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Health Spending for Low, Middle, and High-Income Americans, 1963-2012

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Abstract

U.S. medical spending growth has slowed since 2004, coincident with rising co-payments and deductibles, which might particularly impact lower-income persons. We analyzed 22 national surveys between 1963 and 2012 to assess trends in health expenditures by and on behalf of persons in each income quintile. Before the 1965 passage of Medicare and Medicaid, the poorest quintile had the lowest expenditures, despite their worse health. By 1977 their expenditures exceeded those for other Americans (although after adjusting for age and health status the income-based gap never fully reversed). This pattern persisted until 2004. Thereafter, expenditures fell 3.7% for the poorest quintile, while rising 12.5% for the middle-three quintiles and 19.7% for the wealthiest, who had the highest expenditures in 2012. The post-2004 divergence of expenditure trends for the rich, middle-class and poor occurred only among the non-elderly. We conclude that the slowdown in health expenditure growth in the non-elderly has been driven primarily by lower spending among the poorest segment of the US population.

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Glossary

ACA	Affordable Care Act
CPI	Consumer Price Index
MEPS	Medical Expenditures Panel Survey
NHEA	National Health Expenditure Accounts
NMCUES	National Medical Care Utilization and Expenditure Survey
NMES	National Medical Expenditure Survey
SHSUE	Survey of Health Services Utilization and Expenditures
VA	US Department of Veterans Affairs Health Care System

Introductionⁱ

U.S. medical spending growth, which for decades has outpaced Gross Domestic Product growth, slowed starting in 2004.¹ Much discussion of the slowdown in health spending has focused on whether it is due primarily to structural or to cyclical factors,²⁻⁹ and prior studies have attributed 37% to 77% of the slowdown to the lingering effects of the Great Recession.^{2,8,9} These estimates imply that between one fourth and two-thirds of the spending slowdown may be due to durable changes in the health care system, such as improved provider efficiency or less rapid diffusion of expensive medical technology and pharmaceuticals.⁴ More recent health spending estimates suggest that the growth in health care spending has rebounded and may return to its high pre-slowdown rate.^{10,11} Nevertheless, understanding the drivers and consequences of the pre- and post-recession health spending slowdown is a critical component of developing policies designed to increase value and ensure long-run sustainability in the health care system.

Despite considerable attention paid to the relative balance of structural and cyclical factors in driving lower health spending, few if any studies have explored spending changes across the income distribution. Some structural drivers of slower health spending growth, such as decreased use of expensive “low-value” services (promoted, for example, by the Choosing Wisely campaign) could be expected to constrain health spending across all income groups. Others, such as cost-sharing (e.g., deductibles and co-payments) in private insurance plans, might affect price-sensitive lower-income individuals preferentially. Similarly, recession-related cyclical factors might have caused greater slowing in health spending among those with lower incomes (a pattern that would mirror the trend in overall spending between 2008 and 2012, when inflation-adjusted consumption by the top 5% of income earners rose 17% but fell among the bottom 95%).¹²

Need plays a greater role in determining the consumption of medical care than for most goods and services. Moreover, health insurance has insulated most patients from the cost of their care, and Medicaid and Medicare have heavily subsidized care for the poor and elderly, who tend to

ⁱ A revised version of this work is forthcoming in *Health Affairs*. An earlier draft was presented at the Society of General Internal Medicine Annual Meeting, April 2015, Toronto, Canada. This work was supported by the Harvard Medical School Center for Primary Care.

have the greatest health needs.¹³ However, recent increases in copayments and deductibles for the privately insured^{14,15} along with flat income growth among the non-wealthy¹⁶ may have constrained health spending overall and skewed it toward wealthier Americans.

We used national survey data to analyze trends in health spending for different income groups over the past half century, with particular attention to the recent spending slowdown.

Methods

Data sources

We analyzed individual-level data from 22 nationally representative surveys of health expenditures by and on behalf of the civilian non-institutionalized U.S. population conducted over the past 50 years: the Surveys of Health Services Utilization and Expenditures (SHSUE), conducted in 1963 and 1970 (N = 7,759 and 11,619, respectively); the 1977 and 1980 National Medical Care Utilization and Expenditure Surveys (NMCUES) (N = 38,815 and 17,123, respectively); the 1987 National Medical Expenditure Survey (NMES) (N = 23,652); and the 1996-2012 Medical Expenditure Panel Surveys (MEPS) (N = 21,571-37,418 per year), carried out annually by the Agency for Health Care Research and Quality. All of these surveys tabulated health expenditures (including all out-of-pocket and third-party payments) based on respondents reports, which surveyors then verified with providers. The surveys also collected demographic information, including income and family size.

Analysis

Our main analysis examined trends in mean per-capita health expenditure for each income quintile. We also explored income-related trends according to payer, type of service and self-reported health status. Expenditure figures for all years were adjusted to 2012 dollars using the Consumer Price Index.¹⁷

We divided the population in each survey year into income quintiles (i.e. fifths) based on family income as a percent of poverty. We used the Census Bureau's poverty measure, which standardizes for age and family size (and, in 1963 and 1970 only, for farm vs. non-farm status). Because of limitations in the 1977 data, for that year we calculated poverty levels standardized for family size but not age. In 2012, income quintile cut-points were at 125, 230, 361, and 558 percent of the federal poverty level, corresponding to annual incomes for a family of three (two adults and one child) of \$22,689, \$41,820, \$65,462, and \$101,094.

In addition to total health expenditures, we calculated estimates for five sub-categories of health services: inpatient care; outpatient care (including emergency care, and outpatient lab tests and imaging); dental care; prescription medicines; and other (including home health care, vision aids, and medical supplies). Because expenditures for over-the-counter drugs were not included in the MEPS and the 1987 NMES, we also excluded such expenditures in analyses of the earlier surveys.

We analyzed payments from six sources: private insurers; Medicare; Medicaid; other public payers (including worker's compensation, VA, TRICARE, and other government sources); out-of-pocket; and unclassified.

We also analyzed income-related trends in self-reported health status (which correlates closely with more objective measures of health).^{18,19} MEPS respondents rated their health on a five point scale: excellent, very good, good, fair, or poor. The earlier surveys used a four point scale: excellent, good, fair, or poor. To harmonize the scales, we recorded "very good" responses in the MEPS as half-way between "good" and "excellent." We then calculated a mean health status score for each income quintile relative to the mean for the total population each year. We explored different definitions of this variable, which yielded substantially similar results.

We evaluated time trends in health spending according to family income quintile using linear regression. We chose 2004 as the start of the recent health spending slowdown based on prior national health spending tabulations.⁷ We conducted sensitivity analyses using cut-points between 2002 and 2006; the choice of year did not substantially change our estimates.

We used multiple linear regression to adjust for health status (coded categorically on a five-point scale) and age (coded as a continuous variable,) where the bottom income quintile's mean (unadjusted) health spending for each survey year was used as a reference group for the other four quintiles. Analyses with and without adjustment for age and health status yielded similar time trends; in most cases we report the unadjusted figures. (Detailed age- and health status-adjusted estimates are available in Appendix Table 1.) Analyses were conducted for each data year and income quintile. However, to smooth and simplify our visual presentation of the data,

our graphs display two-year moving averages for 1996-2012 (the period for which annual data were available) and pool data for the middle three quintiles (which followed similar trends.)

