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Changes In The Equity Of US Health Care Financing In The Period 2005–16

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ABSTRACT Spending on health care in the United States amounted to 17.9 percent of gross domestic product in 2017. Households paid for this care through out-of-pocket medical spending and a complex mix of out-of-pocket premiums, employer premium contributions, taxes, and subsidies that combined to finance private employer-sponsored insurance, nongroup insurance, and multiple public insurance programs. Our analysis examined the impact of this complex system of health care financing on households in the period 2005–16, tracking how economic and policy changes affected incidence—that is, the amount paid to finance health care, either directly or indirectly, by households as a share of their pretax income. Health care financing was regressive at the start of our study period, with households in the bottom 20 percent of income paying 26.8 percent of their income compared to about half that amount for those with income in the top 1 percent. By 2016 incidence had become approximately proportional (the same percentage across all income levels). In part, these results reflect increases in coverage through Medicaid and the Affordable Care Act Marketplaces, which are progressively financed through the federal tax system.

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The United States spent \$3.5 trillion on health care in 2017, an amount equal to 17.9 percent of gross domestic product (GDP).¹ The financing and delivery of this care occurs through a complex system comprising multiple public insurance programs, private employer-sponsored group coverage, private nongroup coverage, and direct payments from households to providers. Households bear the burden of financing health care in numerous ways: out-of-pocket spending for health care; out-of-pocket premiums (for private and, in some cases, public coverage); reduced cash wages associated with employer premium contributions; earmarked Medicare payroll taxes; and an array of income and other taxes at the federal, state, and local levels. Adding to this complexity are tax preferences and other public subsidies that shift the

burden of these costs across households.

With the large share of GDP spent on health care in the US and the intricacy of how health care is financed, it is important to understand how households are affected not only by readily visible out-of-pocket spending but also by the employer- and tax-financed components that are more hidden from view.² The incidence of health care financing—defined here as the amount paid to finance health care, either directly or indirectly, by households as a share of their pretax income—is routinely assessed for other countries,³ yet relatively few such analyses have been conducted for the US. Prior studies examined the incidence of US health care financing in 1977,⁴ 1980–81,⁵ 1987,⁶ and 2004.⁷ Despite methodological differences, all found regressive patterns of incidence, whereby total health-related spending as a share of income was higher for

low-income households than for high-income households. These studies also found that regressivity was driven by private health care financing (including out-of-pocket medical spending and premiums for private insurance), which more than offset the progressivity of publicly financed health care.

We undertook a comprehensive measurement of health care financing to provide an updated understanding of how incidence across the income distribution has evolved since 2005. We examined the period 2005–16, which included a severe macroeconomic shock and recovery, several changes to the federal tax system, and several important health system changes—including the introduction of Medicare Part D, the rising prevalence of high-deductible health plans, and the implementation of the Affordable Care Act (ACA).

As has been found in previous work, health care financing was regressive at the start of our study period. Households in the bottom 20 percent of the US income distribution paid 26.8 percent of pretax income to finance health care in 2005, compared with only 13.8 percent of income paid by households in the top 1 percent. Since 2005, however, the incidence of US health care financing has become approximately proportional (the same percentage across all income levels), as a result of first temporary changes during the recession followed by longer-term changes that reduced out-of-pocket spending among low-income households and increased tax-related burdens on upper-income households.

Study Data And Methods

Health care spending is often expressed using aggregate spending from the National Health Expenditure Accounts (NHEA) as a share of GDP. We sought a more granular perspective that accounted for nearly all health expenditures in the NHEA but did so by income group, because our goal was to construct ratios of average spending in each income group to the group's average household income.⁸ The out-of-pocket spending component of such an analysis can be readily obtained from household data, but a more complex analysis is needed to allocate federal and state spending on public health insurance programs and adjust spending burdens to reflect tax preferences.

DATA SOURCES No single data source provides all of the necessary components for a comprehensive analysis of US health care financing equity. We chose to combine information from three key sources. The first was the Medical Expenditure Panel Survey–Household Component

(MEPS-HC), a nationally representative survey of the civilian noninstitutionalized population sponsored by the Agency for Healthcare Research and Quality (AHRQ). We relied on MEPS-HC for the incidence of out-of-pocket spending on health care and out-of-pocket premiums, as well as the distribution of sources of health insurance. We supplemented MEPS-HC with employer premium contributions imputed from the MEPS–Insurance Component (MEPS-IC), a survey of employers also sponsored by AHRQ, and with simulated federal and state income taxes from the National Bureau of Economic Research (NBER) TAXSIM model.⁹

The second critical component was the NHEA, on which we relied for public spending totals by program and for private spending benchmarks.¹ We allocated \$2.89 trillion in health spending to households, or 86.5 percent of the official NHEA total (\$3.34 trillion), in 2016. Our estimates differed from the NHEA total because we excluded several categories of spending that were either outside the scope of MEPS (such as out-of-pocket spending for nursing home residents and spending on nonprescription nondurable goods) or distantly related to either health consumption or households' tax obligations (such as the private revenues providers receive from philanthropy and hospital cafeterias).¹⁰ To allocate state Medicaid spending, we supplemented the NHEA information with state-specific Medicaid data.¹¹

The third critical component was information compiled by the Congressional Budget Office (CBO) on income by source and taxes paid by type across the household income distribution.¹² To express health spending as a share of income, we used a modified version of the CBO's definition of pretax, pretransfer household income. Unlike the CBO, we excluded the fungible value of Medicare benefits because households cannot use these amounts to increase consumption. Pretax income is appropriate because a large share of the payments for health care take the form of taxes. Because many lower-income households receive income from the Earned Income Tax Credit and the Child Tax Credit, we calculated the sensitivity of our main findings to including these two transfers as income. The results, included in the online appendix,¹³ were quite similar to those presented in the text.

CBO benchmarks were of particular importance for capturing the very top of the income distribution (which is underrepresented in MEPS-HC). In addition, combining CBO estimates with micro-level data from MEPS-HC and TAXSIM enabled us to simulate tax subsidies such as those associated with employer-sponsored insurance.

We also used household and TAXSIM data in

The ACA may have played an important role in helping prevent a return to prerecession regressivity.

cases where tax liabilities were negative because of refundable credits. Because average tax liabilities of lower-income households can often be negative, we assumed that the incidence of health spending on these families occurred before the Earned Income Tax Credit, the Child Tax Credit, and the Child and Dependent Care Credit were accounted for. This approach allocated a positive incidence of publicly financed health spending to lower-income households by assuming that they received less from federal income tax filing than they would have if health care spending were lower.

As an example of our approach, consider out-of-pocket spending on health care. We started with MEPS-HC amounts, adjusted to match annual totals reported in the NHEA. We then adjusted the incidence of these amounts to reflect simulated tax subsidies for flexible spending accounts, health savings accounts, and the tax deduction for excess medical spending. As a result, households that had preferred tax treatment of out-of-pocket spending incurred lower incidence, while the total burdens of financing these federal and state tax preferences were then allocated to all households in proportion to their federal and state tax payments. Thus, for each income group we measured out-of-pocket spending on health care, net of tax preferences and inclusive of the group's share of the overall cost of financing these tax expenditures.

For private health insurance, we started with MEPS-HC out-of-pocket spending on premiums, including those for employee contributions to group coverage and individual coverage through nongroup, Marketplace, and Medigap supplemental policies. We augmented employee contributions with (imputed) employer premium contributions from MEPS-IC. We aligned total premiums with information from the NHEA and then adjusted for tax expenditures, subtracting the benefits from favorable tax treatment and adding back in the burdens of financing these tax

benefits. In our results we refer to private spending, which consists of the after-tax incidence of private premiums and out-of-pocket spending for privately insured people or those without coverage, as well as any taxpayer funds to finance the tax expenditures and subsidies for private-sector premiums and out-of-pocket spending.

To allocate NHEA Medicare spending to households, we began by simulating enrollee premiums in MEPS-HC, including any premiums for Medicare Advantage, Parts B and D, and any additional Part B premiums for higher-income households beginning in 2007. To these we added estimates of Medicare payroll taxes based on earnings reported in MEPS-HC and benchmarked to match CBO estimates by percentile or quintile, as well as tax burdens associated with the portion of Medicare financed from federal general revenues.

