HEALTH CARE USA:
A Cancer on the American Dream

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I. Abstract

The widely reported waning of the American Dream has been blamed on a litany of economic and cultural currents, but the cost of the U.S. health care system rarely makes the list. The U.S. spends at least 7 percent more of its GDP on health care than other rich countries, on average, leaving us with less to spend on infrastructure and defense, houses and education, and other worthwhile governmental and personal pursuits. And we have little to show for it, as the U.S. lags most other rich countries on many key health measures, including longevity. This analysis shows how since the 1980s, the cost growth of employer-provided health benefits has been shrinking workers' wage growth, eroding their retirement benefits and becoming an increasingly important factor in growing income inequality. While the losses have been most painful for those across the bottom 60 percent of the earnings distribution, higher earners have not escaped the damage, especially when factoring in the total cost of employer-provided health insurance. The latter part of the analysis explores how the organization and delivery of health services in the U.S. sustain our abnormally high health costs, often without improving our health, and suggests several practical solutions that can both bring costs down and encourage evidence-based best practices. Failure to stanch the rising flow of compensation dollars into health benefits will close the door on the American Dream for an ever-increasing share of U.S. workers.

II. Introduction

James Truslow Adams is often cited as having coined the phrase "The American Dream" which he described as the "dream of a land in which life should be better and richer and fuller for everyone, with opportunity for each according to ability or achievement." Over the years, the American Dream has generally been interpreted as the ability to advance up the economic ladder and help your children climb even higher. But Adams' notion of the dream was broader: "It is not a dream of motor cars and high wages *merely* [italics added], but a dream of social order in which each man and each woman shall be able to attain to the fullest stature of which they are innately capable, and be recognized by others for what they are, regardless of fortuitous circumstances of birth or position." (Adams, 1931, p. 404).

Robert Shiller argues that the modern characterization of the American Dream as the unbounded opportunity for economic advancement has displaced Adams' inclusion of the quest for a just society (Shiller, 2017). But Adams' vision is in keeping with Martin Luther King's articulation of the American Dream—"a dream of equality of opportunity," where African Americans could enjoy the simple things their white brethren took for granted—sit in any seat on a bus, drink at any water fountain, sit at any lunch counter. Even more important, however, it was a dream of living a better life: attending good schools, having equal access to good jobs, living in safe communities, being treated equally under the law and participating freely in all the other inalienable rights in a society where all men are created equal (Cullen, 2003). Cullen contends that there is not simply one American Dream but an endless list of aspirations by people seeking to escape limitations imposed by race, nationality, creed, political affiliations, sexual orientation or other characteristics.

In an era of gated communities with streets lined with McMansions, some might argue that the American Dream has become overly materialistic. But all these dreams of equality include an element of economic opportunity, so that everyone—black or white, Muslim, Christian or Jew, conservative or liberal, gay or straight—has the same chance to work toward a better life. For most Americans, the dream is to reap at least modest economic gains over their own lifetime and bequeath even greater opportunities to the next generation. Adams' American Dream was not an aspiration of "high wages merely," but the realization of higher wages is not a trivial matter in the pursuit of a better life. Recently, a Hamilton Project policy forum overview asserted that the answer to "One simple question—Are wages rising?—is as central to the health of our democracy as it is to the health of our economy." Without the ability to "live in good homes, support their families, to retire comfortably, and to see their children do better—what we call the American Dream—simply cannot be realized." (Shambaugh and Nunn, 2018).

There has been considerable public angst of late that the American Dream has moved beyond the grasp of many Americans. A succinct quantification of the concern comes from Chetty et al. (2017), who compared incomes at age 30 of U.S.-born workers in the 1940-to-1984 birth cohorts to their parents' incomes at roughly the same age. Ninety-two percent of Americans born in 1940 had higher incomes at age 30 than their parents at the same age, but only half of those born in 1980 outearned their parents at age 30. Chetty and his colleagues estimated that about 30 percent of the difference in upward income mobility between the two cohorts reflects slower GDP growth rates, while roughly 70 percent is attributable to burgeoning income inequality.

If the concentration of income among high earners is pushing the American Dream out of reach, it is important to understand why this is happening. Some theorize that changing social mores and public policies are the primary drivers of income dispersion in the United States. Smith (2012) has articulated a theory that, since the 1970s, business managers have shifted from balancing the interests of workers, customers, communities and stockholders to a singular concentration on maximizing shareholder returns. Reich (2015) cites the transformation of the political and economic systems since the 1970s in delivering

disproportionate economic gains to the wealthiest members of our society. Economic explanations are based on evidence that computer technology has reduced demand for workers performing less technical or repetitive functions, such as assembly, calculations and sorting, and has enhanced demand for workers who perform design, analytic and other abstract work.[1] Globalization has shifted lower-skill jobs in manufacturing and services from the United States to lower-wage economies, leaving less well-educated American workers to struggle with job losses and wage reductions (Levy and Murnane, 2006; Ebenstein et al., 2014; and Moncarz, Wolf and Wright, 2008). As former middle earners lost jobs due to technology and globalization, many were pushed into lower-skilled and lower-paying employment, while workers with more education were able to forge ahead in technical and other specialized careers.

Compensation is the reward paid to workers for their efforts, and continually rising compensation builds prosperity over time. But compensation includes more than take-home pay. It also includes the employer's share of payroll taxes, contributions to retirement plans and health insurance premiums. The reason we characterized health care as a "cancer" in the title is that health care premiums have been encroaching on compensation growth, leaving employees with less in their paychecks. It is the amount workers take home that determines whether they get ahead (or even keep up) over time.

Cancer occurs when certain cells form where they are not needed. As this process continues, the mass of new, unnecessary cells starts encroaching on nearby organs, blood vessels or nerves, interfering with their normal functions. U.S. employers' health care costs started small—in 1950, health care amounted to only 0.5 percent of total compensation. But premiums rose 3.1 times faster than total compensation in the 1950s and over twice as fast in the 1960s. Over the next 40 years, health plan costs grew 3.4 times faster than compensation in the 1970s, 2.1 times faster in the 1980s and 1.2 times faster in the 1990s. By the first decade of the new millennium, health care costs were again increasing 3.4 times faster than compensation. This analysis shows that the escalation of employers' health premiums is now consuming all compensation growth for many workers, leaving nothing to add to their paychecks—what should be their ticket for the ride to the American Dream.

Each year the Centers for Medicare and Medicaid Services (CMS) release data on health care spending in the United States (CMS, 2017), generally coupled with a professional summary of the results. For example, after the release of historical data running through 2016 by CMS, Hartman et al. (2018)[2] wrote: "Total nominal US health care spending increased 4.3 percent and reached $3.3 trillion in 2016; per capita spending on health care increased by $354, reaching $10,348.[3] The share of gross domestic product devoted to health care spending was 17.9 percent in 2016, up from 17.7 percent in 2015." The summary explained some of the reasons behind the higher costs in 2016. The annual release of the data by CMS and accompanying summary description in *Health Affairs* are commonly reported by the news media (e.g., Sahadi, 2016).

The national statistics on health care expenditures are used by economists tracking macroeconomic activity, analysts assessing government budgets and spending, health care policymakers and others. But the data have little meaning for the typical couple sitting at their dinner table trying to understand why they are losing economic ground. They know that their health premiums have been rising for some time, often by more than their paychecks, and they are painfully aware of higher out-of-pocket costs for treatment of their kids' ear infections, minor injuries and the like. Families with a member who has potentially deadly allergies or diabetes see the costs of their prescriptions also rising, sometimes at a dizzying pace. While the news media might report these developments, there has been little to

1 Autor, Levy and Murnane (2003) cite a significant body of economic research indicating that the adoption of computer technology in recent decades has led to the increased demand for college-educated workers and the growth of their wages relative to those with less education.

2 While the publication date is 2018, this issue of *Health Affairs* was released in December 2017.

3 The $354 increase represented a 3.5 percent increase in per capita health spending from 2015 to 2016.

no probing into how these higher costs fit into the larger story of stagnant wages and growing income inequality.

The next section of the discussion begins by comparing health expenditures since 1970 in the United States with those in other developed countries. The United States has diverted more than an extra 5 percent of GDP to health care than the comparison countries, on average, and 7 percent more than Canada, so these countries have an extra 5 percent to 7 percent of GDP to spend where they like. While it might seem counterintuitive, our health outcomes are measurably worse than those in other counties by several standards. So, we are spending more but receiving less in the way of good health. As more money is siphoned into health spending, fewer resources are left for meeting basic needs, and people feel their standards of living stagnating or sliding backward.

In the fourth section, we estimate how rising employer-paid health insurance premiums have reshuffled compensation and net pay delivered to workers since 1980. These costs are part of workers' compensation, and to the extent employers' premium costs outpace compensation growth, they reduce the amount of workers' paychecks. This analysis splits the workforce into 10 equal groups based on earnings and shows the effects decade-by-decade for the 1980s, 1990s, 2000s and from 2010 through 2015. The results show that rising health care premiums over the past 35 years have played a major role in wage stagnation, with the burden heaviest for lower earners covered by employer-sponsored health benefits.

The fifth section introduces employee health insurance premiums to the analysis. These premiums are paid directly by workers, reflected as reductions in gross pay reported on pay stubs. This breakdown shows that health insurance premiums have often grown more rapidly than compensation, meaning that while workers' gross "rewards" might have grown, their paychecks have not kept up. For example, for a married worker whose earnings fall between the 50th and 60th percentile of the earnings distribution, compensation (after deducting the employer cost of retirement benefits and payroll taxes) rose by about $4.00 per hour or $8,000 per year between 1999 and 2015 (in 2015 dollars). After accounting for employers' and employees' share of health care premiums, net disposable pay for workers with family coverage under their employer's plan declined by $0.80 per hour or $1,600 per year in 2015 dollars. For many workers, growing health insurance costs are blocking their path to the American Dream.

The sixth section of the analysis considers how growing health care costs have reduced parity in the distribution of disposable wages. Consider two workers at the same company who earn pre-health-care compensation of $50,000 and $125,000, both with family coverage under the employer plan. In 2017, employer premiums for family coverage averaged around $13,000 and employee premiums averaged roughly $5,700, for a combined total of $18,700. After subtracting $18,700 from their pre-health-care compensation, their post-health-care disposable wages are $31,300 and $106,300, respectively.

Next, assume that both these workers received a 2 percent raise in early 2018, bumping up the first worker's compensation by $1,000 and the second worker's by $2,500, bringing their respective rewards before health premiums are paid to $51,000 and $127,500. Meanwhile, the employer's health premiums rose to $13,650 and the employee's premium to $5,985 for a total of $19,635. After deducting the health premiums, these two workers' net disposable earnings are now $31,365 and $107,865. So, the net increase to disposable wages is $65 for the lower earner and $1,565 for the higher earner. Before factoring in health care premiums, the higher earner's raise was 2.5 times that of the lower earner's—i.e., $2,500 ÷ $1,000—but after deducting health costs, the higher earner took home an increase in net-disposable wages that was 24.1 times as much as the lower earner—i.e., $1,565 ÷ $65. The net wage increases after the increases in health insurance premiums favor higher

earners and, over time, exacerbate the skewing of disposable earnings toward those who earn more. Growing health premiums have played a significant and increasing role in skewing net earnings toward higher earners.

We did not focus on the extent to which this phenomenon shifted net wages from workers in the bottom three earnings deciles to higher earners because of considerable declines in employer-sponsored health coverage for lower-earning workers from 1999 through 2015, especially after enactment of the Affordable Care Act, a.k.a. Obamacare. For many workers who lost employer health coverage, their direct out-of-pocket health costs—buying health insurance or consuming health services—made things even worse than continuing under the employer's health plan. But we simply did not have the data to sort out those effects. For middle earners—from the 30th to the 70th percentiles of the earnings distribution—we estimated that a quarter to a third of the recent shift in aggregate disposable earnings from these groups to the top decile is attributable to the higher costs of participation in their employer-sponsored health plans. Health costs are also keeping many workers in the broad middle class from achieving the American Dream, and the barriers will only get higher unless excessive health cost inflation can be reined in.

The seventh section of the analysis shifts from a micro to a macro view of how the high cost of the U.S. health system affects everything else. Many health care dollars are from the coffers of federal and state governments. Spending 7 percent or 8 percent more of our GDP on health expenditures than other developed economies limits the resources available for infrastructure, education and other functions of government.

In the eighth section, we examine some of the major factors behind health care costs growth and some nascent solutions. We begin by summarizing the growing consolidation of health care services and its effects on the prices consumers pay. We compare the approaches and effects of government responses to this phenomenon with those in the private sector. The drug markets are explored separately because their concentration arises from somewhat different forces, including the regulatory approval process and protections under patent laws and their ramifications. The remainder of this section focuses on practice patterns and the delivery of health services. Most health spending is concentrated on a small segment of the consumer population, yet the management of service delivery to high-cost consumers is woefully inadequate, with a tremendous waste of resources caused by the lack of coordinated care. Then there are some areas, such as childbirth, where the huge volume of service delivery calls for effective and efficient management, but again, current practices are woefully inefficient and often harmful to boot. For decades, the U.S. health delivery system has been badly served by inadequate efficacy trials, which has resulted in widespread utilization of products and procedures that are ineffective or worse. In the latter part of this section, we briefly describe some evolving models to rationalize care delivery with the potential to improve the health of high-cost patients, even those with multiple chronic conditions, on a more holistic and cost-effective basis.

The final section discusses the analysis in the earlier sections in the framework of a 1975 description of problems with the U.S. health care system. We use this framework for three reasons. First, it describes major systemic and structural problems that have thus far gone unaddressed. Second, that analysis recognized nearly a half century ago that the organization of our health system lent itself to widespread utilization of ineffective and inefficient practices, resulting in adverse health risks to individual patients and threatening the welfare of the larger society. Third, the summary of the state of affairs in 1975 serves as a practice baseline for this analysis showing that our excessive health costs have imposed and are imposing a tremendous deadweight burden on workers, blocking their ability to get ahead. This section lays out, in general terms, some options for addressing the problems that were documented throughout the earlier sections.

III. A Comparison of Health Care Spending between the U.S. and Other Countries

The OECD recently estimated that the United States spent nearly 2.5 times the average outlay of its 35 members on health care in 2016. But this estimate includes several Eastern European nations—Czech Republic, Estonia, Hungary, Latvia, Poland, Slovakia and Slovenia—as well as Chile, Mexico and Turkey, where spending was less than half the OECD average. But the United States stands alone even when compared to other high-income countries. In 2016, we spent about 80 percent more per capita on health care than Germany, and more than twice as much as Canada, France and Japan (OECD, 2017, pp. 132-133).

To a certain extent, we spend more on health care than many other countries because we are relatively richer. According to empirical studies, there is a positive relationship between income levels and health spending. In the late 1990s, an analysis across 191 member countries in the World Health Organization linked a 1 percent difference in national income level to a 1.2 percent difference in health spending (Poullier, 2002, p. 6). A more recent analysis across 184 countries associated higher health care spending from 1995 through 2004 with higher GDP per capita (Dieleman et al., 2017, pp. 2014-2020).

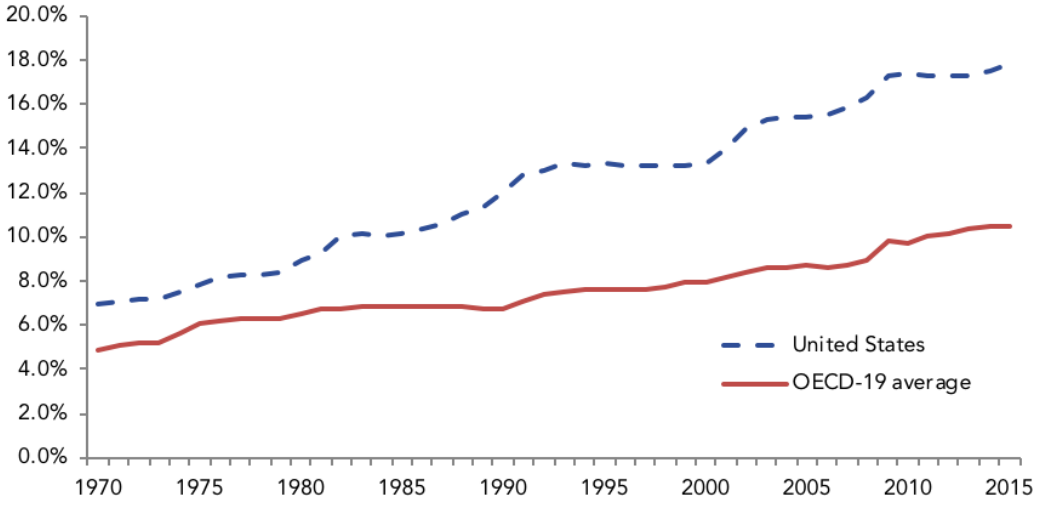
To ensure a fair comparison between health spending in the United States versus spending in other OECD countries, we eliminated those with lower levels of per capita income.[4] Italy and Israel were also excluded because of insufficient data back to 1970. This left 19 other OECD-member countries[5] to compare to the United States. According to the OECD data, in 2015, U.S. GDP per capita was $56,420, while the other 19 countries averaged $50,955 (the average in the 15 countries not included was $28,897).

The solid line in *Figure 1* shows the average of the 19 OECD comparison countries' share of GDP spent on health care annually from 1970 through 2015; the dashed line shows comparable spending in the United States. The annual averages for the 19 countries were derived by weighting spending in a country by its population (averages calculated by weighting annual spending by GDP were virtually identical). In 1970, U.S. health spending was 2.1 percent more of GDP than the comparison countries average. This differential climbed to 7.6 percent by 2009 and, after leveling off somewhat after 2010, was back up to 7.4 percent in 2015.

4 The countries not included were Chile, Czech Republic, Estonia, Greece, Hungary, Korea, Latvia, Mexico, Poland, Portugal, Slovakia, Slovenia and Turkey.

5 These included Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Japan, Luxembourg, Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland and the United Kingdom.

Figure 1. Average percentage of GDP spent on health care in 19 OECD countries and the United States, 1970–2015



Source: OECD Statistics on Health Expenditures and Financing, Current Expenditures on Health Care as a Percentage of GDP, found on 11 December 2017, at: http://stats.oecd.org/index.aspx?DataSetCode=SHA#.

There are two ways of looking at these results. First, in 2015, we spent nearly 7.5 percent more of our national output on health care than similarly developed countries. Alternatively, from the baseline perspective of 1970, we diverted an additional 5.3 percent of our GDP to health care expenditures in 2015 compared to the 19 developed economies (on average). From either perspective, we are allocating a significant share of our productivity to health care goods and services, money that people in other countries have available for infrastructure, education and other valuable pursuits.

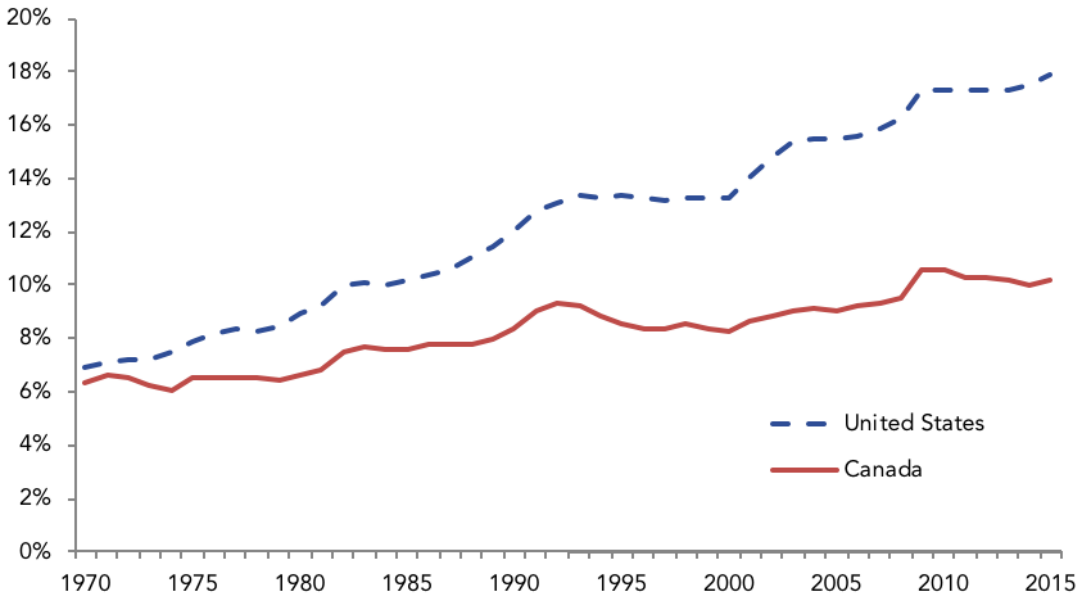
A comparison of the United States with Canada alone is probably more interesting than the comparison with the larger group because of the two countries' geographic proximity, common age structure and demographic diversity. *Figure 2* presents a direct comparison of health expenditures as a percentage of GDP between Canada and the United States, and the dichotomy is even more pronounced than that in the larger comparison. In 1970, the two countries' health expenditures as a percentage of GDP were within a half percentage point of each other; by 2015, the gap had widened to 7.8 percentage points. Over the 45-year period, the United States diverted an extra 7.3 percent of its GDP to health spending.

These evolving patterns of health expenditures are presented in terms of GDP. Converting the results to dollars may be more illuminating. *Figure 1* showed that the United States diverted an additional 5.3 percent of GDP to health expenditures between 1970 and 2015 relative to the 19 comparison countries. In 2015, U.S. GDP was $18.1 trillion, so 5.3 percent of GDP was $960.4 billion. *Figure 2* shows that, between 1970 and 2015, the United States diverted an extra 7.3 percent of GDP to health expenditures relative to Canada. In 2015, 7.3 percent of U.S. GDP was $1.3 trillion.

The additional hundreds of billions of dollars spent by the United States is only for one year. In 1970, the U.S. spent 0.5 percent more of its GDP on health care than Canada. If we had maintained that 0.5 percent differential in health spending from 1970 through 2015, we would have saved a cumulative $22.2 trillion (in 2015 dollars) on health care over the intervening

45 years. And that total is just a straight accumulation of past differences in health care spending. Accumulating the differences with interest at 10-year government bond rates would bring the disparity between hypothetical and actual U.S. health care spending up to $30.5 trillion by year-end 2015. So, on a cumulative basis from 1970 through 2015, the additional spending by the United States versus Canada was somewhere between 1.25 and 1.67 times GDP in 2015. In other words, we have spent an extra year to a year-and-a-half of our total national productivity on health care compared to Canada and it is arguable that we have gotten little in return.

Figure 2. Percentage of GDP spent on health care in Canada and the United States, 1970 – 2015



Sources: Canadian Institute of Health Information, "National Health Expenditure Trends, 1975-2017: Table A.1, Summary of Total Health Expenditure," found on 12 December 2017, at: https://www.cihi.ca/en/access-data-reports/results?query=Table+A.1+Summary+of+total+health+expenditure%2C+Canada%2C+1975+to+2016&Search+Submit=. Data were extended from 1975 back to 1970 using OECD Statistics on Health Expenditures and Financing, Current Expenditures on Health Care as a Percentage of GDP, found on 11 December 2017, at: http://stats.oecd.org/index.aspx?DataSetCode=SHA#.

One would think that spending so much more than other countries on health care would give Americans broader access and more health services, but the data show a different reality. In 2005, the 19 OECD comparison countries had an average of 35 percent more medical doctors per 1,000 people than the United States, where doctors were 60 percent more likely to be in specialty practice. On average, the number of doctor visits per person was 59 percent higher in the comparison countries than in the United States, and their doctors saw 20 percent more patients per year than U.S. doctors. The 19 countries averaged 76 percent more hospital beds per 1,000 people than the United States, and the average occupancy rates of acute care beds in the other countries were 28 percent higher than in U.S. hospitals (OECD, 2017).

The United States is also an outlier in the delivery of health services. The prevalence of MRI exams per 100,000 people was 55 percent higher in the United States than in the OECD comparison countries (that reported data), and the prevalence of CT exams was 72 percent higher.[6] Hip

6 Japan, New Zealand, Norway and Sweden did not report this information.

replacements were performed at similar rates: 204 cases per 100,000 people in the United States compared to 214 cases in the other countries. Cesarean-section rates were 35 percent higher in the United States than in the 18 other countries for which there were data.[7] In Finland, Iceland, the Netherlands and Sweden, cesareans were performed at roughly half the U.S. rate. Hospitalization rates were an average 24 percent higher in the comparison countries and, on average, the length of stay was 35 percent longer for normal child deliveries and 16 percent longer for acute myocardial infarction. The United States spent more than twice as much as other countries on drugs per capita: $1,162 versus $552 (OECD, 2017).

Canada had slightly more doctors than the United States per 100,000 population—2.7 versus 2.6—but the U.S. rate of specialization was 66 percent higher than for our northern counterpart. Canadians visited their doctors nearly twice as often as U.S. residents visited theirs, and Canadian doctors conducted an average of 86 percent more consults per year than doctors in the United States. Canada had 7 percent fewer hospital beds, but the occupancy rate of acute care beds was 46 percent higher than in U.S. hospitals. Controlling for population, U.S. residents had 112 percent more MRI exams, 61 percent more CT exams, 31 percent more hip replacements, 27 percent more knee replacements and 4 percent more C-sections than Canadians. Canadians were 50 percent more likely to have spent some time in the hospital, but their hospital stays for normal birth deliveries and acute myocardial infarction were slightly shorter (OECD, 2017).

One important measure of health advances is longer life expectancies. At the end of the Civil War, life expectancy at birth was around 45 compared to nearly 80 today. Many public health advances—improved water and sanitation systems, refrigeration, and regulation of food handling and packaging—were all major contributors. Improved health delivery methods, imaging capabilities, and new vaccines and medicines all played major roles. Longevity advances were tremendous in the early years of the 20th century and the gains continued into the new millennium. Over the last 30 years, U.S. life expectancy at birth rose from 73.7 in 1980 to 75.3 in 1990, 76.7 in 2000 and 78.6 in 2010 (OECD, 2017). After that, we have seemingly hit a barrier. U.S. life expectancy inched up to 78.9 by 2014 and then declined in 2015 and 2016 (Kochanek et al., 2017). The last two-year drop in life expectancy was over 50 years ago: 1962 and 1963 (OECD, 2017).

U.S. life expectancy has lagged behind many other developed countries in recent decades. Americans born in 1980 could expect to live 0.8 fewer years than people in the 19-country comparison group and 1.6 years less than their Canadian counterparts. By 2000, Americans, on average, were living 1.9 years less than the OECD average and 2.3 years less than Canadians. By 2015, the United States was 3.2 years behind the OECD-comparison countries and 3.3 years behind Canada. The massively higher U.S. expenditures for health care have certainly not delivered commensurate longevity gains. Moreover, the additional outlays for our health care are also threatening the economic health of large segments of the U.S. workforce and their families.

7 Japan did not report this information.

IV. Accounting for Workers' Health Costs

Summaries of health care costs in trillions of dollars or percentages of GDP are national macro concepts, but the real impact of health spending occurs at the micro level—for people and households.