Finally, to assess whether a small number of very high-cost patients drove our findings, we repeated our analyses using quantile regression at the 50th, 75th, 90th, 95th and 97.5th percentiles of expenditures.

All estimates incorporate person-level weights that allow extrapolation to the entire U.S. non-institutionalized population. The 1963 SHSUE survey was a simple random sample, with each respondent having equal weight. For all other surveys we used SAS survey procedures that adjust confidence intervals for the complex survey design.

Analyses were conducted using SAS version 9.3.

Results

Per capita health expenditures grew 549% (adjusted for inflation) between 1963 and 2012 (Figure 1.) As has been widely observed, spending rose rapidly between 1963 and 1987, surged again from 2000 through 2004, started slowing prior to the Great Recession, and slowed further during and after the recession.

Expenditures for the poorest group grew more rapidly than for other Americans from 1963 (before the implementation of Medicare and Medicaid) through 1987, while expenditure growth differed little amongst the top four quintiles. By 1977, expenditures for the poorest quintile exceeded those for all other Americans by 23%.

Between 2004 and 2012, per capita expenditures for the poorest quintile fell at a rate of \$19.27 annually, 3.7% over the 8 year period (Table 1). Meanwhile, health expenditures for the wealthiest group have outpaced those of the three middle quintiles. While per capita expenditures rose at a rate of \$106.04 annually (19.7% over 8 years) for the wealthiest group, they increased only 12.5% during this period for the middle-three quintiles. As a result, by 2012 the top income quintile, which until the early 2000s had among the lowest per-capita health spending, had the highest expenditures of any income group.

Individuals reporting worse health status had higher health expenditures (data not shown). The lowest income quintile had the worst health status and the wealthiest the best throughout the study period (Appendix Figure 2), and shifts in health status did not explain the recent divergence in health expenditures between income groups. Moreover, after adjustment for health status (and age) health expenditures were higher for the top income quintile than for less affluent Americans throughout the 50 year period (Figure 2). In 2000, age- and health status-adjusted per capita health expenditures for individuals in the top quintile were \$616 (18%) higher than for persons in the lowest quintile; the difference increased to \$1,743 (43%) in 2012 (Appendix Table 1).

Expenditure trends differed markedly in the over- and under-65 age groups (Figure 2, Appendix Figure 1, and Appendix Table 2). Post-2004, the elderly of all incomes experienced similar, flat expenditure growth, with the poorest fifth continuing to have the highest expenditures. In contrast, the non-elderly population experienced a sharp income-based divergence in expenditure growth after 2004; spending grew rapidly in the top income quintile, modestly in the middle three quintiles, and minimally among the poorest group.

Prescription drug spending grew similarly for all income groups after 2004 (Table 1). However, both inpatient and outpatient expenditures grew rapidly for the wealthiest quintile, while remaining flat or actually declining for the poorest group. The income-related divergence in outpatient expenditures reflects both volume and price effects; wealthy individuals had both rising volumes of medical visits (Appendix Figure 3), and increasing payments per visit. By 2012, the top income quintile made 40% more outpatient visits per capita than other Americans, and costs per visit were also higher (\$303 vs \$241).

After 2004, private insurance expenditures for different income groups diverged strikingly, rising rapidly for the wealthiest quintile, while falling for the poorest 20% (Table 1). This was true whether average private insurance expenditure was calculated per capita (Table 1) or per continuously enrolled privately insured non-elderly person (Appendix Figure 4). For those under 65, private insurance expenditures per enrollee grew modestly in the middle three income quintiles. Medicaid spending per non-elderly recipient declined after 2004 (Appendix Figure 4). Per-capita Medicare expenditure growth on behalf of the poor was lower than for other income groups during this period, although interpretation of this finding is complex because many poor Medicare beneficiaries have supplemental Medicaid coverage.

To explore whether a small number of high-cost patients accounted for the income-based trends we observed, we repeated our analyses using quantile regression. Prior to 2004 the faster growth of expenditures in the poorest group (and slower growth for the wealthiest) was driven by the costliest (and presumably sickest) 10% of patients (Appendix Figure 5a). After 2004, expenditures surged for both low-cost and high-cost affluent patients, but fell for both low-cost and high-cost low-income patients (Appendix Figure 5b).

Discussion

The slowdown in health spending growth between 2004 and 2013 was widely reported and much celebrated.^{3,8,20} Our data suggest that slower spending growth was concentrated among poor and middle-income Americans, leading to a growing disparity in health expenditures across income groups. It is unclear whether the recent acceleration of spending growth will reverse this trend.

The pattern of sharply rising spending for the wealthy, and flat or slow growth for others, mirrors the widening gap in the consumption of other goods,¹² and may signal a shift towards a more “consumer-driven” health care system.

Prior to the implementation of Medicaid and Medicare in 1966, the poor had the lowest health expenditures despite their greater medical need, while expenditures for the wealthy were nearly twice as high. Subsequent to these public investments, health spending tracked closer to medical need, with the poorest income quintile having the highest expenditures, and the top quintile the lowest. (However, after adjusting for age and health status, the gap between income groups never fully reversed.) The pattern of higher (unadjusted) expenditures for poorer persons persists for the elderly, virtually all of whom have public coverage through Medicare. Among the non-elderly, however, the income-related pattern reversed after 2004: wealthy individuals - who are the healthiest segment of the population - now have the highest expenditures.

The shift of some lower-income families from private coverage to Medicaid,¹⁶ which pays lower fees, could explain part of the widening gap in per-visit payments. However, this would not explain the disparate trends in visit rates, the divergence between the wealthy and the middle class, or the fall in expenditures among poorer persons with private insurance.

The slowdown in medical spending growth since 2004 is the sum of disparate trends: flat spending for the elderly and poor; slow growth for the non-elderly middle class; and rapid expenditure growth for the non-elderly wealthy. Personal healthcare expenditures totaled \$2.3793 trillion in 2012;²⁰ if all income groups had experienced the same growth as the

wealthiest quintile between 2004 and 2012, personal health spending would have been approximately \$2.5370 trillion in 2012, an increase of \$157 billion in that year alone.

Research on the health spending slowdown has largely focused on the various structural changes in the health care system that may have contributed to slower growth, as well as the extent to which the Great Recession deserves most of the credit.²⁻⁹ Although cyclical (i.e., recession-related) factors could result in the observed income-related trends in health spending, the divergence in spending appears to pre-date the Great Recession by several years.¹

Some structural changes, including greater provider efficiency and fewer expensive “blockbuster” pharmaceuticals entering the market, would be expected to affect all income groups uniformly. Other structural changes – particularly increased cost-sharing for the privately insured - would be expected to have a greater impact on low- and middle-income people, consistent with our findings. Cost sharing and depressed income among the poor and middle class may explain why spending by the privately insured dropped after 2008,⁶ and why regions of the U.S. most affected by the Great Recession experienced the slowest growth in health spending for the privately insured between 2007 and 2011.²

A mix of cyclical and structural factors - the lingering effects of the Great Recession on non-wealthy households and increased cost sharing – seems the best explanation for the rising income-based spending disparities we observed. Wages for most workers have been slow to rebound from the recession. Meanwhile, the percentage of privately-insured workers with individual-plan deductibles of at least \$2,000 has increased six-fold since 2006.²¹ Such high-deductible plans cause particularly large drops in healthcare utilization among the highest cost (i.e. sickest) enrollees²² and disproportionately impact lower-income workers.