For Medicaid and the Children's Health Insurance Program (CHIP), federal spending was allocated according to the financing of federal general revenues, while state spending was allocated first to the state level¹¹ and then to households, according to our estimates of each household's share of state general revenues. Our estimates of state general revenues were constructed using TAXSIM simulations of state personal income tax liabilities; US census data on state corporate income tax revenues;¹⁴ and Internal Revenue Service data on average sales tax payments by tax filing unit size, income level, and state.¹⁵ Other state and local spending was allocated to households according to methods described in the appendix.¹³

The "other public" category refers to remaining programs in NHEA spending at the federal level—including the Indian Health Service, the Veterans Health Administration, and the Department of Defense—as well as state and local public health programs.¹⁶

We combined the above data sources using a consistent methodology for the period 2005–16. For comparison purposes, all dollar amounts were converted to 2016 dollars using the Personal Consumption Expenditures Price Index.¹⁷ Additional methodological details are in the appendix.¹³

LIMITATIONS Our study had several limitations. First, we assumed that all privately and publicly financed health care was paid for in the year it was consumed. Thus, we assumed that the public portion was not debt financed, despite large federal deficits throughout the study period.¹⁸ To the extent that a portion of federal health care was debt financed rather than paid for in the current year, incidence might be more or less progressive than our estimates, depending on factors such as the future progressivity of federal

taxation and changes over time in the income distribution.

Second, our study focused on the civilian noninstitutionalized population. Therefore, our analysis did not account for out-of-pocket spending on nursing home care or on acute care of the institutionalized, nor did it account for tax payments by the institutionalized.

Third, because our goal was to assess the full distribution of health care financing, our estimates did not account for the efficacy or benefit of care, even though some people likely forgo needed care and others may consume unnecessary care.

Fourth, we did not attempt to net out program benefits from program costs, in either current or future years. Thus, we counted the premiums paid by Medicare enrollees as burdens on households but did not net out the value of health care that Medicare enrollees received. Similarly, we counted as a burden the Medicare payroll tax paid by current workers but did not net out the potential future benefits such workers may one day receive from the Medicare program. Our

focus was solely on current-year burdens of financing health care.

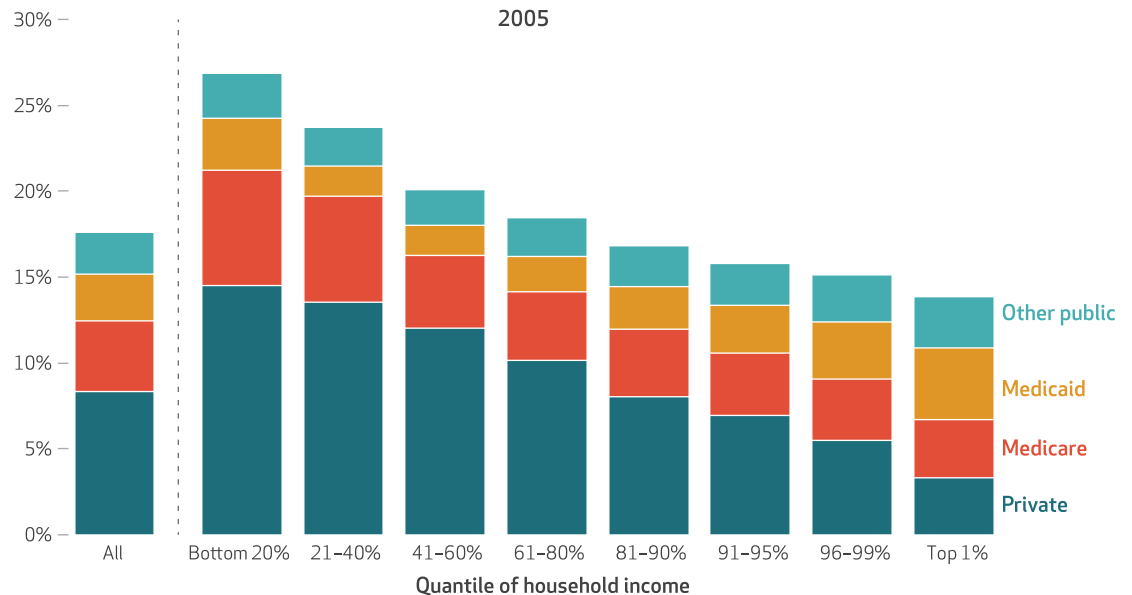
Finally, as in any study of income groups over time, the composition of those groups can change as a result of factors such as reduced household formation among nonminor children,¹⁹ the aging of the population, or differential income growth across subgroups of the population.

Study Results

INCIDENCE IN 2005 AND 2016 In 2005 health care spending, on average, accounted for 17.6 percent of household income (exhibit 1). The US had a regressive health care financing incidence, with households in the bottom 20 percent of the income distribution paying 26.8 percent of their income for health care and households in the top 1 percent paying 13.8 percent of income. Private spending was the primary driver of regressivity, ranging from 14.5 percent of average household income in the bottom 20 percent to only 3.3 percent in the top 1 percent. Tax

EXHIBIT 1

Percent of average household income spent on health care, by type of spending and quantile of household income, 2005



SOURCE Authors' analysis of data for 2005 from the Medical Expenditure Panel Survey (MEPS)–Household Component, MEPS–Insurance Component, National Health Expenditure Accounts, and Congressional Budget Office. **NOTES** Households are assigned to quantiles of household income by pretax household income plus the value of any Medicare benefits received. "Private" includes people with no insurance. Spending includes after-tax out-of-pocket spending and the implied federal, state, or local tax revenues required to finance the relevant programs or activities (private spending includes the implied cost of the favorable tax treatment for private health insurance). Private spending also includes after-tax contributions for premiums and employer contributions to health plans. Medicare spending also includes any required contributions for Medicare Parts B and D or Medicare Advantage and employer and employee payroll contributions for the Medicare program. Medicaid spending also includes any required premium contributions. Other public spending includes the implied federal revenues needed to finance other programs, such as federal public health programs, the Veterans Health Administration, the Indian Health Service, subsidy payments for coverage under the Consolidated Omnibus Budget Reconciliation Act (COBRA) of 1985, small business tax credits after 2010, and the implied state and local revenues to finance public health activities at those levels.

payments to finance tax expenditures and subsidies were a relatively small component of spending by the lowest 20 percent but were the largest share of spending for the top 1 percent (data not shown). Medicare financing also contributed to regressivity, accounting for 6.7 percent of income in the bottom 20 percent versus only 3.4 percent in the top 1 percent. Medicaid (and CHIP) and, to a lesser extent, “other public” had the most progressive incidence, which reflects the progressivity of the taxes used to finance these programs. (The plotting point data used to construct the exhibits are in the appendix).¹³

By 2016 average spending had increased from 17.6 percent to 21.4 percent of household income (exhibit 2). During this period, the incidence of the spending had shifted considerably, becoming nearly proportional. Despite the overall increase in spending as a share of income, the average burden in the bottom 20 percent of the income distribution dropped from 26.8 percent to 22.6 percent. In part, this reflected a 3.8-percentage-point decline in private burden and a 0.8-percentage-point decline in Medicare burden. In contrast, the average burden in the top 1 percent increased by 7.6 percentage points, from 13.8 percent to 21.4 percent. The amounts spent on Medicare and Medicaid were the primary drivers, increasing as shares of income by 3.0 percentage points and 2.3 percentage points, respectively (data not shown). Cumulatively over

