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RESEARCH ARTICLE

HSR Health Services Research

Accounting for the burden and redistribution of health care costs: Who uses care and who pays for it

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Abstract

Objective: To measure the burden of financing health care costs and quantify redistribution among population groups.

Data Sources: A synthetic population using data combined from multiple sources, including the Survey of Income and Program Participation (SIPP), Medical Expenditure Panel Survey (MEPS), Kaiser Family Foundation (KFF)/Health Research Educational Trust (HRET) Employer Health Benefits Survey, American Community Survey (ACS), and National Health Expenditure Accounts (NHEA).

Study Design: We estimate two dollar amounts for each individual in the synthetic population: (a) payments to finance health care services, which includes all payments by a household and their employers to finance health care, including premiums, out-of-pocket payments, federal and state taxes, and other payments; and (b) the dollar value of health care services received, which equals the amount paid to providers for those services.

Data Extraction Methods: We linked the nationally representative survey data using statistical matching. We allocated health care expenditures from the NHEA to individuals and households based on expenditures reported in the MEPS.

Principal Findings: We show that higher-income households pay the most to finance health care in dollar amounts, but the burden of payments as a share of income is greater among lower-income households.

Conclusions: Accounting for all sources of payments provides a clear picture of the burden of financing health care costs, and how that burden is spread under our current financing system.

KEYWORDS

health care costs, health care financing, health economics, redistribution

1 | INTRODUCTION

In 2015, health care costs in the United States accounted for nearly 18 percent of GDP.[1] Over the coming 10 years, the share of GDP spent on health care is expected to continue to grow.[2] Devoting a large share of GDP to health care has implications for not only the economy as a whole, but also for the individual households that devote a significant share of their income to health care.

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Ultimately, all health care costs are paid by households, either in ways that are obvious such as through insurance premiums and out-of-pocket costs, or through less visible ways such as through employer-paid premiums and taxes. Focusing on average or economy-wide health care costs tells us little about the burden that different families bear to pay for health care, or about the relationship between who pays for care and who receives care.

Researchers over time and around the world have long been interested in understanding redistribution in health care, for example, Wagstaff, van Doorslaer, and Rutten; Pauly; Wagstaff and van Doorslaer; and Evans.[3-6] Past examples in the United States include Auerbach and Kellerman; Gottschalk and Wolfe; and Ketche et al[7-9] Our work provides an updated analysis using data from 2015. A recent paper (Jacobs and Selden) considers similar questions regarding the distribution of health care financing.[10] However, our paper makes a number of important contributions. First, we consider the payments that are made to finance health care as well as the dollar value of benefits received. Analyses that only consider who pays into health care provide information on the burden of payments but do not assess redistribution of health care dollars to different groups within the population that use health care services. Second, we consider the impact not only on groups defined by income, but also by age and source of insurance. Third, prior work has considered the burden of health care costs on "typical" families—a family of four covered by employer-sponsored insurance (ESI), and a family of 2 older adults also covered by ESI (Auerbach and Kellerman), while we consider all families. Furthermore, "typical" families are surprisingly rare: based on our analyses, only 10 percent of people are part of four-person households in which all are covered by ESI. Finally, prior work has typically focused on civilian, non-institutionalized populations, whereas our analysis includes insistitutionalized and active duty military populations. In particular, excluding the institutionalized populations may have important implications for the overall results as nursing facilities

What This Study Adds

- Health care financing arrangements are designed to redistribute funds for health care expenditures.
- Previous work rarely considers, redistribution by age, redistribution by insurance status, or both costs paid and the dollar value of care received.
- Higher-income households pay the most to finance health care in dollar amounts, but the burden of payments as a share of income is greater among lower-income households.
- We also find significant redistribution across age group and income groups.