The trend toward higher co-payments and deductibles seems likely to continue under the ACA. A typical individual “Silver” plan sold through the insurance exchanges carries a \$2,907 deductible.¹⁵ While the ACA's Medicaid expansion will boost expenditures for the eight million newly-enrolled, they constitute only 13% of the poorest quintile, and several states are imposing cost sharing on Medicaid enrollees,²³ which may attenuate utilization increases.

The rising income-based disparities in spending suggest a shift from allocation of health care according to need to allocation by willingness (and ability) to pay. Additional research is needed to determine whether this shift arises from the underuse of needed care among the poor or overuse of unnecessary care by the wealthy, e.g. due to supply-induced demand.²⁴⁻²⁶ In either case, the pattern suggests declining efficiency in resource allocation.

Several caveats apply to our findings. Although the MEPS and its predecessors accurately reflect national trends in medical spending (and are widely used for analyses of expenditures for population and disease subgroups) they understate total expenditures as tabulated in the National Health Expenditure Accounts (NHEA) due to a number of factors, including the exclusion of persons in institutions (e.g. nursing homes) and the military; alternative medicine (e.g., acupuncture); and “non-patient care revenues”; and the under-representation of high-expenditure patients.^{27,28} Prior studies examining trends in health spending by age and gender adjusted for this discrepancy by scaling their estimates to data from the NHEA.²⁹ However, such adjustment was not possible in our analysis because income data are not available in the NHEA.

Second, the 1963, 1970, 1977, and 1980 surveys recorded charges rather than actual payments for medical services. Because charges often exceed actual payments, the pre-1987 surveys probably overestimate spending. However, this discrepancy would likely be similar across income groups and should not greatly distort income-related trends.

Increasing social and economic inequality has drawn considerable attention in recent years. Our findings suggest that disparities in health care spending is also on the rise; expenditures for the poorest (and sickest) segment of the population are falling, while those for the wealthy are growing rapidly, and now exceed those for other Americans. Additional research is needed to determine whether this pattern persists as health spending growth rebounds to pre-2004 levels, and whether these emerging spending disparities, which have not been seen since prior to the introduction of Medicare and Medicaid, may manifest in widening disparities in health outcomes.^{30,31}

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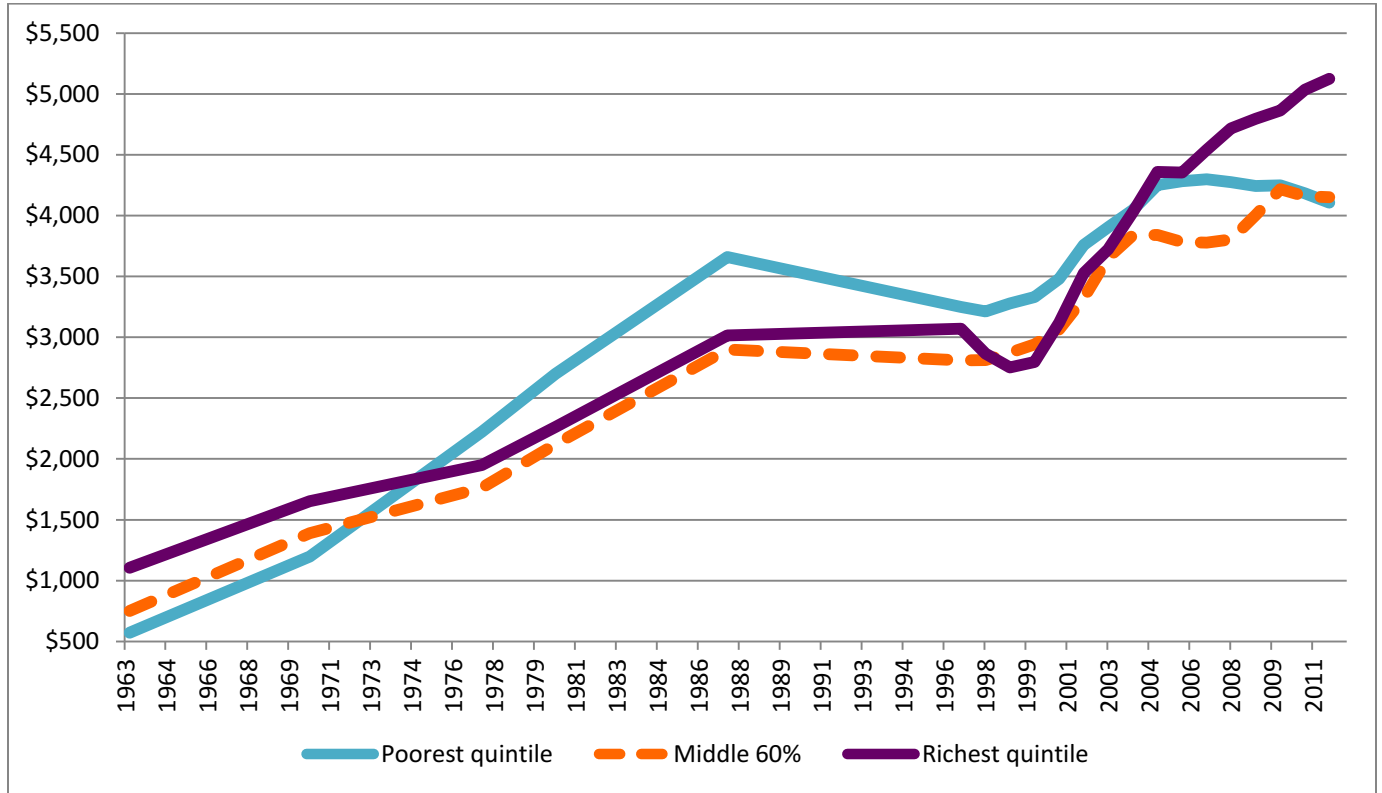
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Tables and Figures

Figure 1: Medical spending per capita by income group, adjusted for inflation, 1963-2012



Source: Authors' analysis of data from the 1963 and 1970 Surveys of Health Services Utilization and Expenditures; the 1977 and 1980 National Medical Care Utilization and Expenditure Surveys; the 1987 National Medical Expenditure Survey; and the 1996-2012 Medical Expenditure Panel Surveys.