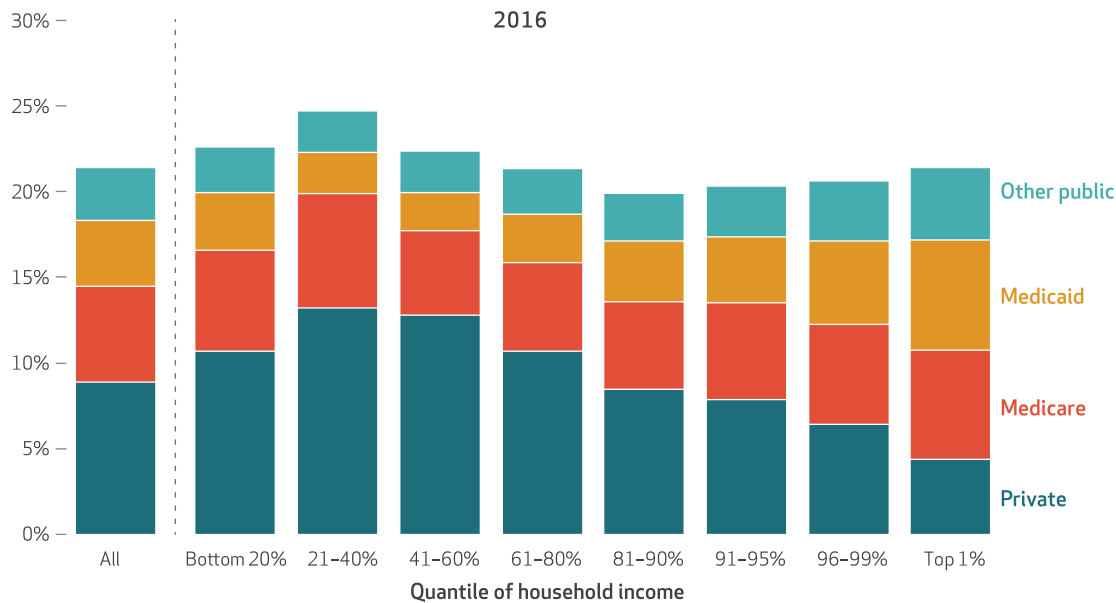
the period 2005–16, average income and average health care spending rose by 7.2 percent and 30.4 percent, respectively. The growth in health care spending varied depending on whether it was in the private-sector (13.9 percent), Medicare (46.9 percent), or Medicaid (53.3 percent).

WHEN AND HOW HEALTH CARE INCIDENCE CHANGED To help analyze the dramatic shift in the progressivity of health care financing, exhibit 3 traces incidence for selected low- and high-income groups over the study period. (The appendix presents estimates for all income levels.)¹³ Exhibit 3 clearly shows that the greatest convergence in burdens occurred in the period 2007–09—a period of few notable health reforms but including the economic upheaval of the Great Recession. The exhibit also shows that regressivity did not revert to its prerecession pattern as the economy recovered during the remainder of our study period. Exhibit 4 complements exhibit 3 by presenting average income and incidence amounts by program, for selected income groups and selected years that bracket key periods of change.

Initially, in the period 2005–07 we observed a modest reduction in regressivity (exhibit 3), as a result of declines in the shares of income paid by those in the bottom 20 percent and in the 21–40 percent quantile. From 2005 to 2007 these two income quantiles experienced increases in average incomes and modest reductions in total

EXHIBIT 2

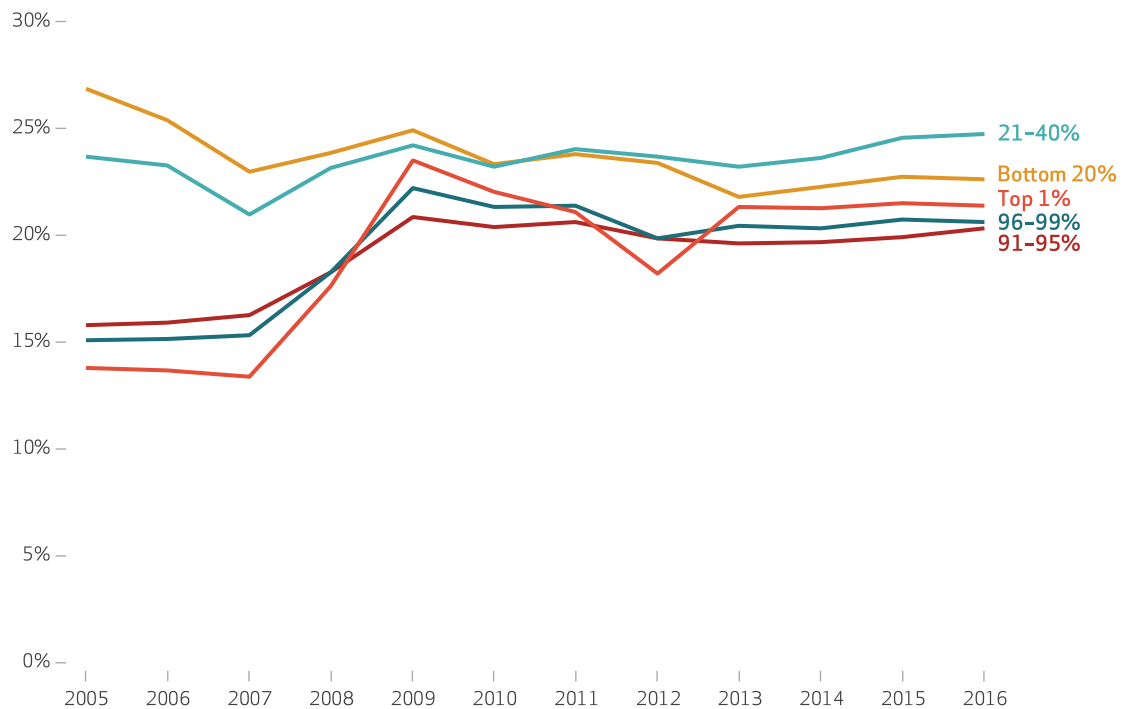
Percent of average household income spent on health care, by type of spending and quantile of household income, 2016



SOURCE Authors' analysis of data for 2016 from the Medical Expenditure Panel Survey (MEPS)–Household Component, MEPS–Insurance Component, and National Health Expenditure Accounts, and data for 2015 from the Congressional Budget Office. **NOTES** Household assignment to income quantiles and categories of spending are explained in the notes to exhibit 1.

EXHIBIT 3

Percent of average pretax household income spent on health care, by selected quantiles of household income, 2005-16



SOURCE Authors' analysis of data for 2005-16 from the Medical Expenditure Panel Survey (MEPS)-Household Component, MEPS-Insurance Component, and National Health Expenditure Accounts, and data for 2005-15 from the Congressional Budget Office. **NOTE** Household assignment to income quantiles is explained in the notes to exhibit 1.

health care spending (exhibit 4).

From 2007 to 2009, in the period of greatest change in incidence, average incomes declined for all groups, but the declines were by far the largest in dollar and percentage terms for high-income households. Average income declined by 13.1 percent for households with incomes in the ninety-sixth to ninety-ninth percentiles (from \$341,531 to \$296,643) and by 36.3 percent for those with incomes in the top 1 percent (from \$2,097,046 to \$1,335,600). Within the lowest 20 percent, average income declined by only 5.7 percent (from \$19,534 to \$18,420). Moreover, whereas average spending rose by 2.3 percent in the lowest 20 percent, the corresponding increases were 26.0 percent for the ninety-sixth to ninety-ninth percentiles (from \$52,324 to \$65,920) and 12.0 percent for the top 1 percent (from \$279,727 to \$313,401).