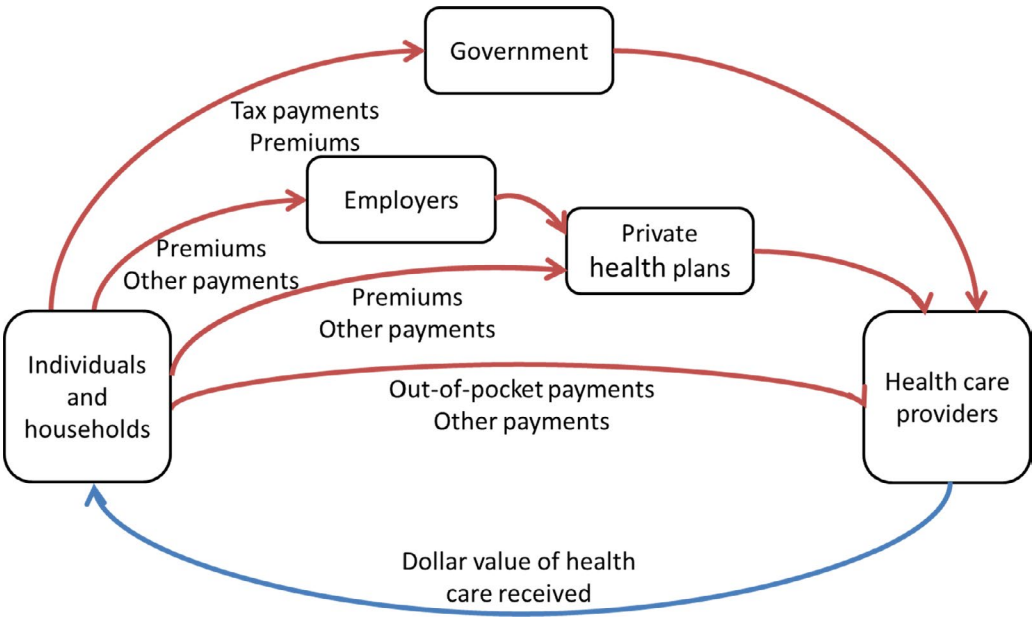

FIGURE 1 Conceptual Framework of Health Care Payments and Health Care Received [Colorfigure can be viewed at wileyonlinelibrary.com]
Note: Tax payments consist of the portions of federal and state income taxes, payroll taxes, and other taxes devoted to health care programs (health care programs include Medicare, Medicaid, TRICARE, Veterans' health, Indian Health Services, workers' compensation, maternal and child health programs, vocational rehabilitation programs, SAMHSA, public health activities, research, and structures and equipment). Premium payments include Medicare premiums, TRICARE premiums, premiums payments made by individuals for employer-sponsored insurance and direct purchased insurance, and premium contributions by employers. Out-of-pocket payments are payments at the point of service. Other payments include contributions to retiree health insurance, workers' compensation, worksite health care, school health programs, private investment, and other private spending on health care. The dollar value of health care received reflects all health care received regardless of the source of payment.
Source: Authors' depiction

and continuing care retirement communities expenditures were $158 billion in 2015 according to the NHEA.

Health care financing arrangements are designed to redistribute funds for health care expenditures. Redistribution occurs not only from high to low income, but also from those who use less health care to those who use more. This redistribution is often opaque. Health care costs are paid through many different channels, some of which are obvious and most of which are not. The most obvious payments are out-of-pocket at the point of service, but based on our analyses, these represent just 9.1 percent of total health care costs. The vast bulk of health care costs are paid through insurance premiums and taxes, with redistributive financing pools between the people paying for health care and the people using health care. Health insurance pools redistribute costs from the healthy to the sick. Tax-based financing redistributes from the rich to the poor, and from the working age population to the elderly and children. A deep understanding of the burden imposed by health care costs and the redistribution inherent in our health care financing system is essential to promoting a Culture of Health and reducing the burden imposed on families.[11]

In this analysis, we distinguish between two concepts. The first concept is payments to finance health care services, which includes all payments by a household and their employers to finance health care, including premiums, out-of-pocket costs, taxes, and other payments. Following standard economic practice, we treat the burden of employer payments as ultimately falling on workers.[12,13] Payments represent the financial burden borne by each household for health care services, including those they receive themselves and those provided to others. In Figure 1, the red arrows illustrate payment types that finance health care services.

The second concept is the dollar value of health care services received. By "value," we mean simply the dollar amount paid for those services; we do not measure or monetize quality or any health benefits. The health care services that a household receives may be financed directly by members of the household, or indirectly by their health plan or through government programs financed by taxpayers. In Figure 1, the blue arrow, representing services delivered by providers to patients, illustrate the dollar value of health care services received.