Note: Two year moving average for years 1996-2012

Note: Appendix Table 3 displays confidence intervals for all estimates

Table 1: Average inflation-adjusted annual change in per capita spending for each income group and type of service or payer, 1963-2004 and 2004-2012

	Poorest Quintile		Middle 60%		Richest Quintile	
	1963-2004	2004-2012	1963-2004	2004-2012	1963-2004	2004-2012
Total expenditures (\$)	71.25*	-19.27*	63.44	59.82	59.14	106.04*
Service type						
Inpatient expenditures (\$)	19.25*	-32.54*	14.10	16.31	3.49*	31.30
Outpatient expenditures (\$)	23.92*	0.62*	27.65	25.96	34.71*	47.79*
Prescription medications (\$)	19.50*	19.76	16.14	16.07	16.60	27.65*
Dental expenditures (\$)	0.24*	-0.96	0.61	-1.57	0.93*	-4.00*
Other (\$)	9.12*	-5.07	3.23	4.10	-0.26*	2.34
Payer						
Private insurers (\$)	11.10*	-24.97*	32.28	21.68	44.09*	67.87*
Out-of-pocket (\$)	3.26	-37.67*	2.66	-19.97	0.53*	-14.96
Medicare (\$)	25.76*	14.64*	19.67	34.54	10.69*	37.86
Medicaid (\$)	24.33*	18.44*	3.24	5.54	0.66*	1.15
Other (\$)	1.54	19.72*	1.74	10.67	0.13*	-2.47*

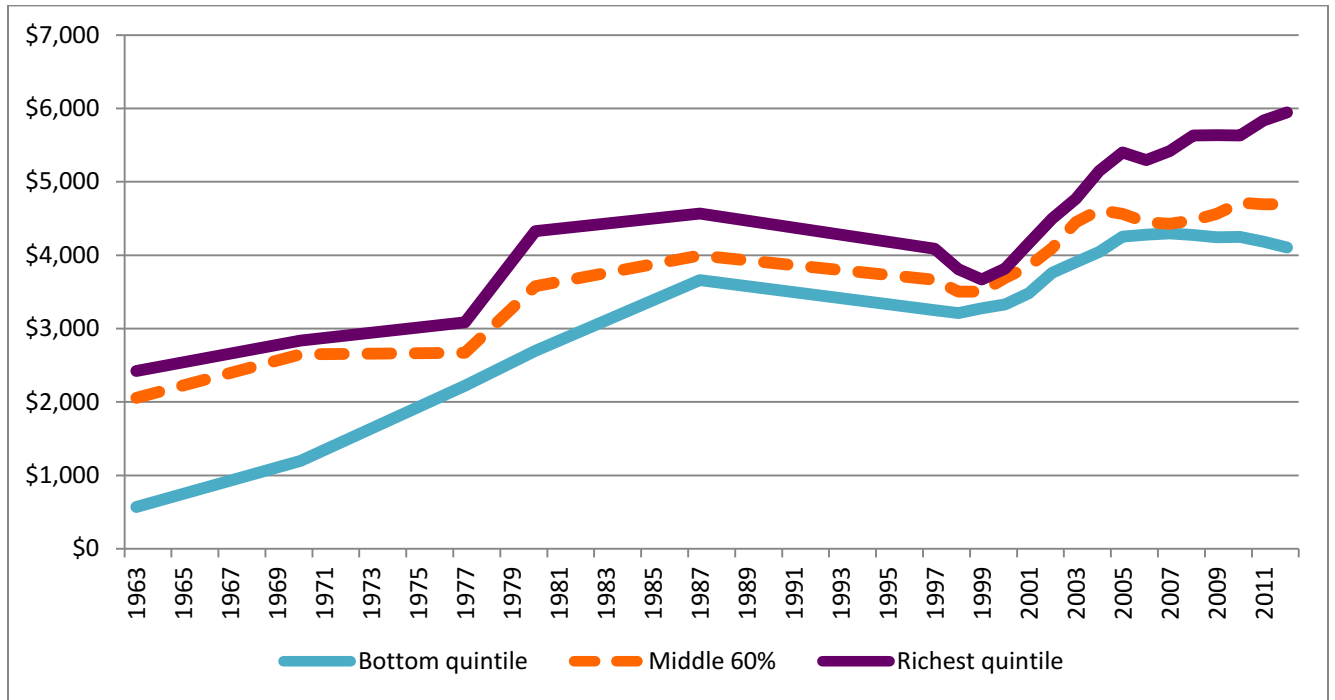
* Significantly different from middle 60% over same time period at $p < 0.05$ level

Source: Authors' analysis of data from the 1963 and 1970 Surveys of Health Services Utilization and Expenditures; the 1977 and 1980 National Medical Care Utilization and Expenditure Surveys; the 1987 National Medical Expenditure Survey; and the 1996-2012 Medical Expenditure Panel Surveys.

Note: Service-type and payer columns may not sum to the change in total medical expenditures because some expenses were not classified under a specific expenditure type or payer.

Note: All figures are in 2012 dollars and are calculated from linear regression.

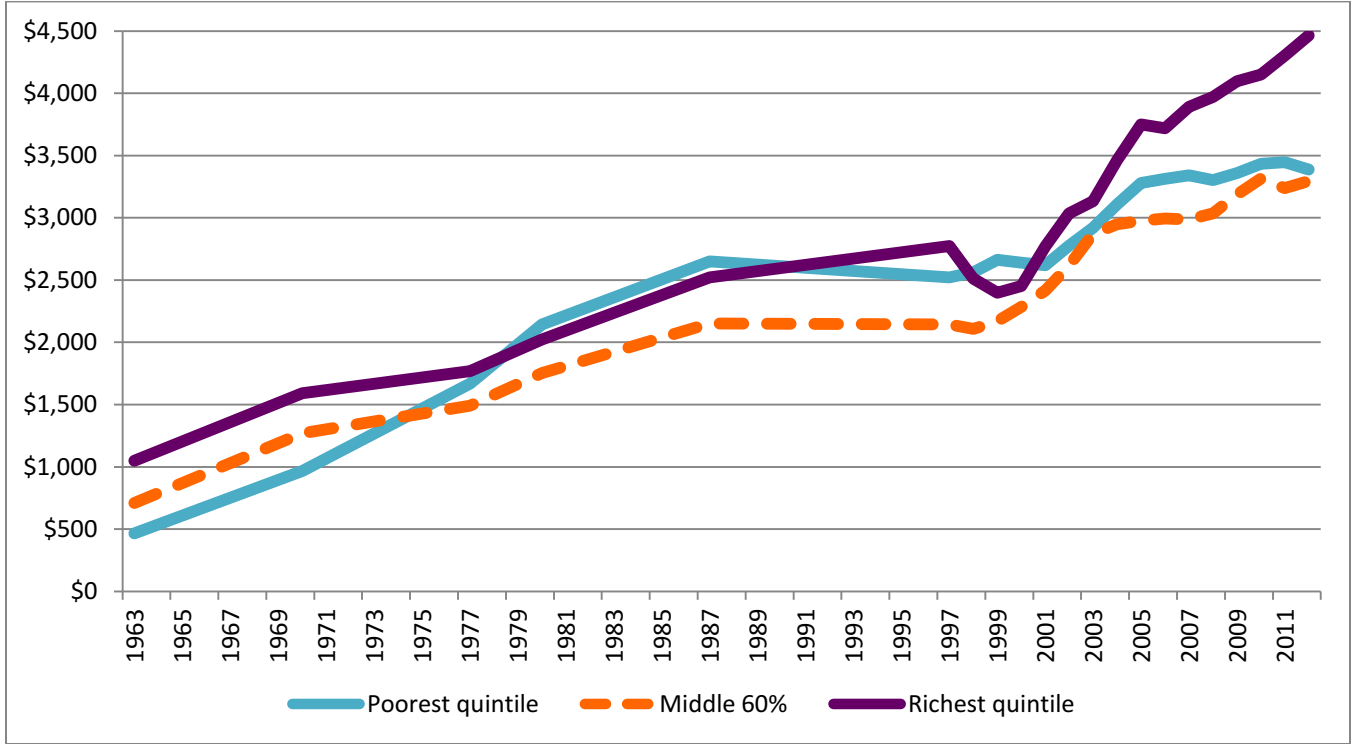
Figure 2: Medical spending per capita by income quintile, adjusted for age, health status, and inflation, 1963-2012