> *The Piraha tribe is a group living in the jungles of South America. They are well known because they do not have a way to count past two. Studies have shown that the tribe members cannot tell the difference between a pile of eight rocks and twelve rocks. They have no number words to distinguish between these two numbers. Anything more than two is a "big number."*
>
> *Most of us are similar to the Piraha tribe.*
>
> *We may be able to count past two, but there comes a point where we lose our grasp of numbers. When the numbers get big enough, intuition is gone and all we can say is that a number is "really big." In English the words "million" and "billion" differ by only one letter, yet that letter means that one of the words signifies something that is a thousand times larger than the other.*
>
> *Do we really know how big these numbers are? The trick to thinking about large numbers is to relate them to something that is meaningful. How big is a trillion? Unless we've thought of some concrete ways to picture this number in relation to a billion, all that we can say is, "A billion is big and a trillion is even bigger" (Taylor, 2017).*

The Introduction cited an article in *Health Affairs* that distilled U.S. health expenditures to a more relatable number: $10,348 per person in 2016, but this amount does not capture the economic ramifications for individuals and families. And dividing total health expenditures ($3.3 trillion) by U.S. population (322 million) doesn't convey how excessive national health expenditures play out at the personal or family level.

Simple multiplication of 2016 per capita health expenditures suggests a family of four would have had average expenditures of around $41,400, but few families spend anywhere close to that much in a year. For most people, last year's health care spending might have included their premiums for the employer health plan plus out-of-pocket spending for illnesses or injuries. To complicate matters, the vast majority of working-age people get health insurance through their employers, who typically pay some portion of the premiums, which is likely not obvious to workers. But employers' contributions to their health coverage are not "free" to the worker. To understand this, it is important to quantify the costs of the benefits and their implications.

If you ask someone how much they are paid, assuming they are willing to tell you, they will typically divulge either their hourly rate or annual salary. But from the employer's perspective, wages or salaries are only one piece of the total compensation package. The other parts of the package include health benefits, payroll taxes (Social Security and Medicare), retirement benefits, unemployment insurance, workers' compensation, and sometimes life insurance, dental insurance and other relatively incidental benefits.[8]

8 When employers summarize the benefits they provide workers, they typically include paid vacation and sick leave. These are different in that the cost of the benefits is embedded in workers' pay. Workers receive a paycheck for time taken as paid leave and it shows up as annual pay on their summary tax forms at the end of the year, so they count it as part of their wages or salary. Employer contributions for social insurance and other benefits do not show up on either the paycheck or the tax forms.

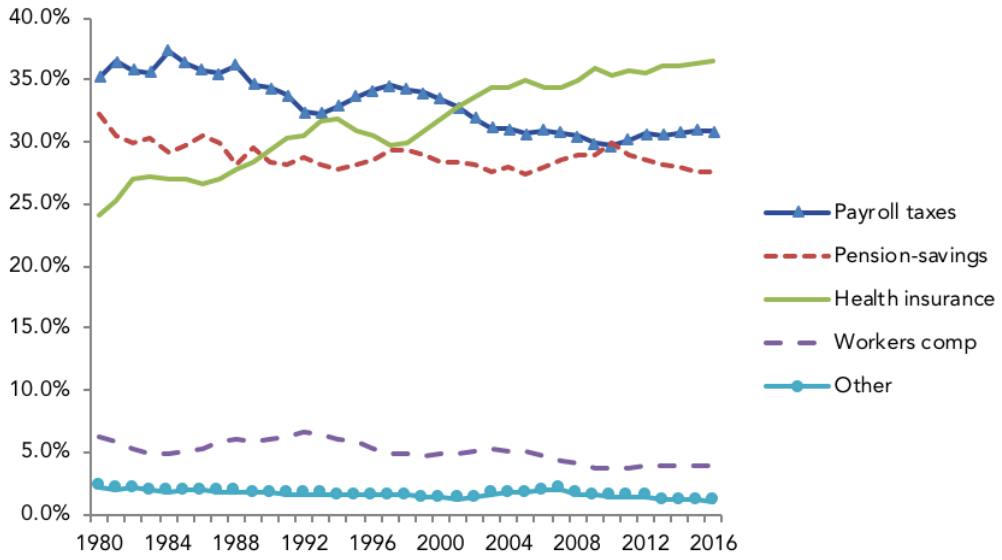
The fact that an employer pays some share of health insurance or retirement savings, or reimburses the IRS for the "employer's portion" of the payroll tax may imply that the employer shoulders this financial burden. But these costs directly relate to individual workers' employment, and their productivity must cover these costs or their jobs will be eliminated. As the marginal cost of one element of compensation increases, the additional expense must be made up elsewhere, either with higher productivity from workers or a reduction to another element of the compensation package. If the cost of health benefits rises faster than workers' productivity, then wages, retirement contributions or some combination of benefits will suffer accordingly.

These adjustments do not happen instantaneously. Reducing workers nominal wages immediately would be disruptive to the work environment and productivity, but limiting wage growth accomplishes the same thing over time. Given the long historical trend in premium increases, employers can anticipate future costs fairly accurately and so can make equivalent downward adjustments to salaries or other benefits. Requiring employees to work more hours rather than hiring more workers reduces the number of health plan participants relative to total hours of work. Where premium increases are large relative to compensation for lower earners, entire classes of jobs can be contracted out to firms with less generous wage and benefit packages. Employers can eliminate positions that are no longer economically viable.

There have been many economic analyses to determine who incurs the costs of the employers' share of payroll taxes, retirement plan contributions and health benefits. Most economists agree that these costs are ultimately borne by workers. Specifically related to health benefits, Cutler and Madrian (1998) studied the period from 1979 through 1992, when health benefit costs rose faster than other benefit costs (*Figure 3*), and found that workers covered by health benefits worked an additional 40 to 45 minutes per week relative to uncovered workers. Sommers (2005) analyzed the relationship between health insurance coverage and labor market outcomes during 2000. He found that workers covered by employer health insurance were more likely to be unemployed a year later, and that wage growth was slower for workers in areas with higher health cost inflation than for those in areas with lower inflation. Baicker and Chandra (2005) estimated that a 10 percent increase in health insurance premiums reduced the probability of employment by 1.6 percent and increased the chances of a wage cut by 2.3 percent.

The Bureau of Economic Analysis estimates annual aggregate compensation and several of its major components. Benefit costs comprised 15 percent of compensation in 1980, 20 percent by 2010, and then dropped back to 19 percent in 2015 and 2016. *Figure 3* shows the relative distribution of employer-financed benefit costs from 1980 through 2016. The big three are social insurance payroll taxes, employer-sponsored retirement benefits and health insurance. The cost of the workers' compensation program has remained about 5 percent of total benefit costs over most of the period, and other benefits are relatively insignificant. Health benefits comprised 24 percent of employers' total benefit costs in 1980 and reached nearly 37 percent in 2016. They are large and growing, and are a major factor behind the larger share of compensation consumed by benefit costs.

Figure 3. Relative shares of employer contributions to specific employee benefit programs, 1980–2016



Source: Derived by the author from the *National Income and Product Accounts*, Tables 6.10B, 6.10C and 6.10D and 6.11A.

Benefits average roughly 20 percent of compensation across the workforce, but the cost varies significantly for individual workers, even those working for the same employer. Variations in the cost of payroll taxes largely result from the cap on earnings subject to the payroll tax. In 2016, for example, employers paid 6.2 percent of workers' earnings up to $118,500 for payroll taxes, while higher earnings were exempt. Employers also had to pay 1.45 percent of workers' earnings toward Medicare costs in 2016. On a salary of $118,500, the employers paid $7,347.00 for Social Security and $1,718.25 for Medicare. On a salary of $200,000, Social Security taxes remained the same, but the Medicare obligation rose to $2,900.00 for a total of $10,247.00 or 5.12 percent of the worker's total earnings. On a salary of $300,000, the employer's payroll tax rate dropped to 3.9 percent of the worker's wages.

Employers' retirement plan costs also vary across the earnings spectrum. The capping of contributions for high earners has somewhat the same effect as the Social Security cap. More important, participation in defined contribution plans is largely voluntary, and higher earners are more likely both to participate and to contribute more than lower earners.

While the cost of health benefits might be fairly uniform for employers, it varies widely as a percentage of employees' compensation. For example, assume the employer pays $10,000 for health insurance benefits for three 30-year-old workers being paid total compensation of $40,000, $80,000 and $120,000. The insurance equals 25 percent of the lower earner's compensation compared with 12.5 percent for the middle earner ($80,000) and 8.25 percent for the high earner ($120,000). For companies that offer multiple plans, sorting out the effects of plan choice on the distribution of costs is more complicated, but cheaper plans have higher deductibles and copayments than more expensive ones. It is not easy for workers to escape the hard arithmetic of rising health care costs but the burden is greater for some than others.

Nyce and Schieber (2009 and 2011) developed an analytical framework they used to distribute compensation and benefit costs across the U.S. workforce segmented by earnings deciles[9] using data from the U.S. Census Bureau's *Annual Social and Economic Supplement* (ASEC) to the *Current Population Survey* (CPS). The CPS collects information from a representative sample of U.S. households and is the basis for monthly estimates of workforce size and employment and unemployment levels. Each March, the ASEC gathers detailed information from participating households on the demographic makeup of household members, their sources and levels of income, whether each member of the household 16 or older worked last year and, if so, the number of weeks worked and average hours per week. Those who worked in the prior year are asked whether they were covered by health and retirement benefit plans and, if so, whether they participated. Health plan participants were also asked who else in the household was covered under the plan.

In their 2009 analysis, Nyce and Schieber used the CPS-ASEC files from 1981 through 2008 covering income years 1980 through 2007. The 2011 analysis included 2009 and 2010. In both studies, the authors estimated compensation paid out in the form of health benefits based on employer size, whether the individual participated in their employer's health plan and whether they had individual, couple or family coverage. Employers' payroll taxes for Social Security and Medicare were based on workers' reported earnings and the contribution rates stipulated in law. Employers' contributions to retirement plans were based on plan type, and workers' ages and salary levels. The essence of the model is that total compensation and its growth are constrained by productivity. Payroll taxes are compulsory, but employers manipulate health benefits, retirement benefits and wages within the limits of the productivity constraints. The aggregate allocation of benefit values was constrained by the level of annual benefits reported in the Bureau of Economic Analysis' *National Income and Product Accounts* (NIPA).[10]

Nyce and Schieber's earlier estimation of the distribution of compensation and benefits costs was updated and serves as the basis for the analysis below. Workers' hourly pay is estimated from CPS reports of pay amounts and basis (hourly, weekly or other), and average hours per week from 1980 through 2015. Reported wages are used to impute benefits to individual workers, and hourly wages and benefits are summed to estimate total hourly compensation. The distribution of total compensation varies considerably from the distribution of wages because of the cap on payroll-tax-eligible earnings, differences in coverage under employer-sponsored retirement and health plans, and variations in the generosity of plans and worker participation at different pay levels.

Figure 4 compares the relationship between average compensation and benefits estimated for this analysis with the average of compensation to benefits from the NIPA data series described earlier and from modified estimates of compensation and benefits published regularly by the Bureau of Labor Statistics (based on the employer surveys used to develop the quarterly BLS Employment Cost Index). The analysis of benefits presented in the figure considers only employers' contributions for payroll taxes, health insurance and retirement plans.

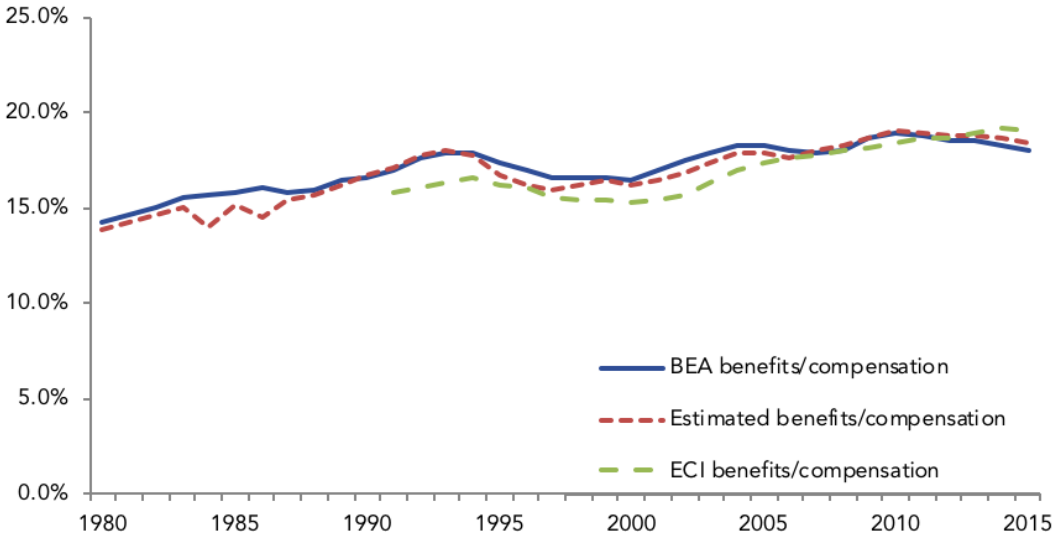
The estimate of the share of compensation paid out in the form of benefits by the Bureau of Economic Analysis (BEA in the figure) in its NIPA estimates does not include employer-provided life insurance, workers' compensation and supplemental unemployment benefits to remain consistent with the estimates using the CPS. For the estimates of benefit costs used in developing the Employment

9 The first nine deciles each represent one-tenth of the workforce. The tenth decile includes only the top 9 percent of the workforce by earnings level. The top 1 percent of earners are not included because the analysis relied on U.S. Census data and these individuals' reported earnings are "top coded" in the data files released to the public to avoid possible public identification of the respondents to the Census surveys.

10 Employer costs for unemployment insurance, workers' compensation and life insurance were not estimated and allocated because their value was not material compared to the costs of the three major forms of benefits incorporated and would have had little practical effect on the results if included.

Cost Index (ECI in the figure), the Bureau of Labor Statistics considers a much wider range of benefits than does this analysis. The two major categories included in their estimates that are excluded from this analysis are paid leave and supplemental pay. The first includes vacation, holiday, sick and other leave such as personal leave; and the second includes premium pay, shift differentials and nonproduction bonuses. These amounts are accounted for in the CPS when workers report their wages for the prior year. Cash payments from employers show up in family income levels, distributions and so forth when they are made.

Figure 4. Estimated ratio of employers' average hourly benefits costs to average hourly compensation, 1980–2015



Sources: Department of Commerce, *National Income and Product Accounts*, GDP and Personal Income Tables 6.2 (compensation), 6.9 (hours), 6.10 (Social Security and Medicare) and 6.1 (benefits) found at http://www.bea.gov/iTable/iTable.cfm?ReqID=9&step=1#reqid=9&step=1&isuri=1; CPS estimates developed as described in the text; BLS estimates of Employer Costs for Employee Compensation found at: http://www.bls.gov/ncs/ect/#tables.

The CPS is generally considered to do a good job of capturing annual earnings. For example, a recent comparison of 2012 earnings reported to the CPS with those reported to the IRS found that the CPS captured 100.3 percent of the earnings reported to the IRS for taxpayers aged 18 to 64, and 98.1 percent of earnings for those 65 and older (Bee and Mitchell, 2017, p. 40). Given that the allocation of benefits matched to the CPS has resulted in ratios reflected in *Figure 4* that approximate other federal data sources, our aggregate estimates of benefits are close to known benefit payments, and our estimates of total compensation are close to official aggregate estimates published by the government.

Table 1 presents summary estimates of compensation growth by decade from 1980 through 2010 and then for 2010 through 2015 for full-time, full-year workers. During the 1980s, compensation increases tended to be higher at each successive earnings decile with the exception of the fifth, which was the same as in the fourth. The growth rates from decile to decile during the 1980s were a bit more erratic, larger in the first than the second decile, in the fourth than the fifth decile and in the sixth than the seventh decile. Compensation growth was considerably higher during the 1990s than during the 1980s, particularly at the lower deciles and the top decile, and the growth rates tended to be much flatter across the whole distribution except at the very top, where compensation growth was two to

three times that of the other deciles. In the first decade of the new millennium, hourly rate increases were somewhat smaller than during the 1990s, although better than the 1980s. Compensation growth rates also tended to be relatively flat again, except for the top decile where growth slowed to one-third to one-fourth that of the lower earners. During the 1990s, many larger employers adopted pay-for-performance reward systems, particularly for middle and upper management, which likely accounts for the sizable growth in compensation for the highest earners during the expansionary 1990s followed by relatively low compensation growth for comparable workers during the turbulent 2000s. The results for 2010 through 2015 were the most miserable over the analysis period. Compensation actually dropped across the bottom two-thirds to three-fourths of the earnings distribution.

The earlier discussion linked workers' compensation growth over time to their productivity. The GDP in the total economy divided by the number of hours worked by full- and part-time workers provides a rough measure of worker productivity. To estimate productivity growth rates, we used data from the NIPA for nominal GDP converted to 2015 dollars using the GDP implicit price index and divided by annual hours of employed workers, arriving at 1.6 percent per year in the 1980s, 1.8 percent during the 1990s, 2.0 percent during the 2000s and 0.3 percent between 2010 and 2015. The productivity improvement rates help to explain the pattern of compensation growth shown in *Table 1* although they do not necessarily explain variations by earnings.

Table 1. Increases in hourly compensation in 2015 dollars and percentages by earnings decile for full-time, full-year workers, 1980–2015

	1980-1990		1990-2000		2000-2010		2010-2015	
Earnings decile	Dollar change	Percent change	Dollar change	Percent change	Dollar change	Percent change	Dollar change	Percent change
1st 10%	$0.10	1.6%	$1.07	16.5%	$0.76	10.0%	$0.15	1.8%
2nd 10%	0.13	1.2%	1.61	14.5%	1.08	8.5%	-0.21	-1.5%
3rd 10%	0.64	4.8%	2.03	14.4%	1.37	8.5%	-0.51	-2.9%
4th 10%	1.24	7.9%	2.11	12.4%	1.80	9.5%	-0.49	-2.3%
5th 10%	1.24	6.7%	2.46	12.6%	2.31	10.4%	-0.50	-2.0%
6th 10%	1.64	7.8%	2.65	11.7%	3.13	12.4%	-1.13	-4.0%
7th 10%	1.79	7.3%	3.07	11.7%	3.25	11.1%	-0.13	-0.4%
8th 10%	2.39	8.5%	4.13	13.5%	4.09	11.8%	0.41	1.1%
9th 10%	4.23	12.7%	5.52	14.7%	5.90	13.7%	0.55	1.1%
Next 9%	6.81	15.3%	19.15	37.3%	1.91	2.7%	3.69	5.1%

Source: Developed from the augmented CPS by Willis Towers Watson as described in the text.

As shown in *Table 1*, on average, hourly compensation rates rose for all workers between 1980 and 2010. The increases generally were larger at each higher earnings decile during the 1980s, relatively flat during the 1990s and more progressive again in the first decade of the 2000s. These results suggest that the concentration of income gains toward higher earners was more prevalent during the 1990s than during either the 1980s or the 2000s. The financial market meltdown in 2008 took a heavy toll on most workers, and the fallout persisted for some time. The results in *Table 1* help to explain some of the political discord in 2016 but seem to run counter to the narrative that the highest earners were the only ones getting ahead after the 1970s.

Table 2 focuses on the distribution of compensation growth during the 1980s. The "Comp/hour" column is taken directly from *Table 1*. The "Benefits/hour" column shows estimated increases in the average employer cost of the three major benefit categories— health benefits, pensions and retirement savings, and payroll taxes. The next column shows the share of compensation growth during the decade allocated to benefits costs. It is important to understand that, while these costs are paid by the employer, they are financed through relative adjustments within the total compensation bundle paid to workers.

Table 2. Changes in hourly compensation and benefit costs, benefit increases as percentage of compensation growth and broken out for health benefits and payroll taxes, and change in hourly pay, 1980–1990

Earnings decile	Dollar changes 1980-1990		Benefit increase as % of comp increase	Percent of benefit increases attributable to		Change in pay per hour 1980-1990
	Comp/hour	Benefits/hour		Health benefits	Payroll taxes	
1st 10%	$0.10	$0.18	172.8%	66.9%	43.4%	$-0.08
2nd 10%	0.13	0.38	292.6%	78.7%	32.1%	-0.25
3rd 10%	0.64	0.54	83.2%	74.1%	34.1%	0.11
4th 10%	1.24	0.76	61.7%	66.9%	31.4%	0.48
5th 10%	1.24	0.86	69.2%	66.8%	31.2%	0.38
6th 10%	1.64	0.94	57.6%	56.3%	34.4%	0.69
7th 10%	1.79	1.09	60.8%	57.0%	34.0%	0.70
8th 10%	2.39	1.29	53.8%	49.2%	34.9%	1.10
9th 10%	4.23	1.80	42.6%	40.0%	38.0%	2.43
Next 9%	6.81	2.25	33.0%	30.4%	43.1%	4.56

Note: Changes in hourly compensation and benefit costs are in 2015 dollars.

Source: Developed from the augmented CPS by Willis Towers Watson as described in the text.

For workers in the bottom two deciles, benefit cost growth was outpacing compensation growth, meaning that, on average, their cash wages declined from 1980 to 1990 (in inflation-adjusted dollars). For workers in the third through the eighth earnings deciles, benefits consumed more than half the compensation growth over the decade. Note that the average lowest-decile earner is not the same person in 1980 and 1990; rather the comparisons are simply based on the distribution of earnings in each year. These results suggest that lower-earning workers had somewhat higher average compensation in 1990 than in 1980, but their wages were somewhat lower. Most people would be far more aware of the lower wages than the higher compensation.

Table 2 shows that, for workers in the lower half of the earnings distribution, two-thirds to three-fourths of benefit cost growth was attributable to health benefits. Across the whole workforce during the 1980s, inflation-adjusted compensation grew by roughly 1 percent a year, compared with a 5 percent growth rate for the employer cost of health benefits. Higher payroll taxes were also siphoning off a larger share of compensation growth. These increases arose out of legislation adopted in 1977 and 1983 that raised payroll taxes as well as the threshold for compensation subject to the taxes. Where health benefits and payroll taxes added up to more than 100 percent of benefit cost growth,

employers were spending less on defined benefit pensions and retirement savings. Among workers in the bottom three earnings deciles, inflation-adjusted employer contributions to retirement plans declined during the 1980s.

For example, consider the average full-time, full-year earner in the fourth earnings decile. In 1980, he received $15.71 per hour in 2015 dollars. Ten years later, his 1990 counterpart received $16.95 per hour in 2015 dollars: a raise of $1.24 per hour. Of that hourly amount, employers spent $0.76 on benefit increases—$0.51 for more expensive health benefits, $0.24 for higher payroll taxes and another penny for retirement benefits. After the higher benefit costs were factored in, the average worker in the fourth decile took home an extra $0.48 an hour. So, while overall compensation had risen 7.9 percent over the decade, wages had risen only 3.5 percent. Health cost inflation had devoured a considerable share of workers' rewards for their improving productivity, and the result was most painful for those at the lower end of the earnings distribution.

For the vast majority of workers in 1990, their more expensive health plan would appear no more valuable than the cheaper 1980 version. Of the additional $0.24 per hour in payroll taxes, $0.16 was attributable to legislation to rebalance Social Security and Medicare financing, which also required many future retirees to work an extra year or two to qualify for unreduced Social Security benefits. In other words, workers in the 1990s were paying more for less generous benefits. So, workers in the fourth earnings decile were taking home about one-third of the compensation growth they had earned with their higher productivity, while employers were spending the other two-thirds on benefits that generally seemed no more valuable than what had been provided a decade earlier at considerably lower cost.

The effects of higher benefit costs are regressive—the money missing from workers' paychecks represents a larger share of compensation for low earners than for those with larger incomes. A great deal has been written and discussed about the skewing of income gains to the top end of the income distribution, but the disproportionate percentage-of-compensation devoted to rising benefit costs for lower earners played a pivotal role in growing income disparity.

Table 3 shows the distribution of compensation growth for the 1990s, using the same format in *Table 2* for the 1980s. During the 1990s, the economic winds were considerably more favorable than a decade earlier. In the early 1980s, baby boomers were still flooding the labor market at the same time tight monetary policies and a hard recession dampened labor demand. The unemployment rate was 9.7 percent in 1982, held steady at 9.6 percent the next year and averaged 7.3 percent over the decade. Output per hour of labor grew by 1.6 percent per year over the decade, but compensation growth lagged behind at only 1.4 percent per year. The early 1990s delivered another recession, but this time unemployment peaked at 7.5 percent and fell steadily to 4.2 percent by 1999. The compound growth rate in workers' hourly output was a relatively hearty 1.8 percent per year and, with the tight labor market, compensation growth picked up to 2.2 percent per year over the decade.

Table 3. Changes in hourly compensation and benefit costs, benefit increases as percentage of compensation growth and broken out for health benefits and payroll taxes, and change in hourly pay, 1990-2000

Earnings decile	Dollar changes 1990-2000		Benefit increase as % of comp increase	Percent of benefit increases attributable to		Change in pay per hour 1990-2000
	Comp/hour	Benefits/hour		Health benefits	Payroll taxes	
1st 10%	$1.07	$0.30	28.4%	77.8%	19.3%	$0.77
2nd 10%	1.61	0.38	23.7%	70.7%	24.6%	1.23
3rd 10%	2.03	0.49	24.1%	69.6%	24.1%	1.54
4th 10%	2.11	0.45	21.4%	68.3%	28.2%	1.66
5th 10%	2.46	0.50	20.4%	67.5%	29.9%	1.96
6th 10%	2.65	0.55	20.8%	72.9%	29.2%	2.10
7th 10%	3.07	0.50	16.3%	63.1%	39.4%	2.57
8th 10%	4.13	0.64	15.4%	55.2%	41.9%	3.49
9th 10%	5.52	0.70	12.8%	47.2%	52.2%	4.81
Next 9%	19.15	2.07	10.8%	18.0%	38.9%	17.08

Note: Changes in hourly compensation and benefit costs are in 2015 dollars.

Source: Developed from the augmented CPS by Willis Towers Watson as described in the text.

During the 1990s, compensation growth was significantly greater across the board than during the prior decade, and benefit cost growth generally slowed. In the bottom three deciles, workers lost around a quarter of compensation growth to more expensive benefits; in the fourth through sixth deciles, the loss dropped to roughly 20 percent. The percentage of compensation diverted to higher benefit costs declined steadily up the compensation ladder, reaching around 11 percent for those in the 10th decile. Health benefits were still the largest claimant of the rising cost of benefits but, on average, their compounded growth rate was only 2.2 percent per year over the decade, roughly equivalent to average compensation growth. Most of the payroll tax rate increases that had been adopted in 1977 and 1983 were fully implemented by the beginning of the 1990s so the higher payroll taxes shown in *Table 3* were generally the result of wage growth. The 1993 legislation that lifted the cap for Medicare taxes increased payroll taxes on higher earners somewhat more than on those lower down the distribution. In the top decile, much of the wage growth was above the maximum earnings level on which payroll taxes were levied, so the share of compensation devoted to added payroll taxes was somewhat less than in the seventh through the ninth deciles. Once again, for all but the top earnings decile, employer contributions for pension and retirement savings programs rose by only a cent or two per hour in 2000 versus 1990 (not shown in the table).