In the aggregate, total payments to finance health care equal the dollar value of health care services received. However, health care services received by any given individual are frequently paid by others. The divergence between payments and services received arises from redistribution that occurs through insurance and taxation. By considering both payments and the value of services received, this paper illustrates the burden of health care costs on households, and the degree of redistribution inherent in the American health care financing system.

2 | DATA AND METHODS

We constructed a synthetic population to estimate payments to finance health care services and the dollar value of health care services received by individuals and households. A synthetic population is needed because no single source contains the comprehensive data required to assess the distribution of health care payments and receipts across population subgroups.[14,15] We aligned multiple micro survey data sets and national health care expenditures. We used data on demographics, family structure, and income for the civilian non-institutionalized population from the April 2010 sample of the 2008 Survey of Income and Program Participation (SIPP). We linked the SIPP to the 2014 Medical Expenditure Panel Survey (MEPS) using statistical matching based on characteristics including age, insurance status, health status, region, and income.[16] We augmented MEPS spending to address underestimated total expenditures and underrepresentation of individuals with high spending.[14] We also linked firm information from the 2010 Kaiser Family Foundation (KFF)/Health Research Educational Trust (HRET) Employer Health Benefits Survey to the synthetic population. We assigned individuals a primary health insurance status, that represents the primary source of insurance during the year, some may have periods when they are uninsured or have a different source of insurance. We then supplemented the SIPP using the 2015 American Community Survey (ACS) microdata to account for individuals residing in institutions (nursing homes, other health facilities, and correctional facilities) and those in active duty military service. We aligned total income and wages those reported by the Bureau of Economic Analysis,[17] and the share of income and wages by quintiles to the distribution reported by the Congressional Budget Office.[18]

To calculate the payments to finance health care, we categorize total payments to finance health care into four streams: out-of-pocket payments, premium payments, tax payments devoted to health programs, and other payments to health care. We assigned each payment type to individuals in our synthetic population, allowing us to track how much individuals contribute to health care spending in each category of spending. In addition to the dollar amount of total payments, we also calculated total payments as a share of household income in order to capture the relative burden across households with varying income levels.

To calculate the dollar value of services received, we started with aggregate health care expenditures from the National Health Expenditure Accounts (NHEA) as the total dollar value of health care services received. We omitted other non-durable medical products purchased by individuals and other private revenues received by providers from the NHEA. For each of the included expenditure categories, we assigned the aggregate amounts to individuals in our synthetic population using the proportionof expenditures in the MEPS.

Further details about our methodology are included in a supplementary appendix.

3 | LIMITATIONS

Our study has several limitations. First, there is no one data source that contains all of the data elements needed for this analysis. Thus, we created a synthetic population by merging data from multiple data sources and assigning spending and payments rather than

TABLE 1 Per capita payments to finance health care, 2015

	Per capita payments ($)	Per capita payments as a percent of income (%)					
	Total payments	Total payments	Out-of-pocket payments	Premium payments by individuals	Premium payments by employers	Tax payments	Other payments
Overall	$9393	18.7	1.7	1.9	4.0	9.6	1.4
By primary insurance status							
Employer	$14 139	20.0	1.0	1.8	5.8	10.2	1.1
Medicaid	$1801	13.6	6.3	0.0	0.0	3.6	3.8
Medicare	$5998	13.6	3.9	2.8	0.0	6.1	0.8
Individual market	$11 724	19.7	1.2	4.5	0.0	13.1	1.0
Other public	$8198	14.0	1.2	0.3	0.0	8.9	3.6
Uninsured	$4543	18.2	2.5	0.0	0.0	10.9	4.9
By household income quintile							
Q1 (lowest)	$3093	33.9	11.9	3.3	5.0	7.9	5.9
Q2	$4571	23.2	3.9	4.3	7.1	5.4	2.5
Q3	$7048	21.1	2.1	3.2	6.9	7.1	1.8
Q4	$10 110	19.8	1.7	2.4	5.4	8.7	1.5
Q5 (highest)	$22 161	16.0	0.7	1.0	2.2	11.3	0.9
By age							
19-34	$10 374	23.7	1.3	2.0	5.7	12.5	2.1
35-49	$14 324	25.7	1.6	2.6	6.8	12.9	1.8
50-64	$16 119	22.0	1.8	2.0	4.9	11.9	1.5
65+	$7638	15.9	4.6	2.5	0.0	7.5	1.2