Source: Authors' analysis of data from the 1963 and 1970 Surveys of Health Services Utilization and Expenditures; the 1977 and 1980 National Medical Care Utilization and Expenditure Surveys; the 1987 National Medical Expenditure Survey; and the 1996-2012 Medical Expenditure Panel Surveys

Note: Two year moving average for years 1996-2012.

Figure 3: Medical spending per capita for persons under 65 years of age by income quintile, adjusted for inflation, 1963-2012



Source: Authors’ analysis of data from the 1963 and 1970 Surveys of Health Services Utilization and Expenditures; the 1977 and 1980 National Medical Care Utilization and Expenditure Surveys; the 1987 National Medical Expenditure Survey; and the 1996-2012 Medical Expenditure Panel Surveys

Note: Two year moving average for years 1996-2012.

Appendix

Appendix Table 1: Age, health-status, and inflation-adjusted medical expenditures per capita by income group

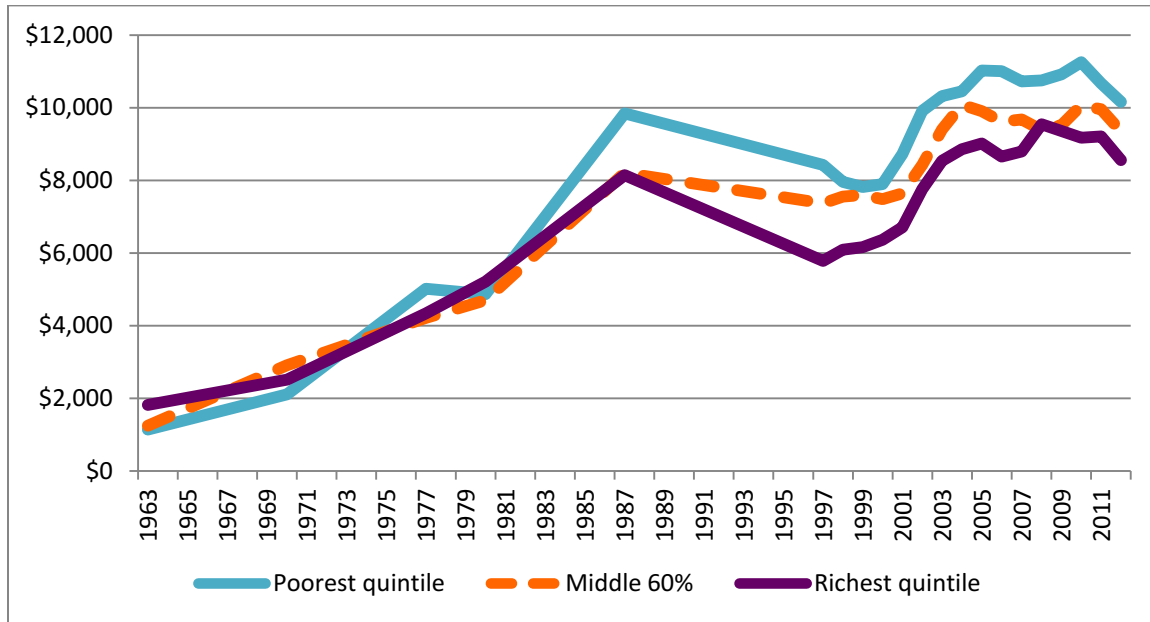
	Poorest quintile (\$)	Quintile 2 (\$)	Quintile 3 (\$)	Quintile 4 (\$)	Richest quintile (\$)
1963	572	1,845	2,098	2,233	2,423
1970	1,197	2,113	2,917	2,919	2,836
1977	2,222	2,519	2,692	2,800	3,086
1980	2,699	3,338	3,403	3,996	4,326
1987	3,659	3,708	4,067	4,210	4,566
1996	3,329	3,456	3,659	3,947	4,235
1997	3,170	3,247	3,941	3,753	3,944
1998	3,256	3,206	3,320	3,563	3,675
1999	3,303	3,539	3,592	3,804	3,664
2000	3,357	3,490	3,620	4,096	3,973
2001	3,606	3,779	3,957	4,155	4,349
2002	3,914	4,140	4,134	4,419	4,648
2003	3,892	4,780	4,233	5,002	4,891
2004	4,200	4,180	4,480	5,008	5,401
2005	4,303	4,283	4,750	4,685	5,396
2006	4,260	3,944	4,142	4,909	5,195
2007	4,337	4,518	4,398	4,655	5,643
2008	4,214	4,198	4,383	4,699	5,619
2009	4,272	4,520	4,731	4,848	5,656
2010	4,226	4,390	4,623	5,197	5,603
2011	4,140	4,308	4,547	5,093	6,073
2012	4,074	4,467	4,647	5,091	5,817

Source: Authors' analysis of data from the 1963 and 1970 Surveys of Health Services Utilization and Expenditures; the 1977 and 1980 National Medical Care Utilization and Expenditure

Surveys; the 1987 National Medical Expenditure Survey; and the 1996-2012 Medical Expenditure Panel Surveys.

Note: all figures are in 2012 dollars

Appendix Figure 1: Medical spending per capita for persons over 65 years of age by income group, adjusted for inflation, 1963-2012



Source: Authors' analysis of data from the 1963 and 1970 Surveys of Health Services Utilization and Expenditures; the 1977 and 1980 National Medical Care Utilization and Expenditure Surveys; the 1987 National Medical Expenditure Survey; and the 1996-2012 Medical Expenditure Panel Surveys.

