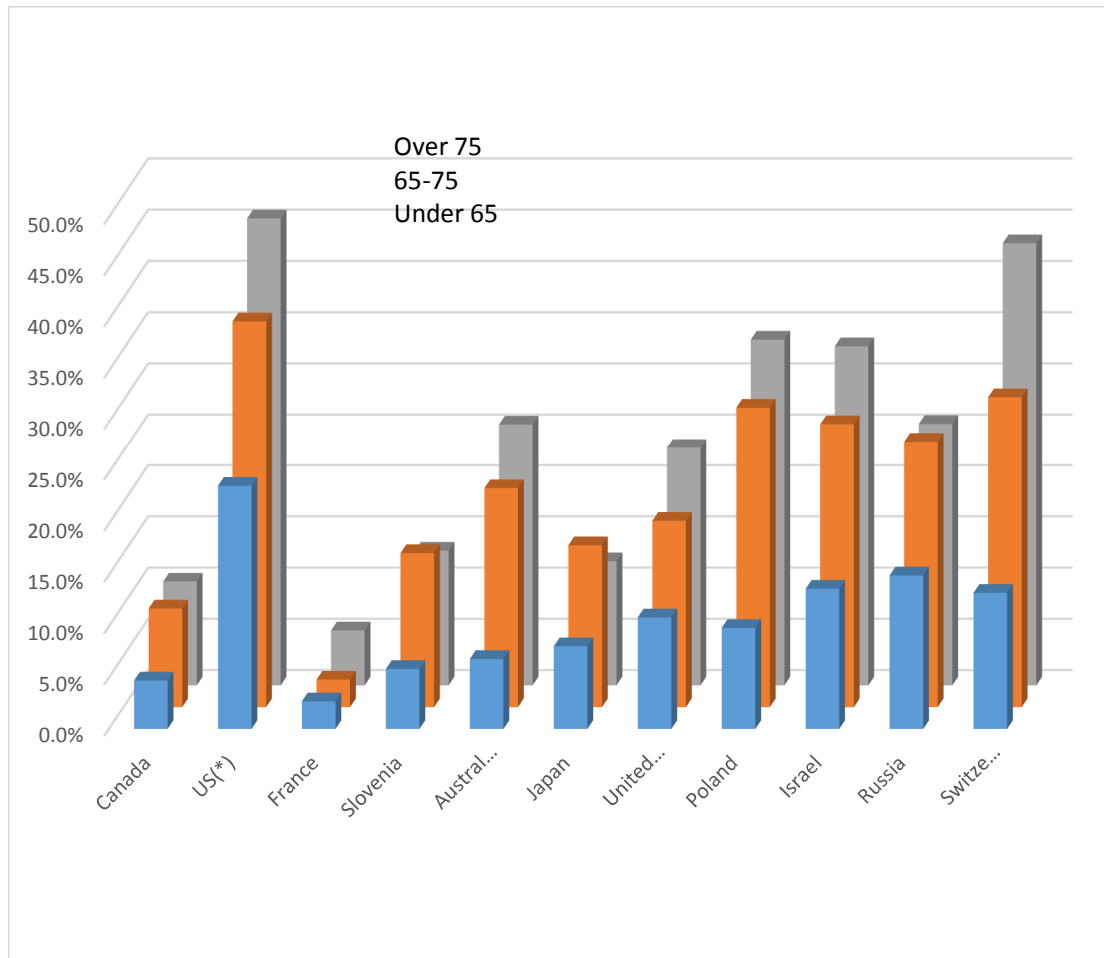


SOURCE: Author calculation based on LIS data (www.lisdatacenter.org). All calculations based on weighted data. Year is 2010 except for Japan (2008) and Switzerland (2004).

NOTES: High OOP defined as above 10% of household income, or 5% if poor. Poverty, income, income categories, and OOP defined in text.

US* includes expenditures on private insurance premiums. Canada also includes private insurance premiums. All other countries percent based on OOP expenditures only.

EXHIBIT 4: Percent of Citizens with High Out-of-Pocket Health Expenditures, By Country and Age, Select Year



SOURCE: Author calculation based on LIS data (www.lisdatacenter.org). All calculations based on weighted data. Year is 2010 except for Japan (2008) and Switzerland (2004).

NOTES: High OOP defined as above 10% of household income, or 5% if poor. Poverty, income, and OOP defined in text.

US* includes expenditures on private insurance premiums. Canada also includes private insurance premiums. All other countries percent based on OOP expenditures only.