Note: We calculated per capita payments as a percent of income as payments to finance health care divided by household income. Household income here includes employer premium contributions and is allocated equally to all household members. The payments to finance health care are the sum of out-of-pocket, premium, tax, and other payments. Out-of-pocket payments for care received by children are attributed to adults in their household. Individual premium payments include premiums for employer-sponsored insurance, individual market insurance, Medicare Parts B and D, Medicare supplemental plans, and TRICARE. Family premiums are attributed to the policy owner. Tax payments here include federal income, Medicare Hospital Insurance payroll, state income, and other federal and state tax payments devoted to government-sponsored health programs. Household tax payments are attributed to adults in the household. Other payments include private investment in non-commercial research, structures, and equipment; workers' compensation; worksite health care; school health; employer contributions to retiree health insurance; and other payments such as those made by individuals with partial year coverage.

Source: Authors' analysis.

directly observing them. Second, our key data sources (SIPP and MEPS) exclude institutionalized individuals and active duty military. We drew these populations from the ACS: 3.9 m institutionalized (eg, residents of nursing homes, correctional facilities) and 1.0 m active duty military. Third, for some categories of payments, it is not obvious how to assign incidence and we had to determine reasonable assumptions. One important type of payment is premium payments by employers on behalf of their employees, which we assigned to the employee. Another important type of payment is payments for health care by the federal government that is deficit-financed, which we assigned proportionally to current taxpayers. In both of those cases, analysts could make other assumptions and the results would differ somewhat. Fourth, we estimate the dollar value of health care services received by different types of individuals and families, but we make no attempt to estimate whether the benefits of that care outweigh the costs, either in health benefits generated or the amount that individuals would be willing to pay for that care.

4 | FINDINGS

4.1 | Payments to finance health care

Overall, payments to finance health care services were $9393 per capita, or 18.7 percent of income, in 2015. Table 1 shows the types of payments made by households with different demographic characteristics and through different payment mechanisms. Looking across the "Overall" row of Table 1, the major types of payments are out-of-pocket payments (1.7 percent of income) and insurance premiums paid directly by individuals (1.9 percent of income), which most consumers recognize as the payments for health care, and also less visible payments from employer contributions to insurance premiums (4.0 percent of income), tax payments that support health care programs (9.6 percent of income), and other payments (1.4 percent of income).

Table 1 also illustrates the differences in payments by source of insurance, income, and age. We first consider differences by primary

insurance status. Payments per person are highest for enrollees in employer-sponsored plans ($14 139) and those covered in the individual market ($11 724). The second column of Table 1 shows the same per capita payments as a percent of income. Here, there is less variation in the total payments across sources of insurance. However, the types of payments each group makes vary substantially. Out-of-pocket payments as a share of income are particularly high for those covered by Medicaid as their primary source of insurance (6.3 percent of income), who have lower-income levels and who may have large out-of-pocket costs while not covered by Medicaid. Premiums as a percent of income paid by individuals are highest among those covered by insurance purchased throught the individual market (4.5 percent of income), which partially reflects premiums but also reflects lower income among this group. Tax payments are a substantial portion of payments made to finance health care for all groups but are highest for those with ESI, those purchasing on the individual market, and those who are uninsured. The tax payments for these groups are larger than for others mostly because they are more likely to be employed, as a result their household income is higher and therefore taxes are higher.

The next section of the table considers differences by household income. The payments in dollar amounts rise steeply with income, largely due to the progressivity of taxes. However, payments as a percentage of income are significantly higher for those in the lowest income quintile and significantly lower for those in the highest income quintile. In the lowest income quintile, households are paying on average 33.9 percent of income toward health care. While the mean is skewed by outliers (those with little or no income), this represents a very large burden on households. In the middle three quintiles, households pay between 19.8 percent and 23.2 percent of income toward health care, while the highest quintile pays 16 percent of income toward health care.