Note: Two year moving average for years 1996-2012

Appendix Table 2: Health expenditures per capita among persons under and over 65 by income quintile, adjusted for inflation, 1963-2012

Under 65:

	Poorest quintile (\$)	Quintile 2 (\$)	Quintile 3 (\$)	Quintile 4 (\$)	Richest quintile (\$)
1963	465	525	711	891	1,050
1970	966	1,038	1,400	1,374	1,591
1977	1,669	1,436	1,446	1,590	1,770
1980	2,144	1,870	1,502	1,891	2,024
1987	2,649	1,956	2,192	2,303	2,522
1996	2,583	1,990	2,137	2,321	2,969
1997	2,462	1,839	2,243	2,329	2,577
1998	2,662	2,032	1,878	2,332	2,445
1999	2,662	2,200	2,212	2,370	2,351
2000	2,618	2,132	2,243	2,553	2,555
2001	2,621	2,411	2,501	2,652	2,985
2002	2,930	2,606	2,636	2,893	3,088
2003	2,908	3,290	2,546	3,249	3,178
2004	3,308	2,499	2,905	3,194	3,747
2005	3,250	2,743	3,362	3,157	3,753
2006	3,374	2,598	2,734	3,373	3,684
2007	3,306	3,092	2,917	3,204	4,097
2008	3,300	2,856	2,840	3,298	3,843
2009	3,417	3,006	3,724	3,395	4,348
2010	3,452	2,929	3,186	3,651	3,953
2011	3,440	2,873	2,941	3,847	4,650
2012	3,334	3,061	3,364	3,687	4,280

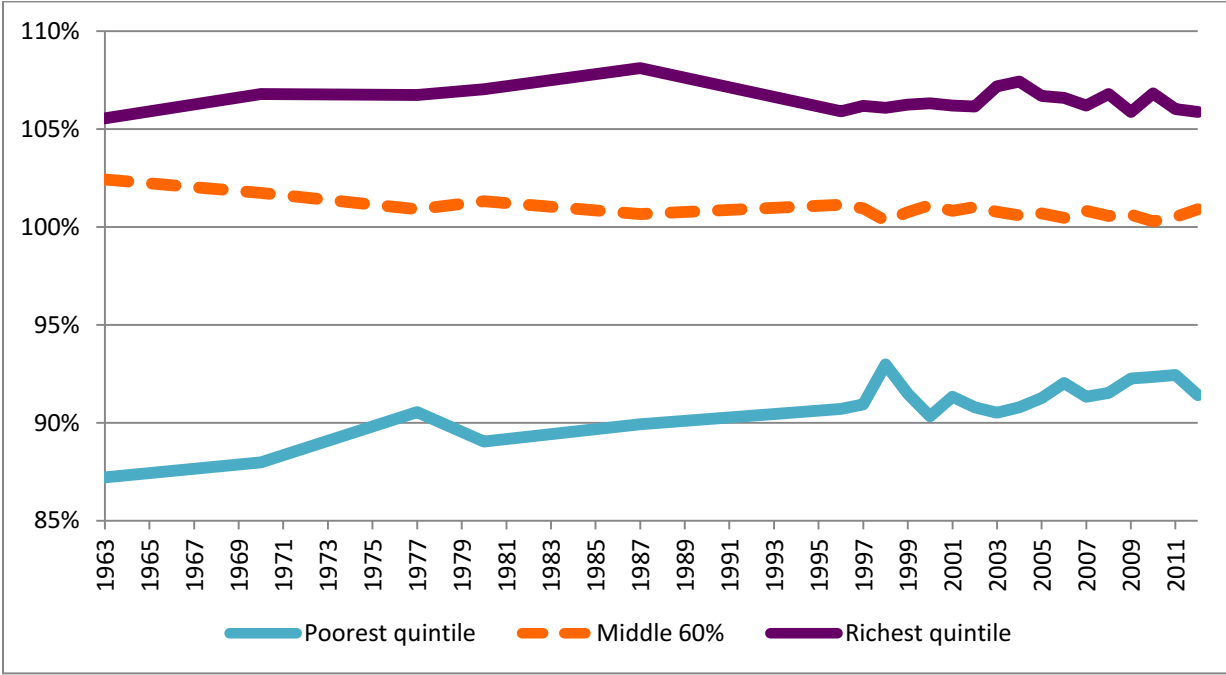
Over 65:

	Poorest quintile (\$)	Quintile 2 (\$)	Quintile 3 (\$)	Quintile 4 (\$)	Richest quintile (\$)
1963	1,139	987	1,237	1,529	1,819
1970	2,108	2,000	3,087	3,653	2,519
1977	5,021	4,550	4,092	4,015	4,339
1980	4,867	5,050	4,339	4,701	5,212
1987	9,839	8,602	8,876	7,136	8,146
1996	8,618	7,426	6,604	7,451	5,478
1997	8,232	7,380	8,762	6,608	6,095
1998	7,692	7,929	8,127	6,525	6,098
1999	7,944	8,028	7,078	7,895	6,228
2000	7,841	7,635	6,748	7,510	6,493
2001	9,615	8,099	7,786	8,049	6,921
2002	10,206	9,061	8,733	8,825	8,583
2003	10,431	9,293	9,606	10,921	8,494
2004	10,469	10,507	9,556	10,623	9,228
2005	11,576	10,192	9,556	8,992	8,809
2006	10,429	9,208	9,445	10,294	8,494
2007	11,019	10,683	9,858	8,580	9,089
2008	10,485	9,444	9,857	7,869	9,999
2009	11,344	11,312	9,498	9,105	8,726
2010	11,168	10,397	10,201	9,890	9,630
2011	10,182	9,547	11,039	8,662	8,787
2012	10,132	9,612	8,758	8,463	8,333

Source: Authors' analysis of data from the 1963 and 1970 Surveys of Health Services Utilization and Expenditures; the 1977 and 1980 National Medical Care Utilization and Expenditure Surveys; the 1987 National Medical Expenditure Survey; and the 1996-2012 Medical Expenditure Panel Surveys.

Note: all figures are in 2012 dollars

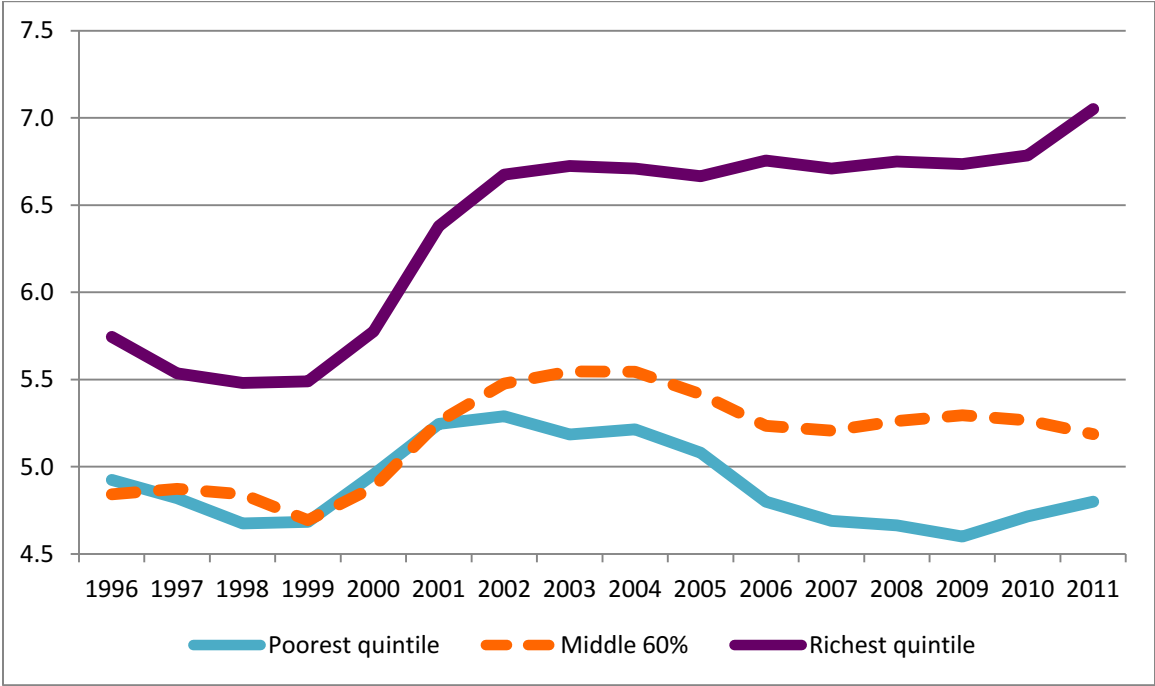
Appendix Figure 2: Self-Reported Health Status Score By Income Quintile, Indexed to the Population Average, 1963-2012



Source: Authors’ analysis of data from the 1963 and 1970 Surveys of Health Services Utilization and Expenditures; the 1977 and 1980 National Medical Care Utilization and Expenditure Surveys; the 1987 National Medical Expenditure Survey; and the 1996-2012 Medical Expenditure Panel Surveys.