The good news from the 1990s was that pay was rising at the fastest clip since the 1960s, and the gains were spread largely across the earnings spectrum. While the highest earners gained more than anyone else, everyone was getting ahead, so the widening dispersion of earnings was less noticeable or painful than it was when those on the lower rungs of the economic ladder were losing ground.

Table 4 summarizes compensation growth for workers in different earning deciles for the first decade of the 2000s. For all but the top earners, compensation growth generally improved during the 2000s compared with the1980s, but slowed slightly from the 1990s. During the 1980s and 1990s,

compensation gains were largest for the highest-earning workers, but during the first decade of the 2000s, growth rates for top earners fell significantly behind the lower earnings deciles. While compensation grew for most workers, employers' benefit costs were up again, absorbing at least half the compensation increases from the second through the seventh earnings deciles. *Table 4* shows the allocation of benefit increases between health plans and retirement plans; the latter was not shown in *Tables 2* and *3* because those costs showed little change. During the 2000s, average retirement costs increased significantly for the first time in 20 years.[11]

Table 4. Changes in hourly compensation and benefit costs, benefit increases as percentage of compensation growth and broken out for health benefits and retirement benefits, and change in hourly pay, 2000-2010

Earnings decile	Dollar change 2000-2010		Benefit increase as % of comp increase	Percent of benefit increases attributable to		Change in pay per hour 2000-2010
	Comp/hour	Benefits/hour		Health plans	Retirement plans	
1st 10%	$0.76	$0.19	24.8%	56.3%	20.5%	$0.57
2nd 10%	1.08	0.53	49.3%	71.2%	20.9%	0.55
3rd 10%	1.37	0.77	55.7%	65.6%	28.3%	0.61
4th 10%	1.80	1.13	62.8%	66.7%	28.8%	0.67
5th 10%	2.31	1.25	54.0%	61.4%	32.1%	1.06
6th 10%	3.13	1.57	50.2%	55.8%	36.6%	1.56
7th 10%	3.25	1.79	55.2%	55.0%	38.8%	1.45
8th 10%	4.09	1.86	45.4%	50.7%	40.1%	2.23
9th 10%	5.90	2.45	41.5%	41.1%	48.1%	3.45
Next 9%	1.91	2.66	139.3%	42.1%	45.3%	-0.75

Note: Changes in hourly compensation and benefit costs are in 2015 dollars.

Source: Developed from the augmented CPS by Willis Towers Watson as described in the text.

In 2007, the U.S. economy—along with many others around the world—fell into a prolonged recession. The U.S. unemployment rate, which had been 4.6 percent in 2007—before the financial market turmoil—rose to 9.6 percent by 2010 and remained over 8 percent throughout 2011 and 2012. According to our estimates, which are based on *National Income and Product Account* data for the United States, average compensation climbed by only 0.1 percent during 2011 and 0.2 percent in 2012, then fell 0.6 percent in 2013 before beginning to rebound in 2014, when it climbed 0.8 percent. These are averages. Our results suggest the pain meted out by the recession was felt disproportionately by lower-earning workers.

11 A variety of forces prompted the increase. Schieber (2012) has analyzed elsewhere that private employers were curtailing their defined benefit pensions during the 1990s and into the 2000s. Some plan sponsors froze all accruals for all participants, others allowed some or all existing participants to continue to accrue benefits and offered those not grandfathered in their prior defined benefit plans. In many cases, the short-term employer costs increased during the conversion and transition process.

Table 5 summarizes changes in compensation and its components from 2010 through 2015. For the average earner in the bottom 70 percent of the full-time, full-year workforce, the early 2010s were a losing proposition. Part of the loss was absorbed as reductions in employer-financed benefits. For an average worker, the cost of health benefits rose at a compound rate of 0.2 percent per year, a minor fraction of the growth rate over the prior 30 years, and health benefit costs fell slightly in a few earnings deciles. Employers' payroll tax costs fell slightly for workers in the bottom six earnings deciles because their hourly pay was falling. According to a Willis Towers Watson survey of 260 large companies (WTW, 2011), most had implemented one or more of layoffs, hiring freezes, furloughs, salary freezes and reduced contributions to retirement plans. Two hundred thirty-one of the 260 companies suspended the matches to their 401(k) plans. So, the reductions in retirement benefit contributions shown in *Table 5* were at least partly attributable to employer cutbacks in the generosity of their plans during the recession. They were also partly related to reductions in employer matching when workers reduced their own retirement contributions in the face of personal economic hardship.

Based on its larger sample of employee benefit plans, Willis Towers Watson estimated that, for health and retirement benefits in 2001, employers spent 41.9 percent of total cost on health benefits versus 58.1 percent on retirement benefits. By 2015, the split was in the other direction: 63.5 percent for health benefits and 36.5 percent for retirement benefits (WTW, 2017). The shift was partly driven by the continuing growth in health costs and partly by less spending on retirement benefits. It is likely that many employers cut back on retirement contributions to offset the cancerous growth of health plan costs.

Table 5. Changes in hourly compensation, benefit costs and pay, 2010–2015

Earnings	Compensation	Total benefits costs	Health benefits	Retirement benefits	Payroll taxes	Pay
1st 10%	$0.15	$0.15	$0.16	-$0.02	$0.00	$0.00
2nd 10%	-0.21	-0.10	-0.03	-0.06	-0.01	-0.11
3rd 10%	-0.51	-0.16	0.02	-0.15	-0.03	-0.36
4th 10%	-0.49	-0.23	-0.03	-0.17	-0.02	-0.26
5th 10%	-0.50	-0.20	-0.01	-0.17	-0.02	-0.30
6th 10%	-1.13	-0.49	-0.14	-0.31	-0.05	-0.64
7th 10%	-0.13	-0.24	0.00	-0.25	0.01	0.12
8th 10%	0.41	-0.13	0.04	-0.21	0.04	0.54
9th 10%	0.55	-0.23	0.09	-0.38	0.06	0.78
Next 9%	3.69	-0.23	0.03	-0.45	0.19	3.92

Note: Changes in hourly compensation and benefit costs are in 2015 dollars.

Source: Developed from the augmented CPS by Willis Towers Watson as described in the text.

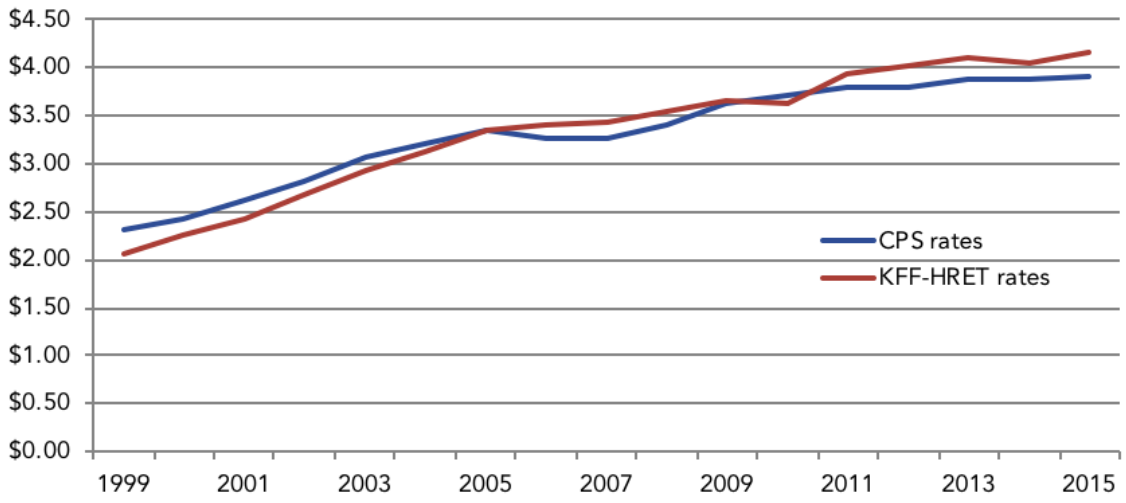
Table 5 presents what we believe is a conservative picture of the hit to compensation for workers who participated in their employers' health plans. Based on the CPS, we estimated that only 62.4 percent of full-time, full-year workers were participating in their own employer's health plan in 2015. The average hourly costs of employer premiums were the average of total costs across all full-time, full-year workers, including the self-employed, in each earnings decile. We estimated that the

employer costs for health benefits distributed across all full-time, full-year workers averaged $2.44 per hour in 2015. Given that many workers were not in plans, the average cost for participating workers was around $3.91 ($2.44 ÷ 0.62 = $3.91) per hour.

For comparison, the Kaiser Family Foundation/Health Research & Education Trust (KFF-HRET) Employer Health Benefits Survey estimated that in 2015, employers' average annual premiums were $5,179 for individual coverage and $12,591 for family coverage (KFF-HRET, 2017, Exhibits 6.3 and 6.4). Converting these premiums to hourly rates for full-time, full-year workers using 2,080 hours as the annual rate, premiums were $2.49 per hour for individual coverage and $6.05 per hour for family coverage. Our tabulations of the 2015 CPS indicated that 52.9 percent of participating workers had individual coverage and 47.1 percent had family coverage. The weighted-average employer premiums for 2015 would have been $8,670 or $4.16 per hour for full-time, full-year plan participants.

Figure 5 tracks employers' estimated average hourly cost for health care premiums from 1999 (the first year in the KFF-HRET survey series) through 2015. The estimates were derived under the methodology used for this analysis and compared to the average annual premiums converted to hourly rates estimated from the KFF-HRET surveys for the same years. These two sets of rates were developed using different methodologies but track each other closely.

Figure 5. Estimated average hourly premiums paid by employers for health plan participants as estimated from the CPS and the KFF-HRET *Employer Health Benefit Surveys*



Sources: Developed from the augmented CPS by Willis Towers Watson as described in the text and derived from KFF-HRET surveys (2017, Figures 6.3-6.4).

V. Getting to the Bottom Line

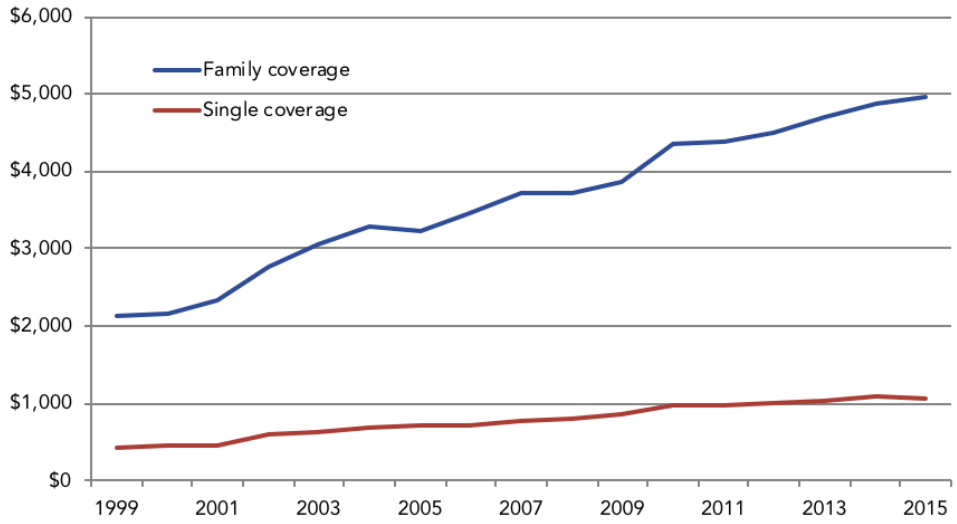
Thus far, we have focused on the opaque share of health costs passed down from employers to employees. But employers and health plans also make direct claims on workers' disposable incomes by increasing the workers' share of premiums, and raising deductibles and copayments.

Employers' higher health insurance premiums and the inhibiting effects on pay growth is only part of the story. Health cost inflation also drives up employee premiums for employer health plans, and these have been depleting disposable pay more visibly than employer cost, as the premium payments appear as payroll deductions on employees' statements of earnings. The CPS does not include information about employee-paid premiums. To show the effects of those premiums on workers' disposable wages, we used the KFF-HRET surveys of employer health benefit programs.

The KFF-HRET surveys gather data on employer contributions from participating companies and report individual and family premiums for the employer's largest plan of each type—preferred provider organization (PPO), health maintenance organization (HMO), point-of-service (POS) plan, and consumer-driven health plan (CDHP). The combined premiums for all plan types are averages weighted by employee counts in each type, and premiums are reported separately for individual and family coverage.

Figure 6 shows average employee premiums for single and family coverage under employer health plans participating in the KFF-HRET annual surveys. The results highlight an important consequence of premium inflation. For premiums from 1999 through 2015, the compound annual growth rate was 5.8 percent for individual coverage compared with 5.4 percent for family coverage. Because the compounding for family coverage was on a much larger base, however, its premium growth was three times that of single coverage. Converting the results in *Figure 6* into 2015 dollars, the annual premiums for full-time, full-year single workers rose from $415 in 1999 to $1,068 in 2015, an increase of $653 per year or $0.30 per hour. For workers buying family coverage, the employee premium rose from $2,127 to $4,956 in 2015 dollars, an increase of $2,829 per year or $1.36 per hour.

Figure 6. Average annual employee premiums converted to 2015 dollars for individual and family coverage under employer health plans, 1999–2015



Note: Results are shown in 2015 dollars.
Source: KFF-HRET *Employer Health Benefits, 2017 Annual Survey,* Figures 6.3 and 6.4.

To put the higher employee premiums in context, we estimate that, between 1999 and 2015, average pay for the full-time workers in our analysis rose by $3.39 per hour in 2015 dollars. Average pay per hour in the fifth decile in 1999 was $17.43 per hour, rising to $18.74 in 2015. So, the average pay increase for workers at this level fell just short of covering the increase in the average premium charged workers for family coverage between 1999 and 2015. For considerable numbers of workers, their own share of premiums was eating up every last cent of their pay increases and more.

We have made a case here that employers' health insurance costs are one component of overall compensation, and if the relative share of that component increases, one or more of the others must fall. Across the workforce, we have estimated how health costs vary by compensation levels, primarily due to differences in plan offerings and take-up rates for different earnings deciles. To an extent, the cost of health insurance for individual workers is based on more than their own coverage decisions.

While there may be some segmentation of large classes of workers within an organization—union versus nonunion, production versus white collar—health plan costs are generally shared across the workforce. When Tom, Jane and Harry do essentially the same type of work, hourly pay does not vary because Tom enrolls in family coverage, while Jane has individual coverage and Harry foregoes employer health coverage altogether. Employers might structure their plans to discourage certain sorts of workers—the Toms who need coverage for their whole families—from working for them or from selecting certain health plans,[12] but once the choices are made, the aggregate costs of health coverage are generally distributed somewhat uniformly across all workers.

In estimating the effects of health care costs on insured workers' disposable earnings, we assumed that the employers' costs were spread evenly across their workforces. Focusing on full-time workers, we averaged annual premiums over 2,080 hours to derive hourly rates. In 1999, the weighted average of employer premiums for workers enrolled in the average employer plan was $2.05 per hour in 2015 dollars.[13] That year, the average enrollment rate was 85 percent, so hourly premiums averaged $1.74. By 2015, the weighted average of employer premiums had risen to $4.17 per hour.[14] That year, the average enrollment rate in employers' plans fell to 79 percent, so hourly premiums averaged $3.29. The growth in employer premiums over the years averaged $1.55 per hour (i.e., $3.29 – 1.74).

To isolate the effects of workers' health insurance costs on their economic gains, or lack thereof, we started with a modified measure of compensation; here we used estimated compensation growth from 1999 through 2015 minus the growth in employers' contributions to payroll taxes and to pension and retirement plans. The results are reflected in the first column of *Table 6*, "Growth in pre-health care compensation." The table includes results for single individuals and married workers in single-earner households. To estimate the effects of health care costs on pay, we subtracted the estimated average growth in employers' health care premiums, $1.55 per hour as calculated above, and the change in average premiums directly charged to enrolled workers.

The most significant results in *Table 6* appear in the two boldface columns. Single workers in the bottom three deciles with individual coverage suffered net-wage losses after paying their health-insurance premiums, while workers in the fourth decile broke roughly even. For average workers in

12 Willis Towers Watson estimates that 39 percent of plans impose a $600 surcharge per year for a worker to cover a spouse and another 24 percent impose a surcharge of roughly double that amount.

13 In 1999, the estimated employer average hourly premium for single coverage was $1.24 per hour in 2015 dollars and $2.81 per hour for family coverage. On average, 48.1 percent of contract holders had single coverage and 51.9 percent had family coverage.

14 In 2015, the estimated employer average hourly premium for single coverage was $2.49 per hour in 2015 dollars and $6.05 per hour for family coverage. On average, 52.9 percent of contract holders had single coverage and 47.1 percent had family coverage.

the bottom 40 percent of the earnings distribution, enrolling in employer health care drove their disposable earnings down over the 16-year analysis period. After paying their health care premiums, workers in the fifth decile retained about one-sixth of their gross compensation gains net of expenses for additional employer payroll taxes and retirement benefits. The increase in post-premium disposable earnings for those in the sixth decile was about one-fourth of their post-retirement-cost compensation gains; and those in the seventh decile received less than one-half their compensation gains net of increases to payroll taxes and retirement contributions.

Table 6. Changes from 1999 through 2015 in average hourly compensation levels before employer health premiums, changes in employers' and employees' health premiums, and post-premium pay for individual coverage and for sole earners with family coverage

	Growth in pre-health care compensation	Growth in employer health care premiums	Individual coverage		Sole wage earner, family coverage	
			Change in employee premiums	**Change in pay after health care**	Change in employee premiums	**Change in pay after health care**
1st 10%	$1.35	$1.55	$0.30	**-$0.50**	$1.36	**-$1.56**
2nd 10%	1.40	1.55	0.30	**-0.45**	1.36	**-1.51**
3rd 10%	1.52	1.55	0.30	**-0.33**	1.36	**-1.39**
4th 10%	1.84	1.55	0.30	**-0.01**	1.36	**-1.07**
5th 10%	2.22	1.55	0.30	**0.37**	1.36	**-0.69**
6th 10%	2.38	1.55	0.30	**0.53**	1.36	**-0.53**
7th 10%	3.49	1.55	0.30	**1.64**	1.36	**0.58**
8th 10%	4.90	1.55	0.30	**3.05**	1.36	**1.99**
9th 10%	6.93	1.55	0.30	**5.08**	1.36	**4.02**
Next 9%	11.53	1.55	0.30	**9.68**	1.36	**8.62**

Note: Changes in hourly compensation and benefit costs are in 2015 dollars.

Source: Growth in pre-health-care compensation was developed from the augmented CPS by Willis Towers Watson as described in the text. Growth in the employer and employee premiums were derived by the authors from KFF-HRET (2017), also as described in the text.

As shown in *Table 6*, single earners enrolled in family coverage were much worse off than workers with individual coverage. After paying their premiums, workers in the bottom 60 percent of the earnings distribution with family coverage registered losses in earnings over the 16-year period. Not until the ninth earnings decile did workers receive half their compensation gains net of additional employer retirement costs. The costs of employer-sponsored health benefits were sucking the lifeblood out of the potential economic gains for many, if not most, of these workers.

Table 7 shows results for two-earner couples under two different health coverage scenarios. The analysis assumes that the second earner realized compensation gains, net of employers' retirement plan increases, that were only two-thirds of the first earner's net gains. Further, we assumed that both workers' employers sponsored a health plan, so both their compensation packages reflected average employer costs for sponsoring a plan. Thus, the growth in employer health premiums in *Table 7* is twice the rate in *Table 6*, where only one worker was covered by a plan.

The first scenario in *Table 7* assumes that one worker receives family coverage under the employer's health plan. In this case, the growth in the employee's health insurance premium from 1999 through 2015 is the same as the family coverage example in *Table 6*. The second scenario assumes that both spouses are covered under their own employer's health plan, with one spouse taking family coverage and the other taking single coverage. A sizable number of employers, maybe as many as 60 percent to 65 percent, impose a surcharge for covering spouses who could obtain health insurance from their own employer. This latter scenario represents the situation faced by many two-earner couples today.

The results in *Table 7* suggest that, after paying their health premiums, the bottom 60 percent of these hypothetical two-earner households would have seen their net earnings decline between 1999 and 2015. Higher earners in the seventh decile would have realized modest net gains over the period, but excessive health costs still would have absorbed 75 percent to 80 percent of their compensation gains. Those families that managed to acquire health insurance from a single employer would get off a little easier than those who had to acquire it from two employers.

Table 7. Changes from 1999 through 2015 in average hourly compensation before employer health premiums, changes in employers' and employees' health premiums, and post-premium pay for coverage under either one or two employer-sponsored health plans for two-earner couples

	Growth in pre-health care compensation	Growth in employer health care premiums	Single plan coverage		Two-plan coverage	
			Growth in employee premiums	**Growth in pay after health insurance premiums**	Growth in employee premiums	**Growth in pay after health insurance premiums**
1st 10%	$2.25	$3.10	$1.36	**-$2.21**	$1.66	**-$2.51**
2nd 10%	2.34	3.10	1.36	**-2.12**	1.66	**-2.42**
3rd 10%	2.54	3.10	1.36	**-1.92**	1.66	**-2.22**
4th 10%	3.07	3.10	1.36	**-1.39**	1.66	**-1.69**
5th 10%	3.69	3.10	1.36	**-0.77**	1.66	**-1.07**
6th 10%	3.96	3.10	1.36	**-0.50**	1.66	**-0.80**
7th 10%	5.82	3.10	1.36	**1.36**	1.66	**1.06**
8th 10%	8.17	3.10	1.36	**3.71**	1.66	**3.41**
9th 10%	11.56	3.10	1.36	**7.10**	1.66	**6.80**
Next 9%	19.21	3.10	1.36	**14.75**	1.66	**14.45**

Note: Changes in hourly compensation and benefit costs are in 2015 dollars.

Source: Growth in the pre-health-care compensation was developed from the augmented CPS by Willis Towers Watson as described in the text. Growth in the employer and employee premiums in this case are derived by the authors from KFF-HRET (2017) also as described in the text.

The results in *Tables 6* and *7* are for full-time, full-year workers with employer-sponsored health insurance, a group with relatively secure positions in a tumultuous economic period. On the other hand, the negative wage gains for many of these workers suggest that higher health insurance costs were threatening the economic well-being of large segments of the working population.

Evidence that many workers with employer health coverage were on a downward trending economic path does not mean they were simply swallowing the sour medicine the health system was doling out. *Table 8* summarizes changing health insurance status by decade among the full-time, full-year workforce from 1980 through 2010 and for the next half decade. A decline from 80 percent of workers being covered by employer-sponsored health insurance to 60 percent covered 10 years later is reflected in the table as a 25 percent reduction in coverage.

Table 8. Declining health coverage among full-time, full-year workers, 1980–2015

Earnings decile	Any insurance coverage	Coverage offered by own employer	Insured by own employer	Worker only insurance	Family insurance
1980-1990					
1st 10%	0.9%	-24.3%	-30.6%	-28.1%	-34.4%
3rd 10%	1.0%	-8.7%	-14.7%	-9.7%	-20.6%
5th 10%	1.2%	-6.4%	-10.0%	-6.5%	-13.0%
7th 10%	2.5%	-3.7%	-8.2%	11.1%	-17.5%
9th 10%	4.0%	-1.5%	-5.8%	24.6%	-14.0%
1990-2000					
1st 10%	-0.9%	12.0%	11.7%	16.3%	3.9%
3rd 10%	-1.1%	3.3%	0.4%	6.4%	-7.6%
5th 10%	-0.7%	1.3%	-2.2%	9.2%	-12.5%
7th 10%	-0.3%	2.2%	-3.1%	18.4%	-17.0%
9th 10%	-0.8%	0.9%	-3.6%	27.2%	-15.5%
2000-2010					
1st 10%	-9.6%	-18.5%	-21.9%	-15.6%	-34.0%
3rd 10%	-6.3%	-11.1%	-10.4%	-6.9%	-15.6%
5th 10%	-3.2%	-4.5%	-6.5%	-3.9%	-9.6%
7th 10%	-1.8%	-3.2%	-1.4%	-2.4%	-0.6%
9th 10%	-1.1%	-2.5%	-3.2%	5.5%	-8.4%
2010-2015					
1st 10%	31.3%	7.4%	11.1%	11.2%	10.6%
3rd 10%	10.3%	-2.4%	-3.3%	-0.5%	-8.0%
5th 10%	3.8%	-3.4%	-2.6%	5.6%	-12.5%
7th 10%	1.5%	-3.7%	-5.0%	1.2%	-10.7%
9th 10%	0.7%	-2.5%	-3.6%	-0.7%	-5.6%

Source: Authors' tabulations of the CPS, various years.

As we saw earlier, employers' health cost inflation was particularly virulent during the 1980s. While the availability of coverage for the workers in *Table 8* was relatively stable across much of the earnings distribution, coverage by workers' own employers fell significantly. It is not shown in the table, but employer coverage dropped from 86.0 percent in 1980 to 80.1 percent in 1990. *Table 8* does show that employer coverage reductions fell most heavily on lower earners. We do not show the coverage rates by size of employer, but our analysis indicates that much of the decline in coverage was concentrated among employees working for smaller organizations. Not only was coverage dropping significantly, but the incidence of workers being insured by their own employers was declining at an even higher rate during the 1980s, again highly skewed toward those at the bottom of the earnings distribution. By the 1980s, two-earner couples were much more common than in earlier decades, and

employers began to structure plans to discourage workers from covering spouses who could obtain health insurance from their own employers. As a result, there were reductions in the take-up of family coverage. At the lower earnings levels, these reductions were part of the general declines in insured status. At higher earnings levels, many workers switched from family to individual coverage.

The 1990s, especially the later years, were characterized by a booming economy and tight labor markets. Coverage reductions were minimal, and coverage by workers' own employers was rising, especially for lower earners. Workers continued to switch out of family insurance into worker-only coverage. One factor in the shift was the rise in two-earner households, which allowed couples to opt for separate individual coverage arrangements.

Early in the new millennium, the tech bubble burst, and the later financial meltdown wreaked havoc on the economy. The unemployment rate climbed from 4.0 percent in 2000 to 9.6 percent in in 2010. Average hourly compensation rose over that decade by 8.4 percent, but 57 percent of workers' raises went toward additional employer benefit costs, with slightly more than half that consumed by health care. Employers moved aggressively to control costs; scaling back health insurance coverage was part of the equation. The reductions in coverage and participation were most prevalent for lower earners but were significant for middle earners, too. Generally, smaller employers were the ones dropping coverage, but it was workers who were shifting from family to individual coverage.