The last section of Table 1 considers differences in costs by age group. In absolute amounts, payments rise with age. When considering payments as a percent of income, there is a slight decline with age. The differences in the sources of payments are largely divided between those below and above 65. For those below 65, the less visible employer premiums and tax payments make up the bulk of the burden, but for those above 65, payments are more obvious and are spread across out-of-pocket payments, individual premiums and tax payments. While tax payments make up the largest source of payments for all age groups, they are significantly lower for those over 65.

4.2 | The dollar value of health care received

The results presented so far indicate that taxes contribute significantly to differences in payments across demographic groups and are suggestive of the idea that redistribution is extensive. Our analysis also allows us to look at the differences in the dollar value of services received by different groups and compare that to the payments made to finance health care.

In Table 2, we show the dollar value of health care received for groups by primary insurance status, income, and age. Those with Medicare receive health care with the greatest dollar value ($21 779), which is unsurprising given the larger health care consumption by those over 65 ($23 823). Those with Medicaid have the largest dollar value of health care received as a percent of income (112.6 percent), which corresponds to the lower income and generally poorer health among this group. The dollar value of health care received is lowest for those with insurance through ESI ($6698), the individual market ($6567), and the uninsured ($5104). However care received by the uninsured represents nearly 25 percent of their income, much higher than the share received by those with ESI or individual market insurance.

The dollar value of health care received declines as income rises as does health care received as a percent of income. Those with income in the lowest quintile receive 50 percent more care in terms of dollar value compared to those with income in the highest quintile. However, the dollar value of health care received for those with income in the lowest quintile is over 200 percent of their income, which likely reflects in part the high dollar value of long-term care and the low levels of income. Those with income in the highest quintile receive care with a dollar value equivalent to <5 percent of their income.

Health care utilization often increases with age, as a result, the dollar value of care recived is highest for those over 65 ($23 823) and lowest for those age 19-34 ($5180) similarly the dollar value of care recived as a percent of income rises with age, from roughly 12-13 percent between ages 19 and 49, to over 49.5 percent over age 65.

4.3 | Redistribution: payments to finance health care relative to the dollar value of health care received

Figure 2 combines payments made to finance health care and the dollar value of health care received for different demographic groups. By design, the average payments for health care per person are equivalent to the average dollar value of services received per person, at $9393 dollars. Figures in the supplementary materials also show the breakdown by types of payments and differences by insurance status and age.

Unsurprisingly, those with lower income are much more likely to be the beneficiaries of the redistribution of health care payments made by others into the dollar value of health care services received. Our analysis suggests that the first three income quintiles are the beneficiaries of more health care services (in dollar value) than they pay for through all forms of payment. In the fourth quintile, the payments and dollar value of care received are similar. Those in the highest quintile, thus are paying much more into the system than they receive.

The supplementary tables also show differences by primary insurance status and age. Those on Medicaid, Medicare, and other public programs contribute less payments to finance health care than the dollar value of services they received. In addition to premium and

TABLE 2 Per capita dollar value of health care received, 2015

	Health expenditures ($)	Health expenditures as a percent of income (%)
Overall	$9393	18.7
By primary insurance status		
Employer	$6698	9.1
Medicaid	$10 192	112.6
Medicare	$21 779	59.3
Individual market	$6567	9.0
Other public	$13 856	27.1
Uninsured	$5104	24.8
By household income quintile		
Q1 (lowest)	$12 130	240.8
Q2	$9833	62.4
Q3	$8526	34.4
Q4	$8409	24.5
Q5 (highest)	$8059	4.7
By age		
19-34	$5180	11.9
35-49	$6750	12.1
50-64	$13 200	18.0
65+	$23 823	49.5

Note: The dollar value of health care received reflects national health expenditures, excluding other non-durable medical products (non-prescription drugs and medical sundries) and other private revenues (philanthropy and income from gift shops, cafeterias, parking lots, educational programs, and investment income for institutions such as hospitals, nursing homes, and home health agencies).
Source: Authors' analysis.

out-of-pocket payments for their own insurance and health care services, those in the individual market and employer-sponsored insurance also make large contributions to health care financing through taxes. As a result, their total payments exceed the dollar value of health care received, as others are typically the beneficiaries of tax-financed public health care programs. In fact, the average dollar value of services received for those on employer-sponsored insurance ($6698) is nearly equivalent to the the average premiums that they and their employers pay and the out-of-pocket payments toward their own care ($14 139*(1.0 + 1.8 + 5.8)/20 = $6080). This suggests that typically, those on employer-sponsored insurance receive little direct benefits paid for by government taxes, suggesting that the employer market is largely self-sufficient. This is also shown in a supplementary figure in the appendix.