Note: Higher score indicates better health

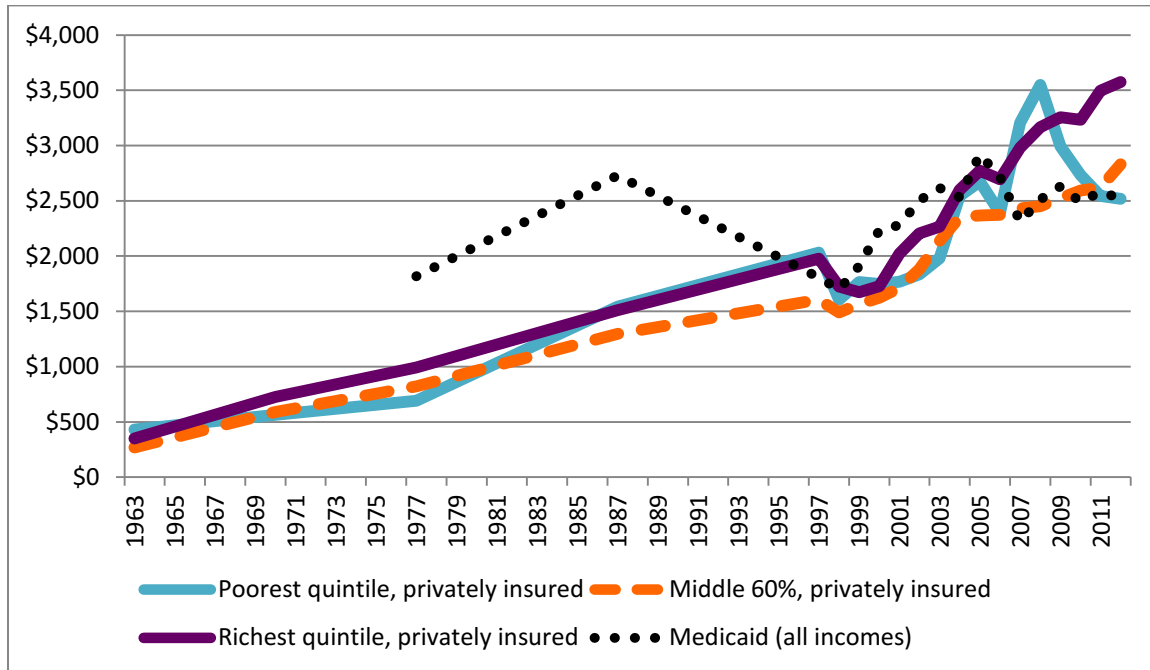
Appendix Figure 3: Number of outpatient visits per capita by income group, 1996-2012



Source: Authors' analysis of data from the 1996-2012 Medical Expenditure Panel Surveys.

Note: Two-year moving average

Appendix Figure 4: Inflation-adjusted insurance expenditures per continuously enrolled person under 65 with private insurance (by income group) or with Medicaid, 1963-2012



Source: Authors' analysis of data from the 1963 and 1970 Surveys of Health Services Utilization and Expenditures; the 1977 and 1980 National Medical Care Utilization and Expenditure Surveys; the 1987 National Medical Expenditure Survey; and the 1996-2012 Medical Expenditure Panel Surveys.

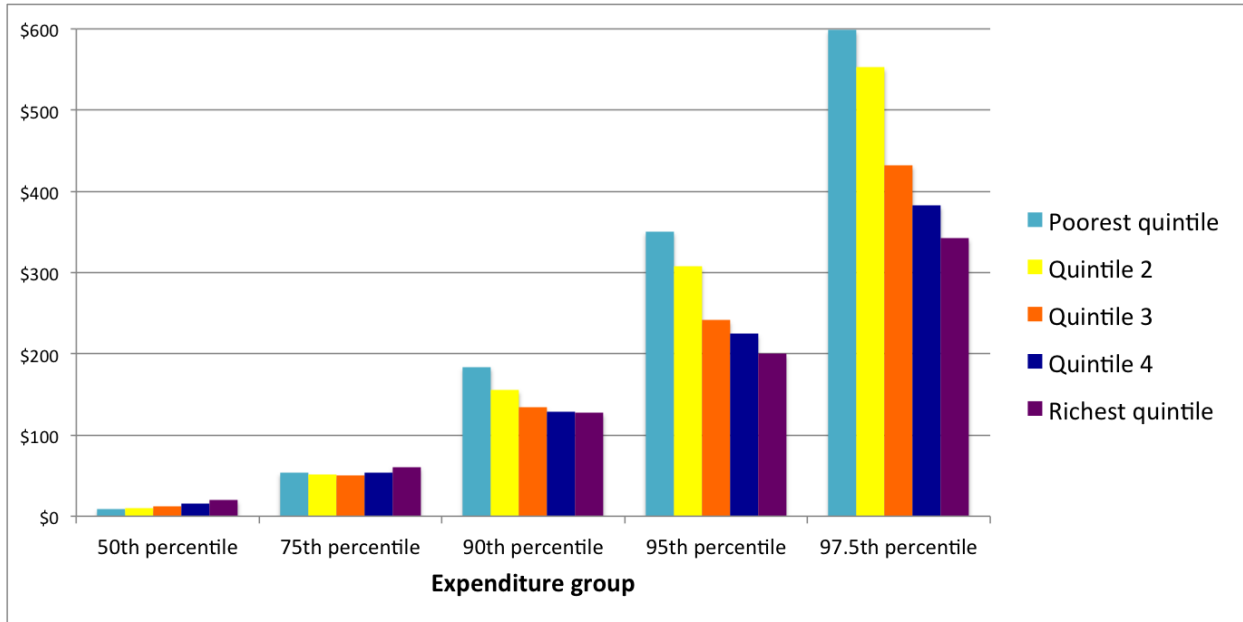
Note: Two year moving average for years 1996-2012

Note: Medicaid was not yet implemented in 1963, and the 1970 survey did not include individual-level Medicaid enrollment status