There is some evidence of a return to the pre-recession pattern of regressive incidence in the period 2009-13. For the top 1 percent, health care spending peaked at 23.5 percent of income in 2009 and then dropped to 18.2 percent of income in 2012, a 5.3-percentage-point decline (exhibit 3). There was also a 2.4-percentage-point decline in average burdens among house-

holds in the ninety-sixth to ninety-ninth percentiles in the same period. Also during this period, average incomes recovered more rapidly at the top of the income distribution than at lower income levels. Income for the top 1 percent grew by 19.4 percent, compared to small declines in incomes among those in the bottom 20 percent (-1.7 percent) and in the 21-40 percent quantile (-1.0 percent) (data not shown). As a result, as of 2012 health care financing appeared to be reverting toward prerecession incidence. From 2012 to 2013, however, there was a sharp increase in health care burdens at the top of the income distribution. From 2012 through the end of our study period, we observed little additional change in incidence, except that the bottom 20 percent quantile and the 21-40 percent quantile switched positions as the group paying the highest percentage of income. This switch resulted from increased public coverage (which disproportionately benefited the bottom 20 percent), combined with recovery-related increases in employment-based coverage (the premiums of which disproportionately burdened households in the 21-40 percent quantile). At the top of the income distribution, incomes continued to increase disproportionately, but spending for

EXHIBIT 4
Per household mean health spending, by selected quantiles of household income and types of spending, 2005, 2007, 2009, and 2016

	Pretax household income (\$)	Type of spending (\$)				
		Private	Medicare	Medicaid	Other public	All
2005						
All	99,429	8,323	4,081	2,689	2,382	17,475
Quantile of income						
Bottom 20%	17,309	2,515	1,162	527	440	4,643
21–40%	39,364	5,351	2,420	692	858	9,321
91–95%	192,207	13,349	7,080	5,354	4,525	30,309
96–99%	321,103	17,700	11,466	10,668	8,636	48,471
Top 1%	1,839,654	61,133	62,768	77,064	52,836	253,800
2007						
All	107,520	8,325	4,505	2,796	2,667	18,294
Quantile of income						
Bottom 20%	19,534	2,461	1,105	395	523	4,483
21–40%	42,197	5,039	2,256	653	899	8,847
91–95%	202,222	13,613	8,263	5,724	5,281	32,881
96–99%	341,531	18,155	13,380	11,340	9,449	52,324
Top 1%	2,097,046	58,294	80,693	81,558	59,182	279,727
2009						
All	92,919	8,651	5,070	3,288	3,062	20,072
Quantile of income						
Bottom 20%	18,420	2,584	930	469	605	4,587
21–40%	38,664	5,119	2,356	805	1,078	9,357
91–95%	189,888	15,131	10,402	7,401	6,647	39,582
96–99%	296,643	21,196	17,843	14,843	12,038	65,920
Top 1%	1,335,600	60,467	96,119	91,818	64,997	313,401
2016						
All	106,593	9,483	5,995	4,121	3,186	22,786
Quantile of income						
Bottom 20%	18,263	1,954	1,088	606	479	4,126
21–40%	40,452	5,367	2,699	966	968	10,000
91–95%	217,821	17,168	12,350	8,394	6,363	44,275
96–99%	367,055	23,720	21,417	17,870	12,710	75,716
Top 1%	1,944,261	85,722	123,764	126,004	80,579	416,069

SOURCE Authors' analysis of data for 2005, 2007, 2009, and 2016 from the Medical Expenditure Panel Survey (MEPS)—Household Component, MEPS—Insurance Component, and National Health Expenditure Accounts, and data for 2005, 2007, 2009, and 2015 from the Congressional Budget Office. **NOTES** All dollar amounts are in 2016 dollars. Pretax income is household income before taxes plus employer contributions for payroll taxes and health insurance. Household assignment to income quantiles and categories of spending are explained in the notes to exhibit 1. Data for additional years are in appendix exhibit 4 (see note 13 in text).

those households rose just as rapidly. In 2016 average household spending on health care in the top 1 percent of the income distribution reached \$416,069—slightly more than 100 times the average spending among households in the lowest 20 percent (exhibit 4). However, incomes at the top 1 percent were slightly more than 106 times the average income in the lowest 20 percent. As a result, health care financing remained slightly regressive, but much less so than at the start of our study period.

Discussion

In 2005 the US had a strongly regressive pattern of health care financing, as has been found in

the previous literature. Burdens ranged from 26.8 percent of household income in the bottom 20 percent of the income distribution to 13.8 percent of household income in the top 1 percent. By 2016 regressivity had largely disappeared. We estimated that household spending on health care was 22.6 percent of income in the bottom 20 percent and 21.4 percent of income in the top 1 percent.

To highlight the magnitude of this incidence shift, we note that average income and average health care spending rose by 7.2 percent and 30.4 percent, respectively, during the study period. If all households' incomes and health expenditures had uniformly increased by these respective percentages, spending as a share of

income in the top 1 percent would have grown from 13.8 percent of income to only 16.8 percent, instead of rising to 21.4 percent. In contrast, spending by the bottom 20 percent would have grown from 26.8 percent of income to 32.6 percent, rather than declining to 22.6 percent.

Much of the incidence shift was attributable to the fact that average private-sector spending, the most regressive component of health care spending, grew in real terms by only 13.9 percent over the study period, compared to 46.9 percent and 53.3 percent growth in average spending for Medicare and Medicaid, respectively. The slower growth in private spending reflected the fact that throughout the study period, rapid private insurance premium increases were offset by an erosion in private coverage (until the introduction of Marketplace coverage in 2014).²⁰ Simultaneously, increases in public coverage were driven by aging, disability, and (by the end of our study period) the ACA. These increases in public coverage not only increased federal spending on these programs but also helped reduce private out-of-pocket spending by the uninsured, both of which increased the progressivity of health care financing.

Regressivity began to decline in the period 2005–07, as a result of declines in burdens among low-income households. Several factors contributed to this change. Incomes in the bottom 20 percent rose disproportionately, by 12.9 percent, whereas these households' private-sector spending declined modestly (authors' calculations from exhibit 4). The introduction of Medicare Part D during this period helped shift the financing of prescription drugs away from regressive out-of-pocket spending toward more progressively financed premiums and general revenues.²¹ According to data from MEPS-HC, among Medicare recipients with incomes in the bottom 20 percent, out-of-pocket spending declined by 33.7 percent from 2005 to 2007 (authors' calculations).

The largest shift in incidence in our study period occurred between 2007 and 2009. Officially, the Great Recession began in December 2007 and ended in June 2009. Declining regressivity during this period was primarily driven by recession-related changes in the distribution of income and the progressivity of taxation. The American Recovery and Reinvestment Act of 2009 provided tax relief targeted at low-income households and supported state efforts to fund Medicaid programs by increasing the federal share of Medicaid payments, thereby increasing the overall progressivity of Medicaid financing (see appendix exhibit 5).¹³ Another factor was that households at the top of the income distribution

By 2016 regressivity had largely disappeared.

experienced larger declines in capital gains (taxed less heavily) than in earnings and other income (taxed at higher rates). Yet another factor is the basic mathematics of progressivity, according to which a decline in the tax base, coupled with a progressive tax system (such as for federal Medicaid financing), results in larger percentage-point increases in contributions to publicly financed programs at high income levels than at low income levels. Taken together, all of these changes increased the share of income that higher-income households paid for Medicare and Medicaid through federal and state taxes over this period.

Although the decreased regressivity of health care financing was, as of 2009, primarily attributable to the recession and associated tax policy, the question arises why incidence did not revert to its prerecession regressivity as the economy recovered. One obvious factor is that recovery from the recession was only gradual. Unemployment remained high for many years after GDP growth resumed in late 2009,²² and the recession's impact on lower-income families' incomes continued past the end of our study period. Capital gains were slow to recover as a share of income among households at the top end of the income distribution. Also, while employer-sponsored insurance premiums increased rapidly after 2009, average spending was slowed as fewer employers offered coverage and take-up declined among eligible workers.²⁰ All of these factors would have tended to slow any reversion toward prerecession regressivity.

Careful scrutiny of exhibit 3 reveals that in the period 2009–12 incidence did begin to shift back toward increased regressivity as the economy gradually recovered. However, this tendency toward increased regressivity stopped after 2012. In 2013 spending by the top 1 percent as a share of income reversed its decline. In that year the Medicare payroll tax increased by 0.90 percentage points (from 1.45 percent to 2.35 percent) for higher-income taxpayers, and the American Taxpayer Relief Act of 2012 allowed earlier tax cuts to expire for high-income households (a 4.6-percentage-point increase in the top federal individual income tax rate).²³

The ACA may also have played an important role in helping prevent a return to prerecession regressivity in at least two key ways. First, increases in Medicaid coverage and the introduction of subsidized Marketplace plans may have helped protect low-income adults by reducing out-of-pocket spending. Second, this expansion in coverage was financed primarily through federal tax revenues, which are progressive. The expansion in Medicaid had an enhanced federal matching rate of 100 percent for newly eligible enrollees for the years covered by our study, and the federal government primarily financed the Marketplace subsidies. Taken together, these changes slowed any tendency to return to the more regressive financing that was the norm before the ACA.