Those who are primarily covered by individual market insurance pay 45 percent less in premiums and out-of-pocket payments ($12 3 70*(1.2 + 4.5)/19.7 = $3579 calculated from table 1) than the dollar value of services received ($6567), suggesting that they may receive some publicly financed health care.

The last section of Figure S1 illustrates redistribution by age. For the youngest age group, most payments are borne by their parents. Working age adults (age 20-64) contribute the majority of tax payments that support public health care programs. Thus, those age groups essentially subsidize the costs of care for the low income, through Medicaid, and older populations, through Medicare.

4.4 | Sensitivity analysis

In supplementary materials, we present results for several key sensitivity checks. First, we consider the impact of including institutionalized and active duty military populations in our analysis. Second, we consider differences by self-reported health status among the civilian, non-institutionalized population. Finally, we consider alternative distributions of employer premium contributions with lower contributions forlower-wage workers.

In Table S1, we conduct the same analysis as above, but exclude institutionalized and active duty military populations. We find that the overall costs borne by the lowest quintile of the population decline, from 33.9 to 27.7 percent of income, and from 23.2 to 21.7 percent of income for the second income quintile. The change for higher income quintiles was <0.3 percent. In particular, long-term care can impose significant out-of-pocket health care costs on particularly older age populations who live on low and fixed incomes. By excluding this group, our methods and results are more in line with those found in past research focusing on the civilian, non-institutioalized population, with more modest degrees of regressivity.

Excluding institutionalized and active duty populations also allows us to consider differences in redistribution by self-reported health status. In our main analysis, information on institutionalized individuals and active duty military personnel are drawn from the ACS that does not report health status. We find that those in better health contribute a larger dollar amount to health care than those in worse health. We also find that those in poorer health pay a larger percentage of their income toward out-of-pocket payments and individual premiums than those in better health, while those in better health pay a larger percentage of the income toward taxes.

In our analysis above, workers in firms with many lower-wage workers (using the definition used in the Kaiser Family Foundation Employer Health Benefits Survey, which is firms with at least 35 percent of workers earning the 25th percentile of national earnings or less) have employer premium contributions that are 11 percent lower than the average contribution for workers in firms with few lower-wage workers (defined as firms with less than 35 percent of workers earning the 25th percentile of national earnings or less). Based on the 2019 KFF Employer Health Survey, employer premium contributions are 15-25 percent lower at firms with many lower-wage workers. As such, in our sensitivity analysis, shown in Table S2, we adjusted employer ESI payments to be 20 percent lower at firms with many lower-wage workers than firms with few lower-wage workers. This adjustment makes little difference to our results, with average employer premiums for the bottom two income quintiles falling by $13-15 and increasing by $10-17 for the top two income quintiles.