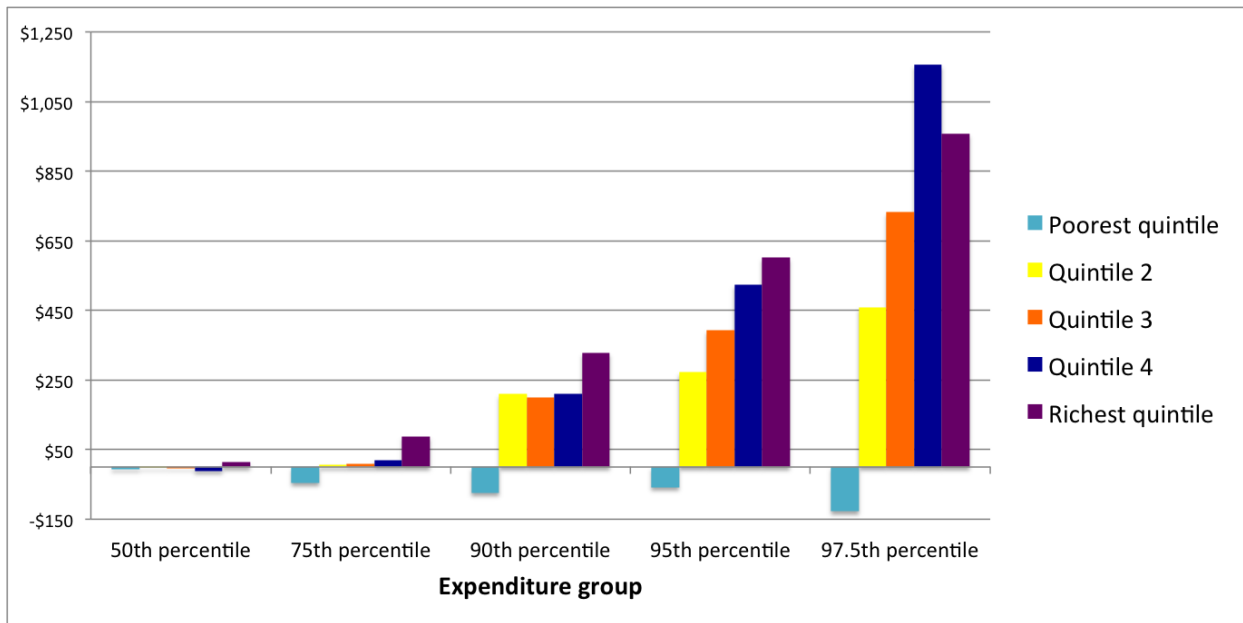
Note: all figures are in 2012 dollars

Appendix Figures 5a and 5b: Quantile regression of average annual change in medical spending per capita

a) 1963-2004



b) 2004-2012



Source: Authors' analysis of data from the 1963 and 1970 Surveys of Health Services Utilization and Expenditures; the 1977 and 1980 National Medical Care Utilization and Expenditure Surveys; the 1987 National Medical Expenditure Survey; and the 1996-2012 Medical Expenditure Panel Surveys.

Appendix Table 3: Inflation-adjusted medical expenditures per capita by income group with 95% confidence intervals

Year	Poorest Quintile		Quintile 2			Quintile 3			Quintile 4			Richest Quintile		
	Estimate (\$)	95% Confidence Interval	Estimate (\$)	95% Confidence Interval	Estimate (\$)	95% Confidence Interval	Estimate (\$)	95% Confidence Interval	Estimate (\$)	95% Confidence Interval	Estimate (\$)	95% Confidence Interval		
1963	572	285 859	566	295 837	750	477 1,022	933	650 1,216	1,106	820 1,392				
1970	1,197	889 1,504	1,137	832 1,442	1,527	781 2,273	1,508	1,076 1,941	1,652	1,160 2,144				
1977	2,222	1,885 2,560	1,855	1,548 2,162	1,660	1,360 1,959	1,772	1,483 2,060	1,950	1,642 2,258				
1980	2,699	2,223 3,175	2,403	1,873 2,933	1,825	1,503 2,146	2,134	1,671 2,596	2,262	1,905 2,620				
1987	3,659	3,089 4,228	3,002	2,624 3,379	2,930	2,587 3,273	2,762	2,411 3,114	3,016	2,753 3,279				
1996	3,329	2,580 4,077	2,889	2,195 3,582	2,660	1,998 3,323	2,824	2,106 3,541	3,210	2,305 4,116				
1997	3,170	2,473 3,867	2,739	2,090 3,388	3,018	2,189 3,846	2,731	2,077 3,384	2,929	2,273 3,585				
1998	3,256	2,406 4,105	2,976	2,272 3,680	2,664	1,990 3,337	2,741	2,068 3,414	2,799	2,145 3,452				
1999	3,303	2,577 4,029	3,125	2,393 3,857	2,805	2,101 3,509	2,923	2,220 3,627	2,703	2,063 3,343				
2000	3,357	2,652 4,062	2,938	2,251 3,625	2,822	2,167 3,477	3,029	2,306 3,751	2,889	2,222 3,556				
2001	3,606	2,920 4,293	3,293	2,621 3,965	3,182	2,525 3,838	3,130	2,456 3,805	3,353	2,687 4,018				
2002	3,914	3,196 4,632	3,591	2,892 4,291	3,275	2,599 3,950	3,470	2,824 4,116	3,701	3,049 4,354				
2003	3,892	3,173 4,611	4,237	3,145 5,329	3,359	2,694 4,024	3,993	3,124 4,862	3,744	3,075 4,413				
2004	4,200	3,412 4,988	3,771	3,073 4,469	3,659	2,911 4,407	4,015	3,237 4,794	4,310	3,614 5,007				
2005	4,303	3,585 5,021	3,912	3,176 4,647	3,989	3,153 4,824	3,706	3,003 4,408	4,409	3,685 5,134				
2006	4,260	3,540 4,979	3,597	2,931 4,263	3,425	2,765 4,086	4,074	3,365 4,783	4,299	3,613 4,986				
2007	4,337	3,593 5,081	4,207	3,473 4,940	3,639	2,913 4,364	3,729	3,073 4,384	4,781	3,966 5,597				
2008	4,214	3,510 4,918	3,822	3,115 4,530	3,633	2,925 4,341	3,798	3,134 4,461	4,649	3,898 5,401				
2009	4,272	3,583 4,961	4,318	3,613 5,024	4,410	3,484 5,337	4,034	3,326 4,742	4,942	4,233 5,651				
2010	4,226	3,460 4,992	4,122	3,424 4,819	4,068	3,371 4,764	4,356	3,609 5,103	4,784	4,093 5,475				
2011	4,140	3,316 4,963	3,958	3,266 4,651	3,990	3,177 4,803	4,452	3,728 5,175	5,286	4,559 6,014				
2012	4,074	3,367 4,781	4,169	3,462 4,876	4,076	3,432 4,720	4,265	3,527 5,002	4,962	4,359 5,566				

Source: Authors' analysis of data from the 1963 and 1970 Surveys of Health Services Utilization and Expenditures; the 1977 and 1980 National Medical Care Utilization and Expenditure Surveys; the 1987 National Medical Expenditure Survey; and the 1996-2012 Medical Expenditure Panel Surveys.

Note: all figures are in 2012 dollars