Conclusion

In a recent Health Affairs Blog post, members of the Health Affairs Council on Health Care Spending and Value discussed the high level of aggregate health care expenditures, stating, “We must

consider how this level of spending impacts individuals and families.”²⁴ We agree, yet a first step toward such an analysis must be the careful measurement of what individuals and families are actually spending, the form these expenditures are taking, and how financing incidence has evolved over time. The incidence of health care financing in the US has been addressed only sporadically, despite the magnitude and complexity of the US health care system. Unfortunately, this very complexity has led to methodological differences among the few studies that exist, confounding efforts to draw strong conclusions about historical changes. By using a consistent methodology across time, our analysis offers important insights into a substantial shift toward greater progressivity that occurred during a period of substantial macroeconomic, tax, and health policy upheaval. We look forward to applying this same methodology in future years to study the impact that economic, tax, and health policy, including the Tax Cuts and Jobs Act of 2017, has on health care financing incidence. ■

A previous version of this article was presented at the 7th Annual Conference of the American Society of Health Economists in Atlanta, Georgia, June 12, 2018, and at the 2019 Congress of the International Health Economics Association in Basel, Switzerland, July 16, 2019. In the past twelve months Thomas Selden has received

over \$5,000 in compensation from Allstate Insurance for serving as an expert witness in litigation related to auto injury claims. The authors appreciate the helpful comments from Patricia S. Keenan, G. Edward Miller, and Joel W. Cohen, of the Agency for Healthcare Research and Quality (AHRQ); and from Melinda B. Buntin, of

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NOTES

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- 14 Data on state corporate income tax

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Appendix 1: Methodology

No single U.S. data source provides all of the necessary components for a comprehensive analysis of healthcare finance equity. To produce the estimates in this paper, we combined information from a variety of sources on personal health care spending, health insurance coverage and premiums, household income, tax revenues, and spending on public health and other government program activities. As outlined below, all of the key estimates derived from survey data were adjusted to match national totals from publicly-available sources. We combined each of the data sources using a consistent methodology over the 2005 through 2016 period. For comparison purposes, all dollar amounts reported in the main text were converted to 2016 dollars using the Personal Consumption Expenditures price index.¹

The starting point of our study was the Medical Expenditure Panel Survey Household Component (MEPS-HC): a household survey of the civilian, noninstitutionalized population sponsored by the Agency for Healthcare Research and Quality (AHRQ). MEPS-HC data for each year from 2005 to 2016 were used, with sample sizes averaging between 30 and 35 thousand observations per year. The MEPS-HC conducts five interviews for each respondent covering a two-year period and obtains information on medical expenditures, insurance coverage, premiums paid out of pocket, and a range of socioeconomic variables including income, home ownership, household composition, and more. MEPS interviewers collect detailed information about each health care event and this information is supplemented with follow-up surveys of providers.

Sources of Healthcare Finance

Out-of-pocket spending

The MEPS-HC formed the backbone of our estimates of out-of-pocket (OOP) spending on healthcare. We adjusted the MEPS-HC estimates of OOP spending in two key ways. First, we benchmarked estimates of OOP spending in the MEPS-HC to match the total OOP spending in each year from the National Health Expenditure Accounts (NHEA), produced by the Centers for Medicare and Medicaid Services (CMS). We adjusted the NHEA target by excluding OOP spending related to non-durable medical products, nursing care facilities and continuing care communities, and the acute care expenditures of the institutionalized, all of which are not collected in the MEPS-HC. Second, we simulated the after-tax cost of OOP spending in the MEPS-HC reflecting the preferred tax treatment through

flexible spending accounts (FSA), health savings accounts (HSA), and the tax deduction for excess medical spending. To do this, we used MEPS-HC reports of participation in flexible spending accounts and health savings accounts. Our estimates of the after-tax cost of OOP spending accounted for variation in tax benefits, including an approximation of the size of the tax deduction for excess medical spending, by simulating federal and state income taxes for MEPS-HC respondents using the National Bureau of Economic Research's (NBER) TAXSIM model.

Premiums

The MEPS-HC collects several measures of health insurance premiums that we used in this analysis: 1) employee contributions for employer-sponsored group health insurance (ESI); 2) premiums for non-group coverage or other (non-employer) group coverage; 3) premiums for Marketplace coverage (beginning in 2014); 4) contributions required to enroll in Medicaid or CHIP coverage; and 5) premiums for Medicare beneficiaries including premiums to enroll in Medicare Advantage or Part D plans and to purchase Medigap supplemental coverage. We also assigned amounts owed for enrollment in Part B of Medicare incorporating any income-related premiums beginning in 2007, which were calculated based on estimates of the adjusted gross income (AGI) of the beneficiary's tax filing unit.

Household surveys generally do not collect information on employer contributions to health insurance premiums. To approximate these amounts, first we imputed the average premium for ESI coverage - including both employer and any employee contribution amounts - from the Insurance Component of the MEPS (MEPS-IC) by industry, Census Division, and plan type. Plan types were single, single-plus-one, or family coverage. Second, we subtracted any employee contributions reported in the MEPS-HC from the imputed total premium to approximate employer contributions.

As we did with OOP spending, we benchmarked estimates of private health insurance premiums in each year to the NHEA estimate of private health insurance spending.

Direct taxes

To estimate the incidence of public health insurance programs on federal and state personal income taxes, we combined TAXSIM data on simulated taxes and Congressional Budget Office reports of average incomes taxes paid by quintile or percentile of the income distribution.² Because the MEPS-HC sample underrepresents very high income households, we relied on CBO-reported data for

average federal income taxes paid for households with incomes above the second quintile (40th percentile). For the bottom two quintiles we relied on NBER's TAXSIM model³ applied to the MEPS-HC to separately identify the federal tax liabilities of lower-income families. Because the average tax liabilities of lower income households can be negative, we assumed the incidence of health spending on these families occurs before accounting for three tax policies that can often lead to negative tax payments: 1) the earned income tax credit; 2) the child tax credit; and 3) the childcare tax credit. Our approach assumes that lower income households with negative tax liabilities receive less from federal income tax filing than they would if healthcare spending was lower. This approach implies that the effect of federal spending on health care is financed at least in part through increased federal income taxes on households across the income distribution - even those with tax liabilities that are, on net, negative due to credits.

In relying on the CBO tables, our analysis incorporated CBO's assumption that 25 percent of the corporate tax was borne by labor and the remainder borne by owners of capital. We modified CBO's incidence of the corporate income tax by assuming foreign owners of capital bore part of the burden of health care financed with through corporate taxes in proportion to their ownership of U.S. corporate equity.⁴ Any incidence on foreign owners of capital is excluded from the analysis.

We assumed the burden state spending on health care fell on households according to our estimates of each household's share of state general revenues. Our estimates of state general revenues were constructed using: NBER TAXSIM simulations of state personal income tax liabilities, U.S. Census data on state corporate income tax revenues,⁵ and Internal Revenue Service data on average sales tax payments by tax filing unit size, income level, and state.⁶ We used NBER TAXSIM to provide estimates of state personal income taxes for MEPS-HC respondents. We adjusted state personal income tax estimates for MEPS-HC households to account for any differences between income reported in the MEPS-HC and CBO estimates of average income within each percentile group. State corporate income taxes were assigned by matching state-level totals from an annual survey of state government agencies and allocating these amounts in proportion to total dividends and interest payments as reported in the MEPS-HC. Individual contributions to state sales taxes were estimated using Internal Revenue Service estimates of average sales taxes paid each year by state, income level, and tax unit size.

The cost of tax expenditures

Tax expenditures were calculated using household level data from MEPS-HC and TAXSIM and each expenditure was defined according to the specific provisions of tax codes. We incorporated the preferential tax treatment of: 1) employer contributions for group coverage; 2) out-of-pocket premium contributions for policyholders covered by Section 125 plans; 3) premiums paid for non-group and other qualified types of coverage if the policyholder was self-employed; 4) out-of-pocket payments for medical care if a family member reported a flexible spending account or a health savings account or if the tax unit would have benefited from itemizing deductions and could have claimed amounts for the excess medical deduction.