Supplemental Appendix A					
Country	Data Source	Year	Number obs used/Total	Universe	Note:
Australia	Australian Bureau of Statistics <i>Household Expenditure Survey and Survey of Income and Housing</i>	2010	22087/42595	Residents of private dwellings, excluding households with members of non-Australian defence forces, and households with diplomatic personnel.	Only 52 percent of observations had values for OOP spending (hcmcd). Several hundred observations were missing disposable income (dhi).
Canada	Statistics Canada <i>Survey of Labour and Income Dynamics</i>	2010	36237/60362	All individuals in Canada, excluding residents of Yukon, the Northwest Territories and Nunavut, institutions, and persons living on Indian reserves or in military barracks.	About 40 percent of observations missing information on OOP (hcmcd); spending begins at 50CAD, so missing values could be a value of zero.
France	Institut National de la Statistique et des Etudes Economiques <i>Enquête "Budget de Famille"</i>	2010	40854/41285	Excludes collective households (such as hospices, religious communities, university campuses, workers dormitories, prisons, etc.) and persons without a residence.	
Israel	Central Bureau of Statistics <i>Household Expenditure Survey</i>	2010	20203/20225	Excludes residents for kibbutzim, collective moshavim and Bedouins living outside of localities.	
Japan	Keio University Joint Research Center for Panel Studies <i>Japan Household Panel</i>	2008	10852/14575	Excludes households in which the oldest member is under the age of 20.	Missing 2799 observations on disposable income (dhi), and 1887 missing OOP (hcmcd). A few also missing age.
Poland	Central Statistical Office <i>Household Budget Survey</i>	2010	107147/107967	Excludes collective households (e.g. students' hostels, social welfare homes) and household of foreigners	dhi negative values, bottom coded.
Russia	National Research University Higher School of Economics <i>Russia Longitudinal Monitoring Survey-Higher School of</i>	2010	15081/16867	Excludes military, penal, and other institutionalized populations.	Missing 1472 observations on disposable income (dhi) and 230 on OOP (hcmcd).
Slovenia	Statistical Office of the Republic of Slovenia <i>Household Budget Survey</i>	2010	11514/11515	Excludes collective households such as boarding schools, nursing homes for children, old people's homes, hospitals, homes for pupils, student hostels, etc.	
Switzerland	Federal Statistical Office <i>Income and Expenditure Survey</i>	2004	7938/7993	Excludes border residents, foreign tourists, and collective households (e.g. prisons).	
United States	United States Census Bureau <i>Current Population Survey Annual Social and Economic Supplement</i>	2010	203799/204983	Civilian non-institutional population in the United States.	Variable capturing spending on health insurance premiums is hmxvcs.
Notes:					
Weighting: all calculations are based on weighted values using "ppopwgt" variable. Out of pocket spending					
Bottom coding: All negative values for disposable income (dhi) or out-of-pocket spending (hcmcd or hcmcd) bottom-coded to zero.					