The losses of health coverage during the 2000s sowed the seeds for the Affordable Care Act (ACA). Despite considerable public and political opposition to the implementation of the ACA, health care coverage increased significantly among the lowest-earning workers. Ironically, the percentage of full-time, full-year workers enrolled in their own employer's plan declined at every other earnings decile from 2010 to 2015. This was due to both fewer employers offering health coverage and a lower take-up rate in eight of the nine earnings deciles above the bottom one.

The ACA promised to moderate health cost inflation. Our calculations of health inflation within the compensation package found that costs did moderate in the early 2010s, but we spread the growth in employers' health premiums across the whole workforce. Adjusting for declining coverage and participation in employer-sponsored plans shows a different outcome. Between 2010 and 2015, average hourly compensation grew at a compound annual rate of 0.3 percent per year, but employers' premiums using the KFF-HRET (2017) estimated premiums for enrolled workers grew by 2.8 percent per year for individual coverage and by 3.5 percent for family coverage. In other words, while the aggregate numbers looked like health inflation was moderating, employers' costs for insured workers were growing by nine to 10 times the growth rate of average compensation.

VI. Health Cost Inflation and the Concentration of Income

The decade-by-decade synopsis of disappearing compensation gives context to the story of economic stagnation, but it also sheds light on an important element of the larger narrative about income inequality. *Table 9* shows average compensation growth by earnings from 1980 through 2015, and the share of those gains diverted away from wages to pay higher benefit costs. The compensation growth pattern is not surprising: progressively higher earners gained more than lower earners in real dollars. The results are consistent with claims that, since the 1970s, income gains have tended to be moderate for middle earners and substantial for those at the very top. Workers in the tenth decile received nearly twice the take-home gains of earners in the ninth decile, whose gains, in turn, were 45 percent to 50 percent higher than those in the eighth.

Table 9. Changes in hourly compensation and the distribution of compensation growth to benefits, and wages and salaries, 1980–2015

		Percent of added compensation devoted to:				
	Compensation growth	Health insurance	OASDHI	Retirement	Wages & salaries	Wage growth
1st 10%	$2.08	30.2%	8.7%	0.6%	60.5%	$1.26
2nd 10%	2.61	35.2%	9.6%	1.1%	54.0%	1.41
3rd 10%	3.53	35.8%	9.1%	1.4%	53.7%	1.90
4th 10%	4.66	33.0%	8.5%	3.9%	54.6%	2.54
5th 10%	5.51	30.3%	8.6%	4.7%	56.3%	3.10
6th 10%	6.29	26.6%	8.8%	5.5%	59.1%	3.72
7th 10%	7.98	24.0%	8.6%	6.7%	60.7%	4.85
8th 10%	11.02	17.9%	8.4%	6.9%	66.9%	7.37
9th 10%	16.20	13.3%	8.5%	7.4%	70.8%	11.47
Next 9%	31.56	7.0%	7.3%	7.1%	78.6%	24.82

Note: Amounts are in 2015 dollars.

Source: Developed from the augmented *Current Population Survey* by Willis Towers Watson as described in the text.

Although the effects of the higher cost of health insurance tended to be regressive, consuming a larger share of compensation growth for lower earners than for higher earners, this phenomenon did not occur in the bottom two deciles because those workers were losing coverage. Based on the CPS, we estimated that, between 1980 and 2000, coverage of full-time, full-year workers dropped from 80 percent to 69 percent. By the time the ACA was adopted in 2010, coverage rates were 65 percent. For the lowest-earning decile, coverage fell from 61 percent in 1980 to 45 percent in 2015, but the percentage of workers insured by their own employers declined from 44 percent to 30 percent. In the second earnings decile, coverage dropped from 78 percent to 56 percent, and the percentage covered by their own employers plunged from 66 percent to 42 percent.

The share of compensation growth that was absorbed by employers' payroll taxes tended to be relatively proportional across the earnings distribution, falling off slightly at the top decile because of

the cap on taxable earnings. Almost all workers know that Social Security will provide only so much retirement income, and their own pensions and retirement savings will be essential. As shown in *Table 9*, by the end of the 35-year analysis period, 5 percent to 7 percent of compensation growth was supporting workers' retirement plans at the top five earnings levels, compared with less than 1 percent for the lowest earners.

The right-hand column in *Table 9* shows the average increase in cash earnings in 2015 relative to what comparable workers were paid in 1980. Compensation for the average earner in the bottom decile increased by roughly $4,000 over the period, but only about $2,500 made it into these workers' wages. In 2015, workers at the fifth decile were $11,000 ahead on the compensation ledger but only $6,200 ahead in cash earnings. For the bottom four earnings deciles, three-fourths of the benefit draw on compensation growth went to higher-cost employer-financed health insurance, declining to two-thirds for the fifth through seventh deciles. Even at the ninth decile, health plan increases consumed 46 percent of workers' compensation growth. While workers clearly appreciated their employer plans, most of them were not receiving better health benefits than those earned by their parents 35 years earlier let alone a higher standard of living.

The declines in health coverage that affected lower earners disproportionately in the 1980s coincided with growing awareness of shifting income patterns. On the eve of the Great Depression in 1929, the top 1 percent of the population claimed 18.4 percent of U.S. income. The concentration of income declined slightly during the 1930s, although even on the eve of World War II, the top 1 percent still claimed 18 percent of income. There was considerable income leveling during and immediately after the war, and by 1953, only 9 percent of total income was going to the top 1 percent. The downward trend continued more gradually until the late 1970s, when the top 1 percent were claiming 8 percent of income. After that, the pattern began to revert. By 1988, the top 1 percent were claiming 13 percent of income, and income concentration continued through the 1990s and into the 2000s (Piketty and Saez, 2001, and Piketty, Saez and Zucman, 2016). While a variety of factors have been suggested as explanations for income inequality—income tax policy, computerization and globalization, for example—the effects of growing health costs have not been explored.

If the effects of higher health premiums on wages are regressive, then higher earners will bear relatively less financial pain than lower earners. This is borne out in *Table 10*, which first shows changes to compensation between 1980 and 2015 after deducting payroll taxes and retirement benefits. It then shows changes to cash wages after also deducting employer health premiums and, finally, the disposable wages left after workers pay their share of premiums. For example, workers in the sixth earnings decile lost 0.8 percent of aggregate compensation net of employers' payroll taxes and retirement benefits paid to all workers from 1980 through 2015, 0.9 percent of aggregate cash wages and 1.0 percent of aggregate disposable wages. For each category, the first column shows the changes for each decile and the second column shows the cumulative changes for that decile plus all lower deciles. Cumulatively, all workers in the first through sixth deciles lost 3.8 percent of aggregate compensation net of employers' payroll taxes and retirement benefits, 4.3 percent of cash wages and 4.7 percent of disposable wages over the period.

Table 10. Changes in the distribution of full-time, full-year workers' rewards by earnings decile, 1980–2015

	Compensation less employers' OASDHI and retirement benefits		Cash wages		Disposable wages after employee health premiums	
Income deciles	Change in shares 1980-2015	Change in cumulative shares 1980-2015	Change in shares 1980-2015	Change in cumulative shares 1980-2015	Change in shares 1980-2015	Change in cumulative shares 1980-2015
	(1)	(2)	(3)	(4)	(5)	(6)
1st 10%	-0.2%	**-0.2%**	-0.2%	**-0.2%**	-0.3%	**-0.3%**
2nd 10%	-0.7%	**-0.9%**	-0.7%	**-1.0%**	-0.8%	**-1.0%**
3rd 10%	-0.7%	**-1.6%**	-0.8%	**-1.7%**	-0.9%	**-1.9%**
4th 10%	-0.6%	**-2.2%**	-0.8%	**-2.5%**	-0.9%	**-2.8%**
5th 10%	-0.7%	**-3.0%**	-0.9%	**-3.4%**	-1.0%	**-3.7%**
6th 10%	-0.8%	**-3.8%**	-0.9%	**-4.3%**	-1.0%	**-4.7%**
7th 10%	-0.8%	**-4.6%**	-0.9%	**-5.2%**	-0.9%	**-5.7%**
8th 10%	-0.3%	**-4.9%**	-0.3%	**-5.5%**	-0.3%	**-5.9%**
9th 10%	0.7%	**-4.2%**	0.8%	**-4.7%**	0.8%	**-5.1%**
Next 9%	4.2%	**0.0%**	4.7%	**0.0%**	5.1%	**0.0%**

Source: Developed from the augmented CPS by Willis Towers Watson as described in the text.

For lower-earning workers, the comparative results in *Table 10* for compensation and wages may seem illogical—the compensation losses in aggregate share were essentially equal to the share losses of wages. That's because lower-earning workers were far less likely to have health insurance from their employer in 2015 than in 1980, so the higher health insurance cost for those with insurance were being masked by declining take-up rates for lower earners. In 1980, 44 percent of the workers in the bottom decile were enrolled in their employer's health plan, 39 percent with family coverage. By 2015, only 30 percent of workers in the bottom decile were enrolled and only 29 percent of them had family coverage. In the second decile, 65 percent of workers were enrolled in their employer's plan in 1980 compared to 42 percent in 2015. Forty-one percent of enrollees had family coverage in 1980 but only 34 percent in 2015. As these lower-earning workers lost health insurance, their compensation was also being adversely affected, although their rate of pay was generally better protected than it was for lower earners with employer coverage. From the fourth through the eighth earnings deciles—where declining enrollment in employer plans was more moderate—workers lost a larger share of aggregate wages than of compensation.

Considering the cumulative results between 1980 and 2015 for the first eight earnings deciles combined, the compensation share fell by 4.9 percent versus 5.5 percent for the wage share. It is important to keep in mind that this analysis does not include the top 1 percent of earners because the CPS data do not provide adequate detail to estimate their earnings in 1980 and 2015. Including the top 1 percent in the analysis would make the differences even starker.

The two right-hand columns in *Table 10* are the changes to disposable wages, mostly declines, after employees paid their health premiums. The estimates were calculated using the KFF-HRET

survey (2017) average employee premiums for plan participants reported by employers in 2015. The average premiums are the premiums reported in the survey for insured workers weighted to reflect the percentage of workers in each decile who were insured under their employers' plans.[15] While the patterns are consistent, the declines in disposable wages are generally larger than those in the compensation and wage categories.

To understand the full ramifications of escalating health care costs, it helps to consider changes within the earnings deciles shown in *Table 10*. The share of compensation that was paid to the average worker in the fifth decile, net of payroll taxes and retirement benefits, declined by 0.7 percent from 1980 through 2015. When employers' health premiums are netted out, the result is wages. For the average worker in the fifth decile, the share of total wages was 0.9 percent less in 2015 than in 1980, so the marginal effect of higher employer health costs was to reduce these workers' share of this pie by 0.2 percent. After paying their own share of health premiums, the disposable wage share for the average worker in the fifth decile fell by another 1.0 percent from 1980 to 2015.

These losses in shares of disposable wages—1.1 percent at the seventh decile—might seem relatively insignificant. But the percentage changes in *Table 10* are not changes in income within individual deciles. They are losses to the shares of *aggregate* rewards paid to all workers.

Another way to look at the implications of employer-sponsored health insurance inflation is that, between 1980 and 2015, 24 percent of the decline in the share of aggregate disposable wages paid to workers in the third decile, net of health costs, was attributable to higher employer and employee health insurance premiums. For workers in the fourth decile, 36 percent of the loss of disposable wages was due to higher premiums; for those in the fifth decile, it was 31 percent. Even those in the seventh decile lost 24 percent. The rising cost of employer-sponsored health insurance was not the only development suppressing wage growth for middle-class workers, but it played a significant role in the story.

Other health expenditures affect workers' economic status, namely out-of-pocket costs for health services. Nationally, the share of health expenditures financed by out-of-pocket payments has been declining, dropping from 22.4 percent of total health expenditures in 1980 to 16.3 percent in 2000 and 12.5 percent in 2015 (CMS, 2017). Recently, though, employers have instituted higher copayments and deductibles, partly to increase sensitivity to health care costs and, at least theoretically, encourage enrollees to be more judicious consumers. Since 2005, employers have been offering high-deductible health plans (HDHPs), which are linked to either a health reimbursement account (HRA) or a health savings account (HSA). As their name suggests, these plans have very high deductibles that must be reached before the plans start paying for covered services. The KFF-HRET surveys estimated that 20 percent of firms offered an HDHP with a qualified HSA in 2015 and another 7 percent offered a plan with an HRA. Among firms with 1,000 or more employees, 52 percent offered an HDHP with a savings option in 2015, increasing to 58 percent in 2017 (KFF-HRET, 2017, p. 132). In 2015, 26 percent of workers in these larger firms were enrolled in the HDHP, rising to 31 percent in 2016 (KFF-HRET, 2017, p. 134).

Workers have been choosing HDHPs for various reasons; the ability to save in a tax-favored HSA is but one of them. Employee premiums for HMOs are considerably higher than the average of all

15 For example, in 2015, we estimated that in the first decile of the earnings distribution, 29.6 percent of full-time, full-year workers were insured under their employer plans, 29.0 percent with family coverage and 71 percent with individual coverage. The estimated employee premium for the complete decile was $0.31 per hour. By comparison, in the fifth decile, 62.8 percent of workers were insured, 38.5 percent of them with family coverage and 61.5 percent with individual coverage. In that decile, the average employee premium was $0.85 per hour.

plans for both single and family coverage, and the spread widened significantly between 2015 and 2017 *(Table 11)*. PPO premiums are also somewhat higher. Employee HDHP premiums are much lower than the average premium, and the savings were likely attractive to people who anticipated relatively low utilization of health services in the near future. The employer premiums in *Table 11* do not include employer contributions to health accounts, so where employers subsidized the HSA, the HDHP option would be even more attractive.

Table 11. Average employer and employee premiums in nominal dollars for single and family coverage under health plans in 2015 and 2017

	Average annual premiums			Premium difference relative to average of all plans		
2015	*Employer*	*Employee*	***Total***	*Employer*	*Employee*	***Total***
Single coverage						
HMO	$5,032	$1,179	$6,211	-2.8%	10.1%	-0.6%
PPO	5,430	1,145	6,575	4.8%	6.9%	5.2%
POS	5,231	1,027	6,258	1.0%	-4.1%	0.1%
HDHP	4,699	868	5,567	-9.3%	-19.0%	-10.9%
All plan average	5,179	1,071	6,250			
Family coverage						
HMO	11,801	5,447	17,248	-6.3%	9.9%	-1.7%
PPO	13,253	5,216	18,469	5.3%	5.3%	5.3%
POS	11,503	5,410	16,913	-8.6%	9.2%	-3.6%
HDHP	12,053	3,917	15,970	-4.3%	-20.9%	-9.0%
All plans	12,591	4,955	17,546			
2017						
Single coverage						
HMO	$5,520	$1,532	$7,052	0.8%	26.3%	5.4%
PPO	5,653	1,312	6,965	3.2%	8.2%	4.1%
POS	5,912	804	6,716	7.9%	-33.7%	0.4%
HDHP	5,004	1,020	6,024	-8.6%	-15.9%	-10.0%
All plans	5,477	1,213	6,690			
Family coverage						
HMO	12,221	6,850	19,071	-6.3%	19.9%	1.6%
PPO	13,430	6,050	19,480	2.9%	5.9%	3.8%
POS	12,530	5,616	18,146	-4.0%	-1.7%	-3.3%
HDHP	12,982	4,599	17,581	-0.5%	-19.5%	-6.3%

Source: Derived by the authors from KFF-HRET 2015 and 2017.

The changing levels of deductibles were also altering the relative values of health plan options. The law governing tax-deductible HSAs sets minimum annual deductibles in HDHPs coupled with HSAs, as well as maximum annual out-of-pocket expenses for consumers. These limits are indexed by inflation and have effectively kept increases in deductibles below the rate of health cost inflation and deductibles in other plans. Using the KFF-HRET surveys, we estimate that, between 2006 and 2015,

average HDHP deductibles grew at a compound annual rate of 0.6 percent for single coverage and 1.2 percent for family coverage. By comparison, HMO deductibles grew at compound annual rates of 10.8 percent for single coverage and 13.7 percent for family coverage. The corresponding rates for PPO coverage were 6.4 percent and 5.9 percent per year; for POS plans, they were 7.5 percent and 6.3 percent per year.

There is solid evidence that workers have been shifting to high-deductible plans and that those remaining in more conventional plans are incurring higher costs for health goods and services. Unfortunately, there are limited data and little research exploring the effects on workers' expenditures and health care consumption patterns. One study evaluated utilization patterns and spending by approximately 43,000 workers covered under four employers' health plans in 2014. The workers were first split into four groups (quartiles) by earnings, and then the bottom quartile was split in half by earnings. After controlling for demographics and other relevant characteristics, those in the lowest earning group—the bottom quarter by earnings—used about half the level of preventive services used by the top group, were admitted to the hospital nearly twice as often, and had four times as many avoidable admissions and three times as many emergency room visits (Sherman et al., 2017). While these results do not explain how changes in plan characteristics affected usage, it is likely that lower-wage workers were more sensitive to the direct costs of using health services than their more well-off counterparts. Shifting costs to consumers at the point of usage generally takes a higher toll on the disposable income and health of lower earners than of higher earners.

VII. The Cost of What Ails Us

The earlier comparison of health spending between the United States and Canada showed that our medical costs have absorbed an extra 7.3 percent of our GDP since 1970, compared with health spending in Canada. That means that in 2017, we spent $1.4 trillion more on health care than we would have under spending patterns comparable to Canada's. In the broader comparison with 19 OECD countries, the differential wasn't quite as dramatic, but the U.S. still spent an extra trillion on health care in 2017 that other developed countries could spend elsewhere. Moreover, populations in the 19 comparison countries are, on average, older than ours, so U.S. health spending should be lower. Everywhere in the world, older people consistently use more health care services than younger ones.

Despite our excessive spending on health care, other developed countries have 35 percent more doctors per 1,000 people than we do, and their doctors see an average of 20 percent more patients per year than ours. So, people in other countries visit the doctor 1.6 times more often than we do. They have 75 percent more hospital beds, controlling for our respective population sizes, and their hospital bed occupancy rates are nearly 30 percent higher than ours. The comparison countries have higher hospitalization rates than we do, and their patients stay in the hospital longer when they have babies or suffer from heart attacks. Yet, their life expectancies at birth are around 3.3 years longer than ours. Americans undergo far more MRIs and CT scans, have far more knee replacement surgeries, and spend nearly twice as much on prescription drugs as these other countries, yet these extra health services do not appear to be doing us much measurable good either physically or emotionally.

Why has this great country, which has led the world in productivity, done such a miserably inefficient job of organizing and delivering health services? The numbers suggest we are wasting a trillion dollars or more on health care each year, and health insurance premiums have been sucking the lifeblood out of the rewards workers have earned with their added productivity, leaving many of them with shrinking paychecks. While the waste and wage stagnation and income inequality are bad enough, this is also a story about our deteriorating infrastructure, inadequate pension funding, missing government services and all the other things we can't do and don't have because we are dithering away valuable, hard-earned resources.

One of the few issues on which most politicians and the public agree is the urgency of investing more in our infrastructure. A 2017 report card from the American Society of Civil Engineers gave an overall grade of D to our systems, including aviation, dams, drinking water, energy, hazardous waste, inland waterways, levees, roads, schools, transit and wastewater. Our bridges, ports and solid waste handling received a slightly better grade of C. Only our rail system managed to score a B, and none of our systems earned an A. The engineers noted that nearly 40 percent of U.S. bridges are at least 50 years old, and 9 percent of all our bridges carrying a daily average of 188 million vehicles are structurally deficient. Around 16 percent of the approximately 90,600 dams around the country were found to be potentially highly hazardous. More than half the population lives within three miles of hazardous waste sites. Nearly half the locks on our inland waterway systems are beyond their 50-year design life, and half the ships and barges using them experience delays. The list goes on (ASCE, 2017).

There also appears to be growing support among Republicans and Democrats for spending more on defense. When President Barack Obama took office in 2009, federal defense outlays were $661 billion, 4.6 percent of GDP. Defense spending peaked in 2011 at $706 billion and then began a retreat with the phasing down of military operations in Iraq and Afghanistan. That same year, a budget crisis led to a negotiated agreement to allocate future spending reductions evenly between defense and

other discretionary programs. The resulting "sequestration" was slated to start in January 2013 but was delayed until March. In 2013, defense outlays were $633 billion, 3.8 percent of GDP. By 2016, defense outlays had declined to $593 billion, 3.2 percent of GDP. With all the threats around the world today, there is growing sentiment that the defense cuts have gone too far.

So why bring infrastructure and national defense into a discussion about excessive spending on health goods and services? Much of the infrastructure deficiencies that civil engineers are concerned about and virtually all defense forces and their equipment are financed through national, state and local governments. Any additional government outlays for infrastructure and defense will almost certainly have to be financed through deficit spending. Some observers might conclude that we simply need higher taxes to cover the upcoming costs. We are not attempting to refute this position but believe it is important to consider that federal, state and local governments finance around 45 percent of all health expenditures in this country. If our health care system operated as efficiently as those in many other highly developed countries, our governments could likely fund health care, infrastructure, defense and other functions of government without raising taxes.

At the personal level, it takes little imagination to consider how workers might have spent their missing pay raises. It is important, however, to consider the dynamics of compensation and wage history over the past several decades. Daniel Kahneman and his colleague, Amos Tversky, spent years studying the psychology of the ways people make decisions and respond to potential gains and losses. Their work has played a significant role in the development of behavioral economics in recent years, and Kahneman won the Nobel Prize in Economics for his contribution after Tversky died. In Kahneman's book (2011), *Thinking, Fast and Slow*, he describes the studies that led Tversky and him to understand that individuals react more strongly to losses than to gains around their "reference point."

For workers who learn of an annual pay adjustment, the reference point is their current pay. Our estimate is that the average full-time, full-year worker's pay in the fourth earnings decile was $0.13 per hour higher in 2012 than in 2011. For the worker in the fifth decile, the average net increase was $0.18 per hour. For those same workers who were covered by an average family health insurance benefit through their employer, the reference point on any premium increase was what they were paying before. From 2011 to 2012, the employee's premium for an average plan increased by $0.11 per hour for a full-time, full-year worker. The results in 2013 were better, but those in 2014 were much worse. It is unlikely that workers were using CPI adjustment factors to convert their pay and premium rates into constant dollars but, if they did, their pay was falling as their health costs rose. Most workers didn't need complex calculations to understand that they were losing ground on both ends of the stick. In the context of Kahneman and Tversky's results showing the aversion to losses, such as declines in wages and disposable income, it is hardly surprising that many workers have been concluding that things have been moving in the wrong direction and are looking for a course correction.

VIII. Addressing Causes versus Symptoms

Much of the discussion about health care policy in the United States over the past couple of decades has focused primarily on increasing insurance coverage among the segments of the population without insurance. The coverage mandates in the Affordable Care Act were intended to require individuals without coverage to purchase it or pay a penalty. The subsidies for those with low incomes were intended to overcome the barrier of high costs for those who could not afford insurance in the open marketplace or even in an employer plan.

To the extent that cost control entered into health policy discussions in recent years, it generally took a back seat to expanding access to health insurance. Between 2013 and 2017, U.S. health expenditures rose from 17.2 percent to 17.9 percent of GDP (CMS, 2017). Some of the higher costs might reflect higher utilization by newly insured patients under the ACA, but the average premium for individual coverage under an employer plan increased by 18.25 percent in inflation-adjusted dollars between 2010 and 2017, and the increase was 21.6 percent for family coverage. From 2014 to 2017, the respective increases were 6.50 and 6.95 percent (KFF-HRET, 2017). As measured by premiums in employer-sponsored plans, the upward trajectory of health cost inflation has persisted.

While this analysis was not designed to produce comprehensive policy recommendations, it has yielded some observations we believe deserve attention. There has been significant consolidation of hospitals and other health service providers in recent years, and ample evidence suggests that higher prices have been the result. The pricing of pharmaceuticals in the United States is a significant factor behind the differentials between our spending patterns and those of other developed countries. There is an enormous divergence between the cost of health services delivered under public insurance programs versus those delivered under private insurance plans or provided directly to consumers that has nothing to do with the quantity or quality of the care. The concentration of utilization in services by a small minority of users suggests that these high-cost cases could use more aggressive case management.

Increasing Market Concentration

The U.S. government has regulated the concentration of businesses since the late 19th century. The Sherman Antitrust Act was passed in 1890 to limit the restraint of trade, including price setting by single organizations or groups within an industry. Early in the 20th century, President Theodore Roosevelt's administration used the Sherman Act in its "trust-busting" efforts to dismantle monopolies. Today the U.S. Department of Justice and the Federal Trade Commission oversee all mergers and acquisitions. They measure market concentration using the Herfindahl-Hirschman Index (HHI), which is calculated by squaring the market share of each firm competing in a given market and summing the resulting numbers[16] (DOJ, 2015).

A low HHI score means a large number of firms are competing in a marketplace, while a score of 10,000 means there is only one firm in that market. The Department of Justice and the Federal Trade Commission generally consider an HHI of 1,500 to 2,500 to indicate moderate concentration and an HHI of over 2,500 to signify high concentration. Acquisitions that increase the HHI by 200 points or more in an already concentrated market are presumed to enhance the market power of the combined entity under the federal regulatory guidelines (DOJ, 2015).

16 For example, for a market consisting of four firms with shares of 30, 30, 20 and 20 percent, the HHI is 2,600—that is, $30^2 + 30^2 + 20^2 + 20^2 = 2{,}600$.

The oldest and most extensive analyses of concentration in the health sector and the ramifications focus on the hospitals. Vogt and Town (2006) calculated hospital HHIs for metropolitan statistical areas (MSAs) with populations of 100,000 or more in 1990 and 2003. In 1990, the hospital markets in these areas had an HHI of 1,576, which climbed to 2,323 by 2003. Gaynor and Town (2012) calculated mean hospital market HHIs for U.S. MSAs with populations of less than 3 million every five years from 1987 through 2006. The mean HHI rose from 2,340 in 1987 to 2,440 in 1992, 2,983 in 1997, 3,236 in 2002 and 3,261 in 2006. Fulton (2017) calculated hospital market HHIs for 382 MSAs that included 86 percent of the U.S. population in 2016 as delineated by the Office of Management and Budget (OMB 2015). Fulton estimated that the average hospital market HHI in these MSAs rose from approximately 5,500 in 2010 to roughly 5,800 by 2016. While the MSA marketplaces vary from one study to the next, the pattern of increasing concentration is consistent across them and over time.

Over the last 20 years or so, extensive economic literature has analyzed the effect of hospital concentration on the cost of health services. The studies fall into three classes. In studies relying on reduced-form models, market concentration—typically an HHI score—is regressed on hospital prices and other controlling factors.[17] Several "event" studies have focused on the effects of hospital mergers on prices. These studies compare price changes between consolidating and non-merging hospitals. Simulation models estimate the effects of hospital mergers in specific markets using existing general market data to project demand for services relative to market concentration, costs and other relevant variables, and then create a market model to test alternative scenarios of mergers in market areas.

After reviewing 13 of the reduced-form studies using data from 2001 and before, Vogt and Town (2006) concluded that this approach tended to underestimate the effects of hospital consolidation on prices. They reported that 10 (77%) of the studies found that increased market concentration resulted in higher prices.