Summing these tax preferences across households then yielded total federal and state tax expenditures in each year. These totals were then allocated to all households in proportion to their federal and state tax payments from the CBO distributions and the TAXSIM state tax simulations. Thus, each quintile or top percentile of the income distribution was allocated its total spending on health care net of tax expenditures and inclusive of the tax burden to finance the tax expenditures.

Healthcare Expenditures by Program Type

To allocate health care spending by program type, we began by creating a hierarchical measure of insurance coverage: Medicare at the end of the year; else Medicaid or other public coverage at the end of the year; else any private insurance at the end of the year; else uninsured at the end of the year. We then used these insurance categories to help us assign expenditures into the following broad categories.

Private sector health spending

The paper uses the term "private sector health spending," which comprises the after-tax incidence of private premiums and out-of-pocket spending for privately-insured individuals or those without coverage, as well as any tax payments to fund the tax expenditures and subsidies for private sector premiums and out-of-pocket expenditures.

Medicare

To allocate NHEA Medicare spending to households, we began by simulating enrollee premiums in MEPS-HC, including any premiums for Medicare Advantage, Parts B and D, and any additional Part B premiums for higher-income households beginning in 2007. To

these we added estimates of Medicare payroll taxes based on earnings reported in the MEPS-HC and benchmarked to match CBO estimates by percentile or quintile as well as tax burdens associated with the portion of Medicare financed from federal general revenues. Any out-of-pocket spending for individuals dually enrolled in both Medicare and Medicaid is included in the Medicare program category. Government spending for such dual-eligible enrollees is included in the appropriate category (Medicare spending in Medicare; Medicaid spending in Medicaid).

Medicaid

For Medicaid and the Children's Health Insurance Program (CHIP), federal spending was allocated according to the financing of federal general revenues. State spending was allocated first to the state level using state-specific spending totals by year and then to households according to each state's financing through state personal and corporate income taxes and sales taxes.⁷ We included all state spending reported by the National Association of State Budget Officers as financed through "general funds" as well as a portion of "other state funds." We subtracted from "other state funds" an estimated proportion of these funds that was financed through provider taxes - and therefore paid by individuals through higher private premiums or out-of-pocket spending rather than through state tax obligations. That proportion was based on research by the Government Accountability Office and varied by year from 32 percent to 41 percent.⁸

Other public health spending

The other public category refers to remaining federal programs in NHEA spending for the Indian Health Service, the Veterans' Administration, Department of Defense, as well as public health spending at the state and local levels. Annual NHEA estimates of total state and local public health spending were first apportioned to each state based on each state's share of public health spending using estimates for 2012 developed from U.S. Census Bureau data.⁹ Then, the state component public health spending was apportioned to households according to their estimated share of state general revenues (defined above under the "Direct Taxes" sub-heading). Reliable estimates of local taxes are unavailable at the household level. Instead, we allocated the local portion of public health spending to households in proportion to their county's average income over the previous five years as estimated by the American Community Survey.¹⁰

Definitions of Household Income

To rank households, we relied on CBO's definition of before-tax household income which included employer contributions to payroll taxes and health benefits as well as government benefits such as the fungible value of Medicare, unemployment insurance, and social security. When expressing healthcare financing burdens as a share of household income, we used the above definition but excluded the fungible value of Medicare benefits because households cannot use these amounts for other forms of consumption, unlike payments for social security or unemployment benefits.

Our estimates of spending as a share of household income (over 20 percent in 2016) were higher than total NHEA spending as a share of GDP (17.9 in 2017), despite the fact that we excluded from our analysis portions of NHEA spending, because household income differs from GDP in its treatment of capital gains, depreciation of fixed assets, retained corporate profits, net foreign income flows, and more.¹¹

¹ U.S. Bureau of Economic Analysis, Personal Consumption Expenditures [PCE], Federal Reserve Bank of St. Louis [cited 2018 May 23].

Available from: <https://fred.stlouisfed.org/series/PCE>

² Congressional Budget Office. The Distribution of Household Income, 2015. November 8, 2018 [cited 2019 Mar 26]. See supplemental data available from: <https://www.cbo.gov/system/files/2018-11/54646-supplemental-data.xlsx>

³ Our analysis includes the burden of financing ACA premium tax credits and cost-sharing subsidies (allocated to households in proportion to payment of federal general revenue).

⁴ U.S. Department of the Treasury. Foreign Portfolio Holdings of U.S. Securities, June 30, 2017 [cited 2019 Mar 28]. Available from: <https://ticdata.treasury.gov/Publish/shla2017r.pdf>

⁵ U.S. Census Bureau. 2016 Annual Surveys of State and Local Government Finances: 2005-2016 [cited 2019 Apr 18]. Available from: <https://www.census.gov/data/tables/2016/econ/state/historical-tables.html>

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⁸ Government Accountability Office. States' Increased Reliance on Funds from Health Care Providers and Local Governments Warrants Improved CMS Data Collection [Internet]. Washington (DC): GAO: July 2014 [cited 2019 Mar 29]. Available from:

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⁹ U.S. Census. Census of Governments, 2012 [cited 2019 Mar 28]. Available from: <https://www.census.gov/programs-surveys/cog.html>

¹⁰ U.S. Census. American Community Survey. [cited 2019 Apr 18].

Available from: <https://www.census.gov/programs-surveys/acs/>

¹¹ Bureau of Economic Analysis. Gross Domestic Product, 4th quarter and annual 2018 (third estimate); Corporate Profits, 4th quarter and annual 2018, Table 7 [Internet]. 2019 Mar 28 [cited 2019 Apr 18].

Available from: <https://www.bea.gov/news/2019/gross-domestic-product-4th-quarter-and-annual-2018-third-estimate-corporate-profits-4th>

Appendix Exhibit 1: Data for Exhibit 1 in text: "Health Spending by Category as Percentage of Average Household Income, by Percentiles of Household Income, 2005"

	Private	Medicare	Medicaid	Other Public
Overall	8.4%	4.1%	2.7%	2.4%
Bottom 20%	14.5%	6.7%	3.0%	2.5%
21-40%	13.6%	6.1%	1.8%	2.2%
41-60%	12.0%	4.3%	1.7%	2.0%
61-80%	10.2%	4.0%	2.1%	2.2%
81-90%	8.1%	4.0%	2.4%	2.3%
91-95%	6.9%	3.7%	2.8%	2.4%
96-99%	5.5%	3.6%	3.3%	2.7%
Top 1%	3.3%	3.4%	4.2%	2.9%

Sources: Authors' analyses of Medical Expenditure Panel Survey -- Household Component (MEPS-HC), Medical Expenditure Panel Survey -- Insurance Component (MEPS-IC), National Health Expenditure Accounts (NHEA), and Congressional Budget Office (CBO) data. Notes: Households ranked by pre-tax household income plus value of Medicare benefits (MEPS-HC/CBO). Each category of spending includes after-tax out-of-pocket (OOP) payments for individuals covered by that form of insurance (private spending includes spending by those without any coverage). Each category also includes the implied federal, state and/or local tax revenues required to finance those programs or activities (private spending includes the implied cost of the favorable tax treatment for private health insurance). Private spending also includes: 1) after-tax contributions for premiums; and 2) employer contributions to health plans. Medicare also includes: 1) any required contributions for Medicare Parts B and D or Medicare Advantage; and 2) employer and employee payroll contributions for the Medicare program. Medicaid also includes: 1) any required premium contributions. Other public includes the implied federal revenues needed to finance other programs including: federal public health programs, the Veteran's Administration, the Indian Health Service, subsidy payments for COBRA coverage, small business tax credits after 2010, etc., as well as the implied state and local revenues to finance public health activities at those levels.