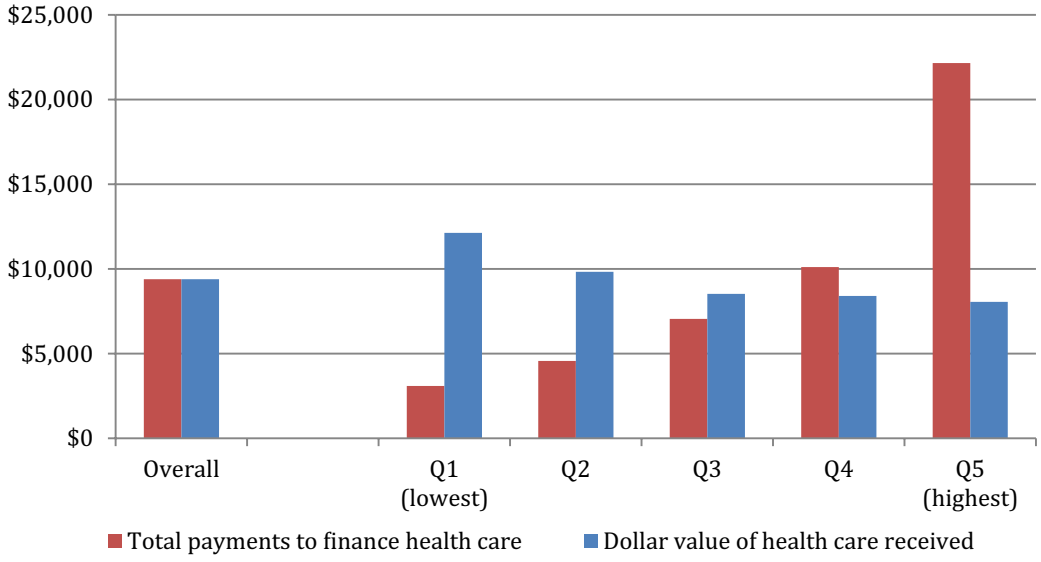

FIGURE 2 Per Capita Payments to Finance Health Care and Dollar Value of Health Care Received, Overall and by Income Quintile, 2015 [Color figure can be viewed at wileyonlinelibrary.com]
Note: The payments to finance health care are the sum of out-of-pocket, premium, tax, and other payments. The dollar value of health care received reflects national health expenditures, excluding other non-durable medical products (non-prescription drugs and medical sundries) and other private revenues (philanthropy and income from gift shops, cafeterias, parking lots, educational programs, and investment income for institutions such as hospitals, nursing homes, and home health agencies).
Source: Authors' analysis.

5 | DISCUSSION

Redistribution is at the heart of publicly financed health care and of health insurance. However, health care financing flows are complex. Understanding how different groups contribute to and benefit from health care spending is difficult for researchers and the general public. In this paper, we bring to together data to unmask the flow of payments and spending to provide not only a better accounting of burden imposed by the high costs of health care but also to highlight the redistribution inherent in the system.

Much of the burden associated with health care financing is hidden. Those who receive insurance through their employers may not know how much their employer contributes to insurance premiums. Similarly, the tax burden of health care spending is similarly difficult for the general public to observe, as health care is only a portion of government spending.

Similar to previous work in this area, with the exception of Jacobs and Selden, we find that overall health care payments as a share of income are regressive. We find a greater degree of regressivity than found in previous research. This is driven in part by our inclusion of institutionalized populations. We find that including health care spending for institutionalized populations results in a largerburden on individuals in the lowest income quintile. Although the majority of people in the lowest income quintile are not institutions, for those who are, out-of-pocket costs are substantial relative to income. This high cost borne by even on a small proportion of the population considerably increases the regressivity of the health care payments. While for many in this group, the costs may be temporary, being paid only for a short period of time before the individual qualifies for Medicaid, it nevertheless has a large impact on the total payments borne by individuals in the in the lowest income groups.

Several types of redistribution are built into the financing of health care in America, and indeed into any tax-financed system or insurance market. First, there is redistribution across phases of life, with working age adults contributing more than older adults, in part because Medicare covers the vast majority of individuals over the age of 65. Second, there is redistribution from the rich to the poor, largely due to the progressive nature of the tax system in the United States. Finally, there is redistribution from the healthy to the sick; this redistribution is fundamentally always a part of health insurance that is designed to protect individuals from the financial shocks associated with illness. Our analysis takes the perspective of a single point in time; however, there may also be implications over the life cycle, as those whole have more financial resources tend to live longer, and may not only make greater contributions, but also receive Medicare benefits for a longer period of time.

In order to have evidence-based, productive discussions of health care reforms and health equity, it is important to have a baseline understanding of the current financing system and the inherent redistribution. Current interest in proposals for health care reform

include financing changes that would alter who pays for care, potentially in small ways with incremental changes to the ACA or dramatic ways with expansive reforms such as Medicare for All. If the current patterns of progressivity of tax payments to health care and regressivity of premiums and out-of-pocket payments were maintained, moving toward more tax-financed programs would shift the burden of health care payments from lower-income to higher-income households, whereas moving toward more privately paid health care would shift the burden from higher-income to lower-income households. A complete picture of the current financing system provides context to understand how these policy changes would impact the overall burden of health care costs, redistribution, and specific segments of the population.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

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