- Four event studies found price increases ranging from 23 percent to 66 percent.
- In another study of 22 hospitals in Ohio and 15 hospitals in California, the analysis focused on the pricing of procedures rather than hospital concentration, comparing cases where the procedural HHIs increased by 2,000 points or more with those where the HHI rose 250 points or less. In this study, the prices of procedures in the more concentrated markets grew by only about 10 percent more than those with less concentration. The study suggested that mergers of two or three hospitals in markets with 25 or more hospitals might increase prices by 5 percent to 10 percent.
- One study of San Luis Obispo, California, where the simulated merger of two hospitals left only two hospitals in the area, suggested prices would have risen by more than 50 percent.

Gaynor and Town (2012) reviewed eight reduced-form studies published from 2000 to 2010. Seven of the eight studies found a positive correlation between market concentration and higher prices. The authors summarized nine studies of mergers, noting that the literature was too voluminous to be discussed in detail. Their overall conclusion was that, on average, hospital consolidation had led to sizable price increases, although the results varied, and the event study methodology did not clarify the underlying reasons for these variations.

Structural modeling of growing market concentration provided a broader analytical perspective on hospital consolidation and its implications for health costs. Most of the services delivered to those

17 The reduced form models are simplified econometric models that show the relationship between hospital-market concentration and prices without isolating the factors associated with concentration that result in higher pricing.

not covered by public insurance were financed through private insurance, often through employer health plans, and the insurers often had considerable market leverage. The creation of various provider arrangements with networks of doctors created another area where aggregation and pricing power evolved. The reduced-form and event studies had focused on horizontal consolidation within the hospital sector, but vertical integration also came to play a major role in the health care marketplace—the purchase of physician groups or hiring of doctors who work in the controlling hospital or its affiliated clinics.

In recent congressional testimony, Gaynor (2018) summarized that from 1998 through 2015, the American Hospital Association documented 1,412 hospital mergers, 561 of which took place between 2010 and 2015. He cited separate sources indicating an additional 115 mergers in 2017. According to Fulton (2017), 65 percent of MSAs had hospital HHI scores of 2,500 or higher in 1990, rising to 77 percent by 2006 and to 90 percent by 2016. By 2016, he estimated that 39 percent of U.S. MSAs[18] had HHI levels of 2,500 or higher for primary physicians and that 65 percent had even higher scores for specialists. The dramatic growth in primary physicians being employed by hospitals or health care systems—from 28 percent in 2010 to 44 percent by 2016—was one reason for their increasing concentration. Among the MSAs, 57 percent had HHIs of 2,500 or higher for insurance providers by 2016. Gaynor (2018) noted that the two largest health insurers now control at least a 70 percent share in half of all insurance markets across the country.

A measurable improvement in the post-merger quality of health services could justify some of the price differential, but in fact the reverse appears to be true. In his recent congressional testimony, Gaynor summarized the implications of all the consolidation.

> *Extensive research evidence shows that consolidation between close competitors leads to substantial price increases for hospitals, insurers, and physicians, without offsetting gains in improved quality or enhanced efficiency. Further, recent evidence shows that mergers between hospitals not in the same geographic area can also lead to increases in price. Just as seriously, if not more, evidence shows that patient quality of care suffers from lack of competition (Gaynor, 2018).*

At the same congressional hearing, Dafny summarized her perspective.

> *As you are aware, we have seen – and I believe we will continue to see – consolidation within and across a vast array of healthcare sectors, including hospitals, physician practices, health insurers, pharmaceutical companies, and outpatient facilities. There is substantial academic literature that finds horizontal mergers of competing health care providers tends to raise prices, and very limited evidence to suggest there are offsetting benefits to patients in the form of improved quality. Economists, myself included, also find that less competition among health insurers tends to raise premiums. We have less extensive evidence on non-horizontal mergers in healthcare, that is mergers across providers or firms in different geographies or service categories, but the evidence we have to date also finds systematic price and spending increases, in particular after hospital systems acquire additional hospitals in the same state, and after hospitals acquire physician practices. In a nutshell, research to date suggests that consolidation in the health care industry, on average, has not yielded benefits to consumers. Yet I expect we'll continue to see more consolidation (Dafny, 2018).*

In their testimony, both Dafny and Gaynor suggested that policymakers should seek "to promote competition in healthcare markets." They recommended giving consumers more data to increase transparency about ownership of providers, insurers, prices and quality. They also suggested eliminating policies that unintentionally encourage consolidation and adopting policies that encourage

18 The U.S. Office of Management and Budget designates an MSA as having at least one urbanized area of 50,000 or more population plus adjacent territory that has a high degree of social and economic integration with the core measured by commuting ties (OMB, 2015). In 2016, the 382 areas that met the criteria included 86 percent of the U.S. population.

competition. In this latter regard, Dafny specifically called for private exchanges in which workers could choose from a wider array of health plans than a single employer can offer. She noted that consumer behavior in the public exchanges suggests that individuals are more price sensitive and willing to accept narrower network plans than employers. This is supported by a recent analysis of the buying patterns of employees in an employer-sponsored private exchange, which showed an increasing migration toward less expensive HDHPs with an HSA (PERC, 2018, p. 14).

The problem with contemporary recommendations to make health care markets more competitive is that the horse is already out of the barn—at least 90 percent of metropolitan regions already have highly concentrated hospital markets and the consolidation of insurance and physician markets is closing fast. In the final paragraph of her presentation for the congressional hearing, Dafny acknowledged that consolidation is already widespread and likely to continue. There are tremendous regulatory and capital burdens that make entry into these markets extremely difficult, leading her to conclude that, "In short, we cannot rely on the market and on antitrust enforcement to 'correct' consolidation that does not deliver benefits to consumers." (Dafny, 2018, p. 3).

Health Care Pricing, Some Fish and Some Foul

Concerns about the economic consequences of market concentration are not new. Malthus (1815) wrote about the abnormal rents that accrued to monopolies and possibly drew the first distinction between what he called "artificial" and "natural" versions of market control. He cited the production of French wines as an example of a natural monopoly, where the special nature of the "soil and situation" in vineyards kept supply far lower than demand, leading to "excessively high prices." In the late 19th and 20th centuries, concerns about market domination prompted U.S. policymakers and law enforcement authorities to try to break up individual firms and associations of firms. They took on the major industries of the time, including the railroads (*Northern Securities Co. vs. the United States*, 1904), the meatpacking industry (*Swift & Co. vs. the United States*, 1905) and the petroleum industry (*Standard Oil of New Jersey vs. the United States*, 1911). Where policymakers recognized natural monopolies arising from specialized production technologies or economies of scale, they created governmental frameworks to regulate pricing, entry and other operations.

Given the disinclination of today's politicians to don the mantle of trust busting worn by earlier policymakers, there has been surprisingly little demand for more aggressive price regulation of privately financed health goods and services. Some readers will reflexively respond to this suggestion with apoplexy, hopefully not fatal. A bit of reflection, however, might uncover some redemptive benefits to the proposition. Such regulation would not require anyone to give up their current health plan or physician(s). Moreover, there is already a nationwide, administered pricing payment system purchasing health services at lower costs than commercial insurance plans. The operational reach of this system now extends far beyond the original charter of the governmental entity creating the administered prices.

Maeda and Nelson (2017) used 2013 MSA hospital claims data from Aetna, Humana and United Healthcare for participants in employer and Medicare Advantage plans to compare their payments for hospital inpatient services with payments under Medicare's fee-for-service (FFS) program. For the non-Medicare population, the analysis focused on the top 20 diagnostic-related groups (DRGs), which included 35 percent of all stays and 30 percent of all payments by the plans. For Medicare Advantage participants, the analysis also focused on the top 20 DRGs, including 35 percent of all stays and 26 percent of all payments. For each sampled case in each group, the authors applied the Medicare FFS payment rules based on the hospital's location, the assigned DRG and other relevant factors.

Maeda and Nelson estimated that for hospital stays in 2013, after controlling for the mix of patients and hospitals, average commercial rates were 89 percent higher than Medicare FFS rates: 88 percent higher for surgical procedures and 89 percent higher for medical stays. The Medicare Advantage rates, on the other hand, were comparable to the Medicare FFS rates, averaging $10,557 versus $10,716, respectively (Maeda and Nelson, 2017, pp. 16-17).

Medicaid is the third largest financier of hospital services in the United States and its reimbursement rates for hospital services track more closely to Medicare than to private insurance, although the rates vary more by state. A recent analysis compared Medicaid and Medicare hospital reimbursement rates across 18 DRGs, looking at Medicaid rates on two bases. The first was the direct marginal payment for services, while the second included supplemental lump-sum payments to hospitals. The latter was considered the more complete comparison because it included the full costs of hospital care under Medicaid. For 16 of the 18 DRGs, the average Medicaid payment was larger than the Medicare payment and, on average for the entire group, the Medicaid net payment was 6 percent higher than the Medicare payment. Across all treatment groups, the average Medicaid payment was higher than Medicare in 25 states and lower than Medicare in 22 states[19] (MACPAC, 2017).

The data are far more limited on the relative pricing of other services delivered under major insurance alternatives. Trish et al. (2017) analyzed claims data from 2007 through 2012 for one national insurance company, including 15.0 million Medicare Advantage claims, 120.7 million traditional Medicare claims and 8.5 million commercial insurance claims.[20] The analysis looked at payments from both insurers and patients to treating clinicians and health care facilities. Generally, Medicare Advantage reimbursements tended to "anchor" more closely on Medicare rates than on commercial rates. For the most common procedure—a standard mid-level office visit for an established patient—the average Medicare Advantage rate was 96.9 percent of the Medicare rate. Medicare Advantage was 91.3 percent of the Medicare rate for cataract removal and 100.2 percent of the Medicare rate for interpretation of a CT scan in an emergency department. For some laboratory services and medical devices, the Medicare Advantage prices were only two-thirds to three-fourths of the prices paid by Medicare.

For commercial rates, Trish et al. (2017) found that the average physician reimbursement for a standard office visit for an established patient was 107.2 percent of the Medicare rate. Differences between commercial and Medicare rates tended to be larger for specialists. For colonoscopies, the average price paid under commercial insurance in a hospital outpatient department was 152.4 percent of the Medicare rate, versus 129.1 percent in an ambulatory surgery center. For cataract removals, the respective differences were 125.0 percent and 107.1 percent of Medicare rates.

The authors noted that the Medicare reimbursement rates for physician services do not vary by delivery location, and that the higher rates for commercial patients in hospitals may reflect the hospitals' stronger negotiating position with commercial insurers. Lab fees paid by commercial insurance were about 75 percent of the rate paid by Medicare, and the differences were similar for face masks for CPAP machines, walkers and oxygen concentrators used in patients' homes. The Medicare Advantage plans tended to be more closely anchored to commercial rates than to Medicare on these sorts of items.

19 The comparison included the District of Columbia but excluded Kansas, Maine and Nebraska because of incomplete data, and excluded Hawaii because of an insufficient sample size.

20 Claim counts suggest this insurer was a relatively small player in the private insurance market and the analysis was restricted to non-capitated HMO and PPO plans excluding the insurer's indemnity and fee-for-service plans.

In 2016, approximately one-third of all U.S. health care expenditures (not including dental expenses) were for hospital care. Private insurance covered 39 percent of costs, Medicare paid 25 percent and Medicaid paid 18 percent. In 2016, hospital services accounted for 40 percent of spending by private insurance and Medicare (each) and 34 percent of Medicaid spending. Private insurance spent $426.7 billion on hospital services, Medicare spent $267.5 billion and Medicaid spent $189.8 billion (CMS, 2017, NHE Table 19).

Adjusting the 2016 expenditures for the price differentials paid by private insurers versus Medicare estimated by Maeda and Nelson (2017) and Medicaid versus Medicare (MACPAC, 2017) suggests that private insurance covered 34 percent of hospital services and paid 48 percent of hospital costs. By comparison, 40 percent of hospital services were delivered under Medicare, which covered 30 percent of total hospital costs; and 27 percent of services delivered in hospitals were provided under Medicaid, which paid 22 percent of total hospital costs.

In 2016, 30 percent of total health expenditures financed by private insurance plans were for physician fees and other professional services (not including dental spending). The comparable amounts were 26 percent for Medicare and 11 percent for Medicaid. The three insurers combined paid for three-quarters of physician fees and other professional services. Of the three combined payments for these services, private insurance accounted for 56 percent, Medicare for 30 percent and Medicaid for 14 percent. A very large and growing share of medical costs in this country is already paid under a system of administered prices.

Prescription drugs are another part of the story, in some ways more complicated than all the rest. The Generic Pharmaceutical Association (2018) estimates that, while 89 percent of dispensed prescriptions are generics, they account for only 26 percent of U.S. drug costs. Express Scripts (2017), one of the largest prescription fulfillment administrators in the country, regularly publishes the *Express Scripts Prescription Price Index,* which tracks prices for the most commonly prescribed generic medications, the most commonly prescribed brand medications and the BLS CPI. They began their index in January 2008 and set it to 100 for each of the three series. In 2016, the generic drug index equaled 26.27, the brand drug index equaled 307.86 and the CPI equaled 114.38. In other words, generic drug prices had fallen 74 percent, brand drug prices had risen 208 percent and consumer prices had risen 14 percent.

Not only are the top-selling brand-name drugs sold in the United States more expensive than their generic counterparts, they are considerably more expensive than the same drugs sold outside the United States—often twice as expensive, even after discounts (Langreth et al., 2015). In other countries, regulatory bodies negotiate prices with drug makers and may reject drugs that are priced too high. In the United States, drug makers generally set prices without interference. A major difference between the pricing of generic and brand drugs in the United States is the role of competition in the respective markets.

Generic drugs cannot be marketed in the United States until seven years after a newly approved "small molecule" or chemical-based drug receives FDA approval. For "large molecule" or biological drugs, generic substitutes are not permitted for 12 years. U.S. patent law protects new inventions from competition for up to 20 years. Because patents on new drugs are generally issued before the FDA approval process starts, the patent protection typically expires somewhat less than 20 years after the drug is first sold. New drug developers can receive extensions on their patent protection to exclude the duration of the approval and clinical trial stages. The median duration of patent protection is 12.4 years. For drugs that underwent priority review and received special developmental designations, the median protection period was 14.8 years (Wang et al., 2015).

Even drugs still under patent, however, might face competition. In 1972, biologists working at Sankyo in Japan isolated a metabolite, a statin they named compactin, from a rice mold that inhibited cholesterol synthesis. In 1976, Merck Research Laboratories signed a nondisclosure agreement with Sankyo and acquired samples of compactin to begin its own developmental program. By 1979, Merck researchers had developed a statin similar to compactin, which they named lovastatin. While Merck was working on its development, researchers at Sankyo ran a series of successful tests reducing cholesterol levels in hens, dogs and monkeys. A lead researcher on that project, Akira Endo, teamed up with a physician at Osaka University Hospital to conduct clinical trials in 1978 and 1979, which found compactin could reduce cholesterol in people with an inherited high cholesterol trait known as heterozygous familial hypercholesterolemia. But in 1980, Sankyo discontinued the development of compactin because of problems occurring in dogs that received high dosages of the substance and developed a second statin called pravastatin (Akira, 2010).

In 1982, clinicians at Oregon Health Sciences University and the University of Texas replicated the Japanese test of compactin on a small group of people with the inherited trait for high cholesterol using Merck's lovastatin. The study found dramatic reductions in cholesterol with few side effects. These tests motivated Merck to begin clinical trials of lovastatin, ultimately leading to FDA approval of the first statin drug for commercial use in fall 1987. Subsequently, other companies developed and marketed two semi-synthetic statins (simvastatin and pravastatin) and four synthetic statins (fluvastatin, atorvastatin, rosuvastatin and pitavastatin). These drugs are better known by their trade names: lovastatin as Mevacor; simvastatin as Zocor by Merck; pravastatin as Pravachol or Pravigard by Bristol-Myers; fluvastatin as Lescol or Lescol XL by Novartis; atorvastatin as Lipitor by Pfizer; rosuvastatin as Crestor by AstraZeneca; and pitavastatin as Livalo licensed by Eli Lilly from Kowa in Japan. Slight differences among these drugs allowed each company to patent its own version.

Despite the number of these drugs in the market with arguably similar levels of effectiveness, the patents seemingly convey pricing benefits for the drug companies. A visit to www.goodrx.com/statins (on 5 March 2018) showed the prices of various brand-name statins and indicated whether generic versions were available. Lipitor and Zocor were $10 per prescription, Crestor at $16, Pravachol at $13 and Lovastatin at $9. Among those without generic versions, Livalo listed for $272, Lescol for $78, Lescol XL for $130 and Altoprev for $2,354. The descriptions of these considerably more expensive options indicated that discount coupons or specials might be available. The broad range of prices for drugs that would likely have the same effect may occur because many physicians are unaware of the prices, and patients with generous drug coverage are similarly unmotivated to comparison shop (Kesselheim et al., 2016).

A larger problem with prescriptions complicates consumer choices regardless of coverage or motivation. Insulin for treatment of diabetes has been around for nearly 100 years, yet there is no generic version available in the United States today. The originators at the University of Toronto sold their patent for insulin to the university for $1 to make the product widely available at a reasonable price. In 1923, the original team established an arrangement with Eli Lilly under which Lilly could patent product developments for the United States, but the University of Toronto would own the rights for the rest of the world.

In the early years, insulin was produced by extracting insulin from the pancreases of cows and pigs. Innovations in the 1930s prolonged the effects of single doses of insulin, and further advances in the immediate aftermath of World War II enabled many people to function with one daily injection. Enhancements in the 1970s allowed for the removal of earlier additives from insulin, and new manufacturing techniques improved its purity. By the late 1970s, Genentech developed a technique to inject the gene coding for human insulin into bacteria that would then grow and produce insulin

that could be harvested for human use. Genentech licensed its "recombinant" human insulin to Eli Lilly, which brought the product to market in 1982, eliminating the need for insulin from cows and pigs. Norvo Nordisk entered the U.S. insulin market about the same time Genentech and Eli Lilly combined forces and developed its own marketable recombinant insulin by 1988. Since then, scientists have continued to improve upon insulin's physiological effects on patients, and every advance has resulted in new patents (Greene and Riggs, 2015).

Dr. Jeremy Greene, one of the authors of the history of the development of insulin summarized in the prior paragraph, is a professor of medicine and history at Johns Hopkins University and a practicing physician in Baltimore. He became interested in the historical development of insulin upon realizing that many of his patients were not properly managing their blood sugar because they could not afford the insulin they needed. Greene called several local pharmacies in search of low-cost options but was told there was no generic version of the drug available. Puzzled about why there was no generic for a drug that had been available for more than 90 years, he set out to understand why (Kelto, 2015).

In their analysis of the evolution of insulin, Greene and Riggs (2015) describe a phenomenon whereby drug companies create "me-too" drugs. These drugs become part of a process known as "evergreening," where drug companies repeatedly obtain a new patent for a marginally improved version of a drug, thus extending its patented status indefinitely. The marginal improvements covered under the new patent preclude other companies from matching the "superior" product. So, any generic version of the original must compete in the market with a "new" and supposedly superior product. Generic manufacturers sometimes sue to invalidate these extended patents, but the cases are typically settled out of court and the settlements are rarely made public. In some cases, companies with patents refuse to provide samples of their patented drugs to stop generic companies from developing equivalent substitutes. While incremental changes to a medication might reflect a sincere desire to improve the product, even then, the net effect is to reduce competition, resulting in higher prices that might keep some people from obtaining drugs they desperately need.

Greene and Riggs concluded that the advances in insulin over the decades did not fit clearly into the "me-too" pattern—many of the improvements have helped people with diabetes live more comfortable, healthier lives. At the same time, they concluded that patients who cannot afford the latest options have not been well served by newly patented products that are only marginally more effective than those whose patents have long since expired. Eliminating the cows and pigs from the process of making insulin turned out to be less of an improvement for Greene's patients than it first appeared. The reporting of the wonders of modern medicine often misses the ramifications for patients who were doing fine with the older technology.

The insulin history traced by Greene and Riggs shows how the combination of product improvements and market control has pushed prices significantly higher over the years. Johnson (2016) traces the history of insulin pricing: a vial listed at $17 in 1997 ($24 in 2016 prices) was $138 in 2016. Another form of insulin that was introduced at $21 a vial 20 years ago ($30 in 2016 dollars) listed for $255 in 2016. Drug companies claim the price histories are misleading as they often discount drugs for prescriptions filled through pharmacy benefit managers (PBMs) for insurance plans and retail pharmacy chains. But discounts negotiated by bulk buyers do not help individual consumers buying retail.

Johnson described a young woman with type-1 diabetes who, after losing her job and employer health plan, saw her monthly prescription costs skyrocket from $10 out-of-pocket to $420. After the sticker shock wore off, this young woman discovered an older version of insulin that was considerably cheaper and met her medical needs. Before losing her job, she had no clue about the insulin options available or the much higher price of the version she had been taking.

The discounts negotiated by private insurers for insulin and other drugs are further confirmation that aggregation on the demand side can ameliorate prices, even from monopolistic or oligopolistic suppliers of drugs. The federal government, which sets prices for hospital services, has been far more timid in pushing back on drug prices paid under Medicare Part D. Under Part D, the Centers for Medicare and Medicaid Services (CMS) contracts with private insurers to provide drug benefits to enrollees. The Medicare Modernization Act, which established the Medicare Part D prescription program, includes a "noninterference" clause that specifically states that the Secretary of Health and Human Services (HHS) "may not interfere with negotiations between drug manufacturers and pharmacies and PDP [prescription drug plan] sponsors, and may not require a particular formulary or institute a price structure for the reimbursement of covered part D drugs."

Many assume this means there are no drug-price negotiations under Medicare Part D, but the private insurers contracted by CMS negotiate aggressively to lower costs and to acquire enrollees. Under Part D, PDPs negotiate with drug manufacturers for cost-reducing rebates for plan participants and the government. Across the 12 drug-therapy classes most used by Medicare enrollees, costs to plans and enrollees are 35 percent under list prices. Net costs to Part D range from 46 percent to 69 percent below list prices, even for drugs in categories protected from significant formulary controls. The Congressional Budget Office concludes that repealing the non-interference clause would not save money because it seems unlikely that federal negotiators could out-bargain the PDPs without a very restrictive national formulary (CBO, 2015). In Part D, plan bids are the projected average cost per person of delivering the benefit, and plans are at risk of financial losses if they underbid. Despite expansion of the Part D benefit under the ACA, Part D plan bids have declined seven years in a row and are lower today than they were in the program's first year. The takeaway is that where we see competition, we usually also see lower costs.

Under Medicaid, drug producers are required to enter into national rebate agreements with the Secretary of HHS. The essence of the agreement is that, for their drugs to be covered under Medicaid, the producers must submit to states their "best-price offer" of drugs to any purchaser, not including the Department of Veterans Affairs (VA) and Department of Defense. The statutory rebate is (1) the greater of 23.1 percent off the drug's list price or the best price offered to any other private or public purchaser, and (2) an additional adjustment if the drug's list price has risen faster than inflation. Generic drugs have a separate rebate formula including a minimum 13 percent of the list price (*Health Affairs*, 2017).

The ACA requires the Inspector General at HHS to evaluate the relative discounts on drugs received under Medicare Part D and Medicaid. Levinson (2011) summarized the 2009 comparison based on 100 brand-name drugs and 100 generics with the highest expenditures under Medicare Part D. For the generic drugs, there were almost no Part D rebates and the Medicaid rebates reduced expenditures by only 3 percent. Medicaid rebates on the brand-name drugs were three times the Part D rebates at the median, and at least twice the Part D rebates for 68 brand-name drugs. The Part D rebates were larger than the Medicaid rebates for only seven of the drugs compared. In 2009, rebates for the Part D drugs reduced program expenditures by 19 percent; for Medicaid, the reduction was 45 percent. Forest Gump's observation that "stupid is as stupid does," may be an apt observation of the price differences in this case.

Drug prices under the VA program are also negotiated based on the drug manufacturers' most-favored commercial customer pricing or on a statutorily established discount of 24 percent. The VA can also exclude individual drugs from its formulary and substitute cheaper alternatives, which further reduce program costs (Kesselheim, 2016). In essence, the only significant federally financed health program where the government does not negotiate drug prices directly is Medicare—the largest of its

health insurance programs by far. Under Medicare's Part D program, private insurers take on the task of negotiating prices outside of administered statutory price arrangements. In 2016, Medicare accounted for 29 percent of all U.S. drug expenditures. As shown in *Table 12*, the Medicare population uses many of the most frequently used classes of drugs at much higher rates than the rest of the population. The potential benefit of aligning Medicare Part D policy with that of other federal programs could be significant, but would involve lessened access to drugs for some consumers according to CBO and MedPAC.

Table 12. Percentage of total and 65+ users of prescription drug classes in past 30 days, 2011-2014

	Total	Age 65 and older
Antihyperlipidemic agents (high cholesterol)	13.7%	47.1%
Analgesics (pain relief)	10.5%	18.2%
Antidepressants (depression and related disorders)	13.9%	24.4%
Proton pump inhibitors or H2 antagonists (gastric reflux, ulcers)	9.4%	25.9%
Beta-adrenergic blocking agents (high blood pressure, heart disease)	8.4%	29.8%
ACE inhibitors (high blood pressure, heart disease)	6.6%	21.0%
Antidiabetic agents (diabetes)	6.3%	17.1%
Diuretics (high blood pressure, heart disease, kidney disease)	6.7%	22.7%
Thyroid hormones (hypothyroidism)	8.0%	21.7%
Antihypertensive combinations (high blood pressure)	4.8%	14.6%
Calcium channel blocking agents (high blood pressure, heart disease)	4.7%	18.7%

Source: National Center for Health Statistics (2016), Table 80.

Drug-price rebates may reduce Medicaid expenditures but they create problems elsewhere in the system. The Medicaid rebate program was created by the Omnibus Budget Reconciliation Act of 1990. By 1994, it was clear that the program's best-price feature was pushing prices higher under private plans because drug manufacturers were less willing to offer private purchasers large drug discounts that would have to be passed along to Medicaid (GAO, 1994). By early 1996, the Congressional Budget Office estimated that the largest discounts from drug manufacturers had fallen from an average of 36 percent in 1991 to 19 percent in 1994 (CBO, 1996). The market distortions introduced by Medicaid's "best-price" rebates have persisted but have taken on a new complexion over the years, and today they are complicating—if not inhibiting—the utilization of "novel" pricing arrangements as summarized by Sachs et al. (2018).

In broad terms, requiring drug companies to offer Medicaid the best price in the marketplace is blocking the shift to value-based drug pricing. For example, sildenafil is the base drug in Viagra, which treats erectile dysfunction, and it also serves as the base for Revatio, a treatment for pulmonary arterial hypertension. The two drugs have different amounts of sildenafil and different prices. The best-price rule treats these as different drugs because they have separate treatment indications under the National Drug Coding (NDC) system. By comparison, colchicine (Colcrys), which is approved for both acute gout and familial Mediterranean fever, has a single NDC code. Under

the best-price rule, Colcrys would likely be treated as a single drug, although it might be offered at different prices because of dosage, utilization rates or other market factors. The same issue arises for drugs that are used for treatment of diseases without formal approval (Sachs et al., pp. 9-10).