Appendix Exhibit 2: Data for Exhibit 2 in text: "Health Spending by Category as Percentage of Average Household Income, by Percentiles of Household Income, 2016"

	Private	Medicare	Medicaid	Other Public
Overall	8.9%	5.6%	3.9%	3.0%
Bottom 20%	10.7%	6.0%	3.3%	2.6%
21-40%	13.3%	6.7%	2.4%	2.4%
41-60%	12.8%	4.9%	2.2%	2.4%
61-80%	10.7%	5.2%	2.8%	2.6%
81-90%	8.5%	5.1%	3.5%	2.7%
91-95%	7.9%	5.7%	3.9%	2.9%
96-99%	6.5%	5.8%	4.9%	3.5%
Top 1%	4.4%	6.4%	6.5%	4.1%

Sources: Authors' analyses of Medical Expenditure Panel Survey -- Household Component (MEPS-HC), Medical Expenditure Panel Survey -- Insurance Component (MEPS-IC), National Health Expenditure Accounts (NHEA), and Congressional Budget Office (CBO) data. Notes: Households ranked by pre-tax household income plus value of Medicare benefits (MEPS/CBO). Definitions of categories of spending are explained in Notes to Exhibit 1 in text.

Appendix Exhibit 3: Data for Exhibit 3 in text: "Health Spending as a Share of Average Pre-Tax Household Income by Selected Percentiles of Household Income, 2005-2016"

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Bottom 20%	26.8%	25.4%	22.9%	23.8%	24.9%	23.3%	23.8%	23.4%	21.8%	22.2%	22.7%	22.6%
21-40%	23.7%	23.3%	21.0%	23.1%	24.2%	23.2%	24.0%	23.6%	23.2%	23.6%	24.5%	24.7%
41-60%	20.1%	19.8%	19.4%	19.9%	21.1%	21.6%	22.2%	22.3%	21.8%	22.7%	22.5%	22.4%
61-80%	18.4%	18.3%	18.2%	18.7%	20.2%	20.5%	21.3%	20.5%	21.0%	20.9%	21.2%	21.3%
81-90%	16.8%	17.0%	16.8%	17.8%	20.0%	19.5%	20.4%	19.6%	19.9%	19.6%	20.4%	19.9%
91-95%	15.8%	15.9%	16.3%	18.2%	20.8%	20.4%	20.6%	19.8%	19.6%	19.7%	19.9%	20.3%
96-99%	15.1%	15.1%	15.3%	18.3%	22.2%	21.3%	21.4%	19.8%	20.5%	20.3%	20.7%	20.6%
Top 1%	13.8%	13.7%	13.3%	17.6%	23.5%	22.0%	21.1%	18.2%	21.3%	21.3%	21.5%	21.4%

Sources: Authors' analyses of Medical Expenditure Panel Survey -- Household Component (MEPS-HC), Medical Expenditure Panel Survey -- Insurance Component (MEPS-IC), National Health Expenditure Accounts (NHEA), and Congressional Budget Office (CBO) data. Notes: Households ranked by pre-tax household income plus value of Medicare benefits (MEPS/CBO).

Appendix Exhibit 4: Data for Exhibit 4 in text: "Per Household Means of Health Spending by Percentiles of Household Income in Civilian Noninstitutionalized Population, 2005, 2007, 2009, 2013, and 2016"

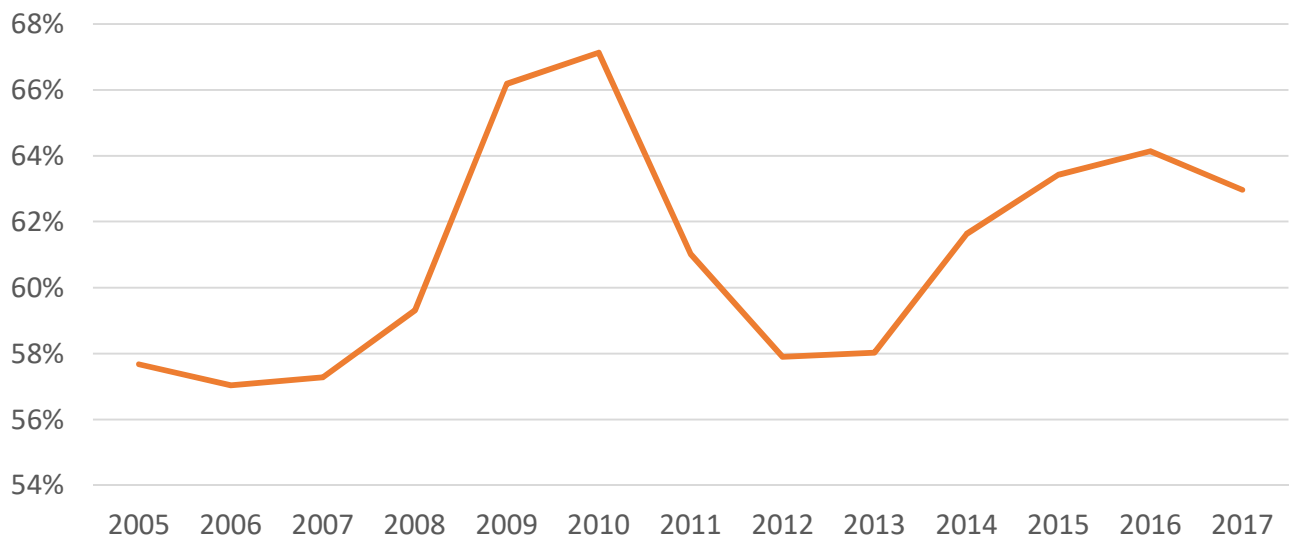
	Pre-Tax Household Income ^a	Private Health Spending	Medicare	Medicaid	Other Public	Total
			<i>2005 (in 2016 \$)</i>			
Total (billions)	\$11,335	\$949	\$465	\$307	\$272	\$1,992
Per Household Mean						
All	\$99,429	\$8,323	\$4,081	\$2,689	\$2,382	\$17,475
Percentiles of Income^b						
Bottom 20%	\$17,309	\$2,515	\$1,162	\$527	\$440	\$4,643
20-40%	\$39,364	\$5,351	\$2,420	\$692	\$858	\$9,321
40-60%	\$65,848	\$7,923	\$2,828	\$1,143	\$1,312	\$13,207
60-80%	\$99,204	\$10,084	\$3,960	\$2,057	\$2,140	\$18,241
80-90%	\$141,961	\$11,446	\$5,626	\$3,463	\$3,325	\$23,861
90-95%	\$192,207	\$13,349	\$7,080	\$5,354	\$4,525	\$30,309
95-99%	\$321,103	\$17,700	\$11,466	\$10,668	\$8,636	\$48,471
Top 1%	\$1,839,654	\$61,133	\$62,768	\$77,064	\$52,836	\$253,800
			<i>2007 (in 2016 \$)</i>			
Total (billions)	\$12,526	\$970	\$525	\$326	\$311	\$2,131
Per Household Mean						
All	\$107,520	\$8,325	\$4,505	\$2,796	\$2,667	\$18,294
Percentiles of Income^b						
Bottom 20%	\$19,534	\$2,461	\$1,105	\$395	\$523	\$4,483
20-40	\$42,197	\$5,039	\$2,256	\$653	\$899	\$8,847
40-60	\$68,482	\$7,948	\$2,875	\$1,085	\$1,410	\$13,318
60-80	\$103,255	\$10,102	\$4,247	\$2,057	\$2,409	\$18,815
80-90	\$147,932	\$11,741	\$6,021	\$3,571	\$3,502	\$24,835
90-95	\$202,222	\$13,613	\$8,263	\$5,724	\$5,281	\$32,881
95-99	\$341,531	\$18,155	\$13,380	\$11,340	\$9,449	\$52,324
Top 1%	\$2,097,046	\$58,294	\$80,693	\$81,558	\$59,182	\$279,727
			<i>2009 (in 2016 \$)</i>			
Total (billions)	\$10,862	\$1,011	\$593	\$384	\$358	\$2,346
Per Household Mean						
All	\$92,919	\$8,651	\$5,070	\$3,288	\$3,062	\$20,072
Percentiles of Income^b						
Bottom 20%	\$18,420	\$2,584	\$930	\$469	\$605	\$4,587
20-40	\$38,664	\$5,119	\$2,356	\$805	\$1,078	\$9,357
40-60	\$64,041	\$7,863	\$2,978	\$1,154	\$1,509	\$13,504
60-80	\$97,701	\$10,116	\$4,594	\$2,435	\$2,635	\$19,780
80-90	\$141,062	\$12,437	\$6,982	\$4,489	\$4,359	\$28,268
90-95	\$189,888	\$15,131	\$10,402	\$7,401	\$6,647	\$39,582
95-99	\$296,643	\$21,196	\$17,843	\$14,843	\$12,038	\$65,920
Top 1%	\$1,335,600	\$60,467	\$96,119	\$91,818	\$64,997	\$313,401