Supplemental Appendix B: Health Expenses as a Share of Income, by Age and Income (2010)											
	US*	US	Canada	France	Australia	Japan (2008)	Poland	Switzerland (2004)	Israel	Russia	Slovenia
50 percentile											
<i>Age</i>											
<i>Below 65</i>	3.8%	1.5%	0.9%	0.8%	1.2%	1.4%	1.9%	0.7%	1.5%	1.5%	0.7%
<i>65-74</i>	6.2%	1.5%	1.5%	0.8%	2.8%	2.2%	5.3%	2.3%	3.2%	3.6%	1.2%
<i>Above 75</i>	7.3%	2.7%	1.3%	0.9%	2.8%	1.9%	6.2%	5.0%	3.6%	3.6%	0.9%
<i>Income</i>											
<i>Extreme Poverty</i>	2.8%	2.1%	2.5%	0.7%	2.9%	3.7%	1.9%	1.8%	2.2%	1.7%	0.0%
<i>Poverty</i>	2.9%	1.9%	1.7%	0.7%	1.7%	2.9%	2.1%	1.4%	2.4%	2.0%	0.0%
<i>Near Poverty</i>	5.0%	1.9%	1.2%	0.9%	1.4%	1.8%	2.4%	0.9%	1.7%	2.1%	0.6%
<i>Above Median</i>	4.1%	1.4%	0.6%	0.7%	1.2%	1.3%	2.1%	0.8%	1.3%	1.5%	0.8%
75 percentile											
<i>Age</i>											
<i>Below 65</i>	8.7%	3.9%	2.3%	1.7%	2.9%	2.8%	4.5%	4.0%	4.2%	4.8%	2.5%
<i>65-74</i>	13.4%	6.1%	5.1%	1.6%	5.6%	4.9%	10.3%	11.6%	8.7%	8.7%	4.6%
<i>Above 75</i>	16.1%	7.3%	4.8%	2.4%	6.3%	4.2%	11.8%	20.8%	9.9%	8.8%	4.2%
<i>Income</i>											
<i>Extreme Poverty</i>	13.1%	7.5%	4.6%	3.1%	9.0%	8.9%	7.9%	11.1%	7.2%	10.0%	8.3%
<i>Poverty</i>	11.4%	6.0%	3.3%	2.4%	5.3%	5.9%	6.6%	9.2%	7.3%	8.6%	3.7%
<i>Near Poverty</i>	11.5%	5.0%	4.1%	2.1%	3.4%	3.3%	5.9%	6.0%	5.0%	6.5%	3.1%
<i>Above Median</i>	8.0%	3.3%	1.9%	1.5%	2.7%	2.3%	4.5%	4.0%	3.4%	4.2%	2.3%
90 percentile											
<i>Age</i>											
<i>Below 65</i>	16.6%	8.7%	5.2%	3.6%	6.3%	6.0%	8.5%	12.1%	9.5%	11.4%	5.9%
<i>65-74</i>	23.6%	13.3%	8.6%	4.0%	11.6%	10.4%	16.5%	36.1%	18.2%	17.2%	11.4%
<i>Above 75</i>	29.9%	15.6%	8.4%	5.1%	11.7%	8.7%	18.7%	58.0%	21.4%	17.7%	10.2%
<i>Income</i>											
<i>Extreme Poverty</i>	41.7%	25.9%	15.3%	8.5%	29.4%	27.1%	20.8%	46.1%	18.1%	33.3%	30.5%
<i>Poverty</i>	29.4%	17.3%	8.3%	5.7%	11.9%	13.8%	14.4%	31.7%	17.3%	21.4%	12.3%
<i>Near Poverty</i>	20.3%	10.7%	7.7%	4.1%	6.6%	6.4%	11.0%	18.6%	12.0%	16.0%	7.1%
<i>Above Median</i>	13.5%	6.7%	4.8%	3.0%	5.2%	4.6%	8.2%	11.3%	7.2%	9.1%	5.2%

Supplemental Appendix B: Health Expenses as a Share of Income, by Age and Income (2010)											
	US*	US	Canada	France	Australia	Japan (2008)	Poland	Switzerland (2004)	Israel	Russia	Slovenia
High Spending Percentage	26.0%	12.8%	5.9%	2.9%	8.9%	9.3%	12.5%	16.5%	15.3%	16.6%	7.2%
<i>Age</i>											
<i>Below 65</i>	23.7%	10.9%	4.7%	2.7%	6.8%	8.1%	9.9%	13.3%	13.7%	15.0%	5.9%
<i>65-74</i>	37.7%	18.2%	9.6%	2.7%	21.4%	15.8%	29.3%	30.3%	27.7%	26.0%	15.0%
<i>Above 75</i>	45.6%	23.2%	10.1%	5.4%	25.5%	12.1%	33.8%	43.2%	33.2%	25.6%	13.1%
<i>Income</i>											
<i>Extreme Poverty</i>	39.6%	32.3%	23.3%	17.4%	38.0%	40.0%	34.0%	34.5%	32.4%	36.8%	31.4%
<i>Poverty</i>	40.1%	28.7%	17.4%	11.5%	26.7%	29.6%	31.9%	33.5%	34.0%	35.3%	22.4%
<i>Near Poverty</i>	29.7%	11.1%	4.9%	1.9%	5.3%	5.7%	12.1%	17.5%	12.0%	15.4%	6.7%
<i>Above Median</i>	17.4%	4.8%	2.2%	1.0%	3.5%	4.4%	6.8%	11.0%	6.2%	8.6%	2.9%
<i>Source: Author calculations from LIS data. Health expenses is hcmcd (or hmcmed), except for United States* where it is hmcmed+hmxv.</i>											
<i>Notes: (1) US* and Canada include household expenditures on health insurance premiums</i>											
<i>(2) Income is defined as household disposable income</i>											
<i>(3) Extreme poverty is equivalized disposable income equalling 40 percent or less of equivalized median disposable income. Poverty is 60</i>											
<i>(4) High spending is spending in excess of 10 percent of disposable income, or 5 percent if in poverty.</i>											