Beyond the potential multiple applications of drugs, value-based pricing accompanied by a money-back guarantee can reduce the eventual price to below market value, even to zero if the prescription does not work. Few drug producers are willing to enter into such agreements if it means they have to give Medicaid the best price under which a drug is provided.

Another potentially advantageous model discourages pricing flexibility for extremely expensive drugs. For example, a 10- or 12-week treatment for hepatitis C might cost $100,000 but provide lifetime benefits, so spreading the treatment cost over the benefit period rather than the treatment period could increase access to treatment. Houses are usually financed under a widely available payment model that allows the mortgage to be paid off over time. But the best-price model considers the immediate cost to the consumer or insurer as the drug price under Medicaid. Sachs et al. (2018, p. 13) suggest that the current pricing practices might also encourage pharmaceutical companies to develop drugs that patients take throughout their lives rather than alternatives that could offer a complete cure.

The unfortunate effects of best-pricing rebates for Medicaid are only part of the picture. Drug pricing in employer-sponsored health plans is such an opaque "pea under the shells" arrangement that it would have made W.C. Fields exclaim with wonder, "Who put the lemonade in my lemonade!"

To the naked eye, plan administrators or the PBMs they contract with pay drug wholesalers' list prices. But the drug plan administrators negotiate discounts based on accepting certain drugs in their formularies, the amount of drugs being purchased and other market factors. These negotiated prices are proprietary, so one purchaser never knows what another receives. Legislators and regulators have been reluctant to mandate such disclosures because they fear that price transparency might push prices even higher given the near oligopoly of PBMs.

Many plan sponsors have established formularies under their drug plans where copayments vary by tier to encourage the use of lower-priced options. For example, the copayment might be $15 for generic drugs, $35 for preferred brand drugs, $60 for non-preferred and off-patent brands, and 20 percent to 30 percent of the price for expensive specialty drugs. Brand-name drug manufacturers realize that these tier structures discourage plan participants from buying their brands, so they often offer copay coupons to entice drug shoppers back to their higher-cost brands.

Using data from 2007 to 2010, Dafny, Ody and Schmitt (2016, p. 11) reported coupon values from $20 to $150 per prescription. When the pharmacy accepting the discount coupon reports the prescription cost back to the insurer, it does not indicate whether the copay was paid by the consumer or the drug company. These coupons can potentially override the copay incentives built into an insurance plan. So, a consumer can fill a prescription using a coupon to cover the copay level, but the plan ends up paying for the high-cost brand-name drug when a much cheaper generic option is available.

Not only do these coupons influence consumer choices, they also appear to increase the prices of brand-name drugs over time. Dafny and her colleagues (2016, p. 20) estimated that, when coupons were available, the prices of brand-name drugs rose by 12.2 percent a year compared to 7.1 percent without coupons. For drugs where a generic alternative was introduced between June 2007 and December 2010, they estimated that coupons increased retail spending by at least $700 million and as much as $2.74 billion (Dafny et al., 2016, p. 23). The estimates do not reflect the cost of brand-

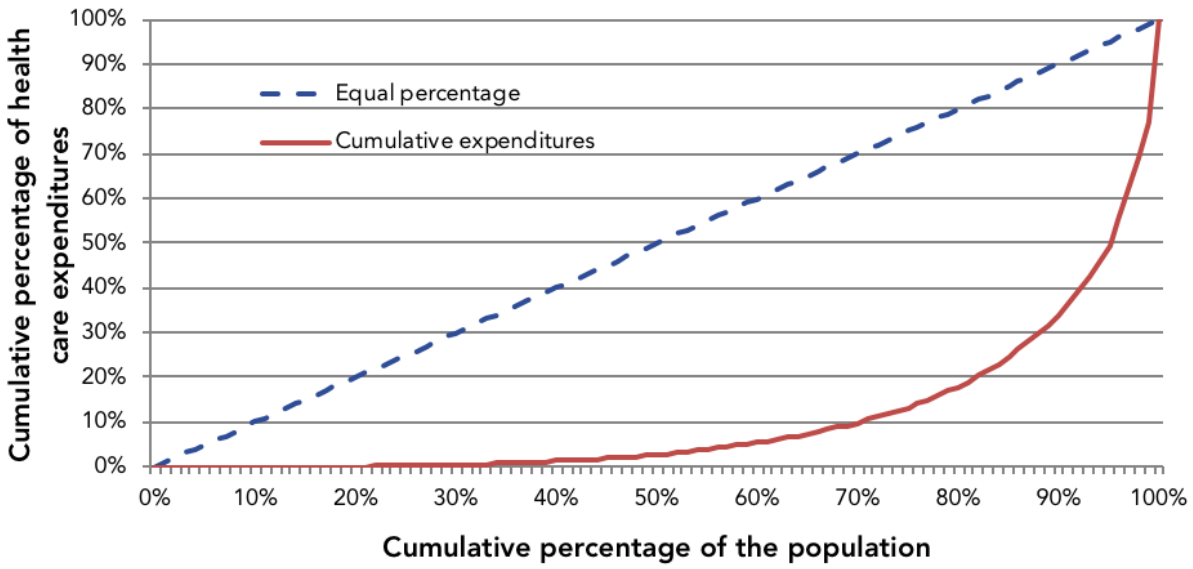
name drugs with generic equivalents that were introduced before June 2007. These coupons might be reducing out-of-pocket costs for plan participants but they are driving up plan costs, which ultimately increases premiums, the costs of which are passed on to workers either through wage adjustments, as we demonstrated earlier, or through higher employee premiums.

Brand-name drug manufacturers have one game going with plan participants, and another one involving rebates to plan sponsors and their PBMs. The rebates are paid after the drug is sold and can be based on the volume of drugs purchased from the producer, the volume of the specific drug or incentives to get a producer's products into health plan formularies. PBMs typically pass a portion of the negotiated rebate back to the plan sponsor. These rebates are often not shared with plan participants, thus raising their out-of-pocket share of the prescription cost. For example, suppose a consumer buys a $200 drug with a $35 copay. At retail, the consumer pays 17.5 percent of the drug cost ($35 ÷ $200), and the plan pays the residual 82.5 percent. Now suppose the plan sponsor gets a 20 percent rebate against the list price, so the drug's net cost is $160, with the consumer still paying the $35 copay, which is now 21.88 percent of the drug cost ($35 ÷ $160). Garthwaite and Morton (2017) cite an example of how this system can increase the price of drugs and profits for the PBMs. In the example, the producer raises a drug price by $10 but reimburses the PBM for $9 in the form of a higher rebate. Given there is little market competition for either the drug or the PBM's operations, the PBM can pass $8 back to the plan sponsor, so the drug producer and the PBM each net an added dollar. The PBM has no incentive to negotiate a lower price because higher drug costs increase its administrative revenues. While the participant's copay might remain the same, the relative share of the plan's cost to the participant increases accordingly. The poor sap without health insurance who buys the drug directly from the pharmacy has to pay the full $10 more. Yes, indeed, "who put the lemonade in my lemonade?"

Moving from Volume to Value; from Health Service Delivery to Health

Ameliorating the effects of market concentration on prices in the hospital, physician and drug sectors, as well as the additional complications in the latter, would generate tremendous savings, but responding to the concentration of service utilization among small segments of the population should also be part of any solution. *Figure 7* shows the concentration of U.S. health expenditures in 2014. The dashed line shows cumulative health care expenditures evenly distributed across the population; the solid line shows the actual cumulative expenditures. The year makes little difference, as the spending pattern has hardly changed over at least the last couple of decades. More than half the population spent less than 3 percent of health dollars in 2014, and 70 percent spent 9.9 percent. The top 10 percent spent two-thirds, the top 5 percent spent half the money, and nearly one quarter of all health care dollars were spent by the top 1 percent.

Figure 7. Concentration of U.S. health care expenditures for civilian noninstitutionalized population in 2014



Source: Agency for Healthcare Research and Quality, *Medical Expenditure Panel Survey*, Household Component, 2014.

As mentioned in the introduction, U.S. health care expenditures for 2016 were reported to be $3.3 trillion. Excluding medical research, capital investments and the like, personal health care expenditures that year were slightly less than $2.8 trillion for medical goods and services rendered to individuals. That includes expenditures for hospital care; professional services; other health, residential, and personal care; home health care, nursing care facilities and continuing care retirement communities; prescription drugs; and durable and non-durable medical equipment. Total expenditures are the sum of out-of-pocket, health insurance and other third-party payments. Average per capita spending on personal health care in 2016 was $8,771, but one must dig deeper for meaningful numbers. Among those in the bottom half of the spending distribution, average per capita spending was only $491. People in the 50th to the 80th percentile of the distribution averaged $4,415, while those in the 80th to the 90th percentile averaged $13,946. Average costs rose to $27,717 for people in the 90th to the 95th percentile, to $60,522 for those in the 95th to 99th percentile and, finally, to $199,985 for individuals in the top 1 percent.

We should explore all avenues to rein in excessive health spending, but the concentration of spending on a small percentage of the population suggests tremendous leveraging opportunities. No doubt, some of the most expensive patients in *Figure 7* suffer from hepatitis-C or similarly treatable diseases, which might be cured with drug therapy that costs $100,000 or more, but many incur high costs through a much more diversified portfolio of treatments. The health problems faced by this latter group are generally multifaceted and complex. Moreover, they are receiving treatment from a health system plagued by both high prices and inadequate management of service delivery. Jauhar (2014) cited a 50-year-old patient with shortness of breath who had been admitted to the hospital where Dr. Jauhar and a colleague were on staff. Dr. Jauhar summarized:

During his month long stay, which probably cost upward of $200,000, he was seen by a hematologist; an endocrinologist; a kidney specialist; a podiatrist; two cardiologists; a cardiac electrophysiologist; an infectious-disease specialist; a pulmonologist; an ear, nose and throat specialist; a urologist; a gastroenterologist; a neurologist; a nutritionist; a general surgeon; a thoracic surgeon; and a pain specialist. The man underwent 12 procedures, including cardiac catheterization, a pacemaker implant and a bone-marrow biopsy (to work up mild chronic anemia). Every day he was in the hospital, his insurance company probably got billed nearly $1,000 for doctor visits alone. Despite this wearying schedule, he maintained an upbeat manner, walking the corridors daily with assistance to chat with nurses and physician's assistants. When he was discharged (with only minimal improvement in his shortness of breath), follow-up visits were scheduled for him with seven specialists.

This case, in which expert consultations sprouted with little rhyme, reason or coordination, reinforced a lesson I learned many times in my first year as an attending [physician]: In our health care system, if you have a slew of physicians and a willing patient, almost any sort of terrible excess can occur (Jauhar, 2014, p. 94).

Hayes et al. (2016) analyzed health care expenditures from the 2009-2011 Medical Expenditure Panel Survey (MEPS)-Household Component[21] to understand which illnesses and conditions lead to high health care utilization and how patients and doctors are using the system. Ninety-four percent of adults whose expenditures fell in the top 10 percent over the two-year analysis period reported having three or more chronic diseases. Compounding matters, 39 percent of this high-cost group also had a functional impairment that limited their ability to perform activities of daily living or instrumental activities. Looking at expenditures in a single year, 76 percent had three or more chronic diseases, and 19 percent of this group also had a functional impairment.

In the fee-for-service model, Dr. Jauhar's example explains the potentially very high-cost outcome. Jauhar (2014, p. 94) observes, "There are many downsides to having too many doctors on a case. The specialists' recommendations are often at cross purposes. The kidney doctor advises 'careful hydration'; the cardiologist, discontinuation of intravenous fluid. Because specialists aren't paid to confer with one another or coordinate … they often leave primary attending(s) [physicians] without a clear direction as to what to do."

In recent years, there has been growing interest in shifting away from the fee-for-service model to "value-based" care, where the goal is to coordinate the delivery of the services patients need to get better and stay better. At least in theory, providers are reimbursed for value—which means delivering services and treatments that improve health, reduce or at least manage the effects of chronic ailments, and help patients attain healthier lifestyles—rather than for individual services. A crucial element of value-based care is using periodic assessments as the basis for continuing program improvements. While the primary goal is to help patients get healthier, the expectation is that value-based delivery of services will reduce costs as well. To encourage experimentation and development of these models, the ACA encouraged groups of physicians to contract with the government as "accountable-care organizations" that would deliver care to Medicare beneficiaries more effectively and efficiently. When accountable care organizations save money, a share of the savings is rebated back to the group.

At the hospital level, CMS introduced a hospital value-based purchasing (HVBP) program in 2011 using Medicare reimbursement incentives to reward high-performing hospitals. The goal was to increase patient safety and satisfaction using incentives based on quality of care rather than fees for services. The program combined bonuses and penalties, together worth 2 percent of total Medicare payments to hospitals, based on how well the hospitals met quality measures or improved their

21 MEPS is a set of large-scale surveys of families and individuals, their medical providers and employers across the United States. MEPS is the most complete source of data on the cost and use of health care and health insurance coverage.

performance over time. After two years, an evaluation compared 30-day risk-adjusted mortality rates for acute myocardial infarction, heart failure and pneumonia between 2,919 hospitals participating in the HVBP program and a nonparticipating control group of 1,348 hospitals. The evaluation concluded that the differences in mortality trends were small and statistically non-significant. The researchers did not find better outcomes in any subgroups of hospitals in the HVBP group relative to the control hospitals (Figueroa et al., 2016).

A companion study measured the effects of the HVBP program on patient satisfaction as measured by a CMS survey, the Hospital Consumer Assessment of Healthcare Providers and Systems. The assessment period ran from 2008—before the HVBP program started—through 2014, and again included participating and nonparticipating hospitals. Overall, patient experience ratings improved by 6.1 percentage points over the six-year period, but most of the improvement occurred before the program was implemented, and there was no evidence that patients treated in HVBP hospitals were any more satisfied than those in other hospitals (Papanicolas et al., 2017).

The Commonwealth Fund recently reviewed the operations of CareMore, a Medicare Advantage plan that started in 1993 as a small regional medical practice in southern California and now serves 100,000 patients across seven states. Its business model aims to identify high-risk patients and give them coordinated services, and the plan partners with primary physicians who refer high-risk patients to CareMore Care Centers for treatment. Some patients use the centers for a single episode and then transition back to their primary physician for ongoing health needs, while those with major continuing ailments might receive care from the centers for years. The partnering primary physicians are paid on a capitated basis so there is no penalty for handing off a patient to CareMore, and doing so might free up time and resources for additional patients. Nurse practitioners, medical assistants and other non-physician staff are responsible for delivering much of the care that would typically be dispensed by physicians, thus freeing up doctors to oversee care provided in hospitals and skilled nursing facilities.

Individual cases in the hospital setting are managed by physicians, generally internists, known as "extensivists" in the CareMore environment, who provide general medical treatment and oversee the work of specialists to ensure that the combined package of services is appropriate for the patient's needs and quality of life. Overall case management is handled by nurses who meet regularly with the extensivists to keep abreast of treatment progress, handle preparations for the post-discharge period and facilitate communications with patients and their families. Part of the task of these case managers is to assess patients' nonmedical needs and link them with local service agencies that can help. In 2015, CareMore had 20 percent fewer hospital admissions, 23 percent fewer bed days and 4 percent shorter stays than fee-for-service Medicare, and its costs were estimated to be 1 percent to 8 percent less than those incurred by comparable plans in 2014 (Hostetter, Klein and McCarthy, 2017).

Bleich et al. recently summarized 27 evaluation studies of five different model components of the framework of value-based care. The studies were completed between 2008 and 2014. The five models of care were care and case management, chronic disease self-management, disease management, nursing home and transitional care. Under the care and case management model, a nurse or social worker helps patients with multiple chronic ailments assess their conditions, communicate with providers and navigate the health delivery system. Chronic disease self-management programs are time-limited education and information-sharing programs aimed at engaging patients in actively managing their diseases. The disease management programs also provided counseling or educational information to patients about managing their chronic conditions. The nursing home models provided palliative care consultation in a long-term care setting that delivered better care and clinical outcomes than a control group. The transitional care model focused on programs aimed at facilitating the relocation of patients from hospital care to the next living situation—another health care setting or

home. The review assessed the extent to which the models reduced spending, improved clinical outcomes and increased patient satisfaction. The authors noted that several of the studies failed to report favorable results on any of the goals. They concluded that the care and case management models hold out promise for improving the care of people with multiple chronic conditions and disabilities, but more research and more consistent measurement criteria are needed.

At a recent *Journal of the American Medical Association* forum, Jha argued that for the value-based model to work in hospitals, financial incentives had to be large enough to convince hospitals to invest the money and time necessary to restructure their systems, motivate clinicians to change their practice patterns, and enable clinical and organizational leaders to develop appropriate evaluation instruments (Jha, 2017). Two percent of Medicare reimbursement set aside for rebates and penalties is too little to motivate hospitals to reconstruct their organizational culture and structure. In his recent congressional testimony, Schulman (2018) concluded that large fee-for-service hospital systems were not committing the talent and resources necessary to transform the quality of care and reduce costs.

In 2012, Oregon undertook a reform of its Medicaid system. Medicaid services had been provided through managed care arrangements, but the new system enrolled 90 percent of the Medicaid population in 16 coordinated care organizations (CCOs). These organizations offered or linked to a broader range of services than most health care plans: physical health, dental, mental health and addiction services. The delivery of these services was coordinated with other social services as necessary to meet enrollees' needs. The CCOs worked under a global budget, risk-adjusted for the covered population and financed prospectively by the state. The CCOs had spending flexibility and could cover services outside the traditional constraints of "medical necessity." Given their fixed budget, the organizations risked financial losses—and also had the potential for upside gains. McConnell et al. (2017) described how the CCOs prepared for their role:

> *CCOs have engaged in a variety of innovative efforts to change the delivery of care for their Medicaid patients. These strategies include incentives to enroll patients in primary care homes; the use of data in new ways to target high-risk patients; the integration of behavioral health services in primary care sites; care transition programs for emergency department (ED) patients admitted to inpatient settings; increased training and employment of community health workers; pilot programs designed to test new ways to care for high-risk groups; and the use of flexible funds to support special services that are intended to improve health and reduce the use of the medical care system (McConnell et al., 2017, p. 451).*

To measure the outcomes, claims data for 2013 and 2014 were used to compare access, appropriateness of care, utilization and spending for evaluation and management, imaging, procedures, tests and inpatient facility care between Medicaid populations in Oregon and Washington. Over the two-year comparison period, Oregon spent 7 percent less than Washington on the measured services, and had fewer avoidable emergency department visits and some improvements in appropriateness of care. One potential concern was a decline in primary care visits (McConnell et al., 2017).

Moving from a Divining-Rod Model to an Evidence-Based Delivery Model

The outcomes for CareMore's Medicare Advantage population and Oregon's Medicaid population suggest that the management of care and service delivery within a more holistic framework holds out promise. But the problem goes deeper than uncoordinated care. A major barrier to a better care delivery system is the widespread clinician indifference to empirical evidence supporting best practices, thus leaving in place practice patterns that are more expensive, less effective and often higher risk. This applies to medical care for high-cost patients with multiple chronic conditions, but it also applies to many health services for conditions that are neither chronic nor among the top 20 percent of high-cost cases. Returning to the hospital case described earlier by Dr. Jauhar, there were 17 treating physicians for one patient. The case summary suggests that at least some of the doctors were providing unnecessary services, and it is not much of a leap to suspect that some doctors might behave similarly when there are fewer other providers at the gurney, and even in non-high-cost cases. In fact, some common medical procedures rarely reach the ranks of the top half or quarter of the expense distribution but their frequency warrants special attention.

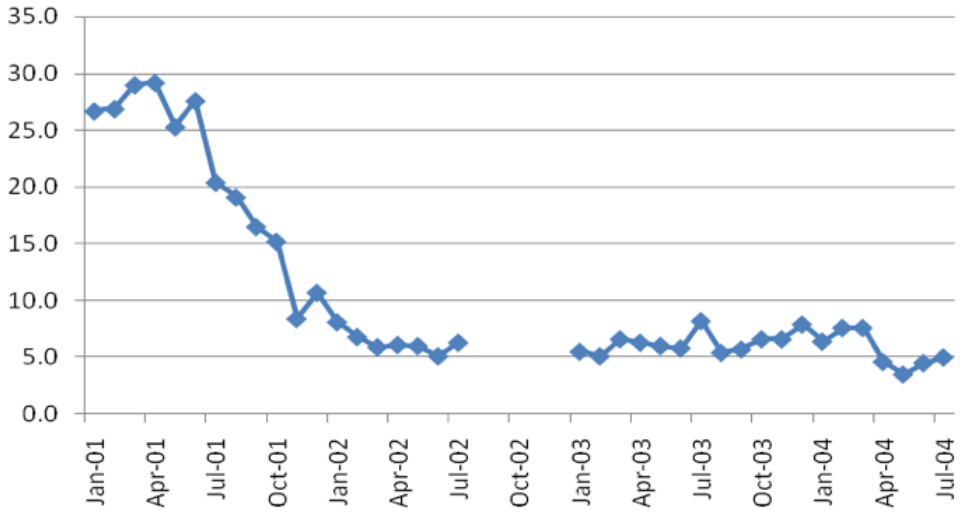
For years, the World Health Organization has recommended that C-section births should not exceed 10 percent to 15 percent of all births (WHO, 1985). These procedures are medically warranted where complications in the pregnancy or during labor necessitate early or immediate delivery. Unnecessary C-sections "pose avoidable risks, including longer maternal recovery, neonatal respiratory problems and potentially severe complications in subsequent pregnancies" (Child Health USA, 2013). A recent cross-national analysis looked at the relationship between C-section delivery rates and maternal and neonatal mortality, based on delivery data from 2005-2012 for 172 of 194 WHO member countries, representing 97.6 percent of all live births in the world for the period. The study associated C-section rates up to approximately 19 per 100 live births with lower mortality rates for the mothers and infants (Molina et al., 2015).

In the United States, slightly less than one-third of all babies were delivered by C-section in 2016, ranging from a high of 38.2 percent in Mississippi to a low of 22.3 percent in Utah (CDC, 2018). Utah offers an interesting example of using data and analysis to improve outcomes and reduce costs. The largest health care provider in Utah is Intermountain Healthcare, which is based in Salt Lake City and operates in Utah and Idaho. It provides hospital services and offers integrated managed care services under Select Health insurance. A number of years ago, the Institute for Healthcare Delivery Research at Intermountain Healthcare undertook a systematic evaluation of some of its highest-revenue service delivery areas, and maternity services were high on the list. One area of focus was the timing of induced labor for expectant mothers and the incidence of medical complications related to gestational age at the time of induction. They empirically documented that medical complications increased significantly for inductions before 39 weeks. For mothers induced at 37 weeks, 6.66 percent of their infants were admitted to the neonatal intensive care unit. The admittance rate dropped to 3.36 percent at 38 weeks and to 2.47 percent at 39 weeks.

Following the analysis, Intermountain Healthcare hospitals restricted induced labor before 39 weeks to cases of medical necessity. While there was some initial resistance from physicians, hospital administrators instructed nurses not to begin medications to induce labor on any patient who was less than 39 weeks pregnant without medical justification, even if the doctor ordered it. While the doctors themselves could administer such medications, doing so meant they had to wait a considerable time for the medication to take effect and the patient to give birth. The new criteria effectively eliminated early inductions that were not medically necessary. *Figure 8* shows the striking change in treatment patterns as Intermountain Healthcare's new policy was implemented, which dramatically reduced

complications of childbirth and also reduced costs. The C-section rate, which had been close to the national average of roughly 32 percent, dropped to 12 percent for first births and to 21 percent overall.

Figure 8. Percentage of live births by inducing labor before 39 weeks of pregnancy at Intermountain Healthcare System



Source: Intermountain Healthcare System, Salt Lake City, Utah.

Childbirth practices in South Florida followed a different path. *Table 13* shows the total births and C-section rates at several hospitals in Miami-Dade and Broward counties between July 2007 and June 2008 and then eight or so years later. In the 2007-2008 period, C-section rates varied from a high of 70.4 percent of births at Kendall Regional to a low of 34.2 percent at Jackson South, with all hospitals above the national average of 31.8 percent.

The Miami Herald article "More S. Florida Babies Born by an Appointment," which provided the 2006-2007 data in *Table 13*, suggested that these high C-section rates were not driven by medical considerations. From a health perspective, a doctor quoted in the article noted "that babies born without labor tend to have more respiratory problems." Cost differentials were also cited as another good reason for fewer C-sections. At the time, C-sections in the area cost between $11,000 and $30,000 per birth compared with $5,000 to $16,000 per natural birth, according to the Florida Agency for Health Care Administration. Reducing the C-section rates in these two counties even to the still-high national rates would have saved between $0.5 billion and $1 billion a year. The two-right hand columns in *Table 13* update the deliveries and C-section rates in the Miami-Dade and Broward County hospitals to 2015 or 2016. While the rates increased slightly at some hospitals and fell at others, the patterns of C-section deliveries in these hospitals over the intervening eight or nine years remained essentially the same.

Market Facts claims data for 2010 estimated that average payments from commercial insurers for all maternal and newborn care associated with a vaginal delivery were $18,329, while C-sections averaged $27,866 (Corry, 2013). Assuming that the medically justifiable rate of C-section births in the Miami area is 25 percent, the excessive rate of C-sections in this area alone costs roughly an extra half billion per year.

There are several reasons that some women might prefer an elective C-section, including resolving scheduling conflicts, averting possible undesirable outcomes of natural birth, such as urinary incontinence or impaired sexual function, and avoiding the pain of labor. After a C-section, new mothers usually stay in the hospital longer than those who delivered naturally, giving them more time to rest and recover.

Table 13. South Florida birth rates and C-section rates for specified hospitals for July 2007 through June 2008 and in 2015 or 2016

	Total births	Percentage C-sections	Total births	Percentage C-sections
Miami-Dade				
Kendall Regional	2,180	70.4%	1,948	62.0% [a]
Hialeah	1,657	52.6%	1,500	68.0% [b]
South Miami	4,145	59.9%	4,097	53.4% [b]
Baptist	4,416	50.3%	3,867	36.4% [b]
Mercy	1,384	58.0%	1,884	55.0% [a]
Mount Sinai	1,944	48.6%	2,678	45.0% [a]
North Shore	2,016	42.0%	1,995	31.6% [b]
Palmetto General	2,005	47.8%	NA	38.0% [b]
Homestead	1,522	49.8%	1,573	44.7% [b]
Jackson Memorial	5,524	50.4%	4,021	49.2% [a]
Jackson North	1,704	36.7%	1,950	34.5% [a]
Jackson South	1,472	34.2%	951	38.4% [a]
Broward				
Plantation General	3,254	47.4%	2,436	45.0% [a]
Northwest Medical	1,855	40.2%	1,955	44.8% [a]
Holy Cross	1,211	51.6%	871	49.0% [a]
Memorial Regional	4,153	41.7%	5,176	45.0% [a]
Memorial West	4,758	40.9%	3,900	39.0% [a]
Memorial Miramar	2,992	47.2%	3,665	43.0% [a]
Broward General	3,550	41.7%	3,436	41.0% [a]
Coral Springs	2,214	37.8%	2,115	41.0% [a]

Sources: John Dorschner, "More S. Florida babies born by an appointment," *The Miami Herald* 10 (May 2009, Early Edition), Health and Medicine Section, Page 1; *Sun-Sentinel*, "Compare: Tri-County Hospitals and Birthing Centers" (17 April 2017), found on 5 March 2018 at: http://www.sun-sentinel.com/features/south-florida-parenting/sfp-tri-county-hospitals-and-birthing-centers-story.html. Sammy Mack, "C-Section Rates Extremely High in Florida (13 April 2016), *WUSF.usf.edu*, found on 5 March 2018 at: http://health.wusf.usf.edu/post/c-section-rates-extremely-high-florida#stream/0.