Appendix Exhibit 4: Data for Exhibit 4 in text: "Per Household Means of Health Spending by Percentiles of Household Income in Civilian Noninstitutionalized Population, 2005, 2007, 2009, 2013, and 2016"

	Pre-Tax Household Income ^a	Private Health Spending	Medicare	Medicaid	Other Public	Total
			<i>2013 (in 2016 \$)</i>			
Total (billions)	\$12,354	\$1,090	\$688	\$431	\$383	\$2,591.74
Per Household Mean All	\$98,123	\$8,645	\$5,469	\$3,425	\$3,042	\$20,581
Percentiles of Income^b						
Bottom 20%	\$18,116	\$1,941	\$936	\$528	\$540	\$3,945
20-40	\$38,261	\$4,640	\$2,478	\$825	\$938	\$8,882
40-60	\$64,140	\$7,835	\$3,205	\$1,340	\$1,597	\$13,977
60-80	\$100,028	\$10,733	\$5,033	\$2,577	\$2,641	\$20,983
80-90	\$146,119	\$12,894	\$7,464	\$4,598	\$4,103	\$29,058
90-95	\$202,426	\$15,596	\$10,829	\$7,076	\$6,242	\$39,743
95-99	\$330,614	\$21,483	\$19,245	\$14,731	\$12,155	\$67,615
Top 1%	\$1,594,201	\$65,099	\$107,704	\$97,871	\$69,394	\$340,068
			<i>2016 (in 2016 \$)</i>			
Total (billions)	\$13,545	\$1,205	\$761	\$523	\$405	\$2,894
Per Household Mean All	\$106,593	\$9,483	\$5,995	\$4,121	\$3,186	\$22,786
Percentiles of Income^b						
Bottom 20%	\$18,263	\$1,954	\$1,088	\$606	\$479	\$4,126
20-40	\$40,452	\$5,367	\$2,699	\$966	\$968	\$10,000
40-60	\$68,332	\$8,776	\$3,350	\$1,528	\$1,621	\$15,275
60-80	\$106,705	\$11,451	\$5,527	\$3,031	\$2,730	\$22,739
80-90	\$157,647	\$13,426	\$8,021	\$5,583	\$4,308	\$31,338
90-95	\$217,821	\$17,168	\$12,350	\$8,394	\$6,363	\$44,275
95-99	\$367,055	\$23,720	\$21,417	\$17,870	\$12,710	\$75,716
Top 1%	\$1,944,261	\$85,722	\$123,764	\$126,004	\$80,579	\$416,069

Sources: Authors' analyses of Medical Expenditure Panel Survey -- Household Component (MEPS-HC), Medical Expenditure Panel Survey -- Insurance Component (MEPS-IC), National Health Expenditure Accounts (NHEA), and Congressional Budget Office (CBO) data. Notes: ^a Pre-tax income is household income before taxes plus employer contributions for payroll taxes and health insurance (CBO). ^b Households ranked by pre-tax household income plus value of Medicare benefits (MEPS/CBO). Definitions of categories of spending are explained in Notes to Exhibit 1.

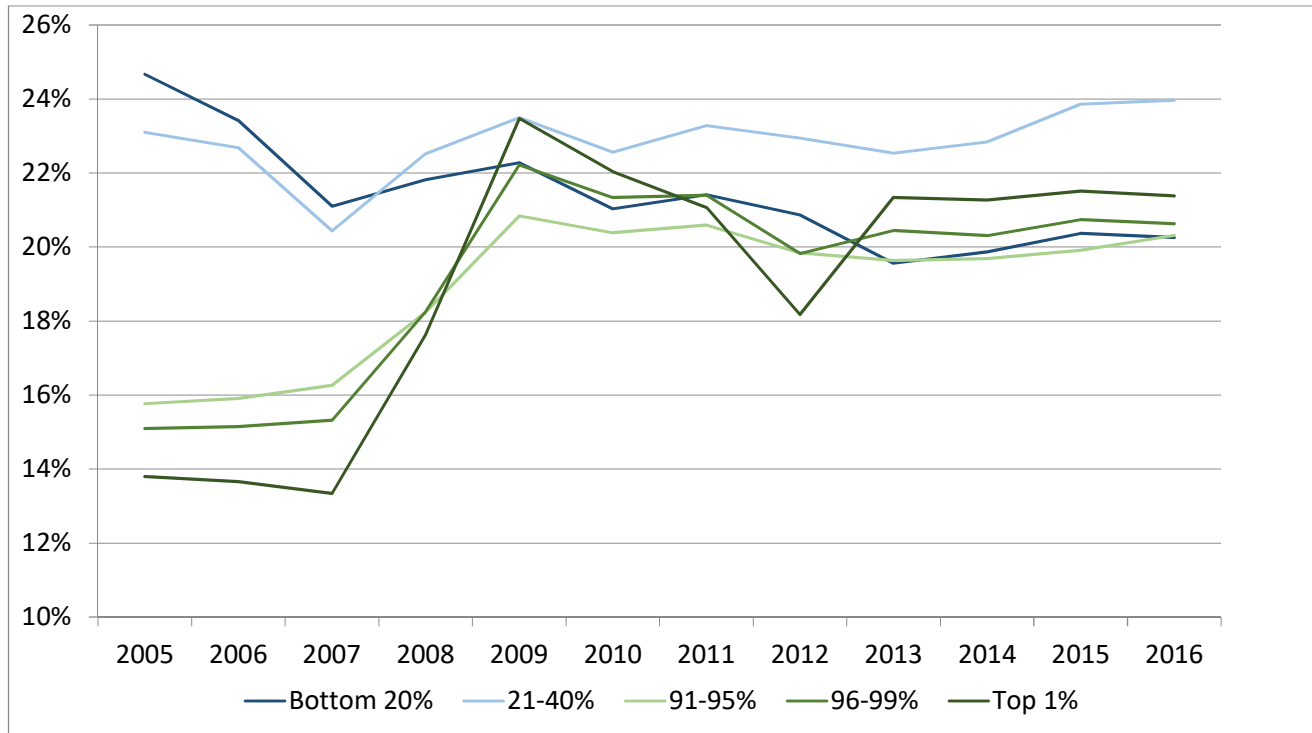
Appendix Exhibit 5: Federal Share of Medicaid and CHIP Spending, 2005-2017



Source: Centers for Medicare & Medicaid Services, Office of the Actuary, National Health Expenditures by Type of Service and Source of Funds, 1960-2017.

Appendix Exhibit 6: Health Spending as a Share of Average Pre-Tax Household Income (Including Transfers from the Earned Income Tax Credit and Child Tax Credit) by Selected Percentiles of Household Income, 2005-2016

Results in the text derive from a pre-tax definition of household income that excludes amounts received from transfer programs such as the Earned Income Tax Credit (EITC) and the Child Tax Credit (CTC). This definition is closely aligned with the definition the Congressional Budget Office uses in their analyses of the distribution of household income. Below is an alternative version of Exhibit 3 where household income was defined including receipts received by households from the EITC and the CTC.



Sources: Authors' analyses of Medical Expenditure Panel Survey -- Household Component (MEPS-HC), Medical Expenditure Panel Survey -- Insurance Component (MEPS-IC), National Health Expenditure Accounts (NHEA), and Congressional Budget Office (CBO) data. Notes: Households ranked by pre-tax household income plus value of Medicare benefits (MEPS/CBO).

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