[a] Rate comes from *Sun-Sentinel*.

[b] Rate comes from Mack.

C-sections are medical procedures that increase the risk of undesirable outcomes for mothers and infants. MacDorman et al. (2006) linked U.S. live birth records (5,762,037) and death records (11,897) for births from 1998 through 2001 to assess the risk of infant and neonatal deaths (i.e., death in the first 28 days of life) by delivery method among women without indicated risks. Neonatal mortality

rates for children born by C-section were 1.77 per 1,000 births versus 0.62 per 1,000 births for children delivered vaginally. Controlling for demographics, medical factors, congenital malfunctions and Apgar scores[22] of less than four reduced the differences only marginally.

Babies born by C-section also face a number of other elevated risks. Those born by scheduled C-sections have higher probabilities of being born prematurely. Because the mother's contractions during labor help prepare the infant's lungs for breathing, babies born without labor are more likely to have trouble breathing on their own. These problems are exacerbated for earlier births, which was an important reason that Intermountain Healthcare set 39 weeks as the baseline for inducing labor. Babies born by elective C-section are four times more likely than those delivered vaginally to have persistent pulmonary hypertension, which is when the baby does not switch from fetal to normal blood circulation and does not get an adequate blood supply to the lungs. Recent studies in the Netherlands and Norway have found that C-section babies are also at higher risk of developing asthma. A U.S. survey of new mothers' childbearing experiences found that only 14 percent of those giving birth by C-section held their children in their arms immediately after birth compared with 43 percent of mothers who delivered vaginally. This is important because the immediate contact is found to sooth the crying baby and fosters the initiation and a longer duration of breastfeeding (VBAC, 2017).

Given the licensing requirements for doctors, nurses and other clinicians, the approval requirements for drugs and many medical devices, and certification standards for hospitals and other health delivery centers, one might think that health care delivery would be highly evidence based. But that doesn't seem to be the case in delivering babies or in many other medical practices. Possibly a more extreme case than obstetrics is in cardiology and the widespread surgical interventions that are common today.

It is well known that atherosclerosis occurs when fatty deposits, known as plaques, build up inside arteries. If the plaque develops tears, blood platelets adhere to the site, forming a blood clot that can keep blood from reaching the heart, or the plaque itself may grow large enough to block the blood flow. Without treatment, a heart attack may occur. In the mid-1970s, ruptured atherosclerotic plaque was found to be the cause of acute myocardial infarction in most cases (Davies, Woolf and Robertson, 1975). Since the early 1970s, many trials have compared the efficacy of angioplasty versus intravenous thrombolytic therapy for acute myocardial infarction. Keeley, Boura and Grines (2003) combined the results from 23 separate trials that included 7,739 patients: 3,872 patients in the percutaneous transluminal coronary angioplasty (PTCA) treatment group and 3,876 in the thrombolytic therapy group. Overall, patients who received an angioplasty were less likely to die or to have a non-fatal reinfarction than those in the drug treatment group. The angioplasty-treatment group's medical outcomes were significantly better in both short-term and long-term follow-up.

Today there is widespread agreement that percutaneous coronary intervention (PCI, also known as angioplasty with stent) reduces deaths for people having heart attacks. Its use for stable coronary artery disease is much less universally accepted. Beyond that, Hadler (2005) contends that this surgical intervention often fits the criteria for Type II Medical Malpractice. He writes that, "Type I Medical Malpractice is familiar: medical or surgical performance that is unacceptable. Type II Medical Malpractice is doing something to patients very well that was not needed in the first place." According to Hadler, compelling scientific evidence suggests that much of the cardiovascular surgery done today for treating heart disease resulting from atherosclerosis amounts to Type II Medical Malpractice (Hadler, 2005, p. 20).

22 The Apgar score is the result of a quick test given newborn infants at one and five minutes after birth. It is the sum of individual assessment scores on heart rate, respiratory effort, muscle tone, response to stimulation and skin color. Each component of the score battery is rated 0, 1 or 2 so 10 is a perfect score.

By the 1970s, cardiac surgeons were performing coronary artery bypass grafts (CABGs) to detour around clogged heart arteries in people suffering from stable coronary artery disease. Partly in response to these critics, three large random trials compared equal numbers of patients who received the coronary artery bypass surgery with those who received the optimal medical therapy of the day. According to the results, which were published in the mid-1980s, 97 percent of those who underwent the CABG surgery were no better off than those treated with the medical therapy. For the other 3 percent of patients with plaques involving the left main coronary artery, the five-year survival rate was 65 percent for those who received medical therapy versus 85 percent for those who had CABGs.

Dr. Hadler concluded the CABG procedure should have been abandoned for most heart patients 15 years earlier. But 500,000 of these surgeries were being performed each year when he was writing in 2005. He noted that the procedure survived in part because the surgical practitioners continued to trumpet the 20 percent survival benefit without mentioning that it only applied to the 3 percent of patients with clogged left main arteries. According to Dr. Hadler, advocates for the surgery also conveniently left out that 2 percent to 8 percent of those who had the surgery died either on the operating table or during the post-operative recovery period, and that 50 percent of surviving patients suffered emotional distress during the six months after the procedure and that 40 percent suffered memory loss a year later.

In 1974, Andreas Grüntzig used a balloon-tipped catheter to open a blocked leg artery at the Medical Policlinic of the University of Zürich. Grüntzig had hit upon the idea a few years earlier when a patient asked him if, instead of using drug treatment or complex coronary bypass surgery, it was possible to clean his obstructed arteries the way a plumber used wire brushes to clean pipes. By 1977, Grüntzig was ready to apply his technique to a human coronary artery, but cardiac surgeons at Zürich were worried about potential complications, so the first such surgery was performed at St. Mary's Hospital in San Francisco on May 9, 1977. For the first few patients, the balloon angioplasties were done on anesthetized patients during coronary bypass surgery with the dilations performed before the aorta-coronary bypass (Barton et al., 2014). As this procedure became popular, doctors learned that after opening an artery and then withdrawing the catheter, the artery often reclosed fairly quickly, so they started inserting metal stents to keep the artery open and the blood flowing freely. Then doctors discovered that plaques would build up around the stent, resulting in further occlusion at the site, so "drug-eluting stents" were introduced to dispense drugs to prevent further blockages.

By the 1990s, cardiologists were using PCI regularly, largely because it was less invasive than the bypass surgery. Hadler noted that heart surgeons welcomed the new procedure, in part, because if angioplasty with a stent had an unfavorable outcome, "CABG is the fallback. And if the CABG 'fails,' another CABG is the fallback" (Hadler, 2005, p. 26). Hadler noted that, while there had been many trials of angioplasty, they usually compared outcomes from one form of the procedure against another or against the CABG. The trials found that angioplasty was both gentler and as effective as CABG. But since CABG was no more effective at keeping 97 percent of angina sufferers alive (those whose plaques did not involve the left main coronary artery) than medical therapy, Hadler suspected that angioplasty was not necessarily superior to medical therapy either.

Many studies have assessed the relative effectiveness of PCI compared to optimal medical therapy (OMT) over the years. The documented benefits of angioplasty with stents during acute myocardial infarction events were noted above. But the window for its maximum benefit is relatively small, only a few hours after the event. Hochman et al. (2006) evaluated the relative merits of angioplasty versus medication for stable patients with total blockage of an infarct-related artery three to 28 days after a heart attack. The objective measures included aggregate death rates, rates of subsequent heart

attacks or rates of Class IV heart failure[23] for each group. This was a randomized controlled trial funded by the National Heart, Lung, and Blood Institute. Known as the Occluded Artery Trial (OAT), the study included 2,166 patients, 1,082 of whom were assigned to a routine angioplasty and stenting treatment combined with an optimal medical therapy regimen, and 1,084 who received optimal medical therapy treatment alone. According to the evaluation, angioplasty with stent treatment performed on patients three to 28 days after a heart attack was no more effective than optimal medical therapy alone in reducing deaths, another heart attack or heart failure during four years of follow-up.

These random-controlled studies are intended to accumulate scientific evidence that can inform clinical practice regimens. After completion of the OAT study, the Task Force on Practice Guidelines of the American College of Cardiology and the American Heart Association updated their practice guidelines (Anderson et al., 2007) on treating patients with unstable angina[24] and non-ST-elevation myocardial infarction (NSTEMI).[25] Summarizing the results of the OAT study, the task force concluded:

> *Percutaneous coronary intervention did not reduce death, reinfarction, or HF [heart failure], and there was a trend toward excess reinfarction during 4 years follow-up. Findings in the 295-patient NSTEMI subgroup were similar to those in the overall group (n = 2,166) and the larger STEMI groups. Thus, a routine PCI strategy in OAT-type patients with persistently occluded infarct-related coronary arteries after NSTEMI is not indicated (Anderson et al., 2007, p. e233).*

The task force indicated that the PCI and CABG usage for the unstable angina/non-ST-elevation myocardial infarction cases were similar to those for stable angina. Patients with severe left ventricle systolic dysfunction (which often leads to heart failure), diabetes, multiple vessel disease and left anterior descending artery (typically supplying more than half the blood to the heart) involvement should be considered for CABG. "Compared with high-risk patients, low-risk patients will have negligibly increased chances of long-term survival with CABG (or PCI) and therefore should be managed medically" (Anderson et al., 2007, p. e236). The task force's recommendations were developed in collaboration with the American College of Emergency Physicians, the Society for Cardiovascular Angiography and Interventions, and the Society of Thoracic Surgeons, and were endorsed by the American Association of Cardiovascular and Pulmonary Rehabilitation and the Society of Academic Emergency Medicine.

A year later, the same task force updated guidelines for management of patients with ST-elevation myocardial infarction (STEMI). The earlier update had dealt with unstable angina and NSTEMI. Once again, the task force looked to the OAT study in proposing updated guidelines for treating heart attack patients. "These studies demonstrate that elective PCI of an occluded infarct artery 1 to 28 days after MI in stable patients had no incremental benefit beyond optimal medical therapy with aspirin, beta blockers, ACE inhibitors, and statins in preserving LV function and preventing subsequent cardiovascular events" (Antman et al., 2008).

A year after the OAT study was published, another study was released evaluating the relative efficacy of medical treatments for stable coronary artery disease in patients who had not had a heart attack (Boden et al., 2007). This latter study, known as Clinical Outcomes Utilizing Revascularization

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23 Class IV heart failure renders a person unable to undertake any physical activity without discomfort and may include the presence of heart failure while the person is at rest.

24 Unstable angina is a condition in which the heart gets inadequate blood flow or oxygen. It is considered unstable because it can occur at any time, whereas "stable angina" occurs when a person is under exertion.

25 An NSTEMI is a heart attack without complete blockage of a major coronary artery. This form of heart attack is typically somewhat less serious than an ST-segment elevation myocardial infarction (STEMI), which involves a complete blockage of a coronary artery. While the NSTEMI may not cause as much immediate damage as the STEMI, it is a serious medical event and requires prompt treatment to prevent unnecessary injury.

and Aggressive Drug Evaluation (COURAGE), set out to determine whether PCI coupled with optimal medical therapy reduced the risks of death or non-fatal heart attack in patients with stable coronary artery disease relative to patients who received only optimal medical therapy. The study population of 2,287 patients with evidence of myocardial ischemia—inadequate blood flow to the heart—and significant coronary artery disease were randomly assigned to one of two treatment groups. Of the total, 1,149 patients received PCI treatment combined with optimal medical therapy, and 1,138 received only optimal medical therapy. Study participants were drawn from 50 U.S. and Canadian treatment centers from 1999 through 2004, and were tracked from 2.7 to 7.0 years. Between the two groups (PCI versus OMT), there were no significant differences in the composite of death, myocardial infarction or stroke (20.0 versus 19.5 percent); hospitalization for acute coronary syndrome (12.4 versus 11.8 percent); or myocardial infarction (13.2 versus 12.3 percent). The overall conclusion was that angioplasty treatment coupled with medical therapy was no better than optimal medical therapy alone for patients with stable coronary artery disease (Boden et al., 2007).

Shortly after the COURAGE results were published, a group of 14 physicians published a critical evaluation (Kereiakes et al., 2007) of the study and its results. In summary, they argued that first, the goal of reducing death and myocardial infarction rates was unrealistic because the stable artery disease patients had already received aggressive medical therapy. The study did show that the patients initially treated with PCI achieved better angina-free status and a reduced rate of required subsequent revascularization relative to patients assigned to medical treatment only. These added benefits for the PCI treatment group were achieved without higher death rates or heart attacks. Second, the trial showed that patients with multiple vessel blockages who were not treated for each blockage were less likely to realize the full benefits of the initial PCI treatment and more frequently required further revascularization. Third, 32 percent of patients receiving medical therapy ended up receiving revascularization treatment to relieve severe or progressive angina symptoms. Fourth, many of the PCI procedures had used the bare-metal stents, and the results would likely have been better if the drug-eluting stents had been used along with more complete vascularization in cases with multiple blockages. Fifth, all study participants already had received coronary angiography and "those with severe and/or complex stenosis may not have been included, and investigator bias in patient selection toward lower angiographic risk could not be excluded. This premise (lower-risk patients enrolled) would appear to be supported by the relatively low (0.4%) annual cardiac mortality observed in the entire study cohort" (Kereiakes et al., 2007, pp. 1599-1600). Finally, the medical and catheter-based approaches play a complementary or synergistic role in treating coronary artery disease and the choice of therapy should reflect each patient's lifestyle, functional capacity, symptoms and ability to take prescribed medications. Outside their list of concerns about the methodology of the COURAGE study and interpretation of the results, the critics observed that the study group had been unusually compliant with prescription schedules during the trial. Ten of the 14 authors who penned the critique of the COURAGE results were affiliated with other organizations that had some financial interest in the outcome.[26]

26 Dr. David J. Kereiakes has received research grants from Pfizer, Conor Medsystems, Boston Scientific, Medtronic, Danchi Sanyko and Cordis Corp., and consulting fees from Conor Medsystems, Cordis Corp., Core Valve, Eli Lilly & Co., Boston Scientific and Abbott/ Bioabsorbable Vascular Solutions. Dr. Paul S. Teirstein has received research grants from Cordis, Boston Scientific, Abbott and Conor Medsystems and royalties from Boston Scientific. Dr. Mitchell W. Krucoff is a consultant for Abbott, Biosensors, Boston Scientific, Cordis J&J, Conor Medsystems, Medtronic and Terumo and has received research grants from Abbott, Biosensors, Boston Scientific, Cordis J&J, Conor Medsystems, Medtronic and Terumo. Dr. Ron Waksman is a consultant and has received speaker fees from Biotronik, Medtronic and Boston Scientific, and research grants from Biotronik, Boston Scientific, Medicines Co., GlaxoSmithKline, Schering-Plough and Sanofi-Aventis. Dr. David O. Williams is a consultant for Cordis and Abbot Vascular and has received research support from Cordis, Abbott Vascular and Boston Scientific. Dr. Jeffrey J. Pompa has received research grants from Cordis, Boston Scientific, Medtronic, Abbott, ev3 and Biosensors; is on the advisory boards of Cordis, Boston Scientific, Medtronic and Abbott; and is on the Speakers' Bureau of Pfizer, Medicines Co., Bristol-Myers Squibb and Sanofi-Aventis. Dr. Maurice Buchbinder has received consultant/research grants from Boston Scientific and Cordis. Dr. Roxana Mehran has received grants from Medicines Co., Boston Scientific and Cordis. Dr. Jeffrey W. Moses is a consultant for Cordis. Dr. Gregg W. Stone has received grants from Boston Scientific and Abbott; consulting fees from Xtent, St. Jude Medical and Medicines Co.; honoraria from Boston Scientific, Abbott, Medicines Co., Nycomed and Medtronic; has equity interests in Devax and Xtent; and is on the Board of Directors of Devax.

By the end of the first decade of the new millennium, a number of studies had concluded that medical treatment with drugs was as effective as popular surgical interventions in large segments of the population suffering from coronary artery disease. For post-incident treatment of people who had heart attacks, the evidence was strong enough that the major medical societies recommended medical treatment as the preferred option over revascularization.

But did all the research and revised medical guidelines make any difference? Deyell et al. (2011) suggest that the effect on practice patterns was negligible. They assessed the clinical response to the revised guidelines published by the American College of Cardiology and American Heart Association in response to the OAT study. They used the National Cardiovascular Data Registry to identify patients admitted for STEMI or NSTEMI from January 1, 2005 through December 31, 2008, which included 28,780 patients from 896 hospitals. The researchers considered three periods: one before the OAT study was published (January 1, 2005 through November 30, 2006); the second from publication until the revised guidelines were published (December 1, 2006 through November 30, 2007); and the period after the updated guidelines were released (December 1, 2007 through December 30, 2008).

Before the OAT report was published in November 2006, the rate of PCI operations for occlusions was 54.2 percent. The rate dropped to 52.8 percent between the release of the study and the publication of new guidelines, and to 51.9 percent after the revised guidelines were released. Looking back over the periods, the researchers realized that PCI procedures peaked in March 2006 and then declined significantly up to publication of the OAT results. After the OAT results came out in November, the rate of procedures was significantly lower than it was in March but not much lower than the April-to-November rate. While it is not clear why, the rate clearly dropped before the OAT results were released, and the rates before and after the new guidelines were issued did not differ significantly.

Deyell et al. (2011) concluded that two years after their release, the revised guidelines based on the results of the OAT study had not been widely incorporated into clinical practice in most U.S. hospitals. Trying to explain these results, they offered:

> *Analysis of physician behaviors suggest a wide spectrum of factors contributing to this clinical inertia, including lack of agreement regarding interpretation of data especially when it contradicts long-held beliefs and external influences, such as conflicting patient expectations and financial incentives to perform the unindicated procedure and fear of litigation (Deyell et al., 2011, p. 1641).*

A year after Deyell and his colleagues documented that the OAT results and subsequent revisions to practice guidelines had no effect on practice patterns, a meta-analysis developed by Stergiopoulos and Brown pooled the results of eight clinical trials, including the OAT and COURAGE studies, and concluded that "initial stent implantation for stable CAD [coronary artery disease] shows no evidence of benefit compared with initial medical therapy for prevention of death, nonfatal MI, unplanned revascularization, or angina" (Stergiopoulos and Brown, 2012, p.312). The results of this meta-analysis were criticized as adding nothing new to the debate over the use of PCI to treat stable coronary artery disease, and because they ignored the primary motivation for many doctors still using the procedure. Dr. Kirk Garratt of Lenox Hill Hospital in New York City was quoted as saying that he and other doctors continued to use stenting because of "the improved functional capacity it offers" in reducing angina (Smith [Michael], 2012).

Deyell and his colleagues considered the clinical response to changing practice guidelines on PCI procedures through 2008. In 2009, the American College of Cardiology published new appropriateness criteria for coronary revascularization that could entail either PCI or

CABG procedures (Patel et al., 2009). In this case, they developed roughly 180 clinical scenarios and asked technical panels to score them for appropriateness of revascularization. Scores of seven to nine were deemed appropriate for an operation, scores of one to three were inappropriate, and scores of four to six were considered uncertain. For objectivity, the panels were constrained "not to include a majority of individuals whose livelihood is tied to the technology under study."

To summarize the development of the new care standards for the use of PCI and CABG procedures, the American College of Cardiology used the "Delphi approach"—they asked the Oracles—to assess the range of real-life circumstances clinicians would face and to postulate when these treatments were appropriate, inappropriate or iffy.[27] The reason given for this approach was the "paucity of large randomized clinical trials" on which to base guidelines for clinical practice that would achieve more consistent and appropriate treatment patterns (Patel et al., 2009, p.1332).

Even had this rationalization been reasonable, the approach is astounding on its face. Hadler (2005) had pointed to trials from the mid-1980s demonstrating the ineffectiveness of these procedures and raising doubts about the efficacy of CABG in patients with stable coronary artery disease. Then other trials concluded that PCI procedures were no more beneficial than prescribed drug treatment for many patients with even more serious heart and circulatory problems. For 25 years, billions of dollars had been spent year-in and year-out on hundreds of thousands of operations done annually, yet the premier professional organization of the physicians performing those surgeries claimed there was insufficient empirical evidence for developing appropriate standards of practice. If the studies were not adequate, why didn't the professional societies demand a definitive trial or set of trials?

Desai et al. (2015) evaluated the implications of the new Appropriateness of Care Criteria over the five years following their release. Tracking PCI procedures from 766 hospitals, they estimated that the number of "nonacute PCIs" decreased from 89,704 procedures in 2010 to 59,375 in 2014. The percentage of these classified as inappropriate declined from 26.2 percent to 13.3 percent over the period, a decline in absolute terms from 21,781 to 7,921 cases. The authors said they could not rule out the possibility that the decline in inappropriate PCI procedures might be due to changes in documentation of symptoms or "even intentional up-coding particularly of subjective data elements such as symptom severity" (Desai et al., 2015, p. 2049). Specifically, they noted that the percentage of patients with reported more severe angina was higher although there was little change in the extent of coronary artery disease, which could reflect some up-coding under the new standards.

Of the 648,150 PCI procedures reported in 2014, including all cases with and without acute coronary syndrome, 92.4 percent of them were considered appropriate under the new guidelines, 5.5 percent were judged uncertain, and 2.1 percent or 13,464 cases were considered inappropriate. Given the volume of PCI cases, having only 2.1 percent considered inappropriate suggests that, by that time, these procedures were seldom performed without good reason. But it is not clear whether the resolution was due to fewer inappropriate PCIs or the new measures of appropriate care.

27 Daniel Kahneman, the behavioral psychologist who had studied the thought and decision processes of individuals, including professionals, for years, suggests the Delphi approach taken here is flawed: The experts may not know the limits of their expertise. An experienced psychotherapist knows that she is skilled in working out what is going on in her patient's mind and that she has good intuitions about what the patient will say next. It is tempting for her to conclude that she can also anticipate how well the patient will do next year, but this conclusion is not equally justified. Short-term anticipation and long-term forecasting are different tasks, and the therapist has had adequate opportunity to learn one but not the other (Kahneman, 2011, p. 242). It is important to remember that Kahneman was referring to "experts" who were exercising their best professional judgments. One has to wonder what the implications are of staffing the Delphi panels with "experts" "whose livelihood is tied to the technology under study."

Steven Nissen, chairman of cardiovascular medicine at the Cleveland Clinic and a former president of the American College of Cardiology, was an influential player in the development of the new grading system for PCI and CABG applications in practice. Epstein (2017) quotes Nissen as saying that treatment patterns "have gotten better, but they're not where they need to be," an implicit indication that the new measurement of inappropriate procedures should be regarded with caution.

In 2014, *Bloomberg News* reported that emergency room doctors at Mount Sinai Hospital in New York City were seeing incoming patients reporting acute symptoms of heart disease who already had same-day appointments with the catheterization lab. Three of the emergency room doctors who talked to reporters said that the "hospital's cath lab has regularly scheduled such emergencies-by-appointment." A couple of patients said they had been coached to say they were having acute symptoms of heart disease. It might be that emergency treatments would trigger insurance benefits otherwise not available to patients. Whatever the explanation, the hospital had been aggressive in growing its catheterization lab business. The annual report from the prior year had characterized its growth in number of procedures as "remarkable," "substantial," "significant" and "tremendous," according to the reporters. The annual report also noted that fewer than 4 percent of the stent procedures the hospital had performed on stable cardiac patients in 2010 were considered inappropriate. Also worthy of note is that the report stated that compensation for lab physicians was based on incentives linked to procedures (Armstrong, Waldman and Putka, 2014).

It is not clear whether this sort of practice or other means of changing the measurements rather than the reality were widespread, but Epstein (2017) quoted Dr. Nissen, the chairman of cardiology at the Cleveland Clinic, as believing that eliminating financial incentives for doing cardiac procedures would help eliminate unnecessary surgeries. Nissen had told Epstein, "I have a dozen or so cardiologists, and they get the exact same salary whether they put in a stent or don't and I think that's made a difference and kept our rates of unnecessary procedures low."

Epstein (2017) also reported that Nissen and David Holmes, a Mayo Clinic cardiologist who was also a former president of the American College of Cardiology, made the case that PCI was appropriate for some patients with stable coronary artery disease to reduce their pain. As evidence mounted that, for many patients, angioplasty and stenting did not save lives, some doctors began justifying the procedure on the grounds that it reduced angina pain more effectively than medical treatment.

In Europe, the COURAGE trial results and meta-analyses led to treatment guidelines that called for prescription drug treatment as the first line of therapy for stable coronary artery disease and recommended PCI only in patients with continuing angina (Windecker et al., 2014). The guideline recommendation that angina relief justified the use of PCI on patients with stable coronary artery disease was developed without medical evidence of the efficacy of PCI for this purpose (Al-Lamee et al., 2018).

The lack of supporting evidence prompted a group of clinicians in the United Kingdom to undertake a blinded, randomized trial of PCI versus a placebo procedure for angina relief in patients with "severe (≥70%) single-vessel stenosis." All participants spent the first six weeks in a medical therapy optimization phase and in assessments of symptom burden, functional capacity, myocardial ischemic burden and quality of life. After randomization, members of the PCI treatment group were administered drug-eluting stents to treat all "angiographically significant" lesions. Members of the placebo group were sedated for at least 15 minutes on the operating table and then the coronary catheters were withdrawn with no intervention. Six weeks after the procedures, all trial subjects were retested with the same instruments used in the pre-randomization assessment.

The two groups were compared on the basis of their pre- and post-procedure electrocardiograms taken during exercise treadmill tests, angina severity measures and overall health status values. The results indicated that "PCI did not improve exercise time beyond the effect of the placebo … There was also no improvement beyond placebo in the other exercise and patient-centered endpoints" (Al-Lamee, 2018, p. 37). In other words, there was no evidence to support the contention that PCI was any more effective than a placebo in relieving angina pain.

This discussion has shone a spotlight on childbirth and clogged arteries, which represent a fraction of the pantheon of modern health practices. So, do the excess C-sections, CABG and PCI procedures reflect relatively isolated cases or a widespread problem? Some recent empirical evidence does not fully answer the question but provides a strong clue. Ioannidis (2005) reviewed articles published from 1990 to 2003 in three of the most respected medical journals—*New England Journal of Medicine, Journal of the American Medical Association* and *Lancet*—along with 10 other highly respected specialty journals. He focused specifically on articles that "addressed the efficacy of therapeutic or preventative interventions and pertained to primary data," and he limited the selection to articles that had been cited 1,000 or more times within three years of their publication in subsequent articles in the medical literature. After reviewing 45 articles where medical interventions had been evaluated and found to be effective, Ioannidis found that seven, or 16 percent, of the articles were contradicted by subsequent studies, and another seven were found to be less effective than the original article had claimed. Twenty of the studies (44 percent) were confirmed by subsequent studies, and 11 (24 percent) were not reconsidered in subsequent articles. Among these widely cited studies, nearly a third were proved wrong or exaggerated.

A similar analysis reviewed all the original articles—which excluded letters, comments, editorials and the like—published in the *New England Journal of Medicine* in 2009. In this case, the authors looked at reviews of existing standards of care and 35 studies fit their criteria. In 16 of these studies (46 percent), the existing standard of care was found to be ineffective (Prasad, Gall and Cifu, 2011). Given these results, the original research was expanded to include articles from 2001 through 2010 in the *New England Journal of Medicine*. This time, the authors reviewed 363 articles reporting test results of the efficacy of existing standards of medical practice. When the reviews were tallied, 146 (40.2 percent) of the articles found the existing standard of practice to be ineffective, 138 articles (38.0 percent) found current practice to be effective, and 79 articles (22 percent) were inconclusive (Prasad et al., 2013). Prasad and Cifu (2015, p. 84) would later comment: "Forty percent is a lot. Nearly half of what doctors do. If that much of medical practice is ineffective, it is pretty scary and it's not hard to see why the United States spends 2 to 3 times more per capita on health care each year than other nations."

Nevertheless, these reviews questioning the time-tested efficacy of practices once hailed in the medical literature do not quite capture the breadth of the problem. Prasad and Cifu (2015) wrote a book citing examples of documented problems that span the spectrum of medical treatments—including common procedures, devices and drug therapies. The following three examples present a small part of the story that Prasad and Cifu tell.

Arthroscopic knee surgery has been done for years to repair degenerative meniscal tears. The authors estimated that 700,000 of these operations are performed annually, costing $4 billion a year. A 2013 study found that surgery followed by physical therapy was no more effective than physical therapy alone. A second study found that the surgery was no more effective than a sham procedure, where the surgeons simply inserted their scopes and looked around, pretending to repair the meniscus. There was no difference in pain level or functioning at two, six or 12 months after the surgery between people whose meniscal tear had been repaired and those whose tears were left alone (Prasad and Cifu, 2015, p. 22).

Another example involves intra-aortic balloon pumps that surgeons have been using for years to respond to cardiogenic shock—when the heart stops pumping normally after a massive heart attack. The surgeon inserts the balloon pump into the aorta on the tip of a catheter, where it is inflated and deflated in rhythm with the heart's beating. It is supposed to improve the functioning of the left ventricle, the heart chamber that pumps blood into the aorta, and lighten the heart's workload.[28] In 2012, a trial was conducted on 600 patients suffering cardiogenic shock caused by a heart attack. All were given the best possible care for their heart attacks, but half the patients received the intra-aortic balloon pump and half did not. Forty percent of the participants died within 30 days of their major heart attacks, but mortality rates were the same for those with and without the balloon pumps. Moreover, the pumps did not reduce the incidence of second heart attacks while the patients were hospitalized, strokes or complications in procedures to open the blocked arteries that had caused the original heart attacks (Prasad and Cifu, 2015, pp.39-40).

The third example addresses atenolol, a beta blocker widely prescribed for hypertension. First introduced in 1976, the drug was considered so effective at reducing blood pressure that it became a "trial standard," the bar that new drugs had to meet or beat to be approved for distribution (Prasad and Cifu, 2015, p. 19). In a 1997 trial in Sweden, more than 9,000 patients with high blood pressure were randomly assigned to use either atenolol or a competitor drug, losartan, for four years. Not only did both drugs reduce blood pressure by the same amount, the group using the competitor drug suffered fewer deaths and strokes. Until this trial, the evidence had clearly indicated that atenolol was effective at reducing blood pressure, and clinicians had presumed that it must also reduce heart attacks, strokes and deaths. After the Swedish trial, a number of follow-on trials tested the effectiveness of atenolol against placebos or other anti-hypertension drugs.

Carlberg, Samuelsson and Lindholm (2004) summarized the results from two sets of trials. Their meta-analysis of four trials comprising 6,825 patients followed over an average of 4.6 years compared atenolol to a placebo. They found a significant difference in the effects on blood pressure but no variance in all-cause mortality, cardiovascular mortality or heart attacks. The risk of stroke tended to be lower for patients being treated with atenolol, but the differences were not statistically significant. The meta-analysis of five trials that followed 17,671 patients for an average of 4.6 years, comparing atenolol to other blood-pressure-reducing drugs, found no major differences in blood pressure reductions between the two groups, but all-cause mortality, cardiovascular mortality and strokes were significantly higher with atenolol versus the alternative treatment. According to Carlberg et al., their "results cast doubts on atenolol as a suitable drug for hypertension patients. Moreover, they challenged the use of atenolol as a reference drug in outcome trials in hypertension" (Carlberg, Samuelsson and Lindholm, 2004, p. 1684).

When Carlberg and his colleagues published their results on the trials of atenolol for hypertension in 2004, 45 million prescriptions for atenolol were written in the United States. One might have thought the new evidence would mark the end for atenolol. Yet in 2015, 30 million atenolol prescriptions were written (ClinCalc, 2018). Epstein (2017) wrote about asking a family practitioner who dispensed 1,100 prescriptions for atenolol in 2014 to patients 65 and older why he continued prescribing the medicine given its poor showing in the randomized control trials. The physician responded that, "I read a lot of medical magazines, but I didn't see that." He said his patients were doing just fine on the medication and asked that any relevant journal articles be sent to him.

28 When the left ventricle of the heart begins to contract, the balloon deflates creating a vacuum causing the blood from the heart to flow more forcefully into the aorta, and out to the body. When the left ventricle contraction is finished and the heart is at rest, the balloon inflates, helping the blood to flow through the coronary arteries to the heart muscle.

Atul Gawande is an endocrine surgeon and frequent author of exposés addressing excessive services or treatment costs, and a passionate advocate for improvements to the modern-day delivery of U.S. health services.[29] In a 2015 article, he identified another cause of unnecessary yet popular medical services, which is new to this discussion. He described a patient who had a thyroid lump removed, which turned out to be benign but contained a microcarcinoma. According to Gawande, about one-third of the population has these tiny cancers in their thyroid but fewer than 100 people die from thyroid cancer each year. The risk of these microcarcinomas becoming a dangerous invasive cancer is so small that some experts believe they should not be called cancers at all. He advised his patient to leave well enough alone, but she decided to have her thyroid removed, despite his assessment "that the surgery posed a greater likelihood of harm than of benefit." After the operation, her neck swelled rapidly from bleeding, a complication easily and quickly resolved in the operating room. Not everyone is so lucky. As she was well into recovery, the patient thanked Gawande profusely for resolving her anxiety about the microcarcinoma. His reflection on the episode was:

> *The medical system had done what it so often does: performed tests, unnecessarily, to reveal problems that aren't quite problems to then be fixed, unnecessarily, at great expense and with no little risk. Meanwhile, we avoid taking adequate care of the biggest problems that people face—problems like diabetes, high blood pressure, or any number of less technologically intensive conditions. An entire health-care system has been devoted to this game. (Gawande, 2015).*

29 Atul Gawande was named the CEO of the Amazon, Berkshire Hathaway and JP Morgan Joint Health Venture in June 2018.

IX. Discussion

Nearly a half century ago, the resources available for medical care and practices drawing on those resources were compared to the "tragedy of the commons" (Hiatt, 1975). The concept originated with Lloyd in 1833, long before Hiatt applied it to U.S. health care under the guise of an allegory about a group of shepherds who share access to a common pasture for grazing livestock. The shepherds make equal payments to rent the pasture, and each shepherd knows that adding one more animal to his flock will increase his holdings and thereby his income but not his cost. The problem is that the other shepherds also operate under the same incentive, eventually leading to an overcrowded commons with an overgrazed pasture, thus ruining what should have been a good thing for all.

Hiatt compared the total resources available for medical care within the economy to the grazing area on the commons, and the health practices that consume those collective resources to the grazing animals. He said, "Surely, nobody would quarrel with the proposition that there is a limit to the resources any society can devote to medical care, and few would question the suggestion that we are approaching such a limit" (Hiatt, 1975, p. 235). Hiatt identified three problems arising from the way the health "commons" has traditionally been used that are as relevant today as they were when he penned his analysis.

The first problem that Hiatt outlined (1975, p. 235) follows from the principle that "one should do everything possible for the individual patient." We will come back to the proposition that "one should do everything possible," but this principle—combined with the unrestricted and seemingly endless march of new medical procedures and practices—creates a reality where the marginal benefit for the individual threatens the "welfare of the whole." Each new procedure represents yet another sheep grazing on the commons, threatening the commonweal. The only way to avoid overcrowding is to displace another "sheep"—which would require priority-setting mechanisms we currently lack.

Hiatt's concern that the unrestricted development of new health care procedures and practices threatens the "welfare of the whole" is correct, but his understanding of the mechanism was not. He was thinking of health care financing as being a closed sector of the economy, meaning that its share of the larger economy was fixed. Spending the same share of GDP on health care in 2017 as we did in 1975 would have kept health care expenditures at $1.4 trillion in 2017 dollars, whereas we actually spent $3.3 trillion. But the commons is the entire economy, not just the health care sector, and the fact that we spent 2.4 times as much on health care in 2016 as we did in 1975 proves that Hiatt was wildly wrong that health spending would be limited by the share of the economy it claimed when he developed his analysis. As it turns out, health spending is now consuming a much larger share of the economy than Hiatt considered possible a half century ago.

Table 7, which we discussed earlier, showed that compensation for the average full-time, full-year worker increased by about $4.00 an hour in 2016 dollars between 1999 and 2015, before taking health care premiums paid by employers and employees into account. After deducting those health care premiums, the average worker in the 60th percentile of the earnings distribution lost all of the $4.00 gain in compensation plus an additional $0.50 per hour for single-employee coverage or an additional $0.80 per hour for family coverage. Those earning less than the workers in the 60th percentile of the earnings distribution fared even worse. Large segments of the U.S. population have watched their standards of living decline as health care costs have climbed. As our analysis shows, this predicament has been percolating for a long time. Because health costs now consume such a large share of employee benefits and continue to grow faster than pay and other elements of compensation, workers' prospects are only going to dim further unless these costs are contained in a meaningful way.

To modify Hiatt's concept, if we think of the entire economy as our commons, health care is the claim being made by the flock of one shepherd. Many other flocks—such as education, defense, infrastructure, food, housing and entertainment—are also making claims on the commons. In reality, of course, there are lots of shepherds managing health care and lots of people managing the other demands on the economy. But the macroeconomic evidence shows that health care cost growth has eclipsed that of other economic sectors for a long time. For many people, money that should be in their paychecks—to buy homes and send their children to college—is instead funneled off to health spending. Health care cost growth is generating such a powerful headwind that many workers have lost all traction on their path to the American Dream. Public discourse about the fading American Dream has been so distracted by concerns about immigration, international trade balances and political rigging of the economy that we have failed to grasp that a problem of our own making is contributing substantially to our misery.

In Lloyd's tragedy of the commons, the solution is to fence in the pasture and admit fewer animals. Other countries have found a variety of ways to fence their health care commons: socializing both financing and delivery under bureaucratic budgeting and control; or creating single or a small number of financing systems, with limits on their health budgets, like the model adopted by our neighbor to the north. Canada's socialized health financing system strictly manages the revenues fed into the private delivery system. In the United States, there is a seeming reflexive opposition to any of those models, despite incontrovertible evidence that other highly developed countries are living comfortably with them, have achieved health measures that arguably exceed ours and have done so on a far more efficient basis than we have.

Unless the political lines in our society are dramatically restriped, we need to find a way to introduce cost containment into our multi-payer system. The concentration of providers in most health care markets has gone beyond what is commonly tolerated by our legal system. Concentration is nearly complete in the hospital and patented brand-name drug sectors and is quickly overtaking the independent physician sector as well. Proponents of consolidation cite organizations like Intermountain Healthcare and Kaiser Permanente as examples of large systems providing high-value, integrated care that should be emulated rather than discouraged. But the evidence confirms that much of the recent market concentration has led to higher, often much higher, prices. At a conference sponsored by the Council for Affordable Health Coverage in Washington, D.C., Michael Chernow, a professor of Health Care Policy at Harvard Medical School, commented that he counsels his Ph.D. students against focusing their research on consolidation in the health care market and its resulting in higher prices because "there's nothing left to prove."

In the past, policymakers recognized that some industries require total market concentration—natural monopolies—to produce their goods efficiently. For example, 10 power companies cannot each run their own power lines through a community to give residents a free market. Both Dafny (2018) and Gaynor (2018), whose recent congressional testimony was cited earlier, suggest that policymakers should encourage greater competition in the health care marketplace. Creating a more competitive market environment for health services would have to start with dismantling massive systems that have been 25 years or so in the making, and running the risk of fragmentation that could be less efficient than what we have now. It also might introduce more capacity into a system where "Say's Law"[30] seems to dominate, meaning that added supply could stimulate delivery of more services in an industry that already delivers more services than medically justifiable.

30 Named after Jean-Baptiste Say, a late 18th-early 19th century economist. The shortened version of his law is that supply creates its own demand.

Technology sometimes alters the landscape in ways that eliminate the need for monopolies—for example, advances in telephone technology have untethered communities from single-company control of phone access. Research from the Health Care Cost Institute through their Healthy Marketplace Index, which is based on health care claims of private payers across four large health insurers, shows considerable variation in prices across a wide variety of procedures. To build a competitive marketplace, people need to have both price and quality information so they can make rational economic decisions, the way they do when shopping for cars or houses. Competition requires price transparency, which has been improved through online tools and greater access to medical claims data for private payers, but costs and quality remain largely opaque for many health services and drugs. Recent developments—such as Amazon's decision to create a more consumer-centric health care model—offer the potential for further progress. The real challenge, however, will be arming patients with credible performance measures of their doctors and other providers. Is technology the solution here? Maybe, but a healthy dose of skepticism is warranted. If you live in a marketplace where there are one or two hospital systems and, between them, they employ all the specialists and an increasing number of family practitioners, it is not clear that transparency will have much effect on the pricing or quality issues consumers face.

When faced with market conditions that lead to a monopoly or oligopoly, policymakers in the past have used regulation to ameliorate the pricing effects of concentrated market power. The current laissez-faire approach to pricing under private insurance contracts and for individual consumers is inconsistent with our approach to other sectors of economic activity. If policymakers want unregulated, purely market-driven health care markets, they should enforce antitrust laws more aggressively and legislate greater price transparency. If policymakers choose to allow consolidation to continue on its current course, they need to regulate the market. Administered prices are already widespread under both Medicare and Medicaid, and commercial insurers now benchmark prices for services under Medicare Advantage plans to Medicare pricing. Extending this pricing to other insured and uninsured consumers should be a relatively easy matter.

The second problem that Hiatt addressed in his 1975 treatise is that unrestricted access to the health care commons triggers widespread consumption of resources that benefits neither the individual nor society. Hiatt pointed to the lack of clinical trials to certify the efficacy of medical procedures but expressed hope for change, allowing that "a people that was sufficiently aroused to create a Food and Drug Administration to control pharmaceutical preparations will surely find mechanisms for controlling medical and surgical procedures when the effects of inadequate restraints become more widely evident" (Hiatt, 1975, p. 240).

Hiatt's diagnosis that our health system was wasting tremendous resources without delivering commensurate value was correct, but his premise that we would develop effective mechanisms for managing the process was wrong. The American College of Cardiology serves as an instructive example. Their 2009 release of appropriateness criteria for coronary revascularization (Patel et al., 2009) announced that the guidelines were developed using a Delphi approach because of the "paucity of large randomized clinical trials" testing the efficacy of coronary artery bypass grafts (CABGs) and coronary angioplasties (also called percutaneous coronary intervention or PCI). CABG surgeries have been performed since the early 1960s, and coronary angioplasties since the 1970s. As we discussed earlier, based on clinical trials dating back to the 1970s, Hadler (2005) believed that many of the surgeries performed on patients with stable coronary artery disease constituted Type-II malpractice—the performance of a medical procedure on a patient who does not need it.

Hundreds of thousands of these operations have been performed each year for decades. Recent evidence suggests that the "appropriateness" standards published by the American College of Cardiology in 2009 have reduced the incidence of CABG and PCI procedures—the number of CABGs declined from 337,972 in 2000 to 160,240 in 2014, and PCIs fell from 581,183 in 2000 to 377,475 in 2014 (National Center for Health Statistics, 2016, Table 96). It is impossible to estimate how many of these procedures could be considered Type II malpractice, but it must be in the hundreds of thousands if not millions. The studies cited here and elsewhere raised red flag after red flag suggestive of unnecessary surgeries. If the aggregation of these studies constituted a "paucity of evidence" for the American College of Cardiology and its associated groups, preventing the development of proper practice standards based on scientific evidence, why didn't these groups call for blind clinical trials to provide whatever evidence they believed was missing?

A few days before Christmas in 2017, news of the 20th death caused by an exploding air bag made by Takata was widely reported by all major U.S. news outlets. The *CBS News* report noted that, "The problem has touched off the largest series of automotive recalls in U.S. history … and forced Takata of Japan into bankruptcy protection" (*CBS News*, 2017). Thirty-seven million cars were subject to this recall in the United States. The U.S. House of Representatives, Committee on Energy and Commerce, Subcommittee on Commerce, Manufacturing and Trade, held a related hearing on 2 June 2015. In the first sentence of his opening statement, the Republican chair of the subcommittee, Fred Upton, said, "An airbag is a safety measure you hope you never need—if you do need it, you need it to work exactly right" (Upton, 2015). The ranking minority member, Frank Pallone, said, "Airbags are supposed to save lives, not take lives" (Pallone, 2015). In part, the hearing focused on the failure of the National Highway and Traffic Safety Administration (NHTSA) to properly identify and disclose safety defects, and on the inadequate legal and regulatory standards that allowed dangerous products to be used in our cars, resulting in deaths and injuries. Toward the end of his opening remarks, Chairman Upton lamented that when the subcommittee should be focusing on modernizing the NHTSA, rolling out more effective safety technologies and boosting recall take-up rates, they were instead forced to "understand why safety, our very highest priority, seems relegated to the back lot. Testing is overdue. Change is overdue" (Upton, 2015).

So why did this tragic episode of exploding auto air bags spark outraged congressional hearings and a major press kerfuffle when the lives and health of far greater numbers of people are at risk and harmed by failures in our health delivery system? Why aren't policymakers calling for long overdue testing and changes to the health sector? Of course we should be concerned about auto safety but, in relative terms, the spotlight on airbags ought to be turned more brightly onto the practice of medicine in the United States to protect both public safety and our economic welfare.

You might think that bad health outcomes are less controllable than injuries and deaths arising from defective products. After all, those suffering from illness and injuries are already at risk, and medical treatments will never be foolproof. But the fellow with stable coronary artery disease who dies on the operating table during CABG surgery most likely did not need the surgery that killed him. The 37-week pregnant woman on the C-section table without any precipitating medical indication who is injured or whose baby is injured by the procedure could have avoided the surgery.

Hiatt's 1975 surmise that we "will surely find mechanisms for controlling medical and surgical procedures when the effects of inadequate restraints become more widely evident" has clearly not come to pass. What we might call Hiatt's dream has not become reality because we have no standing organizational structure with budgetary resources to systematically assess medical practices, procedures and associated pharmaceutical prescriptions, and then provide scientifically reliable, evidentiary assessments of efficacy. It is time to consider creating such a system, with both a financing and an administration mechanism, to protect the health and safety of the American public.

The financing could be based on a model like that developed after September 11, 2001, to safeguard airline passengers. Every ticketed passenger on a flight originating in the United States pays an aviation passenger security fee—currently $5.60 for each departure, not to exceed $11.20 for a single round trip (Hetter, 2014). The fee generated $995 million in 2002 and $3.9 billion in 2017 (TSA, 2018). While such a proposal is likely to be met with a reflexive cry of "no new taxes," remember that massive numbers of people are already paying the equivalent of very high taxes when they pay higher premiums for health coverage or are billed for unnecessary medical procedures, not to mention the cost of preventable complications or worse in some unfortunate cases.

Administering a national program of review of health care practices and procedures could naturally fall under the functional control of the National Institutes of Health. Prasad and Cifu (2015) argue that developers of new products and procedures ought to be held to a much stricter standard in proving that their inventions are safe and effective. At the moment, the political winds seem to be blowing in the opposite direction as reflected by the accelerated rate of drug approvals coming out of the FDA over the past year, along with initiatives like "Right to Try," which would allow terminal patients who have run out of approved options to try new drugs and procedures that have not been fully tested. In addition to more stringent evaluations of safety and efficacy for health care providers, manufacturers of medical instruments and pharmaceutical companies, there will still be a need for the testing of therapies in randomized controlled trials. The new administrative body recommended here would assign priorities for these trials, solicit bids from clinicians and research groups that are unaffiliated with producer entities, make awards, supervise the research process, and support the publication and dissemination of the results.

Assuming that we can contrive better approaches to developing evidence about what works in the medicine bag, providers of care will need to be convinced to follow the evidence. Epstein (2017) speaks about a presentation of the results of the COURAGE study discussed earlier, which found that stents did not prevent heart attacks or deaths in patients with stable coronary artery disease. Three doctors from the University of California presented the study results to a group of cardiologists in San Francisco. In focus groups, the university doctors described fictional scenarios of patients with at least one narrowed artery and no symptoms, and then asked the cardiologists whether they would recommend a stent. Despite the evidence that the stents were of little or no value under the scenarios described, almost all the attending physicians said they would still recommend the procedure. Their rationales were linked to one of four themes: potential regret if the patient died without the surgeon having taken action, belief that a stent would relieve the patient's anxiety, protection from a potential lawsuit for not doing everything possible to save the patient, or an inability (or refusal) to believe the stent wouldn't help.

According to Prasad and Cifu (2015), most medical school curriculums do not teach students much about the development of evidence or its interpretation. They note that research studies come in several different forms—randomized control trials, cohort trials and case control studies—and that asking the right questions, sample sizes, confounding environmental issues and a host of other considerations are crucial. With little background in this work, clinicians can't always sort through the volume of results to find the meaningful evidence that would actually improve their patients' health.[31] This lack of background could be resolved over time by changing the educational curriculum for medical students, including nurses and others involved in care delivery. Hopefully, as individual practitioners gain a better understanding of what the evidence is telling them about the efficacy

31 They point to the example of atenolol, which was discussed earlier. Doctors know that high blood pressure is related to heart disease and other problems. Because atenolol was shown to lower blood pressure, many clinicians prescribed it to hypertensive patients, believing they were lowering the risk of heart disease. But when the trials showed that atenolol did not extend life, it raised the basic question of what good it was doing for those taking it.

of various practices, they can do a better job of discarding practices that are useless or worse and embracing those that work.

Within hospitals and other clinical settings, some of the resistance to rethinking discredited practices can be addressed at the organizational level. The approach taken by Intermountain Healthcare to change doctors' practices in the delivery room is instructive. Instead of telling doctors they could not induce labor before 39 weeks of gestation, administrators told them that, lacking medical justification, nurses and other clinical staff would not initiate the medication process for induction unless the doctor would be present from initiation through delivery. After some initial resistance, the doctors changed their behavior, and C-sections and their associated complications declined significantly.

The third problem outlined by Hiatt in his 1975 article is that health is often narrowly interpreted as being exclusively a medical concern: that the failure to recognize the limitations of curative medicine plays a part in raids on the health care commons by expensive practices. In considering the confines of the health care commons, Hiatt suggested that many health issues are better dealt with by preventive measures than by curative medicine. In the larger context of the commons comprising our entire economy, the limitations of curative medical practices are magnified by the widespread prevalence of ineffective procedures, devices and prescriptions, whose continued use has absorbed tremendous resources that would have better served the general welfare had they remained in the hands of workers and other consumers.

Blank, a medical ethicist, argues that there is a "widely accepted norm that any expenditure is justified in preserving an individual life." (Blank, 1988, p. 85). Churchill (1987), another medical ethicist, has written that discussions of medical ethics tend to focus too narrowly on micro-oriented problems—for example, the treatment of the individual—while ignoring the larger macro issues of justice. While this discussion might not be as broad as Churchill's perspective on "justice," the fact that health costs have robbed many workers of much and often all of their compensation gains in recent decades along with evidence of spending on health services that do not enhance health, individually or collectively, are certainly macro issues of justice.

Churchill (1987) points to the instinctive "urge to rescue" people in desperate situations, which makes it difficult to protect the interests of the whole—the commons—from the needs of the individual.[32] Physicians face heartrending situations every day where their human instinct is do whatever they can to help their patients live longer and to relieve their pain and anxiety. So, third-party payment systems need to be more uncompromising in denying payments for procedures that have proven to be ineffective, and there must be legal protections for denials based on scientific evidence documenting the lack of efficacy. If a physician and a patient decide to proceed with a procedure despite evidence against it, the two of them should agree on a price and the patient should bear the cost. For example, if a patient has a miniscule thyroid nodule, and scientific evidence indicates that removing the thyroid poses the risk of more harm than benefit, the cost of the removal should not be a claim on the commons. If an expectant mother wants to schedule a C-section two weeks before her expected delivery date, she or the doctor should pay the additional cost of the operation, including an insurance fee to cover any associated complications.

We used Hiatt's framework in this concluding discussion because he defined flaws in our health system nearly 45 years ago, arguing that, if these were not addressed, excessive health care spending would threaten the general welfare of society. The ever-expanding range of services and products

32 We often see dramatic examples of the "urge to rescue" leading people to do extraordinary things: a person running into a burning house to rescue the inhabitants; a teacher jumping in front of a student to shield her from a madman shooting students in their school. There are many less dramatic instances of the phenomenon of people going far beyond the norm to help homeless people, refugees and others in need.

created by technological advances and the delivery of ineffective services that were a concern in 1975 have accelerated since then, dramatically inflating the claims made on the U.S. economy. A large share of the resources poured into health care over this period has proven to be money ill spent—ineffective on many health measures and so expensive as to have considerably dimmed the beacon that has attracted so many to our shores—the American Dream—the prospect that hard work, over time, would deliver financial security and comfort to Americans, along with the prospect of greater opportunities for their children.

Of course, other economic forces outside of health care are at work here as well, some more intractable than others. But the forces driving our excessive health care spending have been widely documented and just as widely ignored for a long time. If we continue to overlook the reasons our health care spending is so out of control now—the situation has worsened considerably since Hiatt penned his treatise—the effects on the general welfare will be devastating, exacting an ever-higher claim on the American Dream.

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